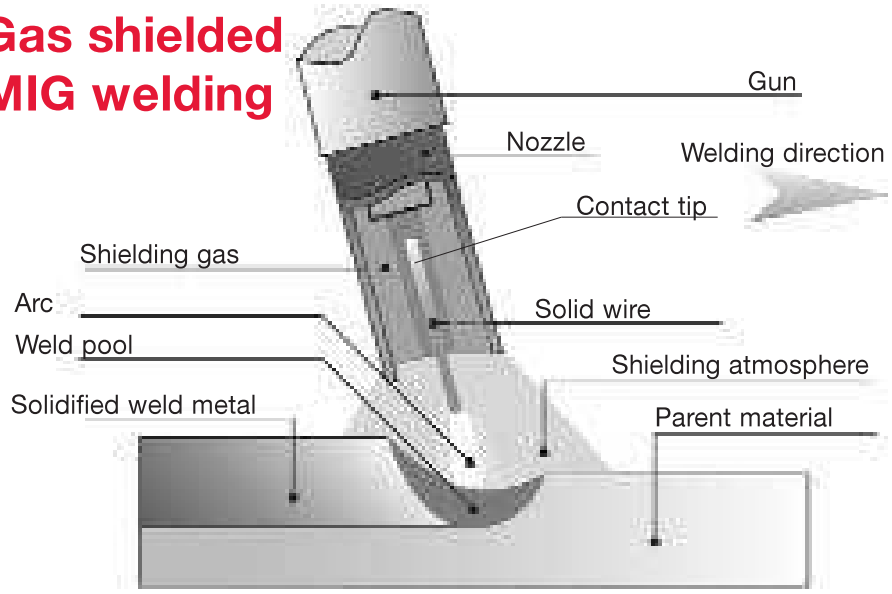
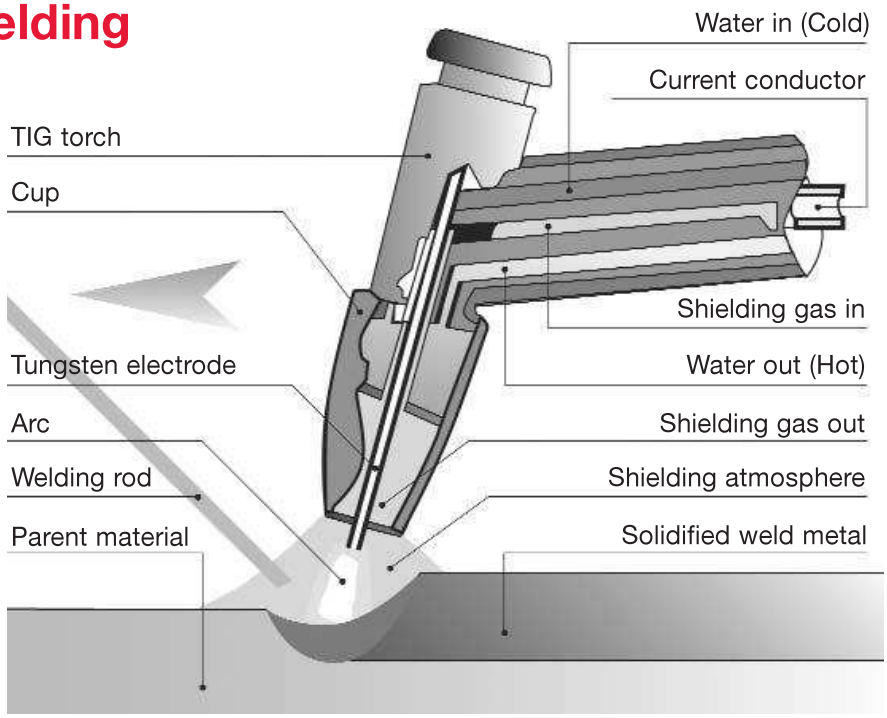
# MIG and TIG Process

## Gas shielded MIG welding




*The MIG/MAG welding process (or GMAW - Gas Metal Arc Welding) is when an electric arc is created between a continuous consumable wire and the work piece to be welded, protected within a gas atmosphere. This atmosphere can be either inert (Argon) or active ($CO_2$ or mixture of Argon and $CO_2$). The wire is continuously fed through a gun to the weld pool by a wire feeder.*

## Gas Tungsten Arc Welding




*In this welding process, the electric arc is generated between a non-consumable tungsten electrode and the work piece to be welded. An inert gas atmosphere, usually argon, protects the weld pool. Welding can be done by simply fusing of the parent material together, or with the addition of welding rod similar to the parent material. The rod is allowed to melt in the electric arc and will fill and reinforce the weld joint.*
*Arc ignition is achieved by touching the work piece with the electrode and lifting it by a few millimetres (contact ignition and lift ignition) or by using a high frequency voltage discharge, a gap of about 4 millimetres is maintained from the tungsten electrode and the work piece, high frequency spark is generated, this makes the air gap conductive, and allows the arc to be established without touching of the work piece with the tungsten electrode, no tungsten contamination can occur (High Frequency ignition).*
*The following can be used:*
*- DC (continuous) current is used with most metals (steel / stainless steel).*
*- AC (alternative) current is ideal for welding aluminium and other materials containing surface refractory oxide.*

# Mild steel solid wire

## Classification

AWS A5.18/A5.18M : ER70S-3
ISO 14341 : G 42 2 M G2Si

## General description

**Solid wire for welding general construction in mild steel**
**High impact values**
**Stable arc and excellent feedability**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| M21 | Mixed gas Ar+ >5-25% $CO_2$ |
| C1 | Active gas 100% $CO_2$ |

## Approvals

| BV | DNV | GL | LR |
|---|---|---|---|
| SA3,3YM | IIIYMS | 3YS | 3S,3YS |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si |
|---|---|---|
| 0.08 | 1.1 | 0.6 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C |
|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 500 | 575 | 25 | 95 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B. D, AH32 to DH36 |
| **Cast steel** | EN10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L451MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ | P235T1, P235T2, P275T1 |
| | EN 10217-1 | P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool B300 | X | X | X |
| 300 kg metal coil | | X | |

Other sizes and packaging on request

LNM 25: rev. EN 22

# Mild steel solid rod

## Classification

AWS A5.18/A5.18M : ER70S-3
EN 1668 : W 42 5 W2Si

## General description

**Solid rod for welding general construction in mild steel**
**High impact values**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si |
|---|---|---|
| 0.08 | 1.1 | 0.6 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -50°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 450 | 560 | 26 | 170 | 100 |
| | | SR 15h/620°C | 410 | 525 | 26 | | 80 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B. D, AH32 to DH36 |
| **Cast steel** | EN10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L451MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ EN 10217-1 | P235T1, P235T2, P275T1 P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.0 |
|---|---|---|---|---|
| 2 and 5 kg tube | X | X | X | X |

Other sizes and packaging on request

# Mild steel solid wire

## Classification

AWS A5.18/A5.18M : ER70S-6
ISO 14341 : G 46 4 M G3Si1

## General description

**Solid wire for welding general construction in mild steel**
**Smooth bead appearance**
**Stable arc and excellent feedability**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5-25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| ABS | BV | DNV | GL | LR | RINA | TÜV | RMRS |
|---|---|---|---|---|---|---|---|
| 3SA,3YSA | SA3YM | IIIYMS | 3YS | 3S,3YS | 3YS | + | 3S,3YS |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si |
|---|---|---|
| 0.08 | 1.4 | 0.8 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -40°C |
|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 520 | 600 | 25 | 110 | 70 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B, D, AH32 to DH 36. |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ EN 10217-1 | P235T1, P235T2, P275T1 P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.6 | 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|---|
| 5 kg plastic spool S200 | X | X | X | | |
| 15 kg spool B300 | | X | X | X | X |
| 15 kg spool S300 | X | | | | |
| 250 kg Accutrak® Drum | | X | X | X | |
| 300 kg metal coil | | | | X | |

Other sizes and packaging on request

LNM 26: rev. EN 22

# Mild steel solid rod

## Classification

AWS A5.18/A5.18M : ER70S-6
EN 1668 : W 42 5 W3Si1

## General description

**Solid rod for welding general construction in mild steel**
**Smooth bead appearance**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si |
|---|---|---|
| 0.08 | 1.4 | 0.8 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C | -30°C | -50°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 460 | 580 | 26 | 170 | 170 | 120 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B, D, AH32 to DH 36. |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ | P235T1, P235T2, P275T1 |
| | EN 10217-1 | P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML |

## Packaging and available sizes

| Unit type | Diameter (mm) 2.0 | 2.4 |
|---|---|---|
| 2 and 5 kg tube | X | X |

Other sizes and packaging on request

# Mild steel solid wire

## Classification

AWS A5.18/A5.18M : ER70S-6
ISO 14341 : G 42 3 M G4Si1

## General description

**Solid wire with increased manganese content for GMA welding of structural steel**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5-25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire

| C | Mn | Si |
|---|---|---|
| 0.08 | 1.70 | 0.85 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | -20°C | -50°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 500 | 650 | 26 | 150 | 80 | 50 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B,D, AH32 to DH 36. |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ | P235T1, P235T2, P275T1 |
| | EN 10217-1 | P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 15 kg spool B300 | X | X | X | X |

Other sizes and packaging on request

# Mild steel solid wire

## Classification

AWS A5.18/A5.18M : ER70S-6
ISO 14341 : G 42 4 M G3Si1 / G 42 2 C G3Si1

## General description

**Solid wire for semi-automatic and automatic welding applications**
**Good feedability, consistent welding performance**
**Very good weldability, stable arc, and low spatter**
**High productivity**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >15-25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| ABS | BV | DB | DNV | GL | LR | RINA | TÜV | RS |
|---|---|---|---|---|---|---|---|---|
| + | + | + | + | + | + | + | + | + |

## Chemical composition (w%) typical wire

| C | Mn | Si |
|---|---|---|
| 0.07 | 1.45 | 0.85 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C | -30°C | -40°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 471 | 580 | 25 | | 102 | 73 |
| | C1 | | 439 | 547 | 28 | 102 | | |
| | Required | | min. 420 | 500-640 | min. 20 | | min. 47 | |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B, D, AH32 to DH 36. |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ EN 10217-1 | P235T1, P235T2, P275T1 P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.4 | 1.6 |
|---|---|---|---|---|---|
| 15 kg metal basket - K300 | X | X | X | X | X |
| 15 kg spool B300 - D300 | X | X | X | X | X |
| 250 kg Accutrak® Drum | X | X | X | | |
| 380 kg Accutrak® Drum | X | X | X | X | X |
| 500 kg Accutrak® Drum | X | X | X | X | X |

Other sizes and packaging on request

**UltraMagTM: rev. EN 22**

# Mild steel solid wire

## Classification

AWS A5.18/A5.18M : ER70S-6
ISO 14341 : G 46 5 M G4Si1/G 42 4 C G4Si1

## General description

**Solid wire for semi-automatic and automatic welding applications**
**Good feedability, consistent welding performance**
**Very good weldability, stable arc, and low spatter**
**High productivity**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >15-25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| DB | TÜV | RS |
|---|---|---|
| + | + | + |

## Chemical composition (w%) typical wire

| C | Mn | Si |
|---|---|---|
| 0.07 | 1.65 | 0.90 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -40°C | Impact ISO-V(J) -50°C |
|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 478 | 595 | 27 | | 89 |
| | C1 | | 462 | 558 | 30 | 73 | |
| | Required | | min. 460 | 530-680 | min. 20 | min. 47 | |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | | Grade A, B, D, AH32 to DH 36. |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ | P235T1, P235T2, P275T1 |
| | EN 10217-1 | P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML, S460 |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.4 | 1.6 |
|---|---|---|---|---|---|
| 15 kg metal basket - K300 | X | X | X | X | X |
| 15 kg spool B300 - D300 | X | X | X | X | X |
| 250 kg Accutrak® Drum | X | X | X | | |
| 380 kg Accutrak® Drum | X | X | X | X | X |
| 500 kg Accutrak® Drum | X | X | X | X | X |

Other sizes and packaging on request

# Mild steel solid wire

## Classification

AWS A5.18/A5.18M : ER70S-6
ISO 14341 : G 42 4 M G3Si1 / G 38 3 C G3Si1

## General description

**Solid wire for welding of structural steels**
**Excellent feedability and very consistent welding performance**
**No adjustments of welding parameters**
**Tight and stable arc with extremely low spatter**
**Better bead profile and appearance**
**Ultimate GMAW wire for robotics and hard automation**
**Also available in AccuTrak®**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5-25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| BV | DNV | GL | LR | TÜV |
|---|---|---|---|---|
| S3YM | IVY40 | 4Y40S | 3S,3Y40S | + |

## Chemical composition (w%) typical wire

| C | Mn | Si |
|---|---|---|
| 0.08 | 1.55 | 0.85 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -30°C | -40°C | -50°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 490 | 590 | 27 | 100 | 60 | 40 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B, D, AH32 t/m DH36 |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB. L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ EN 10217-1 | P235T1, P235T2, P275T1 P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M S420ML |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 15 kg spool B300 | X | X | X | |
| 15 kg spool S300 | X | X | X | X |
| 250 kg Accutrak® Drum | X | X | X | |

Other sizes and packaging on request

# Mild steel solid wire



## Classification

AWS A5.18/A5.18M : ER70S-6
ISO 14341 : G 46 4 M G4Si1 / G 42 3 C G4Si1

## General description

**Solid wire with increased manganese for semi-automatic welding and robotic applications**
**Excellent feedability and very consistent welding performance**
**Very good weldability, tight and stable arc with extremely low spatter, low fume productions**
**Better bead profile and appearance**
**Highest productivity**
**Also available in AccuTrak®**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5-25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| BV | DNV | GL | TÜV |
|---|---|---|---|
| S3Y40M | IVY40MS | 4Y42S | + |

## Chemical composition (w%) typical wire

| C | Mn | Si |
|---|---|---|
| 0.08 | 1.70 | 0.85 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -40°C |
|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 500 | 650 | 26 | 80 | 80 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S185, S235, S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B, D, AH32 t/m DH36 |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L210, L240, L290, L360 |
| | EN 10208-2 | L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB, L415NB |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1/ EN 10217-1 | P235T1, P235T2, P275T1 P275T2, P355N |
| **Boiler & pressure vessel steel** | EN 10028-2 | P235GH, P265GH, P295GH, P355GH |
| **Fine grained steel** | EN 10113-2 | S275, S275, S355, S420 |
| | EN 10113-3 | S275M, S275ML, S355M, S355ML, S420M, S420ML, S460 |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 |
|---|---|---|---|
| 15 kg spool B300 | X | X | X |
| 250 kg Accutrak® Drum | X | X | X |

Other sizes and packaging on request

**Supra MIG Ultra®: rev. EN 22**

# Low alloy solid wire

## Classification

AWS A5.28 : ER80S-G

## General description

**Solid wire for welding of weather resisting steels**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5 to 25% $CO_2$

C1 Active gas 100% $CO_2$

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cu |
|---|---|---|---|---|
| 0.1 | 1.4 | 0.75 | 0.8 | 0.3 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C |
|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 570 | 620 | 26 | 80 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Weather resisting steels** | EN 10155 | S 235 J 0 W |
| | | S 235 J 2 W |
| | | S 355 J 0 W |
| | | S 355 J 2 W |
| | | S 355 K 2 G 1 W |

## Packaging and available sizes

| Unit type | Diameter (mm) | |
|---|---|---|
| | 1.0 | 1.2 |
| 15 kg spool B300 | X | X |

Other sizes and packaging on request

# Low alloy solid rod

## Classification

AWS A5.28 : ER80S-G

## General description

**Solid rod for welding of weather resisting steels**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cu |
|---|---|---|---|---|
| 0.1 | 1.4 | 0.75 | 0.8 | 0.3 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 570 | 620 | 26 | 80 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Weather resisting steels** | EN 10155 | S 235 J 0 W<br>S 235 J 2 W<br>S 355 J 0 W<br>S 355 J 2 W<br>S 355 K 2 G 1 W |

## Packaging and available sizes

| Unit type | Diameter (mm) 2.4 |
|---|---|
| 5 kg tube | X |

Other sizes and packaging on request

# Low alloy solid wire

## Classification

AWS A5.28 : ER100S-G
EN 12534 : G 62 4 M Mn3NiCrMo

## General description

**Solid wire for welding high strength steels with a yield up to 620 Mpa**
**Good impact values at -40 °C**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar + >5 to 25% $CO_2$
C1 Active gas 100% $CO_2$

## Chemical composition (w%) typical wire

| C | Mn | Si | Ni | Cr | Mo | Cu |
|---|---|---|---|---|---|---|
| 0.10 | 1.65 | 0.75 | 0.55 | 0.60 | 0.30 | 0.08 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength (MPa) | Tensile strength (MPa) | Elongation (%) | Impact ISO-V(J) -20 °C | -40 °C | -60°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 635 | 770 | 19 | 100 | 90 | 70 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Pipe material** | API-5LX | X60, X65, X70, X80 |
| | EN 10208-2 | L480, L550 |
| **Fine grained steel** | EN 10137-2 | S460, S500, S550, S620 |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 |
|---|---|---|---|
| 15 kg spool B300 | X | X | X |

