		OLYMPIA LINE 3 - LIST OF EQUIPMENT	QUIPMENT		
ITEM	EQUIPMENT / SYSTEMS	MANUFACTURE	VENDOR	MODEL	QTY
1	Cupper Press System	Minster	Stolle	DACH-165	1
7	Canmakers & Trimmers	CMB	CMbE	5610 - Fixed 24.5" Stroke	6
3.0	Washer	Greenbank	Greenbank	3000cpm Torrent One	1
	Hot Water Heaters	Unilux Advanced Manufacturing LLC.	Unilux Advanced Manufacturing LLC.	QCCS-SKI-200828A-D-NS	3
3.1	Washer Dry Oven	Greenbank	Greenbank	3000cpm Tornado	1
4	Mass Rim Coater UV System	NVIO	UVIO	36" Rim-Up IMRC System	1
2	Decorator # 31	Stolle	Stolle	Concord	1
2	Decorator # 32	CMbE	CMbE	Reformat	1
9	Pin Ovens	Greenbank	Greenbank	2400cpm Pintec One - Omega	2
4	LSM	CMbE	CMbE	3200	6
8	IBO	Greenbank	Greenbank	3000cpm NIBO	1
6	Necker	CMB	CMB	3400	1
10	Palletizer	Busse	Busse	V4004	1
11	Regenerative Thermal Oxidizer	Anguil	Anguil	Model 55 55000 SCFM	1
12	Bag House/Dust Collector	Canfil-Farr	Anguil	20,000 SCFM	1
	Turbo Sorter (from Lawrence)	Busse	A & B Engineering	TSS 4001 System	1
		OLYMPIA LINE 1 & 2 - LIST OF REPLACEMENT EQUIPMENT	EMENT EQUIPMENT		
	Pin Oven - Line 2	Greenbank	Greenbank	2400cpm Pintec One - Omega	1
	IBO - Lines 1 & 2	Greenbank	Greenbank	2400cpm NIBO	2

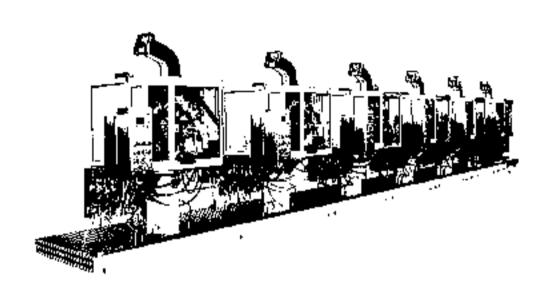


ENGINEERING

Quotation Prepared For

Crown Holdings, Inc

770 Township Line Road Yardley Pennsylvania USA



Description	Bank of 3200 Dual Turret LSM
Raised By	Paul Orsino
Date	10 January 2020
Quotation Number	32347
Issue Number	1
Validity	60 days
Lead Time	25 working weeks

Why Choose CMB Engineering?

With CMB Engineering, you can be confident that our combination of long-standing expertise spanning almost a century, highly innovative technologies, and insight into the modern challenges of canmaking will result in a machine or line that meets your exact specifications.

From our bestselling die sets to our bodymaker, trimmers, decorators, inside spray machines, neckers, and seamers, CMB Engineering harnesses the latest technology to meet our customers' needs. Whether you need a single machine or an entire line, we can help.

Our belief in partnership and collaboration runs through everything that we do, and our in-depth understanding of canmakers' needs, today and in the future, means that we can provide tailored canmaking solutions. Because CMB Engineering's machines are designed for seamless integration, they can interface with other machinery at any point of the canmaking process and enhance the overall efficiency of your line.

Delivery

Delivery Terms EXW to be interpreted in accordance with published Incoterms 2010

26 working weeks from receipt of purchase order

The delivery provided within this quotation is for guidance only and will be confirmed upon receipt of the following;

- 1. Can Data Sheets
- 2. Full Mechanical and Electrical Specifications
- 3. Completed Questionnaire
- 4. Down Payment

Should there be any delay in receiving any of the above then we reserve the right to revise the delivery date.

This offer is generally in accordance with our conditions of sale and the additional terms that follow. It is valid for 60 days from the date of this quotation.

For CarnaudMetalbox Engineering Ltd

Summary of Pricing

Quantity	Description	Total Price
9	12 Pocket Dual Turret Spray Machine for coating internal sides and base of steel and aluminium cans. 3 Gallon per minute pumps. Spark proof extraction fan.	
9	Diameter and Height Change parts per set Dual Turret 211x12oz	
	Packing and Charges	
	Customer Specified Variations	
	Total Cost:	

Customer Specified Variations (INCLUDED in Summary of Pricing)

Recommended Quantity:

Per M/c	Total Qty	Description	Price Each	Total Price
i	9	Variable Speed Drive for Spinner Belt per unit		
1	9	Chuck Spinning Detection per unit		
1	1	Nordson ITRAX Bank of 9		
1	9	Individual 7" HMI screens on each machine instead of 10" on control panel		
1	1	Upgraded air conditioning unit for ambient temperatures above 30 deg. C.		
1	9	Local Isolators		
1	1	Nordson Dual filter.		
1	1	Audible Alarm		
1	1	Customer Specific Charges		
1	9	Teflon mat		
;	9	Laminated Glass		
1	9	Upcharge for stainless steel ducting extract chute.		
1	9	Tropicalization of Motors		
1	9	Additional vacuum extraction connection.		
	9	Gun in position sensor		
1	9	Lacquer extraction vacuum gauges		
1	1	8 Ink Dot		
1	1	Nordson PRX Bank of 9		
1		UL approval and certification		
1	9	Diameter and Height Change parts per set Single Turret 204x7.5oz		
1	9	Height Change parts per set 204x12oz		
1	9	Height Change Parts per set 211 x 16oz		
1	1	Single Heat Exchange Nordson TCU		
		Total Cost:		

Optional Extra Equipment (NOT Included in Summary of Pricing)

Recommended Quantity:

Per Total Description Price Each Total Price M/c Qty

Total Cost:

Customer Notes

- Customer Specific Charges 1 Change of low level and build back sensors from
 Standard IM5135 to OGE100 and OGS100, send &
 receive sensors for 9 Spray M/C's.
 2 Additional Motor Conveyor Extraction Fan
 Starter & Control
- 3 Additional stop start push button enclosure for Discharge conveyor

3200 Lacquer Spray Machine

Spray coating machine for internal and base surfaces of aluminum or steel cans.

The CMB Engineering 3200 Lacguer Spray Machine utilizes Nordson® airless spray technology to precisely apply a coating uniformly to the interior of metal cans. Liquid coating material is accurately sprayed onto the interior can surface using precision nozzles and high-speed, repeatable spray guns. This provides consistent results, can to can, and durable, low maintenance operation.

Available in either single or dual turret format, the machine turrets are indexed by proprietary index units. These have a twin dwell, high-speed, globoidal mechanism.

When fully-integrated with the Nordson® iTrax® System, the CMB Engineering 3200 Lacquer Spray Machine can automatically monitor the inside spray process, maintain corrective action and maintenance histories, and detect changes in the performance of the spray system that may affect production quality. It can also be configured to store can recipes, enabling automatic timer and pressure changing of the spray guns when changing to different container sizes or types. Monitoring of the can spin belt speed, chuck vacuum, and gun mount position is optional.

- Benefits
 Reaches speeds of up to 400 cpm with the single turnet or 350 cpm with twin turnet
- Flexibility in number of stages
 Works with following can sizes;
- 15d 202 to 568ml 211

Technical data

Con Strong

18cl 202 to 68cl 211 Can height and diameter changes are very convenient, as the machine is fully edjustable. The machine has been designed to allow quick changeovers

Speed: Up to 850 consiper minute (Twin Turnet)

Up to 400 cans per minute (Single Turret)

12 or 6 pocket

3kw Orive to indexing units independent Spinner Orive Drive:

Complete safety guarding, electronically interlocked to the control system Guardis

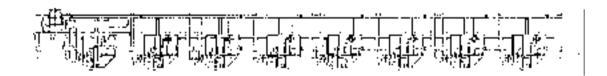
Spray: Nordson Sprey Equipment

Options:

Derrie Spray
Mile-spray Detection (Nordeon Filax® Spray Monitor): Model 9M or 9oncen
Nordson Spray Pressure Control
Nordson Temperature Control (TCU) Unit
Nordson Firax® Spray Controller (Model SC) Nordson Rhax® Pressure
Controller (Model PRt)

Typical installation





Payment Terms

All payments are due as follows:

30% with Order □

60% on despatch □

10% on commissioning but no later than 120 days after despatch

Standard Conditions of Sale - Machinery and Equipment

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Machinery and Equipment

Unless varied by endorsement on our contract note goods are sold only upon the following conditions which shall override any conflicting terms in your order.

Quotations

Quotations are valid for sixty days only and are subject to our written acceptance of your order.

Pricing

Default in payment of any invoice for stage or other payment shall entitle us to treat any outstanding contracts between us as repudiated by you.

Contract

No variation of these conditions or the particulars in the order and acceptance shall be valid unless agreed by us in writing.

Price Variation

Prices may be subject to revision in the event of any variation in costs incurred by us after our acceptance of your order. V.A.T. not included in the quotation or invoice will be added where applicable.

Delivery

Delivery shall be at your nominated point of delivery which if you or your contractors collect or if no written nomination has been received by the time the goods are ready shall be our premises. Any date or period given shall be approximate though we will make every effort to meet it and no delivery shall be overdue until you have made a written request for delivery and given us reasonable time to comply with it. Delivery terms in accordance with INCOTERMS 2010.

Delayed Acceptance

Provided any stipulated date or period for delivery has expired, goods whether wholly or partly fabricated remaining on our premises or in the hands of the forwarding agent by your request or default thirty days after written notice to you, may be invoiced whereupon payment shall forthwith become due together with interest and storage charges. Thereafter the goods will be held at your risk.

Erection

All skilled and unskilled labour for offloading and erection, and Engineer's time in starting the machinery or attending thereto after starting will be charged extra including time travelling to and from site, plus fares, expenses and accommodation at cost. You will provide suitable lifting tackle for off-loading and erection, and all fuel, stores, materials or instruments required for any preliminary working or tests will be charged extra.

Tests

If special tests or tests in the presence of you or your representative are agreed upon between us they shall take place unless otherwise agreed, at our Works, and will be charged extra. In the event of any delay on your part in attending such tests after seven days notice that we are ready, the tests will proceed in your absence but shall be deemed to have been made in your presence.

Ownership

Title in the goods shall remain with us until payment is received in full.

Packaging Designs

(a) Designs, sketches, lay-outs, etc. originated by us are submitted in confidence and unless otherwise agreed in writing they and the copyright in them will remain ours. We cannot accept any responsibility for errors in drawings or specifications approved by you. You will be responsible for any printed matter approved by you and for any design shape or construction to your specification and shall indemnify us against any claim arising therefrom.

(b) Jigs, tools, and equipment provided by us remain our property whether or not a charge is made towards their costs

unless you have placed a specific order for such equipment which we have accepted.

Strikes etc

Every effort will be made to carry out the contract but its due performance is subject to cancellation by us without compensation or to such variation as we may find necessary as a result of scarcity of labour materials or supplies or because of any Act of God, war, strike, lock-out or other labour dispute, fire, the elements, legislation or other cause (whether of the foregoing kind or not) beyond our control.

Warranty

All goods supplied shall be free from defects of material or workmanship. If within twelve months of date of despatch from our works we are satisfied that any part shows defective material or workmanship and it is returned carriage paid we agree to replace or (at our option) repair the part free of charge. No guarantee as to quality is given or shall be implied as regards second-hand goods unless specifically so stated. Our obligations under this clause are subject to your compliance in full with all the provisions of the contract. No warranty is given that goods supplied are suitable for purposes other than those which you make expressly known to us.

Claims

The contract shall be deemed to have been duly performed and the goods accepted unless a written claim is received:-

- (a) in respect of damage, delay or partial loss in transit by both us and the carrier within three days of delivery.
- (b) in respect of non-delivery by both us and the carrier within twenty-eight days of despatch for deliveries within the EU, and within two months thereof for deliveries elsewhere.
- (c) in respect of any matter by us within twenty-eight days of delivery. Goods subject to clam must be stored free of charge for our inspection.

Waiver

Our rights shall not be affected or restricted by any indulgence or forbearance to you. No waiver by us of any breach shall operate as a waiver of any later breach.

Liability

The rights conferred by these conditions shall so far as legally possible replace and exclude all common law, statutory or other warranties or conditions whether expressed or implied. Save as specifically mentioned above we do not accept liability, whether in tort or contract or otherwise, for any direct or indirect loss or damage, however arising.

Guarding

In our opinion the equipment included in our quotation is safe and without risks to health when properly used and we acknowledge our obligations under the Health and Safety at Work etc. Act, 1974. The equipment also complies with the seller's obligations under Section 17 of the Factories Act 1961. The estimate includes reasonable guarding as shown but we give no warranty or guarantee whatsoever that such guarding is sufficient for the purpose of the Factories Act. That is your responsibility. If further guarding is required we shall supply it at additional cost to you.

Customs Duties/Taxes/Licences

Our quotation does not include any Customs Duties, or local taxes and assumes that you have taken the necessary steps to ensure that any Import Licences have been obtained. Any costs or claims resulting from a failure to make such arrangements shall be solely your responsibility.

Purchasers Indemnity

It is a condition of any contract that you indemnify us against any costs claims and demands arising and made under any consumer legislation which are in consequence of any defect or alleged defect in a product ("the subsequent product") manufactured and/or supplied by you in which goods supplied by us are comprised where the defect is attributable to the design of the subsequent product or to compliance by us with instructions given to you.

Damage Loss or Pilferage in Transit

No claim in respect goods lost or damaged in transit will be entertained if the risk has passed to you before the occurrence thereof or; if the carrier has been given a clear receipt for the goods or if the carrier is not notified in writing of such loss or damage and of the particulars thereof within what we consider is a reasonable time.

Experimental Work

Unless otherwise agreed all work produced in an experimental way at your request will be considered an order and the cost of such work including all drawings, designs, specifications and materials will be charged extra.

Software

Goods supplied hereunder may include installation and use of software in connection therewith. Any such software is licensed, not sold, to you, and requires the separate execution of a software license agreement.

Restrictions

You will not sell, export, transfer, divert or otherwise dispose of goods supplied by us into, or to any person for onward supply into, or for incorporation into products manufactured in Cuba, Iran, North Korea, Sudan, Syria or any other country subject to sanctions or restrictive measures under the laws of the European Union (as implemented into National law) and/or the United States of America unless such action is expressly authorized by such laws or has the specific authorization of the competent authorities under the relevant laws and we reserve the right to terminate the sale to you immediately if we have reasonable suspicion of your intention to breach this condition.

Law

English law applies.

Additional Terms and Conditions

Taxes

The price quoted does not include local taxes applicable at the point of delivery.

Commissioning

We offer free of charge engineering services for 14 days to commission the equipment and train your operators providing you are willing to pay for:

- · Travel time from our site to yours,
- Round trip air fare from and back to our factory,
- · Hotel, meal and living expenses.

The services of an engineer can usually be extended for a longer period if so required. Additional Service time will be charged at our standard service rates (available on request), plus additional hotel, meal and living expenses.

Samples

We will require sample cans for machine trials and buy-off and these should be delivered free of charge to our factory 6 weeks before the machine is due for delivery. Any delay in receipt of these samples may make it necessary for us to revise our delivery promise. Any charges incurred by us for duty, clearance and carriage, etc will be recharged to your order. Full details of where and how to consign the samples will be advised after receipt of your order.

Machine Specification

Should there be any discrepancies in specification between our quotation and any sales literature provided please assume that the quotation provides the latest specification.

Paint Specification

Machine will be painted CarnaudMetalbox standard colours. Any special paint requirement may be charged extra.

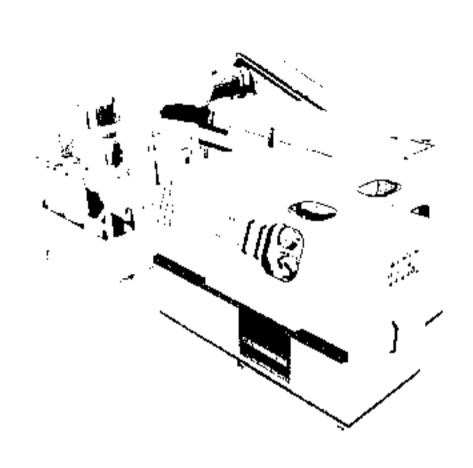


ENGINEERING

Quotation Prepared For

Crown Holdings, Inc.

770 Yownship Line Road Yardley Pennsylvania USA



Description	9 off 5610 Canmakers	
Raised By	Paul Orsino	
Date	10 January 2020	
Quotation Number	32346	
Issue Number	1	
Validity	60 days	
Lead Time	26 working weeks	
		Page 15

September 22, 2020

Why Choose CMB Engineering?

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Delivery

Delivery Terms EXW to be interpreted in accordance with published Incoterms 2010

26 working weeks from receipt of purchase order

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- 1. Can Data Sheets
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- 3. Completed Questionnaire
- 4. Down Payment

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This offer is generally in accordance with our conditions of sale and the additional terms that follow. It is valid for 60 days from the date of this quotation.

For CarnaudMetalbox Engineering Ltd

Summary of Pricing

Quantity	Description	Total Price
9	5610 dual stroke 24.5"/ 26"canmaker comprising 5610 series Bodymaker integrated with a CarnaudMetalbox Trimmer, complete with:High Speed Microdomer, Rotary Cup Feed, Hydraulic Power Pack, Variable Speed rear mounted 55kW Main Drive Motor, Operator Control Console, Four Trimming Heads, Electrical Control cabinet, fully PLC controlled with Sencon sensor to provide rapid short can detection and clutch control. Trimmer Controls in Bodymaker Electrical Cabinet. Includes energy saving pack.	
9	Hydraulic Clutch and Brake	
9	211(66mm)x12oz Change parts with ram and bush, inc Trimmer guides and Setup Parts.	
	Packing and Charges	
	Customer Specified Variations	
	Total Cost:	

Customer Specified Variations (INCLUDED in Summary of Pricing)

Recommended Quantity:

Per M/c	Total Qty	Description	Price Each	Total Price
1	9	Tropicalization of Motors		
1	9	Dual Airbag Monitoring		
1	9	Credit for non supply of Micro Domer		
2	2	Machine Levelling Equipment		
1	1	Combined Flywheel & Clutch/Brake Removal Tool		
1	1	Bulkhead Alignment Fixture		
1	1	Brake Anchor Hub Sleeve		
1	1	Blankholder/Domer Alignment Fixture		
1	9	Upgraded air conditioning unit for ambient temperatures above 30 deg. C.		
1	9	CC Jenson polishing filter integrated into Powerpack		
10	10	SFR PA5601320 BLA 27/27 filter inserts		
1	1	Flywheel Pre-Load Setting Fixture		
1	9	Trimmer light		
1	9	Trimmer Toolkit Bundle:— Pusher Pad Setting Fixture, Pin spanner, Knife retaining spanner, Tightening bung (if required), setting dolly. Ratchet spanner, and Starwheel support.		
1	9	Trimmer cyclone box		
4	4	Trimming Heads 66mm		
1	1	Clutch Seal Mounting Fixture		
1	9	Main Motor Local Isolator OSHA compliant for USA		
1	9	Set of 3 Local Isolators		
1	9	Gauge zone markers		
1	9	Trimmer quick change discharge guide assembly		
1	1	Lifting Beam c/w Swivel Lifting Bolts		
1	1	Desorber unit - CC Jenson		
2	2	Front Bushing Seal Tool		
1	9	Quick change stripper housing.		
1	9	Stripper adaptor wear plates		

Customer Specified Variations (INCLUDED in Summary of Pricing)

Recommended Quantity:

Per M/c	Total Qty	Description	Price Each	Total Price
2	18	Quick change cup feed cover plate spacer		
1	9	Nitrogen accumulator charging kit F.O.C.		
:	9	AutoBAR™		
1	9	Connections and Fittings for Bulk Oil Fill		
2	18	Steel RCF Cam		
2	18	Steel RCF Guides		
2	2	Ram Seal Sleeve		
1	9	Uprated Dual Circuit Oil Cooler		
1	9	UL approval and certification		
2	18	Full set tooling LESS Dome tooling. Inc: Punch, Punch Nose, Re-draw die, Die Holders, Ironing Dies WITHOUT Dome Tooling		
4	36	Set of Coolant spacers		
1	9	211(66mm)x16oz Change parts without ram and bush, inc Trimmer guides and Setup Parts.		
:	9	204(58mm)x7.5oz Change parts with ram and bush, inc Trimmer guides and Setup Parts.	r	
•	9	204(58mm)x12oz Change parts without ram and bush, inc Trimmer guides and Setup Parts.		
4	36	Trimming Heads 58mm		
4	4	Trimming Heads 58mm		
1	9	Festo Water Process Valve on Powerpack		
1	1	Digital Display Unit for use with Electrionic Ram Alignement fixture or EDOG fixture		
1	1	Electronic Dome Overtravel Fixture for use with Digital Display Unit		
		Electronic Ram Alignment Fixture for use with Digital Display Unit		
	9	Setting Dolly		
	9	Spectrum R3D3 Trimmer cyclone box supported from trimmer guard.		
		Total Cost:		

Optional Extra Equipment (NOT Included in Summary of Pricing)

Recommended Quantity:

Per Total Description Price Each Total Price M/c Qty

Total Cost:

5610 Canmaker

The 5610 Canmaker is an integrated combination of the well-established 5000 Bodymaker and CarnaudMetalbox's recently designed trimmer. The bodymaker is a horizontal double action press for manufacturing 2-piece aluminium or steel cans. Its dynamic balancing is designed to achieve the highest possible consistency in can tolerances. The trimmer is a four head machine for trimming cans made by the bodymaker. Its unique trimming action minimises both internal and external burrs - the burr is created on the trim. The integrated stainless steel guarding allows excellent access to all moving parts ensuring easy operational and maintenance intervention.

The bodymaker operating cycle consists of a forward and return stroke of a ram. The Rotary Cup Feed mechanism places a cup in the Cup Holder and the initial forward motion of the reciprocating ram forces a pre-drawn cup through a redraw die to reduce the inside diameter of the cup. As the ram continues its stroke, the cup is then drawn progressively through three ironing dies to reduce the wall thickness of the cup by ironing the wall between the outside diameter of the ram punch and the inside diameter of the die rings, to obtain the proper gauge and desired length of can body. At the end of the forward stroke of the punch the can base is formed in the Doming Die. Ironed can bodies are stripped from the punch on the return stroke by segmented spring action fingers and air strip assist.

The vacuum interconnecting conveyor then takes the can bodies as they are discharged from the pockets of the bodymaker discharge conveyor. The interconnecting conveyor has an open section which will allow cans that have damaged bases to drop out. Dropped cans are carried out of the guarded area by a scrap chute. The same discharge point on the interconnecting conveyor can be used to sample good cans from the bodymaker.

The trimmer operating cycle consists of a single rotation of the trimming turret. The can is transferred from the conveyor by a vacuum turret, which will drop cans with body damage. The can is loaded into a vacuum pocket and located on the vacuum pusher. The pusher moves the can forward into the tooling. An eccentric motion of the tooling then trims the can while the can body remains stationary. The can is withdrawn by the pusher and discharged while the trim ring is held in the tooling. Once the can is successfully discharged the trim is positively ejected by air assisted ejector pins into the scrap chute.

5610 Canmaker

Mechanical - Bodymaker

- 1. Ortlinghaus hydraulic clutch and brake mounted outboard of flywheel designed to stop the Bodymaker within one stroke
- 2. Direct drive on 'overbalanced' crankshaft with Lightweight Drive Mechanism.
- 3. The power take off shaft which drives the can conveyor and rotary cup feed assembly is through a heavy duty mitre gearbox driven by a gear on the crankshaft.
- 4. Hydrostatic bearing system to better support the ram, with the exception of the front bushing which is now a contact ('wearcomp') bearing.
- 5. Rotary Cup Feed Mechanism for continuous high speed feeding of cups.
- 6. CarnaudMetalbox Engineering MicroDomer.
- 7. Automatic lubrication system with free standing power pack and 'clean oil sump' feature to ensure all oil delivered to the machine is filtered twice to 10 microns.
- 8. Oil supply for machine supplied by 18.5kW tandem pump/motor set for high/low pressure lubrication system. Separate supply for hydraulic clutch & brake 2.2kW motor.
- 9. Fully opening machine guards over gearbox for better maintenance

Mechanical - Trimmer

- 1. Vacuum handling throughout trimming process: Vacuum for interconnecting conveyor to be supplied from Customer's scrap system. Vacuum for infeed turret provided by vacuum pump included in price. Vacuum for machine turret to be supplied from Customer's line vacuum.
- 2. Fully interchangeable cartridge design tooling heads, can be set and run off the machine.
- 3. Can is stationary during trimming process, reducing the chance of body damage.
- 4. Burr is created on the trim, rather than on the can.

Mechanical - Integrated Machine

- 1. Integrated stainless steel guarding encloses bodymaker front end, interconnecting conveyor and trimmer. Wide opening doors allow access to all areas.
- 2. Guarding fully interlocked and conforming to European Machinery Safety Directive.
- 3. Operating, Maintenance and Spares manual.

Electrical - Integrated Machine

Our standard 5610 Canmaker installation incorporates the control system as described below.

- 1. Variable Speed AC drive system for 55kW main drive motor.
- 2. Variable speed AC interconnecting conveyor.
- 3. Variable speed AC trimmer drive, modulates around the bodymaker speed, to maintain a head of cans.
- 4. AB PanelView 600 Plus monochrome in customer's choice of language, for error essages and fault diagnosis.
- 5. Fully PLC controlled, (Allen Bradley Compact Logix) with Sencon BCM 387 with AMCI card to provide rapid short can detection and clutch control. Allen Bradley Flex I/O is fitted on the machine to simplify and reduce interconnecting wiring.
- 6. The operator console is integrated into the Bodymaker.

Payment Terms

All payments are due as follows:

30% with Order □

60% on despatch□

10% on commissioning but no later than 120 days after despatch

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Every effort will be made to carry out the contract but its due performance is subject to cancellation by us without compensation or to such variation as we may find necessary as a result of scarcity of labour materials or supplies or because of any Act of God, war, strike, lock-out or other labour dispute, fire, the elements, legislation or other cause (whether of the foregoing kind or not) beyond our control.

Warranty

All goods supplied shall be free from defects of material or workmanship. If within twelve months of date of despatch from our works we are satisfied that any part shows defective material or workmanship and it is returned carriage paid we agree to replace or (at our option) repair the part free of charge. No guarantee as to quality is given or shall be implied as regards second-hand goods unless specifically so stated. Our obligations under this clause are subject to your compliance in full with all the provisions of the contract. No warranty is given that goods supplied are suitable for purposes other than those which you make expressly known to us.

Claims

The contract shall be deemed to have been duly performed and the goods accepted unless a written claim is received:-

- (a) in respect of damage, delay or partial loss in transit by both us and the carrier within three days of delivery.
- (b) in respect of non-delivery by both us and the carrier within twenty-eight days of despatch for deliveries within the EU, and within two months thereof for deliveries elsewhere.
- (c) in respect of any matter by us within twenty-eight days of delivery. Goods subject to clam must be stored free of charge for our inspection.

Waiver

Our rights shall not be affected or restricted by any indulgence or forbearance to you. No waiver by us of any breach shall operate as a waiver of any later breach.

Liability

The rights conferred by these conditions shall so far as legally possible replace and exclude all common law, statutory or other warranties or conditions whether expressed or implied. Save as specifically mentioned above we do not accept liability, whether in tort or contract or otherwise, for any direct or indirect loss or damage, however arising.

Guarding

In our opinion the equipment included in our quotation is safe and without risks to health when properly used and we acknowledge our obligations under the Health and Safety at Work etc. Act, 1974. The equipment also complies with the seller's obligations under Section 17 of the Factories Act 1961. The estimate includes reasonable guarding as shown but we give no warranty or guarantee whatsoever that such guarding is sufficient for the purpose of the Factories Act. That is your responsibility. If further guarding is required we shall supply it at additional cost to you.

Customs Duties/Taxes/Licences

Our quotation does not include any Customs Duties, or local taxes and assumes that you have taken the necessary steps to ensure that any Import Licences have been obtained. Any costs or claims resulting from a failure to make such arrangements shall be solely your responsibility.

Purchasers Indemnity

It is a condition of any contract that you indemnify us against any costs claims and demands arising and made under any consumer legislation which are in consequence of any defect or alleged defect in a product ("the subsequent product") manufactured and/or supplied by you in which goods supplied by us are comprised where the defect is attributable to the design of the subsequent product or to compliance by us with instructions given to you.

Damage Loss or Pilferage in Transit

No claim in respect goods lost or damaged in transit will be entertained if the risk has passed to you before the occurrence thereof or; if the carrier has been given a clear receipt for the goods or if the carrier is not notified in writing of such loss or damage and of the particulars thereof within what we consider is a reasonable time.

Experimental Work

Unless otherwise agreed all work produced in an experimental way at your request will be considered an order and the cost of such work including all drawings, designs, specifications and materials will be charged extra.

Software

Goods supplied hereunder may include installation and use of software in connection therewith. Any such software is licensed, not sold, to you, and requires the separate execution of a software license agreement.

Restrictions

You will not sell, export, transfer, divert or otherwise dispose of goods supplied by us into, or to any person for onward supply into, or for incorporation into products manufactured in Cuba, Iran, North Korea, Sudan, Syria or any other country subject to sanctions or restrictive measures under the laws of the European Union (as implemented into National law) and/or the United States of America unless such action is expressly authorized by such laws or has the specific authorization of the competent authorities under the relevant laws and we reserve the right to terminate the sale to you immediately if we have reasonable suspicion of your intention to breach this condition.

Law

English law applies.

Additional Terms and Conditions

Taxes

The price quoted does not include local taxes applicable at the point of delivery.

Commissioning

We offer free of charge engineering services for 45 days to commission the equipment and train your operators providing you are willing to pay for:

- · Travel time from our site to yours,
- Round trip air fare from and back to our factory,
- · Hotel, meal and living expenses.

The services of an engineer can usually be extended for a longer period if so required. Additional Service time will be charged at our standard service rates (available on request), plus additional hotel, meal and living expenses.

Samples

We will require sample cans for machine trials and buy-off and these should be delivered free of charge to our factory 6 weeks before the machine is due for delivery. Any delay in receipt of these samples may make it necessary for us to revise our delivery promise. Any charges incurred by us for duty, clearance and carriage, etc will be recharged to your order. Full details of where and how to consign the samples will be advised after receipt of your order.

Machine Specification

Should there be any discrepancies in specification between our quotation and any sales literature provided please assume that the quotation provides the latest specification.

Paint Specification

Machine will be painted CarnaudMetalbox standard colours. Any special paint requirement may be charged extra.



UNIT 1, GREENBANK TECHNOLOGY PARK CHALLENGE WAY, BLACKBURN, LANCASHIRE BB1 5QB TEL: +44 (0)1254 690 555 FAX: +44 (0)1254 690 666

Ref: Crown Cork & Seal

Equipment: One (1) 3000 CPM Washer

Project: CHARLIE

Greenbank Quotation No: 7331 REV 1

3000 CPM CAN WASHER





CROWN CORK AND SEAL USA, INC. 770 Township Line Road Yardley, PA 19067

Attention: Richard Ford Brian Rodgers

24th February 2020

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(1) Price Information

Item	Description	Price
1	3000 CPM Can Washer to the Standard Equipment	
<u> </u>	Specification	
1.a	UL Approved Panel and On-Machine Components	
Optio	nal Equipment Specification	
2	Intralox S9000 Belt Replacement	
3	Pressure Transmitters in lieu of Pressure Gauges and Temperature Transmitters in lieu of	
	Temperature Gauges (48 total)	
4	1 MW LTWH Boiler – 1-hour heat up	
5	500 kW LTWH Boiler – 2-hour heat up	
6	Automatic Blowdown Height Adjustment (One unit supplied at no charge at Stage 2 Blowdown)	
7	Export Packing	
8	Riser / Spray Bar Stand (price each)	

All equipment prices are Ex-works Greenbank Technology from one of its European assembly locations.

Equipment protection ready for loading onto your appointed transport and Freight Company is the responsibility of the customer

(2) <u>Delivery Information</u>

A general arrangement drawing for your approval will be provided 2 weeks after receipt of order.

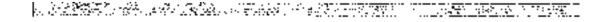
The Can Washer will be ready for buy-off approximately **40 weeks** after approval of general arrangement drawings.

Ex-Works standard Incoterms

(3) Terms & Conditions

- 20% of the contract price, due upon receipt of order confirmation.
- 60% of the contract price prior to shipment, net 30 days after receipt of bill of lading
- 20% of the contract price, net 30 days after signing of Final Acceptance Report however not later than **90** days after delivery date, if the Final Acceptance has not been performed due to the Buyer's fault.

^{*}Until final settlement of the total purchase price/sum, Greenbank, reserve the right of sole ownership of the equipment in whole or in part.



(4) Warranty

All material goods, excluding consumables, e.g. conveyor belts and general electrical components, are warranted against defects in parts and workmanship for 12 months from shipment.

(5) Validity

Equipment Prices will remain firm for thirty (30) days from the date of this quotation.

Pricing may be adjusted, as agreed to between both parties, based upon changes in the Consumer Price Index and Steel Commodities Market (London Metal Exchange), and their effect, if any, on labour and components being utilized in the design of the equipment being supplied to the customer, their licensees and affiliates.

(6) Reference Documentation

18.019 - Process Flow Diagram

Thank for your continuing confidence and the opportunity to provide you with this proposal.

If you have any questions, please do not hesitate to contact us. We look forward to continuing our discussion regarding this project.

Thomas P. Zimmerman
Sales Director – Greenbank Technology Ltd

US Office +1 (262) 642-3535 US Mobile +1 (262) 374-0590 UK Office 011 44 1254 690 555

APPENDICES

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ALUMINIUM CAN WASHER

"Torrent One"



(6) Design Criteria

The unit will be designed to process Aluminum Beverage Cans at a production speed of - **3000 CPM** – 211 diameter.

Process Material:- Aluminum Beverage Cans

Can size:-211 diameter

Trimmed Can Heights from 88mm to 190mm

Process/Production Speed:- 3000 CPM (5.4 m/min at 95% pack density)

Ambient Temperature: - 40 Deg C.

Conveyor Belt Width:- 2.438m (96")

Effective Belt Width:- 2.311m (90")

■ Conveyor Belt Type: - Intralox 9000

■ Tin Line:- 1.825 m (72")

Electrical Supply: - 480VAC 60Hz, 3 phase - 5 wire system

24VDC control circuit.

The unit shall be capable of washing cans at a weekly production rate as specified by the customer.

The unit is designed for operation from 1500 feet (460 meters) above sea-level.

 The washer will not crease, dent, scratch or otherwise render the cans defective or unfit for sale.

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(7) Standard Equipment Specification

Baseframe

Mild steel with 2-Pack-Epoxy paint finish complete with chevron belt return carry way, rollers, shafts & drive motor. The conveyor belt will be an Intralox Series 9000 belt with suitable sprockets. The washer will be provided with the latest Intralox design requirements. The unit will be capable of going from Intralox to 316SS Flatwire belt. A belt tensioning device is provided to take up excessive slack

Tanks

316L stainless steel with Level Control

- Stage 0 tank is to be fitted with a weir trough to allow water to be skimmed off the top surface and sent to drain (Stage 0).
- Stage 1, 2 & 4 to be fitted with an insulated jacket around the tanks

Tunnel

316L stainless steel with access doors for maintenance of the spray bars & blowdowns. Flanged washer sections between Stages 2/3 and 4/5 to be provided due to passivation issues on-site.

Belt Carry way

316L stainless steel framework with removable chevrons

Can Guides

316L stainless steel backing plates with wear strips, broken at every stage to minimize stage to stage carryover.

Stage Blowdowns

316L stainless steel ducts & pipework with a dedicated fan per stage designed to clear the domes of Process Water to reduce stage to stage carryover. The Blowdowns will be height adjustable to suit all can heights. *Stage 2 Blowdown will feature auto height adjustment at no additional charge.

Mat Suction

316L stainless steel suction box sited at the exit of Stages 1, 2, 4 & 7 with dedicated fan. The Mat Suction is designed to remove water from the belt to reduce stage to stage carryover

Mist Elimination System

316L stainless steel extraction system coupled to Stage 2 & the Washer entrance to control the humidity within the Washer envelope. **Framework to be provided to facilitate removal of exhaust fan.**

Riser Bars

316L with Spraying Systems ProMax nozzles selected in accordance with the stage they are fitted. The risers will be fitted with a quick release coupler for easy removal/installation. Riser/spray bar stands quoted as an option.

Pump Skids

Mild steel with 2-Pack-Epoxy paint finish complete with pump mountings & floor grating

Heating System

Separate heating skids complete with appropriately sized plate heat exchangers for Stage 1, 2 & 4. The process side will be connected directly to the stage tank via a dedicated pump & isolation valves. The hot water side will be connected to a boiler feed & return header system (provided by others). All pipework is to be 316L stainless steel ISO tube. All heat exchangers are sized to heat the tank water from cold to operating temperature in approx. 1 hour.

Recirculation Pipework

Each stage will consist of the following 316L stainless steel ISO tube recirculation pipework system:

- o Pump suction connected to the stage tank via an isolation valve
- Variable Speed Drive Pump, selected to run at 60Hz, or the closest suitable curve. The pump will be controlled via a pressure control loop to ensure the pump is running as efficiently as possible.
- o Delivery pipework with pump isolation valve
- Riser Manifold delivery pipework with Vee Sector ball valves to accurately control flow & pressure

Counterflow Pipework

To minimize water usage the washer is designed to use a counterflow system where under normal running conditions clean city water is introduced at Stage 5B and cascade back through the previous stages (with the exception of Stage 4). This allows each stage tank to be constantly refreshed with "cleaner" water from the forward stage instead of refreshing with city water and overflowing to drain. The counterflow system is controlled by flow control & modulating valves and can be set by the operating between 2 defined setpoints. All pipework will be 316L stainless steel ISO tube

The counterflow system is as follows:

- Stage 6 Tank to Stage 5B Tank via overflow (can be isolated if required)
- o Stage 5B via recirculation system to Stage 5A Tank
- Stage 5A via recirculation system to Stage 3C Tank
- Stage 3C via recirculation system to Stage 3B Tank
- o Stage 3B via recirculation system to Stage 3A Tank
- Stage 3A via recirculation system to Stage 2 Tank
- Stage 3A via recirculation system to Stage 1 Tank
- Stage 3A via recirculation system to Stage 0 Tank

• De-Ionized Water System

Under normal operation D.I. water is introduced at Stage 6B via Riser Bars and applied directly to the can pack. A D.I. return pump is fitted directly to Stage 6 tank at the Stage 6A side to return spent D.I. water back to the D.I. plant

Stage 6 & 7 tanks are filled via D.I. water with the option to manually cross over to City Water fill.

All pipework will be 316L stainless steel ISO tube

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City Water Feed Header

Each tank will be filled on first fill via a City Water feed. Although under normal running each tank will be refreshed via the counterflow system, there is also the ability to top up via an automated city water feed. All pipework will be 316L stainless steel ISO tube.

• Coalescing System

Dedicated water/oil separator systems are used on Stages 1 & 2 to remove free oil from the process water so it can be reused in the process tank. This is done by skimming off oil on the surface of the tank and pumping it through an offline, air agitated, water/oil separation tank. All pipework will be 316L stainless steel ISO tube & the oil/water separator will be 316L stainless steel.

Hold Downs

Stages 1 & 2 will be equipped with hold downs to allow higher pressure water to be used in these Stages. The Hold Downs will be automatically height adjustable to suit all can heights. The Hold Downs will be fitted with **Intralox belts** & suitable sprockets along with a belt tensioning device.

Operator Side Platform

Mild Steel with 2-Pack-Epoxy paint finish, minimum 600mm wide complete with floor grating will be provided the full length of the pump side to allow access to Tanks & Blowdown Access Doors.

Maintenance Side Platform

Mild Steel with 2-Pack-Epoxy paint finish, 600mm wide complete with floor grating will be provided to run the full length of the maintenance side to allow access to Riser Bars & Blowdown Access Doors.

Vacuum Transfer Unit

Automatic height adjustable Vacuum Transfer Unit is provided to transfer the cans from the Washer belt to Washer-Dryer mat. Mild Steel with 2-Pack-Epoxy paint finish frame, 316L stainless steel vacuum plenum & ductwork. The VTU is programmed to be synchronized with the Washer conveyor belt drive.

Scrap Can Cross-Conveyor

316L stainless steel frame conveyor with independent drive motor and flighted belt to carry away any fallen cans to a common collection point on **the operator side** (pump) of the washer.

• Washer Control Panel with HMI Module

A Rittal style modular cabinet control panel (with steel plinth) to include all electrical components required complete with air conditioning units. An Allen Bradley CompactLogic PLC with bespoke program operated from a PanelView HMI.

Interconnecting Wiring

All wiring will be between field equipment & control panel, routed on cable containment to suit either CE or UL standards

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Pressure and Temperature Transmitters

In lieu of pressure gauges and temperature gauges, the washer will be provided with pressure and temperature transmitters (option)

(8) Optional Equipment Specification

Intralox S9000 Flush Grid Conveyor Belt

A PVDF plastic conveyor belt provided by Intralox replaces the stainless steel Ashworth Flat Wire main conveyor belt & ChemGuard Hold Down belt. The S9000 belt reduces the need for frequent mat changes and chevron bed replacements due to reduced wear.

In order to offer a guarantee for the S9000 belt and ensure the maximum life span possible, upgrades are required to both the return carryway and tension system. This includes replacing the gravity rollers and replacing them with a chevron bed, installing a weighted roller & a brake drive. This is all designed in accordance with Intralox's design guidance Version 6.1. It is also required that the chevron beds and rollers are levelled and aligned using optical alignment methods. This is <u>not</u> included within this quotation but can be offered with the installation supervision package or a procedure provided from Intralox.

Hot Water System Boiler – 1-hour heat-up time

Greenbank can supply a dedicated 1MW high efficiency Low Temperature Hot Water Boiler to provide hot water to suit the Washer's Heating System. This boiler will allow all heated process tanks to reach operating temperature within 1 hour. The boiler will be provided on its own skid complete with a high efficiency gas burner & fresh air filtration system. It may also be possible to operate multiple washers from the single 1MW boiler.

• Hot Water System Boiler - 2-hour heat-up time

Greenbank can supply a dedicated 500kW high efficiency Low Temperature Hot Water Boiler to provide hot water to suit the Washer's Heating System. This boiler will allow all heated process tanks to reach operating temperature within **2 hour**. The boiler will be provided on its own skid complete with a high efficiency gas burner & fresh air filtration system

Automatic Height Adjustment Blowdown Units

The manual height adjustment can be replaced with fully automatic height adjustment system which is operated from the HMI. (One unit is provided with the washer at no additional charge, as per our meeting discussions in Wantage).

· Export Packing for Sea Freight

(9) <u>Exclusions</u>

- Chemical system to be provided by others
- Civil Works, including design
- Ducting
- Transfer dead plate
- Installation (can be offered as a separate quotation)



(10) Design Overview

Stage Reference	Description	Number of Risers (TOP)	Number of Risers (BTM)	Residence Time (Seconds)
0	PRE-RINSE	3	3	8.34
	SINGLE BLOW-OFF			
1	PRE-WASH	5	5	15.01
	BELT VACUUM & SINGLE BLOW-OFF			
2A	WASH	5	5	
2 B	WASH	5	5	48.35
2C	WASH	5	5	
	BELT VACUUM & SINGLE BLOW-OFF			
3A	RINSE #1 (Drag-Out)	3	3	8.34
	SINGLE BLOW-OFF			
3B	RINSE #2	3	3	8.34
	SINGLE BLOW-OFF			
3C	RINSE #3	3	3	8.34
	SINGLE BLOW-OFF			
4	TREATMENT	5	2	15.01
	BELT VACUUM & SINGLE BLOW-OFF			
SA	RINSE #4 (Drag-out)	3	3	8.34
	SINGLE BLOW-OFF			
5B	RINSE #S	3	3	8.34
	SINGLE BLOW-OFF			
6A	RINSE #6	3	3	8.34
6B	DIINFEED	2	2	5.00
	SINGLE BLOW-OFF			
7	M.E.	1	1	1.67
	BELT VACUUM & SINGLE BLOW-OFF			





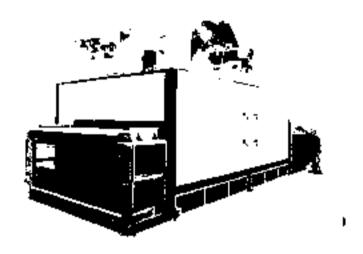
UNIT 1, GREENBANK TECHNOLOGY PARK CHALLENGE WAY, BLACKBURN, LANCASHIRE BB1 5QB TEL: +44 (0)1254 690 555 FAX: +44 (0)1254 690 666

Ref: CROWN CORK AND SEAL USA

PROJECT: CHARLIE

Greenbank Quotation Number: 7305 REV 1

"TORNADO" ONE (1) 3000 CPM CAN WASHER DRY OFF OVEN





CROWN CORK AND SEAL USA, INC. 770 Township Line Road Yardley, PA 19067

Attention: John Leitzke

21st February, 2020

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(3)	Standards and Requirements
(4)	System Dimensions
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(6)	Safety Equipment
(7)	Instruments and Controls
(8)	Utility Requirements
(9)	Factory Test
(10)	Manuals and Drawings
(11)	On-Site Supervision
(12)	Prices and Delivery
(13)	Terms
(14)	Warranty
(15)	Validity

PROPOSED EQUIPMENT DESCRIPTION SUCTION DRYER OVEN "Tornado"

The unit will be designed to process washed Aluminum beverage cans at a production speed of 3000 CPM – 211 x 413 and 211 x 604. Future capability for Sleek can sizes.

(1) <u>Design Criteria - General Specification</u>

Process Material - Aluminum Beverage Cans

Can size - 211 x 413
 211 x 604

Process/Production Speed - 3000 CPM (based on 211 diameter)

Coating Type - Washed Wet Cans

Number of Heating Zones - One (1) heating zone

Operating Temperature - 330/375 Deg. F. (165/190 Deg C.).

Maximum Temperature - 450 Deg F. (232 deg C.)

Fuel - Natural Gas @ 1000 BTU/Ft³ (8,900 Kcal/M³) not to exceed

345 mbar (5 PSIG)

Conveyor Belt Width 98" (2500mm) 96" (2455mm) Effective

Conveyor Belt Type - PTFE Kevlar/Glass - 4mm x 4mm open mesh.

Can Pack Density - 85% @ 3000 CPM

Cooling Zone - N/A

Electrical Supply - 480V, 60 HZ, 3 phase – 5 wire system

24 VDC control circuit

 The units shall be capable of raising the metal temperature of the can to the required temperature for complete evacuation of the water from the wet cans and will be capable of maintaining this temperature.

- Maximum ambient plant temperature 40 degrees Celsius (104 degrees Fahrenheit)
- Each unit is designed for operation at 1500 feet (460 meters) above sea-level.
- The ovens will not crease, dent, scratch or otherwise render the cans defective or unfit for sale.

(2) Scope

The unit will be shop assembled and furnished complete with conveyor, fans, motors, ductwork, burner equipment with all relevant safety devices, temperature controllers, wiring, piping and control panel.

The unit will be designed to allow for ease of access for cleaning and maintenance and will meet the following requirements.

(3) Standards & Requirements

The equipment will conform to the following standards: Low Voltage Directive: (73/23/EEC) (BS EN 60947-1) (CE EMC 89/336/EEC) (BS EN 50081-2) and CE Machinery Directive 98/37/EC, or the latest NFPA, NEC, IEC, OSHA and ANSI standards where applicable.

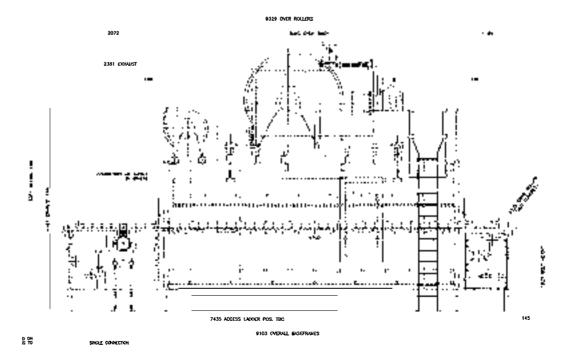
PM&E – Approved Electrical Vendor & Wiring Specifications, as per "Charlie" Approved Electrical Vendor and Wiring Specifications, Rev: 20-01-30, dated January 30, 2020, is included as part of this quotation. The control panel will be UL approved and on-machine wiring and components as per NFPA 70 (optional pricing provided)

Additional equipment may be required to satisfy local codes, which is not included in this proposal.

(4) Dimensions

Provisional

	3000 CPM - Single Zone TORNADO Dryer
Effective Belt Width	96" (2445)
Zone length	5700 (18'-8")
Heating Section	2500wd x 3464hg x 5700lg 8'-2" wd x 11"-4" hg x 18'-8" lg
Overall Length (roller to roller)	9329 (30'-7")



(5) Oven Construction

Frame-work

The framework will be constructed from suitably sized rolled steel sections.

Panels

The oven walls, floor and roof will consist of low conductivity insulated "tray type" assemblies constructed in aluminized steel and packed with 4" (100mm) mineral wool insulation material. In this type of assembly, the insulation material is fixed to the inner frame-work wall and the outer "trays" are supported with top and bottom carriers, which are offset from the insulation thus creating an air gap.



This type of insulation panel gives a continuous external appearance and is superior to the typical tongue and groove type panel assembly where excessive through metal can give cause to high skin temperatures and radiation losses.

The end openings of the oven will be silhouetted with adjustable end plates to regulate air infiltration.

Oven Access Doors

Manually operated access doors will be fitted in the appropriate positions and sized to allow clear access to the oven work-space and internal ducting. The access doors will be fully insulated and sealed to the internal heating compartment. The doors will be "tool tight" ie;- mechanically secure locking mechanism.

The access doors are designed with four (4) point "cam locking" mechanism catches.

Explosion Relief

The top face of the oven will have explosion relief panels conforming to the appropriate area to meet all regulations. The panels consist of Expamet sheet, stainless steel foil, 4" (100mm) 8 lb. density mineral wool insulation, silicone coated glass cloth and covered with a lightweight aluminum top flap.

Note - There is no necessity for explosion doors in the oven sides, therefore the walkways between the ovens are safe passageway.

Access Stairs & Railings

The oven will be provided with an access ladder and necessary railings.

Heating Equipment

The oven heating zone will be heated by a *Proctor MAS, Fully Modulating, Synchronized Air and Gas, high efficiency gas burner*, having a minimum turndown ratio up to 20:1. The burner will include:-

- Spark-ignited pilot burner
- Flame rod flame (Siemens LMV37) supervision
 - Solenoid SSOV shut-off valves
 - Combustion air blower with filter
 - Motorised gas control valve and gas shut-off cock

The burner will be completed pre-piped, pre-wired and interconnected to the main junction box. Gas safety shut-off valves will be Honeywell (or similar) automatic valves. *An Actaris MZ50 gas meter will be provided.*

Re-Circulation and Suction System

Supply ductwork/Air Delivery Nozzles

The oven internal ductwork will be constructed of 16 gauge (2mm) aluminised steel, suitably reinforced and equipped with removable delivery nozzle sections. The nozzles will be of a tapered outlet design. The nozzles will be structurally rigid and provide an even distribution of air-pressure across the width and length of the oven work chamber.

The air delivery nozzles and Pressure Plenum will incorporate an "Automatic Vertical Adjustment Assembly" to suit the different can sizes. This System will allow the operator to simply push a button on the PanelView display, raising or lowering the ductwork to the required height for the can currently in production.

Return Ductwork and Suction Plenum

The Greenbank Tornado Can Washer Dry Off Oven design features a return suction plenum which incorporates various damper arrangements in the return air (negative pressure) side of the system to control air distribution across the width and length of the oven zone and provides the vacuum required for "Can Hold Down", which allows maximum can stability, while providing high velocity airflow to the cans without risk of spoilage at reduced temperatures and dwell times.

<u>Fans</u>

The zone will be equipped with backward curved re-circulation fan **direct driven** with a **WEG 37kW** TEFC motor.

All fan drives/motors will be driven with **Allen-Bradley PowerFlex variable frequency drives**. All motors will be provided with remote disconnects.

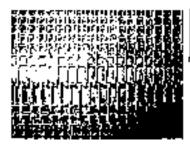
Exhaust System

One (1) backward blade exhaust blower, **direct driven** by a **WEG 5.5 kW** TEFC motor will be provided for removing the products of combustion and water vapors from the oven heating zone. Exhaust air will be controlled with individual adjustable dampers located in each zone of the oven.

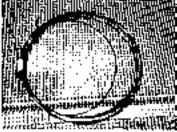
All fan drives/motors will be driven with *Allen-Bradley PowerFlex variable frequency drives*. All motors will be provided with remote disconnects.

Conveyor System

A 96" (2500mm) wide, PTFE Kevlar/glass fabric belt - 4mm x 4mm open mesh with the appropriate supports will be provided. *The belt will feature a pinned type connection and does not require welding.*







The conveyor belt will be supported on a perforated 304 stainless steel slide-bed constructed from polished folded sheet metal sections for rigidity and flatness. The sections are interlocking and provide free movement throughout the oven. The belt return will be supported by full width tubular support bars located at the appropriate intervals inside the oven heating compartment.

The conveyor drive will consist of a variable speed **SEW Eurodrive**, .75 kW motor, gear reducer, chain, sprockets, and will be fitted with a suitable torque limitor clutch for drive overload. An audible alarm will be interconnected to the control panel and be wired to shut down the zone burner in the event of conveyor stop. A remote disconnect will be provided.

A pneumatic conveyor tension device will be incorporated together with belt tracking limit switches located either side of the oven entrance and exit. Emergency stops will also be provided.

Pneumatic Tracking System- a full width automatic "**Pneumatic**" tracking system will be supplied. Mechanical edge or photocell sensors will also be incorporated.





Belt Vacuum Unit

One (1) belt vacuum unit, complete with fan, motor and ductwork, will be mounted within the oven conveyor infeed stand. The system will reduce the water load being introduced into the oven chamber by removing residual water from the cut-edge of the can and the oven belt.

The infeed conveyor stand length is increased in length to accommodate this assembly and facilitate the transfer of cans from the washer vacuum transfer unit.

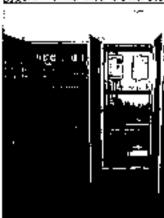
(6) Safety Equipment

The oven will be equipped with safety devices recommended by IRI and as per the Electrical Specifications provided.

The safety equipment will include:-

- Honeywell "safety shut off valves" with block and vent valves.
- Self-checking flame sensor with flame safety relay.
- Combustion air and gas pressure switches.
 - Blower fan interlocks.
- Alarm horns with red light and silencing relay Motor driven purge timers.
- Emergency stop control buttons.
 - Re-circulation and exhaust fan pressure switches.
- Over temperature and flame lock-out audible and visual alarms.





The instruments and controls will be mounted in a completely enclosed, floor mounted pre-wired **Rittal (with steel plinth)** control panel with front access. The control panel will include motor starters, selector switches, fused disconnects, pilot lights, flame safety relays, a fixed purge timer, burner controls, fused branch circuits, a 24 VDC control transformer, a main disconnect switch with a door interlock and a **Rittal** panel air conditioner.

An **Allen-Bradley Compact GuardLogix PLC** will be installed in the oven control panel with a program entered to your specifications. The PLC will power an **Allen-Bradley PanelView Plus 7** depicting the oven control and indication. The graphics display is designed to indicate faults in the oven control and safety system.

The oven zone will be controlled using a **Honeywell UDC3200** Series temperature controller. A **Honeywell UDC2500** Series temperature controller will be used as the high limit device for the combustion chamber.

Interface wiring will be provided with electrical cable tray from the panel outlet.

(8) Utility Requirements

Operation of the equipment will require the following services by the purchaser:

Natural Gas @ 1000 BTU/Ft3 (8,905Kcal/M3), not to exceed 345 mbar (5 PSIG)

Electrical service 480 VAC, 60 Hz, 3 phase - 5 wire system

(9) <u>Factory Test</u>

The unit will be fully assembled, including on-machine wiring and piping.

Testing will include uploading of panel software for control panel operation, start-up and shut-down procedures, and machine faults.

10) Manuals and Drawings

The following items will be provided before shipment:

Installation manuals CD (English)
Operation manuals CD (English)
Set of arrangement drawings (English)
Spare parts list (English)

All manuals, name plates, software etc., are in English language.

(11) Installation

Greenbank Technology Ltd strongly recommends the Installation be supervised by Greenbank engineers. Prices for the complete installation can be provided at extra cost.

Supervision for both installation and commissioning of the equipment can also be provided.

Supervisor for Installation will be charged at £xx,xx per day excluding travel/living expenses.

Commissioning will be charged at £xx.xx per day, excluding travel/living expenses.

(12) Price and Delivery Information

One (1) **3000 CPM**, "Tornado" Can Washer Dryer Oven for Aluminum Cans, as described above, not installed, including:-

- . Electrical Control Panel with European Style machine interconnect
- Allen-Bradley VFD controls on all Re-circulation and Exhaust fan motors MAS Proctor High Efficiency Burner
- Gas Meter Assembly
 - **Automatic Vertical Adjustment Ductwork Assembly**
- Kevlar/Glass Conveyor Belt
 - **Belt Vacuum Unit with Extended Conveyor Infeed Stand Assembly**
- Access Ladder and Railings

Total Price-----£0 each, ex works Additional Equipment

UL Approved Panel and On-Machine Components – The Electrical Control Panel and on-machine components and wiring will meet UL approval.

