

GENERAL							
MATERIAL	CARBON STEEL						
RATING	ASME B16.5, CLASS 150, MATERIAL GROUP 1.1 285 PSIG @ 100°F 170 PSIG @ 500°F 1/16" CORROSION ALLOWANCE						
SERVICES	AQUEOUS AMMONIA, SEAL OIL, AIR EVACUATION, NITROGEN, RELIEF VALVE DISCHARGE, CONTAMINATED WASTEWATER, NATURAL GAS, HOT WATER FOR DRYER, VCM						
ITEM	SIZE	DESCRIPTION					NOTES
PIPE	½" – 1"	SCH 80, A106 GR. B, SMLS, PEXTE OR TE					1, 2, 4
	½" – 2"	SCH 80, A106 GR. B, SMLS, PE					1, 2, 3
	3" – 24"	STD WT, A106 GR. B, SMLS, BE					1, 2, 3
	26" – 36"	STD WT, API 5L GR. B, EFW 100% RT, BE					1, 2, 3
FITTINGS	½" – 1"	THD, CL 3000, A105, ASME B16.11					2, 4
	½" – 2"	SW, CL 3000, A105, ASME B16.11					1, 2
	3" – 24"	BW, SCH TO MATCH PIPE, A234 GR. WPB, ASME B16.9					1, 2
	26" – 36" PER CHART	BW, STD WT, A234 GR. WPB, EFW, ASME B16.9 OLET, SCH/CLASS/TYPE TO MATCH PIPE/FITTINGS, A105, MSS SP-97					1, 2
FLANGES	½" – 2"	RF SW, CL 150, A105, SCH 80, ASME B16.5					1, 2, 5, 6, 7
	3" – 6"	RF WN, CL 150, A105, SCH TO MATCH PIPE, ASME B16.5					1, 2, 5, 6, 7
	8" – 24"	RF SO, CL 150, A105, ASME B16.5					1, 2, 5, 6, 7, 8
	30" – 36"	RF SO, CL 150, A105, ASME B16.47 SER. A					1, 2, 5, 6, 7, 8
	½" – 24"	RF BLIND, CL 150, A105, ASME B16.5					
	2" – 24"	RF ORIFICE FLANGE, CL 300, A105, SCH TO MATCH PIPE, ASME B16.36, ½" SW TAPS					
UNIONS	NONE	USE FLANGES					
BOLTING	ALL	STUD BOLTS, A193 GR. B7, BLUE TEFLON COATED					
		HEAVY HEX NUTS, A194 GR. 2H, BLUE TEFLON COATED					
GASKETS	ALL	CL 150, 1/8" THK, RING TYPE, EXPANDED PTFE W/ CORRUGATED INSERT, ASME B16.21; VSP PITA OR EQ					5, 7
	ALL	CL 150, 1/8" THK, RING TYPE, FILLED PTFE WITH INORGANIC FILLER, ASME B16.21; DURLON 9000 OR EQ					5, 7
THREAD LUBE	PIPE	PTFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F)					
	BOLTS	NONE – PTFE COATED					
TEMPORARY STRAINERS	ALL	RF CONICAL, CL 150, 150% OPEN AREA, SS SCREEN/PLATE					
"Y" STRAINERS	½" – 2"	SW, CL 600, A216, 0.020" PERF. SS SCREEN					
	3" – 24"	RF FLG, CL 150, A216, 0.020" PERF. SS SCREEN					
VALVES							
BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
VBA-618	VBF-913	VCH-302	VGA-101	VGL-200	VPL-515		9, 10, 11,
VBA-628		VCH-303L	VGA-106	VGL-292	VPL-521		12, 13
VBA-665		VCH-303F	VGA-112		VPL-581		
		VCH-415	VGA-120				

NOTES

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE PER WESTLAKE STANDARD [GES-230 "PIPING SPECIFICATIONS"](#) REQUIREMENTS FOR DESIGN, FABRICATION, WELDING, NON-DESTRUCTIVE EVALUATION, INSTALLATION, DOCUMENTATION, ETC. MUST BE FOLLOWED.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 450 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. ALL BURIED PIPING SHALL BE COATED AND WRAPPED IN ACCORDANCE WITH [GES-221 "COATING AND WRAPPING OF UNDERGROUND PIPING"](#).
4. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
5. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
6. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
7. CL 300 FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
8. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
9. VGA-120 & VBA-618 ARE THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVES. ¾" SIZE IS THE DEFAULT SIZE.
10. BUTTERFLY VALVES SHALL BE LIMITED TO 300°F PER API 609. PLUG VALVES SHALL BE LIMITED TO 400°F. BALL VALVES SHALL BE LIMITED TO 300°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.
11. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE TESTED PER API 607 AND FURNISHED WITH A LOCKING DEVICE.
12. INSTALL ALL CHECK VALVES IN A HORIZONTAL POSITION WITH COVER UP.
13. FOR VCH-302, VCH-303L, AND VCH-303F INSTALL IS ALLOWED IN VERTICAL POSITION WITH UPWARD FLOW.



Piping Specification
Specification No: **GES-230-PVC-A1**

Revision No: 7
Rev Date: 06/28/2023

Title: **PVC Spec A1**

Geismar, LA
Page 1 of 2

GENERAL							
MATERIAL	CARBON STEEL						
RATING	ASME B16.5, CLASS 150, MATERIAL GROUP 1.1 285 PSIG @ 100°F 280 PSIG @ 120°F 1/16" CORROSION ALLOWANCE						
SERVICES	SULFURIC ACID (75-98%)						
ITEM	SIZE	DESCRIPTION					NOTES
PIPE	½" – 2"	SCH 80, A106 GR B, SMLS, PE					1, 2
	3" – 4"	SCH 80, A106 GR B, SMLS, BE					1
FITTINGS	½" – 2"	CL 3000, A105, SW, ASME B16.11					1
	3" – 4"	SCH 80, A234 GR WPB, BE, ASME B16.9					1
	½" – 2"	SCH/CLASS TO MATCH PIPE/FITTINGS, A105, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97					1
FLANGES	½" – 2"	CL 150, A105, SCH 80, RF SW, ASME B16.5					1, 3, 4, 5
	3" – 4"	CL 150, A105, SCH 80, RF WN, ASME B16.5					1, 3, 4, 5
	½" – 4"	CL 150, A105, RF BLIND, ASME B16.5					
	3" – 4"	CL 300, A105, SCH 80, RF ORIFICE FLANGE, ASME B16.36, ½" SW TAPS					
UNIONS	NONE	USE FLANGES					
BOLTING	ALL	A193 GR B-7 STUD BOLTS, BLUE TEFLON COATED					
		A194 GR 2H HEAVY NUTS, BLUE TEFLON COATED					
GASKETS	ALL	CL 150, 1/8" THK RING TYPE, FILLED PTFE WITH INORGANIC FILLER, ASME B16.21, DURLON 9000 OR EQ W/ ENGINEERING APPROVAL					3, 5
THREAD LUBE	BOLTS	NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.					
TEMPORARY STRAINERS	ALL	CL 150 RF, CONICAL, 150% OPEN AREA, SS SCREEN/PLATE					
"Y" STRAINERS	½" – 1½"	600#, SW, A-216, 0.020" PERF. ALLOY 20 SCREEN					
	2" – 24"	CL 150, RF FLG, A-216, 0.020" PERF. ALLOY 20 SCREEN					
VALVES							
BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
		VCH-302 VCH-312		VGL-200 VGL-215	VPL-563		7, 8, 9



Piping Specification
Specification No: **GES-230-PVC-A1**

Revision No: 7
Rev Date: 06/28/2023

Title: **PVC Spec A1**

Geismar, LA
Page 2 of 2

NOTES

1. REQUIREMENTS FOR DESIGN, FABRICATION, WELDING, NON-DESTRUCTIVE EVALUATION, INSTALLATION, DOCUMENTATION, ETC. IN WESTLAKE STANDARD [GES-230 "PIPING SPECIFICATIONS"](#) MUST BE FOLLOWED.
2. MAXIMUM FLOW VELOCITY OF LINE FLUID SHALL BE 2 FT/SEC.
3. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
4. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
5. CL 300 FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
6. VPL-563 IS THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. ¾" SIZE IS THE DEFAULT SIZE.
7. PLUG VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE TESTED PER API 607 AND FURNISHED WITH LOCKING DEVICE.
8. INSTALL CHECK VALVES IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.

BRANCH CONNECTIONS

BRANCH

4	T						
3	RT	T					
2	RT	RT	T				
1½	O	RT	RT	T			
1	O	O	RT	RT	T		
¾	O	O	RT	RT	RT	T	
½	O	O	RT	RT	RT	RT	T
	4	3	2	1½	1	¾	½

SYMBOLS

O – OLET (MATCH PER SPEC)

RT – REDUCING TEE

T – TEE



MATERIAL MONEL 400
RATING ASME B16.34, CLASS 150, M.G. 3.4
 230 PSIG @ 100° F
 170 PSIG @ 370° F
 0.030" CORR. ALLOW.

GES 2-3-0
 PVC
AR

REVISION 0
 DATE: 11/18/20

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL


ENG. APPROVAL

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON WVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

RVV

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	½" - ¾"	SCH 40S, B-165 (UNS N04400), ANNEALED, SMLS, THD	2
	1" - 16"	SCH 10S, B-165 (UNS N04400), ANNEALED, SMLS, BE	1, 2
	1" - 16"	SCH 40, B-165 (UNS N04400), ANNEALED, SMLS, BE	1, 2, 11
FITTINGS	½" - ¾"	2000#, B-366 OR B-564 (UNS N04400), ANNEALED, SMLS, THD, ASME B16.11	2
	1" - 16"	SCH/CLASS TO MATCH PIPE/FITTINGS, B-366 (UNS N04400) GR. WPNC, ANNEALED, SMLS, BE, ASME B16.9	1, 2, 3, 11
	½" - 8"	SCH/CLASS TO MATCH PIPE/FITTINGS, B-564 (UNS N04400), ANNEALED, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97	1, 2
FLANGES	½" - ¾"	150#, B-564 (UNS N04400), SCH 40S, RF THD, ASME B16.5	2, 4, 5, 6
	1" - 16"	150#, A-105, LAP JOINT, ASME B16.5	2, 4, 5, 6
	½" - 16"	150#, B-564 (UNS N04400), RF BLIND, ASME B16.5	4, 7
	2" - 16"	300#, B-564 (UNS N04400), SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, ½" THD TAPS	
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B7 STUD BOLTS, TEFLON COATED	
		A-194 GR. 2H HVY. NUTS, TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. SPIRAL WOUND, MONEL 400 INNER RING AND WINDINGS WITH GRAPHITE FILLER, 304SS OUTER RING, ASME B16.5, ASME B16.20, FLEXITALLIC CGI OR EQ.	4, 6
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤ 400°F), MOLYCOTE G OR EQ (> 400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-102	½" - ¾"	GATE, A494 GR. M35-1 MONEL, 150#/200#, THD, TRIM #9	
VGA-104	1" - 8"	GATE, A494 GR. M35-1 MONEL, 150#, RF FLG, TRIM #9	
VCH-316	½" - 12"	CHECK, SWING, A494 GR. M35-1 MONEL, 150#, RF FLG, TRIM #9	9
VPL-541	½" - ¾"	PLUG, MONEL BODY/PLUG, TUFFLINE-600 SLEEVE, 150#, THD	8, 10
VPL-582	1" - 4"	PLUG, MONEL BODY/PLUG, TUFFLINE-600 SLEEVE, 150#, RF FLG	10
VBA-675	1" - 4"	BALL, MONEL BODY/BALL/PTFE SEATS, 150#, RF FLG, FULL PORT	10

		MATERIAL	MONEL 400		GES 2-3-0 PVC AR REVISION 0 DATE: 11/18/20
		RATING	ASME B16.34, CLASS 150, M.G. 3.4 230 PSIG @ 100° F 170 PSIG @ 370° F 0.030" CORR. ALLOW.		
MAINT. APPROVAL	HSE APPROVAL	OPER. APPROVAL	ENG. APPROVAL		

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 350 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. STUB ENDS SHALL BE USED FOR FLANGED CONNECTIONS. THEY SHALL BE SHORT PATTERN PER ASME B16.9.
4. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. BLIND FLANGES SHALL BE MONEL AS LISTED, OR MAY BE EQUIVALENT 150# C.S. BLIND FLANGES WITH ¼" MONEL PLATE LINER.
8. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. ¾" SIZE IS THE DEFAULT SIZE, BUT ½" AND 1" MAY BE USED AS REQUIRED.
9. INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
10. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
11. RE-EVALUATE PIPE SUPPORTS WHEN REPLACING SCH 10S WITH SCH 40 PIPE AND FITTINGS.



MATERIAL

CARBON STEEL

RATING

ASME B16.5, CLASS 150, M.G. 1.1
285 PSIG @ 100° F
170 PSIG @ 500° F
1/16" CORR. ALLOW.

GES 2-3-0

PVC

AV

REVISION 0
DATE: 08/24/16

MAINT. APPROVAL

Jason Palk

HSE APPROVAL

WES

OPER. APPROVAL

AS

ENG. APPROVAL

CITME

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

UNFILTERED VCM/RVCM

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 2"	SCH 80, A-106 GR. B SMLS, PE	1, 2, 3
	3" - 24"	STD. WT., A-106 GR. B SMLS, BE	1, 2, 3
	30"	STD. WT., API 5L GR. B, ERW, BE	1, 2, 3
	36"	STD. WT., API 5L, GR. B, EFW, BE, 100% R.T.	1, 2, 3
FITTINGS	1/2" - 2"	3000#, A-105, SW, ASME B16.11	1, 2
	1/2" - 24"	SCH TO MATCH PIPE, A-234 GR. WPB, BE, ASME B16.9	1, 2
	30", 36"	STD. WT., A-234 GR. WPB, EFW, BE, ASME B16.9	1, 2
	1/2" - 10"	SCH/CLASS TO MATCH PIPE/FITTINGS, A-105 INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97	1, 2
FLANGES	1/2" - 2"	150#, A-105, SCH 80, RF SW, ASME B16.5	1, 2, 5, 6, 7
	1/2" - 24"	150#, A-105, SCH TO MATCH PIPE, RF WN, ASME B16.5	1, 2, 5, 6, 7
	30", 36"	150#, A-105, STD WT, RF WN, ASME B16.47 SER. A	1, 2, 5, 6, 7, 8
	1/2" - 24"	150#, A-105, RF BLIND, ASME B16.5	
	2" - 24"	300#, A-105, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, 1/2" SW TAPS	
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	5, 7
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-120	1/2" - 2"	GATE, EXTENDED BODY, CS, 800#, MSWxFNPT, TRIM #8	9
VGA-112	1/2" - 2"	GATE, CS, 800#, SW, TRIM #8	
VGA-101	1/2" - 14"	GATE, CS, 150#, RF FLG, TRIM #8	
VGA-101G	16" - 24"	GATE, CS, 150#, RF FLG, TRIM #8, GO	
VGL-292	1/2" - 1 1/2"	GLOBE, CS, 150#, RF FLG, TRIM #8	
VGL-200	2" - 14"	GLOBE, CS, 150#, RF FLG, TRIM #8	
VBF-913	3" - 4"	B-FLY, CS, 150#, THD LUG, SS DISC, PTFE SEATS/SEAL	10, 11
VBF-913G	6" - 24"	B-FLY, CS, 150#, THD LUG, SS DISC, PTFE SEATS/SEAL, GO	10, 11
VBF-913GA	30", 36"	B-FLY, CS, 150#, THD LUG, SS DISC, PTFE SEATS/SEAL, GO, ASME B16.47 SER. A	10, 11
VCH-415	1/2" - 1 1/2"	CHECK, PISTON, CS, 150#, RF FLG, TRIM #8	12
VCH-302	2" - 24"	CHECK, SWING, CS, 150#, RF FLG, TRIM #8	12, 13
VCH-303L	2" - 6"	CHECK, DUAL PLATE, CS, 150#, DRILLED LUG, CS DISC/TRIM	12, 13
VCH-303F	8" - 24"	CHECK, DUAL PLATE, CS, 150#, DBL FLG, CS DISC/TRIM	12, 13



MATERIAL

CARBON STEEL

RATING

ASME B16.5, CLASS 150, M.G. 1.1
285 PSIG @ 100° F
170 PSIG @ 500° F
1/16" CORR. ALLOW.

GES 2-3-0

PVC

AV

REVISION 0
DATE: 08/24/16

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

W EB

OPER. APPROVAL

AS

ENG. APPROVAL

CPTME

VPL-521	2" - 4"	PLUG, CS BODY/PLUG, 150#, RF FLG, SHORT	10, 11
VPL-521G	6" - 8"	PLUG, CS BODY/PLUG, 150#, RF FLG, SHORT, GO	10, 11
VBA-628	1/2" - 4"	BALL, CS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, RED. PORT	10, 11
VBA-628G	6" - 8"	BALL, CS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, RED. PORT, GO	10, 11
VBA-665	1/2" - 4"	BALL, CS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, FULL PORT	10, 11
VBA-665G	6" - 8"	BALL, CS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, FULL PORT, GO	10, 11
TEMPORARY STRAINERS	ALL	150# RF, CONICAL, 150% OPEN AREA, SS SCREEN/PLATE	
"Y" STRAINERS	1/2" - 2" 2" - 24"	600#, SW, A-216, 0.020" PERF. SS SCREEN 150#, RF FLG, A-216, 0.020" PERF. SS SCREEN	

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 450 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. ALL BURIED PIPING SHALL BE COATED AND WRAPPED IN ACCORDANCE WITH GES 2-2-1.
4. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
5. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
6. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
7. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
8. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
9. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVES. 3/4" SIZE IS THE DEFAULT SIZE.
10. BUTTERFLY VALVES SHALL BE LIMITED TO 300°F PER API 609. PLUG VALVES SHALL BE LIMITED TO 400°F. BALL VALVES SHALL BE LIMITED TO 300°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.



