



Appendix A

APPROVED MATERIALS LIST

(Capital & Developer Projects)

UPDATED
10.19.2018

Eastern Municipal Water District

Approved Materials List

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Purpose and General Notes

The purpose of the Approved Materials List is to streamline the materials submittal and review process during construction. Contractors are strongly encouraged to use materials from the Approved Materials List as these will be expedited and do not require a full technical submittal for review by the District prior to material approval, except for pipe submittals. All pipe materials shall be submitted for review and approval. However, Contractors must submit and identify that materials to be used comply with the approved list and/or current Specifications.

Use of “or equal” materials will require a formal and complete submittal subject to review by the Materials Approval Committee (MAC) prior to approval. Any schedule delays as a result of a submittal or use of “or equal” materials will be the sole responsibility of the Contractor.

In the event of a conflict between approved/contract drawings and the Approved Materials List, the approved/contract drawings shall take precedence.

All materials used for potable water systems must meet California Health and Safety Code 116875 (previously AB1953). All materials that come into contact with potable water must be NSF certified or approved (<http://www.nsf.org/>). All potable water material submittals must include evidence of NSF certification. Please contact staff if any Model numbers listed are out of date or no longer available.

Vendors and Manufacturers wishing to add materials or products to the Approved Materials List shall follow the Vendor Submittal Requirements (<http://www.emwd.org/home/showdocument?id=2980>) to make a formal submittal to the MAC. Please contact staff for more information.

I. GENERAL

1. BACKFLOW PREVENTION & DETECTOR ASSEMBLIES

Description	Manufacturers
1. Double Check Assemblies (¾" thru 10") (For Non-Toxic Service)	<u>AMES</u> <u>FEBCO</u>
2. Double Check Detector Assemblies (¾" thru 10") Std. Dwg. No. B-657 (For Automatic Sprinkler Systems Containing Non-Toxic Substance)	<u>MUELLER</u> <u>PRATT-WATTS</u> <u>WILKINS</u>
3. R.P. – Reduced Pressure Assemblies (¾" thru 10") (For High Hazard Service)	<p>Note: Backflow prevention materials and detector assemblies shall be one of the above listed manufacturers and shall be listed per latest edition of USC-Foundation for Cross-Connection Control and Hydraulic Research "List of Approved Backflow Prevention Assemblies" A web link to the USC list is located at:</p> <p>http://www.usc.edu/dept/fccchr/list.html</p>
4. R.P. – Reduced Pressure Detector Assemblies (2 ½" thru 10") (For Automatic Fire Sprinkler Systems Containing Toxic Substances)	

2. FIRE HYDRANTS

1 of 2

Description	Manufacturers
1. BLOW-OFF HYDRANT	<p><u>JONES</u> Model: J-344 – 4" x 1-2 ½" (EMWD Std. Drawings B-568 & B-561) Model: J-342 – 2" x 1-2 ½" (EMWD Std. Drawing B-374)</p>
2. BREAK-OFF CHECK VALVE	<p><u>LONG BEACH IRON WORKS</u> Model 400 (for special locations only as determined by Water Operations)</p>
3. INTERMEDIATE HYDRANT 6" x 2-2 ½" Std. Drawings B-360 & B-354	<p><u>CLOW</u> Model: Clow Rich Ranger 945</p> <p><u>JONES</u> Model: J-3720</p> <p><u>LONG BEACH IRON</u> Model: 601-613 Rich East Bay</p>
4. STANDARD HYDRANT 6" x 1-4" x 12 ½" Std. Drawings B-362 & B-356	<p><u>AVK</u> Model: 70 (24-70) Series 24</p> <p><u>CLOW</u> Model: El Rancho 2050 Bronze Model: Ranger 850 Model: F850, F860 Cast Iron</p> <p><u>JONES</u> Model: J-3700 Bronze Model: J-4040, J-4060 Cast Iron</p> <p><u>LONG BEACH IRON</u> Model: Series 125 Bronze (New Pattern) Model: 611 East Bay</p>

2. FIRE HYDRANTS

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Description	Manufacturers
5. SUPER HYDRANT 6" x 1-4" x 2-2 ½" Std. Drawings B-516 & B-517	<u>AVK</u> Model: 90 (24-90) Series 24 <u>CLOW</u> Model: El Rancho 2060 Bronze Model: 860 <u>JONES</u> Model: J-3765 Bronze <u>LONG BEACH IRON</u> Model: LBIW 615 Model: Series 130 Bronze (New Pattern)
6. WARFHEAD HYDRANT 4" x 1-2 ½" Std. Drawings B-368 & B-357	<u>JONES</u> Model: J-344 HP

3. GASKETS & GROMMETS
[Detailed Provisions Section 15081](#)

Description	Manufacturers
1. Hand Hole Liner Grommets For reservoir roof openings	<u>DIVE/CORR, INC.</u>
2. Meter Gaskets For water meter installations	<u>JONES</u> Model 136: ¾" x 1/16" Leather Meter Washers Model 137: 1" x 1/16" Leather Meter Washers 1 ½" & 2" Rubber-Cloth-Inserted Drop-In Meter Gasket
3. Ring and Full Face Gaskets Gaskets for steel and cast iron flanges shall conform to the requirements of EMWD Std. Drawing B-288 and shall be standard full face for pipe 27" diameter and larger.	<u>GARLOCK</u> Blue-Gard Style 3000, compressed non-asbestos (CNA) <u>TRIPAC</u> Style 5000, non-asbestos

4. METER BOXES & VAULTS

1 of 2

Description	Manufacturers
<p>1. Meter Boxes Concrete or Polymer Concrete EMWD Std. Drawing B-590, B-591, B-342, B-344</p>	<p><u>EISEL ENTERPRISES (H & C)</u> 17" x 30" Model No. 666B 30" x 48" Model No. 68MB</p> <p><u>J & R CONCRETE</u> 12" x 20" Model No. 4 ½ (No. 37) Polymer Concrete 13" x 24" Model No. W5 ¼ P (No.38) Polymer Concrete 17" x 30" Model No. 6B 30" x 48" Model No. 8</p> <p><u>BROOKS PRODUCTS</u> 17" x 30" Model No. 66 30" x 48" Model No. 68</p> <p><u>ARMORCAST PRODUCTS</u> 12" x 20" A6000485SA (No.37) 5/8" Polymer Concrete 13" x 24" A6001946PC-12 (No.38) 1" Polymer Concrete</p> <p><u>ASSOCIATED CONCRETE PRODUCTS</u> 12" x 20" Cat #WPB111812C21 (#437) Polymer Concrete Cat #WPC1118RLC11</p> <p>13" x 24" Cat #WPB132412A21 (#438) Polymer Concrete Cat #WPC1324RLC11</p>
<p>2. Meter Box Lid Covers</p>	<p><u>J&R CONCRETE</u> Domestic Meter Box Lid Covers (PC 412 QRP)</p> <p><u>ARMOR CAST PRODUCTS</u> Domestic Meter Box Lid Covers (A6000484-H1)</p>

