

PETRONAS TECHNICAL STANDARDS

DESIGN AND ENGINEERING PRACTICE

MANUAL

PIPING CLASSES - EXPLORATION AND PRODUCTION

CLASS 2500

PTS 31.38.01.15

January 2010



PREFACE

PETRONAS Technical Standards (PTS) publications reflect the views, at the time of publication, of PETRONAS OPUs/Divisions.

They are based on the experience acquired during the involvement with the design, construction, operation and maintenance of processing units and facilities. Where appropriate they are based on, or reference is made to, national and international standards and codes of practice.

The objective is to set the recommended standard for good technical practice to be applied by PETRONAS' OPUs in oil and gas production facilities, refineries, gas processing plants, chemical plants, marketing facilities or any other such facility, and thereby to achieve maximum technical and economic benefit from standardisation.

The information set forth in these publications is provided to users for their consideration and decision to implement. This is of particular importance where PTS may not cover every requirement or diversity of condition at each locality. The system of PTS is expected to be sufficiently flexible to allow individual operating units to adapt the information set forth in PTS to their own environment and requirements.

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PIPING CLASSES - CLASS 2500

The piping class files below are embedded MS-Word files.

To open a file, double-click on the desired piping class (if you are viewing the PDF version of this document, open the MS-Word version of this document and double-click on the desired piping class).

CLASS 251422

CLASS 251432

CLASS 251440

CLASS 251441

CLASS 251412

CLASS 253831

CLASS 253832

CLASS 253833

CLASS 253834

CLASS 251412

Design limits

	Temperature (°C)					
	0	50	75	100	125	150
Pressure (Bar ga)						
DN 15- 300	425.5	417.7	403.0	388.3	381.9	375.6

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For bending of pipe see PTS 31.38.01.31.
- For basis of design see PTS 31.38.01.10.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) for horizontal mounting only

Table of schedules

DN	Schedule
15	XXS
20	XXS
25	XXS
40	XXS
50	XXS
80	XXS
100	20.0
150	28.0
200	36.0
250	44.0
300	52.0

Branch connections 90 degrees

Run size	Branch Size											
	15	20	25	40	50	80	100	150	200	250	300	
300	C	C	C	C	E	E	E	B	B	B	A	
250	C	C	C	C	E	E	B	B	B	A		
200	C	C	C	C	E	E	B	B	A			
150	C	C	C	C	E	B	B	A				
100	C	C	C	C	B	B	A					
80	C	C	C	C	B	A						
50	C	C	B	B	A							
40	C	B	B	A								
25	B	B	A									
20	B	A										
15	A											

Code	Explanation of characters
A	Equal tee
B	Reducing tee
C	Branch fitting
E	Branch outlet

Carbon steel		Plant
Class no.	251412	Consignee
ASME rating	CLASS 2500	Engineered by
Corrosion allowance	1 mm	Principal
Revision letter	O	Contr. job no.
Revision date	01/2006	Project no.

COMPONENT MATERIAL DESCRIPTION
(For full material description see relevant MESG buying description.)

Pipe

PIPE	Pipe	DN 15-100	ASTM A106-B
PIPE	Pipe	DN 150-300	ASTM A333-6

Flanges

BLFL	Blind flange	DN 15-300	ASTM A105
SBFL	Spectacle blind	DN 15-250	ASTM A516-60/65/70
SPFL	Spade	DN 15-300	ASTM A516-60/65/70
SPRT	Spacer ring	DN 15-300	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-300	ASTM A105

Fittings

CAPB	Cap bw	DN 15-100	ASTM A234-WPB
CAPB	Cap bw	DN 150-300	ASTM A420-WPL6
E45B	Elbow 45 deg bw	DN 15-100	ASTM A234-WPB
E45B	Elbow 45 deg bw	DN 150-300	ASTM A420-WPL6
E90B	Elbow 90 deg bw	DN 15-100	ASTM A234-WPB
E90B	Elbow 90 deg bw	DN 150-300	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15-100	ASTM A234-WPB
TEEB	Tee equal bw	DN 150-300	ASTM A420-WPL6

