

OK Flux 10.93

Basic, agglomerated flux for butt welding of stainless steels. A suitable flux for welding of high alloyed CrNi-steels like e.g. duplex stainless steel. The low Si addition during welding provides good mechanical properties in the weld metal.

| | |
|------------------------|---|
| Classifications | EN ISO 14174 : S A AF 2 56 54 DC |
| Approbations | CE EN 13479 NAKS/HAKC RD 03-613-03 DB 51.039.10 |

Les approbations sont dépendant de l'usine de fabrication. Contactez ESAB pour plus d'informations

| | |
|----------------------------|---|
| Type de laitier | Fluoride basic CaF ₂ -Al ₂ O ₃ -SiO ₂ |
| Transfert d'alliage | Non alloying |
| Densité | nom 1.0 kg/dm ³ |
| Index d'alcalinité | nom 1.9 |

Flux Consumption

| Volts | kg Flux / kg Wire DC+ | kg Flux / kg Wire AC |
|-------|-----------------------|----------------------|
| 26 V | 0.5 kg | - |
| 30 V | 0.6 kg | - |
| 34 V | 0.8 kg | - |
| 38 V | 1.0 kg | - |

| Dimensions | Amps | Travel Speed |
|------------|-------|--------------|
| 4.0 mm | 580 A | 33 m/h |

Classifications

| Wire | SFA/AWS - EN ISO |
|--------------------|---|
| OK Autrod 16.10 | A5.9:ER308L |
| OK Autrod 16.11 | A5.9:ER347 |
| OK Autrod 16.30 | A5.9:ER316L |
| OK Autrod 16.38 | 14343-A:S 20 16 3 Mn L |
| OK Autrod 16.53 | A5.9:ER309L |
| OK Autrod 16.97 | 14343-A:S 18 8 Mn |
| OK Autrod 2209 | A5.9:ER2209/ 14343-A:S 22 9 3 N L |
| OK Autrod 2307 | 14343-A:S 23 7 N L |
| OK Autrod 2509 | A5.9:ER2594/ 14343-A:S 25 9 4 N L |
| OK Autrod 308H | A5.9:ER308H/ 14343-A:S 19 9 H |
| OK Autrod 308L | A5.9:ER308L/ 14343-A:S 19 9 L |
| OK Autrod 309L | A5.9:ER309L/ 14343-A:S 23 12 L |
| OK Autrod 309MoL | A5.9:ER309LMo (mod)/ 14343-A:S 23 12 2 L |
| OK Autrod 310MoL | 14343-A:S 25 22 2 N L |
| OK Autrod 312 | A5.9:ER312/ 14343-A:S 29 9 |
| OK Autrod 316H | A5.9:ER316H/ 14343-A:S 19 12 3 H |
| OK Autrod 316L | A5.9:ER316L/ 14343-A:S 19 12 3 L |
| OK Autrod 316LMn | A5.9:ER316LMn/ 14343-A:S 20 16 3 Mn N L |
| OK Autrod 317L | A5.9:ER317L/ 14343-A:S 18 15 3 L |
| OK Autrod 318 | A5.9:ER318/ 14343-A:S 19 12 3 Nb |
| OK Autrod 347 | A5.9:ER347/ 14343-A:S 19 9 Nb |
| OK Autrod 385 | A5.9:ER385/ 14343-A:S 20 25 5 Cu L |
| OK Autrod 410NiMo | 14343-A:S 13 4 |
| OK Autrod NiCrMo-3 | A5.14:ERNiCrMo-3/ 18274:S Ni 6625 (NiCr22Mo9Nb) |
| OK Autrod NiCrMo-4 | A5.14:ERNiCrMo-4/ 18274:S Ni 6276 (NiCr15Mo16Fe6W4) |

Approvals

| Combined with Wire | ABS | BV | DNV | GL | LR | DB | CE | RINA | ClassNK | VdTÜV | DNV-GL |
|--------------------|-----|----|-----|----|----|----|----|------|---------|-------|--------|
| OK Autrod 16.97 | - | - | • | - | - | - | - | - | - | - | - |
| OK Autrod 2209 | • | • | • | • | • | - | • | • | • | • | • |
| OK Autrod 2509 | - | - | - | - | - | - | • | - | - | • | - |
| OK Autrod 308L | • | • | • | - | - | • | • | - | - | • | - |
| OK Autrod 308L LF | - | - | - | - | - | - | • | - | - | • | - |
| OK Autrod 309L | • | - | • | - | • | - | • | - | - | • | - |

