HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

PIPING MATERIAL

JUNE 2021

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0	05/04/2011	First Issue (as Spec 500/5)
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1. SCOPE AND OBJECTIVES

This Technical Specification covers the requirements for the design and selection of piping materials for use in above or underground piping installations.

Main-line piping inside the battery limit of valve stations, scraper stations, metering/pressure reduction stations and compressor stations, is covered by this Specification.

It should be noted that cross-country pipelines are not covered by this Specification.

Present Technical Specification defines the Piping Classes to be used in above or underground piping installations.

It should be kept in mind that the Piping Classes defined a set of materials that will be consistent with the design conditions set out for the particular class.

Alternate materials are permissible provided it is ensured that the design conditions are fulfilled, and after OWNER'S approval.

Only latest revisions of Standards are applicable. Standards with status marked as ''withdrawn'' are not applicable.

2. REFERENCES

The following codes, standards and specifications, to the extent specified herein, form a part of this specification. Any items required completing the scope of supply and which are not covered by this specification or the codes and standards listed below or in the Basis of Design, shall be referred to the Company/Company Representative for agreement on codes or standards to be applied. When an edition date is not indicated for any code or standard, the latest edition in force at the time of Contract award shall apply.

2.1 Reference Documents

Tech. Specification DSF-SPC-PIP-002	Steel Pipe
Tech. Specification DSF-SPC-PIP-021	Shop and Field Fabricated Piping
Tech. Specification DSF-SPC-PIP-023	Welding Inspection of Piping for M/R stations
Tech. Specification DSF-SPC-PIP-029	Butt Welding Steel Fittings Dn≤300
Tech. Specification DSF-SPC-PIP-030	Butt Welding Steel Fittings Dn ≥300
Tech. Specification DSF-SPC-PIP-031	Hot Bends
Tech. Specification DSF-SPC-PIP-032	Welding Nozzles for Branch Connection
Tech. Specification DSF-SPC-PIP-033	Flanges
Tech. Specification DSF-SPC-PIP-035	Gaskets
Tech. Specification DSF-SPC-PIP-036	Stud-Bolts and Nuts
Tech. Specification DSF-SPC-PIP-040	Strength and Tightness for M/R Stations

2.2 Reference Codes and Standards

EN 1515-3	Flanges and their joints - Bolting - Part 3: Classification of bolt materials for steel flanges, Class designated

EN 1594	Gas Supply Systems – Pipelines for Maximum Operating Pressure over 16bar – Functional Requirements
EN 1759-1	Flanges and their Joint - Circular Flanges for Pipes, Valves, Fittings and Accessories, Class Designated – Part 1: Steel Flanges NPS, ½ to 24
EN 10028-3	Specification for flat products made of steels for pressure purposes. Weldable fine grain steels, normalized
EN 10028-7	Flat products made of steels for pressure purposes. Stainless steels
EN ISO 3183	Petroleum and natural gas industries. Steel pipe for pipeline transportation systems
EN 10216-3	Seamless steel tubes for pressure purposes. Technical delivery conditions. Alloy fine grain steel tubes
EN 10216-4	Seamless steel tubes for pressure purposes. Technical delivery conditions. Non-alloy and alloy steel tubes with specified low temperature properties
EN 10216-5	Seamless steel tubes for pressure purposes. Technical delivery conditions. Stainless steel tubes
EN 10217-3	Welded steel tubes for pressure purposes. Technical delivery conditions. Alloy fine grain steel tubes
EN 10217-7	Welded steel tubes for pressure purposes. Technical delivery conditions. Stainless steel tubes
EN 10222-4	Steel Forgings for Pressure Purposes – Part 4: Weldable Fine Grain Steels with High Proof Strength
EN 10222-5	Steel forgings for pressure purposes. Martensitic, austenitic and austenitic-ferritic stainless steels
EN 10253-2	Butt Welding Pipe Fittings-Part 2: Non alloy and Ferritic Alloy Steels with Specific Inspection Requirements
EN 12560-1	Flanges and their joints. Gaskets for Class-designated flanges. Non-metallic flat gaskets with or without inserts
EN 12560-2	Flanges and their joints. Gaskets for Class-designated flanges. Spiral wound gaskets for use with steel flanges

EN 12583	Gas supply systems. Compressor stations. Functional requirements
EN 13480	Metallic Industrial Piping
EN 14870-2	Petroleum and natural gas industries. Induction bends, fittings and flanges for pipeline transportation systems. Fittings.
EN 14870-3	Petroleum and natural gas industries. Induction bends, fittings and flanges for pipeline transportation systems. Flanges.
ASME B16.5	Pipe Flanges and Flanged Fittings, NPS ½ Through NPS 24 Metric/inch Standard
ASME B1.20.1	Pipe Threads, General Purpose (inch).
ASME B16.9	Factory-Made Wrought Butt-welding Fittings.
ASME B16.11	Forged Fittings, Socket-Welding and Threaded
ASME B16.20	Metallic Gaskets for Pipe Flanges: Ring-Joint, Spiral-Wound and Jacketed
ASME B16.21	Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.25	Butt-welding Ends
ASME B31.3	Process Piping
ASME B31.8	Gas Transmission and Distribution Piping Systems
ASME B36.10	Welded and Seamless Wrought Steel Pipe
ASME B36.19	Stainless Steel Pipe
ASTM A105	Carbon Steel Forgings for Piping Applications
ASTM A106	Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A234	Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High-Temperature Service

ASTM A350	Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components
ASTM A352	Steel Castings, Ferritic and Martensitic for Pressure-Containing parts, Suitable for Low-Temperature Service
MSS SP-44	Steel Pipeline Flanges
MSS SP-75	High-Strength Wrought, Butt-Welding Fittings
MSS SP-97	Integrally Reinforced Forged Branch Outlet Fittings - Socket Welding, Threaded and Butt-welding Ends

3. ABBREVIATION

3.1 General

API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
EN	European Norms
MSS	Manufacturers Standardization Society of the valve and fittings industry
AGI	Above Ground Installation
UGI	Under Ground Installation
PN	Pressure Numbers
HDPE	High Density PolyEthylene
NDT	Non Destructive Testing
SMYS	Specified Minimum Yield Strength
TBC	To Be Confirmed
WT	Wall Thickness
M/R	Metering Regulating

3.2 FLANGE FACING

FF	Flat Face
RF	Raised Face
Ra	Roughness Average (EN 14870-3)

3.3 FITTINGS

BW	Butt Weld
LR	Long Radius (Elbow)
SR	Short Radius (Elbow)
PE	Plain End
TBE	Threaded Both Ends (Nipples)
TOE	Threaded One End
LEB	Large End Bevel
LEP	Large End Plain
LET	Large End Threaded
SEP	Small End Plain
SEB	Small End Bevel
SET	Small End Threaded

3.4 CONNECTIONS

BW	Butt-Weld
FLGD	Flanged
SW	Socket Weld
NPT	National Pipe Thread
PWHT	Post Weld Heat Treatment
THD'D	Threaded
WN	Welding Neck
SO	Slip-On

3.5 PIPES DESCRIPTION

BE	Bevelled End
CS	Carbon Steel
FS	Forged Steel
EFW	Electric Fusion Welded
PE	Plain End
SAW	Submerged Arc Welded
SMLS	Seamless
SS	Stainless Steel
T&C	Threaded and Coupled

3.6 SITE IDENTIFICATION

PL Pipeline

4. DESIGN

4.1 GENERAL

Piping Classes are denoted using the following 3 digit system.

