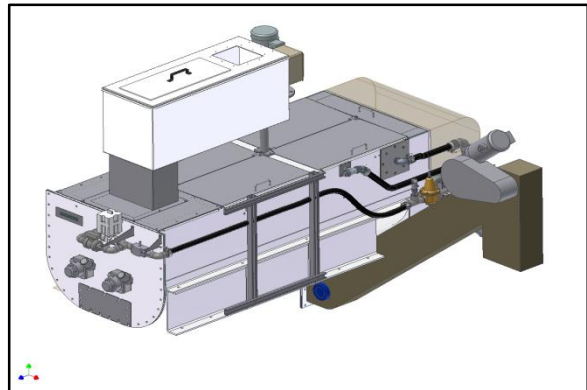
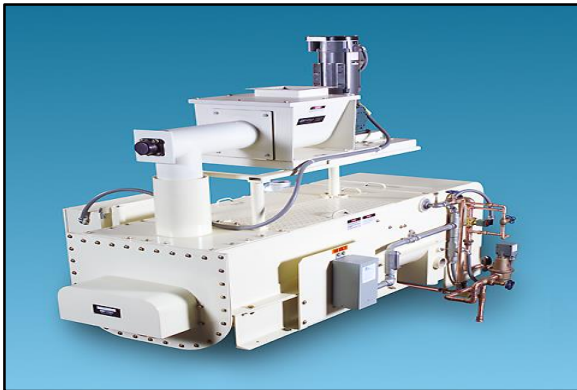




COST PROPOSAL

LIME SLAKING SYSTEMS FOR CITY OF HOLLYWOOD, FL



IMS File No.: D15-017

Revised on: June 3, 2016

SALES REPRESENTATIVE

Water Treatment & Controls Co.

Mike Robbins

9900A N. Palafox Street

Pensacola, Florida 32534

Tel: (850) 474-1805

Cell: (352) 267-3223

Email: mike@watertc.com



TABLE OF CONTENTS

Cover Letter

Equipment Selection Sheet

Section 1: Commercial Proposal and Order

Section 2: General Arrangement Selection, Drawings, and Brochures

IMPORTANT NOTICE: All the information in this Proposal is confidential and has been prepared for Buyer's use solely in considering the purchase of the Equipment described. Transmission of all or any part of this Proposal to others or use by Buyer for other purposes is unauthorized without Seller's advance written consent.



June 3, 2016

Mr. Carlos Aguilera
City of Hollywood, FL
Tel: (954) 967-4230
Fax: (954) 967-4232
Email: Caguilera@hollywoodfl.org

RE: City of Hollywood, FL
Lime Slaking Systems

Dear Carlos,

Thank you for your interest in Integrity Municipal Systems, LLC (IMS).

Per your request, we have prepared this cost proposal for providing two (2) Lime Slaking Systems for the City of Hollywood, FL. Our proposal is based on the following design criteria:

Design Criteria

Quicklime Feed Rate, lb/hr	1,000
Slaker Maximum Capacity, lb/hr	1,000
Maximum Output Lime Slurry Concentration, %	18%

Our lime slaking system is a packaged system. It consists of a lime feeder, lime slaker, grit remover, piping, valves, instrumentation and controls to make a complete and functional system.

The IMS A-758 Lime Slaker System incorporates many features and advantages, including:

- Economical, consistent and reliable on-site slaking
- Proven track record with 40 years of experience
- Easy to install
- Tested at the factory
- Robust construction
- Superior paste slaking process (2:1 water to lime ratio)
- Faster slaking (5 minutes)
- More reactive lime slurry
- Compact size
- External heat source not required
- Saves water, heat and power
- Completely automatic system
- Flexible configurations
- Flexible controls



We have attached our commercial proposal in Section 1 and equipment drawings and brochures in Section 2.

We look forward to working with you on this project. If we can be of any further assistance, please do not hesitate to contact our sales representative, Mike Robbins at WTC at (352) 267-3223.

Thank you.

Sincerely,

Khaled Roueiheb
Director of Sales

Cc: Mike Robbins; WTC



EQUIPMENT SELECTION SHEET

<u>FEEDER ACCESSORIES</u>			
<input type="checkbox"/> Inlet Rotary Valve	<input type="checkbox"/> Rotary Valve Adapter	<input checked="" type="checkbox"/> Inlet Flexible Connector	
<u>FEEDER</u>			
<input checked="" type="checkbox"/> Volumetric Screw (32-300SP)	<input type="checkbox"/> Volumetric Belt (32-215)	<input type="checkbox"/> Gravimetric Belt (31-165)	
<i>Feeder Material of Construction</i>			
<input type="checkbox"/> Carbon Steel	<input checked="" type="checkbox"/> 304SS	<input type="checkbox"/> 316SS	
<input checked="" type="checkbox"/> Unpainted		<input type="checkbox"/> Painted	
<u>SLAKER MAXIMUM CAPACITY</u>			
<input type="checkbox"/> 500 lb/hr	<input checked="" type="checkbox"/> 1,000 lb/hr	<input type="checkbox"/> 2,000 lb/hr	<input type="checkbox"/> 4,000 lb/hr
<input type="checkbox"/> 8,000 lb/hr			
<i>Slaker Material of Construction</i>			
<input type="checkbox"/> Carbon Steel	<input checked="" type="checkbox"/> 304SS	<input type="checkbox"/> 316SS	
<input checked="" type="checkbox"/> Unpainted		<input type="checkbox"/> Painted	
<u>GRIT REMOVER</u>			
<input type="checkbox"/> Conveyor	<input type="checkbox"/> Screen	<input checked="" type="checkbox"/> Screw	
<i>Grit Remover Material of Construction</i>			
<input type="checkbox"/> Carbon Steel	<input checked="" type="checkbox"/> 304SS	<input type="checkbox"/> 316SS	
<input checked="" type="checkbox"/> Unpainted		<input type="checkbox"/> Painted	
<u>WATER SUPPLY OPTIONS</u>			
Water Valve:	<input checked="" type="checkbox"/> Mechanical	<input type="checkbox"/> Electronic	
Water Piping Selection:	<input type="checkbox"/> Slaker-Mounted Piping	<input checked="" type="checkbox"/> Water Panel	
Water Piping Material:	<input checked="" type="checkbox"/> Copper	<input type="checkbox"/> PVC	
Water Panel Location (If Applicable):	<input type="checkbox"/> Unit-Mounted	<input type="checkbox"/> Local Freestanding	<input checked="" type="checkbox"/> Remote
<u>POWER SUPPLY</u>			
<input checked="" type="checkbox"/> 480V/3ph/60Hz	<input type="checkbox"/> 230V/3ph/60Hz	<input type="checkbox"/> 120V/1ph/60Hz	<input type="checkbox"/> 230V/1ph/60Hz
<u>CONTROL PANEL</u>			
<input type="checkbox"/> Mounted on Slaker		<input checked="" type="checkbox"/> Remote-Mounted	
<input type="checkbox"/> Relay Logic Based		<input checked="" type="checkbox"/> PLC Based	



SECTION 1

COMMERCIAL PROPOSAL

Proposal D15-017

Date: June 3, 2016

ORDER

The undersigned authorized representative of the below named purchaser (“Buyer”) hereby orders the Equipment described in the accompanying Seller’s Documentation on the terms and conditions specified therein.

Buyer: _____

Signed by: _____

Print Name: _____

Print Title: _____

All orders are subject to prior acceptance by Integrity Municipal Systems, LLC at its offices in Poway, CA.



SCOPE OF WORK BY INTEGRITY MUNICIPAL SYSTEMS, LLC (“SELLER”)

The following equipment and services are included in Seller’s scope of work. All equipment will be manufactured in accordance with Seller’s standard equipment specifications and installed in a non-hazardous area. Please see attached equipment general arrangement drawing for illustration and reference.

<u>No.</u>	<u>Item Description</u>	<u>Qty.</u>
1.	Inlet Flexible Connection, Canvas	2
2.	Series 32-300SP Volumetric Screw Feeder – 1,000 PPH Capacity including: a) Unpainted 304SS Housing Construction b) 1 HP Motor- 0-180VDC TENV, Tachometer c) SCR Drive Control Panel (In Junction Box) d) 2" Feed Screw, Feed Tube, Trough Cover, Stand & Mounting Hardware e) Feeder Support Posts and Discharge Connection	2
3.	Series A-758 Lime Paste Slaker, 1,000 PPH Capacity , including: a) Unpainted 304SS Trough b) 1/2 HP Paddle Shaft Motor – 230/460V, 3 ph, 60 Hz c) Mechanical Torque Operated Water Valve d) Vapor & Dust Arrestor e) Pre-Assembled Copper Water Panel (IMS Standard) (Remote-Mounted) a. Water Pressure Reducing Valve, Water Strainer, Pressure Gauge, Water Low Pressure Switch b. Solenoid Valve for Auto Batch and Adapter f) Slaker delivers up to 18% Lime Slurry Concentration g) Unit is shipped pre-Wired/pre-Piped, Assembled and Tested at the Factory	2
4.	Screw Type Grit Remover for 1000 PPH Capacity , including: a) Unpainted 304SS Housing Construction b) 1/2 HP Grit Remover Motor – 230/460V, 3 ph, 60 Hz, TENV & Gearbox c) Two-Part Full Length Grit Screw Cover d) Grit Remover Screw, Grit Remover Flowmeter, Valves & Piping	2
5.	PLC Based Control Panel for Slaker, Grit Remover & Feeder , including: a) Nema 4X Enclosure – 304SS (Remote-Mounted) b) Allen-Bradley CompactLogix L24ER PLC with Color 10" Allen-Bradley Panelview Plus 1000 HMI (Touch Screen Operator Interface) c) Auto-Batching d) Input Power Disconnect Switch e) Control Circuit Transformer for 460V, 3 ph, 60Hz Power Input f) Conduit and Parts for Grit Remover, Junction Box, Feeder g) Audible Alarm Mounted To Control Panel h) 4-20 mA Control of Screw Feeder	2



6.	Junction Box for Remote Mounting of Control Panel- 304SS	2
7.	5 Year Recommended Spare Parts for One System (See Attached List)	1
8.	Manufacturer's Services for Installation Inspection, System Start-Up and Operator Training (1 Trip for 4 Days Total at the Jobsite)	Included
9.	Design Submittal and Operation and Maintenance Manuals	Included
10.	F.O.B Factory with Full Freight Allowed to Jobsite, City of Hollywood, FL	Included
	EQUIPMENT PRICE [ITEMS 1-10]	\$282,794

SCOPE OF WORK BY BUYER

1. Equipment unloading and installation
2. All civil works and concrete pad for equipment including anchor bolts supply
3. Provision and installation of any raised platforms
4. Electrical power to slaker control panel (480V/3 ph/60Hz)
5. All overflow drain piping from slaker to plant drain
6. Remote installation of control panel and interconnecting wiring from remote-mounted control panel to junction box, etc.
7. All electrical conduit, wiring, electrical material, etc. from control panel to plant SCADA, etc.
8. Process signal and wiring from process for feeder operation
9. Quicklime supply equipment to feeder inlet
10. Vent piping from vapor & dust arrestor connection onwards (3")
11. Lime slurry discharge piping from slaker connection to process (2")
12. Provision and installation of any splitter boxes
13. Remote installation of water panel and interconnecting piping from remote-mounted water panel to slaker
14. 1 ½" water supply piping to water connection- **18 gpm at 75 psi**
15. Room ventilation, air conditioning, or lighting
16. Any items not explicitly listed under Integrity Municipal Systems, LLC's scope of work

SHIPPING INFORMATION

Estimated Shipping Weight: 2,400 lbs. per system

FIELD SERVICES

Should additional services be required for work beyond Seller's Scope of Work, Buyer may purchase such services from Seller at a standard rate of \$1,500 per eight (8) hour day, plus expenses.