Price adder-----£0 each

Crating – One (1) TORNADO Dry Off Oven, comprising 1 fully boarded Packing Case for Oven, which is hermetically sealed within a barrier foil envelope with sufficient desiccant to ensure moisture free environment. + Basing & Shrink wrapping all ancillary equipment using 1000g polythene

Price -----£0 each

Equipment Commissioning – Two (2) men on site three (3) days for commissioning and start-up support. Does not include living and travel expenses.

Price: -----£00 each

All equipment prices are FCA Seller's plant, Šeběsťanová 255, 017 01 Považská Bystrica, Slovakia according to INCOTERMS 2010.

Equipment protection ready for loading onto your appointed transport and Freight Company is the responsibility of the customer.

Note: - All Fan, Motor, and Burner sizes quoted are provisional at this stage and may change on final equipment design.

Delivery Information

A general arrangement drawing for your approval will be provided 1 week after receipt of order.

The oven will be ready for shipment approximately 19 to 20 weeks after approval of general arrangement drawings.

(13) Terms

- 20% of the contract price down-payment by wire transfer after contract signing prior to Commence of engineering, net 90 days.
- of the contract price following shop inspection at sellers/manufacturers plant (Prior to delivery) by means of wire transfer against the presentation of Acceptance/inspection protocol executed at the sellers' plant, net 90 days.
- 15% of the contract price following installation/commissioning of the equipment at Buyers plant and acceptance documents signed by both parties or no later than 120 days from final equipment commissioning, said acceptance documents having been signed or not.

*Final acceptance will be automatic upon the customer utilizing the system/equipment supplied for production.

*Should equipment be delayed due to circumstances beyond Greenbank responsibility, Greenbank has the right to store the goods already manufactured at the customers cost and risk. Furthermore, shipping dates as indicated and agreed will dictate payment dates even if shipment is made to storage facility.

*Until final settlement of the total purchase price/sum, Greenbank, reserve the right of sole ownership of the equipment in whole or in part.

(14) Warranty

All material goods are warranted against defects in parts and workmanship for 18 months from shipment.

(15) Validity

This quotation is valid for 30 days. Thank for your continuing confidence and the opportunity to provide you with this proposal.

If you have any questions, please do not hesitate to contact us. We look forward to continuing our discussion regarding this project.

Thomas P. Zimmerman

Sales Director - Greenbank Technology Ltd

US Office +1 (262) 642-3535 US Mobile +1 (262) 374-0590 UK Office +44 (0) 1254 690 555



UNIT 1, GREENBANK TECHNOLOGY PARK CHALLENGE WAY, BLACKBURN, LANCASHIRE BB1 5QB TEL: +44 (0)1254 690 555

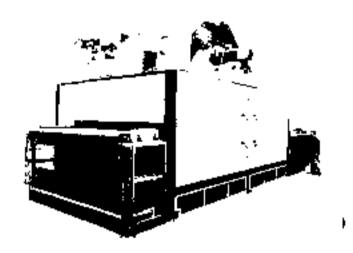
FAX: +44 (0)1254 690 666

Ref: CROWN CORK AND SEAL USA

PROJECT: CHARLIE

Greenbank Quotation Number: 7305 REV 1

"TORNADO" ONE (1) 3000 CPM **CAN WASHER DRY OFF OVEN**





CROWN CORK AND SEAL USA, INC. 770 Township Line Road Yardley, PA 19067

Attention: John Leitzke

21st February, 2020

CONTENTS

(1)	Design Criteria
(2)	Scope
(3)	Standards and Requirements
(4)	System Dimensions
(5)	Oven Construction
(6)	Safety Equipment
(7)	Instruments and Controls
(8)	Utility Requirements
(9)	Factory Test
(10)	Manuals and Drawings
(11)	On-Site Supervision
(12)	Prices and Delivery
(13)	Terms
(14)	Warranty
(15)	Validity

PROPOSED EQUIPMENT DESCRIPTION SUCTION DRYER OVEN "Tornado"

The unit will be designed to process washed Aluminum beverage cans at a production speed of 3000 CPM – 211 x 413 and 211 x 604. Future capability for Sleek can sizes.

(1) <u>Design Criteria - General Specification</u>

Process Material - Aluminum Beverage Cans

Can size 211 x 413
 211 x 604

Process/Production Speed - 3000 CPM (based on 211 diameter)

Coating Type - Washed Wet Cans

Number of Heating Zones - One (1) heating zone

Operating Temperature - 330/375 Deg. F. (165/190 Deg C.).

Maximum Temperature - 450 Deg F. (232 deg C.)

Fuel - Natural Gas @ 1000 BTU/Ft³ (8,900 Kcal/M³) not to exceed

345 mbar (5 PSIG)

Conveyor Belt Width 98" (2500mm) 96" (2455mm) Effective

Conveyor Belt Type - PTFE Kevlar/Glass - 4mm x 4mm open mesh.

Can Pack Density - 85% @ 3000 CPM

Cooling Zone - N/A

Electrical Supply - 480V, 60 HZ, 3 phase – 5 wire system

24 VDC control circuit

The units shall be capable of raising the metal temperature of the can to the required temperature for complete evacuation of the water from the wet cans and will be capable of maintaining this temperature.

Maximum ambient plant temperature 40 degrees Celsius (104 degrees Fahrenheit)

Each unit is designed for operation at 1500 feet (460 meters) above sea-level.

The ovens will not crease, dent, scratch or otherwise render the cans defective or unfit for sale.

(2) Scope

The unit will be shop assembled and furnished complete with conveyor, fans, motors, ductwork, burner equipment with all relevant safety devices, temperature controllers, wiring, piping and control panel.

The unit will be designed to allow for ease of access for cleaning and maintenance and will meet the following requirements.

(3) Standards & Requirements

The equipment will conform to the following standards: Low Voltage Directive: (73/23/EEC) (BS EN 60947-1) (CE EMC 89/336/EEC) (BS EN 50081-2) and CE Machinery Directive 98/37/EC, or the latest NFPA, NEC, IEC, OSHA and ANSI standards where applicable.

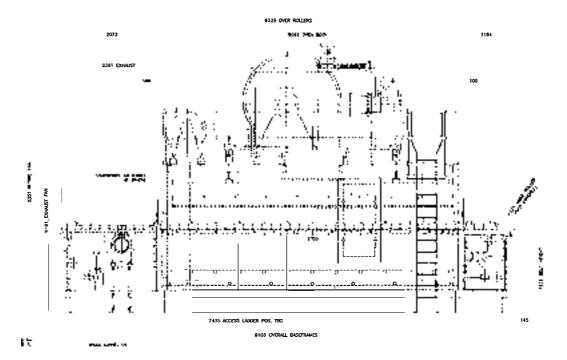
PM&E – Approved Electrical Vendor & Wiring Specifications, as per "Charlie" Approved Electrical Vendor and Wiring Specifications, Rev: 20-01-30, dated January 30, 2020, is included as part of this quotation. The control panel will be UL approved and on-machine wiring and components as per NFPA 70 (optional pricing provided)

Additional equipment may be required to satisfy local codes, which is not included in this proposal.

(4) Dimensions

Provisional

	3000 CPM - Single Zone TORNADO Dryer
Effective Belt Width	96" (2445)
Zone length	5700 (18'-8")
Heating Section	2500wd x 3464hg x 5700lg 8'-2" wd x 11"-4" hg x 18'-8" lg
Overall Length (roller to roller)	9329 (30'-7")



(5) Oven Construction

Frame-work

The framework will be constructed from suitably sized rolled steel sections.

Panels

The oven walls, floor and roof will consist of low conductivity insulated "tray type" assemblies constructed in aluminized steel and packed with 4" (100mm) mineral wool insulation material. In this type of assembly, the insulation material is fixed to the inner frame-work wall and the outer "trays" are supported with top and bottom carriers, which are offset from the insulation thus creating an air gap.







This type of insulation panel gives a continuous external appearance and is superior to the typical tongue and groove type panel assembly where excessive through metal can give cause to high skin temperatures and radiation losses.

The end openings of the oven will be silhouetted with adjustable end plates to regulate air infiltration.

Oven Access Doors

Manually operated access doors will be fitted in the appropriate positions and sized to allow clear access to the oven work-space and internal ducting. The access doors will be fully insulated and sealed to the internal heating compartment. The doors will be "tool tight" ie;- mechanically secure locking mechanism.

The access doors are designed with four (4) point "cam locking" mechanism catches.

Explosion Relief

The top face of the oven will have explosion relief panels conforming to the appropriate area to meet all regulations. The panels consist of Expamet sheet, stainless steel foil, 4" (100mm) 8 lb. density mineral wool insulation, silicone coated glass cloth and covered with a lightweight aluminum top flap.

Note - There is no necessity for explosion doors in the oven sides, therefore the walkways between the ovens are safe passageway.

Access Stairs & Railings

The oven will be provided with an access ladder and necessary railings.

Heating Equipment

The oven heating zone will be heated by a *Proctor MAS, Fully Modulating, Synchronized Air and Gas, high efficiency gas burner*, having a minimum turndown ratio up to 20:1. The burner will include:-

Spark-ignited pilot burner
Flame rod flame (Siemens LMV37) supervision
Solenoid SSOV shut-off valves
Combustion air blower with filter
Motorised gas control valve and gas shut-off cock

The burner will be completed pre-piped, pre-wired and interconnected to the main junction box. Gas safety shut-off valves will be Honeywell (or similar) automatic valves. *An Actaris MZ50 gas meter will be provided.*

Re-Circulation and Suction System

Supply ductwork/Air Delivery Nozzles

The oven internal ductwork will be constructed of 16 gauge (2mm) aluminised steel, suitably reinforced and equipped with removable delivery nozzle sections. The nozzles will be of a tapered outlet design. The nozzles will be structurally rigid and provide an even distribution of air-pressure across the width and length of the oven work chamber.

The air delivery nozzles and Pressure Plenum will incorporate an "Automatic Vertical Adjustment Assembly" to suit the different can sizes. This System will allow the operator to simply push a button on the PanelView display, raising or lowering the ductwork to the required height for the can currently in production.

Return Ductwork and Suction Plenum

The Greenbank Tornado Can Washer Dry Off Oven design features a return suction plenum which incorporates various damper arrangements in the return air (negative pressure) side of the system to control air distribution across the width and length of the oven zone and provides the vacuum required for "Can Hold Down", which allows maximum can stability, while providing high velocity airflow to the cans without risk of spoilage at reduced temperatures and dwell times.

The zone will be equipped with backward curved re-circulation fan **direct driven** with a **WEG 37kW** TEFC motor.

All fan drives/motors will be driven with **Allen-Bradley PowerFlex variable frequency drives**. All motors will be provided with remote disconnects.

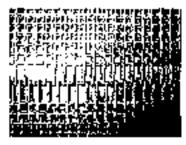
Exhaust System

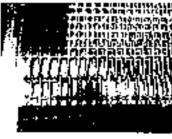
One (1) backward blade exhaust blower, **direct driven** by a **WEG 5.5 kW** TEFC motor will be provided for removing the products of combustion and water vapors from the oven heating zone. Exhaust air will be controlled with individual adjustable dampers located in each zone of the oven.

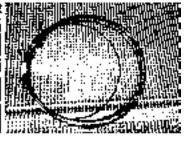
All fan drives/motors will be driven with *Allen-Bradley PowerFlex variable frequency drives*. All motors will be provided with remote disconnects.

Conveyor System

A 96" (2500mm) wide, PTFE Kevlar/glass fabric belt - 4mm x 4mm open mesh with the appropriate supports will be provided. *The belt will feature a pinned type connection and does not require welding.*







The conveyor belt will be supported on a perforated 304 stainless steel slide-bed constructed from polished folded sheet metal sections for rigidity and flatness. The sections are interlocking and provide free movement throughout the oven. The belt return will be supported by full width tubular support bars located at the appropriate intervals inside the oven heating compartment.

The conveyor drive will consist of a variable speed **SEW Eurodrive**, .75 kW motor, gear reducer, chain, sprockets, and will be fitted with a suitable torque limitor clutch for drive overload. An audible alarm will be interconnected to the control panel and be wired to shut down the zone burner in the event of conveyor stop. A remote disconnect will be provided.

A pneumatic conveyor tension device will be incorporated together with belt tracking limit switches located either side of the oven entrance and exit. Emergency stops will also be provided.

Pneumatic Tracking System- a full width automatic "**Pneumatic**" tracking system will be supplied. Mechanical edge or photocell sensors will also be incorporated.





Belt Vacuum Unit

One (1) belt vacuum unit, complete with fan, motor and ductwork, will be mounted within the oven conveyor infeed stand. The system will reduce the water load being introduced into the oven chamber by removing residual water from the cut-edge of the can and the oven belt.

The infeed conveyor stand length is increased in length to accommodate this assembly and facilitate the transfer of cans from the washer vacuum transfer unit.

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The oven will be equipped with safety devices recommended by IRI and as per the Electrical Specifications provided.

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The instruments and controls will be mounted in a completely enclosed, floor mounted pre-wired **Rittal (with steel plinth)** control panel with front access. The control panel will include motor starters, selector switches, fused disconnects, pilot lights, flame safety relays, a fixed purge timer, burner controls, fused branch circuits, a 24 VDC control transformer, a main disconnect switch with a door interlock and a **Rittal** panel air conditioner.

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Operation of the equipment will require the following services by the purchaser:

Natural Gas @ 1000 BTU/Ft3 (8,905Kcal/M3), not to exceed 345 mbar (5 PSIG)

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The unit will be fully assembled, including on-machine wiring and piping.

Testing will include uploading of panel software for control panel operation, start-up and shut-down procedures, and machine faults.

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The following items will be provided before shipment:

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Spare parts list (English)

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Supervisor for Installation will be charged at £xx.xx per day excluding travel/living expenses.

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One (1) **3000 CPM,** "Tornado" Can Washer Dryer Oven for Aluminum Cans, as described above, not installed, including:-

- . Electrical Control Panel with European Style machine interconnect
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- . MAS Proctor High Efficiency Burner
- Gas Meter Assembly
- Automatic Vertical Adjustment Ductwork Assembly
- Kevlar/Glass Conveyor Belt
- Belt Vacuum Unit with Extended Conveyor Infeed Stand Assembly
- Access Ladder and Railings

Total Price-----£0 each, ex works

Additional Equipment

UL Approved Panel and On-Machine Components – The Electrical Control Panel and on-machine components and wiring will meet UL approval.

Price adder-----£0 each

Crating – One (1) TORNADO Dry Off Oven, comprising 1 fully boarded Packing Case for Oven, which is hermetically sealed within a barrier foil envelope with sufficient desiccant to ensure moisture free environment. + Basing & Shrink wrapping all ancillary equipment using 1000g polythene

Price ------£0 each

Equipment Commissioning – Two (2) men on site three (3) days for commissioning and start-up support. Does not include living and travel expenses.

Price: -----£0 each

All equipment prices are FCA Seller's plant, Šeběsťanová 255, 017 01 Považská Bystrica, Slovakia according to INCOTERMS 2010.

Equipment protection ready for loading onto your appointed transport and Freight Company is the responsibility of the customer.

Note: - All Fan, Motor, and Burner sizes quoted are provisional at this stage and may change on final equipment design.

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A general arrangement drawing for your approval will be provided 1 week after receipt of order.

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(14) Warranty

All material goods are warranted against defects in parts and workmanship for 18 months from shipment.

(15) Validity

This quotation is valid for 30 days. Thank for your continuing confidence and the opportunity to provide you with this proposal.

If you have any questions, please do not hesitate to contact us. We look forward to continuing our discussion regarding this project.

Thomas P. Zimmerman

Sales Director - Greenbank Technology Ltd

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PROPOSAL DOCUMENT

Prepared For: Customer Crown Project Charlie

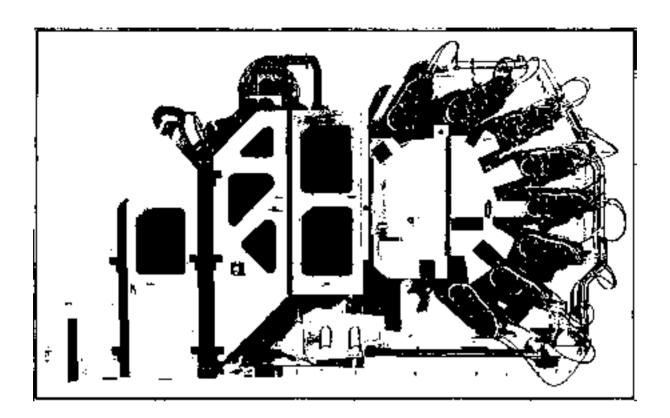
www.stollemachinery.com

SUMMARY SHEET

QUOTATION NUMBER:	14100.6
DATE:	February 6, 2020
PREPARED BY:	Andy Layden/Tom Beebe
ATTN:	Brian Rodgers
CUSTOMER:	Crown
FAX/EMAIL:	E-mail
PLANT LOCATION:	Project Charlie
MACHINERY TYPE:	24MRT-8 Concord Decorator with oven
QUANTITY:	2
COMMENTS:	

This quotation is for two Standard 24MRT Decorator with 8 ink stations set up for one can size 204x12oz Option items and change parts listed on page 5 are not included unless noted.

SCRIPTION:	UNIT PRICE FCA, Centennial, CO USA Plant. Incoterms 2010		
Pricing for Concord Decorator Machines	Qty	Price Ea	
Concord 24MRT-8 color decorator	2		
Selected Optional items	1		
Selected Change parts Discount 12%	2		
SEA Controls Upcharge	2		
Crating decorator GRAND TOTAL	2		
Optional NR12 Certified	2		



Description

Description	
CONCORD DECORATOR	
24 mandrel rotary trip	Single mandrel trip
Speed (max)	2,000 CPM (355ml can size)
Removable ink stations	8 color capable
Heat exchanger	Oil circulating system
Can Height (max)	610
Can Diameter	202 - 300
Running adjustments	Plate image registration & plate
	pressure
Variable frequency closed loop	Each ink station (optional) &
motor drives	Over varnish unit (Standard)

STANDARD FEATURES

STANDARD MECHANICAL	
FEATURES:	
Can size operating speed	2000CPM 211X12oz.
2. Mandrels	24
3. Mandrel material	Light-weight steel self-aligning
4. Mandrel trip	Single mandrel (rotary trip)
5. Trip arm pivot	Needle bearing with lube
6. Inkers	8 interchangeable with mechanical drive.
7. Inker cooling	Inkers equipped to accept optional chillers
8. Oil cooling	Ink station main frame & critical gearboxes
9. Infeed	Air assist (5 HP blower) adjustable
10.Can stop	Pneumatic
11. Plate cylinder	Light weight magnetic
12. Running registration	Included
13.Blanket wheel	12 segments
14. Overvarnish unit	Reverse type 7.5 HP AC Vector Duty
15. Overvarnish pre-spin	Flat Belt
ι 16. Overvarnish day tank	8 gallon with pump
17. Transfer	24 suction heads
18. Oven drive clutch	Included
19. Guards	Interlocked
20.	
STANDARD ELECTRICAL FEATURES:	
1. Main Motor	75 HP AC TEBC – Inverter duty with
	mechanical drive inkers. 60hp with motor
	driven ink stations
2. Drive	Allen Bradley power flex 755
3. Logic	Control Logix
4. Timing Device	PLS – integrated in PLC
5. Tropicalized motors	Included
6. Interconnecting cables	included
ELECTRICS:	
460V/3PH/60Hz or as specified by Buyer	

	OPTIONAL MECHANICAL & ELECTRICAL	COST E	OR OPTION	JAL FEATURES
	FEATURES:	00311	OITOI HOI	VALILATORILO
		Price	Qty	Total price
1	Adj. infeed - quick height change		2	
2	Adj. Disk transfer - quick change		2	
3	Muti-pin-position quick - change		2	
4	Segmented pocket hub - quick chg.		2	
5	Auto lube system		2	
6	Self- aligning mandrels add on		2	
7	DLC coating add on for a set of mandrels		2	
8	Set up and Maintenance Tools		1	
9	Spare Ink Station w/ceramic coat SST Rolls		0	
10	Pneumatic Ductor for 8 Inkers		2	
11	OV visc.ctrl.w/heat exch.&mixer.(Brookfield)		2	
12	OV removal cart		0	
13	Spare Plate Cylinder ea.		0	
14	Inker Maintenance Cart with drive motor		0	
15	Operator Platform		0	
16	Segment gap cover set		0	
17	Rider roll ea.		0	
18	Ink station storage cart for 2 ink stations		0	
19	Mist Collection system - Ink station & OV		0	
20	Spare reverse ov unit w/ font. & gravure roll		0	
21	Ceramic coated rolls on ink stations		0	
22	Pre-registration fixture		0	
23	Mandrel brake		0	
24	Vector Duty 5hp Inker Motor Drives		2	
25	4 Zone Temperature Control System		0	
26	Upgrade to Gravite system		0	
27	Upgrade to Handy coat system for applicator roll		0	
28	Upcharge for Flexoart fountain		0	
29	Stretch Decorator option up to 8" tall cans		2	
30			0	
31			0	
32			0	
33			0	
34			0	
35			0	
36			0	\$0
	Deco	rator selected of	tions total	\$
		ļ		

Change parts

ge parts		
211 diameter		211x16oz
Price	Qty	Extended
		1
	2	24
		1
		1
		0
		0
		1
Len	gth 211	211x12oz
Price	Qty	Extended
	2	24
1		1
1		1
sleek	and slim	
Price	Qty	Extended
		0
		0
		0
		0
		0
		0
		0
Lengh slo	eek and slim	7.5 oz sleek
Price	Qty	Extended
	2	24
		1
		1
3	1	
	Price Len Price Len Price Len Len Len Len Len Len Len Len Len L	Price Qty Length 211 Price Qty Length sleek and slim Price Qty Length sleek and slim Price Qty Length sleek and slim Qty

GENERAL/SPECIFIC TH	ERMS AND CONDITIONS:		
This quotation is limited to t	he specific terms and conditions contained on the face of this		
document and the attached general terms and conditions. Any additional or different terms in			
	eby deemed to be material alterations and notice of objection to		
them and rejection of them is	s hereby given.		
SPECIFIC TERMS AND			
CONDITIONS			
Pricing:	Prices quoted are Ex works, Centennial, Colorado		
Payment:	 30% upon submittal of purchase order 		
	• 60% upon shipment		
	 10% on commissioning Not to exceed 180 days from 		
	shipment(whichever is sooner) (final 10% due no earlier than January 15, 2021)		
Freight:	• ExWorks- Stolle's point of manufacturing, as such, Stolle cannot be listed as the exporter and/or shipper on any documentation. Additional cost for crating, lifting, inland freight, port charges, ocean/air freight, insurance, taxes, etc. are for the account of BUYER.		
Delivery:	 Frist machine September 21st buyoff Second machine October 19th buyoff or sooner providing timely receipt of: Initial payment of 30% 		
	 Agreement and written approval on equipment specifications, receipt of CORe (if applicable) 		
Validity:	Quotation valid for 60 Days		
Training:	 Provided at no charge at Stolle facility in Centennial, Colorado for the Decorator and Europe for the Pin oven. Expenses for travel, lodging, and meals are not included. 		
Servicemen:	Start-up service available at Stolle standard rates.		
	• Electrical assistance is the responsibility of customer and is recommended		
	• Temperature control unit installation/support is the		
	customer's responsibility. Contact information may be		
	located in their installation manual.		
1 1	and manufactured to meet the requirements of the European CE 98/37/EC, which meets or exceeds all Federal, State and Local		

END OF QUOTE



UNIT 1, GREENBANK TECHNOLOGY PARK CHALLENGE WAY, BLACKBURN, LANCASHIRE BB1 5QB TEL: +44 (0)1254 690 555

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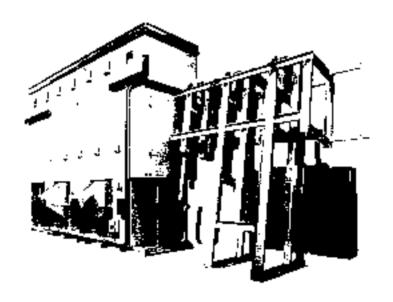
FAX: +44 (0)1254 690 666

Ref: CROWN CORK & SEAL USA

PROJECT: CHARLIE

Greenbank Quotation Number: 7307 REV 1

TWO (2) 2400 CPM R.H. DECORATOR PIN OVENS





CROWN CORK AND SEAL USA, INC. 770 Township Line Road Yardley, PA 19067

Attention: John Leitzke

21st February, 2020

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Píntec One - Omega

(1) Design Criteria

The units will be designed to process Aluminum Beverage Cans, with "water/solvent base" external coatings at a production speed of 2400 CPM – 211 x 413 and 211 x 604. Future capability for Sleek can sizes.

Process Material - Aluminum Beverage Cans

Can size - 211 x 413
 211 x 604

Process/Production Speed - 2400 CPM

Pin Chain - 0.75" inch pitch ASA 60

■ Pin Centers - 5.25" inches

■ Time in Oven - 9.16 seconds at 2400 CPM = 14 Pass Oven

Orientation - Right Hand – 10 deg.

Coating Type - Typical (TBA)

Coating Applied Weights - Overvarnish - Typical 95 - 145mg per can

(dry film weight) (max solids 43% +/- 2%)

Number of Heating Zones - One (1)

Operating Temperature - 395 to 415 Deg F (202/213 Deg C.)

Maximum Temperature - 450 Deg F. (232 deg C.)

■ Fuel - Natural Gas @ 1000 BTU/Ft³ (8,905 Kcal/M³), not to exceed

345 mbar (5 PSIG)

Electrical Supply - 480V, 60 HZ, 3 phase – 5 wire system

24 VDC control circuit

 The unit shall be capable of raising the metal temperature of the can to 365 Deg F (185 Deg C.) at 2400 CPM.

Maximum ambient plant temperature 40 degrees Celsius (104 degrees Fahrenheit)

Each unit is designed for operation at 1500 feet (460 meters) above sea-level.

The ovens will not crease, dent, scratch or otherwise render the cans defective or unfit for sale.

(2) Scope

The units will be shop fully assembled and furnished complete with conveyor components, fans, motors, ductwork, burner equipment with all relevant safety devices, temperature controllers, wiring, piping and control panel.

The units will be designed to allow for ease of access for cleaning and maintenance and will meet the following requirements.

(3) Standards & Requirements

The equipment will conform to the following standards: Low Voltage Directive: (73/23/EEC) (BS EN 60947-1) (CE EMC 89/336/EEC) (BS EN 50081-2) and CE Machinery Directive 98/37/EC, or the latest NFPA, NEC, IEC, OSHA and ANSI standards where applicable.

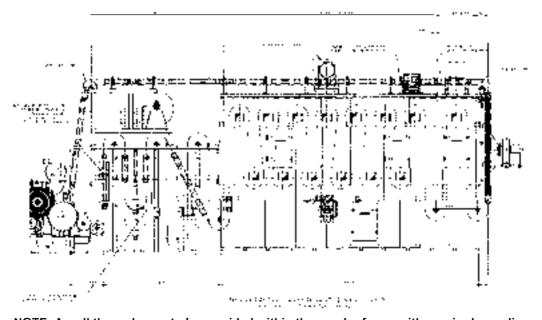
PM&E – Approved Electrical Vendor & Wiring Specifications, as per "Charlie" Approved Electrical Vendor and Wiring Specifications, Rev: 20-01-30, dated January 30, 2020, is included as part of this quotation. The control panel will be UL approved and on-machine wiring and components as per NFPA 70 (optional pricing provided)

Additional equipment may be required to satisfy local codes, which is not included in this proposal.

(4) <u>Dimensions</u>

Provisional

1 10110101141	
2400 CPM - Pin Oven (14 Pass) 126 T Sprockets	
	12"w x 11'-9"h x 25'-4"L
Zone Length	7727
	25'-4"
Overall Dimensions – Heating Zone, Cooler and Pre-dry	4410w x 7112h x 13313L
frame	14'-6"w x 23'-4"h x 43'-8"L



NOTE: A walkthrough area to be provided within the pre dry frame with required guarding.

(5) Oven Construction

Frame-work

The framework will be constructed from suitably sized rolled steel sections.

<u>Panels</u>

The oven walls, floor and roof will consist of low conductivity insulated "tray type" assemblies constructed in aluminized steel and packed with 4" (100mm) 8 lb. density mineral wool insulation material. In this type of assembly, the insulation material is fixed to a "continuously welded" inner frame-work wall and the outer "trays" are supported with top and bottom carriers, which are offset from the insulation thus creating an air gap.

This type of insulation panel gives a continuous external appearance and is superior to the typical tongue and groove type panel assembly where excessive through metal can give cause to high skin temperatures and radiation losses.

The continuously welded inner frame-work wall design also eliminates the need for "caulking" panel seams, as required with tongue and groove panel construction, and provides a clean oven exterior.

Oven Access Doors

Manually operated, outer access doors will be fitted on each side of the oven and cooler chambers. The doors will be positioned and sized to allow clear access to the oven workspace. Secondary perforated sheet hinged doors internal to the oven will be provided to allow clear access to the oven work chamber. The access doors will be fully insulated and sealed.

Additional access doors are located in the roof of the oven to provide access to the upper sprockets, nozzles and pin chain. Access doors are also located in the bottom of the oven work chamber to provide access to the bottom sprockets. Can chutes are also fitted for the easy removal of any fallen cans.

Explosion Relief

The top face of each oven will have explosion relief panels conforming to the appropriate area to meet all regulations. The panels consist of Expamet sheet, stainless steel foil, **4" (100mm) 8 lb. density** mineral wool insulation, silicone coated glass cloth, covered with a lightweight aluminum top flap. Access doors are fitted with heavy duty explosion relief catches and gaskets.

Heating Equipment

The oven heating zone will be heated by a Proctor MAS, Fully Modulating, Synchronized Air and Gas, high efficiency gas burner, having a minimum turndown ratio up to 20:1. Each burner will include:-

- Spark-ignited pilot burner
- Flame rod flame (Siemens LMV37) supervision
- Solenoid SSOV shut-off valves
- Combustion air blower with filter
- Motorised gas control valve and gas shut-off cock

The burner will be completed pre-piped, pre-wired and interconnected to the main junction box. Gas safety shut-off valves will be Honeywell (or similar) automatic valves. *An Actaris MZ50 gas meter will be provided.*

Recirculation System

Supply Ductwork/Air Delivery Nozzles

The oven internal ductwork will be constructed of 16 gauge (2mm) aluminized steel, suitably reinforced and design with expansion relief to prevent buckling and distortion in the air delivery supply wall.

The air delivery system incorporates "high velocity "OMEGA" air distribution system which produces superior air distribution and temperature uniformity on the can body.

The "Omega" design nozzles are special folded steel which prevents any distortion or buckling from heat stress. The nozzles are also individually removable and interchangeable.

Fans - Oven Re-circulation System

The oven zone will be equipped with two (2) "backward curved" re-circulation fans, **direct driven** with **WEG 37kW TEFC motors**.

All fan drives/motors will be driven with **Allen-Bradley PowerFlex** variable frequency drives. All motors will be provided with remote disconnects.

Exhaust System

One (1) backward blade exhaust blower, **direct driven** by a **WEG 2.2kW TEFC motor**, will be provided for removing the products of combustion and volatile vapors from the oven heating zone. Exhaust air will be controlled with individual adjustable damper located in the oven zone.

All fans will be driven with **Allen-Bradley PowerFlex** variable frequency drives. All motors will be provided with remote disconnects.

The exhaust system will be calculated based on flue gas insurance requirements, water-based solvent removal from product, and a slight negative pressure at the entrance and exit ends of the unit.

Note: Plant conditions will affect exhaust system performance. The units have been designed for a neutral condition within the factory environment.

Cooling System

The 2 pass cooling zone is constructed from fully insulated "tray type panels" packed with **4" (100mm) of 8 lb. density** semi-rigid, batt-type mineral wool insulation material. Access doors will be incorporated on each side. The internal ductwork will be constructed similarly to the main oven ductwork and designed for horizontal high velocity airflow through special air delivery nozzles.

The supply and exhaust fans for the cooler will be **direct driven** with **WEG 4kW TEFC motors**. All fan drives/motors will be driven with **Allen-Bradley PowerFlex** variable frequency drives. All motors will be provided with remote disconnects.

Chain Conveyor System



The oven will be equipped with high strength shafts, bearings and hardened sprockets for use with a #60 ASA roller chain, 0.75" pitch, with 8.380" pin length on 5.25" centers, *supplied by the customer.*

All 96T sprockets will have a maximum "run out" tolerance not greater than 0.015" TIR. 126T sprockets will have a maximum "run out" tolerance not greater than 0.020" TIR.

Fixed expansion bearings for the shaft and sprocket assemblies are mounted to rigid structural steel supports. The bearings will be attached to the shaft with "squeeze-lock" type bushings/collars.

All shafts will have a "non-mechanical" means of attaching the sprocket hub to the shaft.

Rear shaft extension for the pin stripper drive linkage will be provided, if necessary.

Structural supports for the entrance and exit shaft and sprocket assembly will be provided as necessary.

Chain Path and Chain Return

All chain paths through the oven will be vertical. The return chain path will be "top return" and will utilize UHMW adjustable chain guides with rigid structural supports.

A Dry Can Blow-Off System will be provided prior to the pin stripper.

A Wet Can Blow-Off System will be provided on the pin chain path at the Decorator discharge.

These systems will include solenoid, blow-off nozzle and can chute.

Pin Chain "Take-Up" Devices

A vertical down rack and pinion pneumatic "take-up" system will be provided prior to the oven entrance. This will be air operated and will provide a constant chain tension. The unit will be complete with, pneumatic cylinders, air piping, regulator, filter and gauges. Limit switches will be mounted on the take up frame to indicate chain stretch and low take up air pressure.

Pin Chain Oiler

An AutoJet Technologies (Division of Spraying Systems), Model 52200 AccuCoat® Electrostatic Lubrication System will be provided. The oiler consists of a PLC-equipped control panel, airless electrostatic spray nozzle with injector pumps, 16 liter (4.2 gallon) oil reservoir and a pressure regulator/filter/pressure switch assembly. A list of approved lubricants to be utilized with the electrostatic oiler will be supplied upon request. Lubricants not on the list will require testing to determine compatibility.

Air Can Guides

Air can guides are provided between the printer/coater and the oven entrance and between the exit of the oven and the pin stripper to maintain can stability.

The guides are equipped with fans, ductwork, dampers, distribution boxes, transitions and **WEG 7.5 kW TEFC motors**.

Pre-Dry Frame/Front End steel

Structural steel for mounting plates the external "take-up" devices, air can guides, chain guides and external sprockets will be provided.

Vacuum Pin Stripper

The extended nose vacuum pin stripper, with drive components and controls will be provided by Greenbank.

Allowance is provided in the design of the pin stripper discharge for the mounting of an Orion inspection system provided by Applied Vision.

The Pin Stripper will be pre-drilled for installation of the customer supplied inspection system.

Service Platforms

Service platforms will extend along both sides of the oven. Access to the service platforms will be via adjacent platforms and connecting bridges supplied by the customer.

(6) Safety Equipment

The oven will be equipped with safety devices recommended by IRI and as per the Electrical Specifications provided.

The safety equipment will include:-

- Honeywell "safety shut off valves" with block and vent valves.
- Self-checking flame sensor with flame safety relay.
- · Combustion air and gas pressure switches.
- Blower fan interlocks.
- Alarm horns with red light and silencing relay
- Motor driven purge timers.
- Emergency stop control buttons.
- Re-circulation and exhaust fan pressure switches.
 - Over temperature and flame lock-out audible and visual alarms.

(7) <u>Instruments and Controls</u>

The instruments and controls will be mounted in a completely enclosed, floor mounted pre-wired **Rittal (with steel plinth)** control panel with front access. The control panel will include motor starters, selector switches, fused disconnects, pilot lights, flame safety relays, a fixed purge timer, burner controls, fused branch circuits, a 24 VDC control transformer, a main disconnect switch with a door interlock and a **Rittal** panel air conditioner.

An **Allen-Bradley Compact GuardLogix PLC** will be installed in the oven control panel with a program entered to your specifications. The PLC will power an **Allen-Bradley PanelView Plus 7** depicting the oven control and indication. The graphics display is designed to indicate faults in the oven control and safety system.

The oven zone will be controlled using a **Honeywell UDC3200** Series temperature controller. A **Honeywell UDC2500** Series temperature controller will be used as the high limit device for the combustion chamber.

Interface wiring will be provided with electrical cable tray from the panel outlet.

(8) Utility Requirements

Operation of the equipment will require the following services by the purchaser:

Natural Gas @ 1000 BTU/Ft3 (8,905Kcal/M3), not to exceed 345 mbar (5 PSIG)

Electrical service 480 VAC, 60 Hz, 3 phase - 5 wire system

(9) Factory Test

The units will be fully assembled, including on-machine wiring and piping.

Testing will include uploading of panel software for control panel operation, start-up and shut-down procedures, and machine faults.

(10) Manuals and Drawings

The following items will be provided before shipment:

Installation manuals CD (English)
Operation manuals CD (English)
Set of arrangement drawings (English)
Spare parts list (English)

All manuals, name plates, software etc., are in English language.

(11) Installation and Commissioning

Greenbank Technology Ltd strongly recommends the Installation be supervised by Greenbank engineers. Prices for the complete installation can be provided at extra cost.

Supervision for both installation and commissioning of the equipment can also be provided.

Supervisor for Installation will be charged at £790.00 per day excluding travel/living expenses.

Commissioning will be charged at £790.00 per day, excluding travel/living expenses.

(12) Price and Delivery Information

Two (2) RH **2400 CPM** – 14 Pass – 126T - (Single Zone) "Omega" Pin Ovens as described above, including:-

Electrical Control Panel with European Style machine interconnect

VFD motors on all Re-circulation and Exhaust fan motors

MAS Proctor High Efficiency Burners

2 Pass Cooling System

Service Platforms

Gas Meter Assembly

Pre-dry Frame including:-

Electrostatic Chain Lubrication System

Chain Return Structure (pre-dry frame) and components for the Decorator Pin Oven:-UHMW chain guides, sprockets, shafts, bearings, vertical chain "take-up", pneumatic piping components, guarding, bottom rim coater mounting plates and wet and dry can blow-off assemblies*. Includes "Can Guide" system, i.e. "Air Knife" ducting and fans.

Note: Dry Can Blow Off duct is supplied by Greenbank. Solenoid, valve and pushbuttons supplied, wired to the Greenbank electrical panel by others. Wet Can Blow Off duct is supplied as well by Greenbank, with line controls supplied from the decorator/coater by others.

Cooler Supply Inlet Damper - An "Automatic Cooler Supply Inlet Damper Assembly" will be provided with the cooler supply fan to "blend" incoming air with plant air during winter operation. A separate thermocouple will signal the damper motor to actuate as required to maintain the desired cooler supply air temperature.

Price: -----£ each

Crating – One (1) Right Hand 2400 CPM Pin Oven, comprising 1 fully boarded Packing Case for Pressure Chamber which is hermetically sealed within a barrier foil envelope with sufficient desiccant to ensure moisture free environment. + Basing & Shrink wrapping all ancillary equipment using 1000g polythene.

Price Adder -----£ each

Equipment Commissioning – Two (2) men on site three (3) days for commissioning and start-up support. Does not include living and travel expenses.

All equipment prices are FCA Seller's plant, Burnley, UK according to INCOTERMS 2010.

Equipment protection ready for loading onto your appointed transport and Freight Company is the responsibility of the customer.

Note: - All Fan, Motor, and Burner sizes quoted are provisional at this stage and may change on final equipment design.

Delivery Information

A general arrangement drawing for your approval will be provided 1 week after receipt of order.

The ovens will be ready for shipment approximately 23 - 24 weeks after approval of general arrangement drawings.

(13) <u>Terms</u>

- 20% of the contract price down-payment by wire transfer after contract signing prior to Commence of engineering, net 90 days.
- of the contract price following shop inspection at sellers/manufacturers plant (Prior to delivery) by means of wire transfer against the presentation of Acceptance/inspection protocol executed at the sellers' plant, net 90 days.
- of the contract price following installation/commissioning of the equipment at Buyers plant and acceptance documents signed by both parties or no later than 120 days from final equipment commissioning, said acceptance documents having been signed or not.

(14) Warranty

All material goods are warranted against defects in parts and workmanship for 18 months from shipment.

(15) Validity

This quotation is valid for 30 days. Thank for your continuing confidence and the opportunity to provide you with this proposal.

If you have any questions, please do not hesitate to contact us. We look forward to continuing our discussion regarding this project.

Thomas P. Zimmerman
Sales Director – Greenbank Technology Ltd

US Office +1 (262) 642-3535 US Mobile +1 (262) 374-0590 UK Office 011 44 1254 690 555

^{*}Final acceptance will be automatic upon the customer utilizing the system/equipment supplied for production.

^{*}Should equipment be delayed due to circumstances beyond Greenbank responsibility, Greenbank has the right to store the goods already manufactured at the customers cost and risk. Furthermore, shipping dates as indicated and agreed will dictate payment dates even if shipment is made to storage facility.

^{*}Until final settlement of the total purchase price/sum, Greenbank, reserve the right of sole ownership of the equipment in whole or in part.

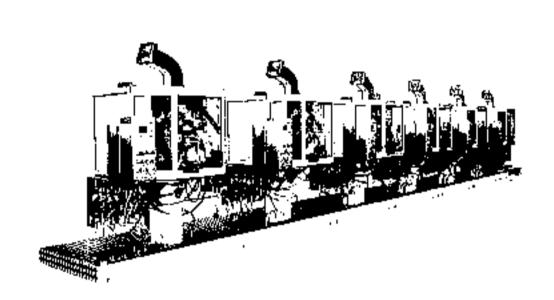


ENGINEERING

Quotation Prepared For

Crown Holdings, Inc.

770 Township Line Road Yardley Pennsylvania USA



Description	Bank of 3200 Dual Turret LSM
Raised By Date	Paul Orsino 10 January 2020
Quotation Number	32347
Issue Number	1
Validity	60 days
Lead Time	26 working weeks

Why Choose CMB Engineering?

With CMB Engineering, you can be confident that our combination of long-standing expertise spanning almost a century, highly innovative technologies, and insight into the modern challenges of canmaking will result in a machine or line that meets your exact specifications.

From our bestselling die sets to our bodymaker, trimmers, decorators, inside spray machines, neckers, and seamers, CMB Engineering harnesses the latest technology to meet our customers' needs. Whether you need a single machine or an entire line, we can help.

Our belief in partnership and collaboration runs through everything that we do, and our in-depth understanding of canmakers' needs, today and in the future, means that we can provide tailored canmaking solutions. Because CMB Engineering's machines are designed for seamless integration, they can interface with other machinery at any point of the canmaking process and enhance the overall efficiency of your line.

Delivery

Delivery Terms EXW to be interpreted in accordance with published Incoterms 2010

26 working weeks from receipt of purchase order

The delivery provided within this quotation is for guidance only and will be confirmed upon receipt of the following;

- 1. Can Data Sheets
- 2. Full Mechanical and Electrical Specifications
- 3. Completed Questionnaire
- 4. Down Payment

Should there be any delay in receiving any of the above then we reserve the right to revise the delivery date.

This offer is generally in accordance with our conditions of sale and the additional terms that follow. It is valid for 60 days from the date of this quotation.

For CarnaudMetalbox Engineering Ltd

Summary of Pricing

Quantity	Description	Total Price
9	12 Pocket Dual Turret Spray Machine for coating internal sides and base of steel and aluminium cans. 3 Gallon per minute pumps. Spark proof extraction fan.	\$
9	Diameter and Height Change parts per set Dual Turret 211x12oz	
	Packing and Charges	\$
	Customer Specified Variations	\$
	Total Cost:	\$

Customer Specified Variations (INCLUDED in Summary of Pricing)

Recommended Quantity:

Per M/c	Total Qty	Description	Price Each	Total Price
1	9	Variable Speed Drive for Spinner Belt per unit		
1	9	Chuck Spinning Detection per unit		
1	1	Nordson ITRAX Bank of 9		
1	9	Individual 7" HMI screens on each machine instead of 10" on control panel		
i	1	Upgraded air conditioning unit for ambient temperatures above 30 deg. C.		
1	9	Local Isolators		
1	1	Nordson Dual filter.		
1	1	Audible Alarm		
1	1	Customer Specific Charges		
1	9	Teflon mat		
1	9	Laminated Glass		
1	9	Upcharge for stainless steel ducting extract chute.		
1	9	Tropicalization of Motors		
1	9	Additional vacuum extraction connection.		
1	9	Gun in position sensor		
1	9	Lacquer extraction vacuum gauges		
1	1	8 Ink Dot		
1	-	Nordson PRX Bank of 9		
1	1	UL approval and certification		
:	9	Diameter and Height Change parts per set Single Turret 204x7.5oz		
í	9	Height Change parts per set 204x12oz		
î	9	Height Change Parts per set 211 x 16oz		
1	1	Single Heat Exchange Nordson TCU		
		Total Cost:		

Optional Extra Equipment (NOT Included in Summary of Pricing)

Recommended Quantity:

Per Total Description Price Each Total Price M/c Qty

Total Cost: \$ 0.00

Customer Notes

- Customer Specific Charges \$16,000.00

 1 Change of low level and build back sensors from Standard IM5135 to OGE100 and OGS100, send & receive sensors for 9 Spray M/C's.

 2 Additional Motor Conveyor Extraction Fan
- Starter & Control
- 3 Additional stop start push button enclosure for Discharge conveyor

3200 Lacquer Spray Machine

Spray coating machine for internal and base surfaces of aluminum or steel cans.

The CMB Engineering 3200 Lacquer Spray Machine utilizes Nordson® airless spray technology to precisely apply a coating uniformly to the interior of metal cans. Liquid coating material is accurately sprayed onto the interior can surface using precision nozzles and high-speed, repeatable spray guns. This provides consistent results, can to can, and durable, low maintenance operation.

Available in either single or dual turret format, the machine turrets are indexed by proprietary index units. These have a twin dwell, high-speed, globoidal mechanism.

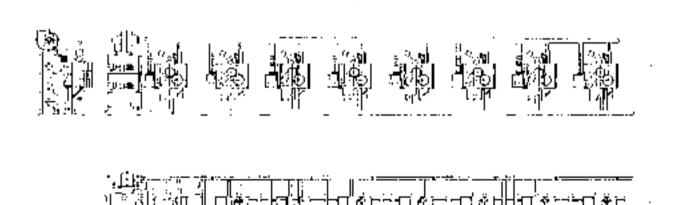
When fully-integrated with the Nordson® iTrax® System, the CMB Engineering 3200 Lacquer Spray Machine can automatically monitor the inside spray process, maintain corrective action and maintenance histories, and detect changes in the performance of the spray system that may affect production quality. It can also be configured to store can recipes, enabling automatic timer and pressure changing of the spray guns when changing to different container sizes or types. Monitoring of the can spin belt speed, chuck vacuum, and gun mount position is optional.

Reaches speeds of up to 400 cpm with the single turnet or 350 cpm with twin turnet. Flexibility in number of stages. Works with following can sizes: 15d 202 to \$68ml 211.

High-speed internal coating of aluminium or steel cans

Technical de	ata
Con Sizes:	15c) 202 to 50c) 211 Can height and diameter changes are very convenient, as the machine is fully adjustable. The machine has been designed to allow quick changeovers
Speed:	Up to 350 cans per minute (Twin Turet) Up to 400 cans per minute (Single Turet) 12 or 6 pocket
Drive:	Skew Drive to Indexing units Independent Spinner Crive
Quards:	Complete safety guarding, electronically interlocked to the control system
Spreys	Nordson Spray Equipment
Opilona:	Dome Spray Mis-spray Detection (Nordson Trax® Spray Monitor) Model 9M or Sencon Nordson Spray Pressure Control Nordson Temperature Control (TCU) Unit Nordson Trax® Spray Controller (Model SC) Nordson Trax® Pressure Controller (Model PRx)

Typical installation



Payment Terms

All payments are due as follows:

30% with Order □

60% on despatch□

10% on commissioning but no later than 120 days after despatch

Standard Conditions of Sale - Machinery and Equipment

Unless varied by endorsement on our contract note goods are sold only upon the following conditions which shall override any conflicting terms in your order:

Machinery and Equipment

Unless varied by endorsement on our contract note goods are sold only upon the following conditions which shall override any conflicting terms in your order.

Quotations

Quotations are valid for sixty days only and are subject to our written acceptance of your order.

Pricina

Default in payment of any invoice for stage or other payment shall entitle us to treat any outstanding contracts between us as repudiated by you.

Contract

No variation of these conditions or the particulars in the order and acceptance shall be valid unless agreed by us in writing.

Price Variation

Prices may be subject to revision in the event of any variation in costs incurred by us after our acceptance of your order. V.A.T. not included in the quotation or invoice will be added where applicable.

Delivery

Delivery shall be at your nominated point of delivery which if you or your contractors collect or if no written nomination has been received by the time the goods are ready shall be our premises. Any date or period given shall be approximate though we will make every effort to meet it and no delivery shall be overdue until you have made a written request for delivery and given us reasonable time to comply with it. Delivery terms in accordance with INCOTERMS 2010.

Delayed Acceptance

Provided any stipulated date or period for delivery has expired, goods whether wholly or partly fabricated remaining on our premises or in the hands of the forwarding agent by your request or default thirty days after written notice to you, may be invoiced whereupon payment shall forthwith become due together with interest and storage charges. Thereafter the goods will be held at your risk.

Erection

All skilled and unskilled labour for offloading and erection, and Engineer's time in starting the machinery or attending thereto after starting will be charged extra including time travelling to and from site, plus fares, expenses and accommodation at cost. You will provide suitable lifting tackle for off-loading and erection, and all fuel, stores, materials or instruments required for any preliminary working or tests will be charged extra.

Tests

If special tests or tests in the presence of you or your representative are agreed upon between us they shall take place unless otherwise agreed, at our Works, and will be charged extra. In the event of any delay on your part in attending such tests after seven days notice that we are ready, the tests will proceed in your absence but shall be deemed to have been made in your presence.

Ownership

Title in the goods shall remain with us until payment is received in full.

Packaging Designs

(a) Designs, sketches, lay-outs, etc. originated by us are submitted in confidence and unless otherwise agreed in writing they and the copyright in them will remain ours. We cannot accept any responsibility for errors in drawings or specifications approved by you. You will be responsible for any printed matter approved by you and for any design shape or construction to your specification and shall indemnify us against any claim arising therefrom.

(b) Jigs, tools, and equipment provided by us remain our property whether or not a charge is made towards their costs unless you have placed a specific order for such equipment which we have accepted.

Strikes etc

Every effort will be made to carry out the contract but its due performance is subject to cancellation by us without compensation or to such variation as we may find necessary as a result of scarcity of labour materials or supplies or because of any Act of God, war, strike, lock-out or other labour dispute, fire, the elements, legislation or other cause (whether of the foregoing kind or not) beyond our control.

Warranty

All goods supplied shall be free from defects of material or workmanship. If within twelve months of date of despatch from our works we are satisfied that any part shows defective material or workmanship and it is returned carriage paid we agree to replace or (at our option) repair the part free of charge. No guarantee as to quality is given or shall be implied as regards second-hand goods unless specifically so stated. Our obligations under this clause are subject to your compliance in full with all the provisions of the contract. No warranty is given that goods supplied are suitable for purposes other than those which you make expressly known to us.

Claims

The contract shall be deemed to have been duly performed and the goods accepted unless a written claim is received:

- (a) in respect of damage, delay or partial loss in transit by both us and the carrier within three days of delivery.
- (b) in respect of non-delivery by both us and the carrier within twenty-eight days of despatch for deliveries within the EU, and within two months thereof for deliveries elsewhere.
- (c) in respect of any matter by us within twenty-eight days of delivery. Goods subject to clam must be stored free of charge for our inspection.

Waiver

Our rights shall not be affected or restricted by any indulgence or forbearance to you. No waiver by us of any breach shall operate as a waiver of any later breach.

Liability

The rights conferred by these conditions shall so far as legally possible replace and exclude all common law, statutory or other warranties or conditions whether expressed or implied. Save as specifically mentioned above we do not accept liability, whether in tort or contract or otherwise, for any direct or indirect loss or damage, however arising.

Guarding

In our opinion the equipment included in our quotation is safe and without risks to health when properly used and we acknowledge our obligations under the Health and Safety at Work etc. Act, 1974. The equipment also complies with the seller's obligations under Section 17 of the Factories Act 1961. The estimate includes reasonable guarding as shown but we give no warranty or guarantee whatsoever that such guarding is sufficient for the purpose of the Factories Act. That is your responsibility. If further guarding is required we shall supply it at additional cost to you.

Customs Duties/Taxes/Licences

Our quotation does not include any Customs Duties, or local taxes and assumes that you have taken the necessary steps to ensure that any Import Licences have been obtained. Any costs or claims resulting from a failure to make such arrangements shall be solely your responsibility.

Purchasers Indemnity

It is a condition of any contract that you indemnify us against any costs claims and demands arising and made under any consumer legislation which are in consequence of any defect or alleged defect in a product ("the subsequent product") manufactured and/or supplied by you in which goods supplied by us are comprised where the defect is attributable to the design of the subsequent product or to compliance by us with instructions given to you.

Damage Loss or Pilferage in Transit

No claim in respect goods lost or damaged in transit will be entertained if the risk has passed to you before the occurrence thereof or; if the carrier has been given a clear receipt for the goods or if the carrier is not notified in writing of such loss or damage and of the particulars thereof within what we consider is a reasonable time.

Experimental Work

Unless otherwise agreed all work produced in an experimental way at your request will be considered an order and the cost of such work including all drawings, designs, specifications and materials will be charged extra.

Software

Goods supplied hereunder may include installation and use of software in connection therewith. Any such software is licensed, not sold, to you, and requires the separate execution of a software license agreement.

Restrictions

You will not sell, export, transfer, divert or otherwise dispose of goods supplied by us into, or to any person for onward supply into, or for incorporation into products manufactured in Cuba, Iran, North Korea, Sudan, Syria or any other country subject to sanctions or restrictive measures under the laws of the European Union (as implemented into National law) and/or the United States of America unless such action is expressly authorized by such laws or has the specific authorization of the competent authorities under the relevant laws and we reserve the right to terminate the sale to you immediately if we have reasonable suspicion of your intention to breach this condition.

Law

English law applies.

Additional Terms and Conditions

Taxes

The price quoted does not include local taxes applicable at the point of delivery.

Commissioning

We offer free of charge engineering services for 14 days to commission the equipment and train your operators providing you are willing to pay for:

- · Travel time from our site to yours,
- · Round trip air fare from and back to our factory,
- · Hotel, meal and living expenses.

The services of an engineer can usually be extended for a longer period if so required. Additional Service time will be charged at our standard service rates (available on request), plus additional hotel, meal and living expenses.

Samples

We will require sample cans for machine trials and buy-off and these should be delivered free of charge to our factory 6 weeks before the machine is due for delivery. Any delay in receipt of these samples may make it necessary for us to revise our delivery promise. Any charges incurred by us for duty, clearance and carriage, etc will be recharged to your order. Full details of where and how to consign the samples will be advised after receipt of your order.

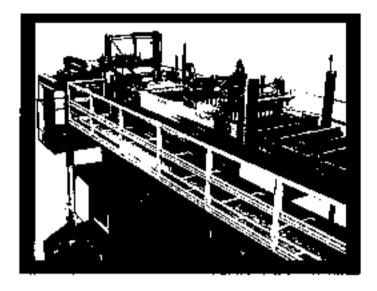
Machine Specification

Should there be any discrepancies in specification between our quotation and any sales literature provided please assume that the quotation provides the latest specification.

Paint Specification

Machine will be painted CarnaudMetalbox standard colours. Any special paint requirement may be charged extra.





Proposed solution for:

Crown Cork & Seal Northeast – United States

Project Horizon Proposal #38438BBC November 5, 2019









Priority One



Dear John Leitzke

Thank you for including Busse/SJI Corporation in your search for a material handling solutions and submitting a Request for Proposal. Busse/SJI, as part of Arrowhead Systems and working with A&B Engineering Services, an affiliated company, offers a wide range of high quality and innovative material handling product lines and services. Therefore, we can customize a solution that will help you increase your productivity and efficiency. We look forward to working with you. This document provides detailed information on a system configured to fit your specific equipment and service needs. We are pleased to present this proposal for your review. If you have questions about any aspect of our proposed solution, do not hesitate to contact me.

Sincerely, Dan Erdman, Sales Manager

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CONTACTS

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Corey Neuman Applications Engineering 920-326-3131, Ext. 1069 cneuman@busse-sji.com



1. REVISION HISTORY

None as of November 04, 2019 Rev 01, November 5, 2019. Added quick adjust squarer option

2. PROJECT SCOPE

The scope of our offering is to provide one (1) Busse/SJI V4004 palletizer with expanded service-side platform to accommodate future addition of a Pattern-Rite change-out crane, one (1) TSS4001 Sorter System, and an FPC System.

The project will be referred to as Project Horizon – Line 1, and will include the same electrical as Nichols Line 3 (Projects 4432 & 4440).

The proposed equipment will be able to process the containers listed in the Product Data Table at the rates noted.

3. PRODUCT DATA TABLE

This proposal was generated based on the details listed in the table(s) below and the section "Customer Reference Documents". We will engineer your equipment based on the products and rates listed. Busse/SJI cannot assume responsibility for the performance of the proposed equipment unless detailed, accurate product information is provided. If applicable, customer to supply drawings of pack orientation to confirm equipment design needs. Note: future container changes may require machine modifications including drive package changes.

The buyer is responsible for supplying test product at no cost to Seller (containers, pallets, slip sheets top frames, etc., including freight). Base equipment pricing includes testing of two (2) SKU's/containers, additional SKU's/containers testing can be offered at an additional cost. If the equipment is to handle multiple material/container sizes, the buyer shall provide empty samples of each product and detailed drawings of dunnage at time of purchase order. Details of testing requirements must be finalized and agreed upon prior to receipt of order and materials.

