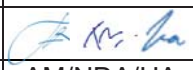
GENERAL SPECIFICATION

MATERIAL CLASS FOR 12CG2T02

ENGINEERING TECHNICAL STANDARDS & PROCEDURES
PT KILANG PERTAMINA INTERNASIONAL
DIREKTORAT PROYEK INFRASTRUKTUR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REVISION HISTORY

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1. INTRODUCTION

1.1 The Specification covers the detail material specification for Material Class 12CG2T01.

1. PENGANTAR

1.1 Spesifikasi mencakup detail spesifikasi material untuk Kelas Material 12CG2T01.

2. SCOPE

2.1 The detail specification for common piping part/item such as pipes, fittings, flanges, valves, gaskets, and bolt & nuts.

2.2 The specification applies to piping in auxiliary cooling water supply & return, drinking water and utility water.

2.3 Additional requirements imposed by the Pertamina Standards shall apply to this specification.

2. LINGKUP

2.1 Spesifikasi detail untuk bagian/barang perpipaan umum seperti pipa, fitting, *flange*, *valve*, gasket, dan baut & mur.

2.2 Spesifikasi ini berlaku untuk perpipaan untuk suplai & pengembalian air pendingin, air minum dan air utilitas.

2.3 Persyaratan tambahan yang diberlakukan oleh Standar Pertamina berlaku untuk spesifikasi ini.

3. CONFLICTS AND DEVIATIONS

3.1 Any conflicts between this standard and other applicable Engineering Technical Standards & Procedures (ETSP), or OWNER standard, codes, and forms shall be resolved in writing by OWNER.

3.2 All direct requests to deviate from this standard (ETSP) in writing to OWNER, who shall follow internal OWNER procedure and forward such requests to OWNER for approval.

3. KONFLIK DAN DEVIASI

3.1 Apabila terdapat konflik antara standar ini dengan *Engineering Technical Standards & Procedures* (ETSP) yang berlaku lainnya, atau standar PEMILIK, *codes* dan formulir, maka harus diselesaikan secara tertulis oleh PEMILIK.

3.2 Semua permintaan penggunaan standar yang berbeda dari standar ini (ETSP), harus diajukan kepada PEMILIK secara tertulis dengan mengikuti prosedur internal PEMILIK untuk mendapatkan persetujuan.

4. ABBREVIATIONS

4.1 Abbreviations used for this specification shall have the following definitions:

ASB	Asbestos
BB	Bolted Bonnet

4. SINGKATAN

4.1 Singkatan yang digunakan pada spesifikasi ini harus memiliki definisi sebagai berikut:

ASB	*Asbestos*
BB	*Bolted Bonnet*

BE	Beveled End	BE	*Beveled End*
BLND	Blind	BLND	*Blind*
BRZ	Bronze	BRZ	*Bronze*
CHK	Check	CHK	*Check*
CL	Class	CL	*Class*
CON	Concentric	CON	*Concentric*
CORR	Corrosion	CORR	*Corrosion*
CPLG	Coupling	CPLG	*Coupling*
CS	Carbon Steel	CS	*Carbon Steel*
CWP	Cold Working Pressure	CWP	*Cold Working Pressure*
ECC	Eccentric	ECC	*Eccentric*
ELS	Elastomer	ELS	*Elastomer*
ENPT	External Taper Pipe Thread	ENPT	*External Taper Pipe Thread*
FF	Flat Face	FF	*Flat Face*
FIG 8 BLANK	Figure 8 Blank / Spectacle Blind	FIG 8 BLANK	*Figure 8 Blank / Spectacle Blind*
FLG	Flange	FLG	*Flange*
GALV	Galvanized	GALV	*Galvanized*
GLB	Globe	GLB	*Globe*
GT	Gate	GT	*Gate*
HW	Handwheel	HW	*Handwheel*
I/E	Internal And External	I/E	*Internal And External*
INPT	Internal Taper Pipe Thread	INPT	*Internal Taper Pipe Thread*
ISRS	Inside Screw Rising Stem	ISRS	*Inside Screw Rising Stem*
LDT	Line Designation Table	LDT	*Line Designation Table*
LNGHT	Lengths	LNGHT	*Lengths*
LO	Lever	LO	Lever Operated
MAX	Maximum	MAX	*Maximum*
MFR	Manufacturer	MFR	*Manufacturer*
NIP	Nipple	NIP	*Nipple*

