# Exaton 15W

Exaton 15W is a basic welding flux for submerged arc welding giving good slag removal and a fine bead appearance. Its relatively high basicity makes it suitable for joining of austenitic and duplex stainless steel when high impact strength is desired. Due to its low niobium content burn-off it can be used advantageously with stabilized wire electrodes.

Exaton 15W is a high performance welding flux in many joining applications in the chemical, petrochemical and oil&gas industry. It is particularly suited for Exaton range of duplex wire electrodes (e.g. 22.8.3.L/25.10.4.L) due to the highly neutral behavior, which ensures an optimal balanced microstructure.

Taking the benefit of its features (not limited to nice bead appearance and self slag release only), it can also be used in combination with NiCrMo-3 wire for several other applications (i.e. both joining and weld overlay).

| | |
|---|---|
| **Classifications** | EN ISO 14174 : S A AF 2 |

| | |
|---|---|
| **Welding Current** | 1200 A (Using 60x0.5 mm strip) |
| **Slag Type** | Fluoride basic CaF2-Al2O3-SiO2 |
| **Density** | nom 1.0 Kg/l |
| **Basicity Index** | 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 | AWS - As Welded |
|---|---|---|
| Exaton 19.12.3.L | A5.9:ER316L/ 14343-A:S 19 12 3 L | |
| Exaton 19.9.L | A5.9:ER308L/ 14343-A:S 19 9 L | |
| Exaton 19.9.Nb | A5.9:ER347/ 14343-A:S 19 9 Nb | A5.39: F90A15-ER347/347 |
| Exaton 19.9.Nb | A5.9:ER347/ 14343-A:S 19 9 Nb | A5.39: F90A15-ER347/347 |
| Exaton 19.9.Nb HF | A5.9:ER347/ 14343-A:S 19 9 Nb | |
| Exaton 20.25.5.LCu | A5.9:ER385/ 14343-A:S 20 25 5 Cu L | |
| Exaton 22.12.HT | 14343-A:S 21 10 N | |
| Exaton 22.15.3.L | A5.9:ER(309LMo)/ 14343-A:S 23 12 2 L | |
| Exaton 22.15.3.L | A5.9:ER(309LMo)/ 14343-A:S 23 12 2 L | |
| Exaton 22.8.3.L | A5.9:ER2209/ 14343-A:S 22 9 3 N L | A5.39: F115A15-ER2209/2209 |
| Exaton 22.8.3.L | A5.9:ER2209/ 14343-A:S 22 9 3 N L | A5.39: F115A15-ER2209/2209 |
| Exaton 24.13.L | A5.9:ER309L/ 14343-A:S 23 12 L | |
| Exaton 24.13.LHF | A5.9:ER309L/ 14343-A:S 23 12 L | |
| Exaton 24.13.LNb | A5.9:ER"309LNb"/ 14343-A:S 23 12 Nb | |
| Exaton 25.10.4.L | A5.9:ER2594/ 14343-A:S 25 9 4 N L | |
| Exaton 25.22.2.LMn | A5.9:ER"310LMo"/ 14343-A:S 25 22 2 N L | |
| Exaton 27.31.4.LCu | A5.9:ER383/ 14343-A:S 27 31 4 Cu L | |
| Exaton Ni56 | A5.14:ERNiCrMo-4/ 18274:S Ni 6276 (NiCr15Mo16Fe6W4) | |
| Exaton Ni60 SAW | A5.14:ERNiCrMo-3/ 18274:S Ni 6625 (NiCr22Mo9Nb) | |

## Approvals

| Combined with Wire | BV | VdTÜV | DNV-GL |
|---|---|---|---|
| Exaton 19.12.3.L | - | • | - |
| Exaton 19.9.L | - | • | - |

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## Approvals

| Combined with Wire | BV | VdTÜV | DNV-GL |
|---|---|---|---|
| Exaton 22.8.3.L | • | • | • |
| Exaton 25.10.4.L | • | • | • |

