

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

Qual.lev. fusion welding (not beam)

Quality levels for beam welding

Quality levels for cutting

Joint preparation

Joint details

Geometric imperfections -
Definitions

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

European (international^b) standards for fusion welding

Copper	Nickel	Titanium & Zirconium
EN ISO 9606-3	EN ISO 9606-4	EN ISO 9606-5

Gas welding	Electron beam welding	Laser welding
EN ISO 15609-2	EN ISO 15609-3	EN ISO 15609-4

Cast iron	Titanium & Zirconium	Copper
EN ISO 15614-3	EN ISO 15614-5	EN ISO 15614-6

Overlay welding	Tube to tube plate	Beam welding
EN ISO 15614-7	EN ISO 15614-8	EN ISO 15614-11

Clad steel	Laser	Electron beam	Cast iron
EN 1011-5 (ISO/TR 17671-5)	EN 1011-6 (ISO/TR 17671-6)	EN 1011-7 (ISO/TR 17671-7)	EN 1011-8 (ISO/TR 17671-8)

Environment, health & safety	Product
EN ISO 15011-1 to -5	Quality req. for manufacturing
EN ISO 10882-1 & -2	Technical delivery conditions
EN ISO 15012-1, -2 & -4	Procurement
EN 169, 170, 171, 175 & 379	Type testing
EN ISO 11611, EN 12477	Testing
EN 1598	TIG electrodes
EN 14717	Hard facing
Fume sampling in laboratory	
Fume sampling in breathing zone	
Filters	
Eye protection	
Protective clothing	
Welding curtains	
Environm. checklist	

MMA

MIG/MAG

TIG

Electrodes etc for submerged arc

Fluxes for submerged arc

Cored wires

Gas welding

Shielding gas

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)

Classification of welding consumables									
Steel				Other materials					
Non-alloy and fine grain	High strength	Creep resistant	Stainless and heat resisting	Nickel	Copper	Aluminium	Cast iron	Titanium	
EN ISO 2560	EN ISO 18275	EN ISO 3580	EN ISO 3581	EN ISO 14172	EN ISO 17777				
EN ISO 14341	EN ISO 16834	EN ISO 21952	EN ISO 14343	EN ISO 18274	EN ISO 24373	EN ISO 18273	EN ISO 1071	EN ISO 24034	
EN ISO 636									
EN ISO 14171	EN ISO 26304	EN ISO 24598							
EN ISO 14174									
EN ISO 17632	EN ISO 18276	EN ISO 17634	EN ISO 17633	EN ISO 12153					
EN 12536 (ISO 20378)		EN 12536 (ISO 20378)					EN ISO 1071		
EN ISO 14175									

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
Impact
Tensile long.
Tensile perp.
Tensile cruc.
Bend
Fracture
Hardness
Macroscopic
Hot crack
Cold crack
Delta ferrite

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
Radiography
Ultrasonic
Magnetic particle
Penetrant
Visual testing (+ macro/micro etc)

^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

ČEZ_SD_0049 – volná příloha B
Závazné normy svařování.

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