In order to accurately test your products, we request 4 pallet loads of product for both the 12 oz. & 16 oz. 211 diameter can; in addition to pallet/dunnage for testing no later than 6 weeks prior to expected equipment ship date. In some cases drawings can be substituted for samples. Also supply a drawing of pack orientation, if applicable.

Note: Sample test product must be unused and free of any hazardous materials. If due to the application requirements, the product does or may contain some form of hazardous material, a material safety data sheet (MSDS) must be supplied with the product. No product evaluation or testing will start on potentially hazardous materials without a MSDS on file.

The disposal of test products will be determined by the buyer and seller.

Arrowhead Systems, Inc.

As a leader in the material handling industry, Arrowhead Systems, Inc. helps you keep pace with your ever-changing production demands. We welcome the opportunity to assist you in finding the right solution for your equipment and service needs.

We offer the best brands in the industry:

Arrowhead Conveyor Corporation

Arrowhead Conveyor Corp has over 50 years of proven experience in conveyance equipment. Look to Arrowhead Conveyor for a complete selection of customized and standard conveyor systems, including conveyance for the can manufacturing industry. Arrowhead Conveyor also manufactures the NeXtconveyor wash down and sanitary product line.

Busse/SJI Corporation

As the inventor of the original bulk palletizer and depalletizer, Busse/SJI continues to dominate the industry. In addition to Busse/SJI machines, they manufacture Priority One equipment—simple, yet sophisticated low-level depalletizers, high and low-level case palletizers, and multi-line case palletizing systems.

A&B Engineering Services, LLC

A&B sends experienced field service engineers around the world to assist customers with Arrowhead Systems equipment, as well as other major brands. Services include new equipment start-ups, legacy equipment upgrades, programming and line controls integration, technical support, and parts.



Dunnage Table

Dunnage	Thickness	Material	Width	Length
Layer Sheet	.035"	Plastic	44"	56"
Top Frame	1"	Plastic	44"	56"
Pallet	5.5"	Plastic	44"	56"

- > Busse/SJI's standard design accommodates pallet heights between 4 1/2" and 6". If the pallet is shorter or taller, machine modifications will be required and additional charges will apply.
- > Tolerances on length and width to be less than +/- ½". Note: If pallets, top frames, layer sheets or top cap (if applicable) exceed this tolerance, there is a risk of improper machine function and/or damage to the hoist due to possible pallet jams. Customer is responsible for identifying whether maximum tolerances are exceeded and requesting that Seller provide pricing for machine modifications.
- > Pallets must be four way bulk container pallets of acceptable quality and free of defects. [Quality defined as: flat, square, no missing/broken boards (top, bottom or interior to pallet)] Load quality and machine functionality/performance may be impacted if pallet quality is not maintained. Seller must be notified if slat-type pallets are used.
- > Busse/SJI standard equipment design will accommodate slip sheets and tier sheets made of corrugate, fiberboard or plastic. If other style of sheet is required, additional machine modifications will be required and additional charges will apply. Pending construction material/design of sheet, machine rate may be affected and testing will need to be conducted.

Product Data Table

				Line	Machine				Load
	Material	Description	Dimensions	Speed	Speed	Stagger	CPL	LPP	Height
1	Aluminum	12 oz. 211 Dia.	202/211 x 413	2800	3360	#1	389	22	Up to 110"
2	Aluminum	16 oz. 211 Dia.	202/211 x 603	2800	3360	#1	389	15	Up to 110"
3	Aluminum	*9.1 oz. 204 Dia.	200/204 x 503	2800	3360	#2	528	19	Up to 110"
4	Aluminum	*12 oz. 204 Dia.	200/204 x 602	2800	3360	#2	528	15	Up to 110"

^{*} Denotes "Future" 204 diameter Sleek cans. Sleek can change parts priced optionally.

NOTE: 528CPL may not be achievable if the radius of the sheets used exceeds 1". Corner containers may not be fully contained on sheet. Busse/SJI recommends a 517CPL or 506CPL Pattern

Table Key

- Dimensions Overall dimensions of the product: [Diameter x Height]
- Color of Container Color of Glass, Plastic or PET container.
- > Line Speed (Container per minute, CPM) i.e. Nominal speed. Requested line speed without any over speed factored in. Does not indicate machine capacity.
- Machine Speed (CPM) Line speed and appropriate over speed or maximum output of the machine based on the drive system used (does not take into consideration container handling issues). Note: Machine speed is subject to change following actual testing and/or review of product for container handling characteristics and container stability. In some cases, maximum machine rate cannot be determined until final field set-up is complete.
- > CPL (Containers per Layer) Performance of the equipment is dependent upon the container pattern having the maximum number of containers per layer without extending over the borders (overhang) of the pallet dimension. Additional costs may apply if the number of containers per layer is not maximized or the layer size overhangs the pallet impacting the functionality/performance of the machine, Seller is not responsible for damage caused to containers presented with overhang to the depalletizer. Oversized loads will also compromise the Depalletizer or Palletizer ability to grip layer sheets impacting the automatic function of the equipment. All layers must consistently have the same number of containers per layer. Voids may cause container-handling problems, therefore, the operator is required to correct any tipped containers resulting from voids in pattern. For non-round containers, pattern layouts are required prior to order placement. Palletizing Layer sheets with large radius corners (>1") may require a reduction in containers per layer (CPL) to prevent possible container damage/contamination. Reduction in CPL may result in reduced machine rates.
- > LPP (Layers per Pallet) Note: Number of layers on a load directly affects the Machine Speed. If a reduced number of layers is utilized other than stated in the Product Data Table, the machine rate may be impacted.
- > Load Height The maximum overall height of the completed load including pallet and dunnage height must not exceed 110". (Assumed to be single high loads.) Buyer to notify Seller if the load is not maximized and loads are less than 85".
- > General Bulk Container Pallet Load Requirements Busse/SJI quality commitment in palletizing applications: Pallet loads shall be vertical with perpendicularity deviation of not more than 0.3 degrees, and product damage during palletizing shall be <.01%. However, this is highly dependent on the quality of layer sheets, top frames, and pallets.
 - In a depalletizer application, the incoming load shall not lean more than 1.5° to either side and load layer level shall not vary more than ½" (due to crowning). If load tolerances are outside of these specifications; machine design changes can be made at additional charges.



4. PRICING SUMMARY

Busse/SJI proposes to furnish the following equipment as per Section 7 Proposal Reference Documents. *Note: Pricing contained in this quotation is valid for 30 days from the date of issue.* **All pricing listed is in US dollars and no sales tax included.**

"Customer is asked to present Terms and Conditions in advance of Purchase Order. If Terms and Conditions are presented with a Purchase Order, additional time will be required to process the order."

*Note: The following pricing is the net cost from Seller. Commissions and/or further discounts will not apply without written authorization from Seller.

**Please Note: Pricing in this proposal for Steel (stainless and/or mild) projects is based upon steel surcharges in effect on the date of the proposal's issue. Adjustments in steel surcharges will be passed through to the customer at the time the material is purchased. Steel surcharges are based on surcharges published by our steel supplier. This may produce either a cost addition, or rebate, to the customer depending on market conditions.

***Palletizer pricing valid through Dec 31, 2019

Λ.	One (4) Viscou Mandal VACCA Dellations	4
Α.	One (1) Viper Model V4004 Palletizer	Э

1. One (1) Busse/SJI V4004 Palletizer

- Supports one (1) can diameter (211)
- Three (3) Full Pallet Conveyors
- Bed and Hoist Covers
 - Covers supported from ceiling
 - Ceiling support by customer in field
- Stainless Steel sweep drive shaft over containers
- SEW Gearmotors
- IFM Pressure Switch
- Sick light curtains
- CAT3 Safety Electrical Controls
- Allen Bradley Controls
- CompactGuardLogix with Two (2) Ethernet Ports
- Stratix Ethernet Switch
- 65kAIC Rating on the Main Control Cabinet
- UL Listed Control Cabinet
- 140G-J Circuit Breaker Main Disconnect
- Control Power Disconnect
- Hoffman-SpectraCool Panel Air Conditioner
- Local Motor Disconnects (Qty 21)
 - Hubbell HBLDS30CNK type disconnect (Except Servo Motors)
 - · Early break aux contacts included
- 1492-J Terminal Blocks
- 140M Series Motor Protectors
- 4 Stack Light Beacon

2. V4004 Palletizer - Optional Equipment & Features:

- - 5 Sized to serve as shared operator platform for ratare palietize
- Expanded-Size Service Platform w/Stairway (approx. 300 sq ft)\$
 - Includes light curtain
 - Sized for future pattern rite change out crane



B. 1	SS4001 Turbo Sorter System\$
B. 1	SS4001 Turbo Sorter System One (1) Busse/SJI Model TSS4001 Sorter System One (1) Busse/SJI TS4001 Turbo Sorter Depalletizer One (1) V4001 Busse/SJI Resort Palletizer Supports one (1) can diameter (211) V4001 Resort Semi-Auto Palletizer will be a free patterning bed Operator to fill voids Machine speed is operator dependent Three (3) full pallet conveyors exiting the V4001 Semi-Auto Resort Palletizer Two (2) full pallet conveyors entering the TS4001 Sorter Depalletizer 30ft beds for both the TS4001 and V4001 machines
	 Manual dunnage removal/placement for the TS4001 and V4001 Stainless Steel sweep drive shaft over containers SEW Gearmotors IFM Pressure Switch Sick light curtains CAT3 Safety - Electrical Controls Allen Bradley Controls CompactGuardLogix with Two (2) Ethernet Ports Stratix Ethernet Switch 65kAlC Rating on the Main Control Cabinet UL Listed Control Cabinet 140G-J Circuit Breaker Main Disconnect Control Power Disconnect Hoffman-SpectraCool Panel Air Conditioner Local Motor Disconnects (Qty 16) Hubbell HBLDS30CNK type disconnect Early break aux contacts included 1492-J Terminal Blocks 140M Series Motor Protectors 4 Stack Light Beacon
2.	TSS4001 - Optional Equipment & Features: One (1) Change Parts Package for 204 diameter Sleek can
	 Bed covers supported from ceiling Ceiling support by customer in field. Customer to confirm facility structure is structurally adequate

C.	Full	Pallet Conveyor System\$
	1. (44" x 56" Pallet SEW Gearmotors IFM Pressure Switch CAT3 Safety – Electrical Controls Allen Bradley Controls CompactGuardLogix with Two (2) Ethernet Ports Stratix Ethernet Switch 65kAlC Rating on the Main Control Cabinet UL Listed Control Cabinet 140G-J Circuit Breaker Main Disconnect Control Power Disconnect Hoffman-SpectraCool Panel Air Conditioner Local Motor Disconnects (Qty 24) Hubbell HBLDS30CNK type disconnect Early break aux contacts included 1492-J Terminal Blocks 140M Series Motor Protectors
D	Field	d Services
υ.		
		The following are estimates only. Actual billing will be on a time and material basis in accordance with the Service Policy in force at the time service is rendered.
		etizer
	1. i	nstallation Supervision Assistance\$
		Bacoa on total and in plant of one (2) inclandation capervisor choice capervisors are inclandation of the
	_	equipment for ten (10) consecutive days at ten (10) hours per day.
		The price listed is an estimate only. Actual billing is on a time and material basis per current Service Bulletin rates.
	2. 8	Start-up Assistance\$
		(10) hours per day.
	•	The price letter to an ecumate only return smill to on a time and material sacie per current control banding
		rates.
	3. N	Machine-side Training\$ Based on total time in plant of one (1) Customer Service Engineer onsite for two (2) consecutive days at ten
		(10) hours per day.
	•	Estimate based on same mobilization as Startup. If a separate mobilization is required, there will be additional expense.
۶	Sort	er System
,		nstallation Supervision Assistance
	-7. II	Based on total time in plant of one (1) Installation Supervisor onsite supervising the installation of the
		equipment for eight (8) consecutive days at ten (10) hours per day.
		The price listed is an estimate only. Actual billing is on a time and material basis per current Service Bulletin

rates.



5.	 Start-up Assistance
6.	 Machine-side Training
FP	C System
7.	 Installation Supervision Assistance
8.	 Start-up Assistance\$ Based on total time in plant of one (1) Customer Service Engineer onsite for four (4) consecutive days at ten (10) hours per day. The price listed is an estimate only. Actual billing is on a time and material basis per current Service Bulletin rates.



5. SHIPPING TERMS & LEAD TIMES

Shipping Terms: The proposed equipment shall be shipped Ex-works original manufacturing site. Customer responsibility for in land freight, port receiving charges, forwarder fees, ocean/air freight, charges in foreign port; foreign airport, custom clearance, customs duties, delivery charges to final destination.

Lead Time: Busse/SJI will commit to shipment of equipment by June 30, 2020 based on receipt of Purchase Order no later than November 01, 2020. Additional production time may be required if the project involves non-standard components. A firm shipping schedule will be established after Seller receives the Buyer's down payment and approved project documentation. The project documentation includes the Product Data Table and Layout Drawing(s), which the Buyer must approve within three (3) business days of receipt. If this time frame is not met or the changes are outside of the proposal's scope, additional charges may be incurred and the shipping schedule may be revised.

6. PAYMENT AND REMIT TERMS

Payment Terms:

30% due with issuance of purchase order by Buyer, Due January 15, 2020 30% due upon presentation of engineering documents 30% due prior to shipment

10% due upon commissioning, not to exceed 90 days from shipment.

See attached Terms and Conditions for contractual terms and conditions of equipment sale.

Interest of 1 ½% per month will be charged on any amount which becomes delinquent beyond invoice terms.

Purchase Orders:

The remit amount is due with the issuance of purchase order.

Purchase Orders to be addressed to:

Busse/SJI Corporation

124 N Columbus St Randolph, WI 53956 Attention: Order Entry Fax: 920-326-2532

Acceptance of order is subject to review based on Arrowhead System's "Standard Supplier Terms and Conditions", which may be found at https://www.arrowheadsystems.com/seller-terms-conditions and at the end of this document.

Buyer to supply tax exemption documentation prior to or with Purchase Order. Tax exempt status should apply to the installed/shipped location.

Remittance Information:

Use the link below for the remittance information for Busse/SJI Corporation: $\underline{\text{http://www.arrowheadsystems.com/pdf/BUS-AHSRemittance.pdf}}$



7. PROPOSAL REFERENCE DOCUMENTS

Busse/SJI Documents & Attachments

Document Title		File Name	Date/Re v
Layout Drawing	 38438BBC		 Nov. 04, 2019/None

This proposal is based on Busse/SJI standard design, component selection, and manufacturing practices along with the referenced files/documents. Busse/SJI reserves the right to review and comment to Buyer's specifications. Any additional options required to meet Buyer's specifications will be quoted as line items after Customer Specifications have been reviewed.

Customer Documentation

The following documents and/or files were supplied with your request for proposal. This list will be referred to as "Customer Specs" hereafter.

Document Title	File Name	Date/Rev	
Horizon - Approved Electrical Vendor &	HORZ Approved Electrical Vendor List 19-10-28.pdf	Oct. 28, 2019/19-10-28	
Wiring Specifications		·	

Busse/SJI has reviewed the specifications to the best of their abilities. Busse/SJI reserves the rights to re-review any specifications upon receipt of order commitment to ensure all pricing and specifications are followed prior to order entry and acceptance.

The following exceptions were taken to the Approved Electrical Vendor List

Customer Specification	Comment	Status	
Terminals. Allen Bradley screw	Busse/SJI will provide electronically fused output cards	Exception	
type with blown fuse indication	per previous project to Nichols		

8. CUSTOMER SERVICE

A&B Engineering Services takes care of your service needs.

A&B Engineering, LLC provides a comprehensive menu of service offerings. These include new equipment services such as installation, installation supervision, start-up, and training. Also available, a full array of aftermarket support services including equipment upgrades, rebuilds, enhancements, parts, and preventative maintenance plans.



Call our Service Hotline 24 hours per day, 7 days per week, 365 days a year. A&B offers field service support to customers all over the world.

For additional information, see the current Service Bulletin at http://www.arrowheadsystems.com/pdf/Service-Policy-2019-A-B or request a copy.



Equipment Manuals

Applicable equipment is supplied with one manual in electronic (USB) format. All documentation and equipment signage is in English. Equipment manuals translated into foreign languages can be provided as a cost-extra option. Additional printed copies of machine manuals are available for \$1000 each and printed copies of conveyor manuals are available for \$500 each.



Recommended Spare Parts List

- > Initial Spares Program We offer customized, comprehensive spare part lists with all new Busse/SJI and Arrowhead Conveyor equipment.
- > To guarantee the accuracy of the "Suggested Spare Part List", it is compiled at the completion of the machine build process and is a true "as built" list. Due to this, the final Suggested Spare Part List is not available prior to the Customer buyoff/inspection of the equipment.
- > A&B Engineering provides only Original Equipment Machine Parts.

Note: The following is a list of services the Seller can provide. If not specifically called out within the proposal, these services are not included, but can be upon request. Service rates are billed in accordance with the Service Bulletin in force at the time service is provided.

Services

- > Installation Supervision Ensures that your installation crew operates at peak efficiency by having trained personnel supervising the installation of your Arrowhead Systems new or used equipment.
- > Turnkey Installation of Equipment We offer mechanical installation, electrical installation, start-up and training.
- > Initial Start-up / Commissioning Ensures maximum performance from new equipment. This service is required to validate your new equipment warranty.
- > Technical Support / Trouble-shooting Phone and onsite support available when technical assistance is needed.
- > Retrofits / Upgrades On-site services are available to improve the speed, reliability, efficiency, or safety of various brands of equipment.
- Machine Overhaul Rebuilding of various equipment and machines.
- > Relocation of Equipment for our own and other manufacturer's equipment.

Training

- > Available for operators, maintenance and electricians
- > We offer many class types including skills training, maintenance, trouble-shooting, and refresher courses.
- > Our dedicated training personnel can provide customized formal classroom and/or machine-side training.
- > Customized training materials are offered to provide diversified and supplemental training.

9. EQUIPMENT WARRANTY

Busse/SJI warrants the equipment addressed in this proposal that we manufacture shall be free of defects in workmanship and material for a period of one (1) year from commissioning of the equipment not to exceed eighteen (18) months from shipment, whichever occurs first.

Please Note: Startup and commissioning of all new Busse/SJI equipment MUST be performed by Busse/SJI authorized field service personnel to validate your new equipment warranty.



See Terms and Conditions for full details.

10.BUYER CLARIFICATIONS

Safety Barriers

Busse/SJI's standard high level equipment (equipment that requires a platform for access) includes safety barriers on the operator side of the machine. If access is available to any part of the machine other than the main operator side and this access is not provided by Busse/SJI it is requested that Busse/SJI be notified of such access so that any additional guarding that may be required can be quoted. If Busse/SJI is not made aware of these instances, it will be the owner's or integrator's responsibility to provide additional guarding.

Sweep Light Curtain

Busse/SJI calculates light curtain distance from moving objects per ANSI B11.19. However, in some situations such as space limitations, allowances can be made to minimize this distance. If the end user limits machine access to properly trained



individuals, has safety training programs and follows facility safety protocols, the distance can be reduced with written approval from the end user. (Applies to Alpha Turbo, Turbo, W-Series, R-Series (+Bedless), and Viper).

Buyer's Responsibility

The following items are Buyer's responsibility:

- > Thorough review of this Proposal
- > Electrical service to the panel
- > This proposal supposes that the power system used at the facility is grounded. (Delta, Delta-Wye) Any damage to the equipment due to an ungrounded system, without notifying the Seller to allow proper procedures to be taken, will be the responsibility of the Buyer's plant and not of Seller or any of their subsidiaries, both foreign and domestic.
- > Applicable air requirements 14 SCFM at minimum
- > Minimum door size of 10' high x 9' wide for the equipment entry into the facility
- > Product for equipment test and demonstration (if required)
- Fork Truck Barriers (if required)
- > All Installation preparation and requirements outside of purchased installation supervision, startup, and commissioning (Mechanical & Electrical)

Prior to/After accepting a purchase order:

- > CAD drawings of every container and/or material to be handled (samples may be substituted for drawings).
- > Drawing of pack orientation if applicable.
- > Verification of information and completion of any incomplete or inaccurate data from the Product Data Table as listed in this proposal.
- Sample test product must be unused and free of any hazardous materials. If due to the application requirements the product does or may contain some form of hazardous material, a material safety data sheet (MSDS) must be supplied with the product. No product evaluation or testing will start on potentially hazardous materials without a MSDS on file.
- Notification to Seller if UL "Listed" is required for the electrical panel at the proposed plant location. The standard is to use UL approved components, but if UL "Listed" is required, it can be provided at an additional charge.
- Approval of layout drawings, which will be sent with the purchase order acceptance letter, requires a three (3) business day approval turnaround. Additional charges may be incurred and the scheduled ship date may be revised if the drawing requires changes that are outside the scope of this proposal.
- > Specified preferred freight carrier for collect freight charges.
- > Ship to contact information, including name and phone number.

11.STATEMENT OF PERFORMANCE

Busse/SJI warrants that under production operation conditions, the equipment will perform per the specified scope of this proposal and at an efficiency level of 99%, when the conditions below have been met:

- > The product/containers and packaging materials (dunnage) meet the container specifications provided within the Product Data Table of this proposal and meet the manufacturer's tolerances (such as to print dimensional integrity) and are free of defects.
- The equipment is furnished with an uninterrupted supply of properly oriented, approved materials.
- Electrical controls for the system must be supplied or previously approved by Seller. If no controls are provided, the equipment does not constitute a system and therefore warranty can only be extended to mechanical performance of the individual items and workmanship.
- > Operators and maintenance people have been properly trained by authorized Busse/SJI representative.
- > The equipment is properly installed, maintained and operated by trained personnel within the parameters in which it was designed.
- > All upstream or downstream devices and/or equipment are operating properly at rated speeds.
 - NOTE: Any customer-provided conveyor and all upstream or downstream equipment must be operational at design speed. Sufficient containers must be available for continuous testing.
- Startup and commissioning by Arrowhead Systems (or approved representative.
 - STARTUP NOTE: All mechanical and electrical installation must be completed prior to Arrowhead Systems
 Representatives arrival on-site including interface to existing or customer-provided conveyor and all upstream
 equipment must be operational at design speed. Sufficient containers must be available for continuous testing.



- > The improper performance of all other equipment shall not adversely affect the operation of the system and/or equipment as defined in this proposal.
- The efficiency level is calculated on the following equation: 99% = $\frac{ST-DT}{ST}$
 - ST is the Scheduled Running Time for the period which the efficiency is being calculated for.
 - DT is Down Time due to malfunction of the equipment. Down time is defined as the period of time during which corrective action is being performed on the equipment (it is the Buyer's responsibility to ensure the availability of competent maintenance personnel and an adequate supply of spare parts).
 - Equipment malfunctions do not include failures due to bad containers, untrained operators or malfunction of upstream, downstream devices and/or equipment.
- Any modifications made to the equipment and/or system as described in this proposal, without prior approval from Seller may invalidate this warranty.
- > This statement of performance applies only to the equipment manufactured by the companies of Arrowhead Systems, Inc. Seller does not make any claim of performance for third party equipment supplied as part of this proposal.

Busse/SJI's Commitment

- > Seller must be notified prior to any testing and agree that the equipment is ready. Seller may or may not have a representative present during testing.
- Prior to performance testing, the Buyer's operators and maintenance personnel must be instructed in the machine's operation and maintenance requirements. At Buyer's expense, additional training can be provided by Seller's Technician or Engineer on site.
- If the equipment fails to perform up to the specified level of efficiency, written notification must be received by Seller within thirty (30) days after receipt of equipment. The Seller may have a period of thirty (30) days in which to make, at Seller's expense, the necessary alterations to enable the equipment to meet the stated performance guarantees and specifications. Upon completion of the alterations, the test will be rescheduled.

12. CUSTOMER DEMONSTRATION

As part of our Customer Satisfaction and Quality Assurance Program, Seller verifies the operation and performance of all equipment prior to shipping including both an internal inspection and, if applicable, customer demonstration. Each piece of equipment must pass an internal inspection procedure prior to shipping. A representative from Manufacturing, Engineering, Sales, Service and Accounting must approve the inspection.

Our customers are invited to observe the final stages of the standard testing process at the Seller's manufacturing facility. This shop "demonstration" provides the customer with the opportunity to view the equipment prior to shipment. There is a cost associated with these demonstrations and they are limited to one (1) day for a maximum of four (4) attendees, covered in base system pricing. If additional days or attendees are desired, additional costs will be incurred. The Seller also reserves the right to charge for the additional time required for support personnel. If Buyer requires language interpretation during the FAT, Buyer is responsible for providing interpreter at their expense.

Revisions or additions to the equipment's design requested by the buyer during shop demonstration may result in price increases and/or delays to the shipping schedule. An authorized representative of the buyer must approve these revisions. Special shop testing and training, which is in addition to the standard procedure described above or extended running of particular products can be accommodated at an extra charge.

Equipment described in this proposal may be manufactured at two (2) different manufacturing locations. Each piece of equipment will be fabricated and tested according to the standard practices of the respective location. No provision is included for set-up of all equipment in one location prior to shipment. All equipment will be shipped directly to the end user location directly from the manufacturing sites.

Seller also tests the machines independent of ancillary equipment purchased with the machine. This equipment can be tested with the machine, however, additional charges and time may apply. If additional testing is required, the Buyer must notify Seller prior to ordering. In the case that the additional equipment is purchased by the Seller from another vendor, the inspection of the



equipment will be at their facility and per their standard policies. The Buyer will be responsible for any additional charges that may apply.

If applicable, test product supplied by the buyer will be manually loaded into the equipment. Cycle times can be measured and used to verify equipment capacity. Continuous product flow simulating sustained production runs is not possible due to limited material availability and handling restrictions.



13.TECHNICAL DESCRIPTIONS

A. Viper Palletizer Model V4004:

- General Machine Configuration
 - Model No: V4004
 - Machine Automation: Automatic
 - Machine Hand: Right
 - Machine Flow: Reverse
 - Product Handled: Empty Containers
 - Top of Chain Elevation: 13"
 - Tin Line Elevation: 16'-1"
 - Maximum Load Size: 44" x 56" x 110"
 - Load Capacity: 1300 Pounds
 - Pallet Orientation: Narrow Way
 - Electrical Power: 460V/3 Ph/60 Hz
 - Control Voltage: 24 VDC
 - Compressed Air Maximum: 73 SCFM at 80 psi
 - Control Cabinet Air Conditioner Included
 - Hoffman SpectraCool air conditioner has been Included
 - UL Label on Electrical Panel Included
 - Inspection/Approval of electrical panel in the main electrical cabinet by Underwriters Laboratories Inc. has been included
- Paint
 - RAL 9010 (Pure White)
 - Machine; including moving parts
 - Skins
 - Operator Platform
 - Electrical Junction and Pushbutton Boxes
 - RAL 7035 (Light Grey)
 - Main Electrical Enclosure
 - Programming Shelf
 - RAL 1021 (Rape Yellow)
 - Guards
 - Handrails
 - Stairways
 - RAL 5012 (Light Blue)
 - Compressed Air Hard Pipe
 - Automatic Powered Full Pallet Conveyor
 - Conveyor 1: 8'-0" Conveyor in front of the hoist
 - Conveyor 2: 11'-0" Chain Conveyor (Strapping)
 - Conveyor 3: 11'-0" Chain Conveyor
- Chain Conveyor
 - Three-strand chain
 - Heavy duty 7-gauge formed construction
 - 1/8" [3.175mm] steel diamond deck plate between chains
 - UHMW Channel Chain Guides
 - Individual photo eye controlled staging zones with automatic pallet advancing
 - Variable Frequency Drives for smooth pallet handling
 - Reversible operation
- Hoist
 - All electric and pneumatic modular construction



- Muted Light Curtain at hoist entry
 - Disables the hoist in the event of inadvertent entry
- Servo Driven Hoist
 - Uses a pneumatic brake for the indexing of the hoist.
- Layer Squarer Assembly
 - Squares each layer after the load has indexed down
- Flight Bar Hoist
 - Allows top pallet injection which will insert the pallet at approximately the bed level and thereby reducing
 the pallet change cycle of a standard reciprocating hoist.
- Maximum Load Height Proximity Switch
 - Ensures proper load height is reached.
- Sweep Area
 - Two-Sided Sweep
 - Layer is contained and supported in the front and rear.
 - Dual side driven with polychain belt
 - Servo Driven for gentle/gradual acceleration and deceleration.
 - Light Curtain located on operator side for safety to stop the sweep in the event of inadvertent entry, with fault reset at operator console
 - Busse/SJI calculates light curtain distance from moving objects per ANSI B11.19. However, in some
 situations such as space limitations, allowances can be made to minimize this distance. If the end user
 limits machine access to properly trained individuals, has safety training programs and follows facility
 safety protocols, the distance can be reduced with written approval from the end user.
 - Sweep has no painted parts above containers.
- Accumulation Bed
 - Bed Length: 30'-0"
 - Tip-up Dead plate
 - Minimizes containers catching on the layer sheet (no sheet gripper).
 - Electrically Conductive Inserts are belting inserts to dissipate static electricity created by the containers on accumulation bed.
 - Dead plate (End) Transfer
 - The customer will provide conveyor that will match up to the accumulation bed. Busse/SJI will provide a
 dead plate transfer.
 - Roller returns for belting
 - Direct drive hollow shaft gear motor mount minimizes additional parts, sprockets, chains, guards, etc., and maintenance friendly.
- Container Patterning
 - Stagger #1
 - Patent pending "Slide-by mechanism" to create stagger Every other row contains one more container
 - Stagger #2
 - Adjacent rows contain an equal number of containers
 - Pattern Rite
 - For void free patterning using Busse/SJI's exclusive patented Pattern Rite™ System.
 - No painted parts used in construction of the Pattern Rite™.
 - Air Bed in Pattern Rite™ area maximizes Pattern Rite lane throughput.
 - Note: Machine throughput is dependent on a constant flow of rail to rail product on the infeed conveyor at machine rated speed and an infeed conveyor effective width equal to the effective width on the accumulation bed infeed.



- Dunnage Handling
 - Dual Stage Layer Sheet Placement
 - Sheets are picked only from the pallet, squared, registered and positioned for the sweep assembly to pickand-place it. The unit is located behind the hoist and must be end loaded.
 - Dual Stage Top Frame Placement
 - Top frames are picked from a pallet via a mechanism which squares it from side to side. This mechanism is inserted inside the hoist at which time the top frame is placed on the load. The unit is located behind the hoist, directly under the sheet handling mechanism and is end loaded only.
 - Top Pallet Injection Hoist will lift individual pallets above the top frame placement carriage and allows the insertion of the pallet at approximately the tin line elevation for quick pallet change cycle. (Less than 20 seconds) while simultaneously placing the top frame on the full pallet load while still contained in the hoist. Thereby giving better load stability on the full pallet conveyor discharge.
- Empty Pallet Conveyor
 - Chain Driven Live Roller Conveyor
 - Two (2) 5'-5" zones of Chain Driven Live Roller Conveyor for staging two (2) stacks of pallets before the pallet hoist.
 - Individual photo eye controlled staging zones with automatic pallet advancing
- Controls
 - NEMA 12 Enclosure
 - Completely pre-wired, programmed and fully tested prior to shipment. Freestanding, fused main disconnect, motor starters, variable frequency drives, control transformer, programmable controller, and schematics
 - Components
 - All wires and terminal strips are numbered for identification

B. TSS4001 Sorter System:

- General Machine Configuration
 - Model No: TSS4001
 - Machine Automation: Manual/Semi-Automatic
 - Product Handled: Empty containers
 - Top of Chain Elevation: 13" V4001 / 14" TS4001
 - Tin Line Elevation: 16'-1"
 - Maximum Load Size: 44" x 56" x 110"
 - Load Capacity: 2000 lbs.
 - Pallet Orientation: Narrow Way
 - Electrical Power: 460V/3 Ph/60 Hz
 - Control Voltage: 24 VDC
 - Compressed Air Maximum: 23 CFM at 80 psi
 - Control Cabinet Air Conditioner Included
 - Hoffman SpectraCool air conditioner has been Included
 - UL Label on Electrical Panel Included
 - Inspection/Approval of electrical panel in the main electrical cabinet by Underwriters Laboratories Inc. has been Included
- Paint
 - RAL 9010 (Pure White)
 - · Machine; including moving parts
 - Skins
 - Operator Platform
 - Electrical Junction and Pushbutton Boxes
 - RAL 7035 (Light Grey)
 - Main Electrical Enclosure



- Programming Shelf
- RAL 1021 (Rape Yellow)
 - Guards
 - Handrails
 - Stairways
- RAL 5012 (Light Blue)
 - Compressed Air Hard Pipe

1. TECHNICAL DESCRIPTION: PALLETIZER V4001

- General Machine Configuration
 - Machine Flow: Reverse (full pallet conveyor beneath the bed)
 - Machine Hand: Left
- Automatic Powered Full Pallet Discharge Conveyors
 - Conveyor 1: 8'-0" Chain Conveyor in front of the hoist
 - Conveyor 2: 11'-0" (Strapping Conveyor)
 - Conveyor 3: 11'-0" Chain Conveyor
 - Chain Conveyor
 - Three-strand chain
 - Heavy duty 7-gauge formed construction
 - 1/8" [3.175mm] steel diamond deck plate between chains
 - UHMW channel chain guides
 - Individual photo eye controlled staging zones with automatic pallet advancing
 - Variable Frequency Drives for smooth pallet handling
 - Reversible operation

Hoist

- All electric and pneumatic modular construction
- Muted Light Curtain at hoist entrance
 - Disables the hoist in the event of inadvertent entry.
- Variable Frequency Drive
 - Uses a pneumatic brake for the indexing of the hoist.
- Layer Squarer Assembly
 - Squares each layer after the load has indexed down
- Pallet Lift Platform
 - Hoists raises pallet using chains with individual UHMW chain tracks at 4 points, each with a chain tension idler for precise guidance, low maintenance, and quiet operation
- Maximum Load Height Proximity Switch
 - Ensures proper load height is reached. Manually adjusted by operator.
- Sweep Area
 - Operator Initiated "Sweep Forward" Motion and Automatic Return
 - This method allows the operator to check the pattern and fill any voids prior to initiating the sweep cycle by depressing a separate pushbutton located outside of the light curtain area.
 - Two-Sided Sweep
 - · Layer is contained and supported in the front and rear.
 - Dual side driven with polychain belt
 - Variable Frequency Sweep Drive For gentle/gradual acceleration and deceleration.
 - Light Curtain located on operator side for safety to stop the sweep in the event of inadvertent entry, with fault reset at operator console
 - One Set of Change Parts
 - Machine will be set-up to accommodate one container profile. Additional change parts may be required when changing container diameters.
- Accumulation Bed



- Bed Length: 30'-0"
- Bed Belting: Intralox 900 Series
- Tip-up Dead plate
 - Minimizes containers catching on the layer sheet (no sheet gripper).
- Electrically Conductive Inserts are belting inserts to dissipate static electricity created by the containers on accumulation bed.
- Roller returns for belting
- Direct drive hollow shaft gear motor mount minimizes additional parts, sprockets, chains, guards, etc., and maintenance friendly.
- Dead plate (End) Transfer
- Cross conveyor section from sorter depalletizer with mass infeed.
- Container Patterning
 - Self-Patterning Accumulation Area
 - Operator required to fill voids in the pattern
 - Note: Machine throughput is dependent on a constant flow of rail to rail product on the infeed conveyor at
 machine rated speed and an infeed conveyor effective width equal to the effective width on the accumulation
 bed infeed.
 - Stagger #1
 - Using Patent Pending "Slide-by Mechanism" to create stagger Every other row contains one more container than the adjacent row.
- Dunnage Handling
 - Top Frame Handling
 - Operator manually places the top frame on the load
 - Laver sheet
 - Operator manually places the layer sheet on the load
- Dunnage Storage
 - Free standing Dual Dunnage Racks shared with the sorter depalletizer.
 - Gravity Roller Conveyor to stage pallet of layer sheets
 - Separate rack for top frames shared with sorter depalletizer
- Automatic Empty Pallet Dispenser
 - A stack of pallets will be loaded directly to the dispenser by the fork lift operator.
 - Loading Direction: End
 - Quick change for variety of pallet sizes (max 15" size limit)
 - Rugged pneumatic assisted pallet catch fingers
 - Remote Dispenser Controls for operation at floor level.
 - Safety fencing complete with light curtains at fork truck access point.
- Empty Pallet Conveyor
 - Automatic Powered Conveyor:
 - (1) 12'-0" Chain Conveyor
- Controls
 - NEMA 12 Enclosure Shared with the Sorter depalletizer
 - Completely pre-wired, programmed and fully tested prior to shipment. Includes fused main disconnect, motor starters, variable frequency drives, control transformer, programmable controller, programming documentation, and schematics

2. TECHNICAL DESCRIPTION: DEPALLETIZER TS4001

- General Machine Configuration
 - Machine Flow: Inline (Empty pallet conveyor beneath the bed)
 - Machine Hand: Left
- Automatic Powered Pallet Infeed Conveyor
 - Stages 2 pallet loads prior to hoist.
 - Conveyor 1 8'-0" 3-Strand Chain Conveyor in front of the hoist



- Conveyor 2 5'-6" 3-Strand Chain Conveyor
- Chain Conveyor:
 - Three strand chain
 - UHMW Channel Chain Guides
 - Conveyor Decking Steel Diamond Plate
 - Individual photo eye controlled staging zones with automatic pallet advancing
 - Variable Frequency Drives for smooth pallet handling
 - Reversible operation

Hoist

- Muted Light Curtain at Hoist Entrance
 - Disables the hoist in the event of inadvertent entry.
- Layer Sheet Grippers
 - Two pneumatically operated grippers hold the layer sheet during the sweeping of the containers including
 the last layer sheet on the pallet
- Hoist Chain Tension Monitor Kit
 - Helps reduce further damage during pallet jam by compressing hoist tensioners and triggering proximity switch to stop hoist
- Pneumatic Positive Pallet Stop:
 - A direct pallet backstop will not allow pallet overruns, under any circumstance; therefore, ensuring true
 pallet positioning
- Pneumatic Side Squaring Walls
 - Provide freedom around loads during hoist entry and resquare the load prior to rising
- Right Angle Gearbox:
 - Directly drives power transmission to both sides of hoist, superior performance with minimal maintenance
- Pallet Lift Platform:
 - Hoists raises pallet using chains with individual UHMW chain tracks at 4 points, each with a chain tension idler for precise guidance, low maintenance, and quiet operation
- Fail Safe Brake Mechanism
 - External, shaft mounted, spring clamp brake held disengaged by compressed air. In the event of a power failure or E-stop, air pressure is dumped causing the brake to engage instantaneously.
- Sweep Assembly
 - Single Sided Manual Sweep
- Accumulation Bed
 - Bed Length: 30'-0"
 - Bed Belting: Intralox 900 Series Flush grid
 - Electrically Conductive Inserts are belting inserts to dissipate static electricity created by the containers on accumulation bed.
 - Split Belting on Accumulation Bed
 - Allows pattern to be split into two (2) inspection lanes and a mass bypass
 - Tilt Brackets Urethane belt tilt containers for visibility.
 - Independent Jackscrew Leveler Adjustments for end shafts, dead plates, bed support/sprocket interface, accurate field adjustments, and maintenance friendly.
 - Shaft-mounted Gear motor eliminating sprockets, chains and guards which also reduces maintenance requirements.
 - Variable Frequency Control Drive
 - All 4-bolt Flange Bearings
 - 1 ½" (minimum) square shafting
- Dunnage Handling
 - Manual Top Frame Removal
 - Operator removes the top frame from the load before sweeping and places it in appropriate dunnage location.



- Manual Layer Sheet Removal
 - Operator removes each layer sheet and places it in appropriate dunnage location
- Dunnage Storage
 - Layer Sheet Rack
 - The layer sheets will be positioned directly behind the hoist with side access for removal of layer sheet pallet load
- Empty Pallet Discharge Conveyor
 - (1') 8'-0" Gravity Roller Conveyor for the dispensing of individual pallets
 - Unpowered roller conveyor with control photo eye
- Controls
 - NEMA 12 enclosure, shared with the Palletizer, fused main disconnect, motor starters, variable frequency drives, control transformer, programmable controller, and schematics completely pre-wired, programmed and fully tested prior to shipment.

C. Full Pallet Conveyor System:

- General Machine Configuration
 - Material: Mild Steel
 - Load Capacity: 2000 pounds
 - Control Voltage: 24 VDC
 - Plant Voltage: 460V/3 Ph/60 Hz
 - Control Cabinet Air Conditioner Included
 - Hoffman SpectraCool air conditioner has been Included
 - UL Label on Electrical Panel Included
 - Inspection/Approval of electrical panel in the main electrical cabinet by Underwriters Laboratories Inc. has been Included
- Paint
 - RAL 9010 (Pure White)
 - · Machine; including moving parts
 - Skins
 - Electrical Junction and Pushbutton Boxes
 - RAL 7035 (Light Grey)
 - Main Electrical Enclosure
 - Programming Shelf
 - RAL 1021 (Rape Yellow)
 - Guards
 - RAL 5012 (Light Blue)
 - Compressed Air Hard Pipe
- Three-strand Chain Conveyor
 - 08B-2 ISO chain
 - UHMW Channel Chain Guides
 - 1/8" [3.175mm] steel diamond deck plate between chain
 - Individual photo eye per zone
 - Inverter duty motors for smooth pallet handling
 - Bi-Directional Operation
- Chain to Chain Right Angle Transfer Conveyor
 - 08B-2 ISO chain
 - UHMW Channel Chain Guides
 - Individual photo eye per zone
 - Bi-Directional Operation
 - Pop up transfer
 - Transfer Chains are driven by independent motors.



- "Over Center" feature guarantees the lift mechanism stays in the raised positions during power loss
- Proximity Sensor provides positive signal indicating raised position
- CDLR Conveyor
 - Full Length chain driven powered rollers
 - 2½" diameter Steel Rollers
 - 4 1/16" Roller Centers
 - Direct drive Gearbox
 - Individual photo eye controlled staging zones with automatic pallet advancing.
 - Inverter Duty Motors for smooth pallet handling
 - Bi-Directional operation
- Electrical Controls
 - Three (3) pedestal mounted control consoles.
 - One (1) PV+7 10" HMI display console
 - Two (2) Pushbutton consoles
 - Electrical Panel
 - Stand-alone enclosure completely pre-wired with all necessary motor starters, soft starts, etc.
 - Estimated cable lengths will be provided for cable run back to Control Cabinet
 - Each motor will be tested for amp draw rotation
 - Pre-wiring of all conveyors
 - Pre-wiring of all conveyors in the cable tray located inside of the conveyor. Cable tray is cut to conveyor length. All pre-wiring will terminate in main control panel located on drawing. Due to space constraints, Busse/SJI will only pre-assemble major portions of conveyor system as needed to complete pre-wiring.

> Full Pallet Conveyor List

	Detailed Pallet Conveyor Listing								
Item #	Conveyor Length	TOC Elevation	Pallet Leading Edge j	Type of Motor Control	Conveyor Description	Controlled B <u>y</u> :			
A-01	10'-0"	13"/14"	44"/56"	VFD	Right Angle Transfer Conveyor	FPC System			
B-01	14'-0"	14"	56"	i VFD	Full Pallet Chain Conveyor (Strapper)	FPC System			
B-02	12'-0"	14"	56"	VFD	Full Pallet Chain Conveyor	FPC System			
B-03	10'-6"	14"	56"	VFD	Full Pallet Chain Conveyor	FPC System			
B-04	10'-6"	14"	56"	VFD	Full Pallet Chain Conveyor	FPC System			
B-05	10'-6"	14"	56" i	VFD	Full Pallet Chain Conveyor	FPC System			
B-06	12'-0"	14"	56"	VFD	Full Pallet Chain Conveyor (Strapper)	FPC System			
B-07	11'-6"	14"	56"	VFD	Full Pallet Chain Conveyor	FPC System			
B-08	5'-5"	14"	56"	VFD	Full Pallet CDLR Conveyor	FPC System			
C-01	10'-0"	13"/14"	44"/56"	VFD	Right Angle Transfer Conveyor	FPC System			
D-01	8'-6"	13"/14"	56"/44"	VFD	Right Angle Transfer Conveyor	FPC System			
E-01	8'-6"	13"/14"	56"/44"	VFD	Right Angle Transfer Conveyor	FPC System			
E-02	8'-6"	13"	44"	VFD	Full Pallet Chain Conveyor	FPC System			
E-03	6'-6"	13"	44"	VFD	Full Pallet Chain Conveyor	FPC System			
E-04	8'-0"	13"	44"	VFD	Full Pallet Chain Conveyor	FPC System			
E-05	8'-6"	13"	44"	VFD	Full Pallet Chain Conveyor	FPC System			
E-06	8'-6"	13"/14"	44"/56"	VFD	Right Angle Transfer Conveyor	FPC System			
F-01	10'-0"	14"	56"	VFD	Full Pallet Chain Conveyor	FPC System			
F-02	10'-10"	14"	56"	VFD	Full Pallet CDLR Conveyor	FPC System			



14. MECHANICAL & ELECTRICAL COMPONENT TABLES

A. Viper Palletizer Model V4004:

Mechanical Specifications

Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Main Frame	1/4" thick formed channel, 1/4" wall mechanical tubing	Bed covers w/frame (over bed, hoist and sweep area) ceiling supported by
		customer
Accumulation Bed	7 gauge formed channel	
Fasteners	Imperial	
Mesh Belt	Intralox 900 Series Raised Rib	
Shafts	Turned, ground and polished shaft	
Bearings	Peer metric - 4 bolt/2 bolt	
Sprockets	Hardened with Taper Loc/QD bushings where required by application	
Gear Boxes:		
Hoist Lift	Grove	i
Hoist Conveyor	NORD	SEW Eurodrive
Bed	NORD	SEW Eurodrive
Sweep	NORD	SEW Eurodrive
Sheet Hoist	NORD	SEW Eurodrive
Sheet Conveyor	NORD	SEW Eurodrive
Full Pallet Conveyor	NORD	SEW Eurodrive
EPC Hoist	NORD	SEW Eurodrive
Empty Pallet Conveyor	NORD	SEW Eurodrive
Top Frame Hoist	NORD	SEW Eurodrive
Top Frame Conveyor	NORD	SEW Eurodrive
Motors:		Premium Efficiency
Hoist Lift	Allen-Bradley VPL Series	i
Hoist Conveyor	NORD	SEW Eurodrive
Bed	NORD	SEW Eurodrive
Sweep	Allen-Bradley VPL Series	
Sheet Hoist	NORD	SEW Eurodrive
Sheet Conveyor	NORD	SEW Eurodrive
Full Pallet Conveyor	NORD	SEW Eurodrive
EPC Hoist	NORD	SEW Eurodrive
Empty Pallet Conveyor	NORD	SEW Eurodrive
Top Frame Hoist	NORD	SEW Eurodrive
Top Frame Conveyor	NORD	SEW Eurodrive
Chain	ANSI/ISO as required	İ
Timing Belts	Gates Polychain	i
Pneumatics:		
Filter and Regulator	Numatics	
Air Cylinders	NFPA / ISO or equivalent	
Pneumatic Switches / Valves	Numatics	IFM Efector pressure switch
Tubes and Fittings	Nylon & Polyurethane tubing. Fittings are "Push In" connection.	
Brakes	Horton	1
Vacuum Generator	SMC	



Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Signage & Display Screens	English	
Leveling Adjustment	+/- 1" (25 mm)	

Electrical Specifications

Component	Busse/SJI Standards	Customer Specified Component Options
Harmonized Standard	All standard components are subject to change without notice Not Included [Optional - UL Label/CE	See optional pricing UL Certification of panel
	Mark/CSA/Other]	l ·
Enclosures:		65kAIC rating on control cabinet
		Programmer shelf and Graceport
		located on main cabinet.
		Additional Graceport located in upper machine junction box.
Rating	NEMA 12	i
Safety Category	Category 3/PLd	
Manufacturer	Hoffman	Square D grounding Lug (PK 15GTA-L)
Lighting	Hoffman (Main enclosure only)	
Cooling	Not Included	Hoffman Spectracool
Exterior Computer Outlet and Ethernet Port	Grace Engineering GracePort	
Exterior Folding Shelf	Hoffman	İ
Disconnects:		
Main Disconnect	Flange Mount Allen-Bradley 1494U or	
	Allen-Bradley 140 G-J circuit breaker if	
	required	
Local Motor Disconnects	Not Included	Hubbell HBLDS30CNK (except servos)
Distribution Block (3 pole)	Allen-Bradley	AB 1492-PD Series w/ clear cover
Distribution Block (4 pole)	Allen-Bradley	AB 1492-PD Series w/ clear cover
Fuse/Circuit Breakers:		1
Fuse Blocks - CC	Allen-Bradley 1492-F	
Fuse Blocks - J	Allen-Bradley 1492-F	
Fuses 30 Amp and Below	Ferraz Shawmut ATDR & ATQR Class CC	I
Fuses Above 30 Amps	Ferraz Shawmut AJT Class J	
Supplemental Protection	Allen-Bradley 1489 Series	
Branch Circuit Breakers	Allen-Bradley 1489 Series	
Relays:		
General Control (Multiple Contacts)	Allen-Bradley 700CF	
General Control (Single Contact)	Allen-Bradley 700H	For AB w/ LED indication and coil
		suppressor 700HA Series
Safety	Allen-Bradley 440R/700S	Safety Control Relay AB Bulletin700S-
		CF
		Safety Relay Modules - AB Guardmaster 440R Series
Drives:		
Variable Frequency Drive	Allen-Bradley PowerFlex 525 Series	140M series motor protectors
Communications	EtherNet/IP	
Vector Drive	N/A	_
Servo Drive	Allen-Bradley Kinetix	
Motor Starters:		



Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Motor Starters	Allen-Bradley IEC/190E/191E (140M	See optional pricing
Contactors Conord Durage	Motor Protector w/100C contactor)	<u> </u>
Contactors - General Purpose	Allen-Bradley 100-C Series	1
Contactors - Safety	Allen-Bradley 100S-C Series	1
Transformer/Power Supply:	0014 (11- 1 Dotte	1
Control Transformer	SOLA/Hevi-Duty	I Tour Common the Common tour
Transformer Mounting	1KVA and over external mount	Transformer with disconnect for control power, mounted externally Spec: 1 KVA or greater to 7.5 = HS14F Series 1 KVA or less = Sbe Series
Power Supply	Allen-Bradley 1606-XLS/XLE Series	1
PLC:		
PLC	Allen-Bradley CompactLogix	CompactGuardLogix L320ERMS Electronically fused output cards
Software	Current released version	1
Operator Interface:		1
НМІ	Allen-Bradley PV +7 - 10 inch (Main) and 7 inch (Secondary)	
Pushbuttons, Selector Switches & Pilot Lights	Allen-Bradley 800F	AB 800FM
Beacon	Allen-Bradley 856T (Red Only)	! 4 color stack beacon Red - Stopped due to fault Amber - Stopped - auto restart Blue - Equipment requires material Green - Machine run
Communication/Network		1
Remote Access	Not Included	
Ethernet Switch	N-Tron	Stratix
NAT Module	Not Included	
Pilot Light Colors:		İ
MCR Enabled/Power On	White	Ī
Circuit Enabled	Blue	1
Auto Mode	Green	İ
Modes/Misc.	Amber	Ī
Sensors:		
Photoeyes	Banner	1
Proximity Switches	Turck	İ
Hoist Entry Protection	Muted Light Curtain	Lockable selector switch to prevent reset
Sensor Blocks	Turck	
Safety Devices:		İ
Safety Switches	Allen-Bradley	i
Light Curtain	SICK	
Wiring:	Gauges (Minimum)	İ
Power	14 AWG	i
Panel	16 AWG	İ
Machine (Single Conductor)	14 AWG	İ
Cables (Control Wires)	16 AWG	:



Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Cables (Motor Wires)	14 AWG - All VFD motors to be shielded	222 252 252 252 252 252 252 252 252 252
	cable	
Sensor Cables	22 AWG	
Interlocks Cable	14 AWG	
Signal Cables	18 AWG - Shielded as required	
Wire Colors:		
220 - 5 7 5 VAC	Black	
120 VAC (Fused)	Red	
120 VAC Neutral	White	
24 VDC	Blue	Dark Blue
24 VDC Common	White w/ Blue Trace	White w/Dark Blue Trace
Interlocks (Foreign Voltage)	Orange	
Ground	Green w/ Yellow Stripe	
Marking	Panduit (Self-laminating wrap around)	1
Miscellaneous:		İ
Labels/ID Tags	Brady LAT 20 (Silver tags black	Ī
	lettering)	
Terminal Blocks	Allen-Bradley 1492-L Series (Spring-	1492-J screw type
	Clamp)	
Field Device Wiring	All field devices have quick disconnects	
	and utilize commercially available	İ
	cables that will be routed along the	
	machine to the appropriate termination	
	point.	1
Machine Wiring Methods	Multi-conductor cables (TC-ER rated) for	
	machine wiring. Routed in open ladder	
	style cable tray or along machine	
	framework. Separate cables for AC and	
	DC. All sensors QD (where available)	
	using cordsets. Cable tray to have dividers.	
Control Architecture	Distributed I/O via EtherNet/IP	<u> </u>
Control Architecture	communication. I/O Devices by Allen-	
	Bradley, Turck, Numatics, and others as	
	required by application.	
I/O Devices	I/O Devices by Allen-Bradley, Turck,	1
1/ O Devices	Numatics and others as required by	



B. TSS4001 Sorter System:

Mechanical Specifications: V4001 Resort Palletizer (TSS4001)

Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Main Frame	1/4" thick formed channel 1/4" wall	
	mechanical tubing	
Accumulation Bed	7 gauge formed channel	
Mesh Belt	Intralox 900 Series Flush Grid	
Gear Boxes:		
Hoist	Grove	
Hoist Conveyor	NORD	SEW Eurodrive
Bed	NORD	SEW Eurodrive
Sweep	NORD	SEW Eurodrive
FPC Conveyor	NORD	SEW Eurodrive
EPC Conveyor	. NORD	SEW Eurodrive
Motors:	1	Premium Efficiency
Hoist	NORD	SEW Eurodrive
Hoist Conveyor	NORD	SEW Eurodrive
Bed	NORD	SEW Eurodrive
Sweep	- NORD	SEW Eurodrive
FPC Conveyor	j NORD	SEW Eurodrive
EPC Conveyor	NORD	SEW Eurodrive
Shafts	Turned, ground and polished shaft, 11/4"	
	min.	
Bearings	Dodge 4 bolt/2 bolt	
Sprockets	Hardened with Taper Loc/QD bushings	
	where required by application	
Leveling Adjustment	+/- 1" (25 mm)	
Chain	ANSI	
Timing Belts	Gates Polychain	
Filter and Regulator	Numatics	
Air Cylinders	NFPA / ISO or equivalent	
Pressure Switch	Numatics	IFM Efector pressure switch
Air Valves	Numatics	
Dump Valve	Numatics	
Tubes and Fittings	Polyurethane tubing. Fittings are "Push	
	In" connection.	
Brakes	Horton/Nexen Pneumatic	
Vacuum Generator	Festo	
Signage & Display Screens	English	



Mechanical Specifications: TS4001 Depalletizer

Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Main Frame	7 gauge formed channel, ¼" wall	
	mechanical tubing	
Accumulation Bed	10 gauge formed channel	
Fasteners	Imperial	
Mesh Belt	Intralox 900 Series Raised Rib	
Shafts	Turned, ground and polished shaft	
Bearings	Dodge / Peer or equivalent	
Sprockets	Hardened with Taper Loc/QD bushings	
	where required by application	
Gearboxes:		
Hoist Lift	Grove	
Hoist Conveyor	NORD	SEW Eurodrive
Bed	NORD	SEW Eurodrive
Sweep	N/A	
FPC	NORD	SEW Eurodrive
EPC	N/A	
Motors:		
Hoist	NORD	SEW Eurodrive
Bed	NORD	SEW Eurodrive
Sweep	N/A - Manual	
FPC	NORD	SEW Eurodrive
EPC	N/A – Gravity	
Chain	ANSI / ISO as required	
Flow Controls	SMC/Festo or equivalent	
Pneumatics:		
Filter and Regulator	Numatics	
Air Cylinders	NFPA / ISO or equivalent	
Pneumatic Switches / Valves	Numatics	IFM Efector pressure switch
Tubes and Fittings	Nylon & Polyurethane tubing. Fittings	
	are "Push In" connection.	
Brakes	Horton	
Vacuum Generator	Gast	
Signage & Display Screens	English	
Leveling Adjustment	+/- 1" (25 mm)	



Electrical Specifications: TSS4001 Sorter System

Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Harmonized Standard	Not Included/UL Label/CE Mark/CSA/Other	UL Certification of panel
Enclosures:	İ	65kAlC rating on control cabinet Programmer shelf and Graceport located on main cabinet. Additional Graceport located in upper machine junction box.
Rating	NEMA 12	
Safety Category	Category 3/PLd	
Manufacturer	Hoffman	Square D grounding Lug (PK 15GTA-L)
Lighting	Hoffman (Main enclosure only)	
Cooling	None	Hoffman SpectraCool
Exterior Computer Outlet and Ethernet Port	Grace Engineering GracePort	
Exterior Folding Shelf	Hoffman	
Disconnects:		
Main Disconnect	Flange Mount Allen-Bradley 140 G-J circuit breaker	
Local Motor Disconnects	Not Included	Hubbell HBLDS30CNK
Distribution Block (3 pole)	Allen-Bradley	AB 1492-PD Series w/ clear cover
Distribution Block (4 pole)	Ferraz-Shawmut	AB 1492-PD Series w/ clear cover
Fuse/Circuit Breakers:		
Fuse Blocks - CC	Allen-Bradley 1492-F	
Fuse Blocks - J	Allen-Bradley 1492-F	
Fuses 30 Amp and Below	Ferraz Shawmut ATDR & ATQR Class CC	
Fuses Above 30 Amps	Ferraz Shawmut AJT Class J	
Supplemental Protection	Allen-Bradley 1489 Series	
Branch Circuit Breakers	Allen-Bradley 1489 Series	
Relays:		
General Control (Multiple Contacts)	Allen-Bradley 700CF	
General Control (Single Contact)	Allen-Bradley 700H	For AB w/ LED indication and coil suppressor 700HA Series
Safety	Allen-Bradley 440R/700S	Safety Control Relay AB Bulletin700S-CF Safety Relay Modules - AB Guardmaster 440R Series
Drives:		
Variable Frequency Drive	Allen-Bradley PowerFlex 525 Series	140M Motor Protectors
Communications	CompactLogix - Ethernet/IP	
Motor Starters:		
Motor Starters	Allen-Bradley IEC/190E/191E (140M Motor Protector w/100C contactor)	
Contactors - General Purpose	Allen-Bradley 100-C Series	
Contactors - Safety	Allen-Bradley 100S-C Series	
Transformer/Power Supply:		
Control Transformer	SOLA/Hevi-Duty	



Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Transformer Mounting	1KVA and over external mount	Transformer with disconnect for control power, mounted externally Spec: 1 KVA or greater to 7.5 = HS14F Series 1 KVA or less = Sbe Series
Power Supply	Allen-Bradley 1606-XLS/XLE Series	
PLC:		
PLC	Allen-Bradley CompactLogix	CompactGuardLogix L320ERMS Electronically fused output cards
Software	Current released version	
Operator Interface:		
нмі	Allen-Bradley PV +7 - 10inch (V4001) & PB Station (T4001)	
Pushbuttons, Selector Switches & Pilot Lights	Allen-Bradley 800F	AB 800FM Included
Beacon	Allen-Bradley 855T (Red Only)	4 color stack beacon Red - Stopped due to fault Amber - Stopped - auto restart Blue - Equipment requires material Green - Machine run
Communication/Network		
Remote Access	Not Included	
Ethernet Switch	N-Tron	Stratix switch included
NAT Module	Not Included	
Pilot Light Colors:		
MCR Enabled/Power On	White	
Circuit Enabled	Blue	
Auto Mode	Green	
Modes/Misc.	Amber	
Sensors:		
Photoeyes	Banner	
Proximity Switches	Turck	
Hoist Entry Protection	SICK Muted Light Curtain	Lockable selector switch to prevent reset
Sensor Blocks	Turck	
Safety Devices:		
Safety Switches	Allen-Bradley	
Light Curtain	SICK	
Wiring:	Gauges (Minimum)	
Power	14 AWG	
Panel	16 AWG	
Machine (Single Conductor)	14 AWG	
Cables (Control Wires)	16 AWG	
Cables (Motor Wires)	14 AWG - All VFD motors to be shielded cable	
Sensor Cables	22 AWG	
Signal Cables	18 AWG - Shielded as required	
Interlocks Cable	14 AWG	
Wire Colors:		
220 - 575 VAC	Black	
120 VAC (Fused)	Red	



Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
120 VAC Neutral	White	
24 VDC	Blue	Dark Blue
24 VDC Common	White w/ Blue Trace	White w/Dark Blue Trace
Interlocks (Foreign Voltage)	Orange	
Ground	Green w/ Yellow Stripe	
Marking	Panduit (Self laminating wrap around)	
Miscellaneous:		
Labels/ID Tags	Brady LAT 20 (Silver tags black lettering)	
Terminal Blocks	Allen-Bradley 1492-L Series (Spring- Clamp)	AB-1492J screw type
Field Device Wiring	All field devices have quick disconnects and utilize commercially available cables that will be routed along the machine to the appropriate termination point.	
Machine Wiring Methods	Multi-conductor cables (TC-ER rated) for machine wiring. Routed in open ladder style cable tray or along machine framework. Separate cables for AC and DC. All sensors QD (where available) using cordsets. Cable tray to have dividers.	
Control Architecture	Distributed I/O via EtherNet/IP communication. I/O Devices by Allen-Bradley, Turck, Numatics, and others as required by application.	