4. METER BOXES & VAULTS

2 of 2

Description	Manufacturers		
<p>3. Utility Vaults</p> <p style="text-align: center;"><u>SIZE</u></p> <p style="text-align: center;">4' x 4'</p> <p style="text-align: center;">4' x 6'6"</p> <p style="text-align: center;">4'6" x 8'6"</p> <p style="text-align: center;">4' x 7'9"</p> <p style="text-align: center;">4'6" x 10'6"</p> <p style="text-align: center;">6' x 8'</p>	<p><u>BROOKS</u> <u>CONCRETE</u> <u>PRODUCTS</u></p> <p>#W-300 Series</p> <p>#W-500 Series</p> <p>#W-510 Series</p> <p>#W-600 Series</p> <p>#W-610 Series</p> <p>#W-680 Series</p>	<p><u>EISEL</u> <u>ENTERPRISES</u></p> <p>#EM 4848</p> <p>#EM 4878</p> <p>#EM 60108</p> <p>#EM 4896</p> <p>#EM 60132</p> <p>#EM 7296</p>	<p><u>J&R</u> <u>PRODUCTS</u></p> <p>#4400-1W</p> <p>#4660-2W</p> <p>#4686-1W</p> <p>#4700-1W</p> <p>#5106-1W</p> <p>N/A</p>
<p>4. Valve Boxes</p>	<p><u>BROOKS</u> <u>CONCRETE</u> <u>PRODUCTS</u></p> <p>#1-RD</p> <p>#1-RT</p> <p>#3-RT</p> <p>#4-TT</p> <p>#1-SP</p>	<p><u>EISEL</u> <u>ENTERPRISES</u></p> <p>#1R-VB-CC</p> <p>#2VB-VC</p> <p>#10VB-VC</p> <p>#4TT VB-VC</p> <p>#1RVB-CC</p>	<p><u>J&R</u> <u>PRODUCTS</u></p> <p>#1-R</p> <p>#2-R</p> <p>#3-R</p> <p>#4-T</p> <p>#5-R</p>
<p>5. Vaults</p>	<p><u>BEST CONCRETE PRODUCTS</u> Models MCT-4 and MCT-5</p> <p><u>ASSOCIATE CONCRETE</u> As approved by Engineering</p> <p><u>ARMORCAST PRODUCTS</u> Polymer Concrete Only</p>		

5. METERS & METER COMPONENTS

1 of 2

Description	Manufacturers
1. Compound Meters 3" thru 6" (cubic feet register)	<u>SENSUS TECH. INC.</u> Omni C-2 (AMI/AMR Sensus Flex Net, ERC Register)
2. Electromagnetic Meter 4" thru 10" (domestic) (cubic feet register)	<u>SENSUS TECH. INC.</u> Model Series DRFS & CFS (Must be with ECR 2 or 3 registers & Absolute Encoder Technology)
3. Fire Service Meters (Cubic feet registers) strainer required	
4. Mag Meters These are the model #'s with options required. Additional specification, i.e. liner, electrodes, size, etc., will be required depending on the meter application -All meters must be grounded in accordance with manufacturer's recommendations	<p><u>ENDRESS & HAUSER</u> Promag 53 W Electromagnetic Flowmeter Remote Mounted Transmitter</p> <ul style="list-style-type: none"> i) Input/Output Signal Type: Current/HART, frequency, relay, and status input (flexible module) ii) NEMA 4X/remote wall mounted housing or Panel mount depending on application/location iii) 120 VAC, with display, touch control operation <p><u>ABB</u> Electromagnetic Flowmeter WaterMaster FEP/FET300 Flowmeter system, optimized full bore Remote Mounted Transmitter</p> <ul style="list-style-type: none"> i) Three line back-lit graphical display ii) NEMA 4X / remote wall mounted housing or Panel mount depending on application/location iii) Power Supply: 120 VAC iv) Input/Output Signal Type: HART + 20 mA + pulse + contact output <p><u>SIEMENS</u> Sensor SITRANS F M MAG 5100 W MAG 6000, Polyamid, 120 VAC</p> <ul style="list-style-type: none"> i) Remote Mounted Transmitter ii) NEMA 4X / remote wall mounted housing or Panel mount depending on application/location <p>Cables Required FDK001STCAB ___ FDK001SPCAB ___</p> <ul style="list-style-type: none"> iii) MODBUS RTU/RS 485 <p>Input/Output Signal Type: 4-20 mA output, pulse/frequency and relay output</p>

5. METERS & METER COMPONENTS

2 of 2

Description	Manufacturers
<p>5. Multi-Jet Water Meter</p> <p>AWWA (cubic-feet register) Std. Drawings B-590, B-591, B-342, & B-344</p>	<p><u>MASTER METER</u></p> <p>5/8" x 3/4": BLO5-2VA-NAA-2 MJ Meters with Acculinx Registers Lead Free Body w/Plastic Bottom, Cubic Feet W/Sensus 520m TP6 Potted</p> <p>3/4" x 1 1/2" BLO5-2VA-NNA-2 MJ. Meters with Acculinx Registers Lead Free Body w/Plastic Bottom, Cubic Feet W/Sensus 520m TP6 Potted</p> <p>1" meter: BLO5-2VA-NNA-2 MJ. w/Acculinx register, Lead free body w/bronze bottom, CCF registration, w/Sensus 520M TP6 Potted</p> <p>1 1/2" meter: MJ11-2VA-NNA-2 w/Acculinx register. Lead free body w/bronze bottom, CCF registration, w/Sensus 520M TP6 Potted.</p> <p>2" meter: MJ13-2VA-NNA-2 w/Acculinx register. Lead free body w/bronze bottom, CCF registration, w/Sensus 520M TP6 Potted</p>
<p>6. Propeller Flow Meters- Pumping Plants & Agriculture (ECR Register AMI/AMR, FlexNet compatible, acre-feet register)</p>	<p><u>MCCROMETER</u></p> <p>MG-900-series MW-900-series MW-500-series</p> <p><u>SENSUS Tech, Inc.</u> 101 102</p>
<p>7. Sports Hydrant Meters</p>	<p><u>PERFORMANCE METER INC.</u></p> <p>Model No. FHS20 (Must be with a 2" inch gate valve)</p>
<p>8. Turbine Meters</p> <p>A. Landscape Strainer required 2" & smaller to have cubic feet registers 3" & larger to have acre feet register</p> <p>B. Domestic Cubic feet register</p>	<p><u>SENSUS TECH. INC.</u></p> <p>Model Omni T2 (Turbine) 1.5" thru 6" (ECR Register AMI/AMR Flex Net)</p> <p><u>PERFORMANCE METER INC.</u></p> <p>Model No. FHS20 (Must be with a 2" inch gate valve)</p>