WARRANTY TERM

The Warranty Period is two (2) years from Equipment acceptance or 36 months from shipment, whichever occurs first, and is subject to the Standard Terms of Sale included with this Proposal.



TAXES

Seller's Proposal does not include any sales, use, federal, state, local, excise, or other similar taxes or duties unless expressly stated in this quotation. All applicable taxes shall be paid by Buyer. Upon acceptance of an order by Seller, Buyer shall provide a resale certificate or tax exemption certificate, whichever is applicable, to Seller.

PAYMENT TERMS

Subject to prior credit approval, the terms of payment are:

20% upon submittal approval, Net 30 days

75% upon equipment shipment (or offer to ship), Net 30 days

5% upon beneficial occupancy, or 120 days after shipment, whichever occurs first

PROPOSAL VALIDITY

Seller's Cost Proposal dated June 3, 2016 is valid until December 30, 2016. The stated price is predicated on shipment no later than December 29, 2017. In the event Buyer desires to extend the delivery date or the Warranty Period beyond the time period set forth in this Proposal, Seller can offer extended terms for an additional charge which will be provided upon request.

SCHEDULE

As part of any binding Agreement that results from this proposal, Seller and Buyer shall mutually agree upon a production and delivery schedule (not to exceed the outside delivery date stated above). Our normal lead time for this type of equipment is:

Design Submittal: 4-6 weeks after receipt of a fully executed purchase order

Equipment Shipment: 14 weeks after seller's written receipt of submittal approval and release for fabrication.

TERMS & CONDITIONS

NOTE: Seller's Standard Terms of Sale, attached to this Proposal and incorporated herein by this reference, will apply to any order resulting from this Proposal and are factored into the purchase price set forth in this Proposal.

Recommended Spare Parts List (One Unit)					
Ref.	Item ID	Legacy Number	Description	Qty.	Ext. Price
1	W2T383041	U19582	SPRAY NOZZLE; TYPE G; 0.375 FNPT	1	\$117
2	W2T382969	U18536	NOZZLE,UNIJET 2.0GPM; 80DEG	3	\$69
3	W2T384255	P39366	GASKET; 0.125"THK; 4000LB SLAKER	2	\$86
4	W2T383425	P41154	O-RING; 2.13"ID X 2.5"OD X 3/16"DIA	2	\$4
5	W2T383482	P37190	O-RING; 2"ID X 2.375"OD X 3/16"DIA	6	\$6
6	W2T382967	U18534	FLANGED ROLLER BEARING; 1.5"SHFT	4	\$1,960
7	W2T384121	P39335	RETAINING RING; SPIROLOX; 2.13"DIA	2	\$46
8	W2T382961	U18080	SHAFT SEAL; TYPE 2; 2.125"DIA	2	\$1,628
9	W2T382965	U18531	FORK UNIT 1000LB CS	4	\$1,252
10	W2T385044	P39305	#7 RUBBER PLUG	2	\$4
11	W2T384843	R32234	PADDLE; LH; 1000PPH	10	\$670
12	W2T384844	R32235	PADDLE; RH; 1000PPH	10	\$670
13	W2T385479	P40474	UPPER WEAR PLATE; 1000LB CS	1	\$154
14	W2T385478	P40473	LOWER WEAR PLATE; 1000LB CS	1	\$169
15	W2T382992	U19240	SPLIT COLLAR	2	\$644
16	W2T383118	U20698	CLUTCH GEAR	1	\$440
17	W2T385289	P57373	V-BELT A47	1	\$65
18	W3T141966	U29189	SWITCH & ENCLOSURE	3	\$351
19	W2T384765	P21120	N03 BEARING LOCK NUT	1	\$12
20	W2T384926	P21121	W03 BEARING WASHER	1	\$2
21	W2T383016	U19533	BALL BEARING; .669ID X 1.85OD	1	\$186
22	W2T384384	P43099	DIAPHRAGM MODIFIED; DASHPOT	2	\$560
23	W2T384096	P39325	GASKET; HEAD; WCV	1	\$15
24	W2T383453	P42723	STEM; WCV 1-2000LB	1	\$196
25	W2T383698	P39323	ORFICE SEAT; WTC	1	\$25
26	W2T383696	P39321	DIAPHRAGM; WCV; NEOPRENE	1	\$118
Total Spare Parts Price:					\$9,449

TERMS AND CONDITIONS

The following Terms and Conditions are applicable to this order entered into by and between the City of Hollywood (referred to as Buyer) and Vendor (referred to as Seller).

MODIFICATIONS

This purchase order form, and any other document pertaining to this transaction which has been acknowledged in writing by the Director is a complete and exclusive statement of this order. Accordingly no modification or amendment shall be binding upon the Buyer unless signed by the Director. The City Attorney has approved these standard terms and conditions as to form and legality. Accordingly no modification of these terms and conditions shall be binding upon buyer unless they are endorsed and approved by the City Attorney. In the event of a conflict between these terms and conditions and any other document pertaining to the transaction covered by this order, these terms and conditions shall prevail.

ASSIGNMENT

Any assignment of this order or the performance of work hereunder, in whole or in part, is prohibited.

EXCUSABLE DELAYS

The Buyer may grant additional time for any delay or failure to perform hereunder if the delay will not adversely impact the best interests of the Buyer and is due to causes beyond the control of to Seller. Such grant must be in writing and made part of the order.

DEFAULT

In the event of default by the Seller, Buyer may procure the articles or services covered by this order from other sources and hold to Seller responsible for any excess costs occasioned thereby, in addition to all other available remedies at law or equity.

TERMINATION

Buyer, acting through its City Manager or his/her designee, reserves the right to terminate this order in whole or in part for default (a) if Seller fails to perform in accordance with any of the requirements of this order or (b) If Seller becomes insolvent or suspends any of its operations or if any petition is filed or proceeding commenced by or against Seller under any State or Federal Law relating to bankruptcy, reorganization, receivership or assignment to the benefit of creditors. Any such termination will be without liability to Buyer except for completed Items delivered and accepted by the Buyer. Seller, will be liable for excess costs of procurement.

F.O.B.

In those cases where F O.B. point is not Destination, Seller is required to prepay freight charges and list separately on invoice. Collect shipments will not be accepted.

TERMS

By accepting this order, the Seller agrees that payment terms shall be Net 30 unless otherwise stated.

INVOICING

Seller must render original invoice to the City of Hollywood, Department of Financial Services, P.O. Box 229045, Hollywood, Florida 33022-9045.

TAX

The City of Hollywood is exempt from Federal and State taxes for tangible personal property. Sellers doing business with the City, which are not otherwise exempt, shall not be exempt from paying sales tax to their suppliers for materials to fulfill contractual obligations with the City, nor shall any Seller be authorized to use the City Tax Exemption Number in securing such materials

RESPONSIBILITY

Responsibility will not be accepted for any goods delivered or services performed unless covered by a duly signed and authorized City of Hollywood order, issued by the Procurement Services Division.

ACCEPTANCE

Sellers acceptance of this order will be presumed unless Seller acknowledges exception, in writing, to Buyer within ten (10) calendar days after date of order.

DELIVERIES

Deliveries are to be made during the hours of 7:30 a.m. to 4:00 p.m. Monday through Friday, excluding holidays, unless otherwise stipulated. Seller shall notify the Buyer of deliveries that require special handling and/or assistance for off-loading. Failure to notify the Buyer concerning this type of delivery will

result in the billing to Seller of any add-on redelivery, storage or handling charges.

INSPECTION

All Commodities delivered on this order are subject to inspection upon receipt by a representative of the Buyer. All rejected commodities shall remain the property of the Seller and will be returned at the Seller's expense.

QUANTITIES

Quantities specified in the order cannot be changed without Buyer approval. Goods shipped in excess of quantity designated may be returned at the Seller's expense.

PAYMENT CHANGES

Payments will be made only to the company and address as set forth on order unless the Seller has requested a change thereto on official company letterhead, signed by an authorized officer of the company.

ANTI-DISCRIMINATION

Sellers doing business with the Buyer are prohibited from discriminating against any employee, applicant or client because of race, creed, color, national origin, sex or age with regard to but not limited to the following: employment practices, rates of pay or other compensations, methods and training selection.

UNIFORM COMMERCIAL CODE GOVERNING LAW

Florida law, ~~including without limitation the Uniform Commercial Code (Chapter 670—680, Florida Statutes),~~ shall apply to ~~and supplement the terms and conditions of~~ this order. Venue shall lie in a court of competent jurisdiction in Broward County, Florida.

LEGAL RESPONSIBILITY

By accepting this order, Seller understands and agrees that the items covered herein, or services to be rendered, shall be manufactured, sold or performed in compliance with applicable Federal, State, County and Local laws, ordinances, rules and regulations. Lack of knowledge by the Seller shall in no way be a cause for relief from responsibility

LIABILITY - COPYRIGHT/PATENT/TRADEMARK

Seller shall save and hold harmless Buyer, its officers, employees and agents from liability for infringement of any United States patent, trademark or copyright for or on account of the use of any product sold to Buyer or used in the performance of this order.

INDEMNIFICATION

Seller shall indemnify, hold harmless and defend Buyer, its officers, employees and agents from and against any and all claims, damages, liability, judgments or causes of action, including costs, expenses and attorney fees, for bodily injury, wrongful death or damage to property (other than the goods provided by Seller hereunder), to the extent incurred as a result of any error, omission or negligent act by the Seller, its officers, employees, agents, subcontractors or assignees arising out of this order.

OCCUPATIONAL SAFETY AND HEALTH

Seller must comply with requirements under Chapter 442, Florida Statutes, that any toxic substance delivered as a part of this order must be accompanied by a Materials Safety Data Sheet (M.S.D.S.).

REPRESENTATIVE

All parties to this order agree that the representatives named herein are, in fact, bonafide and possess full and complete authority to bind said parties.

PUBLICITY

No endorsement by the City of the product and/or service will be used by Seller in any way, manner or form in product literature or advertising.

INSURANCE

The Seller of services must have secured and maintained the required amount of \$1,000,000 general and \$500,000 automobile liability limits and must list the City as an additional insured of this coverage. The Seller must have worker's compensation coverage as required by law. Any exception to the above stated limits or other requirements must be endorsed and approved by the City of Hollywood Risk Manager.

WARRANTY

Seller warrants to Buyer that during the period that ends 18 months from delivery or one year from acceptance, whichever occurs first (the "Warranty Period"), the Equipment shall materially conform to the specifications set forth in Seller's Documentation and shall be free from defects in material and

workmanship. If Buyer gives Seller prompt written notice of breach of this warranty within the Warranty Period, Seller shall, at its sole option and as Buyer's sole and exclusive remedy, repair or replace the Equipment or any non-conforming parts thereof. If Seller determines that any claimed breach is not, in fact, covered by this warranty, Buyer shall pay Seller's then customary charges for any repair or replacement made by Seller. The warranty on repaired or replaced Equipment or parts is limited to the remainder of the Warranty Period. The foregoing warranty shall not apply to any Equipment or part thereof (x) that is (a) not operated and maintained in accordance with Seller's instructions, (b) damaged as a result of any unauthorized repairs or alterations, (c) damaged by chemical action or abrasive material, misuse, (d) damaged by improper installation (unless installed by Seller), and (y) if Buyer is in default of any payment obligation to Seller under this Agreement. Seller's warranty does not cover any consumables used in the Equipment, regardless of whether such consumables were supplied by Seller. THE WARRANTIES SET FORTH IN THIS SECTION ARE SELLER'S SOLE AND EXCLUSIVE WARRANTIES AND ARE SUBJECT TO "LIMITATION OF LIABILITY" SECTION BELOW. SELLER MAKES NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE.