C. Full Pallet Conveyor System:

Mechanical Specifications

Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
	Carbon steel construction	
Main Frame	7 ga. formed channel	
	1/4" wall mechanical tubing	
	Imperial fasteners and Shafts (Roller	
Fasteners	Conveyors), Metric fasteners and Shafts	
	(Chain Conveyors)	
Shafts	Turned, ground and polished shaft	
Bearings	Dodge / Peer or equivalent	
Sprookoto	Hardened with Taper Loc/QD bushings	
Sprockets	where required by application	
Gearboxes:	NORD	SEW Eurodrive
Motors:	NORD	SEW Eurodrive - Premium Efficiency
Chain	ANSI / ISO as required	i
Rollers	1.9 Diameter (Air Chain)	1
	2.5 Diameter (CDLR) – 11 ga. tubing	
Roller Centers	4 1/16" (CDLR)	
Pneumatics:		1
Filter and Regulator	Numatics	
Air Cylinders	NFPA / ISO or equivalent	
Pneumatic Switches / Valves	Numatics	1
Tules and Fittings	Nylon & Polyurethane tubing Fittings are	1
Tubes and Fittings	"Push In" connection	
Signage & Display Screens	English	
Leveling Adjustment	+/- 1" (25 mm)	!

Electrical Specifications

Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Harmonized Standard	Not Included	UL Certification of panel
Enclosure:		65kAIC rating on control cabinet Programmer shelf and Graceport located on main cabinet.
Rating	NEMA 12	
Safety Category	Category 3/PLd	
Manufacturer	Hoffman	Square D grounding Lug (PK 15GTA-L)
Lighting	Hoffman (Main enclosure only)	
Cooling	None	Hoffman SpectraCool
Exterior Computer Outlet and Ethernet Port	Grace Engineering GracePort	
Exterior Folding Shelf	Hoffman	
Disconnects:		
Main Disconnect	Flange Mount Allen-Bradley 140 G-J circuit breaker	
Local Motor Disconnects	Not Included	Hubbell HBLDS30CNK
Distribution Block (3 pole)	Allen-Bradley	AB 1492-PD Series w/ clear cover
Distribution Block (4 pole)	Allen-Bradley	AB 1492-PD Series w/ clear cover
Fuse/Circuit Breakers:		



Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Fuse Blocks - CC	Allen-Bradley 1492-F	
Fuse Blocks - J	Allen-Bradley 1492-F	
Fuses 30 Amps and below	Ferraz Shawmut ATDR & ATQR Class CC	
Fuses above 30 Amps	Ferraz Shawmut AJT Class J	
Supplemental Protection	Allen-Bradley 1489 Series	
Branch Circuit Breakers	Allen-Bradley 1489 Series	
Relays:		
General Control (Multiple Contacts)	Allen-Bradley 700CF	
General Control (Single Contact)	Allen-Bradley 700H	For AB w/LED indication and coil suppressor 700HA Series
Safety	Allen-Bradley 440R/700S	Safety Control Relay AB Bulletin700S-CF Safety Relay Modules - AB Guardmaster 440R Series
Drives:		
Variable Frequency Drive	Allen-Bradley PowerFlex 525 Series	140M Motor Protectors
Communications	EtherNet/IP	
Motor Starters:		
Motor Starters	Allen-Bradley IEC/190E/191E (140M Motor Protector w/100C contactor)	
Contractors - General Purpose	Allen-Bradley 100-C Series	
Contractors - Safety	Allen-Bradley 100S-C Series	
Transformer/Power Supply:		
Control Transformer	SOLA/Hevi-Duty	
Transformer Mounting	1KVA and over external mount	Transformer with disconnect for control power, mounted externally Spec: 1 KVA or greater to 7.5 = HS14F Series 1 KVA or less = Sbe Series
Power Supply	Allen-Bradley 1606-XLS/XLE Series	2,444,454,4555
PLC:		
PLC	Allen-Bradley CompactLogix	CompactGuardLogix L320ERMS Electronically fused output cards
Software Version	Current released version	
Operator Interface:		
HMI	One (1) PV +7 - 10 inch Two (2) PV +7 - 7 inch	
Pushbuttons, Selector Switches & Pilot Lights	Allen-Bradley 800F	AB 800FM
Beacon	Allen-Bradley 855T (Red Only)	4 color stack beacon Red - Stopped due to fault Amber - Stopped - auto restart Blue - Equipment requires material Green - Machine run
Communication/Network		
Remote Access	Not Included	
Ethernet Switch	N-Tron	Stratix switch
NAT Module	Not Included	
Pilot Light Colors:		
MCR Enabled/Power On	White	
Circuit Enabled	Blue	



Component	Busse/SJI Standards All standard components are subject to change without notice	Customer Specified Component Options See optional pricing
Auto Mode	Green	
Modes/Misc.	Amber	
Sensors:		
Photoeyes	Banner	
Proximity Switches	Turck	
Sensor Blocks	Turck	
Safety Devices:		
Safety Switches	N/A	
Light Curtain	N/A	
Wiring:	Gauges (Minimum)	
Power	14 AWG	
Panel	16 AWG	
Machine (Single Conductor)	14 AWG	
Cables (Control Wires)	16 AWG	
	14 AWG - All VFD motors to be shielded	
Cables (Motor Wires)	cable	
Sensor Cables	22 AWG	1
Interlocks Cable	14 AWG	
Signal Cables	18 AWG - Shielded as required	1
Wire Colors:	257Wd Chiolada as roquilea	<u> </u>
220 - 575 VAC	Black	1
120 VAC (Fused)	Red	I I
120 VAC Neutral	White	1
24 VDC	Blue	I Dark Blue
24 VDC Common	White w/ Blue Trace	White w/Dark Blue Trace
Interlocks (Foreign Voltage)	Orange	:
Ground	Green w/ Yellow Stripe	1
Marking	Panduit (Self laminating wrap around)	<u> </u>
Miscellaneous:	Fanduit (Sen laminating wrap around)	<u> </u>
Labels/ID Tags	Brady LAT 20 (Silver tags black lettering)	1
Labels/ID Tags	Allen-Bradley 1492-L Series (Spring-	AB 1492-J Series screw type
Terminal Blocks	Clamp)	AB 1492-3 Series screw type
	All field devices have quick disconnects	<u> </u>
	and utilize commercially available	
Field Device Wiring	cables that will be routed along the	
Tick Device Withing	machine to the appropriate termination	
	point.	
	Conveyor systems are not shipped as a	Pre-wired system is Included
	pre-wired system. It is the responsibility	To this dispersion is moraded
Machine Wiring Methods	of the customer to provide and install all	
	wire, conduit/wireway and bracketry.	
	Non-distributed I/O architecture on the	:
0	equipment. This means that the sensors	i
Control Architecture	and output devices are wired to the I/O	
	located in main cabinet.	
	I/O Devices by Allen-Bradley, Turck,	
I/O Devices	Numatics and others as required by	
•	application.	



Field Services

1. Installation 9	Supervision Assistance (Viper Palletizer)
Project Scope	Installation Supervision Assistance of the equipment as listed in this proposal
	Based on consecutive installation of all equipment in the scope of this proposal at time of quote
Estimated Duration	Total time in plant of one (1) Customer Service Technician for ten (10) consecutive day(s)
Customer requirements	Customer to provide installation crew.
	Any required heavy equipment and power tools
	All electrical installation including any required electrical conduit/sealtite runs
Workday Hours	Estimate is based on non-union labor working 10-hour workdays
	Holiday and overtime hours were not used to calculate estimated price
Travel Expenses	Includes one mobilization expense
Living Expenses	Estimated for Domestic Installation
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be
_	handled via purchase order amendment prior to the conclusion of provided services at the facility.
Clarifications	Includes installation supervision only. Start-up service priced separately

2. Start-up Ass	istance (Viper Palletizer)
Project Scope	I/O and functional checkout and startup assistance of the equipment as listed in this proposal
Estimated Duration	Total time in plant of one (1) Customer Service Engineer for ten (10) consecutive days
Workday Hours	Estimate is based on non-union labor working 10-hour workdays
	Holiday and overtime hours were not used to calculate estimated price
Travel Expenses	Includes one mobilization expense
Living Expenses	Estimated for Domestic Installation
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be
	handled via purchase order amendment prior to the conclusion of provided services at the facility.
Assumptions	All mechanical and electrical installation must be completed prior to beginning of startup including:
	All required service drops connected to equipment (I.e. Electrical Power & Pneumatic supply lines)
	Interface to existing or Buyer-provided necessary systems and equipment
	All upstream equipment must be operational at design speed
	Sufficient test product must be available for continuous testing
Machine startup/	Machine startup/ramp up estimate of full production capacities with modifications: 30% on day 3, 60%
ramp up	on day 6, 80% on day 8, and 100% on day 10. Estimated based on continuous product available at
	production speeds, operator and plant assistance available during entire time period
Site Acceptance Test:	This is the last step of Startup and is considered complete when the Field Service Engineer successfully
	demonstrates palletizing three (3) pallet loads in full auto mode without intervention except as required
	for normal operation.

3. Machine-s	ide Training (Viper Palletizer)
Project Scope	Machine-side Training for up to eight (8) students on equipment as listed in this proposal
Estimated Duration	Total time in plant of one (1) Customer Service Engineer for two (2) consecutive days
Workday Hours	Estimate is based on non-union labor working 10-hour workdays
	Holiday and overtime hours were not used to calculate estimated price
Travel Expenses	Based on same mobilization as Startup, mobilization expense not included
Living Expenses	Estimated for Domestic Installation
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be
	handled via purchase order amendment prior to the conclusion of provided services at the facility.
Clarifications	Machine-side training does not include classroom training or handouts.



4. Installation S	upervision Assistance (Sorter System)
Project Scope	Installation Supervision Assistance of the equipment as listed in this proposal
	Based on consecutive installation of all equipment in the scope of this proposal at time of quote
Estimated Duration	Total time in plant of one (1) Customer Service Technician for eight (8) consecutive day(s)
Customer requirements	Customer to provide installation crew.
	Any required heavy equipment and power tools
	All electrical installation including any required electrical conduit/sealtite runs
Workday Hours	Estimate is based on non-union labor working 10-hour workdays
	Holiday and overtime hours were not used to calculate estimated price
Travel Expenses	Includes one mobilization expense
Living Expenses	Estimated for Domestic Installation
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be
	handled via purchase order amendment prior to the conclusion of provided services at the facility.
Clarifications	Includes installation supervision only. Start-up service priced separately

5. Start-up As	ssistance (Sorter System)	
Project Scope	I/O and functional checkout and startup assistance of the equipment as listed in this proposal	
Estimated Duration	Total time in plant of one (1) Customer Service Engineer for eight (8) consecutive days	
Workday Hours	Estimate is based on non-union labor working 10-hour workdays	
	Holiday and overtime hours were not used to calculate estimated price	
Travel Expenses	Includes one mobilization expense	
Living Expenses	Estimated for Domestic Installation	
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.	
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be	
	handled via purchase order amendment prior to the conclusion of provided services at the facility.	
Assumptions	All mechanical and electrical installation must be completed prior to beginning of startup including:	
	All required service drops connected to equipment (I.e. Electrical Power & Pneumatic supply lines)	
	Interface to existing or Buyer-provided necessary systems and equipment	
	All upstream equipment must be operational at design speed	
	Sufficient test product must be available for continuous testing	
Machine startup/	Machine startup/ramp up estimate of full production capacities with modifications: 40% on day 5, 60%	
rampup	on day 6, 80% on day 7, and 100% on day 8. Estimated based on continuous product available at	
	production speeds, operator and plant assistance available during entire time period	
Site Acceptance Test:	This is the last step of Startup and is considered complete when the Field Service Engineer successfully	
	demonstrates palletizing three (3) pallet loads in full auto mode without intervention except as required	
	for normal operation.	

6. Machine-	side Training (Sorter System)
Project Scope	Machine-side Training for up to eight (8) students on equipment as listed in this proposal
Estimated Duration	Total time in plant of one (1) Customer Service Engineer for three (3) consecutive days
Workday Hours	Estimate is based on non-union labor working 10-hour workdays
	Holiday and overtime hours were not used to calculate estimated price
Travel Expenses	Based on same mobilization as Startup, mobilization expense not included
Living Expenses	Estimated for Domestic Installation
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be
	handled via purchase order amendment prior to the conclusion of provided services at the facility.
Clarifications	Machine-side training does not include classroom training or handouts.

7. Installation S	Supervision Assistance (FPC System)
Project Scope	Installation Supervision Assistance of the equipment as listed in this proposal
	Based on consecutive installation of all equipment in the scope of this proposal at time of quote
Estimated Duration	Total time in plant of one (1) Customer Service Technician for five (5) consecutive day(s)



7. Installation	Supervision Assistance (FPC System)
Customer requirements	Customer to provide installation crew.
	Any required heavy equipment and power tools
	All electrical installation including any required electrical conduit/sealtite runs
Workday Hours	Estimate is based on non-union labor working 10-hour workdays
	Holiday and overtime hours were not used to calculate estimated price
Travel Expenses	Based on same mobilization as Installation Supervision of Palletizer, mobilization expense not included
Living Expenses	Estimated for Domestic Installation
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be
	handled via purchase order amendment prior to the conclusion of provided services at the facility.
Clarifications	Includes installation supervision only. Start-up service priced separately

8. Start-up As	ssistance (FPC System)
Project Scope	I/O and functional checkout and startup assistance of the equipment as listed in this proposal
Estimated Duration	Total time in plant of one (1) Customer Service Engineer for four (4) consecutive days
Workday Hours	Estimate is based on non-union labor working 10-hour workdays
	Holiday and overtime hours were not used to calculate estimated price
Travel Expenses	Based on same mobilization as Startup of Palletizer, mobilization expense not included
Living Expenses	Estimated for Domestic Installation
Time and Material	Billing is calculated and invoiced on time and material basis per the current Service Bulletin rates.
Changes	Changes or additions to project scope, or changes due to delays or scheduling differences will be
	handled via purchase order amendment prior to the conclusion of provided services at the facility.
Assumptions	All mechanical and electrical installation must be completed prior to beginning of startup including:
	All required service drops connected to equipment (I.e. Electrical Power & Pneumatic supply lines)
	Interface to existing or Buyer-provided necessary systems and equipment
	All upstream equipment must be operational at design speed
	Sufficient test product must be available for continuous testing
Machine startup/	Machine startup/ramp up estimate of full production capacities with modifications: 30% on day 1, 60%
ramp up	on day 2, 80% on day 3, and 100% on day 4. Estimated based on continuous product available at
	production speeds, operator and plant assistance available during entire time period
Site Acceptance Test:	This is the last step of Startup and is considered complete when the Field Service Engineer successfully
	demonstrates palletizing three (3) pallet loads in full auto mode without intervention except as required
	for normal operation.



15. TERMS AND CONDITIONS

- Arrowhead Systems, Inc. ("Arrowhead Systems", "AHS") consists of Arrowhead Conveyor Corporation, Busse/SJI Corporation, and A & B Engineering Services, LLC and may do business as any of these
- corporations. AHS also owns the product lines Nextconveyor and Priority One Packaging.

 Acceptance: Buyer's acceptance of this proposal is limited to the terms and conditions contained herein and excludes any different or additional terms and conditions supplied by Buyer. If, for Buyer's convenience, Buyer's regular purchase order forms are used in accepting this proposal or in ordering equipment covered by this proposal, Arrowhead Systems' acceptance is expressly conditioned upon Buyer's assent to the terms and conditions contained herein. Any contract made by and between the parties is expressly conditioned upon Arrowhead Systems' review and approval of Buyer's credit.
 - Equipment Purchase Terms of Payment: The purchase price shall be payable in United States currency (USD) as per the terms expressed in this proposal (to be determined by Arrowhead Systems and communicated to Buyer In writing).
 - Parts & Service and equipment orders less than \$15,000 value will require payment of 100% of the purchase price due upon shipment or completion of services. The purchase price shall be payable in United States currency (USD).
- Pricing in this proposal for Steel (stainless and/or mild) projects is based upon steel surcharges in effect on the date of the proposal's issue. Prior to the submission of a Purchase Order by Buyer, Seller may 3. make adjustments to final steel surcharges that will be passed through to the Buyer. Adjustment will be based on steel surcharges, published by our steel supplier, at the time of the orde
- Unless otherwise stated in this proposal, all pricing is valid for 30 days from date of proposal issue subject to any changes under Section 3 above.
- 5.
 - Domestic Shipping: The proposed equipment shall be shipped F.O.B. shipping point freight collect by either dedicated or common carrier at the Buyer's expense and at current applicable charges. If applicable, the cost for any over width/over height permits, flagmen, escorts, etc. will be charged in addition to mileage. It is assumed that, if required, all destinations will be accessible by tractor/trailer.
 - ٧ International Shipping: The proposed equipment shall be shipped Ex-works shipping point. The Buyer is responsible for inland freight, port receiving charges, forwarder fees, ocean/air freight, charges in foreign port, foreign airport, custom clearance, customs duties, and delivery charges to final destination. All wood packaging materials are compliant to the destination country's requirements at the time of the quote.
- 6. Manufacturing: The proposed equipment may/will be manufactured and assembled at multiple sites. This proposal does not include any provision for consolidation of equipment at a single facility for either testing or shipping purposes. Each piece of equipment will be manufactured, tested, and shipped according to the standards of each manufacturer. Multiple shipments may be required. 7.
 - Domestic: Unless otherwise stated on the face of the proposal, the equipment shall be shipped F.O.B. shipping point with risk of loss passing to Buyer upon delivery of the equipment to the carrier, regardless of installation terms. Buyer shall fully insure the equipment against all risks from the time of delivery to the carrier, with policies payable to Arrowhead Systems benefit. Upon request, Buyer shall furnish to Arrowhead Systems certificates of insurance evidencing such coverage prior to shipment. Arrowhead Systems shall determine method and route of transportation unless otherwise specified. Buyer shall pay local transfer, unloading, and cartage costs at destination. Buyer will be responsible for filling any damage claims with the carrier as might be required.
 - specified. Buyer shall pay local transfer, unloading, and cartage costs at destination. Buyer will be responsible for filing any damage claims with the carrier as might be required.

 International: Unless otherwise stated on the face of the proposal, the equipment shall be shipped Ex-works (per Incoterms 2010) original manufacturing site (shipping point) with risk of loss passing to Buyer upon delivery of the equipment to the carrier, irrespective of installation terms. Buyer shall fully insure the equipment against all risks from the time of delivery to the carrier. Arrowhead Systems shall determine method and route of transportation unless otherwise specified. Buyer shall pay local transfer, unloading, and carrier costs to final destination. Buyer will be responsible for an import taxes, customs tariffs, fees levied by the destination country or the shipping country, and for filing any damage claims with the carrier as might be required. Tariffs and taxes are neither collected, nor included in your price calculation at the time of your order. Buyer may get an estimation of these fees by contacting the customs office in Buyer's area.

 Delays: Amounts due upon shipment shall be due even if Buyer has notified Arrowhead Systems that they are not ready to receive said shipment. Such delayed shipment is subject to storage and handling charges and is payable upon presentation of invoice. If the terms of the agreement and/or purchase order include installation, startup, commissioning or other services and Buyer delays or interrupts such services, the full balance of the purchase price less cost of completion of such services shall immediately become due. If services are resumed, Buyer shall reimburse Arrowhead Systems for any increased costs resulting from such delays. In the event Buyer does not satisfy the terms of payment outlined herein, Arrowhead Systems reserves the right to assess a service charge of 1 ½ % per month on the amount due in a norraries passif for a norrarial month on the amount due in a received a
- amount due on a pro-rata basis for any partial month on the amount due in arrears, provided there Is no conflict with local or state law. In the event of any legal action, the prevailing party shall be entitled to reasonable attorney's fees, together with all costs and expenses incurred.
- Q,
- reasonable attorney's rees, together with all costs and expenses incurred.

 Storage: When Buyer delays shipment and space is available at the factory, Seller will store completed equipment at a reasonable preparation and storage fee for the project at current market rate. Buyer will be invoiced the monthly storage fee along with appropriate costs for preparing the equipment for storage, loading and unloading of equipment.

 Duty and Taxes: Unless otherwise agreed, the price stated herein does not include any duties, excise, sales, use, property, retailers, occupation, or similar tax. The amount of any such taxes, whether Imposed on Buyer or Arrowhead Systems, shall be payable, in accordance with the provisions of any statute or rules, regulations, or decisions of any taxing authority or by reimbursing Arrowhead Systems for the 10. amount of such taxes shown on its invoice. If Buyer claims exemption from any sales, use, or similar tax imposed by any taxing authority, Buyer will hold Arrowhead Systems harmless from any such tax, together with any interest, fines, or penalties thereon, which may at any time be assessed against it by reason of the fact that such equipment or system is held to be taxable by the taxing authority. In the event Buyer is exempt from such taxes or should Buyer elect to pay such taxes directly to the taxing authority, then Buyer shall provide Arrowhead Systems with a valid tax exemption certificate or similar document satisfactory in form to Arrowhead Systems.
- document satisfactory in form to Arrowhead Systems.

 Prototype Warranty: If Arrowhead Systems has been contracted to develop a prototype unit for the Buyer and Buyer and Seller expressly agree that such work will be a prototype, then all work performed by Arrowhead Systems on the prototype unit shall be on a time and materials basis. Once the Buyer accepts and approves in writing that the prototype unit meets the Buyer's specifications, Arrowhead Systems shall extend its standard performance warranty, as set forth in the attached document, to any subsequent units purchased by Buyer. This warranty compromises the sole and entire warranty pertaining to the prototype unit and Arrowhead Systems makes no other warranty, guarantee, or representation of any kind whatsoever pertaining to the prototype unit. Arrowhead Systems hereby expressly disclaims all implied warranties including but not limited to merchantability and fitness for a particular purpose or those arising by operation of law, trade usage, or course of dealing.

 Equipment Warranty: Except as set forth in Paragraph 11 hereof, Arrowhead Systems warrants that the equipment manufactured by Arrowhead Systems shall conform to the descriptions and specifications set forth herein and, when used for the ordinary purposes for which such equipment is designed, shall be free of defects in workmanship and material for a period of one (1) year from commissioning of the equipment not to exceed eighteen (18) months from shipment, whichever occurs first. If the shipment of the machine is delayed at the Buyer's request, the originally scheduled ship date is utilized in the warranty period calculation. During the warranty period and upon satisfactory proof of claim by Buyer, Arrowhead Systems will repair (excluding installation) any part proving defective In material or workmanship. If such repair does not remedy the issue within 30 days of the repair or service. The Buyer may request replacement of the defective parts F. O. B. Arrowhead Systems factory. Foulment
- workmanship. If such repair does not remedy the issue within 30 days of the repair or service, then Buyer may request replacement of the defective parts F.O.B. Arrowhead Systems factory. Equipment warranty is subject to the following conditions: (a) Buyer shall return defective equipment and components to Arrowhead Systems upon request; (b) this warranty applies only to equipment properly used and maintained and does not apply to any equipment which has been subjected to misuse, neglect, accident, or which has been installed, operated, repaired, altered, or modified other than in accordance with written instructions or written authorization by Arrowhead Systems; (c) that the equipment was started up and commissioned by Arrowhead Systems factory authorized personnel; (d) if the system requires written instructions or written a duriforization by Arrownead Systems; (c) that the equipment was started up and commissioned by Arrownead Systems factory authorized personner; (d) if the system requires controls/programming from Arrownead Systems; (e) this warranty does not apply to any equipment or components not manufactured by Arrownead Systems, and Buyer's sole warranty with respect to such items shall be that of the manufacturer, if any; (f) This warranty does not include any warranty claim for wear parts; (g)There is no liability for damages due to improper maintenance and operation and non-compliance with Seller instructions for storage, service, and maintenance; (h) Seller has no liability nor warranty follows for any consequential, incidental, recall, punitive, loss of profit, or liquidated damages. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO THE EQUIPMENT SOLD BY ARROWHEAD SYSTEMS, AND ARROWHEAD SYSTEMS MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER PERTAINING TO THE EQUIPMENT. ARROWHEAD SYSTEMS HEREBY EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE OR THOSE ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING
- Laws, Regulations and Codes: The equipment sold hereunder is designed and manufactured to comply with the provisions of the National Electrical Code and the American National Standard Safety Requirements for Packaging Machinery and Packaging-Related Converting Machinery (ANSI/PMMI B155.1) in effect on the date of this proposal. Compliance with other federal, state, or local laws or regulations, or electrical, building, or other codes, standards or requirements, governmental or private, will be furnished only if expressly set forth on the face of the proposal. Arrowhead Systems reserves the right to make changes in the design and specifications of the equipment sold hereunder, or of any component part, to comply with any applicable law, regulation, code orstandard, governmental or private, where such compliance is deemed advisable by Arrowhead Systems, and to make adjustments in the price charged for the equipment sold hereunder to reflect such changes. Arrowhead Systems shall not be responsible for failure to comply with laws, regulations, and codes it has agreed to comply with when such failure results from a condition that was not contemplated at the time of the proposal or from alteration of the equipment by persons other than Arrowhead Systems or from an option or accessory to the equipment which was available to Buyer but omitted at Buyer's direction, adaptations to Buyer's environmental or physical conditions, or from design or instructions provided by Buyer.
- Compliance with the Occupational Safety and Health Act of 1970 (OSHA) is the responsibility of the Buyer and/or end user and is dependent upon many factors beyond the equipment supplied by Arrowhead Systems. Arrowhead Systems will make every effort to design its products so that Buyer can meet the OSHA requirements. However, the ultimate responsibility for compliance remains with Buyer or the end user. Arrowhead Systems recommends that a risk assessment be performed by the Buyer or the end user once the equipment is installed and is ready for use. Arrowhead Systems will appropriately guard hazards on the proposed equipment, according to national standards at time of manufacturing. Any guarding requirements, which arise as a result of interfacing the proposed equipment in the proximity of an install site hazard, are not included in the pricing presented above. Because of the diversity of every application, the end user is responsible for final guarding, proper training, and use of the equipment by its operators and maintainers. Arrowhead Systems can provide additional guarding and certified training at additional cost. If revisions to the equipment are required and requested, Arrowhead Systems will make them as far as technically possible and will make adjustments in the price charged to reflect such changes. Labor performed by Arrowhead Systems' employees at Buyer's facility during installation and startup will be accomplished in compliance with the applicable OSHA requirements.
- Indemnification: Equipment furnished hereunder will be manufactured with Arrowhead Systems safety features and furnished with user safety instructions. Operation of the equipment with safety features removed or modified and/or the disregard of the user safety instructions is outside of Arrowhead Systems' control and is the responsibility of Buyer. Compliance with safe use instructions, regulatory compliance with any safe operating procedures such as OSHA or ANSI by Buyer or the end user is also outside of the control of Arrowhead Systems. Therefore, Buyer agrees to indemnify (at its own expense with counsel satisfactory to Arrowhead Systems), and hold Arrowhead Systems harmless from any and all claims, demands, liabilities, causes of action, suits, costs, and expenses of any kind or nature (including attorney's fees) for loss or damage which may be incurred as a result of injury to persons (including death) and property including, without limitation regarding: (a) any person injured while using the



equipment in a manner inconsistent with proper use Instructions (examples include but are not limited to riding, sitting, stepping, walking, or climbing on the equipment furnished hereunder); (b) removal or modification to Arrowhead Systems furnished safety features; (e) the disregard of Arrowhead Systems furnished user safety instructions; (d) any portion of the equipment which includes Buyer's existing equipment or equipment furnished by the Buyer; (e) improper use of the equipment; or (f) equipment design or safety features which were developed based on any information, representation, reports, or

- data furnished or prepared by Buyer which is inconsistent with actual use or conditions.

 Patents: Arrowhead Systems agrees to indemnify and hold Buyer harmless against charges or claims of infringement of currently existing United States patents owned by third parties in connection with the apparatus manufactured by Arrowhead Systems for the equipment which is the subject of this Agreement. Buyer agrees to notify Arrowhead Systems in writing, immediately upon Buyer's knowledge thereof, of any charge or claim of infringement and gives Arrowhead Systems the exclusive control of the defense and settlement of the charges or claims, including the right to defend, settle, or make changes in the
- or any unarge of claims, initingement and gives Arrownead Systems or the exclusive control of the declarear and section in the ranges of infringement to avoid any alleged infringement. Buyer is responsible for charges and claims of infringement where Buyer has modified or combined the equipment hereunder with other equipment and where Arrownead Systems furnished equipment is in accordance with drawings and/or specifications furnished by Buyer.

 Buyer Supplied Data: Buyer acknowledges that Arrownead Systems has relied upon all specifications and other data supplied by Buyer to Arrownead Systems in the selection and design of the equipment and the preparation of this proposal. In the event the information was not provided in writing with confirmation of receipt by Arrownead Systems or the conditions differ from those presented by Buyer and
- relied upon by Arrowhead Systems, any warranties or performance guarantees contained herein affected by such conditions shall be null and void, unless otherwise mutually agreed upon in writing. Changes and Delays: Proposals to amend the detailed specifications may be offered by either party in writing, which set forth in detail the particular specifications involved, the changes to be made therein, and the effect, if any, of such change on price, design, performance, weight, time of shipment, and time of installation and commissioning. No modification of this Agreement will be permitted unless it is in writing and accepted by Arrowhead Systems. Should the work be delayed or interrupted by Buyer or other contractors of Buyer, or failure of Buyer to furnish facilities or apparatus as agreed herein, or for any other reason beyond Arrowhead Systems' control, Buyer will reimburse Arrowhead Systems for any additional cost resulting from such causes. Penalty for any delay caused by Arrowhead Systems shall not exceed 5% of the total purchase price.
- Force Maleure: If, by reason of strikes, non-delivery of acceptable material by suppliers, unavailability of local labor, delay in delivery or non-delivery of acceptable Buyer furnished property and/or samples of 19. products to be handled, the elements, acts of God, war or war condition, riot, civil disorder, acts of terrorism, government regulation, embargo, fire, flood, severe weather, accident, other acts of force majeure, or causes over which Arrowhead Systems does not have reasonable control, Arrowhead Systems is delayed in completion of the equipment, or installation and commissioning thereof, as defined herein, or Arrowhead Systems is delayed making or be unable to make delivery of goods to be provided to Buyer, no liability shall result there from, and the time of performance under this Agreement shall be extended for a period to be not less than the period of such delay or delays. Nothing contained herein shall be deemed to require Arrowhead Systems to obtain equipment from another supplier.
- Back Charges: Arrowhead Systems will not pay claims for expenses of Buyer relating to labor and/or material supplied by Buyer.

 Rejections and Claims: The Buyer shall give written notice of any rejections or claims for shortage or errors within ten (10) days after receipt of shipment. All equipment furnished under this Agreement is custom built for Buyer and is not returnable for any reason except where authorized in writing by Arrowhead Systems.
 Security Interest: To secure full payment of the purchase price set forth herein, Buyer grants to Arrowhead Systems a security interest in the equipment. Buyer will join with Arrowhead Systems in executing,
- filling, and doing whatever other acts may be necessary under the applicable law to protect Arrowhead Systems security interest until Arrowhead Systems has been paid the full purchase price.

 Cancellation: Buyer may cancel this order only upon written notice to Arrowhead Systems and only upon such terms as will indemnify and reimburse Arrowhead Systems for all loss or damage resulting there from, Including, but not limited to, Arrowhead Systems direct costs incurred, overhead, reasonable contract profits, costs, and expenses to which Arrowhead Systems has become committed for fulfillment of the contract prior to cancellation. Should Arrowhead Systems agree to cancel an order for any reason, we may, at our sole discretion, retain or return to the customer all, or a portion of, the progress payments depending upon our investment in the project prior to our receipt of notification. Should the customer cancel an order for any reason, the following penalties shall apply:

 10% of the purchase price if cancelled within 10 business days of receipt of purchase order

 25% of the purchase price if cancelled between 11 and 20 business days of purchase order

 - 20% of the purchase price in carliceled between 11 and 20 obstities days of purchase order And after 21 business days, the full amount of the progress payment will be due if not yet paid or shall be forfeited. Arrowhead Systems shall have the right to cancel the Agreement if at any time Buyer does not strictly comply with all terms and conditions of this proposal (including without limitation any requirements of progress payments) or Buyer becomes insolvent or commits any act of bankruptcy within the meaning of United States bankruptcy laws. In the event of such cancellation by Arrowhead Systems, Arrowhead Systems shall have the same rights of indemnification and reimbursement as set forth in the first sentence of this paragraph.
- Arrownead systems, Arrowhead Systems and never earlier figits of indeminication and remousement as set from in the first sentence of this paragraph.

 Installation: Arrowhead Systems is not responsible for installation preparation, which includes engineering analysis of the physical structures to which the Arrowhead Systems' equipment may be affixed.

 Buyer is responsible for verification of the floor, ceiling, walls, hangers, brackets, and other supports or devices not provided by Arrowhead Systems. Buyer agrees to indemnify and hold harmless Arrowhead Systems for any accident, damage to person or property, or injury that results from the Buyer's building or supports, that is provided by the Buyer or is presented to Arrowhead Systems as appropriate for use and Installation of Arrowhead Systems equipment. Unless otherwise agreed herein, material for superstructure, hangers, and bracing is to be furnished by Buyer. If Arrowhead Systems does not provide the installation, then it is mutually agreed that any superintendent or technician furnished by Arrowhead Systems shall be subject to Buyer's general supervision during the term of any service done for Buyer, and Arrowhead Systems shall have no liability for schedule performance or costs incurred by Buyer to complete installation. Buyer shall furnish all labor, materials, and tools required for such services and installation. Buyer remains solely responsible for the installation, when such services are provided. It is understood that some realignment or other adjustment in the Buyer or end users premises may be required and such field labor is for Buyer's account and may be billable to Buyer.
- Mechanical and Electrical Installation: If installation is included in the price offered in this proposal or is quoted separately, then that price is contingent and based upon consecutive installation of all equipment provided by Arrowhead Systems. If the installation process is interrupted by circumstances beyond Arrowhead Systems' control, then the price will be adjusted so that the installation part of the project will be billed on a time and materials basis. If specified, equipment installation includes labor, hardware, pipe, wire, heavy equipment rental, and travel and living expenses, this proposal is based on straight time only. Overtime, holiday, and weekends will be billed in accordance with Service Bulletin (attached). This Proposal is based upon a clear area for installation of the equipment, meaning that

- straight time only. Overtime, holiday, and weekends will be billed in accordance with Service Bulletin (attached). This Proposal is based upon a clear area for installation of the equipment, meaning that existing equipment and debris must be removed. If a clear area does not exist at the scheduled time for installation, a change orderwill be required for any additional time needed.

 Installation Supervision/Assistance: Quotations are estimates only. Buyer will be billed on a time and materials basis in accordance with Service Bulletin in force at the time service is rendered.

 Startup Assistance, Commissioning, and Training: All quotations provided are estimates only. Please Note: Startup and commissioning of all new Arrowhead Systems' trained and approved field service personnel to validate your new equipment warranty.

 NOTE: TIME IS OF THE ESSENCE: In order for startup & commissioning to be completed by Systems in a timely manner, any mechanical and electrical installation must be completed on time per agreed upon schedule. Any customer provided conveyor and all upstream equipment must be operational at design speed. Sufficient containers must be available for continuous testing.

 The Buyer and Seller agree not to solicit, entice, or offer employment to Key Persons employed by the other party for a period of twelve (12) months from the date of last official business contact with the Key Persons employed the following conditions: 28 29
- is under the following conditions:

 Key Persons shall be defined as those employees who have worked directly on Buyer projects with Seller.
 - Last Official Business Contact shall be defined as any time the Key Person had any contact (verbal, electronic, in person, in writing, etc.) with any employees or representatives of the Buyer. Special On-site Personnel Considerations: The customer must communicate and/or facilitate for special on-site personnel requirements including, but not limited to:
 - Special personal protection equipment, including ARC flash requirements.

 Contractor training (safety and/or quality) that Arrowhead Systems' staff must attend before performing any work,
 - Background checks

30.

- Hot work permit staffing (a person that whose responsibility is solely to stand and watch welding taking place not only during the work but for a period of time after the work to avoid any possibility of fire hazard)
- Internations:

 Subcontractors: Arrowhead Systems reserves the right to use subcontractors in the performance of any portion of the fabrication and/or installation work included in this proposal.

 LIMITATION OF LIABILITY: NOTWITHSTANDING ANY OF THE PROVISIONS IN THE CONTRACT DOCUMENTS, IN NO EVENT SHALL ARROWHEAD SYSTEMS BE LIABILE FOR ANY INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES OF ANY KIND OR NATURE SUCH AS, BUT NOT LIMITED TO, LOSS OF INCOME, PROFIT OR REVENUE, LOSS OF BUYER GOODWILL, PRODUCT RECALL, DAMAGE TO BUSINESS, RELATIONS, BUSINESS OPPORTUNITY OR PRODUCTION, LOSS OF IUSE OF EQUIPMENT, COST OF CAPTIAL, COST OF SUBSTITUTED FACILITIES OR SERVICES, DO WINTIME COSTS, CLAIMS BY CLIENTS OF BUYERS, OR DAMAGES FOR ECONOMIC LOSSES OR PROPERTY DAMAGE ARISING FROM, CONNECTED WITH OR RELATING TO A PARTY'S ACTS OR OMISSIONS, WHETHER OR NOT SUCH DAMAGES ARE FORESEEABLE. WHETHER OR NOT SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF DAMAGES, WHETHER BASED ON CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE OF ANY NATURE. WHETHER SOLE OR CONCURRENT), STRICT LIABILITY, ENTERPRISE LIABILITY, OR OTHER PROMISED. THE COMMISS. THE CUMULATIVE TOTAL LIABILITY OR RECORD SYSTEMS, WITH RESPECT OF THE WORK, WHETHER SOLE OR CONCURRENT), STRICT LIABILITY, OR OTHER PROMADOC THE WORK, WHETHER BASED ON CONTRACT, WARRANTY, TORY CLAUMS, COSTS, LIABILITY COST, LIABILITY OR THE PERFORMANCE OR NONPERFORMANCE OF THE WORK, WHETHER BASED ON CONTRACT, WARRANTY, TORY CINCLUDING REGLIGENCE OF ANY NATURE, WHETHER SOLE OR CONCURRENT, STRICT LIABILITY OR OTHERWISE, SHALL NOT EXCEED AN AMOUNT EQUAL TO THE CONTRACT PRICE PAID TO ARROWHEAD SYSTEMS PURSUANT TO THE AGREEMENT IN THE TWELVE (12) MONTH PERIOD IMMEDIATELY PRECEDING THE OCCURRENCE OF THE DAMAGE OR LOSS. THE REASONABLE VALUE OF ANY CORRECTIVE WORK PERFORMED BY OR ON BEHALF OF ARROWHEAD SYSTEMS SHALL BE INCLUDED TOWARD THE CUMULATIVE TOTAL LIABILITY OF ARROWHEAD SYSTEMS AS PROVIDED ABOVE. ANY ACTION ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE SYSTEM MUST BE BROUGHT BY BUYER WITHIN TWO (2) YEARS FROM THE DATE THE CAUSE OF ACTION ACCRUES, OR THE APPLICABLE STATUTORY PERIOD, WHICHEVER IS SHORTER.
- Entire Agreement: When this proposal is accepted by Buyer and approved by Arrowhead Systems, it shall constitute the entire agreement and there are no oral or other representations or agreements outside of this proposal. Neither party shall assign this Agreement or any Interest herein without the prior written consent of the other. The laws of the State of Wisconsin shall govern the validity, construction, effect, execution, and performance of this Agreement. If any provision or provisions of this Agreement shall be held to be illegal, Invalid, or unenforceable, the legality, validity, or enforceablility of the remaining provisions shall not be in any way affected or impaired thereby.



PROPOSAL DOCUMENT

STOLLE DYNAFORM CUPPING SYSTEM

Prepared For:

Crown Cork and Seal



Anguil Environmental Systems, Inc. Three (3) Bed Regenerative Thermal Oxidizer

Oate: Proposal #: July 211, 2020 AFS 05316B

Prepared for:

Mr. Yoshko Hockmann Crewn Cork & Seal Company, Inc. 770 Township Line Road Yardley PA 19067

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AND

Mr. John Leitzkei Crown Cark & Seat Company, Inc.

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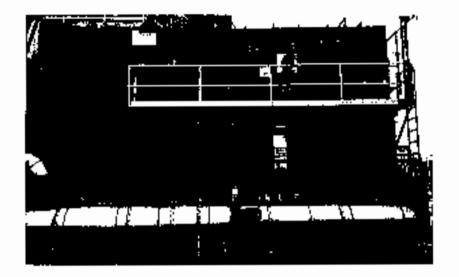


Submitted by:

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September 22, 2020

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Your single source for air and water pollution dontrol systems.





Environmental and Energy Solutions that Ensure Cleaner Air and Water for Future Generations.

Foundary in 1978, Anguil Environmental Systems is a secondgeneration family owned and operated drivingmental technology. supplier headquartered in Milwayises, WHUSA with offices in Asia and Europae. With annual sales in excess of \$50 million globally, Anguit. has been a trusted air and water solutions supplier for over 40 years.

The Anguil Advantage

- Business slatting and unparaticled. expertise with over 40 years to business.
- Single source provider of fully.
- integrated air and water polition control systems for lowest cost of ownership.
- Over half of Anguit staff are degreed. engineers.
- Regulatory compliance is guaranteed.
- Broad range of technology solutions. ensure an unbiased equipment selection.
- Comprehensive Quality Assurance program and procedures.
- An established safety program with continuous fraining for Anguil field service. engineers.
- Custom solutions developed specific to: your application that maximize efficiency. and ironmize system life operation costs.



TECHNOLOGIES

Air pollution control systems for VOC. MAR, and odor abatement - capable of 98+% destruction efficiency.

- Beginnerative thermal ossazors (PTO)
- Cate yes, requarerative, and doubt field. themia, exigizers and vapor carobastors.
- É missión randaditator systems:



Over 1,900 oxidizers installed on six continents in a wide variety of applicational



ENERGY

Heat and energy recovery systems: for Improved efficiency and reduced operating costs.

- Arckelar heat excludegers.
- As to liquid heat explangers.
- Fleal-to-power
- Energy evaluations



WASTEWATER > TREATMENT

Wastewater treatment technologies for industrial and remediation applications.

- For yintegrated and turnkey systema.
- Segre Koprod prowder.
- Encondering assistance, rentals, and pilot programs available.
- Technology agnestic approach
- Advantoed instrumentation, contrats; and automation



AFTERMARKET & SERVICE

Service and maintenance on any make or model, regardless of original. manulacturer.

- 24/7 emergency Kervice response.
- Operating cost reviews
- System upgrades and retrofile.
- Spare parts and component probaces.
- Převenstve Maralonaugo š valgations.

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*Note: This proposal contains confidential and proprietary information of Anguil Environmental Systems, Inc. and is not to be disclosed to any third parties without the express prior written consent of Anguil.

ANGUIL ENVIRONMENTAL SYSTEMS, INC. www.Anguil.com

414.365.6400

Proposal For: Crown Cork & Seal

Environmental Solutions for Cleaner Air and Water

Executive Summary

1. Equipment Description

Crown Cork & Seal has requested a proposal for VOC control technology for exhaust from two 2-pc beverage can manufacturing lines. Process flow from each of the Line cold sources and hot sources will be routed to a Model 550 Regenerative Thermal Oxidizer (RTO). Within the RTO, the process VOCs will be oxidized and sent to atmosphere via an exhaust stack.

2. Facility to be Controlled

Crown Cork & Seal facility in Olympia, WA

3. Processes Controlled

2-pc Beverage Can Manufacturing Lines

4. RTO Energy Recovery

95% Nominal Thermal Energy to minimize gas usage

5. Proposed Equipment

Model 550 (55,000 SCFM) Three-Bed Regenerative Thermal Oxidizer (RTO)

6. Anguil Benefits

- * Seamless integration with the current process
- * Fully automated PLC based controls
- * Modem for remote diagnostics
- * Field Tested and proven technology
- * Full equipment warranty
- * Factory test prior to shipment
- * 24 hour service support

7. Results

* For the RTO emissions, Anguil guarantees the conversion efficiency of 98.5% or an outlet concentration of 20 ppmv as C1 (methane), whichever is less stringent per EPA Method 25A

Proposal For: Crown Cork & Seal AES-05316B

Environmental Solutions for Cleaner Air and Water

Customer Process Specifications

Process Flow: Cold Sources to Oxidizer

> LSMs: 14,850 SCFM (86°F)

Mass Conveyor Exhaust: 4,500 SCFM (86°F)

Hot Sources to RTO

Pin Chain Ovens: 16,000 SCFM (350°F) IBO Ovens: 15,000 SCFM (325°F)

Total (for 2 Lines): 50,350 SCFM (241°F avg. temp)

Maximum / Design Flow: 55,000 SCFM

VOC Concentration: **TBD**

VOCs*: TBD

Facility Operating Schedule: Assumed 24/7

460V / 60 Hz / 3 Ph Facility Power:

Fuel Source: Natural Gas

Process Water Content: Assumed to be no more than 0.01 lb water / lb air

Process Oxygen Content: Assumed to be at least 18%

Process Particulate: A dust collector shall remove particulate from the process cold

source (Dust Collector provided as an option). Particulate from process hot sources is assumed negligible. (Filtration for

hot sources, if required, is by others.)

Performance Requirements: RTO destruction efficiency of 98.5%

RTO location on Site: Outdoors

Desired Operational Date: TBD

Note: Equipment has been designed and sized based on these customer parameters.

^{*} Assumed no halogenated, chlorinated or sulfur bearing compounds are present.

Proposal For: Crown Cork & Seal

AES-05316B

Environmental Solutions for Cleaner Air and Water

RTO Design Specifications

Sizing

Maximum Airflow: 55,000 SCFM

Maximum VOC Concentration: 740 lb/hr @ 13,500 BTU/lb of VOC

(If inlet VOC concentration to the RTO exceeds this,

a Hot Side Bypass is required)

Approximate Footprint: 36' x 65' (RTO Only)

Approximate Weight: 310,000 lbs (entire system)

Stack Diameter / Height: 68" / 60"

Oxidizer Control Panel Location: Indoors within 50' of oxidizer

Suggested Foundation Size: 40' x 68'

Utilities Required

Fuel Requirements:
 15.0 MM BTU/hr @ 5 psig

• Electrical Power: 460V / 60 Hz / 3 Ph

Required Compressed Air: 80-100 psig (-40°F dewpoint) 5-10 SCFM

Operation Information

RTO VOC Destruction Efficiency: 98.5% or an outlet concentration of 20 ppmv as C1

(methane), whichever is less stringent per EPA Method

25A.

Nominal Thermal Efficiency (TE): 95%

System Process Fan Draft Design: Induced Draft

• System Process Fan HP: 500 HP

• Combustion Fan HP: 15 HP

Purge Fan HP: 30 HP

Dust Collector Fan HP: 75 HP

Operating Set Point: 1550-1700°F

*Note: All weights, dimensions, horsepower ratings, burner sizing, and specific engineering details within the proposal are approximate and will be confirmed by Anguil Environmental following order placement.

ANGUIL ENVIRONMENTAL SYSTEMS, INC.



Standard Equipment Specifications

Three (3) Bed Regenerative Thermal Oxidizer Description

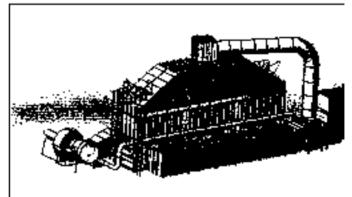
The emission stream from the plant enters the inlet beds of the RTO. The oxidizer consists of three (3) reinforced, insulated chambers filled with high temperature ceramic energy recovery media. The oxidizer utilizes two (2) burners for uniform temperature distribution to heat up and maintain the oxidizer at set point temperature. Located under the energy recovery chambers are diverter valves and air duct plenum passages, which allow the process airflow to be diverted into and out of the oxidizer chambers. To maintain a reasonable size for the inlet / outlet valves from the energy recovery beds, two headers are used for both the inlet and the outlet airflow. The valves are controlled by a PLC, which changes the direction of airflow at regular intervals to optimize system efficiency. Typical operational cycles range from 1.0 to 1.5 minutes.

In operation, the solvent laden air (SLA) enters the oxidizer into one (1) of the energy recovery chambers where the high temperature ceramic heat transfer media preheats the SLA prior to introduction into the oxidation chamber. As the SLA passes up through the beds, its temperature rapidly increases. After the chemical oxidation reaction occurs, the hot, clean, outgoing gas heats one (1) exit energy recovery beds. In order to maintain optimum heat recovery efficiency of the beds, the SLA flow direction is switched at regular intervals by the automatic diverter valves on demand from the PLC control system. This periodic shift in flow direction provides a uniform temperature distribution throughout the entire oxidizer.

The odd bed design allows for the RTO be continually purged which provides for the high destruction efficiency. At any one time, one chamber acts as an inlet, one acts as an outlet, and one chamber is purged. After serving as an inlet chamber, a chamber is purged by drawing air down through the bed and

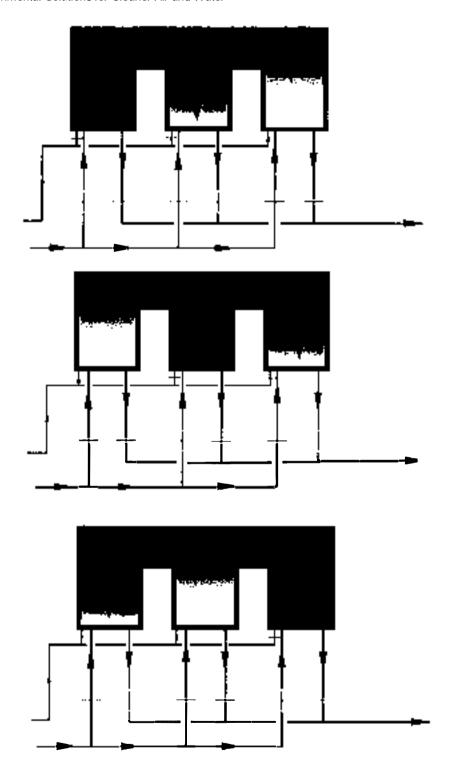
discharging it into the inlet. This chamber then becomes an outlet chamber during the next cycle. The three chamber design eliminates any inlet / outlet bypass during valve cycling.

sufficient of concentration hydrocarbons in the process air stream. the heat energy content of the hydrocarbons will self-sustain oxidation process, and no additional heat energy will be required. The exhaust air from the RTO will then be released to atmosphere.



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BUTTERFLY DIVERTER DAMPERS

SPECIFICATIONS

- Actuator supports carbon steel plate
- Heavy duty, high flow solenoid valve
- Heavy duty pneumatic cylinder
- Compressed air accumulator tank
- Damper position switches
- Solenoid valve exhaust flow control

FEATURES

- Horizontal shaft
- Metal to metal purged seats
- Valves are commercially available guaranteeing replacement parts
- Accessibility for maintenance of the actuator and switches
- Quiet operation
- Over temperature protection

HEAT TRANSFER MEDIA

- Three (3) beds of high temperature structured heat transfer media
- Ceramic media is chemically and thermally stable for rapid heat up and cool down
- Ceramic media designed to provide optimum heat transfer surface
- Low system designed pressure drop
- Perforated plate included below ceramic media to ensure proper air distribution

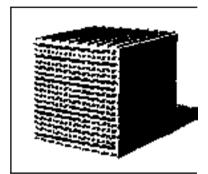
PURGE AIR SYSTEM FOR MEDIA CHAMBERS

- AirPro, New York Blower, or equal purge fan
- Purge air pulled from the purging media bed and sent to the inlet of the RTO
- Purge valve is located under each heat recovery chamber
- Purge duct is constructed of carbon steel

FRESH AIR/PURGE DAMPERS

- Two (2) modulating dampers are included. One located at the RTO inlet for chamber temperature control and RTO start-up purge, and another located upstream of the induced draft RTO fan for temperature control.
- Used during oxidizer start-up, shut down or purging during idle time
- Allows for safe start-up and shut-down on ambient air
- Fresh air/purge damper is also used if dilution air is required during periods of high VOC loading or low process flow. The damper is controlled by a signal from the PLC.





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BURNER(S)/FUEL TRAIN

Burner to be used for preheating the RTO and during periods of low flow. When the process flow increases, the RTO transitions into Supplemental Fuel Injection mode and the single burner turns off. The use of SFI mode proper heat distribution in the large RTO chamber regardless of which bed is being used as the inlet, outlet or purge.

- One (1) Eclipse Thermjet burner
- Fuel Train fabricated to FM Global specifications
- Service platform and ladder
- Burner view port
- Fireye flame safety control with self-checking dynamic UV scanner

SUPPLEMENTAL FUEL INJECTION SYSTEM (SFI)

The Anguil Supplemental Fuel Injection (SFI) system is designed as a high efficiency means of controlling the RTO reaction chamber temperature. During system operation, when appropriate safeties have been satisfied, the burner and combustion air systems can be turned off and the RTO combustion chamber temperature can be maintained by injecting natural gas directly into the VOC laden airstream - typically at or near the inlet of the RTO system. The benefits of SFI are:

- Provides high fuel efficiency by reducing combustion air
- Provides ultralow NOx emissions with flameless operation
- Provides a more uniform temperature profile throughout the RTO

All natural gas injection systems enjoy these benefits, but not all systems are created equally. To date, Anguil's level of safety and controls for natural gas injection have been unmatched by our competitors.

A few of the highlights are:

- Some gas injection systems are designed as solenoid-type full-on or full-off systems. Anguil uses modulating injection valves for more precise control.
- Some gas injection systems are not designed for proper mixing of the natural gas with the solvent laden airstream. Anguil's SFI system is designed with multiple levels of safeties and a custom designed injection quill to ensure a well-mixed airstream is delivered to the RTO chamber.