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Approvals

| Combined with Wire | ABS | BV | DNV | GL | LR | DB | CE | RINA | ClassNK | VdTÜV | DNV-GL |
|--------------------|-----|----|-----|----|----|----|----|------|---------|-------|--------|
| OK Autrod 316L | • | - | • | - | - | • | • | - | - | • | - |
| OK Autrod 318 | - | - | - | - | - | • | • | - | - | • | - |
| OK Autrod 347 | - | - | - | - | - | • | • | - | - | • | - |
| OK Autrod 385 | - | - | - | - | - | - | - | - | - | • | - |

Typical Mechanical Properties

| Combined with Wire | Condition | Yield Strength | Tensile Strength | Elongation | Charpy V-Notch |
|--------------------|---|----------------|------------------|------------|--|
| OK Autrod 16.10 | As Welded DC+ | 410 MPa | 570 MPa | 38 % | 80 J @ -60°C 60 J @ -110°C 45 J @ -196°C |
| OK Autrod 16.11 | As Welded DC+ | 420 MPa | 590 MPa | 36 % | 60 J @ -60°C 45 J @ -110°C 30 J @ -196°C |
| OK Autrod 16.30 | As Welded DC+ | 400 MPa | 530 MPa | 35 % | 70 J @ -60°C 65 J @ -110°C 40 J @ -196°C |
| OK Autrod 16.38 | As Welded DC+ | 410 MPa | 600 MPa | 44 % | 70 J @ -60°C 60 J @ -110°C 40 J @ -196°C |
| OK Autrod 16.53 | As Welded DC+ | 430 MPa | 570 MPa | 35 % | 65 J @ -60°C 55 J @ -110°C 35 J @ -196°C |
| OK Autrod 16.97 | As Welded DC+ | 400 MPa | 600 MPa | 45 % | 60 J @ -20°C |
| OK Autrod 2209 | As Welded DC+ | 630 MPa | 780 MPa | 30 % | 140 J @ 20°C 125 J @ -20°C 110 J @ -40°C 80 J @ -60°C |
| OK Autrod 2307 | As Welded DC+ | 560 MPa | 730 MPa | 32 % | 140 J @ 20°C 125 J @ -20°C 90 J @ -40°C 60 J @ -60°C |
| OK Autrod 2509 | As Welded DC+ | 640 MPa | 840 MPa | 28 % | 85 J @ 20°C 60 J @ -40°C |
| OK Autrod 308L | As Welded DC+ | 400 MPa | 560 MPa | 38 % | 100 J @ 20°C 75 J @ -40°C 65 J @ -60°C 55 J @ -110°C 40 J @ -196°C |
| OK Autrod 308L | As Welded dia 4.0 mm 500A DC+ 30V | 400 MPa | 560 MPa | 38 % | 100 J @ 20°C 75 J @ -40°C 65 J @ -60°C 55 J @ -110°C 35 J @ -196°C |
| OK Autrod 308L LF | As Welded Dia 2.4 mm 45 cm/min 400A DC+ 28V | 400 MPa | 550 MPa | 40 % | 40 J @ -196°C |
| OK Autrod 309L | As Welded DC+ | 430 MPa | 570 MPa | 33 % | 90 J @ 20°C 70 J @ -60°C 60 J @ -110°C 35 J @ -196°C |
| OK Autrod 309MoL | As Welded DC+ | 400 MPa | 600 MPa | 38 % | 120 J @ 20°C |
| OK Autrod 310MoL | As Welded DC+ | 335 MPa | 575 MPa | 42 % | 120 J @ 20°C |
| OK Autrod 316H | As Welded AWS 475A; 30V; H.I 2.0 kJ/mm DC+ | 410 MPa | 550 MPa | 40 % | 85 J @ 20°C 75 J @ 0°C |
| OK Autrod 316L | As Welded DC+ | 390 MPa | 565 MPa | 42 % | 100 J @ 20°C 95 J @ -40°C 90 J @ -60°C 75 J @ -110°C 40 J @ -196°C |
| OK Autrod 316LMn | As Welded 420A, 30V, 30m/h DC+ | 410 MPa | 600 MPa | 44 % | 70 J @ -60°C 60 J @ -110°C 40 J @ -196°C |
| OK Autrod 317L | As Welded DC+ | 440 MPa | 615 MPa | 28 % | 80 J @ 20°C 50 J @ -60°C |
| OK Autrod 318 | As Welded DC+ | 440 MPa | 600 MPa | 42 % | 100 J @ 20°C 90 J @ -60°C 40 J @ -110°C |
| OK Autrod 347 | As Welded 420A DC+ Feed speed: 30m/h 27V | 455 MPa | 635 MPa | 36 % | 105 J @ 20°C 85 J @ -60°C 60 J @ -110°C 30 J @ -196°C |
| OK Autrod 385 | As Welded DC+ | 310 MPa | 530 MPa | 35 % | 80 J @ 20°C |
| OK Autrod 410NiMo | As Welded DC+, 450A, 28V | 900 MPa | 1000 MPa | 15.5 % | 30 J @ 0°C 30 J @ -20°C |