Other sizes and packaging on request

# Low alloy solid wire

## Classification

AWS A5.28 : ER100S-G
EN 12534 : G 69 4 M Mn3Ni1CrMo

## General description

**Solid wire for welding high strength steels with yield strength up to 690 N/mm²**
**Good impact values at -50°C**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5 to 25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| ABS | DB | TÜV |
|---|---|---|
| + | + | + |

## Chemical composition (w%) typical wire

| C | Mn | Si | Ni | Cr | Mo | V | Cu |
|---|---|---|---|---|---|---|---|
| 0.08 | 1.7 | 0.44 | 1.35 | 0.23 | 0.3 | 0.08 | 0.25 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -40°C |
|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 710 | 790 | 20 | 70 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Pipe material** | API-5LX | X65, X70, X80 |
| | EN 10208-2 | L480, L550 |
| **Fine grained steel** | EN 10137-2 | S460, S500, S550, S620 S690 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool B300 | X | X | X |
| 250 kg Accutrak® Drum | | X | X |

Other sizes and packaging on request

# Low alloy solid wire

## Classification

AWS A5.28 : ER120S-G
EN 12534 : G 89 4 M Mn4Ni2CrMo

## General description

**Solid wire for welding high strength steels with yield strength up to 890MPa**
**Good impact toughness value down to -60°C**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5 to 25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire

| C | Mn | Si | Ni | Cr | Mo |
|---|---|---|---|---|---|
| 0.09 | 1.8 | 0.80 | 2.20 | 0.30 | 0.55 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -40°C | Impact ISO-V(J) -60°C |
|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | >890 | 950 | >15 | 70 | >50 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Fine grained steel** | EN 10137-2 | S890 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool B300 | X | X |

Other sizes and packaging on request

GMAW/GTAW

LNM MoNiCr: rev. EN 02

# Low alloy solid wire

## Classification

AWS A5.28 : ER80S-Ni1
ISO 14341 : G 46 5 M G3Ni1

## General description

**Solid wire for welding fine grained and low alloyed nickel steels**
**High impact value at low temperature (-60°C)**
**Typical offshore applications**
**Stable arc and excellent feedability**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5 to 25% $CO_2$

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni |
|---|---|---|---|
| 0.09 | 1.2 | 0.6 | 0.9 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -60°C |
|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 480 | 580 | 31 | 60 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B, D, E, AH32 to EH36 |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L290 GA, L360GA |
| | EN 10208-2 | L290, L360, L415 |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1 | P275T1 |
| | EN 10217-1 | P275 T2, P355 N |
| **Fine grained steel** | EN 10113-2 | S275, S355, S420 |
| | EN 10113-3 | S274, S355, S420 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool B300 | X | X | X |
| 5 kg plastic spool S200 | | X | |

Other sizes and packaging on request

# Low alloy solid rod

## Classification

AWS A5.28 : ER80S-Ni1
EN 1668 : W 42 6 W3Ni1

## General description

**Solid rod for welding fine grained and low alloyed nickel steels**
**High impact value at low temperature (-60°C)**
**Typical offshore applications**
**Stable arc and excellent feedability**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| GL | TÜV |
|---|---|
| 4Y42 | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni |
|---|---|---|---|
| 0.09 | 1.2 | 0.6 | 0.9 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -60°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 480 | 560 | 24 | 80 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| | EN 10025 | S275, S355 |
| **Ship plates** | ASTM A131 | Grade A, B, D, E, AH32 to EH36 |
| **Cast steel** | EN 10213-2 | GP240R |
| **Pipe material** | EN 10208-1 | L290 GA, L360GA |
| | EN 10208-2 | L290, L360, L415 |
| | API 5LX | X42, X46, X52, X60 |
| | EN 10216-1 | P275T1 |
| | EN 10217-1 | P275 T2, P355 N |
| **Fine grained steel** | EN 10113-2 | S275, S355, S420 |
| | EN 10113-3 | S274, S355, S420 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.6 | 2.0 | 2.4 |
| 2 and 5 kg tube | X | X | X |

Other sizes and packaging on request

# Low alloy solid wire

## Classification

AWS A5.28 : ER80S-Ni2
ISO 14341 : G 46 6 M G2Ni2

## General description

**Solid wire for welding fine grained and low alloyed nickel steels**
**High impact value at low temperature (-70°C).**
**Typical offshore applications**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
M21 Mixed Gas Ar+ >5% to 25 $CO_2$

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni |
|---|---|---|---|
| 0.1 | 1.1 | 0.6 | 2.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -62°C | -70°C | -90°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 490 | 580 | 24 | 105 | 50 | |
| | M21 | SR 580°C/15 h | 420 | 535 | 29 | 150 | | 140 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S355 |
| **Pipe material** | EN 10208-2 | L360, L415, L445 |
| | API 5 LX | X52, X56, X60, X65 |
| **Fine grained steel** | EN 10113-2 | S355, S420 |
| | EN 10113-3 | S355, S420 |
| **Low temperature steels** | EN 10028-4 | 11 MnNi 5-3, 13 MnNi 6-3, 15 NiMn 6 (12 Ni 14 G 1, G 2) |
| | EN 10222-3 | 13 MnNi 6-3, 15 NiMn 6 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool B300 | X | X |

Other sizes and packaging on request

# Low alloy solid rod

## Classification

AWS A5.28 : ER80S-Ni2
EN 1668 : W 46 6 W2Ni2

## General description

**Solid rod for welding fine grained and low alloyed nickel steels**
**High impact value at low temperature (-70°C).**
**Typical offshore applications**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni |
|---|---|---|---|
| 0.1 | 1.1 | 0.6 | 2.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -62°C | Impact ISO-V(J) -90°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 525 | 610 | 28 | 280 | 170 |
| | I1 | SR 580°C/15 h | 500 | 570 | 30 | 230 | 180 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **General structural steel** | EN 10025 | S355 |
| **Pipe material** | EN 10208-2 | L360, L415, L445 |
| | API 5 LX | X52, X56, X60, X65 |
| **Fine grained steel** | EN 10113-2 | S355, S420 |
| | EN 10113-3 | S355, S420 |
| **Low temperature steels** | EN 10028-4 | 11 MnNi 5-3, 13 MnNi 6-3, 15 NiMn 6 (12 Ni 14 G 1, G 2) |
| | EN 10222-3 | 13 MnNi 6-3, 15 NiMn 6 |

## Packaging and available sizes

| Unit type | Diameter (mm) 2.0 | Diameter (mm) 2.4 |
|---|---|---|
| 2 and 5 kg tube | X | X |

Other sizes and packaging on request

# Low alloy solid wire

## Classification

AWS A5.28 : ER70S-A1
ISO 14341 : G 46 3 M G2Mo

## General description

**Solid wire for welding creep resistant 0.5%Mo steels and fine grained steels for low temperature applications in the as welded condition with service temperatures in range -30°C to +500°C**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5 to 25% $CO_2$
C1 Active gas 100% $CO_2$

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Mo |
|---|---|---|---|
| 0.12 | 1.2 | 0.6 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | -20°C | -30°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 540 | 640 | 22 | 130 | 90 | 70 |
| | | SR 620°C/1h | 500 | 600 | 25 | 120 | | |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Elevated temperature steel** | EN 10028-2 | P295 G H, P355 G H, 16 Mo 2 |
| | EN 10222-2 | 17 Mo 3, 14 Mo 6 |
| **Fine grained steel** | EN 10113-2 | S275, S355, S420 |
| | EN 10113-3 | S275, S355, S420 |

## Application advice

Preheating welding joint acc. EN 1011-1
Stress relieving 580-650°C if necessary

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool B300 | X | X |

Other sizes and packaging on request

# Low alloy solid rod

## Classification

| | |
|---|---|
| AWS A5.28 | : ER70S-A1 |
| ISO 21952 | : W MoSi |
| EN 1668 | : W 46 3 W2Mo |

## General description

**Solid rod for welding creep resistant 0.5%Mo steels and fine grained steels for low temperature applications in the as welded condition with service temperatures in range -30°C to +500°C**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |

## Approvals

| | DNV | TÜV |
|---|---|---|
| For NV 0,3 Mo | + | |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Mo |
|---|---|---|---|
| 0.12 | 1.2 | 0.6 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%)1 | Impact ISO-V(J) +20°C | Impact ISO-V(J) -30°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 550 | 650 | 24 | 170 | 90 |
| | | SR 620°C/1h | 520 | 610 | 23 | 190 | 120 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Elevated temperature steel** | EN 10028-2 | P295 G H, P355 G H, 16 Mo 2 |
| | EN 10222-2 | 17 Mo 3, 14 Mo 6 |
| **Fine grained steel** | EN 10113-2 | S275, S355, S420 |
| | EN 10113-3 | S275, S355, S420 |

## Application advice

Preheating welding joint acc. EN 1011-1
Stress relieving 580-650°C if necessary

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.0 |
|---|---|---|---|---|
| 2 and 5 kg tube | X | X | X | X |

Other sizes and packaging on request

# Low alloy solid wire

## Classification

| | |
|---|---|
| AWS A5.28 | : ER80S-B2* |
| ISO 14341 | G CrMo1Si |

* Nearest classification

## General description

**Solid wire for welding creep and hydrogen resistant Cr-Mo steels**
**Service temperature up to 550°C**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| M21 | Mixed gas Ar+ >5 to 25% $CO_2$ |
| C1 | Active gas 100% $CO_2$ |

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Mo |
|---|---|---|---|---|
| 0.1 | 1.0 | 0.5 | 1.2 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M21 | AW | 480 | 590 | 24 | 125 |
| | M21 | SR 700°C/1h | 530 | 635 | 23 | 160 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Elevated temperature steel** | EN 10028-2 | 13 CrMo4-5 |
| | EN 10083-1 | 25 CrMo 4 |
| | EN 10222-2 | 14 CrMo 4-5 |
| **Tool steel** | DIN 17210 | 16 MnCr 5 |

## Application advice

Preheating welding joint acc. EN 1011-1, 200-250°C
Post weld heat treatment at 660-700°C

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 0.8 | 1.0 | 1.2 | 1.6 |
| 15 kg spool B300 | X | X | X | X |

Other sizes and packaging on request

# Low alloy solid rod

## Classification

AWS A5.28 : ER80S-B2*
ISO 21952 : W CrMo1Si

* Nearest classification

## General description

**Solid rod for welding creep and hydrogen resistant Cr-Mo steels**
**Service temperature up to 550°C**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Mo |
|---|---|---|---|---|
| 0.1 | 1.0 | 0.5 | 1.2 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | SR 700°C/1h | 540 | 640 | 22 | 250 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Elevated temperature steel** | EN 10028-2 | 13 CrMo4-5 |
| | EN 10083-1 | 25 CrMo 4 |
| | EN 10222-2 | 14 CrMo 4-5 |
| **Tool steel** | DIN 17210 | 16 MnCr 5 |

## Application advice

Preheating welding joint acc. EN 1011-1, 200-250°C
Post weld heat treatment at 660-700°C

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.6 | 2.0 | 2.4 |
| 2 and 5 kg tube | X | X | X |

Other sizes and packaging on request

# Low alloy solid wire

## Classification

AWS A5.28 : ER90S-B3*
ISO 21952 : G CrMo2Si

* Nearest classification

## General description

**Solid wire for welding creep and hydrogen resistant Cr-Mo steels**
**Service temperature up to 600°C**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5 to 25% $CO_2$
C1 Active gas 100% $CO_2$



## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Mo |
|---|---|---|---|---|
| 0.09 | 1.0 | 0.6 | 2.5 | 0.9 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M21 | SR 700°C/1h | 560 | 680 | 20 | 100 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Creep and hydrogen resistant steels** | EN 10028-2 | 10CrMo 9-10 |
| | EN 10222-2 | 12CrMo 9-10 |

## Application advice

Preheating welding joint acc. EN 1011-1, 200-250°C
Post weld heat treatment at 690-740°C

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool B300 | X | X | X |

Other sizes and packaging on request

# Low alloy solid rod

## Classification

AWS A5.28 : ER90S-B3*
ISO 21952 : W CrMo2Si

* Nearest classification

## General description

**Solid rod for welding creep and hydrogen resistant Cr-Mo steels**
**Service temperature up to 600°C**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Mo |
|---|---|---|---|---|
| 0.09 | 1.0 | 0.6 | 2.5 | 0.9 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | SR 700°C/1h | 560 | 640 | 22 | 140 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Creep and hydrogen resistant steels** | EN 10028-2 | 10CrMo 9-10 |
| | EN 10222-2 | 12CrMo 9-10 |

## Application advice

Preheating welding joint acc. EN 1011-1, 200-250°C
Post weld heat treatment at 690-740°C

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 2.0 | 2.4 | 3.0 |
| 2 and 5 kg tube | X | X | X |

Other sizes and packaging on request

# Low alloy solid rod

## Classification

AWS A5.28 : ER80S-B6
ISO 21952 : W CrMo5Si

## General description

**Solid rod for welding of creep and hydrogen resistant 5%Cr, 0.5%Mo steels**
**Service temperature up to 550°C**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Chemical composition (w%),Typical, rod

| C | Mn | Si | Cr | Mo |
|---|---|---|---|---|
| 0.08 | 0.5 | 0.5 | 5.8 | 0.6 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 480 | 625 | 18 | 70 |
| | I1 | SR 750°C/1h | 560 | 650 | 20 | 80 |

## Materials to be welded

| Steel grades | Code | Type |
|---|---|---|
| **Creep and hydrogen resistant steels** | SEW 028 | 12CrMo 19-5 and corresponding steels |
| | ASTM A182 | F5 |
| | ASTM A213 | T5 |
| | ASTM A335 | P5 |
| | ASTM A336 | F5 |
| | ASTM A369 | FP5 |
| | ASTM A387 | Grade 5 |

## Application advice

Recommended preheat and interpass temperature 200-300°C
Recommended post weld heat treatment at range 675-750°C (time depending on material thickness)

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.6 | 2.0 | 2.4 |
| 2 and 5 kg tube | X | X | X |

Other sizes and packaging on request

LNT 502: rev. EN 21

# LNT 9Cr(P91)

## Low alloy solid rod

### Classification

AWS A5.28 : ER90S-B9
ISO 21952 : W CrMo91

### General description

**Solid rod for welding of creep and hydrogen resistant 9% Cr, 1% Mo steels**
**Service temperature up to 650°C**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Chemical composition (w%),Typical, rod

| C | Mn | Si | Cr | Mo | Ni | Nb | V | N |
|---|---|---|---|---|---|---|---|---|
| 0.07 | 0.7 | 0.4 | 8.7 | 0.9 | 0.7 | 0.04 | 0.2 | 0.05 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | SR 750°C/3h | 500 | 700 | 18 | 70 |

### Materials to be welded

| Steel grades | Code | Type | Code | Type |
|---|---|---|---|---|
| **Creep and hydrogen resistant steels** | EN 10222-2 | X10CrMo V9-1 | | |
| | ASTM | A199 Grade T91 | ASME | SA 182-F91 |
| | | A200 Grade T91 | | |
| | | A213 Grade T91 | | SA 213-T91 |
| | | A335 Grade P91 | | SA 335-P91 |
| | | A336 Grade F91 | | SA 336-F91 |
| | | | | SA 369-FP91 |
| | | | | SA 387-Grade 91 |
| | | | | SA 387-Grade 91 |

### Packaging and available sizes

| Unit type | Diameter (mm) 2.0 | 2.4 |
|---|---|---|
| 2 and 5 kg tube | X | X |

Other sizes and packaging on request

LNT 9Cr(P91): rev. EN 21

# Stainless steel solid wire

## Classification

AWS A5.9 : ER308LSi
ISO 14343-A : G 19 9 LSi

## General description

**Solid wire with extra low carbon for welding austenitic CrNi-steels**
**With increased silicon for improved wettability**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $O_2$
M13 Mixed gas Ar+ >0-3% $CO_2$

## Approvals

| ABS | BV | DNV | GL | LR | TÜV |
|---|---|---|---|---|---|
| ER308LSi | 308L | 308L | 4306S | 304L S | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.7 | 0.8 | 20 | 10 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 420 | 570 | 45 | 85 | 55 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNi19 11 | | 1.4306 | (TP)304 L | S30403 |
| | | | | CF-3 | J92500 |
| | X2CrNiN18 10 | | 1.4311 | (TP)304LN | S30453 |
| | | | | 302, 304 | S30400 |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4CrNi18 10 | | 1.4301 | (TP)304 | S30409 |
| | | GX5CrNi19 10 | 1.4308 | CF-8 | J92600 |
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi18 10 | | 1.4541 | (TP)321 | S32100 |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18 10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19 10 | 1.4552 | CF-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 5 kg plastic spool S200 | X | | | |
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER308LSi
ISO 14343-A : W 19 9 LSi

## General description

**Solid rod with extra low carbon for welding austenitic CrNi-steels**
**With increased silicon for improved wettability**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| ABS | DNV | LR | TÜV |
|---|---|---|---|
| ER 308LSi | 308L | + | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.7 | 0.8 | 20 | 10 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 390 | 590 | 36 | 120 | 50 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNi19 11 | | 1.4306 | (TP)304 L | S30403 |
| | | | | CF-3 | J92500 |
| | X2CrNiN18 10 | | 1.4311 | (TP)304LN | S30453 |
| | | | | 302, 304 | S30400 |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4CrNi18 10 | | 1.4301 | (TP)304 | S30409 |
| | | GX5CrNi19 10 | 1.4308 | CF-8 | J92600 |
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi18 10 | | 1.4541 | (TP)321 | S32100 |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18 10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19 10 | 1.4552 | CF-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|---|---|
| 2 and 10 kg tube | X | X | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER308L
ISO 14343-A : G 19 9 L