LIMITATION OF LIABILITY

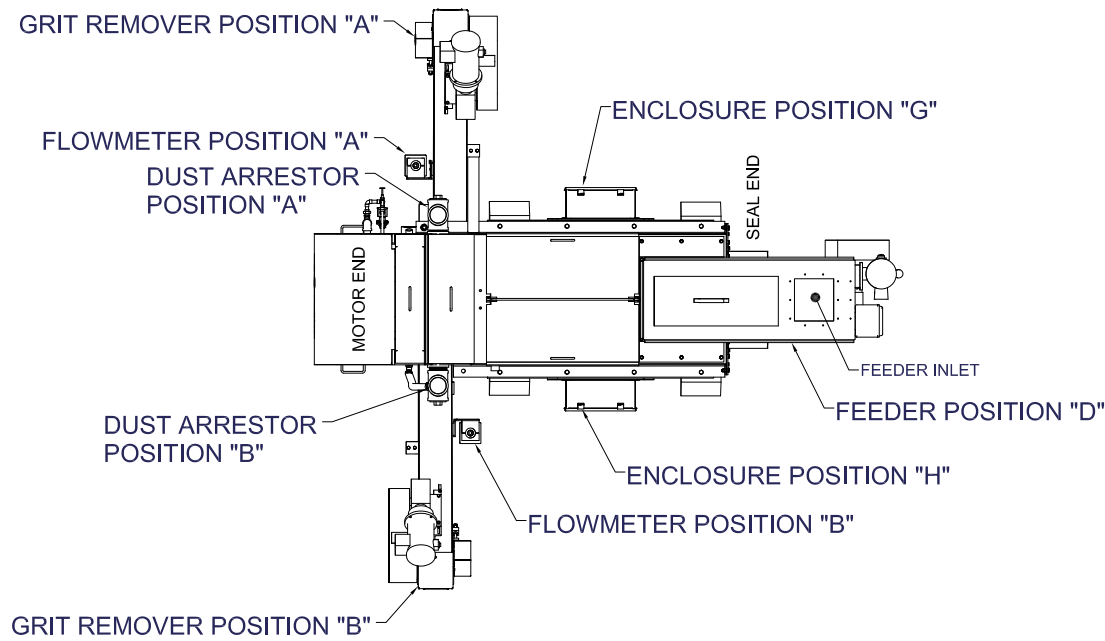
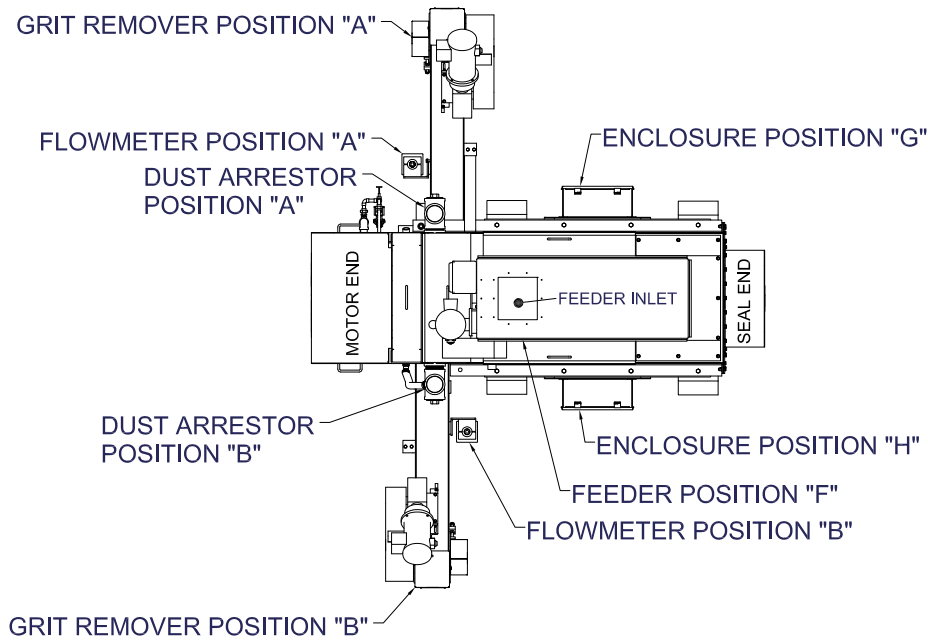
NOTWITHSTANDING ANYTHING ELSE TO THE CONTRARY, SELLER SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER INDIRECT DAMAGES, AND SELLER'S TOTAL LIABILITY ARISING AT ANY TIME FROM THE SALE OR USE OF THE EQUIPMENT OR PARTS SHALL NOT EXCEED THE PURCHASE PRICE PAID UNDER THIS AGREEMENT. THESE LIMITATIONS APPLY WHETHER THE LIABILITY IS BASED ON CONTRACT, TORT, STRICT LIABILITY, OR ANY OTHER THEORY.

The foregoing limitations and exclusions shall not apply to any claims for which seller is responsible pursuant to "Indemnification" article above.



SECTION 2

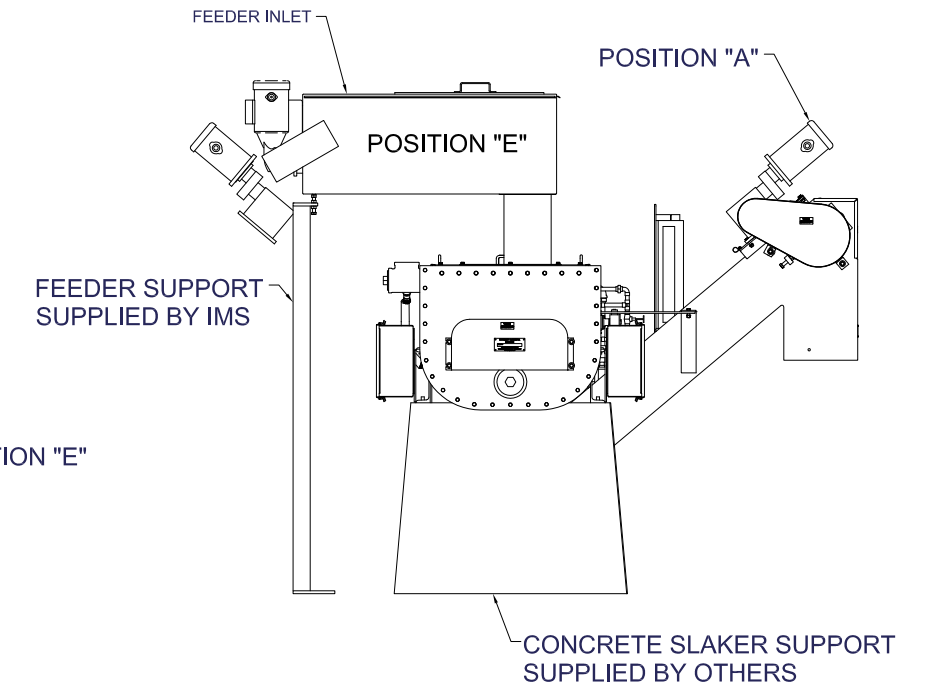
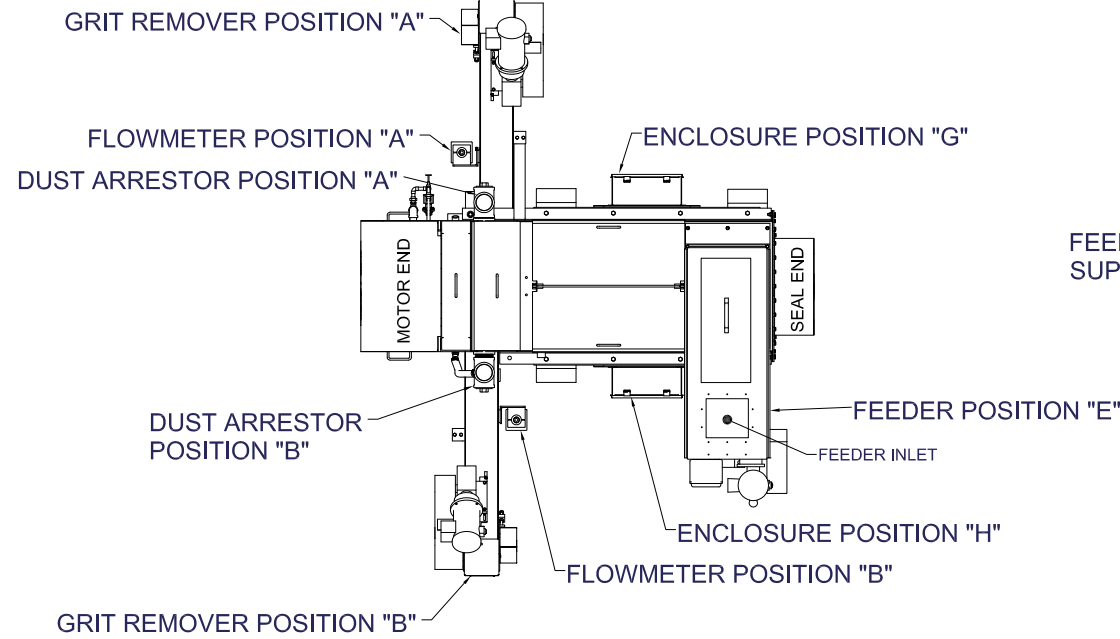
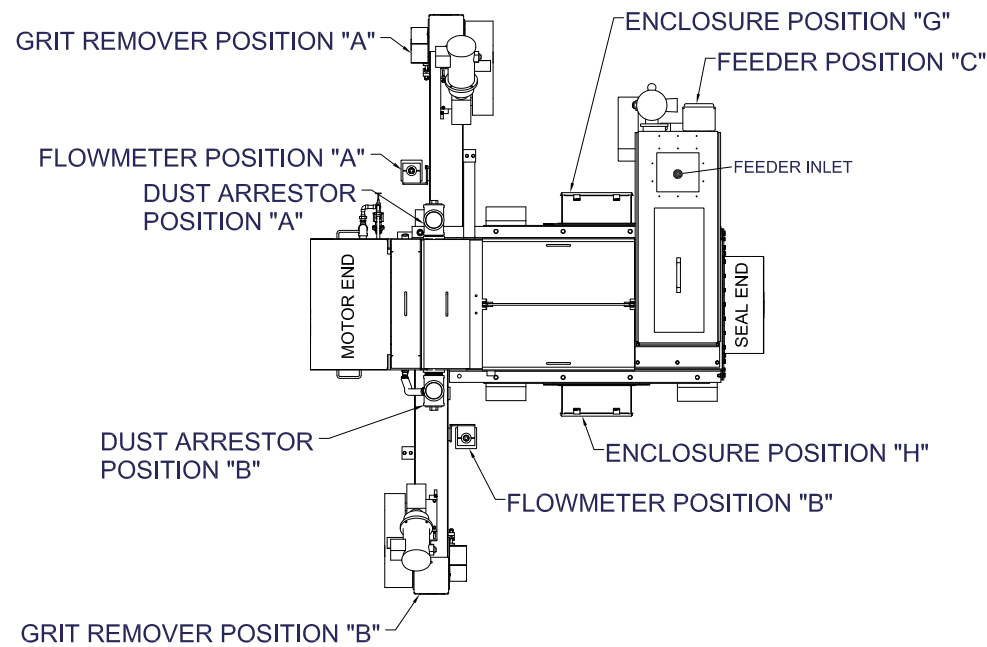
GENERAL ARRANGEMENT SELECTION, DRAWINGS, AND BROCHURES



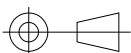
SLAKER SYSTEM COMPONENTS LOCATION GUIDELINES			
FEEDER LOCATION		C	
		D	
		E	
		F	
CONVEYOR GRIT REMOVER LOCATION	OPTION (#1)	A	
	DUST ARRESTOR	B	STANDARD
	WATER FLOW METER	A	STANDARD
CONVEYOR GRIT REMOVER LOCATION	OPTION (#2)	B	
	DUST ARRESTOR	A	STANDARD
	WATER FLOW METER	B	STANDARD
JUNCTION BOX LOCATION		G	
		H	

CUSTOMER TO SELECT:

- FEEDER
- CONVEYOR GRIT REMOVER & JUNCTION BOX LOCATION



THIRD ANGLE PROJECTION



ALL WELD SYMBOL DIMENSIONS ARE MINIMUM. DIMENSIONS IN [mm] ARE MILLIMETERS.

