

# **Sulphur Brine Field Flow Meters at Groundwater Wells**

*Submitted by:*

Westlake



November 24, 2023

## **BACKGROUND**

Order 4 of the Third Supplement to Compliance Order No. IMD 2022-027 issued by the State of Louisiana Department of Natural Resources Office of Conservation requires Westlake US 2, LLC (Westlake) to install metering devices for each groundwater extraction well to measure rates and volumes of freshwater withdrawal on a per-well basis.

In response to the order, Westlake has installed Optiflux 4000 electromagnetic flow meters at each of the five freshwater wells in service at the Sulphur Dome. Meters were installed at the following locations in the sizes indicated:

- Water well 11 – 10"
- Water well 12 – 8"
- Water well 13 – 8"
- Water well 19 – 10"
- Water well 40 – 12"

Installation of the meters is documented on P+IDs 01A-10090.RA and 01A-10090.RXA. Piping tie-ins and the line list are also included in the attachments.

The meters were specified in accordance with Westlake instrumentation and piping standards, and Recognized and Generally Accepted Good Engineering Practices.

The meters were specified and placed on order 11/3/2023. Meters were received and delivered to the work site on 11/9/2023. Instrument installation started on 11/13/2023, and was completed on 11/16/2023. Electrical work was completed and the instruments commissioned on 11/20/2023.

The meters have been incorporated into Westlake's standard instrument maintenance program. The instruments will be inspected every 6 months by qualified Westlake instrument mechanics. Repairs will be installed as needed by Westlake.

Meters will be manually recorded daily and reported in Westlake's daily observation report.