## General description

**Solid wire with extra low carbon for welding austenitic CrNi-steels**
**High resistance to intergranular corrosion and oxidizing environments**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.5 | 20 | 10 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | M12 | AW | 390 | 590 | 35 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNi19 11 | | 1.4306 | (TP)304 L | S30403 |
| | | | | CF-3 | J92500 |
| | X2CrNiN18 10 | | 1.4311 | (TP)304LN | S30453 |
| | | | | 302, 304 | S30400 |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4CrNi18 10 | | 1.4301 | (TP)304 | S30409 |
| | | GX5CrNi19 10 | 1.4308 | CF-8 | J92600 |
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi18 10 | | 1.4541 | (TP)321 | S32100/ |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18 10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19 10 | 1.4552 | CF-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 |
|---|---|
| 15 kg spool BS300 | X |

Other sizes and packaging on request

LNM 304L: rev. EN 21

# Stainless steel solid rod

## Classification

AWS A5.9 : ER308L
ISO 14343-A : W 19 9 L

## General description

**Solid rod with extra low carbon for welding austenitic CrNi-steels**
**High resistance to intergranular corrosion and oxidizing environments**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.5 | 20 | 10 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 390 | 590 | 35 | 120 | 50 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNi19 11 | | 1.4306 | (TP)304 L | S30403 |
| | | | | CF-3 | J92500 |
| | X2CrNiN18 10 | | 1.4311 | (TP)304LN | S30453 |
| | | | | 302, 304 | S30400 |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4CrNi18 10 | | 1.4301 | (TP)304 | S30409 |
| | | GX5CrNi19 10 | 1.4308 | CF-8 | J92600 |
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi18 10 | | 1.4541 | (TP)321 | S32100/ |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18 10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19 10 | 1.4552 | CF-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|
| 5 and 10 kg tube | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER347Si
ISO 14343-A : G 19 9 NbSi

## General description

**Solid wire for welding Ti or Nb stabilized stainless CrNi-steels**
**High resistance to intergranular corrosion and oxidizing environments**

## Shielding gases (acc. ISO 14175)

| | | |
|---|---|---|
| M12 | Mixed gas Ar+ >0-5% $CO_2$ | Inert gas Ar (100%) |
| M13 | Mixed gas Ar+ >0-3% 02 | |

## Approvals

| LR | TÜV |
|---|---|
| + | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Nb |
|---|---|---|---|---|---|---|
| 0.04 | 1.3 | 0.9 | 19.2 | 9.9 | 0.30 | 0.6 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 460 | 650 | 35 | 100 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi 18-10 | | 1.4541 | (TP)321 | S32100 |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | | | (TP)347h | S34709 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |
| **Non stabilized** | | | | | |
| | | | | 302 | |
| | X4 CrNi 18-10 | | 1.4301 | (TP)304 | S30400 |
| | X2 CrNi 19-11 | | 1.4306 | (TP)304L | S30403 |
| | | GX5 CrNi 19-10 | 1.4308 | CF-8 | J92600 |
| | | | 1.4312 | | |
| | | | | (TP)304H | S30409 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool BS300 | X | X | X |

Other sizes and packaging on request

**LNM 347Si: rev. EN 21**

# Stainless steel solid rod

## Classification

AWS A5.9 : ER347Si
ISO 14343-A : W 19 9 NbSi

## General description

**Solid rod for welding Ti or Nb stabilized stainless CrNi-steels**
**High resistance to intergranular corrosion and oxidizing environments**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

TÜV
+

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Nb |
|---|---|---|---|---|---|---|
| 0.04 | 1.3 | 0.9 | 19.2 | 9.9 | 0.30 | 0.6 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 650 | 35 | 80 | 45 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi 18-10 | | 1.4541 | (TP)321 | S32100 |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | | | (TP)347h | S34709 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |
| **Non stabilized** | | | | | |
| | | | | 302 | |
| | X4 CrNi 18-10 | | 1.4301 | (TP)304 | S30400 |
| | X2 CrNi 19-11 | | 1.4306 | (TP)304L | S30403 |
| | | GX5 CrNi 19-10 | 1.4308 | CF-8 | J92600 |
| | | | 1.4312 | | |
| | | | | (TP)304H | S30409 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|
| 2 and 10 kg tube | X | X | X | X |

Other sizes and packaging on request

LNT 347Si: rev. EN 21

# Stainless steel solid rod

## Classification

AWS A5.9 : ER316L
ISO 14343-A : W 19 12 3 L

## General description

**Solid rod with extra low carbon for welding austenitic CrNiMo-steels**
**High resistance to intergranular corrosion and general corrosion conditions**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Chemical composition (w%),Typical, rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.5 | 0.5 | 18.5 | 12 | 2.7 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | -120°C | -196°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 620 | 35 | 100 | 80 | 40 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNiMo17 12 2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2CrNiMo18 14 3 | | 1.4435 | (TP)316L | S31603 |
| | X2CrNiMoN 17 11 2 | | 1.4406 | (TP)316LN | S31653 |
| | X2CrNiMoN 17 13 3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17 12 2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17 13 3 | | 1.4436 | | |
| | | GX5 CrNiMo 19-11 | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17 12 2 | | 1.4571 | 316 Ti | S31635 |
| | X6 CrNiMoNb 17 12 2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|
| 10 kg tube | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER316LSi
ISO 14343-A : G 19 12 3 LSi

## General description

**Solid wire with extra low carbon for welding stainless CrNiMo-steels**
**See also LNM 316L, high silicon for improved wettability**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

| ABS | BV | DNV | GL | LR | TÜV |
|---|---|---|---|---|---|
| ER316LSi | 316L | 316L | 4571S | 316L S | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.8 | 18.5 | 12.2 | 2.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | -120°C | -196°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 420 | 620 | 39 | 150 | 70 | 45 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNiMo17 12 2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2CrNiMo18 14 3 | | 1.4435 | (TP)316L | S31603 |
| | X2CrNiMoN 17 11 2 | | 1.4406 | (TP)316LN | S31653 |
| | X2CrNiMoN 17 13 3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17 12 2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17 13 3 | | 1.4436 | | |
| | GX5 CrNiMo 19-11 | | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17 12 2 | | 1.4571 | 316 Ti | S31635 |
| | X6 CrNiMoNb 17 12 2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 5 kg plastic spool S200 | X | X | | |
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

LNM 316LSi: rev. EN 21

# Stainless steel solid rod

## Classification

AWS A5.9 : ER316LSi
ISO 14343-A : W 19 12 3 Lsi

## General description

**Solid rod with extra low carbon for welding stainless CrNiMo-steels**
**See also LNT 316L, high silicon for improved wettability**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| ABS | DNV | LR | TÜV |
|---|---|---|---|
| ER 316LSi | 316L MS | + | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.8 | 18.5 | 12.2 | 2.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 620 | 35 | 100 | 40 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNiMo17 12 2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2CrNiMo18 14 3 | | 1.4435 | (TP)316L | S31603 |
| | X2CrNiMoN 17 11 2 | | 1.4406 | (TP)316LN | S31653 |
| | X2CrNiMoN 17 13 3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17 12 2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17 13 3 | | 1.4436 | | |
| | GX5 CrNiMo 19-11 | | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17 12 2 | | 1.4571 | 316 Ti | S31635 |
| | X6 CrNiMoNb 17 12 2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|---|---|
| 2,5 and 10 kg tube | X | X | X | X | X | X |

Other sizes and packaging on request

**LNT 316LSi: rev. EN 21**

# Stainless steel solid wire

## Classification

AWS A5.9 : ER318*
ISO 14343-A : G 19 12 3 NbSi

* Nearest classification

## General description

**Solid wire for welding Ti or Nb stabilized stainless CrNiMo-steels**
**High resistance to intergranular corrosion and general corrosion conditions**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Nb |
|---|---|---|---|---|---|---|
| 0.04 | 1.4 | 0.85 | 18.9 | 11.7 | 2.7 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 410 | 630 | 35 | 100 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN102 13-4 | W.Nr. | ASTM/ACI A240/A312/A35 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2 CrNiMo 17-12-2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2 CrNiMo 18-14-3 | | 1.4435 | (TP)316L | S31603 |
| | X2 CrNiMoN 17-11-2 | | 1.4406 | (TP)316LN | S31653 |
| | X2 CrNiMoN 17-13-3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17-12-2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17-13-3 | | 1.4436 | | |
| | | GX5 CrNiMo19-11 | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17-12-2 | | 1.4571 | 316Ti | S31635 |
| | X6 CrNiMoNb 17-12-2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | Cf-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 0.8 | 1.0 | 1.2 | 1.6 |
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

LNM 318Si: rev. EN 21

# Stainless steel solid rod

## Classification

AWS A5.9 : ER318*
ISO 14343-A : W 19 12 3 NbSi

* Nearest classification

## General description

**Solid rod for welding Ti or Nb stabilized stainless CrNiMo-steels**
**High resistance to intergranular corrosion and general corrosion conditions**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Nb |
|---|---|---|---|---|---|---|
| 0.04 | 1.4 | 0.85 | 18.9 | 11.7 | 2.7 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 420 | 680 | 35 | 70 | 45 |

## Materials to be welded

| Steel grades | EN 10088-11-2 | EN102 13-4 | W.Nr. | ASTM/ACI A240/A312/A35 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2 CrNiMo 17-12-2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2 CrNiMo 18-14-3 | | 1.4435 | (TP)316L | S31603 |
| | X2 CrNiMoN 17-11-2 | | 1.4406 | (TP)316LN | S31653 |
| | X2 CrNiMoN 17-13-3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17-12-2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17-13-3 | | 1.4436 | | |
| | | GX5 CrNiMo19-11 | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17-12-2 | | 1.4571 | 316Ti | S31635 |
| | X6 CrNiMoNb 17-12-2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | Cf-8C | J92710 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|---|
| 2 and 10 kg tube | X | X | X | X | X |

Other sizes and packaging on request

LNT 318Si: rev. EN 21

# Stainless steel solid wire

## Classification

ISO 14343-A : G 18 16 5 N L*

* Nearest classification

## General description

**Solid wire for welding AISI 317L, 317LN or equivalent stainless steels**
**For welding 316L if increased molybdemum content is important**
**High resistance to pitting, intergranular and stress corrosion**
**Fully austenitic weld metal**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3 02

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.02 | 7 | 0.7 | 19.1 | 16.9 | 4.6 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | -120°C | -196°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 410 | 620 | 30 | 120 | 80 | 50 |

## Materials to be welded

| Steel grades | EN10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| **Fully austenitic CrNiMo corrosion resistant steels** | | | | | |
| | X2 CrNiMoN 17-11-2 | | 1.4406 | (TP)316LN | S31653 |
| | X2 CrNiMoN 17-13-3 | | 1.4429 | (TP)316LN | S31653 |
| | X2 CrNiMo 18-14-3 | | 1.4435 | (TP)316L | S31603 |
| | X2 CrNiMo 18-15-4 | | 1.4438 | 317L | S31725 |
| | X2 CrNiMoN 17-13-5 | | 1.4439 | 317LN | S31726 |
| | G-X2 CrNiMoN 17-13-4 | GX2 CrNiMo 17-13-4 | 1.4446 | | |
| | G-X6 CrNiMo 17-13 | GX6 CrNiMo 17-13 | 1.4448 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 |
|---|---|---|---|
| 15 kg spool BS300 | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

ISO 14343-A : W 18 16 5 N L*

* Nearest classification

## General description

**Solid rod for welding AISI 317L, 317LN or equivalent stainless steels**
**For welding 316L if increased molybdemum content is important**
**High resistance to pitting, intergranular and stress corrosion**
**Fully austenitic weld metal**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)



## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.02 | 7 | 0.7 | 19.1 | 16.9 | 4.6 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 440 | 650 | 35 | 80 |

## Materials to be welded

| Steel grades | EN10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| **Fully austenitic CrNiMo corrosion resistant steels** | | | | | |
| | X2 CrNiMoN 17-11-2 | | 1.4406 | (TP)316LN | S31653 |
| | X2 CrNiMoN 17-13-3 | | 1.4429 | (TP)316LN | S31653 |
| | X2 CrNiMo 18-14-3 | | 1.4435 | (TP)316L | S31603 |
| | X2 CrNiMo 18-15-4 | | 1.4438 | 317L | S31725 |
| | X2 CrNiMoN 17-13-5 | | 1.4439 | 317LN | S31726 |
| | G-X2 CrNiMoN 17-13-4 | GX2 CrNiMo 17-13-4 | 1.4446 | | |
| | G-X6 CrNiMo 17-13 | GX6 CrNiMo 17-13 | 1.4448 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 |
| 2 and 5 kg tube | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER316LMn
ISO 14343-A : G 20 16 3 Mn L

## General description

**Solid wire for welding fully austenitic CrNiMnMo stainless steels and low temperature steels**
**Not susceptible for hot cracking**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

TÜV
+

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.015 | 7 | 0.35 | 20 | 16 | 2.8 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 400 | 600 | 30 | 50 |

## Materials to be welded

| Steel grades | Code | | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| **N-alloyed stainless CrNi-and CrNiMo steels** | | | | | |
| | EN 10088-1/-2 | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | | X2 CrNiMoN 17-11-2 | 1.4406 | (TP)316LN | S31653 |
| | | X2 CrNiMoN 17-13-3 | 1.4429 | | |
| | | X2 CrNiMoN 17-13-5 | 1.4439 | 317LN | S31726 |
| **Austenitic anti-magnetic steels** | | | | | |
| | SEW 390 | X2 CrNiMoN 22-15 | 1.3951 | | |
| | | X2 CrNiMoN18-14-3 | 1.3952 | | |
| | | X2 CrNiMo 18-15 | 1.3953 | | |
| | | X8 CrMnNi 18-8 | 1.3965 | | |
| **Low temperature steels** | | | | | |
| | SEW 685 | GX6 CrNi 18-10 | 1.6902 | | |
| | | GX5 CrNiNb 18-10 | 1.6905 | | |
| | EN 10028-4 | 12 Ni 14 | 1.5637 | | |
| | | X12 Ni 5 | 1.5680 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.2 | 1.6 |
|---|---|---|
| 15 kg spool BS300 | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER316LMn
ISO 14343-A : W 20 16 3 Mn L

## General description

**Solid rod for welding fully austenitic CrNiMnMo stainless steels and low temperature steels**
**Not susceptible for hot cracking**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.015 | 7 | 0.35 | 20 | 16 | 2.8 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 430 | 650 | 35 | 75 |

## Materials to be welded

| Steel grades | Code | | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| **N-alloyed stainless CrNi-and CrNiMo steels** | | | | | |
| | EN 10088-1/-2 | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | | X2 CrNiMoN 17-11-2 | 1.4406 | (TP)316LN | S31653 |
| | | X2 CrNiMoN 17-13-3 | 1.4429 | | |
| | | X2 CrNiMoN 17-13-5 | 1.4439 | 317LN | S31726 |
| **Austenitic anti-magnetic steels** | | | | | |
| | SEW 390 | X2 CrNiMoN 22-15 | 1.3951 | | |
| | | X2 CrNiMoN18-14-3 | 1.3952 | | |
| | | X2 CrNiMo 18-15 | 1.3953 | | |
| | | X8 CrMnNi 18-8 | 1.3965 | | |
| **Low temperature steels** | | | | | |
| | SEW 685 | GX6 CrNi 18-10 | 1.6902 | | |
| | | GX5 CrNiNb 18-10 | 1.6905 | | |
| | EN 10028-4 | 12 Ni 14 | 1.5637 | | |
| | | X12 Ni 5 | 1.5680 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | |
|---|---|---|
| | 2.0 | 2.4 |
| 2 and 10 kg tube | X | X |

Other sizes and packaging on request

LNT 4455: rev. EN 21

# Stainless steel solid wire

## Classification

ISO 14343-A : G 25 22 2 N L

## General description

**Solid wire for welding high CrNiMo-alloyed austenitic steels of type 25/22/2**
**Excellent resistance to strong oxidizing and moderate reducing conditions**
**Especially for urea applications**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

TÜV
+

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.018 | 5.0 | 0.4 | 25.0 | 23.0 | 2.0 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 360 | 620 | 30 | 80 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM / ACI | UNS |
|---|---|---|---|---|
| **Fully austenitic corrosion resistant CrNiMo steels** | | | | |
| | X1 CrNiMoN 25-25-2 | 1.4465 | | |
| | X3 CrNiMoTi 25-25 | 1.4577 | | |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | | | 310S | S31008 |

Also very well applicable for build-up welding on low alloyed steel, such as pipe plates
Buffer layer -120 ...+350°C

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool BS300 | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

ISO 14343-A : W 25 22 2 N L

## General description

**Solid rod for welding high CrNiMo-alloyed austenitic steels of type 25/22/2**
**Excellent resistance to strong oxidizing and moderate reducing conditions**
**Especially for urea applications**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.018 | 5.0 | 0.4 | 25.0 | 23.0 | 2.0 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -10°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 360 | 620 | 30 | 80 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM / ACI | UNS |
|---|---|---|---|---|
| **Fully austenitic corrosion resistant CrNiMo steels** | | | | |
| | X1 CrNiMoN 25-25-2 | 1.4465 | | |
| | X3 CrNiMoTi 25-25 | 1.4577 | | |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | | | 310S | S31008 |

