UNIVERSITY OF IOWA OAKDALE CAMPUS UTILITY PLANT PIPING STANDARD SPECIFICATIONS TABLE OF CONTENTS

		TABLE OF CON	II EIN I S					
PIPE	CVCTEM	DESIGN (DESIGN CONDITIONS		OPERATING CONDITIONS			
SPECIFICATION	SYSTEM	PRESSURE (PSIG)	TEMPERATURE (°F)	PRESSURE (PSIG)	TEMPERATURE (°F)	PAGE	REV	DATE
UI-LPS	LOW PRESSURE STEAM	50	340	20	260	2	0	2/22/2021
UI-HPS	HIGH PRESSURE STEAM	175	500	150	365	3	0	2/22/2021
UI-LP-CON	LOW PRESSURE CONDENSATE	50	340	20	260	4	0	2/22/2021
UI-HP-CON	HIGH PRESSURE CONDENSATE	175	500	150	365	5	4	2/22/2021
UI-HW	HOT WATER SUPPLY	245	250	130	215	6	0	2/22/2021
UI-HW	HOT WATER RETURN	245	250	130	150	6	0	2/22/2021
UI-VENT	RELIEF DEVICE VENT PIPING	250	500	NO	OTE 1	7	0	2/22/2021
UI-ED	EQUIPMENT DRAIN PIPING	250	500	NO	OTE 1	8	0	2/22/2021
UI-FW	BOILER FEEDWATER	250	300	200	230	9	0	2/22/2021
UI-GFS	NATURAL GAS	150	150	28	55	10	3	2/22/2021
UI-AIR	COMPRESSED AIR	150	150	80-100	75	11	3	2/22/2021
UI-MUS-PWS	MAKE-UP WATER	150	150	100	55	12	6	2/22/2021
UI-MUS-PWS	POTABLE WATER	150	150	60	55	12	6	2/22/2021
UI-SEW	SANITARY SEWER	15	140	0	75	13	2	2/22/2021
UI-BOS-BDS	BOILER BLOWOFF	250	400	150	366	14	0	2/22/2021
UI-BOS-BDS	BOILER BLOWDOWN	250	400	150	366	14	0	2/22/2021
UI-CHW	CHILLED WATER	150	100	50-120	SUPPLY: 42 RETURN: 54-60	15	0	2/22/2021
UI-CS (DI)	CONDENSER WATER (DI)	150	150	50-75	SUPPLY: 85 RETURN: 95-102	16	0	2/22/2021
UI-CS (CS)	CONDENSER WATER (CS)	150	150	50-75	SUPPLY: 85 RETURN: 95-102	17	0	2/22/2021
UI-CS (SS)	CONDENSER WATER (SS)	150	150	50-75	SUPPLY: 85 RETURN: 95-102	18	0	2/22/2021
UI-CS-DRAIN	CONDENSER WATER DRAINS	150	120	50-75	SUPPLY: 85 RETURN: 95-102	19	0	2/22/2021
UI-PCW (CS)	PROCESS COLD WATER - CS	135	200	60-80	55	20	2	2/22/2021
UI-PCW (SS)	PROCESS COLD WATER - SS	150	100	60-80	55	21	1	2/22/2021
UI-PCW (DI)	PROCESS COLD WATER - DI	150	100	60-80	55	22	0	2/22/2021
UI-CSS	SAMPLE WATER	150	100	50-75	95-102	23	0	2/22/2021
UI-CHEM (SS)	CHEMICAL FEED	150	140	NO	OTE 1	24	2	2/22/2021
UI-CHEM (PVC)	CHEMICAL FEED	150	140	NO	OTE 1	25	0	2/22/2021
UI-CHEM (CPVC)	CHEMICAL TREATMENT SERVICE	150	100	50-75	75	26	0	2/22/2021
UI-CHEM (PVDF)	CHEMICAL TREATMENT SERVICE - ACID	150	100	50-75	75	27	0	2/22/2021
UI-DCW	DOMESTIC WATER SYSTEM	135	200	60	COLD: 50 HOT: 150	28	0	2/22/2021
UI-LOL	<u>LUBE OIL</u>	230	100	10	75-95	29	0	2/22/2021
UI-REF	<u>REFRIGERANT</u>	300	250	NO	OTE 1	30	0	2/22/2021
UI-RV	REFRIGERANT VENT PIPING	285	150	NO	OTE 1	31	0	2/22/2021
	BRANCH TABLE					32	1	2/22/2021

NOTES

¹⁾ OPERATING CONDITIONS DETERMINED ON A SYSTEM BY SYSTEM BASIS

²⁾ ALL SYSTEMS ARE ABOVE GROUND UNLESS OTHERWISE STATED

PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:		
			SURE STEAM	50 PSIG AT 340 °F		
UI-LPS	PIPE SIZE (NPS)	2" AND S	SMALLER	2 1/2" THRU 24"		
PIPE MATERIAL:	WEIGHT/SCHEDULE		(S		TD	
ASME B36.10M	MATERIAL CONSTRUCTION		B - SEAMLESS CKETWELD - B16.11		B - SEAMLESS - ASME B16.9	
FITTINGS:	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	MATERIAL		STEEL - ASTM A105		1 A234 GRADE B - SEAMLESS	
PIPING JOINTS:	TYPE		TWELD		PREP PER B16.25	
THING COMTO:	OTHER		R THREAD REQUIRED	WHERE FLAN	GE REQUIRED	
LINION O.	CONSTRUCTION		- FLAT FACE WITH SPIRAL SKET DESIGN	NOT PE	RMITTED	
UNIONS:	WALL THICKNESS MATERIAL		JOINING PIPE STEEL - ASTM A105			
	CONSTRUCTION	TOROLD GARBON		NECK - ASME B16.5		
FLANGES:	WALL THICKNESS		SAME AS ADJOINING PIPE SAME AS ADJOINING PIPE			
	MATERIAL		STEEL - ASTM A105		STEEL - ASTM A105	
FLANGE BOLTS: FLANGE NUTS:	CONSTRUCTION CONSTRUCTION	ALLOY	STEEL, AISI 4140/4142 QUENCI	HED AND TEMPERED, A193 GR A194 GRADE 2H	RADE B7	
WASHER:	CONSTRUCTION			36		
GASKETS:	CONSTRUCTION	SPIRA	AL WOUND - SUITABLE FOR RA	ISED-FACE OR FLAT-FACE FLA	ANGES	
GASKETS:	MATERIAL		EXITALLIC STYLE CGI - TYPE 30			
THERMOWELLS:	CONSTRUCTION	INSERTION	THERMOWELLS - 3000 PSIG F		DED WELLS	
PIPE MATERIAL:	MATERIAL PIPE CODE:	DESIGN/CONST	ASTM A106 CA RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME		nevision.	2/22/2021	
O/INDON OTELL	ACTIVI BOOLTON			-	•	
VENT PIPING FINISH:	SPECIFICATION MATERIAL:		AT SYSTEM WITH SOLVENT-BA POLYMER TOP COAT - COLOR			
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	I CODE:		
UI-LPS	CARBON STEEL	150 PSIG	ASME B31.1	ASME B16.34	<u> </u>	
UI-LF3	PIPE SIZE (NPS)		SMALLER		HRU 24"	
	CONNECTION AND RATING	CLASS 800 PSIG SOC	KETWELD (1" THRU 2")		LANGED ENDS	
GATE VALVE	CONSTRUCTION	BODY/BONNET: A105, TRIM 13% CR OUTSIDE SCREW & YOKE, BOLITED GLAND, SOLID WEDGE, HARD FACED SEATS, CLASS 800 PACKING: GRAPHITE		SEAT RING: DISC/WEDGE: A217 GR. C. OVE STEM: PACKING:	: A216 GR. WCB HARDFACED A15 OR WCB WITH 13% CR RLAY 410 SS GRAPHITE ED SS WITH GRAPHITE	
	VALVE SELECTION	POWELL FIGURE GA08 VOGT SW12111 BONNEY FORGE FIG. H11SW		CRANE F	IGURE 1503 FIGURE 47 PRGE 1-11 RF	
	CONNECTION AND RATING	-	-	CLASS 150 FL	LANGED ENDS	
BUTTERFLY VALVE	CONSTRUCTION			BODY/BONNET: A216 GR. WCB SEAT RING:METAL SEAT DISC: A351 OF8M SHAFT: 17-4 PH PACKING: PTFE GLAND: 304 SS		
	VALVE SELECTION			POWELL FIGURE 1572 DEZURIK STYLE BHP FLOWSEAL TYPE 1LA		
	CONNECTION AND RATING		G SOCKETWELD	CLASS 150 FL	LANGED ENDS	
CHECK VALVE	CONSTRUCTION	SWING SEAT RING: STELLI DISC: ' GASKET: SP	.105 (BOLTED) CHECK ITE 6 FACED 410 SS 13% CR IRAL WOUND	SEAT RING: DISC: A105 OR A216 WCF GASKET: CORRUGATE	GR. WCB (BOLTED) HARDFACED B WITH 13% CR OVERLAY D SST WITH GRAPHITE	
	VALVE SELECTION		GURE SW08 SW701		IGURE 1561 IGURE 147	
		BONNEY FORG	GE FIG. H61SW	BONNEY FO	RGE 1-61 RF	
	CONNECTION AND RATING		G SOCKETWELD		ED ENDS (UP TO 6")	
BALL VALVE	CONSTRUCTION	THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BU FLANG! STEM BUSHING: NITRIDED S COND.2 CHROME	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER	THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BU FLANG! STEM BUSHING: NITRIDED S COND.2 CHROME	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED AR OPERATOR OVER 4")	
	VALVE SELECTION	VELAN TYPE R, META	L SEATED, CLASS 900	VELAN	TYPE R	
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 150 FI	LANGED ENDS	
GLOBE VALVE	CONSTRUCTION	DISC: 4 TRIM: STEM: A PACKING: GASKET: SPIRAL WOUN	.TED) (BODY HARDFACED) 420SST 13% Cr A183 F6A GRAPHITE ND SST WITH GRAPHITE GURE GL08	SEAT RING: A105 O DISC: A105 OR A216 WCF STEM: PACKING: GASKET: CORRUGATE	GR. WCB (BOLTED) R A216 HARDFACED B WITH 13% CR OVERLAY 410 SS GRAPHITE ID SST WITH GRAPHITE IGURE 1531	
	VALVE SELECTION	VOGT S BONNEY FOR	GUNE GL06 GW12141 GE FIG. H31SW	CRANE F	IGURE 143 PRGE 1-31 RF	
MIMOED	REVISION I			·		
NUMBER	DESCRIP	IIUN	DATE			
0	INITIAL ISSUE		2/22/2021			
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PIPING SI	PECIFICATION:		CESS:	DESIGN CONDITIONS:		
UI-HPS			SURE STEAM		AT 500 °F	
	PIPE SIZE (NPS)		SMALLER	2 1/2" THRU 24"		
PIPE MATERIAL:	WEIGHT/SCHEDULE		(S	STD A106 GRADE B - SEAMLESS		
ASME B36.10M	MATERIAL		B - SEAMLESS			
FITTINGS:	CONSTRUCTION		JOINING PIPE		- ASME B16.9 JOINING PIPE	
FILLINGS:	WALL THICKNESS MATERIAL		STEEL - ASTM A105			
	TYPE		TWELD	BUTTWELD FITTING - ASTM A234 GRADE B - SEAML BUTTWELD - END PREP PER B16.25		
PIPING JOINTS:	OTHER		R THREAD REQUIRED		GE REQUIRED	
1			- FLAT FACE WITH SPIRAL			
	CONSTRUCTION		SKET DESIGN	NOT PE	RMITTED	
UNIONS:	WALL THICKNESS	SAME AS AD	JOINING PIPE	-	-	
	MATERIAL	FORGED CARBON	STEEL - ASTM A105	-	-	
	CONSTRUCTION			NECK - ASME B16.5		
FLANGES:	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	MATERIAL		STEEL - ASTM A105		STEEL - ASTM A105	
FLANGE BOLTS:	CONSTRUCTION	ALLOY	STEEL, AISI 4140/4142 QUENCI		ADE B7	
FLANGE NUTS:	CONSTRUCTION			194 GRADE 2H 36		
WASHER:	CONSTRUCTION CONSTRUCTION	SPIRA	AL WOUND - SUITABLE FOR RA		NGES	
GASKETS:	MATERIAL		EXITALLIC STYLE CGI - TYPE 30			
	CONSTRUCTION		THERMOWELLS - 3000 PSIG F			
THERMOWELLS:	MATERIAL		ASTM A106 C			
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME	B31.1	0	2/22/2021	
		2-CO	AT SYSTEM WITH SOLVENT-BA		R, AND	
VENT PIPING FINISH:	SPECIFICATION MATERIAL:		INORGANIC SILICATE			
			COLOR TO MATCH RED OF EX			
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		CODE:		
UI-HPS	CARBON STEEL	300 PSIG	ASME B31.1 SMALLER	ASME B16.34	HRU 24"	
	PIPE SIZE (NPS) CONNECTION AND RATING		G SOCKETWELD		LD ENDS	
1	CONNECTION AND RATING	CLASS 600 PSI	3 OOOKE I WELD			
GATE VALVE	CONSTRUCTION	BODY/BONNET: A105, TRIM 13% CR OUTSIDE SCREW & YOKE, BOLTED GLAND, SOLID WEDGE, HARD FACED SEATS, CLASS 800 PACKING: GRAPHITE		BODY/BONNET: A105 OR A216 GR. WCB SEAT RING: HARDFACED DISC/WEDGE: A217 GR. CA15 OR WCB WITH 13% CR OVERLAY STEM: 410 SS PACKING: GRAPHITE GASKET: SPIRAL WOUND SS WITH GRAPHITE		
	VALVE SELECTION	VOGT S BONNEY FOR	GURE GA08 6W12111 GE FIG. H11SW	CRANE FIG BONNEY FO		
	CONNECTION AND RATING	-	-	BUTTWE	LD ENDS	
BUTTERFLY VALVE	CONSTRUCTION			BODY: A216 GR. WCB CAP: A 516 GR 60 OR A 696 GR B DISC: A351 CF8M SEAL/SEAT GASKET: GRAPHITE PACKING: GRAPHITE	CLOSE STOP: A 516 GR 60 DRIVE SHAFT: A 276 GR 431 BEARING: A 439 TPD2 BEARING SEAL: GRAPHITE GASKET: GRAPHITE	
	VALVE SELECTION			ADAMS SERIES MAK		
	CONNECTION AND RATING		G SOCKETWELD	BUTTWE	LD ENDS	
CHECK VALVE	CONSTRUCTION	SWING SEAT RIN DISC: GASKET: SP	105 (BOLTED) CHECK IG: 316 HF 13% CR IRAL WOUND	BODY/CAP: A216 GR. WCB (BOLTED) SEAT RING: HARDFACED DISC: A105 OR A216 WCB WITH 13% CR OVERLAY GASKET: CORRUGATED SST WITH GRAPHITE		
	VALVE SELECTION		GURE SW08 SW701	POWELL FIGURE 3061 CRANE FIGURE 159-1/2		
	, are delegation		GE FIG. H61SW	BONNEY FO		
	CONNECTION AND RATING	CLASS 900 PSI	COCKETWELD	-	-	
1	OCHINE CONTRACTOR	BODY: A105, STEM SS 410 COND. 2 THRUST WASHER: STELLITE 6; BALL AND SEAT: SS 410/CROME CARBIDE COATED; STEM: SS 410; THRUST BUSHING: BRONZE; PACKING FLANGE SS 304 STEM BUSHING: NITRIDED SS410 COND. 2; SEAT SS 410 COND.2 CHROME CARBIDE COATED			-	
BALL VALVE	CONSTRUCTION	BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED : COND.2 CHROME	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410			
BALL VALVE		BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED 0: COND.2 CHROME LOCKABI	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED		-	
BALL VALVE	CONSTRUCTION	BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANG! STEM BUSHING: NITRIDED : COND.2 CHROME LOCKAB! VELAN TYPE R, META	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING ES 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER		-	
BALL VALVE GLOBE VALVE	CONSTRUCTION VALVE SELECTION	BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED: COND 2 CHROME LOCKAB! VELAN TYPE R, META CLASS 800 PSIC BODY/BONNET: A105 (B01) ISC: TRIM: STEM: A PACKING: GASKET: SPIRAL WOUL POWELL FI VOGT 5	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER LL SEATED, CLASS 900 G SOCKETWELD TED) (BODY HARDFACED) 420SST 13% Cr A183 F6A GRAPHITE ID SST WITH GRAPHITE IGURE GL08 SW12141	BUTTWE BODY/BONNET: A216 SEAT RING: A105 O DISC: A105 OR A216 WG! STEM: PACKING: GASKET: CORRUGATE POWELL F CRANE FIG	ELD ENDS S GR. WCB (BOLTED) R A216 HARDFACED B WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE IGURE 3031 URE 151-1/2	
	CONSTRUCTION VALVE SELECTION CONNECTION AND RATING CONSTRUCTION VALVE SELECTION	BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED: COND.2 CHROME LOCKABI VELAN TYPE R, META CLASS 800 PSIC BODY/BONNET: A105 (B01) DISC: TRIM: STEM: PACKING: PACKING: GASKET: SPIRAL WOU! POWELL F VOGT S BONNEY FOR	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER LL SEATED, CLASS 900 G SOCKETWELD LTED) (BODY HARDFACED) 420SST 13% Cr A183 F6A GRAPHITE ND SST WITH GRAPHITE GURE GL08	BUTTWE BODY/BONNET: A216 SEAT RING: A105 O DISC: A105 OR A216 WG! STEM: PACKING: GASKET: CORRUGATE POWELL F CRANE FIG	ELD ENDS G GR. WCB (BOLTED) R A216 HARDFACED S WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE GURE 3031	
GLOBE VALVE	CONSTRUCTION VALVE SELECTION CONNECTION AND RATING CONSTRUCTION VALVE SELECTION REVISION I	BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED 9: COND.2 CHROME LOCKABI VELAN TYPE R, META CLASS 800 PSIG BODY/BONNET: A105 (BOI DISC: TRIM: STEM: A PACKING: GASKET: SPIRAL WOUL POWELL FI VOGT 9: BONNEY FORG	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER L SEATED, CLASS 900 G SOCKETWELD LTED) (BODY HARDFACED) 420SST 13% Cr 13% Cr 14183 F6A GRAPHITE UD SST WITH GRAPHITE IGURE GL08 SW12141 GE FIG. H31SW	BUTTWE BODY/BONNET: A216 SEAT RING: A105 O DISC: A105 OR A216 WG! STEM: PACKING: GASKET: CORRUGATE POWELL F CRANE FIG	ELD ENDS S GR. WCB (BOLTED) R A216 HARDFACED B WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE IGURE 3031 URE 151-1/2	
	CONSTRUCTION VALVE SELECTION CONNECTION AND RATING CONSTRUCTION VALVE SELECTION	BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED 9: COND.2 CHROME LOCKABI VELAN TYPE R, META CLASS 800 PSIG BODY/BONNET: A105 (BOI DISC: TRIM: STEM: A PACKING: GASKET: SPIRAL WOUL POWELL FI VOGT 9: BONNEY FORG	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER LL SEATED, CLASS 900 G SOCKETWELD TED) (BODY HARDFACED) 420SST 13% Cr A183 F6A GRAPHITE ID SST WITH GRAPHITE IGURE GL08 SW12141	BUTTWE BODY/BONNET: A216 SEAT RING: A105 O DISC: A105 OR A216 WG! STEM: PACKING: GASKET: CORRUGATE POWELL F CRANE FIG	ELD ENDS S GR. WCB (BOLTED) R A216 HARDFACED B WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE IGURE 3031 URE 151-1/2	
GLOBE VALVE	CONSTRUCTION VALVE SELECTION CONNECTION AND RATING CONSTRUCTION VALVE SELECTION REVISION I	BODY: A105, STE THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED 9: COND.2 CHROME LOCKABI VELAN TYPE R, META CLASS 800 PSIG BODY/BONNET: A105 (BOI DISC: TRIM: STEM: A PACKING: GASKET: SPIRAL WOUL POWELL FI VOGT 9: BONNEY FORG	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER L SEATED, CLASS 900 G SOCKETWELD LTED) (BODY HARDFACED) 420SST 13% Cr 13% Cr 14183 F6A GRAPHITE UD SST WITH GRAPHITE IGURE GL08 SW12141 GE FIG. H31SW	BUTTWE BODY/BONNET: A216 SEAT RING: A105 O DISC: A105 OR A216 WG! STEM: PACKING: GASKET: CORRUGATE POWELL F CRANE FIG	ELD ENDS S GR. WCB (BOLTED) R A216 HARDFACED B WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE IGURE 3031 URE 151-1/2	