First Digit: Numerical, denoting the basic system pressure class i.e.,

Numerical	Class	DP (barg)
1	CL 150 / PN 20	19
3	CL 300 / PN 50	50
6	CL 600 / PN 100	80
9	CL 900 / PN 150	140

Note: Systems are always defined at the rating immediately above the specific design pressure.

Second Digit: Alphabetical, denoting the material of construction i.e.,

A = Carbon Steel Normal Temperature Range
or Carbon Steel Low Temperature to – 48°C

B = Stainless Steel

C = HDPE (High Density Polyethylene)

Third Digit: Sequential numeric, designation within the same class/rating and material range.

4.2 DESIGN PHILOSOPHY

Pipework will be designed in accordance with EN 1594 and EN 13480, as appropriate.

4.3 DESIGN CONDITIONS

The choice of the piping material specification to be employed for each line or piping system shall be established on the basis of the following design conditions:

- Characteristics of the process or utility fluid or gas flowing through the pipe or piping system.
- Design Pressure.
- Design Temperature.
- Design Factor.
- Corrosion Allowance.

The design factor, the corrosion allowance, the maximum pressure and temperature rating in accordance with the design code is listed at the top of each piping material specification.

4.4 SPECIFIC REQUIREMENTS

All standard grade forgings shall be normalised, and all high strength (grade 415-485) forgings shall be quenched and tempered. All stainless steel shall be in the solution treated condition.

For vibrating and pulsating services, minimum pipe size shall be NB 2” (DN 50) and piping shall be fully butt welded (not socket welded).

All threaded connections (where allowed) shall be NPT.

Tees with DN≤80 may be die-forged. Seamless caps shall be provided.

All fittings shall be untreated internally but be free of dirt, grease, oil etc.

Externally shall be treated with soluble rust –preventive varnish.

Fittings shall be impact tested (Charpy V- Notch test), at temperatures as per code requirements and Project specifications.

Branch connection shall be tested according to NDT techniques. All welding surfaces shall be magnetic particle or dye penetrant examined.

Extruded fittings shall be magnetic particle examined over the extruded area.

EN1594 does not call for PWHT. Material selected should avoid the need for PWHT of high strength pipe and fittings unless otherwise approved by the Purchaser.

Flanges shall be delivered with soluble rust – preventive varnish. Blind flanges shall be supplied with vent screw.

5. PIPING CLASSES INDEX

Piping Class	Design Code	Pressure Class	Location	Design Factor	Design Pressure (barg)	Design Temperature (°C)	Corrosion Allowance (mm)	Material	Size Range DN (mm)	Service
1A1	EN 1594	CL150 / PN20	UGI	0.5	19	-20/+50	0	Carbon Steel	15–600	Natural Gas
1A2	EN 1594	CL150 / PN20	UGI	0.4	19	-20/+50	0	Carbon Steel	15–600	Natural Gas
1A3	EN 1594	CL150 / PN20	AGI	0.5	19	-20/+80	0.5	Carbon Steel	15–600	Natural Gas
1A4	EN 1594	CL150 / PN20	AGI	0.4	19	-20/+80	0.5	Carbon Steel	15–600	Natural Gas
3A1	EN 1594	CL300 / PN50	UGI	0.5	50	-20/+50	0	Carbon Steel	15–600	Natural Gas
3A2	EN 1594	CL300 / PN50	UGI	0.4	50	-20/+50	0	Carbon Steel	15–600	Natural Gas
3A3	EN 1594	CL300 / PN50	AGI	0.5	50	-20/+80	0.5	Carbon Steel	15–600	Natural Gas
3A4	EN 1594	CL300 / PN50	AGI	0.4	50	-20/+80	0.5	Carbon Steel	15–600	Natural Gas
6A1	EN 1594	CL600 / PN100	UGI	0.5	80	-20/+50	0	Carbon Steel	15–1050	Natural Gas
6A2	EN 1594	CL600 / PN100	UGI	0.4	80	-20/+50	0	Carbon Steel	15–1050	Natural Gas
6A3	EN 1594	CL600 / PN100	AGI	0.5	80	-20/+80	0.5	Carbon Steel	15–1050	Natural Gas
6A4	EN 1594	CL600 / PN100	AGI	0.4	80	-20/+80	0.5	Carbon Steel	15–1050	Natural Gas

Piping Class	Design Code	Pressure Class	Location	Design Factor	Design Pressure (barg)	Design Temperature (ºC)	Corrosion Allowance (mm)	Material	Size Range DN (mm)	Service
Piping Class	Design Code	Pressure Class	Location	Design Factor	Design Pressure (barg)	Design Temperature (ºC)	Corrosion Allowance (mm)	Material	Size Range DN (mm)	Service
1A5	EN 13480	CL150 / PN20	AGI	N/A	19	-48/+80	0.5	Low Temperature Carbon Steel	15–750	Natural Gas/ Nitrogen
6A5	EN 13480	CL600 / PN100	AGI	N/A	80	-48/+80	0.5	Low Temperature Carbon Steel	15–750	Natural Gas/ Nitrogen
1A6	EN 13480	CL150 / PN20	AGI	N/A	19	-20/+90	1.5	Carbon Steel	15–1050	Utilities / Hot Water / Nitrogen / Condensates
3A6	EN 13480	CL600 / PN100	AGI	N/A	50	-20/+90	1.5	Carbon Steel	15–1050	Utilities / Hot Water / Nitrogen / Condensates
6A6	EN 13480	CL600 / PN100	AGI	N/A	80	-20/+90	1.5	Carbon Steel	15–1050	Utilities / Hot Water / Nitrogen / Condensates
3B1	EN 13480	CL300 / PN50	AGI	N/A	48	-40/+80	0	Stainless Steel	15–250	Natural Gas/ Utilities
6B1	EN 13480	CL600 / PN100	AGI	N/A	80	-40/+80	0	Stainless Steel	15–250	Natural Gas/ Utilities