MATERIAL
RATING

304L STAINLESS STEEL

PRESSURE LIMITED BY VICTAULIC COUPLING
TEMPERATURE LIMITED BY EPDM GASKET
200 PSIG @ 100° F
189 PSIG @ 230° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
BA

REVISION 1
DATE: 04/03/18

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

RJP

OPER. APPROVAL

ASch

ENG. APPROVAL

McGill

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

BRINE CONDENSATE – ABOVE GROUND

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" – 1" 1/2" – 2" 3" – 8" 4" – 8"	SCH 40S, A-312 TP-304L, SMLS OR EFW, PEXTE OR TE SCH 40S, A-312 TP-304L, SMLS OR EFW, PE SCH 10S, A-312 TP-304L, SMLS OR EFW, BE SCH 10S, A-312 TP-304L, SMLS, VICTAULIC OGS GROOVED ENDS, TYPE RX	1, 2, 3 1, 2 1, 2 11
FITTINGS	1/2" – 1" 1/2" – 2" 3" – 8" 1/2" – 8"	3000#, A-182, GR. F304L, THD, ASME B16.11 3000#, A-182, GR. F304L, SW, ASME B16.11 SCH TO MATCH PIPE, A-403, WP-304L, BW, ASME B16.9 SCH/CLASS TO MATCH PIPE/FITTINGS, A-182, GR. F304L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97	2, 3 1, 2 1, 2 1, 2
VICTAULIC COUPLINGS	4" – 8" 6"	RIGID COUPLING, ASTM A351, TYPE 316 STAINLESS STEEL, STYLE 489, WITH GRADE "E" GREEN STRIPE EPDM GASKET, WITH VICTAULIC RX GROOVING ROLL SETS FLEXIBLE COUPLING, ASTM A890 (CE8MN), DUPLEX STAINLESS STEEL, STYLE 77DX, WITH GRADE "E" GREEN STRIPE EPDM GASKET, WITH VICTAULIC RX GROOVING ROLL SETS	12 13
FLANGES	1/2" – 2" 3" – 8" 1/2" – 8" 3" – 8"	150#, A-182, GR. F304L, SCH 40S, RF SW, ASME B16.5 150#, A-182, GR. F304L, RF SO, ASME B16.5 150#, A-182, GR. F304L, RF BLIND, ASME B16.5 300#, A-182, GR. F304L, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, 1/2" SW TAPS	1, 2, 6 1, 2, 4, 5, 6
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	6
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-167	1/2" – 2"	GATE, EXTENDED BODY, 316L SS, 800#, MSWxFNPT, TRIM #10	7
VGA-122	1/2" – 2"	GATE, 316L SS, 800#, SW, TRIM #10	
VGA-130	1" – 8"	GATE, 316 SS, 150#, RF FLG, TRIM #10	
VGL-239	1/2" – 8"	GLOBE, 316 SS, 150#, RF FLG, TRIM #10	



**MATERIAL
RATING**

304L STAINLESS STEEL

PRESSURE LIMITED BY VICTAULIC COUPLING
TEMPERATURE LIMITED BY EPDM GASKET
200 PSIG @ 100° F
189 PSIG @ 230° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
BA

REVISION 1
DATE: 04/03/18

MAINT. APPROVAL	HSE APPROVAL	OPER. APPROVAL	ENG. APPROVAL
<i>Jason Polke</i>	<i>[Signature]</i>	<i>A. Baden</i>	<i>[Signature]</i>
VBF-921	3" – 4"	B-FLY, 316 SS, 150#, THD LUG, SS DISC, XTREME/SS SEATS, GRAPHITE SEAL	8, 9
VBF-921G	6" – 8"	B-FLY, 316 SS, 150#, THD LUG, SS DISC, XTREME/SS SEATS, GRAPHITE SEAL, GO	8, 9
VCH-342	½" – 8"	CHECK, SWING, 316 SS, 150#, RF FLG, TRIM #10	10
VPL-504	2" – 4"	PLUG, 316 SS BODY/PLUG, 150#, RF FLG, SHORT	8, 9
VPL-504G	6" – 8"	PLUG, 316 SS BODY/PLUG, 150#, RF FLG, SHORT, GO	8, 9
VBA-610	½" – 1"	BALL, 316 SS BODY, 316 SS BALL/STEM, 1500/2000 WOG, THD, RPTFE SEATS, RED. PORT	7, 8, 9
VBA-656	½" – 4"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, RED. PORT	8, 9
VBA-656G	6" – 8"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, RED. PORT, GO	8, 9
VBA-643	½" – 4"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, FULL PORT	8, 9
VBA-643G	6" – 8"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, FULL PORT, GO	8, 9
TEMPORARY STRAINERS	ALL	150#, CONICAL, 150% OPEN AREA, 304/316 SS SCREEN/PLATE	
"Y" STRAINERS	½" – 2" 3" – 8"	600#, SW, A-351, GR. CF8M, 0.020" PERF. SS SCREEN 150#, RF FLG, A-351, GR. CF8M, 0.020" PERF. SS SCREEN	

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 300 PSIG PER ASME B31.3, PARA. 345.4.2.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
4. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVES. ¾" SIZE IS THE DEFAULT SIZE.



MATERIAL RATING

304L STAINLESS STEEL
 PRESSURE LIMITED BY VICTAULIC COUPLING
 TEMPERATURE LIMITED BY EPDM GASKET
 200 PSIG @ 100° F
 189 PSIG @ 230° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
BA
 REVISION 1
 DATE: 04/03/18

MAINT. APPROVAL <i>Juan Pella</i>	HSE APPROVAL <i>BAJ</i>	OPER. APPROVAL <i>AB</i>	ENG. APPROVAL <i>Blaylock</i>
--------------------------------------	----------------------------	-----------------------------	----------------------------------

8. BUTTERFLY VALVES SHALL BE LIMITED TO 300°F PER API 609. PLUG VALVES SHALL BE LIMITED TO 400°F. BALL VALVES SHALL BE LIMITED TO 300°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.
9. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
10. INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
11. ROLLED END PIPE USED WHEN CONNECTING WITH VICTAULIC COUPLINGS.
12. USED FOR CONNECTING STAINLESS STEEL PIPE IN LONG PIPE RACK RUNS.
13. USED FOR CONNECTING TO YELOMINE PIPE.

BRANCH CONNECTIONS:

BRANCH

8	T								
6	RT	T							
4	W	RT	T						
3	W	W	RT	T					
2	O	O	O	O	T				
1½	O	O	O	O	RT	T			
1	O	O	O	O	RT	RT	T		
¾	O	O	O	O	RT	RT	RT	T	
½	O	O	O	O	RT	RT	RT	RT	T
	8	6	4	3	2	1½	1	¾	½

SYMBOLS

- F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)
- O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)
- P – BRANCH WELD WITH REINFORCING PAD (PAD THICKNESS EQUALS RUN PIPE THICKNESS, PAD WIDTH EQUALS ½ BRANCH OD.)
- RT – REDUCING TEE
- T – TEE
- W – WELDOLET



Piping Specification
Specification No: **GES-230-PVC-BH**

Revision No: 0
Rev Date: 05/16/2023

Title: **PVC Spec BH**

Geismar, LA
Page 1 of 2

GENERAL							
MATERIAL	STAINLESS STEEL, 316L						
RATING	ASME B16.5, CLASS 300, MATERIAL GROUP 2.3 600 PSIG @ 100°F 455 PSIG @ 300°F 1/16" CORROSION ALLOWANCE						
SERVICES	DEMINERALIZED WATER, SEAL OIL						
ITEM	SIZE	DESCRIPTION					NOTES
PIPE	½" – 1½"	SCH 40S, A312 TP316L, SMLS, PE					1
	2" – 6"	SCH 40S, A312 TP316L, SMLS, BE					1
	8" – 14"	SCH 40S, A312 TP316L, SMLS OR EFW 100% RT, BE					1
	16" – 20"	SCH 80S, A312 TP316L, SMLS OR EFW 100% RT, BE					1
FITTINGS	½" – 1½"	CL 3000, A182 F316L, SW, ASME B16.11					1
	2" – 20"	SCH TO MATCH PIPE, A403 WP316L, BW, ASME B16.9					1, 2
	½" – 20"	SCH/CLASS TO MATCH PIPE/FITTINGS, A182 F316L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (OLET), MSS SP-97					1
FLANGES	½" – 1½"	CL 300, A182 F316L, SCH 40S, RFSW, ASME B16.5					1, 3, 5
	2" – 20"	CL 300, A182 F316L, LAP JOINT, ASME B16.5					1, 3, 5
	2" – 20"	CL 300, A182 F316L, RF SO, ASME B16.5					1, 3
	½" – 20"	CL 300, A182 F316L, RF BLIND, ASME B16.5					1
	2" – 20"	CL 300, A182 F316L, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, ½" SW TAPS					1
UNIONS	NONE	USE FLANGES					
BOLTING	ALL	A193 B7 STUD BOLTS, TEFLON COATED A194 2H HEAVY NUTS, TEFLON COATED					
GASKETS	ALL	CL 300, 1/8" THK RING TYPE, FILLED PTFE WITH INORGANIC FILLER, ASME B16.21; DURLON 9000 OR EQ W/ ENGINEERING APPROVAL					4
THREAD LUBE	PIPE	PTFE TAPE					
	BOLTS	NONE					
TEMPORARY STRAINERS	ALL	CL 300, CONICAL, 150% OPEN AREA, 304/316 SS SCREEN/PLATE					
"Y" STRAINERS	½" – 1½"	CL 600, SW, A351, GR CF3M, 0.020" PERF. SS SCREEN					
	2" – 16"	CL 300, RF FLG, A351, GR CF8M, 0.020" PERF. SS SCREEN					
VALVES							
BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
VBA-607 VBA-610 VBA-641	VBF-925	VCH-345 VCH-346	VGA-122 VGA-132 VGA-167	VGL-245 VGL-246	VPL-560 VPL-561 VPL-568		6, 7



NOTES

1. REQUIREMENTS FOR DESIGN, FABRICATION, WELDING, NON-DESTRUCTIVE EVALUATION, INSTALLATION, DOCUMENTATION, ETC. IN WESTLAKE STANDARD GES-230 "PIPING SPECIFICATIONS" MUST BE FOLLOWED.
2. STUB ENDS SHALL BE USED FOR FLANGED CONNECTIONS. THEY SHALL BE SHORT PATTERN PER ASME B16.9.
3. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
4. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
5. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS UNLESS SO INDICATED ON THE DESIGN DRAWINGS.
6. VBA-610 IS THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. ¾" SIZE IS THE DEFAULT SIZE, BUT ½" AND 1" MAY BE USED AS REQUIRED.
7. CHECK VALVES MUST BE INSTALLED IN HORIZONTAL POSITION WITH COVER UP (SWING) OR HINGE PIN VERTICAL (DUAL PLATE). INSTALL ALSO ALLOWED IN VERTICAL POSITION WITH UPWARD FLOW.

BRANCH CONNECTIONS

BRANCH

20	T																
18	RT	T															
16	RT	RT	T														
14	RT	RT	RT	T													
12	RT	RT	RT	RT	T												
10	RT	RT	RT	RT	RT	T											
8	W	W	RT	RT	RT	RT	T										
6	W	W	W	W	RT	RT	RT	T									
4	W	W	W	W	W	W	RT	RT	T								
3	W	W	W	W	W	W	W	RT	RT	T							
2	O	O	O	O	O	O	O	O	RT	RT	T						
1½	O	O	O	O	O	O	O	O	O	RT	RT	T					
1	O	O	O	O	O	O	O	O	O	O	RT	RT	T				
¾	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	T			
½	O	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	RT	T	
	20	18	16	14	12	10	8	6	4	3	2	1½	1	¾	½		

SYMBOLS

- O – OLET
- RT – REDUCING TEE
- T – TEE
- W – WELDOLET



Piping Specification
Specification No: **GES-230-PVC-BU**

Revision No: 1
Rev Date: 06/28/2023

Title: **PVC Spec BU**

Geismar, LA
Page 1 of 2

GENERAL

MATERIAL	CERTA-LOK YELOMINE PVC		
RATING	SEE RATING TABLE ON PAGE 2 200 PSIG @ 73°F 94 PSIG @ 130°F 0" CORR. ALLOW.		
SERVICES	BRINE CONDENSATE – UNDERGROUND		
ITEM	SIZE	DESCRIPTION	NOTES
PIPE	6"	YELOMINE, SDR 13.5, ASTM 1785 CLASS 12454, SMLS, CERTA-LOK ENDS, ASTM D2241	1, 2
FITTINGS	6"	YELOMINE HP, SDR 13.5, ASTM 1785 CLASS 12454, SMLS, CERTA-LOK COUPLING	1, 2
	6"	YELOMINE HP, SDR 13.5, ASTM 1785 CLASS 12454, SMLS, 90° SWEEP BEND, CERTA-LOK ENDS	1, 2
	6"	YELOMINE HP, TRANSITION FITTING, SDR 13.5, ASTM 1785 CLASS 12545, SMLS, CERTA-LOK x STANDARD METAL GROOVE ENDS	1, 2
VICTAULIC COUPLING	6"	FLEXIBLE COUPLING, ASTM A890 (CE8MN), DUPLEX STAINLESS STEEL, STYLE 77DX, WITH GRADE "E" GREEN STRIPE EPDM GASKET, WITH VICTAULIC RX GROOVING ROLL SETS	3
FLANGES	NONE	USE COUPLINGS	
BOLTING	ALL	NONE	
GASKETS	6"	HP CERTA-LOK SPLINES, SQUARE CONFIGURATION	
	6"	CERTA-LOK O-RING FOR PERMANENT USE, IR/SBR MATERIAL, TEFLON COATED, LUBRICANT REQUIRED	

VALVES

NONE

NOTES

1. HYDROSTATIC TESTING SHALL BE PERFORMED PER ASME B31.3, SECTION A345.4. SEE TABLE ON PAGE 2 FOR APPLICABLE TEST PRESSURE.
2. MANUFACTURERS INSTRUCTIONS ON JOINT ASSEMBLY AND SUPPORT REQUIREMENTS SHALL BE PROVIDED WITH PIPE AND FITTINGS AND SHALL BE STRICTLY FOLLOWED.
3. COUPLING USED FOR CONNECTING YELOMINE PIPE TO METALLIC PIPE, RATED FOR 200 PSIG.
4. ONLY COMPONENTS LISTED WITHIN PIPE SPEC ARE APPROVED FOR USE. ADDITIONAL COMPONENTS MAY BE ALLOWED WITH ENGINEERING APPROVAL.



Piping Specification
Specification No: **GES-230-PVC-BU**

Revision No: 1
Rev Date: 06/28/2023

Title: **PVC Spec BU**

Geismar, LA
Page 2 of 2

PRESSURE – TEMPERATURE RATINGS (LIMITED BY VICTAULIC COUPLING UP TO 90°F)

PRESSURE (PSIG)	TEMPERATURE (°F)
200	73
200	80
200	90
195	100
157	110
126	120
94	130

HYDROTEST PRESSURE TABLE

HYDROSTATIC TEST PRESSURE (PSIG)	HYDROSTATIC TEST TEMPERATURE (°F)
300	73
300	80
300	90
295	100

GENERAL							
MATERIAL	304L STAINLESS STEEL						
RATING	ASME B16.5, CLASS 150, MATERIAL GROUP 2.3 230 PSIG @ 100°F 150 PSIG @ 500°F 1/32" CORROSION ALLOWANCE						
SERVICES	AQUEOUS AMMONIA, COATING SOLUTION, DEMIN. WATER, INITIATOR, FILTERED NITROGEN, SERVICE WATER, SUSPENDING AGENT SOLUTION, WET VENT						
ITEM	SIZE	DESCRIPTION					NOTES
PIPE	½" – 1½"	SCH 40S, A312 TP-304L, SMLS, PEXTE OR TE					1, 2, 3
	½" – 2"	SCH 40S, A312 TP-304L, SMLS, PE					1, 2
	3" – 14"	SCH 40S, A312 TP-304L, SMLS, BE					1, 2
	16" – 20"	SCH 10, A312 TP-304L, EFW, BE					1, 2
FITTINGS	½" – 1½"	THD, CL 3000, A182 GR. F304L, ASME B16.11					2, 3
	½" – 2"	SW, CL 3000, A182 GR. F304L, ASME B16.11					1, 2
	3" – 20"	BW, SCH TO MATCH PIPE, A403 WP-304L, ASME B16.9					1, 2
	½" - 8"	OLET, SCH/CLASS/TYPE TO MATCH PIPE/FITTINGS, A182 GR. F304L, MSS SP-97					1, 2
FLANGES	½" – 2"	RF SW, CL 150, A182 GR. F304L, SCH 40S, ASME B16.5					1, 2, 6
	2" – 20"	RF SO, CL 150, A182 GR. F304L, ASME B16.5					1, 2, 4, 5, 6
	½" – 20"	RF BLIND, CL 150, A182 GR. F304L, ASME B16.5					
	2" – 20"	RF ORIFICE FLANGE, CL 300, A182 GR. F304L, SCH TO MATCH PIPE, ASME B16.36, ½" SW TAPS					
UNIONS	NONE	USE FLANGES					
BOLTING	ALL	STUD BOLTS, A193 GR. B7, TEFLON COATED					
		NUTS, A194 GR. 2H, TEFLON COATED					
GASKETS	ALL	EXPANDED PTFE W/ CORRUGATED INSERT, RING TYPE, CL 150, 1/8" THK, ASME B16.21; VSP PITA OR EQ W/ ENGINEERING APPROVAL					6
	ALL	FILLED PTFE WITH INORGANIC FILLER, RING TYPE, CL 150, 1/8" THK, ASME B16.21; DURLON 9000 OR EQ W/ ENGINEERING APPROVAL					6
THREAD LUBE	PIPE	PTFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F)					
	BOLTS	NONE – PTFE COATED					
TEMPORARY STRAINERS	ALL	CL 150, CONICAL, 150% OPEN AREA, 304/316 SS SCREEN/PLATE					
"Y" STRAINERS	½" – 2"	CL 600, SW, A351 GR. CF8M, 0.020" PERF. SS SCREEN					
	3" – 24"	CL 150, RF FLG, A351 GR. CF8M, 0.020" PERF. SS SCREEN					
VALVES							
BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
VBA-610 VBA-643 VBA-656	VBF-921	VCH-342	VGA-122 VGA-130 VGA-167	VGL-239	VPL-500 VPL-504 VPL-580		7, 8, 9, 10

NOTES

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE PER WESTLAKE STANDARD [GES-230 "PIPING SPECIFICATIONS"](#). REQUIREMENTS FOR DESIGN, FABRICATION, WELDING, NON-DESTRUCTIVE EVALUATION, INSTALLATION, DOCUMENTATION, ETC. MUST BE FOLLOWED.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 350 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
4. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. CL 300 FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. VGA-167 AND VBA-610 ARE THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVES. ¾" SIZE IS THE DEFAULT SIZE.
8. BUTTERFLY VALVES SHALL BE LIMITED TO 300°F PER API 609. PLUG VALVES SHALL BE LIMITED TO 400°F. BALL VALVES SHALL BE LIMITED TO 300°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.
9. BUTTERFLY, PLUG, AND BALL VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
10. CHECK VALVES TO BE INSTALLED IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
11. USE CONNECTION P FOR BRANCHES AT ODD ANGLES WHERE STANDARD FITTINGS CANNOT BE USED, BUT MODIFY THE REINFORCING PAD FOR SIZES ½"–1½" TO CONNECTION F.

BRANCH CONNECTIONS

BRANCH

20	T														
18	RT	T													
16	P	RT	T												
14	P	P	RT	T											
12	P	P	P	RT	T										
10	P	P	P	W	RT	T									
8	W	W	W	W	W	RT	T								
6	W	W	W	W	W	W	RT	T							
4	W	W	W	W	W	W	W	RT	T						
3	W	W	W	W	W	W	W	W	RT	T					
2	O	O	O	O	O	O	O	O	O	O	T				
1½	O	O	O	O	O	O	O	O	O	O	RT	T			
1	O	O	O	O	O	O	O	O	O	O	RT	RT	T		
¾	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	T	
½	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	RT	T
	20	18	16	14	12	10	8	6	4	3	2	1½	1	¾	½

SYMBOLS

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

P – BRANCH WELD WITH REINFORCING PAD (PAD THICKNESS EQUALS RUN PIPE THICKNESS, PAD WIDTH EQUALS ½ BRANCH OD.)