Also very well applicable for build-up welding on low alloyed steel, such as pipe plates
Buffer layer -120 ...+350°C

## Packaging and available sizes

| Unit type | Diameter (mm) | |
|---|---|---|
| | 2.0 | 2.4 |
| 2 and 5 kg tube | X | X |

Other sizes and packaging on request

LNT 4465: rev. EN 21

# Stainless steel solid wire

## Classification

AWS A5.9 : ER385
ISO 14343-A : G 20 25 5 Cu L

## General description

**Solid wire for welding of fully austenitic steels of type 20%Cr / 25%Ni / 4.5%Mo / 1.5%Cu**
**Highly corrosion resistant in sulphuric and phosphoric acid**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|
| 0.009 | 1.7 | 0.3 | 20 | 25 | 4.4 | 1.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 350 | 610 | 35 | 100 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. |
|---|---|---|---|
| **Fully austenitic NiCrMoCu and CrNiMoCu steels** | | | |
| | | GX7 NiCrMoCuNb 25-20 | 1.4500 |
| | X5 NiCrMoCuTi 20 18 | | 1.4506 |
| | | G-X2 NiCrMoCuN 20 18 | 1.4531 |
| | | G-X2 NiCrMoCuN 25 20 | 1.4536 |
| | X1 NiCrMoCuN 25 20 5 | | 1.4539 |
| | | G-X7 CrNiMoCuNb 18 18 | 1.4585 |
| | X5 NiCrMoCuNb 22 18 | | 1.4586 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool BS300 | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER385
ISO 14343-A : W 20 25 5 Cu L

## General description

**Solid rod for welding of fully austenitic steels of type 20%Cr / 25%Ni / 4.5%Mo / 1.5%Cu**
**Highly corrosion resistant in sulphuric and phosphoric acid**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

TÜV
+



## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|
| 0.009 | 1.7 | 0.3 | 20 | 25 | 4.4 | 1.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 380 | 560 | 35 | 80 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. |
|---|---|---|---|
| **Fully austenitic NiCrMoCu and CrNiMoCu steels** | | | |
| | | GX7 NiCrMoCuNb 25-20 | 1.4500 |
| | X5 NiCrMoCuTi 20 18 | | 1.4506 |
| | | G-X2 NiCrMoCuN 20 18 | 1.4531 |
| | | G-X2 NiCrMoCuN 25 20 | 1.4536 |
| | X1 NiCrMoCuN 25 20 5 | | 1.4539 |
| | | G-X7 CrNiMoCuNb 18 18 | 1.4585 |
| | X5 NiCrMoCuNb 22 18 | | 1.4586 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.6 | 2.0 | 2.4 |
| 2 and 5 kg tube | X | X | X |

Other sizes and packaging on request

LNT 4500: rev. EN 21

# Stainless steel solid wire

## Classification

No EN or AWS standard

## General description

**Solid wire for welding Lean Duplex stainless steels**
**Corrosion resistance is equal to 316L in most applications**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| M11 | Mixed gas Ar+ >0-5% $CO_2$ +>0-5%H2 |
| M12 | Mixed gas Ar+ >0-5% $CO_2$ |
| M13 | Mixed gas Ar+ >0-3% O2 |

## Chemical composition (w%) typical wire

| C | Mn | Si | Cr | Ni | Mo | P | S |
|---|---|---|---|---|---|---|---|
| 0.020 | 1.7 | 0.7 | 23.0 | 7.0 | 0.3 | 0.025 | 0.005 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -20°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 525 | 710 | 25 | 170 | 150 |

## Materials to be welded

Steel grades

**LDX 2101 and similar**

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool BS300 | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER2209
ISO 14343-A : G 22 9 3 N L

## General description

**Solid wire for welding duplex stainless steels**
**High resistance to general corrosion, pitting and stress corrosion conditions**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

| BV | GL | TÜV |
|---|---|---|
| 2209 | 4462S | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.018 | 1.5 | 0.5 | 22.7 | 8.5 | 3.0 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -46°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 625 | 810 | 28 | 110 | 40 |

## Materials to be welded

| Steel grades | En 10088-1/-2 | W.Nr. | UNS |
|---|---|---|---|
| **Duplex stainless steels** | | | |
| | X2 CrNiMoN 22 5 3 | 1.4462 | S31803 |
| | | 1.4417 | S31500 |
| | X2 CrNiN 23-4 | 1.4362 | S32304 |
| | X3 CrNiMoN 27-5-2 | 1.4460 | S31200 |

Dissimilar joints such as un- and low alloyed steel to duplex stainless steel

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER2209
ISO 14343-A : W 22 9 3 N L

## General description

**Solid rod for welding duplex stainless steels**
**High resistance to general corrosion, pitting and stress corrosion conditions**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | N |
|---|---|---|---|---|---|---|
| 0.015 | 1.6 | 0.5 | 22.5 | 8.5 | 3.0 | 0.15 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | -20°C | -60°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 600 | 800 | 28 | 85 | 60 | 45 |

## Materials to be welded

| Steel grades | En 10088-1/-2 | W.Nr. | UNS |
|---|---|---|---|
| **Duplex stainless steels** | | | |
| | X2 CrNiMoN 22 5 3 | 1.4462 | S31803 |
| | | 1.4417 | S31500 |
| | X2 CrNiN 23-4 | 1.4362 | S32304 |
| | X3 CrNiMoN 27-5-2 | 1.4460 | S31200 |

Dissimilar joints such as un- and low alloyed steel to duplex stainless steel

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|
| 2 and 10 kg tube | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER2594
ISO 14343-A : G 25 9 4 N L

## General description

**Solid wire for welding Zeron 100® and other super duplex stainless steel grades**
**High resistance to pitting and crevice corrosion in seawater**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Cu | W | N |
|---|---|---|---|---|---|---|---|---|
| 0.015 | 0.7 | 0.4 | 25.0 | 9.8 | 3.7 | 0.6 | 0.7 | 0.22 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -46°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 655 | 845 | 23 | 75 | 55 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | | W.Nr. | ASTM/ACI A276/A351/A473 | UNS |
|---|---|---|---|---|---|
| **Regular and super duplex stainless steels** | | | | | |
| | X4 CrNiMoN 27-5-2 | | 1.4460 | | |
| | X2 CrNiMoN 22-5-3 | | 1.4462 | 2205 | S31803 |
| | | GX6 CrNiMo 24-8-2 | 1.4463 | | |
| | | | | CD-4MCu | S32550 |
| | | | | Zeron 100 | S32760 |

Super duplex stainless steel grades: chemical composition approximately:
24-27% Cr, 6-9% Ni, 3-4% Mo, 0.10-0.25% N alloyed also with Cu and/or W (Zeron 100)

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 | 1.6 |
|---|---|---|---|
| 12.5 kg spool B300 | X | X | X |

Other sizes and packaging on request

LNM Zeron 100X: rev. EN 21

# LNT Zeron 100X

## Stainless steel solid rod

### Classification

AWS A5.9 : ER2594
ISO 14343-A : W 25 9 4 N L

### General description

**Solid rod for welding Zeron 100® and other super duplex stainless steel grades**
**High resistance to pitting and crevice corrosion in seawater**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Approvals

TÜV
+

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo | Cu | W | N |
|---|---|---|---|---|---|---|---|---|
| 0.015 | 0.7 | 0.4 | 25.0 | 9.8 | 3.7 | 0.6 | 0.7 | 0.22 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -46°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 680 | 885 | 26 | 80 | 60 |

### Materials to be welded

| Steel grades | EN 10088-1/-2 | E 102 13-4 | W.Nr. | ASTM/ACI A276/A351/A473 | UNS |
|---|---|---|---|---|---|
| **Regular and super duplex stainless steels** | | | | | |
| | X4 CrNiMoN 27-5-2 | | 1.4460 | | |
| | X2 CrNiMoN 22-5-3 | | 1.4462 | 2205 | S31803 |
| | | GX6 CrNiMo 24-8-2 | 1.4463 | | |
| | | | | CD-4MCu | S32550 |
| | | | | Zeron 100 | S32760 |

Super duplex stainless steel grades: chemical composition approximately:
24-27% Cr, 6-9% Ni, 3-4% Mo, 0.10-0.25% N alloyed also with Cu and/or W (Zeron 100)

### Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.4 | 3.2 |
|---|---|---|---|
| 2 kg tube | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER309LSi
ISO 14343-A : G 23 12 L Si

## General description

**Solid wire for welding stainless steel to carbon steel**
**With high silicon for improved wettability**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

| ABS | BV | DB | DNV | GL | LR | TÜV |
|---|---|---|---|---|---|---|
| ER309LSi | 309L | + | 309 | 4332S | SS/CMn S | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.8 | 0.8 | 23.3 | 13.8 | 0.14 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -120°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 430 | 565 | 35 | 96 | 65 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|
| **Corrosion resistant cladsteels** | | | | |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X4 CrNi 18-10 | 1.4301 | (TP)304 | S30400 |

Dissimilar metals (mild and low alloyed steel to stainless steel)
Build-up welding on mild and low alloyed steel

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER309LSi
ISO 14343-A : W 23 12 L Si

## General description

**Solid rod for welding stainless steel to carbon steel**
**With high silicon for improved wettability**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| | ABS | LR | TÜV |
|---|---|---|---|
| ER 309LSi | + | | + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.8 | 0.8 | 23.3 | 13.8 | 0.14 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -46°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 600 | 35 | 65 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|
| **Corrosion resistant cladsteels** | | | | |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X4 CrNi 18-10 | 1.4301 | (TP)304 | S30400 |

Dissimilar metals (mild and low alloyed steel to stainless steel)
Build-up welding on mild and low alloyed steel

## Packaging and available sizes

| Unit type | Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|
| | 1.0 | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
| 2,5 and 10 kg tube | X | X | X | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER309L
ISO 14343-A : W 23 12 L

## General description

**Solid rod for welding stainless steel to carbon steel**
**Low susceptability to embrittlement**
**Minimum 18FN ferrite in weldmetal**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)



## Chemical composition (w%),Typical, rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.65 | 0.35 | 24 | 13 | 0.05 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 390 | 600 | 35 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|
| **Corrosion resistant cladsteels** | | | | |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X4 CrNi 18-10 | 1.4301 | (TP)304 | S30400 |

Dissimilar metals (mild and low alloyed steel to stainless steel)
Build-up welding on mild and low alloyed steel

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.6 | 2.0 | 2.4 |
| 2 and 10 kg tube | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER307*
ISO 14343-A : G 18 8 Mn

* Nearest classification

## General description

**Solid wire for welding Steel with difficult weldability**
**Often used as a buffer layer in hardfacing applications**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni |
|---|---|---|---|---|
| 0.08 | 7.1 | 0.8 | 19.2 | 9 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -120°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 400 | 630 | 40 | 80 | 50 |

## Materials to be welded

Various steel grades, such as:
- Armour plate
- Hardenable steels including steels difficult to weld
- Non-magnetic steels
- Work hardening austenitic manganese steels
- Dissimilar joints (CMn-steels to stainless steels)

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool BS300 | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER307*
ISO 14343-A : W 18 8 Mn

* Nearest classification

## General description

**Solid rod for welding Steel with difficult weldability**
**Often used as a buffer layer in hardfacing applications**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)



## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni |
|---|---|---|---|---|
| 0.08 | 7.1 | 0.8 | 19.2 | 9 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -120°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 650 | 34 | 100 | 50 |

## Materials to be welded

Various steel grades, such as:
- Armour plate
- Hardenable steels including steels difficult to weld
- Non-magnetic steels
- Work hardening austenitic manganese steels
- Dissimilar joints (CMn-steels to stainless steels)

## Packaging and available sizes

| Unit type | Diameter (mm) 2.0 |
|---|---|
| 2 kg tube | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER308H
ISO 14343-A : G 19 9 H

## General description

**Solid wire for welding austenitic CrNi-steels**
**Especially for high temperature applications (up to 730°C)**
**Low sensitivity to precipitation of intermetallic phases**

## Shielding gases (acc. ISO 14175)

| | | |
|---|---|---|
| M12 | Mixed gas Ar+ >0-5% $CO_2$ | Inert gas Ar (100%) |
| M13 | Mixed gas Ar+ >0-3% 02 | |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.05 | 1.8 | 0.5 | 20 | 10 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | M12 | AW | 370 | 590 | 34 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI 302 | UNS |
|---|---|---|---|---|---|
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNi 18-10 | | 1.4301 | (TP)304 | S30400 |
| | | | | (TP)304H | S30409 |
| | | GX5 CrNi 19-10 | 1.4308 | CF 8 | J92600 |
| | | | 1.4948 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool BS300 | X | X |

Other sizes and packaging on request

GMAW/GTAW

LNM 304H: rev. EN 21

# Stainless steel solid rod

## Classification

AWS A5.9 : ER308H
ISO 14343-A : W 19 9 H

## General description

**Solid rod for welding austenitic CrNi-steels**
**Especially for high temperature applications (up to 730°C)**
**Low sensitivity to precipitation of intermetallic phases**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)



## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.05 | 1.8 | 0.5 | 20 | 10 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 370 | 600 | 35 | 80 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI 302 | UNS |
|---|---|---|---|---|---|
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNi 18-10 | | 1.4301 | (TP)304 | S30400 |
| | | | | (TP)304H | S30409 |
| | | GX5 CrNi 19-10 | 1.4308 | CF 8 | J92600 |
| | | | 1.4948 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) 2.0 | 2.4 | 3.2 |
|---|---|---|---|
| 2 and 10 kg tube | X | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER309
ISO 14343-A : G 23 12 L*

* Nearest classification

## General description

**Solid wire for high temperature applications like industrial furnaces**
**High resistance to oxidation up to 1050°C**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Chemical composition (w%) typical wire

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.05 | 1.8 | 0.5 | 24.0 | 13.5 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 400 | 640 | 35 | 110 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| | | GX30 CrSi6 | 1.4710 | | |
| | X10 CrAl7 | | 1.4713 | 502 | |
| | X10 CrAl13 | | 1.4724 | 410/414-TP405-CA15 | |
| | | GX40 CrSi13 | 1.4729 | | |
| | | GX40 CrSi17 | 1.4740 | | |
| | X10 CrAl18 | | 1.4742 | 430-TP430-CB30 | |
| | X10 CrAl24 | | 1.4762 | TP443 | |
| | | GX25 CrNiSi18-9 | 1.4825 | | J92502 |
| | | GX40 CrNiSi22-9 | | | |
| | X15 CrNiSi20-12 | | 1.4828 | TP309 | S30900 |
| | | GX25 CrNiSi20-14 | 1.4832 | | |
| | X12 CrNiTi18-9 | | | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | |
|---|---|---|
| | 1.0 | 1.2 |
| 15 kg spool BS300 | X | X |

Other sizes and packaging on request

# Stainless steel solid wire

## Classification

AWS A5.9 : ER310
ISO 14343-A : G 25 20

## General description

**Solid wire for welding heat resistant Cr- and CrNi-steels (25%Cr-20%Ni)**
**High resistance to oxidation and scaling up to approx. 1100°C**

## Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.1 | 1.8 | 0.45 | 26 | 21 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 355 | 610 | 35 | 110 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| | X10 CrAl24 | | 1.4762 | | |
| | | GX25 CrNiSi18-9 | 1.4825 | | |
| | | GX40 CrNiSi22-9 | 1.4826 | | |
| | X15 CrNiSi20-12 | | 1.4828 | | |
| | | GX25 CrNiSi20-14 | 1.4832 | | |
| | X15 CrNiSi25-20 | | 1.4841 | 310S | S31008 |
| | | | | CK20 | J94202 |
| | X12 CrNi25-21 | | 1.4845 | | |
| | | GX40 CrNiSi 25-20 | 1.4848 | HK40 | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 0.8 | 1.0 | 1.2 |
| 15 kg spool BS300 | X | X | X |

Other sizes and packaging on request

# Stainless steel solid rod

## Classification

AWS A5.9 : ER310
ISO 14343-A : W 25 20

## General description

**Solid rod for welding heat resistant Cr- and CrNi-steels (25%Cr-20%Ni)**
**High resistance to oxidation and scaling up to approx. 1100°C**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.1 | 1.8 | 0.45 | 26 | 21 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 360 | 600 | 35 | 100 |

## Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| | X10 CrAl24 | | 1.4762 | | |
| | | GX25 CrNiSi18-9 | 1.4825 | | |
| | | GX40 CrNiSi22-9 | 1.4826 | | |
| | X15 CrNiSi20-12 | | 1.4828 | | |
| | | GX25 CrNiSi20-14 | 1.4832 | | |
| | X15 CrNiSi25-20 | | 1.4841 | 310S | S31008 |
| | | | | CK20 | J94202 |
| | X12 CrNi25-21 | | 1.4845 | | |
| | | GX40 CrNiSi 25-20 | 1.4848 | HK40 | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 |
| 2 and 10 kg tube | X | X | X | X |

Other sizes and packaging on request

# Lincoln MIG 308LSi

## Stainless steel solid wire

### Classification

AWS A5.9 : ER308LSi
ISO 14343-A : G 19 9 Lsi

### General description

**Solid wire with extra low carbon for welding austenitic CrNi-steels**
**With increased silicon for improved wettability**

### Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.7 | 0.8 | 20 | 10 | 0.2 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 420 | 570 | 45 | 85 | 55 |

### Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNi19 11 | | 1.4306 | (TP)304 L | S30403 |
| | | | | CF-3 | J92500 |
| | X2CrNiN18 10 | | 1.4311 | (TP)304LN | S30453 |
| | | | | 302, 304 | S30400 |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4CrNi18 10 | | 1.4301 | (TP)304 | S30409 |
| | | GX5CrNi19 10 | 1.4308 | CF-8 | J92600 |
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi18 10 | | 1.4541 | (TP)321 | S32100 |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18 10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19 10 | 1.4552 | CF-8C | J92710 |

### Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

# Lincoln TIG 308LSi

## Stainless steel solid rod

### Classification

AWS A5.9 : ER308LSi
ISO 14343-A : W 19 9 LSi

### General description

**Solid rod with extra low carbon for welding austenitic CrNi-steels**
**With increased silicon for improved wettability**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.7 | 0.8 | 20 | 10 | 0.2 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 390 | 590 | 36 | 120 | 50 |

### Materials to be welded

| Steel grades | EN 10088-1/-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNi19 11 | | 1.4306 | (TP)304 L | S30403 |
| | | | | CF-3 | J92500 |
| | X2CrNiN18 10 | | 1.4311 | (TP)304LN | S30453 |
| | | | | 302, 304 | S30400 |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4CrNi18 10 | | 1.4301 | (TP)304 | S30409 |
| | | GX5CrNi19 10 | 1.4308 | CF-8 | J92600 |
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi18 10 | | 1.4541 | (TP)321 | S32100 |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18 10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19 10 | 1.4552 | CF-8C | J92710 |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|---|
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

# Lincoln TIG 308L

## Stainless steel solid rod

### Classification

AWS A5.9 : ER308L
ISO 14343-A : W 19 9 L

### General description

**Solid rod with extra low carbon for welding austenitic CrNi-steels**
**High resistance to intergranular corrosion and oxidizing environments**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Chemical composition (w%),Typical, rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.5 | 20 | 10 | 0.2 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 390 | 590 | 35 | 120 | 50 |

### Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNi19 11 | | 1.4306 | (TP)304 L | S30403 |
| | | | | CF-3 | J92500 |
| | X2CrNiN18 10 | | 1.4311 | (TP)304LN | S30453 |
| | | | | 302, 304 | S30400 |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4CrNi18 10 | | 1.4301 | (TP)304 | S30409 |
| | | GX5CrNi19 10 | 1.4308 | CF-8 | J92600 |
| **Ti-,Nb stabilized** | | | | | |
| | X6CrNiTi18 10 | | 1.4541 | (TP)321 | S32100/ |
| | | | | (TP)321H | S32109 |
| | X6 CrNiNb 18 10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19 10 | 1.4552 | CF-8C | J92710 |

### Packaging and available sizes

| | Diameter (mm) | | | | |
|---|---|---|---|---|---|
| Unit type | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

Lincoln TIG 308L: rev. EN 02

# Lincoln MIG 316LSi

## Stainless steel solid wire

### Classification

AWS A5.9 : ER316LSi
ISO 14343-A : G 19 12 3 Lsi

### General description

**Solid wire with extra low carbon for welding stainless CrNiMo-steels**
**With increased silicon for improved wettability**

### Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.8 | 18.5 | 12.2 | 2.5 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | -120°C | -196°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 420 | 620 | 35 | 150 | 70 | 40 |

### Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNiMo17 12 2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2CrNiMo18 14 3 | | 1.4435 | (TP)316L | S31603 |
| | X2CrNiMoN 17 11 2 | | 1.4406 | (TP)316LN | S31653 |
| | X2CrNiMoN 17 13 3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17 12 2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17 13 3 | | 1.4436 | | |
| | GX5 CrNiMo 19-11 | | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17 12 2 | | 1.4571 | 316 Ti | S31635 |
| | X6 CrNiMoNb 17 12 2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |

### Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

Lincoln MIG 316LSi: rev. EN 02

# Lincoln TIG 316LSi

## Stainless steel solid rod

### Classification

AWS A5.9 : ER316LSi
ISO 14343-A : W 19 12 3 LSi

### General description

**Solid rod with extra low carbon for welding stainless CrNiMo-steels**
**With increased silicon for improved wettability**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.8 | 18.5 | 12.2 | 2.5 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 620 | 35 | 100 | 45 |

### Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNiMo17 12 2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2CrNiMo18 14 3 | | 1.4435 | (TP)316L | S31603 |
| | X2CrNiMoN 17 11 2 | | 1.4406 | (TP)316LN | S31653 |
| | X2CrNiMoN 17 13 3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17 12 2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17 13 3 | | 1.4436 | | |
| | GX5 CrNiMo 19-11 | | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17 12 2 | | 1.4571 | 316 Ti | S31635 |
| | X6 CrNiMoNb 17 12 2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|---|
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

Lincoln TIG 316LSi: rev. EN 02

# Lincoln TIG 316L

## Stainless steel solid rod

### Classification

AWS A5.9 : ER316L
ISO 14343-A : W 19 12 3 L

### General description

**Solid rod with extra low carbon for welding austenitic CrNiMo-steels**
**High resistance to intergranular corrosion and general corrosion conditions**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Chemical composition (w%),Typical, rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.5 | 0.5 | 18.5 | 12 | 2.7 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | -120°C | -196°C |
|---|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 620 | 35 | 100 | 80 | 40 |

### Materials to be welded

| Steel grades | EN 10088-11-2 | EN 102 13-4 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|---|
| **Extra low carbon (C < 0.03%)** | | | | | |
| | X2CrNiMo17 12 2 | | 1.4404 | (TP)316L | S31603 |
| | | | | CF-3M | J92800 |
| | X2CrNiMo18 14 3 | | 1.4435 | (TP)316L | S31603 |
| | X2CrNiMoN 17 11 2 | | 1.4406 | (TP)316LN | S31653 |
| | X2CrNiMoN 17 13 3 | | 1.4429 | | |
| **Medium carbon (C > 0.03%)** | | | | | |
| | X4 CrNiMo 17 12 2 | | 1.4401 | (TP)316 | S31600 |
| | X4 CrNiMo 17 13 3 | | 1.4436 | | |
| | | GX5 CrNiMo 19-11 | 1.4408 | CF 8M | J92900 |
| **Ti-,Nb stabilized** | | | | | |
| | X6 CrNiMoTi 17 12 2 | | 1.4571 | 316 Ti | S31635 |
| | X6 CrNiMoNb 17 12 2 | | 1.4580 | 316 Cb | S31640 |
| | X6 CrNiNb 18-10 | | 1.4550 | (TP)347 | S34700 |
| | | GX5 CrNiNb 19-10 | 1.4552 | CF-8C | J92710 |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|---|
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

Lincoln TIG 316L: rev. EN 02

# Lincoln MIG 309LSi

## Stainless steel solid wire

### Classification

AWS A5.9 : ER309LSi
ISO 14343-A : G 23 12 Lsi

### General description

**Solid wire for welding stainless steel to carbon steel**
**With high silicon for improved wettability**

### Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.8 | 0.8 | 23.3 | 13.8 | 0.14 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -20°C | Impact ISO-V(J) -120°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 430 | 565 | 35 | 96 | 65 |

### Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|
| **Corrosion resistant cladsteels** | | | | |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X4 CrNi 18-10 | 1.4301 | (TP)304 | S30400 |

Dissimilar metals (mild and low alloyed steel to stainless steel)
Build-up welding on mild and low alloyed steel

### Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 15 kg spool BS300 | X | X | X | X |

Other sizes and packaging on request

# Lincoln TIG 309LSi

## Stainless steel solid rod

### Classification

AWS A5.9 : ER309LSi
ISO 14343-A : W 23 12 LSi

### General description

**Solid rod for welding stainless steel to carbon steel**
**With high silicon for improved wettability**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.6 | 0.8 | 23.5 | 13.0 | 0.20 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) -46°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 600 | 35 | 65 |

### Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|
| **Corrosion resistant cladsteels** | | | | |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X4 CrNi 18-10 | 1.4301 | (TP)304 | S30400 |

Dissimilar metals (mild and low alloyed steel to stainless steel)
Build-up welding on mild and low alloyed steel

### Packaging and available sizes

| Unit type | Diameter (mm) | | | | |
|---|---|---|---|---|---|
| | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

# Lincoln TIG 309L

## Stainless steel solid rod

### Classification

AWS A5.9 : ER309L
ISO 14343-A : W 23 12 L

### General description

**Solid rod for welding stainless steel to carbon steel**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Chemical composition (w%),Typical, rod

| C | Mn | Si | Cr | Ni | Mo |
|---|---|---|---|---|---|
| 0.010 | 1.65 | 0.35 | 24 | 13 | 0.05 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 390 | 600 | 35 |

### Materials to be welded

| Steel grades | EN 10088-1/-2 | W.Nr. | ASTM/ACI A240/A312/A351 | UNS |
|---|---|---|---|---|
| **Corrosion resistant cladsteels** | | | | |
| | X2 CrNiN 18-10 | 1.4311 | (TP)304LN | S30453 |
| | X2 CrNi 19-11 | 1.4306 | (TP)304L | S30403 |
| | | | CF-3 | J92500 |
| | X4 CrNi 18-10 | 1.4301 | (TP)304 | S30400 |

Dissimilar metals (mild and low alloyed steel to stainless steel)
Build-up welding on mild and low alloyed steel

### Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.6 | 2.0 | 2.4 |
| 5 kg tube | X | X | X |

Other sizes and packaging on request

# Lincoln MIG 307

## Stainless steel solid wire

### Classification

AWS A5.9 : ER307*
ISO 14343-A : G 18 8 Mn

* Nearest classification

### General description

**Solid wire for welding steel with difficult weldability**
**Often used as a buffer layer in hardfacing applications**

### Shielding gases (acc. ISO 14175)

M12 Mixed gas Ar+ >0-5% $CO_2$
M13 Mixed gas Ar+ >0-3% 02

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Cr | Ni |
|---|---|---|---|---|
| 0.08 | 7.1 | 0.8 | 19.2 | 9 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -120°C |
|---|---|---|---|---|---|---|---|
| Typical values | M12 | AW | 400 | 630 | 40 | 80 | 50 |

### Materials to be welded

Various steel grades, such as:
- Armour plate
- Hardenable steels including steels difficult to weld
- Non-magnetic steels
- Work hardening austenitic manganese steels
- Dissimilar joints (CMn-steels to stainless steels)

### Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool BS300 | X | X |
| 200kg Accutrak® drum | X | X |

Other sizes and packaging on request

# LNM NiCro 31/27

## Ni-base solid wire

### Classification

AWS A5.9 : ER383
ISO 14343-A : G 27 31 4 Cu L

### General description

**Solid wire for welding of Cu-alloyed NiCrMo-steels**
**Excellent resistance to general corrosion, pitting and stress corrosion in acid and alkaline environments**
**Especially for applications in phosphoric and sulphuric acid**

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Mo | Cu |
|---|---|---|---|---|---|---|
| 0.01 | 1.5 | 0.2 | 31.0 | 27.0 | 3.5 | 1.0 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 610 | 35 | 100 | 50 |

### Materials to be welded

| Steel grades | EN 10088-1/2 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|
| **Copper alloyed CrNiMo and NiCrMo-steels** | | | | |
| | X1NiCrMoCu 31-27-4 | 1.4563 | | N08028 |
| | X1NiCrMoCu 25-20-5 | 1.4539 | Alloy 904L | N08904 |
| | DIN 17744 | | | |
| | NiCr 21 Mo | 2.4858 | Alloy 825 | N08825 |
| | NiCr 21 Mo 6Cu | 2.6410 | Alloy 825 h Mo | N08821 |
| | X3NiCrMoTi 27-23 | 1.4503 | | |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.2 |
|---|---|
| 15 kg spool B300 | X |

Other sizes and packaging on request

# LNT NiCro 31/27

## Ni-base solid rod

### Classification

AWS A5.9 : ER383
ISO 14343-A : W 27 31 4 Cu L

### General description

**Solid rod for welding of Cu-alloyed NiCrMo-steels**
**Excellent resistance to general corrosion, pitting and stress corrosion in acid and alkaline environments**
**Especially for applications in phosphoric and sulphuric acid**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Mo | Cu |
|---|---|---|---|---|---|---|
| 0.01 | 1.5 | 0.2 | 31.0 | 27.0 | 3.5 | 1.0 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 600 | 35 | 120 | 80 |

### Materials to be welded

| Steel grades | EN 10088-1/2 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|
| **Copper alloyed CrNiMo and NiCrMo-steels** | | | | |
| | X1NiCrMoCu 31-27-4 | 1.4563 | | N08028 |
| | X1NiCrMoCu 25-20-5 | 1.4539 | Alloy 904L | N08904 |
| | DIN 17744 | | | |
| | NiCr 21 Mo | 2.4858 | Alloy 825 | N08825 |
| | NiCr 21 Mo 6Cu | 2.6410 | Alloy 825 h Mo | N08821 |
| | X3NiCrMoTi 27-23 | 1.4503 | | |

### Packaging and available sizes

| Unit type | Diameter (mm) 2.0 | 2.4 |
|---|---|---|
| 2 kg tube | X | X |

Other sizes and packaging on request

# LNM NiCro 60/20

## Ni-base solid wire

### Classification

AWS A5.14/A5.14M : ERNiCrMo-3
ISO 18274 : S Ni 6625 (NiCr22Mo9Nb)

### General description

**Solid wire for welding of nickel alloys**
**Extreme resistance to various corrosion forms**
**High chromium and molybdenum content**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Mo | Nb | Fe |
|---|---|---|---|---|---|---|---|
| 0.02 | 0.06 | 0.07 | 64 | 21.9 | 9 | 3.5 | 0.4 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 520 | 770 | 34 | 80 | 60 |

### Materials to be welded

| Steel grades | DIN/EN | W.Nr | ASTM/ACI | UNS |
|---|---|---|---|---|
| **NiCrMo-steel type alloy 625 and welding dissimilar high NiCrMo-steels for corrosion and heat resisting purposes** | | | | |
| | X1NiCrMoCuN25-20-6 | 1.4529 | Alloy 925 | N08925 |
| | X1NiCrMoCu25-20-5 | 1.4539 | Alloy 904L | N08904 |
| | X1CrNiMoCuN20-18-7 | 1.4547 | Alloy 254 | S31254 |
| | X2NiCrAlTi32-20 | 1.4558 | Alloy 800L | N08800 |
| | G-X10NiCrNb32-20 | 1.4859 | | |
| | X10NiCrAlTi32-20 | 1.4876 | Alloy 800/800H | N08800/-10 |
| | NiCr22Mo6Cu | 2.4618 | Alloy G | N06007 |
| | NiCr22Mo7Cu | 2.4619 | Alloy G-3 | N06985 |
| | NiCr21Mo6Cu | 2.4641 | Alloy 825hMo | N08821 |
| | NiCr20CuMo | 2.4660 | Alloy 20 | N08020 |
| | NiCr15Fe | 2.4816 | B168-Alloy 600 | N06600 |
| | NiCr22Mo9Nb | 2.4856 | B443-Alloy 625 | N06625 |
| | NiCr21Mo | 2.4858 | B424-Alloy 825 | N08825 |
| | NiCr20Ti | 2.4951 | Alloy 75 | N06075 |
| | NiCr20TiAl | 2.4952 | Alloy 80A | N07080 |
| **Low alloyed steels** | | | | |
| | 10Ni14 (3.5% Ni) | 1.5637 | ASTM A333 Grade 3 | - |
| | 12Ni19, X12Ni5 | 1.5680 | - | K41583 |
| **9% Ni-steel for LNG storage tanks** | | | | |
| | X8Ni9 | 1.5662 | A353/A353M | - |
| | X8Ni9 / 8%Ni | 1.5662 | A553/A553M Type I/II | - / K71340 |

### Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 |
|---|---|---|---|
| 5 kg plastic spool S200 | | X | |
| 15 kg spool BS300 | X | X | X |

Other sizes and packaging on request

LNM NiCro 60/20: rev. EN 21

# LNT NiCro 60/20

## Ni-base solid rod

### Classification

AWS A5.14/A5.14M : ERNiCrMo-3
ISO 18274 : S Ni 6625 (NiCr22Mo9Nb)

### General description

**Solid rod for welding of nickel alloys**
**Extreme resistance to various corrosion forms**
**High chromium and molybdenum content**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

### Approvals

TÜV
+

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Mo | Nb | Fe |
|---|---|---|---|---|---|---|---|
| 0.02 | 0.06 | 0.07 | 64 | 21.9 | 9 | 3.5 | 0.4 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 520 | 800 | 35 | 130 | 100 |