6. PIPING MATERIAL SPECIFICATIONS

Pressure Class:	**CL 150**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0mm**
Design Factor:	**0.5**	**Location:**	**UGI**

	Design Pressure / Temperature Rating				**Specification**
Barg	**19**				**1A1**
°C	**-20/+50**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-100	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 4.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 4.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 5.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	600	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	100-600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45° and 90°, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	50-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	10
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	W
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 150, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-600	Forged Steel to EN 14870-3, CL 150, weld neck or blind, raised face stock finish bored to match pipe.	EN 14870-3 Gr. 245	1, 2
LINE BLINDS:	25-600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 150, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 150, EN 12560-2.		
BOLTING:	15-40	Alloy Steel stud bolts sizes to EN 1759-1, CL 150, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy Steel stud bolts sizes to EN 14870-3, CL 150, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Design Code:	**EN 1594**	**Corrosion Allowance:**	**0mm**
Design Factor:	**0.4**	**Location:**	**UGI**

	Design Pressure / Temperature Rating				Specification
Barg	**19**				**1A2**
ºC	**-20/+50**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-80	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	100	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 4.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 4.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 5.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	600	SAW or EFW, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	100-600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	50-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	\
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 150, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-600	Forged Steel to EN 14870-3, CL 150, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
LINE BLINDS:	25-600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 150, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 150, to EN 12560-2.		
BOLTING:	15-40	Alloy Steel stud bolts sizes to EN 1759-1, CL 150, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy Steel stud bolts sizes to EN 14870-3, CL 150, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 150**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0,5mm**
Design Factor	**0.5**	**Location:**	**AGI**

	Design Pressure / Temperature Rating				Specification
Barg	**19**				**1A3**
ºC	**-20/+80**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-100	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 4.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 4.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 5.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	600	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	15-40	Forged Steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 14870-2 YY-245	1, 3
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or MSS SP-97 Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. Head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	50-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 150, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-600	Forged Steel to EN 14870-3, CL 150, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
LINE BLINDS:	50-600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 150, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 150, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes to EN 1759-1, CL 150, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy steel stud bolts sizes to EN 14870-3, CL 150, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 150**		**Material:**	**Carbon Steel**	
Design Code:	**EN 1594**		**Corrosion Allowance:**	**0,5mm**	
Design Factor	**0.4**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	**19**				**1A4**
ºC	**-20/+80**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-80	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	100	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 4.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 4.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 5.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	600	SAW or EFW, 8.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 14870-2 YY-245	1, 3
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or MSS SP-97 Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. Head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	50-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	105
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WT
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 150, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-600	Forged Steel to EN 14870-3, CL 150, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
LINE BLINDS:	25-600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 150, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 150, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes to EN 1759-1, CL 150, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy steel stud bolts sizes to EN 14870-3, CL 150, as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 300**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0mm**
Design Factor:	**0.5**	**Location:**	**UGI**

	Design Pressure / Temperature Rating				**Specification**
Barg	**48**				**3A1**
^{o}C	**-20/+50**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-100	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 4.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 8.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	600	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	100-600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45^{o} and 90^{o}, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	50-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	10
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	W
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 300, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-600	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish bored to match pipe.	EN 14870-3 Gr. 245	1, 2
LINE BLINDS:	25-600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 300, EN 12560-2.		
BOLTING:	15-40	Alloy Steel stud bolts sizes to EN 1759-1, CL 300, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy Steel stud bolts sizes to EN 14870-3, CL 300, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 300**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0mm**
Design Factor:	**0.4**	**Location:**	**UGI**

	Design Pressure / Temperature Rating				**Specification**
Barg	**48**				**3A2**
°C	**-20/+50**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-80	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	100	Seamless, 4.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NEor ME	1,4,5
	200	Seamless, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 8.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L290NE or ME	1,4,5
	600	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	100-450	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	500	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-290	1, 3
	600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-360	1, 3
	50-450	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4
	500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-290	1, 3, 4
	600	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-360	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	V
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 300, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-450	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
	500	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 290	1, 2
	600	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 360	1, 2
LINE BLINDS:	25-450	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
	500	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 290	1, 2
	600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 360	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 300, to EN 12560-2.		
BOLTING:	15-40	Alloy Steel stud bolts sizes to EN 1759-1, CL 300, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy Steel stud bolts sizes to EN 14870-3, CL 300, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 300**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0,5mm**
Design Factor	**0.5**	**Location:**	**AGI**

	Design Pressure / Temperature Rating				**Specification**
Barg	**48**				**3A3**
ºC	**-20/+80**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-100	Seamless, 3.60mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 5.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 6.30mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	600	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	15-40	Forged Steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 14870-2 YY-245	1, 3
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or MSS SP-97 Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. Head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	50-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE						
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE								
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE									
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE										
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE											
150	SOL	SOL	WOL	WTR	WTR	WTE												
100	SOL	SOL	WTR	WTR	WTE													
80	SOL	SOL	WTR	WTE														
50	STR	STR	WTE															
40	STR	STE																
25	STE																	

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 300, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-600	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
LINE BLINDS:	50-600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 300, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes to EN 1759-1, CL 300, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy steel stud bolts sizes to EN 14870-3, CL 300, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 300**		**Material:**	**Carbon Steel**	
Design Code:	**EN 1594**		**Corrosion Allowance:**	**0,5mm**	
Design Factor	**0.4**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	**48**				**3A4**
^{o}C	**-20/+80**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 3.20mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-80	Seamless, 3.60mm wt, plain ends, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	100	Seamless, 4.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	300	Seamless, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	350	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	400	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	450	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	500	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L290NE or ME	1,4,5
	600	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 14870-2 YY-245	1, 3
		Socket weld – Couplings equal and reducing, Elbows 45^{o} and 90^{o}, Tees equal and reducing or MSS SP-97 Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. Head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-450	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45^{o} and 90^{o}, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	500	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45^{o} and 90^{o}, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-290	1, 3
	600	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45^{o} and 90^{o}, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-360	1, 3
	50-450	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4
	500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-290	1, 3 ,4
	600	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-360	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	105
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WT
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 300, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-450	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
	500	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 290	1, 2
	600	Forged Steel to EN 14870-3, CL 300, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 360	1, 2
LINE BLINDS:	25-450	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
	500	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 290	1, 2
	600	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 300, raised face smooth finish.	EN 14870-3 Gr. 360	1, 2
GASKETS:	15-600	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 300, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes to EN 1759-1, CL 300, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-600	Alloy steel stud bolts sizes to EN 14870-3, CL 300, as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 600**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0mm**
Design Factor:	**0.5**	**Location:**	**UGI**