DIDING	PECIFICATION:	l ppo	CECC.	DEGICE CO	ONDITIONS:	
	FEGIFICATION:		CESS: E CONDENSATE	DESIGN CONDITIONS: 50 PSIG AT 340 °F		
UI-LP-CON	PIPE SIZE (NPS)		SMALLER		HRU 24"	
PIPE MATERIAL:	WEIGHT/SCHEDULE		(S		(S	
ASME B36.10M	MATERIAL	·	B - SEAMLESS		B - SEAMLESS	
ACINE BOO. TOW	CONSTRUCTION		CKETWELD - B16.11		- ASME B16.9	
FITTINGS:	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	MATERIAL		STEEL - ASTM A105		1 A234 GRADE B - SEAMLESS	
	TYPE		TWELD		PREP PER B16.25	
PIPING JOINTS:	OTHER		R THREAD REQUIRED		IGE REQUIRED	
		CLASS 3000 - SW - B16.11	- FLAT FACE WITH SPIRAL			
LINIONIO	CONSTRUCTION	WOUND GAS	SKET DESIGN	NOT PER	RMITTED	
UNIONS:	WALL THICKNESS	SAME AS AD	JOINING PIPE	-	-	
	MATERIAL	FORGED CARBON	STEEL - ASTM A105	-		
	CONSTRUCTION		CLASS 150 - WELD	NECK - ASME B16.5		
FLANGES:	WALL THICKNESS	SAME AS AD	SAME AS ADJOINING PIPE SAME AS ADJOINING PIPE			
	MATERIAL	FORGED CARBON	STEEL - ASTM A105	FORGED CARBON	STEEL - ASTM A105	
FLANGE BOLTS:	CONSTRUCTION	ALLOY	STEEL, AISI 4140/4142 QUENC	HED AND TEMPERED, A193 GR	ADE B7	
FLANGE NUTS:	CONSTRUCTION			A194 GRADE 2H		
WASHER:	CONSTRUCTION			436		
GASKETS:	CONSTRUCTION			AISED-FACE OR FLAT-FACE FLA		
GAGRETO:	MATERIAL			04 STAINLESS - FLEXICARB FIL		
THERMOWELLS:	CONSTRUCTION	INSERTION		PRESSURE CLASS - SEAL WELI	DED WELLS	
	MATERIAL			ARBON STEEL		
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M		B31.1	0	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		CODE:	1	
UI-LP-CON	CARBON STEEL	150 PSIG	ASME B31.1	ASME B16.34	1	
0. 2. 00.0	PIPE SIZE (NPS)		SMALLER		HRU 24"	
	CONNECTION AND RATING	CLASS 800 PSIG SOC	KETWELD (1" THRU 2")		LANGED ENDS	
					: A216 GR. WCB	
		BODY/BONNET: A	105, TRIM 13% CR		HARDFACED	
	CONSTRUCTION	OUTSIDE SCREW & YOKE, BO	DLTED GLAND, SOLID WEDGE,		A15 OR WCB WITH 13% CR	
GATE VALVE	CONSTRUCTION	HARD FACED SEATS, CLASS 800		OVERLAY STEM: 410 SS		
0,112 0,1212		PACKING:	GRAPHITE		GRAPHITE	
				GASKET: CORRUGATED SS WITH GRAPHITE		
		POWELL FI	IGURE GA08	POWELL F	IGURE 1503	
	VALVE SELECTION	VOGT	SW12111	CRANE F	IGURE 47	
		BONNEY FOR	GE FIG. H11SW	BONNEY FORGE 1-11 RF		
	CONNECTION AND RATING	-	-	CLASS 150 FL	LANGED ENDS	
				BODY/BONNET	: A216 GR. WCB	
					METAL SEAT	
	CONSTRUCTION			DISC: A3	351 CF8M	
BUTTERFLY VALVE	CONSTRUCTION				17-4 PH	
DOTTERIE TALVE					IG: PTFE	
				GLAND	: 304 SS	
					IGURE 1572	
	VALVE SELECTION	-			STYLE BHP	
		CLASS 800 PSIG SOCKETWELD			L TYPE 1LA	
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 150 FL	LANGED ENDS	
		BODY/CAP: A	(105 (BOLTED)			
			CHECK		GR. WCB (BOLTED)	
	CONSTRUCTION		ITE 6 FACED 410 SS	SEAT RING: HARDFACED DISC: A105 OR A216 WCB WITH 13% CR OVERLA' GASKET: CORRUGATED SST WITH GRAPHITE		
CHECK VALVE		DISC:	13% CR			
		GASKET: SP	IRAL WOUND	GAGRET: GORRIGOATE	D GGT WITH GIVATINE	
		DOWELL FI	GURE SW08	DOWELLE	IGURE 1561	
	VALVE SELECTION		SW701		IGURE 147	
	VALVE GEEEGITOR		GE FIG. H61SW		RGE 1-61 RF	
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 150 FLANGE	ED ENDS (UP TO 6")	
		BODY: A105, STE	M SS 410 COND. 2		M SS 410 COND. 2	
			ITE 6; BALL AND SEAT: SS		ITE 6; BALL AND SEAT: SS	
		410/CROME CA	RBIDE COATED;	410/CROME CA	RBIDE COATED;	
	CONSTRUCTION		JSHING: BRONZE; PACKING		JSHING: BRONZE; PACKING	
BALL VALVE	551151115511511		E SS 304		E SS 304	
			SS410 COND. 2; SEAT SS 410 CARBIDE COATED		SS410 COND. 2; SEAT SS 410 CARBIDE COATED	
			LE LEVER		AR OPERATOR OVER 4")	
		20010101	·	(02/		
	VALVE SELECTION	VELAN TYPE R. META	AL SEATED, CLASS 900	VEI AN	TYPE R	
]		
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 150 FL	LANGED ENDS	
		BODY/BONNET: A105 (BOI	LTED) (BODY HARDFACED)	BODY/BONNET: A216	GR. WCB (BOLTED)	
			420SST		R A216 HARDFACED	
	CONSTRUCTION		13% Cr		B WITH 13% CR OVERLAY	
GLOBE VALVE	1		A183 F6A		410 SS	
			GRAPHITE ND SST WITH GRAPHITE		GRAPHITE D SST WITH GRAPHITE	
			IGURE GL08		IGURE 1531	
	VALVE SELECTION		SW12141		IGURE 143	
	1		GE FIG. H31SW		RGE 1-31 RF	
	REVISION I	HISTORY				
NUMBER	DESCRIP	TION	DATE]		
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<u> </u>			2/22/2021	J		

	DECIFICATION.		0500		NIDITIONS	
	PECIFICATION:		CESS: RE CONDENSATE	DESIGN CO 175 PSIG	ONDITIONS: AT 500 °F	
UI-HP-CON	PIPE SIZE (NPS)		SMALLER	2 1/2" THRU 24"		
PIPE MATERIAL:	WEIGHT/SCHEDULE		KS .	XS		
ASME B36.10M	MATERIAL		B - SEAMLESS		B - SEAMLESS	
FITTINGS:	CONSTRUCTION WALL THICKNESS		JOINING PIPE	BUTTWELD - ASME B16.9 SAME AS ADJOINING PIPE		
FITTINGS:	MATERIAL		STEEL - ASTM 105	SAME AS ADJOINING PIPE BUTTWELD FITTING - ASTM A234 GRADE B - SEAML		
	TYPE		TWELD	BUTTWELD - END PREP PER B16.25		
PIPING JOINTS:	OTHER		R THREAD REQUIRED	WHERE FLAN	GE REQUIRED	
	CONSTRUCTION		- FLAT FACE WITH SPIRAL	NOT PER	RMITTED	
UNIONS:	WALL THIOMIEGO		SKET DESIGN JOINING PIPE			
	WALL THICKNESS MATERIAL		STEEL - ASTM A105		-	
	CONSTRUCTION		CLASS 300 - WELD NECK - ASME B16.5			
FLANGES:	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	MATERIAL		STEEL - ASTM A105		STEEL - ASTM A105	
FLANGE BOLTS: FLANGE NUTS:	CONSTRUCTION	ALLOY STEEL, AIS		EMPERED, A193 GRADE B7, ST A194 GRADE 2H	UD - FULL LENGTH	
WASHER:	CONSTRUCTION			436		
GASKETS:	CONSTRUCTION			ISED-FACE OR FLAT-FACE FLA		
CACKETO:	MATERIAL			04 STAINLESS - FLEXICARB FIL		
THERMOWELLS:	CONSTRUCTION MATERIAL	INSERTION		PRESSURE CLASS - SEAL WELL ARBON STEEL	DED WELLS	
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M		B31.1	4	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		N CODE:		
UI-HP-CON	CARBON STEEL	300 PSIG	ASME B31.1	ASME B16.34	HDI I 24"	
	PIPE SIZE (NPS) CONNECTION AND RATING		SMALLER G SOCKETWELD	2 1/2" T	ANGED ENDS	
	CONNECTION AND RATING	CLAGG 000 F SIX	3 SOOKE I WEED	BODY/BONNET: A10		
GATE VALVE	CONSTRUCTION	OUTSIDE SCREW & YOKE, BO HARD FACED SI PACKING:	x105, TRIM 13% CR DLTED GLAND, SOLID WEDGE, EATS, CLASS 800 GRAPHITE	SEAT RING: HARDFACED DISC/WEDGE: A217 GR. CA15 OR WCB WITH 13% CR OVERLAY STEM: 410 SS PACKING: GRAPHITE GASKET: SPIRAL WOUND SS WITH GRAPHITE		
	VALVE SELECTION	VOGT S	IGURE GA08 SW12111	POWELL FIGURE 3003 CRANE FIGURE 33-1/2 BONNEY FORGE 3-11 RF		
	CONNECTION AND RATING	BONNEY FOR	GE FIG. H11SW		D ENDS (LUG STYLE)	
BUTTERFLY VALVE	CONSTRUCTION			SEAT RING: A182 F11; STELLITE 6 FACED DISC/WEDGE: A217 GR. WC6; STELLITE 6 FACED STEM: 410 SS PACKING: GRAPHITE GASKET: SPIRAL WOUND SS WITH GRAPHITE		
	VALVE SELECTION			POWELL FIGURE 3072 (3" AND LARGER) FLOWSEAL METAL SEAT CLASS 300		
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 300 FL	ANGED ENDS	
CHECK VALVE	CONSTRUCTION	BODY/CAP: A105 (BOLTED) SWING CHECK SEAT RING: 316 HF DISC: 13% CR GASKET: SPIRAL WOUND		BODY/CAP: A216 GR. WCB (BOLTED) SEAT RING: HARDFACED DISC: A105 OR A216 WCB WITH 13% CR OVERLAY GASKET: CORRUGATED SST WITH GRAPHITE		
	VALVE SELECTION	POWELL FIGURE SW08 VOGT SW701 BONNEY FORGE FIGURE H61SW		POWELL FIGURE 3061 CRANE FIGURE 159-1/2 BONNEY FORGE 3-61 RF		
	CONNECTION AND RATING		G SOCKETWELD		ANGED ENDS	
BALL VALVE	CONSTRUCTION	THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BL FLANGI STEM BUSHING: NITRIDED 9 COND.2 CHROME	BODY: A105, STEM SS 410 COND. 2 THRUST WASHER: STELLITE 6; BALL AND SEAT: SS 410/CROME CARBIDE COATED; STEM: SS 410; THRUST BUSHING: BRONZE; PACKING FLANGE SS 304 STEM BUSHING: NITRIDED SS410 COND. 2; SEAT SS 410 COND. 2 CHROME CARBIDE COATED LOCKABLE LEVER		M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; SHING: BRONZE; PACKING : SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED IR OPERATOR OVER 4")	
	VALVE SELECTION	,	AL SEATED, CLASS 900	VELAN	TYPE R	
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 300 FL	ANGED ENDS	
GLOBE VALVE	CONSTRUCTION	DISC: TRIM: STEM: A PACKING: GASKET: SPIRAL WOU!	LTED) (BODY HARDFACED) 420SST 13% Cr 4183 F6A GRAPHITE ND SST WITH GRAPHITE	SEAT RING: A105 OI DISC: A105 OR A216 WCE STEM: PACKING: GASKET: CORRUGATE	3 WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE	
	VALVE SELECTION	VOGT S BONNEY FOR	IGURE GL08 SW12141 GE FIG. H31SW	POWELL FI CRANE FIG BONNEY FO	URE 151-1/2	
NUMBER	REVISION I		DATE			
	DESCRIP			1		
1	CHANGED SMALL BORE VALVES TO CLA		6/30/2017]		
2	ADDED WALL THICKNESS TO TABLE, REN WALL THICKNESS	MOVED OTHER REFERENCES TO	9/22/2017			

2/22/2021

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CHANGED UNIONS TO A FLAT-FACED GASKETED DESIGN

UPDATED LARGE BORE WALL THICKNESS; VALVE SELECTIONS

PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:		
	·-···-		UPPLY/RETURN	245 PSIG		
UI-HW	PIPE SIZE (NPS)	2" AND S	SMALLER		HRU 24"	
PIPE MATERIAL:	WEIGHT/SCHEDULE		(S		TD	
ASME B36.10M	MATERIAL		B - SEAMLESS		B - SEAMLESS	
FITTINGS.	CONSTRUCTION		CKETWELD - B16.11		- ASME B16.9	
FITTINGS:	WALL THICKNESS MATERIAL		JOINING PIPE STEEL - ASTM A105		JOINING PIPE	
	TYPE		TWELD	BUTTWELD FITTING - ASTM A234 GRADE B - SEAML BUTTWELD - END PREP PER B16.25		
PIPING JOINTS:	OTHER		R THREAD REQUIRED		GE REQUIRED	
			- FLAT FACE WITH SPIRAL			
UNIONS:	CONSTRUCTION		SKET DESIGN	NOT PE	RMITTED	
ONIONS.	WALL THICKNESS		JOINING PIPE		-	
	MATERIAL	FORGED CARBON	STEEL - ASTM A105		-	
FLANGES:	CONSTRUCTION	CAME AC AD	JOINING PIPE	NECK - ASME B16.5	JOINING PIPE	
FLANGES.	WALL THICKNESS MATERIAL		STEEL - ASTM A105		STEEL - ASTM A105	
FLANGE BOLTS:	CONSTRUCTION			HED AND TEMPERED, A193 GR		
FLANGE NUTS:	CONSTRUCTION	-		A194 GRADE 2H		
WASHER:	CONSTRUCTION		F-	436		
GASKETS:	CONSTRUCTION			ISED-FACE OR FLAT-FACE FLA		
GASKETS.	MATERIAL			04 STAINLESS - FLEXICARB FIL		
THERMOWELLS:	CONSTRUCTION	INSERTION		PRESSURE CLASS - SEAL WELL	DED WELLS	
DIDE MATERIAL	MATERIAL	DECICNICONST		ARBON STEEL	DATE DEVICES	
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE: B31.1	REVISION:	DATE REVISED:	
CARBON STEEL VALVE SPECIFICATION:	ASTM B36.10M SPECIFICATION MATERIAL:	PRESSURE CLASS:		0 N CODE:	2/22/2021	
	CARBON STEEL	150 PSIG	ASME B31.1	ASME B16.34		
UI-HW	PIPE SIZE (NPS)		SMALLER		HRU 24"	
	CONNECTION AND RATING		G SOCKETWELD		ANGED ENDS	
				BODY/BONNET:	A216 GR. WCB	
		BODY/BONNET: A	105, TRIM 13% CR		HARDFACED	
	CONSTRUCTION		OLTED GLAND, SOLID WEDGE,		A15 OR WCB WITH 13% CR	
GATE VALVE	CONSTRUCTION		EATS, CLASS 800	OVERLAY		
GATE VALVE		PACKING: GRAPHITE		STEM: 410 SS PACKING: GRAPHITE		
				GASKET: CORRUGATED SS WITH GRAPHITE		
		POWELL FI	IGURE GA08	POWELL F	IGURE 1503	
	VALVE SELECTION		SW12111	CRANE FIGURE 47		
			GE FIG. H11SW	BONNEY FORGE 1-11 RF		
	CONNECTION AND RATING	-	-	CLASS 150 FL	ANGED ENDS	
					: A216 GR. WCB	
				SEAT RING:		
	CONSTRUCTION	-			351 CF8M 17-4 PH	
BUTTERFLY VALVE					G: PTFE	
					: 304 SS	
				POWELL F	IGURE 1572	
	VALVE SELECTION	-			STYLE BHP	
				FLOWSEA		
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 150 FL	ANGED ENDS	
		BODY/CAP: A	105 (BOLTED)			
			CHECK		GR. WCB (BOLTED) HARDFACED	
	CONSTRUCTION	SEAT RING: STELLITE 6 FACED 410 SS			B WITH 13% CR OVERLAY	
CHECK VALVE			13% CR	GASKET: CORRUGATED SST WITH GRAPHITE		
		GASKET: SP	IRAL WOUND			
		POWELL FI	GURE SW08	POWELL F		
	VALVE SELECTION		SW701	CRANE FI		
			GE FIG. H61SW	BONNEY FO		
	CONNECTION AND RATING		G SOCKETWELD		ED ENDS (UP TO 6")	
			M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS		M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS	
			RBIDE COATED;	410/CROME CA		
	CONSTRUCTION		JSHING: BRONZE; PACKING	STEM: SS 410; THRUST BU	SHING: BRONZE; PACKING	
BALL VALVE	CONSTRUCTION		E SS 304		SS 304	
			SS410 COND. 2; SEAT SS 410 CARBIDE COATED		SS410 COND. 2; SEAT SS 410 CARBIDE COATED	
			LE LEVER		AR OPERATOR OVER 4")	
				,,,	- ,	
	VALVE SELECTION	VELAN TYPE R, META	AL SEATED, CLASS 900	VELAN	TYPE R	
	CONNECTION AND RATING		G SOCKETWELD		ANGED ENDS	
			LTED) (BODY HARDFACED) 420SST		GR. WCB (BOLTED) R A216 HARDFACED	
	0011075		420551 13% Cr		B WITH 13% CR OVERLAY	
GLOBE VALVE	CONSTRUCTION	STEM: A	A183 F6A	STEM:	410 SS	
GLOBE VALVE			GRAPHITE		GRAPHITE	
			ND SST WITH GRAPHITE		D SST WITH GRAPHITE	
	VALVE SELECTION		IGURE GL08 SW12141	POWELL F	GURE 1531 GURE 143	
	TALTE SELECTION		GE FIG. H31SW	BONNEY FO		
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PIPING S	PECIFICATION:	PROCESS:	DESIGN CONDITIONS:		
UI-VENT		RELIEF DEVICE VENT PIPING	250 PSIG	AT 500 °F	
UI-VEN I	PIPE SIZE (NPS)	2" AND SMALLER	2 1/2" T	HRU 24"	
PIPE MATERIAL:	WEIGHT/SCHEDULE	XS	S	TD	
ASME B36.10M	MATERIAL	A106 GRADE B - SEAMLESS	A106 GRADE	B - SEAMLESS	
	CONSTRUCTION	CLASS 3000 - SOCKETWELD - B16.11	BUTTWELD	- ASME B16.9	
FITTINGS:	WALL THICKNESS	SAME AS ADJOINING PIPE	SAME AS AD	JOINING PIPE	
	MATERIAL	FORGED CARBON STEEL - ASTM A105	BUTTWELD FITTING - ASTN	1 A234 GRADE B - SEAMLESS	
PIPING JOINTS:	TYPE	SOCKETWELD	BUTTWELD - END	PREP PER B16.25	
PIPING JOINTS:	OTHER	WHERE FLANGE OR THREAD REQUIRED	WHERE FLAN	IGE REQUIRED	
	CONSTRUCTION	CLASS 3000 - SW - B16.11 - FLAT FACE WITH SPIRAL WOUND GASKET DESIGN	NOT PERMITTED		
UNIONS:	WALL THICKNESS	SAME AS ADJOINING PIPE			
	MATERIAL	FORGED CARBON STEEL - ASTM A105			
	CONSTRUCTION	CLASS 300 - WELD NECK - ASME B16.5			
FLANGES:	WALL THICKNESS	SAME AS ADJOINING PIPE	SAME AS ADJOINING PIPE		
	MATERIAL	FORGED CARBON STEEL - ASTM A105	FORGED CARBON	STEEL - ASTM A105	
FLANGE BOLTS:	CONSTRUCTION	ALLOY STEEL, AISI 4140/4142 QUENCHED AND T	EMPERED, A193 GRADE B7, ST	UD - FULL LENGTH	
FLANGE NUTS:	CONSTRUCTION	HEAVY HEX - A	A194 GRADE 2H		
WASHER:	CONSTRUCTION	F	436		
GASKETS:	CONSTRUCTION	SPIRAL WOUND - SUITABLE FOR RA	ISED-FACE OR FLAT-FACE FLA	ANGES	
GASKETS.	MATERIAL	FLEXITALLIC STYLE CGI - TYPE 3	04 STAINLESS - FLEXICARB FIL	LER	
THERMOWELLS:	CONSTRUCTION	INSERTION THERMOWELLS - 3000 PSIG F	PRESSURE CLASS - SEAL WEL	DED WELLS	
THERMOVIELES.	MATERIAL	ASTM A106 C	ARBON STEEL		
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME B31.1	0	2/22/2021	
FINISH:	SPECIFICATION MATERIAL:	2-COAT SYSTEM WITH SOLVENT-B/ INORGANIC SILICATE POLYMER TOP CO/ COLOR TO MATCH RED OF EX		FIFICATIONS	
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INITIAL ISSUE

PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:		
UI-ED		EQUIPMEI	NT DRAINS	250 PSIG AT 500 °F		
_	PIPE SIZE (NPS)		SMALLER		HRU 24"	
PIPE MATERIAL:	WEIGHT/SCHEDULE		TD	STD A106 GRADE B - SEAMLESS		
ASME B36.10M	MATERIAL		B - SEAMLESS			
EITTINGS.	CONSTRUCTION		KETWELD - B16.11		- ASME B16.9	
FITTINGS:	WALL THICKNESS MATERIAL		JOINING PIPE STEEL - ASTM a 105		JOINING PIPE LA234 GRADE B - SEAMLESS	
	TYPE		TWELD	BUTTWELD FITTING - ASTM A234 GRADE B - SEAN BUTTWELD - END PREP PER B16.25		
PIPING JOINTS:	OTHER		R THREAD REQUIRED	WHERE FLANGE REQUIRED		
			- FLAT- FACE WITH SPIRAL			
UNIONS:	CONSTRUCTION		SKET DESIGN	NOT PE	RMITTED	
UNIONS:	WALL THICKNESS		JOINING PIPE	-		
	MATERIAL	FORGED CARBON	STEEL - ASTM A105		-	
	CONSTRUCTION			NECK - ASME B16.5		
FLANGES:	WALL THICKNESS		JOINING PIPE		JOINING PIPE STEEL - ASTM A105	
FLANGE BOLTS:	MATERIAL CONSTRUCTION		STEEL - ASTM A105	EMPERED, A193 GRADE B7, ST		
FLANGE BULTS:	CONSTRUCTION	ALEGI GILLE, AIG		194 GRADE 2H	OB - 1 GEE EENOTH	
WASHER:	CONSTRUCTION			136		
GASKETS:	CONSTRUCTION	SPIRA	AL WOUND - SUITABLE FOR RA	ISED-FACE OR FLAT-FACE FLA	ANGES	
GASKETS:	MATERIAL)4 STAINLESS - FLEXICARB FIL		
THERMOWELLS:	CONSTRUCTION	INSERTION		PRESSURE CLASS - SEAL WELI	DED WELLS	
	MATERIAL			ARBON STEEL	•	
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME		O O	2/22/2021	
FINISH:	SPECIFICATION MATERIAL:	1		CT SPECIFICATION DRAIN PIPING WHITE		
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		I CODE:		
	CARBON STEEL	300 PSIG	ASME B31.1	ASME B16.34	1	
UI-ED	PIPE SIZE (NPS)		SMALLER		HRU 24"	
	CONNECTION AND RATING	CLASS 800 PSIG	G SOCKETWELD	CLASS 300 FI	ANGED ENDS	
GATE VALVE	CONSTRUCTION	OUTSIDE SCREW & YOKE, BO HARD FACED SE PACKING:	EATS, CLASS 800 GRAPHITE	SEAT RING: DISC/WEDGE: A217 GR. C. OVE STEM: PACKING: GASKET: SPIRAL WOU	105 OR A216 GR. WCB 3: HARDFACED CA15 OR WCB WITH 13% CR IZERLAY W: 410 SS G: GRAPHITE JUND SS WITH GRAPHITE	
	VALVE SELECTION	VOGT S	POWELL FIGURE GA08 VOGT SW12111 BONNEY FORGE FIG. H11SW		IGURE 3003 GURE 33-1/2 PRGE 3-11 RF	
	CONNECTION AND RATING	-			D ENDS (LUG STYLE) : A217 GR. WC6	
BUTTERFLY VALVE	CONSTRUCTION			SEAT RING: A182 F11; STELLITE 6 FACED DISC/WEDGE: A217 GR. WC6; STELLITE 6 FACED STEM: 410 SS PACKING: GRAPHITE GASKET: SPIRAL WOUND SS WITH GRAPHITE		
	VALVE SELECTION			POWELL FIGURE 3072* (3" AND LARGER) FLOWSEAL METAL SEAT CLASS 300		
	CONNECTION AND RATING		G SOCKETWELD	CLASS 300 FI	ANGED ENDS	
CHECK VALVE	CONSTRUCTION	SWING SEAT RIN DISC: GASKET: SP	.105 (BOLTED) CHECK IG: 316 HF 13% CR IRAL WOUND	SEAT RING: DISC: A105 OR A216 WCI GASKET: CORRUGATE	GR. WCB (BOLTED) HARDFACED 3 WITH 13% CR OVERLAY D SST WITH GRAPHITE	
	VALVE SELECTION	VOGT	GURE SW08 SW701 GE FIG. H61SW	CRANE FIG BONNEY FO	IGURE 3061 URE 159-1/2 RGE 3-61 RF	
	CONNECTION AND RATING		G SOCKETWELD		ANGED ENDS	
BALL VALVE	CONSTRUCTION	THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BU FLANG! STEM BUSHING: NITRIDED S COND.2 CHROME	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; ISHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED LE LEVER	THRUST WASHER: STELL 410/CROME CA STEM: SS 410; THRUST BU FLANGI STEM BUSHING: NITRIDED S COND.2 CHROME	M SS 410 COND. 2 ITE 6; BALL AND SEAT: SS RBIDE COATED; SHING: BRONZE; PACKING E SS 304 SS410 COND. 2; SEAT SS 410 CARBIDE COATED RO OPERATOR OVER 4")	
	VALVE SELECTION		L SEATED, CLASS 900		TYPE R	
	CONNECTION AND RATING	CLASS 800 PSIG	G SOCKETWELD	CLASS 300 FI	ANGED ENDS	
GLOBE VALVE	CONSTRUCTION	DIŠC: 4 TRIM: STEM: A PACKING:	.TED) (BODY HARDFACED) 420SST 13% Cr 138 GA GRAPHITE ND SST WITH GRAPHITE	SEAT RING: A105 O DISC: A105 OR A216 WCF STEM: PACKING:	G GR. WCB (BOLTED) R A216 HARDFACED 3 WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE	
	VALVE SELECTION	VOGT S BONNEY FOR	GURE GL08 GW12141 GE FIG. H31SW	CRANE FIG	IGURE 3031 URE 151-1/2 IRGE 3-31 RF	
	REVISION I					
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DIDING SI	PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:		
			EDWATER	250 PSIG AT 300 °F			
UI-FW	PIPE SIZE (NPS)		SMALLER	2 1/2" THRU 10"			
PIPE MATERIAL:	WEIGHT/SCHEDULE		(S	STD			
ASME B36.10M	MATERIAL		B - SEAMLESS	A106 GRADE B - SEAMLESS			
	CONSTRUCTION		CKETWELD - B16.11		- ASME B16.9		
FITTINGS:	WALL THICKNESS		JOINING PIPE		JOINING PIPE		
	MATERIAL		STEEL - ASTM A105		A234 GRADE B - SEAMLESS		
PIPING JOINTS:	TYPE	SOCKETWELD			PREP PER B16.25		
FIFING SOINTS.	OTHER	INSERTION THER	RMOWELLS - ASTM A105 - 3000	PSIG PRESSURE CLASS - SEA	L WELDED WELLS		
	CONSTRUCTION		- FLAT FACE WITH SPIRAL	NOT PE	RMITTED		
UNIONS:	WALL THICKNESS	WOUND GASKET DESIGN SAME AS ADJOINING PIPE					
	MATERIAL	FORGED CARBON	STEEL - ASTM A105				
	CONSTRUCTION		CLASS 300 - WELD	NECK - ASME B16.5			
FLANGES:	WALL THICKNESS	SAME AS AD	JOINING PIPE		JOINING PIPE		
	MATERIAL	FORGED CARBON	STEEL - ASTM A105	FORGED CARBON	STEEL - ASTM A105		
FLANGE BOLTS:	CONSTRUCTION		STUD - FULL-LENGTH ASM	E B1.1 - CLASS 2A THREADS			
FLANGE NUTS:	CONSTRUCTION			.1 - CLASS 2B THREADS			
GASKETS:	CONSTRUCTION			AISED-FACE OR FLAT-FACE FLA			
CACILETO.	MATERIAL			04 STAINLESS - FLEXICARB FIL			
THERMOWELLS:	CONSTRUCTION	INSERTION		PRESSURE CLASS - SEAL WELI	DED WELLS		
THERMOVILLES.	MATERIAL			ARBON STEEL			
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE:	REVISION:	DATE REVISED:		
CARBON STEEL	ASTM B36.10M		B31.1	0	2/22/2021		
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		N CODE:			
UI-FW	CARBON STEEL	300 PSIG	ASME B31.1	ASME B16.34	<u> </u>		
OI-I W	PIPE SIZE (NPS)		SMALLER		HRU 10"		
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD		ANGED ENDS		
GATE VALVE	CONSTRUCTION	BODY/BONNET: A105, TRIM 13% CR OUTSIDE SCREW & YOKE, BOLITED GLAND, SOLID WEDGE, HARD FACED SEATS, CLASS 800 PACKING: GRAPHITE		BODY/BONNET: A105 OR A216 GR. WCB SEAT RING: HARDFACED DISC/WEDGE: A217 GR. CA15 OR WCB WITH 13% CR OVERLAY STEM: 410 SS PACKING: GRAPHITE GASKET: SPIRAL WOUND SS WITH GRAPHITE			
	VALVE SELECTION	POWELL FIGURE GA08 VOGT SW12111 BONNEY FORGE FIG. H11SW		POWELL FIGURE 3003 CRANE FIGURE 33-1/2 BONNEY FORGE 3-11 RF			
	CONNECTION AND RATING	-		CLASS 300 FLAN	GED - LUG STYLE		
BUTTERFLY VALVE	CONSTRUCTION			SEAT RING: A182 F11; STELLITE 6 FACED DISC/WEDGE: A217 GR. WC6; STELLITE 6 FACED STEM: 410 SS PACKING: GRAPHITE GASKET: SPIRAL WOUND SS WITH GRAPHITE			
	VALVE SELECTION	-		POWELL FIGURE 3072* (3" AND LARGER) FLOWSEAL METAL SEAT CLASS 300			
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD	CLASS 300 FI	ANGED ENDS		
CHECK VALVE	CONSTRUCTION	BODY/CAP: A105 (BOLTED) SWING CHECK SEAT RING: 316 HF DISC: 13% CR GASKET: SPIRAL WOUND		SEAT RING: DISC: A105 OR A216 WCF	GR. WCB (BOLTED) HARDFACED B WITH 13% CR OVERLAY D SST WITH GRAPHITE		
	VALVE SELECTION	VOGT	GURE SW08 SW701 GE FIG. H61SW	POWELL FIGURE 3061 CRANE FIGURE 159-1/2 BONNEY FORGE 3-61 RF			
	CONNECTION AND RATING	CLASS 800 PSI	G SOCKETWELD		-		
BALL VALVE	CONSTRUCTION	BODY: A105, STEM SS 410 COND. 2 THRUST WASHER: STELLITE 6; BALL AND SEAT: SS 410/CROME CARBIDE COATED; STEM: SS 410; THRUST BUSHING: BRONZE; PACKING FLANGE SS 304 STEM BUSHING: NITRIDED SS410 COND. 2; SEAT SS 410 COND.2 CHROME CARBIDE COATED LOCKABLE LEVER					
	VALVE SELECTION		AL SEATED, CLASS 900				
	CONNECTION AND RATING		G SOCKETWELD		ANGED ENDS		
GLOBE VALVE	CONSTRUCTION	STEM: A183 F6A PACKING: GRAPHITE		SEAT RING: A105 O DISC: A105 OR A216 WCI STEM: PACKING:	G GR. WCB (BOLTED) R A216 HARDFACED S WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE		
	VALVE SELECTION	POWELL FI VOGT S BONNEY FOR	IGURE GL08 SW12141 GE FIG. H31SW	POWELL F CRANE FIG	IGURE 3031 URE 151-1/2 PRGE 3-31 RF		
	REVISION I						
NUMBER	DESCRIP	TION	DATE	1			
0	INITAL ISSUE		2/22/2021				
		2/22/2021		J			

PIPING SI	PECIFICATION:	PRO	CESS:	DESIGN CONDITIONS:		
UI-GFS		NATUF	RAL GAS	150 PSIG AT 150 °F		
UI-GF3	PIPE SIZE (NPS)	2" AND :	SMALLER	2 1/2" T	HRU 10"	
PIPE MATERIAL:	WEIGHT/SCHEDULE	>	(S	S	TD	
ASME B36.10M	MATERIAL	ASTM A53 GRADE B, SEAMLESS		ASTM A53 GRADE B, SEAMLESS		
	CONSTRUCTION	CLASS 3000 SOCKE	TWELD - ASME B16.11	BUTTWELD -	- ASME B16.25	
FITTINGS:	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	MATERIAL	FORGED CARBON	STEEL - ASTM A105	BUTTWELD FITTING - AST	TM A234, GR. B SEAMLESS	
PIPING JOINTS:	TYPE	SOCKETWELD			REP PER ASME B16.25	
FIFING SOINTS:	OTHER	INSERTION THEF	RMOWELLS - ASTM A105 - 3000	PSIG PRESSURE CLASS - SEA	L WELDED WELLS	
UNIONS:	CONSTRUCTION		- FLAT FACE WITH SPIRAL SKET DESIGN	NOT PE	RMITTED	
UNIONS.	WALL THICKNESS	SAME AS AD	JOINING PIPE	-		
	MATERIAL	FORGED CARBON	STEEL - ASTM A105	-		
	CONSTRUCTION		CLASS 150 - WELD	NECK - ASME B16.5		
FLANGES:	WALL THICKNESS	SAME AS AD	JOINING PIPE	SAME AS AD	JOINING PIPE	
	MATERIAL	FORGED CARBON	STEEL - ASTM A105	FORGED CARBON STEE	EL - ASTM A105 - STD WT	
FLANGE BOLTS:	CONSTRUCTION	ALLOY	STEEL, AISI 4140/4142 QUENC	HED AND TEMPERED, A193 GR	RADE B7	
FLANGE NUTS:	CONSTRUCTION		HEAVY HEX - A	A194 GRADE 2H		
WASHER:	CONSTRUCTION		F-	436		
GASKETS:	CONSTRUCTION	SPIRA	AL WOUND - SUITABLE FOR RA	AISED-FACE OR FLAT-FACE FLA	ANGES	
GASKETS:	MATERIAL	FLEXITALLIC STYLE CGI - TYPE 304 STAINLESS - FLEXICARB FILLER				
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME B31.1/NFPA 54		3	2/22/2021	
FINISH:	SPECIFICATION MATERIAL:	REFER TO PROJECT SPECIFICATION - PAIN		NT NATURAL GAS PIPING SAFE	ETY YELLOW	
VALVE SPECIFICATION	SPECIFICATION MATERIAL:	PRESSURE CLASS: DESIGN CODE		N CODE		
UI-GFS	CARBON STEEL	150 PSIG	ASME B31.1	ASME B16.34	1	
UI-GF3	PIPE SIZE (NPS)	2" AND :	SMALLER	2-1/2" T	'HRU 10"	
	CONNECTION AND RATING		CLASS 150 F	LANGED ENDS		
BALL VALVE	CONSTRUCTION		BALL AND STEM: TYPE SEATS: RTFE OR NYLON W SEALS: TFI OPERATOR: L BLOWOUT PF	v216 WCB = 316 STAINLESS STEEL ITH SEAT RING AND GASKET E FIRE-SAFE EVER HANDLE KOOF PACKING OUNDING SPRING		
	VALVE SELECTION		KECKL	' SERIES 7150 EY BVF1 TYPE R		
	CONNECTION AND RATING			CLASS 150 RAISED F	FACE FLANGED ENDS	
PLUG VALVE	CONSTRUCTION			COVER, GLAND: PLUG: CAR STEM: CAR PACKING: GRAPHI	05 OR A216 GR WCB : CARBON STEEL :BON STEEL :BON STEEL :TE/TFE COMPOUND	
	VALVE SELECTION	GASKET: SS WITH GRAPHITE NORDSTROM FIGURE 1925 (THRU 4"): FIGURE 1949 (10") FIGURE 1949 (10")		THRU 4"): FIGURE 1945 (6"-8		

REVISION HISTORY								
NUMBER	DESCRIPTION	DATE						
1	ADDED WALL THICKNESS TO TABLE, REMOVED OTHER REFERENCES TO WALL THICKNESS	9/22/2017						
2	CHANGED UNIONS TO A FLAT-FACED GASKETED DESIGN	11/22/2017						
3	UPDATED VALVE SELECTIONS; ADDED PIPE FINISH SPECIFICATION	2/22/2021						