NPS	Nominal Pipe Size	NPS	*Nominal Pipe Size*
PKG	Packing	PKG	*Packing*
RED	Reducer	RED	*Reducer*
SCH	Schedule / Wall Thickness	SCH	*Schedule / Wall Thickness*
SLD	Solid	SLD	*Solid*
SMLS	Seamless	SMLS	*Seamless*
SNGL	Single	SNGL	*Single*
SS	Stainless Steel	SS	*Stainless Steel*
STD	Standard	STD	*Standard*
TEMP	Temperature	TEMP	*Temperature*
THD	Threaded	THD	*Threaded*
UB	Union Bonnet	UB	*Union Bonnet*
VLV	Valve	VLV	*Valve*
WDG	Wedge	WDG	*Wedge*

5. DEFINITIONS

5.1 The following words shall have these special meanings when used herein:

OWNER	Owner of the Plant is defined as PT Kilang Pertamina Internasional.
CONTRACTOR /CONSULTANT	Defined as The Organization to which PT Kilang Pertamina Internasional assign the work.
VENDOR	Defined as the company selected to supply the equipment and service detailed in this specification.

5. DEFINISI

5.1 Penggunaan kata-kata berikut harus memiliki arti khusus sebagai berikut:

PEMILIK	Pemilik Kilang didefinisikan sebagai PT Kilang Pertamina Internasional.
KONTRAKTOR / KONSULTAN	Didefinisikan sebagai Organisasi yang ditunjuk oleh di PT Kilang Pertamina Internasional untuk melakukan suatu pekerjaan.
VENDOR	Didefinisikan sebagai perusahaan yang dipilih untuk memasok peralatan dan layanan yang dirinci dalam spesifikasi ini.

shall	Indicates that the statement is mandatory	*shall*	Menunjukkan bahwa pernyataan itu wajib
should	Indicates a recommendation	*should*	Menunjukkan rekomendasi

6. CODES AND STANDARDS

The following Codes, Standard and Specifications apply to this specification. When an edition date is not indicated for a code or standard or any update in codes and standards in this specification document, the latest edition and addendum in force at the time of purchase shall apply. Material & equipment shall be as a specification or an equal approved by OWNER.

6.1 American Society of Mechanical Engineers (ASME)

ASME B16.5	Pipe Flanges and Flanged Fittings
ASME B31.3	Process Piping
ASME B36.10M	Welded and Seamless Wrought Steel Pipe
ASME B16.1	Gray Iron Pipe Flanges and Flanged Fittings
ASME B16.9	Factory-Made Wrought Butt-welding Fittings
ASME B16,10	Face-to-Face and End-to-End Dimensions of Valves
ASME B16.11	Forged Fittings, Socket-Welding and Threaded
ASME B16.21	Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.24	Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves

6. KODE DAN STANDAR

Kode, standar, dan spesifikasi berikut berlaku untuk spesifikasi ini. Kode dan standar harus menggunakan edisi yang terbaru atau edisi yang berlaku pada saat pembelian. Material & peralatan harus sesuai spesifikasi atau setara dengan yang disetujui oleh PEMILIK.

6.1 *American Society of Mechanical Engineers (ASME)*

ASME B16.5	*Pipe Flanges and Flanged Fittings*
ASME B31.3	*Process Piping*
ASME B36.10M	*Welded and Seamless Wrought Steel Pipe*
ASME B16.1	*Gray Iron Pipe Flanges and Flanged Fittings*
ASME B16.9	*Factory-Made Wrought Butt-welding Fittings*
ASME B16,10	*Face-to-Face and End-to-End Dimensions of Valves*
ASME B16.11	*Forged Fittings, Socket-Welding and Threaded*
ASME B16.21	*Nonmetallic Flat Gaskets for Pipe Flanges*
ASME B16.24	*Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves*

	ASME B16.36	Orifice Flanges	ASME B16.36 *Orifice Flanges*
	ASME B16.42	Ductile Iron Pipe Flanges and Flanged Fittings	ASME B16.42 *Ductile Iron Pipe Flanges and Flanged Fittings*
	ASME B16.48	Line Blanks	ASME B16.48 *Line Blanks*
6.2	American Petroleum Institute (API)		6.2 *American Petroleum Institute* (API)
	API 594	Check Valves: Flanged, Lug, Wafer, and Butt-welding	*API 594* *Check Valves: Flanged, Lug, Wafer, and Butt-welding*
	API 609	Butterfly Valves: Double-flanged, Lug and Wafer-type, and Butt-welding Ends	*API 609* *Butterfly Valves: Double-flanged, Lug and Wafer-type, and Butt-welding Ends*
6.3	American Society for Testing and Materials (ASTM)		6.2 *American Society for Testing and Materials* (ASTM)
	ASTM A105	Standard Specification for Carbon Steel Forgings for Piping Applications	ASTM A105 *Standard Specification for Carbon Steel Forgings for Piping Applications*
	ASTM A106	Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service	*ASTM A106* *Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service*
	ASTM A193	Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications	*ASTM A193* *Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications*
	ASTM A194	Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both	*ASTM A194* *Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both*