	Design Pressure / Temperature Rating				Specification
Barg	**80**				**6A1**
°C	**-20/+50**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-100	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	300	Seamless, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	350	SAW or EFW, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	400	SAW or EFW, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	450	SAW or EFW, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	500	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	550	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	600-650	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	700	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	750-800	SAW or EFW, 16.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	850-900	SAW or EFW, 17.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	1050	SAW or EFW, 20.00mm, wt butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L485ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	100-200	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	250-350	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-360	1, 3
	400-500	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-415	1, 3
	600-900	Wrought Steel EN to 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-450	1, 3
	1000-1050	Wrought Steel EN to 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-485	1, 3
	50-200	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4
	250-350	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-360	1, 3, 4
	400-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-415	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	10
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	W
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 600, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-200	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish bored to match pipe.	EN 14870-3 Gr. 245	1, 2
	250-350	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish bored to match pipe.	EN 14870-3 Gr. 360	1, 2
	400-500	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish bored to match pipe.	EN 14870-3 Gr. 415	1, 2
	600-900	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, bored to match pipe.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, bored to match pipe.	EN 14870-3 Gr. 485	1, 2
LINE BLINDS:	25-200	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
	250-350	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 360	1, 2
	400-500	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 415	1, 2
	600-900	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 485	1, 2
GASKETS:	15-1050	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 600, EN 12560-2.		
BOLTING:	15-40	Alloy Steel stud bolts sizes to EN 1759-1, CL 600, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-1050	Alloy Steel stud bolts sizes to EN 14870-3, CL 600, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 600**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0mm**
Design Factor:	**0.4**	**Location:**	**UGI**

	Design Pressure / Temperature Rating				Specification
Barg	**80**				**6A2**
ºC	**-20/+50**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-80	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	100	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 8.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	300	Seamless, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	350	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	400	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	450	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	500	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	550	SAW or EFW, 16.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	600-650	SAW or EFW, 16.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	700	SAW or EFW, 17.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	750-800	SAW or EFW, 20.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	850-900	SAW or EFW, 22.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	1050	SAW or EFW, 25.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L485ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	100-200	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	250-350	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-360	1, 3
	400-500	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-415	1, 3
	600-900	Wrought Steel EN to 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-450	1, 3
	1000-1050	Wrought Steel EN to 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-485	1, 3
	50-200	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4
	250-350	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-360	1, 3, 4
	400-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-415	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	V
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 600, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-200	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
	250-350	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 360	1, 2
	400-500	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 415	1, 2
	600-900	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 485	1, 2
LINE BLINDS:	25-200	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
	250-350	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 360	1, 2
	400-500	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 415	1, 2
	600-900	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 485	1, 2
GASKETS:	15-1050	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 600, to EN 12560-2.		
BOLTING:	15-40	Alloy Steel stud bolts sizes to EN 1759-1, CL 600, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-1050	Alloy Steel stud bolts sizes to EN 14870-3, CL 600, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 600**	**Material:**	**Carbon Steel**
Design Code:	**EN 1594**	**Corrosion Allowance:**	**0,5mm**
Design Factor	**0.5**	**Location:**	**AGI**

	Design Pressure / Temperature Rating				**Specification**
Barg	**80**				**6A3**
ºC	**-20/+80**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-100	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 7.10mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 8.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	300	Seamless, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	350	SAW or EFW, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	400	SAW or EFW, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	450	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	500	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	550	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	600	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	700	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	750-800	SAW or EFW, 16.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	850	SAW or EFW, 17.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	900	SAW or EFW, 20.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	1050	SAW or EFW, 20.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L485ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	15-40	Forged Steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 14870-2 YY-245	1, 3
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or MSS SP-97 Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. Head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-200	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	250-350	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-360	1, 3
	400-500	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-415	1, 3
	600-900	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-450	1, 3
	1000-1050	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-485	1, 3
	50-200	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4
	250-350	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-360	1, 3, 4
	400-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-415	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE						
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE								
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE									
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE										
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE											
150	SOL	SOL	WOL	WTR	WTR	WTE												
100	SOL	SOL	WTR	WTR	WTE													
80	SOL	SOL	WTR	WTE														
50	STR	STR	WTE															
40	STR	STE																
25	STE																	

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 600, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-200	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
	250-350	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 360	1, 2
	400-500	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 415	1, 2
	600-900	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 485	1, 2
LINE BLINDS:	50-200	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
	250-350	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 360	1, 2
	400-500	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 415	1, 2
	600-900	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 485	1, 2
GASKETS:	15-1050	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 600, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes to EN 1759-1, CL 600, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-1050	Alloy steel stud bolts sizes to EN 14870-3, CL 600, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 600**		**Material:**	**Carbon Steel**	
Design Code:	**EN 1594**		**Corrosion Allowance:**	**0,5mm**	
Design Factor	**0.4**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	**80**				**6A4**
°C	**-20/+80**				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-25	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	40	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	50-100	Seamless, 5.60mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	150	Seamless, 8.80mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	200	Seamless, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L245NE or ME	1,4,5
	250	Seamless, 10.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	300	Seamless, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	350	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L360NE or ME	1,4,5
	400	SAW or EFW, 11.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	450	SAW or EFW, 12.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	500	SAW or EFW, 14.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	550	SAW or EFW, 16.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L415NE or ME	1,4,5
	600	SAW or EFW, 16.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	700	SAW or EFW, 17.50mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	750-800	SAW or EFW, 20.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	850-900	SAW or EFW, 22.20mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L450ME	1,4,5
	1050	SAW or EFW, 25.00mm wt, butt-welding joints, to EN ISO 3183	EN ISO 3183 Gr. L485ME	1,4,5
PIPE NIPPLES:	15-25	Seamless, 5mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
	40	Seamless, 5.60mm wt, 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN ISO 3183 Gr. L245NE or ME	1
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 14870-2 YY-245	1, 3
		Socket weld – Couplings equal and reducing, Elbows 45° and 90°, Tees equal and reducing or MSS SP-97 Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. Head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-200	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45° and 90°, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-245	1, 3
	250-350	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45° and 90°, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-360	1, 3
	400-500	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45° and 90°, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-415	1, 3
	600-900	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45° and 90°, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-450	1, 3
	1000-1050	Wrought Steel to EN 14870-2, butt weld fittings, wall thickness as pipe: Long radius Elbows 45° and 90°, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 14870-2 YY-485	1, 3
	50-200	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-245	1, 3, 4
	250-350	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-360	1, 3 ,4
	400-500	Forged Steel to MSS SP-97, butt weld reducing outlet Weldolet fittings see branch schedule.	EN 14870-2 YY-415	1, 3, 4