Water Well 11



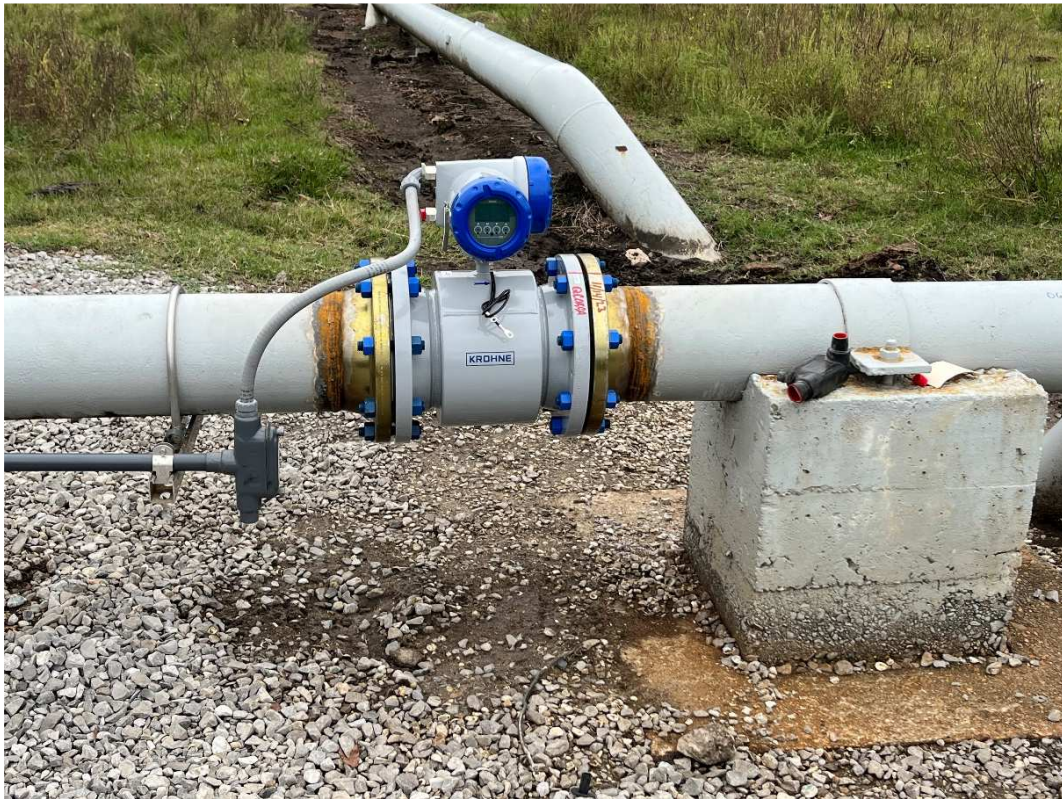


Water Well 12





Water Well 13





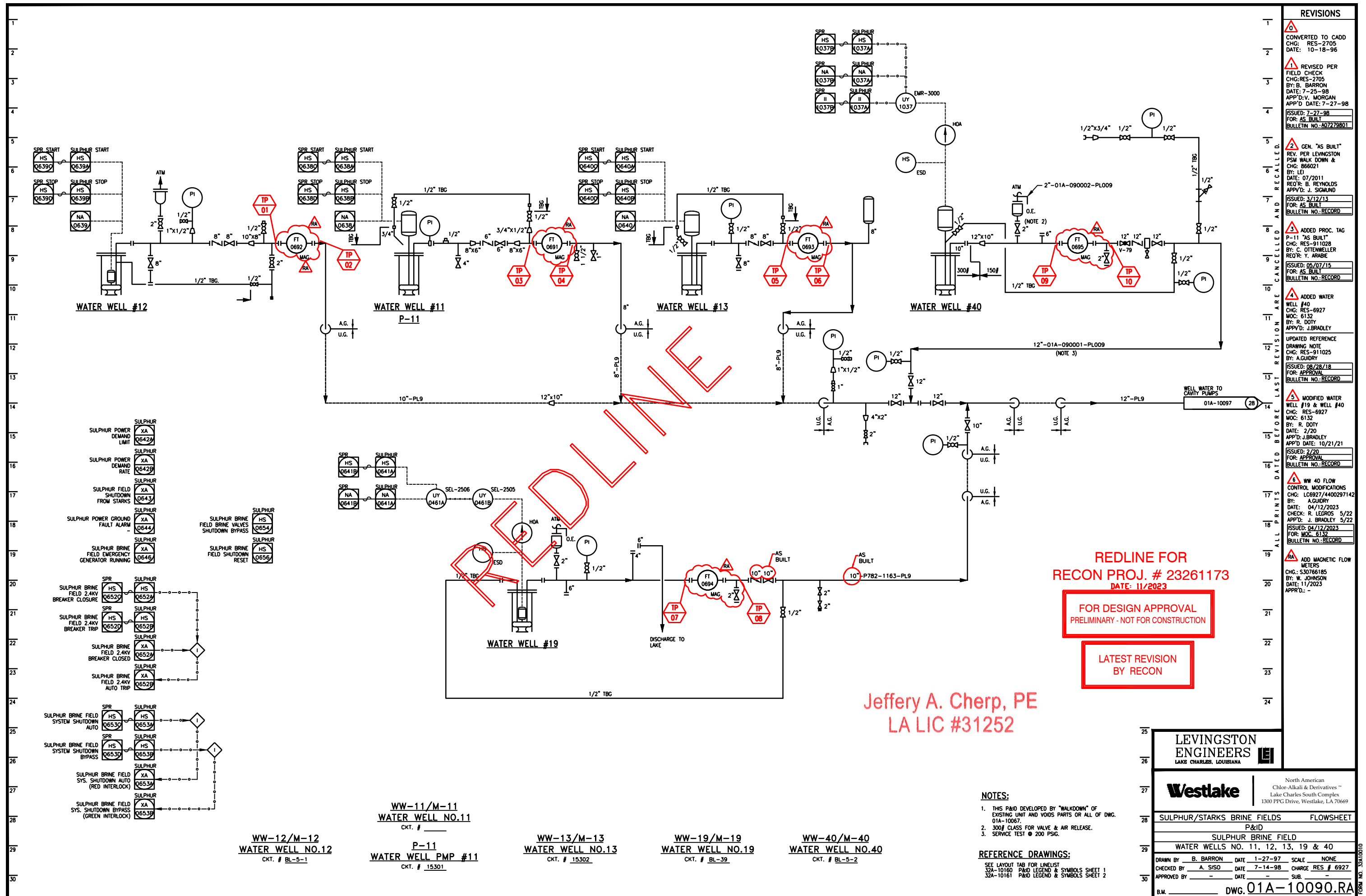
Water Well 19





Water Well 40





REVISIONS	
1	CONVERTED TO CADD CHG: RES-2705 DATE: 10-18-96
2	REVISED PER FIELD CHECK CHG: RES-2705 BY: B. BARRON DATE: 7-25-98 APP'D: V. MORGAN APP'D DATE: 7-27-98 ISSUED: 7-27-98 FOR: AS BUILT BULLETIN NO.: A07279801
3	GEN. "AS BUILT" REV. PER LEVINGSTON PSM WALK DOWN & CHG: 866021 BY: LEI DATE: 07/2011 REQ'D: B. REYNOLDS APP'D: J. SIGMUND ISSUED: 3/12/13 FOR: AS BUILT BULLETIN NO.: RECORD
4	ADDED PROC. TAG P-11 "AS BUILT" CHG: RES-911028 BY: C. OTTENWELLER REQ'D: Y. ARABIE ISSUED: 05/07/15 FOR: AS BUILT BULLETIN NO.: RECORD
5	ADDED WATER WELL #40 CHG: RES-6927 MOC: 6132 BY: R. DOTY APP'D: J. BRADLEY APP'D DATE: 10/21/21 ISSUED: 08/28/18 FOR: APPROVAL BULLETIN NO.: RECORD
6	MODIFIED WATER WELL #19 & WELL #40 CHG: RES-6927 MOC: 6132 BY: R. DOTY DATE: 2/20 APP'D: J. BRADLEY APP'D DATE: 10/21/21 ISSUED: 2/20 FOR: APPROVAL BULLETIN NO.: RECORD
7	WW 40 FLOW CONTROL MODIFICATIONS CHG: LC6927/4400297142 BY: A. GUDRY DATE: 04/12/2023 CHECK: R. LEGROS 5/22 APP'D: J. BRADLEY 5/22 ISSUED: 04/12/2023 FOR: MOC: 6132 BULLETIN NO.: RECORD
8	ADD MAGNETIC FLOW METERS CHG: 530760185 BY: W. JOHNSON DATE: 11/2023 APP'D: -

1	THIS P&ID DEVELOPED BY "WALKDOWN" OF EXISTING UNIT AND VOIDS PARTS OR ALL OF DWG. 01A-10067.
2	300# CLASS FOR VALVE & AIR RELEASE.
3	SERVICE TEST @ 200 PSIG.

SEE LAYOUT TAB FOR LINELIST 32A-10160 P&ID LEGEND & SYMBOLS SHEET 1 32A-10161 P&ID LEGEND & SYMBOLS SHEET 2
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Westlake	North American Chlor-Alkali & Derivatives™ Lake Charles South Complex 1300 PPG Drive, Westlake, LA 70669
SULPHUR/STARKS BRINE FIELDS	FLWSHEET
P&ID	
SULPHUR BRINE FIELD	
WATER WELLS NO. 11, 12, 13, 19 & 40	
DRAWN BY: B. BARRON	DATE: 1-27-97
CHECKED BY: A. SISO	DATE: 7-14-98
APPROVED BY: -	DATE: -
B.M.	DWG. 01A-10090.RA

THIS IS A REDLINE THE CHANGES WILL NEED TO BE ADDED TO THE ORIGINAL DRAWING.









[illegible]



Email: recon@recon-group.com

LOUISIANA OFFICE:  
P.O. BOX 29  
Sulphur, LA 70664  
1907 Ruth St.  
Sulphur, LA 70663  
Phone: (337) 583-4662  
Fax: (337) 583-7565

TEXAS OFFICE:  
550 Fannin Street, Suite 850  
Beaumont, TX 77701  
Phone: (409) 842-8103  
Fax: (409) 832-0202

## Document Transmittal

### Instrument Specification Package - Magnetic Flow Meter

DATE: 11/17/2023

TO: Westlake South

1300 PPG Drive

Lake Charles, LA 70602

ATTENTION: Meg Quinn

PROJECT TITLE: No. 7 Investigation Work

TRANSMITTAL NUMBER: 003

RECON PROJECT NUMBER: 23261173

CLIENT REFERENCE NUMBER:

#### Issued For:

- ☐ As-Builts
- ☐ For Approval
- ☐ For Review & Comment
- ☐ For Construction

- ☐ For Construction Revised
- ☐ For Design Approval
- ☐ Preliminary
- ☐ For Estimate Only

- ☒ For Record
- ☐ For Reference Only
- ☐ Return of Documents
- ☐ Unchecked

#### Transmittal includes:

- ☐ Bid Tabulations
- ☐ Calculations
- ☐ Drawings
- ☐ Engineering Estimate

- ☐ Opinion of Probable Cost
- ☐ Report
- ☐ Scope of Work
- ☐ Sketch

- ☒ Specifications
- ☐ Tie-In Schedule
- ☒ Vendor Data / Quotations
- ☐ FEL-3 Report

Transmittal Details: Transmitted via email in .pdf format.

#### Special Notes:

Document	Revision	Description	Issue
01A-FT-0691	0	Magnetic Flow Meter Data Sheet - Water Well #11	For Record
01A-FT-0692	0	Magnetic Flow Meter Data Sheet - Water Well #12	For Record
01A-FT-0693	0	Magnetic Flow Meter Data Sheet - Water Well #13	For Record
01A-FT-0694	0	Magnetic Flow Meter Data Sheet - Water Well #19	For Record
01A-FT-0695	0	Magnetic Flow Meter Data Sheet - Water Well #40	For Record
23-32176R2	REF	Accutrol Sales Quote (4 Pgs)	For Reference Only

Prepared By: Stacy Skaggs, Document Control

Issued By:

, Project Manager

Distribution:

Tim Gerami


John Leiber

Jason Gooze

Claire Owens

Jeff Cherp




		Westlake Lake Charles, Louisiana				TAG No.		01A-FT-0691		
		INSTRUMENT SPECIFICATION MAGNETIC FLOW METER				Sht No.		1 of 1		
Drawing Number		01A-FT-0691				Project No.		23261173		
Plant		WESTLAKE SOUTH PLANT				Rev.		0		
Location		LAKE CHARLES				Date		11/10/23		
Unit		SULPHUR BRINE FIELD				By		JSG		
						Chk		JAC		
						Appr		TG		
GENERAL	1	Tag Number		P&ID No.		01A-FT-0691		01A-10090		
	2	Service Description				Water Well #11 Flow Measurement				
	3	Line No.				8"-01A-PL009				
	4	Function				Flow Measurement				
	5	Mounting				Inline Process Connection				
	6	Area Classification				N/A				
	7	Electrical Installation								
	8									
PROCESS DATA	9	Fluid		Well Water						
	10	FLUID	Max. Flow		UOM		1200		GPM	
	11		Max. Velocity		UOM				ft/s	
	12		Norm. Flow		Min. Flow		UOM		600-800 0 GPM	
	13		Max. Temp.		Min. Temp.		UOM		120 Ambient Deg. F	
	14		Max. Press.		Min. Press.		UOM		200 0 PSIG	
	15		Min. Fluid Conductivity							
	16		Vacuum Possibility							
	17		Specific Gravity				1			
METERING ELEMENT	18	CONN.	Line Size		Schedule		8"		40 (Note 4)	
	19		Connection Type		8" 150# RF B16.5 Flange					
	20		Face to Face		13.78"					
	21	Flange Material		Carbon Steel (St 37-c22 / A 105)						
	22	METER	Tag Number		01A-FT-0691					
	23		Tube Material		Austenitic Stainless Steel					
	24		Liner Material		PFA					
	25		Electrode Type		Fixed					
	26		Electrode Material		Hastelloy C 22					
	27		Electrode Housing Configuration		Carbon Steel (St 37-c22 / A 105)					
	28		Power Supply		From Transmitter					
	29		Grounding, Type & Material		None (Virtual Reference)					
	30	Enclosure Class		IP66 / 67 DIN						
	31	Conduit Entries		N/A						
TRANSMITTER	32	Tag Number		01A-FT-0691						
	33	Function		Transmit						
	34	Mounting		Integral to flow tube						
	35	Enclosure Class		Aluminum Housing						
	36	Signal Cable		Length		DS 300 Signal				
	37	Electrical Connection		3 x 1/2" npt						
	38	Power Supply		120VAC, 60Hz						
	39	TRANS.	Transmitter Output		4-20 mA / HART, 2 Status, 1 Pulse					
	40		Calibration Range		0 - 1200 GPM					
	41	DISPLAY	Scale Size		Range		N/A 0-1200 GPM			
	42		Chart Drive		Speed		N/A N/A			
	43		Chart Range		Chart Number		N/A N/A			
	44	Integrator								
	45	CONTR.	Modes		Output					
	46		Action		Auto-Man.					
	47	ALARM	Contact No.		Form					
48	Rating		Elec. Code							
49	Action									
PURCHASE	50	Manufacturer		Krohne						
	51	Flow Tube Model Number		Optiflux 4000 - VN044EA01C0B1100000000000						
	52	Transmitter Model Number		IFC 300C-VN3044A0430010100100						
	53	Purchase Order Number								
	54	Serial Number								

**NOTES:**

1. Stainless Steel Name Tag stamped with Tag Number.
2. IFC Min Conductivity > 200 µMho/cm, 10 pipe diameter upstream +2 pipe diameter down stream.
3. Krohne Process Min Temp -40 °F + Max Temp 284 °F
4. Assumed per pipe spec plan to field verify.

NOV 15 2023

FOR  
RECORD

		Westlake Lake Charles, Louisiana				TAG No.		01A-FT-0692		
		INSTRUMENT SPECIFICATION MAGNETIC FLOW METER				Sht No.		1 of 1		
Drawing Number		01A-FT-0692				Project No.		23261173		
Plant		WESTLAKE SOUTH PLANT				Rev.		0		
Location		LAKE CHARLES				Date		11/10/23		
Unit		SULPHUR BRINE FIELD				By		JSG		
						Chk		JAC		
						Appr		TG		
GENERAL	1	Tag Number		P&ID No.		01A-FT-0692		01A-10090		
	2	Service Description				Water Well #12 Flow Measurement				
	3	Line No.				10"-01A-PL009				
	4	Function				Flow Measurement				
	5	Mounting				Inline Process Connection				
	6	Area Classification				N/A				
	7	Electrical Installation								
	8									
PROCESS DATA	9	Fluid		Well Water						
	10	FLUID	Max. Flow		UOM		2000		GPM	
	11		Max. Velocity		UOM				ft/s	
	12		Norm. Flow		Min. Flow		UOM		1600-1800 0 GPM	
	13		Max. Temp.		Min. Temp.		UOM		120° Ambient Deg. F	
	14		Max. Press.		Min. Press.		UOM		200 0 PSIG	
	15		Min. Fluid Conductivity							
	16		Vacuum Possibility							
	17		Specific Gravity				1			
METERING ELEMENT	18	CONN.	Line Size		Schedule		10"		40 (Note 4)	
	19		Connection Type		10" 150# RF B16.5 Flange					
	20		Face to Face		15.75"					
	21	Flange Material		Carbon Steel (St 37-c22 / A 105)						
	22	METER	Tag Number		01A-FT-0692					
	23		Tube Material		Austenitic Stainless Steel					
	24		Liner Material		PFA					
	25		Electrode Type		Fixed					
	26		Electrode Material		Hastelloy C 22					
	27		Electrode Housing Configuration		Carbon Steel (St 37-c22 / A 105)					
	28		Power Supply		From Transmitter					
	29		Grounding, Type & Material		None (Virtual Reference)					
	30		Enclosure Class		IP66 / 67 DIN					
	31	Conduit Entries		N/A						
	TRANSMITTER	32	Tag Number		01A-FT-0692					
		33	Function		Transmit					
34		Mounting		Integral to flow tube						
35		Enclosure Class		Aluminum Housing						
36		Signal Cable		Length		DS 300 Signal				
37		Electrical Connection		3 x 1/2" npt						
38		Power Supply		120VAC, 60Hz						
39		TRANS.	Transmitter Output		4-20 mA / HART, 2 Status, 1 Pulse					
40			Calibration Range		0 - 2000 GPM					
41		DISPLAY	Scale Size		Range		N/A		0-2000 GPM	
42			Chart Drive		Speed		N/A		N/A	
43			Chart Range		Chart Number		N/A		N/A	
44		Integrator								
45		CONTR.	Modes		Output					
46			Action		Auto-Man.					
47		ALARM	Contact No.		Form					
48	Rating		Elec. Code							
49	Action									
PURCHASE	50	Manufacturer		Krohne						
	51	Flow Tube Model Number		Optiflux 4000 - VN044FA01C0B1100000000000						
	52	Transmitter Model Number		IFC 300C-VN3044A0430010100100						
	53	Purchase Order Number								
	54	Serial Number								


**NOTES:**

1. Stainless Steel Name Tag stamped with Tag Number.
2. IFC Min Conductivity > 200 µMho/cm, 10 pipe diameter upstream +2 pipe diameter down stream.
3. Krohne Process Min Temp -40 °F + Max Temp 284 °F
4. Assumed per pipe spec plan to field verify.

