Contents

١.	Seamless tubes	1
	1.1 Scope and design basis	1
	1.2 Information to be supplied by the Purchaser	1
	1.3 Freedom from defects	2
	1.4 Materials and manufacture	
	1.5 Dimensions and tolerances	2
	1.5.1 Outside diameter	2
	1.5.2 Inside diameter	2
	1.5.3 Ovality	2
	1.5.4 Thickness	2
	1.5.5 Length	2
	1.5.7 Straightness	3
	1.6 Selection of test samples	3
	1.7 Mechanical tests	3
	1.7.1 Mandatory tests	3
	1.7.2 Supplementary tests	[∠]
	1.8 Retests	
	1.9 Hydraulic or eddy current tests (mandatory tests)	
	1.9.1 Hydraulic test	
	1.9.2 Eddy current test	
	1.10 Marking	
	1.11 Certification	6
2.	Seam-welded tubes	11
	2.1 Scope and design basis	. 11
	2.2 Information to be supplied by the Purchaser	
	2.3 Freedom from defects	. 12
	2.4 Materials and manufacture	. 12
	2.5 Welding	. 12
	2.5.1 Consumables	. 12
	2.5.2 Welding procedure qualification	. 12
	2.5.3 Welder qualification	
	2.6 Dimensions and tolerances	
	2.6.1 Outside diameter	
	2.6.2 Inside diameter	
	2.6.3 Ovality	12

2.6.4 Circularity (permissible deviation from circularity)	12
2.6.5 Thickness	13
2.6.6 Length	13
2.6.7 Squareness of ends	14
2.6.8 Straightness	14
2.7 Selection of test samples	14
2.8 Non-destructive testing	14
2.8.1 Liquid dye penetrant test	14
2.8.2 Radiography	14
2.9 Repairs to weld seams	14
2.10 Retest of repairs	14
2.11 Hydraulic test	14
2.12 Marking	15
2.13 Certification	15
3. Composite weld neck flanges	19
3.1 Scope and design basis	19
3.2 Pressure/temperature ratings	20
3.3.1 Flanges	20
3.3.2 Gaskets	20
3.4 Weld neck stub ends	20
3.4.1 Manufacture	20
3.4.2 Information to be supplied by the Purchaser	20
3.4.3 Freedom from defects	21
3.4.4 Joint facings and surface finish	21
3.4.5 Selection of test samples	21
3.4.6 Marking	21
3.4.7 Inspection and testing	22
3.4.8 Certification	22
3.5 Weld neck backing flanges	22
3.5.1 Manufacture	22
3.5.2 Information to be supplied by the Purchaser	22
3.5.3 Drilling	23
3.5.4 Facings and surface finish	23
3.5.5 Selection of test samples	
3.5.7 Inspection and testing	
3.5.8 Certification	
3.5.9 Temporary corrosion protection	24
4. Composite slip-on flanges	31
4.1 Scope and design basis	31

4.2 Pressure/temperature ratings	31
4.3 Materials	32
4.3.1 Flanges	32
4.3.2 Gaskets	32
4.3.3 Bolting (stud bolts)	32
4.4 Slip-on stub ends	32
4.4.1 Manufacture	32
4.4.2 Information to be supplied by the Purchaser	32
4.4.3 Freedom from defects	32
4.4.4 Joint facings and surface finish	32
4.4.5 Selection of test samples	33
4.4.6 Marking	33
4.4.7 Inspection and testing	33
4.4.8 Certification	34
4.5. Slip-on backing flanges	34
4.5.1 Manufacture	34
4.5.2 Information to be supplied by the Purchaser	34
4.5.3 Drilling	34
4.5.4 Facings and surface finish	35
4.5.5 Selection of test samples	35
4.5.6 Marking	35
4.5.7 Inspection and testing	35
4.5.8 Certification	35
4.5.9 Temporary corrosion protection	35
5. Solid 90/10 copper nickel weld neck flanges	39
5.1 Scope and design basis	39
5.2 Pressure/temperature ratings	39
5.3 Materials	39
5.3.1 Flanges	39
5.3.2 Gaskets	39
5.3.3 Bolting	40
5.4 Manufacture	40
5.5 Information to be supplied by the Purchaser	40
5.6 Freedom from defects	40
5.7 Joint facings and surface finish	40
5.8 Selection of test samples	40
5.9 Marking	41
5.10 Inspection and testing	41
5.11 Certification	41