	ASTM A234	Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service		*ASTM A234*	*Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service*
	ASTM A516	Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service		*ASTM A516*	*Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service*
	ASTM A536	Standard Specification for Ductile Iron Castings		*ASTM A536*	*Standard Specification for Ductile Iron Castings*
	ASTM A733	Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples		ASTM A733	*Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples*
	ASTM B61	Standard Specification for Steam or Valve Bronze Castings		*ASTM B61*	*Standard Specification for Steam or Valve Bronze Castings*
6.3	American Water Works Associations		6.3	*American Water Works Associations*	
	AWWA C508	Swing-Check Valves for Waterworks Service, 2-In. Through 24-In.(50-Mm Through 600-Mm) NPS		*AWWA C508*	*Swing-Check Valves for Waterworks Service, 2-In. Through 24-In.(50-Mm Through 600-Mm) NPS*
	AWWA C515	Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service		*AWWA C515*	*Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service*
6.4	Manufacturers Standardization Society (MSS)		6.4	Manufacturers Standardization Society (MSS)	
	MSS SP-80	Bronze Gate, Globe, Angle, and Check Valves		MSS SP-80	*Bronze Gate, Globe, Angle, and Check Valves*
	MSS SP-85	Gray Iron Globe and Angle Valves, Flanged		MSS SP-85	*Gray Iron Globe and Angle Valves, Flanged*

	and Threaded Ends		*and Threaded Ends*
MSS SP-95	Swage(d) Nipples and Bull Plugs	MSS SP-95	*Swage(d) Nipples and Bull Plugs*
MSS SP-97	Integrally Reinforced Forged Branch Outlet Fittings: Socket Welding, Threaded, and Buttwelding Ends	MSS SP-97	*Integrally Reinforced Forged Branch Outlet Fittings: Socket Welding, Threaded, and Buttwelding Ends*

6.5 References Documents from PT KPI

6.4 Dokumen Referensi dari PT KPI

MP2-ETS-PIP-GS-0001-00-2018	General Notes Piping Material Specification	MP2-ETS-PIP-GS-0001-00-2018	*General Notes Piping Material Specification*
MP2-ETS-PIP-GS-0002-00-2018	Piping General Design	MP2-ETS-PIP-GS-0002-00-2018	*Piping General Design*
MP2-ETS-PIP-GS-0005-00-2018	Selection of Piping Valves	MP2-ETS-PIP-GS-0005-00-2018	*Selection of Piping Valves*
MP2-ETS-PIP-GS-0007-00-2018	Material Selection for Piping Systems	MP2-ETS-PIP-GS-0007-00-2018	*Material Selection for Piping Systems*
MP2-ETS-PIP-GS-0009-00-2018	Pipe, Flange and Fitting Material Requirements	MP2-ETS-PIP-GS-0009-00-2018	*Pipe, Flange and Fitting Material Requirements*
MP2-ETS-PIP-EG-0017-00-2019	Selection of Flanges, Stud Bolts and Gaskets	MP2-ETS-PIP-EG-0017-00-2019	*Selection of Flanges, Stud Bolts and Gaskets*
RP-ETS-PIP-GS-0018-00-2022	Limitations on Pipe Joints and Components	RP-ETS-PIP-GS-0018-00-2022	*Limitations on Pipe Joints and Components*
RP-ETS-PIP-GS-0021-00-2022	Pressure Testing of Plant Piping	RP-ETS-PIP-GS-0021-00-2022	*Pressure Testing of Plant Piping*
MP2-ETS-CIV-GS-0019-00-2019	General Specification - Galvanizing	MP2-ETS-CIV-GS-0019-00-2019	*General Specification - Galvanizing*

7. DETAIL MATERIAL SPECIFICATION

7. SPESIFIKASI DETAIL MATERIAL

7.1 The wall thickness calculation is considered a full rating condition based on ASME B16.5.

7.2 The wall thickness, which is not yet defined in the specification, CONTRACTOR/CONSULTANT shall calculate the wall thickness during project execution and subject to approval by OWNER.

7.3 The detail material specification for pipe, fittings, flanges, valves, gasket, and bolt & nuts see Attachment-1.

7.4 The branch connection selection is based on ASME B31.3. For the branch connection type see Branch Table Attachment-1.