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Typical Mechanical Properties

| Combined with Wire | Condition | Yield Strength | Tensile Strength | Elongation | Charpy V-Notch |
|--------------------|--|----------------|------------------|------------|--------------------------------|
| OK Autrod 410NiMo | Stress Relieved DC+, 450A, 28V Stress relieved 600°C, 2h | 770 MPa | 850 MPa | 19 % | 55 J @ 0°C 55 J @ -20°C |
| OK Autrod 410NiMo | Stress Relieved DC+, 500A, 30V Stress relieved 580°C, 4h | 785 MPa | 860 MPa | 18 % | 55 J @ 0°C 50 J @ -20°C |
| OK Autrod NiCrMo-3 | As Welded DC+ | 450 MPa | 710 MPa | 45 % | 90 J @ -60°C 80 J @ -196°C |
| OK Autrod NiCrMo-4 | As Welded HI 1.6-1.8 kJ/mm DC+ | 450 MPa | 700 MPa | 45 % | 100 J @ -60°C 80 J @ -196°C |

Analyse du métal déposé

| C | Mn | Si | S | P | Ni | Cr | Mo | V | Cu |
|--|------|------|-------|-------|-------|-------|------|-----|------|
| OK Autrod 16.10 | | | | | | | | | |
| 0.02 | 1.40 | 0.60 | - | - | 8.60 | 18.80 | - | - | - |
| OK Autrod 16.11 DC+, As welded | | | | | | | | | |
| 0.05 | 1.20 | 0.55 | 0.015 | 0.025 | 8.50 | 18.30 | 0.10 | - | 0.15 |
| OK Autrod 16.30 DC+, As welded | | | | | | | | | |
| 0.02 | 1.40 | 0.50 | 0.015 | 0.025 | 10.60 | 17.50 | 2.00 | - | 0.10 |
| OK Autrod 16.53 DC+, As welded | | | | | | | | | |
| 0.02 | 1.40 | 0.50 | 0.015 | 0.025 | 11.60 | 22.10 | 0.10 | - | 0.10 |
| OK Autrod 16.97 | | | | | | | | | |
| 0.06 | 6.3 | 1.2 | 0.01 | 0.02 | 8.0 | 18.0 | 0.1 | - | 0.1 |
| OK Autrod 2209 Current: DC+, 420A, 27V | | | | | | | | | |
| 0.02 | 1.3 | 0.5 | 0.01 | 0.02 | 9.0 | 22.5 | 3.1 | - | 0.1 |
| OK Autrod 2509 Current: DC+, 420A, 27V | | | | | | | | | |
| 0.02 | 0.4 | 0.5 | 0.01 | 0.02 | 10.0 | 23.5 | 3.5 | - | 0.1 |
| OK Autrod 308H DC+ | | | | | | | | | |
| 0.05 | 1.5 | 0.6 | 0.01 | 0.02 | 9.9 | 19.9 | 0.1 | - | 0.1 |
| OK Autrod 308L DC+, As welded | | | | | | | | | |
| 0.02 | 1.4 | 0.6 | 0.01 | 0.02 | 10.0 | 19.5 | 0.2 | - | 0.1 |
| OK Autrod 308L LF DC+, As welded | | | | | | | | | |
| 0.02 | 1.5 | 0.5 | 0.01 | 0.02 | 10.3 | 19.2 | 0.1 | - | 0.1 |
| OK Autrod 309L Current: DC+, 420 A, 27 V | | | | | | | | | |
| 0.02 | 1.3 | 0.5 | 0.01 | 0.02 | 12.5 | 23.0 | 0.2 | - | 0.2 |
| OK Autrod 309MoL DC+, 420 A, 27 V | | | | | | | | | |
| 0.02 | 1.5 | 0.5 | 0.02 | 0.02 | 14.5 | 20.8 | 2.8 | - | 0.1 |
| OK Autrod 310MoL Current: DC+, 420A, 27V | | | | | | | | | |
| 0.02 | 4.0 | 0.1 | 0.01 | 0.02 | 22.0 | 24.5 | 2.1 | - | 0.1 |
| OK Autrod 312 Current: DC+, 420A, 27V | | | | | | | | | |
| 0.1 | 1.5 | 0.5 | - | - | 9.5 | 29.0 | 0.1 | - | 0.1 |
| OK Autrod 316H DC+ | | | | | | | | | |
| 0.04 | 1.5 | 0.6 | 0.01 | 0.02 | 11.2 | 18.4 | 2.1 | - | 0.1 |
| OK Autrod 316L | | | | | | | | | |
| 0.02 | 1.4 | 0.5 | 0.01 | 0.02 | 12.5 | 18.0 | 2.6 | - | 0.1 |
| OK Autrod 316LMn | | | | | | | | | |
| 0.02 | 5.4 | 0.7 | 0.01 | 0.01 | 15.5 | 20.0 | 2.5 | - | 0.2 |
| OK Autrod 317L Current: DC+, 420 A, 27 V | | | | | | | | | |
| 0.02 | 1.5 | 0.5 | 0.01 | 0.02 | 13.5 | 18.5 | 3.2 | - | 0.1 |
| OK Autrod 318 Current: DC+, 440A, 30V | | | | | | | | | |
| 0.035 | 1.2 | 0.5 | 0.01 | 0.02 | 12.0 | 18.5 | 2.6 | - | 0.2 |
| OK Autrod 347 Current: DC+, 420A, 27V | | | | | | | | | |
| 0.035 | 1.1 | 0.5 | 0.01 | 0.02 | 9.6 | 19.2 | 0.1 | - | 0.2 |
| OK Autrod 385 Current: DC+, 420A, 27V | | | | | | | | | |
| 0.02 | 1.5 | 0.5 | 0.01 | 0.01 | 25.0 | 19.0 | 4.0 | - | 1.5 |
| OK Autrod 410NiMo DC+, 450A, 28V | | | | | | | | | |
| 0.02 | 0.4 | 0.5 | 0.01 | 0.02 | 4.1 | 11.7 | 0.51 | - | 0.10 |
| OK Autrod NiCrMo-3 Current: DC+, 400A, 28V, travel speed: 25 m/h. | | | | | | | | | |
| 0.02 | 0.2 | 0.4 | 0.005 | 0.015 | - | 22 | 9 | - | 0.1 |
| OK Autrod NiCrMo-4 DC+ | | | | | | | | | |
| 0.01 | 0.4 | 0.20 | - | - | Bal | 15.1 | 15.6 | 0.1 | - |