Reducing fittings

BNIB	Branch fitting bw	DN 15-40	ASTM A105
BNIF	Branch fitting flgd	DN 15-50	ASTM A105
BROB	Branch outlet bw	DN 150-300	ASTM A105
RECB	Reducer concentric bw	DN 150-300	ASTM A420-WPL6
RECB	Reducer concentric bw	DN 20-100	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 150-300	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20-100	ASTM A234-WPB
TERB	Tee reducing bw	DN 150-300	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20-100	ASTM A234-WPB

Valves

BTFB	Ball valve 14313 FB flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Devlon V
BTRF	Ball valve 14313 RB flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Devlon V
CHVF	Check valve flgd	DN 15-40	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
CHVF	Check valve flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 410
GAVF	Gate valve flgd	DN 15-40	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
GAVF	Gate valve flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 410
GLVF	Globe valve flgd	DN 15-40	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
GLVF	Globe valve flgd	DN 50-100	Body: ASTM A105/A216-WCB/WCC Trim: AISI 410
MSBF	Monofl single block ball	DN 15-50	Body: ASTM A350-LF2 Trim: AISI 316, Devlon V
VDBT	Valve ass doub block ball thrd	---	Body: ASTM A350-LF2 Trim: AISI 316, Devlon V

Instruments

TWHD	Thermowell	DN 50-50	ASTM B564 UNS N04400
TWHL	Thermowell L=255mm	---	ASTM B564 UNS N04400
TWHS	Thermowell L=230mm	---	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-300	AISI 316, graphite filled CS centring-/SS inner ring
ORFS	Orifice flange set	DN 50-300	ASTM A105
STBT	Studbolt with nuts	---	ASTM A193-B7/A194-2H



PIPING COMPONENTS

Item description	Nominal pipe size											
	MESC	15	20	25	40	50	80	100	150	200	250	300
Pipe												
Pipe	743000							0921				
Pipe	743005	0221	0321	0421	0621	0751	1151					
Pipe	743014								1141	1521	1941	2481
Flanges												
Blind flange	766210	4721	4741	4761	4781	4801	4841	4861	4881	4901	4921	4941
Spacer ring	768816	2021	2041	2061	2081	2101	2121	2141	2161	2181	2201	2221
Spade	768813	2021	2041	2061	2081	2101	2121	2141	2161	2181	2201	2221
Spectacle blind	768803	2021	2041	2061	2081	2101	2121	2141	2161	2181	2201	
Welding neck flange	766280	0521	0541	0561	0581	0601	0641					
Welding neck flange	766285							0921	1141	1521	1941	2481
Fittings												
Cap bw	763019	0231	0291	0331	0431	0631	0831					
Cap bw	763022							0921				
Cap bw	763115								1141	1521	1941	2481
Elbow 45 deg bw	763038	5731	5791	5831	5931	6131	6331					
Elbow 45 deg bw	763044							0921				
Elbow 45 deg bw	763144								1021	1461	1871	2391
Elbow 90 deg bw	763040	5731	5791	5831	5931	6131	6331					
Elbow 90 deg bw	763046							0921				
Elbow 90 deg bw	763146								1141	1521	1941	2481
Tee equal bw	763084	5731	5791	5831	5931	6131	6331					
Tee equal bw	763090							0921				
Tee equal bw	763190								1141	1521	1941	2481
Valves												
Ball valve 14313 FB flgd	770067					7581	7601	7621	7641	7651	7661	7671
Ball valve 14313 RB flgd	770067					2581	2601	2621	2641	2651	2661	2671
Check valve flgd	771020					2581	2601	2621	2641	2651	2661	2671
Check valve flgd	771056	5531	5541	5551	5571							
Gate valve flgd	772020					2581	2601	2621	2641	2651	2661	2671
Gate valve flgd	772078	5531	5541	5551	5571							
Globe valve flgd	773020					2581	2601	2621				
Globe valve flgd	773056	5531	5541	5551	5571							
Monofl single block ball	770095	4831	4841	4851	4871	4881						
Miscellaneous												
Gasket spiral wound	854136	2541	2561	2581	2621	2641	2681	2701	2741	2761	2781	2801
Orifice flange set	766295					4821	4831	5771	5211	6021	6081	6151