PIPING SP	PECIFICATION:		CESS:	DESIGN CO		
UI-AIR	DIDE CITE (AIDC)	COMPRESSED AIR 4" AND SMAL	R/INSTRUMENT AIR	150 PSIG AT 150 °F 2-1/2" THRU 24" (NOTE 1)		
PIPE MATERIAL:	PIPE SIZE (NPS) WEIGHT/SCHEDULE	4 AND SWAL	-	STD		
ASME B36.10M/B88	MATERIAL	ASTM B88 COPPER, T	YPE L, HARD DRAWN		MLESS (NON-BLACK STEEL)	
	CONSTRUCTION	SOLDERED C		BUTT		
FITTINGS:	WALL THICKNESS		JOINING PIPE	SAME AS ADJOINING PIPE		
	MATERIAL	ASME B16.18 CAST COPPER COPPER		BUTTWELD FITTING - ASTM	A234 GRADE B - SEAMLESS	
DIDING IOINTS.	TYPE		OR PRESS FIT	BUTTWELD - END PREP PER B16.25		
PIPING JOINTS:	OTHER	SEE BELOW FOR	R JOINT DETAILS			
OOLDED/ELANOEO	CONSTRUCTION	SOLDER: ASTM B32 ALLO			NECK - ASME B16.5	
SOLDER/FLANGES:	WALL THICKNESS MATERIAL	ANTIMONY, LEAD FREE OR: AS TIN-SILVER,		SAME AS AD. FORGED STEE		
	MATERIAL			T OROLD OTEL	E-7101W171100	
SOLDER/FLANGE BOLTS:	CONSTRUCTION	SOLDER: FILLER METAL LEAD FLUX ASTM B813 - SILVER BF BE BCuP SERIES, COPPER I	RAZING FILLER METAL SHALL	STUD - FULL-LEI		
	MATERIAL	GENERAL DUTY BE		HIGH-STRENGTH STEEL - AS LENGTI		
	CONSTRUCTION			HEAVY HEX - ASME B1.		
PRESS FIT/FLANGE NUTS:	MATERIAL	PRESS FIT: MATERIALS CON		CARBON STEEL - ASTM A19 WASI		
	CONSTRUCTION	SEALING ELEMENTS: EPI FACTORY INSTALLED - FITTI		SPIRAL WOUND - SUITABLE FACE FI	FOR RAISED-FACE OR FLAT-	
PRESS FIT/GASKETS:	MATERIAL	TOOLS RECOMMENDED BY		TYPE 304 SS - FULL FACE - FL	EXITALLIC FLEXICARB STYL	
	CONSTRUCTION	THRE	ADED	CGI OR	EQUAL	
	MATERIAL		JOINING PIPE			
UNIONS:	OTHER	INSTALL UNIONS: IN LONG F BYPASS OF VALVES/EQU CONNE	RUNS AT 80' INTERVALS - IN IIPMENT - AT EQUIPMENT	NOT PER	RMITTED	
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST		REVISION:	DATE REVISED:	
COPPER/CARBON STEEL	ASME B36.10M/B88	ASME	B31.1	3	2/22/2021	
FINISH:	SPECIFICATION MATERIAL:		OPPER AIR PIPING	REFER TO PROJECT PAINT COMPRESSE		
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN			
UI-AIR	AS NOTED PIPE SIZE (NPS)	150 PSIG	ASME B31.1 LER (NOTE 1)	ASME B16.34	24" (NOTE 1)	
	CONNECTION AND RATING	4 AND SWAL	- (NOTE 1)	2 1/2" THRU 24" (NOTE 1) CLASS 150 FLANGED ENDS		
GATE VALVE	CONSTRUCTION			DISC/WEDGE: A217 GR. CA15 OR WCB WITH 13% CR OVERLAY STEM: 410 SS PACKING: GRAPHITE GASKET: CORRUGATED SS WITH GRAPHITE POWELL FIGURE 1503		
	VALVE SELECTION			CRANE F	IGURE 47	
	CONNECTION AND RATING	BONNEY FORGE 1-1' CLASS 150 FLANGED - LU				
BUTTERFLY VALVE	CONSTRUCTION			BODY/BONNET: SEAT RING: PTFI DISC: A3 SHAFT: PACKIN GLAND:	E/RTFE/UHMWPE 51 CF8M 17-4 PH G: PTFE 304 SS	
	VALVE SELECTION	-	-	POWELL FIGURE 1572 JAMESBURY SERIES 815 FLOWSEAL TYPE 1LA		
	CONNECTION AND RATING	CLASS 200 PSIG THRE	EADED OR SOLDERED	CLASS 150 FLANGED ENDS		
CHECK VALVE	CONSTRUCTION	BODY/BONN DISC: B SEAT DISC HINGE PIN AND PLUG: BR DISC HANGER:	RONZE C: BUNA-N RONZE ASTM B140 ALLOY	BODY/CAP: A216 GR. WCB (BOLTED) SEAT RING: HARDFACED DISC: A105 OR A216 WCB WITH 13% CR OVERLAY GASKET: CORRUGATED SST WITH GRAPHITE		
	VALVE SELECTION	NIBCO 43 APOLLO 161S SI	3 SERIES ERIES (THRU 2")	POWELL FI CRANE FI BONNEY FO	GURE 147	
	CONNECTION AND RATING	CLASS 600 PSIG THRE	EADED OR SOLDERED	CLASS 150 FL		
BALL VALVE	CONSTRUCTION	BODY: CAST BRONZE OR BRASS, FULL PORT BALL: CHROME PLATED BRONZE OR BRASS STEM: BRONZE OR BRASS SEATS/SEALS: RPTFE PACKING: RPTFE LOCKABLE, QUARTER TURN LEVER HANDLE BODY/BONNET: A105 OR W. SEAT SIGNAL SEAT SEAT SIGNAL SEAT SEAT SIGNAL SEAT SIGNAL SEAT SEAT SEAT SEAT SEAT SEAT SEAT SEAT		5 OR WCB (BOLTED) FE/PTFE/RPTFE TEM: SS 316 AND GRAPHITE 316 GRAPHITE 3" AND SMALLER) ATOR (4" AND LARGER)		
	VALVE SELECTION	APOLLO 70- MILWAUKE NIBCO S-FP-	E BA-485B	JAMESBURY SERIES 7000		
	ON STEEL PIPE MATERIAL MAY BE DESIGN PROFESSIONAL SHALL C	COORDINATE SELECTION OF PI			D BASED UPON THE	

	REVISION HISTORY	
NUMBER	DESCRIPTION	DATE
1	ADDED WALL THICKNESS TO TABLE, REMOVED OTHER REFERENCES TO	9/22/2017
1	WALL THICKNESS	9/22/2017
2	ADDED 'FINISH' SPECIFICATION	10/10/2019
-		,,
3	UPDATED VALVE SELECTIONS; INCREASED UPPER LIMIT FOR COPPER PIPE SIZE TO 4" AND ADDED OVERLAP SIZE RANGE	2/22/2021

PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:	
			OTABLE WATER	150 PSIG AT 150 °F	
UI-MUS-PWS	PIPE SIZE (NPS)		SMALLER	2 1/2" THRU 24"	
PIPE MATERIAL:	WEIGHT/SCHEDULE		1 40S		1 10S
ASME B36.10M	MATERIAL		AMLESS OR WELDED		AMLESS OR WELDED
FITTWOO	CONSTRUCTION		CKETWELD - B16.11		- ASME B16.9
FITTINGS:	WALL THICKNESS MATERIAL		JOINING PIPE A182, F304L, ASME B16.25		JOINING PIPE SEAMLESS, B16.25
	TYPE		TWELD		PREP PER B16.25
PIPING JOINTS:		UNIONS: CLASS 3000 - SW	- B16.11 - FLAT- FACE WITH		
	OTHER	SPIRAL WOUND	GASKET DESIGN		GE REQUIRED
	CONSTRUCTION		T PERMITTED		150 PSIG
FLANGES:	WALL THICKNESS		JOINING PIPE		JOINING PIPE
<u> </u>	MATERIAL				330L, ASME B16.5 STEEL, GRADE B8, CLASS 2,
FLANGE BOLTS:	CONSTRUCTION				LL LENGTH
FLANGE NUTS:	CONSTRUCTION		·-		A194 GRADE 8
WASHER:	CONSTRUCTION		·-		5304
CARKETO	CONSTRUCTION		-		CE OR FLAT-FACE FLANGES
GASKETS:	MATERIAL		· -	FULL FACE - 1/16" ARAMID GARLOCK BLUE-	FIBER WITH SBR BINDER - GARD OR FQUAL
	CONSTRUCTION	INSERTION	THERMOWELLS - 3000 PSIG F		
THERMOWELLS:	MATERIAL		304/304L STA	INLESS STEEL	
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE:	REVISION:	DATE REVISED:
STAINLESS STEEL	ASTM B36.10M		B31.1	6	2/22/2021
VALVE SPECIFICATION:	SPECIFICATION MATERIAL: STAINLESS STEEL	PRESSURE CLASS: 150 PSIG	ASME B31.1	ASME B16.34	
UI-MUS-PWS	PIPE SIZE (NPS)		SMALLER		HRU 24"
	CONNECTION AND RATING		OCKETWELD		ANGED ENDS
		BODY: AST	M A182 F316	BODY: ASTM	M A351 CF8M
	CONSTRUCTION		TM A182 F316		TM A351 CF8M
GATE VALVE	CONSTRUCTION		M A182 F316 M A182 F316		1 A351 CF8M M A276 T316
J TALLE			IG: PTFE		G: PTFE
			GURE GA08		IGURE 1503
İ	VALVE SELECTION		SW12401 RGE HL-18-SW	CRANE FIGURE 47 (THRU 24") BONNEY FORGE 1-18 RF	
	CONNECTION AND RATING				FLANGED ENDS
					6 OR A351 GR. CF8M FE/VITON
	CONSTRUCTION	-	. =	DISC: A182 GR. F316 OR A351 GR. CF8M	
BUTTERFLY VALVE				SHAFT: 17-4 PH PACKING: TFE	
					IGURE 1572
	VALVE SELECTION				(12" AND SMALLER) TYPE 1LC LARGER)
					SERIES 815
	CONNECTION AND RATING		OCKETWELD		ENDS (2-1/2" THRU 12")
ĺ	1		A182 F316L		A351 GR. CF8M
	CONSTRUCTION	CARRIER/CARRIER PIN: 316SS DISC: A276 T316		CAP: ASTM A351 GR. CF8M CARRIER/CARRIER PIN: 316SS	
CHECK VALVE	CONSTRUCTION	SEAT RING: 316 SST		DISC: ASTM A351 GR. CF8M	
		GASKET: SPIRAL WOUND SST WITH PTFE		GASKE	T: PTFE
		POWELL FIGURE SW08 VOGT SERIES SWS718 BONNEY FORGE HL-68-SW			IGURE 1561
	VALVE SELECTION			CRANE FIGURE 147 (THRU 24") BONNEY FORGE 1-68 RF	
	CONNECTION AND RATING		OCKETWELD		ENDS (2-1/2" THRU 20")
		BODY/BONNET: ASTM A351, C	F8M STAINLESS STEEL, FULL-	BODY/INSER	T: A351 CF8M
ĺ	1	PC	ORT	BALL:	316 SS
İ	CONSTRUCTION		G: XTREME SS 316	STEM: 316 SS	
BALL VALVE	1	BALL: SS 316 SEAL: PTFE		SEAT: PTFE BODY SEAL: TFM	
İ		PACKING:	GRAPHITE	STEM SE	AL: PTFE
		JAMESBURY SERIES 4000 MODEL A KECKLEY SYTE BVM3			SERIES 7150
ĺ	VALVE SELECTION		SYTE BVM3 J3TZM		/F1 (THRU 6") SB-150
	CONNECTION AND RATING		OCKETWELD		ENDS (2 1/2" THRU 12")
			M A182 F316		M A351 CF8M
	1	BONNET: AS	TM A182 F316		ГМ A351 CF8M
	CONSTRUCTION	DISC: AST	M A182 F316		1 A351 CF8M
GLOBE VALVE	1		M A182 F316 IG: PTFE		M A276 T316 G: PTFE
	VALVE SELECTION		GURE GL08 ES SW12501		IGURE 1531 E 143 (THRU 24")
	TALTE SELECTION	VOGT SERIES SW12501 BONNEY FORGE HL-38-SW			RGE 1-38 RF
	REVISION I	HISTORY			
NUMBER	DESCRIP	PTION DATE			
1	CHANGED SMALL BORE VALVES TO				
2	ADDED WALL THICKNESS TO TABLE, REN WALL THICKNESS	MOVED OTHER REFERENCES TO 9/22/2017			
_		LANAECDLIDV FROM VEGUS ES	44 45 200=		
3	CHANGED SMALL BORE BALL VALVES TO	NAMESBORY FROM RECKLEY	11/15/2017		
4	CHANGED UNIONS TO A FLAT-FACED GA	SKETED DESIGN	11/22/2017		
_	CHANGED SMALL BORE CHECK VALVES	TO SWING CHECKS RATHER THAN			
5	BALL CHECKS		2/27/2018		
6	UPDATED VALVE SELECTIONS		2/22/2021		
			. ,		

PIPING SE	PECIFICATION:	PROCESS:		DESIGN CONDITIONS:					
UI-SEW		SANITARY SEWER, SEWER VENT, STO	RM		15 PSIG AT 140 °F				
UI-SEVV	PIPE SIZE (NPS)	4" AND SMALLER		ALL	SIZES				
PIPE MATERIAL:	WEIGHT/SCHEDULE		SERVICE WEIGHT		SERVIC	E WEIGHT			
COPPER/CAST IRON	MATERIAL	ASTM B306, DWV	CAST IRON	N, ASTM A74	CAST IRON CISPI	301 OR ASTM A-888			
	CONSTRUCTION	SOLDERED OR PRESS FIT	BELL AN	D SPIGOT	HUI	BLESS			
FITTINGS:	MATERIAL	ASME B16.23 CAST BRONZE OR ASME B16.29 WROUGHT COPPER	CAST IRO	N, ASTM A74	CAST IRC	ON CISPI 301			
	ABOVE GRADE TYPE	SOLDERED OR PRESS FIT		ETS JOINT DEVICES OR LEAD DAKUM					
JOINTS:	SOLDER/BURIED TYPE	SOLDER: ASTM B32 ALLOY, GRADE Sb-5 95/5 TIN-ANTIMONY, LEAD FREE OR: ASTM B32 ALLOY, GRADE SN95 TIN-SILVER, LEAD FREE				KETS AND STAINLESS STEEL IELD ASSEMBLIES			
		DED FOR MAIN DRAIN AND VENT LINES WITHIN THE POWER AND CH FOR BUILDING PLUMBING SYSTEMS (I.E. RESTROOMS, KITCHEN AR			MPUS. FOLLOW THE UNIVERS	SITY OF IOWA DESIGN			
	2) EITHER COPPER OR CAST IRON PIPE MATERIAL MAY BE USED FOR PIPE SIZES BETWEEN 4" AND SMALLER. FINAL PIPE MATERIAL SHALL BE SELECTED BASED UPON THE INDIVIDUAL PROJECT NEEDS. DESIGN PROFESSIONAL SHALL COORDINATE SELECTION OF PIPE MATERIAL WITH UTILITY OPERATOR.								
	3) 'PROVIDE TRAPS ON ALL SANI	TARY BRANCH WASTE CONNECTIONS FROM FIXTURES WITHOUT TO	RAPS						
NOTES:	4) 'EXPOSED BRASS SHALL BE C	HROME- PLATED POLISHED BRASS WITH NIPPLE AND SET SCREW B	ESCUTCHEONS						
	5) CONCEALED TRAPS MAY BE ROUGH CAST BRASS OR SAME MATERIAL AS PIPE CONNECTED TO								
	6) SLIP JOINTS NOT ALLOWED ON SEWER SIDE OF TRAP								
	7) TRAPS SHALL CORRESPOND	RAPS SHALL CORRESPOND TO FITTINGS ON CAST IRON SOIL PIPE OR STEEL PIPE							
	8) SIZE SHALL BE AS REQUIRED	BY CONNECTED SERVICE OR FIXTURE							
PIPE MATERIAL:	PIPE CODE	TYPE			REVISION:	DATE REVISED:			
COPPER/CAST IRON	ASTM B306/A74	PRESS FIT, SOLDER, BELL AN	D SPIGOT OR HUBLESS		2	2/22/2021			
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		DESIGN CODE:					
UI-SEW	CAST IRON	125 PSIG OR 150 PSIG		ASME B31.1 / ASME B16.34					
OI-SEVV	PIPE SIZE (NPS)			ALL	SIZES				
	CONNECTION AND RATING			PER ADJOINING PIP	ING SPECIFICATIONS				
GATE VALVE	CONSTRUCTION			COVER: C HANDWHEEL: CAST GATE/FLAPF	AST IRON (AST IRON IRON (REMOVABLE) (PER: BRONZE S: CAST IRON				
	VALVE SELECTION			MILWAUKEE	1787 (2" THRU 24") SERIES F-2882 IE F53				
	CONNECTION AND RATING			PER ADJOINING PIP	NG SPECIFICATIONS				
BODY/BONNET.ASTM A126 CAST IRON									
	STANDARD				WA C517				
	VALVE SELECTION			DEZURIK F OR EQUAL I	EC SERIES BY MILLIKEN				

CARBON STEEL:					
NUMBER	DESCRIPTION	DATE			
1	INITIAL ISSUE	4/14/2017			
2	UPDATED VALVE SELECTIONS; ADDED COPPER DWV PIPING AS AN OPTION FOR SMALLER SIZES	2/22/2021			

PIPING SI	PECIFICATION:	PROCESS: BLOWOFF/BLOWDOWN SYSTEM		DESIGN CONDITIONS: 250 PSIG AT 400 °F		
UI-BOS-BDS				2 1/2" THRU 10"		
	PIPE SIZE (NPS)		SMALLER			
PIPE MATERIAL:	WEIGHT/SCHEDULE	,	(S	,	(S	
ASME B36.10M	MATERIAL		B - SEAMLESS		B - SEAMLESS	
	CONSTRUCTION		KETWELD - B16.11	BUTTWELD - ASME B16.9		
FITTINGS:	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	MATERIAL	FORGED CARBON	STEEL - ASTM 105	BUTTWELD FITTING - ASTM	A234 GRADE B - SEAMLESS	
PIPING JOINTS:	TYPE	SOCKE	TWELD	BUTTWELD - END	PREP PER B16.25	
PIPING JOIN 15:	OTHER	-	-		-	
	•	CLASS 3000 - SW - B16.11	- FLAT FACE WITH SPIRAL	NOT DE	DINITED	
	CONSTRUCTION	WOUND GAS	SKET DESIGN	NOT PE	RMITTED	
UNIONS:	WALL THICKNESS		JOINING PIPE		-	
	MATERIAL		STEEL - ASTM A105			
	CONSTRUCTION			NECK - ASME B16.5		
FLANGES:	WALL THICKNESS			JOINING PIPE		
i EARGEG.	MATERIAL	+		STEEL - ASTM A105		
	CONSTRUCTION			B1.1 - CLASS 2A THREADS		
FLANGE BOLTS:						
	MATERIAL			- ASTM A193 - GRADE B7		
FLANGE NUTS:	CONSTRUCTION			.1 - CLASS 2B THREADS		
	MATERIAL		ARBON STEEL - ASTM A194 GR			
GASKETS:	CONSTRUCTION		AL WOUND - SUITABLE FOR RA			
GAGILETO.	MATERIAL		EXITALLIC STYLE CGI - TYPE 30			
THERMOWELLS:	CONSTRUCTION	INSERTION	THERMOWELLS - 3000 PSIG F		DED WELLS	
I HERWOWELLS:	MATERIAL			ARBON STEEL		
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M		B31.1	0	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		N CODE:		
	CARBON STEEL	300 PSIG	ASME B31.1	ASME B16.34	i	
UI-BOS-BDS	PIPE SIZE (NPS)	2" AND SMALLER			HRU 10"	
	CONNECTION AND RATING		KETWELD (1" THRU 2")			
	CONNECTION AND RATING	CLASS 000 1 318 300	KETWEED (T TIIKO 2)	CLASS 300 FLANGED ENDS		
GATE VALVE	CONSTRUCTION	BODY/BONNET: A105, TRIM 13% CR OUTSIDE SCREW & YOKE, BOLITED GLAND, SOLID WEDGE, HARD FACED SEATS, CLASS 800 PACKING: GRAPHITE		SEAT RING: HARDFACED DISC/WEDGE: A217 GR. CA15 OR WCB WITH 13% CR OVERLAY STEM: 410 SS PACKING: GRAPHITE GASKET: SPIRAL WOUND SS WITH GRAPHITE		
	VALVE SELECTION	POWELL FIGURE GA08 VOGT SW12111 BONNEY FORGE FIG. H11SW		POWELL FIGURE 3003 CRANE FIGURE 33-1/2 BONNEY FORGE 3-11 RF		
	CONNECTION AND RATING	CLASS 800 PSI	SOCKETWELD	CLASS 300 FLANGED ENDS		
CHECK VALVE	CONSTRUCTION	BODY/CAP: A105 (BOLTED) SWING CHECK SEAT RING: 316 HF DISC: 13% CR GASKET: SPIRAL WOUND		BODY/CAP: A216 GR. WCB (BOLTED) SEAT RING: HARDFACED DISC: A105 OR A216 WCB WITH 13% CR OVERLAY GASKET: CORRUGATED SST WITH GRAPHITE		
	VALVE SELECTION	POWELL FIGURE SW08 VOGT SW701 BONNEY FORGE FIG. H61SW		POWELL FIGURE 3061 CRANE FIGURE 159-1/2 BONNEY FORGE 3-61 RF		
	CONNECTION AND RATING	CLASS 900 PSI	SOCKETWELD		-	
BALL VALVE	CONSTRUCTION	BODY: A105, STEM SS 410 COND. 2 THRUST WASHER: STELLITE 6; BALL AND SEAT: SS 410/CROME CARBIDE COATED; STEM: SS 410; THRUST BUSHING: BRONZE; PACKING FLANGE SS 304 STEM BUSHING: NITRIDED SS410 COND. 2; SEAT SS 410 COND. 2 CHROME CARBIDE COATED		HRUST WASHER: STELLITE 6; BALL AND SEAT: SS 410/CROME CARBIDE COATED; IEM: SS 410; THRUST BUSHING: BRONZE; PACKING FLANGE SS 304 EM BUSHING: NITRIDED SS410 COND. 2; SEAT SS 410		
	VALVE SELECTION	VELAN TYPE R, META	L SEATED, CLASS 900		:-	
	CONNECTION AND RATING	CLASS 800 PSI	SOCKETWELD	CLASS 300 FI	ANGED ENDS	
GLOBE VALVE	CONSTRUCTION	BODY/BONNET: A105 (BOL DISC: TRIM: STEM: A PACKING: GASKET: SPIRAL WOUN	.TED) (BODY HARDFACED) 420SST 13% Cr 4183 F6A GRAPHITE ID SST WITH GRAPHITE	SEAT RING: A105 OR A216 HARDFACED DISC: A105 OR A216 WCB WITH 13% CR OVEF STEM: 410 SS PACKING: GRAPHITE		
	VALVE SELECTION	VOGT S	POWELL FIGURE GL08 VOGT SW12141 BONNEY FORGE FIG. H31SW		IGURE 3031 URE 151-1/2 IRGE 3-31 RF	