Natural gas injection is an excellent means of reducing system operating cost and providing a cleaner "burn" when properly designed and applied.

COMBUSTION AIR FAN

- AirPro, New York Blower, or equal
- Pre-piped and pre-wired
- TEFC motor
- Inlet filter

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INDUCED DRAFT RTO SYSTEM FAN

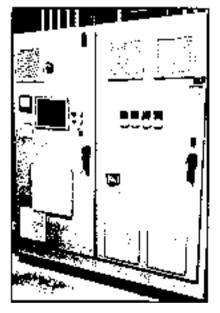
The system fan is sized for -3 in. W.C. at the RTO inlet. The induced draft fan is located downstream of the RTO. This location ensures the RTO maintains a negative pressure.

- AirPro, New York Blower or equal
- VFD rated motor
- Flexible connection on inlet/outlet of fan
- Vibration monitoring
- Bearing temperature monitoring

SYSTEM CONTROLS

The system controls are located in a NEMA 12 control panel enclosure. In the event of a system shutdown, the touch screen will indicate the cause of the shutdown via a digital message in English.

- NEMA 12 control panel enclosure to be mounted in a temperature controlled environment (85°F)
- Allen Bradley Logix family PLC (Programmable Logic Controller)
- Allen Bradley color screen display
- Digital chart recorder: monitors combustion chamber and exhaust stack temperatures
- Ethernet modem for remote diagnostics and service support



VARIABLE FREQUENCY DRIVE (VFD)

The variable frequency drives regulate the airflow through the system. Controlled via pressure transmitters, they aid in minimizing operating cost by providing fan turn-down during periods when only low airflow is required.

- Mounted in a NEMA 12 enclosure in a temperature-controlled environment (85°F)
- VFDs provided for the RTO system fan, combustion fan, and purge fan

EXTERNAL INSULATION AND CLADDING

External insulation will be included as part of the installation cost. Anguil's experience indicates it is best to externally insulate and clad equipment in the field to avoid damage during shipping. Anguil suggests the following equipment receive external insulation.

Induced Draft System Fan, RTO Valves and headers, Lower Cold Face, Exhaust Transition, Lower 10' of **Exhaust Stack**

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ENERGY RECOVERY CHAMBERS

The RTO's energy recovery chambers are rectangular cross-sections constructed of carbon steel. They are reinforced to withstand the pressure requirement of the process air fan and all other applied loads. A carbon steel support structure is also provided to support the oxidizer chambers, media support grid and the ceramic heat recovery media itself. In order to allow for routine inspection of the heat recovery media, cold face and media support grid, two hinged access doors complete with gaskets are included.

- Three (3) carbon steel energy recovery chambers
 - Internally insulated: 6" thick, 8# density ceramic module insulation
 - Insulation rated for 2.300°F
 - Insulation modules: shop installed with 310 stainless steel reinforcements and mounting hardware
- Support Structure
- Media support grid
- Two hinged access doors with gaskets



COMBUSTION CHAMBER

The combustion chamber is a rectangular cross-section constructed of carbon steel and reinforced to withstand the pressure requirements of the process air fan and all other applied loads. The inverted "W" shape design provides the retention time to obtain the specified VOC destruction efficiency. In order to allow for routine inspection of the heat recovery media, insulation and burner, two hinged access doors complete with gaskets are included.

- Inverted "W" shaped oxidation chamber
 - Internally insulated: 6" thick, 8# density ceramic module insulation
 - Insulation rated for 2,300°F
 - Insulation modules: shop installed with 310 stainless steel reinforcements and mounting hardware
- Hinged access doors with gaskets

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RTO EXHAUST STACK

- Free standing stack sized for 55,000 SCFM
- Platform and ladder at 30' elevation included
- Constructed of carbon steel / aluminized steel
- Two (2) EPA tests ports: 90° to each other
- Stack is sandblasted, zinc primed, and high temperature coating applied

OXIDIZER DUCT/ INLET

- Carbon steel duct to the inlets of the diverter valves will be provided
- Carbon steel duct from the outlets of the diverter valves to the exhaust transition

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BAKE OUT

The oxidizer can be operated off-line from the process in a bake-out mode to allow for the removal of organic build-up on the cold face of the heat exchange media. At a reduced airflow, the outlet temperature is allowed to reach an elevated temperature of 600°F before the flow direction is switched. This hot air vaporizes organic particulate that may have collected on the cold face of the heat exchange media. The flow direction is then switched and the opposite cold face is cleaned. The area below the media support grid will be insulated to prevent the temperature of the outer skin from increasing during bake-out.

PAINTING

All exposed surfaces of the oxidizer shall be primed coated with a high solids epoxy coating. The finish coat shall be a gloss high solids polyurethane multi-function weather resistant coating. The natural gas and compressed air piping will be primed and painted with one (1) coat of Anguil's standard coating. All other equipment will be the manufacturer's standard paint and color. Prior to painting, all welds will be caulked.

- UV resistant polyurethane paint
- Paint color can be specified by the customer

OPERATION & MAINTENANCE MANUALS

- Anguil to provide a link to the Operation and Maintenance manual, available for electronic download. Three (3) paper hard copies of the O&M text will be supplied.
- USB flash drive of all vendor bulletins
- Provided in English

FINAL ASSEMBLY AND SHOP TEST

We pre-assemble and pre-test modular components in our factory to provide significant savings of time and money during installation and start-up. Units are prewired and pre-piped at the factory for improved quality control and trouble-free start-up.

- Inspection of the unit for manufacturing quality
- Check fuel and electrical connections
- Warning labels are installed
- Test ports are installed
- Run electrical rigid conduit
- Fans and motors installed, cleared of debris and checked for quality
- Valves to be cycled and set
- Customer is invited to witness shop testing

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ANNUAL PREVENTIVE MAINTENANCE INSPECTION (PME) FOR EXTENDEND **WARRANTY (SEPARATE LINE ITEM)**

An extended warranty of five (5) years on media, insulation, and Anguil manufactured equipment Anguil can be offered with the purchase of the following Preventative Maintenance schedule. Each PME will include a full on-line/off-line evaluation of the oxidizer system.

- Quarterly PME visit for the first 2 years
 - o Each visit will be for two (2) days
 - One (1) 4-5 day visit is included
- Semi-annual PME visit for the subsequent 3 years
 - Two (2) 4-5 day visits per year
- Each PME visit will include:
 - Checklist review
 - Checklist review report
 - Labor, travel/living expenses included
 - Replacement consumable items (typical items below):
 - Two (2) Type K thermocouple
 - Combustion air fan filter element
 - Spark ignitor
 - Valve lubricating oil
- Pricing is based upon 1st shift, straight time labor rates
- Additional day of training is provided during these site visits
- See separate Preventive Maintenance Evaluation Fact Sheet included with this proposal document for further information regarding preventive maintenance

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Options for Customer Consideration

DUST COLLECTOR AND DUST COLLECTOR FAN

Anguil will supply the following dust collector for the cold sources:

- Dust collector sized for 20,000 SCFM for all cold sources
- Manufactured by Camfil-FARR, Donaldson, or equal
- Filters are automatically cleaned by periodic pulses of compressed air. Filters are cleaned in sequence using 90 psig compressed air.
- Includes Control Box
- Extended Legs, Hopper with Rotary Airlock
- Explosion relief panels are included
- **Burst bag detection**
- Inlet Fire Damper included, spark resistant
- Non-Return Damper included

A dedicated dust collector fan is sized to pull the cold source air.

- Induced Draft Construction to pull the process through the dust collector and process ductwork
- 460 V / 60 Hz / 3 Ph TEFC (Totally Enclosed Fan Cooled) motor
- Flex joints at inlet / outlet of fan
- Includes VFD

304 STAINLESS STEEL UPGRADES FOR HIGH TEMPERATURE BAKEOUT

To support a high temperature bake-out (800+F), the following components of the RTO should be upgraded to 304 Stainless Steel:

- RTO media support grid
- RTO diverter dampers and hoppers
- RTO outlet header



RTO AND DUST COLLECTOR INSTALLATION SPECIFICATIONS

ENGINEERING SERVICES

- Provide foundation loading diagram for concrete pad
- Provide electrical interconnect drawings

INSTALLATION SUPERVISION

- An Anguil Project Installation Manager shall manage and supervise RTO installation work. An Anguil ductwork subcontractor will manage the ductwork installation work.
- Travel and living expenses included

MECHANICAL INSTALLATION

- Three-Chamber RTO and Dust Collector
 - Price for Dust collector with installation is provided as a line item
- Labor and material necessary to unload and set the equipment
- Rental of all necessary equipment including crane, forklift and manlift
- Offloading of RTO and components from shipping trucks
- Erection of RTO on concrete pad
- Setting of energy recovery chambers, combustion chambers, valves, transitions, system fan, and purge fan
- Loading of heat exchanger media and insulation
- Erection and installation of exhaust stack and ladder and platform
- Installation of two (2) fresh air/purge dampers (inlet and outlet)
- Compressed air piping to fresh air damper and dust collector
- Insulation and cladding installed as described on page 11
- Finish/touch-up painting as required after installation is complete

ELECTRICAL WORK

- Setting control panel and VFD Power Panel
- Interconnecting wiring, including up to 50 feet of conduit runs, between Control Panel and RTO/ /Dust Collector panels, with Control Panel located indoors. Alternatively, an outdoor NEMA 3R air conditioned panel can be placed near the equipment.



DUCTWORK FABRICATION AND INSTALLATION SPECIFICATIONS:

COLD SOURCES

- Approximately 60' of 20" diameter pipe
- Approximately 360' of 32" diameter pipe
- One (1) 20" diameter X 20" diameter X 32" diameter tee on taper
- One (1) 32" diameter forty five degree elbow (1 ½ X centerline radius)
- Three (3) 20" diameter ninety degree elbows (1 ½ X centerline radius)
- Three (3) 20" diameter heavy duty manual balancing dampers
- Various lengths of straight duct work from the Dust Collector outlet to the Dust Collector fan inlet and from the Dust Collector fan outlet to the tee on taper where the hot duct work connects with the cold duct work (should be within close proximity)
- Two (2) transitions for the inlet and outlet of the Dust Collector
- Two (2) 32" diameter ninety degree elbows (1 ½ X centerline radius) from the outlet of the Dust Collector to the inlet of the Dust Collector fan
- One (1) reducer to the inlet of the Dust Collector fan
- One (1) square to 32" diameter transition off the Dust Collector fan discharge
- One (1) 32" diameter ninety degree elbow and one (1) 32" diameter forty five degree elbow (1 ½ X centerline radius) to connect into the hot duct main header closest to the RTO inlet from the **Dust Collector fan discharge**
- Compressed air piping to diverter valves
- All test ports and instrumentation couplings are included
- Roof top steel support structures
- Wall mounted steel support structures
- Grade mounted steel support structures (to be fabricated with a two legged vertical and all cross members as required) no taller than 16'
- All necessary standard K&B angle iron flanges
- Hardware, silicone and paint
- Labor
- Hotel, per diem and travel related costs
- Shipping
- Equipment rentals (crane, lull type fork lift, boom lift, etc.)



HOT SOURCES

- Approximately 265' of 20" diameter pipe
- One (1) 20" diameter X 20" diameter X 28" diameter tee on taper
- Approximately 210' of 22" diameter pipe
- One (1) 22" diameter X 22" diameter X 32" diameter tee on taper
- Approximately 70' of 32" diameter pipe
- One (1) 28" diameter X 32" diameter X 42" diameter tee on taper
- Approximately 80' of 42" diameter pipe
- One (1) 20" diameter X 42" diameter X 46" diameter tee on taper
- Approximately 40' of 46" diameter pipe
- One (1) 20" diameter X 46" diameter X 50" diameter tee on taper
- Approximately 165' of 50" diameter pipe
- One (1) 22" diameter X 50" diameter X 55" diameter tee on taper
- Approximately 240' of 55" diameter pipe
- Two (2) 55" diameter ninety degree elbows (1 ½ X centerline radius)
- Four (4) 20" diameter ninety degree elbows (1 ½ X centerline radius)
- Three (3) 22" diameter ninety degree elbows (1 ½ X centerline radius)
- Two 20" diameter forty five degree elbows (1 ½ X centerline radius)
- One (1) 22" diameter forty five degree elbow (1 ½ X centerline radius)
- Four (4) 20" diameter heavy duty manual balancing dampers
- Three (3) 22" diameter heavy duty manual balancing dampers
- One (1) 68" diameter spool piece with a tee connection for the fresh air damper (damper to be supplied by others)
- One (1) 68" diameter X 55" diameter X 32" diameter tee on taper (32" diameter to connect into the Dust Collector fan discharge duct work
- Four (4) 20" diameter forty five degree divert tee damper assemblies including pneumatic actuators with position indicator, solenoid valves with -40F low temp seals, forty five degree elbow, rain cap and plug type insulated clean out doors
- Three (3) 22" diameter forty five degree divert tee damper assemblies including pneumatic actuators with position indicator, solenoid valves with -40F low temp seals, forty five degree elbow, rain cap and plug type insulated clean out doors
- Compressed air piping to diverter valves All test ports and instrumentation couplings are included
- Roof top steel support structures
- Wall mounted steel support structures
- Grade mounted steel support structures (to be fabricated with a two legged vertical and all cross members as required) no taller than 16'
- All necessary standard K&B angle iron flanges
- Hardware, silicone and paint
- Labor
- Hotel, per diem and travel related costs
- Equipment rentals (crane, lull type fork lift, boom lift, etc.)

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Note: All flange connections will include a standard K&B rolled angle iron ring to be made water tight. All duct work will be made of galvanized steel welded construction to meet SMACNA classII (+ or -) 10" WC, unless stated otherwise. All duct work will include a plug type insulated clean out door to be located approximately every 20' and each door will have a heavy duty hinge assembly with articulated wing and handle latches.

- All steel support structures on the roof, at grade level and down the building wall are included with this price and will include one (1) coat of primer and one (1) coat of paint. This is based on the assumption that the wall can handle the figure four supports (two (2) sets on the vertical riser) and that the roof support steel structures are to be located approximately every 10' to 15' apart.
- All roof supports will include a piece of rubber (laid on top of the assumed flat rubber roof) followed by a 2" X 10" pressure treated wood followed by a 2" X 6" channel with two (2) vertical 2" diameter and 2 ½" diameter sched 40 posts and an angle iron top.
- All pricing is based on a 30' tall building with a relatively flat rubber roof
- All pricing is based on the assumption that all duct connections will be made above the roof
- All pricing is based on free and clear access

HOT OVEN SOURCE DUCT INSULATION

- Insulate hot ductwork across a roof, 30 ft down the side of the building and up to the point where
 it meets the RTO. Insulate in the field the RTO inlet/outlet plenums, ductwork to ID fan, ID fan,
 and lower 10' of stack.
- All hot ductwork will have 4" fiberglass insulation with aluminum jacket for weather protection.

Notes:

- Additional compensation for all excess cost, not limited to premium pay only, associated with any required variance in work durations, shifts, work hours, or workdays necessary to meet specific construction milestones.
- 2. Vertical drops from rooftop ductwork to indoor process exhaust fans are excluded at this time.

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Exceptions and Clarifications

Anguil takes exception to, requires clarification, or proposes changes on the following items. Anguil welcomes the opportunity to negotiate these items upon award of the final contract.

Document: RTO Bid Specification Package

Page 4: II. Equipment Description (B) Function +

Page 8: VI. Design Construction (B) Physical Requirements (3) Air Distribution System

The RTO chamber's operating temperature is designed to operate at a setpoint of 1,550°F rather han 1,600°F. In most cases, operating the chamber at 1,600°F is unnecessary to achieve 98.5% RTO DRE. Anguil can adjust this operating setpoint by request.

Page 6: VI. Design/Construction (A) General +

Page 7: VI. Design/Construction (B) Physical Requirements (2) General

Page 12: VII. Olympia (C) Oxidizer Design Requirements (5) Insulation

External insulation and cladding are required to prevent surface temperature from exceeding 135 °F. External insulation and cladding are included as part of the installation cost.

Page 6: VI. Design/Construction (A) General

The burner is not sized to attain chamber operating temperature at the 55,000 SCFM design flow. The unit is designed to operate with Supplemental Fuel Injection (SFI).

Page 6: VI. Design/Construction (A) General

Anguil has quoted nominal 95% thermal efficiency (TER). If higher thermal efficiency is desired, Anguil can quote up to 97% TER.

Page 7: VI. Design/Construction (B) Physical Requirements (2) General

No exposed metal will be subjected to high temperatures (>600°F). Media chambers and combustion chambers to be internally insulated. RTO inlet ductwork, outlet ductwork, and diverter valves o be constructed of carbon steel. An option for 304 SS construction of critical RTO components is supplied to allow a high temperature bakeout (900°F)

Page 8: VI. Design/Construction (B) Physical Requirements (2) General

Fan vibration and fan bearing temperature switch is only provided for the RTO induced draft system fan.

Page 9: VI. Design Construction (B) Physical Requirements (4) Exhaust Stack

Anguil external insulation and cladding are included as part of the installation cost.

Page 9: VI. Design Construction (C) Functional Requirements (1) Safety

Remote motor disconnects are not currently included. Disconnects can be quoted by request.

Page 10: VI. Design Construction (D) Subsystem/Components (2) Burners

Anguil has selected an Eclipse Thermjet burner. From past experience, the Kinemax burner does not supply a high enough velocity for proper heat distribution in RTOs sized for more than 50,000 SCFM.

Page 10: VI. Design Construction (D) Subsystem/Components (3) Temperature Control & Recorder Honeywell 450R is obsolete. Anguil to supply a Yokogawa recorder.



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Page 12: VII. Olympia (C) Oxidizer Design Requirements (2) Thermal Eff. (TER)

Anguil design if for nominal 95% TER. Anguil cannot guarantee zero gas usage at average solvent load due because average solvent load in unknown.

Page 12: VII. Olympia (C) Oxidizer Design Requirements (3) Exhaust Fan

Equipment is designed for 55,000 SCFM as previously requested in this document.

Page 12: VII. Olympia (C) Oxidizer Design Requirements (7) Stoneware

Anguil has quoted our standard media selection of MLM-180 and 1.5" saddles.

Page 13: VII. Olympia (C) Oxidizer Design Requirements (8) Bake Out Control

Anguil has currently quoted a 600°F bakeout within the base price. Anguil has provided an option for high temperature bakeout (900°F) via upgrades of critical RTO components to 304 stainless steel. Anguil has quoted a standard bakeout design which will provide bakeout of the media support grids and outlet diverter (process) valves, but not the inlet diverter (process) valves. Anguil would be happy to provide a quote for an inlet valve bakeout design upon request

Page 12: VII. Olympia (C) Oxidizer Design Requirements (10) Foundation

Foundation is not included at this time, to be by others. Anguil shall provide foundation loading diagrams.

Page 13: VI. Olympia (C) Oxidizer Design Requirements (11) Spare Parts

Spare parts are not included at this time. Anguil can supply the spare parts by request.

Page 15: VI. Olympia (F) Warranty

Anguil has currently quoted its standard warranty terms with an option for an extended warranty. Anguil is happy to discuss any changes to warranty.

All other items, components, and equipment proposed within this document are Anguil standard unless indicated otherwise.

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Items Not Included

- Concrete pad / platform
- Dumpster
- All natural gas piping to RTO fuel train
- Winterization of the pneumatic piping and sensing lines, if required
- Power source to RTO control panel
- Personnel protection, security fencing and lighting
- Moving of oxidizer obstructions, fencing, landscaping, etc.
- Multiple installation trips if delays beyond Anguil's control
- All roof and building penetrations
- All fire suppression piping and controls
- All required sound abatement equipment
- HAZOP / PHA Participation (charged at daily rate plus T&L)
- Compliance testing
- Internet connection
- Taxes, permits
- Overtime, holiday or weekend work
- Oxidizer startup and training (Can be quoted as an option)
- UL Inspection & Label for Main Control Panel
- Customer to provide space to store ceramic media prior / during installation

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Operating Cost Summary

The operating costs are based on the following standards outlined by the Institute of Clean Air Companies (ICAC) Guidance Method for Estimation of Gas Consumption in a Regenerative Thermal Oxidizer (see the attachment):

PROCESS SUMMARY		
RTO Process Flow	50,000	SCFM
RTO Destruction Efficiency	99	%
Nominal Heat Transfer Efficiency	95	%
RTO Inlet Temperature	241	°F
Btu/lb Value	13,500	Btu/lb

3-Bed Operating Costs				
VOC Loading	Electrical Usage	Fuel Usage		
lb/hr	kW	BTU/hr		
0	225	5,451,228		
200	225	2,481,228		
400	225	0		
600	225	0		

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Field Service Rates

Field Service Engineer and Installation Supervision * Weekdays, 8 hours/day; minimum of 4 hours

Straight Time *

International Labor Rate *

Emergency Service Rate *

(Site visit within 48 hours of call)

Overtime (More than 8 hours/day and Saturdays)

Sundays and Holidays

Travel Time

Trip Preparation

Report Writing

Technical Phone Support (Minimum of 4 hours)

Engineering * Weekdays, 8 hours/day; minimum of 4 hours

Project Engineer *

Project Manager *

Electrical Engineer / Programming*

Travel and Living Expenses

Airline ticket, Hotel, Car rental, Car service and Expenses Meal allowance - Domestic Meal allowance - International Airport parking Mileage

Terms

Net 30 days

Terms subject to change upon credit review

Holiday Schedule

New Year's Day Good Friday Memorial Day Independence Day Labor Day Thanksgiving (11/26/2020 to 11/28/2020) Christmas (12/24/2020 to 12/26/2020) New Year's Eve

- When an FSE is scheduled to work on-site but not granted access, due to no fault of Anguil, customer will be billed at the daily rate for 8 hours in addition to expenses.
- Pre-negotiated days off will not be billed for service labor unless reports/training are being compiled.
- If receipts or time sheets are required, a 10% handling charge will be applied to the total invoice for report generation.

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Standard Terms and Conditions

1. General

Anguil's prices are based on these terms and conditions of sale. These terms and conditions may not be modified unless prior written agreement is reached between both Anguil and Purchaser and signed by an authorized representative of Anguil.

2. Warranty

Any contract resulting from this proposal will require start-up assistance to validate our warranty. This will require a technical service representative to be present at the time of initial start-up and must give release of operation of the equipment in accordance with the Seller's operating and maintenance manual.

Anguil Environmental Systems, Inc. (ANGUIL) warrants to the buyer that the products delivered will (a) be free from defects in material and manufacturing workmanship (b) conform to manufacturer's applicable product descriptions attached to Seller's quotation. If no product descriptions or specifications are attached to the quotation, manufacturer's specification in effect on the date of shipment will apply.

The product warranties are for a period of 12 months from the date of start-up for purchased components like fans, VFDs, PLC, if start-up is within thirty (30) days of shipment or 15 months from date of shipment, whichever shall occur first. Extended warranty for DRE of Customer Performance Warranty up to 60 months, along with insulation, ceramic media, Anguil manufactured components with annual PME purchase. The product warranties will apply provided the following conditions:

- The equipment is operated and maintained as described in the Anguil operating manual provided with the equipment
- Recommended routine maintenance must be performed and documented per Anguil instructions at recommended
- This warranty does not apply to heat damage that may occur due to improper use of the RTO, or due to fires that may occur due to excessive buildup of organic matter in the process ductwork.

Warranty Exclusions

Warranty coverage does not include: (a) freight, labor, travel, and living expenses associated with parts replacement, (b) normal maintenance items such as fan belts, fuses, light bulbs, spark igniters, bearings, seals, gasket, lubrication and cleaning of the equipment, (c) abrasion, corrosion or negligence in operating the equipment on the part of Buyer or Buyer's subcontractor(s).

In the event the customer, or any installation contractor employed by the customer, contracts outside ANGUIL for installation work or erection of quoted equipment, the customer will assume full responsibility for workmanship resulting from said contract.

3. Performance Guarantee

Anguil guarantees the conversion efficiency as stated in the proposal or an outlet concentration of 20 ppmv as C1 (methane), whichever is less stringent.

- The test methods to be used to show compliance is US EPA Method 25A
- Anguil requires seven (7) days' notice of the official testing to meet DRE guarantee. Anguil reserves the right to review of the test protocol prior to official testing to and to have personnel present at the official compliance
- Equipment is operating in accordance with Seller's written operating and maintenance instructions.
- Anguil shall rely on process and chemical information provided by Purchaser or its agents and not be liable for undisclosed or unknown process or chemical materials.

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AES-05316B

Environmental Solutions for Cleaner Air and Water

4. Prices / Taxes

Prices are quoted in U.S. dollars and may be accepted only within 60 days from date of quotation by Anguil. Anguil reserves the right to adjust the final price of the equipment according to the market price of metals. Any sales, use or other taxes and duties imposed on this sale are not included in the quoted price. If this order is placed from one of the following states; AZ, CA, GA, IL, KY, LA, MA, MI, NJ, NY, PA, TX, WI; and is taxable, sales tax can be added and will be billed separately to the Purchaser. Anguil will accept a valid exemption certificate from the Purchaser for those orders not taxable. If this order is placed from a state not listed, the Purchaser must provide one of the following: 1) Tax exempt certificate; 2) Pollution control exclusion certificate or 3) Self-assessment letter to Anguil.

5. Cancellations

Orders canceled by Purchaser must be in writing and will be subject to a cancellation fee on the following basis: On any orders canceled prior to the procurement of material and the commencement of fabrication the Purchaser will be subject to a cancellation fee of 15% of Contract value to cover costs incurred for Engineering services plus overhead and reasonable expenses including rep commission made or incurred by Anguil in the initial processing of the order. On orders cancelled after the initiation of production, payment shall be made on the basis of actual cost of labor, materials, components (cancellation fees if applicable) and work in progress plus overhead expenses. Upon written receipt of cancellation, Anguil will immediately stop all work except that necessary to effect termination.

6. Engineering Submittals

Anguil will provide layout drawings to the Purchaser for approval and the Purchaser will be asked to comment on these drawings in regards to scope of work, dimensions, site interferences or specifications agreed upon at the time of sale. Approval of Purchaser does not relieve Anguil of obligations to perform to all other specifications of the contract. Final layout drawings will be used to prepare the fabrication drawings after they are returned with the Purchaser's approval.

Anguil will provide Process and Instrumentation Diagrams (P&ID) for approval and the Purchaser will be asked to comment on these drawings in regard to process verification, scope of supply, system features and instrumentation. Approval of Purchaser does not relieve Anguil of obligations to perform to all other specifications of the contract. Final P&ID drawings will be used to prepare the electrical schematics and controls after they are returned with the Purchaser's approval.

All additional Engineering and or drafting costs associated with revising the layout drawings or P&ID as a result of changes requested by Purchaser after initial approval will be considered a Change Order and quoted to the Purchaser at Anguil's prevailing per hour rates. If any such changes cause an increase in the cost or time required for performance, a Change Order will be submitted for Purchase approval. Upon receipt of written approval, Anguil will be granted the authority to proceed with agreed upon changes.

7. Shipping Schedules

Anguil will use its best efforts to meet delivery dates agreed to pursuant to the order of which these terms are a part. Anguil shall not be liable for any delay in delivery when such a delay is, directly or indirectly, caused by fires, floods, terrorism, accidents, riots, government interference, strikes, shortage of labor, materials or supplies, delays in transportation or any other causes beyond the reasonable control of Anguil. In the event of delay in performance due to any such cause, the date of delivery or time for completion will be adjusted to reflect the length of time lost by reason of such delay.

If a delay in shipping is requested less than 6 weeks prior to shipment, Anguil will complete the system and invoice any "prior to shipment" payment milestone which will be due at the time of the original scheduled ship date. Upon completion of the system. Anguil at its option may place the equipment in storage facilities and the Purchaser will pay the cost of storage, special handling fees and insurance. Equipment held for the Purchaser shall be at the risk of the Purchaser.

8. Acceptance and Testing of Equipment

Purchaser will upon delivery inspect and test the equipment and notify Anguil in writing within 30 days of installation or 90 days of shipment, whichever comes first, of all defects discovered including failure of the equipment to meet quoted performance standards. Failure to give such notice constitutes an irrevocable acceptance of the equipment and the equipment will be deemed to conform with the terms of this Agreement, and Purchaser will be bound to pay for the equipment. Upon notification of a defect as above provided, Anguil will repair the equipment and correct the system's performance.

414.365.6410



Proposal For: Crown Cork & Seal AES-05316B

Environmental Solutions for Cleaner Air and Water

9. Risk of Loss

Quotations are F.C.A., place of shipment, per Incoterms 2010, unless otherwise noted. The risk of loss of the equipment shipped will pass to Purchaser upon Anquil's delivery of the equipment to a carrier. Claims for damage in shipment must be filed by Purchaser with the carrier.

10. Limitation of Liability

In no event will Anguil, its subcontractors, or representatives be held responsible, or liable for any claim, whether in warranty, contract, tort or strict liability for any special, indirect, incidental or consequential damages resulting from the purchase of equipment (including but not limited to incidental or consequential damages for labor, lost profits, lost sales, injury to person or to property or any other incidental loss or damages).

Purchaser agrees that Purchaser's exclusive remedy and Anguil's sole liability on any such claim will be limited to reimbursement from Anguil of the purchase price actually received by Anguil from Purchaser for the equipment in auestion.

Anguil shall rely on process and chemical information provided by Purchaser or its agents and not be liable for undisclosed or unknown process or chemical materials (Please refer to Customer Process Specifications section in the proposal).

11. Security Interest

Purchaser grants Anguil a security interest in the equipment to secure payment of the balance due hereunder. Purchaser authorizes Anguil to file this Agreement as a Financing Statement or to sign on behalf of Purchaser and file any other Financing Statements with respect to the equipment in any place Anguil deems necessary.

12. Attorney's Fees

Purchaser will be liable for all reasonable expenses and attorney's fees incurred by Anguil in enforcing its rights and remedies under this Agreement.

Any and all required licenses, certificates and operating permits will be the sole responsibility of the Buyer unless otherwise specified by Anguil.

14. Miscellaneous

The terms and conditions contained herein and any other terms and conditions stated in Anguil's proposal or specifications attached hereto will constitute the entire agreement between Anguil and Purchaser. The terms and conditions stated herein are applicable to all orders accepted by Anguil unless otherwise specifically agreed to by Anguil in writing. Purchaser will be deemed to have assented to all such terms if any part of the described equipment is accepted. If Purchaser finds any terms not acceptable, Purchaser must so notify Anguil within 15 days. Any additional or different terms contained in Purchaser's order to response hereto will be deemed objected to by Anguil and will be of no effect. This proposal and its acceptance will be governed in all respects by the laws of Wisconsin. In the event of a breach, both parties agree that any suit will be brought in the jurisdiction of the Courts of Wisconsin.

15. Destination Control Statement

These commodities, technology or software will be exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to U.S. law is prohibited.

ORDER ACCEPTED BY: ANGUIL ENVIRONMENTAL SYSTEMS, INC.	BUYER:
BY:	BY:
PRINT:	PRINT:
TITLE:	TITLE:
DATE:	DATE:



Environmental Solutions for Cleaner Air and Water

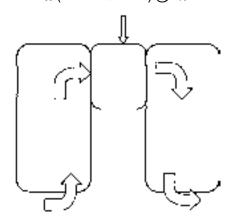
Institute of Clean Air Companies (ICAC) Guidance Method for Estimation of Gas Consumption in an Regenerative Thermal Oxidizer (RTO)

1. OBJECT AND SCOPE

Supplemental fuel consumption, typically natural gas, can be a significant consideration for the installation and operation of a regenerative thermal oxidizer (RTO). Regenerative thermal oxidizers are used in a variety of processes in the destruction of volatile organic compounds (VOC) and hazardous air pollutants (HAP). The amount of fuel required will vary by application; however, within a single application an estimate of fuel consumption should be consistent among RTO manufacturers and suppliers. As a result, the following procedure developed by ICAC and its member companies describes an industry derived guidance method for estimating gas consumption requirements of an RTO. Once fuel consumption has been estimated, fuel as part of the operating cost can be calculated using current or projected fuel cost assumptions. Generally, this method can also be used as a reference to confirm and compare manufacturers' fuel consumption estimates. The guidance method estimate will provide a reference for gas consumption estimates.

2. OVERVIEW OF GAS CONSUMPTION IN AN RTO

Fcc (Combustion Air) @ TA



F₁ (Process Air + VOC) @T₁

F₀ (Process Air + Products of Combustion + Combustion Air) @ T₀

1′

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3. GUIDANCE ESTIMATION METHOD

Energy consumed in the RTO can be determined by performing a heat balance as follows:

$$Q_T = Q_I + Q_{cc} + Q_{RL} - Q_{VOC}$$

 $\begin{array}{ll} Q_I & \quad \text{:Heat used to raise temperature of } F_I \text{ (BTU/hr)} \\ Q_{cc} & \quad \text{:Heat used to raise temperature of } F_{CC} \text{ (BTU/hr)} \end{array}$

Q_{RL} :Radiation Heat loss from RTO (BTU/hr)

Qvoc :Heat Release from oxidation of VOCs (BTU/hr)

$$Q_1 = F_1 X 1.10 x (T_0 - T_1)$$

$$Q_{CC} = F_{CC} \times 1.10 \times (T_0 - T_A)$$

Qvoc = VOC X H_C X (% Dest / 100)

Where:

F_I: Process air (SCFM)

Fcc: Combustion air (SCFM)

T_I: RTO inlet air temperature (°F)

T_A: Ambient or Combustion air temperature (°F)

To: Average RTO outlet temperature (°F)

1.10: 60 (min/hr) x 0.075 (lb/ft³, density of air at standard conditions) x 0.245 (Btu/deg F – lb, specific heat of air), where 0.245 is the average heat capacity of air over the temperature range.

VOC: lbs/hr of VOC to the oxidizer

H_C: Weighted Average for Heat of Combustion of VOCs

% Dest: Guaranteed VOC Destruction Rate

Since F_I , F_{CC} , T_I , T_O and T_A can all be determined by data supplied with proposal, Q_I and Q_{CC} can be determined.

To determine QRL the following guidelines can be used:

- 1. Determine surface area of the RTO shell
- 2. Multiply that area by heat loss factor (assume 200 Btu/ft²) to arrive at approximate QRL.

4. CALCULATION OF THERMAL EFFICIENCY (N)

$$N = ((F_1 + F_{CC}) / F_1) \times ((T_C - T_0) / (T_C - T_1))$$

Where:

N = Thermal Efficiency

Tc = Temperature, Combustion Chamber

To = Temperature, RTO Outlet (Average)

T_I = Temperature, RTO Inlet



UNIT 1, GREENBANK TECHNOLOGY PARK CHALLENGE WAY, BLACKBURN, LANCASHIRE BB1 5QB TEL: +44 (0)1254 690 555

FAX: +44 (0)1254 690 666

Ref: CROWN CORK & SEAL USA

PROJECT: CHARLIE

Greenbank Quotation Number: 7306 REV 1

ONE (1) 3000 CPM INTERNAL BAKE OVEN





CROWN CORK AND SEAL USA, INC. 770 Township Line Road Yardley, PA 19067

CONTENTS

(1)	Design Criteria
(2)	Scope
(3)	Standards and Requirements
(4)	System Dimensions
(5)	Oven Construction
(6)	Safety Equipment
(7)	Instruments and Controls
(8)	Utility Requirements
(9)	Testing
(10)	Manuals and Drawings
(11)	Installation
(12)	Prices and Delivery
(13)	Terms
(14)	Warranty
(15)	Validity

PROPOSED EQUIPMENT DESCRIPTION IBO OVEN

NSBO

The units will be designed to process Aluminum Beverage Cans, with "water bourne" internal coatings at a production speed of 3000 CPM – 211 x 413 and 211 x 604. Future capability for Sleek can sizes.

(1) <u>Design Criteria - General Specification</u>

Process Material - Aluminum Beverage Cans

Can size - 211 x 413211 x 604

Process/Production Speed - 3000 CPM (based on 211 dia)

Coating Type - TBA

Coating Applied Weights - 85 to 200 mg

Number of Heating Zones 3 heating zones - 60 sec - 60 sec - 60 sec

Operating Temperature - 395/400 Deg. F. (201/204 Deg C.)

Maximum Temperature - 450 Deg F. (232 deg C.)

Fuel - Natural Gas @ 1000 BTU/Ft³ (8,905 Kcal/M³), not to exceed

345 mbar (5 PSIG)

Conveyor Belt Width - 96" (2445mm)

Conveyor Belt Type - PTFE "Fiberglass" - 4mm x 4mm open mesh.

Can Pack Density - 85% @ 3000 CPM

Cooling Zone 30 seconds dwell time

Electrical Supply 480V, 60 HZ, 3 phase – 5 wire system

24 VDC control circuit

The units shall be capable of raising the metal temperature of the can to 400 Deg. F. (204 Deg. C.) at the end of zone 2 and will be capable of maintaining this temperature for a minimum of 60 seconds.

- Maximum ambient plant temperature 40 degrees Celsius (104 degrees Fahrenheit)
- Each unit is designed for operation at 1500 feet (460 meters) above sea-level.
- The ovens will not crease, dent, scratch or otherwise render the cans defective or unfit for sale.

(2) Scope

The units will be shop assembled and furnished complete with conveyor, fans, motors, ductwork, burner equipment with all relevant safety devices, temperature controllers, wiring, piping and control panel.

The units will be designed to allow for ease of access for cleaning and maintenance and will meet the following requirements.

(3) Standards & Requirements

The equipment will conform to the following standards: Low Voltage Directive: (73/23/EEC) (BS EN 60947-1) (CE EMC 89/336/EEC) (BS EN 50081-2) and CE Machinery Directive 98/37/EC, or the latest NFPA, NEC, IEC, OSHA and ANSI standards where applicable.

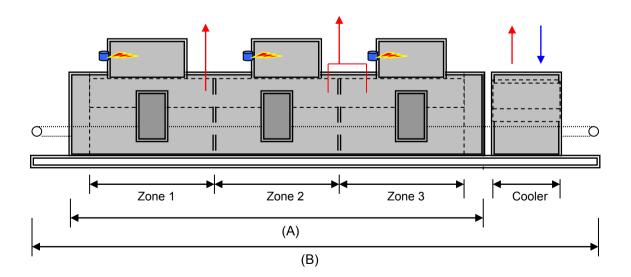
PM&E – Approved Electrical Vendor & Wiring Specifications, as per "Charlie" Approved Electrical Vendor and Wiring Specifications, Rev: 20-01-30, dated January 30, 2020, is included as part of this quotation. The control panel will be UL approved and on-machine wiring and components as per NFPA 70 (optional pricing provided)

Additional equipment may be required to satisfy local codes, which is not included in this proposal.

(4) Dimensions

Provisional

	3000 CPM – 3 Zone IBO With Cooler	
Belt Width (Effective)	96" (2445)	
Zone 1 length	17'-8" (5380)	
Zone 2 length	17'-8" (5380)	
Zone 3 length	17'-8" (5380)	
(A) Heating with capture zones	12'-2"w x 7'-10"h x 57'-4"L	
	3702w x 2400h x 17460L	
(B) Overall length	75'-8" (23055)	



(5) Oven Construction

Frame-work

The framework will be constructed from suitably sized rolled steel sections.

Panels

The oven walls, floor and roof will consist of low conductivity insulated "tray type" assemblies constructed in aluminized steel and packed with 4" (100mm) 8 lb. density mineral wool insulation material. In this type of assembly, the insulation material is fixed to a "continuously welded" inner frame-work wall and the outer "trays" are supported with top and bottom carriers, which are offset from the insulation thus creating an air gap.







This type of insulation panel gives a continuous external appearance and is superior to the typical tongue and groove type panel assembly where excessive through metal can give cause to high skin temperatures and radiation losses.

The continuously welded inner frame-work wall design also eliminates the need for "caulking" panel seams, as required with tongue and groove panel construction, and provides a clean oven exterior.

The oven also features front and rear capture zones to ensure that there is no fume spillage from the oven chamber.

A "Capture Hood Assembly" with access doors and associated ductwork linked to the front capture zone, will be located over the oven's entrance conveyor. This assembly will provide containment of fugitive VOC's prior to the oven.

The end openings of the oven will be silhouetted with adjustable end plates to regulate air infiltration.

Oven Access Doors

Manually operated access doors will be fitted in the appropriate positions and sized to allow clear access to the oven work-space and internal ducting. The access doors will be fully insulated and sealed to the internal heating compartment. The doors will be "tool tight" ie;- mechanically secure locking mechanism.

The access doors are designed with four (4) point "cam locking" mechanism catches.

Explosion Relief

The top face of each oven will have explosion relief panels conforming to the appropriate area to meet all regulations. The panels consist of Expamet sheet, stainless steel foil, **4" (100mm) 8 lb. density** mineral wool insulation, silicone coated glass cloth and covered with a lightweight aluminum top flap.

Note - There is no necessity for explosion doors in the oven sides, therefore the walkways between the ovens are safe passageway.

Access Stairs & Railings

The oven will be provided with access stairs and necessary railings.

Heating Equipment

The oven heating zones will be heated by **Proctor MAS**, **Fully Modulating**, **Synchronized Air and Gas**, **high efficiency gas burners**, **having a minimum turndown ratio up to 20:1**. Each burner will include:-

- Spark-ignited pilot burner
- Flame rod flame (Siemens LMV37) supervision
- Solenoid SSOV shut-off valves
- Combustion air blower with filter
- Motorised gas control valve and gas shut-off cock

The burners will be completed pre-piped, pre-wired and interconnected to the main junction box. Gas safety shut-off valves will be Honeywell (or similar) automatic valves. *An Actaris MZ50 gas meter will be provided.*

Recirculation System

Supply ductwork/Air Delivery Nozzles

The oven internal ductwork will be constructed of 16 gauge (2mm) aluminized steel, suitably reinforced and equipped with removable delivery nozzle sections. The nozzles will be of a tapered outlet design. The nozzles will be structurally rigid and provide an even distribution of air-pressure across the width and length of the oven work chamber.

The air delivery nozzles/pressure plenum in the oven chambers will incorporate an "Automatic Vertical Adjustment Assembly" to suit different can sizes. This System allows the operator to simply push a button on the PanelView display, raising or lowering the ductwork to the required height for the can currently in production.

Return Ductwork

Suitable damper arrangements will be provided in the return air (negative pressure) side of the system to control air distribution across the width and length of each oven zone.

Fans - Oven Recirculation System

All zones will be equipped with backward curved re-circulation fans, **direct driven** by **WEG 15kW TEFC motors**. All fan drives/motors will be driven with **Allen-Bradley PowerFlex** variable frequency drives. All motors will be provided with remote disconnects.

Exhaust System

Two (2) backward blade exhaust blowers, **direct driven** by **WEG 1.5kW TEFC motor in Zone 1** and **3kW motor in Zone 2/3**, will be provided for removing the products of combustion and volatile vapors from the oven heating zones. Exhaust air will be controlled with individual adjustable dampers located in each zone of the oven.

All fans will be driven with **Allen-Bradley PowerFlex** variable frequency drives. All motors will be provided with remote disconnects.

The exhaust system will be calculated based on flue gas insurance requirements, water-based solvent removal from product, and a slight negative pressure at the entrance and exit ends of the unit.

Cooling System

The cooling zone will provide a minimum of 30 seconds cooling time. The module will be constructed from 12/14 gauge aluminised steel over a structural steel frame. The internal ductwork will be constructed similarly to the main oven ductwork and designed for vertical high velocity airflow.

The cooler supply and exhaust fans will feature *direct driven*, *WEG (or equivalent) 5.5kW TEFC* motors with **Allen-Bradley PowerFlex** variable frequency drives. All motors will be provided with remote disconnects.

Conveyor System

A 98" (2500mm) wide (96" effective width), PTFE "Fiberglass" fabric belt - 4mm x 4mm open mesh with the appropriate supports will be provided. *The belt will feature a pinned type connection and does not require welding.*







The conveyor belt will be supported on a perforated steel slide-bed constructed from polished folded sheet metal sections for rigidity and flatness. The sections are interlocking and provide free movement throughout the oven. The belt return will be supported by full width tubular support bars located at the appropriate intervals below the oven heating compartment.

The conveyor drive will consist of a variable speed **SEW Eurodrive** .75kW motor, gear reducer, chain, sprockets, and will be fitted with a suitable torque limitor clutch for drive overload. An audible alarm will be interconnected to the control panel and be wired to shut down the zone burners in the event of conveyor stop. A remote disconnect will be provided.

A pneumatic conveyor tension device will be incorporated together with belt tracking limit switches located either side of the oven entrance and exit. Emergency stops will also be provided.

Pneumatic Tracking System- a full width automatic "Pneumatic" tracking system will be supplied. Mechanical edge or photocell sensors will also be incorporated.





(6) Safety Equipment

The oven will be equipped with safety devices recommended by IRI and as per the Electrical Specifications provided.

The safety equipment will include:-

- Honeywell "safety shut off valves" with block and vent valves.
- Self-checking flame sensor with flame safety relay.
- Combustion air and gas pressure switches.
- Blower fan interlocks.
- Alarm horns with red light and silencing relay
- Motor driven purge timers.
- Emergency stop control buttons.
- Re-circulation and exhaust fan pressure switches.
- Over temperature and flame lock-out audible and visual alarms.

(7) Instruments and Controls



The instruments and controls will be mounted in a completely enclosed, floor mounted pre-wired **Rittal (with steel plinth)** control panel with front access. The control panel will include motor starters, selector switches, fused disconnects, pilot lights, flame safety relays, a fixed purge timer, burner controls, fused branch circuits, a 24 VDC control transformer, a main disconnect switch with a door interlock and a **Rittal** panel air conditioner.

An Allen-Bradley Compact GuardLogix PLC will be installed in the oven control panel with a program entered to your specifications. The PLC will power an Allen-Bradley PanelView Plus 7 depicting the oven control and indication. The graphics display is designed to indicate faults in the oven control and safety system.

The oven zones will be controlled using **Honeywell UDC3200** Series temperature controllers. A **Honeywell UDC2500** Series temperature controller will be used as the high limit device for each combustion chamber.

Interface wiring will be provided with electrical cable tray from the panel outlet.

(8) <u>Utility Requirements</u>

Operation of the equipment will require the following services by the purchaser:

Natural Gas @ 1000 BTU/Ft3 (8,905Kcal/M3), not to exceed 345 mbar (5 PSIG)

Electrical service 480 VAC, 60 Hz, 3 phase - 5 wire system

(9) <u>Factory Test</u>

The unit will be fully assembled, including on-machine wiring and piping.

Testing will include uploading of panel software for control panel operation, start-up and shut-down procedures, and machine faults.

10) <u>Manuals and Drawings</u>

The following items will be provided before shipment:

Installation manuals CD (English)
Operation manuals CD (English)
Set of arrangement drawings (English)
Spare parts list (English)

All manuals, name plates, software etc., are in English language.

(11) Installation and Commissioning

Greenbank Technology Ltd strongly recommends the Installation be supervised by Greenbank engineers. Prices for the complete installation can be provided at extra cost.

Supervision for both installation and commissioning of the equipment can also be provided.

Supervisor for Installation will be charged at £ per day excluding travel/living expenses.

Commissioning will be charged at £ per day, excluding travel/living expenses.

(12) Price and Delivery Information

One (1) 3000 CPM, Internal Bake Oven - as described above, not installed, each including:-

- Electrical Control Panel with European Style machine interconnect
- Entrance Capture Hood Assembly
- Cooling System
- Allen-Bradley VFD controls on all Re-circulation and Exhaust fan motors
- MAS Proctor High Efficiency Burners
- Gas Meter Assembly
- Access Stairs and Railings

responsibility of the customer.

Total Price £
Additional Equipment
UL Approved Panel and On-Machine Components – The Electrical Control Panel and on-machine components and wiring will meet UL approval.
Price adder£
75 Second Zone 1 – The units 1 st zone will extended by 1.345 meters (4'-5") to allow the latitude within the process to produce BPAni lacquered cans. This option includes necessary changes in fan capacities and controls.
Price:£
Cooler Supply Inlet Damper - An "Automatic Cooler Supply Inlet Damper Assembly" will be provided with the cooler supply fan to "blend" incoming air with plant air during winter operation. A separate thermocouple will signal the damper motor to actuate as required to maintain the desired cooler supply air temperature.
Price:£
Crating – One (1) Inside Bake Oven with Cooler Zone, comprising 4 fully boarded Packing Cases for Oven & Cooler Zones which are hermetically sealed within a barrier foil envelope with sufficient desiccant to ensure moisture free environment. + Basing & Shrink wrapping all ancillary equipment using 1000g polythene
Price£
Equipment Commissioning – Two (2) men on site three (3) days for commissioning and start-up support. Does not include living and travel expenses.
Price:£
All equipment prices are FCA Seller's plant, Šeběsťanová 255, 017 01 Považská Bystrica, Slovakia according to INCOTERMS 2010.

Note: - All Fan, Motor, and Burner sizes quoted are provisional at this stage and may change on final equipment design.

Equipment protection ready for loading onto your appointed transport and Freight Company is the

Delivery Information

A general arrangement drawing for your approval will be provided 1 week after receipt of order.

The oven will be ready for buy-off approximately **22 - 24 weeks** after approval of general arrangement drawings.

(13) <u>Terms</u>

- of the contract price down-payment by wire transfer after contract signing prior to Commence of engineering, net 90 days.
- of the contract price following shop inspection at sellers/manufacturers plant (Prior to delivery) by means of wire transfer against the presentation of Acceptance/inspection protocol executed at the sellers' plant, net 90 days.
- of the contract price following installation/commissioning of the equipment at Buyers plant and acceptance documents signed by both parties or no later than 120 days from final equipment commissioning, said acceptance documents having been signed or not.

*Final acceptance will be automatic upon the customer utilizing the system/equipment supplied for production.

*Should equipment be delayed due to circumstances beyond Greenbank responsibility, Greenbank has the right to store the goods already manufactured at the customers cost and risk. Furthermore, shipping dates as indicated and agreed will dictate payment dates even if shipment is made to storage facility.

*Until final settlement of the total purchase price/sum, Greenbank, reserve the right of sole ownership of the equipment in whole or in part.

(14) Warranty

All material goods are warranted against defects in parts and workmanship for 18 months from shipment.

(15) Validity

This quotation is valid for 30 days. Thank for your continuing confidence and the opportunity to provide you with this proposal.

If you have any questions, please do not hesitate to contact us. We look forward to continuing our discussion regarding this project.

Thomas P. Zimmerman
Sales Director – Greenbank Technology Ltd

US Office +1 (262) 642-3535 US Mobile +1 (262) 374-0590 UK Office +44 (0) 1254 690 555



Proposal Package

Integrated Mass Rim Coat System

For



Project: Banjo

To: Crown Packaging

John Leitzke

Email: <u>John.Leitzke@crowncork.com</u>

From: UVio Ltd

Scott FitzGerald

Phone: +44 (0)1635 295620 Email: sfitzgerald@uvio.co.uk

Date: 6th February 2020

Page: 2 of 14

Dear John,

Thank you for your enquiry for your Project Banjo. Following my discussions with Ian Billington I am pleased to provide our revised proposals for our 36" Integrated Mass Rim Coating System, in accordance with BAN Approved Electrical Vendor List 20-01-30.

You will find the technical details in Appendix A and Ordering Information in Appendix B.

The project investment, items 1-3:

- 1. 36" Rim-Up IMRC System
- 2. Commissioning Visit
- 3. Radiometer & Jig

I hope this quotation is acceptable and that we can work together with you on this project. Should you have any questions please do not hesitate to contact me.

Yours sincerely, UVio Ltd.

Scott FitzGerald Managing Director

Appendix A - Technical Details

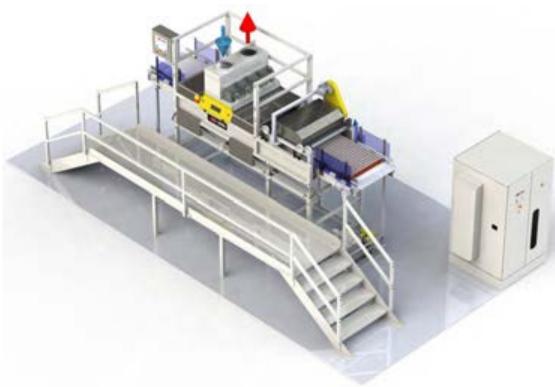
Single-Row Mass Rim Coater Systems

The mass rim coating process will involve a bottom rim coat application and a UV curing system. The system will comprise one Gerhard Bottom Rim Coater and one row of Heraeus Fusion LH10 MKIII lamps fitted perpendicular to Can travel. Both coater and UV lamp system will be combined onto one unit mounted over the production line conveyor. The unit features a single point adjustment for quick change between Can sizes.

A Day Tank will be mounted to the side of the lower frame of the machine. Coater cooling will be via a mobile air-cooled water chiller.

Controls will be located in one air-conditioned cabinet with Safety PLC and a local HMI touchscreen control panel. Lamp cooling will be via remote, variable pressure and exhaust fans.

Optional custom designed access platforms can also be provided upon request to suit the plant layout.



For illustration purposes only

The following pages describe the main Integrated Mass Rim Coat Processor and Control Cabinet, followed by the detail on the individual system components.

Integrated Mass Rim Coat Processor:

Manufacturer: UVio

Model: IMRC-410QU

Qty: 1 off.

- One (1) Custom designed Integrated Processor to house Applicator Unit and UV System over conveyor
- Can Orientation: Rim-UpCan sizes: 88-190mm TBC
- Adjustment:
 - Lower Frame: adjustable feet +/- 25 mm from specification height
 - Equipment Frame: Screw Jack System for manual adjustment to suit Can height complete with colour coded height change spacers for specific Can sizes (2 off)



- UV System Features:
 - o UV Cure Width: up to 1000 mm
 - o Lamp installation: 1 Row of Four (4) LH-I10 irradiators
 - Sealed Lamp Cooling System with Forced Make-up Air System and Slide-Out Removable Single quartz plate
 - Interlocked Side-Access door with Guardmaster Solenoid Switch and Tinted Polycarbonate Viewing Window
 - End snouts incorporating chequer-plate platform above conveyor for easy lamp access
 - o Direct coupled Lamp Slide-plate design (no lamp flexible hoses)
 - Lamp Cooling Air Sensors comprising:
 - Pressure: Integral Pressure Switch in Each Lamp Module
 - Exhaust: IFM Flow Sensor
- Coater System Features:
 - o One (1) IFM Motion Sensor
 - UV Safe Braided Return Hose Plumbing from Coater to Day Tank (up to 5m); positioned in tray to suit layout
 - o One (1) Coating Flow Sensor comprising:
 - IFM Sensor
 - IFM Adaptors
 - Coater Chiller Water Hoses:
 - Two (2) Flexible Hoses to Chiller; positioned to suit layout
 - One (1) Loop Connection Hose at Rear
- Conveyor System Features:
 - o One (1) IFM Motion Sensor
 - o Four (4) Turck Banner Back Up Sensors
- Paint RAL Colour 9010
- One (1) Electrical Terminal Enclosure (pre-mounted) for connection of ancillaries (sensors, etc.) to the Control Loom to Electrical Cabinet
- Four (4) Tinted UV Shielding Sheets (1.5m x 2m) for use as additional shielding, (supplied loose for installation by others)

Electrical Cabinet

Manufacturer: UVio

Model: CE-LH10-4AC

Qty: 1 off.

- General finish RAL 7035 powder
- Custom Double cabinet
- Wired for 480V/3ph/60Hz
- Generally wired as per UL Standards
- Allen Bradley PLC control:
 - 5380 Compact GuardLogix
 5069-L320 ERMS2
 - RSLogix 5000 (version 31 or above)
- Housing for 4 x Fusion LH10 MKIII Power Supply units
- Power Distribution and Controls for:
 - o Day Tank:
 - Stirrer
 - Pump
 - Hi/Low Level Switch
 - Coater:
 - Motor (VFD)
 - Motion Sensor
 - Flow Sensor
 - UV System
 - UV Pressure Fan (VFD)
 - UV Exhaust Fan (VFD)
 - Conveyor:
 - Motor (VFD)
 - Motion Sensor
 - Coater Chiller:
 - Temperature Set Point Input and Output
 - Fault Feedback
- Two (2) Integrated Side-Mounted Air-Conditioning Units complete with Internal ducting
- One (1) Programming shelf externally mounted
- One (1) External Power and Ethernet Socket
- Labelling in local language
- One (1) E-Stop
- Interface Looms (lengths to be confirmed):
 - Power Looms: Cabinet to Conveyor/Coater/Fans (17m)
 - o Control Looms: Cabinet to Sensors/Switches/HMI/E-Stops (17m)

Manufacturer: UVio

Model: Remote HMI Panel & Machine E-Stop

- One (1) IMRC HMI Panel
 - o One (1) AB PanelView Plus 7 Colour Touchscreen HMI
 - o One (1) E-Stop
 - o General finish Stainless Steel
 - Direct Mounting to Operator Side of IMRC Machine to suit layout
- One (1) IMRC Machine E-Stop
 - o One (1) E-Stop at rear of Machine.





System Components:

The following section provides the detail on each of the equipment components integrated into our system. Items are as follows:

1) Coater System:

Manufacturer: Gerhard Design & Manufacturing Model: 37" Bottom Rim-Coater (Rim-Up)

Qty: 1 off.

- Two (2) SS Chrome Plated Metering Rolls
- One (1) Applicator Roll EPDM Coated 30 Durometer Shore 'A'
- One (1) Set of Drain Pans and Hinged Cover
- One (1) set of Side Scrapers for the steel roll
- Gear drive (SEW Eurodrive)
- Water Cooling Preparation:
 - Stainless Steel Metering Rollers to assist in preventing corrosion.
 - Four (4) Deublin Rotary Unions (fitted)
- Single Point Bearing Grease plumbing
- UVio Factory Upgrades:
 - UVio Split Timing Belt Guard allowing Belt Tensioning w/o draining
 - UVio Bearing and Motion Detection Guard
 - UVio High Flow SS Drip Pan featuring enlarged drainage chambers and drain connections.
 - UVio High Flow Drain Kit with IMRC mounted collection manifold and non-kink flexible braided hoses.
 - Upgrade from standard handwheels to UVio Position Indicator Hand Wheels to adjust coating thickness and applicator height.