Company Confidential

DRAWN PER ASME Y14.5M UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE INCHES AND TOLERANCES TO BE AS FOLLOWS.

FABRICATION	MACHINE
.XX +/- .06	.XXX +/- .005
.X +/- .13	.XX +/- .01
[X +/- .25]	.X +/- .03
< +/- .5	[X +/- .05]

00 RELEASE FOR SALES USE

6/24/13

KAL

Rev 00

COMPANY CONFIDENTIAL

THIS DOCUMENT AND ALL INFORMATION CONTAINED HEREIN ARE THE PROPERTY OF INTEGRITY MUNICIPAL SERVICES AND/OR ITS AFFILIATES. THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN ARE PROPRIETARY TO INTEGRITY MUNICIPAL SERVICES AND ARE SUBMITTED IN CONFIDENCE. THEY ARE NOT TRANSFERABLE AND MUST BE USED ONLY FOR THE PURPOSE FOR WHICH THE DOCUMENT IS EXPRESSLY LOANED. THEY MUST NOT BE DISCLOSED, REPRODUCED, LOANED OR USED IN ANY OTHER MANNER WITHOUT THE EXPRESS WRITTEN CONSENT OF INTEGRITY MUNICIPAL SERVICES. IN NO EVENT SHALL THEY BE USED IN ANY MANNER DETRIMENTAL TO THE INTEREST OF INTEGRITY MUNICIPAL SERVICES. ALL PATENT RIGHTS ARE RESERVED. UPON THE DEMAND OF INTEGRITY MUNICIPAL SERVICES, THIS DOCUMENT, ALONG WITH ALL COPIES AND EXTRACTS, AND ALL RELATED NOTES AND ANALYSES, MUST BE RETURNED TO INTEGRITY MUNICIPAL SERVICES OR DESTROYED, AS INSTRUCTED BY INTEGRITY MUNICIPAL SERVICES. ACCEPTANCE OF THE DELIVERY OF THIS DOCUMENT CONSTITUTES AGREEMENT TO THESE TERMS AND CONDITIONS.

DESIGNER	DATE
KAL	6/12/2013
CHECKER	DATE
	6/24/2013
ENGINEER	DATE
KAL	6/24/2013
MANAGER	DATE
	6/24/2013
FILE:	
SCALE:	NONE

TITLE STANDARD GENERAL ARRANGEMENT SELECTION

CLIENT



500 E. WASHINGTON AVE., SUITE 80
ZEELAND, MI 49464, USA
TEL: 858-486-1620

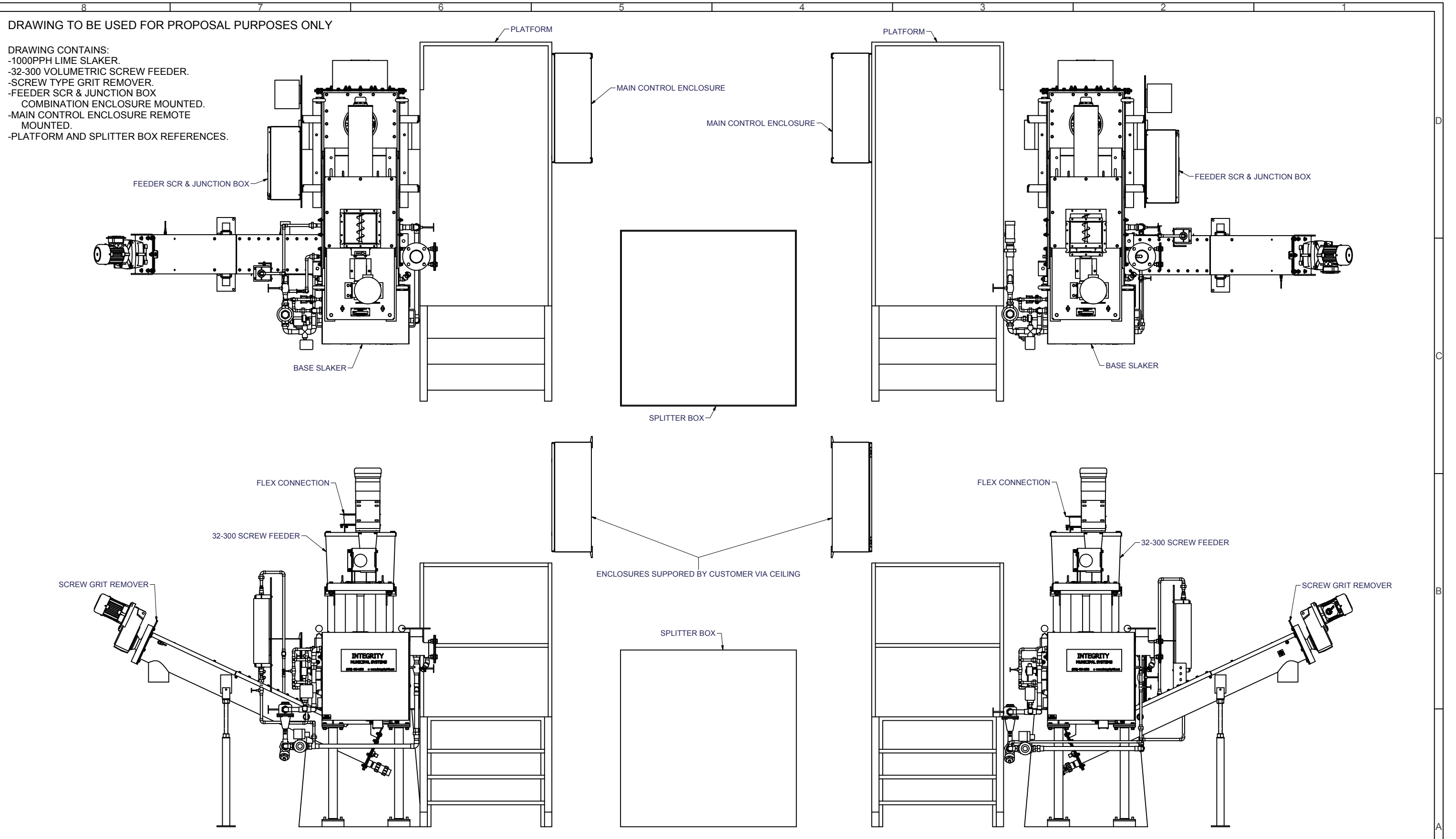
Page 13 of 27

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN	REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN

STD: BORDER-11X17M

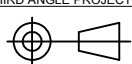
BAR = 1" AT PLOT SCALE

DRAWING F4038 SHEET 1 OF 1 REV 00



DRAWING TO BE USED FOR PROPOSAL PURPOSES ONLY

- DRAWING CONTAINS:
 -1000PPH LIME SLAKER.
 -32-300 VOLUMETRIC SCREW FEEDER.
 -SCREW TYPE GRIT REMOVER.
 -FEEDER SCR & JUNCTION BOX COMBINATION ENCLOSURE MOUNTED.
 -MAIN CONTROL ENCLOSURE REMOTE MOUNTED.
 -PLATFORM AND SPLITTER BOX REFERENCES.

THIRD ANGLE PROJECTION

 ALL WELD SYMBOL DIMENSIONS ARE MINIMUM. DIMENSIONS IN [mm] ARE MILLIMETERS. DO NOT SCALE DRAWING

DRAWN PER ASME Y14.5M UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE INCHES AND TOLERANCES TO BE AS FOLLOWS:

FABRICATION	MACHINE
.XX +/- .06	.XXX +/- .005
.X +/- .13	.XX +/- .01
[X +/- .25]	X +/- .03
< +/- .5	[X +/- .05]

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN	REV	DATE	DWN	CHKD	APVD	ECN
A	RELEASE FOR PROPOSAL PURPOSES	4/22/15	KAL									

COMPANY CONFIDENTIAL
 THIS DOCUMENT AND ALL INFORMATION CONTAINED HEREIN ARE THE PROPERTY OF INTEGRITY MUNICIPAL SYSTEMS AND/OR ITS AFFILIATES. THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN ARE PROPRIETARY TO INTEGRITY MUNICIPAL SYSTEMS AND ARE SUBMITTED IN CONFIDENCE. THEY ARE NOT TRANSFERABLE AND MUST BE USED ONLY FOR THE PURPOSE FOR WHICH THE DOCUMENT IS EXPRESSLY LOANED. THEY MUST NOT BE DISCLOSED, REPRODUCED, LOANED OR USED IN ANY OTHER MANNER WITHOUT THE EXPRESS WRITTEN CONSENT OF INTEGRITY MUNICIPAL SYSTEMS. IN NO EVENT SHALL THEY BE USED IN ANY MANNER DETRIMENTAL TO THE INTEREST OF INTEGRITY MUNICIPAL SYSTEMS. ALL PATENT RIGHTS ARE RESERVED. UPON THE DEMAND OF INTEGRITY MUNICIPAL SYSTEMS, THIS DOCUMENT, ALONG WITH ALL COPIES AND EXTRACTS, AND ALL RELATED NOTES AND ANALYSES, MUST BE RETURNED TO INTEGRITY MUNICIPAL SYSTEMS OR DESTROYED, AS INSTRUCTED BY INTEGRITY MUNICIPAL SYSTEMS. ACCEPTANCE OF THE DELIVERY OF THIS DOCUMENT CONSTITUTES AGREEMENT TO THESE TERMS AND CONDITIONS.