NOV 15 2023

**FOR  
RECORD**




		Westlake Lake Charles, Louisiana				TAG No.		01A-FT-0693	
		INSTRUMENT SPECIFICATION MAGNETIC FLOW METER				Sht No.		1 of 1	
Drawing Number		01A-FT-0693				Project No.		23261173	
Plant		WESTLAKE SOUTH PLANT				RFQ No.		0	
Location		LAKE CHARLES				P.O. No.			
Unit		SULPHUR BRINE FIELD							
GENERAL	1	Tag Number		P&ID No.		01A-FT-0693		01A-10090	
	2	Service Description				Water Well #13 Flow Measurement			
	3	Line No.				8"-01A-PL009			
	4	Function				Flow Measurement			
	5	Mounting				Inline Process Connection			
	6	Area Classification				N/A			
	7	Electrical Installation							
	8								
PROCESS DATA	9	Fluid				Well Water			
	10	Max. Flow		UOM		1200		GPM	
	11	Max. Velocity		UOM				ft/s	
	12	Norm. Flow		Min. Flow		UOM		400-800 0 GPM	
	13	Max. Temp.		Min. Temp.		UOM		120° Ambient Deg. F	
	14	Max. Press.		Min. Press.		UOM		200 0 PSIG	
	15	Min. Fluid Conductivity							
	16	Vacuum Possibility							
METERING ELEMENT	17	Specific Gravity				1			
	18	Line Size		Schedule		8"		40 (Note 4)	
	19	CONN.		Connection Type		8" 150# RF B16.5 Flange			
	20			Face to Face		13.78"			
	21			Flange Material		Carbon Steel (St 37-c22 / A 105)			
	22	METER		Tag Number		01A-FT-0693			
	23			Tube Material		Austenitic Stainless Steel			
	24			Liner Material		PFA			
	25			Electrode Type		Fixed			
	26			Electrode Material		Hastelloy C 22			
	27			Electrode Housing Configuration		Carbon Steel (St 37-c22 / A 105)			
	28			Power Supply		From Transmitter			
	29			Grounding, Type & Material		None (Virtual Reference)			
	30			Enclosure Class		IP66 / 67 DIN			
	31			Conduit Entries		N/A			
TRANSMITTER	32	Tag Number				01A-FT-0693			
	33			Function		N/A			
	34			Mounting		Integral to flow tube			
	35			Enclosure Class		Aluminum Housing			
	36	Signal Cable		Length		DS 300 Signal			
	37			Electrical Connection		3 x 1/2" npt			
	38			Power Supply		120VAC, 60Hz			
	39	TRANS.		Transmitter Output		4-20 mA / HART, 2 Status, 1 Pulse			
	40			Calibration Range		0 - 1200 GPM			
	41	DISPLAY		Scale Size		Range		N/A 1200 GPM	
	42			Chart Drive		Speed		N/A N/A	
	43			Chart Range		Chart Number		N/A N/A	
	44			Integrator					
	45	CONTR.		Modes		Output			
	46			Action		Auto-Man.			
47			Contact No.		Form				
48	ALARM		Rating		Elec. Code				
49			Action						
PURCHASE	50	Manufacturer				Krohne			
	51	Flow Tube Model Number				Optiflux 4000 - VN044EA01C0B1100000000000			
	52	Transmitter Model Number				IFC 300C-VN3044A0430010100100			
	53	Purchase Order Number							
54	Serial Number								

**NOTES:**

1. Stainless Steel Name Tag stamped with Tag Number.
2. IFC Min Conductivity > 200 µMho/cm, 10 pipe diameter upstream +2 pipe diameter down stream.
3. Krohne Process Min Temp -40 °F + Max Temp 284 °F
4. Assumed per pipe spec plan to field verify.

NOV 15 2023

**FOR  
RECORD**

		Westlake Lake Charles, Louisiana				TAG No.		01A-FT-0694		
		INSTRUMENT SPECIFICATION MAGNETIC FLOW METER				Sht No.		1 of 1		
Drawing Number		01A-FT-0694				Project No.		23261173		
Plant		WESTLAKE SOUTH PLANT				Rev.		0		
Location		LAKE CHARLES				Date		11/10/23		
Unit		SULPHUR BRINE FIELD				By		JSG		
						Chk		JAC		
						Appr		TG		
GENERAL	1	Tag Number		P&ID No.		01A-FT-0694		01A-10090		
	2	Service Description				Water Well #19 Flow Measurement				
	3	Line No.				10"-01A-P782-1163-PL009				
	4	Function				Flow Measurement				
	5	Mounting				Inline Process Connection				
	6	Area Classification				N/A				
	7	Electrical Installation								
	8									
PROCESS DATA	9	Fluid				Well Water				
	10	FLUID	Max. Flow		UOM		2000		GPM	
	11		Max. Velocity		UOM				ft/s	
	12		Norm. Flow	Min. Flow	UOM		1400-1600		0 GPM	
	13		Max. Temp.	Min. Temp.	UOM		120°		Ambient Deg. F	
	14		Max. Press.	Min. Press.	UOM		200		0 PSIG	
	15		Min. Fluid Conductivity							
	16		Vacuum Possibility							
17	Specific Gravity				1					
METERING ELEMENT	18	CONN.	Line Size		Schedule		10"		40 (Note 4)	
	19		Connection Type		10" 150# RF RF B16.5 Flange					
	20		Face to Face		15.75"					
	21	Flange Material		Carbon Steel (St 37-c22 / A 105)						
	22	METER	Tag Number		01A-FT-0694					
	23		Tube Material		Austenitic Stainless Steel					
	24		Liner Material		PFA					
	25		Electrode Type		Fixed					
	26		Electrode Material		Hastelloy C 22					
	27		Electrode Housing Configuration		Carbon Steel (St 37-c22 / A 105)					
	28		Power Supply			From Transmitter				
	29		Grounding, Type & Material		None (Virtual Reference)					
	30	Enclosure Class		IP66 / 67 DIN						
	31	Conduit Entries		N/A						
TRANSMITTER	32	Tag Number		01A-FT-0694						
	33	Function		Transmit						
	34	Mounting		Integral to flow tube						
	35	Enclosure Class		Aluminum Housing						
	36	Signal Cable	Length		DS 300 Signal					
	37	Electrical Connection		3 x 1/2" npt						
	38	Power Supply		120VAC, 60Hz						
	39	TRANS.	Transmitter Output		4-20 mA / HART, 2 Status, 1 Pulse					
	40		Calibration Range		0 - 2000 GPM					
	41	DISPLAY	Scale Size	Range	N/A		0-2000 GPM			
	42		Chart Drive	Speed	N/A		N/A			
	43		Chart Range	Chart Number	N/A		N/A			
	44	Integrator								
	45	CONTR.	Modes	Output						
46	Action		Auto-Man.							
47	ALARM	Contact No.	Form							
48		Rating	Elec. Code							
49		Action								
PURCHASE	50	Manufacturer		Krohne						
	51	Flow Tube Model Number		Optiflux 4000 - VN044FA01C0B1100000000000						
	52	Transmitter Model Number		IFC 300C-VN3044A0430010100100						
	53	Purchase Order Number								
	54	Serial Number								


**NOTES:**

1. Stainless Steel Name Tag stamped with Tag Number.
2. IFC Min Conductivity > 200 µMho/cm, 10 pipe diameter upstream +2 pipe diameter down stream.
3. Krohne Process Min Temp -40 °F + Max Temp 284 °F
4. Assumed per pipe spec plan to field verify.
5. Replacing existing transmitter/meter.