2) Coating Day Tank System

Manufacturer: UVio Model: Day Tank Qty: 1 off.

The Day Tank unit will supply coating to the applicator. It will be freestanding next to the IMRC base frame. Features:

- Two (2) Stainless steel tanks mounted on a drip pan mounted to IMRC base frame
- Electric driven mixer and Level Sensor mounted on a quick-change lid; allowing switching of the flow sensor and mixer between tanks
- Power will be supplied to components using Marechal type plugs and sockets pre-mounted to IMRC frame.
- Return Flow Filter basket
- Two (2) Electric driven Diaphragm Coating Pumps
- Two (2) Duty/Standby Inline Coating Filters.





3) Coating Chiller System

Manufacturer: Pfannenberg Model: CC Chiller Qty: 1 off.

Chiller unit will control water temperature of the coater metering rollers and comprises the following:

- Air cooled water chiller
- For water temperatures +2 to 35°C
- For ambient up to +45°C
- UVio Integration:
 - Power Distribution and protection from UVio Cabinet
 - Communications for temperature set point and feedback via machine HMI
 - o Fault feedback
 - Flow and Return Braided Plumbing fitted to fixed trays
 - o Mobile unit for individual machines; the unit will be housed under the outfeed to the IMRC frame. Position and accurate sizing of hoses will be made during the design approval process.



4) UV System

Manufacturer: Heraeus Noblelight America LLC.

Model: Light Hammer 10 Mark III Qty: 1 off, 4-Lamp System





- LHI10 Intelligent Irradiators, arranged in 1 row of 4 lamp modules, fitted with:
 - o 'H' Bulbs
 - o R500 Basic Reflectors
 - UV Measurement Sensor (%)
 - Cooling Air Measurement (Pressure/Temp/Humidity)
- LHP10 MKIII power supplies:
 - o 240 watts/cm Maximum Power Rating
 - o Variable Power Control: 35-100%
 - Ethernet Communications
 - AIMS Compatibility
- One (1) off RF detector with a 17m cable
- 17m interconnecting HV cables
- Longer cable lengths are available at additional cost

5) Lamp Cooling Fans

Supplier: UVio Model: Pressure Qty: 1 off

- AVMs Included
- 4 Lamp capacity
- Pre-mounted Isolator Switch with feedback
- Paint RAL Colour 9010

Supplier: UVio

Model: In Line Filter Box for Pressure Fan

Qty: 1 off

• G5 + F9 filtration

Side access door

Paint – RAL Colour 9010

Supplier: UVio Model: Exhaust Qty: 1 off

- AVMs Included
- 4 Lamp capacity
- Pre-mounted Isolator Switch with feedback

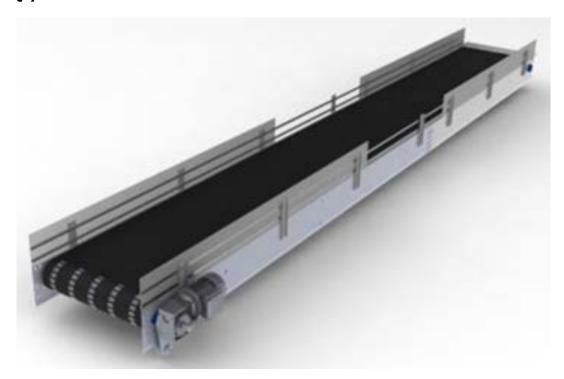
Paint – RAL Colour 9010

6) Conveyor:

Manufacturer: UVio

Model: 36" Custom UV Conveyor

Qty: 1 off.



- One (1) UV Conveyor featuring:
 - Length: 5200mmWidth: 36" wide unit to suit layout
 - Mounted directly to IMRC Lower Frame (by UVio)
 - Main body fabricated from 3mm mild steel sheets
 - o One (1) Drive Shaft
 - o One (1) Tail Shaft
 - o One (1) End Deadplate, 6mm TH Polished Stainless Steel
 - o Return of belt to be supported by 50mm Diameter Rollers
 - o Intralox 1100FG-UVFR (UV, Flame Resistant) Flush Grid, Flush Edge 912mm wide Belt; Distance between rails: 865mm.
 - o Belt drive sprockets 40mm Diameter bore, 155mm Diameter 32T
 - o Belt tail sprockets 40mm Diameter bore, 155mm Diameter 32T
 - G28 Belt Support Wearstrips with Laser Profiled Stainless Steel Plates under Coater and UV Lamp sections
 - Three (3) Siderails 5/8" Half Round Stainless Steel and External Tinted UV Shields
 - o One (1) 0.55kW SEW Eurodrive Geared Motor Drive
 - o Finish Stainless Steel

7) UV Radiometer Components:

Manufacturer: EIT, Inc.

Model: UV POWER PUCK® II

Qty: 1 off.

4-Channel integrating radiometer specifically designed for use with UV curing systems. Measures total energy density of four separate wavelengths simultaneously:

UV-C: 250-260nm UV-B: 280-320nm UV-A: 320-390nm UV-V: 395-445nm

Display is selectable - provides data screen mode which displays Joules of all four bandwidths simultaneously in one screen, graph screen mode, or reference mode for baseline comparison.

Manufacturer: UVio Ltd.

Model: POWER PUCK Can Jig

Qty: 2 off.

Power Puck Location Jigs features:

- $\circ\quad$ Positions Power Puck Sensor at position of Can Rim
- o Suitable for use with a standard Rim-Up Conveyor
- o Can Heights Simulated: to be confirmed

8) Commissioning:

UVio will supply support during commissioning as follows:

- Three (3) days Assistance on site during commissioning / start-up from Two (2) UVio engineers, inclusive of travel and subsistence. This will also include training in the use and maintenance of the equipment.
- Additional training for your staff can be arranged at our offices in Thatcham, England free of charge excluding accommodation, meals, travel, etc. either before or after installation.
- We request Crown provide all local transfers between Airport/Hotel/Plant.
- Additional time required on site due for supervision of installation or extended commissioning will be chargeable at the daily rate of £750/man/day plus travel and subsistence.

End of Specification

Technical and Installation Notes:

- Purchaser is to carry out shipment, off-loading, mechanical mounting, and electrical installation. If UVio has quoted for start-up assistance, it is on the basis that physical locating; mounting, ducting, and electrical connection of all the equipment has been carried out before arrival of the UVio engineer.
- 2. Ductwork: Purchaser is to provide Pressure and Exhaust ductwork at 355mm diameter between Equipment, Fans, and outside atmosphere. It is recommended that the Pressure air be taken from outside to minimise contamination. Inlet ducting position must take consideration of local environment and other utilities that may cause contamination. UVio can assist in specification of suitable duct layout and dimensions upon request. The Pressure blower is sized for a maximum of a 350 Pa static pressure drop in ductwork, respectively.
- 3. Purchaser is responsible for Can Handling and Line Control.
- 4. Lamp Operating conditions:

o Maximum Ambient Temp: 0-50°C

o Relative Humidity: 30-95% (non-condensing)

o Altitude: 0-1000m

- 5. Cabinet and AC Manufacture due to the nature of the equipment all enclosures and air conditioning will be custom made and not by Rittal.
- System is not designed for operation in a hazardous environment and therefore does NOT comply with EN 50014 standards (Electrical apparatus for potentially explosive atmospheres – General requirements).
- 7. The system is designed to comply with EN12100 Parts 1 & 2, and is supplied with relevant EU Declaration of Conformity.
- 8. Voltages must be confirmed in writing on the purchase order.

Training & Documentation:

- 1. Technical support can be provided via phone, e-mail, or site visits (chargeable).
- 2. We provide paper and/or electronic copies of the following documents, in English:
 - I. Fusion LH10MKIII System Manual
 - II. UVio IMRC Instruction Manual including maintenance manual
 - III. UVio CE Cabinet Instruction Manual
- 3. Conformity:
 - I. UVio IMRC System:
 - UL Control Cabinet
 - II. Heraeus LH10MKIII UV System certification:
 - CE
 - TÜV
 - UL 61010-1:2012
 - CAN/CSA-C22.2 NO. 61010-1-12

Appendix B - Ordering Information

Lead-time: estimated 30 weeks from receipt of Purchase Order and

Deposit; i.e. August/September ex-works. Please advise if

you have urgent requirements.

Delivery Basis: Ex-works, Thatcham, UK.

Packed and Loaded by UVio.

Payment terms: 50% Deposit due 22 weeks prior to shipment

40% at ex-works availability prior to shipment

5% at commissioning, no later than 60 days after shipment 5% at 1st Production run, not later 90 days after shipment

Subject to approval of credit status by UVio Ltd

Warranty Terms: Special Project Terms:

Extended warranty terms of 16 months from shipment

date.

Quote validity: 60 days from the date shown above.

Cancellation: In the event of cancellation by Crown the minimum

payment due will be 55% of total contract value.

Terms: The offer is subject to the General Conditions for the

> Supply of Plant and Machinery UN 574 as supplied by Crown Packaging with the exception/addition of the UVio

terms listed in Appendix C.

Notes:

1. Price and delivery are contingent upon receipt of sufficient information on process parameters, space limitations, and equipment interface for design of system.

2. The lead-time quoted is only estimated. Ship dates will be finalised upon receipt by UVio of the purchase order and

deposit as specified.

3. Prices Quoted are Net and Exclude any Local Taxes, which

may apply.

This quotation constitutes an offer to sell only and is expressly conditioned upon the terms and conditions as attached, except as noted above. Any order for products quoted herein shall constitute Buyer's assent to said terms and conditions and said orders shall not be binding against UVio until acknowledged in writing by an authorised representative of UVio.

6th February 2020

Scott FitzGerald Managing Director

Appendix C - Supplementary Terms and Conditions of Sale

Additional UVio Terms

- 1. Limitation of Equipment Warranties:
- 1.1 Unless otherwise stated, the Supplier warrants that all equipment shall be free from defects in material and workmanship if properly installed, maintained and operated by Buyer under normal use with competent supervision for a period of 12 months from date of shipment to Buyer. Buyer shall be responsible for determining that the equipment is suitable for Buyer's use and that such use complies with any applicable law. Provided that Buyer notifies Supplier in writing of any claimed defect in the equipment immediately upon discovery and any such equipment is returned at Buyer's risk to the original shipping point, transportation charges prepaid, within 12 months from date of shipment to Buyer and upon examination Supplier determines to its satisfaction that such equipment is defective in material or workmanship, i.e. contains a defect arising out of the manufacture of the equipment and not a defect caused by other circumstances, including, but not limited to accident, misuse, unforeseeable use, neglect, alteration, improper installation, improper adjustment, improper repair, or improper testing, Supplier shall at its option repair or replace the equipment, shipment to Buyer prepaid. Supplier shall have reasonable time to make such repairs or to replace such equipment. Any repair or replacement of equipment shall not extend the period of warranty. This warranty is limited to 12 months from date of shipment for all products, except lamp bulbs, magnetrons and reflectors, without regard to whether any claimed defects were discoverable or latent on the date of shipment.
- 1.2 Standard H lamp bulbs are warranted for 8000 operating hours on a non-prorated basis, not to exceed thirty-six (36) months from original date of shipment, unless otherwise stated in writing. Standard D, V and H+ lamp bulbs are warranted for 6000 operating hours on a non-prorated basis, not to exceed thirty-six (36) months from original date of shipment. Model I300 and I250 magnetrons are warranted for 8000 operating hours on a prorated basis, not to exceed 36 months from original date of shipment; Model I600, I6 and LHI10 magnetrons are warranted for 6000 hours, on a prorated basis, not to exceed thirty-six (36) months from original date of shipment. Standard reflectors are warranted for 36 months from the date of installation. Light Hammer 10 MarkII/III and Light Hammer 6 MarkII are warranted for thirty-six (36) months from the date of shipment to Buyer unless otherwise stated in writing. Machinery, equipment and accessories furnished by Supplier, but manufactured by others, are warranted only to the extent of the original manufacturer's warranty to Supplier.
- 1.3 Warranty replacements are warranted for ninety (90) days from date of shipment.
- 1.4 Any repairs or alterations, including the use of non-Fusion parts, made by the Buyer without Supplier's prior written consent shall void all warranties provided by Supplier and such warranties shall cease to be in effect. No allowance will be granted for such repairs or alterations. No person, agent, representative or distributor is authorized to give any warranties on behalf of Supplier or to accept for Supplier any other liability in connection with any of Supplier's products.
- 1.5 Resellers and authorized distributors of Supplier's products may require proof of purchase in order to honour claims under warranty on alleged defective products on behalf of the Supplier.
- 1.6 Supplier agrees, at its option, to repair at Supplier's factory, to replace without charge, or to issue credit at a price calculated F.O.B. Supplier's factory for any parts of products of Supplier's manufacture which, within said warranty period, shall be proven to Supplier's satisfaction to have been defective when shipped, provided the Buyer promptly notifies Supplier in writing of such alleged defect.
- 1.7 The preceding warranties are contingent upon Buyer returning alleged defective products, freight prepaid, to Supplier's point of shipment. Such products, if judged by Supplier to be covered by said warranties, shall be repaired or replaced at no charge, and returned surface freight, at Supplier's expense.
- 1.8 Supplier's warranty SPECIFICALLY EXCLUDES field service or repairs at Buyer's installation site. Such field service is provided only upon receipt by Supplier of Buyer's confirmed purchase order number for such services at then prevailing field service rates of Supplier. In the event warranty work is performed during the course of such field service, Supplier will credit Buyer for labour hours specifically arising from such warranty work, but Buyer shall bear full responsibility for the balance of all such field service charges.
- 1.9 If Buyer shall fail to pay when due any portion of the purchase price or any other payment required from Buyer to Supplier under this contract or otherwise, all warranties and remedies granted under this Section 10 may, at Supplier's option, be terminated.
- 1.10THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS, WARRANTIES AND COVENANTS, EXPRESS OR IMPLIED BY STATUTE OR COMMON LAW, TO THE EXTENT PERMITTED BY LAW WITH RESPECT TO THE EQUIPMENT AND ANY DEFECTS THEREIN OF ANY NATURE WHATEVER, INCLUDING WITHOUT LIMITATION WARRANTIES OF QUALITY, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SUPPLIER SHALL NOT BE LIABLE FOR, AND BUYER ASSUMES ALL RISK OF, ANY ADVICE OR FAILURE TO PROVIDE ADVICE BY SUPPLIER TO BUYER REGARDING THE EQUIPMENT OR BUYER'S USE OF THE SAME. UNDER NO CIRCUMSTANCES SHALL SUPPLIER BE LIABLE TO BUYER UNDER ANY TORT, NEGLIGENCE, STRICT LIABILITY, OR PRODUCT LIABILITY CLAIM AND BUYER AGREES TO WAIVE SUCH CLAIMS. NOTHING IN THIS CLAUSE 10 SHALL BE DEEMED TO EXCLUDE OR RESTRICT SUPPLIER'S LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM NEGLIGENCE. SUPPLIER'S SOLE AND EXCLUSIVE LIABILITY, AND BUYER'S SOLE AND EXCLUSIVE REMEDY, FOR ANY NONCONFORMITY OR DEFECT IN THE PRODUCTS OR ANYTHING DONE IN CONNECTION WITH THIS CONTRACT, IN TORT (INCLUDING NEGLIGENCE), CONTRACT, OR OTHERWISE, SHALL BE AS SET FORTH IN SUBSECTION 10.1 THROUGH 10.8 HEREOF AS LIMITED BY SUBSECTION 10.9 HEREOF.

2.0 Patents: Supplier shall defend any suit or proceeding brought against Buyer to the extent that it is based on a claim that any equipment manufactured by Supplier infringes in construction or design a European, United Kingdom or United States patent, and shall indemnify Buyer against all costs, damages and expenses finally awarded against Buyer provided that Buyer notifies Supplier promptly in writing of any such claim and gives Supplier full and complete authority, information and assistance for the defence of such claim and provided further that Supplier shall have sole control of the defence and of the negotiations for settlement, if any, of such claim. If any such equipment is held in construction or design directly to infringe any European, United Kingdom or United States patent and the use of said equipment is enjoined, or in case any equipment may, in the opinion of Supplier, be held to infringe, Supplier may, at its expense and option, either (a) procure for Buyer the right to continue using said equipment, (b) replace said equipment with a suitable non infringing product, (c) suitably modify said equipment, or (d) refund the purchase price of said equipment, less depreciation at twenty percent (20%) per year, and accept its return. Supplier shall not be liable for any cost or expense incurred without Supplier's written authorization. Supplier shall not be obligated to defend or be liable for costs and damages if the infringement arises out of compliance with Buyer's specification or from a combination with or an addition to equipment not manufactured or developed by Supplier or a modification of the equipment after delivery or the use of equipment beyond that established by Supplier or approved in writing by Supplier. THE FOREGOING STATES THE ENTIRE LIABILITY OF SUPPLIER, AND THE EXCLUSIVE REMEDY OF BUYER, WITH RESPECT TO ANY ALLEGED PATENT INFRINGEMENT BY THE SAID EQUIPMENT.

3.0 Limitation of Liability and Buyer Indemnity: IN NO EVENT, REGARDLESS OF THE FORM OF ACTION, SHALL SUPPLIER BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSSES, INCLUDING, BUT NOT LIMITED TO, LOSSES OR DAMAGES ARISING OUT OF CLAIMS FOR LOSS OF USE, BUSINESS, GOODWILL, OR PROFITS, AND CLAIMS ARISING OUT OF THIRD PARTY ACTIONS, REGARDLESS OF WHETHER SUCH THIRD PARTY ACTIONS, OR ANY OTHER CLAIMS, LOSSES, OR DAMAGES, WERE REASONABLY FORESEEABLE TO BUYER OR SUPPLIER, OR DAMAGES ARISING OUT OF THE SALE OF ITS PRODUCTS TO BUYER OR ARISING OUT OF ANYTHING DONE IN CONNECTION WITH THE CONTRACT. BUYER'S EXCLUSIVE REMEDY ARISING OUT OF ITS PURCHASE AND USE OF SUPPLIER'S PRODUCTS, OR ARISING OUT OF ANYTHING DONE IN CONNECTION WITH THE CONTRACT, SHALL BE FOR DAMAGES AND NO CLAIM OR CLAIMS OF ANY KIND, WHETHER BASED UPON CONTRACT, WARRANTY, TORT (INCLUDING, BUT NOT LIMITED TO, NEGLIGENCE, WARRANTY AND STRICT LIABILITY), STATUTORY OR REGULATORY PROVISIONS, INDEMNITY, CONTRIBUTION, OR OTHERWISE, SHALL BE GREATER IN AMOUNT IN AGGREGATE THAN THE PURCHASE PRICE OF THE PRODUCTS IN RESPECT OF WHICH DAMAGES ARE CLAIMED

Buyer shall indemnify and hold harmless Supplier, its officers, agents, employees, subsidiaries, parents, affiliates and insurers from and against any and all liabilities, damages, losses, claims, lawsuits, including costs and expenses in connection therewith, for death or injury to any persons or loss of any property whatsoever, caused in any manner by Buyer's abnormal or negligent use or operation of equipment.

4.0 Proprietary Information: Buyer represents that it has adopted reasonable procedures to protect Proprietary Information, as defined hereafter, including binding agreements with employees and consultants to prevent unauthorized publication, disclosure or use of such during or after the term of their employment by or services for Buyer. Buyer shall not use Proprietary Information except as required for the use of the equipment, shall not disclose Proprietary Information to any third party, and shall not transmit any documents or copies thereof containing Proprietary Information to any third party, except as may be authorized in writing by Supplier. This Section 4.0 shall survive termination of the contract.

"Proprietary Information" shall mean information or data of Supplier, or a third person to whom Supplier owes obligations of confidentiality, and which is furnished or to be furnished to Buyer in written, graphic or machine-readable form and is marked proprietary information or confidential. Where copies or alternative forms of information or data are received from Supplier, such information or data shall be considered Proprietary Information if at least one of said copies or alternative forms is marked proprietary or confidential.

This Section 4.0 shall not apply to information which Buyer demonstrates was in Buyer's possession prior to receipt from Supplier or information which Buyer demonstrates is or has become available to the public or general knowledge in the industry otherwise than through the fault of Buyer.

CROWN CORK AND SEAL, INC. BATESVILLE, MISSISSIPPI ALUMINUM LINE REGENERATIVE THERMAL OXIDIZER SYSTEM INCINERATORS NO. 4 AND 5 VOC CAPTURE AND DESTRUCTION EFFICIENCY

JANUARY 7, 2015

ESS PROJECT NO. 0914-03

Prepared for: Crown Cork and Seal One Crown Way Philadelphia, PA

Prepared by: Environmental Source Samplers, Inc. 436 Raleigh Street, Suite B Wilmington, North Carolina 28412

CERTIFICATION

This test report is submitted to Crown Cork and Seal, Inc. by Environmental Source Samplers, Inc., covering air emissions sampling conducted at the Batesville, Mississippi facility on January 7, 2015. ESS operated within the requirements of ASTM D7036-04 during this test project. The data and results presented in this report are believed to be representative of the actual operating and test parameters.

Analytical reports are reviewed for completeness, accuracy, adherence to method protocol, and compliance with quality assurance guidelines and NELAC 2003 standards. The results relate only to the laboratory samples listed. Neither this certification nor report shall be reproduced except in full, without written approval of ESS. ESS laboratory (VELAP ID: 460039) is accredited through the Virginia Environmental Laboratory Accreditation Program (VELAP) for methods pertaining to filterable particulate matter, sulfuric acid, total reduced sulfur and hydrogen sulfide. ESS only subcontracts to laboratories with NELAP accreditation. All test results provided meet all requirements of NELAP unless labeled otherwise. Justification will be provided in Appendix D for all results that do not meet NELAP requirements. Certificates of Accreditation are available upon request.

Results Reviewed By:

Melanie Parks Bethea, Operations Manager January 29, 2015 Report Reviewed and Finalized By:

Mark Looney, President January 29, 2015



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SECTION 1 INTRODUCTION



1.0 INTRODUCTION

Environmental Source Samplers, Inc. (ESS) conducted air emissions sampling at the Crown Cork and Seal, Inc. facility located in Batesville, Mississippi on January 7, 2015. Sampling was conducted on two (2) inlet ducts leading to Incinerators #4 and #5. Simultaneously with the inlet sampling, ESS measured the outlet emissions from both incinerators' stacks.

ESS sampled for volatile organic compounds (VOCs) utilizing U.S. Environmental Protection Agency (EPA) Method 25a. Flowrate determinations were conducted using EPA Methods 1, 2, 3/3a and 4. All methods appear in 40 CFR 60, Appendix A.

A total of three (3) test runs were conducted, each 60-minutes in duration, as approved by the Mississippi Department of Environmental Quality – Office of Pollution Control. Calculations were conducted for incinerator capture and destruction efficiency and New Source Performance Standards (NSPS) Subpart WW Compliance.

Personnel present included:

Mr. Michael Herron, Crown Cork and Seal USA, Inc.

Mr. Joe Boyle, Crown Cork and Seal USA, Inc.

Mr. James Jenkins, Crown Cork and Seal USA, Inc.

Mr. James Bradley, Crown Cork and Seal USA, Inc.

Mr. Joe Boyle, Crown Cork and Seal USA, Inc.

Mr. Iulian Duma, QSTI, Environmental Source Samplers, Inc.

Mr. Charlie Garner, QSTI, Environmental Source Samplers, Inc.

Mr. Richard Sitter, QSTI, Environmental Source Samplers, Inc.

Mr. Elijah Strafford, Environmental Source Samplers, Inc.

Mr. Josh Girt, Environmental Source Samplers, Inc.

Mr. John Reed, Environmental Source Samplers, Inc.

Mr. Chuck Sneeringer, Environmental Source Samplers, Inc.



SECTION 2 SUMMARY OF RESULTS



2.0 SUMMARY OF RESULTS

The test results are summarized below and included in more detail in Appendix B to this test report. Field data sheets are included in Appendix A; calculations in Appendix B; operational data in Appendix C; laboratory data in Appendix D; and calibration data in Appendix E.

A total of three (3) test runs were conducted at the inlet and outlet sample planes serving the regenerative thermal oxidizers (RTOs) identified in the permit as Incinerator Nos. 4 and 5 (also referred to as A and B, respectively).

Destruction Efficiency was determined through simultaneous sampling at the inlet and outlet of the RTO. A series of three (3) valid 60-minute test runs was conducted. The average destruction efficiency calculated for the test is 98.14 percent.

Inlet testing was conducted by sampling at the RTO inlets (A+B) and RTO outlets (A+B), simultaneously. Per applicable methodology, one Method 25a FIA was dedicated to sampling VOC emissions at each of the inlet sampling planes. The lb/hr emission rates reported for VOCs are calculated by multiplying the concentration of the gas (PPM) by the EPA Method 4 flowrate calculated from measurements conducted during the emission test.

Stack (outlet) testing was conducted by sampling at the RTO A and B outlet sampling planes, simultaneously with the inlet test series. Sampling and calculations were conducted as defined for the inlet location(s).

Quality Control procedures outlined in EPA Methods 1, 2, 3a, 4, and 25a, and in the applicable sections of the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III were followed in conducting the sampling and analysis at the Crown Cork and Seal facility.

Table 1.1 - Compliance Test Summary

Compliance Parameter	Run 1	Run 2	Run 3	Average
Destruction Efficiency (%)	98.13	98.32	97.97	98.14
Capture Efficiency (%)	64.9	85.4	81.9	77.4
Overall (%)	63.69	83.97	80.24	75.97

Table 1.2 - NSPS Subpart WW Compliance

Compliance Parameter	Run 1	Run 2	Run 3
kg VOC/L Solids (inside spray)	0.05	0.05	0.07
NSPS Allowable	0.89	0.89	0.89
kg VOC/L Solids (varnish)	0.01	0.01	0.02
NSPS Allowable	0.46	0.46	0.46
Fugitive Release (lb VOC)	4.204	5.597	7.189



SECTION 3 PROCESS DESCRIPTION

3.0 PROCESS DESCRIPTION AND OPERATION

The Crown Cork & Seal facility in Batesville, Mississippi manufactures aluminum cans for soft drinks. A cupping press forms a cup-shaped article from a continuously fed aluminum coil stock. The cups are drawn into the proper diameter and approximate length and trimmed to exact height. Lubricant is added and is reused in a re-circulating system. Aluminum scrap is removed as a solid waste and sent out for recycling.

Cans are washed in a continuous flow steam heated washer. The washer also contains a natural gas fueled drying section. Wastewater is removed and sent to a pretreatment system and then to the local POTW. Water vapor from the heated wash section and the products of combustion from the dryer section are exhausted to the atmosphere.

Cans pass to a can decorating machine where metal decorating inks, a water-based varnish and a bottom rim coat are applied to the exterior of the can. The inks' coatings are then cured in a gas fueled oven. VOC and products of combustion are exhausted to two Smith Regenerative Thermal Oxidizers (RTO's) for VOC emission control.

The cans have a water-based material applied to the interior of the can by means of an automatic spraying operation. The sprayed material is applied in a careful manner to the can interior. VOC emissions at this point are collected and exhausted to the RTO's. The interior coating is then cured in a continuous flow drying oven fueled by natural gas. The VOC emissions as well as products of combustion are then exhausted to the regenerative thermal oxidizers.

In a combustion forming operations, the can diameter is reduced and flanged. The remainder of the operation consists of leak testing using photo optics, then packaging through the use of a palletizer. The product is then ready for shipment to the customer.

The average production rate for the 16 oz aluminum can line is 1465 cans/minute. The average production rate for the 12 oz aluminum can line is 1826 cans/minute. The average production rate for the 8oz can line is 1575 cans/minute. The process is continuous. The can lines operate continuously unless the production schedule (or maintenance issues) require line stoppage.

Process Documentation

Crown employees were assigned to obtain the inside spray material usage. For the purpose of this test series, plant personnel used tote tanks of material supplied by the material manufacturer. Individual totes were provided for each line. Utilizing calibrated scales, Crown personnel recorded weights at the beginning and end of each test series. The documentation of these weights is included in Appendix C to this test report.

The ink container for each machine is filled utilizing a spatula. The Crown equipment operator was required to fill his inkwells prior to the start of the test run. Upon test completion, the ink bucket was weighed on a certified scale. Usage was determined by subtracting the ending bucket weight

(ESS)

from the starting bucket weight. The net weight for each line was used to determine the total VOC usage.

Crown employees recorded overvarnish usage on a run-by-run basis. Varnish is pumped from a day tank reservoir over a metering roll and the excess drains back to the day tank. During this test series the overvarnish feed container was topped off to a defined mark using a 5-gallon bucket. The liquid level was marked on the feed container. As each test progressed, plant personnel topped off the container with a pre-weighed bucket of varnish. At the end of each test series the day tank reservoir was brought back to a "full" condition. The process was repeated during each one-hour test run.

Line speed and can counters were utilized to document process parameters. A Crown employee was tasked with logging these parameters at the beginning and end of each run.



SECTION 4 SAMPLING POINT LOCATION

4.0 SAMPLING LOCATION

At the RTO-A inlet sampling location, ESS sampled at twelve (12) equal area points in the round stack for velocities and moisture. The sampling plane has a diameter of thirty-six (36) inches and is located more than 2.0 duct diameters downstream from a disturbance to flow, and greater than 0.5 duct diameters upstream of a flow disturbance. VOCs were sampled at a single representative point near the center of the duct after the completion of a gaseous stratification test run.

At the RTO-B inlet sampling location, ESS sampled at twenty (20) equal area points in the round stack for velocities and moisture. The sampling plane has a diameter of twenty-six (26) inches and is located more than 2.0 duct diameters downstream from a disturbance to flow, and greater than 0.5 duct diameters upstream of a flow disturbance. VOCs were sampled at a single representative point near the center of the duct after the completion of a gaseous stratification test run.

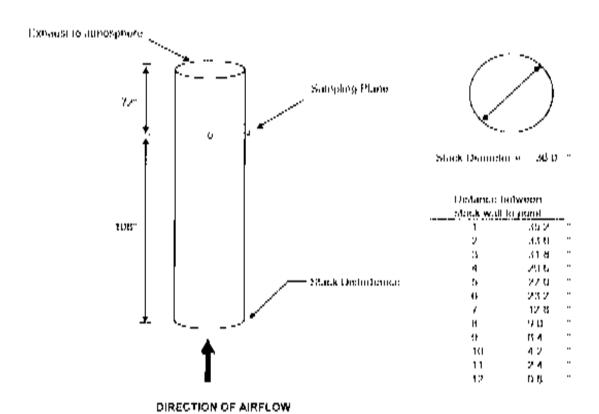
The RTO-A outlet stack is thirty-six (36) inches in diameter at the sample plane. Two (2) test ports are located at 90 degree angles more than 2.0 duct diameters downstream from a disturbance to flow and more than 0.5 duct diameter upstream of the stack exit. Eight (8) points were sampled for flowrate determinations at each of the two (2) test ports during each test run. VOCs were sampled at a single representative point near the center of the stack after completion of a gaseous stratification test run.

The RTO-B outlet stack is approximately fifty (50) inches in diameter at the sample plane. Two (2) test ports are located at 90 degree angles more than 2.0 duct diameters downstream from a disturbance to flow and more than 0.5 duct diameter upstream of the stack exit. Eight (8) points were sampled for flowrate determinations at each of the two (2) test ports during each test run. VOCs were sampled at a single representative point near the center of the stack after completion of a gaseous stratification test run.

Diagrams of the sampling locations appear on the following pages.

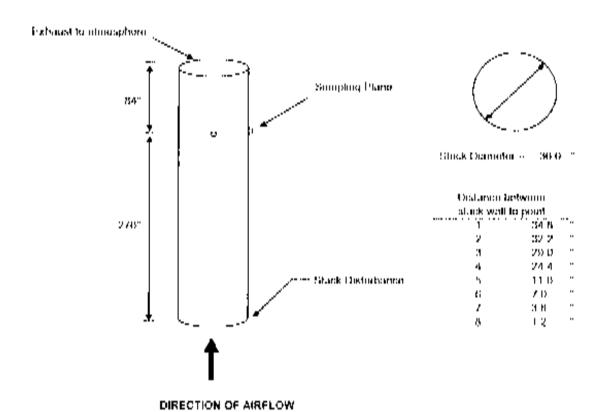


GROWN CORK & SEAL BATESVILLE, MS RTO A - INLET SAMPLING PLANE



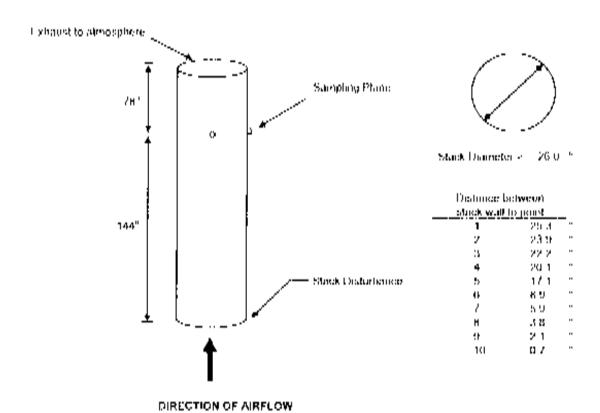


CROWN CORK & SEAL HATESVILLE, MS RTO A - OUT LET SAMPLING PLANE



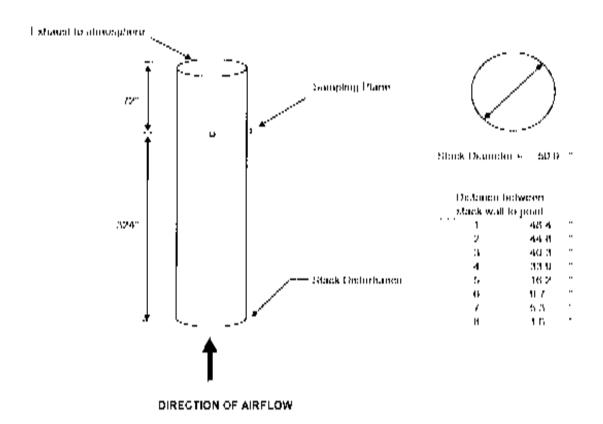


CROWN CORK & SEAL BATESVILLE, MS RTO B - INLET SAMPLING PLANE





CROWN CORK & SHAL DATESVILLE, MS RTO 8 - OUTLET SAMPLING PLANE





SECTION 5 FIELD & ANALYTICAL PROCEDURES



5.0 FIELD AND ANALYTICAL PROCEDURES

The four (4) EPA Method 25a THC analyzers used to determine VOC emissions were JUM Model VE-7s. These flame ionization analyzers continuously measures the concentration of total organic hydrocarbons in the gaseous sample. The sample gas delivered to each THC analyzer was on a wet basis and was delivered in a heated teflon sample line. The heated sample line was connected directly to a stainless steel sampling probe with an in-stack filter. The FID uses a blended hydrogen-helium gas as the fuel. The outlet and fugitive emission point analyzers were calibrated with method-determined propane concentrations. Results were converted to carbon per equation 25A-1.

The RTO A inlet monitor was operated on the 0-990 ppm range (as propane). The RTO A outlet monitor was operated on the 0-100 ppm range (as propane). The RTO B inlet monitor was operated on the 0-1000 ppm range (as propane). The RTO B outlet monitor was operated on the 0-100 ppm range (as propane). EPA Method 205, appearing in 40 CFR 51, Appendix M, was used to provide diluted calibration standards to the VOC analyzer, as required. Prior to calibrating the instruments, the dilution system performance was demonstrated on an oxygen (O_2) analyzer. Zero air $(20.99\% O_2)$ was diluted with nitrogen to provide standards at 100%, 50% and 0% of the 20.99 percent O_2 mixture. This data appears in Appendix E of this report.

The extractive monitoring system and all sampling and analysis procedures used in this testing program conform with the requirements of 40 CFR 60, Appendix A, reference method 25a. A STRATA Data Acquisition System (DAS) recorded a series of sixty (60) one-minute averages from each analyzer during each test run.

Prior to the start of the test series, a zero and high-level calibration gas was introduced to the heated sample line of each analyzer and the analyzer output was adjusted as necessary. A mid level and low level calibration gas was then introduced to the heated sample line of each analyzer. Section 6.4 of EPA Method 25a requires that the mid and low levels values be within 3 percent of the respective calibration standards.

A response time test indicated an analyzer response time of 60 seconds (or less) for the inlet and outlet monitors.

Following each test run, the zero and precision level calibration gases were re-introduced into each analyzer to ensure that the analyzer drift for each test run remained below 3 percent of the analyzer span value.

Moisture sampling was conducted by EPA Method 4. A Method 5 type impinger sampling train was used to sample for stack gas moisture at each of the two (2) outlet sampling locations. The first two (2) impingers each contained about 100 mls of water, the third impinger was blank, and the fourth impinger contained silica gel. A sample was collected over a 30-minute period at a constant sampling rate of no greater than 0.75 cubic feet per minute. The impingers were weighed prior to and following the test run to determine moisture gained. EPA Method 4 calculations were used to determine percent moisture. The moisture measurement was used in determining the dry standard



cubic feet of vent gas and the molecular weight of the stack gas. To calculate the molecular weight of the stack gas, it is necessary to determine the oxygen and carbon dioxide levels in the flue gas. ESS utilized Method 3a for the measurement of oxygen (O₂) and carbon dioxide (CO₂) during the test series. A Teledyne Model 320P chemical cell oxygen analyzer and a non dispersive infrared (NDIR) carbon dioxide analyzer were used in making the oxygen and carbon dioxide determinations. The analyzers were calibrated prior to and following each test series. The data appears in Appendix A and the linearity data appears in Appendix E.

Velocity measurements were made at intervals of approximately once per hour on each of the sources. The calculations for the flowrate determinations are included in Appendix B to this report.

ESS conducted CE calculations per the Site-Specific Test Plan that was reviewed by the MSDEQ. CE was analyzed using a liquid/gas protocol comparing inlet data taken by Method 25a at the LSM and oven inlets. Coating VOC content was previously determined using Method 24 – this laboratory data was utilized during this test series. The exact amount of coatings applied (as documented by plant personnel) were used to determine the lbs/hr of VOC applied and compared to the lbs/hr of VOC collected at the incinerator inlets.

Electrical voltages supplied to the analyzers are critical for correct operation. Line voltages were checked to ensure that at least 110 volts A.C. were maintained. This is especially critical for correct operation of the JUM hydrocarbon analyzers.

Velocity and temperature measurements were conducted in order to calculate VOC mass emission rates. An S-type pitot tube and Omega type K thermocouple were used to record the data at each of the test points according to EPA Method 1 and 2 procedures.



APPENDIX A FIELD DATA



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	1 12	0.04			. <u></u>				

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L	ft' Drawn	Avg Dolla P	Avg Dolan H	(1)	lump (F)
Е	20 107	0.9717	1.500	43.890	323 683



RTO A - OUTLET



mon rown Hart	VO(, 677)1 PUM	oz mil Z	(100 vol.)	
Pre Zeno Pre Sean	0 00A 20 02A	0.077 81 (98)	0 155 T 14:35 T	
02/2015				OV STRAT
9.45	1 (4)5.	(5.00)	0.765	1.0 1111/11
11.14	1.577	16 81 7	0.76%	:
9.17	1.07	14 821	0.067	
9.45	1 10 5	Birkari Paraga	F / 1-7	P
14.171 2.401	1.770 1.770	19 707	0.754	,
9.41	1 1/02	19 791	0.770	
9.40	1.674	10 777	0.74.1	٠
9.49	1 1191	19.795	0.01%	
9 44 9 49	1 100 %	10.745 19.757	4 II III 2 1107	١,
9.40	1.70	19774	3 1111	
0.47	12075	19 714	0.077	
2.4%	1 000	10.747	0.41.1	
4.44	141	10 749	(I H."+	
9 50 9 51	7 114 -: 147	19.774	0 AND 0 m/m	
9.50	2.000	19 759	0.000	
9.50	2.44	14 / 41	0.414	
4.54	2.44	19.7405	4 670	
4.54	la fami	19 751	0.853	
11 las 14 las	2 395 2 244	19 (67	0 A07 0 A21	
9.90	2, 840	19 7+4	0.77	
9.59	9.47	19.777	9.790	
10.00	7.701	19.755	0.744	
10.00	7.174	19 740	(1.407	
10 0) 10 0.1	2 4 76. 2 242	00 (A) 59 772	0.794	
10.04	2.040	39.77	0.747	
10.125	2.544	59.7490	0 791	
117 1911	2.204	24,004	0.777	
10.07	2 474	. 2 700	81 7 11 %	
10.00	7 M C	10 7.75 10 745	0.004	
19.19	7+1	91.797	0.797	
10/11	2,504	101 / 14	0.017	
10.17	2.112	59.720	9.024	
16.13	9 AB 2 #75	12 736	1: 00% 1: 00%	
19.15	959	16 717	0.00%	
10.75	2.254	19.600	0.754	
10.17	1 "	17171111	0.7465	
10 10	9 1700	19.740	0.017	
13 14	9 9 17 2 17 1	19 71%	D 11/10	
10.71	7.107	19 100	0.007	
10.27	2.010	19.674	0.095	
10177	3.879	10.574	0.079	
10 94	9 176	114 141.0	D 11.40 D 465	
10 95 10 70	9 1944 2 567	150 4165 (54 5.65)	D 1057	
10.77	2.504	19 500	0.070	
10.74	2.040	197.47	0.032	
10.04	9.4154	19.550	0.073	
50, 50	9 949 5 47	TO RAIN To rein	D 07D	
10.71	2.747	114 9411	0.074	
10.44	2.00	19 1970	0.090	
14.54	2,100	19 79 1	0.030	
AVERACE	y lisa	19.724	D 11.05	,
Post Zene Post Space	0.072 02020	0.049 11.001	(5 (074) 15 (074)	/



ыкан коАо Выст	VOC. DOT	0.001 %	CO: OO1	
Die Zein Die Siegen	0.077	0.049 11.004	0.006	
1977-3010				
11 (11)	CILITA	10.470	0.077	
13.01	3.45%	10.464	0.000	
1 (0):	A470	An Aug	0.000	
11 0.4	. 11410	10 005 10 010	0.040	
11.00	.1 421	10.500	6 071	
11 (8)	0.024	10.504	0.079	
12.07	1 #5A 1 013	14 000	(; ((4)) ((() 4))	
11.00	1 117	14 501	(IIA/	
11.30	4.47	19 500	9.072	
1: 11	J 700	19,905	0.033	
11.17	3.735	13.743	1: 11.41	
11.11	1740	14 508 14 508	6 079 8 0 00	
11.15	2545	19.005	0 10:3	
11.15	3.500	194.047	0 790	
11.17	2.027	19 0555	0.005	
11 171	31 JF.II 31 JA9	TO DIE	0.770 0.707	
11.70	1114	19 (017	0.701	
21.73	0.027	translity	0.700	
11.77	3.047	19717	0.769	
11.74	3 404 V 3 40 U	19 009	0.767 8.767	
11 10	1 117.1	10.774	0.757	
11.96	1 11 11	19/10/2	0.700	
1137	4.67%	193077	0.774	
11.75 11.79	2 (2 fu 2 () 2 (19717	0.761	
11.10	1971	17 004	V 777	
11.45	1.543	11641.00	u maa	
11.32	V 4015	10 134	// A27	
11.43	9.701 9.000	19 50d 19 57/1	0.450	
11.77	4 000	14 501	0.441	
11.30	1 184	19.004	0.7.111	
11.37	1.605	19 542	V MILL	
11 (1)	5 V II V 5 V II V	19 5A0 19 6 63	11 A 37 A 1094	
11.40	3 340	12.574	Author	
1145	5,970	19 560	0.040	
1142	2.607	59.5(1)	0.00%	
1141	9 70 9 9 10 7	10014 (24)0	0.005 0.007	
11.42	2005	100.00	0 (1 10	
11 411	4.177	sa rito	0.002	
114/	2.9.89	19.55%	D 78%	
11 40	3 (06) 3 (16)	19 ANJ 19 71 I	D 7814	
12.50	1 105	141 7461	0.711	
1111	3.054	10.690	Q. Alus	
10.07	2001	20.5080	0.773	
1111	27 7 10 3 4 7 5	18 507 18 104	B 780 B 834	
11 45	1664	12 104	D 1407	
11.70	1,145	Vii 544	0 11464	
11.57	2.049	10 Self	0.470	
11.11	2 977	10 110	0.000	
1111	3.131	10.750	15 II II U	
vAs hatel	5.407	V6 A 40	A 100 C	10
Print Zwice	0.059	4 050	0.078	1/
Prost Separa	00.000	11 700	17 19111	-



Pen Zang 0.050 0.050 0.075 0.075 17.000 17.00	177-1909 177-1915 1919 1919 1910			
177-7015 19 20	1779/0015 1970 1970 1970			
1996 1098 10000 3000 3000 1200 2000 12000 3000 3000 12000	(\$ \$) (\$ \$)			
1996 1098 10000 3000 3000 1200 2000 12000 3000 3000 12000	(\$ \$) (\$ \$)	2.041	16.567	9.769
19 20 20 20 20 20 20 20 2	1900			
17.24				
12.75			19916	
17.76	17.74	7.527	114 7 711	0.60
12 17 2 24 18 19 19 19 19 19 19 19				
12 10 2 770 10 10 10 10 10 10 1				
10				
12 20				
19 21				
19 707				
19 14	19.79		111444	0.030
12 95				
12.36				
12.07				
19 98				
19 10				
17 40				
12 47				
12 41	17.41	2 300	180 5-22	0.000
19.44		31,0000		
19.40, 19.40				
19 46				
19 27 19 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 2				
19 49				
17.49				
12 13 13 10 10 10 10 10 10				9 1117
12.07	12.50	331716	19.507	0.00%
19 53				
10 94				
1779 3700 17900 0 7400 0 7400 17700 17700 17700 17700 179000 17900				
17.50				
17.57				
12.50				
1500	135.50	4 10.1		0.840
1,505				
14 100				
1 4 0 1				
1 04				
19.05				
14.07 1007 10047 00400 10404 11504 11504 11504 10407 00400 10404 10407 10400 10404 10407 10400 10404 10407 10401 1	17.00		50 Sec. 2	0.652
1 CON	1.5 176	< 0.14	19411	0.971
15 mil				
1 1 2 2 2 2 2 2 2 2				
13.11				
13.12				
1919 0.705 10.710 0.766 1114 4.717 10.701 0.764 1114 4.717 10.701 0.764 1116 4.066 0.765 1117 4.065 0.7670 0.767 1117 2.012 0.005 0.767 1118 2.004 0.762 0.072 1118 2.004 0.762 0.072 1118 2.004 0.762 0.072 1118 2.004 0.762 0.072 1119 2.004 0.005 0.004				
1 1 1 1 1 1 1 1 1 1			10.710	
1	1114	4917	70.701	0.759
13.17 (2.10) NO 505 O 6164 11.14 (2.10) NO 505 O 676 13.10 (2.10) 10.105 O 676 13.10 (2.10) 10.105 O 617 13.10 (2.10) 10.105 1				
1 1 141 3 144 51 522 0 1474 1 14 14 2 14 14 13 135 14 14 14 14 14 107 1441 3 474 3 6 6 27 0 14 1 108 2 6 6 6 7 1 14 14 14 14 14 14 14 14 14 14 14 14 1				
15.10 2.011 10.505 0.004 NVFNACT 5.474 56.627 0.011 NBS.2000 0.16.6 0.027 0.055				
NV/ NACI (474 (682) ATCC OBSZEGO (6182 (1827 (785)				
masteria bilas sistem otras				
			P1 41 14	111.81



PLANT: TEST LOCATION: BUN NUMBER:					(ES	<u>s</u>)		
DATE. TIMC START:	177791115 1905			escu	OMMENT.	at soun	CE SAMPL	ERS. INC.	
TIME STOP:			MOIS	TURE COLLEC				MAT YEIS	
OPERATOR(8)	JI.			IMPINGER	Shiles GEL		CO,%	0,%	TOTAL
METER DOX #	75, 27,	٠٠. ٠٠٠	FINAL	210.0	201.1	† ,	0.4	19.6	2 0 .D
CONRECTION FACTOR	0 0011	* .	INITIAL	200.0	200 0	· · · · · · · · · · · · · · · · · · ·	ļ—— —	12.0	
BAR PRESSURE (HG)		t,	DITCERENCE	10.0	1.1	,	!	•	
	Ž		TOTAL	11 1	MLD/GRAMS	AVG	0.4	19.6	20 0
PRINT NIPPLE LENGTH (IN)	4 25	<i>*</i>				****			
NOVELE BICE	NA 7	r'		MCTER	MOX LEAK O	HECK.		PITOTIL	AK CHICK
NOZZLE ID:		/					,		138
PROME NIZERO			97467	0.000		15 3	/IN NG		ОК
STACK PRESSURE OF HEAVY	0.29	/	STOP	0.000	₽	n	INDIG	<u> </u>	OK
	YMPASONEN	11-N18			MORE	HI MI ASSI	REMINTS.		
Point MinimeterMent One Prof Migdle Length Onthi	Muluronca I'oint	ено (6) Ч ₁ О1 АР	Black Temp (F)	Clock Time	Ory One Mater 6Y2	Orffice flet H ₇ (2) AM	Dry Gas Temperature (F)	Vaccum	Сольтчентя
	Δ1	0 23	704	(· · · · · · · · · · · · · · · · · · ·	037.631	1.60	34	¢	[
	2	0.45	300	[, KA]	641 207	1.60	36	G	
	a	044.	. 204	10.0	644.976	1.50	36	0	
	4.	0.64	202	16.6	M40.130	1.50	37	6	
	^	.0.67	303	2D.d	851.743	1.80		<u> </u>	ļ
	·· <u>\$</u>	0.40	203	28.0	855 267	1.50	35	<u></u>	
	-	0.55	302	30.0	858 674	{	· · ·		ŀ
	<u> </u>	0.46	703	}··	i	· · · · · · · · · · · · · · · · · · ·			
		1 444							l
· · · · · · · · · · · · · · · · · · ·	<u> </u>	0.36	300	H	ı·	f ···· · · · ·	• • •		•
	2	D.37	305						
	3	0.37 0.48	306 308						
	3 4	0.37 0.48 0.67	305 305 305						
	2 3 4 5	0.37 0.48 0.57 0.59	305 308 308 304						
	2 3 4 5	0.37 0.48 0.67 0.59 0.58	305 305 305 304 308						
	2 3 4 5	0.37 0.48 0.57 0.59	305 308 308 304						

			Con Inthe	Avg Stack
Ht' Orawii	Avg Onlin P	And Order H	(+)	1600թ (Բի
X1 044	0.490	7.000	36.047	797.899



TEST LOCATION: KUN NUMBER:	V	1			(ES	S		
TIML STANT:		 ·····		ENVIR	ONMENT	at. SOUR	CE SAMPL	ERS, INC.	
TIMESTOP	11 16)		M (218)	TURE COLLEG		<u> </u>		ANALYSIS	
OPI:RATOR(S):	<u>16 !</u>			IMPINGER	SILICA GLL		CO.W	. O. %	FOTAL
METER BOX #:			PINAL	210 0	201.4			95.8	19.9
CORRECTION FACTOR:			INITIAL	300 0	200.0	[```	1_'	! <u></u>]
BAR PREBBURE (HO)	30 44		DR LENENGE	10.0	1 4	[3]- :	!''	
81 ACK DIAMILIER (FT)	J.,		TOTAL	11,4	44 3/01/44/3	AV()	0.4	19.0	10.9
PORT NIPPLE LENGTH (IN)	3.25								
NOZZUE SIZE	MA			MCTER	BOX LEAK CI	(ECK		PITOTL	AK GHUGK
NO2216 (6)			1					!	OK
PROBE SIZERIO:	451		START	0.000		18 "	ن 94 Neg] •	OK
STACK PRESSURE (in. H2O):			5706	0.000	(A)	5	(N 19G	<u> </u>	OK
VELGEN	Y MEABUREN	ICNTS"			MONITU	IRE MLASU	REMENTS		l .
Point Monavirusion) One Port Including Nipple Longita Alachi	Morfaret Disar Protest	Pilot (in. ti _s O) AP	Stack Yump (F)	Glock Timo	Dry Oak Maior FT3	ом ри и _г ој ом	Dry Gan Tongeratoro (F)	Vectoria	Goremenin
	A1	0.35	205	0.0	058.074	+.50	38	3	i
	2	0.42	304	<u> </u>	867,585	1.60	26	3	ļ
		0.48	303	10.0	666355	1.50		3	ļ
	<u>+</u>	0.83	304	!B.O	479.131	1,50	.40	.3	ļ
	<u>5</u>	0.88	303	20.0	873,865	.160	40	3	ŀ
	🤨	0.62		26.0	877.696	1 60	47	7	ŀ
	l ː		309	30.0	M#1.300				
•	l .î.	. 0.42,	304.	1 1	Į.				•
}	B1 2	0.37	306	1	,				
•	1 ;	0.88 0.47	304 308	1 1	,				ł
	1 1	04,0	303	1 1	,	1			
	! .	0.00	302	1 1	,				
	†	Ú H1	303	1 :	† :			· · ·	
)			1 !	t i	1			··· · · · · · -
	1 7	0.68	502						
	,	Ona Ona	502 504				· ·• ··· • ··· • •		· ·

			Gas Temp	Avg Stack
Ct' Drawn	Avg Della P	Avg Delia H	(7)	Tamp (F)
22.276	0 4909	1.600	39.107	203.213



			Ť						
PI ANI:	CROWNSON	K & SI AI				ES.	~		
TEST LOCATION:	RIGAGIIIO	- I]		(┌ ヽ	•		
RUN NUMBER:	9]				J		
DATE:	D7/2015		ì		_				
TIMI, BIANT:	19.20					<u>41. SOUR</u>	CESAMPL	ERS. INC.	
INNE STOP	17.50		MOIS	THE COLLE	NED.	<u> </u>	QA5 /	ANALYSIS	
OPI RATOR(5):	307			IMPINGER	BILIÇA GIJI.	<u>l</u>	00,%	0,7	TOTAL
METER DOX #:	11.27		TINAL	209 D	202 1	,		14 R	184
CONKECTION FACTOR	D 95177		INITIAL	200.0		<u> </u>]	<u> </u>]
BAR PRESSURE (HG)	30.44		DIFFERENCE	9.0	71	1	1		
STACK DIAMETUR (FT)	,I		10101	111	ин дизинаме	AVO	u A	19.6	19.9
PORT MIPPLE ET NOTE (IN)	0.05								
NOZZI E SIZE	NA	 .		MUTIR	BOX LEAK OF	несн	/	PHO114	AR CHI CK
NOZZEL RE							12	l	OH.
PROBE SIZE/IO:	491		START	D. 000	one .	74	/ IN HO	+	OR
	0.299		5101	D. 000	are .	· · · •	/ IN RO.		Ok.
VELOCIT	Y MEKSUREN	IENYA			MOIST	ING WEVRO	HEMENTS		
Point Modeurement One Pon Including Mipple Longth Mischi	Hufarensa Perat	Filot (in. h _i O) nP	Stack Temp	Clock Time	Dry Gan Motor ETD	Ordico (la. 11,0) aH	(a) Januarujan (a)	Vaq saqiiil	Copfidential
	A1	0.32	30†	0.0	881.010	1,50	. 36	3	
	2	0.40	302	5.0	888.000	1.60	36	3	
	3	0.44	302	10,0	885.708	1.60	36		
	t	0.56	304	10.9	auz.236	1.60	30		
	<u></u>	0.55	308	20.9	\$K0.04\$	1 60			l
		0.55	304	28.0	800 100	1 70	36	. a .	
		088	. 303	30.0	1100 000		}	.	
	5	0,47	. 301			l :			· · · · · ·
4		0.39	701			l :			
	91	4							
	2	0.42	303			1	· · · ·		
		0.42 0.47	20€	}					
	2	0 42 0 47 0 88	304 304						
	2	0 42 0 47 0 66 9 60	704 704 704						
	2	0 42 0 47 0 66 9 60 0 67	ana ana ana ana						
	2	0 42 0 47 0 66 9 60	704 704 704			· · · · · · · · · · · · · · · · · · ·			

1			
	-5	S	

Let Dzawn

21.846

Avy Dolla II Avg Dolla II 0.4940 1.600

Av<u>à</u> Dry Gas Tomp

(F)

35 833

Avg Black Tomp (II)

006.PVX

RTO B - INLET



114.44	MON IN
Hsm 1	13.24
Plus Zens. Care Lange	0 769 229 638
	77, ","
1000000	
9.05	1811 2022
9 56 9 57	110 711 114 544
li po	1,000.00
9 A9 9 4 0	124 745 142 = 07
9.41	1.49.45
0.47	191 012 198 307
0.44	142-767
949 940	170 1472 186 2402
247	1,79 (408)
0.49	1 44 304 1 34 114
4.50	147 000
9.50	14.0 P.W.
914	152,976
6-7-4 13-4-14	100 445
9 (4)	135.024
99/ 998	144.675
2.29	127 000
10 IXI 10 D I	147 4411 138 3 97
10.07	141 478
10 0.4 16 9#	ten nov Carriés
10.05	0.00 5200
10.04 10.07	104.701
10.08	184 214
10.00	194-114
90.11	1.04 950
70 17 70 17	75 / 744 145
KI IA	999-570 911- 754
10 To 10 To	94 175
80.17	107,127
70 FB	10 9 .70 0 GO DO
10.20	74 525 00 505
10.01	119 947
141.53	140 140
10.74 10.24	146. R97 140 dD3
10.29	· 4., 4.0A
100 27 101 20	101 417 144 (44
10.79	. 50, 1/0.0
10 NO 10 No	1.01.00
10.32	130 97 1
10.44	11 / 21 122 / 40 A
AVI (RA) 4	111487
Pokt Zero	100 0
Post Span	270 414