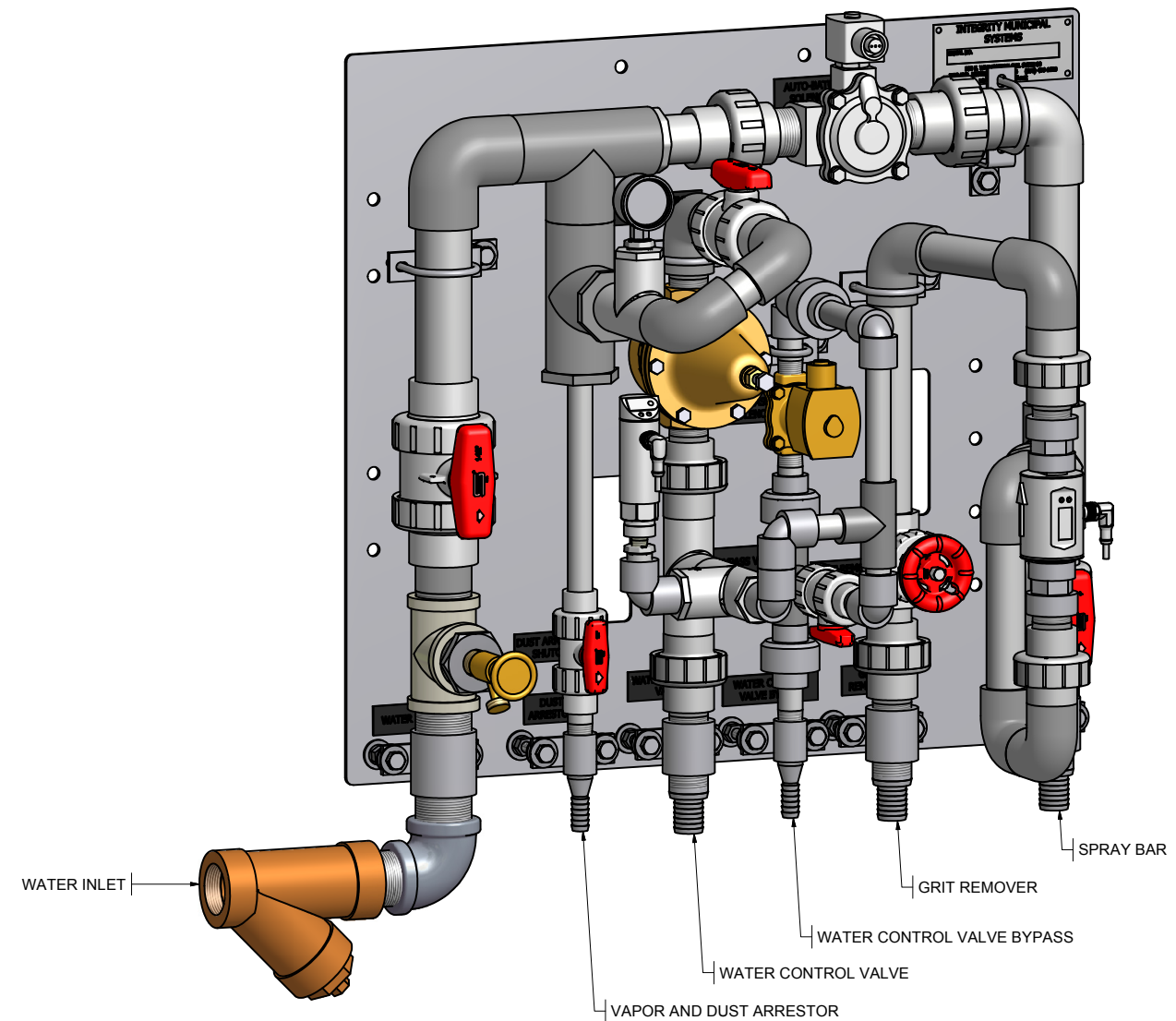
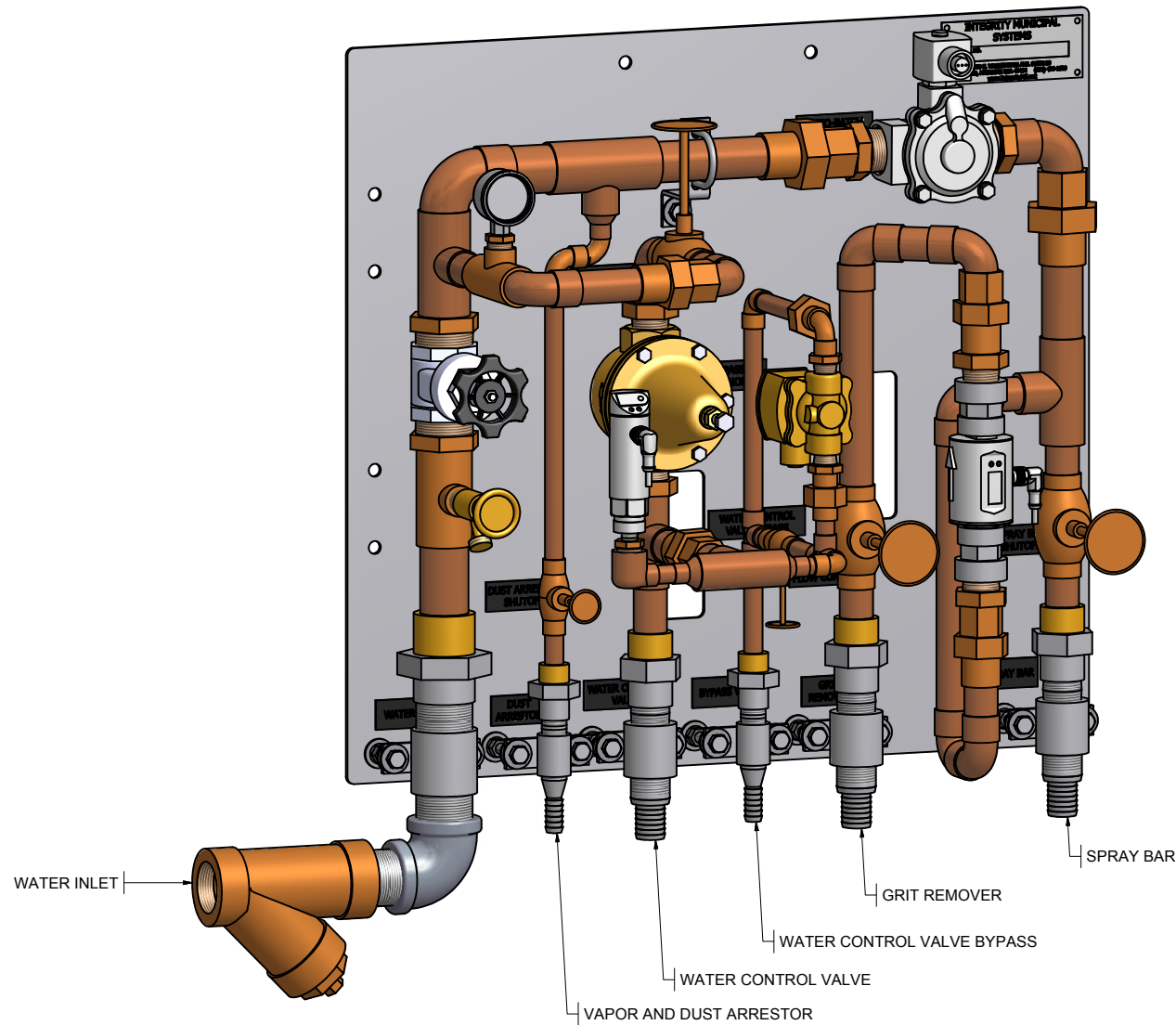
DESIGNER	DATE
KAL	4/22/2015
CHECKER	DATE
ENGINEER	DATE
MANAGER	DATE
FILE:	
SCALE:	NONE

TITLE	LIME SLAKER GENERAL ARRANGEMENT
CLIENT	HOLLYWOOD, FL
PROJECT	D15-017
CODE	
DRAWING	D15-017_G1
SHEET	1
OF	27
REV	
DATE	

Integrity MUNICIPAL SYSTEMS
 500 E. WASHINGTON AVE., SUITE 80
 ZEELAND, MI 49464, USA
 TEL: 858-486-1620

COPPER PIPE

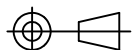
PVC PIPE



PATENT PENDING

PATENT PENDING

THIRD ANGLE PROJECTION



ALL WELD SYMBOL DIMENSIONS ARE MINIMUM. DIMENSIONS IN [mm] ARE MILLIMETERS. DO NOT SCALE DRAWING

DRAWN PER ASME Y14.5M UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE INCHES AND TOLERANCES TO BE AS FOLLOWS:
FABRICATION **MACHINE**
 .XX +/- .06 .XXX +/- .005
 .X +/- .13 .XX +/- .01
 [X +/- .25] X +/- .03
 < +/- .5 [X +/- .05]

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN	REV

COMPANY CONFIDENTIAL
 THIS DOCUMENT AND ALL INFORMATION CONTAINED HEREIN ARE THE PROPERTY OF INTEGRITY MUNICIPAL SYSTEMS AND/OR ITS AFFILIATES. THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN ARE PROPRIETARY TO INTEGRITY MUNICIPAL SYSTEMS AND ARE SUBMITTED IN CONFIDENCE. THEY ARE NOT TRANSFERABLE AND MUST BE USED ONLY FOR THE PURPOSE FOR WHICH THE DOCUMENT IS EXPRESSLY LOANED. THEY MUST NOT BE DISCLOSED, REPRODUCED, LOANED OR USED IN ANY OTHER MANNER WITHOUT THE EXPRESS WRITTEN CONSENT OF INTEGRITY MUNICIPAL SYSTEMS. IN NO EVENT SHALL THEY BE USED IN ANY MANNER DETRIMENTAL TO THE INTEREST OF INTEGRITY MUNICIPAL SYSTEMS. ALL PATENT RIGHTS ARE RESERVED. UPON THE DEMAND OF INTEGRITY MUNICIPAL SYSTEMS, THIS DOCUMENT, ALONG WITH ALL COPIES AND EXTRACTS, AND ALL RELATED NOTES AND ANALYSES, MUST BE RETURNED TO INTEGRITY MUNICIPAL SYSTEMS OR DESTROYED, AS INSTRUCTED BY INTEGRITY MUNICIPAL SYSTEMS. ACCEPTANCE OF THE DELIVERY OF THIS DOCUMENT CONSTITUTES AGREEMENT TO THESE TERMS AND CONDITIONS.

DESIGNER	DATE
KAL	12/18/2014
CHECKER	DATE
ENGINEER	DATE
MANAGER	DATE
FILE:	
SCALE:	

TITLE	WATER PANEL, 1-4K A758 COPPER & PVC; 120VAC		
CLIENT			
PROJECT	CODE	DRAWING	SHEET
	F4465	F4465	1 OF 1



NEW WATER PANEL DESIGN [PATENT-PENDING]

The new water panel design provides all water piping preassembled in a water panel that can be freestanding next to the slaker or remote-mounted.

Features & Advantages:

1. Minimized Installation Time:

With the water panel design, the water piping does not need to be re-assembled at the jobsite as is the case with the on-unit water supply piping, which requires disassembly for shipment to prevent damage during transit from the factory. The water panel design provides all water piping preassembled in a water panel that can be quickly installed and connected at the jobsite (One (1) water supply connection from water source and five (5) water connections from water panel to slaker [control valve, control valve bypass, spray bar, dust arrestor, and grit remover]).

2. Reduction of Equipment Manufacturing Lead Time:

The water panel can be assembled ahead of time (not at the same time as the slaker), reducing equipment lead time by up to 2-3 weeks.

3. Remote Installation of Water Panel (Option):

The water panel provides flexible installation configurations for different installation requirements and preferences. The water panel can be installed freestanding next to the slaker unit or remote-mounted.

4. Ease of Maintenance:

All parts are easily accessible on the water panel and are therefore easier to maintain.

5. Ease of Connections:

All water connections are in one area (on the water panel) - Much easier to connect.

6. Improved Slaker Access:

The removal of the water piping from the slaker and its relocation to the water panel, frees up space in front of the slaker, improving ease of slaker access, ease of maintenance, etc.