7.1 Perhitungan ketebalan pipa dianggap sebagai kondisi *full rating* berdasarkan ASME B16.5.

7.2 Ketebalan pipa yang belum ditentukan pada spesifikasi, KONTRAKTOR/ KONSULTAN harus menghitung ketebalan pipa selama pelaksanaan proyek dan harus disetujui oleh PEMILIK.

7.3 Spesifikasi material rinci untuk pipa, fitting, *flange*, *valve*, gasket dan baut & mur lihat Lampiran-1.

7.4 Pemilihan cabang koneksi didasarkan pada ASME B31.3. Untuk detail jenis sambungan cabang lihat Tabel Cabang Lampiran-1.

8. GENERAL NOTES

060 Piping shall be hot-dip galvanized after fabrication. Shop fabrication shall be maximized and all spools shall be hot-dip galvanized after fabrication. Valves and inside of field welds shall not be galvanized.

A01 Only a short description of the commodity code can be seen in the piping material class. Always refer to the "Piping Material Purchase Descriptions per Class" report for the detailed description.

A02 Options ("Opt") are required to internally govern the use of alternate selections within a single class specification. Like components having the same or an overlapping size range, but different properties, require different "Opt" codes. The "Opt" column is blank next to items designated as the default component for that type, size and spec. Each option to that default component

8. CATATAN UMUM

060 *Hot-dip* galvanis pipa harus dilakukakan setelah fabrikasi. *Shop* fabrikasi harus dimaksimalkan dan semua *spool* harus digalvanis dengan *hot-dip* setelah fabrikasi. *Valve* dan lasan lapangan bagian dalam tidak boleh digalvanis.

A01 Hanya deskripsi singkat tentang kode komoditas yang dapat dilihat pada kelas material perpipaan. Agar mengacu kepada laporan "Deskripsi Pembelian Material Perpipaan per Kelas" untuk penjelasan rinci.

A02 Opsi ("Opt") yang diperlukan agar diatur secara internal terkait penggunaan pilihan alternatif dalam spesifikasi kelas tunggal. Seperti komponen yang memiliki rentang ukuran yang sama atau tumpang tindih, tetapi memiliki properti yang berbeda, memerlukan kode "Opt" yang berbeda. Kolom "Opt" kosong di sebelah item yang ditetapkan sebagai

	will have a number in the "Opt" column and when necessary, a note detailing when its applicable. In cases where several options exist, as in the case of components with multiple end connection types, a different "Opt" number is required to differentiate each type having an overlapping size range.		komponen *default* untuk jenis, ukuran, dan spesifikasi tersebut. Setiap opsi untuk komponen *default* itu akan memiliki nomor di kolom "Opt" dan bila perlu, catatan yang merinci kapan itu berlaku. Dalam kasus di mana ada beberapa opsi, seperti dalam kasus komponen dengan beberapa jenis koneksi ujung, nomor "Opt" yang berbeda diperlukan untuk membedakan setiap jenis yang memiliki rentang ukuran yang tumpang tindih.
A03	Piping schedules/wall thicknesses shown are adequate for the full temperature/pressure limits of this class. Where "CALC" is shown, the schedule/wall thickness should be determined from the design conditions for each line size.	A03	*Schedule*/ketebalan perpipaan yang ditunjukkan memadai untuk batas suhu/tekanan penuh dari kelas ini. Jika "*CALC*" ditampilkan, *schedule*/ketebalan perpipaan harus ditentukan dari kondisi desain untuk setiap ukuran line pipa.n.
TP2	Temperature/Pressure limits indicated in 'Default Schedule - Table 1' are in accordance with the Ductile Iron Pipe (DIP) Flange Pressure Class (CL) referenced from ASME B16.42 (2011) and, where applicable by size range of this material class, ASME B16.47 (2011).	TP2	Batas suhu/tekanan yang ditunjukkan dalam *'Default Schedule* - Tabel 1' sesuai dengan Kelas Tekanan *Flange* (CL) *Ductile Iron Pipe* (DIP) berdasarkan referensi ASME B16.42 (2011) dan, jika berlaku menurut kisaran ukuran kelas material ini, ASME B16.47 (2011).
Z02	Branch connections for size ranges outside of those shown require a combination of tee or reducing tee with one or more reducers.	Z02	Sambungan cabang untuk rentang ukuran di luar yang ditunjukkan memerlukan kombinasi *tee* atau *reducing* tee dengan satu atau lebih *reducer*.
014	Full-face gaskets shall be used at flat-faced flanges.	014	Gasket f*ull-face* harus digunakan pada *flat-faced flange*.
026	These valves shall be used only if indicated on the P&ID.	026	*Valve* ini harus digunakan hanya jika ditunjukkan pada P&ID.
062	These check valves shall be installed in a horizontal position with cover up or in vertical position with upward flow.	062	*Check valve* ini harus dipasang dalam posisi horizontal dengan penutup atau dalam posisi vertikal dengan aliran ke atas.
501	Blind and Spacer Set only to be used	501	*Blind and Spacer Set* hanya