REDUCING/PIPING COMPONENTS

Run	x	Br	BROB	RECB	REEB	TERB
20	x	15		7630721421	7630731421	7630890401
25	x	15		7630721521	7630731521	7630890501
25	x	20		7630721621	7630731621	7630890601
40	x	15		7630721721	7630731721	
40	x	20		7630721821	7630731821	7630890801
40	x	25		7630721921	7630731901	7630890901
50	x	20		7629461961	7629611961	
50	x	25		7630722021	7630732021	7630891081
50	x	40		7630722121	7630732121	7630891171
80	x	40		7630722321	7630732321	
80	x	50		7630722421	7630732421	7630891351
100	x	40		7630620601	7630630601	
100	x	50		7630620701	7630630701	7630930701
100	x	80		7630620901	7630630901	7630930901
150	x	50	7679080321			
150	x	80		7631621141	7631631141	7631930901
150	x	100		7631621421	7631631421	7631931151
200	x	50	7679080661			
200	x	80	7679083061			
200	x	100		7631621781	7631631781	7631931791
200	x	150		7631622121	7631632121	7631932131
250	x	50	7679080971			
250	x	80	7679083571			
250	x	100		7631622611	7631632671	7631932511
250	x	150		7631622981	7631632981	7631932981
250	x	200		7631623481	7631633481	7631933481
300	x	50	7679081491			
300	x	80	7679084091			
300	x	100	7679086561			
300	x	150		7631624071	7631634071	7631934021
300	x	200		7631624651	7631634651	7631934651
300	x	250		7631625291	7631635291	7631935291

Comp.name	Description
BNIB	Branch fitting bw
BNIF	Branch fitting flgd
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

Branch	Run	pipe	BNIB	BNIF
15	40	- 300	7680310721	7680374411
20	50	- 50	7680310731	7680374421
20	80	- 150	7680310741	7680374441
20	200	- 300	7680310751	7680374471
25	80	- 250	7680310761	7680374481
25	300	- 300	7680310771	7680374491
40	80	- 80	7680310791	7680374521
40	100	- 200	7680310811	7680374531
40	250	- 300	7680310821	7680374541
50	80	- 80		7680374591
50	100	- 200		7680374601
50	250	- 300		7680374611

Thermowell	
Length	MESC number
230	7683385611
255	7683385621

BOLTING

Boltset standard flange					
DN	nr	inch	x	mm	MESC number
15	4	3/4	x	130	8138613341
20	4	3/4	x	130	8138613341
25	4	7/8	x	140	8138614041
40	4	1 1/8	x	180	8138615331
50	8	1	x	180	8138614751
80	8	1 1/4	x	230	8138615981
100	8	1 1/2	x	300	8138616961
150	8	2	x	400	8138618241
200	12	2	x	440	8138618291
250	12	2 1/2	x	550	8138837061
300	12	2 3/4	x	610	8138837821

Boltset orifice flange					
DN	nr	inch	x	mm	MESC number
50	8	1	x	190	8138614771
80	8	1 1/4	x	240	8138616001
100	8	1 1/2	x	310	8138616981
150	8	2	x	410	8138618251
200	12	2	x	460	8138618341
250	12	2 1/2	x	570	8138837081
300	12	2 3/4	x	640	8138837851

Boltset blind/spacer					
DN	nr	inch	x	mm	MESC number
15	4	3/4	x	140	8138613351
20	4	3/4	x	140	8138613351
25	4	7/8	x	160	8138614071
40	4	1 1/8	x	190	8138615351
50	8	1	x	200	8138614641
80	8	1 1/4	x	260	8138616031
100	8	1 1/2	x	330	8138617171
150	8	2	x	450	8138618311
200	12	2	x	500	8138835611
300	12	2 3/4	x	700	8138837911