6. Solid 90/10 copper nickel slip-on flanges	47
6.1 Scope and design basis	47
6.2 Pressure/temperature ratings	47
6.3 Materials	47
6.3.1 Flanges	47
6.3.2 Gaskets	47
6.3.3 Bolting	47
6.4 Manufacture	48
6.5 Information to be supplied by the Purchaser	48
6.6 Freedom from defects	48
6.7 Joint facings and surface finish	48
6.8 Selection of test samples	48
6.9 Marking	48
6.10 Inspection and testing	49
6.11 Certification	49
7. 90/10 Cu Ni butt welding fittings	53
7.1 Scope and design basis	53
7.2 Information to be supplied by the Purchaser	53
7.3 Freedom from defects	53
7.4 Materials and manufacture	53
7.5 Welding	54
7.5.1 Consumables	54
7.5.2 Welding procedure qualification	54
7.5.3 Welder qualification	54
7.6 Selection of test samples	54
7.7 Non-destructive testing	54
7.7.1 liquid dye penetrant test	54
7.7.2 Radiography	54
7.8 Repairs to welded seams	54
7.9 Retests of repairs	54
7.10 Marking	55
7.11 Inspection and testing	55
7.12 Certification	56
8. 90/10 Cu Ni socket welding fittings	71
8.1 Scope and design basis	71
8.2 Information to be supplied by the Purchaser	71
8.3 Freedom from defects	71
8.4 Materials and manufacture	

8.5	Proof tests for adequacy of socket welding union type fittings (prototype test)	72
8.6	Marking	73
8.7	Inspection and testing	73
8.8	Certification	73
9. Cop	oper alloy capillary brazing fittings	75
9.1	Scope and design basis	75
9.2	Information to be supplied by the Purchaser	75
9.3	Freedom from defects	75
9.4	Materials and manufacture	76
9.5	Proof tests for adequacy of capillary brazing union type fittings (prototype test)	76
9.6	Marking	77
9.7	Inspection and testing	77
9.8	Certification	77
10. Co	opper alloy flareless non-manipulative type compression fittings	79
10.	1 Scope and design basis	79
10.	2 Information to be supplied by the Purchaser	79
10.	3 Freedom from defects	79
10.	4 Materials and manufacture	80
10.	5 Proof test for adequacy of compression fittings (prototype test)	80
10.	6 Marking	81
10.	7 Inspection and testing	81
10.	8 Certification	81
11. Co	pper alloy threaded fittings	83
11.	1 Scope and design basis	83
11.	2 Information to be supplied by the Purchaser	83
11.	3 Freedom from defects	84
11.	4 Materials and manufacture	84
11.	5 Marking	84
11.	6 Inspection and testing	85
11.	7 Certification	85
12. 90)/10 Cu Ni self-reinforced branch connection fittings	89
12.	1 Scope and design basis	89
12.	2 Information to be supplied by the Purchaser	89
12.	3 Pressure/temperature ratings	90
12.	4 Freedom from defects	90
12.	5 Materials and manufacture	90
12	6 Marking	90

12.7 Inspection and testing	90
12.8 Certification	91
13. 90/10 Cu Ni saddle pieces	95
13.1 Scope and design basis	95
13.2 Information to be supplied by the Purchaser	95
13.3 Pressure/temperature ratings	95
13.4 Freedom from defects	95
13.5 Materials and manufacture	95
13.6 Welding	96
13.6.1 Consumables	96
13.6.2 Welding procedure qualification	96
13.6.3 Welder qualification	96
13.7 Selection of test samples	96
13.8 Non-destructive testing	96
13.8.1 Liquid dye penetrant test	96
13.8.2 Radiography	96
13.9 Repairs to weld seams	
13.10 Retest of repairs	
13.11 Marking	
13.12 Inspection and testing	
13.13 Certification	97
14. Discretionary contractual clauses	105
14.1 Inspection	105
14.1.1 General	105
14.1.2 Seamless tubes	105
14.1.3 Flanges	105
14.1.4 Fittings	
14.2 Facilities for testing	105
Appendix A	107
Appendix B	109
Appendix C	111
Appendix D	113
Appendix E	115
References	117
EEMUA Publication: feedback form	119