6. NUTS & BOLTS

Detailed Provisions Section 15089

Description	Manufacturers
<p>1. Nuts & Bolts For Flanged Fittings</p> <p>Shall be bare steel conforming to SAE-J429 Grade 5 or ASTM A449 medium carbon steel quenched and tempered, meeting the following requirements, and shall have hex heads and lite pattern hex nuts</p> <p><u>¼” thru 1” Diameter</u> Proof Strength – 85,000 PSI Yield Strength – 92,000 PSI Tensile Strength – 120,000 PSI</p> <p><u>1” thru 1 ½” Diameter</u> Proof Strength – 74,000 PSI Yield Strength – 81,000 PSI Tensile Strength – 105,000 PSI</p>	
<p>2. Nuts & Bolts for 1 ½” & 2” Meter Installations</p> <p>⅝ x 2 ½” Silicon Bronze Hex head. Bolts w/ Bronze Hex Nuts</p>	
<p>3. Zinc Caps</p>	<p><u>RELIANCE</u></p> <p><u>MARS</u></p>

7. PAINT SCHEDULE

Item	Color*	Manufacturer
1. Aerator & Clarifier Spray Headers, Effluent Pumps, & Piping	OSHA Safety Red	Sherwin-Williams
2. Air Valve Assemblies	Koala Bear	
3. Chlorine	OSHA Safety Orange	
4. Electrical	White	
5. Fire Hydrants	OSHA Safety Yellow	
6. Fire Hydrant Tops and Nozzle Caps	Red = 500 gpm or less Orange = 500-999 gpm Green = 1000-1499 gpm Light Blue = 1500 gpm or greater	
7. Natural Gas Pipe	OSHA Safety Yellow	
8. Hydrogen Peroxide (H ₂ O ₂) Equipment	OSHA Safety Yellow	
9. High & Low Pressure Air	OSHA Safety Green	
10. Oil	Black	
11. Potable Water – Pumps, Piping and Appurtenances	Pale Blue / Desert Tan	
12. Reclaimed Water – Piping and Appurtenances	Pantone Purple #513 C or #522 C	
13. Sludge Sewage - Pumps, Piping, and Appurtenances	Rich Brown	
14. Steam Lines	Pale Blue	
15. Water Storage Tanks	Fawn / Buffalo	
16. Water Valve Caps	Pale Blue	

* Color shall be selected by Engineering Department staff such that facility blends inwith the surroundings (existing terrain) or to ensure permit requirements/conditions of approval are satisfied.

8. SERVICE SADDLES & TAPPING SLEEVES

1 of 3

Description	Manufacturers
1. *Service Saddles for A.C. Pipe 4" thru 12"	<u>JONES</u> Model: J-975 Model: J-979
2. Service Saddle for C-900 Pipe ¾" thru 2"	<u>CAMBRIDGE BRASS</u> Model: 800 Series Hinged Bronze Saddle
3. *Service Saddles for C-900 Pipe 4" thru 12"	<u>JONES</u> Model: J-996-R Model: J-996 <u>McDONALD</u> Model: 3805 <u>MUELLER</u> Model: H-13000 <u>ROMAC IND.</u> Model: B-101 Model: B-202 <u>FORD</u> Model: S902 and S912 (Style B2 piece bolted design)
4. *Service Saddles for Ductile Iron Pipe 4" thru 36"	<u>FORD</u> Model: F-101 Model: F-202 <u>ROMAC IND.</u> Model: Romac 101 Model: Romac 202 <u>SMITH-BLAIR</u> Model: Rockwell 311 Model: Rockwell 313

*Note: Size 10" & above require double-strap service saddles.

8. SERVICE SADDLES & TAPPING SLEEVES

2 of 3

Description	Manufacturers
<p>5. Service Saddles for Steel Pipe Connections</p> <p>Weld Saddles 1 - ¼" x 4" thru 48" Weld Saddles 2 - ½" x 4" thru 48"</p> <p>Refer to Std. Drawing B-271</p>	<p><u>INTERNATIONAL FABRICATORS</u></p> <p><u>NORTHWEST PIPE COMPANY (AMERON)</u></p> <p><u>SOUTHLAND PIPE CO.</u></p> <p><u>WEST COAST PIPE</u></p>
<p>6. Tapping Sleeves for A.C., PVC, & D.I. 4" thru 24"</p>	<p><u>FORD PRODUCTS</u> Model: Fast-Sleeve" 18-8 All Stainless Steel</p> <p><u>JCM IND.</u> Model: JCM-432 All Stainless Steel Model: JCM-452 All Stainless Steel (14" & above)</p> <p><u>POWERSEAL PRODUCTS</u> Model: 3490 All Stainless Steel</p> <p><u>ROMAC IND.</u> Model: SST 18-8 All Stainless Steel</p> <p><u>SMITH BLAIR. INC.</u> Model: 663 (4" thru 24") Model: 665 (6" thru 12")</p> <p><u>ROBAR</u> Model: 6606</p>

8. SERVICE SADDLES & TAPPING SLEEVES

3 of 3

Description	Manufacturers
7. Weld Saddles Std. Drawing B-271 Epoxy, Coated Fabricated Steel Outlet Scotch 3M – #206N Schedule 40 Pipe on 4" thru 10" ¼" Wall Pipe on 12" & above	<u>INTERNATIONAL FABRICATORS</u> <u>NORTHWEST PIPE COMPANY (AMERON)</u> <u>SOUTHLAND PIPE CO.</u> <u>WEST COAST PIPE</u>