NOV 15 2023

**FOR  
RECORD**



		Westlake Lake Charles, Louisiana				TAG No.		01A-FT-0695		
		INSTRUMENT SPECIFICATION MAGNETIC FLOW METER				Sht No.		1 of 1		
Drawing Number		01A-FT-0695				Project No.		23261173		
Plant		WESTLAKE SOUTH PLANT				Rev.		0		
Location		LAKE CHARLES				Date		11/10/23		
Unit		SULPHUR BRINE FIELD				By		JSG		
						Chk		JAC		
						Appr		TG		
GENERAL	1	Tag Number		P&ID No.		01A-FT-0695		01A-10090		
	2	Service Description				Water Well #40 Flow Measurement				
	3	Line No.				12"-01A-090002-PL009				
	4	Function				Flow Measurement				
	5	Mounting				Inline Process Connection				
	6	Area Classification				N/A				
	7	Electrical Installation								
	8									
PROCESS DATA	9	Fluid		Well Water						
	10	FLUID	Max. Flow		UOM		2500		GPM	
	11		Max. Velocity		UOM				ft/s	
	12		Norm. Flow		Min. Flow		UOM		2000-2200 0 GPM	
	13		Max. Temp.		Min. Temp.		UOM		120° Ambient Deg. F	
	14		Max. Press.		Min. Press.		UOM		200 0 PSIG	
	15	Min. Fluid Conductivity								
	16	Vacuum Possibility								
	17	Specific Gravity				1				
METERING ELEMENT	18	CONN.	Line Size		Schedule		12"		STD (Note 4)	
	19		Connection Type		12" 150# RF B16.5 Flange					
	20		Face to Face		19.69"					
	21	Flange Material		Carbon Steel (St 37-c22 / A 105)						
	22	METER	Tag Number		01A-FT-0695					
	23		Tube Material		Austenitic Stainless Steel					
	24		Liner Material		PFA					
	25		Electrode Type		Fixed					
	26		Electrode Material		Hastelloy C 22					
	27		Electrode Housing Configuration		Carbon Steel (St 37-c22 / A 105)					
	28		Power Supply		From Transmitter					
	29		Grounding, Type & Material		None (Virtual Reference)					
	30	Enclosure Class		IP66 / 67 DIN						
	31	Conduit Entries		N/A						
TRANSMITTER	32	Tag Number		01A-FT-0695						
	33	Function		Transmit						
	34	Mounting		Integral to flow tube						
	35	Enclosure Class		Aluminum Housing						
	36	Signal Cable		Length		DS 300 Signal				
	37	Electrical Connection		3 x 1/2" npt						
	38	Power Supply		120VAC, 60Hz						
	39	TRANS.	Transmitter Output		4-20 mA / HART, 2 Status, 1 Pulse					
	40		Calibration Range		0 - 2500 GPM					
	41	DISPLAY	Scale Size		Range		N/A		0-2500 GPM	
	42		Chart Drive		Speed		N/A		N/A	
	43		Chart Range		Chart Number		N/A		N/A	
	44	Integrator								
	45	CONTR.	Modes		Output					
	46		Action		Auto-Man.					
	47	ALARM	Contact No.		Form					
48	Rating		Elec. Code							
49	Action									
PURCHASE	50	Manufacturer		Krohne						
	51	Flow Tube Model Number		Optiflux 4000 - VN044GA01C0B1100000000000						
	52	Transmitter Model Number		IFC 300C-VN3044A0430010100100						
	53	Purchase Order Number								
	54	Serial Number								

**NOTES:**

1. Stainless Steel Name Tag stamped with Tag Number.
2. IFC Min Conductivity > 200 µMho/cm, 10 pipe diameter upstream +2 pipe diameter down stream.
3. Krohne Process Min Temp -40 °F + Max Temp 284 °F
4. Assumed per pipe spec plan to field verify
5. Replacing existing transmitter/meter.

NOV 15 2023

**FOR  
RECORD**

# Engineering Standard-Piping

 <b>Westlake Chemical Corporation</b>	DOCUMENT: <b>PL-009</b> REVISION DATE: 12/01/22 PAGE: 1 of 9
DOCUMENT TITLE: <b>WATER-GENERAL SERVICE</b>	

## APPLICABILITY

This document provides materials specifications, engineering considerations, and fabrication requirements for carbon steel piping systems, with ASME Class 150 flanges, that transport most types of water. Types of water included are well water, cooling tower water, & chilled water. Potable water, typically used for safety showers, eye wash stations, bathrooms, and laboratories, is now covered under PL-441. Although historically this standard covered potable water, PL-441 shall be used for all potable water applications to avoid cross contamination and address higher quality potable water standards.

The performance of carbon steel piping in water depends largely on the oxygen content or the water treatment programs.

Care must be exercised when using well water in enclosed spaces that the entrained natural gas does not buildup and cause a flammable or explosive mixture that would result in fire or explosion were an ignition source available.

## PRESSURE TEMPERATURE LIMITS

Design Press. PSIG	285	260
Vacuum Rating	----- Full Vacuum -----	
Design Temp. °F	-20 to 100	200
Hydrostatic Test Pressure	450	

Remarks --1. The above ratings follow ASME ratings for ASME B16.5 flanges and flanged equipment with the same class rating specified herein. All other components specified meet the design pressures & temperatures stated with the possible exception of certain valves (see Valve Notes for further details and restrictions). These pressure/temperature ratings became effective 12/01/22, therefore all piping systems constructed to this standard after this date are rated to these pressures and temperatures.

2. Original pressure/temperature rating of this system was FV to 150 psig and -20F to 200F. Legacy piping systems built before 12/01/22 will continue to maintain those original ratings unless they are re-certified to ratings outside of the original limits. Legacy piping systems constructed prior to 12/01/22 that were originally rated to 150 psig and 200F can only be accepted as having the new class ratings if:
  - 1) All components are verified as ASME B31.3 compliant and their pressure/temperature ratings have been verified.
  - 2) A full API 579/ASME FFS-1 Fitness-For-Service evaluation has been performed to confirm legacy piping system is satisfactory for the new class pressure rating.
3. Piping built per this specification will structurally withstand full vacuum conditions, but would not be reliable for continuous high vacuum leak tightness.

## REGULATIONS

This commodity is not considered a hazardous material and is not covered by OSHA or other regulatory agencies dealing with releases.



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## PIPE

- 2" & below ----- Steel, Schedule 80 (ASTM A106 Grade B or ASTM A53 Grade B Type S).  
 3" thru 10"----- Steel, Schedule 40/Standard wall, (ASTM A53 Grade B Type E or S).  
 12 thru 24" ----- Steel, Standard wall (.375), (ASTM A53 Grade B Type E or S)  
 Over 24" ----- Consult Engineering

Remark(s): 1. Listed Pipe Schedules allow for 1/16" corrosion allowance at 285 psig pressure rating.

## FLANGES

Steel, 150# Class, Raised Face Weld Neck (RFWN). The flange bore is to be the same as the adjoining pipe. Dimensions and pressure ratings are per ASME B16.5. Steel is per ASTM A105.

- Remarks: -1. Minimize flange joints to reduce potential leak points and costs.  
 2. Raised Face Slip-On (RFSO) and Raised Face Socket Weld (RFSW) flanges are also acceptable in this service when RFWN flanges are not possible or practical. RFSO flanges shall be welded inside and outside to develop flange strength and seal the crevice.  
 3. Slip-on flanges have larger gasket surfaces IDs. This results in higher gasket stresses. This has occasionally caused problems in smaller flanges and plastic lined equipment (lined butterfly valves), where the gasket can be crushed or the liner can be cut and/or cold-flowed. Check the attaching equipment's ability to accommodate RFSOs before installing.  
 4. Threaded flanges should be used only when other types are unacceptable.  
 5. Use flat face flanges where required by equipment being bolted to.