ASSEMBLIES

Boltset standard flange					
DN	nr	inch	x mm	MESC number	
15	4	3/4	x 130	8138613341	
20	4	3/4	x 130	8138613341	
25	4	7/8	x 140	8138614041	
40	4	1 1/8	x 180	8138615331	
50	8	1	x 180	8138614751	
80	8	1 1/4	x 230	8138615981	
100	8	1 1/2	x 300	8138616961	
150	8	2	x 400	8138618241	
200	12	2	x 440	8138618291	
250	12	2 1/2	x 550	8138837061	
300	12	2 3/4	x 610	8138837821	
Boltset orifice flange					
DN	nr	inch	x mm	MESC number	
50	8	1	x 190	8138614771	
80	8	1 1/4	x 240	8138616001	
100	8	1 1/2	x 310	8138616981	
150	8	2	x 410	8138618251	
200	12	2	x 460	8138618341	
250	12	2 1/2	x 570	8138837081	
300	12	2 3/4	x 640	8138837851	
Boltset blind/spacer					
DN	nr	inch	x mm	MESC number	
15	4	3/4	x 140	8138613351	
20	4	3/4	x 140	8138613351	
25	4	7/8	x 160	8138614071	
40	4	1 1/8	x 190	8138615351	
50	8	1	x 200	8138614641	
80	8	1 1/4	x 260	8138616031	
100	8	1 1/2	x 330	8138617171	
150	8	2	x 450	8138618311	
200	12	2	x 500	8138835611	
300	12	2 3/4	x 700	8138837911	

Drain/vent point DN 15 Fig.I DN15 - 15		
Branch: according to branch table		
Blind flange	1	7662104721
Welding neck flange	1	7662800521
Gasket spiral wound	1	8541362541
Studbolt with nuts	4	8138613341
Drain/vent point DN 20 Fig.I DN20 - 40		
Branch: according to branch table		
Blind flange	1	7662104741
Welding neck flange	1	7662800541
Gasket spiral wound	1	8541362561
Studbolt with nuts	4	8138613341
Drain/vent point DN 20 Fig.H DN50 - 50		
Branch: branch nipple flanged		
Blind flange	1	7662104741
Gasket spiral wound	1	8541362561
Studbolt with nuts	4	8138613341
Drain/vent point DN 25 Fig.H DN80 - 300		
Branch: branch nipple flanged		
Blind flange	1	7662104761
Gasket spiral wound	1	8541362581
Studbolt with nuts	4	8138614041
Meter run connection DN 15 Fig.AA DN15 - 40		
Branch: not applicable		
Valve ass doub block ball thrd	2	7785470831
Gasket spiral wound	2	8541362541
Orifice connection DN 15 Fig.AB DN50 - 300		
Branch: not applicable		
Valve ass doub block ball thrd	2	7785470831
Welding neck flange	2	7662800521
Gasket spiral wound	2	8541362541
PI on piping cl coup DN 15 Fig.CB DN15 - 40		
Branch: according to branch table		
Valve ass doub block ball thrd	1	7785470831
Welding neck flange	1	7662800521
Gasket spiral wound	1	8541362541

PI on piping cl coup DN 15 Fig.CA DN50 - 300		
Branch: branch nipple flanged		
Valve ass doub block ball thrd	1	7785470831
Gasket spiral wound	1	8541362541
PI on piping remote DN 15 Fig.AB DN15 - 40		
Branch: according to branch table		
Valve ass doub block ball thrd	1	7785470831
Welding neck flange	1	7662800521
Gasket spiral wound	1	8541362541
PI on piping remote DN 15 Fig.AA DN50 - 300		
Branch: branch nipple flanged		
Valve ass doub block ball thrd	1	7785470831
Gasket spiral wound	1	8541362541
Temperature instrum DN 50 Fig.HS DN80 - 100		
Branch: branch nipple flanged		
Gasket spiral wound	1	8541362641
Thermowell L=230mm	1	7683385611
Studbolt with nuts	4	8138614641
Temperature instrum DN 50 Fig.HL DN150 - 300		
Branch: branch nipple flanged		
Gasket spiral wound	1	8541362641
Thermowell L=255mm	1	7683385621
Studbolt with nuts	4	8138614641

CLASS 251422

Design limits

	Temperature (°C)					
	0	50	75	100	125	150
Pressure (Bar ga)						
DN 15- 150	314.9	314.9	314.9	314.9	314.9	314.9
DN 200- 300	296.1	296.1	296.1	296.1	296.1	296.1

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1 and ASME B31.3 allowable internal pressure, and limited by allowable stress of bolting material
- For bending of pipe see PTS 31.38.01.31.
- For basis of design see PTS 31.38.01.10.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) for horizontal mounting only