RT – REDUCING TEE

T – TEE

W – WELDOLET

SEE NOTE 11

GENERAL							
MATERIAL	304L STAINLESS STEEL						
RATING	ASME B16.5, CLASS 300, MATERIAL GROUP 2.3 600 PSIG @ 100°F 185 PSIG @ 400°F 1/32" CORROSION ALLOWANCE						
SERVICES	ADDITIVE CHARGE, COATING SOLUTION, INJECTION WATER, NITROGEN, REACTOR SEAL FLUSH WATER, SODIUM NITRITE SOLUTION, SEAL OIL, FILTERED 185 PSIG STEAM (STEAM LIMITED TO 400F)						
ITEM	SIZE	DESCRIPTION					NOTES
PIPE	½" – 1"	SCH 80S, A312 TP-304L, SMLS, PEXTE OR TE					1, 2, 3
	½" – 10"	SCH 40S, A312 TP-304L, SMLS, PE					1, 2
FITTINGS	½" – 1"	THD, CL 3000, A182 GR. F304L, ASME B16.11					2, 3
	½" – 2"	SW, CL 3000, A182 GR. F304L, ASME B16.11					1, 2
	3" – 10"	BW, SCH 40S, A403 WP-304L, ASME B16.9					1, 2
	½" – 3"	OLET, SCH/CLASS/TYPE TO MATCH PIPE/FITTINGS, A182 GR. F304L, MSS SP-97					1, 2
FLANGES	½" – 2"	RF SW, CL 300, A182 GR. F304L, SCH 40S, ASME B16.5					1, 2, 5
	3" – 10"	RF SO, CL 300, A182 GR. F304L, ASME B16.5					1, 2, 4, 5
	½" – 10"	RF BLIND, CL 300, A182 GR. F304L, ASME B16.5					
	2" – 10"	RF ORIFICE FLANGE, CL 300, A182 GR. F304L, SCH TO MATCH PIPE, ASME B16.36, ½" SW TAPS					
	½" – 6"	RF SW, CL 150, A182 GR. F304L, SCH 40S, ASME B16.5					1, 2, 11
UNIONS	NONE	USE FLANGES					
BOLTING	ALL	STUD BOLTS, A193 GR. B7, TEFLON COATED NUTS, A194 GR. 2H, TEFLON COATED					
GASKETS	ALL	EXPANDED PTFE W/ CORRUGATED INSERT, RING TYPE, CL 300, 1/8" THK, ASME B16.21; VSP PITA OR EQ					10
	ALL	FILLED PTFE WITH INORGANIC FILLER, RING TYPE, CL 300, 1/8" THK, ASME B16.21; DURLON 9000 OR EQ W/ ENGINEERING APPROVAL					
	ALL	SPIRAL WOUND, 304SS WINDINGS WITH GRAPHITE FILLER, CS OUTER RING, ANTI-BUCKLING, CL 300, 1/8" THK, ASME B16.20; FLEXITALLIC STYLE CGI, VSP AB-326, OR EQ W/ ENGINEERING APPROVAL					
THREAD LUBE	PIPE	PTFE TAPE					
	BOLTS	TEFLON COATED OR NEVER-SEEZ PURE NICKEL SPECIAL OR EQ					
TEMPORARY STRAINERS	ALL	CL 300, CONICAL, 150% OPEN AREA, 304/316 SS SCREEN/PLATE					
"Y" STRAINERS	½" – 2"	CL 600, SW, A351, GR. CF8M, 0.020" PERF. SS SCREEN					
	3" – 6"	CL 300, RF FLG, A351, GR. CF8M, 0.020" PERF. SS SCREEN					
VALVES							
BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
VBA-676	VBF-934	VCH-352	VGA-132	VGL-244	VPL-560		6, 7, 8, 9
VBA-681		VCH-353	VGA-167	VGL-246			

NOTES

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 900 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
4. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. VGA-132 AND VGA-167 ARE THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVES. ¾" SIZE IS THE DEFAULT SIZE.
7. BUTTERFLY, PLUG, AND BALL VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
8. CHECK VALVES TO BE INSTALLED IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
9. BUTTERFLY, PLUG, AND BALL VALVES ARE NOT TO BE USED IN STEAM SERVICE.
10. GASKETS ARE TO BE USED IN STEAM SERVICE ONLY.
11. ½" – 6" FLANGES FOR USE IN CL 150 DI INJECTION WATER SERVICE ONLY. THESE FLANGES DO NOT MEET SPECIFIED PRESSURE/TEMPERATURES FOR THIS PIPE SPEC. ENGINEERING APPROVAL REQUIRED FOR USE.

BRANCH CONNECTIONS

BRANCH

10	T													
8	RT	T												
6	W	RT	T											
4	W	W	RT	T										
3	W	W	W	RT	T									
2	O	O	O	O	O	T								
1½	O	O	O	O	O	RT	T							
1	O	O	O	O	O	RT	RT	T						
¾	O	O	O	O	O	RT	RT	RT	T					
½	O	O	O	O	O	RT	RT	RT	RT	T				
	10	8	6	4	3	2	1½	1	¾	½				

SYMBOLS

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

RT – REDUCING TEE

T – TEE

W – WELDOLET



MATERIAL 304 STAINLESS STEEL
RATING ASME B16.5, CLASS 2500, M.G. 2.1
 6000 PSIG @ 100° F
 3880 PSIG @ 500° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
 C2

REVISION 6
 DATE: 08/24/16

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

W. E. [Signature]

OPER. APPROVAL

AS

ENG. APPROVAL

C. Pitre

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

HIGH PRESSURE REACTOR CLEANING WATER

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1"	SCH XXS, A-312 TP-304, SMLS, BExTHD	1, 2, 3
	1" - 3"	SCH XXS, A-312 TP-304, SMLS, BE	1, 2, 3
FITTINGS	1" - 3"	SCH XXS, A-403, WP-304, BW, ASME B16.9	1, 2, 3
	1" - 3"	SCH XXS, A-182, GR. 304, INTEGRALLY REINFORCED OUTLET CONNECTIONS O'LET, MSS SP-97	1, 2
FLANGES	1" - 3"	2500#, A-182 GR. F304, SCH XXS, WN RTJ, ASME B16.5	1, 2, 4, 5
	1" - 3"	2500#, A-182 GR. F304, WN RTJ BLIND FLANGE, ASME B16.5	1, 2, 4, 5
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED	
		A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	2500#, OCTANGONAL RING, SOFT IRON	
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGL-441	1" - 3"	GLOBE, 316SS, 2680#, BW, TRIM #16	
TEMPORARY STRAINERS	NONE		
"Y" STRAINERS	NONE		
BRANCH CONNECTIONS	1" - 3"	ALL BRANCH CONNECTIONS SHALL BE MADE USING FULL TEES, REDUCING TEES, OR WELDOLETS IN SIZES WHERE REDUCING TEES ARE NOT AVAILABLE	



MATERIAL 304 STAINLESS STEEL
RATING ASME B16.5, CLASS 2500, M.G. 2.1
6000 PSIG @ 100° F
3880 PSIG @ 500° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
C2

REVISION 6
DATE: 08/24/16

MAINT. APPROVAL

Jason Bell

HSE APPROVAL

WSS

OPER. APPROVAL

AS

ENG. APPROVAL

CPHNE

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT 100% OF ALL WELDS PER ASME B31.3, PARA. 341.4.2.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 9000 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS ARE NOT ALLOWED, EXCEPT WHERE CONNECTING TO PSV'S.
4. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
5. RTJ FLANGES SHALL NOT BE USED FOR BIMETALLIC CONNECTION WITHOUT ENGINEERING APPROVAL



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
 230 PSIG @ 100° F
 150 PSIG @ 500° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
CV
 REVISION 1
 DATE: 04/03/18

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

[Signature]

OPER. APPROVAL

ASudra

ENG. APPROVAL

[Signature]

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES
 FILTERED VCM

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 2"	SCH 40S, A-312 TP-304L, SMLS, PE	1, 2
	3" - 14"	SCH 40S, A-312 TP-304L, SMLS, BE	1, 2
	16" - 20"	SCH 10, A-312 TP-304L, SMLS, BE	1, 2
FITTINGS	1/2" - 2"	3000#, A-182, GR. F304L, SW, ASME B16.11	1, 2
	3" - 20"	SCH TO MATCH PIPE, A-403, WP-304L, BW, ASME B16.9	1, 2, 4
	1/2" - 8"	SCH/CLASS TO MATCH PIPE/FITTINGS, A-182, GR. F304L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97	1, 2
FLANGES	1/2" - 2"	150#, A-182, GR. F304L, SCH 40S, RF SW, ASME B16.5	1, 2, 5, 6, 7
	3" - 20"	150#, A-105, LAP JOINT, ASME B16.5	1, 2, 5, 6, 7
	1/2" - 20"	150#, A-182, GR. F304L, RF BLIND, ASME B16.5	
	2" - 20"	300#, A-182, GR. F304L, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, 1/2" SW TAPS	
	3" - 20"	150#, A-105, SCH TO MATCH PIPE, RF WN, ASME B16.5	1, 2, 5, 6, 7
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	6
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	3
VALVES VGA-122 VGA-130 VGA-130G VGA-167 VGL-239 VBF-921 VBF-921G VCH-342 VPL-504 VPL-504G	1/2" - 2"	GATE, 316L SS, 800#, SW, TRIM #10	3
	1" - 14"	GATE, 316 SS, 150#, RF FLG, TRIM #10	
	16" - 20"	GATE, 316 SS, 150#, RF FLG, TRIM #10, GO	
	1/2" - 2"	GATE, EXTENDED BODY, 316L SS, 800#, MSWxFNPT, TRIM #10	
	1/2" - 12"	GLOBE, 316 SS, 150#, RF FLG, TRIM #10	
	3" - 4"	B-FLY, 316 SS, 150#, THD LUG, SS DISC, XTREME/SS SEATS, GRAPHITE SEAL	8, 9, 10
	6" - 20"	B-FLY, 316 SS, 150#, THD LUG, SS DISC, XTREME/SS SEATS, GRAPHITE SEAL, GO	8, 9, 10
	1/2" - 12"	CHECK, SWING, 316 SS, 150#, RF FLG, TRIM #10	11
	2" - 4"	PLUG, 316 SS BODY/PLUG, 150#, RF FLG, SHORT	8, 9, 10
	6" - 12"	PLUG, 316 SS BODY/PLUG, 150#, RF FLG, SHORT, GO	8, 9, 10



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
 230 PSIG @ 100° F
 150 PSIG @ 500° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
 CV
 REVISION 1
 DATE: 04/03/18

MAINT. APPROVAL <i>Jason Polk</i>	HSE APPROVAL <i>[Signature]</i>	OPER. APPROVAL <i>ASudh</i>	ENG. APPROVAL <i>[Signature]</i>
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VBA-656	½" – 4"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, RED. PORT	8, 9, 10
VBA-656G	6" – 8"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, RED. PORT, GO	8, 9, 10
VBA-643	½" – 4"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, FULL PORT	8, 9, 10
VBA-643G	6" – 8"	BALL, 316 SS BODY, 316 SS BALL/STEM, 150#, RF FLG, XTREME SEATS, FULL PORT, GO	8, 9, 10
TEMPORARY STRAINERS	ALL	150#, CONICAL, 150% OPEN AREA, 304/316 SS SCREEN/PLATE	
"Y" STRAINERS	½" – 2" 3" – 24"	600#, SW, A-351, GR. CF8M, 0.020" PERF. SS SCREEN 150#, RF FLG, A-351, GR. CF8M, 0.020" PERF. SS SCREEN	

NOTES:

- RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
- HYDROSTATIC TESTING SHALL BE PERFORMED AT 350 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
- THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
- STUB ENDS SHALL BE USED FOR FLANGED CONNECTIONS. THEY SHALL BE SHORT PATTERN PER ASME B16.9.
- USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
- FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
- 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
- DEFAULT VENT, DRAIN, AND INSTRUMENT VALVES. ¾" SIZE IS THE DEFAULT SIZE.
- BUTTERFLY VALVES SHALL BE LIMITED TO 300°F PER API 609. PLUG VALVES SHALL BE LIMITED TO 400°F. BALL VALVES SHALL BE LIMITED TO 300°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.
- VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.



MATERIAL DUPLEX STAINLESS STEEL 2205
RATING ASME B16.5, CLASS 150, M.G. 2.8
 290 PSIG @ 100° F
 200 PSIG @ 400° F
 0" CORR. ALLOW.

GES 2-3-0
 PVC
 D

REVISION 0
 DATE: 08/21/18

MAINT. APPROVAL

Jason Bell

HSE APPROVAL

Ryan Estro

OPER. APPROVAL

Alvin Red 8/21/18

ENG. APPROVAL

Michael

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON WVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES
 HOT SLURRY

ITEM	SIZE	DESCRIPTION	NOTES	
PIPE	1/2" - 1 1/2"	SCH 40S, ASTM A-790 UNS NO. S31803, SMLS OR EFW W/ 100% R.T., PE OR TE	1, 2, 3	
	2" - 24"	SCH 10S, ASTM A-790 UNS NO. S31803, SMLS OR EFW W/ 100% R.T., BE	1, 2	
FITTINGS	1/2" - 1 1/2"	3000#, ASTM A-182 GR. F51 UNS NO. S31803, THD, ASME B16.11	2, 3	
	1/2" - 1 1/2"	3000#, ASTM A-182 GR. F51 UNS NO. S31803, SW, ASME B16.11	1, 2	
	2" - 24"	SCH 10S, ASTM A-815 WPS31803-S OR WPS31803-WX (100% R.T.), BW, ASME B16.9	1, 2	
	2" - 24"	SCH/CLASS TO MATCH PIPE/FITTINGS, ASTM A-182 GR. F51 UNS NO. S31803, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97	1, 2	
FLANGES	1/2" - 1 1/2"	150#, ASTM A-182 GR. F51 UNS NO. S31803, RF SW, ASME B16.5	1, 2, 5, 6, 7	
	2" - 24"	150#, ASTM A-182 GR. F51 UNS NO. S31803, SCH 10S, RF WN, ASME B16.5	1, 2, 5, 6, 7	
	1/2" - 24"	150#, ASTM A-182 GR. F51 UNS NO. S31803, RF BLIND, ASME B16.5		
	2" - 24"	300#, ASTM A-182 GR. F51 UNS NO. S31803, SCH 10S, RF ORIFICE FLANGE, ASME B16.36, 1/2" SW OR THD TAPS		
UNIONS	NONE	USE FLANGES		
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED		
		A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED		
GASKETS	ALL	150#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	5, 7	
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.		
VALVES VCH-464	1/2" - 12"	CHECK, SWING, DUPLEX SS BODY/TRIM, 150# RF FLG	9	
	VPL-581 VPL-581G	1/2" - 4"	PLUG, DUPLEX SS BODY/PLUG, 150# RF FLG, PTFE SLEEVE	4, 8
		6" - 18"	PLUG, DUPLEX SS BODY/PLUG, 150# RF FLG, PTFE SLEEVE, GO	8
	VBA-702 VBA-702G	1/2" - 4"	BALL, DUPLEX SS BODY/BALL/STEM, 150# RF FLG, RPTFE SEATS, FULL PORT, LONG PATTERN	4, 8
6" - 12"		BALL, DUPLEX SS BODY/BALL/STEM, 150# RF FLG, RPTFE SEATS, FULL PORT, LONG PATTERN, GO	8	



MATERIAL DUPLEX STAINLESS STEEL 2205
RATING ASME B16.5, CLASS 150, M.G. 2.8
290 PSIG @ 100° F
200 PSIG @ 400° F
0" CORR. ALLOW.

GES 2-3-0
PVC
D

REVISION 0
DATE: 08/21/18

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 450 PSIG. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6. DRAIN AND BLOW DRY.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
4. BALL OR PLUG VALVE ALLOWED FOR VENT, DRAIN, AND INSTRUMENT VALVE. 3/4" SIZE IS THE DEFAULT SIZE. LARGER SIZES MAY BE USED AS REQUIRED.
5. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
6. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
7. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
8. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
9. INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.



MATERIAL DUPLEX STAINLESS STEEL 2205
RATING ASME B16.5, CLASS 150, M.G. 2.8
 290 PSIG @ 100° F
 200 PSIG @ 400° F
 0" CORR. ALLOW.

GES 2-3-0
 PVC
 D

REVISION 0
 DATE: 08/21/18

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

Ryan Ester

OPER. APPROVAL

A. Sobh

ENG. APPROVAL

M. Campbell

BRANCH CONNECTIONS:

BRANCH

24	T															
20	RT	T														
18	P	RT	T													
16	P	P	RT	T												
14	P	P	P	RT	T											
12	P	P	P	P	RT	T										
10	P	P	P	P	P	RT	T									
8	W	W	W	W	W	W	RT	T								
6	W	W	W	W	W	W	W	RT	T							
4	W	W	W	W	W	W	W	W	RT	T						
3	W	W	W	W	W	W	W	W	W	RT	T					
2	W	W	W	W	W	W	W	W	W	W	RT	T				
1½	O	O	O	O	O	O	O	O	O	O	O	O	T			
1	O	O	O	O	O	O	O	O	O	O	O	O	RT	T		
¾	O	O	O	O	O	O	O	O	O	O	O	O	RT	RT	T	
½	O	O	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	T
	24	20	18	16	14	12	10	8	6	4	3	2	1½	1	¾	½

SYMBOLS

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

P – BRANCH WELD WITH REINFORCING PAD (PAD THICKNESS EQUALS RUN PIPE THICKNESS, PAD WIDTH EQUALS ½ BRANCH OD.)