	EEMUA Publications Catalogue	120
	Asset and integrity management	120
	Automation and electrical equipment	120
	Pressure equipment	121
	Process pipework, valves and machinery	122
	Storage and containment systems	122
Fi	gures	
	Figure 1 Flattening test	4
	Figure 2 Double-bend test	
	Figure 3 Drifting test	4
	Figure 4 Dimensions of welding ends on butt welding components	56
	Figure 5 Guidance for the design of tees	
	Figure 6 Welding dimensions required for socket welding fittings	
	Figure 7 Dimensions of welding ends on butt welding saddle pieces	
	Figure 8 Saddle pieces - seamless	98
	Figure 9 Saddle pieces - seam welded	
Ta	ables	
	Table 1 Minimum random lengths for seamless tubes	2
	Table 2 Tolerances on lengths for seamless tubes	3
	Table 3 Dimensions of seamless 90/10 Cu/Ni tubes: 16 bar rating	7
	Table 4 Dimensions of seamless 90/10 Cu/Ni tubes 20 bar rating	8
	Table 5 Chemical composition and mechanical properties of seamless 90/10 copper/nickel tubes	9
	Table 6 Minimum random lengths for seam-welded tubes	13
	Table 7 Tolerances on lengths for seam-welded tubes	13
	Table 8 Dimensions of seam-welded 90/10 Cu Ni tubes: 16 bar rating	16
	Table 9 Dimensions of seam-welded 90/10 Cu Ni tubes: 20 bar rating	17
	Table 10 Chemical composition and mechanical properties of seam-welded 90/10 Cu Ni tubes	18
	Table 11 Surface finish (weld neck stub ends)	21
	Table 12 Weld neck 90/10 Cu Ni stub ends: 16 bar rating	25
	Table 13 Weld neck 90/10 Cu Ni stub ends: 20 bar rating	26
	Table 14 Weld neck blanking flanges: Class 150	27
	Table 15 Tolerances: weld neck stub ends	28
	Table 16 Tolerances: backing flanges	29
	Table 17 Chemical composition and mechanical properties for wrought 90/10 Cu Ni weld-neck	
	stub ends	30
	Table 18 Chemical composition and mechanical properties for carbon steel backing flanges	30
	Table 19 Surface finish (Slip-on stub ends)	33
	Table 20 Slip-on 90/10 Cu Ni stub ends 20 bar	36

Table 21	Steel backing flanges for use with 90/10 Cu Ni slip-on stub-ends: Class 150	37
Table 22	Tolerances: slip-on stub ends	37
Table 23	Tolerances: steel backing flanges	38
Table 24	Chemical composition and mechanical properties for wrought 90/10 Cu Ni slip on stub-ends	38
Table 25	Chemical composition and mechanical properties for carbon steel backing flanges	38
Table 26	Surface finish (solid weld neck flanges)	40
Table 27	Solid 90/10 Cu Ni weld neck flanges: 16 bar	42
Table 28	Solid 90/10 Cu Ni weld neck flanges: 20 bar	43
Table 29	Tolerances: solid 90/10 Cu Ni weld neck flanges	44
Table 30	Chemical composition and mechanical properties for solid wrought 90/10 Cu Ni weld neck	
flanges		45
Table 31	Surface finish (solid slip-on flanges)	48
Table 32	Solid 90/10 Cu Ni slip-on flanges	50
Table 33	Tolerances: solid 90/10 Cu Ni slip-on flanges	51
Table 34	Chemical composition and mechanical properties for solid wrought 90/10 Cu Ni slip-on	
flanges		51
Table 35	Dimensions of welding ends for all butt welding components	58
Table 36	Dimensions of welding ends for all butt welding components	59
Table 37	Tolerances – fittings	60
Table 38	Dimensions of long radius elbows	61
	Intrados thickness of long radius elbows.	
	Dimensions of straight (equal) tees	
Table 41	Dimensions of reducing outlet tees - sizes up to 159 x 159 x 108	64
Table 42	Dimensions of reducing outlet tees	65
Table 43	Dimensions of reducing outlet tees	66
Table 44	Dimensions of end caps	67
Table 45	Dimensions of butt welding reducers	68
Table 46	Dimensions of butt welding reducers	69
Table 47	Dimensions of butt welding reducers	70
	Basis for hydraulic proof pressure test of assembled union joints	
	Dimensions of socket welding fittings	
Table 50	Basis for hydraulic proof pressure test of assembled union joints	76
	Dimensions of capillary brazing fittings	
Table 52	Basis for hydraulic proof pressure test of assembled non-manipulative compression joints	80
Table 53	Dimensions of flareless non-manipulative compression fittings	82
	Dimensions of copper alloy threaded plugs and bushings	
	Dimension of copper alloy threaded couplings. half couplings and caps	
	Dimensions of 90/10 Cu Ni alloy tubes suitable for screwing NPT to ASME B1.20.1-2013*	
Table 57	Self reinforced branch connection fittings (butt welding type)	92

Table 58	Self reinforced branch connection fittings (socket welding type)	93
Table 59	Self reinforced branch connection fittings (threaded type)	94
Table 60	Dimensions of butt welding ends 16 bar rating	99
Table 61	Dimensions of butt welding ends 20 bar rating	100
Table 62	Dimensions of butt welding ends 20 bar rating	101
Table 63	Tolerances -Seamless saddle pieces -20 bar rating	101
Table 64	Seam-welded saddle pieces -16 bar rating	102
Table 65	Seam-welded saddle pieces -20 bar rating	103
Table 66	Comparison of backing flanges for use with weld neck and slip-on stub ends	107
Table 67	Pressure/temperature ratings: flanges	109
Table 68	Chemical composition and mechanical properties of 90/10 Cu Ni fittings	113
Table 69	Pressure/temperature ratings fittings	115