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	160
80	XXS
100	XXS
150	XXS
200	26.0
250	32.0
300	38.0

Branch connections 90 degrees

Run size	Branch Size											
	15	20	25	40	50	80	100	150	200	250	300	
300	C	C	C	C	E	E	E	B	B	B	A	
250	C	C	C	C	E	E	B	B	B	A		
200	C	C	C	C	E	E	B	B	A			
150	C	C	C	C	E	B	B	A				
100	C	C	C	C	B	B	A					
80	C	C	C	C	B	A						
50	C	C	B	B	A							
40	C	B	B	A								
25	B	B	A									
20	B	A										
15	A											

Code	Explanation of characters
A	Equal tee
B	Reducing tee
C	Branch fitting
E	Branch outlet

Carbon steel Sour		Plant
Class no.	251422	Consignee
ASME rating	CLASS 2500	Engineered by
Corrosion allowance	1 mm	Principal
Revision letter	O	Contr. job no.
Revision date	11/2009	Project no.

COMPONENT MATERIAL DESCRIPTION
(For full material description see relevant MESG buying description.)

Pipe

PIPE	Pipe	DN 15-150	ASTM A106-B
PIPE	Pipe	DN 200-300	ASTM A333-6

Flanges

BLFL	Blind flange	DN 15-300	ASTM A105
SBFL	Spectacle blind	DN 15-250	ASTM A516-60/65/70
SPFL	Spade	DN 15-300	ASTM A516-60/65/70
SPRT	Spacer ring	DN 15-300	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-300	ASTM A105

Fittings

CAPB	Cap bw	DN 15-150	ASTM A234-WPB
CAPB	Cap bw	DN 200-300	ASTM A420-WPL6
E45B	Elbow 45 deg bw	DN 15-150	ASTM A234-WPB
E45B	Elbow 45 deg bw	DN 200-300	ASTM A420-WPL6
E90B	Elbow 90 deg bw	DN 15-150	ASTM A234-WPB
E90B	Elbow 90 deg bw	DN 200-300	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15-150	ASTM A234-WPB
TEEB	Tee equal bw	DN 200-300	ASTM A420-WPL6

Reducing fittings

BNIF	Branch fitting flgd	DN 15-50	ASTM A105
BNIP	Branch fitting plain	DN 15-40	ASTM A105
BROB	Branch outlet bw	DN 200-300	ASTM A105
RECB	Reducer concentric bw	DN 20-150	ASTM A234-WPB
RECB	Reducer concentric bw	DN 200-300	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20-150	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 200-300	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20-150	ASTM A234-WPB
TERB	Tee reducing bw	DN 200-300	ASTM A420-WPL6

Valves

BTFB	Ball valve 14313 FB flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Devlon V
BTRF	Ball valve 14313 RB flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Devlon V
CHVF	Check valve flgd	DN 15-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
GAVF	Gate valve flgd	DN 15-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
GLVF	Globe valve flgd	DN 15-100	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
MSBF	Monofl single block ball	DN 15-50	Body: ASTM A350-LF2 Trim: AISI 316, Devlon V
VDBT	Valve ass doub block ball thrd	---	Body: ASTM A350-LF2 Trim: AISI 316, Devlon V

Instruments

TWHD	Thermowell	DN 50-50	ASTM B564 UNS N04400
TWHL	Thermowell L=255mm	---	ASTM B564 UNS N04400
TWHS	Thermowell L=230mm	---	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-300	AISI 316, graphite filled CS centring-/SS inner ring
ORFS	Orifice flange set	DN 50-300	ASTM A105
STBT	Studbolt with nuts	---	ASTM A193-B7M/A194-2HM