Proc Note 1 141 177 179 177 179 177 179 177 179 177 179 177 179	datan Ran z	VIV.	· III • M	
1 10				
1 01	177.901			
11.40 11.105 11.40 100.705 11.50 104.407 11.50 001.094 11.60 001.094 11.60 001.405 11.64 11.105 11.64 11.105 11.65 12.4.701 11.50 11.705	The 'quan	100 (1) 100 (1	#14 #14 #14 #14 #14 #14 #14 #14 #14 #14	
11 10 104 407 11 17 001 004 11 40 001 404 11 40 11 108 11 14 11 109 11 14 12 12 101 11 10 112 101	114	11.1	ıp.	
1 (4) 5 (2) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	11.5	104 4 (01.0	127	
(1.4a) C) CODA	. j 4. . g 5. . g 5. . j 1. . j 1.	1176 114 1247 1191 119	100 101 101 4.5	
11/4 /47/01	11.5	\u0/7	01	
Total Zoro 2004 Con 2	Post Zaro	* **	J	



Michia Migne 11	9001, 174 199 44
Pre Zota Pře Span	1.674 274.99
100,000	
15.96	195.01
82.20	11 CAU
12.72 12.74	179 004
10.74	1.05 (0.05)
(9.9%	135 700
CD 200	112 140
12.76	114 419
52,29	175,747
10 40 10 41	140 /07
\$7.52	196 / 30
45.83	171 146
57.74	126 195 110 954
12 AT 12 AU	110,004
10.17	133,700
CP NO	100 (0)
10 A4 17 +0	146 706
17.41	1.17 (90%)
12.42	107 701
(2.4.) (2.4.)	195 500
Cp 44.	114 114
C) 440	147 479 200 200
12 +7 12 +0	1 () ()()() 140 / 14
12.4%	ואוח חייו
10.66	111.17
CP 04 CP 57	184 004
1068	14P Bill
57.04	149 049
0.00 OF	101 (/4)/
Q 67	19/1/10
CP Aid	144.9
52 59 53 502	1.00 0 M
1 1 0 1	149.5%
53.37	151 374
00 0 0 00 04	180 (25)
20.00	132.079
\ 1 KID	175 407
01 07 03 56	11511/577 981 AllO
5,0,39	10 749
53.10	47.446
14 14 14 14	07 024 05 040
iiii	110 1418
V) 14	07.044
53-15 53-15	n7 502
10.17	97 100 9
V1.16	111 (124)
1114	11 & ARII
VALHACI	175 650
Part Zera	1.44
Court (span	275.11



PLANT: TEST LOCATION: HUN NUMBER: DATE:		<i>~</i>	(ESS)					
TIME START.	 :: :::				a. sour	CE SAMPL	ERS, INC.	
TIME STOP	10 05	M	MATURE COLLE	CTFO:			LNAL VSIS	
OPERATOR(S).	10%		IMPINGUR	SILICA GEL	ļ	00,%	9,74	TOTAL
METER BOX # _	5042	PIŅ	AL 202.0	200,6	י	0.7	10,9	20 B
CORRECTION FACTOR	1.9040	INIT	M 200.6 .	200.0	2	D.7	19.9	20.6
RVK LAIFBROKE IHC)	30.54	OHFEREN	GE 7.0	0.0	,	0.1	T D W	yo m
BANCK DIAMETER (F1)	2.100	} 101	AL 2.6	мі вланами	AVÜ	6.7	10 0	20 m
PORT NIPPLE LENGTH (IN):	NA /							
NOZZLE SIZE:	.NA		METER	BOX LEAK CI	II.CK		PITOT LE	AR GIR.CR
NO221 F 10	NA -	····· ·						ಲ≼
PHOUE SMEAD: _	402	NT2	NT 0.000	4	15	IN HO	···•	OK
ITACK PRESSURE (m. N2O): T	·1 20	ST	011 0.000	<u> </u>	В	OF IN HO		OK
VELOČII	Y MEASOREMENTS			MOISTU	INC MEASU	RLMUNTS		
Dis Port kicfuding Nipplo Langth Unch1	Reference Pilot Potes H ₂ O)	(ID. Slack Terri AP. (F)	Clock Time	UTY GAR Mains	(m. H,O) AB	Ory Gne Temperature (F1	Vacuum	() per marph
	A1 0	.02 72	0.6	808 243	1.50	37	2 :	
	2 0	.55 73	5.D	811.299	1.80	37	2	,
		.09 73	10.9	814,487	1.50	28	2	
		71 73	15.0	ļ. ē17.60ē .	1.60	24	X	
		74	20.0	820 876	1,60	3.IF	,	
		77 74	28.0	973 087	1.60	nů.	,	
		. 74	100	M28 182				
		.08 78 .83 78	Ш					
	" "		Ш					
	l 35 l 4	MIL 1 77						
		60 73	Ш					
	0	69 (1						
	11.7 0 2 0	61 /1 84 /7						
	117 0 2 0 3 0	69 (1						
	11.7 0 2 0 3 0 4 A	60 /1 84 /7 85 /2						
	111 0 2 0 3 0 4 0 4 0	69 (1 84 (7 85 (2 79 70		·				
	111 0 2 0 3 0 4 0 4 0	60 /1 84 /1 85 /2 79 79 76 75						
	111 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	60 /1 84 /1 85 /2 79 /79 76 /75 73 /4						
	111 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	60 /1 84 /1 85 /2 79 /79 76 /75 74 /4 71 /4						

			AVO DIY	
			Gas Tamp	Avg Stack
FL' Drawn	Avg Delta P	Avg Dalta (1	(l')	Temp (f)
18.5G	0.0732	1.57	36.60	F3 20



JERT LOUVION	2 1022015 11 00 11 30 85 5042 1 00 3 30 54 2 166		FINAL INITIAL DIFFERENCE TOTAL	ENTTR TURO: COLT EC IMPINGER 201.0 909 0 1.0 2.4	ONMENT	ES	CE SAMP! OAM CO₂% 9.7 0.7 0.7	.FRS, FAC. Anal YSIS 0, % 19.9 19.9	70 JAI 20 5 20 A 70 8 20 9
MOZZLE ID: NOZZLE ID: PRONE SIZEDIE: STACK PREZZURE (ID: 1120):	NA NA 109 120		START	MI YER 0 000 0.000	00 × 1.EAK €)	10 × 12 × 12 × 13 × 12 × 13 × 12 × 13 × 13	IN HO	PITOTLE	OK OK OK
Point Mexiconom One from inclining Nappe Length russin	Reference Point	Pitor jus. H ₂ (2) AP	Stack Tunip (I-)	Clark Time	Dry Con Marior	04/404 (44 H,O) AH	Dry Gns Temperature (F)	Vacuurn	Communic
	A1 2	0 #1 0.46 0.70 0.72 0.73 0.72 0.67	74 74 73 73 76 76 76	0.0 5.0 10.0 15.0 20.0 25.0	627,026 630,761 633,637 635,967 640,010 643,338	1.50 1.50 1.50 1.50	35 39 39 30 30 30	2 2 2 2	
	1D 15 2	0.67 0.69 0.62 0.68 0.68	74 73 73 73 72 72 70						· · ·
	5 7 9	0.70 0.74 0.76 0.73 0.71 0.54 0.64	74 74 75 76 74 78						

			AVA Bry Gas Toing	Avg Sinck
Fr ² Detwel	Avg Dolta (*			Temp (F)
16.901	0.6724	1.500	38.633	73 500



FEST LOCATION. RUN NUMBER! DATE.	3 100/01%	K vija ķiri		•	•	ES.			
TIME START:						M. SOUR	CE SAMPL		
TIME STOP:			MOIS	TURL GOLLER	SILICA GEL	-		KIRY TANA	TOTAL
OPERATOR(A)			PINAL	201.0	202.9	} .	CO,%	17.5	1
METER BOX at COMMESTION PASTON.			INITIAL	200 0	707.9	·		19.0	20.5
					09	,	0.0	19.9	20.5
BAR PRESSURE (I/G): STACK DIAMETER (FT):	하시다면		DIFFI RI NCE TOTAL	1.D	MUSICHAMS		4	19.0	20.5
PORT NUTTUE LENGTH IIN).			IGIAL	1.0	meana nama	ATV	• • •	.0.4	# V V
MOVALE SIZE				METER	DOM LEAK OF	(CCK		CITOTIL	AK CITI CK
NOZZLC ID:				m: 17 F		TI SER		''''''	OR
PROOF SIZEND			TRATE	0.000	13 .	44	// IN IFG	Ι.	l ok
	1.70		STOP	0.000	<u>ve</u> r.		IN 11G	:	
	YMEASUREM	II N LA		T		MÎ MÎ ASU		•	
filmy Popel - Cerclaritely Magyare I malgyn Haly Mi	Roteronice Point	H ¹ O) VI.	Slack Tomp (F)	Cinck Time	Day Gan Maler FT3	710 H 3/21	Tomporaturo (F)	Vacuum	Comments
	Δ1	0.61	79	. 0.0	#46.0R2	1.50	37	2	
J	ý	0.66	72	ñ.o.	440.024	1.50	37	2	
Į.		0.76		10.0	NB3.14N	1.56	37		
ļ	🐧	0.72	74	15.0	P66.394	1.50	37	7	
	···· <u>*</u>	0.73	75	20.D	559.815	1.50	37	2	
	·· -	0.74	73 73	30.0	883.134	1.99		, ,	
	· <u>-</u>	0.66 0.70	72	30.0	888.400		!	•	
		0.62	71					•	
	10	0.60	 					†	
	D+	0.50	70			'	ĺ	1	
	2	0.52	72			l '			·
	3	0.83	71		l.'. '			i	
	+	0.71	T2					[
	5	0.73	73						
	<u> </u>	0.75					ļ		
	-	0.72	71	1				1	l
	·-··	X	• • • • • • • • • • • • • • • • • • • •				,	,	
		2:71	71						
		0.74 0.64 0.63	• • • • • • • • • • • • • • • • • • • •						

			Cos Temp	Avg Stack
F4 ² 136mwn	Avg Dake P	Avg Delm H	(C)	Tomp (f)
19.4/n	0.6736	1.500	37.000	72,100



RTO B - OUTLET



Fileste Pon 1	141- M 141-1410	609 THTT	007000	
10to Zeroz 15to Septemb	0.077 79-7	0.014	0.07± 10.07±	
177700				
71.74.	274	la ala	0 and	OZ STRAT
10, 405	8 70H	70.017	0.670	1
0.07	0.500	-11 114	0.000	
U .IM	0.750	251 215 155 A	0.747	
11.50	0.640	19.976	0.000	
N -41	3.756	70 524	N ILI	
947	0.690	20011	1.649	.1
9.47	() mp()	*** 11,14.	7 O.16	
244	1 (11) (1 (41)	19 977 70 015	7 / 05 8 (50)	•
9.11	0.776	19 960	0.714	ı:
9.17	0.776	19.968	0.710	
9.40	0.400	10.64	0.751	
9.49	0.709	10.075	9.77	
0.48	U DIID 81 KOO	20 022 19 052	V 714 V 755	
419	1 100	19 0605	0.764	
9.50	0.996	yn do t	0.744	
9.44	1 150	10.083	0.76	
9.55	1 107 0 057	Lite one	0.759 0.737	
0 Mil. 9 M	1.005	VIII 11945 VIII 11945	V (6)	
9.80	0.779	20 (11)	11 (41	
94,50	0.023	181-19	D (4)6.	
10 00	0.919	16.674	9///	
10.01	0 / my 12 / 49	20 07 20 07	0.775 0.749	
11/10/	2.007	20.077	V (407	
10.04	0.709	20.079	0.739	
115 185	15 (0), 2	10.471	0.701	
10.00	D MHI.	20.011	D (()	
10.67	0.07/4	20 0 · 2 \pu \r*-4	0.744	
10.00	1 110	20.000	0.267	
10.10	0.046	20 07.1	0.774	
10 11	1 0 44	. 0. 470	15 11817)	
10 17	10 H / U () 4 · 1 / y	7/LODII 18: Gibli	D /4/ D /4/	
16 14	0.019	1313010	0/00	
16.15	11 40 11 1	20.000	0.759	
80.16	11 41 7 1	50 05.	0.770	
10 10	0.4000 0.4000	20 03H	D 776	
10.19	0.5559	19.96	0.00	
10.70	0.579	20.07.1	0.75%	
NI 21	0.511	20 (1960)	0.775	
80.77	11 11 10	10 GHI 20 O IZ	D / 77.	
10 24 10 24	0 544 0 544	20 0 7 11	D (Au)	
10.75	0.676	20 011	6.25%	
10.20	0.659	20.037	n Zes	
W1 07	0.4110	20.004	0.794	
40 % 10 %	8 45% 0 mg t	10 091 20 021	D IIO 1 D Zu4.	
10.10	0.572	20 0 1 5	0.007	
10.41	11 4:11*	20,042	0.792	
101.77	II 5 AIC	20.04	0.746	
10.74	0 4400 0 4400	70 0KH	0.04% 0.747	
AVERAGE	0.700	20 000	Dinos.	, ,
Prost Zinge Populationer	0 .72 April-164	1 1 Oiki	1) (1) / 1)	
1 A L. SIRAL	,,			



Me.D Mary	OCH. THIT PEM	ez not	doziouti N
Pro Zero Pre Stano	0.93 24.554	0.002	0 14.41
1776/0015			
11.00	1341	16.855	0.001
11.51	1.51	10.784	1.001
11.07	1394	19.671	0.478
1131	1 2 19	pare, no	. !
1134	1.460	19761	1.074
11.05	1.7911	10 (14)	1.005
1107	1.760	10 770	1.075
11.05	1 400	197474	1.600
1.1.21.5	1.155	[14.16,11	Loni
1110	1.794	19149	1014
11.11	1 150	19 (97	1 0.15
11.13	1.794	10 115 4	
11.14	1.471	19.945	71.4.10
11.15	1.74%	Ly y fly	0.4.1
11.16	1.740	111.115	0 40"
11.17	1 499	10 Han	0.904
11 19	1.745	115 9 6 4	0.00
11.70	1.455	115 (5), (4.605
11.71	1774	19525	0 444.
11.77	1.06.	179,79427	0.442
11.24	1.501	10 927	U V 141 U N 14
11.25	1.5 40	10.07#	O APJ
11.26	1.650	198 497	0.20
9777	1.724	10 off	6.01
11.75	1 4	1.6.54.0	04//
11.79	1202	19.957	0 yml
11 111	1.407	10.011	0.490
11.00	1.625	16 920	1 184
11.77	1.540	19 916	1.604
11.74	1.707	10000	! rid!!
11.15	1700	19.947	1.930
11 10 11 37	1.000	10 1174	23112 1305
11.36	1671	10 454	1.770
11.59	1.775	, 0. 15 1	1 484
11 40	17(1):	Learning.	1.544
11 4	1.094	19.626	1,00
11 47	1 /mh 1 / 14	10.07.1	1 ABJ 1 4 7 J
11.44	1005	14 4/4	13.96
11.49	i wis	to salid	1 radi
1.1.40	1.770	19.934	1.794
11.47	1.470	15.501	: /95
11 44	1 6.4%	10 0.17	1.4005
1150	1.297	ra alm	1 (4)
11.51	1.020	19.971	1 4/4 7
11.57	1.270	20.00	1 401
11.53	1.179	2010/13	1.759
11.82	1.744	1 0 095 20 012	1.709
11.55	1 /4"	70 mily	1.454
11.57	1 100	10.000	1 199
11.57	1,085	20/07	1.419
11.54	1.010	271 (1151)	E II45
AVERAGE	1,500	10.0/4	1940
Post Zero	0.419	0.005	9.000
Perp Again	94.11	11/02/	17 11417 - 2000



HH-H Mos 3	OOLOD DOM	02001 W	1,00 (0),1 %
And Anton End-Liptor	6.114 20.11	7400 N	15 067 15 067
177799116			
17.78	1.19.	15/3005	3 41111
17.71	1.00%	20.01	3.414.7
12.22 12.23	1.054	10 047 10 047	0.00%
17.24	195	20.016	0.77%
19.94	1.150	10.004	3 0 10 10 10
12.26	1 969	12 010	3 04 1
1/7/	1.119	16 671	0 797 0 644
17.70	1 /00	20.005	U 1658
12.30	0.000	111.9461	0.04
19.11	1 4.40	19.944	0.117.6
17.12	1,075	2011111 10 044	:: 4111
17.52	1.576	10 074	0.81
17.45	1.040	l y 4ij h	0.751
12.35	1.470	1.4.444	0.049
19 07 19 08	1.611	10.074	314097 O (90)
1939	1 103.0	19 807	1.10.
1/40	1.755	20.002	0.080
17.41	0.045	20 017	1.217
12.42	1 041	10 90 A 19 90 B	1.001
19 44	1 1111	12 5.17	3 164
12.45	1.030	19-91	0.540
17.49	l light	16.019	671
17.47 17.49	5 566 3 119	10.617	0 1657 0 7 AM
10.40	2.107	19.924	0 1164
19.50	9 155	19 milei	0.4029
12.51	2 164	10 801	0.4053
12.55	9 004 # 155	15 MAII 15 MAS	0.64
17.04	5 4/4	14 45 1	0.4054
17.55	2.754	19971	0.0004
19.56	7.54	10 0110	9.447
19.57 12.58	2 584 2 454	19 904 16 805	31 41 579 33 41 549
12.09	2444	19.867	0.0147
1400		19.911	0 042
1.4.91	3.023	19.670	0.04
1982	7.70 9.30	19 9.14	0 40 70 31 40 49
17.04	44.04	19 604	0.05
1000	2.54	14.40.4	11 4) 19
1.4 (0)	7.000	19.97	0.044
10.07 10.08	4 2740 9 1777	19 0/7 15 000	007
1,174	1 0 14	14 (11)	0.41.01
13.10	Lindin	116 5 11	II subiff
1,1,11	4.400	70.013	0.99
11.12	1 1147	119 190 2011/2011	0 4129 VI 201
10.14	1 114 1	20 030	3 531
50.05	4.004	14.445	0.40.50
13.15	1.767	14 4 17	11 41 48
19.17	1.777	19 9.17 19 905	0 41,55
11111	1.4/9B	12.765	0.4074
AVE 9AGE	2717	10.047	1 Test
Post Zuro	C .1114	0.905	0.640
Persk Oppen	25.14	11 027	15,007



TEST LOCATION RUN HUMBER	CROWN COL MICENTINA 1				(ES	S)		
IMF START	1400/015 0.05			ENITR	ONMENT.	o. Sour	CE SAMPL	ERS, INC.	
TIME STOP.	10.0%		18018	TURE COLLEC				MALTSIS	
((PERATOR(S)	F 59			IMPINGER	SILICA GEL		CO,%	0, %	TOTAL
METER BOX #	74.75	.	FINAL	212.0	200.9	١ ١	0.0	Z0.0	20 B
CORNECTION LACTOR.	0.0077	/ "	INTURAL.	200.0	200 H		T	Ī	· ·
BAR PRESSURE (HG):			DIFFERENCE	12 D	9.9	,		T	
STACK DIAMETER (ET):		7	TOTAL	12.9	MLS/GRAMS	AVG	0.9	WE D	9E D
PONT NIPPLE LEMOTH (IN).		7							
NOVALE BIKE	NΛ	/		METCH	BOX LEAK C	HECK		PITOTIL	AK GHECK
NOZZLE ID:	NA 4	1/2]					1	OK
enone sizemi:	TV1	7	START	0.000		16 ,	/NHG		OK .
STACK PRESSURE ON HEQU	11.2.1		I stor	0.000	e	11	INHO		OH.
ALL DAZI	I V MI-ARURI-A	MI-MITS.		MORYURY MEASUREMENTS					
Pour Measurement One Hoo Inchailing Nigola Longth anchi	italarance l'omi	Photon (b) HyDl NA	Sinch Torns (4.)	Clack Time	Dry Ope Metor	Ortice (in H,Ch AH	Dry Gos Tomporeture If)	Vacoum	Companyote
	A1	0 20	208	44	943 009	1.30	42		
	2	0.27	209	5.0	946.608	1.30	42		
		0.30	289	10.0	950 DDZ	1.30	42	2 .	,
	<u>-</u>	0.30	301	16.0	953.704	1.30		7 3	
	<u></u>	0.29	297	20.0	957, 208	1,30	45 46	7 7	
	- 5	0.27	295	28.0	960.501	1.30	1 40	'	•
	 ;	D. 28 D. 3D	297 296	30.0	954.401	• • • •	l	l 1	•
	 	0.26	295	}	!	!	l		•
		0.35	295	 -			l		•
· · · · · · · · · · · · · · · · · · ·		D.27	295	 		ł	I		
	├─- - -	0.26	795				l		
	1	D.26	299	ļ			I	l'''	· · · - · ·
	1 έ	0.27	297	} ···			Ι ΄		· ·
	 ;	0.27	508	i		1	· ·]	· · · · · · · · · · · · · · · · · · ·
	3	0.30	208		1	Ī			



Avg Dolin P

P(Depuis

21.13

A∨n ⊔ay Gau Temp

IF1

43 60

Avg ranks H

Avg Stack Temp (F)

207.50

							_		
PLANT.	Cife Mail 1886	R K NI AI					<u>~</u>		
TEST LOCATION:	RICTOUTU	Т			()	ES.	5)		
non mambana	177)2015								
TIME START				ENVIR	ONMENT	O,SOUR	CE SAMPL	ERS, INC.	
UMB STOP	11()		MOIS	TURE COLLEC				IMAL YSIA	
OPERATOR(S):				IMPINGI H	SILION OF	l .	CO.W	O'W	IOTAL
METER BOX #:			HINAL	2000	201.7		1.2	19.7	71.0
CORRECTION FACTOR:		• · • · · · · · · · · · · · · · · · · ·	INITIAL DIFFERENCE	200.0	200.V 0.8	l ,			
GAN PRESSURE (HG): STACK DIAMETER (FT).			TOTAL	9.6	ML SIGNAMO		1.2	14 #	21.0
PORT NIPPLE LENGTH (IN):					1 411 41				
NOZZILE SIZE:				MUTHE	рожитьк ст	неск		PITOT ILL	AK CHECK
MONALERO							1		. ok
PROBE SIZEAU:			*1941	0.000	e	14	IN HO	, ,	OK
STACK PAESSURE (in. N20):	0.73 Y Mlašuren	II NITH	8100	40 01010	<u>e</u>	ਨਗ ਸਪੰ ਨਤਰ	MINITED TO THE PROPERTY OF THE		OK
¥1	I III CASONCII	I				<u> </u>	· · · · · · · · · · · · · · · · · · ·	l''	1
Point Measurement One Port Including Rippie Longin Ilnchi	Aoteronce Poler	PHOA (An. (h,O) oP	Stack Fainp (F)	Chage Three	Ory Gas Motor F10	ОлПен Пн. И ₁ 01 ДН	Dry Gas Temperature (II)	Vacuum	Community
	A1	0.27	202	0.0	004.065	1.30	43	2	
	<u> </u>	0.30	. 294	n ()	900.487	1.30	44		
		0.28	242 242	16.0	979.05† 976.012	1.30	45	. 2	
		0.29	994	20.0	979.004	1.30	40	. ,	
		0.78	244	25.0	982,050	1.30		ય	
	7	() on	sau	30.0	985,248				
		0.54	394			- ·	Į. ,	•	
	۳۱ و	0.51	295 297				1 '	•	
• •	á	0.20	794				1 1		
	ä	0.24	209]]		
	٨	0.24	297			ľ]		
		6.36	201] .		
	· 3	6.2A	200			l	Ι .		
		0.76	200						
									

			Ave lay	
			Own Torrig	Avg Stack
l't' Drawn	Avg melta P	Avg Bolla H	(+1	Tomp (f)
21 327	0 3779	1 300	48.000	295.343



TEST LOCATION: RUN NUMBER:					`	ES			
TIME START:	12 20					41. SOUM	CESAMPL	ERS, INC.	
IIM+ St(3)	12.50		MOIS	TORE COLLEC	7760			WWT ARIS	
OPERATOR(5):	1.9			IMPINGER	SHIEA GEL	Į] co,% [0,%	TOTAL
METER BOX #:	11 35		FINAL.	211.0	202.M	[1.3	19.9	21.7
CORRECTION FACTOR	0.0077		INIYIAI	2000	3017	,	. .	ļ	
BAN PHESSURE (HG).	JQ 5A		OIFFERENCE		1.9		[. .	l <u></u>
STACK DIAME (ER IFT)			▼OTAL	12.1	MLS/GRAMS	AVG	1.3	19.7	21.2
PORT NIPPLE LENGTH (IN)	h+A								
NO22) F 5IZF:	NA			MITTER	OOX LEAK CI	ICCK		PITOTIC	AK CHECK
MOSSI F III			ļ				, ,	,	, 1244
PROBE SIZERID:			START	·	थ	16 4	/ IN HO	<u> </u>	OK
STACK PRESSURE (in. H2O):	TV MCXSURTS		STOP	0.000		er mi kad	IN HU	· · · · · · · · · · · · · · · · · · ·	OK
Point Measurement One Port Including Nipple Langth tinchi	Reference of Proofit	Picos (HI. H.Oj AP	Sjerk fernji (1-)	Clack Time	Ory (Jan. Atajar ETA	OFFICE (In H ₁ O) (H	Dry Gas Temperature (F)	Vacuum	Comments
	A1	0.25	295	0.0	200.002	1.30	39	2	
	3	0.27	295	6.0	990.213	1.30	39	2	
							l 40 I		
	3	0.29		10.0	993.725	1.30		2	
	4	0.28	297	18.0	997.759	1.30	41	2	
	4 3	0.28 0.20	297 298	18.0 20.0	997.759 1000.660	1.30 1.30	41 42	2	····
	4	0.28 0.20 0.27	297 298 300	18.0 20.0 28.0	997.789 1000.660 1004.167	1.30	41	2	
	3	0.28 9.20 0.27 0.30	297 298 300 207	18.0 20.0	997.759 1000.660	1.30 1.30	41 42	2	
	4 3 0 /	0.28 9.20 0.27 0.30 0.28	297 298 300 207 298	18.0 20.0 28.0 30.0	997.789 1000.660 1004.167	1.30 1.30 1.30	41 42	2	
	4 3 0 /	0.28 9.20 0.27 0.30 0.28 0.27	297 298 300 207 298 298	18.0 20.0 28.0 30.0	997.789 1000.660 1004.167 1007.147	1.30 1.30 1.30	41 42	2 2 2	
	4 3 0 7	0.28 9.20 0.27 0.30 0.28	297 298 300 207 298	18.0 20.0 28.0 30.0	997.789 1000.660 1004.167	1.30 1.30 1.30	41 42	2 2 2	
	4 5 7 0 7	0.28 0.20 0.27 0.30 0.28 0.27 0.28	297 298 300 207 288 216 218	18.0 20.0 28.0 30.0	997.789 1000.660 1004.167 1007.147	1.30 1.30 1.30	41 42	2 2 2	
	4 5 7 0 7	0.28 0.20 0.27 0.30 0.28 0.27 0.28	297 298 300 207 288 208 208 208 208	18.0 20.0 28.0 30.0	997.789 1000.660 1004.167 1007.147	1.30 1.30 1.30	41 42	2 2 2	
	4 5 7 0 7	0.28 0.20 0.27 0.30 0.28 0.27 0.28 0.70	297 298 300 207 228 228 228 228 228 228 228 228	18.0 20.0 28.0 30.0	997.789 1000.660 1004.167 1007.147	1.30 1.30 1.30	41 42	2 2 2	
	4 5 7 0 7	0.28 0.20 0.27 0.30 0.28 0.27 0.28 0.71 0.30 0.78	297 298 300 207 298 218 218 218 218 218 218 218	18.0 20.0 28.0 30.0	997.789 1000.660 1004.167 1007.147	1.30 1.30 1.30	41 42	2 2 2	

			Red Temp	
PA (Britism)	Avg Dolta C	Avg italia ii	u i	Long (6)
20.250	0.7844	1,300	40 400	268.756



APPENDIX B CALCULATIONS



NSPS SUBPART WW COMPLIANCE REPORTING



Cross Certigol Seal - NSPS Support Mill Report of Amery 1, 2015 - Perit Roll 12 November Environs Samury

:: 1

Carlo Practice

4s: 0.

	s design	2017 N. 181. Specifically	# #8	35.45 808-6-5-5	r F E	7 50 E	10 m 10 m 10 m 10 m 10 m 10 m 10 m 10 m	5 9 LBC	5 (S) 4 (C) 4 (S) 4 (S)	5555 Control
18.38 (6.31) 18.13.1 19.13.1	9 <u>7 8</u>	54 # FE	5 (0) (1 20 (1) (1	\$ 85	A.M.	: # :: • : : :	W 14 7	#W#	ii ii i	## T
, is	Central Pressor	 1.5 2.8	23							
		\$00000 \$000000	8 8	SSV4 MOSSIFIED	93 = -48 (A)	20 v 60 20 v 60 20 v 60 20 v 60	7 a. 2 a. 3 a.	2000 per 200	19 (20 at) 0 (3 (3 (3)	100 M
E8887	# A	k # #	KN A	752	E #.1:	20 (A.) 40 (A.) 40 (A.)	80.7	Z !! *	HHP	PX7
r F	Constitution of Constitution (Constitution Constitution	 14: TK								
	100 CM	#300.84 Prefacti	$\S_{\alpha}^{\mathbb{Q}}$	Page Property	300 September 1	\$20 BY	1980 8 70 8	2000 2000 2000 2000 2000 2000 2000 200	1,400 km 0,400 km 0,400 km	N. 38. A. 38. A.
2 2 2 2 2 2 2	9 (18 9 (18	HXE	NOA UP	11 H	# T T	\$ 3. 9 # 1 1.	W.C.	W.C.	i: ii r	877



DAVA SUPPLIED BY CROWN GORK AND SEAL FOR CAPTURE EPHICIENCY DETERMINATION January 7, 2015

Buo [f]					
P. 902 5 003 (Juage)	1014 1714	Hr Cylb cont fi SunO	laca) carbon (b) b) who	(aprised carbon (lh)	AS CUITSVIE
QV (RPSRIZ	720 4R	0.0577	1 (0).74		
rn×.	p,m	0.0717	0.5446		
			A11 20	31 30	44 0
Rom / f					
Ps 1044 (-001) Disage	1054 500	th tylo vous (thing)	Firth? Carbon Hb) Ct Onnit		
city teoristics	JUN OF	0.46427	13 200701		
INX	24.57	0.0717	0.9499		
			afi 46	50-00	M6 /4
Hga \$71					
Pr 482 (001 Ovage	105# 4105	th Cythic nat O (land)	fanals aroun (lh) 42 0100		
OV MOSSICE	2.55 44	0.0577	1.5 1.65/4		
18(8)	1111	0.0217	0.4711		
			46 13	27 77	H4 ft
		Summing	46.08	36.24	77.30



RTO A - INLET



CROWN CORK & SHAL - BATESVILLE, MS RTG A January 7, 2015

INLET	THE			
RUNNUMBER	1	2	3	1
VOC SPAN (PPM)	990 00	440.00	0.00 1019	•
VOI: MCASURED (PPM)	216.72	207.23	280 70	
VOC SPAN GAS (PPM)	24.0 (0)	240.00	248 00	
VOC PRE ZERO (PPM)	1.38	1.75	1.69	
VOC POST ZERO (PPM)	1.75	1.49	1 60	
VOCERRI (SPAN (PPM)	240.25	250,10	250 22	
VOC POST SIMN (PPM)	250.40	250.22	250.00	
INDIAL ZERO CAL BIAS (%)	0.14	0.1/1	D 15	
FINAL ZERO CAL BIAS (%)	0.10	0.15	D 10	
ZLRO DRIFT (%)	0.04	0.03	0.02	
INDIAL SPANICAL BIAS (%)	0.13	0.21	0.22	
FINAL SPANICAL HIAS (%)	0.21	0.22	0.21	
SPAN DRILL (%)	0.09	0.01	0.02	
VOC CLURE CH D. (PPM)	215.00	284 98	270.50	
VOC UNCORRECTED (C PPM)	650-16	861.68	H42 10	
RON NOMILLR		2	3	
VOCUNCERRICH D (CARMVD)	` હંહ√	890	HAG	/
STACK CAS MOISTURE (%)	2.57	3.17	3.20	
DSOLM	14990	18928	18823	
VOCT MISSIONS AS CITUSTUR)	2/3/128	31.46	30.58	



CROWN CORK & STAL DETERMINATION OF FLOWRATE - RESULTS RTO A IN[T]

l Pinter		177715	177715	1777/5	Average	
Rot Nombro		٦	Ż	5		
Run Stad Tima		9.00	11.00	17.70		hih irirri
Pour Stup Lines		10.30	12/10	13.20	Acres 1	lili irirri
Martin Couldy amount bactor	17)	1 00007	1 0007	1 (0)07		
Pand Turna Conofficient	(C_p)	0.04	9 0-1	9 04	11 114	
Lotal Motor Volumn	{V.,}	20 093	26 328	20/102	29.18	n'
Total Sampling Lines	{03	30.0	30.0	30.0	30.00	
Average Motor Temperature	31 July	45.5	45.0	4.0 %	44 11	"•
Average Stack Trespendure	وجهانيا)	323.5	322.7	323.6	323.26	"f
Abholide Stack Premium	(P_{\bullet})	30.42	30.42	30.42	30.42	m 14g
Average Sample Bare		: 50	: 50	1.50	1.50	in H ₂ O
Avg Square Rnot Pitol Prezion	$(\Phi p_{ij}, \mathcal{M}^{met})$	0.4040	0.4901	0.972	O IIII	$\operatorname{Her}(A/\lambda)^{2}$
DISTURE CONTENT DATA						
Intal Walne Valuesa Collected	(V _k)	12.0	15.0	15.0	14.0	ml
Standard Wetra Vagor Vet	(V.,),,,,	0.508	0.708	n zan	⊞ #61	act
Stricting Maler Vol	(V),	21,423	2.1.595	271 (4.38)	21.485	med
Strick Monture Contont	(0)	2.57	5.17	3.20	25.911	٧.
AS ANALYSIS DATA						
Rad Number	· · · · · · ·		2	3		
Carbon Dioxido Porcontigo	$(\%CO)_{\nu}$	3.41	0.9	1 11	1 [[% . /
Oxygen Percentage	$(\% \mathfrak{O}_{\ell})$	19.5	19.1	18.9	19.2	2 V
Carbon Monox-do Percentage	(500.60)	0.0	0.0	ଚ୍ଚ	0.0	Ψ.
Nitrogran Percentuga	(%N ₂)	79.5	BO 3	HO 1	73/17	'%ı
Dry Cais Molocolai Wt	IM ₄ I	28.04	28.91	28.97	260,055	10/lb mok
Worthingk Circ. Molegylar WI	(M,)	78.61	10.72	28.72	20.75	lb/lh moli
Calculated Funt Lardin	0.5	1.400	2.000	2.009	1 809	
Percent Lisenson Air	(%3.A)	131.1	9 5	8.4	10/3	% i
DI UMETRIC FI OW RATE DATA						
Average Stack Cas Volocity	(v.)	67.12	67.20	66 93	67.00	M/aas.
Stack Cross Sectional Arms	(A)	7.07	7.07	7.07	7.07	h^{j}
Argura Strays Linea Raga	((2,)	784C8L	20502	29392	28457	aglm
Wet Standard Black Flow Rule	(Qnw)	1120000	11/2/4/1	1106670	1.16905033	acth
Dry Standard Stack Flow Rate	((1, 1)	60681	18926	088203	18016	dacha



ELOWRATE BY MUTHODS 1.4

Derivation of Calculations and Ex. Calculations

	(AR)" \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
A11 a. g-	entrober of aperples potents
Λ.,	Area of the stack (II')
C	Pilol lube coefficinel
к,.	$R6.49^{\text{tree}} = \left(\frac{-1000 \text{pimpingar-pin (Fg)}}{(\text{Fe})(\text{min}(4.5))} \right)^{-10}$
6/1. ·	More-colar weight of flor-gas, anchoring which supply
$\mathbf{P}_{\mathbf{h}^{\mathbf{k}_{\mathbf{d}}}}$	Binametric pressure (m. 199)
Ffil	O _{rtain} (in Fig.)
tr" .	Stack premiure (17 mag > 17 mag) (in 19p)
r 🚾	Avenue Mater Temperature (1.)
r., .	Han gan konprintari (*)
V _{en}	Vistamo of gas, sampled at meter conditions (ts')
V ₀ 5111	Volume of grainsampled at standard conditions (15)
V."	Victorally of flun grid (fl/sm.)
V	Volume of water condensed in improgression (ml)
VASTO	Valume of water supporting as samples at standard confidents (It')

Verillention	ol Calca	ileljone.
From Outlet	Hum 1	/
(A ^w Still) o	21,423	DACE CO
(Vo)STD o	0.566	113
Marie	2.57	* /
v.,	67.17	DPS /
ACLM 6	28,46K	CIM /
PSCLM	18,999	расты 🗸
wicim	19,501	WILLIAM
WSCIN :	1170	KMTH

$$\frac{\text{Drv Gas Volume (F-1)}}{(V_0)\text{STD}} \times \frac{\frac{(52800)}{(29.92.4640)}}{(29.92.4640)} \times \frac{P_{0A0}}{(V_0)} \frac{P_{0A0}}{(V_0)^{4400}} \times \frac{(V_0)\text{STD} + 17.65 \text{ (Va)}}{(V_0)^{5400}} \frac{(P_{0A0}) \cdot (P_{0A})}{(P_{0A0}) \cdot (P_{0A})} \times \frac{(P_{0A0}) \cdot (P_{0A})}{(P_{0A})^{4400}} \times \frac{(P_{0A0}) \cdot (P_{0A})}{(P_{0A})^{4400}} \times \frac{(P_{0A0}) \cdot (P_{0A})}{(P_{0A})^{4400}} \times \frac{(P_{0A0}) \cdot (P_{0A})}{(P_{0A})^{4400}} \times \frac{(P_{0A0}) \cdot (P_{0A})}{(P_{0A})^{4400}} \times \frac{(P_{0A})}{(P_{0A})^{4400}} \times \frac{(P_{0A})}{$$

Volume of Water Vapor (F13)

Moisture Contact (by volume)

$$V_{n,j} = (K_p) (C_p) (\Lambda^p)^{M_{p,p,q}^p} \times \left(\frac{(\Gamma_n + 4)(D)}{(M_n)(\Gamma_n)} \right)^{-M_p}$$

Flowrates

$$OSC(TM) = \frac{(ACFM)(P_{*})(1|\theta_{*})(528/48)}{(29.92 \text{ in Hg})(1, 460)}$$

RTO A - OUTLET



CRÓWN CORK & SEAL - MATESVILLE, MS RTO A January 7, 2015

OUTLET	THE			
RUN NUMBU R	1	2	3	
VOC SUSAN (LYNA)	100.00	100 00	[100.00]	المسترسي
VOC MEASURE O (PPM)	27 143	31.50	31.449	
VOCEMAN GAS (PPM)	29 00	261.690	20.69	ممس
VOC PRE ZERO (PPM)	in this	0.07	11 CIG	
VOC POST ZERO (PPM)	0.07	CH CH)	ii 14	
VOC PRE SPAN (PPM)	307 174	30.08	30.02	
VOC POST SPAN (PPM)	JSD OH	.90 021	ປຽ ຕົດ	
INITIAL ZERO CAL BIAS (%)	0.06	0.07	0.00	
LINAL ZERO CALBIAS (%)	0.07	o nn	!! 14	
ZE IKO DRH 1 (%)	10.0	0.01	O ON	
INITIAL SPAN CAL BIA/3 (%)	D 189	0.40	0.54	
FINAL GRANICAL MASS (%)	D 40	0.34	0.32	
SPAN DRILLE(%)	17 194	0.06	0.02	
VITO BORRE COLLIG (PPM)	y OH	3 40	3.3%	
VIIC CORRECTED (COPPM)	6.23	10 14	10 वद	
VOO UNCORRECTED (CIPPM)	0.40	10 49	10 44	
ISON NOMBOOK	<u>1</u>	2	<u>ə</u>	
Vucconcercia (c-PPMVD)	છે છેવસ	10 726	115 6667	- /
STACK GAS MOISTURE (%)	2.236	2 103	2 150	
DSCEM	1707014	13712	1344157	
VCC LMISSIONS AS CILLRISHER)	D 17	0.27	0.28	
VOC DI STRUCTION (%)	99.28	00.13	99.10	



CROWN CORK & SEAL - BATESVILLE, MS RTO A January 7, 2016

QUILLET

02 SPAN (x) 20 85 20 85 70 85 02 MUASURE (x) 11 72 19 61 19 62 02 SPAN (AAS (%) 11 21 11 21 11 21 02 PRE ZERO (%) 0 03 0 05 0 06 02 POST ZERO (%) 0 05 0 00 0 03 02 POST SPAN (%) 11 27 11 30 11 20 02 POST SPAN (%) 11 30 11 29 11 29 INFIAL ZERO CAL BIAS (%) 0 02 0 08 0 12 INAL ZERO CAL BIAS (%) 0 09 0 12 0 02 ZERO DRB 1 (%) 0 11 0 03 0 14 INFIAL SPAN CAL BIAS (%) 0 13 0 04 0 03 LINAL SPAN CAL BIAS (%) 0 04 0 03 0 16	-
11 21	
O2 PREZIRG (%) 0.03 0.05 0.06 O2 POSEZIRG (%) 0.05 0.00 0.03 O2 POSEZIRG (%) 11.27 11.30 11.29 O2 POSE SPAN (%) 11.30 11.29 11.26 INTIAL ZERO CAL BIAS (%) 0.02 0.03 0.12 INAL ZERO CAL BIAS (%) 0.09 0.12 0.02 ZERO DRO 1 (%) 0.01 0.03 0.14 INITIAL SPAN CAL BIAS (%) 0.13 0.04 0.03 LINAL SPAN CAL BIAS (%) 0.04 0.03 0.16	
02 POST ZERD (%) 0.08 0.00 0.03 02 POST SEAN (%) 11.27 11.30 11.29 02 POST SEAN (%) 11.30 11.29 11.20 INFHALZERO CAL BIAS (%) 0.02 0.03 0.12 INAL ZERO CAL BIAS (%) 0.09 0.12 0.02 ZERO DRB 1 (%) 0.01 0.03 0.14 INHAL SPAN CAL BIAS (%) 0.13 0.04 0.03 LINAL SPAN CAL BIAS (%) 0.04 0.03 0.16	
02 PG SPAN (%) 11 27 11 30 11 29 02 PGST SPAN (%) 11 30 11 29 11 26 INFIAL ZERO CAL BIAS (%) 0 02 0 09 0 12 INAL ZERO CAL BIAS (%) 0 09 0 12 0 02 ZERO DIRB 1 (%) 0 11 0 03 0 14 INITIAL SPAN CAL BIAS (%) 0 13 0 04 0 03 LINAL SPAN CAL BIAS (%) 0 04 0 03 0 16	
O2 POST SPAN (%) 11 30 11 26 INFIAL ZERO CAL BIAS (%) 0 02 0 08 0 12 LINAL ZERO CAL BIAS (%) 0 09 0 12 0 08 ZERO DIRB 1 (%) 0 11 0 03 0 14 INITIAL SPAN CAL BIAS (%) 0 13 0 04 0 03 LINAL SPAN CAL BIAS (%) 0 04 0 03 0 16	
INFLIAL ZERO CÁL BIAS (%)	
FINAL ZERO CAL (BAS (%)	
ZEROTIRB 1 (%) 0.11 0.03 -0.14 (NITROTIRB 1 (%) 0.15 0.04 -0.03 (NITROTIRB 1 (%) 0.04 0.03 0.16	
INDIAL SPAN CALBIAS (%) 0.13 0.04 -0.03 DINAL SPAN CALBIAS (%) 0.04 0.03 0.16	
TINAL SPAN CAL BIAS (%) 0.04 0.03 0.16	
SPAN (SRIFT (Sa) 0.17 0.08 0.12	
O2 CORRUGIED (%) 19 62 19 50 19 54	
RUNNUMBER 1 2 3	
CO2 59'AN (%) (5.9) 15.91 15.91 ₩	
CO2 MEASURE D (%) 0.82 0.81	,
CO2 SPAN GAS (%) 15 91 15 91 15 91 15 91	
CO2 PRI 7FRO (%) 0.05 0.07 0.07	
CO2 POST XURO (%) 0.07 0.07 0.00	
COZ PRE 595N (%) 1595 1597 1598	
COQ POST SPAN (%) 15.98 15.96	
INITIAL ZERO CAL 19AS (%) DDG 0.14 0.18	
TINAL / TRUCAC (MAS (%) 0.14 _ 0.18 0.07	
ZH (c) S(d)-1 (%) 0.00 ✓ 0.04 0.11	
INITIAL SPAN CAL BIA'S (%) 0.14 0.00 0.05	
FINAL SPAN CALDIAG (%) 0.00 y 0.05 -0.09	
SPAN (1881 1 (%) 0.06 -0.14	
CO2 CORRECTIONS) 0.77 0.75 0.75	



Chaptone Data (COV) by METHOD 3A Derivation of Calculations and Fa. Calculations

ACC	A Native California cere i per entrat cattorit de suali
u _w . •	Manufaction of a security of the action of t
Land 1	Avendge small, asteržigas i Phriot Malmoninski atternitori Prystaki. Heteritate i Hill Melik Nith (1999)
Legal Control	Published concert aload adjusted by day careful east well as
1	Measurest concentration of a carbinotain gas class and of fugit) when ordered and a still defect that such the
11,000	Assemble officeral gas or an enhalism adjusted for less, opens
P _H	Assemble of unhal and fizial system collision has observeed to expensive SurViviagos above this head on your papers.
Pan.	Actual committation of the agestate continuous gas approxi-
: <u>.</u> •	Capital grange of sulprison in their schedule guestions are consequent on their times (CVIII), process
ri	Asympto of the initial proplanal systems obligation than other is unspicious from the loss losest percent positions, in uses, upons
r	Accuracy engineers of the bag transfer out out on given, grows
C,	Medisoner operational at a manifold of performance gains a own property where reporting a conjugate or a obtainer made
0.95	CAMPENSAN SIGNIC DOPPO
e.	Materials present with the Conservation of the salabol consignations of the English process.
()	(mill property ment) percent) of calculation specifical
:31 **	Cycles State, percent of a difference space
att +	Proc National Build Specified Constitution (page)
ally pro-	Production system State open and of distributed System
*4.1 ···	Speciment and the administrative of the Associated Capadia
51.1	Cost of a Physician of the property of the relational operation in the relation of the relational operations in the relational operation of the relational operations in the relational operation of the relational operations in the relational operations of the relations of the re
ald or m	to, a contry term of an initial person person of transmission pears.

$$ACI = \frac{C_{01} - C_{02}}{C^{12}} \times 1000 \qquad \frac{C_{01} + C_{02}}{C^{12}} \times 1000 \qquad \frac{C_{02} + C_{02}}{C^{$$

Faample Carculations for Run 1 CO2

Linearity C Cp. 1	alculation 15 97 %	Bles (Pen-Run Com	7m/01 0.06 %	Filliand Can Can =	Оченье выменно в 40 Очертур	Coreogram for Cirili)
c_v ·	15-91-W	ra,	0.04 %	191 "	0.09, 7.	
CH	15-91-9	(45 %	0.08 %	13 _{0A} =	15.91.70	
ACL -	0.096 %			1.4 -	18.00.00	
Blas (Post C) 1	Run Zoro) 11 117 *:	Blan Pre-Run C ₁ -	Opecale) 15 95 %	1.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.77 %	
C ., -	H 04 %	Gp. n	n II %			
: .64 -	0.14 %	1414 00	49 11 %			
Rias (Post C), -	Run Upecalo) 16 97 %	Zera Driff Silk 4	9 06 S.			
ı	R 11 7.	SHEEK "	p la 4.			
: 49 -	AN AN TU	11 -	5101 %. /			
Span Drift dia, -	44 11 %.		·			
$\tau_{i}(a_{k+1,k}) \in$	aulas m.					
11	D 14 %					



CROWN CORK & SICAL DETERMINATION OF FLOWRATE - RESULTS INTO A OUTLIT

Uale		177/16	17775	177775	Avuraçıa	
Han Natober		1	2	1		
Rum Silant Time		9.35	11.00	12.00		Ah mm
Mun Blop Tiren		10.05	11.30	12.60		Alterna
Meijer: Cadhhaapoin Fiograf	(Y)	0.9977	0.9977	0.9977	Land Control	
Pilot Fubri Confficient	(C_{i_0})	0.84	0.64	0.64	0.84	
Fulai Molec Volume	(V.,)	21.194	22/275	21 846	21.74	6.
Total Salahing Tile-	(5.2)	300	300	30 ()	30.00	~
Average Meter Temperature	(1)	36.7	39.5	35.0	37.02	ı
Avronge Stack Temporature	$(\mathbf{t}_n)_{\mathbf{x},\mathbf{y}}$	30004.5	000003	296.5	301.10	1
Atmosphy Stack Pressure	0251	30.59	10.52	30 07	30,39	m Hp
Average Sample Rate		100	1.50	1.50	1.48)	in 112O
Avg Square Roof Pilot Pressure	$1\Delta p^{(n)})^2_{(n,n)}$	0.450	0.494	0 -194	0.49	(in FryO)**
ADISTURE CONTENT DATA						
Folal Waler Volume Crelected	ΪÝω)	11.1	114	11.1	11.2	ml
Shindard Water Vagor Vol.	IV.,;	0.524	0.538	D 524	0.528	set
Standard Meter Vol	$(V_{ij})_{i\neq j}$	22.879	24 038	23.734	73,004	ask4
Stack Moishire Content	(n)	2.74	2 19	2.10	2.20	'%
AS ANALYSIS DATA						
Run Number		· 🙀	. 2	J		
Cretson Craxión Precionalism	(2000D ₂)	11.4	11.4	11.4	0.4	50 J
Cheygane Heatermaniger	(2(0))	19 H	19.5	19.5	19.6	4.
Carbon Monosino Percentago	(%&O)	0.0	0.0	0.0	6.0	'%
Nitropen Parauchage	(%N ₂)	n on	60.1	7111-1	80.4	971
Pry Carr Molecular Wt	(Ma)	28.85	284-84	78 84	78 84	ID/Remijo V
West Sharok Care Mislocialar Wit	100,1	26.76	2H 76	78,76	20,76	Salta mga
Calculated Lant Lactor	0	3 360	3.684	3.676	3 5 70	
Parcent Lixeeas An	(A b3)	1.3 1	11 H	12.2	32.4	%
OLUMETRIC FLOW BATE DATA						
Average Stack Gas Velucity	(v _s)	-06.70	-116 814	416 78	-412 (51)	ft/sunt:
Stack Grons Sectional Area	IA,	7.07	7.07	7.07	7.07	10.1
Acroni Binch Flow Hare	100	19847	190907	199704	19840	action
Wall Standard Stock Lines Rate	$ \Omega_{\rm SW} $	#POORS?	#41112	84174892	842806	with
Dry Standard Stack How Brite	(O_{kn})	13GH-I	10712	13819	13738	dache



FLOWRATE BY METHODS 1-4

Dorivation of Calculations and t.z. Calculations

مانين.	1 2000 PM	Verification of Calculations
2.3.	number of cample pools	Cross Code (Rus)
A.,	Area of the stack (II')	(V ₀)STD 22 87 9 03CF ✓
Cq.	Poor ruhe confliction	_ _ /
×	$m_2 \oplus m_2 = \left(\frac{-\operatorname{distb-moto}(\operatorname{red}_{\mathcal{O}})}{\operatorname{CD}(\operatorname{red}_{\mathcal{O}})} \right)^{-2/2}$	(V _W)S1D = 0.524 - 10
м	Molecular weight of the gas, including water value:	B ₀₀₀ 2.24 %
Paner .	Barnmetic pressure (in Hg)	_
Physics	P _{man} (re lig)	Vi. 40.79 1.25
60.	Stack pressure: Power + Page (in Egg)	_
Ly	Average Moler Temperatum (T)	ACEM ** 19,847 CIM
T.,	Lisa gas semperatura (T)	_
V ₀	Volume of gas sumpled of maker conditions (*C)	1551 FM 1.3,684 OSCHM
VeS1D a	Volume of gas, scampled at standard conditions (PC)	
V.,	Volocity of thin que (fleenc)	WNC1M 13,998 W501M
Vw.	Volume of water conductant in interrupt for a [69]	
VWSTD :	Volume of waret super in que campine al scandard contribute (ff*)	WAGELL 1640 KACLIC

$$\frac{\text{Pry Got Molume (FT')}}{(V_{sc}) \text{STD}} \frac{(528^{\circ} \text{R})}{(29.92 \text{ m/H}_{\odot})} (V_{sc}) \frac{P_{\text{BAB}}}{(T_{sc} * 499)} = (V_{sc}) \text{STD} - 17.05 (V_{sc}) \frac{(P_{\text{BAB}} - (P_{sc}) - (P_{sc}))}{(T_{sc} * 460)}$$

Volume of Water Veper (F11)

Melsture Content (by volume)

$V_{0} = (R_{0}) (C_{0}) (AP)^{(0)}_{mag} \times \left(\frac{(C_{0} + 4600)}{(M_{0})(P_{0})} \right)^{-10}$ V_WS(f) V_WS(f) + V_WS(f)

Flowretoe

DSGLM
$$\frac{\text{(AGFM)(Ps)(1 B_p)(528 R)}}{\text{(29.92 in Gg)(1, 460)}}$$

RTO B - INLET



CROWN CORK & SEAL - BATESVILLE, MS R10 B January 7, 2015

INLE1	IHG			
RUN NUMBER	1	2	3	
VOC SPAN (PPM)	14910 00	(४:सस्य स्वरं	ADDSLDD	
MOC MEASURED (PPM)	10101059	143.92	125.70	
VOC SPAN GAS (PPM)	272.50	2726.50	272.50	ستسمي
VOCTER ZERO (PPM)	0.37	1.69	1 07	
VOC POST ZERO (PPM)	183	107	1.04	
VOC PRI: SPAN (PPM)	273.93	274 41	274 60	
VOC POST SPAN (PPM)	274.41	274 685	275.11	
INITIAL ZERO GAL BIAS (%)	0.04	C3 125	0.11	
LINAL ZERO CAL BIAS (%)	0.18	0.11	0.13	
ZERO DRU 1 (%)	0.15	-0.08	0.04	
INPLACEDAN CAL BIAN (%)	0.14	0.19	0.52	
LINAL SPAN CAL BIAS (%)	0.19	0.77	0.76	
SPAN DRIFT (%)	0.05	0.03	D D4	
VOC CORRECTED (PPM)	102/21	142.10	1204-985	
VOC ONDORRECTED (C.P.PM)	401	4.52	.577	
RUN NUMBIR	1	,		
VOC ONCORRECTED (C PPMVD)	403	4:14	38781	
STACK GAS MOISTURE (%)	4) (61	0.55	0.42	
DOM:	10179	10123	10100	
RTO B VOCT MESSIONS AS C (LISSUR)	7 (4.3	8 21	7 19	
RTO A VOC EMISSIONS AS CITED/RD	23 68	31.46	30.29	
TOTAL VOG EMISSIONS AS C (LBS/HR)	31.31	39.67	37.77	



CROWN CORK & SEAF DETERMINATION OF FLOWRATE - RESULTS RTO (LIN) (1)

Unte		177715	177716	177716	Average	
Rsac Nombol		1	2	3		
Ron Start Tenn		9.0%	11.00	12.70		he ann
Ron Slop Line		10 8%	11.00	12.50		lih rum
Metric Cultingstron Europer	(Y)	1.0030	1,0030	1.0030		
Plint Luba Conflic net	(C _p)	0.444	O PM	O IM	NII G	
Islat Motor Valures	(V_{in})	18.565	181181	191,476	185 9M	18° - 24
Total Sampling Time	(5.7)	30.0	360.0	30 0	30 00	2000
Average Mater Lamperature	(1)	0.00	309.0	0.7.0	37.94	"1
Average Stack Peroposition	$(1_i)_{m=q}$	73.2	73 H	77.1	73 03	"I
Absolute Stack Pressure	(0.0)	30.45	30/49	30.49	30.45	m Mg
Average Sample Rate		1.50	1.50	1.50	1.50	in H,O
Avry Square Root Pitrit Prossure	$(\Delta \omega^{1/2})^2_{(a,b)}$	0.623	0.172	0.624	0.67	$\cos(\alpha)$
IOISTURE CONTENT DATA						
Fold Water Volume Collected	79.5	2.6	2.4	1.0	2.3	m·
Shrohad Water Vagor Vol	1V.,}	0.123	0.113	0.990	0.109	act
Standard Meter Vol.	IV_1,	20 036	20.365	21.062	20.489	dise. (
Black Moisture Content	[H]	0.61	0.55	0.42	0.53	ν.
AS ANALYSIS DATA						
Run Number			2	3		
Carbon Dissidn Procembign	(%CO ₂)	0.7	07	06	0/	%i
Campage of President Regard	(28/01	19.77	19.77	19.51	1979	77,.
Carling Macagae Procentage	(2.4.15)	0.0	0.0	20	0.0	'Y
Ndragen Permittiga	(% N.)	75.4	71.4	79.5	71.4	1%.
Thy Cata Molecular WI	(M_0)	28 91	28 91	285 894	28 90	IE/ID mol
Wor Stagk Cark Molenglar Ws	(M,)	29.00	204.01	29.00	20.00	Ilyan) migh
Cahalahid Liid Lactor	(1.)	1.429	1.425	1.6977	1.600	
Percent Escoas An	(%LA)	18.7	187	18.3	1H G	174
OLUMPTRIC FLOW BATE DATA						
Avmogn Black Can Volcoly	(v ₄)	45.71	45.71	45.67	45.69	Mane
Stuck Cruse Soutonal Area	(A ₁)	3.68	3.68	3.68	3.68	μ.
Actual Stack Floor Photo	(94)	10105	10105	10047	10102	actor
Wall Brandard Search Flow Rand	(04w)	641084	640356	613025	GIAGINE	netty
	,					