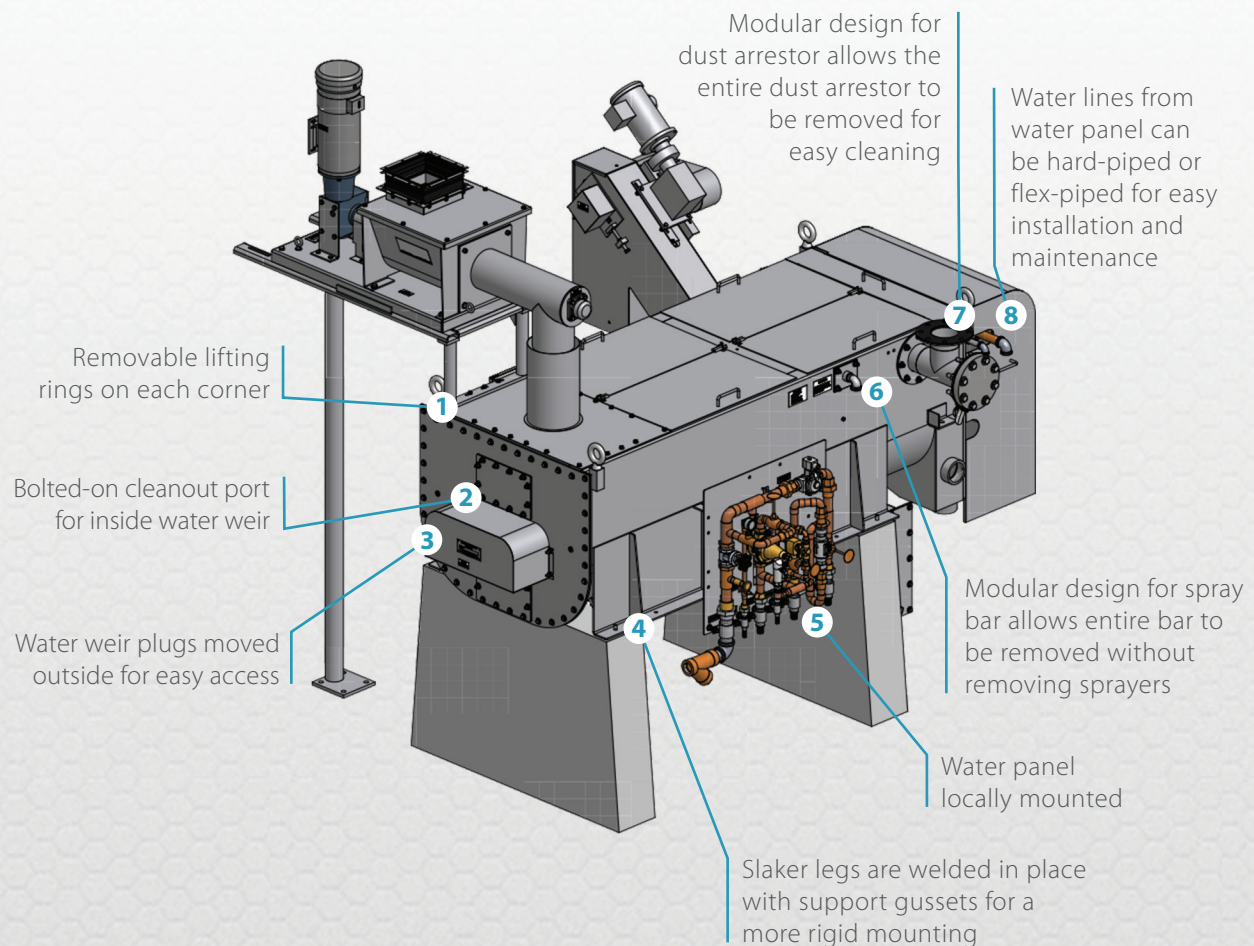
7. Design Repeatability and Consistency:

A more consistent product can be produced, which in turn results in high quality equipment.

8. Decreased Likelihood of Damage:

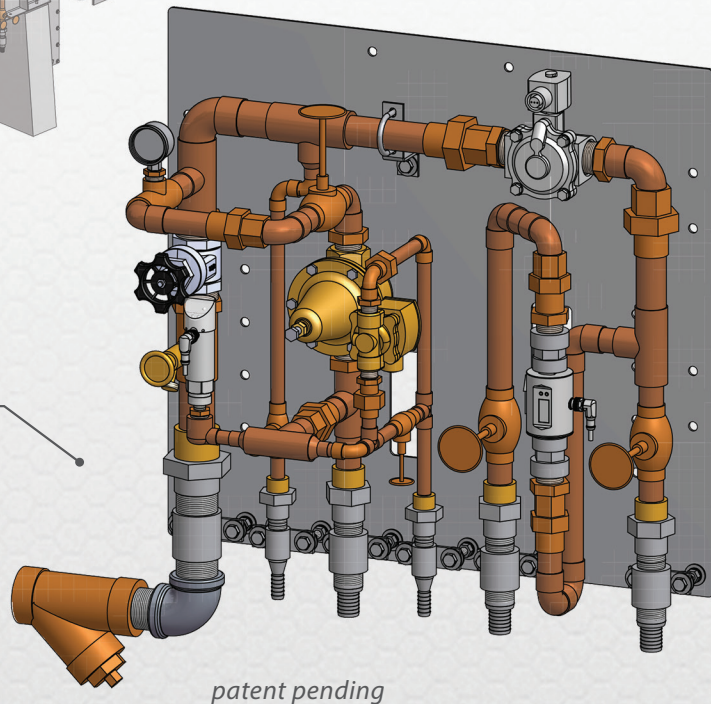
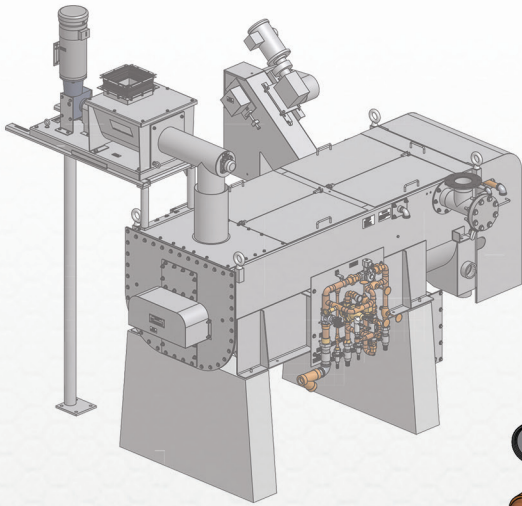
The water piping is less likely to be damaged during shipping and, more importantly, during operation due to the improved access for maintenance and increased space around the slaker and water panel.

INTRODUCING THE IMPROVED
A-758™ AND *A-758 PLUS™* LIME SLAKER:
EASIER. FASTER.
INNOVATIVE.



EASIER. FASTER. INNOVATIVE.

THE IMPROVED IMS LIME SLAKER



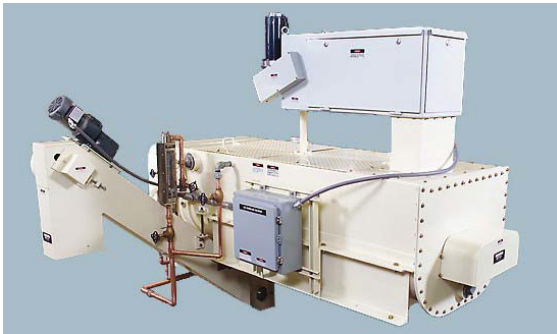
PRE-ASSEMBLED WATER PANEL

- Minimizes installation time
- Reduces manufacturing lead time
- Enables remote installation of water panel
- Makes maintenance easier
- Eases connection complexity
- Enhances slaker access
- Decreases risk of damage
- PVC or copper construction



Integrity Municipal Systems
13135 Danielson St, Suite 204 Poway, CA 92064
www.integrityms.net | **phone** (858) 486-1620 | **fax** (858) 486-1659

Lime is one of the most common and economical chemicals used in the water and wastewater treatment process. The cost of commercial bulk hydrated lime or prepared lime slurry solutions, however, becomes prohibitive for installations requiring a continuous, high volume supply, typically greater than 45 kgs/hr (100 lbs/hr). To help alleviate this cost, on-site slaking or hydration is the ideal solution. The Series A-758 lime slaker provides for reliable, efficient slaking of various grades of quicklime (CaO) at a substantial savings over other slaking methods. Through the pioneering use of paste-type slaking technology, the Series A-758 lime slaker consistently produces a more reactive lime slurry requiring less energy and less operator attention. The compact size and flexible configuration make this pre-engineered system ideal for new and retrofit installations.



FEATURES

Superior Paste-Slaking Process

Utilizing a 2:1 water-to-lime ratio, the A-758 unit slakes lime as paste which provides a number of benefits over the more traditional 4:1 water-to-lime or slurry slaking process. This includes less power, faster slaking, a smaller footprint and, most importantly, a more reactive lime slurry solution.

Saves Power

The 2:1 paste slaking process generates its own slaking heat from the hydration heat of reaction ($\text{CaO} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2 + \text{Heat}$ (490 btu/lb)). This avoids the need and expense of an external heat source, internal heat exchangers, and temperature control systems. Additionally, slow speed agitation requires one-half the horsepower of equivalent sized slurry slakers.

Fast Slaking

The low water-to-lime ratio and high self-generating heat of reaction completes the slaking process in approximately five minutes. This short retention time leads to efficient start-stop or batching operation and rapid changes in lime concentration when required.

Compact Size

The 2:1 slaking ratio and short retention time allows for a smaller slaking compartment without bulky insulation or any need for a water jacket. The A-758 lime slaker takes about 20% less floor space than other designs.

KEY BENEFITS

- Saves water, heat and power
- Economical and reliable on-site slaking
- Easy to install, unit is factory pre-tested
- Choice of final slurry concentration
- Flexible controls: manual, flow proportional, and automatic start-stop

More Reactive Hydrate Particles

The intense heat [$>82^\circ \text{C}$ (180°F)] generated by the 2:1 slaking ratio subjects the quicklime to steam penetration. The resulting internal pressure promotes the fracturing of the quicklime into smaller, highly reactive particles. This means more surface area for more efficient lime usage.

Controlled Consistency

An automatic, torque-actuated water inlet valve provides precise, continuous control of paste consistency and, therefore, the slaking process. Variations in lime quality and feed rate are quickly recognized and the optimum slaking rate is maintained, without operator intervention.

Integrated System Design

The pre-engineered A-758 lime slaker system is available with a broad range of capacities, capabilities and control options:

- Four different capacities from 450 to 3600 kgs/hr (1000 to 8000 lbs/hr)
- Specific gravity classification or screen-type grit removal technology
- Gravimetric or volumetric belt-type lime feeders or screw-type lime feeder
- PLC or relay logic controls with an optional automatic batching function

DESIGN AND OPERATION

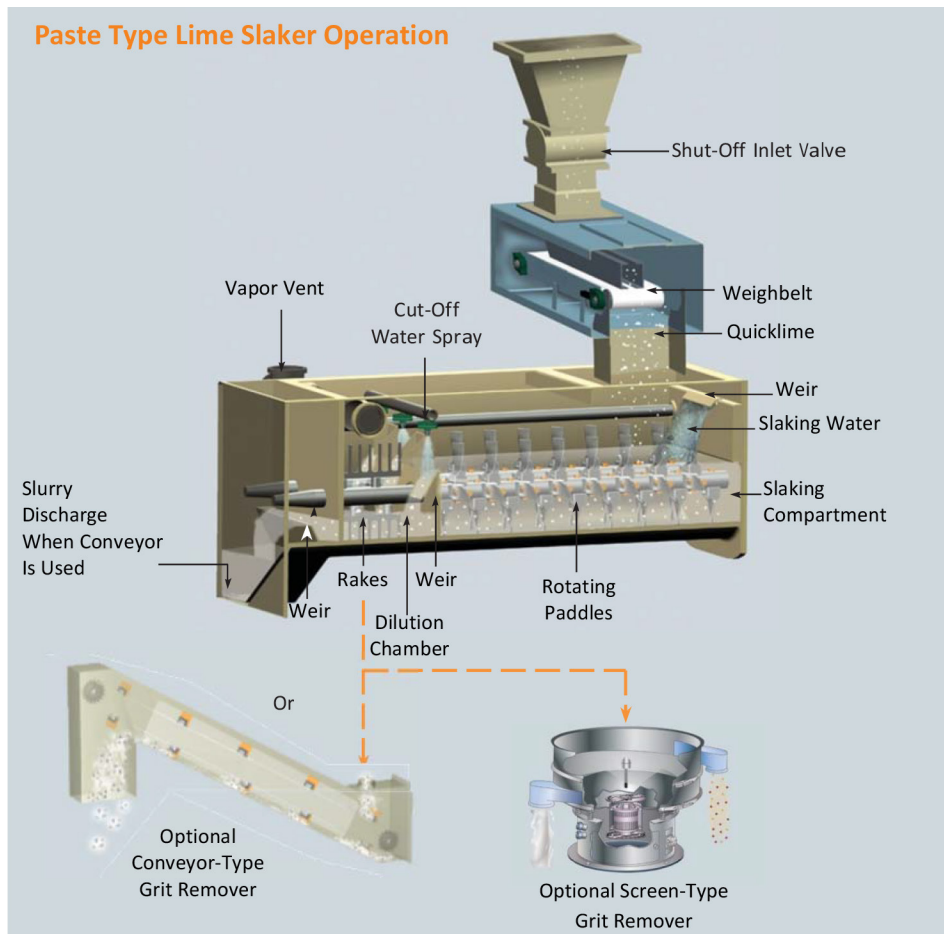
Water and quicklime (CaO) are fed into the slaker mixing compartment at an approximate 2:1 ratio. The lime is metered by either a gravimetric weighbelt feeder or a volumetric screw or belt-type feeder. Controlling the lime feedrate determines the output of the slaker system. The water flow is automatically controlled by a torque-sensitive water adjusting valve.