RT – REDUCING TEE

T – TEE

W – WELDOLET

GENERAL			
MATERIAL	CARBON STEEL		
RATING	ASME B16.5, CLASS 150, MATERIAL GROUP 1.1 275 PSIG @ 100° F 215 PSIG @ 300° F 1/16" CORROSION ALLOWANCE		
SERVICES	CHILLED WATER, CLARIFIED WATER, COOLING WATER SUPPLY & RETURN, SANITARY SEWER ABOVE GROUND, UNCONTAMINATED WASTEWATER ABOVE GROUND		
ITEM	SIZE	DESCRIPTION	NOTES
PIPE	½" – 1½"	SCH 80, A106 GR. B, SMLS, PEXTE OR TE	1, 2, 3
	½" – 2"	SCH 80, A106 GR. B, SMLS, PE	1, 2, 3
	2" – 24"	STD. WT., A53 GR. B, SMLS OR ERW, BE	1, 2, 3
	30"	STD. WT., API 5L GR. B, ERW, BE	1, 2, 3
FITTINGS	½" – 1½"	THD, CL 3000, A105, ASME B16.11	2
	½" – 2"	SW, CL 3000, A105, ASME B16.11	1, 2
	2" – 24"	BW, STD. WT., A234 GR. WPB, ASME 16.9	1, 2
	30"	BW, STD. WT., A234 GR. WPB, EFW, ASME B16.9	1, 2
	½" – 10"	OLET, SCH/CLASS/TYPE TO MATCH PIPE/FITTINGS, A105, MSS SP-97	1, 2
FLANGES	½" – 1½"	RF THD, CL 150, A105, ASME B16.5	2, 4, 5, 6
	½" – 2"	RF SW, CL 150, A105, SCH 80, ASME B16.5	1, 2, 4, 5, 6
	2" – 12"	RF WN, CL 150, A105, STD. WT., ASME B16.5	1, 2, 4, 5, 6, 12
	4" – 24"	RF SO, CL 150, A105, ASME B16.5	1, 2, 4, 5, 6, 7
	30"	RF SO, CL 150, A105, ASME B16.47 SER. A	1, 2, 4, 5, 6, 7
	½" – 24"	RF BLIND, CL 150, A105, ASME B16.5	
	30"	RF BLIND, CL 150, A105, ASME B16.47 SER. A	
	2" – 24"	RF ORIFICE FLANGE, CL 300, A105, ASME B16.36, ½" THD TAPS	
UNIONS	½" – 1 ½"	THD, CL 3000, A105, MSS-SP-83	
BOLTING	ALL	STUD BOLTS, A193 GR. B7, TEFLON COATED	
		NUTS, A194 GR. 2H, TEFLON COATED	
GASKETS	ALL	EXPANDED PTFE W/ CORRUGATED INSERT, RING TYPE, CL 150, 1/8" THK, ASME B16.21; VSP PITA OR EQ W/ ENGINEERING APPROVAL	4, 6
	ALL	FILLED PTFE WITH INORGANIC FILLER, RING TYPE, CL 150, 1/8" THK, ASME B16.21; DURLON 9000 OR EQ W/ ENGINEERING APPROVAL	4, 6
THREAD LUBE	PIPE	PTFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F)	
	BOLTS	NONE – PTFE COATED	
TEMPORARY STRAINERS	ALL	CL 150 RF, CONICAL, 150% OPEN AREA, CS SCREEN/PLATE	
"Y" STRAINERS	½" – 1½"	THD, CL 600, A216, 0.045" PERF, SS SCREEN	
	2" – 24"	RF FLG, CL 150, A216, 0.045" PERF, SS SCREEN	

VALVES

BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
VBA-618	VBF-913	VCH-304 VCH-305 VCH-454	VGA-101 VGA-226	VGL-200 VGL-440	VPL-521		8, 9, 10, 11

NOTES

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE PER WESTLAKE STANDARD [GES-230 "PIPING SPECIFICATIONS"](#) REQUIREMENTS FOR DESIGN, FABRICATION, WELDING, NON-DESTRUCTIVE EVALUATION, INSTALLATION, DOCUMENTATION, ETC. MUST BE FOLLOWED.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 450 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. ALL BURIED PIPING SHALL BE COATED AND WRAPPED IN ACCORDANCE WITH [GES-221 "COATING AND WRAPPING OF UNDERGROUND PIPING"](#).
4. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. CL 300 FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. SLIP-ON FLANGES MAY BE USED ON FITTINGS IF REQUIRED.
8. VGA-226 IS THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVES. ¾" SIZE IS THE DEFAULT SIZE.
9. BUTTERFLY, PLUG, AND BALL VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
10. INSTALL CHECK VALVES IN A HORIZONTAL POSITION WITH COVER UP.
11. CHECK VALVES CAN ALSO BE INSTALLED IN A VERTICAL POSITION WITH UPWARD FLOW.
12. WELD NECK FLANGES ARE DEFAULT FOR SIZES LISTED. SLIP-ON FLANGES MAY BE USED WHERE REQUIRED.

BRANCH CONNECTIONS

BRANCH

30	T																		
24	RT	T																	
20	F	RT	T																
18	F	P	RT	T															
16	F	P	P	RT	T														
14	F	P	P	P	RT	T													
12	F	P	P	P	P	RT	T												
10	W	P	P	P	P	P	RT	T											
8	W	W	W	W	W	W	W	RT	T										
6	W	W	W	W	W	W	W	W	RT	T									
4	W	W	W	W	W	W	W	W	W	RT	T								
3	W	W	W	W	W	W	W	W	W	W	RT	T							
2	O	O	O	O	O	O	O	O	O	O	O	O	T						
1½	O	O	O	O	O	O	O	O	O	O	O	O	RT	T					
1	O	O	O	O	O	O	O	O	O	O	O	O	RT	RT	T				
¾	O	O	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	T			
½	O	O	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	RT	T		
	30	24	20	18	16	14	12	10	8	6	4	3	2	1½	1	¾	½		

SYMBOLS

F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

P – BRANCH WELD WITH REINFORCING PAD (PAD THICKNESS EQUALS RUN PIPE THICKNESS, PAD WIDTH EQUALS ½ BRANCH OD.)

RT – REDUCING TEE

T – TEE

W – WELDOLET



MATERIAL

CAST IRON, HUB & SPIGOT (H&S)

RATING

ATM PSIG @ 150° F
0" CORR. ALLOW

GES 2-3-0

PVC

F

REVISION 5
DATE: 08/24/16

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

ROOF DRAINS UNDERGROUND, TRENCH DRAINS, SANITARY SEWERS UNDERGROUND

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	2" - 15"	XH, EXTRA HEAVY CAST IRON SOIL PIPE, H&S, ASTM A74	
FITTINGS	2" - 15"	XH, EXTRA HEAVY CAST IRON SOIL PIPE FITTINGS, H&S, ASTM A74	
FLANGES	NONE		
UNIONS	NONE		
BOLTING	NONE		
GASKETS (FOR CI)	2" -15"	XH, EXTRA HEAVY COMPRESSION TYPE RUBBER GASKET, ASTM C564	
THRD. LUBE	NONE		

NOTES:

1. THIS SYSTEM IS INTENDED FOR USE IN NON-PRESSURE APPLICATIONS.
2. INSTALLATION SHALL COMPLY WITH THE LATEST INSTALLATION INSTRUCTIONS RECOMMENDED BY THE PIPE AND FITTINGS MANUFACTURER, AND SHALL CONFORM TO ALL APPLICABLE PLUMBING, FIRE, AND BUILDING CODE REQUIREMENTS.
3. THE SYSTEM SHALL BE HYDROSTATICALLY TESTED USING WATER AFTER INSTALLATION TO 10 FT. OF HEAD (4.3 PSI MAXIMUM).



MATERIAL

GALV STEEL & CAST IRON

RATING

ATM PSIG @ 200 °F
0" CORR. ALLOW

GES 2-3-0

PVC

F1

REVISION 4

DATE: 08/24/16

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

ROOF DRAINS ABOVE GROUND AND IN BUILDINGS

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1" - 3"	SCH 40, ASTM A53, HOT-DIPPED GALV. STEEL PIPE, WELDED	
	4" - 15"	SERVICE (SV) WALL, ASTM A74, CAST IRON SOIL PIPE, HUB & SPIGOT	
FITTINGS	1" - 3"	CLASS 125, ASTM A126 CL. B, HOT-DIPPED GALV. GRAY IRON THREADED FITTINGS, ASME B16.4	
	4" - 15"	SERVICE (SV) WALL, ASTM A74, CAST IRON SOIL PIPE FITTINGS, HUB & SPIGOT	
FLANGES	NONE		
UNIONS	NONE		
BOLTING	NONE		
GASKETS	4" - 15" USE W/ CI PIPE	COMPRESSION TYPE PREFORMED RUBBER GASKET, ASTM C-564	
THRD. LUBE			

NOTES:

1. THIS SYSTEM IS INTENDED FOR USE IN NON-PRESSURE APPLICATIONS.
2. INSTALLATION SHALL COMPLY WITH THE LATEST INSTALLATION INSTRUCTIONS RECOMMENDED BY THE PIPE AND FITTINGS MANUFACTURER, AND SHALL CONFORM TO ALL APPLICABLE PLUMBING, FIRE, AND BUILDING CODE REQUIREMENTS.
3. THE HUB AND SPIGOT PIPING SYSTEM SHALL BE HYDROSTATICALLY TESTED USING WATER AFTER INSTALLATION TO 10 FT. OF HEAD (4.3 PSI MAXIMUM). THE STEEL PIPING SYSTEM MAY BE SERVICE TESTED.



MATERIAL PVC
RATING 132 PSIG @ 73 °F
 82 PSIG @ 100 °F
 0" CORR. ALLOW.

GES 2-3-0
 PVC
F2

REVISION 4
 DATE: 04/18/18

MAINT. APPROVAL

Jason Pelt

HSE APPROVAL

[Signature]

OPER. APPROVAL

A. Seach

ENG. APPROVAL

[Signature]

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

UNCONTAMINATED WASTEWATER – UNDERGROUND (6)

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	2" – 8"	SCH 40, PVC, TYPE 1, GR 1 (12454-B), PVC 1120 PER ASTM 1785, SMLS, PE	
FITTINGS	2" – 8"	SCH 40, PVC PER ASTM D2466 (12454), SOCKET ENDS, ASTM D1784	
FLANGES	2" – 8"	150 ANSI, PVC PER ASTM D2467, SOCKET ENDS, SCH 80, FF	7
UNIONS	NONE	USE FLANGES	
BOLTING	2" – 8"	A-193 GR. B7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED ASTM F436 WASHERS	3, 4
GASKETS	ALL	1/8" THICK, WHITE NEOPRENE, FULL FACE GASKET, ASME B16.21 (GASKET NOT REQUIRED FOR BUTTERFLY VALVE)	
JOINT CEMENT	ALL	PVC SOLVENT CEMENT, ASTM D2564, (USE MANUFACTURERS RECOMMENDED FORMULATION FOR THE SERVICE)	
VALVES VBF-932	2" – 8"	B-FLY, PVC BODY/DISC, 150#, WAFER STYLE, LEVER WITH EXTENSION STEM, DIRECT BURIAL	
BRANCHES	2" – 8"	ALL BRANCH CONNECTIONS SHALL BE MADE USING FULL OR REDUCING TEES	

NOTES:

1. PRESSURE LIMITED BY FITTINGS.
2. HYDROSTATIC TESTING SHALL BE PERFORMED PER ASME B31.3, SECTION A345.4. SEE "HYDROTEST PRESSURE TABLE" (PAGE 2).
3. WASHERS SHALL BE USED ON BACKSIDE OF FLANGES.
4. BOLTS SHALL BE TORQUED TO MANUFACTURERS SPECIFICATIONS, AND RE-CHECKED AFTER START-UP.
5. MANUFACTURERS INSTRUCTIONS ON JOINT ASSEMBLY AND SUPPORT REQUIREMENTS SHALL BE PROVIDED WITH PIPE AND FITTINGS AND SHALL BE STRICTLY FOLLOWED.
6. DO NOT USE IN AIR OR GAS SERVICE.



MATERIAL PVC
RATING 132 PSIG @ 73 °F
82 PSIG @ 100 °F
0" CORR. ALLOW.

GES 2-3-0
PVC
F2

REVISION 4
DATE: 04/18/18

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

7. SCH 80 FLANGE REFERS TO SOCKET DIMENSIONS WHICH ARE COMPATIBLE WITH SCH 40 PIPE.

HYDROTEST PRESSURE TABLE

Hydrostatic Test Temperature - F	Hydrostatic Test Pressure - PSIG
73 F	195
80 F	175
90 F	145
100 F	120



Piping Specification
Specification No: **GES-230-PVC-G**

Revision No: 8
Rev Date: 06/28/2023

Title: **PVC Spec G**

Geismar, LA
Page 1 of 3

GENERAL							
MATERIAL	CARBON STEEL						
RATING	ASME B16.5, CLASS 150, MATERIAL GROUP 1.1 285 PSIG @ 100°F 170 PSIG @ 500°F 1/16" CORROSION ALLOWANCE						
SERVICES	STEAM, STEAM CONDENSATE						
ITEM	SIZE	DESCRIPTION					NOTES
PIPE	½" – 2"	SCH 80, A106 GR. B, SMLS, PE					1, 2
	3" – 24"	STD WT, A53 GR. B, SMLS OR ERW, BE					1, 2
FITTINGS	½" – 2"	CL 3000, A105, SW, ASME B16.11					1
	½" – 24"	SCH TO MATCH PIPE, A234 GR. WPB, SMLS, BE, ASME B16.9					1
	½" – 8"	SCH/CLASS TO MATCH PIPE/FITTINGS, A105, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97					1
FLANGES	½" – 2"	CL 150, A105, SCH 80, RF SW, ASME B16.5					1, 3, 4, 5
	½" – 12"	CL 150, A105, SCH TO MATCH PIPE, RF WN, ASME B16.5					1, 3, 4, 5
	3" – 24"	CL 150, A105, RF SO, ASME B16.5					1, 3, 4, 5, 6
	½" – 24"	CL 150, A105, RF BLIND, ASME B16.5					3
	2" – 24"	CL 300, A105, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, ½" SW TAPS					
UNIONS	NONE	USE FLANGES					
BOLTING	ALL	A193 B7 STUD BOLTS, TEFLON COATED					
		A194 2H HEAVY NUTS, TEFLON COATED					
GASKETS	ALL	CL 150, 1/8" THK, SPIRAL WOUND, 304SS WINDINGS WITH GRAPHITE FILLER, CS OUTER RING, ANTI-BUCKLING, ASME B16.20; FLEXITALLIC STYLE CGI, VSP AB-326, OR EQ W/ ENGINEERING APPROVAL					3, 5
THREAD LUBE	PIPE BOLTS	PTFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F)					
		NONE					
TEMPORARY STRAINERS	ALL	CL 300, CONICAL, 150% OPEN AREA, 304/316 SS SCREEN/PLATE					
"Y" STRAINERS	½" – 2"	CL 600, SW, A216, 0.020" PERF. SS SCREEN					
	3" – 12"	CL 150, RF FLG, A216, 0.020" PERF. SS SCREEN					
VALVES							
BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
VBA-706		VCH-302 VCH-312	VGA-101 VGA-112 VGA-120	VGL-200 VGL-215	VPL-521		8, 9, 10, 11



NOTES

1. REQUIREMENTS FOR DESIGN, FABRICATION, WELDING, NON-DESTRUCTIVE EVALUATION, INSTALLATION, DOCUMENTATION, ETC. IN WESTLAKE STANDARD [GES-230 "PIPING SPECIFICATIONS"](#) MUST BE FOLLOWED.
2. ALL BURIED PIPING SHALL BE COATED AND WRAPPED IN ACCORDANCE WITH [GES-221 "COATING AND WRAPPING OF UNDERGROUND PIPING"](#).
3. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. VSP AB-326 GASKETS SHALL BE USED BETWEEN THESE FLANGES.
4. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
5. CL 300 FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
6. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
7. VGA-120 IS THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. ¾" SIZE IS THE DEFAULT SIZE.
8. PLUG VALVES SHALL BE LIMITED TO 400°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.
9. PLUG VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH LOCKING DEVICES.
10. CHECK VALVES TO BE INSTALLED IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.

BRANCH CONNECTIONS

BRANCH

24	T																
20	RT	T															
18	RT	RT	T														
16	RT	RT	RT	T													
14	RT	RT	RT	RT	T												
12	RT	RT	RT	RT	RT	T											
10	W	RT	RT	RT	RT	RT	T										
8	W	W	W	RT	RT	RT	RT	T									
6	W	W	W	W	W	RT	RT	RT	T								
4	W	W	W	W	W	W	W	RT	RT	T							
3	W	W	W	W	W	W	W	W	RT	RT	T						
2	O	O	O	O	O	O	O	O	O	RT	RT	T					
1½	O	O	O	O	O	O	O	O	O	O	RT	RT	T				
1	O	O	O	O	O	O	O	O	O	O	O	RT	RT	T			
¾	O	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	T		
½	O	O	O	O	O	O	O	O	O	O	O	RT	RT	RT	RT	T	
	24	20	18	16	14	12	10	8	6	4	3	2	1½	1	¾	½	

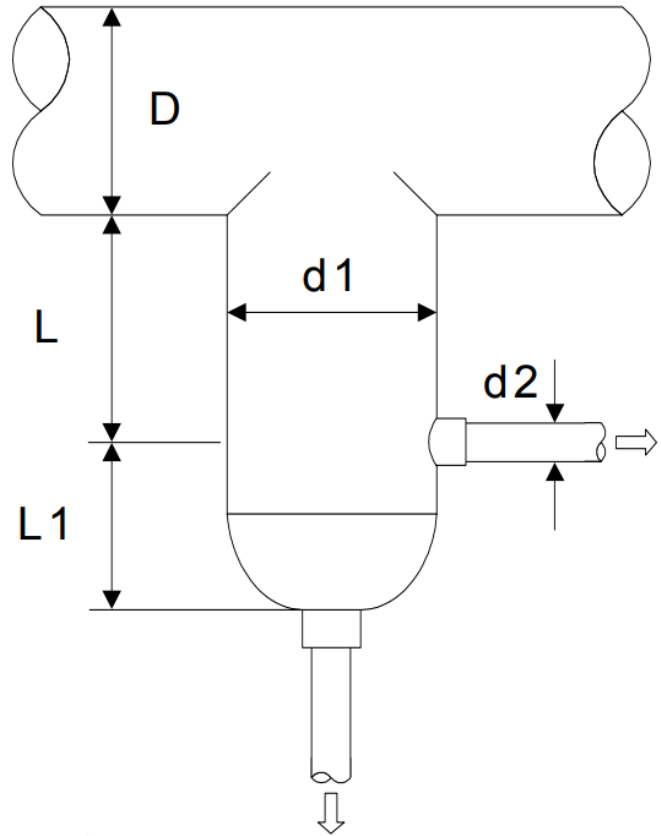
SYMBOLS

- O – OLET
- RT – REDUCING TEE
- T – TEE
- W – WELDOLET

DRAIN ARRANGEMENTS

The following table should be used for all condensate drain legs from steam headers. All dimensions are in inches.

D	d1	d2	L	L1
¾	¾	¾	12	4
1	1			
1 ½	1 ½			
2	2			
3	3			
4	4	1	15	6.5
6	4			
8	4			
10	6			
12	6			
14	8			
16	8			
20	10	30		





MATERIAL

CARBON STEEL

RATING

ASME B16.5, CLASS 300, M.G. 1.1
740 PSIG @ 100° F
605 PSIG @ 500° F
1/16" CORR. ALLOW.