Orifice Flanges are to be 300# weld neck orifice flanges bored to the same ID as the attached pipe. The steel is to be per ASTM A105. Dimensions to be per ASME B16.36 and ASME B16.5. Flanged orifice taps are preferred when available and spacing allows. If threaded orifice taps are deemed necessary, fittings must be schedule 160 and threads must be back-welded at connection to orifice flange. Back-welding of orifice valves should not be done unless valve is confirmed to be weldable by the valve manufacturer.

## WELD FITTINGS

Steel butt-weld fittings per ASTM A234 Grade WPB or ASTM A105 (Steel specification), and ASME B16.9 (physical dimensions). Fittings are to be the same schedule as the pipe being joined.

- Remark(s) 1. Butt weld fittings are preferred due to smoother flow characteristics, reduced corrosion crevices, easier painting, and ability to be non-destructively tested (NDT). Socket-weld fittings (steel 3000#, ASTM A105 and ASME B16.11) may be used on 2" and smaller pipe sizes. Socket fitting welds are required to be double-pass fillet welds.  
 2. Socket-weld fittings are acceptable, but less preferred, (see Remark 1 above) for 2" pipe and below where welding conditions hampers the ability to make small diameter butt welds. Use 3000# type per ASME B16.11 and ASTM A105.

## THREADED FITTINGS

2" & below: ---- Steel, ASTM A105, 3000# class per ASME B16.11.

- Remark(s): -- 1. Threaded piping systems should be minimized. With the exception of vents and drains threaded piping systems should only be used over contained areas. When used, back-welding is recommended to obtain a more leak tight system. Do not back weld valves or other equipment that would be damaged by welding heat. Use thread sealant only where back-welding is not to be done.  
 2. Where a threaded/screwed piping assembly branches off of a 3" or larger header, a flanged valve shall be located at the header with no threaded connections between the valve and the header. This provides a more rugged tie-in assembly for isolation of the branch. Vents and drains are not considered branches. Threaded components are allowed on vents and drains. Threaded vent and drain connections must be schedule 160 and back-welded, except for valves that would be damaged by welding.  
 3. Paint exposed external pipe threads and fittings after assembly. Paint with approved Westlake painting system.

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4. Due to threaded piping systems being of small bore, proper physical support of attachments such as valves and instruments shall be part of the design.

## UNIONS

2" & below ----- Steel, 3000#, steel-to-steel, ground joint type, ASTM A105.

Above 2" ----- Use Flanges.

Remarks ----- 1. Minimize the use of unions to avoid potential leak points.

## PIPE THREAD SEALANT

RectorSeal #5 or #7; Loctite PST565, PST567 or 554.

## GASKETS

Material ----- 1. Non-Asbestos Composition sheet per PL-B-24, Group 3.0.

2. Filled PTFE per PL-B-24 Group 2.0.

3. SBR Red Rubber per PL-B-24, Group 7.3. See Remarks.

4. Neoprene Rubber per PL-B-24, Group 7.2. This gasket is recommended for use when bolting to non-metallic flanges. See Remarks.

5. Graphite with 316 Stainless Steel Foil stiffener/carrier per PL-B-24 Group 1.0.

Thickness ----- 1/16"; other thickness acceptable where required.

Shape ----- 150# class ring gaskets per ASME B16.21. Other gasket configurations may be ordered as required by equipment.

Remarks ----- Rubber gaskets, while offering easy seal ability, can be easily crushed by over torquing or pipe forces applied to the flanges. Care should be taken during engineering and installation that crushing forces are not applied. Limiting rubber gaskets to flat face flanges or other large-area sealing surfaces is recommended.

## BOLTING

Studbolts ----- Alloy Steel with Class 2A threads, per ASTM A193 Gr. B7.

Nuts ----- Carbon Steel, Heavy Hex with Class 2B threads per ASTM A194 Gr. 2H.

- Remark(s) -----
1. Zinc and Cadmium plated bolts are prohibited.
  2. Fluoropolymer coated studbolts (ASTM A193 Gr. B7) and nuts (ASTM A194 Gr. 2H) may be used for improved corrosion resistance.
  3. Where thermal cycling or vibration is present use uncoated studs or use a thread locker such as Loctite 242 or 262. Loctite 7649 (Primer N) fast sets thread lockers on coated bolts.
  4. Stud bolts shall be installed such that on one end, at least one thread, and no more than two threads extend past nut. This provides full nut engagement but eases disassembly. See Westlake Engineering Standard PL-B-25 for more details.
  5. Do not weld on stud or nuts. B7 and 2H nuts are made of heat treatable steels. Welding creates a brittle region around the weld that can generate a fracture.

## BRANCH CONNECTIONS

The chart specifies branch connections that are cost effective and meet the pressure design requirements of B31.3. Other types are acceptable when circumstances dictate and the designer verifies suitability.

		BRANCH SIZE															
		1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12	14	16	18	20	24
HEAD ELEMENT	1/2"	T															
	3/4"	T <sub>R</sub>	T														
	1"	T <sub>R</sub>	T <sub>R</sub>	T													
	1 1/2"	T <sub>R</sub>	T <sub>R</sub>	T <sub>R</sub>	T												
	2"	T <sub>R</sub>	T <sub>R</sub>	T <sub>R</sub>	T <sub>R</sub>	T											
	3"	OL	OL	T <sub>R</sub> , OL	T <sub>R</sub> , OL	T <sub>R</sub>	T										
	4"	OL	OL	OL	OL	T <sub>R</sub> , SB	T <sub>R</sub>	T									
	6"	OL	OL	OL	OL	SB	T <sub>R</sub> , SB	T <sub>R</sub>	T								
	8"	OL	OL	OL	OL	BP	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T <sub>R</sub>	T							
	10"	OL	OL	OL	OL	BP	BP	BP	T <sub>R</sub> , BP	T <sub>R</sub>	T						
	12"	OL	OL	OL	OL	BP	BP	BP	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T <sub>R</sub>	T					
	14"	OL	OL	OL	OL	SB	SB	SB	SB	T <sub>R</sub> , SB	T <sub>R</sub> , SB	T <sub>R</sub> , SB	T				
16"	OL	OL	OL	OL	SB	SB	SB	SB	T <sub>R</sub> /SB	T <sub>R</sub> , SB	T <sub>R</sub> , SB	T <sub>R</sub> , SB	T				
18"	OL	OL	OL	OL	SB	SB	SB	SB	SB	T <sub>R</sub> , SB	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T			
20"	OL	OL	OL	OL	OL	OL	OL	OL	OL	T <sub>R</sub> , OL	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T		
24"	OL	OL	OL	OL	OL	OL	OL	OL	OL	OL	T <sub>R</sub> /OL	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T <sub>R</sub> , BP	T	

### Legend T - Tee

**TR** - Reducing Tee or Tee with Concentric Reducer

**OL** - Weld/Sock/Thread-O-Let

**SB** - Simple Branch

**BP** - Branch with reinforcement pad; pad thickness = run pipe, pad width = half the branch OD

**BFE** - Branch with full encirclement reinforcement; reinforcement length = twice branch OD

### Remarks

- The table lists branch connections that are mechanically sound and labor efficient for the size/schedule combination. Where the required components are unavailable, other types listed in the legend may be used as long as the requirements of ASME B31.3 are met.
- OL refers to integrally reinforced branch connections commonly called Weld-o-Lets, Sock-o-Lets, or Thread-o-Lets. The type of OL used depends on the fittings specified for that size in other requirements of this standard. The Weld/Sock/Thread-o-Let name is the Bonney-Forge Co.'s name for their integrally reinforced branch connection fittings. Other companies have different names for theirs such as the WFI Co.'s Pipets.
- OL type fittings are acceptable for most branch connections, but they are not listed where they are not labor efficient. O-lets require full weld out of the weld bevel to achieve reinforcement requirements unless otherwise confirmed by engineering calculation. This requires large welds for large sizes, and size on size branches. This is labor intensive and distortion is a possibility.
- Where vibration or substantial loading is applied to a branch connection the designer should evaluate and specify a suitable type, not necessarily the type listed in the table. Tees, full encirclement reinforcement, and reinforcement pads tend to distribute loads more uniformly than other types, particularly with thin wall pipe.
- See note under Threaded Fittings concerning threaded piping branches.