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	105
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WT
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged Steel to EN 1759-1, CL 600, socket weld to ASME B16.11 or blind, raised face stock finish, wt bored to match pipe.	EN 1759-1 Gr. 245	1, 2
	50-200	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 245	1, 2
	250-350	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 360	1, 2
	400-500	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 415	1, 2
	600-900	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Forged Steel to EN 14870-3, CL 600, weld neck or blind, raised face stock finish, wt bored to match pipe.	EN 14870-3 Gr. 485	1, 2
LINE BLINDS:	25-200	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 245	1, 2
	250-350	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 360	1, 2
	400-500	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 415	1, 2
	600-900	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 450	1, 2
	1000-1050	Steel plate to EN 14870-3 or spectacle, spade and spacer, CL 600, raised face smooth finish.	EN 14870-3 Gr. 485	1, 2
GASKETS:	15-1050	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 600, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes to EN 1759-1, CL 600, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 1759-1 flanges.	
	50-1050	Alloy steel stud bolts sizes to EN 14870-3, CL 600, as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts.	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impact test in accordance to with relevant material standard at -20 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. As per EN 14870-2, YY is a textual description of the type of fitting, corresponding to one of the following: EL for elbow, TE for tee, CA for cap, CR for concentric reducer, ER for eccentric reducer and NR for conical reducer, preceded by the size designation (e.g. “DN 600 EL” is a DN 600 elbow).
	4. The corresponding piping will have bevelled ends to EN ISO 3183.
	5. PSL 2 pipe for European onshore natural gas transmission pipelines to EN ISO 3183 Annex M. Tolerances for Wall thickness according to EN ISO 3183 table M.4.

Pressure Class:	**CL 150**	**Material:**	**Low Temperature Carbon Steel**	
Design Code:	**EN 13480**	**Corrosion Allowance:**	**0.5mm**	
Design Factor	**N/A**	**Location:**	**AGI**	

	Design Pressure / Temperature Rating				**Specification**
Barg	19				**1A5**
ºC	-48/+80				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-40	Seamless 5.00mm wt plain ends EN 10216-4	EN 10216-3 Gr. P275NL2	1, 4, 5
	50	Seamless 5.60mm wt bevelled ends EN 10216-4	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	80-150	Seamless 7.10mm wt bevelled ends EN 10216-4	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	200-250	Seamless 8.00mm wt bevelled ends EN 10216-4	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	300	Seamless 10.00mm wt bevelled ends EN 10216-4	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	350-750	SAW or EFW 10.00mm wt bevelled ends EN 10217-4	EN 10217-3 Gr. P275NL2	1, 3, 4, 5
PIPE NIPPLES:	15-40	Seamless 4.5mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN 10217-3 Gr. P275NL2	1, 4, 5
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	ASTM A350 GR. LF6 Class2	1, 5
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-750	Wrought steel ASME B16.9 butt weld fittings wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 10253-2 12Ni4	1, 5
	50-350	Forged steel butt weld reducing outlet Weldolet fittings see branch schedule.	ASTM A350 GR. LF6 Class2	1, 3, 5

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WT	WTR	WTR	WTR	WTR	WTR	WTE
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WT	WTR	WTR	WTR	WTR	WTE	
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WT	WTR	WTR	WTR	WTE		
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WT	WTR	WTR	WTE			
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WT	WTR	WTE				
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WT	WTE					
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WT						
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE							
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE								
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE									
150	SOL	SOL	WOL	WTR	WTR	WTE										
100	SOL	SOL	WTR	WTR	WTE											
80	SOL	SOL	WTR	WTE												
50	STR	STR	WTE													
40	STR	STE														
25	STE															

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

Pressure Class:	**CL 150**		**Material:**	**Low Temperature Carbon Steel**	
Design Code:	**EN 13480**		**Corrosion Allowance:**	**0.5mm**	
Design Factor	**N/A**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	19				**1A5**
ºC	-48/+80				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged steel EN 1759-1 CL 150 socket weld to ASME B16.11 or blind, raised face stock finish, bore to suit pipe.	ASTM A350 GR. LF6 Class2	1, 2, 5
	50-750	Forged steel EN 14870-3 CL 150 weld neck or blind, raised face stock finish bore to suit pipe.	ASTM A350 GR. LF6 Class2	1, 2, 5
LINE BLINDS:	25-750	Steel plate or spectacle, spade and spacer CL 150 raised face smooth finish	ASTM A350 GR. LF6 Class2	1, 2, 5
GASKETS:	15-750	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 150, to EN 12560-2.		5
BOLTING:	15-40	Low Temperature Alloy steel stud bolts sizes in accordance with EN 1759-1 CL 150 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 1759-1 flanges.	5
	50-750	Low Temperature Alloy steel stud bolts sizes in accordance with EN 14870-3 CL 150 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	5

NOTES:	**1.** Charpy impacted in accordance to with relevant material standard at -48 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. The corresponding piping will have bevelled ends to EN 10216-3 / EN 10217-3
	4. Materials to be supplied as per EN 10216-3 / EN 10217-3 para.8.3 –Option 5
	5. Designed & Certificated for throttling.