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| N | Nb | Co | Fe | Nb+Ta | W | FN WRC-92 |
|--|------|-----|-----|-------|-----|-----------|
| OK Autrod 16.10 | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 16.11 DC+, As welded | | | | | | |
| - | 0.50 | - | - | - | - | - |
| OK Autrod 16.30 DC+, As welded | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 16.53 DC+, As welded | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 16.97 | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 2209 Current: DC+, 420A, 27V | | | | | | |
| 0.17 | - | - | - | - | - | 45 |
| OK Autrod 2509 Current: DC+, 420A, 27V | | | | | | |
| 0.19 | - | - | - | - | - | 40 |
| OK Autrod 308H DC+ | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 308L DC+, As welded | | | | | | |
| 0.06 | - | - | - | - | - | 9 |
| OK Autrod 308L LF DC+, As welded | | | | | | |
| 0.07 | - | - | - | - | - | 5 |
| OK Autrod 309L Current: DC+, 420 A, 27 V | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 309MoL DC+, 420 A, 27 V | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 310MoL Current: DC+, 420A, 27V | | | | | | |
| 0.12 | - | - | - | - | - | 0 |
| OK Autrod 312 Current: DC+, 420A, 27V | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 316H DC+ | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 316L | | | | | | |
| - | - | - | - | - | - | 8 |
| OK Autrod 316LMn | | | | | | |
| 0.13 | - | - | - | - | - | - |
| OK Autrod 317L Current: DC+, 420 A, 27 V | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod 318 Current: DC+, 440A, 30V | | | | | | |
| - | 0.3 | - | - | - | - | - |
| OK Autrod 347 Current: DC+, 420A, 27V | | | | | | |
| - | 0.5 | - | - | - | - | 8 |
| OK Autrod 385 Current: DC+, 420A, 27V | | | | | | |
| 0.02 | - | - | - | - | - | - |
| OK Autrod 410NiMo DC+, 450A, 28V | | | | | | |
| - | - | - | - | - | - | - |
| OK Autrod NiCrMo-3 Current: DC+, 400A, 28V, travel speed: 25 m/h. | | | | | | |
| - | - | - | 5 | 3 | - | - |
| OK Autrod NiCrMo-4 DC+ | | | | | | |
| - | - | 0.1 | 6.8 | - | 3.6 | - |