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## TUBE & TUBE FITTINGS

Where pipe sizes less than or equal to ½" NPS are desirable tubing and compression tubing fitting are preferred. Typical uses are connections to instrumentation, small purging ports, and chemical addition ports.

### Tube

¼" to ½" ----- 316 Stainless Steel, 035" wall thickness soft annealed per ASTM A269 Grade TP316. Do not use plastic coated tubing.

### Tube Fittings

¼" to ½" ----- 316 Stainless Steel, Compression/ferrule type, Swagelok® or approved equal.

Remarks ----- 316 stainless steel tubing is susceptible to external chloride stress cracking where the tubing is (a) covered by insulation such as in a steam tracing application, or (b), external conditions tend to be continually moist and corrosive. In those situations higher alloys (Monel, Hastelloy C or Alloy 20) are recommended. Contact Materials Engineering for assistance.

## INSTRUMENTATION MATERIALS

INSTRUMENT TYPE			PREFERRED	OPTIONS LIMITED TO SOME CONDITIONS		
ORIFICE PLATES, THERMOWELLS, PITOT TUBES, ANNUBARS, CONTACT RADAR, & VORTEX METER			316SS <sup>1</sup>	N/A	N/A	N/A
PRESSURE SENSORS-DIFFERENTIAL (DP) OR GAUGE	Process Wetted Body Parts	Body & Manifolds	316SS <sup>1</sup>	N/A	N/A	N/A
		Diaphragms	Hastelloy C	Tantalum	N/A	N/A
		O-rings	Glass Filled PTFE	N/A	N/A	N/A
		Vents/Drains	Hastelloy C	N/A	N/A	N/A
	Diaphragm Fill Fluid		Inert	N/A	N/A	N/A
MAGNETIC FLOW TUBE	Body (Lined)		CS <sup>1</sup> or 316SS <sup>1</sup>	N/A	N/A	N/A
	Body Liner		PTFE/PFA	N/A	N/A	N/A
	Grounding Ring		316SS	N/A	N/A	N/A
	Electrode Choices		316SS	N/A	N/A	N/A
CORIOLIS FLOW TUBE	Flow Tubes/Body		316SS <sup>1</sup>	N/A	N/A	N/A
RADAR, NON-CONTACT	Cone Antenna		316SS	N/A	N/A	N/A
	Rod Antenna		PFA	N/A	N/A	N/A
	Seal		PTFE	N/A	N/A	N/A
TRANSMITTER HOUSINGS & TERMINAL CONNECTION HEADS			Use powder-coat,-fusion-bonded epoxy coated low-copper aluminum	Plastic Housings (PBT) may be used where there is no chance of prolonged exposure to detrimental solvents, other chemicals or excessive heat. Consider mechanical damage and sandblasting also. -316SS is preferred in caustic areas and can be used elsewhere when desired.		

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## NOTES

- At temperatures over 140°F, 316SS is subject to external chloride stress corrosion cracking. If 316SS is used above this temperature and exposed to the external environment, it should be externally coated with high temperature silicone paint designed to prevent chloride stress cracking in stainless steel (Example: PPG Pitt-Therm or equal). All carbon steel components must be coated regardless of temperature. The coating will be a fusion bonded epoxy and polyurethane topcoat. Other coatings or no coating must be approved by Westlake personnel.
- At temperatures over 150°F, consult instrument manufacturer for temperature limitations.
- Material Specifications:  
**304/304L s.s.** - UNS S30400/S30403 (wrought); ASTM A351 Grade CF8/CF3 (cast)  
**316/316L s.s.** - UNS S31600/S31603 (wrought); ASTM A351 Grade CF8M/CF3M (cast)  
**2205 duplex s.s.** - UNS S31803 (wrought); ASTM A890 Grade 4A CD3MN (cast)  
**2507 duplex s.s.** - UNS S32750 (wrought); ASTM A890 Grade 5A CE3MN (cast)  
**Alloy 20** - UNS N08020 (wrought); ASTM A351 CN7M (cast)  
**Incoloy 800** - UNS N08800; **800H** - UNS N08810; **800HT** - UNS N08811  
**Inconel 600** - UNS N06600 (wrought); ASTM A494 CY40 (cast)  
**Monel 400** - UNS N04400 (wrought); ASTM A494 Grade M-35-1 (cast)  
**Nickel 200** - UNS N02200 (wrought); ASTM A494 CZ100 (cast)  
**Nickel 201** - UNS N02201 (wrought); ASTM A494 CZ100M (cast)  
**Hastelloy C276** - UNS N602276 (wrought); ASTM A494 CW12MW (cast)  
**Hastelloy C22** - UNS N06022 (wrought); ASTM A494 CX2MW (cast)  
**Hastelloy C2000** - UNS N06200 (wrought)  
**Titanium Grade 2** - UNS R50400 (wrought); ASTM B367 Grade C-2 (cast)  
**Titanium Grade 7** - UNS R52400 (wrought); ASTM B367 Grade C-7 (cast)  
**Tantalum** - UNS R05200/R05400 & R05252 - 2%W (wrought)  
**Silver** - UNS P07020 (wrought)

## VALVES

	THREADED END	FLANGED END	SOCKET WELD	BUTT WELD
GATE	V-24 V-245	V-31 V-241 <sup>1,2</sup> V-15 <sup>2</sup>		
GLOBE	V-112 V-60 <sup>2</sup>	V-79 V-237 <sup>2</sup>		
PLUG	V-191	V-190 <sup>2</sup>		
BALL	V-156	V-159 <sup>2</sup> , V-157, V-333		
CHECK	V-127 V-236 <sup>2</sup>	V-80, V-40 <sup>2</sup> , V-652		
BUTTERFLY		V-239 <sup>2</sup> , V-284 <sup>2</sup> , V-205 <sup>2</sup> , V-572 <sup>2</sup> , V-675 <sup>2</sup>		
DIAPHRAGM				
SRV 3-WAY	V-366	V-367		
OTHER	V-502			

- For underground use.
- Pressure Ratings may/will be below the limits set by this standard due to body pressure ratings and/or soft seal temperature limitations. Consult Materials Engineering or manufacturer for pressure and temperature ratings.

## VALVE PACKING

- PL-B-28- Group 5, Formed Grafoil rings and braided carbon/graphite top and bottom ring. For partial repack, use braided graphite.
- PL-B-28 Group 3, Lattice braided PTFE fiber, lubricated with PTFE dispersion.