Pressure Class:	**CL 600**	**Material:**	**Low Temperature Carbon Steel**	
Design Code:	**EN 13480**	**Corrosion Allowance:**	**0.5mm**	
Design Factor	**N/A**	**Location:**	**AGI**	

	Design Pressure / Temperature Rating				**Specification**
Barg	80				**6A5**
ºC	-48/+80				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-40	Seamless 5.00mm wt plain ends to EN 10216-3	EN 10216-3 Gr. P275NL2	1, 4, 5
	50	Seamless 5.60mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	80	Seamless 8.00mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	100	Seamless 8.80mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	150	Seamless 10.00mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	200-250	Seamless 12.50mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	300	Seamless 14.20mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL2	1, 3, 4, 5
	350	SAW or EFW 11.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL2	1, 3, 4, 5
	400	SAW or EFW 12.50mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL2	1, 3, 4, 5
	450	SAW or EFW 14.20mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL2	1, 3, 4, 5
	500	SAW or EFW 16.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL2	1, 3, 4, 5
	600	SAW or EFW 20.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL2	1, 3, 4, 5
	700	SAW or EFW 22.20mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL2	1, 3, 4, 5
	750	SAW or EFW 25.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL2	1, 3, 4, 5
PIPE NIPPLES:	15-40	Seamless 4.5mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN 10217-4 Gr. P275NL2	1, 4, 5
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	ASTM A350 GR. LF6 Class2	1, 5
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-300	Wrought steel ASME B16.9 butt weld fittings wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 10253-2 12Ni4	1, 5
	350-750	Wrought steel ASME B16.9 butt weld fittings wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 10253-2 X10Ni9	1, 5
	50-350	Forged steel butt weld reducing outlet Weldolet fittings see branch schedule.	ASTM A350 GR. LF6 Class2	1, 3, 5

Pressure Class:	**CL 600**	**Material:**	**Low Temperature Carbon Steel**	
Design Code:	**EN 13480**	**Corrosion Allowance:**	**0.5mm**	
Design Factor	**N/A**	**Location:**	**AGI**	
	Design Pressure / Temperature Rating			**Specification**
Barg	80			**6A5**
ºC	-48/+80			

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE				
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE					
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE						
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE							
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE								
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE									
150	SOL	SOL	WOL	WTR	WTR	WTE										
100	SOL	SOL	WTR	WTR	WTE											
80	SOL	SOL	WTR	WTE												
50	STR	STR	WTE													
40	STR	STE														
25	STE															

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged steel EN 1759-1 CL 600 socket weld to ASME B16.11 or blind, raised face stock finish, bore to suit pipe.	ASTM A350 GR. LF6 Class2	1, 2, 5
	50-750	Forged steel EN 14870-3 CL 600 weld neck or blind, raised face stock finish bore to suit pipe.	ASTM A350 GR. LF6 Class2	1, 2, 5
LINE BLINDS:	25-750	Steel plate or spectacle, spade and spacer CL 600 raised face smooth finish	ASTM A350 GR. LF6 Class2	1, 2, 5
GASKETS:	15-750	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 600, to EN 12560-2.		5
BOLTING:	15-40	Low Temperature Alloy steel stud bolts sizes in accordance with EN 1759-1 CL 600 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 1759-1 flanges.	5
	50-750	Low Temperature Alloy steel stud bolts sizes in accordance with EN 14870-3 CL 600 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	5

NOTES:	1. Charpy impacted in accordance to with relevant material standard at -50 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. The corresponding piping will have bevelled ends to EN 10216-3 / EN 10217-3
	4. Materials to be supplied as per EN 10216-3 / EN 10217-3 para.8.3 –Option 5
	5. Designed & Certificated for throttling.

Pressure Class:	**CL 150**		**Material:**	**Carbon Steel**	
Design Code:	**EN 13480**		**Corrosion Allowance:**	**1.5mm**	
Design Factor	**N/A**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	19				**1A6**
ºC	-20/+90				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-40	Seamless 5.00mm wt plain ends EN 10216-3	EN 10216-3 Gr. P275NL1	1,4
	50	Seamless 5.60mm wt bevelled ends EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	80-150	Seamless 7.10mm wt bevelled ends EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	200-250	Seamless 8.00mm wt bevelled ends EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	300	Seamless 10.00mm wt bevelled ends EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	350-850	SAW or EFW 10.00mm wt bevelled ends EN 10217-3	EN 10217-3 Gr. P275NL1	1, 3, 4
	900-1050	SAW or EFW 12.50mm wt bevelled ends EN 10217-3	EN 10217-3 Gr. P275NL1	1, 3, 4
PIPE NIPPLES:	15-40	Seamless 4.5mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN 10216-3 Gr. P275NL1	1, 4
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 10253-2 P355NL1	1
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-1050	Wrought steel ASME B16.9 butt weld fittings wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 10253-2 P355NL1	1
	50-350	Forged steel butt weld reducing outlet Weldolet fittings see branch schedule.	EN 10222-4 P355QH	1, 3

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	1050
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee -
WTR = Weld Tee - Reducing
WOL = Weldolet

Pressure Class:	**CL 150**		**Material:**	**Carbon Steel**	
Design Code:	**EN 13480**		**Corrosion Allowance:**	**1.5mm**	
Design Factor	**N/A**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	19				**1A6**
ºC	-20/+90				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged steel EN 1759-1 CL 150 socket weld to ASME B16.11 or blind, raised face stock finish, bore to suit pipe.	EN 10222-4 P355QH	1, 2
	50-1050	Forged steel EN 14870-3 CL 150 weld neck or blind, raised face stock finish bore to suit pipe.	EN 10222-4 P355QH	1, 2
LINE BLINDS:	25-1050	Steel plate or spectacle, spade and spacer raised face smooth finish	EN 10028-3	1, 2
GASKETS:	15-1050	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 150, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes in accordance with EN 1759-1 CL 150 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 1759-1 flanges.	
	50-1050	Alloy steel stud bolts sizes in accordance with EN 14870-3 CL 150 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impacted in accordance to with relevant material standard at -25 ºC
	2. The gasket contact surface shall be “Stock” finish i.e. having a roughness between Ra 3.2 and 12.5 microns.
	3. The corresponding piping will have bevelled ends to EN 10216-3 /EN 10217-3
	4. Materials to be supplied as per EN 10216-3/ EN 10217-3 section 8.3 –Option 5

Pressure Class:	**CL 300**		**Material:**	**Carbon Steel**	
Design Code:	**EN 13480**		**Corrosion Allowance:**	**1.5mm**	
Design Factor	**N/A**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	50				**3A6**
ºC	-20/+90				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-40	Seamless 5.00mm wt plain ends	EN 10216-3 Gr. P275NL1	1, 4
	50	Seamless 5.60mm wt bevelled ends	EN 10216-3 Gr. P275NL1	1, 3, 4
	80-150	Seamless 7.10mm wt bevelled ends	EN 10216-3 Gr. P275NL1	1, 3, 4
	200	Seamless 8.80mm wt bevelled ends	EN 10216-3 Gr. P275NL1	1, 3, 4
	250-300	Seamless 10.00mm wt bevelled ends	EN 10216-3 Gr. P275NL1	1, 3, 4
	350-400	SAW or EFW 10.00mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
	500	SAW or EFW 11.00mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
	600	SAW or EFW 12.50mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
	700	SAW or EFW 14.20mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
	750-800	SAW or EFW 16.00mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
	850	SAW or EFW 17.50mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
	900-1000	SAW or EFW 20.00mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
	1050	SAW or EFW 22.20mm wt bevelled ends	EN 10217-3 Gr. P275NL1	1, 3, 4
PIPE NIPPLES:	15-40	Seamless 4.5mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN 10216-3 Gr. P275NL1	1,4
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 10253-2 P355NL1	1,3
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-1050	Wrought steel ASME B16.9 butt weld fittings wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 10253-2 P355NL1	1, 3
	50-350	Forged steel butt weld reducing outlet Weldolet fittings see branch schedule	EN 10222-4 P355QH	1, 3