PIPING COMPONENTS

Item description	Nominal pipe size											
	MESC	15	20	25	40	50	80	100	150	200	250	300
Pipe												
Pipe	743003	0201	0301	0401	0601	0731	1151	1631	2291			
Pipe	743015									1421	1821	2341
Flanges												
Blind flange	766210	4721	4741	4761	4781	4801	4841	4861	4881	4901	4921	4941
Spacer ring	768846	2021	2041	2061	2081	2101	2121	2141	2161	2181	2201	2221
Spade	768842	2021	2041	2061	2081	2101	2121	2141	2161	2181	2201	2221
Spectacle blind	768837	2021	2041	2061	2081	2101	2121	2141	2161	2181	2201	
Welding neck flange	766280	0021	0041	0061	0081	0101	0641	0661	0681			
Welding neck flange	766285									1421	1821	2341
Fittings												
Cap bw	763017	5721	5781	5821	5921	6121	6331	6531	6731			
Cap bw	763116									1421	1821	2341
Elbow 45 deg bw	763034	5721	5781	5821	5921	6121	6331	6531	6731			
Elbow 45 deg bw	763145									1421	1821	2341
Elbow 90 deg bw	763042	5721	5781	5821	5921	6121	6331	6531	6731			
Elbow 90 deg bw	763147									1421	1821	2341
Tee equal bw	763081	5721	5781	5821	5921	6121	6331	6531	6731			
Tee equal bw	763191									1421	1821	2341
Valves												
Ball valve 14313 FB flgd	770067					7581	7601	7621	7641	7651	7661	7671
Ball valve 14313 RB flgd	770067					2581	2601	2621	2641	2651	2661	2671
Check valve flgd	771006					2581	2601	2621	2641	2651	2661	2671
Check valve flgd	771056	5531	5541	5551	5571							
Gate valve flgd	772004					2581	2601	2621	2641	2651	2661	2671
Gate valve flgd	772078	5531	5541	5551	5571							
Globe valve flgd	773005					2581	2601	2621				
Globe valve flgd	773056	5531	5541	5551	5571							
Monofl single block ball	770095	4831	4841	4851	4871	4881						
Miscellaneous												
Gasket spiral wound	854136	2541	2561	2581	2621	2641	2681	2701	2741	2761	2781	2801
Orifice flange set	766295					4691	4831	4851	4861	5901	5971	5461

REDUCING/PIPING COMPONENTS

Run	x	Br	BROB	RECB	REEB	TERB
20	x	15		7630661411	7630671411	7630880391
25	x	15		7630661511	7630671511	7630880491
25	x	20		7630661611	7630671611	7630880591
40	x	15		7630661711	7630671711	
40	x	20		7630661811	7630671811	7630880791
40	x	25		7630661911	7630671911	7630880891
50	x	20		7630661951	7630671951	
50	x	25		7630662011	7630672011	7630881071
50	x	40		7630662111	7630672111	7630881161
80	x	40		7630662341	7630672341	
80	x	50		7630662431	7630672431	7630881411
100	x	40		7630662581	7630672581	
100	x	50		7630662731	7630672731	7630881641
100	x	80		7630662821	7630672821	7630881681
150	x	80		7630663021	7630673021	7630881801
150	x	100		7630663121	7630673121	7630881931
200	x	50	7679080681			
200	x	80	7679083011			
200	x	100		7631641631	7631651631	7631941631
200	x	150		7631641971	7631651971	7631941981
250	x	50	7679081001			
250	x	80	7679083511			
250	x	100		7631642461	7631652481	7631942331
250	x	150		7631642791	7631652791	7631942791
250	x	200		7631643291	7631653291	7631943291
300	x	50	7679081531			
300	x	80	7679084021			
300	x	100	7679086521			
300	x	150		7631643811	7631653811	7631943811
300	x	200		7631644431	7631654441	7631944431
300	x	250		7631645071	7631655071	7631945051

Comp.name	Description
BNIF	Branch fitting flgd
BNIP	Branch fitting plain
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

Branch	Run	pipe	BNIF	BNIP
15	40	- 300	7680374211	7680310161
20	50	- 50	7680374221	7680310171
20	80	- 150	7680374241	7680310191
20	200	- 300	7680374271	7680310211
25	80	- 250	7680374281	7680310221
25	300	- 300	7680374291	7680310231
40	80	- 80	7680374321	7680310251
40	100	- 200	7680374331	7680310271
40	250	- 300	7680374341	7680310291
50	80	- 80	7680374631	
50	100	- 200	7680374641	
50	250	- 300	7680374651	

