Weaver
CONSTRUCTION MANAGEMENT
3679 S Huron Street, Suite 404 Englewood, Colorado 80110
Phone: (303) 789-4111 FAX: (303) 789-4310

SUBMITTAL TRANSMITAL

September 07, 2012
WCM Submittal No: 11160-001

PROJECT: **Harold Thompson Regional WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **Boyer & Seeley, Inc.**
5600 Greenwood Plaza Blvd., #160
Greenwood Village, CO 80111
303-232-3907 Craig Garrett
craig@boyerseeley.com

SUBJECT: Submittal for Aeration Basin Mixers & Hoists

SPEC SECTION: 11160 – Aeration Basin Mixers

PREVIOUS SUBMISSION DATES:

DEVIATIONS FROM SPEC: ___ YES _X_ NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver Construction Management and, unless indicated otherwise, has been found to be in conformance with the intent of the contract documents.

Contractor's Stamp:	Engineer's Stamp:
Date: 9/7/12 Reviewed by: John Jacob ( ) Reviewed Without Comments (X) Reviewed With Comments	

ENGINEER'S COMMENTS:_____

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FX 303-789-4310 Englewood, Colorado 80110

Project: HDTWRF **Submittal No.: 11160-001**

Location: Fountain, CO

Supplier: Boyer Seeley

Date: 9/7/12

Submittal 11160-001 Aeration Basin Mixers and Hoists

Additional Submittal Review Comments:

1. **It appears Boyer Seeley did not include the responses to questions 1 to 10 in the Mixer Mast/SRP Guide Rail Inquiry Form, attached. Boyer Seeley shall incorporate all responses in a re-submittal.**
2. **The Memorandum list model AMG 150.73.354 while the submittal references model 150.29.408.6.1P. Also refer to Grundfos Inquiry Form question and response #1. Boyer Seeley shall confirm that the submitted mixer model is an equal to the one listed in the Memorandum.**
3. **Memorandum dated 7/23/12 minimum mixer pumping capacity 1,200 GPM. Please confirm minimum pumping capacity. One of the cut sheets in the submittal references Primary Flow GPM 11,782.**
4. **Memorandum dated 7/23/12 requires each mixer have a NEMA 3R disconnect for mounting to the handrail. The submittal includes drawing Mixer-2_ABB Titled 5 HP Mixer Controller Detail. The proposed mixers are 15 HP. Please ensure the HP rating for each panel is properly sized for a 15 HP motor. Connection of the panel to the handrail by Electrical Subcontractor.**
5. **The submittal contains a cut sheet labeled Series M Mixer Mast which appears to be a general diagram of a mast and does not appear to be applicable to this project. Boyer Seeley to confirm.**
6. **Regarding sheet labeled Series M Stainless Steel Mixer Mast Assembly Quantity 10. The drawing shows the upper extension at or near the top of the wall. Referring to Sheet 1/AB-13 provided in the Memorandum, the air pipe and walkway may interfere with the upper extensions at the 10 locations. WCM suggest lowering the upper arm extensions at least 6 to 8 inches below top of wall to avoid any conflict. Input request by GMS. Also, the pivot point of the extension is 22" from the wall. At this distance the pivot point would be 'under' the 12 inch air header. WCM does not see an issue with this. GMS to confirm.**
7. **Regarding sheet labeled Series DM Fixed Reach Portable Hoist. The hoist length is 60 inches plus 6 ½ inches of mast per the mast assembly sheets equals a total of 66 ½ inches. The hand rail is 42 inches tall leaving 24 1 /2 inches to maneuver the mixer over the handrail. It appears based on the AMG Gear Drive**

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Mixer Data Sheet that the longest length of the mixer is 18 1/16 inches which will allow the mixer to fit over the rail.

8. **Boyer Seeley shall provide a lever arm to allow for full rotation of the column. This information is not mentioned in the submittal.**
9. **The submittal includes information about Warranty. The Warranty is per the executed Purchase Agreement between WCM and Boyer Seeley.**
10. **Boyer Seeley has requested the following clarification from GMS. Clarify if the requirement for a soft start in the control is needed. Boyer Seeley does not need this and for a 15 Hp mixer this would be very unusual. Please note this clarification. If absolutely required - go to the control for the AFG.**

End of Review

MIXER MAST / SRP GUIDE RAIL INQUIRY FORM

To effectively provide accurate submittal drawings for Mixer, SPR, and mixer mast installations, please complete the following questions. In addition, please provide a sectional drawing detail of the location where the mixer / SRP will be installed.

1. **Project Name:** Harold D. Thompson *Regional* WRF – Weaver Construction Management

2. **Mixer / SRP Models (s):** AMG.150.29.408.6.1P *Is this an equivalent to the model AMG.150.73.354 specified in the Mixer Memorandum dated 07-23-12? Is the second number the propeller diameter? If so, " .29." is less than half the specified ".73", will the flow generated by these two be similar or not?*

3. **Quantity:** 12 *12 mixers, 12 masts, see question no. 10 for hoists*

4. **Mixer locations(s) – this facilitates tagging of the submittal drawings for individual masts at specific locations:** ____per sheet AB-11_____ *I have added tag nos. to the mixers to AB-11, see attached*

5. **Overall tank depth / top of walkway surface to basin floor:** *[*Top of walkway is 5413.38 per sheet 1/AB-13*] – YES [*and top of concrete slope is 5386.41 per sheet 1/AB-13.*] – NO, a-basin floor slope = 0.50% from West to East. Basin floor elev. = 5386.20 (West end), = 5385.41 (East end)*_____

6. **Will the upper mast / guide rail bracket be mounted to a concrete deck or metal walkway:** *Neither.* Attach to concrete wall per sheet 1/AB-13. Supports shall be designed by mixer manufacture as per the notes on sheet 1/AB-13._____

BE > THINK > INNOVATE >

Tim Tressler * 372 Charlton Lane - Tappahannock, VA 22560
Phone: 630-536-7288 Email: TTressler@Grundfos.com

7. **If applicable, what is the offset or overhang dimension. This is the difference between the surface where the upper bracket will be mounted and the tank wall below the overhang:** ***There will be no overhang since the upper bracket must mount to the inside face of basin wall below the walkway. Edge of walkway will overhang inside face of basin wall by 6" and edge of support angles under walkway will overhang inside face of basin wall by 12". However, neither of these items can be used for attachment of a mixer/mast support.***

8. **Will the mast / guide rail be mounted in an open tank or below an access cover:** __**Open**_____

9. **Specify if the mast / guide rail is to be Type 304 or Type 316 SS:** **304**

10. **Are hoists required?** **Yes** **If so how many:** **12** ***If all masts AND hoists are fixed units then 12 hoists will be required. If the masts are fixed in place and a removable or portable hoist can be furnished, then only one hoist can be supplied and the operators will move it into the different locations as necessary.***

BE > THINK > INNOVATE >

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Phone: 630-536-7288 Email: TTressler@Grundfos.com

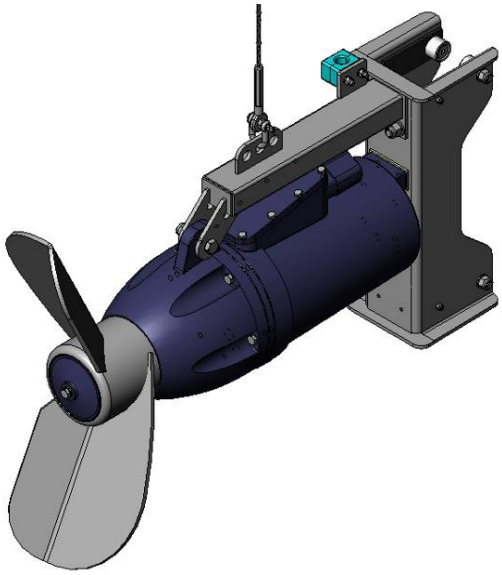
SUBMITTAL DOCUMENTATION

Submersible Gear Drive Mixers

SERIES	TYPE/SIZE	MOTOR	MATERIAL	PROPELLER
AMG	150.29.408.6.1P	15 Hp, 1750 rpm	CI/SS	316 SS / 408 rpm

MANUFACTURER

GRUNDFOS
3905 Enterprise Court
Aurora, IL 60598-0620
Phone (630) 236-5500
Fax (630) 236-5511



AMG DETAILED SCOPE OF SUPPLY DATA SHEET

GRUNDFOS

REPRESENTATIVE	**Boyer & Seeley Pumps & Process, Inc.**		
LOCATION	**Denver**		
PROJECT NAME	**Lower Fountain MSDD**	**EQUIPMENT TAG:**	**Proj. 9103, Cost Code: 11060**
		SERVICE:	**Aeration Basin Mixers**

SUBMERSIBLE MIXER

Type:	**AMG.150.29.408.6.1P**	To Include:	12) Mixers Mast Assemblies as Detailed Below
Quantity:	12		12) Interface Controls as detailed in Submittals

OPERATING DATA

Propeller Speed	**408**	RPM	Thrust to Power Ratio	**0.233**	
BHp Required	**12.7**	Hp	Axial Force	**593.5**	lbs. Force
Number of Blades	**2**		Nominal Flow	**11782**	GPM *per ISO 21630
Rated Motor Power:	**15**	Hp	Blade Angle	**16.7**	Degrees
Propeller Diameter	**28-5/8**	Inches			

MIXER MATERIALS

Motor Housing:	**A48 Class 40B**
Propeller Shaft:	**Type 316 SS**
Type Mech. Seal :	**TC/TC**
Orings.:	**NBR**
Propeller	**304 SS**
Reduction Gear Type:	**1 Stage Planetary**
Guide Bracket	**304 SS**

MIXER MAST MATERIALS

Hoist:	**Type 304 SS**
Lifting Cable:	**Type 316 SS**
Mast Assembly Complete:	**Type 304 SS**
Winch:	**Marine Grade**

MOTOR VERSION

Tension:	**460**	Volts	Explosion proof:	**No**	
Frequency:	**60**	Hz	Moisture Sensor In Oil	**Yes**	
Starting Mode:	**DOL**		Cable Entry:	**Sealed**	
Protection Class:	**IP 68**		Cable Length:	**50**	ft
Insulation Class:	**H**		Cable Type:	**CPE Rubber**	
Th. Mot. Protection:	**3 - Bi-Metals**				
Nominal Speed:	**1740**	rpm			
Full Load Amps	**21.5**	A			