9. UNDER-GROUND UTILITY MARKING TAPE
(Non-Detectable Only)

Description	Color Code: A.P.W.A.	Manufacturers
<p>1. Specifications: ASTM-1712</p> <p>Underground utility marking tape shall be in accordance with the A.P.W.A. National Color Code and shall be imprinted with an appropriate legend to define the type of utility line it protects.</p> <p>Tape shall be of a pigmented polyolefin film with a printed message on one side. The ink used to print the materials shall be permanent and cannot be removed by normal handling or upon underground burial.</p> <p>The polyethylene shall be chemically inert and shall not degrade when exposed to alkalies, acids, and other destructive substances commonly found in soils.</p> <p>Tape shall consist of a 4.0 mil overall thickness or as approved by Engineering.</p>	<p><u>SAFETY BROWN</u> – Force Effluent Mains</p> <p><u>SAFETY BLUE</u> – Potable Water Systems</p> <p><u>SAFETY GREEN</u> – Sanitary and Storm Sewer Systems</p> <p><u>SAFETY ORANGE</u> – Telephone, Cable & Telegraph Systems</p> <p><u>SAFETY PURPLE</u> – Reclaimed Water Lines</p> <p><u>SAFETY RED</u> – Electric Power & Systems</p> <p><u>SAFETY YELLOW</u> – Gas & Oil</p>	<p><u>SHIELDTEC</u> Thor</p> <p><u>REEF INDUSTRIES</u> Terra Tape</p>

10. WATER PIPE & TUBING

1 of 2

WATER PIPE	
Description	Manufacturers
1. Ductile Iron Pipe Detailed Provisions Section 15057 AWWA C-600, C-151, C-150, & C-104	<u>PACIFIC STATES</u> <u>U.S. PIPE</u>
2. High Density Polyethylene Pipe	<u>J-M MANUFACTURING COMPANY, INC.</u> <u>CHEVRON PHILLIPS CHEMICAL COMPANY</u>
3. High Density Polyethylene Pipe	<u>J-M MANUFACTURING COMPANY, INC.</u> <u>CHEVRON PHILLIPS CHEMICAL COMPANY</u>
4. Polyvinyl Chloride (PVC) Detailed Provisions Section 15064 4" thru 36" – C900	<u>CARLON PIPE</u> <u>CERTAIN-TEED CORP.</u> <u>JOHN-MANSVILLE CO. – "JM"</u> <u>NORTH AMERICAN PIPE CORP.</u> <u>PW PIPE CO.</u> <u>VINYL-TECH – "White Knight"</u> <u>DIAMOND PLASTICS CORP.</u> 4" thru 24"
5. Steel Pipe (Bare) 3" thru 10" – standard wall thickness 12" thru 54", ¼" wall thickness minimum Steel Certification Required	
6. Steel Pipe (CML&C) Detailed Provisions Section 15061 AWWA C-200, C-205 & C-303 (all classes) 4" thru 54"	<u>CONTINENTAL PIPE MAN</u> <u>ROSCOE MOSS</u> <u>MID AMERICA PIPE</u> <u>NORTHWEST PIPE COMPANY (AMERON)</u> <u>WEST COAST PIPE</u>

9. WATER PIPE & TUBING

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TUBING	
Description	Manufacturers
1. Copper Tubing – Type K Soft Water Service Installations ASTM B-88 ¾ thru 2”	
2. Copper Tubing – Type L Rigid Backflow Installations ASTM B-88 ¾ thru 3”	
3. Liner Insert (Stainless Steel)	<u>FORD CO.</u> #72 <u>JONES CO.</u> J-2806 <u>MUELLER CO.</u> #505142 <u>MCDONALD</u> #6136
4. Polyethylene Water Service Pipe 1”	<u>DRISCO</u> #5100 Ultraline <u>WESTFLEX</u> Gold Label – Class 200

II. FITTINGS

1. BRASS SERVICE FITTINGS

Std. Drawings B-590 – B-591A

1" thru 2" B-342 – B344B

1 of 2

Item	Manufacturers				
	CAMBRIDGE	FORD	JONES	MCDONALD	MUELLER
1. ¼-BEND (90 Ell)	105 (Series)	L04-44-NL L06-44-NL C04-44-NL C06-44-NL L84-44-NL L86-44-NL C86-44-NL F250	J-1548 J-1550	4776-22 4761-22	H-15530 H-15068
2. Angle Meter Stop	210 (Series) 105 (Series)	KV43-444-NL FV23-666W-NL FV23-777W-NL FV43-666W-NL FV43-777W-NL	J-4201 J-1973W J-1975W	4602-T 4602-22	H-14258 H14277 Mueller (110)
3. Corp Stop Ballcorp		FB700-NL (series) FB1000-NL (series) FB1100-NL (series)	J-1929 (series) J-1930 (series) J-1935	4701-T 4701-22	H-15000 (w/110) H-15013 (w/IPT) H-15023 (w/IPT) H-15008
4. Corp Stop Keycorp	301 (Series)	F-1000 (series) F-600 (series)	J-3401 (series) J-1500 (series) J-1505 (series)	4701-T 4701-22 4701	H-15000 (series) H-15008 (series)
5. Liner Inserts		Ford-72	J-2806	61362	Full Circle 316 SS #505142
6. Meter Bushings 1 ¼" x 1"		FORD-34-NL	J-128H	4134-239	H-10889
7. Meter Flange			J-129	610-F	
8. Meter Tail Piece (Meter Couplings)			J-130 J-134	4622 4624	
9. Service Curb Stops (gas-cock)	252NL	ZV-3W	J-182	10621S	H-11026

ASTM – 43 Copper Service

1. BRASS SERVICE FITTINGS
 Std. Drawings B-590 – B-591A
 1" thru 2" B-342 – B344B
 2 of 2

Item	Manufacturers				
	CAMBRIDGE	FORD	JONES	MCDONALD	MUELLER
10. Splicing Couplings		C44-44-NL	J-2609	4758	H-15403
		C22-66-NL	J-2610	4758-22	H-15456
		C44-66-NL	J-1528	4758-33	
		C22-77-NL		4756	
		C44-77-NL			
		C84-44-NL			
		C66-44-NL			