## Typical Mechanical Properties

| Combined with Wire | Condition | Yield Strength | Tensile Strength | Elongation | Charpy V-Notch |
|---|---|---|---|---|---|
| Exaton 19.12.3.L | As Welded hr () | 390 MPa (57 ksi) | 530 MPa (77 ksi) | 41 % | 100 J @ 20°C (74 ft-lb @ 68°F)<br>85 J @ -40°C (63 ft-lb @ -40°F)<br>40 J @ -196°C (30 ft-lb @ -320.8°F) |
| Exaton 19.9.L | As Welded hr () | 390 MPa (57 ksi) | 560 MPa (81 ksi) | 35 % | 90 J @ 20°C (67 ft-lb @ 68°F)<br>35 J @ -196°C (26 ft-lb @ -320.8°F) |
| Exaton 19.9.Nb | As Welded hr () | 470 MPa (68 ksi) | 640 MPa (93 ksi) | 39 % | 95 J @ 20°C (70 ft-lb @ 68°F)<br>40 J @ -110°C (30 ft-lb @ -166°F)<br>25 J @ -196°C (19 ft-lb @ -320.8°F) |
| Exaton 19.9.Nb | As Welded hr () | 470 MPa (68 ksi) | 650 MPa (94 ksi) | 32 % | 80 J @ 20°C (59 ft-lb @ 68°F) |
| Exaton 19.9.Nb HF | As Welded DC+hr () | 440 MPa (64 ksi) | 610 MPa (88 ksi) | 32 % | 75 J @ 20°C (56 ft-lb @ 68°F) |
| Exaton 20.25.5.LCu | As Welded hr () | 345 MPa (50 ksi) | 550 MPa (80 ksi) | 40 % | 125 J @ 20°C (93 ft-lb @ 68°F)<br>100 J @ -196°C (74 ft-lb @ -320.8°F) |
| Exaton 22.12.HT | As Welded hr () | 400 MPa (58 ksi) | 580 MPa (84 ksi) | 35 % | 120 J @ 20°C (89 ft-lb @ 68°F) |
| Exaton 22.15.3.L | As Welded hr () | 400 MPa (58 ksi) | 600 MPa (87 ksi) | 40 % | 140 J @ 20°C (104 ft-lb @ 68°F) |
| Exaton 22.8.3.L | As Welded hr () | 650 MPa (94 ksi) | 790 MPa (115 ksi) | 33 % | 115 J @ 20°C (85 ft-lb @ 68°F)<br>85 J @ -40°C (63 ft-lb @ -40°F) |
| Exaton 22.8.3.L | As Welded hr () | 650 MPa (94 ksi) | 810 MPa (117 ksi) | 29 % | 85 J @ -40°C (63 ft-lb @ -40°F)<br>65 J @ -60°C (48 ft-lb @ -76°F)<br>29 J @ -110°C (21 ft-lb @ -166°F) |
| Exaton 24.13.L | As Welded hr () | 400 MPa (58 ksi) | 600 MPa (87 ksi) | 40 % | 140 J @ 20°C (104 ft-lb @ 68°F) |
| Exaton 24.13.LHF | As Welded hr () | 410 MPa (59 ksi) | 600 MPa (87 ksi) | 40 % | 140 J @ 20°C (104 ft-lb @ 68°F) |
| Exaton 24.13.LNb | As Welded hr () | 400 MPa (58 ksi) | 600 MPa (87 ksi) | 35 % | 90 J @ 20°C (67 ft-lb @ 68°F) |
| Exaton 25.10.4.L | As Welded DC+hr () | 690 MPa (100 ksi) | 880 MPa (128 ksi) | 25 % | 90 J @ 20°C (67 ft-lb @ 68°F)<br>60 J @ -40°C (44 ft-lb @ -40°F) |
| Exaton 25.22.2.LMn | As Welded DC+hr () | 335 MPa (49 ksi) | 575 MPa (83 ksi) | 42 % | 120 J @ 20°C (89 ft-lb @ 68°F) |
| Exaton 27.31.4.LCu | As Welded hr () | 360 MPa (52 ksi) | 540 MPa (78 ksi) | 35 % | 165 J @ 20°C (122 ft-lb @ 68°F) |
| Exaton Ni56 | As Welded HI 1.6-1.8 kJ/mm DC+ hr () | 450 MPa (65 ksi) | 700 MPa (102 ksi) | 45 % | 100 J @ -60°C (74 ft-lb @ -76°F)<br>100 J @ -60°C (74 ft-lb @ -76°F)<br>80 J @ -196°C (59 ft-lb @ -320.8°F)<br>80 J @ -196°C (59 ft-lb @ -320.8°F) |
| Exaton Ni60 SAW | As Welded hr () | 445 MPa (65 ksi) | 715 MPa (104 ksi) | 45 % | 93 J @ -60°C (69 ft-lb @ -76°F)<br>82 J @ -196°C (61 ft-lb @ -320.8°F) |