### Materials to be welded

| Steel grades | DIN/EN | W.Nr | ASTM/ACI | UNS |
|---|---|---|---|---|
| **NiCrMo-steel type alloy 625 and welding dissimilar high NiCrMo-steels for corrosion and heat resisting purposes** | | | | |
| | X1NiCrMoCuN25-20-6 | 1.4529 | Alloy 925 | N08925 |
| | X1NiCrMoCu25-20-5 | 1.4539 | Alloy 904L | N08904 |
| | X1CrNiMoCuN20-18-7 | 1.4547 | Alloy 254 | S31254 |
| | X2NiCrAlTi32-20 | 1.4558 | Alloy 800L | N08800 |
| | G-X10NiCrNb32-20 | 1.4859 | | |
| | X10NiCrAlTi32-20 | 1.4876 | Alloy 800/800H | N08800/-10 |
| | NiCr22Mo6Cu | 2.4618 | Alloy G | N06007 |
| | NiCr22Mo7Cu | 2.4619 | Alloy G-3 | N06985 |
| | NiCr21Mo6Cu | 2.4641 | Alloy 825hMo | N08821 |
| | NiCr20CuMo | 2.4660 | Alloy 20 | N08020 |
| | NiCr15Fe | 2.4816 | B168-Alloy 600 | N06600 |
| | NiCr22Mo9Nb | 2.4856 | B443-Alloy 625 | N06625 |
| | NiCr21Mo | 2.4858 | B424-Alloy 825 | N08825 |
| | NiCr20Ti | 2.4951 | Alloy 75 | N06075 |
| | NiCr20TiAl | 2.4952 | Alloy 80A | N07080 |
| **Low alloyed steels** | | | | |
| | 10Ni14 (3.5% Ni) | 1.5637 | ASTM A333 Grade 3 | - |
| | 12Ni19, X12Ni5 | 1.5680 | - | K41583 |
| **9% Ni-steel for LNG storage tanks** | | | | |
| | X8Ni9 | 1.5662 | A353/A353M | - |
| | X8Ni9 / 8%Ni | 1.5662 | A553/A553M Type I/II | - / K71340 |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|
| 2 and 10 kg tube | X | X | X | X |

Other sizes and packaging on request

**LNT NiCro 60/20: rev. EN 21**

# LNM NiCro 70/19

## Ni-base solid wire

### Classification

AWS A5.14/A5.14M : ERNiCr-3
ISO 18274 : S Ni 6082 (NiCr20Mn3Nb)

### General description

**Solid wire for welding nickel based alloys, dissimilar metals and cladding**
**High resistance to oxidation and high impact toughness at low temperature**

### Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

### Approvals

| TÜV |
|---|
| + |

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Nb | Fe | Cu |
|---|---|---|---|---|---|---|---|
| 0.03 | 3.1 | 0.08 | 72.5 | 20.5 | 2.6 | 0.8 | 0.01 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 390 | 640 | 35 | 150 | 50 |

### Materials to be welded

| Steel grades | BS3076 | DIN 17744/17465 SEW 595 | W.Nr. | ASTM/ACI B366 | UNS |
|---|---|---|---|---|---|
| **Ni-base high Cr alloyed steel for low and high corrosion searching application** | | | | | |
| | Na 14 | NiCr15Fe | 2.4816 | B168-Alloy 600 | N06600 |
| | | LC-NiCr15Fe | 2.4817 | Alloy 600L | N06600 |
| | | NiCr20Ti | 2.4951 | Alloy 75 | |
| | | NiCr20TiA1 | 2.4952 | Alloy 80A | N07080 |
| | Na 15 | X10NiCrAlTi32 20 | 1.4876 | Alloy 800/800H | N0800/10 |
| | | NiCr23Fe | 2.4851 | Alloy 601(H) | N06601 |
| | Na 17 | X12NiCrSi36 16 | 1.4864 | 330 | N08330 |
| | | G-X40NiCrNb35 25 | 1.4852 | | |
| | | G-X40NiCrSi35 25 | 1.4857 | HP | |

Un- and low alloyed heat and creep resistant steel to stainless steel

### Application advice

Limit heat-input (HI<1.5kJ/mm) and interpass temperature (Ti<150°C)

### Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool BS300 | X | X |

Other sizes and packaging on request

**LNM NiCro 70/19: rev. EN 21**

# LNT NiCro 70/19

## Ni-base solid rod

### Classification

AWS A5.14/A5.14M : ERNiCr-3
ISO 18274 : S Ni 6082 (NiCr20Mn3Nb)

### General description

**Solid rod for welding nickel based alloys, dissimilar metals and cladding**
**High resistance to oxidation and high impact toughness at low temperature**

### Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

### Approvals

| TÜV |
|---|
| + |

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Nb | Fe | Cu |
|---|---|---|---|---|---|---|---|
| 0.03 | 3.1 | 0.08 | 72.5 | 20.5 | 2.6 | 0.8 | 0.01 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 680 | 40 | 150 | 120 |

### Materials to be welded

| Steel grades | BS3076 | DIN 17744/17465 SEW 595 | W.Nr. | ASTM/ACI B366 | UNS |
|---|---|---|---|---|---|
| **Ni-base high Cr alloyed steel for low and high corrosion searching application** | | | | | |
| | Na 14 | NiCr15Fe | 2.4816 | B168-Alloy 600 | N06600 |
| | | LC-NiCr15Fe | 2.4817 | Alloy 600L | N06600 |
| | | NiCr20Ti | 2.4951 | Alloy 75 | |
| | | NiCr20TiA1 | 2.4952 | Alloy 80A | N07080 |
| | Na 15 | X10NiCrAlTi32 20 | 1.4876 | Alloy 800/800H | N0800/10 |
| | | NiCr23Fe | 2.4851 | Alloy 601(H) | N06601 |
| | Na 17 | X12NiCrSi36 16 | 1.4864 | 330 | N08330 |
| | | G-X40NiCrNb35 25 | 1.4852 | | |
| | | G-X40NiCrSi35 25 | 1.4857 | HP | |

Un- and low alloyed heat and creep resistant steel to stainless steel

### Application advice

Limit heat-input (HI<1.5kJ/mm) and interpass temperature (Ti<150°C)

### Packaging and available sizes

| Unit type | Diameter (mm) 2.0 | 2.4 | 3.2 |
|---|---|---|---|
| 2 and 10 kg tube | X | X | X |

Other sizes and packaging on request

# LNT NiCroMo 59/23

## Ni-base solid rod

### Classification

AWS A5.14/A5.14M : ERNiCrMo-13
ISO 18274 : S Ni 6059 (NiCr23Mo16)

### General description

**Solid rod for welding nickel base alloys with high CrMo content**
**Excellent resistance against pitting, stress, and crevice corrosion in acid sulfur phosphorus and chlorine surroundings**
**Suitable for dissimilar joints**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

### Approvals

| TÜV |
|---|
| + |

### Chemical composition (w%),Typical, rod

| C | Mn | Si | Ni | Cr | Mo | Fe | Al |
|---|---|---|---|---|---|---|---|
| 0.015 | 0.5 | 0.06 | 59 | 23 | 16 | 1.5 | 0.4 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 720 | 30 |

### Materials to be welded

| Steel grades | DIN 17744 | W.Nr. | ASTM / ACI | UNS | |
|---|---|---|---|---|---|
| **Ni-base high CrMo steel** | | | | | |
| | NiCr23Mo16 | 2.4605 | | N06059 | |
| | NiMo16Cr16Ti | 2.4610 | C-4 | N06455 | |
| | NiMo16Cr15Ti | 2.4819 | C-276 | N10276 | |
| | NiCr21Mo 14W | 2.4602 | C-22 | N06022 | |
| | NiCr22Mo 9Nb | 2.4856 | 625 | N06625 | |
| **High Mo stainless steel for high corrosion environments** | | | | | |
| | EN 10088-1/-2 | | | | |
| | X1 NiCrMoCuN25-20-7 | | 1.4529 | 904hMo | N08925 |
| | X1 CrNiMoCuN20-18-7 | | 1.4547 | S31254 | |

### Packaging and available sizes

| Unit type | Diameter (mm) 2.0 |
|---|---|
| 2 kg tube | X |

Other sizes and packaging on request

# LNM NiCroMo 60/16

## Ni-base solid wire

### Classification

AWS A5.14/A5.14M : ERNiCrMo-4
ISO 18274 : S Ni 6276 (NiCr15Mo16Fe6W4)

### General description

**Solid wire for welding CrMoW-alloyed nickel alloys (e.g. Alloy C276)**
**Depending on the corrosion requirements also applicable for welding C-22 and C-4**
**Extreme resistance to corrosion environments containing sulphuric acid and chlorides**
**Applicable for surfacing in high temperature applications (up to 1200°C)**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Mo | W | Fe |
|---|---|---|---|---|---|---|---|
| 0.006 | 0.5 | 0.04 | 57.8 | 15.5 | 16.0 | 3.6 | 5.8 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield Strength ($N/mm^2$) | Tensile Strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20 °C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 400 | 700 | 25 | 90 |

### Materials to be welded

| Steel grades | DIN/EN | Mat. Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|
| **Ni Base high CrMo steel for high corrosion environments** | | | | |
| | NiMo 16Cr15W | 2.4819 | C-276 | N10276 |
| | NiCr21Mo14W | 2.4602 | C-22 | N06022 |
| | NiMo 16Cr16Ti | 2.4610 | C-4 | N06455 |

- LNT/LNM NiCroMo 60/16 is developed for welding C-276 material
- Can also be applied for welding C-22 and C-4, depending on the corrosion requirements

### Packaging and available sizes

| Unit type | Diameter (mm) | |
|---|---|---|
| | 1.0 | 1.2 |
| 15 kg spool B300 | X | X |

# LNT NiCroMo 60/16

## Ni-base solid rod

### Classification

AWS A5.14/A5.14M : ERNiCrMo-4
ISO 18274 : S Ni 6276 (NiCr15Mo16Fe6W4)

### General description

**Solid rod for welding CrMoW-alloyed nickel alloys (e.g. Alloy C276)**
**Depending on the corrosion requirements also applicable for welding C-22 and C-4**
**Extreme resistance to corrosion environments containing sulphuric acid and chlorides**
**Applicable for surfacing in high temperature applications (up to 1200°C)**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cr | Mo | W | Fe |
|---|---|---|---|---|---|---|---|
| 0.006 | 0.5 | 0.04 | 57.8 | 15.5 | 16.0 | 3.6 | 5.8 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield Strength ($N/mm^2$) | Tensile Strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20 °C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 410 | 720 | 27 | 100 |

### Materials to be welded

| Steel grades | DIN/EN | Mat. Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|
| **Ni Base high CrMo steel for high corrosion environments** | | | | |
| | NiMo 16Cr15W | 2.4819 | C-276 | N10276 |
| | NiCr21Mo14W | 2.4602 | C-22 | N06022 |
| | NiMo 16Cr16Ti | 2.4610 | C-4 | N06455 |

- LNT/LNM NiCroMo 60/16 is developed for welding C-276 material
- Can also be applied for welding C-22 and C-4, depending on the corrosion requirements

### Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 |
| 2 kg tube | X | X | X | X |

**LNT NiCroMo 60/16: rev. EN 21**

# LNM NiCu 70/30

## Ni-base solid wire

### Classification

AWS A5.14/A5.14M : ERNiCu-7
ISO 18274 : S Ni 4060 (NiCu30MnTi)

### General description

**Solid wire for welding Monel and NiCu-alloys to mild and low-alloyed steels**
**High resistance to seawater corrosion**

### Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

### Approvals

| TÜV |
|---|
| + |

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cu | Fe | Ti |
|---|---|---|---|---|---|---|
| 0.10 | 3.3 | 0.6 | 64 | 29 | 1.5 | 2.4 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 300 | 500 | 35 | 150 |

### Materials to be welded

| Steel grades | BS3076 | DIN 17743 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| | NA 13 | NiCu30Fe | 2.4360 | Monel 400 | N04400 |
| | | G-NiCu30Nb | 2.4365 | | |
| | NA 18 | NiCu30Al | 2.4375 | Monel K500 | N05500 |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 15 kg spool BS300 | X | X |

Other sizes and packaging on request

# LNT NiCu 70/30

## Ni-base solid rod

### Classification

AWS A5.14/A5.14M : ERNiCu-7
ISO 18274 : S Ni 4060 (NiCu30MnTi)

### General description

**Solid rod for welding Monel and NiCu-alloys to mild and low-alloyed steels**
**High resistance to seawater corrosion**

### Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

### Approvals

| TÜV |
|---|
| + |

### Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Cu | Fe | Ti |
|---|---|---|---|---|---|---|
| 0.06 | 3.5 | 0.5 | 65 | 30 | 1.1 | 2.0 |

### Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 350 | 550 | 40 | 160 | 140 |

### Materials to be welded

| Steel grades | BS3076 | DIN 17743 | W.Nr. | ASTM/ACI | UNS |
|---|---|---|---|---|---|
| | NA 13 | NiCu30Fe | 2.4360 | Monel 400 | N04400 |
| | | G-NiCu30Nb | 2.4365 | | |
| | NA 18 | NiCu30Al | 2.4375 | Monel K500 | N05500 |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 |
|---|---|---|---|---|
| 2 and 10 kg tube | X | X | X | X |

Other sizes and packaging on request

# Ni-base solid wire

## Classification

AWS A5.14/A5.14M : ERNi1
ISO 18274 : S Ni 2061 (NiTi3)

## General description

**Solid wire for welding pure nickel and nickel alloys and joining these materials with unalloyed/low-alloyed steel**
**Suitable for surfacing carbon steels**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Ti | Fe |
|---|---|---|---|---|---|
| 0.02 | 0.4 | 0.2 | 96.2 | 3.1 | 0.06 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 250 | 460 | 30 | 120 |

## Materials to be welded

| DIN-classification | W.Nr. | ASTM/ACI |
|---|---|---|
| **Ni 99.6** | 2.4060 | |
| **Ni 99.8** | 2.4050 | |
| **Ni 99.6Si** | 2.4056 | |
| **Ni 99.4Fe** | 2.4062 | |
| **Ni 99.2** | 2.4066 | Alloy 200 |
| **LC-Ni 99** | 2.4068 | Alloy 201 |
| **LC-Ni 99.6** | 2.4061 | Alloy 205 |
| **NiMn 10** | 2.4108 | |
| **NiMn 5** | 2.4116 | |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.2 |
|---|---|
| 15 kg spool BS300 | X |

Other sizes and packaging on request

# Ni-base solid rod

## Classification

AWS A5.14/A5.14M : ERNi1
ISO 18274 : S Ni 2061 (NiTi3)

## General description

**Solid rod for welding pure nickel and nickel alloys and joining these materials with unalloyed/low-alloyed steel**
**Suitable for surfacing carbon steels**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |



## Chemical composition (w%) typical wire / rod

| C | Mn | Si | Ni | Ti | Fe |
|---|---|---|---|---|---|
| 0.03 | 0.5 | 0.4 | bal. | 2.8 | 0.06 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength (N/mm²) | Tensile strength (N/mm²) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 250 | 460 | 30 | 120 |

## Materials to be welded

| DIN-classification | W.Nr. | ASTM/ACI |
|---|---|---|
| **Ni 99.6** | 2.4060 | |
| **Ni 99.8** | 2.4050 | |
| **Ni 99.6Si** | 2.4056 | |
| **Ni 99.4Fe** | 2.4062 | |
| **Ni 99.2** | 2.4066 | Alloy 200 |
| **LC-Ni 99** | 2.4068 | Alloy 201 |
| **LC-Ni 99.6** | 2.4061 | Alloy 205 |
| **NiMn 10** | 2.4108 | |
| **NiMn 5** | 2.4116 | |

## Packaging and available sizes

| Unit type | Diameter (mm) | |
|---|---|---|
| | 2.0 | 2.4 |
| 2 and 10 kg tube | X | X |

Other sizes and packaging on request

# Ni-base solid wire

## Classification

| | |
|---|---|
| AWS A5.15 | : ENiFe-CI |
| ISO 1071 | : S NiFe-CI |

## General description

**Solid wire for butt welds and hardfacing application in cast iron**
**Suitable for dissimilar joints cast iron/steel**
**Hardness approximately 200HB**
**Optimal welding characteristics**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

## Chemical composition (w%) typical wire

| C | Mn | Si | Ni | Fe | Cu |
|---|---|---|---|---|---|
| 0.05 | 0.83 | 0.14 | 54.8 | 43.8 | 0.4 |

## Mechanical properties, all weld metal

| | Typical hardness values |
|---|---|
| 2 Layers, AW | approx. 200 HB |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.2 |
|---|---|
| 15 kg spool BS300 | X |

Other sizes and packaging on request

# Cu-base solid wire

## Classification

AWS A5.7 : ERCuAl-A1
EN 14640 : S Cu 6100 (CuAl8)

## General description

**Solid wire for welding copper-aluminium alloys, as aluminiumbronze**
**High resistance to corrosion and wear**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He



## Chemical composition (w%) typical wire

| Cu | Al | Mn |
|---|---|---|
| bal. | 8 | 0.3 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Hardness HB |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 185 | 430 | 30 | 95 |

## Materials to be welded

| Steel grades | Code | Type | W.Nr. |
|---|---|---|---|
| **Copper-aluminium wrought alloys** | | | |
| | DIN 17665 | CuAl5As | 2.0918 |
| | | CuA18 | 2.0920 |
| **Copper-aluminium cast alloys** | | | |
| | DIN 1714 | G-CuAl8Mn | 2.0962 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | | |
|---|---|---|---|---|---|
| | 0.8 | 1.0 | 1.2 | 1.6 | 2.0 |
| 12 kg spool B300 | X | X | X | X | X |

Other sizes and packaging on request

# Cu-base solid rod

## Classification

AWS A5.7 : ERCuAl-A1
EN 14640 : S Cu 6100 (CuAl8)

## General description

**Solid rod for welding copper-aluminium alloys, as aluminiumbronze**
**High resistance to corrosion and wear**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Chemical composition (w%) typical wire

| Cu | Al | Mn |
|---|---|---|
| bal. | 8 | 0.3 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Hardness HB |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 185 | 430 | 30 | 95 |