ASTM – 43 Copper Services

2. DUCTILE IRON FITTINGS
[Detailed Provisions Section 15057](#)

Description	Manufacturers
<p>Fittings shall be Ductile Iron and shall conform to ANSI/AWWA C153 / A21.53, ANSI/AWWA C111/A21.11, and ANSI/AWWA C110/A21.10.</p> <p>Fittings shall be Mechanical Joints or Push-on Joints.</p> <p>Fittings shall be Tar (seal) coated and Cement Mortar lined per ANSI A21.4 (AWWA C104).</p>	<p><u>ONE BOLT, INC.</u> ASTM / A536 Restraint Joint</p> <p><u>PACIFIC STATES</u></p> <p><u>PIPELINE COMPONENTS, INC.</u> M.J. Compact Fittings – All Sizes M.J. Full Body Fittings – All Sizes Push On Fittings – 4” thru 8”</p> <p><u>SERAMPORE INDUSTRIES PRIVATE LTD, INC.</u> SIP Industries C110 MJ</p> <p><u>SIGMA CORPORATION</u> Sigma/Nappco</p> <p><u>STAR PIPE PRODUCTS</u></p> <p><u>TYLER UNION</u> TufGrip Dual Wedge, Series 1500</p> <p><u>U.S. PIPE</u></p>

3. FLANGES

Description	Manufacturers
1. Companion Flange Cast Iron, Threaded	<u>JONES</u> Model: J-129. Size: 1 ½" & 2"
2. Ring Flange Std. Drawing B-288 1 ½" thru 54"	<u>RETECH INC. & CONTINENTAL MANUFACTURING</u> No. A-36 Steel Ring Flange No. A-283 "C" Steel Flange No. A-283 "D" Steel Flange
3. Meter Flange Bronze Std. Drawing B-342 thru B-344-B	<u>MCDONALD</u> #610-F. Size: 1 ½" & 2" 3" Class "D" Plate Flange with four ⅝" I.D. Bore For use on 3" Compound Meter Connection.
4. Meter Flange Steel Std. Drawing B-633	

4. FLEX COUPLINGS & FLEXIBLE EXPANSION JOINTS

Description	Manufacturers
1. Flex Couplings (Compression) Steel & Cast Iron ½" thru 36"	<u>FORD METER PRODUCTS</u> Model: F-Ringwall Series <u>ROMAC</u> Model: Romac 501 Series Model: Macro HP 4" thru 12" Alpha Series <u>SMITH-BLAIR</u> Model: SB-411, SB-441
2. Flex Expansion Joints 3" thru 36" min. offset: 11" for ≤ 12" diameter min. offset: 18" for > 12" diameter	<u>EBBA IRON</u> Flex-tend

5. PIPELINE FITTINGS

1 of 2

Description	Manufacturers
<p>1. Joint Restraints</p>	<p><u>EBAAC IRON</u> 2000 PV Series: 4" thru 24" (C-900) Model 1100 Series: 3" thru 48" 2100 Series: 4" thru 12" (C-900) 2800 Series: 14" thru 36" (C-900)</p> <p><u>FORD</u> Uni-flange Series Model 200, 900,1300 & 1400 Uni-flange Series Model 1500 restraint joint for PVC pipe 4" thru 12" Uni-flange Series Model 1390 restraint joint for PVC pipe</p> <p><u>NAPPCO/SIGMA CORP.</u> Model PV-Lok PVM: 2" thru 12" Model PV-Lok PVP: 2" thru 12" Model ONE LOK: 4" thru 36"</p> <p><u>ROMAC INDUSTRIES</u> Grip Ring 4" thru 12"</p> <p>Alpha Restrained Joints 4" thru 12" Flanged Coupling Adaptor, Coupling, and End Cap</p> <p><u>SIP INDUSTRIES</u> EZ-Grip</p> <p><u>SMITH BLAIR</u> Model C111/C120</p> <p><u>STAR</u> Allgrip 3600: 4" thru 12" for C900 and ductile iron pipe Series 1000: 4" thru 12" for C900 Series 1100: 4" thru 48" for C900 PVC Grip 3500: 4" thru 16" for C-900 Stargrip 3000: 4" thru 36" for D.I.P. PVC Stargrip 4000: 4" thru 36" for C900</p> <p><u>U.S. PIPE</u> Field Lok Gaskets: 4" thru 12"</p>

5. PIPELINE FITTINGS

2 of 2

Description	Manufacturers
2. Pipeline Adapters	<p><u>CERTAIN-TEED CORP.</u></p> <p><u>ROBAR</u> Models 1506, 1508, 1908</p> <p><u>ROMAC IND.</u> Model 500 Series Alpha Series</p> <p><u>SIGMA CORP.</u> Model Sigma/NAPPCO</p> <p><u>SMITH-BLAIR</u> Model SB-900 Series</p> <p><u>TYLER UNION</u></p>

6. VICTAULIC COUPLINGS & FITTINGS

Detailed Provisions Section 15077, Std. Drawing No. A-192

Description	Manufacturers
<p>1. Grooved Victaulic Couplings and Fittings</p>	<p><u>GUSTIN-BACON</u> Model: 100-IPS Model: 500-Ductile Iron</p> <p><u>VICTAULIC CO.</u> Style 31 – Coupling - 3” to 36”</p> <p>Style 307 – Transition Coupling – 3” to 12”</p> <p>Style 341 – Flange Adaptor – 3” to 24”</p> <p>Style 107N – QuickVic Rigid Coupling – 2” to 12”</p> <p>Style 177N – QuickVic Flexible Coupling – 2” to 12”</p> <p>Style W07 – AGS Rigid Coupling – 14” to 50”</p> <p>Style W77 – AGS Flexible Coupling – 14” to 72” w/ Grade “E” Gasket</p> <p>Style W741 – AGS Vic-Flange Adapter</p>

7. WELDED STEEL FITTINGS
[Detailed Provisions Section 15059](#)

Description	Manufacturers
<p>1. Steel Fittings Domestic Steel Various Sizes</p> <p>Shall be fabricated as shown on the contract drawings, and/or as specified in the Special Conditions.</p> <p>Flanges shall conform to the requirements of EMWD Std. Drawing B-288 made a part hereof by reference.</p> <p><u>Steel Certification Required</u></p>	

III. VALVES

1. AIR VALVES

[Detailed Provisions Section 15136](#)