	when layout cannot accommodate Spectacle Blinds. Permission from project required to use Blind and Spacer.		digunakan ketika *layout* tidak dapat mengakomodasi *Spectacle Blind*. Izin dari proyek diperlukan untuk menggunakan *Blind dan Spacer*.
508	Use of low-strength bolting is required for joining flat face flanges and full face gaskets	508	Penggunaan perbautan (baut & mur) kekuatan rendah diperlukan untuk menyambung *flat face flange* dan *gasket full face.*
F01	Higher rated flanged components and gaskets shall be used as required at spec breaks and/or to match flange connections at control valves and special equipment which exceed the class rating of this piping material class.	F01	Komponen *flange* dan gasket dengan *rating* lebih tinggi harus digunakan seperti yang dipersyaratkan pada batas putus spesifikasi dan/atau untuk mencocokkan sambungan *flange* pada *control valve* dan peralatan khusus yang melebihi *rating* kelas dari kelas material perpipaan ini.
G02	Higher rated flanges and gaskets shall be used as required at spec breaks and/or to match flange connections at control valves and special equipment which exceed the class rating of this piping material class.	G02	*Flange* dan gasket dengan *rating* lebih tinggi harus digunakan sesuai kebutuhan pada batas putus spesifikasi dan/atau untuk mencocokkan sambungan *flange* pada *control valve* dan peralatan khusus yang melebihi *rating* kelas dari kelas material perpipaan ini.
K01	Higher rated flanged components and gaskets shall be used as required at spec breaks and/or to match flange connections at control valves and special equipment which exceed the class rating of this piping material class.	K01	Komponen *flange* dan gasket dengan *rating* lebih tinggi harus digunakan seperti yang dipersyaratkan pada batas putus spesifikasi dan/atau untuk mencocokkan sambungan *flange* pada *control valve* dan peralatan khusus yang melebihi *rating* kelas dari kelas material perpipaan ini.
V01	Higher rated flanged components and gaskets shall be used as required at spec breaks and/or to match flange connections at control valves and special equipment which exceed the class rating of this piping material class.	V01	Komponen *flange* dan gasket dengan *rating* lebih tinggi harus digunakan seperti yang dipersyaratkan pada batas putus spesifikasi dan/atau untuk mencocokkan sambungan *flange* pada *control valve* dan peralatan khusus yang melebihi *rating* kelas dari kelas material perpipaan ini.

GENERAL SPECIFICATION
DETAIL MATERIAL SPESIFICATION FOR 12CG2T02

PIPING CLASS : **12CG2T02**

SERVICE : AUXILIARY COOLING WATER RETUR, AUXILIARY COOLING WATER SUPPLY, DRINKING WATER, UTILITY WATER

PRESSURE - TEMP. RATING : **ASME B16.5**		CLASS DESCRIPTION	
TEMPERATURE	PRESSURE		
Deg C	Kg/cm^2G		
-29	17.5	DESIGN CODE	: ASME B31.3
38	17.5	PIPING MATERIAL	: GALVANIZED CARBON STEEL
50	17.5	FITTING MATERIAL	: GALVANIZED CARBON STEEL
100	16.3	VALVE MATERIAL	: DUCTILE IRON
		VALVE TRIM	: BRONZE TRIM
		FLANGE CLASS	: 150 FF
		CORR. ALLOW	: 3 MM
		MAX. HYDROTEST	: SEE LDT
		STRESS RELIEF	: NOT APPLICABLE