NOTES

REVISION HISTORY					
NUMBER	NUMBER DESCRIPTION				
0	INITIAL ISSUE	2/22/2021			

PIPING SPECIFICATION:		PROC	CESS:	DESIGN CONDITIONS:		
UI-CHW		CHILLED	WATER	150 PSIG AT 100 °F		
	PIPE SIZE (NPS)		SMALLER	2 1/2" THRU 30"	36" THRU 48"	
PIPE MATERIAL:	WEIGHT/SCHEDULE		-	STD A53 OR A106 GRADE B -	STD	
ASME B36.10M/B88	MATERIAL		TYPE L, HARD DRAWN	SEAMLESS	API 5L GRADE B - SEAMLESS	
	CONSTRUCTION WALL THICKNESS		DR PRESS FIT JOINING PIPE		- ASME B16.9 JOINING PIPE	
FITTINGS:	MATERIAL		OR ASME B16.22 WROUGHT		A234 GRADE B - SEAMLESS	
			R ALLOY			
PIPING JOINTS:	TYPE		DR PRESS FIT	BUTTWELD - END	PREP PER B16.25	
	OTHER	SEE BELOW FOR	R JOINT DETAILS	-	:-	
SOLDER/FLANGES:	CONSTRUCTION WALL THICKNESS	SOLDER: ASTM B32 ALLO ANTIMONY, LEAD FREE OR: A			- ASME B16.47 AND B16.5 JOINING PIPE	
GOLDEIGI EARGEG.	MATERIAL	TIN-SILVER,			05 OR ASTM A516 GRADE 70	
SOLDER/FLANGE BOLTS:	BE BOUP SERIES, COPPER PROSPROKUS A		RAZING FILLER METAL SHALL	ALLOY STEEL, AISI 4140/4142 QUENCHED AND TEMPE A193 GRADE B7		
	MATERIAL	SENERAL SOTT SI	VENCE /WE/ICIO		STM A193 - GRADE B7, FULL H STUD	
DDEGO EIT/EI ANGE NUTO	CONSTRUCTION			HEAVY HEX - ASME B1	.1 - CLASS 2B THREADS	
PRESS FIT/FLANGE NUTS:	MATERIAL	PRESS FIT: MATERIALS CON ASME B16.22 AND CRITER SEALING ELEMENTS: EPI	RIA UNDER IAPMO PS 117 -		94 GRADE 2H HEAVY - F436 HERS	
PRESS FIT/GASKETS:	CONSTRUCTION		NGS SHALL BE PRESSED BY		FOR RAISED-FACE OR FLAT- LANGES	
FRESS III/GASKEIS:	MATERIAL			TYPE 304 SS - FULL FACE - FLEXITALLIC FLEXICARB STY CGI OR EQUAL		
WASHER:	CONSTRUCTION		· -	WAS	94 GRADE 2H HEAVY - F436 HERS	
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE: B31.1	REVISION:	DATE REVISED:	
COPPER/CARBON STEEL VALVE SPECIFICATION:	ASME B36.10M/B88 SPECIFICATION MATERIAL:	PRESSURE CLASS:		0 N CODE:	2/22/2021	
UI-CHW	AS NOTED	150 PSIG	ASME B31.1	ASME B16.34		
01 01111	PIPE SIZE (NPS) CONNECTION AND RATING	2" AND S	SMALLER		HRU 48" ASS 150 FLANGES	
BUTTERFLY VALVE	CONSTRUCTION			BODY/SEAT: CARBON STEEL STEM: SS DISC: SS GLAND/BEARING: SS WITH RTFE IMPREGNAT OPERATOR: GEARED HANDWHEEL W/ POSITI INDICATOR SEAT: PTFE 200 PSIG WORKING PRESSURE		
	VALVE SELECTION			ABZ SERIES 400 DEZURIK STYLE BHP JAMESBURY SERIES 815		
	CONNECTION AND RATING	CLASS 600 PSIG THRE	EADED OR SOLDERED		ENDS (2 1/2" THRU 24")	
CHECK VALVE	CONSTRUCTION	BODY/BONNET: BRONZE DISC: BRONZE SEAT DISC: BUNA-N HINGE PIN AND PLUG: BRONZE ASTM B140 ALLOY DISC HANGER: SAME AS BODY		SEAT RING: DISC: A105 OR A216 WCI GASKET: CORRUGATE	GR. WCB (BOLTED) HARDFACED 3 WITH 13% CR OVERLAY D SST WITH GRAPHITE	
	VALVE SELECTION	NIBCO 43 APOLLO 16		POWELL FIGURE 1561 CRANE FIGURE 147 BONNEY FORGE 1-61 RF		
	CONNECTION AND RATING	-	-	CLASS 150 FI	ANGED ENDS	
SILENT CHECK VALVE	CONSTRUCTION	-	-	CARBO SEAT: STAIN DISC OR PLUG: TYPE STEM: STAIN TORSION SPRING: TYPI GASKET: SPIRAL WOU 12" THRU- 10" AND SMA	IED ASTM A216 GRADE WCB N STEEL ILESS STEEL 316 STAINLESS STEEL ILESS STEEL E 316 STAINLESS STEEL ND SS WITH GRAPHITE 22": GLOBE LLER: WAFER	
	VALVE SELECTION	-	-	MUELLER MODEL	(GLOBE) OR CW (WAFER) 101MDT OR 105MDT STYLE CSC	
	CONNECTION AND RATING		EADED OR SOLDERED			
BALL VALVE	CONSTRUCTION	BALL: STEM: STAINLESS STE PACKIN SEATS AND SEALS:	PIECE, FULL-PORT SS 316 EEL, BLOWOUT PROOF G: PTFE REINFORCED PTFE	-		
	VALVE SELECTION	NIBCO MODE MILWAUKE 2		-		
	REVISION H	HISTORY				
NUMBER	DESCRIP	TION	DATE			
1	CHANGED SMALL BORE VALVES TO		6/30/2017			

ADDED SPECIFICATIONS FOR PIPE SIZES 36" THRU 48", CHANGED SMALL BORE BALL VALVE MODEL

2

PIPING SPECIFICATION:		PRO	CESS:	DESIGN C	ONDITIONS:	
UI-CS-DI		CONDENS	ER WATER	150 PSI	G at 150 °F	
01-C2-DI	PIPE SIZE (NPS)		3" TH	RU 48"		
PIPE MATERIAL:	WEIGHT/SCHEDULE		SPECIAL THICKNESS CLASS 53 ANSI/AWWA C150/A21.50			
ANSI/AWWA C151/A21.51	MATERIAL		ANSI/AWWA C151/A21.51 DUCTILE IRON PIPING			
	CONSTRUCTION	ANSI/AWWA C110/A21.10 FLANGED				
FITTINGS:	DESIGN RATING	150 PSIG IN ACCORDANCE WITH ANSI/AWWA C110/A21.10				
	MATERIAL		DUCTILE IRON			
	TYPE	ANSI/AWWA C115/A21.15 FLANGED				
JOINTS:	DESIGN RATING		250 PSIG IN ACCORDANCE WITH ANSI/AWWA C115/A21.15			
	OTHER		-			
	CONSTRUCTION		ASTM A536 D	DUCTILE IRON		
	DESIGN RATING		350 PSIG IN ACCORDANC	E WITH ANSI/AWWA C800		
SERVICE SADDLES:	COATING		FUSION BONDE	D BLACK NYLON		
	STRAPS		TYPE 304 STA	INLESS STEEL		
	CONSTRUCTION		CLASS 150 - WELD	NECK - ASME B16.5		
FLANGES:	WALL THICKNESS		SAME AS AD	JOINING PIPE		
	MATERIAL		FORGED CARBON STEEL - ASTM A105			
BOLTS:	CONSTRUCTION		STAINLESS STEEL IN ACCO	ORDANCE WITH ASTM A240		
NUTS:	CONSTRUCTION		HEAVY HEX - A	A194 GRADE 2H		
WASHERS:	CONSTRUCTION		TYPE 304 STA	INLESS STEEL		
GASKETS:	CONSTRUCTION	SUITABLE FOR RAISED-FACE OR FLAT-FACE FLANGES AND FOR USE WITH SERVICE SADDLES				
	STANDARD	ANSI/AWWA C111/A21.11				
	MATERIAL	FULL FACE - 1/16" ARAMID FIBER WITH SBR BINDER - GARLOCK BLUE-GARD OR EQUAL				
	CONSTRUCTION		CEMENT MORTAR LII	NING AND SEAL COAT		
PIPE LINING:	STANDARD		ANSI/AWW	A C104/A21.4		
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
DUCTILE IRON	ANSI/AWWA C151/A21.51	-	-	0	2/22/2021	
ALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	CODE:		
III CC DI	DUCTILE IRON					
UI-CS-DI	PIPE SIZE (NPS)		3" TH	RU 48"	•	
	CONNECTION AND RATING		LUGGED FOR CL	ASS 150 FLANGES		
BUTTERFLY VALVE	CONSTRUCTION	BODY/SEAT: CARBON STEEL STEM: SS DISC: SS GLAND/BEARING: SS WITH RTFE IMPREGNATED OPERATOR: GEARED HANDWHEEL W/ POSITION INDICATOR SEAT: PTFE 200 PSIG WORKING PRESSURE			₹	
	VALVE SELECTION	ABZ SERIES 400 DEZURIK STYLE BHP JAMESBURY SERIES 815				
WWDED	REVISION H		1	1		
NUMBER	DESCRIPT	TION	DATE	1		
0	INITIAL IS	SSUE	1/5/2018			

ADDED INFORMATION FOR BUTTERFLY VALVE

PIPING SPECIFICATION:		PROG	CESS:	DESIGN CONDITIONS:		
UI-CS-CS		CONDENS	ER WATER	150 PSIG AT 150 °F		
PIPE MATERIAL:	PIPE SIZE (NPS) WEIGHT/SCHEDULE	2" AND S	SMALLER -	2 1/2" THRU 30" STD	36" THRU 48" STD	
ASME B36.10M/B88	MATERIAL	†	TYPE L, HARD DRAWN	A53 OR A106 GRADE B - SEAMLESS	API 5L GRADE B - SEAMLESS	
	CONSTRUCTION	SOLDERED C			- ASME B16.9	
FITTINGS:	WALL THICKNESS	SAME AS ADA ASME B16.18 CAST COPPER	JOINING PIPE		JOINING PIPE	
	MATERIAL	COPPER	RALLOY	BUTTWELD FITTING - ASTM	A234 GRADE B - SEAMLESS	
PIPING JOINTS:	TYPE	SOLDERED C		BUTTWELD - END	PREP PER B16.25	
FIFING JOIN 13.	OTHER	SEE BELOW FOR	R JOINT DETAILS			
SOLDER/FLANGES:	CONSTRUCTION WALL THICKNESS	SOLDER: ASTM B32 ALLO	DY, GRADE Sb-5 95/5 TIN- STM B32 ALLOY, GRADE SN95		- ASME B16.47 AND B16.5 JOINING PIPE	
SOLDER/FLANGES.	MATERIAL		LEAD FREE	FORGED STEEL - ASTM A10	05 OR ASTM A516 GRADE 70	
SOLDER/FLANGE BOLTS:	CONSTRUCTION	SOLDER: FILLER METAL LEAD FLUX ASTM B813 - SILVER BF	D-FREE - WATER-FLUSHABLE RAZING FILLER METAL SHALL		QUENCHED AND TEMPERED, RADE B7	
SOLDER/FLANGE BOLTS.	MATERIAL	BE BCuP SERIES, COPPER I GENERAL DUTY BE	PHOSPHORUS ALLOYS FOR RAZING - AWS A5.8		STM A193 - GRADE B7, FULL H STUD	
	CONSTRUCTION			HEAVY HEX - ASME B1	.1 - CLASS 2B THREADS	
PRESS FIT/FLANGE NUTS:	MATERIAL		RIA UNDER IAPMO PS 117 -		94 GRADE 2H HEAVY - F436 HERS	
	CONSTRUCTION	SEALING ELEMENTS: EPI FACTORY INSTALLED - FITTI	NGS SHALL BE PRESSED BY		FOR RAISED-FACE OR FLAT- LANGES	
PRESS FIT/GASKETS:	MATERIAL	TOOLS RECOMMENDED BY	FITTING MANUFACTURER	TYPE 304 SS - FULL FACE - FI	LEXITALLIC FLEXICARB STYLE REQUAL	
WASHER:	CONSTRUCTION	-		CARBON STEEL - ASTM A1	94 GRADE 2H HEAVY - F436 HERS	
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE: ASME B31.1		REVISION:	DATE REVISED:	
COPPER/CARBON STEEL FINISH:	ASME B36.10M/B88 SPECIFICATION MATERIAL:	3-COAT SYSTEM WITH EPO	: B31.1 XY PRIMER, ACRYLIC INTERME FING CONDENSER WATER PIPI			
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	I CODE:	l	
UI-CS-CS	AS NOTED	150 PSIG	ASME B31.1 SMALLER	ASME B16.34	HRU 48"	
	PIPE SIZE (NPS) CONNECTION AND RATING	2 AND S	- SWALLER		ASS 150 FLANGES	
BUTTERFLY VALVE	CONSTRUCTION			BODY/SEAT: CARBON STEEL STEM: SS DISC: SS GLAND/BEARING: SS WITH RTFE IMPREGNATED OPERATOR: GEARED HANDWHEEL W/ POSITION INDICATOR SEAT: PTFE 200 PSIG WORKING PRESSURE		
	VALVE SELECTION			ABZ SERIES 400 DEZURIK STYLE BHP JAMESBURY SERIES 815		
	CONNECTION AND RATING	CLASS 600 PSIG THREADED OR SOLDERED		CLASS 150 FLANGED	ENDS (2 1/2" THRU 24")	
CHECK VALVE	CONSTRUCTION	BODY/BONN DISC: B SEAT DISC HINGE PIN AND PLUG: BF DISC HANGER:	RONZE C: BUNA-N RONZE ASTM B140 ALLOY	SEAT RING: DISC: A105 OR A216 WC	GR. WCB (BOLTED) HARDFACED B WITH 13% CR OVERLAY D SST WITH GRAPHITE	
	VALVE SELECTION	NIBCO 433 SERIES POWELL FIGURE APOLLO 161S SERIES CRANE FIGURE BONNEY FORGE 1: BONNEY FORGE 1:		IGURE 147		
	CONNECTION AND RATING			CLASS 150 FLANGED ENDS		
SILENT CHECK VALVE	CONSTRUCTION			BODY/CAP: CAST OR FORGED ASTM A216 GRADE WCB CARBON STEEL SEAT: STAINLESS STEEL DISC OR PLUG: TYPE 316 STAINLESS STEEL STEM: STAINLESS STEEL TORSION SPRING: TYPE 316 STAINLESS STEEL GASKET: SPIRAL WOUND SS WITH GRAPHITE 12" THRU 42": GLOBE 10" AND SMALLER: WAFER		
	VALVE SELECTION	-	-	MUELLER MODEL 1	(GLOBE) OR CW (WAFER) 101MDT OR 105MDT STYLE CSC	
	CONNECTION AND RATING		EADED OR SOLDERED			
BALL VALVE	CONSTRUCTION	BALL: STEM: STAINLESS STE PACKIN	PIECE, FULL-PORT SS 316 :EL, BLOWOUT PROOF G: PTFE REINFORCED PTFE	-		
	VALVE SELECTION		-140 SERIES EL T-580-70-66	-		
	CONNECTION AND RATING	MILWAUKE 2	-	CLASS 150 FLANGED	ENDS (2 1/2" THRU 24")	
GLOBE VALVE	CONSTRUCTION	SEAT R DISC: A105 C		BODY/BONNET: A216 SEAT RING: A105 O DISC: A105 OR A216 WC STEM: PACKING: GASKET: CORRUGATE	G GR. WCB (BOLTED) R A216 HARDFACED B WITH 13% CR OVERLAY 410 SS GRAPHITE D SST WITH GRAPHITE IGURE 143	
	VALVE SELECTION	-	-	POWELL F	IGURE 143 IGURE 1531 GURE 0074C	
	REVISION H					
NUMBER 0	DESCRIP	TION	DATE 2/22/2021			
1	INITIAL ISSUE		-,,,			