OTHERS

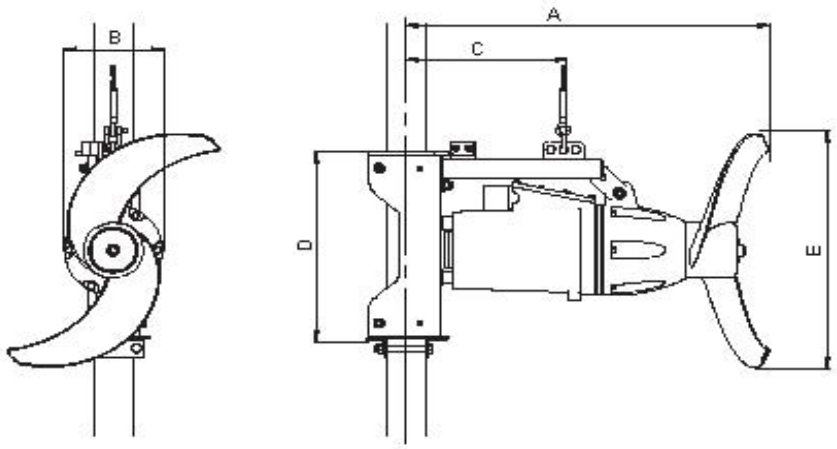
Documentation:	**1-fold by mail / English**	Hydrostatic Test:	**not req'd**
	O&M Manual, Parts List	Performance Tests:	**None**
		Test Standard:	**ANSI / ISO 21630**

Other Options:

SUBMITTAL DOCUMENT	**Project**	**Lower Fountain MSDD**
GRUNDFOS	**Location**	**Denver**
	Project Number	**1000624660**
	Date	**9/25/2012**

AMG GEAR DRIVE MIXER DATA SHEET

AMG.150.29.408.6.1P



DIMENSIONS - Inches

A	B	C	D	E	* Net Weight
39-7/8	10-9/16	16-7/8	18-1/16	28-5/8	390

* - lbs. includes mixer, motor bracket, 30 ft. power/control cable

PHYSICAL DATA

Motor rpm	Propeller rpm	Axial Thrust lbs. Force	Axial Thrust N	Max Install Depth	*Primary Flow GPM	Mean Flow Velocity ft./sec.
1740	408	593.5	2640	65 ft.	11782	5.84

*Note: Flow Data Ascertained per ISO 21630 Standards
Other Methodology Available on Request

ELECTRICAL DATA

Rated Hp	Input Hp	Shaft Hp	Voltage	FLA	Start Amps	Power Factor
15	15.1	12.7	460	21.5	115	0.81

MATERIALS

Motor Housing	Propeller	Seals	Fasteners	Mounting Bracket	Motor Shaft	Propeller Shaft
CI 40B	316 SS	SIC/SIC	316 SS	316 SS	AISI 4820	316 SS

Shafts

AMD, AMG and AFG motor and gear shafts are made of stainless steel. See table below.

Shaft	AMD		AMG, AFG	
	DIN	AISI	DIN	AISI
Motor	1.4401	316	1.7147	5120
Gear	1.4401	316	1.5713	3115

Propeller

For the number of propeller blades on the various types of mixers and flowmakers, see section *Technical data*, page 46.

Power supply cables

The specific cable can be found in the tables in section *Technical data*, page 46.

Cable type	Dimension	Outer diameter [Inches]
Standard		
S1BN8-F 11G1.5	11 x 1.5 mm^2	3/4
S1BN8-F 11G2.5	11 x 2.5 mm^2	7/8
H07RN-F 7G4 + 4 x 1	7 x 4 mm^2 + 4 x 1 mm^2	7/8
Biogas		
Power supply cable Lapp Ölflex FD Robust	7 x 4 mm^2 + 4 x 1.5 mm^2	7/8
Screened cable		
H07RC4N8-F 7G4 + 4 x 1	7 x 4 mm^2 + 4 x 1 mm^2	15/16

Cable entry

Elastomer 70 Shore-hardness.

Sensors

As standard, the pump is supplied with the following:

- For AMD & AMG three bi-metallic thermal switches (PTO), one in each motor winding
- one water-in-oil sensor

Wiring diagrams

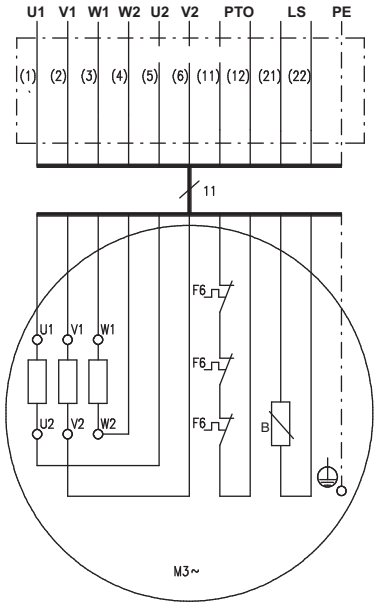


Fig. 7Wiring diagram for AMD & AMG

Terminals	Description
1, 2, 3, 4, 5, 6	Ends of the three stator windings (U1, U2, V1, V2, W1, W2)
11, 12	Thermal switches (F6)
21, 22	Leak sensor in gearbox (B) See section *Water-in-oil sensor*, page 9.

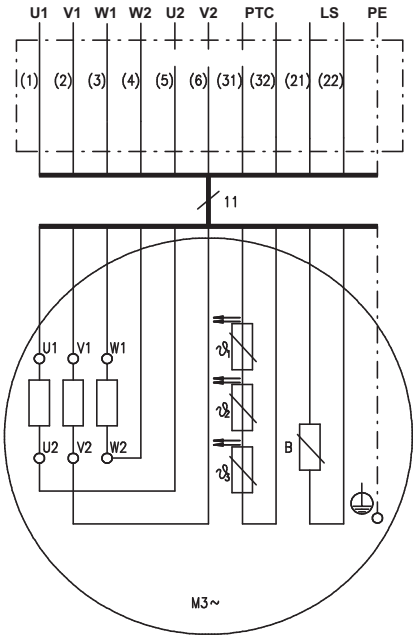
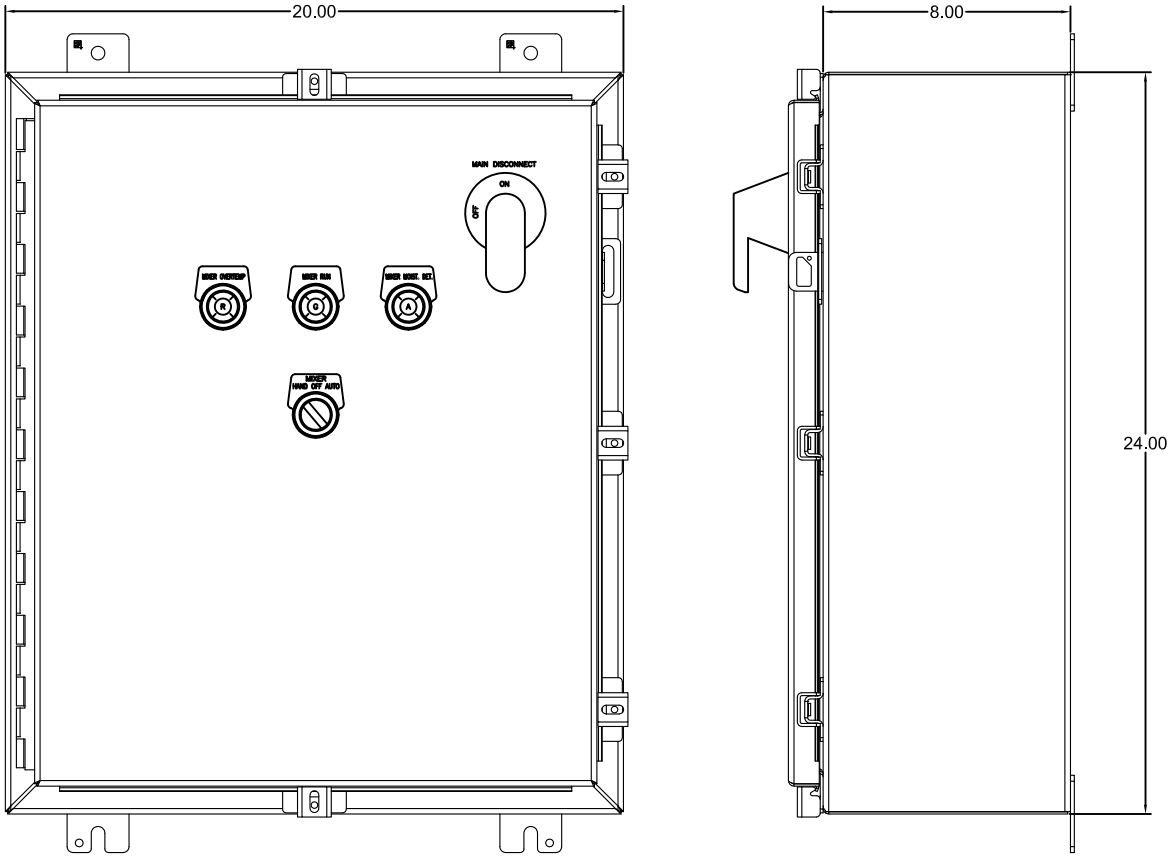
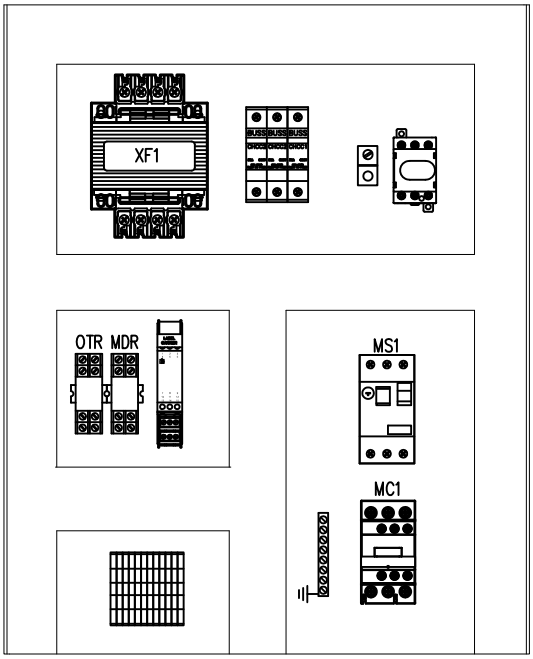


Fig. 8 Wiring diagram, three thermistors - for AFG only

Terminals	Description
1, 2, 3, 4, 5, 6	Ends of the three stator windings (U1, U2, V1, V2, W1, W2)
31, 32	Thermistors (according to DIN 44081) (ϑ1, ϑ2, ϑ3)
21, 22	Leak sensor in gearbox See section *Water-in-oil sensor*, page 9.