In the slaking compartment, two intermeshing paddle shafts, rotating in counter-clockwise directions, mix the quicklime and water into a paste-type composition, controlled by the torque valve to the 2:1 slaking ratio. Any variation in the paste consistency caused by vapor loss, lime quality or size fluctuations, or changes in the lime feed rate, results in a different torque load on the paddle shafts. This causes the torque valve to adjust the water flow to maintain the desired paste consistency.

The paste and entrained inert grit moves forward in a plug-flow fashion. After approximately 5 minutes, the completely slaked lime paste flows over a weir into the dilution compartment. Here water nozzles direct a cut-off spray to dilute the paste into a lime slurry at an approximate 4:1 concentration. This also releases the grit from the lime paste so that it can be removed. Two sets of rotating rakes keep the lime in suspension and help move the grit to the grit separator.

Dust and steam, generated by the exothermic reaction of the lime and water, are drawn off by an integral, water operated vapor-dust arrestor. The steam and dust are condensed and returned to the dilution compartment. Excess steam and water vapor are vented outside of the slaker.

A low water pressure switch in the torque valve piping is designed to stop the lime feeder when the supply pressure falls below the minimum operating requirement. This avoids heat build-up due to insufficient slaking water. The feeder automatically restarts when the pressure is restored.



CHOICE OF LIME FEEDERS

Reliable lime feed is required for proper operation of the lime slaker system. A selection of standard feeders is available to provide accurate CaO feed over a range of up to 20:1. This determines the operating range of the slaker along with lime reactivity.

Series 31-165 Gravimetric Weighbelt Feeder

A microprocessor controller unit that delivers an accuracy better than 1% of set rate over a 20:1 range. It features direct measurement of throughput for inventory control and complete alarm monitoring for any off-feed condition.



Series 32-215 Volumetric Belt-Type Feeder

Simple controls with a quick speed of response for changing feed rates. A no-feed alarm is available as an option.

Series 32-300 Volumetric Screw-Type Feeder

A rugged, heavy duty variable speed feeder with only five moving parts provides low maintenance and simple service.



CHOICE OF GRIT REMOVERS

All quicklime (CaO) contains a small amount of inert grit or unslaked material. To protect lime slurry pumps and piping, it is necessary to remove this grit as the slurry exits the slaker. The A-758 lime slaker is available with a choice of two different grit remover technologies:

Conveyor-Type Grit Remover

Grit particles are separated from the lime slurry based on their specific gravity. An up-flow of water is introduced into the dilution compartment of the slaker. The heavier grit particles fall through this flow to be subsequently removed by the chain and flight scraper. The operator can adjust the water flow to determine the size and amount of grit that is to be removed.



An accurate glass-tube flow meter is used to provide a fine degree of control and repeatability. This system removes virtually all grit down to 10 mesh in size and some portion of finer grit down to 40 mesh. Slurry concentrations up to 18% are achievable. Operation is simple and efficient with very low maintenance.

Screen-Type Grit Remover

In this system, grit particles are separated by size through a vibrating screen separator to provide positive grit removal. The lime slurry discharge passes through a 20 mesh screen (40 mesh optional), where grit is removed through an exit port. The slurry passes through the screen where it is delivered to the process or a stabilization tank. Slurry concentrations up to 20% are achievable. A high-strength slurry concentration, up to 28% at maximum feed rate, is available with this type of grit remover. This utilizes optional high velocity spray nozzles and a booster pump to decrease the amount of dilution water. This is ideal for installations where storage space is a consideration or in applications where excess water is limited in the process.



AUTOMATIC START-STOP CONTROL

The paste-type lime slaker is ideally suited for all types of control systems. In a continuous process, slaker operation remains constant. Lime slurry is continuously discharged while the lime feed rate can be varied to account for flow or process variations. Lime can be gravity flow, directly to the point of application without the need for costly slurry handling equipment. For batching applications, the slaker system can be automatically stopped and started from a single contact closure. The low water to lime ratio ensures a fast start-up to bring the slaker on line quickly. Both long-term (> 8 hours) and short-term (< 8 hours) shutdown modes are operator selectable.

TECHNICAL DATA

Capacities

450, 900, 1800, and 3600 kg of quicklime per hour (1000, 2000, 4000, and 8000 lbs/hr).

Operating Range

Up to 20:1

Slaking Ratio

Approximately 2:1 water to lime by weight before dilution.

Lime Feeder

Three types of feeders available: Series 31-165 Gravimetric weighbelt feeder; Series 32-215 Volumetric belt-type feeder; and/or Series 32-300 screw-type feeder.

Control Panel

For local or remote mounting. NEMA 12; 230/460 VAC, 3 ph, standard; 115 VAC, 1 ph, optional (not available with 3600 kg/hr (8000 lb/hr) capacity).

Paddle Shaft Mixer Motors

452 kgs/hr (1000 lbs/hr) capacity - 1/2 hp;
 900 kgs/hr (2000 lbs/hr) capacity - 1 hp;
 1800 kgs/hr (4000 lbs/hr) capacity - 1-1/2 hp;
 3600 kgs/hr (8000 lbs/hr) capacity - 2 hp;
 Standard is 230/460 VAC, 60 hz, 3 ph.
 Single phase motors are available up to 1800 kgs/hr (4000 lbs/hr).

Conveyor-Type Grit Remover Motors

1/4 hp, 230/460 VAC, 60 hz, 3 ph, totally enclosed. Also available in single phase up to 1800 kgs/hr (4000 lbs/hr) capacity units.

Screen-Type Grit Remover

450 kgs/hr (1000 lbs) slaker - 1/3 hp;
 900 and 1800 kgs/hr (2000 lbs & 4000 lbs/hr) slakers - 1/2 hp;
 3600 kgs/hr (8000 lbs) slaker - 2-1/2 hp;
 All motors are 230/460 VAC, 60 hz, 3 ph, 1200 RPM TENV.

Booster Pump Motors (High Slurry Concentration Option)

450 and 900 kgs/hr (1000 and 2000 lbs) slakers - 1/2 hp;
 1800 kgs/hr (4000 lbs) slakers - 1 1/2 hp;
 3600 kgs/hr (8000 lbs) slaker - 2 hp;
 All motors are 230/460 VAC, 50/60 hz, 3 ph, TE turbine, all bronze housing. Note: Only available with screen-type grit remover.

Water Requirements

Recommended supply pressure for 450 to 1800 kgs/hr (1000, to 4000 lbs/hr) slakers, 2.7 bar (40 psi) minimum and 5.2 bar (75 psi) maximum; for the 3600 kgs/hr (8000 lbs/hr) slaker, 3.8 bar (55 psi) minimum and 5.2 bar (75 psi) maximum.

Control options

- Manual speed control of feeder via a potentiometer on the control panel.
- Automatic speed control of the lime feeder via a 4-20 mA input signal.
- Automatic batching and automatic system shut-down via optional start-stop configuration.

Dimensions

Complete dimension details can be found in catalog numbers WT.330.100.100.UA.CN to WT.330.100.126.UA.CN.

Total Slaker System Water Input at 40 psi (2.7 bar)

Slaker Size		Conveyor-Type Grit Remover (max 18% slurry concentration)		Screen-Type Grit Remover (max 20% slurry concentration)		Screen-Type Grit Remover (max 28% slurry concentration)	
Kg/hr	lbs/hr	lpm	gpm	lpm	gpm	lpm	gpm
450	1,000	57	15	45	12	34	9
900	2,000	91	24	76	20	64	17
1800	4,000	178	47	148	39	125	33
3600	8,000	405	107	360	95	246	65

Shipping and Operating Weights

Includes slaker, grit remover and feeder.

Capacities		Shipping		Operating	
Kg/hr	lbs/hr	kgs	lbs	kgs	lbs
450	1,000	1,900	2,400	1,410	3,110
900	2,000	1,330	2,930	1,895	4,180
1800	4,000	1,640	3,620	2,660	5,860
3600	8,000	3,335	7,350	6,160	13,580

The Series 32-300 Screw Type Volumetric Feeders are designed for the demands of industrial-process applications. They meter dry and semi-dry powders and other free-flowing materials as well as pellets, flakes, chips, and other difficult materials with reliable accuracy and repeatability.

The heavy gauge steel construction stands up to the stress of long-running, high-volume bulk operations. Operation and control are simple and direct. There are only five moving parts. Power from the vertically mounted DC motor is transmitted through a right-angle gear reducer to the feed-screw shaft. A potentiometer on the SCR control sets the feed rate. Automatic control from an mA signal is available as an option. The compound feed screw comprises three screw elements welded to a heavy steel shaft. The interaction of the different-size-and-shape screw elements develops multi-level mixing of the process material. This produces a uniform material density and promotes complete filling of the feed-screw flights. Oversize sealed ball bearings support the one-piece, through-shaft at both ends. Interchangeable feed screws and discharge tubes, in six sizes, extend the versatile capabilities of these feeders. The standard 5- cubic foot hopper with steeply sloped sides is designed to promote an even flow of material to the feed screw.



KEY BENEFITS

- Heavy gauge construction
- Simple design
- Convenient controls and readouts
- Easy to maintain
- Smooth handling of difficult material flows

KEY ARRANGEMENTS

Model 32-300ST

This basic arrangement handles most dry materials, including powder, pellets, and flakes. Feed screw is available in 1", 1½", 2", 3", 4", and 6" sizes. Maximum feed rates range from 2.6 to 500 cubic feet per hour.

Model 32-300SP

This model is specifically designed for difficult-to-feed materials. The agitator and conditioner segments of the feed screw are larger and set out at a greater radius from the shaft to handle oversize and irregularly shaped particles. The area in the mixing trough has been increased to provide greater mechanical clearances. The discharge port is larger; there is no down-spout to impede the flow. Standard metering screws are available in 3", 4" and 6" sizes. Maximum feed rates range from 50 to 500 cubic feet per hour.

Model 32-300SN

This sanitary version of the basic Series 32-300 Feeder is designed specifically for applications in the food and pharmaceutical industries. All surfaces in contact with the process material are 304 stainless steel and polished to a No. 4 finish (316 stainless available on request). Welds are ground smooth and polished to avoid product build-up. Exterior metal surfaces are covered with a white (food grade) epoxy paint. A TEFE rear seal and white neoprene (food grade) gasketing are standard. Hand-secured clamps and turn-nuts allow easy disassembly for cleaning. The TENV DC motor is suited for wash-down maintenance. Feed screw is available in 1", 1½", 2", 3", 4" and 6" sizes. Maximum feed rates range from 2.6 to 500 cubic feet per hour.

FEATURES

Advanced Engineering Design

The compound feed screw operates on three levels to condition the material and provide a smooth flow. The agitator segment, turning in an orbit outside the metering screw, releases air captured in the material. The de-aerated material fills the spiral lights of the metering screw. The outermost, conditioner segment on the feed screw has a reverse pitch. The back-mixing effect prevents material jamming in the trough.



Versatile

Six screw sizes are available for capacities from 2.6 to 500 cubic feet per hour. The feeder can be controlled manually or by an mA signal. Basic feeder can process material at temperatures to 150° F: higher with optional TFE seal.

Reliable Performance

The simple, direct mechanical linkage has only five moving parts (drive, coupling, screw, and two bearings). Power from the vertically mounted DC motor is transmitted through a right-angle gear reducer. The feed screw is directly coupled to the gear reducer.

