

ISO 20421-1:2006-04 (E)

Cryogenic vessels - Large transportable vacuum-insulated vessels - Part 1: Design, fabrication, inspection and testing

Contents		Page
Foreword		v
1	Scope	1
2	Normative references	1
3	Terms and definitions	3
4	Symbols	6
5	General requirements	8
6	Mechanical loads	8
6.1	General	8
6.2	Load during the pressure test	8
7	Chemical effects	8
8	Thermal conditions	9
9	Materials	9
9.1	Selection of materials	9
9.2	Inspection certificates	9
10	Design	10
10.1	Design options	10
10.2	Common design requirements	10
10.3	Design by calculation	18
11	Fabrication	47
11.1	General	47
11.2	Cutting	47
11.3	Cold forming	47
11.4	Hot forming	49
11.5	Manufacturing tolerances	49
11.6	Welding	54
11.7	Non-welded joints	55
12	Inspection and testing	55
12.1	Quality plan	55
12.2	Production control test plates	56
12.3	Non-destructive testing	58
12.4	Rectification	60
12.5	Pressure testing	60
13	Marking and labelling	61
14	Final acceptance test	61
15	Periodic inspection	61

Annex A (informative) Examples of tank plates	62
Annex B (normative) Elastic stress analysis	65
Annex C (normative) Additional requirements for 9 % Ni steel	74
Annex D (informative) Pressure strengthening of vessels from austenitic stainless steels	76
Annex E (informative) Specific weld details	87
Annex F (informative) Outer-jacket relief devices	91
Annex G (informative) Base materials	93
Annex H (normative) Components subject to external pressure (pressure on the convex surface) -- Calculation	102
Annex I (normative) Design of openings in cylinders, spheres and cones -- Calculation	113