Description	Manufacturers
1. Air Release Valve ¾"	<u>APCO VALVE CO.</u> Model: APCO #65
2. Air Release and Vacuum Valve Std. Dwgs. B-598 & B-367 1" & 2"	<u>APCO VALVE CO.</u> Model: 143C and 145C <u>CLA-VAL CO.</u> Model:361-CAV564B and 362-CAV332 <u>CRISPIN VALVE CO.</u> Model:UL-10 and UL-20 <u>EMPIRE VALVE CO.</u> Model: 940 <u>VALVMATIC VALVE CO.</u> Model: 201C and 202C
3. Air Release and Vacuum Valve Std. Drawing B-578 4" & 6"	<u>APCO VALVE CO.</u> Model:149-C and 150-C <u>CLA-VAL CO.</u> Model:364-CAV332 and 366-CAV732-3 <u>CRISPIN VALVE CO.</u> Model: UL-41 (4") and AL-61/PL-10 (6")
4. Air Valve Suction Screens Std. Dwgs. B-598 & B-367	<u>FLOW EZY FILTERS, INC.</u> M-6-8 (¾") – Stainless Steel M-8-8 (1") – Stainless Steel M-16-8 (2") – Stainless Steel
5. Pump Air Valve	<u>ARMSTRONG MACHINE WORKS</u> – Model: 21

2. APPURTENANCES

Description	Manufacturers
<p>1. Hose Bibbs (Brass) 300-lbs working water pressure For Treatment Plants</p>	<p><u>CALIFORNIA BRASS MFG. CO.</u> Calco Fig. 101</p> <p><u>FAIRBANKS VALVE CO.</u> Model: 150-S</p>
<p>2. Valve Cap & Riser</p> <p>Std. Drawing B-668</p> <p>6" C.I. Valve Cap Marked "Water" for Potable Water Marked "Recycled" for Recycled Water</p> <p>Galv. Split Valve Can Top Section – 6" O.D. x 22Ga. Slip Can length 12", 18" or 24", as required.</p> <p>Valve Can – 6 5/8" O.D. x 10 Ga. Double-Dip Pipe</p>	

3. BALL VALVES

Detailed Provisions Section 15104

Description	Manufacturers
1. Ball Valves AWWA C507	<u>LUNKENHEIMER COMPANY</u> <u>MARPAC, INC.</u> <u>VALVE TECHNOLOGY CO.</u> Models: D7410 – 7420 Series Models: D7421 – 7432 Series
2. Meter Ball Valves (with Handles)	<u>A.Y. MCDONALD</u> Model: 6101 MWH ($\frac{3}{4}$ " and 1") <u>JAMES JONES CO.</u> Jones Model: J1908W ($\frac{3}{4}$ " and 1") <u>THE FORD METER BOX CO., INC.</u> Model: B13-332 W ($\frac{3}{4}$ ") Model: B13-444 (1")

4. BUTTERFLY VALVES

Description	Manufacturers
<p>1. Class 150 Detailed Provisions Section 15103 AWWA C-504</p> <p>Coatings: valves shall have all ferrous parts epoxy coated per AWWA-C550 (fusion bonded)</p>	<p><u>AMERICAN FLOW CONTROL</u> Model: A.D. 150 Size: 4"-48"</p> <p><u>CLOW CO.</u> Model: Clow BFV. Class 150, Size: 4" thru 72"</p> <p><u>CRISPIN (Previously CMB Industries)</u> K-FLO Model: 500 Series, 3" thru 20" K-FLO Model: 47 Series, 24" thru 48"</p> <p><u>DEZURIK CO.</u> Model: Dezurik BFV. Class 150, Size: 4" thru 20"</p> <p><u>KENNEDY</u> Model: Kennedy BFV. Class 150 Size: 4" thru 72"</p> <p><u>KUBOTA</u> Model: Kubota BFV. Class 150, Size: 24" thru 48"</p> <p><u>M & H CO.</u> Model : 4500, Class 150, Size 4" thru 24" Model: 1450, Class 150B, Size 30" thru 48"</p> <p><u>MUELLER CO.</u> Model: Mueller Linesal III, Size: 4" thru 24" Model: Mueller Linesal III, Size: 30" thru 48" (with Ductile Iron Disc.)</p> <p><u>PRATT VALVE CO.-</u> Model: Pratt Ground Hog BFV. Class 150 with no Power Operation Allowed, Size: 4" thru 12" Model: Pratt Ground Hog with Power operation allowed with knowledge of turns. Size: 14" thru 48" Model: Pratt Triton XR-70 with Handwheel. Size: 24" thru 48"</p>
<p>2. Class 250</p> <p>Coatings: valves shall have all ferrous parts epoxy coated per AWWA-C550 (fusion bonded)</p>	<p><u>CRISPIN (Previously CMB Industries)</u> Model : K-FLO 500 Series</p> <p><u>DEZURIK</u> Model: BAW Series</p> <p><u>PRATT</u> Model: H.P. 250</p>

5. CHECK VALVES

Description	Manufacturers
<p>1. Bronze Threaded Swing Check Valve ¾" thru 2"</p>	<p><u>HAMMOND VALVE CO.</u> Model: 946 Bronze</p> <p><u>MILWAUKEE VALVE CO.</u> Model: 510 & 511</p> <p><u>STOCKHAM VALVE CO.</u> Model: B-320</p>
<p>2. Flanged Swing Check Valves shall be single disc type with spring and lever when so specified on the Bidding Sheet. Detailed Provisions Section 15111</p>	<p><u>APCO VALVE CO.</u></p> <p><u>CLOW CO.</u></p> <p><u>KENNEDY VALVE CO.</u></p> <p><u>M & H CO.</u></p> <p><u>MUELLER CO./PRATT</u></p> <p><u>STOCKHAM CO.</u></p>
<p>3. Wafer Check Valve w/Viton O-Ring Seal 4 thru 12"</p>	<p><u>PENTAIR</u> Keystone Prince Figure No. 810 & Figure No. 813-S & L Short Wafer Body Keystone Prince Figure No. F810-004 Keystone Prince Figure No. F813-519-S&L</p>