Thermowell	
Length	MESC number
230	7683385611
255	7683385621

BOLTING

Boltset standard flange					
DN	nr	inch	x	mm	MESC number
15	4	3/4	x	130	8138663341
20	4	3/4	x	130	8138663341
25	4	7/8	x	140	8138664041
40	4	1 1/8	x	180	8138665331
50	8	1	x	180	8138664751
80	8	1 1/4	x	230	8138665981
100	8	1 1/2	x	300	8138666961
150	8	2	x	400	8138668241
200	12	2	x	440	8138668291
250	12	2 1/2	x	550	8138867061
300	12	2 3/4	x	610	8138867821

Boltset orifice flange					
DN	nr	inch	x	mm	MESC number
50	8	1	x	190	8138664771
80	8	1 1/4	x	240	8138666001
100	8	1 1/2	x	310	8138666981
150	8	2	x	410	8138668251
200	12	2	x	460	8138668341
250	12	2 1/2	x	570	8138867081
300	12	2 3/4	x	640	8138867851

Boltset blind/spacer					
DN	nr	inch	x	mm	MESC number
15	4	3/4	x	140	8138663351
20	4	3/4	x	140	8138663351
25	4	7/8	x	160	8138664071
40	4	1 1/8	x	190	8138665351
50	8	1	x	200	8138664971
80	8	1 1/4	x	260	8138666031
100	8	1 1/2	x	330	8138667011
150	8	2	x	450	8138668311
200	12	2	x	500	8138865611
300	12	2 3/4	x	700	8138867911



ASSEMBLIES

Drain/vent point DN 15 Fig.I DN15 - 15		
Branch: according to branch table		
Blind flange	1	7662104721
Welding neck flange	1	7662800021
Gasket spiral wound	1	8541362541
Studbolt with nuts	4	8138663341

Drain/vent point DN 20 Fig.I DN20 - 40		
Branch: according to branch table		
Blind flange	1	7662104741
Welding neck flange	1	7662800041
Gasket spiral wound	1	8541362561
Studbolt with nuts	4	8138663341

Drain/vent point DN 20 Fig.H DN50 - 50		
Branch: branch nipple flanged		
Blind flange	1	7662104741
Gasket spiral wound	1	8541362561
Studbolt with nuts	4	8138663341

Drain/vent point DN 25 Fig.H DN80 - 300		
Branch: branch nipple flanged		
Blind flange	1	7662104761
Gasket spiral wound	1	8541362581
Studbolt with nuts	4	8138664041

Meter run connection DN 15 Fig.AA DN15 - 40		
Branch: not applicable		
Valve ass doub block ball thrd	2	7785470831
Gasket spiral wound	2	8541362541

Orifice connection DN 15 Fig.AB DN50 - 300		
Branch: not applicable		
Valve ass doub block ball thrd	2	7785470831
Welding neck flange	2	7662800021
Gasket spiral wound	2	8541362541

PI on piping cl coup DN 15 Fig.CB DN15 - 40		
Branch: according to branch table		
Valve ass doub block ball thrd	1	7785470831
Welding neck flange	1	7662800021
Gasket spiral wound	1	8541362541

PI on piping cl coup DN 15 Fig.CA DN50 - 300		
Branch: branch nipple flanged		
Valve ass doub block ball thrd	1	7785470831
Gasket spiral wound	1	8541362541

PI on piping remote DN 15 Fig.AB DN15 - 40		
Branch: according to branch table		
Valve ass doub block ball thrd	1	7785470831
Welding neck flange	1	7662800021
Gasket spiral wound	1	8541362541

PI on piping remote DN 15 Fig.AA DN50 - 300		
Branch: branch nipple flanged		
Valve ass doub block ball thrd	1	7785470831
Gasket spiral wound	1	8541362541

Temperature instrum DN 50 Fig.HS DN80 - 100		
Branch: branch nipple flanged		
Gasket spiral wound	1	8541362641
Thermowell L=230mm	1	7683385611
Studbolt with nuts	4	8138664971

Temperature instrum DN 50 Fig.HL DN150 - 300		
Branch: branch nipple flanged		
Gasket spiral wound	1	8541362641
Thermowell L=255mm	1	7683385621
Studbolt with nuts	4	8138664971

CLASS 251432

Design limits

	Temperature (°C)					
	0	50	75	100	125	150
Pressure (Bar ga)						
DN 15- 300	425.5	417.7	403.0	388.3	381.9	375.6