## ENGINEERING & FABRICATION DETAILS

- The system shall meet the requirements of ASME B31.3.
  - New systems shall be evaluated according to the requirements of ASME B31.3 to determine if a flexibility analysis is required.
  - Replacement piping or piping of identical, or very similar geometry to an existing successful system do not require a flexibility analysis.
- All lines shall be properly supported as per Westlake Engineering Standards PL-B-18 or D5-7002 and associated standards. Support piping on elevating shoes (do not use eel slips) to avoid crevice type of corrosion at the pipe supports.

3. Expansion Joints shall meet the requirements of PL-B-29.
4. Vent and drain valves shall be placed in accessible locations. To avoid accidental opening and fugitive emissions, all high point vent valves shall be removed and plugged or blinded. All low point drain valves shall be plugged or blinded.
5. When tapping or branching into a header, the preferred method is to use Weld-o-lets.
6. All connections to process lines shall be at least 1/2" NPS, and preferably larger.
7. Contractors and Westlake maintenance groups must adhere to the requirements in Westlake Engineering standard PL-B-32, "Piping Fabrication & Installation Quality Control Requirements". PL-B-32 clarifies the requirements stated in the Welding, Examination, Testing, and Inspection sections of this document for contractors and Westlake maintenance groups.
8. System shall be painted per Westlake specification.

## WELDING SPECIFICATIONS

Westlake personnel shall use one of the following Lake Charles Welding Procedures:

- W-3 and/or W-5, (SMAW) for pipe above 2" size.
- W-10 (GTAW) recommended on pipe sizes 2" and below.
- W-18 (GMAW) for pipe 1" and above.
- Welders shall be qualified in the Welding Procedure used.

Two pass fillet welds are required when welding socket weld fittings.

Contractors and Westlake welders working under the QC authority of a third party must satisfy the requirements of Westlake Engineering Standard PL-B-32 "Piping Fabrication & Installation Quality Control Requirements" for welding quality control procedures.

## API CLASSIFICATION

API classifications are used to determine inspection protocol for plant piping systems as part of the Mechanical Integrity program. The piping contained in this standard is API Class 4. See Westlake Standard 2305-J-3 "Mechanical Integrity of Piping Systems" for more information.

## EXAMINATION AND LEAK TESTING

Water as specified in this standard fits in Piping Service Group "1A" as defined in specification PL-B-19 "Pipe Leak Testing & Non-Destructive Examination.

Water fits in the "Normal Failure Consequence Class in document 2305-MP-24 "Piping Service Evaluation." This class does not require qualified inspector verification or documentation of examination and testing, although they are recommended "good practices." This is left to the discretion of the Fixed Equipment Reliability Engineer and/or lead inspector.

The supervisor responsible for the piping job shall ensure that the required examination and leak testing is performed. To document results, the supervisor initiates Piping System Fabrication and Maintenance Form #32A-193.

Contractors and Westlake maintenance groups should adhere to the requirements of PL-B-32 with regard to the methods and practices of documentation and record keeping for examination and leak testing. The methods and extents of examination and leak testing used should compare favorably with those presented here.

### Visual Examination Requirements

Materials	Fabrication Joints	Longitudinal Joints <sup>(6)</sup>	Mechanical Joints	During Erection	After Erection
Examiner Satisfaction					

### Material Verification

Piping materials must carry material identification markings that can be verified during receipt into plant or fabrication site. Material must retain markings during fabrication until verified by authorized inspector.

### Radiographic Examination Requirements

Not Required



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### Standard Leak Testing Requirements (See PL-B-19 for acceptable alternatives)

1. New Construction Leak Test Method: Initial Service Test
2. Major Repairs & Alterations-None; check for leaks when pressure is applied.

Remarks 1. A major repair is the addition or replacement of a welded or threaded component (e.g. pipe, ells, tees, flanges etc.)

### REVISIONS

- 07/12/04 ----- (1.) Added new Applicability Section; (2.) Added New Regulatory Section; (3.) Revised Pressure Temperature limits to use term Standard Design Pressure and Standard Design Temperature to clarify pressure temperature ratings and give details behind the standard Temperature rating; (4.) Revised Gasket Section to accommodate PL-B-24 changes; (5.) Removed Reference to Corporate Welding Specifications (6.) Added new examination and leak testing section; (7.) Added revision section; (8.) Numerous other format and wording revision including moving statements to different sections. Removed
- 08/21/07 ----- Revised Welding Specifications section to include W-18, also included requirement for two pass welding socket welds. (DLH)
- 06/16/08 ----- revised Pressure/Temperature Rating section, revised Bolting section, added Branch Connection, added Tube and Tube Fittings Section.(NDR)
- 09/09/08 ----- Added V-366 & V-367 3-way valves. (SF)
- 05/20/10 ----- Added V-333 (SF)
- 10/13/10 ----- 1) Added Over 24" pipe size statement; 2) Added V-572 (SF)
- 03/11/11 ----- 1) Added requirements for hot-dipped galvanized fittings & unions and added recommendation for hot-dipped galvanized piping 2" & below; 2) Changed header to "General Service"; 3) Removed potable water from standard and referenced PL-441; 4) Increased threaded sizes to 2"; 5) Added RectorSeal #5 to thread sealants; 6) Added gasket options section; 7) Reworded applicability section (SF)
- 02/23/15-----1) Added graphite gasket option per operations request; 2) Updated title block and changed company name from PPG to Axiall (KG)
- 08/14/15 ----- Changed gasket from Garlock 3300 to 3000 to comply with PL-B-24 (KYG)
- 12/13/17 ----- 1) Added V-652 to valve table; 2) Changed title block; 3) Edited flanged section; 4) Removed gasket and packing examples; 5) General updates for clarification (KYG)
- 03/26/19 ----- 1) Added Instrument Materials section. (GSC)
- 09/23/19 ----- Added V-675 (SF)
- 09/14/20 ----- 1) Design Pressure Reevaluated based on ASME B16.5/34 150# Pressure Ratings using ASME B31.3 methodology. Both the highest design pressure/lowest temperature and lowest design pressure/highest design temperature were evaluated to ensure that the wall thickness specified herein this spec is acceptable. 2) Hydrostatic test pressure was changed to 450 psig. This is arrived at by using 1.5 x the max design pressure and rounding up to the nearest 25 psig. However since this is a category D fluid and only an initial service test is required this test pressure was not added to the Examination and Leak Testing Requirements section. 3) Changed ANSI to ASME. 4) Note 2 was added to denote corrosion allowance in the Pipe section. 5) The wording and format of the notes in the Flange were changed. 6) Wording added to the material description in the Gasket section. 7) Minor wording changes in Bolting Section. 8) Content and format of the Weld Fittings section was updated. 9). Wording of Threaded Fitting notes changed. 10) Solder Seal TiteSeal 55 was removed and RectorSeal #7 was added to the the Pipe Thread Sealant Section. 10) All valve specs pressure and temperature ratings were investigated to determine if they are up to the new design pressure and temperature. Valves from specs V-241, V-15, V-60, V-237, V-190, V-159, V-236, V-40,

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V-239, V-284, V-205, V-572, and V-675 may/will be below the updated design pressure and temperatures; Consult Materials Engineering or manufacturer for pressure and temperature ratings. 11) Notes 1a and b were added to Engineering & Fabrication Details Section along with other minor wording changes and the addition of standard PL-B-18 to note 2. 12) API Classification Section was added. 13) Note under Material Specification was changed. 14) Various formatting and section rearrangement changes along with minor wording changes throughout. 15) The title of PL-B-32 was updated in Welding Specifications section. 16) Vent and drain wording changed for more clarification (KYG)