6. CONTROL VALVES

Detailed Provisions Section 15120

1 of 2

Description	Manufacturers
<p>1. Control Valves</p> <p>All control valves shall be flanged diaphragm type globe valves, with Cast-Iron Body, as manufactured by CLA-VAL Co., or approved equal. Epoxy shall be Thermo-Setting, Conforming to AWWA C-550. Delrin Stem. All Control Valves other than pressure reducing valves shall have Bronze Trim. Pressure Reducing Valves shall have Stainless Steel Trim.</p>	<p><u>CLA-VAL CO.</u></p>
<p>2. Pressure Regulators</p>	<p><u>AMES CO.</u> Model: Ames 900 Series Model: Ames 800 Series <u>CLA-VAL CO. Model: Clayton 90 Series</u> Model: Clayton 610 Series</p> <p><u>PRATT/WATT CO.</u> Model: Globe Fig. 115 – Class 125 Fig. 1115 – Class 250</p> <p><u>WATT CO.</u> Model: Watts 25 AUB, Bronze</p> <p><u>WILKINS</u> Model: Wilkins, 600 Cold Water & Air</p>

6. CONTROL VALVES

Detailed Provisions Section 15120

2 of 2

Description	Manufacturers
3. Pressure Relief Valves	<u>AMES CO.</u> Model: Ames 800 Series <u>CLA-VAL</u> Model: Series 50 & 51 <u>PRATT/WATTS CO.</u> Model: No. Globe – 116 Class 125, Angle-116 Class 250
4. Pump Control Valves	<u>AMES</u> Model Ames 800 Series <u>CLA-VAL</u> Model: 61-G <u>PRATT/WATTS</u> Model: Globe 513, Class 125 Model: Angle 1513, Class 250

7. GATE VALVES

Std. Drawing Nos. B-590 thru B-344-B

1 of 3

Description	Manufacturers
<p>1. Bronze Threaded NRS-½"</p>	<p><u>HAMMOND VALVE CO.</u> Model: 606-125 PSI</p> <p><u>MILWAUKEE VALVE CO.</u> Model: 105-200 PSI</p> <p><u>STOCKHAM VALVE CO.</u> Model: B-103-200 PSI</p>
<p>2. Bronze Threaded NRS ¾" thru 1"</p> <p>*To be used in customer side of meter installation only. Std. Drawing B-591</p>	<p><u>AMERICAN VALVE CO.</u> Model: Milano, M-300</p> <p><u>FAIRBANKS VALVE</u> Model: 125-S 250</p> <p><u>*F&F VALVE</u> Model: 710-Brass</p> <p><u>*KITZ VALVE</u> Code No. 27 Fig. AKH</p> <p><u>MILWAUKEE VALVE</u> Model: 1105M & #105</p> <p><u>NIBCO VALVE</u> Model: T-113-Domestic</p> <p><u>*PIONEER ENTERPRISES</u> Model: GTI-0102 & 0103</p> <p><u>RED AND WHITE VALVE</u> Model: 206</p> <p><u>STOCKHAM VALVE</u> Model: B-103</p> <p><u>WOLVERINE VALVE</u> Model: 50293</p>

7. GATE VALVES

Std. Drawing Nos. B-590 thru B-344-B

2 of 3

Description	Manufacturers
3. Bronze Threaded NRS 1 ½" thru 2"	<u>AMERICAN VALVE</u> Model: 3-F Bronze <u>MILWAUKEE VALVE</u> Model: 1105M & 105 <u>NIBCO VALVE</u> Model: T-113, Domestic <u>STOCKHAM VALVE</u> Model: B-103
4. Cast Iron With 2" Operating Nuts for 2" Blow-offs	<u>CLOW VALVE CO.</u> <u>IOWA VALVE</u> Model : List 14 <u>MUELLER VALVE</u> Model: A-2380-8 & A-2380-6 <u>RENSELSER VALVE</u> Model: Ludlow, list 13A <u>STOCKHAM VALVE CO.</u>
5. Flange x Hub End Resilient Gate Valves AWWA C-509	Ring-tite, Fluid-tite, or Approved Equal
6. Horizontal, Double-Disc Iron Body Bronze-Mounted (IBBM) with By-Pass 24"	<u>AMERICAN FLOW SYSTEMS</u> Model: A.D. "50-Line" <u>CLOW VALVE CO.</u> Model: Clow F5070 <u>MUELLER VALVE CO.</u> Model: A-2380-6

7. GATE VALVES

Std. Drawing Nos. B-590 thru B-344-B

3 of 3

Description	Manufacturers
<p>7. Resilient Seat Gate Valves Flanged AWWA C-509, C-515 and AWWA C-550 EMWD Detailed Provisions Section 15102 4" thru 36"</p>	<p><u>ACIPCO</u> Model: 82-200W-77785-7</p> <p><u>AMERICAN AVK CO.</u> Model: 25 AVK</p> <p><u>AMERICAN FLOW CONTROL CO.</u> Model: AFC-500 for 4" thru 12" Or Series 2500 for 4" thru 36"</p> <p><u>CLOW CO.</u> Model: Clow RW, Class 150</p> <p><u>KENNEDY</u> Model: Kennedy RS-Class 150</p> <p><u>M & H</u> Model: M & H #A-4067</p> <p><u>MUELLER CO.</u> Model: A-2360</p> <p><u>STOCKHAM CO.</u> Model: Stockham #G700-0</p> <p><u>TYLER</u> Model: DRS 250</p> <p><u>U.S. PIPE</u> Model: Metroseal, RS Class 150</p> <p><u>WATEROUS CO.</u> Model: Waterous #AFC-500</p>

8. PLUG VALVES

Description	Manufacturers
1. Eccentric Fullport Non-Lubricated Plug Valves 3" thru 24"	<u>DEZURIK</u> Model: G Series <u>HENRY PRATT CO.</u> Pratt Keystone 580 Series, #898

IV. SEWER

1. MANHOLES & CLEAN-OUTS

1 of 2

Description	Manufacturers
<p>1. Clean-Outs (Residential)</p>	<p><u>BROOKS PRODUCTS</u> <u>Model: 1-RD</u> <u>CHRISTY CONCRETE PRODUCTS</u> <u>Model: F8</u> <u>EISEL ENTERPRISES</u> <u>Model: 1VB-VC</u> <u>J&R CONCRETE</u> <u>Model: V1-R</u> <u>LONG BEACH IRON WORKS</u> Model: Apex</p>
<p>2. Manhole Covers & Frames 24" & 36" Std. Drawing SB-61</p> <p>Note: Cast Iron Lid To Be Marked "EMWD Sewer"</p>	<p><u>ALHAMBRA FOUNDRY</u> Model: A-1251 & A-1254 <u>EVERETT ENTERPRISES</u> Model: GTS – Pont-A-Mousson <u>FAMEX FOUNDRY</u> Model: F-1251 & F-1254 <u>NATIONAL CASTING CORP.</u> Model: NC-2531 <u>NEENAH FOUNDRY</u> Model: R-1593 <u>NORFOLK CASTING CORP</u> Model: NC-254 <u>RIVERSIDE FOUNDRY</u> Model: 1251 & 1254 <u>SOUTHBAY FOUNDRY</u> Model: SBF-1251 & 1254 Model: SBF-1348 with Pick Hole for EMWD Standard Drawing SB-30</p>