## Materials to be welded

| Steel grades | Code | Type | W.Nr. |
|---|---|---|---|
| **Copper-aluminium wrought alloys** | | | |
| | DIN 17665 | CuAl5As | 2.0918 |
| | | CuA18 | 2.0920 |
| **Copper-aluminium cast alloys** | | | |
| | DIN 1714 | G-CuAl8Mn | 2.0962 |

## Packaging and available sizes

| Unit type | Diameter (mm) 2.0 |
|---|---|
| 2 kg tube | X |

Other sizes and packaging on request

# Cu-base solid wire

## Classification

AWS A5.7 : ERCuNi
EN 14640 : S Cu 7158 (CuNi30)

## General description

**Solid wire for welding copper-nickel alloys containing 10-30%Ni**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He



## Chemical composition (w%) typical wire / rod

| Cu | Mn | Ni |
|---|---|---|
| bal. | 0.8 | 31 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Hardness HB |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 220 | 380 | 30 | 70 |

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | UNS |
|---|---|---|---|---|
| **Copper-nickel wrought alloys** | | | | |
| | DIN 17664 | CuNi10Fe1Mn | 2.0872 | C 70600 |
| | | CuNi30Mn1Fe | 2.0882 | C 71500 |
| | | CuNi30Fe2Mn2 | 2.0883 | C 71600 |
| **Copper-nickel cast alloys** | | | | |
| | DIN 17658 | G-CuNi10 | 2.0815 | |
| | | G-CuNi30 | 2.0835 | |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.2 |
|---|---|---|
| 12 kg spool B300 | X | X |

Other sizes and packaging on request

# Cu-base solid rod

## Classification

AWS A5.7 : ERCuNi
EN 14640 : S Cu 7158 (CuNi30)

## General description

**Solid rod for welding copper-nickel alloys containing 10-30%Ni**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| Cu | Mn | Ni | Si | Ti | Fe |
|---|---|---|---|---|---|
| bal. | 0.75 | 30 | 0.05 | 0.35 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Hardness HB |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 250 | 400 | 30 | 100 | 70 |

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | UNS |
|---|---|---|---|---|
| **Copper-nickel wrought alloys** | | | | |
| | DIN 17664 | CuNi10Fe1Mn | 2.0872 | C 70600 |
| | | CuNi30Mn1Fe | 2.0882 | C 71500 |
| | | CuNi30Fe2Mn2 | 2.0883 | C 71600 |
| **Copper-nickel cast alloys** | | | | |
| | DIN 17658 | G-CuNi10 | 2.0815 | |
| | | G-CuNi30 | 2.0835 | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 |
| 2 kg tube | X | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

LNT CuNi30: rev. EN 21

# Cu-base solid wire

## Classification

AWS A5.7 : ERCu
EN 14640 : S Cu 1898 (CuSn1)

## General description

**Solid wire for GMA-welding of copper**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Chemical composition (w%) typical wire

| Cu | Mn | Si | Sn | Ni |
|---|---|---|---|---|
| bal. | 0.2 | 0.3 | 0.8 | 0.1 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Hardness HB |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 220 | 60 | 35 |

## Materials to be welded

| Steel grades | Code | Type | W.Nr. |
|---|---|---|---|
| **Copper** | | | |
| | DIN 1787 | OF-Cu | 2.0040 |
| | | SE-Cu | 2.0070 |
| | | SW-Cu | 2.0076 |
| | | SF-Cu | 2.0090 |
| **Wrought low alloyed copper alloys** | | | |
| | DIN 17666 | CuFe2P | 2.1310 |
| | | CuSP | 2.1498 |
| | | CuTeP | 2.1546 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 |
|---|---|---|
| 12 kg spool B300 | X | X |

Other sizes and packaging on request

LNM CuSn: rev. EN 21

# Cu-base solid rod

## Classification

AWS A5.7 : ERCuSn-A
EN 14640 : S Cu 5180 (CuSn6P)

## General description

**Solid rod for GTA-welding of copper-tin alloys**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Chemical composition (w%),Typical, rod

| Cu | Sn | P |
|---|---|---|
| bal. | 6 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Hardness HB |
|---|---|---|---|---|---|---|---|
| Typical values | I3 | AW | 150 | 260 | 20 | 80 | 75 |

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | |
|---|---|---|---|---|
| **Copper-tin wrought alloys** | | | | |
| | DIN 17662 | CuSn4 | 2.1016 | |
| | | | CuSn6 | 2.1020 |
| | | | CuSn8 | 2.1030 |
| **Copper-tin cast alloys** | | | | |
| | DIN 1705 | G-CuSn2ZnPb | 2.1098 | |
| | | G-CuSn5ZnPb | 2.1096 | |
| | | G-CuSn6ZnNi | 2.1093 | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 2.0 | 2.4 | 3.2 | 4.0 |
| 2 kg tube | X | X | X | X |

Other sizes and packaging on request

# Cu-base solid wire

## Classification

EN 14640 : S Cu 5410 (CuSn12P)

## General description

**Solid wire for GMA-welding of copper-tin and copper-zinc alloy**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |



## Chemical composition (w%) typical wire

| Cu | Sn | P |
|---|---|---|
| bal. | 12 | 0.2 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 250 | 30 |

## Materials to be welded

Copper-tin alloys, e.g. bronze with 10-12% tin
Copper-zinc alloys e.g. brass

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 |
|---|---|
| 12 kg spool B300 | X |

Other sizes and packaging on request

LNM CuSn12: rev. EN 21

# Cu-base solid rod

## Classification

AWS A5.7 : ERCuSi-A
EN 14640 : S Cu 6560 (CuSi3Mn1)

## General description

**Solid rod for GTA-welding of low-alloyed copper grades**
**High temperature and corrosion resistant**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Chemical composition (w%),Typical, rod

| Cu | Mn | Si | Sn | Zn |
|---|---|---|---|---|
| bal. | 1.0 | 3.0 | 0.1 | 0.1 |

## Mechanical properties, typical, all weld metal

| | Shielding gas | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Hardness HB |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 120 | 350 | 40 | 60 | 95 |

## Materials to be welded

Copper, low alloyed copper and copper-zinc alloys

## Packaging and available sizes

| Unit type | Diameter (mm) | |
|---|---|---|
| | 2.0 | 2.4 |
| 2 kg tube | X | X |

Other sizes and packaging on request

GMAW/GTAW

LNT CuSi3: rev. EN 21

# Aluminium wire

## Classification

AWS A5.10 : ER4043
ISO 18273 : S Al 4043 A (AlSi5)

## General description

**Solid wire for welding of aluminium-silicium alloys**
**Excellent feedability and very consistent welding performance**
**Tight and stable arc**
**Also available in 120 kg AccuPak®, that increases productivity by reducing time to change spools**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Fe | Zn | Cu | Mg |
|---|---|---|---|---|---|---|---|
| bal. | 0.01 | 4.7 | 0.001 | 0.3 | 0.002 | 0.01 | 0.004 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -60°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 160 | 15 | 20 | 20 |

## Physical properties

Melting range 573 - 625°C
Density approximately 2680 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium cast alloys** | DIN 1725-1 | Al Mg Si 0.5 | 3.3206 | 6060 | |
| | | Al Mg Si 0.7 | 3.3210 | 6005A | |
| | | Al Mg Si 0.8 | 3.2316 | 6181 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Si 5 | | | 443.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 |
|---|---|---|---|---|
| 0.5 kg plastic spool S100 | X | X | X | X |
| 7.26 kg spool S300 | X | X | X | X |
| 7.0 kg spool BS300 | X | X | X | X |
| 120 kg AccuPak | | | X | |

Other sizes and packaging on request

# Aluminium rod

## Classification

AWS A5.10 : ER4043
ISO 18273 : S Al 4043 A (AlSi5)

## General description

**Solid rod for welding of aluminium-silicium alloys**
**Excellent feedability and very consistent welding performance**
**Tight and stable arc**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

TÜV
+

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Fe | Zn |
|---|---|---|---|---|---|
| bal. | 0.005 | 5.0 | 0.15 | 0.4 | 0.1 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -60°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 160 | 15 | 20 | 20 |

## Physical properties

Melting range 573 - 625°C
Density approximately 2680 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium cast alloys** | DIN 1725-1 | Al Mg Si 0.5 | 3.3206 | 6060 | |
| | | Al Mg Si 0.7 | 3.3210 | 6005A | |
| | | Al Mg Si 0.8 | 3.2316 | 6181 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Si 5 | | | 443.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 | 4.0 |
|---|---|---|---|---|---|
| 2 and 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

# Aluminium wire

## Classification

AWS A5.10 : ER5183
ISO 18273 : S Al 5183 (AlMg4.5Mn0,7)

## General description

**Solid wire for welding of high strength aluminium alloys and low temperature applications (-196°C)**
**Excellent feedability and very consistent welding performance**
**Tight and stable arc**
**Also available in 90 kg AccuPak®, that increases productivity by reducing time to change spools**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

| ABS | BV | DNV | GL | LR | TÜV |
|---|---|---|---|---|---|
| WC | WC | 5183 | S AlMg4.5Mn | + | + |

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Zn | Cr | Fe | Cu |
|---|---|---|---|---|---|---|---|---|
| bal. | 0.8 | 0.09 | 0.02 | 4.5 | 0.15 | 0.15 | 0.14 | 0.02 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 140 | 300 | 30 |

## Physical properties

Melting range 568 - 638°C
Density approximately 2400 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4.5 Mn | 3.3547 | 5083 | |
| | | Al Mg 5 | 3.3555 | 6082 | |
| | | Al Mg Si 1 | | | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 0.8 | 1.0 | 1.2 | 1.6 |
| 7.26 kg spool S300 | X | X | X | X |
| 7.0 kg spool BS300 | X | X | X | X |
| 90 kg AccuPak | | | X | |

Other sizes and packaging on request

# SuperGlaze® TIG 5183

## Aluminium rod

### Classification

AWS A5.10 : ER5183
ISO 18273 : S Al 5183 (AlMg4.5Mn0,7)

### General description

**Solid rod for welding of high strength aluminium alloys and low temperature applications (-196°C)**
**Excellent feedability and very consistent welding performance**
**Tight and stable arc**

### Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

### Approvals

TÜV
+

### Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Zn | Cr | Fe |
|---|---|---|---|---|---|---|---|
| bal. | 0.8 | 0.09 | 0.02 | 4.5 | 0.15 | 0.15 | 0.2 |

### Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 150 | 290 | 25 |

### Physical properties

Melting range 568 - 638°C
Density approximately 2400 $kg/m^3$

### Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4.5 Mn | 3.3547 | 5083 | |
| | | Al Mg 5 | 3.3555 | 6082 | |
| | | Al Mg Si 1 | | | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

### Packaging and available sizes

| Unit type | Diameter (mm) | | | | |
|---|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 | 4.0 |
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

# Aluminium wire

## Classification

AWS A5.10 : ER5356
ISO 18273 : S Al 5356 (AlMg5Cr)

## General description

**Solid wire for welding aluminium alloys containing more than 3% Mg**
**Excellent feedability and very consistent welding performance**
**Tight and stable arc**
**Also available in 90 kg AccuPak®, that increases productivity by reducing time to change spools**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

| ABS | BV | DNV | GL | LR | TÜV |
|---|---|---|---|---|---|
| WB | WB | 5356 | S ALMg5 | + | + |

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Cr | Cu | Fe | Zn |
|---|---|---|---|---|---|---|---|---|
| bal. | 0.11 | 0.08 | 0.06 | 4.9 | 0.07 | 0.01 | 0.2 | 0.03 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 110 | 250 | 25 |

## Physical properties

Melting range 562 - 633°C
Density approximately 2640 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4,5 | 3.3345 | 5082 | |
| | | Al Mg 5 | 3.3555 | 5056A | |
| | | Al Mg 2 Mn 0,8 | 3.3527 | 5049 | |
| | | Al Mg 2,7 Mn | 3.3537 | 5454 | |
| | | Al Mg 4 Mn | 3.3545 | 5086 | |
| | | Al Zn 4,5 Mg 1 | 3.4335 | 7020 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 0.8 | 1.0 | 1.2 | 1.6 |
| 0.5 kg plastic spool S100 | X | X | X | X |
| 2.0 kg plastic spool S200 | | | X | |
| 7.26 kg spool S300 | X | X | X | X |
| 7.0 kg spool BS300 | X | X | X | X |
| 90 kg AccuPak | | | X | |

Other sizes and packaging on request

SuperGlaze® MIG 5356: rev. EN 21

# Aluminium rod

## Classification

AWS A5.10 : ER5356
ISO 18273 : S Al 5356 (AlMg5Cr)

## General description

**Solid rod for welding aluminium alloys containing more than 3% Mg**
**Excellent feedability and very consistent welding performance**
**Tight and stable arc**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

TÜV
+

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Cr |
|---|---|---|---|---|---|
| bal. | 0.10 | 0.01 | 0.10 | 5.0 | 0.15 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 130 | 285 | 25 |

## Physical properties

Melting range 562 - 633°C
Density approximately 2640 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4,5 | 3.3345 | 5082 | |
| | | Al Mg 5 | 3.3555 | 5056A | |
| | | Al Mg 2 Mn 0,8 | 3.3527 | 5049 | |
| | | Al Mg 2,7 Mn | 3.3537 | 5454 | |
| | | Al Mg 4 Mn | 3.3545 | 5086 | |
| | | Al Zn 4,5 Mg 1 | 3.4335 | 7020 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 | 4.0 | 5.0 |
| 5 kg tube | X | X | X | X | X | X |

Other sizes and packaging on request

# Aluminium wire

## Classification

AWS A5.10 : ER1100*

* Nearest classification

## General description

**Solid wire for welding pure aluminium with maximum of 0.5% alloying elements**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

## Chemical composition (w%) typical wire / rod

| Al | Zn | Ti | Cu | Mn | Si | Si+Fe | Fe |
|---|---|---|---|---|---|---|---|
| bal. | 0.02 | 0.04 | 0.04 | <0.01 | 0.05 | 0.2 | 0.12 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 30 | 80 | 40 |

## Physical properties

| | |
|---|---|
| Melting range | 647 - 658°C |
| Density | approximately 2700 $kg/m^3$ |

## Materials to be welded

| Code | Type | W.Nr. | Int.Reg.Nr. |
|---|---|---|---|
| **DIN 1712-3** | Al 99.8 | 3.0285 | 1080 A |
| | Al 99.7 | 3.0275 | 1070 A |
| | Al 99.5 | 3.0255 | 1050 A |
| | E-Al | 3.0257 | 1350 A |
| | Al 99 | 3.0205 | 1200 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.0 | 1.2 | 1.6 |
| 7 kg spool B300 | X | X | X |

Other sizes and packaging on request

# Aluminium rod

## Classification

AWS A5.10 : ER1100*

* Nearest classification

## General description

**Solid rod for welding pure aluminium with maximum of 0.5% alloying elements**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Chemical composition (w%) typical wire / rod

| Al | Zn | Ti | Cu | Mn | Si |
|---|---|---|---|---|---|
| bal. | 0.02 | 0.04 | 0.04 | <0.01 | 0.05 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 30 | 80 | 40 |

## Physical properties

Melting range 647 - 658°C

Density approximately 2700 $kg/m^3$

## Materials to be welded

| Code | Type | W.Nr. | Int.Reg.Nr. |
|---|---|---|---|
| **DIN 1712-3** | Al 99.8 | 3.0285 | 1080 A |
| | Al 99.7 | 3.0275 | 1070 A |
| | Al 99.5 | 3.0255 | 1050 A |
| | E-Al | 3.0257 | 1350 A |
| | Al 99 | 3.0205 | 1200 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 2.0 | 2.4 | 3.2 | 4.0 |
| 5 kg tube | X | X | X | X |

Other sizes and packaging on request

# Aluminium wire

## Classification

ISO 18273 : S Al 5754 (AlMg3)

## General description

**Solid wire for welding of aluminium alloys up to 3%Mg**

## Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| Al | Mg | Zn | Cr | Ti | Mn | Si | Cu | Fe |
|---|---|---|---|---|---|---|---|---|
| bal. | 3.4 | 0.1 | 0.19 | 0.09 | 0.01 | 0.06 | 0.01 | 0.13 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 210 | 30 |

## Physical properties

| | |
|---|---|
| Melting range | 580 - 642°C |
| Density | approximately 2660 $kg/m^3$ |

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 1 | 3.3315 | 5005 A | |
| | | Al Mg 1.5 | 3.3316 | 5050 B | |
| | | Al Mg 1.8 | 3.3326 | 5051 A | |
| | | Al Mg 2.5 | 3.3523 | 5052 | |
| | | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 1 | 3.0515 | 3103 | |
| | | Al Mg Si 0.5 | 3.3206 | 6060 | |
| | | Al Mg Si 0.7 | 3.3210 | 6005 A | |
| | | Al Mg Si 0.8 | 3.2316 | 6181 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-AlMg 3 | 3.3541 | | |
| | | G-AlMg 3 Si | 3.3241 | | 512.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.0 | 1.2 | 1.6 |
| 7 kg spool B300 | X | X | X |

Other sizes and packaging on request

# Aluminium rod

## Classification

ISO 18273 : S Al 5754 (AlMg3)