PIPING SE	PIPING SPECIFICATION: PROCESS: DESIGN CONDITIONS:				
UI-CS-SS		CONDENS	ER WATER	150 PSIG AT 150 °F	
	PIPE SIZE (NPS)		SMALLER	2 1/2" THRU 48"	
PIPE MATERIAL: ASME B36.10M	WEIGHT/SCHEDULE MATERIAL		40S 4 - SEAMLESS	SCH 10S A312 TYPE 304 - SEAMLESS OR WELDED	
Tionic Boo. Tom	CONSTRUCTION	SOCKETWELD: CLASS 3000	, B16.11 THREADED: CLASS	BUTTWELD - ASME B16.9	
FITTINGS:	WALL THICKNESS		B16.11 JOINING PIPE		JOINING PIPE
	MATERIAL		- SEAMLESS, B16.25	ASTM A403, WP304L - SEAMLESS, B16.25	
	TYPE		OR THREADED CLASS 2000	BUTTWELD - END	PREP PER B16.25
JOINTS:	OTHER	SPIRAL WOUND	- B16.11 - FLAT FACE WITH GASKET DESIGN		GE REQUIRED
FLANGES:	CONSTRUCTION WALL THICKNESS		T PERMITTED JOINING PIPE		- ASME B16.47 AND B16.5 JOINING PIPE
. 2.41020.	MATERIAL				F330L, ASME B16.5
FLANGE BOLTS:	CONSTRUCTION		-		L, GRADE B8, CLASS 2, STUD - FULI IGTH
FLANGE NUTS:	CONSTRUCTION CONSTRUCTION				A194 GRADE 8
WASHER:	CONSTRUCTION		-		S304 CE OR FLAT-FACE FLANGES
GASKETS:	MATERIAL		-	FULL FACE - 1/16" ARAMID FIBER W	/ITH SBR BINDER - GARLOCK BLUE- R EQUAL
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:
STAINLESS STEEL	ASME B36.10M		B31.1	0	2/22/2021
VALVE SPECIFICATION:	SPECIFICATION MATERIAL: CARBON STEEL	PRESSURE CLASS: 150 PSIG	ASME B31.1	GN CODE: ASME B16.34	1
UI-CS-SS	PIPE SIZE (NPS)		MALLER		HRU 48"
	CONNECTION AND RATING		-		ASS 150 FLANGES
BUTTERFLY VALVE	CONSTRUCTION		-	BODY: A182 GR. F316 OR A351 GR. CF8M SEAT: TFE/VITON DISC: A182 GR. F316 OR A351 GR. CF8M SHAFT: 17-4 PH PACKING: TFE	
	VALVE SELECTION			POWELL FIGURE 1572 CRANE FLOWSEAL TYPE 1LA (12" AND SMALLER) TYPE 1LC (14" ANE LARGER) JAMESBURY SERIES 815	
	CONNECTION AND RATING	CLASS 800 PSIG SOCKETWELD		CLASS 150 FLANGED ENDS (2-1/2" THRU 12")	
CHECK VALVE	CONSTRUCTION	BODY/CAP: A182 F316L CARRIER/CARRIER PIN: 316SS DISC: A276 T316 SEAT RING: 316 SST GASKET: SPIRAL WOUND SST WITH PTFE		BODY: ASTM A351 GR. CFBM CAP: ASTM A351 GR. CFBM CARRIER/CARRIER PIN: 316SS DISC: ASTM A351 GR. CF8M GASKET: PTFE	
	VALVE SELECTION	VOGT SER	GURE SW08 ES SWS718 IGE HL-68-SW	POWELL FIGURE 1561 CRANE FIGURE 147 (THRU 24") BONNEY FORGE 1-68 RF	
	CONNECTION AND RATING			CLASS 150 FLANGED ENDS	
SILENT CHECK VALVE	CONSTRUCTION		-	SEAT: CAST STAINLESS S' DISC OR PLUG: CAST STAINLES STEM: STAIN SPRING: TYPE 318 GASKET: SPIRAL WOU 12" THRU - 10" AND SMA	S STEEL ASTM A351 GR. CF8M ITEEL, ASTM A351 GR. CF8M SS STEEL, ASTM A351 GR. CF6M ILESS STEEL STAINLESS STEEL STAINLESS STEEL NO SS WITH GRAPHITE 42": GLOBE LLER: WAFER
	VALVE SELECTION	-	-	KECKLEY CO. MODEL CG (GLOBE) OR CW (WAFER) MUELLER MODEL 101MDT OR 105MDT DEZURIK STYLE CSC	
	CONNECTION AND RATING		SOCKETWELD		ENDS (2-1/2" THRU 20")
BALL VALVE	CONSTRUCTION	BALL: SEAL PACKING:	RT 3: XTREME SS 316 : PTFE GRAPHITE	BODY/INSERT: ASST CF8M BALL: 316 SS STEM: 316 SS SEAT: PITE BODY SEAL: TFM STEM SEAL: PITE GEAR OPERATOR 4" AND LARGER	
	VALVE SELECTION	KECKLEY	IES 4000 MODEL A SYTE BVM3 J3TZM	JAMESBURY KECKLEY B\ VELAN	SERIES 7150 /F1 (THRU 6") SB-150
	CONNECTION AND RATING		-	CLASS 150 FLANGED	ENDS (2 1/2" THRU 24")
GLOBE VALVE	CONSTRUCTION			BODY: ASTM A351 CF8M BONNET: ASTM A351 CF8M DISC: ASTM A351 CF8M STEM: ASTM A276 T316 PACKING: PTFE	
	VALVE SELECTION		-	POWELL FIGURE 1531 CRANE FIGURE 143 (THRU 24") BONNEY FORGE 1-38 RF	
	REVISION I				
NUMBER	DESCRIP	TION	DATE		
0	INITIAL ISSUE	2/22/2021			

CONDENSER WATER DRAINS (TO 150 PSIG)

PIPING S	PIPING SPECIFICATION:		CESS:	DESIGN CO	DESIGN CONDITIONS:	
UI-CS-DRAIN		CONDENS	ER WATER	150 PSIG	AT 120 °F	
UI-CS-DRAIN	PIPE SIZE (NPS)		2			
PIPE MATERIAL:	WEIGHT/SCHEDULE		-	-		
ASME B36.10M	MATERIAL		ASTM B88 COPPER, T	YPE K, HARD DRAWN		
	CONSTRUCTION	SOLDERED OR PRESS FIT				
FITTINGS:	WALL THICKNESS		SAME AS AD.	JOINING PIPE		
	MATERIAL	ASME	B16.18 CAST COPPER OR ASM	E B16.22 WROUGHT COPPER	ALLOY	
PIPING JOINTS:	TYPE		SOLDERED C	R PRESS FIT		
PIPING JOINTS:	OTHER		SEE BELOW FOR	R JOINT DETAILS		
SOLDER:	MATERIAL	SOLDER: ASTM B32 ALLOY	, GRADE SB-5 95/5 TIN-ANTIMO SILVER, LI		2 ALLOY, GRADE SN95 TIN-	
SOLDER.	WATENAL		O-FREE - WATER-FLUSHABLE F COPPER PHOSPHORUS ALLOY			
PRESS FIT:	CONSTRUCTION		IFORM TO ASME B16.18 OR: AS			
FRESSTIT.	MATERIAL	 ELEMENTS: EPDM - SEALING ELEMENTS FACTORY INSTALLED - FITTINGS SHALL BE PRESSED BY TOOLS RECOMMENDED BY FITTING MANUFACTURER 				
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
COPPER	ASTM B88	ASME	B31.1	0	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	CODE:		
UI-CS-DRAIN	AS NOTED	150 PSIG	ASME B31.1	ASME B16.34		
UI-CS-DRAIN	PIPE SIZE (NPS)		2			
	CONNECTION AND RATING	CLASS 200 PSIG THREADED				
CHECK VALVE	CONSTRUCTION	BODY/CAP: ASTM B584 BRONZE DISC: BRONZE, SWING TYPE, Y-PATTERN SEAT: BRASS SPRING: SS 316				
	VALVE SELECTION	APOLLO 161T-LF SERIES POWELL MSS 5P-80 NIBCO T-413-Y-LF				
	CONNECTION AND RATING		CLASS 600 PS	IG THREADED		
BALL VALVE	CONSTRUCTION	BODY: BRONZE, 2-PIECE, FULL-PORT BALL: SS 316 STEM: STAINLESS STEEL, BLOWOUT PROOF PACKING: RPTFE SEATS AND SEALS: RPTFE				
	VALVE SELECTION	APOLLO 77-140 SERIES NIBCO MODEL T-580-70-66 MILWAUKE 20BS SERIES				
	REVISION I	HISTORY			•	
NUMBER	DESCRIE	PTION	DATE			
0	INITIAL ISSUE		2/22/2021			

PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:		
UI-PCW (CS)			S WATER		G at 200 °F	
	PIPE SIZE (NPS)	4" AND S	SMALLER	2 1/2" THRU 24" STD		
PIPE MATERIAL:	WEIGHT/SCHEDULE	A STM DOG CODDED	 TYPE L, HARD DRAWN	_	TD MLESS (NON-BLACK STEEL)	
ASME B36.10M/B88	MATERIAL CONSTRUCTION		OR PRESS FIT		ASME B16.25	
	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
FITTINGS:	MATERIAL		OR ASME B16.22 WROUGHT R ALLOY	BUTTWELD FITTING - ASTM A234 GRADE B - SEAMLESS		
	TYPE		OR PRESS FIT	BUTTWELD - END PREP PER B16.25		
JOINTS:	WALL THICKNESS		JOINING PIPE	SAME AS ADJOINING PIPE		
	OTHER CONSTRUCTION		R JOINT DETAILS	CLASS 150 WELD	NECK - ASME B16.5	
SOLDER/FLANGES:	WALL THICKNESS		OY, GRADE Sb-5 95/5 TIN- STM B32 ALLOY, GRADE SN95		JOINING PIPE	
	MATERIAL		, LEAD FREE		STEEL - ASTM A105	
SOLDER/FLANGE BOLTS:	CONSTRUCTION		D-FREE - WATER-FLUSHABLE RAZING FILLER METAL SHALL	STUD - FULL-LE	NGTH ASME B1.1	
SOLDENI LANGE BOLTS.	MATERIAL		PHOSPHORUS ALLOYS FOR RAZING - AWS A5.8	HIGH-STRENGTH STEEL - A LENGT	STM A193 - GRADE B7, FULL H STUD	
	CONSTRUCTION			HEAVY HEX - ASME B1	.1 - CLASS 2B THREADS	
PRESS FIT/FLANGE NUTS:	MATERIAL	ASME B16.22 AND CRITER	NFORM TO ASME B16.18 OR: RIA UNDER IAPMO PS 117 -		94 GRADE 2H HEAVY - F436 HERS	
PRESS FIT/GASKETS:	CONSTRUCTION	FACTORY INSTALLED - FITTI	DM - SEALING ELEMENTS INGS SHALL BE PRESSED BY Y FITTING MANUFACTURER		FOR RAISED-FACE OR FLAT- LANGES	
	MATERIAL			CGI OR	EXITALLIC FLEXICARB STYLE EQUAL	
WASHER:	CONSTRUCTION		-		94 GRADE 2H HEAVY - F436 HERS	
	CONSTRUCTION MATERIAL		ADED JOINING PIPE			
UNIONS:	OTHER	INSTALL UNIONS: IN LONG BYPASS OF VALVES/EQU	RUNS AT 80' INTERVALS - IN JIPMENT - AT EQUIPMENT COTIONS	NOT PERMITTED		
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE:	REVISION:	DATE REVISED:	
COPPER/CARBON STEEL	ASME B36.10M/B88		B31.1	2	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		CODE:		
UI-PCW (CS)	AS NOTED PIPE SIZE (NPS)	150 PSIG 4" AND S	ASME B31.1 SMALLER	ASME B16.34 2 1/2" T	HRU 24"	
	CONNECTION AND RATING		-		ANGED ENDS	
GATE VALVE	CONSTRUCTION			BODY/BONNET: ASTM A395 CA: SEATS AND SEALS: ASTM B DISC/WEDGE: BRON STEM: ASTM B16 BR PACKING: ARAMID FIBERS WI		: ASTM B61 BRONZE GE: BRONZE M B16 BRASS
	VALVE SELECTION	-		APOLLO 610F-LFA SERIES OR EQUAL BY POWELL OR NIBCO		
	CONNECTION AND RATING	-		LUGGED FOR CLASS 150 FLANGED ENDS		
BUTTERFLY VALVE	CONSTRUCTION			BODY/SEAT: DUCTILE IRON SHAFT: SS DISC: STAINLESS STEEL SEAT: EPDM GLAND/BEARING: BRONZE OR ALUMINIZED BRONZE OPERATOR: GEARED HANDWHEEL W/ POSITION INDICATOR 200 PSIG WORKING PRESSURE		
	VALVE SELECTION			DEZURIK BOS-US OR JAMESBURY SERIES 815		
	CONNECTION AND RATING	CLASS 600 PSIG THR	EADED OR SOLDERED	CLASS 150 FL	ANGED ENDS	
CHECK VALVE	CONSTRUCTION	DISC: E SEAT DIS HINGE PIN AND PLUG: BF	IET: BRONZE SRONZE C: BUNA-N RONZE ASTM B140 ALLOY SAME AS BODY	SEAT RING: DISC: A105 OR A216 WC	GR. WCB (BOLTED) HARDFACED 3 WITH 13% CR OVERLAY D SST WITH GRAPHITE	
	VALVE SELECTION		33 SERIES ERIES (THRU 2")	POWELL FIGURE 1561 CRANE FIGURE 147 BONNEY FORGE 1-61 RF		
	CONNECTION AND RATING	CLASS 600 PSIG THR	EADED OR SOLDERED	CLASS 150 FLANG	ED ENDS (UP TO 6")	
BALL VALVE	CONSTRUCTION	BODY: CAST BRONZE OR BRASS, FULL PORT BALL: CHROME PLATED BRONZE OR BRASS STEM: BRONZE OR BRASS SEATS/SEALS: RPTFE PACKING: RPTFE LOCKABLE, QUARTER TURN LEVER HANDLE BODY SEAL: SS 316 GRAPHITE GEAR OPERATOR 4" AND LARGER		IFE/PTFE/RPTFE TEM: SS 316 AND GRAPHITE 3 316 GRAPHITE R 4" AND LARGER		
NOTES:	VALVE SELECTION	MILWAUKE	-200 SERIES EE BA-485B 600A SERIES	JAMESBURY	UB-150 SERIES 7000 EY BVF1	

NOTES:

1) EITHER COPPER OR CARBON STEEL PIPE MATERIAL MAY BE USED FOR PIPE SIZES BETWEEN 2-1/2" AND 4". FINAL PIPE MATERIAL SHALL BE SELECTED BASED UPON THE INDIVIDUAL PROJECT NEEDS. DESIGN PROFESSIONAL SHALL COORDINATE SELECTION OF PIPE MATERIAL WITH UTILITY OPERATOR.

REVISION HISTORY					
NUMBER DESCRIPTION DATE					
1 CHANGED SMALL BORE VALVES TO CLASS 600 FROM CLASS 3000 6/30/20					
2	ADDED ADDITIONAL VALVE MANUFACTURERS; INCREASED SMALL BORE UPPER LIMIT TO 4", ALLOWED SIZE RANGE OVERLAP	2/22/2021			

PIPING SP	PECIFICATION:	PROC	CESS:	DESIGN CO	ONDITIONS:			
			ER - EXTERIOR		150 PSIG AT 100 °F			
UI-PCW (SS)	PIPE SIZE (NPS)		SMALLER	2 1/2" T				
PIPE MATERIAL:	WEIGHT/SCHEDULE		140S		I 10S			
ASME B36.10M	MATERIAL		AMLESS OR WELDED		AMLESS OR WELDED			
	CONSTRUCTION	CLASS 3000 - SOC	KETWELD - B16.11	BUTTWELD -	- ASME B16.9			
FITTINGS:	WALL THICKNESS		JOINING PIPE		JOINING PIPE			
	MATERIAL		A182, F304L, ASME B16.25	ASTM A403, WP304L - SEAMLESS, B16.25				
	TYPE	SOCKE	TWELD		PREP PER B16.25			
PIPING JOINTS:	OTHER		- B16.11 - FLAT-FACE WITH GASKET DESIGN	-				
	CONSTRUCTION	FLANGES NO	T PERMITTED	CLASS 150 - WELD NECK	- ASME B16.47 AND B16.5			
FLANGES:	WALL THICKNESS	-	-	SAME AS AD	JOINING PIPE			
	MATERIAL	-	-	SS, ASTM A182, F	330L, ASME B16.5			
FLANGE BOLTS:	CONSTRUCTION	-	-	HIGH-STRENGTH STAINLESS STUD - FU	S STEEL, GRADE B8, CLASS : LL LENGTH			
FLANGE NUTS:	CONSTRUCTION	-	-		A194 GRADE 8			
WASHER:	CONSTRUCTION	-	-	SSS	5304			
	CONSTRUCTION	-	-	SUITABLE FOR RAISED-FAC	CE OR FLAT-FACE FLANGES			
GASKETS:	MATERIAL	-	-	FULL FACE - 1/16" ARAMID				
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:			
STAINLESS STEEL	ASTM B36.10M	ASME		1	2/22/2021			
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		N CODE:	<u> </u>			
	STAINLESS STEEL	150 PSIG	ASME B31.1	ASME B16.34	1			
UI-PCW (SS)	PIPE SIZE (NPS)		MALLER		HRU 24"			
· ,	CONNECTION AND RATING		-		ANGED ENDS			
GATE VALVE	CONSTRUCTION	-	-	BONNET: AST DISC: ASTN STEM: ASTI PACKIN	M A351 CF8M FM A351 CF8M I A351 CF8M M A276 T316 G: PTFE			
VALVE SELECTION		-	-	POWELL FIGURE 1503 CRANE FIGURE 47 (THRU 24") BONNEY FORGE 1-18 RF				
	CONNECTION AND RATING			LUGGED FOR CLASS 150 FLANGED ENDS				
BUTTERFLY VALVE	CONSTRUCTION			BODY: A182 GR. F316 OR A351 GR. CF8M SEAT: TFE/VITON DISC: A182 GR. F316 OR A351 GR. CF8M SHAFT: 17-4 PH PACKING: TFE				
	VALVE SELECTION		-	POWELL FIGURE 1572 CRANE FLOWSEAL TYPE 11A (12" AND SMALLER) TYP (14" AND LARGER) JAMESBURY SERIES 815				
	CONNECTION AND RATING		SIG THREADED	-	-			
CHECK VALVE	CONSTRUCTION	CARRIER/CARF DISC: AZ SEAT RING	A182 F316L RIER PIN: 316SS 276 T316 3: 316 SST DUND SST WITH PTFE	BODY: ASTM A351 GR. CF8M CAP: ASTM A351 GR. CF8M CARRIER/CARRIER PIN: 316SS DISC: ASTM A351 GR. CF8M GASKET: PTFE				
	VALVE SELECTION	VOGT SERI BONNEY FOR		POWELL FIGURE 1561 CRANE FIGURE 147 (THRU 24") BONNEY FORGE 1-68 RF				
	CONNECTION AND RATING	CLASS 800 SOCKETWELD		CLASS 150 FLANGED	ENDS (2-1/2" THRU 20")			
BALL VALVE	CONSTRUCTION	SEAT RING BALL: SEAL:	F8M STAINLESS STEEL, FULL- RT 3: XTREME SS 316 PTFE GRAPHITE	ULL-BODY/INSERT: A351 CF8M BALL: 316 SS STEM: 316 SS SEAT: PTFE BODY SEAL: TFM STEM SEAL: PTFE GEAR OPERATOR 4* AND LARGE!				
	VALVE SELECTION	KECKLEY S KITZ U	IES 4000 MODEL A SYTE BVM3 J3TZM	JAMESBURY KECKLEY BV	SERIES 7150 /F1 (THRU 6") SB-150			
	REVISION I							
NUMBER	DESCRIP	TION	DATE					
0	INITIAL ISSUE		12/5/2018					