GES 2-3-0

PVC

H

REVISION 7
DATE: 08/24/16

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

HSE

OPER. APPROVAL

AS

ENG. APPROVAL

C. Pike

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SERVICES

MECHANICAL SEAL OIL

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 1"	SCH 160, A-106 GR. B, SMLS, PEXTE OR TE	1, 2, 3
	1/2" - 2"	SCH 80, A-106 GR. B, SMLS, PE	1, 2
	3" - 6"	STD WT, A-53 GR. B, SMLS OR ERW, BE	1, 2
FITTINGS	1/2" - 1"	3000#, A-105, THD, ASME B16.11	2, 3
	1/2" - 2"	3000#, A-105, SW, ASME B16.11	1, 2
	3" - 6"	STD WT, A-234 GR. WPB, SMLS OR WX, BE, ASME B16.9	1, 2
	1/2" - 3"	SCH/CLASS TO MATCH PIPE/FITTINGS, A105, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97	1, 2
FLANGES	1/2" - 2"	300#, A-105, SCH 80, RF SW, ASME B16.5	1, 2, 4, 5
	3" - 6"	300#, A-105, STD WT, RF WN, ASME B16.5	1, 2, 4, 5
	1/2" - 6"	300#, A-105, RF BLIND, ASME B16.5	4
	2" - 6"	300#, A-105, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, 1/2" SW TAPS	
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED	
		A-194 GR. 2H HVY. HEX NUTS, BLUE TEFLON COATED	
GASKETS	ALL	300#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	4
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGL-215	1/2" - 2"	GLOBE, CS, 800#, SW, TRIM #8	
VGL-208	3" - 6"	GLOBE, CS, 300#, RF FLG, TRIM #8	
VCH-312	1/2" - 2"	CHECK, BALL, CS, 800#, SW, TRIM #8	8
VCH-307	3" - 6"	CHECK, SWING, CS, 300#, RF FLG, TRIM #8	8
VPL-577	1/2" - 2"	PLUG, CS BODY/ 316SS SLEEVED PLUG, 300#, RF FLG, SHORT	6, 7, 9
VPL-577G	3" - 6"	PLUG, CS BODY/ 316SS SLEEVED PLUG, 300#, RF FLG, SHORT, GO	7, 9
"Y" STRAINERS	1/2" - 2"	600#, SW, A-216, 0.020" PERF. SS SCREEN	
	3" - 6"	300#, RF FLG, A-216, 0.020" PERF. SS SCREEN	



MATERIAL CARBON STEEL
RATING ASME B16.5, CLASS 300, M.G. 1.1
740 PSIG @ 100° F
605 PSIG @ 500° F
1/16" CORR. ALLOW.

GES 2-3-0
PVC
H

REVISION 7
DATE: 08/24/16

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 1125 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
4. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. 3/4" SIZE IS THE DEFAULT SIZE.
7. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
8. INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
9. PLUG VALVES SHALL BE LIMITED TO 300°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.



MATERIAL

CARBON STEEL

RATING

ASME B16.5, CLASS 300, M.G. 1.1
740 PSIG @ 100° F
605 PSIG @ 500° F
1/16" CORR. ALLOW.

GES 2-3-0

PVC

H

REVISION 7
DATE: 08/24/16

MAINT. APPROVAL

James Polke

HSE APPROVAL

HSE

OPER. APPROVAL

AB

ENG. APPROVAL

C. Pitme

BRANCH CONNECTIONS:

BRANCH

6	T								
4	RT	T							
3	W	RT	T						
2	O	O	O	T					
1½	O	O	O	RT	T				
1	O	O	O	RT	RT	T			
¾	O	O	O	RT	RT	RT	T		
½	O	O	O	RT	RT	RT	RT	T	
	6	4	3	2	1½	1	¾	½	

SYMBOLS

F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

RT – REDUCING TEE

T – TEE

W – WELDOLET



MATERIAL CARBON STEEL
RATING ASME B16.5, CLASS 1500, M.G. 1.1
 3705 PSIG @ 100° F
 3015 PSIG @ 500° F
 1/16" CORR. ALLOW.

GES 2-3-0
 PVC
 H1

REVISION 8
 DATE: 08/24/16

MAINT. APPROVAL

Jim Polk

HSE APPROVAL

[Signature]

OPER. APPROVAL

AS

ENG. APPROVAL

C. Pitre

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SERVICES

HIGH PRESSURE NITROGEN FROM BOTTLES

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 2"	SCH XXS, A-106 GR. B SMLS, PEXTE OR TE	1, 2, 3
	1/2" - 2"	SCH 160, A-106 GR. B SMLS, PE	1, 2
FITTINGS	1/2" - 2"	6000#, A-105, THD, ASME B16.11	2, 3
	1/2" - 2"	6000#, A-105, SW, ASME B16.11	1, 2
FLANGES	1/2" - 2"	1500#, A-105, SCH 160, RF SW, ASME B16.5	1, 2, 4, 5
	1/2" - 2"	1500#, A-105, RF BLIND, ASME B16.5	
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	1500#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	4
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES VGL-241	1/2" - 2"	GLOBE, CS, 1500#, SW, TRIM #8	
TEMPORARY STRAINERS	ALL	1500#, RF, CONICAL, 150% OPEN AREA, SS SCREEN/PLATE	
"Y" STRAINERS	1/2" - 2"	1500#, SW, A-216 WPB, 0.020" PERF. SS SCREEN	
BRANCH CONNECTIONS	1/2" - 2"	ALL BRANCH CONNECTIONS SHALL BE MADE USING FULL OR REDUCING TEES	



MATERIAL

CARBON STEEL

RATING

ASME B16.5, CLASS 1500, M.G. 1.1
3705 PSIG @ 100° F
3015 PSIG @ 500° F
1/16" CORR. ALLOW.

GES 2-3-0

PVC

H1

REVISION 8

DATE: 08/24/16

MAINT. APPROVAL

James Polk

HSE APPROVAL

W. E. B.

OPER. APPROVAL

A. D.

ENG. APPROVAL

C. Pitme

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 5575 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. SW COMPONENTS ARE PREFERRED FOR GENERAL USE. THREADED COMPONENTS SHALL ONLY BE USED FOR BOTTLE CONNECTIONS.
4. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
 230 PSIG @ 100° F
 195 PSIG @ 200° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
 K

REVISION 9
 DATE: 04/03/18

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

[Signature]

OPER. APPROVAL

A. B. [Signature]

ENG. APPROVAL

[Signature]

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

PVC SLURRY, DI WATER CHARGE HEADER

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 1 1/2" 1/2" - 2" 3" - 12"	SCH 80S, A-312 TP-304L, SMLS, PEXTE OR TE SCH 40S, A-312 TP-304L, SMLS, PE SCH 40S, A-312 TP-304L, SMLS, BE	1, 2, 3, 11 1, 2 1, 2
FITTINGS	1/2" - 1 1/2" 1/2" - 2" 3" - 12" 1/2" - 10"	3000#, A-182, GR. F304L, THD, ASME B16.11 3000#, A-182, GR. F304L, SW, ASME B16.11 SCH TO MATCH PIPE, A-403, WP-304L-S, SMLS, BW, ASME B16.9 SCH/ CLASS TO MATCH PIPE/FITTINGS, A-182, GR. F304L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET) MSS SP-97	2, 3, 11 1, 2 1, 2 1, 2
FLANGES	1/2" - 2" 2" - 12" 1/2" - 12" 2" - 12" 2" - 6"	150#, A-182, GR. F304L, SCH 40S, RF SW, ASME B16.5 150#, A-182, GR. F304L, RF SO, ASME B16.5 150#, A-182, GR. F304L, RF BLIND, ASME B16.5 300#, A-182, GR. 304L, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, 1/2" SW TAPS 150#, A-182, GR. F304/304L, SCH TO MATCH PIPE, RF WN, ASME B16.5	1, 2, 5, 6 1, 2, 4, 5, 6 1, 2, 5, 6
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	6
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-153 VGA-235	1/2" - 2" 1/2" - 1 1/2"	GATE, EXTENDED BODY, 316L SS, 800#, SWxNPT, TRIM #12 GATE, 316L SS, 800#, NPT, TRIM #12	7, 11 11
VCH-339 VCH-340	1/2" - 2" 3" - 12"	CHECK, SWING, HORIZONTAL, 316L SS BODY/TRIM, 150#, SW CHECK, SWING, HORIZONTAL, 316 SS, 150#, RF FLG, TRIM #10	9 9
VPL-504 VPL-504G	1/2" - 4" 6" - 8"	SLEEVED PLUG, 316SS BODY/PLUG, 150#, RF FLG, SHORT SLEEVED PLUG, 316SS BODY/PLUG, 150#, RF FLG, SHORT, GO	8 8
VBA-607 VBA-607G	1/2" - 4" 6" - 8"	BALL, FP, 316 SS, XTREME SEATS, 150#, RF FLG BALL, FP, 316 SS, XTREME SEATS, 150#, RF FLG, LONG, GO	8 8



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
 230 PSIG @ 100° F
 195 PSIG @ 200° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
 K

REVISION 9
 DATE: 04/03/18

MAINT. APPROVAL <i>Jason Polk</i>	HSE APPROVAL <i>[Signature]</i>	OPER. APPROVAL <i>ASud</i>	ENG. APPROVAL <i>[Signature]</i>
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VBF-921G	6" – 12"	B-FLY, 316 SS, 150#, THD LUG, SS DISC, XTREME/SS SEATS, GRAPHITE SEAL, GO	8
TEMPORARY STRAINERS	ALL	150#, CONICAL, 150% OPEN AREA, 316 SS SCREEN/PLATE	
"Y" STRAINERS	1/2" – 2" 3" – 12"	600#, SW, A-351, GR. CF8M, 0.020" PERF. SS SCREEN 150#, RF FLG, A-351, GR. CF8M, 0.020" PERF. SS SCREEN	

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 350 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
4. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. 3/4" SIZE IS THE DEFAULT SIZE.
8. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
9. INSTALL IN HORIZONTAL POSITION WITH COVER UP.
10. USE CONNECTION P FOR BRANCHES AT ODD ANGLES WHERE STANDARD FITTINGS CANNOT BE USED, BUT MODIFY THE REINFORCING PAD FOR SIZES 1/2"–1 1/2" TO CONNECTION F.
11. NOT TO BE USED IN PVC SLURRY SERVICE.



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
 230 PSIG @ 100° F
 195 PSIG @ 200° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
 K1

REVISION 4
 DATE: 08/24/16

MAINT. APPROVAL

James Polk

HSE APPROVAL

NSB

OPER. APPROVAL

AS

ENG. APPROVAL

C. Pitre

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES
 REACTOR SLURRY

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2"	SCH 80S, A-312 TP-304L, WELDED, PEXTE OR TE	1, 2, 3
	1/2" - 2"	SCH 40S, A-312 TP-304L, WELDED, PE	1, 2
	3" - 12"	SCH 10S, A-312 TP-304L, WELDED, BE	1, 2
FITTINGS	1/2"	3000#, A-182, GR. F304L, THD, ASME B16.11	2, 3
	1/2" - 2"	3000#, A-182, GR. F304L, SW, ASME B16.11	1, 2
	3" - 12"	SCH TO MATCH PIPE, A-403, WP-304L, BW, ASME B16.9	1, 2
	1/2" - 10"	SCH/ CLASS TO MATCH PIPE/FITTINGS, A-182, GR. F304L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET) MSS SP-97	1, 2
FLANGES	1/2" - 2"	150#, A-182, GR. F304L, SCH 40S, RF SW, ASME B16.5	1, 2, 5, 6
	3" - 12"	150#, A-182, GR. F304L, RF SO, ASME B16.5	1, 2, 4, 5, 6
	1/2" - 12"	150#, A-182, GR. F304L, RF BLIND, ASME B16.5	
	2" - 12"	300#, A-182, GR. 304L, SCH TO MATCH PIPE, RF ORIFICE FLANGE, ASME B16.36, 1/2" SW TAPS	
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED	
		A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ	6
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-153	1/2" - 2"	GATE, EXTENDED BODY, 316L SS, 800#, SWxNPT, TRIM #12	7
VGA-130	3" - 12"	GATE, 316 SS, 150#, RF FLG, TRIM #10	
VPL-504	1/2" - 4"	SLEEVED PLUG, 316 SS BODY/PLUG, 150#, RF FLG, SHORT	8
TEMPORARY STRAINERS	ALL	150#, CONICAL, 150% OPEN AREA, 316 SS SCREEN/PLATE	
"Y" STRAINERS	1/2" - 2"	600#, SW, A-351, GR. CF8M, 0.020" PERF. SS SCREEN	
	3" - 12"	150#, RF FLG, A-351, GR. CF8M, 0.020" PERF. SS SCREEN	



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
230 PSIG @ 100° F
195 PSIG @ 200° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
K1

REVISION 4
DATE: 08/24/16

MAINT. APPROVAL

Jason Bolch

HSE APPROVAL

W.B.

OPER. APPROVAL

AB

ENG. APPROVAL

C. Pitme

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 350 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
4. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. 3/4" SIZE IS THE DEFAULT SIZE.
8. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
 230 PSIG @ 100° F
 195 PSIG @ 200° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
K1

REVISION 4
 DATE: 08/24/16

MAINT. APPROVAL

J. Polk

HSE APPROVAL

[Signature]

OPER. APPROVAL

AB

ENG. APPROVAL

C. Pitme

BRANCH CONNECTIONS:

BRANCH

12	T													
10	W	T												
8	W	W	T											
6	W	W	W	T										
4	W	W	W	W	T									
3	W	W	W	W	W	T								
2	O	O	O	O	O	O	T							
1½	O	O	O	O	O	O	RT	T						
1	O	O	O	O	O	O	RT	RT	T					
¾	O	O	O	O	O	O	RT	RT	RT	T				
½	O	O	O	O	O	O	RT	RT	RT	RT	T			
	12	10	8	6	4	3	2	1½	1	¾	½			

SYMBOLS

F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

RT – REDUCING TEE

T – TEE

W – WELDOLET



MATERIAL

DUCTILE IRON & PVC

RATING

DUCTILE 150 PSIG @ 120F
PVC 150 PSIG @ 120F
0" CORR. ALLOW.

GES 2-3-0
PVC
L

REVISION 5
DATE: 08/24/16

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

POTABLE WATER BELOW GROUND

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 2"	SCH 80, PVC, TYPE 1, GR 1(12454-B) PVC1120 PER ASTM D1785, SMLS, PE	1
	3" - 4"	SPECIAL THICKNESS CLASS 51 (ANSI/AWWA C150/A21.50), DUCTILE IRON, MECHANICAL JOINT ONE END X PLAIN OTHER END, ANSI/AWWA C151/A21.51	1
	6" - 48"	SPECIAL THICKNESS CLASS 50 (ANSI/AWWA C150/A21.50), DUCTILE IRON, MECHANICAL JOINT ONE END X PLAIN OTHER END, ANSI/AWWA C151/A21.51	1
FITTINGS	1/2" - 2"	SCH 80, PVC PER ASTM D2467 (12454), SOCKET ENDS, ASTM D1784	1
	3" - 48"	DUCTILE IRON, MECHANICAL JOINT ENDS, RATING TO MATCH PIPE, ANSI/AWWA C110/A21.10	1
FLANGES	1/2" - 2"	150 ANSI, PVC PER ASTM D2467, SOCKET ENDS, SCH 80, FF	1, 6
	3" - 48"	DI, MECH JOINT X FLG ADAPTERS, ANSI/AWWA C110/A21.10	1, 6
BLINDS	3" - 48"	DI, 150 PSI MIN WORKING PRESSURE, ANSI/AWWA C110/A21.10 APP B OR ASME B16.42, (BOLT PATTERN TO MATCH AWWA C110, C111, C153 FLANGE DRILLING)	
UNIONS	NONE		
BOLTING	1/2" - 2"	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	6 6
	3" - 48"	TEE BOLTS/NUTS, LOW-ALLOY HIGH-STRENGTH STEEL PER ANSI/AWWA C111/A21.11	
GASKETS	1/2" - 2"	1/8" THICK, WHITE NEOPRENE, FULL FACE GASKET, FOR USE WITH 150# FF FLANGES, ANSI B16.21	
	3" - 48"	SBR RUBBER MECH JOINT GASKET, ANSI/AWWA C111/A21.11	
GATE VALVES	3" - 24"	IBBM, 150 PSI MIN WORKING PRESSURE, WOG, DOUBLE DISC, INSIDE SCREW, BOLTED BONNET, NON-RISING STEM, SQUARE OPERATING NUT, AWWA PATTERN, MJ ENDS WITH RETAINER RINGS, M&H DRESSER FIG F-5065 OR EQUAL, 14" AND HIGHER TO HAVE GEAR OPERATOR, AWWA C500	
BALL VALVES	1/2" - 2"	PVC, SOCKET ENDS, PTFE SEATS, FKM O-RING SEALS, DOUBLE UNION BODY, FULL PORT, CHEMTROL HEAVY DUTY TRU-BLOC TRU-UNION OR EQUAL	



MATERIAL

DUCTILE IRON & PVC

RATING

DUCTILE 150 PSIG @ 120F
PVC 150 PSIG @ 120F
0" CORR. ALLOW.

GES 2-3-0

PVC

L

REVISION 5
DATE: 08/24/16

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

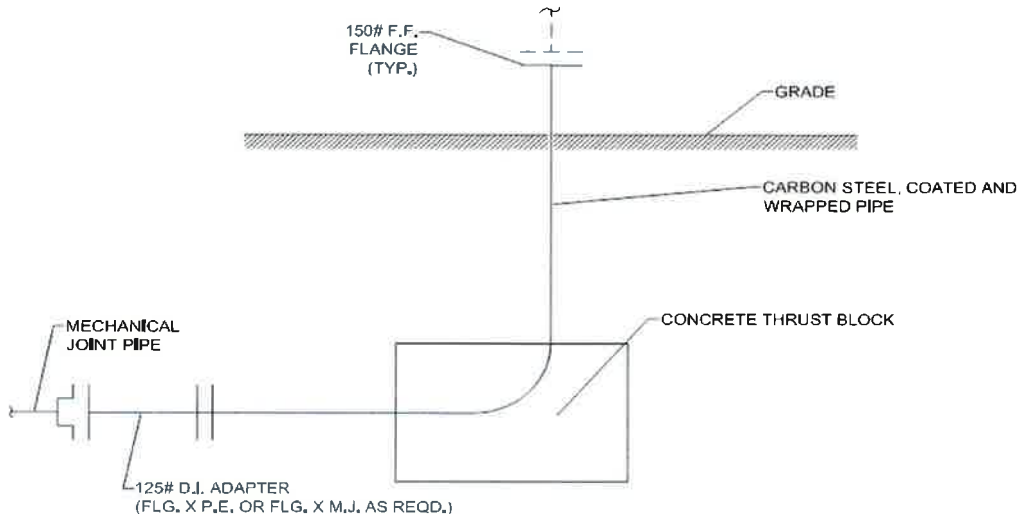
ENG. APPROVAL

NOTES:

1. ALL PIPING SPOOLS SHALL BE SERVICE TESTED.
2. ALL MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE SAFE DRINKING WATER ACT AND OTHER FEDERAL REGULATIONS FOR POTABLE WATER, WASTEWATER, AND RECLAIMED WATER SYSTEMS AS APPLICABLE.
3. FROM PLASTIC PIPE INSTITUTE—PRESSURE VS TEMPERATURE DERATING FACTOR:

OPERATING TEMP (°F)	DE-RATING FACTOR
73	1.00
80	0.88
90	0.75
100	0.62
110	0.51
120	0.40
130	0.30
140	0.22

4. DEPTH OF COVER SHALL BE LIMITED BY ANSI/AWWA C150/A21.50 FOR APPROPRIATE LAYING CONDITION.
5. WESTLAKE ENGINEERING SHALL BE CONSULTED FOR VALVE BOX SELECTION.
6. BOLTS SHALL BE TORQUED TO MATCH MANUFACTURER'S SPECIFICATIONS AND RECHECKED AFTER START-UP.
7. VERTICAL RISERS—ALL VERTICAL RUNS OUT OF GROUND SHALL BE MADE WITH CARBON STEEL, COATED AND WRAPPED, PIPE AND FITTINGS. USE STD WT ASTM A53 GR B SEAMLESS, OR ERW PIPE WITH STD WT ASTM A-234 BUTT WELD FITTINGS. FLANGES SHALL BE 150# ANSI FLAT FACE WELDING NECK OR SLIP-ON TYPE PER ASTM A-105. MECHANICAL JOINTS ARE NOT TO BE USED ON VERTICAL RUNS. ALL RISERS ARE TO BE MADE ACCORDING TO THE SKETCH BELOW.





