

ISO/TR 17671-6:2005-02 (E)

Welding - Recommendations for welding of metallic materials - Part 6: Laser beam welding

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	3
4	Health and safety and protection of the environment	3
5	Quality requirements	3
6	Equipment	4
6.1	General	4
6.2	Provisions for acceptance testing	4
6.3	Provisions for maintenance and calibration	4
7	Qualification of welding personnel	4
8	Welding procedure specification	5
9	Welding procedure test	5
10	Consumables	5
10.1	Filler metals	5
10.2	Gases	5
11	Design	6
11.1	Overall design of structure or product	6
11.2	Joint design	6
11.3	Joint preparation	6
12	Laser beam welding	7
12.1	Characteristics	7
12.2	Advantages and limitations	9
12.3	Assembling and fixtures	10
12.4	Process control	10
12.5	Inspection and testing	10
12.6	Imperfections	10
Annex A (informative) Equipment		11
A.1	Description of laser process	11
A.2	Laser beam sources	12
A.3	Guiding, shaping and focussing the beam	14
A.4	Devices used to create a relative movement between the laser beam and the work piece ...	18
A.5	Fixtures used to hold the work piece	18
A.6	Cooling system	19
A.7	Control systems	19

Annex B (informative) Laser beam properties	20
Annex C (informative) Information about weldability of metallic materials	22
C.1 General	22
C.2 Steels and iron alloys	22
C.3 Nickel alloys	24
C.4 Aluminium and magnesium alloys	24
C.5 Copper and its alloys	24
C.6 Refractory and reactive materials	24
C.7 Titanium and its alloys	25
C.8 Dissimilar metals	25
C.9 Non-metals	25
Annex D (informative) Information about causes of weld imperfections and their prevention	26
Annex E (informative) Beam control and monitoring	28
E.1 General	28
E.2 Focal point	28
E.3 Beam alignment and pilot beam coincidence	28
E.4 Beam power	29
E.5 Beam power distribution	29
E.6 Nozzle alignment	29
E.7 Pulsed beam power data	30
E.8 Manipulators, guides, etc	30
Annex F (informative) Laser beam processing	31
F.1 Laser beam cutting	31
F.2 Laser beam drilling	33
F.3 Laser beam surface treatment	33
F.4 Laser beam cladding	34
F.5 Laser beam marking and engraving	35
Bibliography	36