

ISO 15590-1:2024-07 (E)

Oil and gas industries including lower carbon energy - Factory bends, fittings and flanges for pipeline transportation systems - Part 1: Induction bends

Contents		Page
Foreword		v
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Symbols and abbreviated terms	5
4.1	Symbols	5
4.2	Abbreviated terms	6
5	General requirements	6
5.1	Units of measurement	6
5.2	Rounding	6
5.3	Conformity to this document	6
6	Designation	7
7	Pressure rating and design	7
8	Purchaser-supplied information	8
8.1	General information	8
8.2	Additional information	9
8.3	Information on the mother pipe	9
9	Manufacturing	10
9.1	Mother pipe	10
9.2	Qualification test bend	10
9.3	Production bending	11
9.4	Post-bending heat treatment	11
9.5	Forming and sizing after bending	11
9.6	Strip/plate end welds	12
9.7	Jointers and girth welds	12
9.8	End preparation	12
10	Testing and inspection	12
10.1	General requirements	12
10.2	Extent of testing and inspection	13
10.2.1	Qualification test bend	13
10.2.2	Production bends	13
10.2.3	Production test bends	13
10.3	Chemical composition	13
10.4	Physical testing	13
10.4.1	Test pieces — General	13
10.4.2	Tensile testing	13
10.4.3	Charpy V-notch impact testing	18
10.4.4	Through-thickness hardness testing	20
10.4.5	Surface hardness testing	20
10.4.6	Metallographic examination	20
10.4.7	Crack tip opening displacement testing	21
10.4.8	Guided bend testing	21
10.4.9	Flattening tests	21
10.4.10	Retesting	21
10.5	Non-destructive testing	22

10.5.1	General	22
10.5.2	Visual inspection.....	22
10.5.3	Weld seam testing.....	22
10.5.4	Inspection of bend ends.....	23
10.5.5	Magnetic particle testing or liquid-penetrant testing on the bend body.....	23
10.5.6	Ultrasonic testing on the bend body.....	23
10.5.7	Level of residual magnetism.....	23
10.5.8	Repairs	23
10.5.9	NDT personnel.....	23
10.6	Dimensions	23
10.7	Gauging.....	28
10.8	Hydrostatic testing.....	28
11	Inspection document.....	28
12	Marking.....	28
Annex A	(normative) Manufacturing procedure specification (MPS)	29
Annex B	(normative) PSL 2S bends ordered for sour service.....	31
	Bibliography	35