## General description

**Solid rod for welding of aluminium alloys up to 3%Mg**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

TÜV

+

## Chemical composition (w%) typical wire / rod

| Al | Mg | Zn | Cr | Ti | Mn | Si | Cu |
|---|---|---|---|---|---|---|---|
| bal. | 3.2 | 0.1 | 0.20 | 0.10 | 0.01 | 0.06 | 0.01 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 220 | 33 |

## Physical properties

Melting range 580 - 642°C

Density approximately 2660 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 1 | 3.3315 | 5005 A | |
| | | Al Mg 1.5 | 3.3316 | 5050 B | |
| | | Al Mg 1.8 | 3.3326 | 5051 A | |
| | | Al Mg 2.5 | 3.3523 | 5052 | |
| | | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 1 | 3.0515 | 3103 | |
| | | Al Mg Si 0.5 | 3.3206 | 6060 | |
| | | Al Mg Si 0.7 | 3.3210 | 6005 A | |
| | | Al Mg Si 0.8 | 3.2316 | 6181 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-AlMg 3 | 3.3541 | | |
| | | G-AlMg 3 Si | 3.3241 | | 512.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | | |
|---|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 | 4.0 |
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

LNT AlMg3: rev. EN 21

# Aluminium wire

## Classification

AWS A5.10 : ER5356
ISO 18273 : S Al 5356 (AlMg5Cr)

## General description

**Solid wire for welding aluminium alloys containing more than 3% Mg**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

| ABS | BV | DNV | GL | LR | TÜV |
|---|---|---|---|---|---|
| WB | WB | 5356 | S ALMg5 | + | + |

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Cr | Cu | Fe | Zn |
|---|---|---|---|---|---|---|---|---|
| bal. | 0.11 | 0.08 | 0.06 | 4.9 | 0.07 | 0.01 | 0.2 | 0.03 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 110 | 250 | 25 |

## Physical properties

Melting range 562 - 633°C
Density approximately 2640 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4,5 | 3.3345 | 5082 | |
| | | Al Mg 5 | 3.3555 | 5056A | |
| | | Al Mg 2 Mn 0,8 | 3.3527 | 5049 | |
| | | Al Mg 2,7 Mn | 3.3537 | 5454 | |
| | | Al Mg 4 Mn | 3.3545 | 5086 | |
| | | Al Zn 4,5 Mg 1 | 3.4335 | 7020 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 0.8 | 1.0 | 1.2 | 1.6 |
| 7 kg spool B300 | X | X | X | X |

Other sizes and packaging on request

# Aluminium rod

## Classification

AWS A5.10 : ER5356
ISO 18273 : S Al 5356 (AlMg5Cr)

## General description

**Solid rod for welding aluminium alloys containing more than 3% Mg**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| RINA | TÜV |
|---|---|
| RC | + |

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Cr |
|---|---|---|---|---|---|
| bal. | 0.10 | 0.10 | 0.10 | 5.0 | 0.15 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 130 | 285 | 25 |

## Physical properties

Melting range 562 - 633°C
Density approximately 2640 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4,5 | 3.3345 | 5082 | |
| | | Al Mg 5 | 3.3555 | 5056A | |
| | | Al Mg 2 Mn 0,8 | 3.3527 | 5049 | |
| | | Al Mg 2,7 Mn | 3.3537 | 5454 | |
| | | Al Mg 4 Mn | 3.3545 | 5086 | |
| | | Al Zn 4,5 Mg 1 | 3.4335 | 7020 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|
| | 1.6 | 2.0 | 2.4 | 3.2 | 4.0 | 5.0 |
| 5 kg tube | X | X | X | X | X | X |

Other sizes and packaging on request

# Aluminium wire

## Classification

AWS A5.10 : ER5183
ISO 18273 : S Al 5183 (AlMg4.5Mn0,7)

## General description

**Solid wire for welding of high strength aluminium alloys and low temperature applications (-196°C)**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

| ABS | BV | DNV | GL | LR | TÜV |
|---|---|---|---|---|---|
| WC | WC | 5183 | S AlMg4.5Mn | + | + |

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Zn | Cr | Fe | Cu |
|---|---|---|---|---|---|---|---|---|
| bal. | 0.65 | 0.09 | 0.02 | 5 | 0.03 | 0.06 | 0.14 | 0.02 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 150 | 290 | 25 |

## Physical properties

Melting range 568 - 638°C
Density approximately 2400 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4.5 Mn | 3.3547 | 5083 | |
| | | Al Mg 5 | 3.3555 | 6082 | |
| | | Al Mg Si 1 | | | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.0 | 1.2 | 1.6 |
| 7 kg spool B300 | X | X | X |

Other sizes and packaging on request

# Aluminium rod

## Classification

AWS A5.10 : ER5183
ISO 18273 : S Al 5183 (AlMg4.5Mn0,7)

## General description

**Solid rod for welding of high strength aluminium alloys and low temperature applications (-196°C)**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

| TÜV |
|---|
| + |

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Mg | Zn | Cr | Fe |
|---|---|---|---|---|---|---|---|
| bal. | 0.80 | 0.10 | 0.02 | 4.5 | 0.15 | 0.15 | 0.20 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 150 | 290 | 25 | 40 |

## Physical properties

Melting range 568 - 638°C
Density approximately 2400 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4.5 Mn | 3.3547 | 5083 | |
| | | Al Mg 5 | 3.3555 | 6082 | |
| | | Al Mg Si 1 | | | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 2.0 | 2.4 | 3.2 | 4.0 |
| 5 kg tube | X | X | X | X |

Other sizes and packaging on request

# LNM AlMg4.5MnZr

## Aluminium wire

### Classification

ISO 18273 : S Al 5087 (AlMg4.5MnZr)

### General description

**Solid wire for welding of high strength aluminium alloys and low temperature applications (-196°C)**
**Zr added to increase hot cracking resistance and improve structure**

### Shielding gases (acc. ISO 14175)

| | |
|---|---|
| I1 | Inert gas Ar (100%) |
| I3 | Inert gas Ar+ >0-95% He |

### Approvals

| TÜV |
|---|
| + |

### Chemical composition (w%) typical wire

| Al | Mn | Si | Ti | Mg | Zn | Cr | Zr |
|---|---|---|---|---|---|---|---|
| bal. | 0.8 | 0.2 | 0.15 | 4.5 | 0.15 | 0.15 | 0.1 |

### Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -196°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 140 | 300 | 30 | 25 | 15 |

### Physical properties

| | |
|---|---|
| Melting range | 568 - 638°C |
| Density | approximately 2400 $kg/m^3$ |

### Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium wrought alloys** | DIN 1725-1 | Al Mg 3 | 3.3535 | 5754 | |
| | | Al Mg 4,5 Mn | 3.3547 | 5083 | |
| | | Al Mg 5 | 3.3555 | 6082 | |
| | | Al Mg Si 1 | | | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Mg 3 | 3.3541 | | |
| | | G-Al Mg 3 Si | 3.3241 | | 512.0 |
| | | G-Al Mg 5 | 3.3561 | | B 535.0 |
| | | G-Al Mg 5 Si | 3.3261 | | |

### Packaging and available sizes

| Unit type | Diameter (mm) 1.0 | 1.2 | 1.6 |
|---|---|---|---|
| 7 kg spool B300 | X | X | X |

Other sizes and packaging on request

GMAW/GTAW

LNM AlMg4.5MnZr: rev. EN 21

# Aluminium wire

## Classification

AWS A5.10 : ER4043
ISO 18273 : S Al 4043A (AlSi5(Al))

## General description

**Solid wire for welding of aluminium-silicium alloys**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Approvals

TÜV
+

## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Fe | Zn | Cu | Mg |
|---|---|---|---|---|---|---|---|
| bal. | 0.01 | 4.7 | 0.001 | 0.3 | 0.002 | 0.01 | 0.004 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -60°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 160 | 15 | 20 | 20 |

## Physical properties

Melting range 573 - 625°C
Density approximately 2680 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium cast alloys** | DIN 1725-1 | Al Mg Si 0.5 | 3.3206 | 6060 | |
| | | Al Mg Si 0.7 | 3.3210 | 6005A | |
| | | Al Mg Si 0.8 | 3.2316 | 6181 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Si 5 | | | 443.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) 0.8 | 1.0 | 1.2 | 1.6 | 2.4 |
|---|---|---|---|---|---|
| 7 kg spool B300 | X | X | X | X | X |

Other sizes and packaging on request

# Aluminium rod

## Classification

AWS A5.10 : ER4043
ISO 18273 : S Al 4043A (AlSi5(Al))

## General description

**Solid rod for welding of aluminium-silicium alloys**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Approvals

TÜV
+



## Chemical composition (w%) typical wire / rod

| Al | Mn | Si | Ti | Fe | Zn |
|---|---|---|---|---|---|
| bal. | 0.05 | 5.0 | 0.15 | 0.4 | 0.10 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C | Impact ISO-V(J) -60°C |
|---|---|---|---|---|---|---|---|
| Typical values | I1 | AW | 100 | 160 | 15 | 20 | 20 |

## Physical properties

Melting range 573 - 625°C
Density approximately 2680 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Reg.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|---|
| **Aluminium cast alloys** | DIN 1725-1 | Al Mg Si 0.5 | 3.3206 | 6060 | |
| | | Al Mg Si 0.7 | 3.3210 | 6005A | |
| | | Al Mg Si 0.8 | 3.2316 | 6181 | |
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Si 5 | | | 443.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) 1.6 | 2.0 | 2.4 | 3.2 | 4.0 |
|---|---|---|---|---|---|
| 5 kg tube | X | X | X | X | X |

Other sizes and packaging on request

# Aluminium wire

## Classification

AWS A5.10 : ER4047
ISO 18273 : S Al 4047A (AlSi12 (A))

## General description

**Solid wire for welding of cast aluminium alloys containing up to 12% Si**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ >0-95% He

## Chemical composition (w%) typical wire / rod

| Al | Si | Ti | Fe | Zn | Mn | Cu |
|---|---|---|---|---|---|---|
| bal. | 11.4 | 0.01 | 0.4 | 0.10 | 0.01 | 0.04 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 80 | 180 | 6 |

## Physical properties

Melting range 573 - 585°C
Density approximately 2650 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Si 12 | 3.3581 | A 413.0 |
| | | G-Al Si 12 (Cu) | 3.3583 | |
| | | G-Al Si 11 | | |
| | | G-Al Si 10 Mg | 3.2381 | 361.0 |
| | | G-Al Si 10 Mg (Cu) | 3.2383 | |
| | | G-Al Si 9 Mg | 3.2373 | 359.0 |
| | | G-Al Si 9 Cu 3 | 3.2161 | |
| | | G-Al Si 7 Mg | 3.2371 | 356.0 |
| | | G-Al Si 6 Cu 4 | 3.2151 | 319.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | |
|---|---|---|---|
| | 1.0 | 1.2 | 1.6 |
| 7 kg spool B300 | X | X | X |

Other sizes and packaging on request

# Aluminium rod

## Classification

AWS A5.10 : ER4047
ISO 18273 : S Al 4047A (AlSi12 (A))

## General description

**Solid rod for welding of cast aluminium alloys containing up to 12% Si**

## Shielding gases (acc. ISO 14175)

I1 Inert gas Ar (100%)

## Chemical composition (w%) typical wire / rod

| Al | Si | Fe | Zn | Mg |
|---|---|---|---|---|
| bal. | 12.0 | 0.5 | 0.10 | 0.10 |

## Mechanical properties, typical

| | Shielding gas | Condition | 0.2% Proof strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) |
|---|---|---|---|---|---|
| Typical values | I1 | AW | 80 | 180 | 5 |

## Physical properties

Melting range 573 - 585°C
Density approximately 2650 $kg/m^3$

## Materials to be welded

| Steel grades | Code | Type | W.Nr. | Int.Cast.Nr. |
|---|---|---|---|---|
| **Aluminium cast alloys** | DIN 1725-2 | G-Al Si 12 | 3.3581 | A 413.0 |
| | | G-Al Si 12 (Cu) | 3.3583 | |
| | | G-Al Si 11 | | |
| | | G-Al Si 10 Mg | 3.2381 | 361.0 |
| | | G-Al Si 10 Mg (Cu) | 3.2383 | |
| | | G-Al Si 9 Mg | 3.2373 | 359.0 |
| | | G-Al Si 9 Cu 3 | 3.2161 | |
| | | G-Al Si 7 Mg | 3.2371 | 356.0 |
| | | G-Al Si 6 Cu 4 | 3.2151 | 319.0 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 2.0 | 2.4 | 3.2 | 4.0 |
| 5 kg tube | X | X | X | X |

Other sizes and packaging on request

# Hardfacing solid wire

## Classification

DIN 8555 : MSG 6-GZ-60-PS

## General description

**Solid wire for wear resistant overlays**
**High resistance against corrosion, abrasion and impact deformation**
**Hardness approximately 55-60HRc**
**Optimal weldability**
**Ferritic and martensitic structure**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5-25% $CO_2$

## Application

Dies
Matrix

Parts for agricultural machinery

Transport rolls
Sand pumps

## Chemical composition (w%) typical wire

| C | Mn | Si | Cr |
|---|---|---|---|
| 0.5 | 0.4 | 3 | 9 |

## Mechanical properties, all weld metal

| | Typical hardness values |
|---|---|
| 2 Layers, AW<br>Heat resistant to 450°C | approx. 60 HRc |

## Packaging and available sizes

| Unit type | Diameter (mm)<br>1.2 |
|---|---|
| 15 kg spool B300 | X |

# Hardfacing solid wire

## Classification

DIN 8555 : MSG 2-GZ-350

## General description

**Solid wire for hardfacing applications**
**Hardness approximately HB 325-375**
**Optimal welding characteristics**
**Martensitic structure**

## Shielding gases (acc. ISO 14175)

M21 Mixed gas Ar+ >5-25% $CO_2$



## Application

Forming dies
Dies

Impact resistance tools

## Chemical composition (w%) typical wire

| C | Mn | Si | Cr |
|---|---|---|---|
| 0.7 | 1.9 | 0.45 | 1.0 |

## Mechanical properties, all weld metal

| | Typical hardness values |
|---|---|
| 2 Layers, AW | approx. 38 HRc (360 HB) |

## Packaging and available sizes

| Unit type | Diameter (mm) |
|---|---|
| | 1.2 |
| 15 kg spool B300 | X |

# Autogenous wire

## Classification

AWS A5.2 : R45*
EN 12536 : O I

* Nearest classification

## General description

**Rods for oxy-acetylene gas welding of general construction steel**
**Suitable for mild steel**
**max. design temperature 350°C**



## Chemical composition (w%),Typical, rod

| C | Mn | Si | P | S |
|---|---|---|---|---|
| 0.07 | 0.4 | 0.07 | 0.01 | 0.01 |

## Mechanical properties, typical, all weld metal

| | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|
| Typical values | AW | 280 | 390 | 16 | 50 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| 5 kg / 25 kg box | 2.0 | 3.0 | 4.0 | 5.0 |
| | X | X | X | X |

# Autogenous wire

## Classification

AWS A5.2 : R60*
EN 12536 : O II

* Nearest classification

## General description

**Rods for oxy-acetylene gas welding of general construction steel**
**Suitable for mild steel**
**max. design temperature 350°C**
**Higher strength than LNG I**



## Chemical composition (w%),Typical, rod

| C | Mn | Si | P | S |
|---|---|---|---|---|
| 0.10 | 1.1 | 0.15 | 0.01 | 0.01 |

## Mechanical properties, typical, all weld metal

| | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|
| Typical values | AW | 320 | 430 | 17 | 60 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|
| | 1.6 | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 |
| 5 kg / 25 kg box | X | X | X | X | X | X |

# Autogenous wire

## Classification

AWS A5.2 : R60*
EN 12536 : O III

* Nearest classification

## General description

**Rods with 0.4% Ni for oxy-acetylene gas welding of joints in pipes**
**Excellent rootwelding**
**Applicable for design temperatures from -20°C to +350°C**



## Chemical composition (w%),Typical, rod

| C | Mn | Si | P | S | Ni |
|---|---|---|---|---|---|
| 0.06 | 1.1 | 0.15 | 0.01 | 0.01 | 0.40 |

## Mechanical properties, typical, all weld metal

| | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|
| Typical values | AW | 340 | 470 | 26 | 65 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | | |
|---|---|---|---|---|---|
| | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 |
| 5 kg / 25 kg box | X | X | X | X | X |

# Autogenous wire

## Classification

AWS A5.2 : R65*
EN 12536 : O IV

* Nearest classification

## General description

**Rods with 0.5% Mo for oxy-acetylene gas welding of fine grained and creep resisting steel**
**Design temperature max. 500°C**



## Chemical composition (w%),Typical, rod

| C | Mn | Si | P | S | Mo |
|---|---|---|---|---|---|
| 0.09 | 1.0 | 0.19 | 0.010 | 0.010 | 0.5 |

## Mechanical properties, typical, all weld metal

| | Condition | Yield strength ($N/mm^2$) | Tensile strength ($N/mm^2$) | Elongation (%) | Impact ISO-V(J) +20°C |
|---|---|---|---|---|---|
| Typical values | AW | 380 | 500 | 22 | 60 |

## Packaging and available sizes

| Unit type | Diameter (mm) | | | |
|---|---|---|---|---|
| | 2.0 | 2.5 | 3.0 | 4.0 |
| 5 kg / 25 kg box | X | X | X | X |