PANEL EXTERIOR



PANEL LAYOUT

WIRING NOTES:

1. ALL PANEL WIRING TO BE AS FOLLOWS:
   480V POWER WIRING–12AWG MIN. BLACK
   120V POWER WIRING–16AWG MIN. RED
   120V NEUTRAL WIRING–16AWG MIN. WHITE

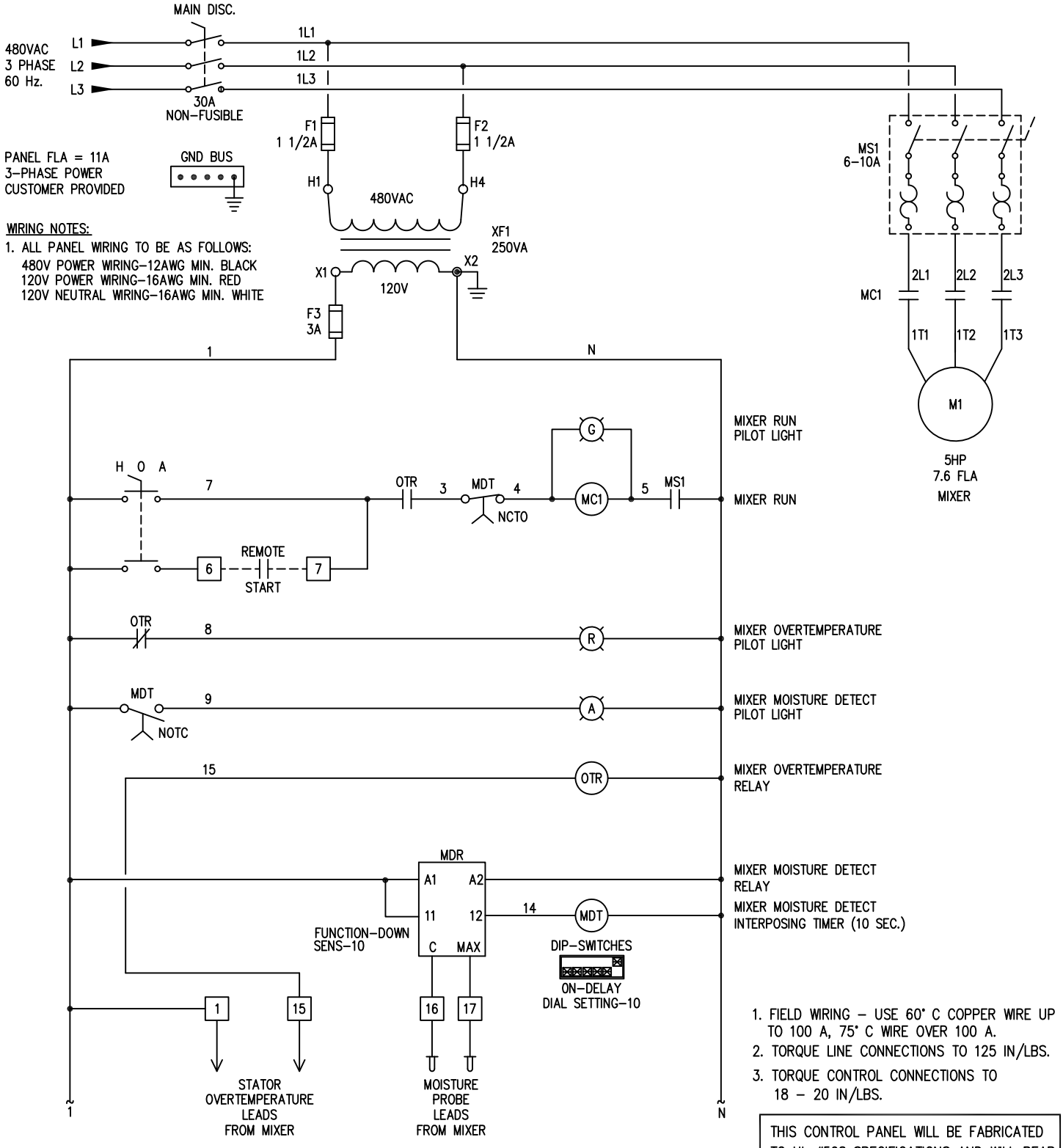
1. FIELD WIRING – USE 60° C COPPER WIRE UP TO 100 A, 75° C WIRE OVER 100 A.
2. TORQUE LINE CONNECTIONS TO 125 IN/LBS.
3. TORQUE CONTROL CONNECTIONS TO 18 – 20 IN/LBS.

THIS CONTROL PANEL WILL BE FABRICATED TO UL #508 SPECIFICATIONS AND WILL BEAR THE C UL LABEL

GRUNDFOS

DATE	7/14/11	SCALE	NTS	REV.	DESCRIPTION
DRAWN BY	ACL	PO#			
CHECKED BY	CAF	JOB #			Typical Drawing
CUSTOMER				TITLE	5 HP MIXER CONTROLLER DETAILS
				DRAWING NO.	MIXER-2_ABB

SHORT CIRCUIT CURRENT: 5kA RMS SYMMETRICAL
500VAC MAXIMUM.



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GRUNDFOS	DATE 7/14/11	SCALE NTS	REV.	DESCRIPTION	
	DRAWN BY ACL	PO#			
	CHECKED BY CAF	JOB #		Typical Drawing	
	CUSTOMER		TITLE	5 HP MIXER CONTROLLER WIRING DIAGRAM	
			DRAWING NO.	MIXER-1_ABB	

Interzone 954

Modified Epoxy

International Protective Coatings

World Wide Product Range

PRODUCT DESCRIPTION

A two component, low VOC, high solids, modified epoxy barrier coat designed to give long term protection in a single coat application. Will continue to cure when immersed in water and has excellent cathodic disbondment resistance.

INTENDED USES

Primarily designed for use in offshore splashzone maintenance, where its continued cure under immersed conditions make it ideal for coping with tidal movements and surges. May be applied to reoxidised and slightly damp surfaces. Interzone 954 has also found extensive use in a number of other corrosive environments including pulp and paper plants, chemical plants, jetties and sluice gates.

As part of a non-slip deck system in conjunction with appropriate aggregate.

PRACTICAL INFORMATION FOR INTERZONE 954

Colour	Range available via the Chromascan system
Gloss Level	Gloss
Volume Solids	85% ± 3% (depends on colour)
Typical Thickness	250-500 microns (10-20 mils) dry equivalent to 294-588 microns (11.8-23.5 mils) wet
Theoretical Coverage	1.70 m²/litre at 500 microns d.f.t and stated volume solids 68 sq.ft/US gallon at 20 mils d.f.t and stated volume solids
Practical Coverage	Allow appropriate loss factors
Method of Application	Airless Spray, Air Spray, Brush, Roller

Drying Time

			Overcoating Interval with recommended topcoats	
Temperature	Touch Dry	Hard Dry	*Minimum*	*Maximum*
10°C (50°F)	14 hours	24 hours	24 hours	14 days[1]
15°C (59°F)	10 hours	18 hours	18 hours	10 days[1]
25°C (77°F)	4 hours	8 hours	8 hours	7 days[1]
40°C (104°F)	90 minutes	3 hours	3 hours	5 days[1]

[1] Maximum overcoating intervals are shorter when using polysiloxane topcoats. Consult International Protective Coatings for further details.

REGULATORY DATA

Flash Point	Base (Part A) 30°C (86°F)	C/A (Part B) 44°C (111°F)	Mixed 33°C (91°F)
Product Weight	1.8 kg/l (14.6 lb/gal)		
VOC	130 g/l (1.08 lb/gal)	UK - PG6/23(04), Appendix 3	
	2.12 lb/gal (255 g/l)	USA - EPA Method 24	
	249 g/l, 162 g/kg	EU Solvent Emissions Directive (Council Directive 1999/13/EC)	

See Product Characteristics section for further details

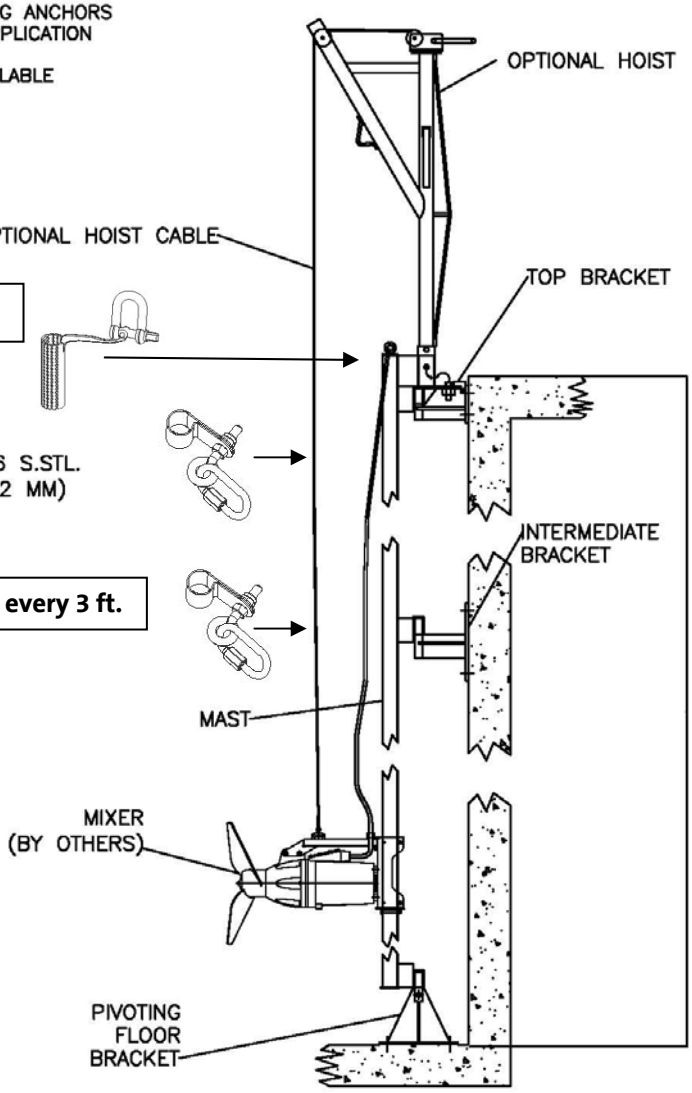
SERIES M MIXER MAST

STANDARD FEATURES:

- AVAILABLE IN 2" (51 MM) AND 4" (102 MM) MAST SYSTEMS
- ALL WELDED CONSTRUCTION
- POLYMER BUSHINGS AT ALL PIVOT POINTS
- POSITIONER PLATE W/MULTIPLE SETTINGS
- HOIST SOCKET W/BUSHING
- STAINLESS STEEL MOUNTING ANCHORS
- CUSTOM FIT FOR EACH APPLICATION
- PIVOTING BASE BRACKET
- EXTENSION BRACKETS AVAILABLE
- 3 YEAR GUARANTEE

REQUIRED INFORMATION:

- OVERALL TANK DEPTH
- TYPE 304 OR TYPE 316 S.STL.
- 2" (51 MM) OR 4" (102 MM) MAST SYSTEM



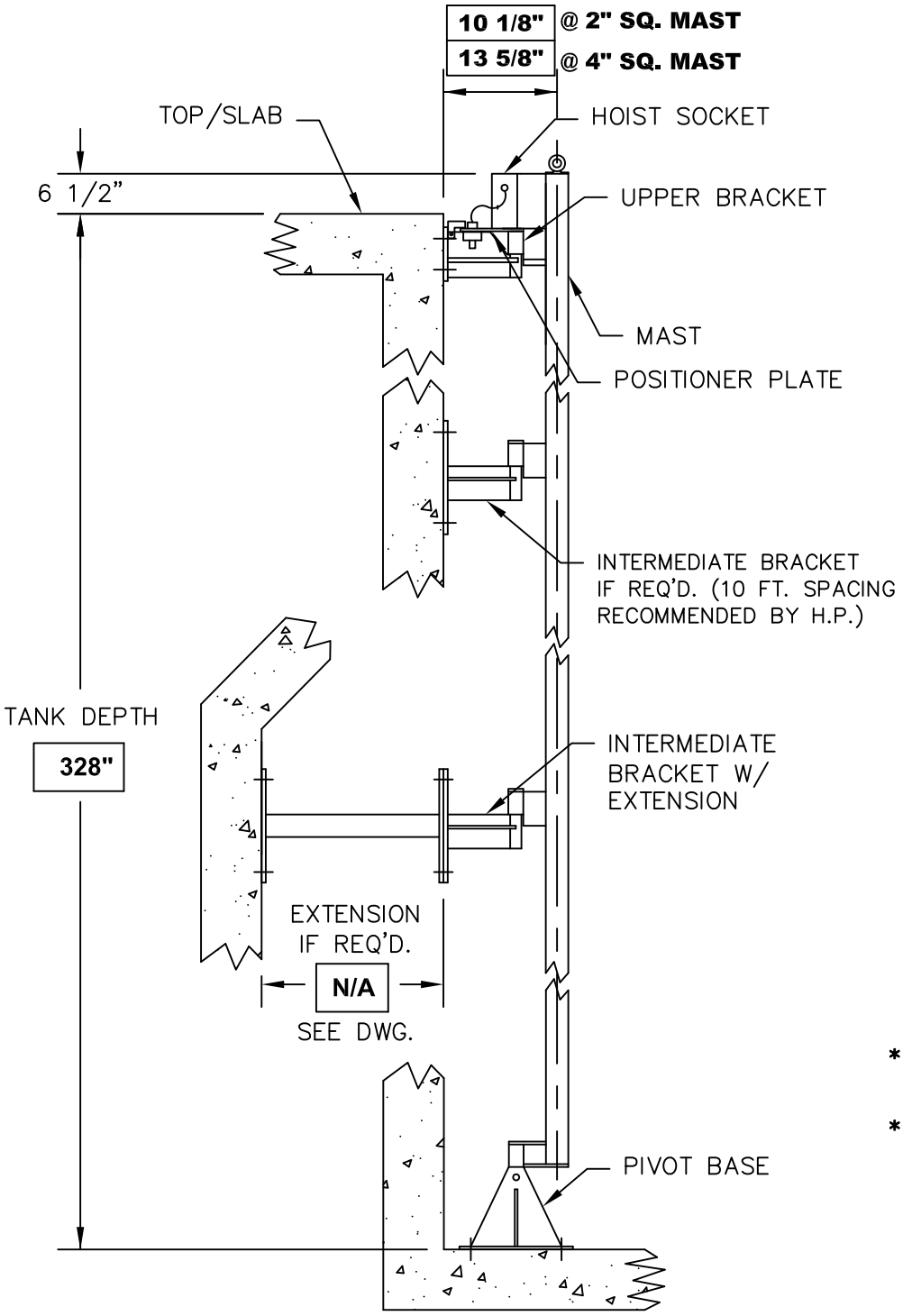
HALLIDAY PRODUCTS, INC.
ORLANDO, FL
http://www.hallidayproducts.com

HALLIDAY PRODUCTS

MODEL NO. M4B328BAAAA
QUANTITY: 2
ORDER NO. Q16453
LOCATION/TAG:

AERATION BASIN #3 NORTH WALL
HAROLD D THOMPSON WRF
ID# 7517004323

SERIES M
STAINLESS STEEL MIXER MAST ASSEMBLY



STANDARD FEATURES:

ALL S. STL. WELDED CONST.
MULTIPLE SETTING POSITIONER PLATE
KYNAR BUSHINGS AT MOUNTING BRKTS.
CUSTOM FIT FOR EACH APPLICATION
S.STL. MOUNTING ANCHOR BOLTS SUPPLIED
PIVOTING BASE BRACKET
LINED HOIST SOCKET
3 YEAR GUARANTEE

MATERIAL:

- [X] **T-304**
- [ ] **T-316**

SIZE:

- [ ] **2" SQ. MAST**
- [X] **4" SQ. MAST**

SQ. TUBE WALL THICKNESS:

- [X] **1/8"**
- [ ] **3/16"**
- [ ] **1/4"**

INTERMEDIATE BRACKETS: (PER ASSEMBLY)

- [2] QUANTITY
- [ ] NONE (H.P. RECOMMENDS INTERMEDIATE BRACKETS @ 10 FT. SPACING)

EXTENSION: (PER ASSEMBLY)

- [0] QUANTITY

* [ ] MISCELLANEOUS

* SEE ACCOMPANYING DETAIL DRAWING

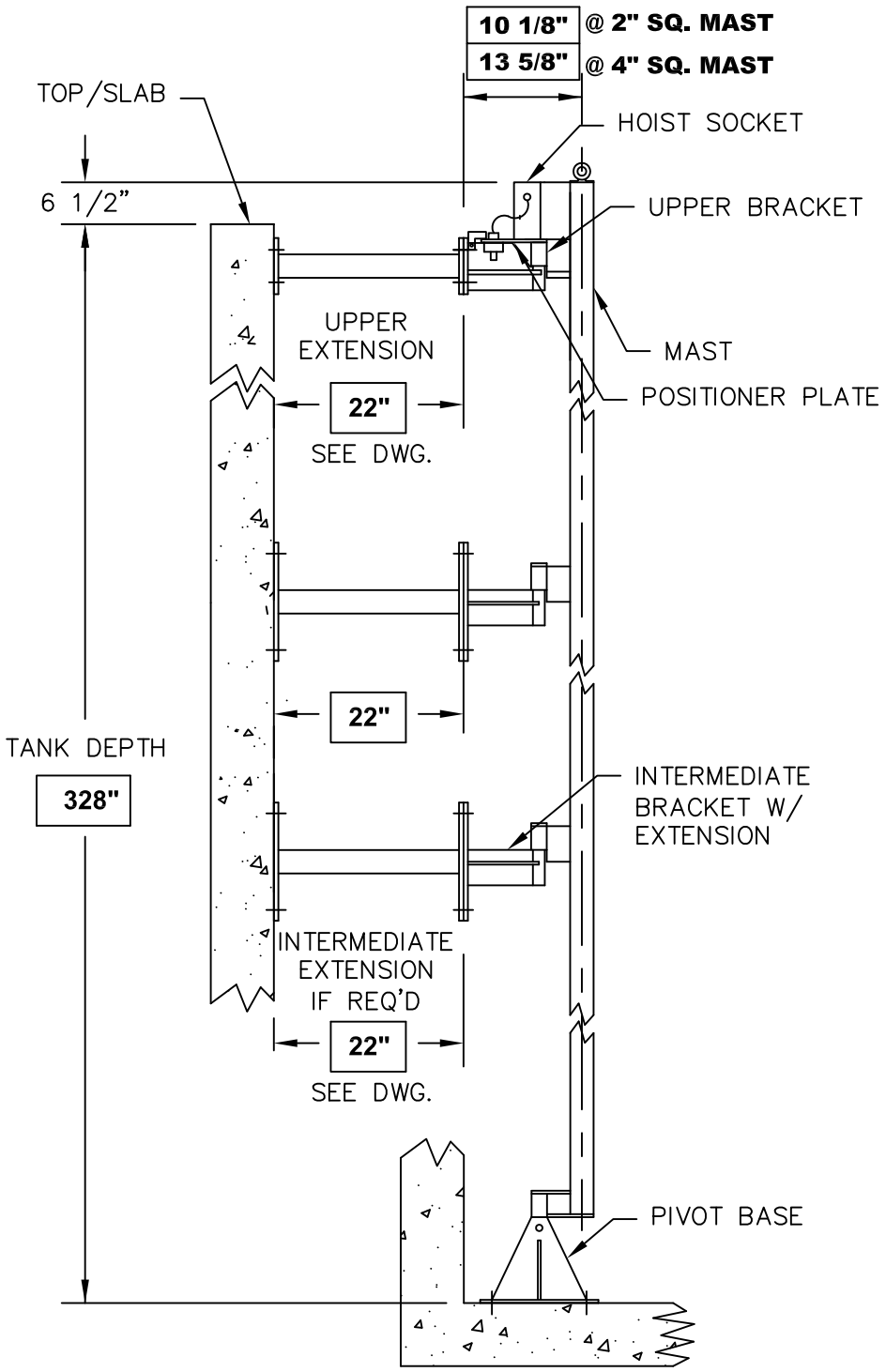
8/31/12

HALLIDAY PRODUCTS, INC.
ORLANDO, FL
http://www.hallidayproducts.com

HALLIDAY PRODUCTS

MODEL NO. M4B328BAAAAA
QUANTITY: 10
ORDER NO. Q16453
LOCATION/TAG:
HAROLD D THOMPSON WRF
ID# 7517004323

SERIES M
STAINLESS STEEL MIXER MAST ASSEMBLY



STANDARD FEATURES:

ALL S. STL. WELDED CONST.
MULTIPLE SETTING POSITIONER PLATE
KYNAR BUSHINGS AT MOUNTING BRKTS.
CUSTOM FIT FOR EACH APPLICATION
S. STL. MOUNTING ANCHOR BOLTS SUPPLIED
PIVOTING BASE BRACKET
LINED HOIST SOCKET
S.STL. STATIC CABLE SUPPLIED (NOT SHOWN)
3 YEAR GUARANTEE

MATERIAL:

- [X] **T-304**
- [ ] **T-316**

SIZE:

- [ ] **2" SQ. MAST**
- [X] **4" SQ. MAST**

SQ. TUBE WALL THICKNESS:

- [X] **1/8"**
- [ ] **3/16"**
- [ ] **1/4"**

INTERMEDIATE BRACKETS: (PER ASSEMBLY)

- [2] QUANTITY
- [ ] NONE (H.P. RECOMMENDS INTERMEDIATE BRACKETS @ 10 FT. SPACING)

UPPER EXTENSION: (PER ASSEMBLY)

- [1] QUANTITY

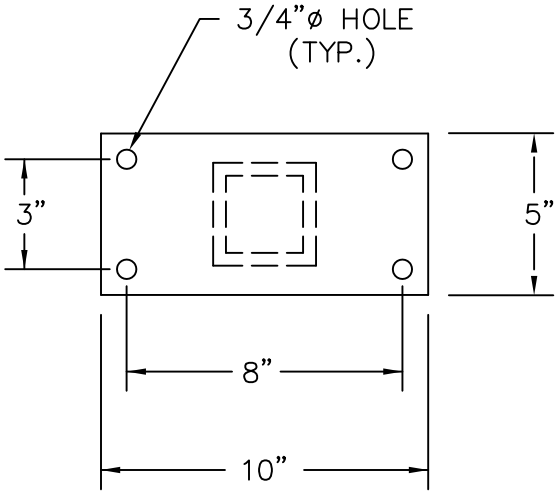
INTERMEDIATE EXTENSION: (PER ASSEMBLY)

- [2] QUANTITY

* [ ] MISCELLANEOUS

* SEE ACCOMPANYING DETAIL DRAWING

8/31/12



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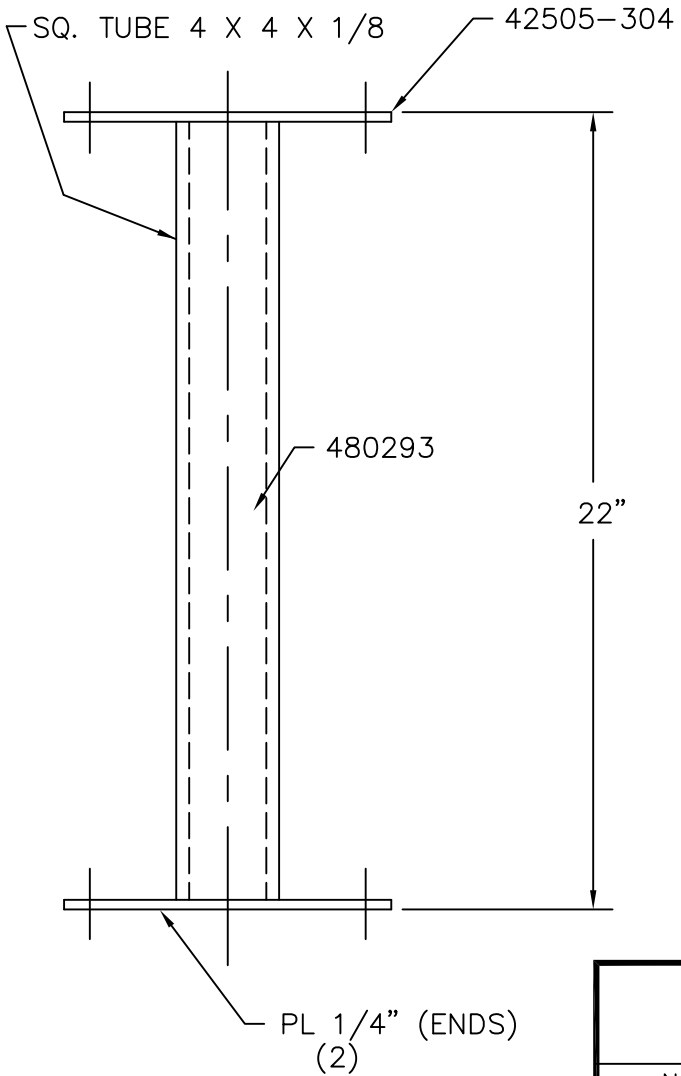
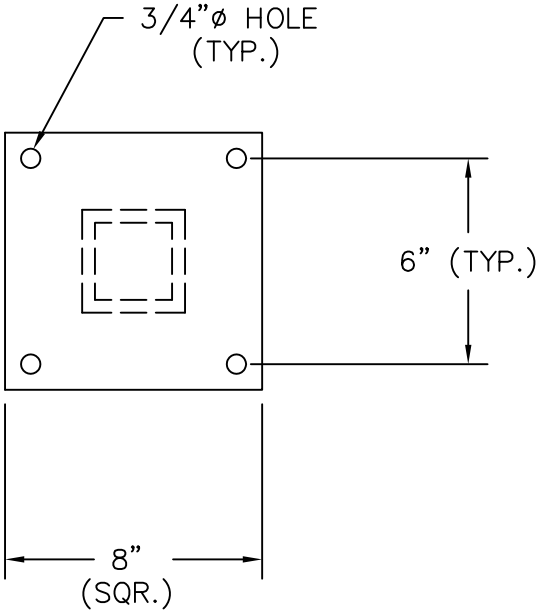


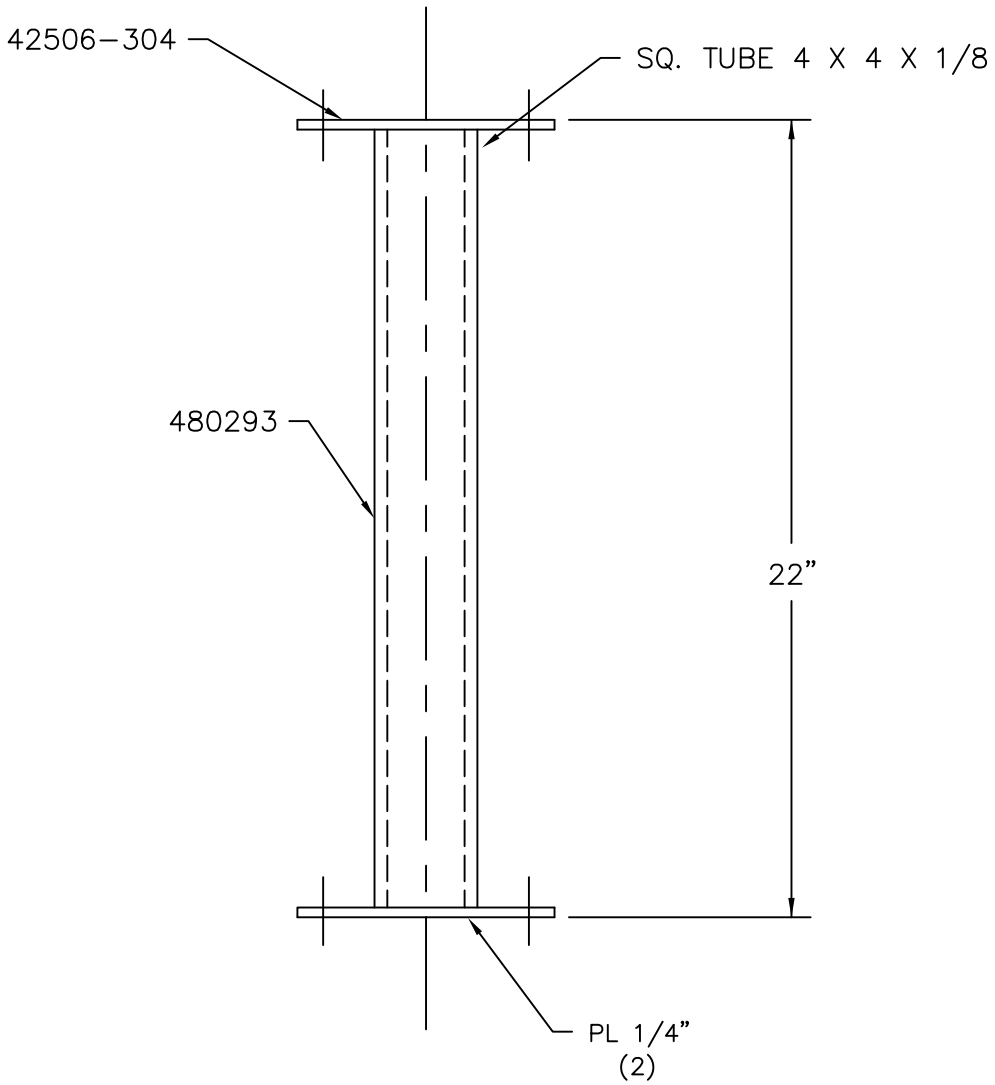
(10) REQ.
HAROLD D THOMPSON WRF
ID# 7517004323

HALLIDAY PRODUCTS
ORLANDO FL.