Pressure Class:	**CL 300**	**Material:**	**Carbon Steel**	
Design Code:	**EN 13480**	**Corrosion Allowance:**	**1.5mm**	
Design Factor	**N/A**	**Location:**	**AGI**	

	Design Pressure / Temperature Rating				**Specification**
Barg	50				**3A6**
ºC	-20/+90				

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	1050
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged steel EN 1759-1 CL 300 socket weld to ASME B16.11 or blind, raised face stock finish, bore to suit pipe.	EN 10222-4 P355QH	1, 2
	50-1050	Forged steel EN 14870-3 CL 300 weld neck or blind, raised face stock finish bore to suit pipe.	EN 10222-4 P355QH	1, 2
LINE BLINDS:	25-1050	Steel plate or spectacle, spade and spacer raised face smooth finish	EN 10028-3	1, 2
GASKETS:	15-1050	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 300, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes in accordance with EN 1759-1 CL 300 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 1759-1 flanges.	
	50-1050	Alloy steel stud bolts sizes in accordance with EN 14870-3 CL 300 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impacted in accordance to with relevant material standard -25 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. The corresponding piping will have bevelled ends to EN 10216-3 /EN 10217-3
	4. Materials to be supplied as per EN 10216-3/ EN 10217-3 section.8.3 –Option 5

Pressure Class:	**CL 600**		**Material:**	**Carbon Steel**	
Design Code:	**EN 13480**		**Corrosion Allowance:**	**1.5mm**	
Design Factor	**N/A**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	80				**6A6**
ºC	-20/+80				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15-40	Seamless 5.00mm wt plain ends to EN 10216-3	EN 10216-3 Gr. P275NL1	1, 4
	50	Seamless 5.60mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	80	Seamless 8.00mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	100	Seamless 8.80mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	150	Seamless 10.00mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	200-250	Seamless 12.50mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	300	Seamless 14.20mm wt bevelled ends to EN 10216-3	EN 10216-3 Gr. P275NL1	1, 3, 4
	350-400	SAW or EFW 12.50mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	450	SAW or EFW 14.20mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	500	SAW or EFW 16.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	600	SAW or EFW 20.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	700	SAW or EFW 22.20mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	750-800	SAW or EFW 25.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	850-900	SAW or EFW 28.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	1000	SAW or EFW 30.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
	1050	SAW or EFW 32.00mm wt bevelled ends to EN 10217-3	EN 10217-3 Gr. P355NL1	1, 3, 4
PIPE NIPPLES:	15-40	Seamless 4.5mm wt 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN 10216-3 Gr. P275NL1	1, 4
FITTINGS:	15-40	Forged steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 10253-2 P355NL1	1
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-1050	Wrought steel ASME B16.9 butt weld fittings wall thickness as pipe: Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.	EN 10253-2 P355NL1	1, 3
	50-350	Forged steel butt weld reducing outlet Weldolet fittings see branch schedule	EN 10222-4 P355QH	1, 3

Pressure Class:	**CL 600**	**Material:**	**Carbon Steel**	
Design Code:	**EN 13480**	**Corrosion Allowance:**	**1.5mm**	
Design Factor	**N/A**	**Location:**	**AGI**	

	Design Pressure / Temperature Rating				**Specification**
Barg	80				**6A6**
ºC	-20/+90				

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000	1050
1050	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE
1000	SOL	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE	
900	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE		
750	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE			
700	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTR	WTE				
600	SOL	SOL	WOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE					
500	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTR	WTE						
450	SOL	SOL	WOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE							
400	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTR	WTE								
350	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTR	WTE									
300	SOL	SOL	WOL	WOL	WOL	WTR	WTR	WTR	WTE										
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE											
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE												
150	SOL	SOL	WOL	WTR	WTR	WTE													
100	SOL	SOL	WTR	WTR	WTE														
80	SOL	SOL	WTR	WTE															
50	STR	STR	WTE																
40	STR	STE																	
25	STE																		

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15-40	Forged steel EN 1759-1 CL 600 socket weld to ASME B 16.11 or blind, raised face stock finish, bore to suit pipe.	EN 10222-4 P355QH	1, 2
	50-1050	Forged steel EN 14870-3 CL 600 weld neck or blind, raised face stock finish bore to suit pipe.	EN 10222-4 P355QH	1, 2
LINE BLINDS:	25-1050	Steel plate or spectacle, spade and spacer raised face smooth finish	EN 10028-3	1, 2
GASKETS:	15-1050	Spiral wound with inner and outer centring rings and stainless steel windings and non-asbestos filler 4.5mm thick, CL 600, to EN 12560-2.		
BOLTING:	15-40	Alloy steel stud bolts sizes in accordance with EN 1759-1 CL 600 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 1759-1 flanges.	
	50-1050	Alloy steel stud bolts sizes in accordance with EN 14870-3 CL 600 as applicable, threaded full length with 2No. heavy hexagonal carbon steel nuts	EN 1515-3 to suit EN 14870-3 flanges.	