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For bending of pipe see PTS 31.38.01.31.
- For basis of design see PTS 31.38.01.10.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) for horizontal mounting only

Table of schedules

DN	Schedule
15	XXS
20	XXS
25	XXS
40	12.0
50	13.0
80	18.0
100	22.0
150	30.0
200	38.0
250	48.0
300	56.0

Branch connections 90 degrees

Run size	Branch Size											
	15	20	25	40	50	80	100	150	200	250	300	
300	C	C	C	C	E	E	E	B	B	B	A	
250	C	C	C	C	E	E	B	B	B	A		
200	C	C	C	C	E	E	B	B	A			
150	C	C	C	C	E	B	B	A				
100	C	C	C	C	B	B	A					
80	C	C	C	C	B	A						
50	C	C	B	B	A							
40	C	B	B	A								
25	B	B	A									
20	B	A										
15	A											

Code	Explanation of characters
A	Equal tee
B	Reducing tee
C	Branch fitting
E	Branch outlet

Carbon steel		Plant
Class no.	251432	Consignee
ASME rating	CLASS 2500	Engineered by
Corrosion allowance	3 mm	Principal
Revision letter	O	Contr. job no.
Revision date	11/2009	Project no.

COMPONENT MATERIAL DESCRIPTION
(For full material description see relevant MESG buying description.)

Pipe

PIPE	Pipe	DN 15-100	ASTM A106-B
PIPE	Pipe	DN 150-300	ASTM A333-6

Flanges

BLFL	Blind flange	DN 15-300	ASTM A105
SBFL	Spectacle blind	DN 15-250	ASTM A516-60/65/70
SPFL	Spade	DN 15-300	ASTM A516-60/65/70
SPRT	Spacer ring	DN 15-300	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-300	ASTM A105

Fittings

CAPB	Cap bw	DN 15-100	ASTM A234-WPB
CAPB	Cap bw	DN 150-300	ASTM A420-WPL6
E45B	Elbow 45 deg bw	DN 15-100	ASTM A234-WPB
E45B	Elbow 45 deg bw	DN 150-300	ASTM A420-WPL6
E90B	Elbow 90 deg bw	DN 15-100	ASTM A234-WPB
E90B	Elbow 90 deg bw	DN 150-300	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15-100	ASTM A234-WPB
TEEB	Tee equal bw	DN 150-300	ASTM A420-WPL6

Reducing fittings

BNIB	Branch fitting bw	DN 15-40	ASTM A105
BNIF	Branch fitting flgd	DN 15-50	ASTM A105
BROB	Branch outlet bw	DN 150-300	ASTM A105
RECB	Reducer concentric bw	DN 150-300	ASTM A420-WPL6
RECB	Reducer concentric bw	DN 20-100	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 150-300	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20-100	ASTM A234-WPB
TERB	Tee reducing bw	DN 150-300	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20-100	ASTM A234-WPB

Valves

BTFB	Ball valve 14313 FB flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Devlon V
BTRF	Ball valve 14313 RB flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Devlon V
CHVF	Check valve flgd	DN 15-40	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
CHVF	Check valve flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 410
GAVF	Gate valve flgd	DN 15-40	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
GAVF	Gate valve flgd	DN 50-300	Body: ASTM A105/A216-WCB/WCC Trim: AISI 410
GLVF	Globe valve flgd	DN 15-40	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite 6
GLVF	Globe valve flgd	DN 50-100	Body: ASTM A105/A216-WCB/WCC Trim: AISI 410
MSBF	Monofl single block ball	DN 15-50	Body: ASTM A350-LF2 Trim: AISI 316, Devlon V
VDBT	Valve ass doub block ball thrd	---	Body: ASTM A350-LF2 Trim: AISI 316, Devlon V

Instruments

TWHD	Thermowell	DN 50-50	ASTM B564 UNS N04400
TWHL	Thermowell L=255mm	---	ASTM B564 UNS N04400
TWHS	Thermowell L=230mm	---	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-300	AISI 316, graphite filled CS centring-/SS inner ring
ORFS	Orifice flange set	DN 50-300	ASTM A105
STBT	Studbolt with nuts	---	ASTM A193-B7/A194-2H