SCALE NONE	UPPER MIXER BRACKET EXTENSION (4" MAST)	STANDARD
DATE 10/18/91		OLD NO.
REVISED 09/04/12	MATERIAL: S. STL. (T-304)	DWG. NO. Q16453 M4CB22A



ENDS



(20) REQ.
HAROLD D THOMPSON WRF
ID# 7517004323

HALLIDAY PRODUCTS
ORLANDO FL.

SCALE NONE	INTERMEDIATE MIXER BRACKET EXTENSION (4" MAST)	STANDARD
DATE 10/18/91		OLD NO. M4BEXT
REVISED 9/4/12	MATERIAL: STAINLESS STEEL	DWG. NO. Q16453 M4CD22A

HALLIDAY PRODUCTS, INC.
ORLANDO, FL
http://www.hallidayproducts.com

HALLIDAY PRODUCTS

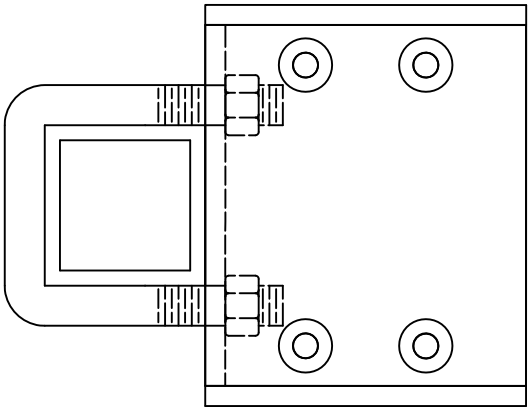
MODEL NO. M4C J
QUANTITY: 12
ORDER NO. Q16453
LOCATION/TAG

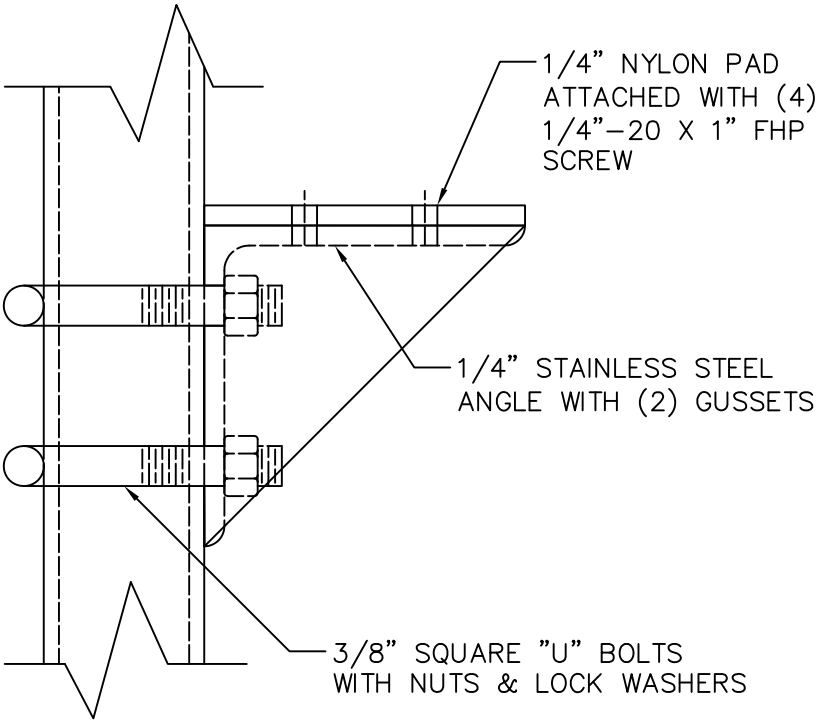
SERIES M
STAINLESS STEEL MIXER MAST STOP ASSEMBLY

MATERIAL:
- [X] **T-304**
- [ ] **T-316**

SIZE:
- [ ] **2" SQ. MAST**
- [X] **4" SQ. MAST**

TOP VIEW



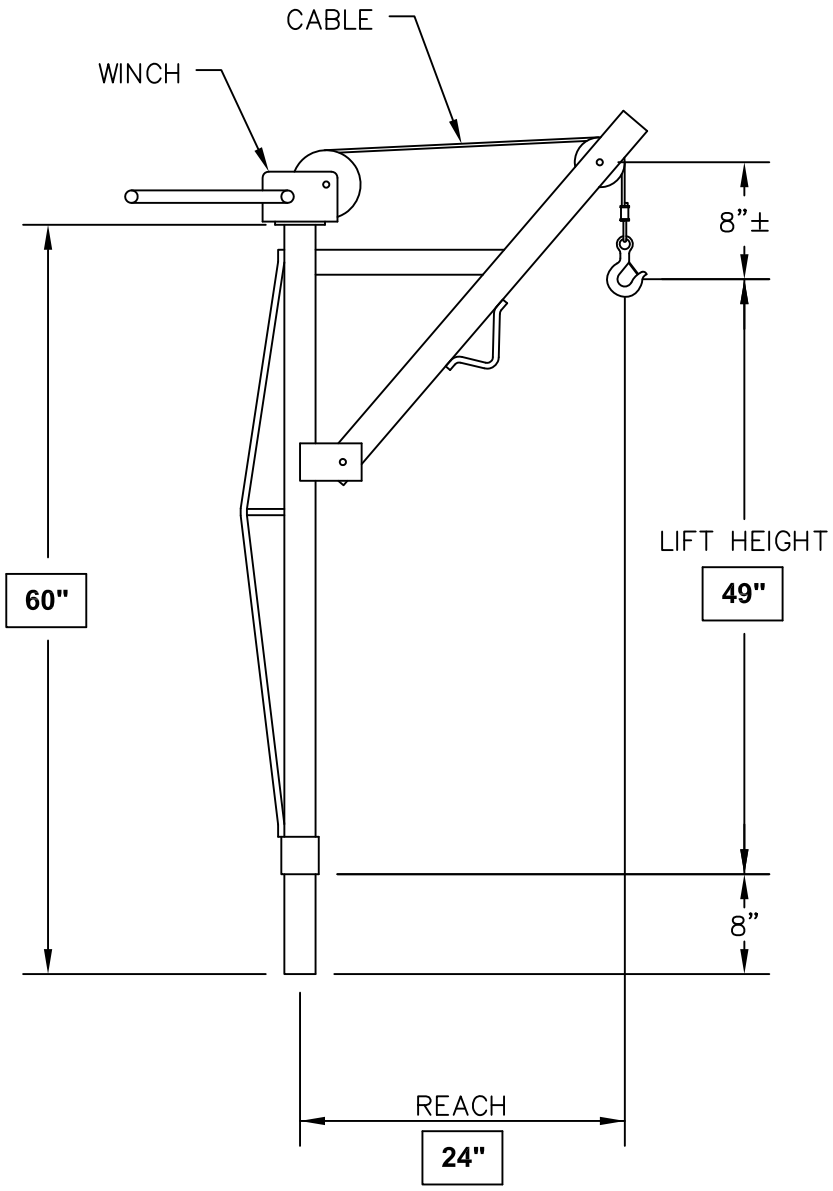


HALLIDAY PRODUCTS, INC.
ORLANDO, FL
http://www.hallidayproducts.com

HALLIDAY PRODUCTS

MODEL NO. D2M24R40GC60BA
QUANTITY: 12
ORDER NO. Q16453
LOCATION/TAG:
HAROLD D THOMPSON WRF
ID# 7517004323

SERIES DM
FIXED REACH PORTABLE HOIST



STANDARD FEATURES:

STAINLESS STEEL CONSTRUCTION
S.STL. CABLE
3 YEAR GUARANTEE

1000 LB. MAX. CAPACITY
40 FT. CABLE LENGTH
85 LB. UNIT WEIGHT

CABLE DIA.		3/16"	X	1/4"
CABLE MAT'L.	X	T-304		T-316
HOIST MAT'L.	X	T-304		T-316

STANDARD CABLE ENDS:

(ALL CABLE END ASSEMBLIES INCLUDE COPPER NICOPRESS SLEEVE W/ S.STL. THIMBLE)

[ ] GALV. SAFETY HOOK (STANDARD)

OPTIONAL ENDS:

[ ] S.STL. SAFETY HOOK

[X] S.STL. SHACKLE
3/8" SHACKLE SIZE

TYPE WINCH:

[ ] NONE

MARINE GRADE BRAKE WINCHES:

[ ] DUTTON-LAINSON B-1200B
[ ] DUTTON-LAINSON B-1500
[ ] DUTTON-LAINSON B-2500
[ ] DUTTON-LAINSON DLB-1200A
[X] DUTTON-LAINSON DLB-2500A
[ ] THERN 4022PB
[ ] THERN 4312PB
[ ] 4WM2 WORM GEAR

S.STL. WINCHES:

[ ] THERN 4042PBSS
[ ] THERN 4312PBSS

MIXERMAST HOIST:

[X] 24" TURN HANDLES

SUBMITDA 5/30/03

Grundfos Chicago Corporation
3905 Enterprise Court
Aurora, Illinois 60504

PHONE: (630) 236-5500
FAX: (630) 236-5511
Web: www.yccpump.com

Standard 2-Year Warranty for Municipal Applications
Grundfos Series AMG, AMD, & AMF

For a period of twenty-four (24) months from start-up or thirty (30) months from shipment, whichever occurs first, Yeomans Chicago Corporation warrants that the equipment covered by this order shall be free of defects in materials and workmanship under normal use and service, and when properly installed. YCC agrees to repair or replace F.O.B. point of shipment, such equipment, or any part thereof, previously furnished by YCC as actually found, after inspection, as defective, provided: (a) said equipment has been properly installed, operated and maintained by Buyer in accordance with YCC's recommendations and specifications, and (b) Buyer notifies YCC, in writing within thirty (30) days from when such defect becomes apparent. Unless agreed to the contrary by YCC in writing, any work done, material furnished, repairs or designs made by "others" than specifically approved by YCC, shall void the warranty. Equipment that is repaired/replaced is warranted for the residual period of the initial warranty.