1. MANHOLES & CLEANOUTS

2 OF 2

Description	Manufacturers
<p>3. Manhole Covers & Frames Locking Std. Drawing SB-8</p> <p>Note: Cast Iron Lid To Be Marked "EMWD Sewer"</p>	<p><u>ALHAMBRA FOUNDRY</u> Model: No.A-1175</p> <p><u>FAMEX FOUNDRY</u> Model: F-1251</p> <p><u>LONG BEACH IRON WORKS</u> Model: RE85R3PD GTS</p> <p><u>NATIONAL CASTING CORP.</u> Model: NC-2531</p> <p><u>NEENAH FOUNDRY</u> Model: R-1251</p> <p><u>SOUTHBAY FOUNDRY</u> Model: SBF-1251</p>
<p>4. Manhole Shafts, Cones, Flat Tops & Grade Rings 24" thru 48"</p>	<p><u>AMERICAN HIGHWAY PRODUCTS</u></p> <p><u>AMERICAN PIPE</u></p> <p><u>ASSOCIATED CONCRETE</u></p> <p><u>B & W PRECAST CONSTR.</u></p> <p><u>HOWARD ENTERPRISES</u></p> <p><u>INLAND CONCRETE</u></p> <p><u>MANHOLE BUILDERS</u></p> <p><u>MAR-CON PRODUCTS</u></p> <p><u>OLSEN PRECAST</u></p> <p><u>RIALTO CONCRETE</u></p> <p><u>SAN DIEGO PRECAST</u></p> <p><u>SOUTHWEST CONCRETE</u></p>
<p>5. Manhole Steps</p>	<p><u>SOUTHWEST CONCRETE PRODUCTS</u></p> <p>Model: X040PS</p> <p>Model: X038PS</p>

2. SEWER PIPE & FITTINGS

1 OF 2

Description	Manufacturers
1. Reinforced Concrete Pipe	<u>AMERON</u> <u>HYDRO CONDUIT</u> <u>RIALTO PIPE</u>
2. Sewer Pipe Polyvinyl Chloride (PVC) & Acrylonitrile-Butadiene-Styrene (ABS) Fittings and pipe shall be from the same manufacturer when they make both. If manufacturer only makes pipe, fittings from 2.a. shall be used.	<u>ARMCO PIPE - (CONTECH)</u> <u>CARLON PIPE</u> <u>CERTAIN-TEED CORP.</u> <u>DIAMOND PLASTICS CORP.</u> SDR 35 PVC <u>JM EAGLE</u> <u>PRIME CONDUIT VYLON</u> 21" thru 48" <u>VINYL TECH</u> White Knight
a. PVC sewer fittings 4" thru 8" gravity use only	<u>BUILDING PRODUCTS CO.</u> JCP Compression Joints <u>GPK</u> <u>JM EAGLE</u> <u>MULTI-FITTINGS CORP.</u> <u>TIGRE</u> SDR 35 PVC
b. PVC sewer fittings 4" thru 8" gravity use only	<u>SYROCO INC</u> SDR 35

2. SEWER PIPES & FITTINGS

2 OF 2

Description	Manufacturers
3. Sewer Repair Couplings	<p><u>MISSION RUBBER</u> PVC MR56 44 ARC MR56 66 ARC MR56 88 ARC MR56 1212 ARC</p> <p>Clay MR01 44 ARC MR01 66 ARC MR01 88 ARC MR01 1212 ARC</p>
4. Tapping Saddle	<p><u>JOINTS COUPLINGS</u> TAP-N-TEE (Conditional/Emergency use only)</p>
5. Vitrified Clay Pipe (VCP) Note: fittings to be from same manufacturer as pipe	<p><u>BUILDING PRODUCTS CO.</u> <u>JCP Compression Joints</u></p> <p><u>GLADDING McBEAN Co.</u> <u>“Speed-Seal”</u></p> <p><u>MISSION CLAY PRODUCTS</u> <u>“Band-Seal”</u></p> <p><u>PACIFIC CLAY PRODUCTS</u> <u>“Wedgelock”</u></p>

V. ELECTRICAL

1. WIRING & BASIC ELECTRICAL MATERIALS

1 of 2

Description	Manufacturers
1. Insulated CP Test Connections & Blow-Off Connections Std. Drawing B-660 & B-662 #4 HMW – PE (High Molecular Wt-Polyethylene Coated) Stranded Wire Black #12 TW – Solid Wire – Green or Yellow	
2. Locating Wire Std. Drawing B-656 #14-1 UF Black Copper-Insulated Locating Wire	

1. WIRING & BASIC ELECTRICAL MATERIALS

2 of 2

Description	Manufacturers
<p>3. Telemetry Cable Std. Drawing B-533</p>	<p><u>ALCATEL DEDW</u> Telemetry wire, double-jacketed, filled polyethylene jacket for burial 5-mil copper shield, solid strand 6-pair, 19-gauge copper wire Alcatel DEDW. (Approximately 5,000 ft. Rolls)</p> <p>DISTRIBUTORS: <u>POWER AND TELEPHONE SUPPLY</u> Phone No.: 1-800-451-4381</p>
<p>4. Telemetry Hardware:</p>	<p><u>3M</u> Splice Kit Model No. 72-N2</p> <p><u>CHARLES INDUSTRIES</u> Pedestal Model No. CPLM8-1/GTE</p> <p><u>ENTRELEC</u> Terminal Model No. M4/6.SNB 0115686.13 Terminal End Stop Model No. 114836.00 DIN Rail Model No. 101598.26</p> <p>DISTRIBUTORS: <u>CHARLES INDUSTRIES</u> Phone No. (847) 806-6300</p> <p><u>REXEL ESD ELECTRICAL</u> Phone No. (760) 747-2211</p> <p><u>ROYAL WHOLESALE ELECTRIC</u> Phone No. (951) 683-6625</p>