MATERIAL COPPER / C. S. GALVANIZED

RATING 100 PSIG @ 100° F
0" CORR. ALLOW.

GES 2-3-0
PVC
N

REVISION 4
DATE: 08/21/15

MAINT. APPROVAL <i>Juan Pelt 10/12/15</i>	HSE APPROVAL <i>J.P. 10/23/15</i>	OPER. APPROVAL <i>A.B. 10/19/15</i>	ENG. APPROVAL <i>M. 10/19/15</i>
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****THIS SPECIFICATION HAS NOT BEEN REVIEWED FOR CODE COMPLIANCE. IT SHALL ONLY BE USED AS A REFERENCE FOR EXISTING PIPING. DO NOT USE FOR NEW CONSTRUCTION.****

SERVICES

POTABLE WATER ABOVE GROUND

ITEM	SIZE	DESCRIPTION	NOTES
TUBING	1/2" - 1"	COPPER TUBING, TYPE "K", HARD DRAWN, ASTM B88	7
PIPE	1 1/2" - 4"	STD. WT., A-53 GR. B, SMLS, GALV., TE	
FITTINGS	1/2" - 1"	RECESSED SOLDER TYPE, CAST BRASS OR WROUGHT COPPER	7
	1 1/2" - 4"	150#, MALLEABLE IRON, A-197, GALV., FITTINGS PER ASME B16.3, PLUGS AND BUSHING PER ASME 16.14, THRD	7
FLANGES	1/2" - 1"	150#, CAST RED BRONZE, FF, SW	7
	1 1/2" - 4"	150#, CAST IRON, A-126, GALV., FF, THD	7
UNIONS	1/2" - 1"	300# STD., CAST BRONZE, METAL TO METAL SEATS, SOLDER JOINT ENDS	7
	1 1/2" - 4"	150# MALLEABLE IRON, A-197, GALV., BRASS SEATS, THD	7
BOLTING	ALL	A-307 MACHINE BOLTS, SEMI-FINISHED HVY. HEX NUTS	
GASKETS	ALL	150#, 1/16" THK., COMPRESSED FIBER, FF	2, 3
JOINTS	1/2" - 1"	NO. 50 SOLDER WITH NO. 50 FLUX	6
	1 1/2" - 4"	TEFLON TAPE	
VALVES			
N/A	1/2" - 1"	GATE, BRONZE, SOLDER JOINT, INSIDE SCREW, NRS	7
VGA-115	1 1/2" - 2"	GATE, CAST IRON, 125#/150#, RS, CLAMP GATE, THD	7
VGA-114	3" - 4"	GATE, CAST IRON, 125#, RS, OS&Y, FF, BB	7
N/A	1/2" - 1"	GLOBE, BRONZE, RS, 300#, THRD	7
VGL- 218	1 1/2" - 2"	GLOBE, CAST IRON, 125#, RS, THD, UB	7
VGL- 217	3" - 4"	GLOBE, CAST IRON, 125#, FF, BB	7
N/A	1/2" - 1"	CHECK, SWING, BRONZE, SOLDER JOINT, THD CAP	4, 5, 7
VCH- 321	1 1/2" - 2"	CHECK, HORIZONTAL SWING, CAST IRON, 200#, THD	
VCH- 311	3" - 4"	CHECK, DUAL PLATE, WAFER, CAST IRON, 125#, SPRING LOADED, NEOPRENE SEATS	
TEMPORARY STRAINERS	NONE		
"Y" STRAINERS	1/2" - 2"	250#, THRD, A 126 CL. B, 0.045 PERF. SS SCREEN	7
	3" - 4"	125#, FF FLG, A 126 CL. B, 0.045 PERF. SS SCREEN	7



MATERIAL COPPER / C. S. GALVANIZED
RATING 100 PSIG @ 100° F
0" CORR. ALLOW.

GES 2-3-0
PVC
N

REVISION 4
DATE: 08/21/15

MAINT. APPROVAL	HSE APPROVAL	OPER. APPROVAL	ENG. APPROVAL
<i>Jason Polk 10/12/15</i>	<i>JTB 10/23/15</i>	<i>ASch 10/19/15</i>	<i>M. E. [Signature] 10/15/15</i>

NOTES:

1. WELDING NOT ALLOWED FOR THIS PIPING SPECIFICATION.
2. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
3. EXISTING GASKETS MAY CONTAIN ASBESTOS. APPROPRIATE PRECAUTIONS SHOULD BE TAKEN WHEN HANDLING.
4. INSTALL IN HORIZONTAL POSITION WITH COVER UP.
5. INSTALL ALSO ALLOWED IN VERTICAL POSITION WITH UPWARD FLOW.
6. THE SAFE DRINKING WATER ACT AMENDMENTS OF 1986 PROHIBIT THE USE OF ANY SOLDER HAVING A LEAD CONTENT IN EXCESS OF 0.2% IN POTABLE WATER SYSTEMS.
7. HYDROSTATIC TESTING SHALL BE A SERVICE TEST. AFTER TESTING AND BEFORE BEING PLACED IN SERVICE, ALL PIPING THAT HANDLES POTABLE WATER SHALL BE DISINFECTED IN ACCORDANCE WITH GOVERNING CODES AND REGULATIONS OF THE LATEST EDITION OF AMERICAN WATER WORKS ASSOCIATION STANDARD AWWA C-651.

FOR REFERENCE ONLY



MATERIAL
RATING

GALVANIZED CARBON STEEL
ASME B16.3/B16.39, CLASS 150
225 PSIG @ 250° F
1/16" CORR. ALLOW.

GES 2-3-0
PVC
P

REVISION 7
DATE: 08/24/16

MAINT. APPROVAL

James Pocke

HSE APPROVAL

H SB

OPER. APPROVAL

AS

ENG. APPROVAL

C. PINE

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

INSTRUMENT AIR, PLANT AIR, BREATHING AIR, POTABLE WATER ABOVE GROUND

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 2"	SCH XS, A-53, GR. B, ERW OR SMLS, GALV., TE	1, 2
	3" - 4"	SCH STD, A-53, GR. B, ERW OR SMLS, GALV., TE	1, 2
FITTINGS	1/2" - 4"	CLASS 150, A-197, MALLEABLE IRON, GALV., FITTINGS PER ASME B16.3, PLUGS AND BUSHINGS PER ASME B16.14, THD	1, 2
FLANGES	1/2" - 2"	150#, A-105, SCH XS, GALV., THD, FF FLG, ASME B 16.5	1, 2, 3
	3" - 4"	150#, A-105, SCH STD, GALV., THD, FF FLG, ASME B 16.5	1, 2, 3
	1/2" - 4"	150#, A-105, GALV., FF BLIND FLG, ASME B16.5	3
	3" - 4"	300#, A-105, SCH STD, GALV., RF ORIFICE FLANGE, ASME B16.36, 1/2" THD TAPS	
UNIONS	1/2" - 4"	CLASS 150, MALLEABLE IRON, GALV., A-197, ASME B16.39, THD	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED	
		A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. WHITE NEOPRENE, FULL FACE GASKET, FOR USE WITH 150# FF FLANGES, ASME B16.21	3
THRD. LUBE	PIPE BOLTS	TFE TAPE (≤400°F), MOLYCOTE G OR EQ (>400°F) NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-189	1/2" - 3"	GATE, 200#, B61 BRONZE, UNION BONNET, RS, THD	4
VGL-313	1/2" - 3"	GLOBE, 200#, B61 BRONZE, UNION BONNET, THD	
VCH-413	1/2" - 3"	CHECK, 200#, B61 BRONZE, SWING, THD	6
VBA-642	1/2" - 2"	BALL, 200#, BRASS, PTFE SEATS, THD	5
TEMPORARY STRAINERS	ALL	150#, CONICAL, 150% OPEN AREA, SS SCREEN/PLATE	
"Y" STRAINERS	1/2" - 4"	250#, THD, A126-B, CAST IRON BODY, 0.020 PERF. SS SCREEN, MUELLER 11M OR EQ.	



MATERIAL GALVANIZED CARBON STEEL
RATING ASME B16.3/B16.39, CLASS 150
 225 PSIG @ 250° F
 1/16" CORR. ALLOW.

GES 2-3-0
 PVC
 P

REVISION 7
 DATE: 08/24/16

MAINT. APPROVAL

James Polk

HSE APPROVAL

N. J. B.

OPER. APPROVAL

AB

ENG. APPROVAL

C. P. McE

NOTES:

1. WELDING NOT ALLOWED FOR THIS PIPING SPECIFICATION.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 340 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.3.
3. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
4. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. 3/4" SIZE IS THE DEFAULT SIZE.
5. BALL VALVES SHALL BE LIMITED TO 300°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL. VALVE SHALL BE FURNISHED WITH A LOCKING DEVICE.
6. INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.

BRANCH CONNECTIONS:

BRANCH

4	T							
3	RT	T						
2	RT	RT	T					
1½	RT	RT	RT	T				
1	RTB	RT	RT	RT	T			
¾	RTB	RT	RT	RT	RT	T		
½	RTB	RTB	RT	RT	RT	RT	T	
	4	3	2	1½	1	¾	½	

SYMBOLS

- F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)
- O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)
- RT – REDUCING TEE
- RTB – REDUCING TEE WITH BUSHING
- T – TEE
- W – WELDOLET



MATERIAL 304 SS TUBING
RATING ASME B16.5, CLASS 300, M.G. 2.1
 720 PSIG @ 100° F
 540 PSIG @ 300° F
 0" CORR. ALLOW.

GES 2-3-0
 PVC
 Q
 REVISION 7
 DATE: 08/24/16

MAINT. APPROVAL

J. Palko

HSE APPROVAL

H. S. S.

OPER. APPROVAL

AS

ENG. APPROVAL

C. P. McE

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

SERVICE WATER, SEAL FLUSH

ITEM	SIZE	DESCRIPTION	NOTES												
TUBING	1/4" - 1"	TYPE 304 SS, A-269, ANNEALED, BEND TUBING, SMLS OR WELDED, PE <table border="1" data-bbox="581 592 1040 785"> <thead> <tr> <th>SIZE (OD)</th> <th>WALL THICKNESS</th> </tr> </thead> <tbody> <tr> <td>1/4"</td> <td>0.035"</td> </tr> <tr> <td>3/8"</td> <td>0.035"</td> </tr> <tr> <td>1/2"</td> <td>0.049"</td> </tr> <tr> <td>3/4"</td> <td>0.065"</td> </tr> <tr> <td>1"</td> <td>0.065"</td> </tr> </tbody> </table>	SIZE (OD)	WALL THICKNESS	1/4"	0.035"	3/8"	0.035"	1/2"	0.049"	3/4"	0.065"	1"	0.065"	1, 2
			SIZE (OD)	WALL THICKNESS											
			1/4"	0.035"											
			3/8"	0.035"											
			1/2"	0.049"											
			3/4"	0.065"											
			1"	0.065"											
FITTINGS	1/4" - 1"	TYPE 316 SS, A-276 & A-182 COMPRESSION TYPE FITTINGS, SWAGELOK ENDS (Advanced-geometry back ferrule design)	1, 2												
FLANGES	NONE														
UNIONS	NONE														
BOLTING	NONE														
GASKETS	NONE														
THRD. LUBE	NONE														
VALVES															
VCH-440	3/8" - 1/2"	CHECK, POPPET, 316 SS, 6000#, SWAGELOK ENDS													
VPL-568	1/2" - 1"	PLUG, 316 SS BODY/PLUG, PTFE SLEEVE, 300#, FNPT													
VNE-02	3/8" - 1/2"	NEEDLE, 316 SS, 6000#, SWAGELOK ENDS													
TEMPORARY STRAINERS	NONE														
"Y" STRAINERS	NONE														
BRANCH CONNECTIONS	1/4" - 1"	USE COMPRESSION FITTINGS AS NECESSARY													

NOTES:

1. WELDING NOT ALLOWED FOR THIS PIPING SPECIFICATION.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 1100 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.



MATERIAL 304 SS TUBING
RATING ASME B16.5, CLASS 300, M.G. 2.1
 720 PSIG @ 100 ° F
 540 PSIG @ 300 ° F
 0" CORR. ALLOW.

GES 2-3-0
 PVC
Q1
 REVISION 9
 DATE: 08/24/16

MAINT. APPROVAL

James Polk

HSE APPROVAL

HSE

OPER. APPROVAL

AB

ENG. APPROVAL

C. Pitre

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

INJECTION WATER

ITEM	SIZE	DESCRIPTION	NOTES						
TUBING	3/8" - 1/2"	TYPE 304 SS, A-269, ANNEALED, BEND TUBING, SMLS OR WELDED, PE <table border="1" data-bbox="581 590 1040 688"> <thead> <tr> <th>SIZE (OD)</th> <th>WALL THICKNESS</th> </tr> </thead> <tbody> <tr> <td>3/8"</td> <td>0.065"</td> </tr> <tr> <td>1/2"</td> <td>0.095"</td> </tr> </tbody> </table>	SIZE (OD)	WALL THICKNESS	3/8"	0.065"	1/2"	0.095"	1, 2
SIZE (OD)	WALL THICKNESS								
3/8"	0.065"								
1/2"	0.095"								
FITTINGS	3/8" - 1/2"	TYPE 316 SS, A-276 & A-182 COMPRESSION TYPE FITTINGS, SWAGELOK ENDS (Advanced-geometry back ferrule design)	1, 2						
FLANGES	NONE								
UNIONS	NONE								
BOLTING	NONE								
GASKETS	NONE								
THRD. LUBE	NONE								
VALVES									
VCH-440	3/8" - 1/2"	CHECK, POPPET, 316 SS, 6000#, SWAGELOK ENDS							
VPL-568	1/2"	PLUG, 316 SS BODY/PLUG, PTFE SLEEVE, 300#, FNPT							
VNE-02	3/8" - 1/2"	NEEDLE, 316 SS, 6000#, SWAGELOK ENDS							
TEMPORARY STRAINERS	NONE								
"Y" STRAINERS	NONE								
BRANCH CONNECTIONS	3/8" - 1/2"	USE COMPRESSION FITTINGS AS NECESSARY							

NOTES:

1. WELDING NOT ALLOWED FOR THIS PIPING SPECIFICATION.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 1100 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.



MATERIAL 304L STAINLESS STEEL
RATING -30" WC VACUUM @ 180° F
 2 PSIG @ 180° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
R

REVISION 8
 DATE: 04/03/18

MAINT. APPROVAL

Jason Palko

HSE APPROVAL

[Signature]

OPER. APPROVAL

ABedra

ENG. APPROVAL

[Signature]

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

CONVEYOR VENT, BALANCING AIR

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1" - 4"	SCH 10S, A-312 TP-304L, SMLS OR EFW, BE	1, 2
	6" - 24"	SCH 5S, A-312 TP-304L, SMLS OR EFW, BE	1, 2
FITTINGS	1" - 4"	SCH 10S, A-182 OR A-403 304L, SMLS OR EFW, BW, ASME B16.9	1, 2
	6" - 24"	SCH 5S, A-182 OR A-403 304L, SMLS OR EFW, BW, ASME B16.9	1, 2
	1" - 10"	SCH/ CLASS TO MATCH PIPE/FITTINGS, A-182, GR. F304L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET) MSS SP-97	1, 2
FLANGES	1" - 4"	150#, A-182 GR. F304L, RF SO, ASME B16.5	1, 2, 3, 4, 5, 6
	6" - 24"	150#, A-182 GR. F304L, RF SO, ASME B16.5	1, 2, 3, 4, 5, 6
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, 100% EXPANDED PTFE, ASME B16.21, GORE UPG STYLE 800 OR EQ.	3, 5
THRD. LUBE	BOLTS	NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-192	2" - 24"	KNIFE GATE, 304 SS, 150# CWP, THD LUG, SS STEM/GATE, PTFE OR EPDM SEAT, HANDWHEEL ACTUATOR	
VBF-909	2" - 6"	B-FLY, ALUMINUM, 200# CWP, WAFER, 316 SS DISC, NEOPRENE SEAT, LEVER OPERATOR	7
VBF-909G	8" - 12"	B-FLY, ALUMINUM, 200# CWP, WAFER, 316 SS DISC, NEOPRENE SEAT, GO	7
VBF-921	3" - 4"	B-FLY, 316 SS, 150#, THD LUG, SS DISC, XTREME/SS SEATS, GRAPHITE SEAL	8
VBF-921G	6" - 20"	B-FLY, 316 SS, 150#, THD LUG, SS DISC, XTREME/SS SEATS, GRAPHITE SEAL, GO	8
TEMPORARY STRAINERS	NONE		
"Y" STRAINERS	NONE		



MATERIAL 304L STAINLESS STEEL
RATING -30" WC VACUUM @ 180° F
2 PSIG @ 180° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
R

REVISION 8
DATE: 04/03/18

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 50 PSIG.
3. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
4. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
5. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
6. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
7. ALUMINUM BUTTERFLY VALVES SHALL BE LIMITED TO 180°F.
8. STAINLESS BUTTERFLY VALVES ARE PREFERRED OVER ALUMINUM FOR NEW CONSTRUCTION. IF REPLACING AN EXISTING ALUMINUM VALVE, EXISTING DESIGN SHOULD BE CHECKED TO ENSURE ADDITIONAL WEIGHT CAN BE SUPPORTED.



MATERIAL 304L STAINLESS STEEL
RATING -30" WC VACUUM @ 180° F
 2 PSIG @ 180° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
R

REVISION 8
 DATE: 04/03/18

MAINT. APPROVAL

[Signature]

HSE APPROVAL

[Signature]

OPER. APPROVAL

[Signature]

ENG. APPROVAL

[Signature]

BRANCH CONNECTIONS:

BRANCH

24	T													
20	RT	T												
18	P	RT	T											
16	P	P	RT	T										
14	P	P	P	RT	T									
12	P	P	P	P	RT	T								
10	P	P	P	P	W	RT	T							
8	W	W	W	W	W	W	RT	T						
6	W	W	W	W	W	W	W	RT	T					
4	W	W	W	W	W	W	W	W	RT	T				
3	W	W	W	W	W	W	W	W	W	RT	T			
2	W	W	W	W	W	W	W	W	W	W	RT	T		
1½	O	O	O	O	O	O	O	O	O	O	O	O	T	
1	O	O	O	O	O	O	O	O	O	O	O	O	RT	T
	24	20	18	16	14	12	10	8	6	4	3	2	1½	1

SYMBOLS

F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

P – BRANCH WELD WITH REINFORCING PAD (PAD THICKNESS EQUALS RUN PIPE THICKNESS PAD WIDTH EQUALS ½ BRANCH OD.)