The mixer/flowmaker has a mechanical and a rotary shaft seal with a moisture detection system. The warranty shall cover the cost of replacement of those seals only. IF THE MOISTURE DETECTION SYSTEM IS NOT CONNECTED, THE WARRANTY IS VOID! If the mixer/flowmaker is approved for installation without a moisture detection system, the machine must be physically inspected for leakage every six months. WITHOUT PROOF OF THIS INSPECTION HAVING BEEN DONE, THE WARRANTY IS VOID. The mixer/flowmaker motor has winding thermostats. The thermostats must be connected per local, state and/or National Electric Code. IF THE MOTOR WINDING THERMOSTATS ARE NOT CONNECTED, THE WARRANTY IS VOID!

Equipment destined for long-term storage shall be stored in accordance with the appropriate O&M instructions. Any damage to the equipment due to improper storage conditions shall void this warranty.

Equipment not manufactured by Grundfos/YCC, such as starting equipment, electrical apparatus and other peripheral items are covered by the warranty of the respective manufacturer in lieu of the above.

YCC shall not be liable for incidental or consequential losses, damages or expenses, directly or indirectly arising from the sale, handling or use of the equipment, or from any other cause relating thereto, and YCC's liability hereunder in any case is expressly limited to the replacement (in the form originally shipped) of equipment or any part thereof, not complying with this order, or, at YCC's election, to the repayment of, or crediting Buyer with an amount equal to the purchase price of such equipment, whether such claims are for breach or warranty or negligence.

THIS WARRANTY IS EXPRESSLY MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS.

Requirements

Provide _____ gear drive mixer/s. Each mixer shall have a stainless steel propeller with a maximum rotating speed of ____ rpm and a maximum diameter of _____ inches. The mixer/s shall have a 460 volt, three (3) phase motor providing a maximum shaft power of _____ Hp. Minimum thrust capabilities shall not be less than _____ ft. lbs.

The mixer/s shall be supplied complete with all mounting assemblies that are completely assembled and delivered to the jobsite without requiring assembly by the contractor. This is required to insure complete compliance with specified materials and to insure warranty issues are borne only by the mixer supplier.

Mixer Design

The mixer shall be of gear reduction type in design. It shall be easily removed for inspection and service without the need for personnel to enter the tank or pit in which it is installed. This shall be accomplished by a manufacturer supplied complete mixer mast assembly that shall be an integral part of the mixer scope of supply.

Each mixer shall be supplied with electric power / control cable of a length required for installation plus a length of 10 feet for maintenance purposes. The power/control cable shall be resistant to oil, corrosive gases, or other material normally found in the application as specified. Provide cable holders with the supplied mixer mast assembly as necessary to provide cable strain relief as required.

Mixer Construction

All major casings coming into contact with the mixed media shall be of cast iron with smooth surfaces and devoid of irregularities except the propeller which shall be of stainless steel. The propeller and all fasteners shall also be of stainless steel. The propeller shall be dynamically balanced, and non-clogging in design. The propeller shall be capable of handling fibrous materials and other matter as normally found in the specified application. The mixer shall incorporate a guide bracket of a non-corrosive stainless steel material. Lesser materials are not acceptable.

The motor shaft shall be completely isolated from the mixed media and rotate on two permanently lubricated bearings. Bearings shall be designed for long service life at full load requirements. A minimum of three (3) seals shall separate the various sections of the mixer. The outer seal shall be at minimum a mechanical seal with faces of tungsten or silicon carbide, both faces. Other seals shall separate the gear box and the motor from intrusion of mixed material. Seals shall require neither maintenance nor adjustment but shall be easily accessible and replaceable.

Mixer Motor

Motors shall be provided as an integral part of the mixer design. Motors shall be suitable and fully capable of operation with PWM variable frequency drives and shall be non-overloading across the full performance range of the mixer. The motors service factor shall be at minimum 1.15 and be capable of at minimum 20 starts per hour. Motors shall be capable of withstanding all forces which may be imposed during the course of normal operation and be asynchronous in design.

Gearbox

The mixer shall have a single stage planetary reduction gear to allow optimization of propeller rotational speeds. All bearings within the reduction gear, as well as all other bearings, shall have a minimum L10 life of 100,000 hrs. The gear box shall be provided with a "water-in-oil" leakage sensor to allow operations personnel to monitor intrusions of water into the gear box proper, without having to remove the mixer from service. Direct Drive mixers that do not utilize a gear reduction unit in their design shall not be acceptable.

Protection

The mixer motor shall be furnished with protective devices as normally provided by the pump manufacturer. These devices shall be monitored by a manufacturer supplied relay status module. The motor shall be provided with thermal sensors embedded in each winding to provide motor over-temperature protection. A water-in-oil leakage sensor shall be installed within the oil chamber to monitor the amount of water in the oil. In this way, operations personnel can monitor seal leakage without having to remove the mixer from service.

Mixer Mast Assembly

Each mixer shall be supplied with its own mixer mast assembly per contract drawings. A removable turning handle shall be provided for each mast to permit manual adjustment of the mixer's horizontal attitude. The mast shall be minimum 4" x 4" square tube with 1/8" wall, supplied with factory welded sockets at the top, bottom and at intermediate levels as needed to provide support at a maximum of 10ft intervals.

Sockets shall be lined with a kynar® insert to insure easy mast rotation, and shall work in conjunction with supplied mounting brackets to secure the unit to the tank wall. The top mast bracket shall include a rotary positioning plate which allows the mast to be secured in any of 14 locations with a total of 167 degrees of rotation. Wall extension brackets, if required, shall be provided with the mast and shall be custom designed to insure a straight and true installation.

A fabricated mixer support frame (an integral part of the mixer and guide mast assembly system) shall support the entire weight of the mixer at its horizontal center of gravity. The

frame shall include a bracket with stainless steel or nylon liners for attachment to the mast. A static cable with adjustable end loop shall be furnished to support the mixer at various operating levels; as-well-as; a permanently mounted stop on the mixer mast to insure the mixer cannot be operated to a level below which improper or damaging operation could occur.

Portable Lifting Hoist and Lifting Cable

Each mixer mast assembly shall be provided with one (1) portable hoist with a fixed reach for each mixer in this section. The hoist shall be designed to be mounted on the top mast mounting bracket. It shall include a manual brake winch, and shall be adequately rated to lift the mixer and support arm off the mast and directly onto the adjacent deck surface. If handrail is fitted to

the deck, removable sections or safety chain sections shall be provided such that the mixer does not need to be lifted over the handrail. A Type 316 stainless steel lifting cable, permanently attached to each mixer, shall be provided in sufficient length for attachment of the upper end to the winch cable reel when the davit assembly is installed.

Quality Control

Prior to shipment, the mixer manufacturer shall check each unit for proper balance and alignment, quiet vibration-free operation, proper electrical characteristics, and satisfactory performance. The mixer manufacturer shall perform certified performance tests in accordance with ANSI/ISO Standards to insure that the performance of the supplied units is in accordance with specified requirements. These tests results shall be certified by the mixer manufacturer and submitted to the engineer for approval prior to shipment. The engineer and owner reserve the right to inspect these tests.

Verification of Performance

All mixers shall be field tested after installation to demonstrate satisfactory operation without excessive noise, vibration, or overheating. Any mixer which fails to meet any of the contract specifications will be modified, repaired or replaced by the contractor at no additional cost to the owner.

Date: 2011-01-01

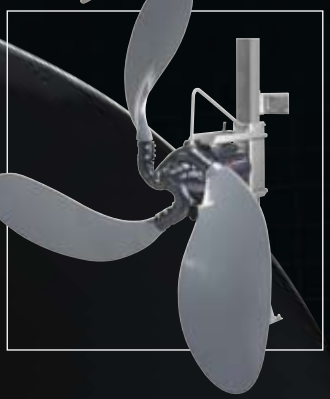
GRUNDFOS **AMG, AMD, and AFG RANGES**

Mixers and flowmakers, 0.75 - 18.5 kW

60 Hz DIN

KEEP YOUR PROCESSES **MOVING**

Mixers and flowmakers for wastewater and sludge applications



BE > THINK > INNOVATE >

GRUNDFOS

STIRRING SUPPORT FOR YOUR SYSTEMS

Mixers and flowmakers. Creating flows on any scale.

Grundfos is dedicated to making wastewater systems of any kind as reliable and efficient as possible. Our AMD, AMG, and AFG ranges reflect this dedication. Very dependable and highly efficient, these submersible mixers and flowmakers prevent sedimentation and support processes in treatment plants, industries, and agriculture.

All models share many features, facilitating easy maintenance. Materials are selected for strength, and every component is tested for durability before assembly. Recent evolutions include a triple sealing system for maximum protection of the mechanical shaft seal as well as an installation-friendly bracket.

Grundfos mixers are available with direct (AMD) or planetary gear-driven (AMG) stainless steel or polyamide propellers. All flowmakers (AFG) are gear-driven and share the AMG motor design.

- AMD (direct-driven) mixers are available in 8-pole versions in range from 1,5-4,5kW
- AMG (gear-driven) mixers are available from 1.5-18.5 kW.
- AFG flowmakers are available from 1.3-7.5 kW.

When you design your systems, we invite you to draw on the Grundfos fount of experience. Our application specialists can help ensure the right flow characteristics, velocities, etc. You may well find that Grundfos' recommendations can save you substantial sums on construction. To make the most of our help, we urge you to call us at the earliest stage possible.

THE AMD, AMG, AND AFG AT WORK

Mixers and flowmakers make sure that particles remain evenly distributed in wastewater and sludge, preventing sedimentation and supporting treatment processes.

The range covers everything from small-scale mixers, ideal for prefabricated pumping stations, to large-scale flowmakers created for large tanks and basins. Wastewater infrastructure is an obvious application area – from network stations to treatment plants – but the mixing power of the AMD, AMG, and AFG ranges is also appreciated by industries and agricultural professionals worldwide.

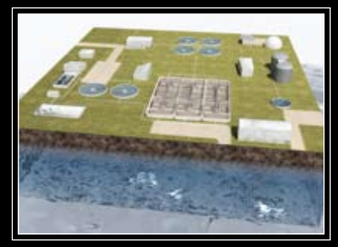
Typical application areas

- Sewage pumping stations
- Wastewater treatment plants
- Industrial processes
- Agriculture

Installation

Great care has been taken to ensure easy installation of the Grundfos mixer/flowmaker ranges. The mounting bracket has been optimised on the basis of installer and customer input; for example, top/bottom fixation capabilities make the units instantly suitable for a very wide range of applications. Different control options are available to match your system – from start/stop to more sophisticated functions. Ask us for more.