## Typical Weld Metal Analysis %

| C | Mn | Si | S | P | Ni | Cr | Mo | V | Cu |
|---|---|---|---|---|---|---|---|---|---|
| **Exaton 19.12.3.L** | | | | | | | | | |
| 0.01 | 1.5 | 0.5 | - | - | 12.3 | 18.1 | 2.6 | - | - |
| **Exaton 19.9.L** | | | | | | | | | |
| 0.02 | 1.2 | 0.6 | 0.012 | 0.025 | 10 | 19.5 | 0.15 | - | 0.1 |
| **Exaton 19.9.Nb Current: DC+, 400A, 28V, welding speed 48cm/min** | | | | | | | | | |
| 0.03 | 1.18 | 0.5 | 0.011 | 0.018 | 9.3 | 18.83 | 0.032 | - | 0.097 |
| **Exaton 19.9.Nb HF** | | | | | | | | | |
| 0.04 | 1.4 | 0.66 | 0.01 | 0.02 | 9.3 | 19.4 | 0.12 | - | 0.11 |
| **Exaton 20.25.5.LCu** | | | | | | | | | |
| 0.01 | 1.4 | 0.5 | - | - | 25 | 19.6 | 4.5 | - | - |
| **Exaton 22.8.3.L Current: DC+, 400A, 28V, 45cm/min** | | | | | | | | | |
| 0.01 | 1.2 | 0.004 | - | 0.018 | 8.36 | 22.6 | 2.95 | - | 0.12 |
| **Exaton 24.13.LNb** | | | | | | | | | |
| <=0.020 | 1.2 | 0.7 | <=0.015 | <=0.025 | 12 | 23.5 | - | - | - |
| **Exaton 25.10.4.L** | | | | | | | | | |
| <=0.020 | 0.3 | 0.6 | <=0.015 | <=0.020 | 9.6 | 24.5 | 4 | - | - |
| **Exaton 25.22.2.LMn Current: DC+, 420A, 27V** | | | | | | | | | |
| 0.02 | 4.0 | 0.1 | - | - | 22.0 | 24.5 | 2.1 | - | 0.1 |
| **Exaton 27.31.4.LCu** | | | | | | | | | |

# Exaton 15W

| Typical Weld Metal Analysis % | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **C** | **Mn** | **Si** | **S** | **P** | **Ni** | **Cr** | **Mo** | **V** | **Cu** |
| 0.01 | 1.4 | 0.4 | 0.003 | 0.01 | 31.3 | 26.3 | 3.5 | - | 1.0 |
| **Exaton Ni56 DC+** | | | | | | | | | |
| 0.01 | 0.4 | 0.20 | - | - | Bal | 15.1 | 15.6 | 0.1 | - |
| **Exaton Ni60 SAW Current: DC+, 400A, 28V, travel speed: 25 m/h.** | | | | | | | | | |
| 0.02 | 0.2 | 0.4 | 0.005 | 0.015 | - | 22 | 9 | - | 0.1 |

| **N** | **Nb** | **Co** | **Fe** | **Nb+Ta** | **W** | **PRE** | **FN deLong** | **FN WRC** | **FN WRC-92** |
|---|---|---|---|---|---|---|---|---|---|
| **Exaton 19.12.3.L** | | | | | | | | | |
| - | - | - | - | - | - | - | - | - | - |
| **Exaton 19.9.L** | | | | | | | | | |
| 0.05 | - | 0.1 | - | - | - | - | - | - | 6 |
| **Exaton 19.9.Nb Current: DC+, 400A, 28V, welding speed 48cm/min** | | | | | | | | | |
| 0.063 | 0.56 | 0.14 | - | 0.6 | - | - | 6 | 6 | - |
| **Exaton 19.9.Nb HF** | | | | | | | | | |
| 0.04 | 0.7 | - | - | 0.7 | - | - | 13 | 12 | - |
| **Exaton 20.25.5.LCu** | | | | | | | | | |
| - | - | - | - | - | - | - | - | - | - |
| **Exaton 22.8.3.L Current: DC+, 400A, 28V, 45cm/min** | | | | | | | | | |
| 0.135 | <0.003 | - | - | - | - | 34 | - | - | 52 |
| **Exaton 24.13.LNb** | | | | | | | | | |
| - | 0.7 | - | - | - | - | - | - | - | - |
| **Exaton 25.10.4.L** | | | | | | | | | |
| 0.21 | - | - | - | - | - | - | - | - | - |
| **Exaton 25.22.2.LMn Current: DC+, 420A, 27V** | | | | | | | | | |
| 0.12 | - | - | - | - | - | - | - | - | - |
| **Exaton 27.31.4.LCu** | | | | | | | | | |
| 0.06 | - | - | - | - | - | - | - | - | - |
| **Exaton Ni56 DC+** | | | | | | | | | |
| - | - | 0.1 | 6.8 | - | 3.6 | - | - | - | - |
| **Exaton Ni60 SAW Current: DC+, 400A, 28V, travel speed: 25 m/h.** | | | | | | | | | |
| - | - | - | 5 | 3 | - | - | - | - | - |



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