NOTES:	**1.** Charpy impacted in accordance to with relevant material standard -25 ºC.
	2. The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.
	3. The corresponding piping will have bevelled ends to EN 10216-3 /EN 10217-3
	4. Materials to be supplied as per EN 10216-3/ EN 10217-3 section.8.3 –Option 5

Pressure Class:	**CL 300**	**Material:**	**Stainless Steel**
Design Code:	**EN 13480**	**Corrosion Allowance:**	**0mm**
Design Factor	**N/A**	**Location:**	**AGI**

	Design Pressure / Temperature Rating				Specification
Barg	50				**3B1**
ºC	-40/+80				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15	Seamless wt 3.6mm plain ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	25	Seamless wt 4.5mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	40	Seamless wt 5.0mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	50	Seamless wt 4.5mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	80	Seamless wt 5.6mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	100	Seamless wt 6.3mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	150-200	Seamless wt 7.1mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	250	Seamless or EFW wt 8.00mm bevelled ends to EN 10216-5 / EN 10217-7	EN 10216-5 X5CrNi18-10 /EN 10217-7 X5CrNi18-10	2
PIPE NIPPLES:	15-40	Seamless wt 5mm 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN 10216-5 X5CrNi18-10	
FITTINGS:	15-40	Forged stainless steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 10222-5 X5CrNi18-10	
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-250	Stainless steel ASME B16.9 butt weld fittings wall thickness as pipe:	EN 10253-4 X5CrNi18-10	
		Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.		
	50-250	Forged stainless steel butt weld reducing outlet Weldolet fittings see branch schedule.	EN 10222-5 X5CrNi18-10	

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE	
150	SOL	SOL	WOL	WTR	WTR	WTE		
100	SOL	SOL	WTR	WTR	WTE			
80	SOL	SOL	WTR	WTE				
50	STR	STR	WTE					
40	STR	STE						
25	STE							

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15– 40	Forged alloy steel EN 1759-1 CL 300 socket weld to ASME B16.11 or blind, raised face stock finish, bore to suit pipe	EN 10222-5 X5CrNi18-10	1
	50-250	Forged alloy steel EN 14870-3 CL 300 weld neck or blind, raised face stock finish bore to suit pipe	EN 10222-5 X5CrNi18-10	1
LINE BLINDS:	25-250	Stainless steel plate or spectacle, spade and spacer CL 300,raised face stock finish	EN 10028-7 X5CrNi18-10	1
GASKETS:	15-250	Compressed non-metallic, non-asbestos oil resistant flat ring 1.5mm thick, CL 300, to EN 12560-1		
BOLTING:	15-40	Stainless steel stud bolts sizes in accordance with EN 1759-1 CL 300 as applicable, threaded full length with 2No. heavy hexagonal stainless steel nuts	EN 1515-1 to suit EN 1759 flanges.	
	50-250	Stainless steel stud bolts sizes in accordance with EN 14870-3 CL 300 as applicable, threaded full length with 2No. heavy hexagonal stainless steel nuts	EN 1515-1 to suit EN 14870-3 flanges.	
NOTES	**1.** The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.			
	2. Wall thickness as per EN ISO 1127			

Pressure Class:	**CL 600**		**Material:**	**Stainless Steel**	
Design Code:	**EN 13480**		**Corrosion Allowance:**	**0mm**	
Design Factor	**N/A**		**Location:**	**AGI**	
	Design Pressure / Temperature Rating				**Specification**
Barg	80				**6B1**
ºC	-40/+80				

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
PIPE:	15	Seamless wt 3.60mm plain ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	25	Seamless wt 4.5mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	40	Seamless wt 5.0mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	50	Seamless wt 4.5mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	80	Seamless wt 5.6mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	100	Seamless wt 6.3mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	150	Seamless wt 8.0mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	200	Seamless wt11.0mm bevelled ends to EN 10216-5	EN 10216-5 X5CrNi18-10	2
	250	Seamless or EFW wt 12.5mm bevelled ends to EN 10216-5/ EN 10217-7	EN 10216-5 X5CrNi18-10 / EN 10217-7 X5CrNi18-10	2
PIPE NIPPLES:	15-40	Seamless wt 5.0mm 100mm long. Ends plain, threaded one end (TOE), or threaded both ends (TBE) as required.	EN 10216-5 X5CrNi18-10	
FITTINGS:	15-40	Forged stainless steel Class 3000 ASME B16.11 socket weld or screwed ASME B1.20.1 fittings as listed:	EN 10222-5 X5CrNi18-10	
		Socket weld – Couplings equal and reducing, Elbows 45º and 90º, Tees equal and reducing or Sockolets as appropriate see branch schedule.		
		Screwed – Couplings equal and reducing, female Unions, pipe Caps and hex. head Plugs.		
		Note: Screwed fittings are only to be used after the first isolation valve.		
	50-250	Stainless steel ASME B 16.9 butt weld fittings wall thickness as pipe:	EN 10253-4 X5CrNi18-10	
		Long radius Elbows 45º and 90º, Reducers concentric and eccentric, pipe Caps, Tees equal and reducing see branch schedule.		
	50-250	Forged stainless steel butt weld reducing outlet Weldolet fittings see branch schedule.	EN 10222-5 X5CrNi18-10	

BRANCH SCHEDULE:

DN	25	40	50	80	100	150	200	250
250	SOL	SOL	WOL	WOL	WTR	WTR	WTR	WTE
200	SOL	SOL	WOL	WOL	WTR	WTR	WTE	
150	SOL	SOL	WOL	WTR	WTR	WTE		
100	SOL	SOL	WTR	WTR	WTE			
80	SOL	SOL	WTR	WTE				
50	STR	STR	WTE					
40	STR	STE						
25	STE							

Note:
Minimum branch size DN25
STE = Socket Weld Tee - Equal
STR = Socket Weld Tee - Reducing
SOL = Sockolet
WTE = Weld Tee - Equal
WTR = Weld Tee - Reducing
WOL = Weldolet

ITEM	SIZE RANGE DN (MM)	DESCRIPTION	MATERIAL SPECIFICATION	NOTE
FLANGES:	15– 40	Forged alloy steel EN 1759-1 CL 600 socket weld to ASME B16.11 or blind, raised face stock finish, bore to suit pipe	EN 10222-5 X5CrNi18-10	1
	50-250	Forged alloy steel EN 14870-3 CL 600 weld neck or blind, raised face stock finish bore to suit pipe	EN 10222-5 X5CrNi18-10	1
LINE BLINDS:	25-250	Stainless steel plate EN 10253-3 or spectacle, spade and spacer CL 600, raised face stock finish	EN 10028-7 X5CrNi18-10	1
GASKETS:	15-250	Compressed non-metallic, non-asbestos oil resistant flat ring 1.5mm thick, CL 600, to EN 12560-1		
BOLTING:	15-40	Stainless steel stud bolts sizes in accordance with EN 1759-1 CL 600 as applicable, threaded full length with 2No. heavy hexagonal stainless steel nuts	EN 1515-1 to suit EN 1759 flanges.	
	50-250	Stainless steel stud bolts sizes in accordance with EN 14870-3 CL 600 as applicable, threaded full length with 2No. heavy hexagonal stainless steel nuts	EN 1515-1 to suit EN 14870-3 flanges.	
NOTES	**1.** The gasket contact surface shall be “Stock” finish i.e. Having a roughness between Ra 3.2 and 12.5 microns.			

	2. Wall thickness as per EN ISO 1127