FLOWPATE BY MIJHOUS 1-4

Durivation of Calculations and Ex. Calculations

114	(SIAN)***	Verification of Calculations
11-4-4-	number of sample points	From Outles Burn 1
Α,	Area of the stack (%)	(V ₆)810 20.046 0804
Cart	Pilot tuber confliction	(Va)SID - 0.171 117
K .	Ms 49**** (— plant more governa) — by	
M.,	Motocolar weaps of this gas, ecclusing within vapor	B ₆₀₀ 2 0.61 % /
Proper	Barometric processor (m. Hg)	
60.0	Page (m. 11g)	V. 49.71 1P9
P.,	Shock procedure - P _{man} + P _{man} - On Fig.	
T _{al} .	Assuringe Meter Temporation (11)	ACEM 4 10,70% CEM 4-7
17.	Pun qua temperature (1)	- 1 - 1
V	Volume of gas, sumpled at meter continues (fr')	DSCFM - 10,123 USCFM
V _e sito	Volume of gas sampled at standard conditions (*t*)	
V	Volocity of fluo qua (Wared	WSCEM LOURS WRITEM
V.,	Volume of water condensed to appropriately poli-	1
MANUEL F	Volume ut water vapor in gra samples at standard conditions III 1	W5011 611 K5010

$$\frac{\text{Dry Gas Volume (IT13)}}{(V_{\text{N}})\text{S1D}} \frac{(52878)}{(29.92 \text{ in Fig.})} (V_{\text{A}}) \frac{\Gamma_{\text{NAS}}}{(1_{\text{N}} + 400)} = (V_{\text{N}})(310 - 17.05 (V_{\text{N}}) - \frac{(P_{\text{NAS}}) \cdot (\Gamma_{\text{N}})}{(\Gamma_{\text{N}} + 400)}$$

<u>Volume of Water Valler (FT1)</u>

$$(V_{sp})(1) \times m(QR) = \underbrace{ \left(\frac{V_{sp}(qm)}{(18 \text{ lb x 454 qm) } t \text{ (lb mole x lb)}} \right)_{sp} \left(\frac{21.85 \text{ R5 x m Fig.}}{\text{lb mole R}} \right)_{sp} \left(\frac{60^{7} + 460^{7} R}{3} \right)_{sp} \left(\frac{60^{7} + 460^{7} R}{3} \right)_{sp} \left(\frac{100^{7} +$$

Moisture Content (by volume)

$$D_{\text{spec}} \simeq \frac{V_{\text{sp}}S(1)}{V_{\text{sp}}S(1) + V_{\text{sp}}S(1)}$$

$$V_{p} := (R_{p}) : (C_{p})(A^{(p)})^{(p)}_{a_{p,q}} := \left(\frac{(1_{p,q} + 4600)}{(M_{p,q})(P_{p,q})} \right)^{-1/2}$$

Flowrates

DESCRIPTION =
$$\frac{(ACLM)(P_0)(1|P_{ab})(520|P_0)}{(29.92 \text{ arctin})(1, 460)}$$

RTO B - OUTLET



CROWN CORK & SHALL BATH SVILLE, MS RTO B January 7, 2015

OUTLET	HIG			
DOMESTICAL DESIGNATION OF THE PROPERTY OF THE	1	Ż	. 3	
Orocci (ar Ochi (gra (Mr)	KOO OO	100.00	104 ÖÖ	
VOC MEASURED (PPM)	0.70	1 50	2.21	
VOC SPAN GAS (PPM)	30.56	30.56	300,565	
VOC PIG. ZERO (PPM)	0.97	0.22	0.32	
VOC POST ZCRO (PPM)	0.22	0.02	0.39	
VOCEPRE SPAN (PPM)	29 70	28 50	V: 11	
VOU POST SPAN (PPM)	2H 56	29.11	29.11	
INTHA: ZERO CAUMOS, (%)	00/	0.72	0.32	
FINAL ZURORIA, BIASI (%)	0.77	0.37	0.32	
ZERO DRIFT (%)	0.15	0.10	0.00	
INITIAL SPAN CAL BIAS (%)	O 100	2.484	1.45	
FINAL SPANICAL BIAS (%)	2.00	1.45	-1.45	
SPAN DRIET (%)	1 14	D 5656	0.00	
VOC CORRECTED (PTM)	0.09	1 A11	A 63	
VOC DORRECTED (C PTM)	A 84	14.140	7.66	
VOC UNCORRECTED (C PPM)	7 7A	4.51	6174	
RIAN NIAMIII IR	1	2	<u>3</u>	
VOC DIRECTED (C-PPMVD)	≥ 54	4 00	0.01	
STACK GAS MOISTURE (%)	2.62	1.99	7.56	المستسب
DSCFM	18054	111421	18517	Carried Co.
RTO B VOC LMISSIONS AS CRITISTER)	a an	0.16	0.24	
RTO A VOCT MISSIONS ASSECTIONS IS	0.61	0.51	G 505	
TOTAL VOC I MISSIONS AS C (LIISAIR)	0.59	0.67	0 77	
VOC DESTRUCTION (%)	98.13	98.32	97 97	



CROWN CORK & SEAL - BATESVILLE, MS RTO 0 January 7, 2015

OUTLET

RON NOMBER		2	Ė	
O2 SPAN (%)	27(3,59(9	20199	20 99	-
O2 MLASIJIR D (%)	20.00	19.92	10.04	
OZ SPAN DASI (%)	NO 903	10 90	10.90	سمب
O2 1981 - Z1 16O (%)	0.03	0 00	0.07	
COST PRODUIT AND PROPERTY.	0.09	0.07	0.07	
O2 PRL SPAN (%)	10 05	1.1 (27)	11.03	
O2 POST SPAN (%)	I I DH	1.1 (03	11 0.4	
INITIAL ZERO CAL BIAS (%)	D 13%	0.22	0.10	
LINAL ZERO CAL HIAS (%)	0.92	0.10	0 10	
Z1 RO DRU 1 (%)	0.28	0.13	0.00	
INFLIAT SPAN CAL BIAS (%)	0.21	0.40	0.14	
FINAL SPANICAL BIAS (%)	0.40	0.14	0.14	
SPAN ORIET (%)	0.00	0.26	0.00	
O2 CORRECTED (%)	19.95	151 352	19:47	
BUN NUMBU R	1	2	3	
COZMANI(%)	15 93	15 93	15 (03	للممما
CO2 MLASOID D (97)	0.60	1 24	1 36	
COZ SPANICAS (%)	15.93	157 3123	176 183	~
CO2 PRE ZERO (%)	D DH	a aa	0.00	
COS BOST SURO (%)	D DD	0.06	0.09	
CO2 PRUSPAN (%)	15 88	15 83	15.87	
COMPOST SIMN (%)	15.63	15.97	15 117	
INTHAL ZERO CAL BIAS (%)	0.51	0.02	0.37	
FINAL ZERO CAL BIAS (%)	n 192	0.37	0.37	
ZERO PRIFT (%)	0.49 🗸	(1.05%)	0.00	
INITIAL BRAN CAL HIAS (%)	48.98	48 87	4H 90	
LINAL SPAN CALIBAS (%)	48.07	, 48.00	48 90	
SIPANI DIRILIT (%)	031 4/	0.23	0.00	
CO2 CORRECTED (%)	0.00 🗸	1.22	1.31	



Openions Units (1902) BY My (1901) 34 Derivation of Calculations and Ex. Calculations

ALA	Analyzer caktealoni eren	encest of caldwaren	crear

$$G_{a,c} = -$$
 Average conditional paint size or halo mode alred by data on order for the first care provided $G_{a,c} = -$

$$G_{q,\alpha}(r) = -r$$
 . Assuming off and gas over extration adjusted for time, prime

$$\Gamma_{\rm HK}(r) = - \delta r$$
 for discreme algebras of the supergreeness displacety, $r_{\rm HK}$ upon ρ

$$C_{\rm total}(z) = -\zeta_{\rm total}$$
 considered in the $\gamma_{\rm total}(z)$ is $\gamma_{\rm total}(z)$ and in the large z is given

$$\begin{aligned} & \Delta G \Gamma = -\frac{C_{\rm col} - C_{\rm col}}{C G} + 100 & \frac{G K_{\rm col}}{C_{\rm col}} + 100 & \frac{C_{\rm$$

heavighe Calculations for You 1 CO2

Linearity (interintion	Bias Pro-Hui	ı Zuro)	r	Minant Gna C	owcontration (Corrected for Dr:NI
City to	10 69 %	U,	0.000.02	()	2.10	0.00 %	
$\mathcal{C}_{V}(s)$	15 00 %	c_0 .	υ 00 · t x.	C	:	0.04 %	
Call (15 90 %	Site •	9.51 %	C	· •	15.00-56	
ACC	8 468 %			(ω.	15 85 %	<i>_</i>
Diss (Fore	Run Zeroj	Dias (Pro-Rai	· Upscaloj	(· •	0.00 %	Lore
C., •	ti iii 7.	C.,	10 MIS No.				
$G_{\mathfrak{g}}(\mathfrak{g})$	11 1111 'X.	C	л ок %				
.:64 -	אי עמיזי	: .(4 -	88.08 N				
Cies (Post Run Upecale)		Zera Dr.h					
City or	15 00 %	:31 · ··	11 81 %				
V-111 **	MIDIL T.	$\mathrm{SD}_{k,k,k}(\cdot)$	11 02 70	/			
1.15 -	ARM/ W	 1 -	n #41 ~. ✓				



Span Drift :414, -

:114,... 17 "

AR THE OLD

0.00 %

CROWN CORK & SEAL DI 11 RMINATION OF LLOWINGTH - RESULTS RTO B OUTLET

HELD DATA						
Date		10775	177715	177/15	Avarage	
Burn Number		1	2	3		
Rate State Trees		9.39	11 (8)	12 (9)		file min
Run Stop Time		10.05	11.00	12.50		hh mm
Meter Calibration Factor	(Y)	0.9877	41 9857 7	0.9877		
Parcy Trobas Constitutions	(K_{ij})	OHA	O Av	0.64	O 6M	
Lotal Marar Voluma	IVI	21.129	21 327	20,200	20.90	11' ×
Letal Sampling Time	[IH)	30.0	30.0	30.0	201 00	111111
Away artis Medica Tagong of attorn	!!!,,,,	43.5	45.0	40.5	4.5 00	"¢
Azorogo Silack Tomperature	if.1	297.5	2545.0	796 A	2895.62	"•
Absolute Man.* Pressure	(P_n)	30.52	30.52	30.52	30 52	m My
Awaranga Sample Bate		1.30	1.30	1.30	1 30	ar MyCr
Avg Signare Root Publ Pressure	$\{\Delta \mu^{\prime\prime\prime}\}^{\prime\prime}_{(\bullet,\bullet)_{\bullet}}$	0.770	0.778	0.784	0.2%	$- \ln (\mathrm{H}/\Omega)^{1/2}$
MOISTURE CONTENT DATA						
Total Water Volume Sale-crea	(4) (19.9	9.8	1/1	11 (
Standard W.two Vapor Vol.	$(V_{+})_{i,j}$	0.600	0.402	0.571	0.547	ne.f
Standard Maler Vol	$(V_{\tau})_{\rm em}$	22 807	27.752	21.782	22 3HD	dru:*
Stock Moston Conton	(N _m .)	2.62	1.99	2.55	2.39	^4
SAS ANALYSIS DATA						
Ros Namber		1	2	3		
Cornon Dinante Percentage	P%CO),1	0.0	1.2	1.3	1.1	No. 200
Oxygen Youandeen	(%O,)	20.8	19.11	19.9	19.9	W
Control Mondarde Prodectivita	(%CO)	0.0	0.0	00	0.0	%
Milliogen Percentage	(WN)	79.7	79.0	700.0	79 O	₩.
Ory Cara Molnoulin VVI	(M _a)	28.94	28.90	29.09	28.98	Reflictricate
Well Strok Gas Molecular Wil	IM,)	28.81	241.92	28 88	28 87	16/Ib/mole
Calculated Fixed Lactor	16	1.056	0.865	0.766	0.000	
Percent Lannou Ar	[A 486]	21.1	14.3	21.2	20.5	Ψ.
OLUMETRIC FLOW RATE DATA						
Average Stank Clas Volocity	(9.)	79.19	34.06	35.44	36.17	fil/sac
			116.1.7	12.57	12.57	n^{\prime}
Maurik Crons, Gunhumat Area	(A)	12.57	125.57	10 .14		
Stack Cross-Gostiana Area	(A) (U)	12.57 26506	248356	24,697	20920	achn
Mark Cross-Sanhard Area Actual Stock Fluw Rate	(A _a) (U _a) (Uow)					•



PLOWRATE BY METHQUS 1-4

Derivation of Calculations and Ex. Calculations

	/ H/M)"' \ \ \ '	Yortheation of Calculations	ſ
AF*	hander of sample points	Fram Outlet Run 1	ı
A., ·	Atom of the Space (W)	10x451111 1 22.002 1000	ı
U _P	Print John Conflictent		ı
κ.	85.49° ($\frac{\text{(io/lb molnigh Hig)}}{\text{(Right H,O)}}$)	(Va)STD 0.009 0')	
M., 1	Molnoutur weight of flue gnz. including water virgor	Harry 2.62 W	ı
D.,,,,	Principle for pre-ware (in Hg)		ı
$\mathbf{p}_{i,j}$	Production (dr)	Vs (1 15, 15) 19%	ı
14, 1	Which provides a Price of Page (in High		ı
1	Average Morar Ferripariture (f.)	ACRM 20,500 CFM	ı
1.,	Fluoriques hand promotores (T.)		Ί
Vu	Volumn of quantumphed at motor conditions (B1)	OSCIM 18,304 DSCEM	ı
Vastoria	Volume of gas sampled at standard conditions (fr')		ı
V	Vidocity of flor (as: (f0sm))	WYCEM 130349 WYEM	1
Ver -	Vursing of writer condensed in improper from (int)		1
V _w stips.	Volume of water value in gas samples of standard conditions $H(\cdot)$	WSCIH 1131 KSCHH	1

$$\frac{\text{Dry Gas Volume (F)}^3}{(9243119)} \frac{(52860)}{(924325 \text{m.Fb})} (94) \frac{92000}{(1624460)} \frac{(92000) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(9200) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(1624460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(162460)} \frac{(920) \cdot (1200)}{(16260)} \frac{(920)}{(16260)} \frac{(920)}{(16260)} \frac{(920)}{(16260)} \frac{(920)}$$

Volume of Water Vapor (§ 12)

$$\frac{\left(\frac{\nabla_{W}(g|m)}{(1000 \times 404 \text{ gm}) / (j) \text{ mole } g)}\right)_{2} \left(\frac{21.89 \text{ for a ming}}{\text{lb. mole } g}\right)_{3} \left(\frac{188 \times 400 \text{ for a ming}}{1}\right)_{4} \left(\frac{188 \times 400 \text{ for$$

Moletony Content (by volume)

$$|V_{+}\rangle = (K_{0}) |\langle C_{0}\rangle (A^{(1)})^{1/2}|_{0 \leq t} |\chi| = \left(\frac{|\langle T_{0}| + 4640\rangle|}{|\langle M_{0}\rangle \langle P_{0}\rangle|}\right)^{-1/2}$$

Howrston

APPENDIX C OPERATIONAL DATA



INCINERATOR TEST PALLET AND LAYER COUNT SHEET

			E:		<i>(</i>)	- 1		ל. ׳			_		NE		Þ	02	Z .					РΑ	LL	E1	H	Eli	ЗH	Ť	e) 4	
, P	.9	BŪ	ĊĤ	×	auar	riyi	_	Ar	v 29	Hillips	<u>-11.3</u>	781.	17 oz	- 71	Nigh	- 6,1	ISD:	12nz	- 20	Migh	* 1,	/AD,	186	<u>, 1</u>	N II	HpPs	- 0.3	224)		
1	TI	=:	37	3	#1										Tola	l Que Malo	unity		<i>i</i> 7	. 4	3	<u>; </u>			_					
15	ST.	AF	175	N	G E	AY.	ĘF	₹ €	ΦU	Ţ	(Ÿ			(Circ	alen Et:	in ni						TΑ	RT	01	गहर	37")		Foreign of coper	a Abar
1	2	3	4	5	6	7	8 8	9 1	0 11	12	13	14	19	16	i 17	7 18	1.5	20) 2	1 22	23	24	25	26	27	/ 20	8 28	9		
į	ō	۲'n	ĭĽī	ΡĀ	īĹΪ	ĒΪ	s	PR	ODI	jčě	0 0)UF	(NC	ΞŦ	ES1	<u> </u>		-								-			©	•
١,	2	9	4	5	6	$\gamma ($	<u>(</u>)) 10	0 11	12	13	14	15	16	9 17	18	19	20	2	1 22	23	24	25	26	2/	/ 28	9 25	,	Anter nom	
ŀ	N	- N	V.	77	41	E	-	OT.	ΝŤ						C le c l	40 t/10		orbo				. E.	.		- <u> </u>	:			2022	%
∥⁻			••	_	· · ·		•	vv	,,,,					,	O) O	0 010	/ · · · ·	1100		iuy:	1 :0 10			131 1	4 ;;	'')		į	ļ	
1	2	3	4	5	G	7 4	B (1 1	Ω 11	12	13	14	15	16	17	145	(1)) 20	2.	1 22	23	24	25	26	27	28	3 26)	# of layer ca hmon (x) ?	ieta Ieta
E	_	<u></u>		-				=		=:		==	==	==					==		=	=:		==	Ξ	=	=:	==		
ון	Ŀ		ŀ	#	<i>‡</i> 2											roiduc 'roiduc	Mili A Saki		4	7	g	io								
8	T	Se	49	NC.		ΔV	FA	C	OUN	ıт						o Iha				,			•	٠.			• •	•		
1	Α.																											!	Contract of the second contract of the second	1-24
L.				_	_			_	3 11								19	20	21	1 22	23	24 .	25	7 6	27	78	138	, ;	70,50	7-
T	O,	ГА	LŦ	Ā	ū	ĒŤ	3 [PR	ODC	ΙŒΕ	o D	ЦŔ	ING	Ŧ	ST			_						_	_	_		-၂		<u>'</u>
1	2	3	4	5	G/	4	9 11	10	11	12	13	14	15	16	11	18	19	20	21	22	23	24 (25	26	27	80	: 29	, į	t obje compl cacled	17'
Ŀ	<u>.</u>	7,5	15	٠,	تاريخ	FA	-27	λT.	NT		. . .			رب -	ب ببر	<u></u> -								.=	_	 .		-4	<u> 174/50</u>	겓
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INCINERATOR TEST PALLET AND LAYER COUNT SHEET

DATE: 1 / / \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	#: 12 oz	PALLET HEIGHT	_ એ ા
TEST #1	Yestel Accountite		
L .	Pronucado / Q	8,531	
STARTING LAYER COUNT	(Circle the number of	layous of START of TEST)	January and programme
1 2 3 4 5 6 /(8)9 10 11	12 13 14 15 16 17	18 19 20 21	(rinto pros
TOTAL PALLETS PRODUCED DURIN	G TEST		LINEEZ
1 2 3 4 5 6 7 8 9 10 11		18 19 20 21	Leant planba: chelnd
ENDING LAYER COUNT	(Circle the number of t	Inyom of END of TEST)	يا جيونين لايا جيونين ا
1 2 3 4 5 6 7 8 9 10 11	12 13 (4) 15 16 17	18 19 20 21	N of topor concled topon (c) 360
TEST #2	Total Quentity Produced:/ 6		
STARTING LAYER COUNT	Produced: / 0	4 6 8 1	, <i></i> -
		syste at START of TEST)	Training of the Art of
1234567891011		18 19(20)21	380
TOTAL PALLETS PRODUCED DURIN	G TEST		<u> </u>
1 2 3 4 5 6 7 8 9 10 11	•••		College number College College
ENDING LAYER COURT	(Circle the number of to	ayers at END of 19/5/15	
1 2 3 4 5 6 7 8 (9) 10 11	12 13 14 15 16 17	18 19 20 21	# of layer current three (x) 389
			<u> 3501 </u>
TEST #3	Yotal Quantity Fredward (14	O, 10g 7	
STARTING LAYER COUNT		yore at START of TEST)	Total Park Ingeria affect
1 2 3 4) 5 6 7 8 9 10 11		- '	Una conclusi dependente (a) 3440 — in- ionale ma
TOTAL PACLETS PRODUCED DURING			<u> 2003 </u>
1234567891011/	(2)13 14 15 16 17	18 19 20 21	I find forces
ENDING LAYER COUNT	(Clienty the number of la	yoru nt END of TI(ET)	— ⇔ ⊕ ८७४ .
1 2 3 4 5 6 7 8 9 10 11	12 13 (4) 15 18 17	10 19 20 21	M of Jayor elected History (a) 1965 5474 fo

Page to 1 CIP 6

1402015

INCINERATOR TEST PALLET AND LAYER COUNT SHEET

DATE : ∫. 7.7.7.7	LINE #: 16 OZ	PALLET HEIGHT //
1 1999 garane pret frayret - Har - 20 High = 1	.2411: 32oz - 27 High n 5,160; (2oz - 2614)gh =	
TEST #1	Professed: 87, 5	<u> 25° </u>
STARTING LAYER COUNT	(Circle the number of layer	S At START of TEST) I made at legal and an add approximation
123456789	10 11 12 13 14 15 16 17 18	19 20 21
TOTAL PALLETS PRODUCED	DURING TEST	-
123456789	10 11 12 13 (14)15 16 17 18	19 20 21 Cover number sircled 87,736
ENDING LAYER COUNT	(Gircle the number of layors	at END of TUST)
1	10 11 12 13 14 15 16 17 18	an of lawer circles
TEST #2	Trital Quarelly Produced.	
STARTING LAYER COUNT	Circle the number of layers	
<u> </u>	10 11 12 13 14 (5) 16 17 18	19 20 21
TOTAL PAULETS PRODUCED	- 	
	_	berdug en nation
1	10 11 12 13 14 (15) 16 17 18	19 20 21 circled 77,365
ENDING LAYER COUNT	(Circle the number of byece	SHEND ACTUSOR
75 123456789	10 11 12 13 14 15 16 17 18	19 20 21 ### of tayor circled tomes (4.1.20)
TEST #3	Tarai Quanti V	
	Tarif Oriential 50, 51	
STARTING LAYER COUNT	Calcle the number of layers	A LONG TO THE COURT OF THE COUR
1234567(8)9	10 11 12 13 14 15 16 17 18	19 20 21 (Table 20 2)
TOTAL PALLETS PRODUCED	DURING TEST	
123458789	10 11 (12) 13 14 15 16 17 18	19 20 21 Internation
ENDING LAYER COUNT	(Chair the number of layers	1 79 68 5
	10 11 12 13 14 15 16 17 18	

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CONTRACTOR Spinsterink of Marketon

10/2016

INSIDE SPRAY TOTE CONTAINER WEIGHT TRACKING SHEET

NAME K. PARKIK CONTAINER II. BELIEV DATE 1/2 1/2/3

TEST 1	STARTING WEIGHT	52,290
	ENDING WEIGHT	1763
	USAGE AMOUNT	
TEST 2	STARTING WEIGHT	1765
	ENDING WEIGHT	7-2-4-4
	USAGE AMOUNT	
	STARTING WEIGHT	2395
	ENDING WEIGHT	1860
	USAGE AMOUNT	



CALIBRATION



Sold 20 Sold 20 Sold	" was L'ROWN CORK & STAL	550 mc 2,5 8090 Common D.
AATESVICE 1850. Sty 147 Capabi 20006. 5 Control 56 BAR 54AFE. Charter FFR 200 and 2015 Control 1860 and 2015	gal Hess	Stocked 200 5860 Section 209 30906 8-24
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VARNISH WEIGHTS WORKSHEET

START MES AND STEP. 1885

TEST #			DATE: //	<u> 2, 45</u>
LINE#	STÄRTING WGT.	ENDING WGT.	USAGE WGT.	REMARKS
PRINTER # 3				
res7_4 + 909/5	1/5,/6	- Cy 43	(3873)	
RINTER # 4			<u> </u>	
1947 4	44255-	267	422	
	44.088 = 95.14	35/17	(.59.18)	
(AC)		10146	(.59.(8)	
RINTER # 6				
1-51	25,69 -	12,9%	43,77	
7 4 <u>*</u> * * *	75,69 -	33,24	70.87 (53,64)	
(10)		TokA !-	(53,64)	
RINTER#6				
70x + 1	45.71	1254	(27,57)	
·Z agykaczy ,		T		
,				· · · · · · · · · · · · · · · · · · ·
RINTER # 7				,
1-x4 1	44.12.	1 2,59	41.18	
State Section There	45.68	+ 9,59 39,₹⊘	6.18	
क्ष्मकार २ <i>१</i> ८७४		70.701	6.18 (77.38)	
		1 / 1/1/1	2.26,50	

VARNISH WEIGHTS WORKSHEET

TEST#		A 11:00 A 11	powido 17 (GO Po DATE: 7/	` //.5
LINE#	STARTING WGT.	ENDING WGT.	USAGE WGT.	REMARKS
PRINTER#3	46,97	. 2.6.5	(36,61)	
				· · · · · · · · · · · · · · · · · · ·
PRINTER # 4	4/5,05/- 4/5,05/	2.11 4 35,38	113,30 0 7 - 12,009 (53.07)	
PRINTER # 5	. <u>98</u> 700 99,31	2,67 3/5/8	22.93 19,95 (6,236)	
PRINTER # 6	45.68	_85/02	(30,61)	
PRINTER # 7	45747	218/	(92.74)	

GRAND 1MAK 224:35

VARNISH WEIGHTS WORKSHEET

TEST#	s*;	1 (1907) (2) (1908) [1	DÁIL.	1/2/1.
LINE #	STARTING WGT.	ENDING WGT.	USAGE WGT.	REMARKS
PRINTER # 3				'
	151.44	2.65	(41.24)	·· .v n
,				<u> </u>
PRINTER # 4				
	14,81	2007 29257	42,00	
	<u>-48627</u> 54 85		30.97 (16.2157)	
PRINTER # 5			(<u>/</u>	
WINTER # 6	44.14	2 37	41,25	
	44.19	3262	74 8 14 35	
			(* * , 4 .3)	1/8.43
PRINTER#6	03.56	17/ 52	<u>(32.5%)</u>	
	//			
			<u>—</u> -	
RINTER#7	20 C 30 O	1	778-77	
	<u>45,82</u>	32/4	92.77	
			(50, 76)	
			·	
			·	
		FOTAL	236.49	

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INK WEIGHTS WORKSHEET

	SHOWSTING			<u> </u>
INK COLORS	wcy.	ENDING WG F.	DEAGE WOT.	REMARKS
NTER#3	1			
× -1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	14/11	F-64/86	$O_{1}H_{3737}$	
<u>v → · ⁄ √ √ √ / / / / / / / / / / / / / / / /</u>	11159	14.70	7.7	
ggggggggggggggggggggggggggggggggggg	. (*	4 1936		
V 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	14 . 2 9	1 /2/39 =		
<u> </u>	122,72		1 1 1/4	·· · ·
est v	14/07/2/7	2233	Total	
ITER # 4	<u> </u>	<u>'''''</u>	<u> </u>	
11 Rhin	1008 63.29	[a,]	7,11	
<u> 2224 - 18276 20</u> 2	PER 2744	7.57	531	
Carried But	1 2-142 12-	/5/10	7 7	
12. 2 120.96		2020		
<u> 17 m //bree 24/5263</u>	1 . 	20,06	L.\ ⁴⁵	
Carried Line	13,76	<u> </u>	3.77	
TED # 6		,	(g. J. G. To(a)	
TER#6		552552		
- <i></i>	-4/e /	76.47		· ·· ··
<u> </u>	1 2 3 3	3.36	(83.3 -)	<u> </u>
7 20 -	01001	□`?; ``, '	- 12°+	
9-11/10 11/140		三ガンム 十		 · -
120.1/10 151.09	 ,, .	32,02	- 180 1	- · -
,		P2-17-12-11	Total	
TER#B				
	<u> </u>			
11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-18109	15128	<u> </u>	
<u>// / // // // // // // // // // // // /</u>	9-57	_(Q) } {	<u>, 13 es</u>	
(188 7), 3 <u>7</u>		4407	1.35	·
161. 1 ·	₩ \$ 37.67	30/97	-484 . \perp	
TER # 7			() Total	
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14 3 in 13 1 in 1	16,00	439	1.27.8	
(4)	こめがぬけ	<i>7777</i> 1:	1.26	
X 77.7	12 75		2 755	· ·- · ·
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			44, 30, Yotal	
		GRAND TOTAL	- (CE)	

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INK WEIGHTS WORKSHEET

32		EIGHTS W		
EST # <u> </u>	STARTING	(100 . 26 . 47	DATE:	<u> </u>
INK COLORS	WGT.	ENDING WOT,	USAGE WAT,	REMARK9
RINTER # 3				
Rhuls _	1770	16045	15	
DB 6	1440	3,/3	12,57	
CT. 64 144.	16425	15.00	1.09	
0.00		13001	+ (v+ (
Charles	72,19	12.05	- <u>- (05</u>	
	LIA saldi.d.	18307 4	7. 38 Total	
RINTER # 4	.,			
- 27 N/2 11 ""	27777	11199		
<u> </u>	. 743,85%	1165		
<u> </u>		1/1/10	. 1.71 (
N = 11	19.60	19,08	/39[•••
of their	1 200 Ca	18.06.	$b \ge 1$	
Callett	J//225	10,00	f_{f_1,f_2} , $f_{O(a)}$	
RINTER # 6	<u> </u>	i '		
02 8/6 5	<u> </u>		7.19	
11 11/11/11	6,49	[_C()]	1,27	
6-4-6-1	- 2434 1759	15.00 S	172	· ······
Red.	7/57	\$52,2 <i>7</i>	1.7.入	
y a Hayse	75.77.5	735.00%		
18-16-18	3.4.00	39 <i>68</i>	1 C Total	
NNTER # ()		· - ··-	1. (Total	
	[!	· ··· · 	
	· [· · ·——			·····
2.25. 8/6 G	14.3%	77 10	(.46)	
X X X 1/		-43,40	$\frac{1}{100}$	
	61.27	<u> 61.10</u>		 · · ·
		21, 194	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ 	-
1, C.31, 7 1	1.3097	<u> 30 mi 7 (</u>	Roll 5 Total	
INTER#7		<u> </u>		
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	4 (1)	——————————————————————————————————————		
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· · · · · · · · · · · · · · · · · · ·	- - <u> </u>	13.85		
· / (10 / 10 / 10 / 10 / 10 / 10 / 10 / 1	 ////////////////////////////////////	7,5,6,5		
5.62.73	<u> 129747</u> . 1	·-<_\$/-5./	71 80 Tatul	
			TOTAL TOTAL	

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INK WEIGHTS WORKSHEET

<u>ьзт #</u>	Mark	12180 31.2	TO THE DATE:	1/1/6
INK GOLORS	81ARTING WGT.	CNDING WGT,		REMARKS
RINTER #3				
Black	1/4,25.	1646]
1310 Bearing	1.3.64	73765	111]
1. 1. 1. 1. 1. 1. 1. 1.	スルスく	17.95	3.8	
74.7.	132512	123.60	0.6t	
<u> </u>	72,03	1297.5	XQX	`
	125,25	ተናትሎትን		N
(17.41. / -1	717.8 (0.52	1 (%) / / Z	5 (3 T To(a)	- `
RINTER # 4		<u> </u>		
Z7345	19.28	18:42	1.06	
2 / 12/ <u>2015</u>	11.68	70.26	1,47%	·
<u> - D. A. 12 de es</u>	14,75		: : : : : : : : : : : : : : : : :	
<u> </u>			<u></u>	
	18,97	78.27	.26	
/ * //2/50:	1871810	Z4.5.Y	104	
16 14 1/14	Yerrin	J _30.202	ابوا	
		,	나, 그 A Total	
NINTER # 6	i	<u> </u>	-1 -b	<u> </u>
Mrs. 18th Missing	1,64	1- 2774	.50	
41. Block	6, 20	- 4-16-14 1	5.6	
<u></u>	1/14	1. 16	7.3.8	
<u> </u>	\$239	1.89	136	
<u> </u>	1250X	77.72	7.37	
certit 4	30,68	2977	191	· · · · · · · · · · · · · · · · · · ·
			3. >3 Total	
INTER#8				
			· · · · · ·	
			[·
_ // S. F. Co. K. 18/16_ v	13338	7497	TB33 8	
N. (1)	6,1-28	337 "	7.35	
· ///	Zy, 1/3	20.70	1.89	
CKANTE	12/1/27	300 6 27.24		· · · -
	3. 0.XC	1 2 11:4 1	ST. 8' TOTAL	
INTER#7	<u> </u>		, <u>a 🛶 🔭</u>	
· · · · · <u> </u>		! -		
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8.12 K 186 C	1 28-37:11	···/7(7.5X	10.19 th	
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PAGE 4 OF 6

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Crown Cork and Seal 195 Crown Drive Batesville, MS 38606

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APPENDIX D LABORATORY DATA



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APPENDIX E CALIBRATION DATA



CROWN CORK & SEAL - BAILSVILLE, MS RID A GALHRIGHTON DATA

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Airgas Specialty Gasos

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Part Number Cylender Number Cabonatory: POVP Nambor

L03NF/3E,15A40/QA

CC450652

1322014

Gras Code:

ASC - Durbary - NC

G02,02,BALN

Reference Nomber Cylinder Volume

Cylinder Prossure Valve Collet. Carbbeation Date.

122-124444069-1 155.2 CF

2015 PSIC 590

Jul 14, 2014

Expiration Date: Jul 14, 2022

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Approved Int Release

Page 1 of 127-124444005-1





Airgas Specialty Gason

correspondence District MC 27711 919 144 (07.18) (6.916.544,3774 normality (Francisco)

CERTIFICATE OF ANALYSIS **Grade of Product: EPA Protocol**

Prot Number Cylinder Number:

Laburatory

POVP Number

E02NI70F.15A0927 XC021140B

ASG - Durham - NO H22914

O2 BALN Fire Code

Reference Number 122 124413623 1

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Certification Only Jan 10, 2014

Expiration Date: Jan 10, 2022

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Plaggy 5 of 177, 2944730073-1





Airgas Specialty Gases

Gille Denhalt Drove The Transport NG 277 CT

199 (84) 447 F. (44) 9132 (914-1779)

www.angas.com

Part Number Cylinder Number Laboratory PGVP Number

Giant Cincles

1/03NRGL 15A38G0 SG881878ALB ASG - Dorban - NC U22O14

CO2, C2, RAUN

Cylinder Volume Cylinder Pressure Valve Outlet

Reference Number

322-124444070-1 149 3 CF 2045 (PSIC)

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Cartification Data 301 14, 7014

Lapiration linto: Jul 14, 2022

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Triad Cara Available Open Request

Notes

Approved for Robusto

Phage 1 of #22-1244444070.1





Aligns Specialty Gases

610 00 980 200 param, Milyter NOTES AND LANGUAGE SOUTH www.arga.com

CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Flort Number LIDZABISE 15A0Z05

Reference Number

122-124413024-1

Cylinder Number Colbrariationy

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Certification Date

Jan 44, 2014

Expiration Date. Jan 14, 2022

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Paparagion Care Lot IF3 Cylinder No. Continuity of late Uncorrelately Тура 4 IE IED TYTYM ETROTTYNIKT ANTRE Çaran ya na 67 (0.50%) May 1+ 2016 040010 090001028 ANALYTICAL EQUIPMENT Last Multipoint Calibration Analytical Principle Instrument/Make/Model Dec 31, 2013 Napolial SIASO MARKAGI 302 (CO-4) F F116

Tring Unin Avaijable Upon Request

Lender Chronic Motors

Approved for Release

Project of 122-124412624-1



CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Cases

Affordazolog Efficien Crabbins, NR 27753

909 Sala 977 Car (1995) 961-9781

megrangas cren

Plant Number Cylinder Number Laboratory

1265VI* Number

Dian Codo

P02AI99E15A0456 OG119256 ASG Dorhain - NO Reference Number Cylinder Votorios Cylinder Pressure Valve Coulet

122-124446250 1 146.2 GF

2019 PSIO 590

B22014 Certification Date PPN.UALA

Jul 29, 2014

Expiration Date: Jul 29, 2022

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Approved for Robinse

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Airgas Specialty Cases

Ref He had these Danners, SeC 2271 a had been set of the SEP fall folds

CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Part Number

E02AI99E15A0659

Reference Number

122-124415191-1

Lighter Number

XC034244B

Cylinder Volume

1469 00

Laboratory

ASG Durham NO

Cylinder Prossure

2015 PSIG

PGVP Number B Gas Gode P

B22DA4 PPN BALA Valva Outlet: Certification Date: 590 Jun 24, 2014

Expiration Date: Jan 24, 2022

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Page 1 of 122,124416191 1



Airgas Specialty Gases

a Regional participate Distribution of the Control cellulore szolikasi minojosia azca wine despositions

Part Number:

E02AI99E15A1980

00201124

Cylinder Number

Laboratory: PCVP Number

B22012

Cas Darie

ASG - Durham - NC

APPVO

Refereitus Number

Cylinder Volume

146 Cu.I%

Cylinder Pressure:

2015 PSIG

Valve Outlet 5000

Analysis Dute

Apr. 30, 2012

122-1243/14985 1

Expiration Date: Apr 30, 2015

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			ANAL	VTICAL RESULT	'S	"
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Air			Malani n			
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detre Colorense	on VMako/Mai	la!	ANALYI Analytical i	TCAL BQUEPMIS	N't'	Last Muliipolini Colleration
Nicobis 47an Arthonoxony (2944)			Film			Apr 25, 2012

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Notes: ANW PN 781099

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Page 1 of 122-124344886-1





Airgas Specially Gases

activities for the second Dietain Mc27754 0000 004 4784 (410) 044 1774

Part Number

Pozabne (sansaz

Reference Nymber

www.alcyanasamir

Cylinder Number:

00770925

Cylinday Valurus.

140 Cu Ft

127-124306250-1

Linboratory

ASC - Durham - NO

2015 PSIC

PCVP Norther.

692012

Cylinder Pressure: Valve Cullet:

Gris Code APPVD

Analysis Data

Mar 07, 2012

Expiration Hate: Mar 07, 2015

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NHHM	100005	0.0281455	405 JELM LERGEANIZALLI ROCKEN			kah sujums	
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Page 1 of 122 transcovers 1





Airgos Specialty Gazus

KAN Lament Helon Onemies, Mil 27717

(0.19)144-1773 Fire (414)144-1774

www.intenty.com

Part Number

#02AI09E15A@333

Retrance Numbro

192 124305690-1

Cylinder Number Laboratory:

A(G) - Durham - NO

Cylinger Volume 1

140.3 GF

Laboratory: PCOT: Nomber

622013

Cylinder Pressure Valva Onder

2015 (193K) 590

G. n. Coda

PPN BALA

CCC234117

Corphiadian Date:

Jul 24, 2013

Expliration Date: - Jol 24, 2021

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letrate con	ant/Minke/Most	el.	Analytical Principle		point Calibration	
Nicolal 8700 ARROBOTON CORN			r rak	Jul 18, 2011		

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Airgos Specially Gases

CAR Dorest Dove Purhue (91, 277)

WIND SAA SECLED CONTRACTOR

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Part Number. Cylinder Number E03N173E15A4BQ4

CC454142 Cylinder Volumes 122-124453079-7

Lathenedary PGVP Number

ASG - Durham - NC B09014

159.2 CF Cylinder Primarine 2015 PSK3

590 Válva Outlot:

Cas Codo

CO2,O2,BALN

(Oference Number

Sep 10, 2014

Certification Date:

Lapiration Main; Sup 10, 2022

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			CALIBRATION	STANDARD	s	
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MITEM AUTUM	09060211 12081551	CC26237G 13.356000	B 961 % OXYGL NAN 16 67 % CARRION DI	THOCEN	47 (0 A7%) #A (0 (5%)	Nov 68 , 2018 Jan 27, 2018
	••		ANALYTICAL	EQUIPMENT		
Instrument/Make/Model			Analytical Principle		Lawt Multipoint Cal	Dration
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Total Data Available Upon Request

Puge 1 of 102 124453620-1





Airgae Specially Guses

950 United Orien Contraint, NC 27717 (119)544-5775 Len (1995444/1974 www.sifejint.com

CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Plant Number

E0XNI/9E15A00B1 CC4X80D9 Reference Nordse/ Cylinder Volume 122-124401919 1

Cylinder Northber Laboratory

ASC - Durmin - NC

Cylinder Volume 148 2 CF Cylinder Pressure 2015 PSIC

fs22013

Valve Outlet 590

590

P'GVP' Number Gas Code

DZJIMALN

Confidention Date

Oct 25, 2013

Expiration Date. Oct 26, 2021

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Part Number FG2Ab9F15A0705 Retained Number 122-124348171-1

Cylinder Number, CC 117317 Cylinder Volume 146,2 CI Laboratory ASO - Dinfinin - NC Cylinder Pronounc 2015 PSiC

 PGVP Number.
 B22012
 Valve Onliet
 580

 Gas Code:
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Page 1 of 107 104348471-1





Airgon Specialty Gases

EAR Contact Dates Darkson, 400 27717 (11m)344-3773 frag (110)444 3774 Wyser alaysis comm

Part Number Cylinder Number | Q2A009F15A0332

- Rotgreens: Number - Cylinder Volume 177 174385072-1

Cylindez Number Laboratory PGVP Nombor GC413700 ASG | Durhom - NC B22013 Cylinder Volumn 145.3 CF Cylinder Procesure 2015 PSIG

Valva Outlet

500

Cas Code PPN, HALA

Continuation Date

Jul 24, 2013

Expiration Date: Jul 24, 2021

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www.majinascon

Part Number.

L 02A090E15A0331

Reterence Number.

122-124313101-1

Cylinder Number

CC23689 ASC - Durham - NO Cylinder Volume.

140 Cu.Ft.

Laboratory PGVP Number

H22012

Cylinder Processors Valve Outlet

2015 PSIG 580

Gata Coder

APPIVO

Analysis Oate

Apr 18, 2012

Expiration Date: Apr 16, 2016

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Page 1 or 197-124315161-1





Airgas Specially Gases

AND Dorder! Drive District, NE 77713 (UPDIDA+-DADITH- |DIRIDA+-AFAG www.nirana.com

Part Number

U02AIB9L 15A0456

Rufurerou Nambut. 122-124360798-1

Cylindro Nombro

000210774

Cylinder Volume.

146.2 CF

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ASCC - Durbarn - NC

Cylinder Pressure

2015 PSIG

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Leb 19, 2013

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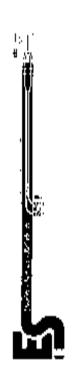
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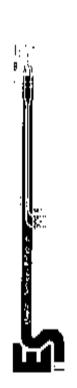
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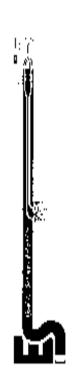
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Page 297 September 22, 2020



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September 22, 2020



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September 22, 2020

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Thermocouple Calibrations

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OOM S-y5	1/2/2018	L'OINT 1	.17		0.00
		POINT 2	50		0.20
		POINT 3	212	212	0.00
		POINT 4	500	900	กถต
DGM 8-27	17272015	POINT 1	32	32	0.00
		POINT 2	50	50	
		POINT 3	712	213	-0.15
		POINT 4	200	500	0 00
DCM 5-35	1/2/2019	POINT 1	32	32	0.00
		POINT 2	50	51	0.20
		POINT 3	212	212	0.00
		POINT 4	500	500	0.00
DGM S 30	1/2/2015	POINT 1	32	32	0.00
		POINT 2	50	50	0.00
		POINT 3	212	212	0.00
		POINT 4	500	501	0.10
DOM S-37	1/2/2015	POINT 1	32	32	0.00
		POINT 2	50	50	0.00
		COINT 3	212	211	0.19
		POINT 4	500	499	0 10
ORM \$408	1/2/2015	_	32	32	0.00
		POINT 2	50	49	0 20
		POINT3	212	2 12	0 00
		POINT 4	500	(400	0.00
DCM S-39	1/2/2016		32	31	0.20
		POINT 2	50	49	0.20
		POINT 3	212	212	0.00
		POINT 4	700	900v!	0.00
DGM 5042	1/2/2015	POINT 1	32	32	0.00
		POINT 2	50	50	0.00
		POINT 3	212	213	0.15
		POINT 4	500	501	0.10

CADBRATION INSTRUMENT USED IS AN EXTECHINSTRUMENTS MODEL NO 42312 (S/N 50000139) CADBRATOR/THERMOMETER



TYPE ISTRITOT TORL CALIFRATION SUMMARY

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301	12	1.2	0.75	D.A	1 11	0.78	0.900	0.017	0.014	0.475	0.472	D 360	17272/01/5
307	10	10	1.0	1.0	0.8	0.6	0 (480	0.014	0.014	0.400	O ALIA	0.3800	122720 15
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497	13	1 %	00	1.3	0.8	0.6	0.982	0.014	0.010	റ ഷ്ഥ	ብ ለባን	0.37%	12272035
5V1	1.2	1.2	1.2	1.3	1.0	OH	0.900	0.017	0.014	0.497	0.492	0.379	1/2/2015
502	1 /	14	1.3	1.0	0.7	0.6	0.985	0.012	0.014	0.502	0.501	0.379	17272035
GV1	1.6	1.3	1.0	1.25	0.11	0.7	0.903	0.014	0.012	0.496	0.494	0.378	1/2/2019
6VZ	1.0	17	1.0	17	10	0/	0.978	0.017	0.012	ዕ ልባሉ	O deid	0.378	1/2/2015
/V1	1.1	0.9	1.0	1.6	1.2	OH	0.902	0.021	0.014	0.48%	0.484	0.378	1/2/2019
971	1 1	0.9	0.6	0.6	13.7	1.0	0.998	0.012	0017	0.497	0.483	0.378	1/2/2015
97.4	1.2	3.71	0.0	0.6	0.7	1.0	O SHIPL	0.012	0.017	0.487	0.483	11.378	1/2/2015
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12/01	0.9	1.7	0.9	0.6	1.0	1.0	Ú 860	0.019	0.016	O and	ር ልባን	0.216	1/2/2015
1207	1.0	1.0	1.0	1.0	1.1	0.7	0.976	0.019	0.012	0.482	0.484	11.262	1/2/2015
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2010-06	0.4	0.0	Ub	1.2	0.4	0.9	0.980	0.007	0.000	0.497	0.495	0.075	1/2/2015
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842005	0.6	11.4	0.4	0.4	0.2	0.0	0.978	0.003	0.000	0.499	0.496	0.070	1/2/2015
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Source Evaluation Society

F. C. Box 12124 Research Triangle Fark North Carolina 27709

March 18, 2014

George I, Dunia Environmental Source Samplers, 436 Ralaigh Street, Sotte B Wilmington, NO. 28612

Subject - Qualified Source Texter Application No. 2014-829.

Ourlification Notice - Manual Gas Volume Measurements and isokinetic Particulate Sampling Methods - Manual Gascons Pollutants Source Sampling Methods

Dear Mr. Durna

If is my pleasure to inform you that you have satisfied the requirements of the Source Evaluation Society Qualified Source Lesting Individual program for the group exam(s) lested above. As a member of the successful candidates in this SES program, you stimuld be proud of this dedination within the source-emissions tooling community. Their confident that you will continue to uphold the standards of technical excellence and officed conduct embodied in the SES mession statement.

This employed Qualification Noticity) and SES identification could are your performed record of this action again. This statical is valid for the period above by the Qualification Notice.

Congratelations on your achievement and I with you continued success in your faters undereversible property a percentional letter if you wish to have your information posted on the SES web site.

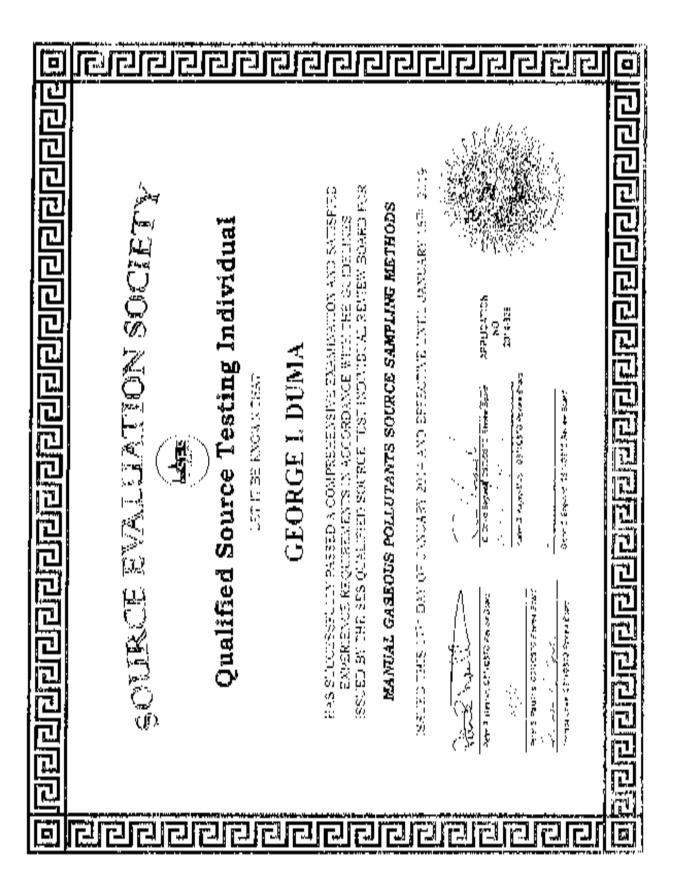
Sincurally yours,

Peter R. Wedfin

SES OSTI/OSTO Review Committee Chairman

ce: Climin Empland, SES OSTPOSTO Review Board Member
C. David Bilgwell, SES OSTPOSTO Review Board Member
Karen D. Kapya Mills, SES OSTPOSTO Review Board Member
Poter S. Pokglais, SES OSTPOSTO Review Board Member
Thereso Lower, SES OSTPOSTO Review Board Member
Coal Westler, SES OSTPOSTO Review Committee Administrator

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Source Evaluation Socially 10 Chapt 19174 Research Harryle Park, NC 27780 2194

GEORGE L DUMA

ARRESTADO, TARA, SERVICIOS ESTADAS, ARRAMANTAS ESTADAS





Source Evaluation Society

P. O. Box 12124 Research Triangle Park North Carolina 27709

December 22, 2010

Charles A. Cimmo Environmental Source Samplers 436 Rateigh St. Wilmington, NC 28412

Subject: Qualified Source Tester Application No. 2009-306

Qualification Notice - Manual Gas Volume Measurements and Isokinetic Particulate Sampling Methods

- Manual Caseons Pullutants Source Sampling Methods
- Guscous Pollutants Instrumental Sampling Methods
 Eugardous Metals Measurement Sampling Methods

Dear Mr. Garner:

It is my pleasure to inturn you that you have satisfied the requirements at the Source Realization Source Qualified Source Test Individual program for group exam(s) lested above. As a member of the assessability and dates in this SES program, you should be proud of this distinction within the source emissions testing community. I am confident that you will continue to ophold the standards of technical excellence and of this destination conduct embodied in the SES massion statement.

The enclosed Qualification Notice(s) and SES identification card me your permanent record of this achievement. This states is valid for the period shown on the Qualification Nations.

Computations on your adapted and I wish you continued success or your fature endeavors. Please see attached a permassion letter if you wish to have your information posted on the SES web site.

Sincerely yours,

Peter R. Westlin.

SPS OSTROSTO Review Committee Charman

cc. Roy Owens, SFS QSTI/QSTO Review Board Member Gleon England, SES QSTI/QSTO Review Board Member C. David Bagwell, SES QSTI/QSTO Review Board Member Known D. Knjiya-Mills, SES QSTI/QSTO Review Board Member Peter S. Pakulnis, SES QSTI/QSTO Review Board Member Gail Westlin, SES QSTI/QSTO Review Committee Administrator

(ESS)

SOURCE EVALUATION SOCIETY



Qualified Source Testing Individual

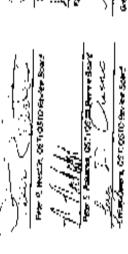
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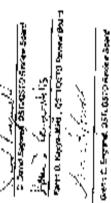
CHARLES A. GARNER

EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED

MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE BAMPLING METHODS

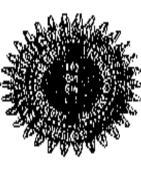
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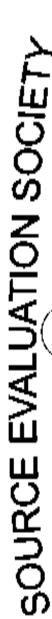


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Qualified Source Testing Individual

LET IT BE KNOWN THAT

CHARLES A. GARNER

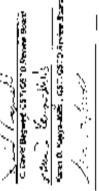
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR BAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES

MANTAL GASEOUS POLLUTANTS SOURCE SAMPLING METHODS

ISSUED THIS 2210 DAY OF DECEMBER 2018 AND EFFECTIVE LIVITUDECEMBER 2115, 2015

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Qualified Source Testing Individual

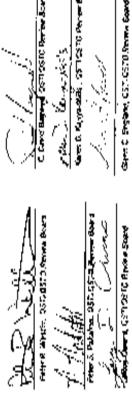
LET IT BE KNOWN THAT

CHARLES A. GARNER

HAS SUCCESSPULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES

GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METRODS

ISSUED THIS 22% DAY OF DECENORR 2010 AND EFFECTIVE UNTIL DECENORR 215", 2015



APPLICATION NO.





Qualified Source Testing Individua

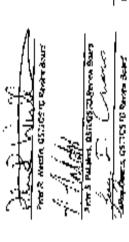
LET IT BE KNOWN THAT

CHARLES A. GARNER

ISSUED BY THE SES QUALITIED SOURCE TEST INDIVIDUAL REALEW BOARD FOR EAS SUCCESSEULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GOIDELINES

hazardous metals measurement sampling methods

ISSUED THIS 22°C DAY OF DECEMBER 2010 AND BFFECTIVE UNTIL BECKNIBER 21°F 2015



Aarm D. Oppowiek, GST:CSTD Goden Star

APPLICATION NO Gen : Agus do 1011 9816 981 in dour





P. O Box 12124 Source Evaluation Society

Research Triangle Park, NC 27709-2124

CHARLES A. GARNER

Qualified Source Testing Individual

MANGAL GAS VOLOME MEASUREMENTS AND JSOKINETIC PARTICULATE SAMPLING .METHODS - Effective December 22, 2010 through December 21, 2015

MANUAL GAS SOURCE SAMPLING METHODS

GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METHODS Effective December 22, 2010 through December 21, 2015

- Effective December 22, 2019 through Becomber 21, 2015 HAZARDOOS METALS REASUREMENT SAMPLING METHODS

Effective December 22, 2010 through December 21, 2015



Source Evaluation Society

P. C. Hox 12124 Research Triangle Park North Carolina 27709

January 9, 2013

Richard D. Suter Environmental Source Samplers, Inc. 436 Raleigh Street Wilmington, NO: 28417

Subject: Qualified Source Lester Application No. 2014, 754.

Qualification Notice - Manual Gas Valume Measurements and Emkinetic Particulate Sampling Methods - Manual Gascons Pullutants Source Sampling Methods

Door Mr. Sitter:

It is my pleasure to inform you that you have satisfied the requirements of the Source Pvaluation. Society Qualified Source Testing Individual program for the group exam(s) bated above. As a member of the successful candidates in the SISS program, you should be proud of this distinction within the source emersions testing community. I am confident that you will continue to uplote the standards of technical excellence and elhical conduct conbodied in the SLS mission statement.

The enclosed Qualification Notice(s) and St-S identification and me your permanent record of this achievement. This status is valid for the period shown on the Qualification Natice.

Comprainfaitions, on your achievement and I wish you configured suggest in your future endowers. Please see attached a permission letter if you wish to have your information peated on the SES web site.

Sincerely yours,

Peter R. Westlan

SES ON DON 101 Review Committee Chamman

cc Roy Owens, NLS OSTROSTO Review Board Member Olem England, SES OSTROSTO Review Board Member C. David Bapwell, NES OSTROSTO Review Down! Member Karm D. Kapiya-Mills, SES OSTROSTO Review Board Member Peter S. Pilkalins, SES OSTROSTO Review Pourd Member Gail Weatin, SES OSTROSTO Review Committee Administrator



MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE ISSUED THIS 9TH DAY OF JANUARY 2003 AND SFFECTIVE UNTIL JANUARY 3TH, 2018 SOURCE EVALUATION SOCIETY EAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED ISSUED BY TRE SES QUALIFIED SOURCE FEST INDIVIDUAL REVIEW BOARD FOR Qualified Source Testing Individua EMPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES APPLICATION 2713754 SAMPLING METHODS LET IT BE KNOWN THAT Gern C. Employ 25 Tracks Person Associa RICHARD D. SIT Premi Oblice, GSSQS TO Sevenday. Color Constitutions 655.027 Janvin Bases

SOURCE EVALUATION SOCIETY



Qualified Source Testing Individual

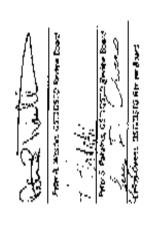
LET IT BE KNOWN THAT

RICHARD D. SITTER

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDBLINES

MANUAL GASEOUS POLLUTANTS SOURCE SAMPLING METHODS

ISSUED THIS 977 DAY OF JANUARY 2013 AND EFFECTIVE UNTIL JANUARY 879, 2018



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Source Evaluation Society of the Res 19194 feature of Europia Paix, NC 27400 9394

RICHARD D. SITTER
(Decided Names Froling Individual

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