1/21/2021

ADDED VALVE MANUFACTURERS

PIPING S	PECIFICATION:	PROC	ESS:	DESIGN C	ONDITIONS:			
UI-PCW-DI		PROCESS WAT	TER - OUTSIDE	150 PSI	G at 150 °F			
OI-PCW-DI	PIPE SIZE (NPS)	3" THRU 24"						
PIPE MATERIAL:	WEIGHT/SCHEDULE	SPECIAL THICKNESS CLASS 53 ANSI/AWWA C150/A21.50						
ANSI/AWWA C151/A21.51	MATERIAL		ANSI/AWWA C151/A2	1.51 DUCTILE IRON PIPING				
	CONSTRUCTION		ANSI/AWWA C	110/A21.10 FLANGED				
FITTINGS:	DESIGN RATING		150 PSIG IN ACCORDANCE	WITH ANSI/AWWA C110/A21.10				
	MATERIAL		DUC	TILE IRON				
	TYPE		ANSI/AWWA C	115/A21.15 FLANGED				
JOINTS:	DESIGN RATING		250 PSIG IN ACCORDANCE	WITH ANSI/AWWA C115/A21.15				
	OTHER							
	CONSTRUCTION		ASTM A53	6 DUCTILE IRON				
0557//05 04557 50	DESIGN RATING		350 PSIG IN ACCORDA	NCE WITH ANSI/AWWA C800				
SERVICE SADDLES:	COATING		FUSION BON	DED BLACK NYLON				
	STRAPS		TYPE 304 S	TAINLESS STEEL				
	CONSTRUCTION		CLASS 150 - WE	D NECK - ASME B16.5				
FLANGES:	WALL THICKNESS		SAME AS	ADJOINING PIPE				
	MATERIAL	FORGED CARBON STEEL - ASTM A105						
BOLTS:	CONSTRUCTION	STAINLESS STEEL IN ACCORDANCE WITH ASTM A240						
NUTS:	CONSTRUCTION	HEAVY HEX - A194 GRADE 2H						
WASHERS:	CONSTRUCTION	TYPE 304 STAINLESS STEEL						
	CONSTRUCTION	SUITABLE FOR RAISED-FACE OR FLAT-FACE FLANGES AND FOR USE WITH SERVICE SADDLES						
GASKETS:	STANDARD		ANSI/AW\	VA C111/A21.11				
	MATERIAL	FULL FACE - 1	1/16" ARAMID FIBER WITH S	BR BINDER - GARLOCK BLUE-GA	RD OR EQUAL			
PIPE LINING:	CONSTRUCTION		CEMENT MORTAR	LINING AND SEAL COAT				
PIPE LINING:	STANDARD		ANSI/AW	WA C104/A21.4				
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTI	RUCTION CODE:	REVISION:	DATE REVISED:			
DUCTILE IRON	ANSI/AWWA C151/A21.51	-	-	0	2/22/2021			
ALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DES	GN CODE:				
UI-PCW-DI	DUCTILE IRON				1			
OI-PCW-DI	PIPE SIZE (NPS)		3" -	THRU 24"	-			
	CONNECTION AND RATING		LUGGED FOR	CLASS 150 FLANGES				
BUTTERFLY VALVE	CONSTRUCTION	BODY/SEAT: CARBON STEEL STEM: SS DISC: SS GLAND/BEARING: SS WITH RTFE IMPREGNATED OPERATOR: GEARED HANDWHEEL W! POSITION INDICATOR SEAT: PTFE 200 PSIG WORKING PRESSURE						
	ABZ SELECTION VALVE SELECTION DEZURIK STYLE BHP JAMESBURY SERIES 815							

NOTES:

1) DESIGN PROFESSIONAL SHALL DISCUSS THE USE OF DUCTILE IRON PIPING IN PROCESS WATER SERVICE WITH UTILITY OPERATOR DURING PROJECT DESIGN

REVISION HISTORY							
NUMBER DESCRIPTION DATE							
0	0 INITIAL ISSUE						

H CELL	
M D2564	CHE -SA
M D2564 R VALVE	
CLASS 150	MPLE V
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	IENT SERVICE (TO 150 PSIG
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PIPING SPECIFICATION:		PROCESS: DESIGN CON			ONDITIONS:	
UI-CSS		CHEMICAL 7	TREATMENT	150 PSIG	AT 100 °F	
01-035	PIPE SIZE (NPS)	2" AND S	SMALLER	2 1/2" T	HRU 6"	
PIPE MATERIAL:	WEIGHT/SCHEDULE	SCH 80, SD	R 21 OR 26	SCH 80, SD	R 21 OR 26	
ASME B36.10M	MATERIAL		C) ASTM D1784, WITH CELL DF 12454	POLYVINYL CHLORIDE (PVC) ASTM D1784, WITH CELL CLASS OF 12454		
	CONSTRUCTION	SOLVENT V	WELD TYPE	SOLVENT WELD TYPE		
FITTINGS:	STANDARD	ASTM	D2467	ASTM	F1970	
FITTINGS:	WALL THICKNESS	SAME AS AD.	JOINING PIPE	SAME AS ADJOINING PIPE		
	SOLVENT MATERIAL	SOLVENT CEMENT IN ACCC	PRDANCE WITH ASTM D2564	SOLVENT CEMENT IN ACCC	RDANCE WITH ASTM D2564	
	CONSTRUCTION	SOLVENT V	WELD TYPE	SOLVENT V	WELD TYPE	
JOINTS:	WALL THICKNESS	SAME AS AD.	JOINING PIPE	SAME AS AD	JOINING PIPE	
	SOLVENT MATERIAL	SOLVENT CEMENT IN ACCC	DRDANCE WITH ASTM D2564	SOLVENT CEMENT IN ACCC	RDANCE WITH ASTM D2564	
	CONSTRUCTION		FOR EQUIPMENT OR VALVE CTIONS		FOR EQUIPMENT OR VALVE CTIONS	
FLANGES:	WALL THICKNESS	SAME AS AD	JOINING PIPE	SAME AS AD	JOINING PIPE	
	MATERIAL	POLYVINYL CHLORIDE (PVC) . FLANGE DI	ASTM F1970, WITH CLASS 150 IMENSIONS		ASTM F1970, WITH CLASS 150 MENSIONS	
FLANGE BOLTS:	CONSTRUCTION		STUDS IN ACCORDANCE WITH I A307	CARBON STEEL BOLTS AND S ASTM		
FLANGE NUTS:	MATERIAL	HEAVY HEX - A	A194 GRADE 8	HEAVY HEX	A194 GRADE 8	
	CONSTRUCTION	SUITABLE FOR RAISED-FAC	CE OR FLAT-FACE FLANGES	SUITABLE FOR RAISED-FAC	CE OR FLAT-FACE FLANGES	
GASKETS:	MATERIAL		RAFLUOETHYLENE (PTFE) - 00 OR EQUAL	FULL FACE - 1/8" POLYTETRAFLUOETHYLENE (PTF GARLOCK 3500 OR EQUAL		
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
PVC 1120	ASTM B36.10M	ASME B3	1.1 (2012)	0	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	CODE:		
UI-CSS	PVC	150	ASME B31.1	ASME B16.34		
01-035	PIPE SIZE (NPS)		1/2" Th	IRU 6"		
	CONNECTION AND RATING		CLASS: 150 S	OCKETWELD		
CHECK VALVE	CONSTRUCTION	E	ASTM D1784 CELL CLASS 1245 BALL: PVC, TYPE IV, ASTM D178 I PLATE: PVC, TYPE IV, ASTM I PACKING: O-RIN	4, CELL CLASSIFICATION 1245 01784, CELL CLASSIFICATION OF GRAPHITE	4	
	VALVE SELECTION		SPEARS TRU COLONIAL TRUE UI HAYWARD	IION CHECK VALVE TC SERIES		
	CONNECTION AND RATING		CLASS: 150 S	OCKETWELD		
		BODY: ASTM D1784 CELL CLASS 12454, PVC, SCH. 80, FULL-PORT, "TRUE UNION" STYLE BALL: PVC, TYPE 1, ASTM D1784, CELL CLASSIFICATION 12454 SEAT: PTFE STEM: PVC, TYPE 1, ASTM D1784, CELL CLASS 12454 HANDLE: POLYPROPYLENE PACKING: GRAPHITE O-RING: EPDM				
BALL VALVE	CONSTRUCTION		HANDLE: POL PACKING: O-RING	YPROPYLENE GRAPHITE : EPDM		
BALL VALVE	VALVE SELECTION		HANDLE: POL PACKING:	YPROPYLENE GRAPHITE : EPDM E UNION 2000 'RIAL TRUE UNION BALL VALVI	E	
	VALVE SELECTION REVISION I	HISTORY	HANDLE: POL PACKING: O-RING SPEARS TRU COLONIAL FULL BLOCK INDUS' HAYWARD	YPROPYLENE GRAPHITE : EPDM E UNION 2000 'RIAL TRUE UNION BALL VALVI	E	
BALL VALVE NUMBER	VALVE SELECTION	HISTORY	HANDLE: POL PACKING: O-RING SPEARS TRU COLONIAL FULL BLOCK INDUST	YPROPYLENE GRAPHITE : EPDM E UNION 2000 'RIAL TRUE UNION BALL VALVI	E	

1/2 2	CHEMICAL
095 0.109	(TO 150
REVISED:	FEED (SS)
2/2021) PSIG)

PIPING S	PECIFICATION:	PROCESS: DESIGN CONDITIONS:												
UI-CHEM (SS)		CHEMICAL FEED 150 PSIG AT 140 °F												
UI-CHEIVI (33)	PIPE SIZE (NPS)		2" AND SMALLER											
PIPE MATERIAL:	WEIGHT/SCHEDULE		TUBE WALL THICKNESS VARIES BY LINE SIZE											
ASME B36.10M	MATERIAL	ASTM	A269 AN	ND A213	TYPE 316/	316L SEAMLESS	TUBING	- HARDN	ESS NOT	TO EXC	EED 90 H	RB OR 20	00 HV	
TUBING WALL:	TUBING OD (IN.)	1/16 1/8	1/16 1/8 3/16 1/4 5/16 3/8 1/2 5/8 3/4 7/8 1 1 1/4 1 1/2						1 1/2	2				
TODING WALL	WALL THICKNESS (IN.)	0.010 0.028	0.028	0.028	0.035	0.035	0.035	0.049	0.049	0.049	0.065	0.083	0.095	0.109
	CONSTRUCTION				SI	VAGELOK COM				S				
FITTINGS:	WALL THICKNESS						S ADJOIN	_						
	MATERIAL					TM A276, TYPE 3								
PIPING JOINTS:	TYPE				SI	VAGELOK COM	PRESSIO	N TUBING	FITTING	S				
1 ii ii ii ii ii ii ii ii ii ii ii ii ii	OTHER													
	CONSTRUCTION					FLANGE	S NOT PE	RMITTE)					
FLANGES:	WALL THICKNESS													
	MATERIAL													
FLANGE BOLTS:	CONSTRUCTION					FLANGE	S NOT PE	RMITTE)					
TEARGE BOLTO.	MATERIAL													
FLANGE NUTS:	CONSTRUCTION					FLANGE	S NOT PE	RMITTE)					
TEANOL NOTO:	MATERIAL													
GASKETS:	CONSTRUCTION					FLANGE	S NOT PE	RMITTE)					
GAGRETO.	MATERIAL													
PIPE MATERIAL:	PIPE CODE:		DES			ON CODE:			F	REVISION	l:		TE REVIS	
STAINLESS STEEL	ASTM B36.10M			A:	SME B31.1					2			2/22/202	1
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLA	ASS:		DESIGN									
UI-CHEM (SS)	CARBON STEEL	150 PSIG			ASME I									
OI-CITEIVI (33)	PIPE SIZE (NPS)	2" AND SMALLER												
	CONNECTION AND RATING	SWAGELOK COMPRESSION TUBING FITTINGS												
BALL VALVE	CONSTRUCTION	BODY: ASTM A479 316SS BALL: ASTM A276 OR A479 316SS STEM: STM A276 OR A479 316SS SEATS, STEM BEARING AND PACKING: PEEK												
	VALVE SELECTION					SWA	GELOK S	S-62P						

REVISION HISTORY					
NUMBER	DESCRIPTION	DATE			
1	1 ADDED WALL THICKNESS TO TABLE, REMOVED OTHER REFERENCES TO WALL THICKNESS				
2	CHANGED CONSTRUCTION TO 2" AND SMALLER TUBING SPEC	2/22/2021			

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PIPING S	PECIFICATION:	PROCESS: DESIGN CONDITIONS:						
UI-CHEM (PVC)		CHEMIC	AL FEED		AT 140 °F			
OI-CITEIN (FVC)	PIPE SIZE (NPS)			SMALLER				
PIPE MATERIAL:	WEIGHT/SCHEDULE	SCH 80, SDR 21 OR 26						
ASME B36.10M	MATERIAL	POLY		D1784, WITH CELL CLASS OF	12454			
	CONSTRUCTION	SOLVENT WELD TYPE						
FITTINGS:	STANDARD			D2467				
TITTINGS.	WALL THICKNESS			JOINING PIPE				
	SOLVENT MATERIAL		SOLVENT CEMENT IN ACCO	DRDANCE WITH ASTM D2564				
	CONSTRUCTION			WELD TYPE				
JOINTS:	WALL THICKNESS			JOINING PIPE				
	SOLVENT MATERIAL			DRDANCE WITH ASTM D2564				
	CONSTRUCTION	FLAN	IGE ONLY PERMITTED FOR EQ	UIPMENT OR VALVE CONNECT	TIONS			
FLANGES:	WALL THICKNESS			JOINING PIPE				
	MATERIAL	POLYVINY	L CHLORIDE (PVC) ASTM F197	0, WITH CLASS 150 FLANGE DI	MENSIONS			
FLANGE BOLTS:	CONSTRUCTION	CARE	BON STEEL BOLTS AND STUDS	S IN ACCORDANCE WITH ASTM	1 A307			
FLANGE NUTS:	MATERIAL		HEAVY HEX -	A194 GRADE 8				
GASKETS:	CONSTRUCTION			AT-FACE FLANGES				
GASKETS.	MATERIAL	FULL FACE	E - 1/8" POLYTETRAFLUOETHY	LENE (PTFE) - GARLOCK 3500	OR EQUAL			
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTI	RUCTION CODE:	REVISION:	DATE REVISED:			
PVC 1120	ASTM B36.10M	ASME	B31.1	0	2/22/2021			
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	N CODE:				
UI-CHEM (PVC)	PVC	150	ASME B31.1	ASME B16.34				
UI-CHEIVI (FVC)	PIPE SIZE (NPS)		2" AND S	SMALLER				
	CONNECTION AND RATING		CLASS 150 S	OCKETWELD				
CHECK VALVE	CONSTRUCTION	BODY: ASTM D1784 CELL CLASS 12454, PVC, TYPE IV, "TRUE UNION" STYLE BALL: PVC, TYPE IV, ASTM D1784, CELL CLASSIFICATION 12454 SEAT PLATE: PVC, TYPE IV, ASTM D1784, CELL CLASSIFICATION 12454 PACKING: GRAPHITE O-RING: FKM						
	VALVE SELECTION	SPEARS TRUE UNION 2000 COLONIAL TRUE UNION CHECK VALVE HAYWARD TC SERIES						
	CONNECTION AND RATING		CLASS 150 S	OCKETWELD				
BALL VALVE	CONSTRUCTION	BODY: ASTM D1784 CELL CLASS 12454, PVC, SCH. 80, FULL-PORT, "TRUE UNION" STYLE BALL: PVC, TYPE 1, ASTM D1784, CELL CLASSIFICATION 12454 SEAT: PTFE STEM: PVC, TYPE 1, ASTM D1784, CELL CLASS 12454 HANDLE: POLYPROPYLENE PACKING: GRAPHITE O-RING: EPDM						
	VALVE SELECTION	(COLONIAL FULL BLOCK INDUS	IE UNION 2000 TRIAL TRUE UNION BALL VALV I TB SERIES	E			

REVISION HISTORY						
NUMBER	DESCRIPTION	DATE				
0	INITIAL ISSUE	2/22/2021				

PIPING SPECIFICATION:		PROC	CESS:	DESIGN CO	ONDITIONS:	
III CHEM (CD)(C)		CHEMICAL T	TREATMENT	150 PSIG	AT 100°F	
UI-CHEM (CPVC)	PIPE SIZE (NPS)	2" AND S	SMALLER	2 1/2" T	HRU 6"	
PIPE MATERIAL:	WEIGHT/SCHEDULE	SCH 80		SCH 80		
ASTM F441	MATERIAL	CHLORINATED POLYVINYL CHLORIDE (CPVC) ASTM D1784 TYPE IV, GRADE 1, WITH CELL CLASS OF 23447		CHLORINATED POLYVINYL CHLORIDE (PVC) ASTM D1784 TYPE IV, GRADE 1, WITH CELL CLASS OF 23447		
	CONSTRUCTION	SOLVENT/SOCKET WELD TYPE		FABRI	CATED	
FITTINGS:	STANDARD	ASTM	1 F439	ASTM	F1970	
FITTINGS.	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	SOLVENT MATERIAL	SOLVENT CEMENT IN ACC	ORDANCE WITH ASTM F493	SOLVENT CEMENT IN ACCO	DRDANCE WITH ASTM F493	
	CONSTRUCTION		WELD TYPE	SOLVENT V		
JOINTS:	WALL THICKNESS		JOINING PIPE		JOINING PIPE	
	SOLVENT MATERIAL	SOLVENT CEMENT IN ACC	ORDANCE WITH ASTM F493	SOLVENT CEMENT IN ACCO	DRDANCE WITH ASTM F493	
	CONSTRUCTION		FOR EQUIPMENT OR VALVE	FLANGE ONLY PERMITTED CONNE	FOR EQUIPMENT OR VALVE CTIONS	
FLANGES:	WALL THICKNESS	SAME AS AD	JOINING PIPE	SAME AS AD	JOINING PIPE	
	MATERIAL	CHLORINATED POLYVINYL CI WITH CLASS 150 FL	HLORIDE (CPVC) ASTM F1970, ANGE DIMENSIONS	CHLORINATED POLYVINYL CI WITH CLASS 150 FL	HLORIDE (CPVC) ASTM F1970, ANGE DIMENSIONS	
FLANGE BOLTS:	CONSTRUCTION	CARBON STEEL BOLTS AND STUDS IN ACCORDANCE WITH ASTM A307		ASTM	CARBON STEEL BOLTS AND STUDS IN ACCORDANCE WITH ASTM A307	
FLANGE NUTS:	MATERIAL		A194 GRADE 8	HEAVY HEX - A194 GRADE 8		
	CONSTRUCTION	SUITABLE FOR RAISED-FAC	CE OR FLAT-FACE FLANGES	SUITABLE FOR RAISED-FACE OR FLAT-FACE FLANGES		
GASKETS:	MATERIAL		RAFLUOETHYLENE (PTFE) - 00 OR EQUAL	FULL FACE - 1/8" POLYTETRAFLUOETHYLENE (PTFE) - GARLOCK 3500 OR EQUAL		
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
CPVC (ASTM D1784)	ASTM F441	ASME	B31.1	0	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	I CODE:		
UI-CHEM (CPVC)	CHLORINATED POLYVINYL CHLORIDE (CPVC)	235 PSIG at 73°F	ASME B31.1	ASTM F1970		
` ,	PIPE SIZE (NPS)			HRU 6"		
	CONNECTION AND RATING		CLASS: 150 S	OCKETWELD		
CHECK VALVE	CONSTRUCTION	В.		84, CELL CLASSIFICATION 234 D1784, CELL CLASSIFICATION SS: FKM	47	
	VALVE SELECTION	SPEARS TRUE UNION 2000 COLONIAL TRUE UNION CHECK VALVE HAYWARD TC SERIES				
	CONNECTION AND RATING		CLASS: 150 S	OCKETWELD		
BALL VALVE	CONSTRUCTION	BODY: ASTM D1784 CELL CLASS 23447, CPVC, SCH. 80, FULL-PORT, "TRUE UNION" STYLE BALL: CPVC, TYPE 1, ASTM D1784, CELL CLASSIFICATION 23447 SEAT: PTFE STEM: CPVC, TYPE 1, ASTM D1784, CELL CLASS 23447 HANDLE: POLYPROPYLENE PACKING: GRAPHITE O-RINGS: FKM				
	VALVE SELECTION		SPEARS TRU COLONIAL FULL BLOCK INDUS	E UNION 2000		

NOTES:

1) FOR USE WITH LIQUID SERVICE. NOT FOR COMPRESSED AIR OR GAS SERVICE.

2) PRESSURE RATINGS FOR FITTINGS AND FLANGES SHALL MEET OR EXCEED MAXIMUM WORKING PRESSURE.

