

# European (international<sup>b</sup>) standards for fusion welding

## QUALITY REQUIREMENTS for welding<sup>a</sup>

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	
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 12584 (ISO 17658)
Designation system	CEN ISO/TS 17845

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

MMA
MIG/MAG
TIG
Electrodes etc for submerged arc
Fluxes for submerged arc
Cored wires
Gas welding
Shielding gas

EN ISO 15011-1 till -4 & CEN ISO/TR 15011-5
EN ISO 10882-1 & -2
EN ISO 15012-1 & -2
EN 169, 170, 171, 175 & 379
EN ISO 11611, EN 12477
EN 1598
EN 14717

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
CEN/TR 14599 (ISO/TR 25901)
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

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

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

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

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				Other materials					
	Non alloy and fine grain	High strength	Creep resistant	Stainless and heat resisting	Nickel	Copper	Aluminium	Cast iron	Titanium	
MMA	EN ISO 2560	EN ISO 18275	EN ISO 3580	EN ISO 3581	EN ISO 14172	prEN ISO 17777				
MIG/MAG	EN ISO 14341	EN ISO 16834	EN ISO 21952					EN ISO 1071	EN ISO 24034	
TIG	EN ISO 636			EN ISO 14343	EN ISO 18274					
Electrodes etc for submerged arc	EN ISO 14171	EN ISO 26304	EN ISO 24598							
Fluxes for submerged arc	EN ISO 14174									
Cored wires	EN ISO 17632	EN ISO 18276	EN ISO 17634	EN ISO 17633	EN ISO 12153					EN ISO 1071
Gas welding	EN 12536 (ISO/DIS 20378)		EN 12536 (ISO/DIS 20378)							
Shielding gas	EN ISO 14175									

<sup>a</sup> References in fields with this colour are directly linked to EN ISO 3834  
<sup>b</sup> The ISO-reference in brackets is in most cases identical with or is based on corresponding EN