RT – REDUCING TEE

T – TEE

W – WELDOLET

18

10/19/15



BORDEN CHEMICAL
DIVISION OF BORDEN INC.

MATERIAL: 304L STAINLESS STEEL
CONSTRUCTION:
RATING: -30" WC VACUUM @ 200°F

BY: J.S.

REV: 5

8/11/81 Pg. 1/2

ITEM	SIZE	DESCRIPTION	V-NO.
PIPE	1" - 10"	SCH 5S, WELDED TYPE 304L STAINLESS STEEL, ASTM A312	
DUCT	12" & UP	TO BE CONSTRUCTED OF WELDED STAINLESS STEEL SHEET, TYPE 304L 2B FINISH. UP TO 22" = 16 GAGE 24" - 48" = 14 GAGE OVER 48" = 12 GAGE	
PIPE FITTINGS	1" - 10"	SEAMLESS OR WELDED STAINLESS STEEL TYPE 304L, SCH 5S, BUTT WELDING TYPE CONFORMING TO MSS-SP 43 OR ANSI B16.9.	
DUCT BENDS	12" & UP	TO BE CONSTRUCTED OF WELDED STAINLESS STEEL TYPE 304L, SAME THICKNESS AS DUCT, BENDS TO HAVE MINIMUM CENTER LINE RADIUS OF 1 DIAMETER (OR DUCT WIDTH). IN THE EVENT RECTANGULAR DUCT IS USED, TURNING VANES TO BE PROVIDED AT ABRUPT CHANGES IN DIRECTION.	
FLANGES	1" - 10" 12" & UP	FORGED STEEL SLIP-ON FLANGE, 150# ANSI, WITH SCH 5S TYPE "C" 304L SS MSS LENGTH STUB END. CS PLATE FLANGE, 1/2" THICK, SLIP-ON TYPE, WELDED TO DUCT. UNLESS OTHERWISE INDICATED ON DRAWINGS, DRILLING SHALL BE 125# ANSI.	
KNIFE GATE VALVES	2" - 24"	150# ANSI, WAFER TYPE, BONNETLESS KNIFE GATE VALVE, 304 SS WITH WHITE NEOPRENE RING SEAT AND TEFLON IMPREGNATED ASBESTOS PACKING, (TYPE "C"). HANDWHEEL OPERATED UNLESS OTHERWISE INDICATED ON DRAWINGS.	VGA-180 (Q01)
BUTTERFLY VALVES	2" - 10" 12" & UP	150# ANSI, WAFER TYPE, ALUMINUM BODY, 316 SS DISC AND STEM, ACETAL BUSHINGS, WHITE SANITARY RUBBER SEAT. LEVER-LOCK OPERATOR UNLESS OTHERWISE NOTED ON DWGS. SAME AS ABOVE EXCEPT GEAR OPERATED	VBF-909 (SD7)
PLUG VALVE	1/2" - 1 1/2"	300# SLEEVED, BOLTED GLAND, THREADED ENDS, 316 SS	VPL-554 (EA6)

5

7-28

AB 10/17/15



BORDEN CHEMICAL
DIVISION OF BORDEN INC.

MATERIAL: 304L STAINLESS STEEL
CONSTRUCTION:
RATING: -30" WC VACUUM @ 200°F

BY: J.S.
REV: 5
8/11/81

Handwritten signature







Pg. 2/2

ITEM	SIZE	DESCRIPTION	V- NO.
GASKETS	ALL	1/8" THICK EPDM RUBBER, RING TYPE TO FIT 150/125# ANSI FLGS	
BOLTING	ALL	HEAVY HEX HEAD MACHINE BOLTS WITH HEX NUTS ASTM A307 GR. B CADMIUM PLATED.	
FLEXIBLE CONNECTION	ALL	TWO (2) LAYERS OF WHITE NEOPRENE COATED NYLON TIGHTLY CLAMPED TO DUCTWORK, UNLESS OTHERWISE NOTED ON DRAWINGS.	
CLEANOUTS	ALL	CLEANOUTS SHALL BE PROVIDED WHERE SHOWN ON DRAWINGS	
CONSTRUCTION	ALL	ROUND DUCT MAY BE FABRICATED WITH WELDED LONGITUDINAL SEAMS. GIRTH JOINTS MAY BE MADE WITH LAP IN DIRECTION OF AIR FLOW WITH 1" LAP FOR DIAMETER UP TO 18" AND 1 1/2" LAP ON 18" AND LARGER.	

HJB

THERMOPLASTICS SPEC R2

AB.L 10/18/15

 BORDEN CHEMICAL <small>DIVISION OF BORDEN INC.</small>		MATERIAL: GALV. CS DUCT CONSTRUCTION: RATING: -30" WC VACUUM @ 200°F	BY: JS REV: 1 7/1/81	 Pg 1/1
ITEM	SIZE	DESCRIPTION	V- NO.	
 DUCT	2" - 20"	TO BE CONSTRUCTED OF 16 GAGE GALVANIZED CARBON STEEL SHEET. ROUND DUCT SHALL BE USED WHEREVER POSSIBLE.		
 DUCT BENDS	2" - 20"	TO BE CONSTRUCTED OF SAME MATERIAL AS PIPE. BENDS TO HAVE MIN. CENTERLINE RADIUS OF 1 DIA (OR DUCT WIDTH). IN THE EVENT RECTANGULAR DUCT IS USED, TURNING VANES SHALL BE PROVIDED.		
 FLANGES	2" - 20"	CS PLATE FLANGE, SLIP-ON., WELDED TO DUCT, SIZE AND DRILLING AS SPECIFIED ON DRAWINGS		
GASKETS	ALL	1/8" THICK EPDM RUBBER, CUT TO SUIT		
BOLTING	ALL	HEAVY HEX HEAD MACHINE BOLTS WITH HEX NUTS ASTM A307 GR. B		
FLEXIBLE CONNECTION	ALL	TWO (2) LAYERS OF WHITE NEOPRENE COATED NYLON TIGHTLY CLAMPED TO DUCTWORK, UNLESS OTHERWISE NOTED ON DRAWINGS		
CLEANOUTS	ALL	CLEANOUTS SHALL BE PROVIDED WHERE SHOWN ON DRAWINGS		
CONSTRUCTION	ALL	ROUND DUCT MAY BE FABRICATED WITH WELDED LONGITUDINAL SEAMS. GIRTH WELDS MAY BE MADE WITH LAP IN DIRECTION OF AIR FLOW WITH 1" LAP FOR DIAMETERS UP TO 18" AND 1 1/2" LAP ON DIAMETERS LARGER THAN 18"		
 BUTTERFLY VALVE	2" - 10" 12" - 20"	150# ANSI, WAFFER TYPE, ALUMINUM BODY, 316 SS DISC & STEM, ACETAL BUSHINGS, WHITE SANITARY RUBBER SEAT, LEVERLOCK OPERATOR, UNLESS OTHERWISE NOTED ON DWGS. SAME AS ABOVE EXCEPT GEAR OPERATED	VBF-909 (SD7)	



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
 230 PSIG @ 100° F
 190 PSIG @ 225° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
T

REVISION 9
 DATE: 03/09/18

MAINT. APPROVAL

Juan P. de

HSE APPROVAL

Pa

OPER. APPROVAL

A. Bader

ENG. APPROVAL

M. Kingfield

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

AIR CONVEYING PVC

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	2" – 12"	SCH 10S, A-312 TP-304L, SMLS OR EFW, BE	1, 2
FITTINGS	2" – 12"	SCH 10S, A-403, WP-304L, BW, ASME B16.9	1, 2
LATROLETS	2" – 6"	A-182 TP-304L, 45 ° LATROLET, BW, MSS-SP-97	1, 2
BENDS	2" – 12"	A-312 TP-304L, BEND RADIUS SHALL BE 72" WITH 12" MINIMUM TANGENTS, SCH 40S PIPE SHALL BE USED IF THINNING OF PIPE WALL AFTER BENDING EXCEEDS 8% OF ORIGINAL PIPE WALL THICKNESS	1, 2, 7
FLANGES	2" – 12"	150#, A-182, GR. F304L, FF SO, ASME B16.5 150# , A182, GR. F304L, FF BLIND, ASME B16.5	1, 2, 3, 4, 5
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THICK WHITE NEOPRENE, FULL FACE, 40-50 DUROMETER	4
THRD. LUBE	BOLTS	NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES	NONE		
TEMPORARY STRAINERS	NONE		
"Y" STRAINERS	NONE		



MATERIAL 304L STAINLESS STEEL
RATING ASME B16.5, CLASS 150, M.G. 2.3
230 PSIG @ 100° F
190 PSIG @ 225° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
T
REVISION 9
DATE: 03/09/18

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

[Signature]

OPER. APPROVAL

ABach

ENG. APPROVAL

[Signature]

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 350 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
4. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
5. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
6. 90 DEGREE BRANCHES OR 90 DEGREE ELBOWS AND TEES SHALL NOT BE USED. USE LATROLETS. REINFORCED LATERAL CONNECTIONS ARE ALSO ALLOWED WITH ENGINEERING APPROVAL.
7. OTHER RADII BENDS MAY ONLY BE USED WITH PRIOR APPROVAL OF THE MECHANICAL AND PROCESS DEPARTMENTS.
8. WELDED JOINTS SHALL BE MADE PER ASME B31.3. THE I.D. OF THE JOINT SHALL BE MADE SMOOTH, WITH NO POROSITY OR ICICLES.
9. EACH WELDER SHALL PROVIDE A SAMPLE WELD THAT COMPLIES WITH NOTE 8 (ABOVE).
10. THE PIPE END SHALL BE FLUSH WITH THE FACE OF THE SLIP-ON FLANGE. WELDING OF THE SLIP-ON FLANGE SHALL AT BE DONE AT THE HUB PER ASME B31.3.



MATERIAL

304L STAINLESS STEEL

RATING

ASME B16.5, CLASS 150, M.G. 2.3
230 PSIG @ 100° F
190 PSIG @ 225° F
1/32" CORR. ALLOW.

GES 2-3-0

PVC

T

REVISION 9
DATE: 03/09/18

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

BRANCH CONNECTIONS:

BRANCH

12	PL						
10	PL	PL					
8	PL	PL	PL				
6	L	L	PL	PL			
4	L	L	L	PL	PL		
3	L	L	L	L	PL	PL	
2	L	L	L	L	L	PL	PL
	12	10	8	6	4	3	2

SYMBOLS

F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

PL – BRANCH WELD LATERAL WITH REINFORCING PAD (PAD THICKNESS EQUALS RUN PIPE THICKNESS, PAD WIDTH EQUALS 0.75 x BRANCH OD.)

RT – REDUCING TEE

T – TEE

W – WELDOLET

L - LATROLET



MATERIAL 304L STAINLESS STEEL
RATING 50 PSIG @ 225° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
T1

REVISION 9
 DATE: 04/04/18

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

[Signature]

OPER. APPROVAL

ASad

ENG. APPROVAL

[Signature]

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

CENTRIFUGE EFFLUENT, CONVEYING AIR

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" - 2"	SCH 80S, A-312 TP-304L, SMLS, TE	2, 3
	3" - 12"	SCH 10S, A-312 TP-304L, SMLS OR EFW, BE	1, 2
FITTINGS	1/2" - 2"	3000#, A-182, GR. F304L, THD, ASME B16.11	2, 3
	3" - 12"	SCH 10S, A-403, WP-304L, BW, ASME B16.9	1, 2, 3
	1/2" - 1 1/2"	3000#, A-182, GR. F304L, THREDOLET, MSS SP-97	3
	1/2" - 8"	SCH/CLASS TO MATCH PIPE/FITTINGS, A-182, GR 304L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET), MSS SP-97	
FLANGES	3/4" - 12"	150#, A-182, GR. F304L, RF SO, ASME B16.5	1, 2, 4, 5, 6, 7
	3/4" - 12"	150#, A-182, GR. F304L, RF BLIND, ASME B16.5	4
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED	
		A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, JINMA FA303 OR EQ.	6
THRD. LUBE	PIPE	TFE TAPE (<400°F), MOLYCOTE G OR EQ (>400°F)	
	BOLTS	NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VGA-192	3" - 12"	KNIFE GATE, 304 SS, 150# CWP, THD LUG, SS STEM/GATE, PTFE OR EPDM SEAT, HANDWHEEL ACTUATOR	
VBF-909	3" - 6"	B-FLY, ALUMINUM, 200# CWP, WAFER, 316 SS DISC, NEOPRENE SEAT, LEVER OPERATOR	9, 11
VBF-909G	8" - 12"	B-FLY, ALUMINUM, 200# CWP, WAFER, 316 SS DISC, NEOPRENE SEAT, GO	9, 11
VCH-340	3" - 12"	CHECK, SWING, HORIZONTAL, 316 SS, 150#, RF FLG, TRIM #10	10
VPL-580	1/2" - 1 1/2"	PLUG, 316SS BODY/PLUG, 150#, THD, PTFE SLEEVE	3, 8, 11
TEMPORARY STRAINERS	NONE		
"Y" STRAINERS	NONE		



MATERIAL 304L STAINLESS STEEL
RATING 50 PSIG @ 225° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
T1

REVISION 9
DATE: 04/04/18

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 75 PSIG PER ASME B31.3.
3. TO BE USED WITH VENT, DRAIN, AND INSTRUMENT CONNECTIONS ONLY.
4. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS.
8. DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. 3/4" SIZE IS THE DEFAULT SIZE.
9. BUTTERFLY VALVES SHALL BE LIMITED TO 180°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL.
10. INSTALL IN HORIZONTAL POSITION WITH COVER UP.
11. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.



MATERIAL 304L STAINLESS STEEL
RATING 50 PSIG @ 225° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
T1
 REVISION 9
 DATE: 04/04/18

MAINT. APPROVAL <i>Jean Polk</i>	HSE APPROVAL <i>[Signature]</i>	OPER. APPROVAL <i>A. Bedn</i>	ENG. APPROVAL <i>[Signature]</i>
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BRANCH CONNECTIONS:

BRANCH

12	T												
10	RT	T											
8	W	RT	T										
6	W	W	RT	T									
4	W	W	W	RT	T								
3	W	W	W	W	RT	T							
2	O	O	O	O	O	O	T						
1½	O	O	O	O	O	O	RT	T					
1	O	O	O	O	O	O	O	RT	T				
¾	O	O	O	O	O	O	O	RT	RT	T			
½	O	O	O	O	O	O	O	RT	RT	RT	T		
	12	10	8	6	4	3	2	1½	1	¾	½		

SYMBOLS

- F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)
- O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)
- RT – REDUCING TEE
- T – TEE
- W – WELDOLET



MATERIAL

C.S., COATED AND WRAPPED

RATING

150 PSIG @ AMBIENT
1/8" CORR. ALLOW.

GES 2-3-0

PVC

U

REVISION 6

DATE: 08/24/16

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

FIRE WATER – ABOVE AND BELOW GROUND

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	4" – 24"	STD WT, A-53 GR. B SMLS OR ERW, BE, COATED AND WRAPPED	1, 2, 3
FITTINGS	4" – 24"	STD WT, ASTM A234 GR. WPB, BW, ASME B16.9	1, 2, 3
FLANGES	4" – 24"	150#, A-105, FF SO, ASME B16.5 150#, A-105, FF BLIND, ASME B16.5	1, 2
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B8M CL. 2, STUD BOLTS A-194 GR. 8MA, 2H HVY. NUTS	
GASKETS	ALL	150#, 1/8" THK. FULL FACE, JINMA FA303 OR EQ	
THRD. LUBE	BOLTS	NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
GATE VALVES	4" – 12"	175 PSI NON-SHOCK WATER WORKING PRESSURE, IBBM, INSIDE SCREW, SOLID WEDGE, NON-RISING STEM, UL/FM APPROVED, CLASS 125 ANSI B16.1, FF, BB, SUITABLE FOR USE WITH INDICATOR POST (COMPLETE WITH INDICATOR POST, DEPTH AS REQUIRED PER INSTALLATION), NIBCO F-609 OR EQ.	
BUTTERFLY VALVES	4" – 24"	150 PSI ALLOWABLE WORKING PRESSURE, CAST IRON BODY ASTM A126, NI-RESIST DISC, RUBBER SEAT, UL/FM APPROVED, ASTM B16.1 CLASS 125 FLANGED ENDS, VALVE TO MEET AWWA C504 CLASS 150B. (COMPLETE WITH INDICATOR POST, DEPTH AS REQUIRED BY INSTALLATION) HENRY PRATT OR EQ.	
HYDRANT	6"	250 PSI ALLOWABLE WORKING PRESSURE, CAST IRON BODY, CLASS 125 ASTM B16.1 FLANGED INLET TO MATCH WATER MAIN PIPE SIZE, 5 1/4" VALVE OPENING, TWO (2) 2 1/2" NST HOSE CONNECTIONS, NATIONAL STD. OPERATING NUT, LEFT TO OPEN (CCW), AWWA C502, KENNEDY GUARDIAN K81D OR EQ.	
VALVE BOX	ALL SIZES	THREE PIECE SCREW TYPE, ADJUSTABLE VALVE BOX FOR GATE VALVE SPECIFIED ABOVE, DEPTH AS REQUIRED	



MATERIAL C.S., COATED AND WRAPPED
RATING 150 PSIG @ AMBIENT
 1/8" CORR. ALLOW.

GES 2-3-0
 PVC
 U

REVISION 6
 DATE: 08/24/16

MAINT. APPROVAL

Jason Polk

HSE APPROVAL

M. E. E.

OPER. APPROVAL

AB

ENG. APPROVAL

C. P. ME

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 225 PSIG PER ASME B31.3, PARA 345.4.2.
3. ALL BURIED PIPING SHALL BE COATED AND WRAPPED IN ACCORDANCE WITH GES 2-2-1, "SPECIFICATION FOR COATING AND WRAPPING OF UNDERGROUND PIPE". ABOVE GROUND PIPING IS NOT REQUIRED TO BE COATED AND WRAPPED.

BRANCH CONNECTIONS:

BRANCH

24	T																		
20	RT	T																	
18	RT	RT	T																
16	RT	RT	RT	T															
14	W	RT	RT	RT	T														
12	W	W	W	RT	RT	T													
10	P	W	W	W	RT	RT	T												
8	P	P	P	W	W	RT	RT	T											
6	P	P	P	P	P	W	W	RT	T										
4	P	P	P	P	P	P	P	W	RT	T									
	24	20	18	16	14	12	10	8	6	4									

SYMBOLS

F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

P – BRANCH WELD WITH REINFORCING PAD (PAD THICKNESS EQUALS RUN PIPE THICKNESS, PAD WIDTH EQUALS ½ BRANCH OD.)