REVISION HISTORY					
NUMBER DESCRIPTION DATE					
0	INITIAL ISSUE	2/22/2021			

POLYVINYLIDENE FLUORIDE (PVDF) ASTM D3222 FOR TYPE I HOMOPOLYMERS WITH 1.7% RED PIGMENT SERVICE - ACID (TO 150 PSIG) DATE REVISED:

CHEMICAL TREATMENT

DESIGN CONDITIONS

150 PSIG AT 100 °F

SCH 80

ASTM D2467

SAME AS ADJOINING PIPE

HEAT FUSION WELDED

SAME AS ADJOINING PIPI

FLANGES NOT PERMITTED

REVISION

DESIGN CODE

O-RING: FKM NIBCO PVDF TRU UNION BALL CHECK WATTS PVDF TRUE UNION BALL CHECK

CLASS: 150 SOCKETWELD

BODY: ASTM D3222, WITH CELL CLASS TYPE II, RED PVDF, SCH. 80, FULL-PORT, "TRUE UNION" STYLE BALL: PVDF, ASTM D3222, WITH CELL CLASS TYPE II SEAT: PTFE SEAT: PITE
STEM: PVDF, ASTM D3222, WITH CELL CLASS TYPE II
HANDLE: POLYPROPYLENE
PACKING: GRAPHITE
O-RINGS: FKM

NIBCO PVDF TRU-BLOC MODEL C WATTS PVDF TRUE UNION BALL

150 SOCKETWELD BODY: ASTM D3222, WITH CELL CLASS TYPE II, RED PVDF, SCH. 80, FULL-PORT, "TRUE UNION" STYLE BALL: PVDF, ASTM D3222, WITH CELL CLASS TYPE II
SEAT: FKM
STOP RING: RED PVDF

ASME B31.1

1) FOR USE WITH LIQUID SERVICE, NOT FOR COMPRESSED AIR OR GAS SERVICE.

PIPING SPECIFICATION:

PIPE SIZE (NPS)

WEIGHT/SCHEDULE

MATERIAL

CONSTRUCTION

STANDARD

WALL THICKNESS

CONSTRUCTION

WALL THICKNESS

CONSTRUCTION

WALL THICKNESS MATERIAL

CONSTRUCTION

MATERIAL CONSTRUCTION

MATERIAL

ASTM D1785

POLYVINYLIDENE FLUORIDE

PIPE SIZE (NPS)
CONNECTION AND RATING

CONSTRUCTION

VALVE SELECTION

CONNECTION AND RATING

CONSTRUCTION

VALVE SELECTION

PECIFICATION MATERIAL

UI-CHEM (PVDF)

DIDE MATERIAL

ASTM D3222

FITTINGS:

JOINTS:

FLANGES:

FLANGE BOLTS

FLANGE NUTS:

GASKETS:

PIPE MATERIAL

UI-CHEM (PVDF)

CHECK VALVE

BALL VALVE

VALVE SPECIFICATION

2) PRESSURE RATINGS FOR FITTINGS AND FLANGES SHALL MEET OR EXCEED MAXIMUM WORKING PRESSURE

REVISION HISTORY				
NUMBER	DESCRIPTION	DATE		
0	INITIAL ISSUE	11/19/2020		

PROCESS CHEMICAL TREATMENT

2" AND SMALLER

SCH 80 POLYVINYLIDENE FLUORIDE (PVDF) ASTM D3222 FOR TYPE I HOMOPOLYMERS WITH 1.7% RED PIGMENT

ASTM D2467

SAME AS ADJOINING PIPE

HEAT FUSION WELDED

SAME AS ADJOINING PIPE

FLANGES NOT PERMITTED

DESIGN/CONSTRUCTION CODE

ASME B31.1

PRESSURE CLASS

150 PSIG at 73°F

DOMESTIC WATER SYSTEMS (TO 135 PSIG)

PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:		
UI-DCW		DOMESTIC COLD	AND HOT WATER	135 PSIG AT 200 °F		
OI-DCVV	PIPE SIZE (NPS)	4" AND SMALI	LER (NOTE 1)	2 1/2" THRU	24" (NOTE 1)	
PIPE MATERIAL:	WEIGHT/SCHEDULE	-	-	S	TD	
ASME B36.10M/B88	MATERIAL	ASTM B88 COPPER, T	YPE K, HARD DRAWN	ASTM A53 GRADE B - SEAMLESS GALVANIZED		
	CONSTRUCTION	SOLDERED O	R PRESS FIT	BUTT	WELD	
FITTINGS	WALL THICKNESS	SAME AS ADJ	JOINING PIPE	SAME AS AD	JOINING PIPE	
FITTINGS:	MATERIAL	ASME B16.18 CAST COPPER OR ASME B16.22 WROUGHT		CLASS 12	CLASS 125 FLANGED	
		COPPER			-	
PIPING JOINTS:	TYPE	SOLDERED O		CLASS 128	5 FLANGED	
	OTHER	SEE BELOW FOR		-	-	
	CONSTRUCTION	SOLDER: ASTM B32 ALLC			NECK - ASME B16.5	
SOLDER/FLANGES:	WALL THICKNESS	ANTIMONY, LEAD FREE OR: AS			JOINING PIPE	
	MATERIAL	TIN-SILVER,	LEAD FREE	GALVANIZED ST	EEL - ASTM A105	
SOLDER/FLANGE BOLTS:	CONSTRUCTION	SOLDER: FILLER METAL LEAD FLUX ASTM B813 - SILVER BR	RAZING FILLER METAL SHALL	STUD - FULL LE	NGTH ASME B1.1	
	MATERIAL	BE BCuP SERIES, COPPER F GENERAL DUTY BF		ASTM A307 - GRADE I	B, FULL LENGTH STUD	
	CONSTRUCTION			HEAVY HEX - ASME B1.1 - CLASS 2B THREADS		
PRESS FIT/FLANGE NUTS:	MATERIAL	PRESS FIT: MATERIALS CONFORM TO ASME B16.18 OR: ASME B16.22 AND CRITERIA UNDER IAPMO PS 117 - SEALING ELEMENTS: EPDM - SEALING ELEMENTS FACTORY INSTALLED - FITTINGS SHALL BE PRESSED BY TOOLS RECOMMENDED BY FITTING MANUFACTURER		CARBON STEEL - ASTM A194 GRADE 2H HEAVY - F436 WASHERS		
PRESS FIT/GASKETS:	CONSTRUCTION			SPIRAL WOUND - SUITABLE FOR RAISED-FACE OR FACE FLANGES		
	MATERIAL			FULL FACE -	RED RUBBER	
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTR	RUCTION CODE:	REVISION:	DATE REVISED:	
COPPER/CARBON STEEL	ASTM B36.10M	ASME	B31.1	0	2/22/2021	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	I CODE:		
UI-DCW	AS NOTED	125 PSIG	ASME B31.1	ASME B16.34		
OI-DCVV	PIPE SIZE (NPS)	4" AND SMALI	LER (NOTE 1)	2 1/2" THRU 24" (NOTE 1)		
	CONNECTION AND RATING			CLASS 125 FLANGED ENDS IN ACCORDANCE WITH MSS SP-70 'BODY/SEAT:ASTM A395 CAST IRON SHAFT: B16 BRASS DISC: BRONZE INTERNALS: BRONZE SEATS AND SEALS: RENEWABLE BRONZE OS&Y CLASS 125		
GATE VALVE	CONSTRUCTION					
	VALVE SELECTION			POWELL FIG. NO. 1793 CRANE F84 ELITE GTVA-FCI1333-HW		
	CONNECTION AND RATING	CLASS 200 PSIG SOLE	DERED OR PRESS FIT			
BALL VALVE	CONSTRUCTION	BODY: C89836 LEAD-FREE BRONZE, STANDARD PORT BALL: C27451 LEAD-FREE BRASS STEM: C27451 LEAD-FREE BRASS SEATS/SEALS: RPTFE PACKING: RPTFE		-		
	VALVE SELECTION	LOCKABLE, QUARTER TURN LEVER HANDLE APOLLO 70LF SERIES (SOLDER) APOLLO 77VLF SERIES (PRESS FIT) NIBCO 580 LF SERIES (THRU 3") MILWAUKEE UPBA-480B (PRESS FIT ENDS)				

NOTES:

1) PIPE SIZE RANGE OVERLAP IS INTENTIONAL. EITHER MATERIAL CAN BE USED BETWEEN 2-1/2" AND 4" PENDING DESIGN PROFESSIONAL DISCUSSION WITH UTILITY OPERATOR.

REVISION HISTORY					
NUMBER	DESCRIPTION	DATE			
0	INITIAL ISSUE	12/1/2017			
1	ADDED MODEL NUMBER FOR NIBCO BALL VALVE, ADDED VALVE MANUFACTURERS	2/22/2021			

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PIPING SI	PIPING SPECIFICATION: PROCESS: DESIGN COND				
UI-LOL		LUBE OIL		230 PSIG AT 100 °F	
UI-LUL	PIPE SIZE (NPS)		SMALLER	2 1/2" THRU 10"	12" THRU 24"
PIPE:	WEIGHT/SCHEDULE	SCH 40S		SCH 10S	SCH 40S
ASME B36.10M	MATERIAL	ASTM A312 TYPE 304 - SEAMLESS		ASTM A312 TYPE 304 - SEAMLESS	
	CONSTRUCTION	CLASS 3000 - SOCKETWELD - B16.11		BUTTWELD	- ASME B16.9
FITTINGS:	WALL THICKNESS	SAME AS AD	JOINING PIPE	SAME AS AD	JOINING PIPE
	MATERIAL	FORGED STEEL - ASTM	A182, F304L, ASME 16.11	ASTMA403, WP304L - S	EAMLESS, ASME B16.25
PIPING JOINTS:	TYPE	SOCKETWELD		BUTTWELD - END	PREP PER B16.25
PIPING JOINTS:	OTHER	-	-		-
	CONSTRUCTION	FLANGES NO	T PERMITTED	FLANGES NO	T PERMITTED
FLANGES:	WALL THICKNESS	-	-		_
	MATERIAL	-	_		_
FLANGE BOLTS:	CONSTRUCTION	-	-		-
FLANGE NUTS:	CONSTRUCTION	-	-		-
WASHER:	CONSTRUCTION	-	-	-	
GASKETS:	CONSTRUCTION			-	
GASKETS:	MATERIAL				_
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:
STAINLESS STEEL	ASTM B36.10M	ASME	B31.1	0	2/22/2021
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN	I CODE:	
111.1.01	STAINLESS STEEL	300 PSIG	ASME B31.1	MSS SP-110	1
UI-LOL	PIPE SIZE (NPS)	2" AND S	MALLER	2 1/2" THRU 10"	
	CONNECTION AND RATING	CLASS 300 THREADED			
		BODY/BONNET: ASTM A351, C	F8M STAINLESS STEEL, FULL-		
			PRT		
			G: XTREME		
	CONSTRUCTION		SS 316	-	
BALL VALVE			SS 316		
			ORCED PTFE		
			GRAPHITE		
			76F-100-A		
	VALVE SELECTION	NIBCO T-585-S6-R-66-LL MILWAUKEE SERIES BA260		·	
	REVISION H		SERIES BAZOU		
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0	INITIAL ISSUE		2/22/2021		
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PIPING SPECIFICATION:		PROCESS:		DESIGN CONDITIONS:	
UI-REF		R1	34A		AT 250 °F
	PIPE SIZE (NPS)		10" AND	SMALLER	
PIPE MATERIAL:	WEIGHT/SCHEDULE	<u> </u>		-	
ASME B31.5	MATERIAL			K, HARD DRAWN, SEAMLESS	
	CONSTRUCTION			PRESSURE TYPE	
FITTINGS:	WALL THICKNESS			JOINING PIPE	
	MATERIAL			GHT COPPER ALLOY	
PIPING JOINTS:	TYPE		ERIES FILLER METAL AND CAP		
PIPE MATERIAL:	PIPE CODE:		RUCTION CODE:	REVISION:	DATE REVISED:
COPPER	ASTM B31.5		B31.5	0	2/22/2021
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:		CODE:	1
UI-REF	AS NOTED	150 PSIG	ASME B31.1	ASME B16.34	
OI ILLI	PIPE SIZE (NPS)		RU 2 5/8"		RU 10"
	CONNECTION AND RATING	CLASS 500 PSIG SOLI	DERED OR THREADED		
CHECK VALVE	CONSTRUCTION	BODY/CAP: BRONZE STEM: SILICON BRASS SEAT: NITRILE RUBBER DISC: BRONZE, IN-LINE GASKET: SPIRAL WOUND SS WITH GRAPHITE GRAPHITE ARAMID FIBERS			
	VALVE SELECTION	HENRY VALVE COMPANY SERIES 205 ALCO SERIES EC PARKER SERIES C			
	CONNECTION AND RATING	CLASS 600 PSIG SOLDERED OR THREADED			
BALL VALVE	CONSTRUCTION	BODY: BOLTED FORGED BRASS, 2-PIECE, FULL-PORT BALL: ELECTRO-PLATED BRASS STEM: STAINLESS STEEL WITH NOPHRENE RING STEM SEALS PACKING: PTFE SEATS AND SEALS: PTFE			
	VALVE SELECTION	HENRY VALVE COMPANY SERIES 937 ALCO BVE PARKER SERIES 500			
	CONNECTION AND RATING	CLASS 500 PSIG SOLI	DERED OR THREADED		
RELIEF VALVE	CONSTRUCTION	TYPE: ANGLE TYPE, DESIGNED, APPROVED, AND STAMPED IN ACCORDANCE WITH ANSI 89.1/ASHRAE STANDARD 15, SEALED AND STAMPED WITH ASME UV AND NATIONAL BOARD CERTIFICATION NB BODY/DISC: BRASS SEAT: NEOPRENE SETTING: 300 PSIG			
	VALVE SELECTION	MUELLER ANGLE NPTFE TO FLARE			
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PIPING SPECIFICATION:		PROCESS:		DESIGN C	DESIGN CONDITIONS:		
III DV	UI-RV		R123	285 PSI	G AT 150 °F		
UI-RV	PIPE SIZE (NPS)	4" THRU 12"					
PIPE MATERIAL:	WEIGHT/SCHEDULE		S	CH. 40			
ASME B31.10M	MATERIAL		ASTM A53 GR	ADE B - SEAMLESS			
	CONSTRUCTION	BUTTWELD - B16.25					
FITTINGS:	WALL THICKNESS		SAME AS A	ADJOINING PIPE			
	MATERIAL	E	BUTTWELD FITTING - AST	TM A234 GRADE B - SEAMLESS			
DIDING IGNITO	TYPE		BUTTW	ELD - B16.25			
PIPING JOINTS:	OTHER		WHERE FLANGE	OR THREAD REQUIRED			
	CONSTRUCTION		NOT F	PERMITTED			
UNIONS:	WALL THICKNESS						
	MATERIAL						
	CONSTRUCTION	CLASS 300 - WELD NECK - ASME B16.5 AND ASME B16.47					
FLANGES:	WALL THICKNESS	SAME AS ADJOINING PIPE					
	MATERIAL	FORGED CARBON STEEL - ASTM A105 OR ASTM A516 GRADE 70					
FLANGE BOLTS:	CONSTRUCTION	Н	IGH-STRENGTH STEEL A	STM A193, CLASS 2, GRADE B8			
FLANGE NUTS:	CONSTRUCTION		HEAVY HEX	- A194 GRADE 2H			
WASHER:	CONSTRUCTION			F436			
	CONSTRUCTION	SPIRAL WOUND - SUITABLE FOR RAISED-FACE OR FLAT-FACE FLANGES					
GASKETS:	MATERIAL	FLEXITALLIC STYLE CGI - TYPE 304 STAINLESS - FLEXICARB FILLER					
	MANUFACTURER	GARLOCK BLUE-GARD 3000 OR EQUAL					
THERMOWELLS:	MATERIAL	INSERTION THERMO	WELLS - ASTM A105 - 300	00 PSIG PRESSURE CLASS - SEA	AL-WELDED WELLS		
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE:		REVISION:	DATE REVISED:		
CARBON STEEL	ASTM B36.10M	ASME B31.1		0	2/22/2021		
FINISH:	SPECIFICATION MATERIAL:	2-COAT SYSTEM WITH SOLVENT-BASED INORGANIC ZINC PRIMER, AND INORGANIC SILICATE POLYMER TOP COAT - REFER TO PROJECT SPECIFICATIONS COLOR TO MATCH RED OF EXISTING RELIEF DEVICE PIPING					
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PIPING S	PIPING SPECIFICATION:		PROCESS: DESIGN CONDITIONS:			
UI-RV		R134A	OR R123	285 PSI	G AT 150 °F	
PIPE SIZE (NPS)			4" T	HRU 12"		
PIPE MATERIAL:	WEIGHT/SCHEDULE		SC	CH 10S		
ASME B31.10M	MATERIAL		A312 GRADE 304 - S	SEAMLESS OR WELDED		
	CONSTRUCTION	BUTTWELD - ASME B16.9				
FITTINGS:	WALL THICKNESS		SAME AS A	DJOINING PIPE		
	MATERIAL		ASTM A403, WP304	4L - SEAMLESS, B16.25		
	TYPE		BUTTWELD - EN	ID PREP PER B16.25		
PIPING JOINTS:	OTHER					
	CONSTRUCTION		NOT P	ERMITTED		
UNIONS:	WALL THICKNESS					
	MATERIAL					
	CONSTRUCTION	CLASS 300 - WELD NECK - ASME B16.5 AND ASME B16.47				
FLANGES:	WALL THICKNESS	SAME AS ADJOINING PIPE				
	MATERIAL	SS, ASTM A182, F330L, ASME B16.5				
FLANGE BOLTS:	CONSTRUCTION		HIGH-STRENGTH STEEL A	STM A193, CLASS 2, GRADE B8		
FLANGE NUTS:	CONSTRUCTION		HEAVY HEX	- A194 GRADE 2H		
WASHER:	CONSTRUCTION			F436		
	CONSTRUCTION	SPIRAL WOUND - SUITABLE FOR RAISED-FACE OR FLAT-FACE FLANGES			ANGES	
GASKETS:	MATERIAL	FLEXITALLIC STYLE CGI - TYPE 304 STAINLESS - FLEXICARB FILLER				
	MANUFACTURER	GARLOCK BLUE-GARD 3000 OR EQUAL				
THERMOWELLS:	MATERIAL	INSERTION THER	RMOWELLS - ASTM A105 - 300	0 PSIG PRESSURE CLASS - SE.	AL-WELDED WELLS	
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONST	RUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME	B31.1	0	2/22/2021	
	REVISION HIST	FORY				
NUMBER	DESCRIPTION	N	DATE			
0	INITIAL ISSUE		2/22/2021			

BRANCH TABLE		HEADER SIZE (NPS)																
BRANCH SIZE (NPS)	24	20	18	16	14	12	10	8	6	4	3	2 1/2	2	1 1/2	1 1/4	1	3/4	1/2
1/2	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	RT	RT	RT	RT	ST
3/4	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	RT	RT	RT	RT	ST	
1	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	RT	RT	RT	RT	ST		
1 1/4	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	RT	RT	RT	RT	ST		_	
1 1/2	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	RT	RT	RT	RT	ST		_		
2	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	SOL	RT	RT	RT	ST					
2 1/2	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	RT	RT	RT	ST		=				
3	WOL	WOL	WOL	WOL	WOL	WOL	WOL	RT	RT	RT	ST		-'					
4	WOL	WOL	WOL	WOL	WOL	WOL	RT	RT	RT	ST		='						
6	WOL	WOL	WOL	RT	RT	RT	RT	RT	ST									
8	WOL	RT	RT	RT	RT	RT	RT	ST										
10	RT	RT	RT	RT	RT	RT	ST											
12	RT	RT	RT	RT	RT	ST												
14	RT	RT	RT	RT	ST													
16	RT	RT	RT	ST														
18	RT	RT	ST															
20	RT	ST													ST	STANDAR		
24	ST														RT	REDUCIN		
30															WOL	WELDOL	ET	
36					E∩R PIPE	SIZES AR	OVE 24"	CONSULT	DESIGN E	NGINEER	,				SOL SOCKETOLET			
42						OIZEO AD	OVL 24 ,	CONTOUL	DECIGINE	LINGHALLIN	•				CRBC CUSTOM REINFORCED			
48																BRANCH	CONNECT	ION
													REVISION:		DATE RE	VISED:		
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