SIZE RANGE (INCHES)		PART SYMB	DESCRIPTION	OPSI	NOTE
			PIPE		
1/2	4	PIP	PIPE, CS A106-B, SMLS, ENPT, SCH 160, B36.10M, GALV, SNGL RANDOMLGTHS		
6	12	PIP	PIPE, CS A106-B, SMLS, BE, STD, B36.10M, DBL RANDOM LGTHS		
			VALVES		V01
GATE VALVE					
1/2	2	GAT INPT	VLV-GT, BRZ B61-C92200, CL200, INPT, SP-80, MFR STD, SP-80, ISRS, UB, STD PORT, SLD WDG, BRONZE TRIM, MFR (NON-ASB) PKG, HW		
3	12	GAT	VLV-GT, DI A536-65-45-12, CL150, FF, B16.42, B16.10, AWWA C515, OS&Y, BB, FULL PORT, ELS ENCAP WDG, BRONZE TRIM, MFR PKG, 304 SS BOLTING, EPOXY COATED I/E, 20.5 BAR (300 PSIG) CWP, HW		
1/2	3	GAT	VLV-GT, BRZ B61-C92200, CL150, FF, B16.24, MFR STD, SP-80, ISRS, UB, STD PORT, SLD WDG, BRONZE TRIM, MFR (NON-ASB) PKG, HW		
GLOBE VALVE					
1/2	3	GLO	VLV-GLB, BRZ B61-C92200, CL200, INPT, SP-80, MFR STD, T-BODY, SP-80, ISRS, UB, STD PORT, CONICAL DISC, BRONZE TRIM, MFR (NON-ASB) PKG, HW		
4	6	GLO	VLV-GLB, DI A536-65-45-12, CL150, FF, B16.42, B16.10, T-BODY, SP-85, OS&Y, BB, STD PORT, CONICAL DISC, BRONZE TRIM, MFR (NON-ASB) PKG, HW		
CHECK VALVE					
1/2	3	CHESWG	VLV-CHK, BRZ B61-C92200, CL200, INPT, SP-80, MFR STD, SWING, SP-80, TC, STD PORT, BRONZE TRIM		062
4	12	CHESWG	VLV-CHK, DI A536-65-45-12, CL125, FF, B16.1, B16.10, SWING, AWWA C508, BC, API 594 TRIM AA, MFG STD BOLTS, EPOXY COATED I/E, 17 BAR (250 PSIG) CWP		062
1/2	3	CHESWG	VLV-CHK, BRZ B61-C92200, CL150, FF, B16.24, MFR STD, SWING, SP-80, TC, STD PORT, BRONZE TRIM		
BUTTERFLY VALVE					
4	12	BUTT	VLV-BFLY, DI A536-65-45-12, CL150, FF, B16.5, API 609 CAT A DIMS, THRU DRILLED LUG, API 609 CAT. A, CONC DISC, AL-BRZ DISC, BUNA-N ST, 416 SS		
			NIPPLES		
1/2	1-1/2	NIPTBE	PIPE NIPPLE SMLS SCH 160 CS, A106-B, L=100MM NPT X NPT		
1/2	1-1/2	NIPTOE	PIPE NIPPLE SMLS SCH 160 CS, A106-B, L=100MM PE X NPT		
1/2	1-1/2	NIPPBE	PIPE NIPPLE SMLS SCH 80 CS, A106-B, L=100MM PE X PE		
1/2	1-1/2	SWACTS	SWG CON NIPPLE SMLS SCH 80, CS A234-WPB, PE X PE MSS SP95		
1	2	SWACBE	SWG CON NIPPLE SMLS SCH 80, CS A234-WPB, BE X PE MSS SP95		
1/2	1-1/2	SWAETS	SWG ECC NIPPLE SMLS SCH 80, CS A234-WPB, PE X PE MSS SP95		
1	2	SWAEBE	SWG ECC NIPPLE SMLS SCH 80, CS A234-WPB, BE X PE MSS SP95		