RT – REDUCING TEE

T – TEE

W – WELDOLET

GENERAL							
MATERIAL	316L STAINLESS STEEL						
RATING	ASME B16.5, CLASS 150, M.G. 2.3 230 PSIG @ 100°F 195 PSIG @ 200°F 1/32" CORR. ALLOW.						
SERVICES	PROCESS CONNECTIONS, WASTE WATER						
ITEM	SIZE	DESCRIPTION					NOTES
PIPE	½" – 1"	SCH 80S, A312 TP-316L, SMLS, TE					2, 3
	½" – 2"	SCH 40S, A312 TP-316L, SMLS, PE					1, 2
	3" – 12"	SCH 40S, A312 TP-316L, SMLS, BE					1, 2
FITTINGS	½" – 1"	THD, CL 3000, A182 GR. F316L, ASME B16.11					2, 3, 11
	½" – 2"	SW, CL 3000, A182 GR. F316L, ASME B16.11					1, 2, 11
	3" – 12"	BW, SCH TO MATCH PIPE, A403 WP-316L, ASME B16.9					1, 2, 11
	PER CHART	OLET, SCH/CLASS/TYPE TO MATCH PIPE/FITTINGS, A182 GR. F316L, MSS SP-97					1, 2
FLANGES	½" – 2"	RF SW, CL 150, A182 GR. F316L, SCH TO MATCH PIPE, ASME B16.5					1, 2, 4
	2" – 12"	RF SO, CL 150, A182, GR. F316L, ASME B16.5					1, 2, 4, 5, 6
	½" – 12"	RF BLIND, CL 150, A182 GR. F316L, ASME B16.5					
	2" – 12"	RF ORIFICE FLANGE, CL 300, A182 GR. 316L, SCH TO MATCH PIPE, ASME B16.36, ½" SW TAPS					
UNIONS	NONE	USE FLANGES					
BOLTING	ALL		STUD BOLTS, A193 GR. B7, TEFLON COATED				
			NUTS, A194 GR. 2H, TEFLON COATED				
GASKETS	ALL	EXPANDED PTFE WITH CORRUGATED INSERT, RING TYPE, CL 150, 1/8" THK, ASME B16.21; VSP PITA OR EQ W/ ENGINEERING APPROVAL					6
	ALL	100% EXPANDED PTFE, RING TYPE, CL 150, 1/8" THK, ASME B16.21; GORE UPG 800 OR EQ W/ ENGINEERING APPROVAL					6
	ALL	FILLED PTFE W/ INORGANIC FILLER, RING TYPE, CL 150, 1/8" THK, ASME B16.21; DURLON 9000 OR EQ W/ ENGINEERING APPROVAL					6
THREAD LUBE	PIPE	PTFE TAPE					3
	BOLTS	TEFLON COATING OR NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.					
TEMPORARY STRAINERS	ALL	CL 150, CONICAL, 150% OPEN AREA, 316 SS SCREEN/PLATE					
"Y" STRAINERS	½" – 2"	SW, CL 600, A351 GR. CF3M, 0.020" PERF. SS SCREEN					
	3" – 12"	RF FLG, CL 150, A351 GR. CF8M, 0.020" PERF. SS SCREEN					
VALVES							
BALL	BUTTERFLY	CHECK	GATE	GLOBE	PLUG	OTHER	NOTES
VBA-607	VBF-921	VCH-339		VGL-236	VPL-504		3, 7, 8, 9
VBA-610		VCH-340		VGL-237			
NOTES							
<p>1. ALL REQUIREMENTS FOR NDE FOUND IN GES-230 "PIPING SPECIFICATIONS" MUST BE FOLLOWED. RADIOGRAPHIC EXAMINATION SHALL BE DONE PER GES-230. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.</p>							

2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 350 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS SHALL ONLY BE USED IN VENT, DRAIN, AND INSTRUMENT CONNECTIONS. NOT FOR SERVICES THAT CONTAIN VINYL.
4. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS UNLESS SO INDICATED ON THE DESIGN DRAWINGS.
5. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
6. CL 300 FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
7. VBA-610 IS THE DEFAULT VENT, DRAIN, AND INSTRUMENT VALVE. ¾" SIZE IS THE DEFAULT SIZE.
8. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.
9. CHECK VALVES TO BE INSTALLED IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
10. USE CONNECTION P FOR BRANCHES AT ODD ANGLES WHERE STANDARD FITTINGS CANNOT BE USED, BUT MODIFY THE REINFORCING PAD FOR SIZES ½"–1½" TO CONNECTION F.
11. IN LIEU OF SO FLANGES, RF BUTT WELD FLANGES MAY BE USED. SCH TO MATCH PIPE, A-403, WP-316L, BW, ASME B16.9

BRANCH CONNECTIONS

BRANCH

12	T											
10	RT	T										
8	RT	RT	T									
6	RT	RT	RT	T								
4	W	W	RT	RT	T							
3	W	W	W	RT	RT	T						
2	O	O	O	O	RT	RT	T					
1½	O	O	O	O	O	RT	RT	T				
1	O	O	O	O	O	O	RT	RT	T			
¾	O	O	O	O	O	O	RT	RT	RT	T		
½	O	O	O	O	O	O	RT	RT	RT	RT	T	
	12	10	8	6	4	3	2	1½	1	¾	½	

SYMBOLS

- O – OLET
- RT – REDUCING TEE
- T – TEE
- W – WELDOLET



MATERIAL 316/316L STAINLESS STEEL (DUAL GRADE)
RATING ASME B16.5, CLASS 150, M.G. 2.2
 275 PSIG @ -20° F to 100° F
 235 PSIG @ 200° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
 V1

REVISION 0
 DATE: 05/09/17

MAINT. APPROVAL

Jason Beck

HSE APPROVAL

R. J. May

OPER. APPROVAL

Adm Bedon

ENG. APPROVAL

Carl P. Allen

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

NEAT EMULSIFIED INITIATOR

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1/2" 1/2" - 2" 3" - 4"	SCH 80S, A-312 TP-316/316L, SMLS, TE SCH 40S, A-312 TP-316/316L, SMLS, PE SCH 10S, A-312 TP-316/316L, SMLS, BE	2, 3 1, 2 1, 2
FITTINGS	1/2" 1/2" - 2" 3" - 4" 1/2" - 2"	3000#, A-182, GR. F316/316L, THD, ASME B16.11 3000#, A-182, GR. F316/316L, SW, ASME B16.11 SCH TO MATCH PIPE, A-403, WP-316/316L, BW, ASME B16.9 SCH/ CLASS TO MATCH PIPE/FITTINGS, A-182, GR. F316/316L, INTEGRALLY REINFORCED OUTLET CONNECTIONS (O'LET) MSS SP-97	2, 3 1, 2 1, 2 1, 2
FLANGES	1/2" - 2" 2" - 4" 1/2" - 4" 1/2" - 4"	150#, A-182, GR. F316/316L, SCH 40S, RF SW, ASME B16.5 150#, A-182, GR. F316/316L, RF SO, ASME B16.5 150#, A-182, GR. F316/316L, SCH TO MATCH PIPE, RF WN, ASME B16.5 150#, A-182, GR. F316/316L, RF BLIND, ASME B16.5	1, 2, 4, 6, 7 1, 2, 4, 5, 6, 7 1, 2, 4, 6, 7
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, GARLOCK GYLON 3505 OR EQ	7
THRD. LUBE	PIPE BOLTS	TFE TAPE NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES VBA-682	1/2" - 4"	BALL, 316SS BODY/BALL/STEM, XTREME SEATS, 150#, RF FLG, RED. PORT, 1/8" VENT HOLE DRILLED INTO UPSTREAM SIDE OF BALL, FLOW ARROW INDICATOR PERMANENT TO BODY	8
TEMPORARY STRAINERS	ALL	150#, CONICAL, 150% OPEN AREA, 316 SS SCREEN/PLATE	
"Y" STRAINERS	1/2" - 2" 3" - 4"	600#, SW, A-351, GR. CF3M, 0.020" PERF. SS SCREEN 150#, RF FLG, A-351, GR. CF8M, 0.020" PERF. SS SCREEN	



MATERIAL 316/316L STAINLESS STEEL (DUAL GRADE)
RATING ASME B16.5, CLASS 150, M.G. 2.2
275 PSIG @ -20° F to 100° F
235 PSIG @ 200° F
1/32" CORR. ALLOW.

GES 2-3-0
PVC
V1

REVISION 0
DATE: 05/09/17

MAINT. APPROVAL

HSE APPROVAL

OPER. APPROVAL

ENG. APPROVAL

NOTES:

1. RADIOGRAPHIC EXAMINATION SHALL BE DONE AT A MINIMUM OF 5% FOR NORMAL FLUID SERVICE PER ASME B31.3, PARA. 341.4.1, OR A MINIMUM OF 20% FOR CATEGORY M FLUID SERVICE PER ASME B31.3, PARA. M341.4.1. ENGINEERING MAY REQUIRE HIGHER PERCENTAGES FOR SPECIAL SERVICES.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 425 PSIG PER ASME B31.3. HYDROTEST PRESSURE DETERMINED BY ASME B16.5, PARA. 2.6.
3. THREADED COMPONENTS SHALL ONLY BE USED IN INSTRUMENT CONNECTIONS.
4. USE FLAT FACED FLANGES AGAINST EQUIPMENT WITH FLAT FACED FLANGES. FULL FACE GASKETS SHALL BE USED BETWEEN THESE FLANGES.
5. SLIP-ON FLANGES SHALL NOT BE USED DIRECTLY ON FITTINGS UNLESS SO INDICATED ON THE DESIGN DRAWINGS.
6. FLANGES SHALL BE USED FOR ALL PIPE TO EQUIPMENT AND VESSEL CONNECTIONS. SPOOL SECTIONS SHALL BE USED WHEN NECESSARY TO FACILITATE EQUIPMENT REMOVAL. DIRECT WELDING IS NOT PERMITTED.
7. 300# FLANGES AND GASKETS MAY BE USED FOR MATING TO EQUIPMENT AS NECESSARY.
8. VALVES SHALL BE SPECIFIED AND PURCHASED AS FIRE SAFE AND FURNISHED WITH A LOCKING DEVICE.



MATERIAL 316/316L STAINLESS STEEL (DUAL GRADE)

RATING ASME B16.5, CLASS 150, M.G. 2.2
 275 PSIG @ -20° F to 100° F
 235 PSIG @ 200° F
 1/32" CORR. ALLOW.

GES 2-3-0
 PVC
 V1

REVISION 0
 DATE: 05/09/17

MAINT. APPROVAL

Jason Polle

HSE APPROVAL

R. May

OPER. APPROVAL

A. B...

ENG. APPROVAL

Chad Pine

BRANCH CONNECTIONS:

BRANCH

4	T							
3	RT	T						
2	O	O	T					
1½	O	O	RT	T				
1	O	O	RT	RT	T			
¾	O	O	RT	RT	RT	T		
½	O	O	RT	RT	RT	RT	T	
	4	3	2	1½	1	¾	½	

SYMBOLS

F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)

O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)

RT – REDUCING TEE

T – TEE

W – WELDOLET



MATERIAL CARBON STEEL, PPL LINED

RATING 275 PSIG @ 100° F
150 PSIG @ 200° F
0" CORR. ALLOW.

GES 2-3-0
PVC
Yb

REVISION 2
DATE: 08/21/15

MAINT. APPROVAL <i>James Polk 10/12/15</i>	HSE APPROVAL <i>10/23/15</i>	OPER. APPROVAL <i>10/19/15</i>	ENG. APPROVAL <i>10/19/15</i>
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****THIS SPECIFICATION HAS NOT BEEN REVIEWED FOR CODE COMPLIANCE. IT SHALL ONLY BE USED AS A REFERENCE FOR EXISTING PIPING. DO NOT USE FOR NEW CONSTRUCTION.****

SERVICES

VCM

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1" - 10"	STD. WT., A-53 GR. B, SMLS, POLYPROPYLENE LINED, FLANGED AS MANUFACTURED (MFG. BY RESISTOFLEX, DOW, OR DORE)	
FITTINGS	1" - 10"	150# FLANGED, CAST OR DUCTILE IRON, POLYPROPYLENE LINED (MFG. BY RESISTOFLEX, DOW, OR DORE)	
FLANGES	1" - 10"	150#, CAST OR DUCTILE IRON, INTEGRAL WITH PIPE & FITTINGS	
	1" - 10"	150#, CAST OR DUCTILE IRON, REDUCING, POLYPROPYLENE LINED	
	1" - 10"	150#, CAST IRON BLIND WITH POLYPROPYLENE FULL SPACER FACING	
UNIONS	NONE	USE FLANGES	
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, A-194 GR. 2H HVY. NUTS	
GASKETS		FOR LINED PIPE TO BARE METAL, USE JM STYLE 933-C-8390 OR EQUAL	
THRD. LUBE	NONE		
VALVES			
VCH-???	1" - 8"	LIFT CHECK, POLYPROPYLENE OR PTFE LINED CAST IRON, 150#, FLG	
VPL-506	1" - 4"	PLUG, PFA LINED DUCTILE IRON, BOLTED GLAND, FLG	
	6" - 8"	PLUG, PFA LINED DUCTILE IRON, BOLTED GLAND, FLG, GO	
VBF- 903	2" - 6"	BUTTERFLY, PTFE LINED DUCTILE IRON, PTFE ENCAPSULATED DISC, 150#, WAFER TYPE (NO LUGS)	
TEMPORARY STRAINERS	NONE		
"Y" STRAINERS	NONE		



MATERIAL TEFLON LINED CARBON STEEL
RATING ASME B16.42, CLASS 150
 150 PSIG @ 100° F
 150 PSIG @ 400° F
 0" CORR. ALLOW.

GES 2-3-0
 PVC
 Yd

REVISION 4
 DATE: 08/24/16

MAINT. APPROVAL
James Pelt

HSE APPROVAL
HSE

OPER. APPROVAL
AS

ENG. APPROVAL
C. P. McE

CURRENT LIVE VERSION OF PIPE SPEC LOCATED ON GVCDOCS WEBSITE. PRINTED COPIES ARE UNCONTROLLED.

SERVICES

SULFURIC ACID, WET VENT

ITEM	SIZE	DESCRIPTION	NOTES
PIPE	1" - 6"	PTFE LINED FLANGED SPOOLS PER ASTM F1545. FABRICATED FROM PTFE LINED A587 (1" - 4") OR A53 GR. B (6"), ERW, CARBON STEEL PIPE WITH ANSI CLASS 150 DUCTILE IRON OR CARBON STEEL LAPPED FLANGES, SCH 40, WELDED FLANGES ALLOWED WITH ENGINEERING APPROVAL, RESISTOFLEX OR EQ.	3, 4, 5, 6
FITTINGS	1" - 6"	CLASS 150, PTFE LINED FLANGED FITTINGS PER ASTM F1545. HOUSING TO BE CAST STEEL (A216), DUCTILE IRON (A395), OR FABRICATED CARBON STEEL; FLANGES TO BE DUCTILE IRON (A395) OR CARBON STEEL (A105), INTEGRAL OR LAPPED JOINT. FLANGES PER ASME B16.5 (CS) OR B16.42 (DI), FABRICATED CS BODY AS SUPPLIED BY MANUFACTURER TO MEET B31.3 COMPLIANCE, RESISTOFLEX OR EQ.	3, 5, 6
INSTRUMENT TEE	1" - 6"	LINE SIZE X 1 INCH BRANCH CONNECTION, PTFE LINED CS HOUSING, CLASS 150 FLANGES (A105), SUPPLIED BY MANUFACTURER TO MEET B31.3 COMPLIANCE, RESISTOFLEX OR EQ.	3, 5, 6
SPACER	1" - 6"	ARMORED PTFE SPACER, TAPER BORE TO MATCH ID OF BFLY VALVE AND LINED PIPE. USE ONLY WHEN NEEDED TO PREVENT INTEFERENCE BETWEEN DISC AND LINED PIPE., RESISTOFLEX OR EQ.	3, 5, 6
FLANGES	1" - 6"	TO BE SUPPLIED WITH FITTINGS AND PIPE SPOOLS	3, 5
	1" - 6"	BLIND, CLASS 150, A105, PTFE LINED, ASME B16.5.	3, 5
UNION	NONE		
BOLTING	ALL	A-193 GR. B-7 STUD BOLTS, BLUE TEFLON COATED A-194 GR. 2H HVY. NUTS, BLUE TEFLON COATED	
GASKETS	ALL	150#, 1/8" THK. RING TYPE, 100% EXPANDED PTFE, ASME B16.21, GORE UPG STYLE 800 OR EQ.	8
THRD. LUBE	BOLTS	NEVER-SEEZ PURE NICKEL SPECIAL OR EQ.	
VALVES			
VBF-903	3" - 6"	B-FLY, DI BODY, 150#, LUG, PTFE LINER/TRIM	7
VPL-506	1" - 3"	PLUG, DI BODY, 150#, PFA LINED BODY/PLUG, FLG	7



MATERIAL TEFLON LINED CARBON STEEL
RATING ASME B16.42, CLASS 150
 150 PSIG @ 100° F
 150 PSIG @ 400° F
 0" CORR. ALLOW.

GES 2-3-0
 PVC
 Yd

REVISION 4
 DATE: 08/24/16

MAINT. APPROVAL

Joson Polk

HSE APPROVAL

W.S.

OPER. APPROVAL

AS

ENG. APPROVAL

C. P. McE

NOTES:

1. WELDING IS NOT PERMITTED ON LINED PIPING COMPONENTS.
2. HYDROSTATIC TESTING SHALL BE PERFORMED AT 425 PSIG PER ASTM F1545.
3. PIPING TO BE PURCHASED AS FLANGED SPOOLS PER DESCRIPTION.
4. MANUFACTURER'S GUIDELINES FOR ALLOWABLE PIPE SPAN DISTANCES SHOULD BE FOLLOWED.
5. ALL LINED ASSEMBLIES SHALL HAVE THE LINER/GASKET FACE PROTECTED BY AN END PLATE (E.G. PLYWOOD / PLASTIC CAP) UNTIL FINAL INSTALLATION.
6. LINED PIPE AND FITTING MAY CONTAIN VENT HOLES IN THE METALLIC HOUSINGS. PLUGGING OF THESE HOLES BY PAINT OR OTHER SUBSTANCE SHALL NOT BE ALLOWED.
7. BUTTERFLY VALVES SHALL BE LIMITED TO 300°F. PLUG VALVES SHALL BE LIMITED TO 400°F. HIGHER TEMPERATURE ALLOWED ONLY WITH ENGINEERING APPROVAL OF DESIGNATED MAKE/MODEL. VALVES SHALL BE FURNISHED WITH A LOCKING DEVICE.
8. FOR USE WITH LINED PIPE CONNECTIONS TO BARE METAL.

BRANCH CONNECTIONS:

BRANCH

6	T						
4	RT	T					
3	RT	RT	T				
2	RT	RT	RT	T			
1½	RT	RT	RT	RT	T		
1	RT	RT	RT	RT	RT	T	
	6	4	3	2	1½	1	

SYMBOLS

- F – FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD)
- O – OLET (MATCH END TYPE AND CLASS/SCHEDULE OF DESIGN PER PIPE SPEC)
- RT – REDUCING TEE (MAY NOT BE AVAILABLE IN ALL SIZE REDUCTIONS)
- T – TEE
- W – WELDOLET