

European (international^b) standards for fusion welding

QUALITY REQUIREMENTS for welding^a

EN ISO 3834

Grouping of materials

Welder qualification

WPS

Welding procedure qualification

Welding operator qualification

NDT-personnel

Welding coordination

Inspection & testing during welding
- Measurement of preheat and interpass temp.

- Recommendations for welding
- Comparison of methods for avoidance of cold cracks

Inspection & testing after welding
- NDT – General rules

- Visual testing
- Radiographic testing
- Ultrasonic testing
- Magnetic particle testing
- Macro- & microscopic testing
- Penetrant testing (general)

Post-weld heat treatment

Calibration/validation

Arc welding

Steel Aluminium

CEN ISO/TR 15608, 20172, 20173, 20174

EN ISO 9606-1 EN ISO 9606-2

EN ISO 15609-1

EN ISO 15607, 15610, 15611, 15612, 15613

EN ISO 15614-1 EN ISO 15614-2 & -4

EN ISO 14732

EN ISO 9712

EN ISO 14731

EN ISO 13916

EN 1011-2 & -3 (ISO/TR 17671-2 & -3) EN 1011-4 (ISO/TR 17671-4)

CEN ISO/TR 17844

EN ISO 17635

EN ISO 17637

EN ISO 17636-1 & -2

EN ISO 17640, 10863, 13588 & 22825

EN ISO 17638

EN ISO 17639

EN ISO 3452-1

EN ISO 17663

EN ISO 17662

Quality levels & Joint preparation

Steel Aluminium

EN ISO 5817 EN ISO 10042

EN ISO 13919-1 EN ISO 13919-2

EN ISO 9013

EN ISO 9692-1 & -2 EN ISO 9692-3

Other

Pressurized comp. / Steel constr. EN 1708-1 & -3 / -2 (ISO 'missing')

Fusion welding / Pressure welding EN ISO 6520-1 / -2

Thermal cuts EN ISO 17658

Designation system CEN ISO/TS 17845

See continued

Copper

EN ISO 9606-3

Nickel

EN ISO 9606-4

Titanium & Zirconium

EN ISO 9606-5

Gas welding

EN ISO 15609-2

Electron beam welding

EN ISO 15609-3

Laser welding

EN ISO 15609-4

Cast iron

EN ISO 15614-3

Titanium & Zirconium

EN ISO 15614-5

Copper

EN ISO 15614-6

Overlay welding

EN ISO 15614-7

Tube to tube plate

EN ISO 15614-8

Beam welding

EN ISO 15614-11

Clad steel

EN 1011-5 (ISO/TR 17671-5)

Laser

EN 1011-6 (ISO/TR 17671-6)

Electron beam

EN 1011-7 (ISO/TR 17671-7)

Cast iron

EN 1011-8 (ISO/TR 17671-8)

Fume sampling in laboratory

Fume sampling in breathing zone

Filters

Eye protection

Protective clothing

Welding curtains

Environm. checklist

Environment, health & safety

EN ISO 15011-1 to -5

EN ISO 10882-1 & -2

EN ISO 15012-1, -2 & -4

EN 169, 170, 171, 175 & 379

EN ISO 11611, EN 12477

EN 1598

EN 14717

Product

Quality req. for manufacturing

Technical delivery conditions

Procurement

Type testing

Testing

TIG electrodes

Hard facing

Symbolic repr.

Proc. numbers

Terms & Def.

Def. weld proc.

Terms on joints & welds

Tolerances

Welding positions

Reinforcing steel

Other continued

ISO 2553

EN ISO 4063

ISO/TR 25901-parts, CEN/TR 14599

EN 14610

EN ISO 17659

EN ISO 13920

EN ISO 6947, CEN/TR 14633

EN ISO 17660

Welding consumables

EN 13479

EN 12074

EN ISO 544

EN ISO 14344

EN 14532-1, -2 & -3

EN ISO 15792-1, -2 & -3, 6847, 14372, 8249, 3690 & ISO 2401

EN ISO 6848

EN 14700 (ISO/TR 13393)

Impact

Tensile long.

Tensile perp.

Tensile cruc.

Bend

Fracture

Hardness

Macroscopic

Hot crack

Cold crack

Delta ferrite

Radiography

Ultrasonic

Magnetic particle

Penetrant

Visual testing (+ macro/micro etc)

Destructive testing

EN ISO 9016

EN ISO 5178

EN ISO 4136

EN ISO 9018

EN ISO 5173

EN ISO 9017

EN ISO 9015-1 & -2

EN ISO 17639, CR 12361 (ISO/TR 16060)

EN ISO 17641-1, -2 & -3

EN ISO 17642-1, -2 & -3

EN ISO 17655

Acceptance levels for NDT

EN ISO 10675-1 & -2

EN ISO 11666, 15626, 22825, 23279

EN ISO 23278

EN ISO 23277

For all imperfections EN ISO 5817 etc apply

Classification of welding consumables

Steel

Non-alloy and fine grain High strength Creep resistant Stainless and heat resisting

EN ISO 2560 EN ISO 18275 EN ISO 3580 EN ISO 3581

EN ISO 14341 EN ISO 16834 EN ISO 21952 EN ISO 14343

EN ISO 636 EN ISO 14171 EN ISO 26304 EN ISO 24598

EN ISO 14174

EN ISO 14171 EN ISO 26304 EN ISO 24598

EN ISO 14174

EN ISO 14174

EN ISO 14174

EN ISO 14174

EN ISO 14174

EN ISO 14174

EN ISO 14175

Other materials

Nickel Copper Aluminium Cast iron Titanium

EN ISO 14172 EN ISO 17777

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^a References in fields with this colour are directly linked to EN ISO 3834

^b The ISO reference in brackets is in most cases identical with or is based on corresponding EN

"Standards do not replace education, sound judgment and good engineering practice", Mathias Lundin