GENERAL SPECIFICATION
DETAIL MATERIAL SPESIFICATION FOR 12CG2T02

PIPING CLASS : **12CG2T02**

SERVICE : AUXILIARY COOLING WATER RETUR, AUXILIARY COOLING WATER SUPPLY, DRINKING WATER, UTILITY WATER

			FLANGES	
1/2	1-1/2	WNK	SW FLANGE 300 RF SCH 80 CS, A105N ASME B16.5	
2	2	WNK	WN FLANGE 300 RF SCH 80 CS, A105N ASME B16.5	
3	16	WNK	WN FLANGE 300 RF SCH 40 CS, A105N ASME B16.5	
18	24	WNK	WN FLANGE 300 RF SCH 30 CS, A105N ASME B16.5	406
1	1	WNL	LONG WN FLANGE 300 RF SCH 80 CS, A105N ASME B16.5, L=150MM	313
1/2	24	BLF	BLIND FLANGE 300 RF CS, A105N ASME B16.5	
			ORIFICE FLANGES	
2	2	ORI	WN ORIFICE FLANGE 300 RF SCH 80 BORE CS, A105N ASME B16.36	
3	16	ORI	WN ORIFICE FLANGE 300 RF SCH 40 BORE CS, A105N ASME B16.36	
1	24	ORI	WN ORIFICE FLANGE 300 RF SCH 30 BORE CS, A105N ASME B16.36	402
			FITTINGS	
1/2	1-1/2	45L	45 DEG ELBOW 3000 CS, A105N SW ASME B16.11	
2	2	45L	45 DEG ELBOW SMLS SCH 80 CS, A234 WPB BE ASME B16.9	
3	16	45L	45 DEG ELBOW SMLS SCH 40 CS, A234 WPB BE ASME B16.9	
18	24	45L	45 DEG ELBOW WELD SCH 30 CS, A234 WPB-W BE ASME B16.9	311
1/2	1-1/2	ELL	90 DEG ELBOW 3000 CS, A105N SW ASME B16.11	
2	2	ELL	90 DEG ELBOW SMLS SCH 80 CS, A234 WPB BE ASME B16.9	
3	16	ELL	90 DEG ELBOW SMLS SCH 40 CS, A234 WPB BE ASME B16.9	
18	24	ELL	90 DEG ELBOW WELD SCH 30 CS, A234 WPB-W BE ASME B16.9	311
1/2	1-1/2	TEE	TEE 3000 CS, A105N SW ASME B16.11	
2	2	TEE	TEE SMLS SCH 80 CS, A234 WPB BE ASME B16.9	
3	16	TEE	TEE SMLS SCH 40 CS, A234 WPB BE ASME B16.9	
18	24	TEE	TEE WELD SCH 30 CS, A234 WPB-W BE ASME B16.9	311
1/2	1-1/2	REDTEE	REDUCER TEE 3000 CS, A105N SW ASME B16.11	
2	2	REDTEE	REDUCER TEE SMLS SCH 80 CS, A234 WPB BE ASME B16.9	
3	16	REDTEE	REDUCER TEE SMLS SCH 40 CS, A234 WPB BE ASME B16.9	
18	24	REDTEE	REDUCER TEE WELD SCH 30 CS, A234 WPB-W BE ASME B16.9	311
1/2	1-1/2	CAP	CAP 3000 CS, A105N NPTF ASME B16.11	
1/2	1-1/2	CAPSW	CAP 3000 CS, A105N SW ASME B16.11	
2	2	CAP	CAP SMLS SCH 80 CS, A234 WPB BE ASME B16.9	
3	16	CAP	CAP SMLS SCH 40 CS, A234 WPB BE ASME B16.9	
18	24	CAP	CAP SMLS SCH 30 CS, A234 WPB BE ASME B16.9	311
2	2	REDCBW	REDUCER CONC SMLS SCH 80 CS, A234 WPB BE ASME B16.9	
3	16	REDCBW	REDUCER CONC SMLS SCH 40 CS, A234 WPB BE ASME B16.9	
18	24	REDCBW	REDUCER CONC WELD SCH 30 CS, A234 WPB-W BE ASME B16.9	311
2	2	REDEBW	REDUCER ECC SMLS SCH 80 CS, A234 WPB BE ASME B16.9	
3	16	REDEBW	REDUCER ECC SMLS SCH 40 CS, A234 WPB BE ASME B16.9	
18	24	REDEBW	REDUCER ECC WELD SCH 30 CS, A234 WPB-W BE ASME B16.9	311

GENERAL SPECIFICATION
DETAIL MATERIAL SPESIFICATION FOR 12CG2T02

PIPING CLASS : 12CG2T02

SERVICE : AUXILIARY COOLING WATER RETUR, AUXILIARY COOLING WATER SUPPLY, DRINKING WATER, UTILITY WATER

1/2	1-1/2	UNI	UNION 3000 CS, A105N SW ASME B16.11	
1/2	1-1/2	COU	COUPLING 3000 CS, A105N SW ASME B16.11	303
			GASKETS	
1/2	24	GAS	GASKET SPWD 300 RF SS316, GRAPHITE FILLED 4.4 MM, SS316 INNER & CS OUTER RING, ASME B16.20/B16.5	
			BOLT AND NUTS	
		BOL	STUD BOLT A193-B7 C/W 2 HEAVY HEX NUTS A194-2H, HOT DIPPED GALVANIZED	800, 802
			OLETS	
1/2	1-1/2	TOL	THREDOLET 3000 CS, A105N NPTF MSS SP97	100
1/2	1-1/2	SOL	SOCKOLET 3000 CS, A105N SW MSS SP97	
2	2	WOL	WELDOLET SCH 80 CS, A105N BW MSS SP97	
3	8	WOL	WELDOLET SCH 40 CS, A105N BW MSS SP97	
1/2	1-1/2	PLG	PLUG ROUND HEAD 3000 CS, A105N NPTM ASME B16.11	
			MISCELLANEOUS	
1-1/2	8	SPB	SPECTACLE BLD 300 RF CS, A516-60 ASME B16.48	
10	24	BAS	BLIND&SPACER 300 RF CS, A516-60 ASME B16.48	