A complete range of installation accessories is available for all models. For full details, visit Grundfos WebCAPS online.



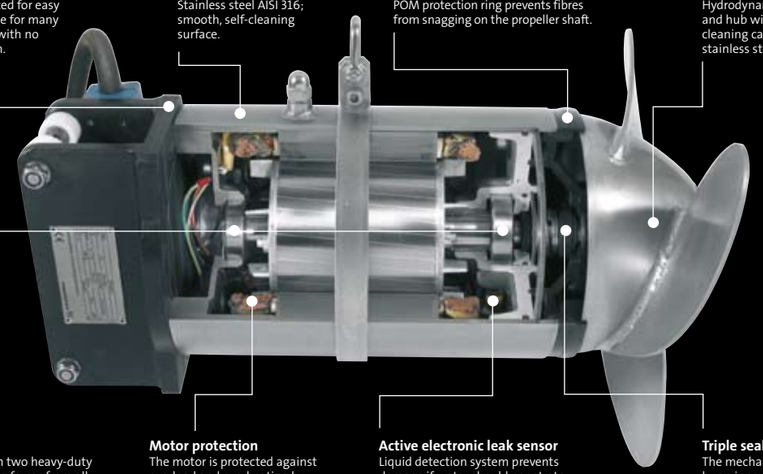
Mixers are ideal for preventing sedimentation in small-scale pumping stations.

Flowmakers can create the flow and velocities you require. For best results, ask us for design assistance.

MIXER AND FLOWMAKER FEATURES

– and what they do for you

AMD



Innovative bracket design
Bracket design optimized for easy installation – adaptable for many different applications with no need for customisation.

Motor housing
Stainless steel AISI 316; smooth, self-cleaning surface.

Protection ring
POM protection ring prevents fibres from snagging on the propeller shaft.

Self-cleaning propeller
Hydrodynamic 3-blade propeller and hub with excellent self-cleaning capabilities, made from stainless steel AISI 316.

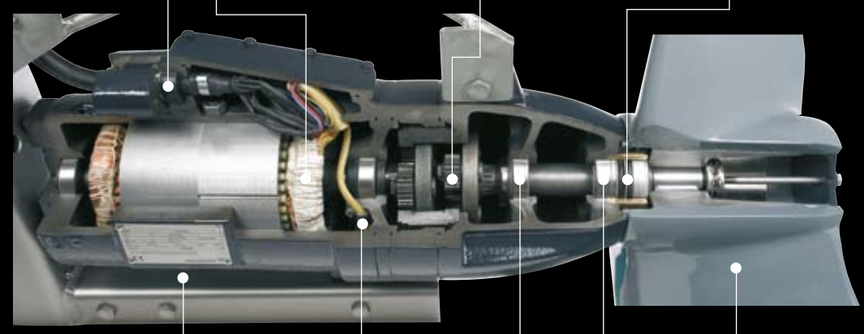
Two ball bearings
The rotor shaft rests on two heavy-duty ball bearings, absorbing forces from all directions.

Motor protection
The motor is protected against overload and overheating by three thermal switches placed in each motor winding.

Active electronic leak sensor
Liquid detection system prevents damage if water should penetrate into the oil chamber.

Triple sealing system
The mechanical shaft seal is protected by an innovative triple sealing system for maximum reliability and durability. Find design details online.

AMG/AFG



Watertight cable entry
A watertight cable entry point with self-shaping seal prevents cable damage.

Motor protection
The motor is protected against overload and overheating by three thermal switches or three thermistors placed in each motor winding.

Planetary gear
The gear housing has a slim design for optimal hydro-dynamic properties.

Triple sealing system
An ingenious triple seal system protects the mechanical shaft seal, minimising wear and service requirements.

Flexible motor bracket
Allowing for top or bottom fixation, this motor bracket is designed for easy installation in almost any setting and promotes stable operation.

Active electronic leak detector
Indicates possible liquid in the gear housing. Even the smallest quantity of liquid in the gear housing is quickly detected, allowing ample time for service before any damage is done.

Two ball bearings
The rotor shaft rests on two ball bearings, which accommodate both axial and radial forces.

Choice of propellers
Hydrodynamic 2 or 3-blade propellers help ensure high efficiency and non-clogging operation. The propeller hub forms a labyrinth seal for the sealing system.

BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

SEE THE BIGGER PICTURE

Grundfos is a global leader within water handling technology. Our passion is to bring you all the products you require to create and operate pump systems that combine reliability, cost-efficiency – and innovation. Our products are for use in water supply and wastewater infrastructure on any scale.

Grundfos has a full line of products and systems for the intake, treatment and distribution of drinking water and for the transport and treatment of wastewater. We also offer expertise and industry insight that can increase reliability and reduce lifecycle costs for water utilities.

Key product areas include:


Submersible pumps


Surface pumps


Sewage pumps


Mixers, flowmakers & recirculation pumps


Pumping stations


Monitoring & controls


Dosing & disinfection


Aeration equipment

Our products are the result of decades of engineering expertise. Supported by a worldwide service network. Visit www.grundfos.com/water-utility for more.

GRUNDFOS A/S
Poul Due Jensens Vej 7
DK-8850 Bjerringbro
Tel: +45 87 50 14 00

www.grundfos.com

GRUNDFOS

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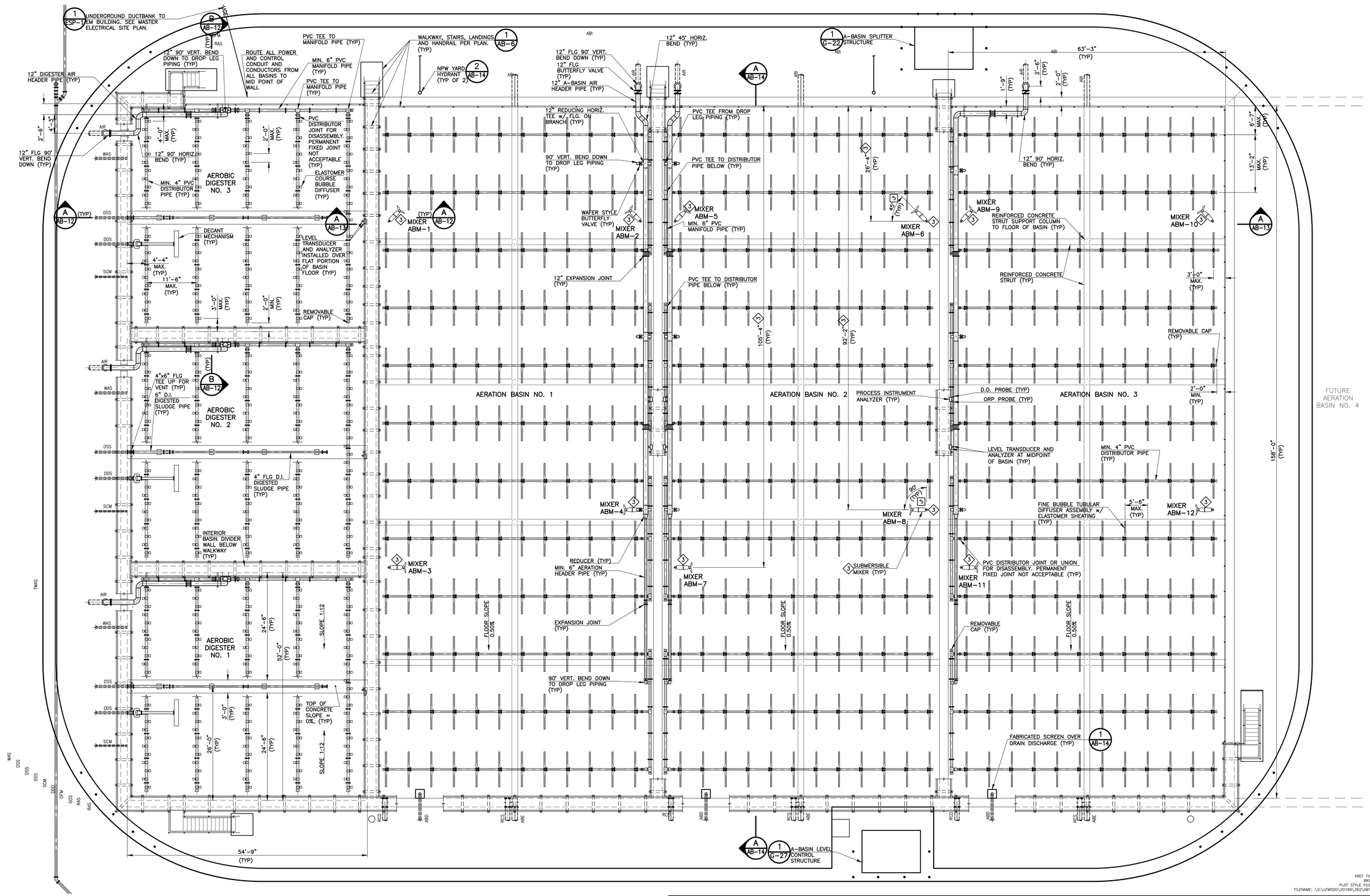

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REVISIONS		
NO. 1	DATE	DESCRIPTION
1	04/09/2012	ISSUED FOR PRELIMINARY QUANTITIES OF AIR HEADER PIPE ONLY
2	07/19/2012	ISSUED FOR AERATION SYSTEM PROPOSAL & VALUE ENGINEERING
3	07/23/2012	ADDED PRELIMINARY MIXER INFORMATION

PROCESS EQUIPMENT AND PIPING PLAN AEROBIC DIGESTER AND AERATION BASINS

HAROLD D. THOMPSON REGIONAL WATER RECLAMATION FACILITY
LOWER FOUNTAIN METROPOLITAN SEWAGE DISPOSAL DISTRICT

DRAWN	SKC
DESIGNED	MAM
CHECKED	RJS
DATE	JUNE 2012
PROJECT NO.	20166.362
GMS FILE NO.	2599

GMS, INC.
CONSULTING ENGINEERS
611 N. WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903

SHEET AB-11 OF —

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