Structural Strength

Heavy gauge steel is used throughout. Feed-screw shaft is a single-piece through-shaft and is supported at both ends by sealed ball bearings. Agitator, conditioner, and metering screw segments are all welded to the shaft for strong unitized construction.

Simplified Control

Feeder controls are centralized in a NEMA 4 enclosure that can be mounted at the feeder or remote. Toggle switches set the operating mode. A potentiometer controls feed rate, and an optional analog meter provides readout of feed rate in percent of full scale.

DESIGN AND OPERATION

The Series 32-300 Volumetric Feeder is powered by an SCR-controlled DC motor. A gear reducer converts the high speed motor-shaft rotation to a low speed, high-torque drive for the feed-screw shaft. Sealed ball bearings support the single-piece through-shaft at both ends. The agitator-conditioner compound feed screw is contoured to produce uniform material density. The agitator segment moves through the material outside the metering screw loosening and freeing the particles for maximum deaeration. This allows material to flow around the metering screw. As the material progresses toward the feed tube, it thoroughly fills the spiral lights of the metering screw. The reverse pitch of the conditioner segment develops a back-mix action that prevents material from piling up in the forward section of the trough. This eliminates dead pockets of material. The interaction of the large-diameter-outrigger segments conditions the material and avoids bridging. The standard hopper has a capacity of five cubic feet and steeply sloped sides for good material flow to the feed screw. A pneumatic-hopper vibrator is available for materials with poor flow characteristics. All controls are housed in a NEMA 4 enclosure that can be mounted on the feeder or remote. A potentiometer enables accurate pre-setting

of the feed rate and excellent repeatability. An optional arrangement with an analog-speed-readout meter is available. Arrangements that accept a 1-5, 4-20, or 10-50 mA control signal have a second potentiometer for trimming the mA signal to the desired feed rate.

Control Arrangements

The basic manual SCR-control arrangement has a three-digit speed-adjust potentiometer for controlling the feed rate. Pushbuttons set the percent of maximum speed at which the motor is to operate. A toggle switch starts and stops the feeder. An arrangement with an analog-percent-readout meter is available. In the automatic arrangement, the feed rate is controlled by an mA input signal. A potentiometer trims the input signal to produce the desired speed rate. Speed-readout meter is standard with the automatic mA arrangement. This arrangement also has a speed-adjust potentiometer and can be operated in manual or remote mA mode. All SCR-control arrangements are available in optional versions which are Factory Manual approved as dust-ignition-proof* for Class II, Divisions 1 and 2, Groups E, F, and G, and Class III, Division 1 hazardous locations, as defined by Article 500 National Electrical Code.

Hoppering

An optional hopper section with a 1.5-cubic-foot capacity can replace the basic hopper to provide interface with the line of hoppers and accessories. These include converging, loading, extension, and storage hoppers in square or cylindrical shapes, and in a variety of sizes. They are offered in a choice of floor-above-supported or feeder-supported configurations. Dust collectors are available in different sizes, floor-mounted or feeder-supported. Bag loaders come in 1-bag and 2-bag models. Other accessories include screens, covers, shut-off gates, flexible connections, and installation hardware. A plate adapts dust collectors and bag loaders to cylindrical hoppers of various diameters (2, 3, or 4 ft.).

APPLICATIONS

Continuous Feeding

Feeding of one or more bulk materials, by volume, at a controlled feed rate. Feed rate is set as a percent of full scale and can be controlled by a remote-process signal.

Continuous Proportioning

Feeding of two or more bulk materials, by volume, at controlled feed rates set in proportion to a specified master ingredient or control feeding by volume of two or more bulk materials in proportions set at the feeders for overall-formula requirements. Alternately, several feeder outputs can be controlled using a master set station which provides a common rate-signal. Each feeder will feed at a ratio pre-set at this station.

Batching

Controlled feeding of one or more bulk materials for repeat production of preset lot quantities. Feed rates are set at the feeders as a percent of full scale. Batch size can be determined by feeder-on time as preset on a timer or by a signal from a controller that automatically shuts off the feeders when a specified condition (weight, level, etc.) has been achieved.

Industry Applications

- Proportioning of virgin PVC pellets, color, resin, and regrind material into plastics extrusion processes
- Feeding bentonite and sand in foundry mold production
- Feeding crushed limestone into fluidized-bed-combustion processes
- Feeding of organic powders in pharmaceutical manufacturing
- Feeding of powered clay and pigments in the production of tile and brick
- Batching milk powder and salt in the production of cream cheese
- Feeding of spice premix in processed food production
- Feeding of diatomaceous earth as an oil filter aid in the cold-roll aluminum sheet rolling process

Short Description

This feeder is a Series 32-300 Screw-Type Volumetric Feeder with electric-variable-speed control. Full scale capacity is 2.6 to 500 cubic feet per hour depending on feed-screw size. Operating range is 20:1. The feeder consists of an SCR variable-speed drive in NEMA 4 enclosure; DC motor; right-angle speed-reducer gear box; a three-element compound feed screw; a 5-cubic foot hopper; a mixing trough and a discharge tube extension. A steel base supports the feeder and all components. SCR-control arrangements can be local manual, remote manual, start-stop, or automatic mA. Speed readout is available with start-stop and automatic arrangements. A three-digit pushbutton potentiometer adjusts motor speed. With the automatic mA arrangement, the feed rate is controlled by a 1-5, 4-20, or 10-50 mA DC process-control input. A panel-mounted potentiometer trims the signal to a percent of maximum to produce the speed-rate required. The walls of the hopper are steeply sloped and a pneumatic vibrator is available. Feeder and hopper are heavy gauge steel construction. In the sanitary arrangement, surfaces in contact with the process material are 304 stainless steel (optional 316 SS is available) polished to a #4 finish: food-grade white neoprene gaskets and TFE rear seal are standard. Feed screws are available in 1", 1-1/2", 2", 3", 4", and 6" sizes for the standard and sanitary models, 3", 4", and 6" sizes for the model for difficult-to-feed materials. A 1.5-cubic-foot hopper is available for interfacing with standard hopping equipment.

TECHNICAL DATA

Accuracy

With uniform free-flowing materials, accuracies of 1% to 2% of full scale can be achieved. It must be realized, however, that with material delivery controlled on a basis of volume, many factors apply: Material flowability, density at the feed screw, hopper size and shape are only a few of the factors which determine accuracy. Actual accuracy can be established only by running sample material tests.

Capacity

2.6; 7; 17; 50; 150; and 500 cubic feet per hour.

Maximum Temperature

Ambient, 120° F; process material, 150° F standard or 250° F with optional TFE seal.

Process-Control Output

1-5, 4-20, or 10-50 mA DC.

Input Impedance

Maximum is 100 ohms for 10-50 mA, 270 ohms for 4-20 mA and 1,000 ohms for 1-5 mA.

Motors

TENV, ¾ hp, 1 hp, 1½ hp (an explosion-proof* UL Listed motor and tachometer are available for use in Class I, Divisions 1 and 2, Group D and Class II, Divisions 1 and 2, Groups F and G hazardous locations).

Control Arrangements

- Manual
- Remote manual
- Start-stop
- Automatic from mA process signal

Housing

SCR drive and controls are in a NEMA 4 housing, can be feeder-mounted or remote.

Options

Extended-length feed screws and discharge tubes, 316 stainless steel construction, a tachometer-generator with meter calibrated in percent of maximum for feedrate readout, 2-cubic-foot hoppers, pneumatic-vibrating hopper trough covers to interface with live-bottom bins. TFE seals for material temperatures to 250° F, UL Listed motors and tachometers, a 1.5 cubic-foot section to interface with hoppers in many sizes and variations as described on page 4.

Continuous Operating Range

20:1

Weight (Shipping Weight)

300 lb. to (400 lb)

*As defined by Article 500 National Electrical Code



Integrity Municipal Systems (IMS) is a specialty engineering company devoted to the design and supply of innovative, pre-assembled, process solutions for the water and wastewater industry. With over 25 years of systems engineering innovation and project execution, the IMS team has the knowledge and dedication to tackle your odor control and chemical feed needs. IMS has achieved a reputation for producing unique, practical, and cost-effective solutions for our customers. We are committed to providing quality, service, and overall value that exceed your expectations.

Lime Slaker Systems (A-758 & A-758 Plus)



The A-758 and A-758 Plus IMS Lime Slaker Systems provide continuous high volume lime slurries (up to 8,000 lbs/hour) for industrial and municipal process pH adjustment, flocculation, and chemical reaction. The superior paste-type slaking technology consistently produces a higher strength and more reactive lime slurry resulting in more efficient and more economical use of the quicklime. Systems are factory assembled and tested for quick and easy installation, and include options for lime feed and grit removal.

Lime Slaker Feeders



Series 31-165 Gravimetric Feeder



Series 32-215 Volumetric Feeder



Series 32-300 Volumetric Feeder

Chemical Feed Systems

IMS chemical feed systems are pre-assembled, fully-functional chemical delivery systems for water treatment applications. These compact, user-friendly chemical skids include local storage tanks, full secondary containment, dosing pumps, instrumentation and controls. Systems are piped and wired at the factory for easy and quick hook-up.



Fluoride Feed System

IMS Fluoride Feed Systems use sodium fluoride for community water fluoridation. They are designed with separate saturator and solution tanks, unlike conventional methods, to assure complete saturation, high reliability, low maintenance and ease of use.



Aqueous Ammonia Feed System

IMS packaged Aqueous Ammonia Feed Systems are used in the formation of chloramines for disinfection. The system includes a heavy-duty pressure rated aqueous ammonia storage tank, integral ammonia fume scrubber, peristaltic dosing pump, instrumentation and controls in a fully contained, pre-assembled skid. Optional enclosure, shown right, is ideal for outdoor or remote locations. The FRP shelter houses the equipment in an air conditioned environment and comes complete with lighting, ventilation fan, and breaker panel.



Odor Control Systems

Standardized, pre-engineered, factory assembled odor control systems for treating odors at sewage pump stations and wastewater treatment plants. Systems are simple to install, reducing installed cost and delivery time.



Biological Odor Control Systems

The I-BOx™ Biological Odor Control System (Patent Pending) uses a two-stage process with a biological stage to remove 99% of the hydrogen sulfide (H₂S), followed by an activated carbon polishing stage to remove residual H₂S and organic odors. Standard models are available to treat up to 5,000 cfm (8,500 m³/h) of odorous air.

Carbon Odor Control Systems

The carbon adsorber odor control systems consist of an exhaust fan, damper, interconnecting ductwork, vessel with activated carbon (3 ft. bed) and a control panel. The carbon odor control systems are designed to work with a wide selection of media: virgin activated carbon for low odor level, and high capacity carbon for higher H₂S concentrations.



MCS Carbon Odor Control System

- Standard models are available to treat up to 1,400 cfm (2400 m³/h) of odorous air in a single carbon stage.



BCS Carbon Odor Control System

- Standard models treat up to 6,800 cfm (11600 m³/h) in a single carbon stage and up to 20,000 cfm (34000 m³/h) in a dual carbon bed system.

Emergency Chlorine Scrubbers

IMS wet emergency chlorine scrubber systems contain and treat accidental releases of chlorine gas, limiting the atmospheric release of chlorine to less than 1 ppm. The compact scrubber systems are factory pre-assembled, piped, wired and tested, with a low profile suitable for either indoor or outdoor installation. The system design surpasses the requirements of the Uniform Fire Code.



EVS-150

This multi-stage wet scrubber system treats chlorine vapors from a bank of 150lb (70kg) chlorine cylinders, at leak rates of 28 lbs/min or more.



EVS-2000

This multi-stage wet scrubber system treats up to 3-Ton of chlorine vapor, at leak rates of 100 lbs/min or more.

EVS-2000C

The EVS-2000C emergency chlorine scrubber is a multi-stage wet scrubber system designed to treat up to 1-Ton of chlorine vapor, at leak rates of 100 lbs/min or more.