NOTES

100	USE ONLY FOR UNVALVED VENT AND DRAIN CONNECTION.
101	FOR VALVED VENTS AND DRAINS, USE SOCKETWELD VALVE, NIPPLE (PE X NPT) AND A SCREWED CAP.
103	USE BALL VALVES FOR FUEL GAS AND SLOPS OIL SERVICES EXCEPT IN AREA 01, FUEL PLANT WHERE VALVING SHALL BE AS INDICATED ON UOP P&ID. BALL VALVE SHALL BE LIMITED TO 232°C.
135	SEVERAL TYPES OF VALVES ARE SPECIFIED IN THIS LINE CLASS TO COVER DIFFERENT SERVICES AND/OR APPLICATIONS. VALVES SELECTION SHALL BE AS INDICATED ON P&ID AND/OR DRWAINGS.
203	USE FOR THREADED CONNECTIONS.
303	USE FOR JOINING PIPE AND SWAGES WITH PLAIN ENDS.
311	SELECT WALL THICKNESS AND GRADE TO MATCH PIPE.
313	USE ONLY FOR THERMOWELL ASSEMBLY. STUB-IN SHALL BE IN ACCORDANCE WITH ASME B31.3 FIGURE 327.4.40(1).
402	SELECT BORE TO MATCH PIPE.
406	SELECT BORE TO MACTH FITTINGS.
630	CAP SCREWS MAY BE REQUIRED ON CERTAIN SIZES.
800	STUD BOLT AND NUTS SHALL BE SUPPLIED COMPLETE WITH HOT DIP GALVANIZED TO ASTM A153.
801	THE FOLLOWING PIPE SIZES SHALL NOT BE USED, 3/8", 1.1/4", 2.1/2", 3.1/2", 4.1/2", 5", 7", 9", AND 22"
802	BOLT LENGTH TO ASME B16.5 BOLT SIZES 1" IN DIAMETER AND LARGER TO BE ONE BOLT DIAMETER LONGER FOR BOLT TENSIONING DEVICE
804	PROVISION OF SWING TYPE CHECK VALVE, IF REQUIRED BY PROCESS WHEN DIFFERENT TYPE OF CHECK VALVE TO BE INSTALLED IN SERIAL.

PERTAMINA KILANG PERTAMINA INTERNASIONAL	SUBHOLDING REFINING & PETROCHEMICAL	Doc. No. MP2-ETS-PIP-GS-0101-01-2022 ATTACHMENT-1

GENERAL SPECIFICATION
DETAIL MATERIAL SPESIFICATION FOR 12CG2T02

PIPING CLASS : **12CG2T02**

SERVICE : AUXILIARY COOLING WATER RETUR, AUXILIARY COOLING WATER SUPPLY, DRINKING WATER, UTILITY WATER

BRANCH TABLE

LEGEND

S	=	SOCKOLET
F	=	SOCKETWELD TEE
H	=	SOCKETWELD REDUCING TEE
R	=	BUTTWELD REDUCING TEE
T	=	BUTTWELD TEE
W	=	WELDOLET

HEADER SIZE \ BRANCH SIZE	1/2	3/4	1	1.1/2	2	3	4	6	8	10	12	14	16	18	20	24
1/2	F															
3/4	H	F														
1	H	H	F													
1.1/2	H	H	H	F												
2	S	S	S	S	T											
3	S	S	S	S	R	T										
4	S	S	S	S	R	R	T									
6	S	S	S	S	W	R	R	T								
8	S	S	S	S	W	W	R	R	T							
10	S	S	S	S	W	W	R	R	R	T						
12	S	S	S	S	W	W	W	R	R	R	T					
14	S	S	S	S	W	W	W	R	R	R	R	T				
16	S	S	S	S	W	W	W	R	R	R	R	R	T			
18	S	S	S	S	W	W	W	W	R	R	R	R	R	T		
20	S	S	S	S	W	W	W	W	R	R	R	R	R	R	T	
24	S	S	S	S	W	W	W	W	W	R	R	R	R	R	R	T