LAMINERIES MATTHEY
NOTZ group advanced metal solutions

# Stainless Steel 1.4369

## Durnomag

| | | EN | UNS (ASTM) | AISI | LMSA |
|---|---|---|---|---|---|
| **Designation** | **X11CrNiMn19-8-6** | 1.4369 | - | - | **D150** |

## Chemical composition

| Fe | C | Cr | Ni | Si | Mn | P | S | N |
|---|---|---|---|---|---|---|---|---|
| Balance | 0.070 - 0.15 | 17.5 -19.5 | 6.8 - 8.5 | 0.5 -1.0 | 5.0 - 7.5 | ≤ 0.030 | ≤ 0.015 | 0.20 - 0.30 |

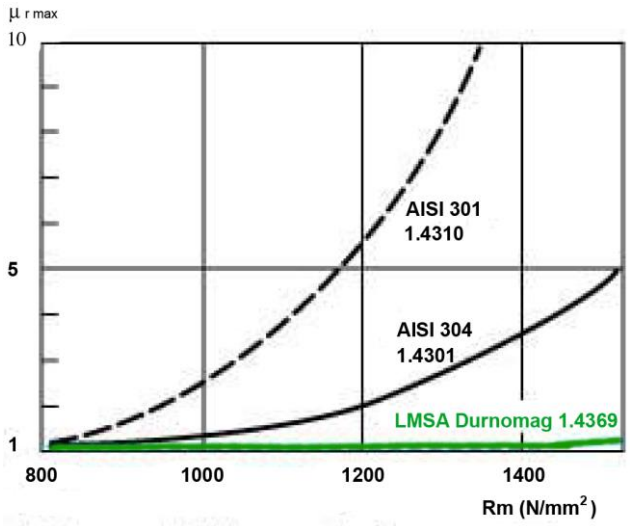
Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precisely than the composition indicated.

## Main technical properties and features

The tensile strengths of austenitic stainless steels are average but can be increased considerably, for certain types, by cold rolling. The 1.4369, X11CrNiMnN19-8-6, is a non-magnetic stainless steel. A high mechanical strength stainless steel combined with a non-magnetic structure is unique. Its resistance to corrosion is similar to that of 1.4310, X10CrNi18-8. The high nitrogen content is known to promote corrosion resistance by pickling. However, like other austenitic stainless steels of this type, if in contact with high temperature chloride solutions, the 1.4369 can be sensitive to corrosion under tension.

The 1.4369, X11CrNiMnN19-8-6 alloy reaches very high mechanical strength through cold working. Its hardness and mechanical strength can be increased by tempering at about 480 °C for two hours. For mechanical strength over 1400 N/mm$^2$ before tempering, an increase of 100 to 200 N/mm$^2$ (30 to 70 HV) can be obtained. This heat treatment is generally applied to the finished parts. To avoid discoloration, the parts must be thoroughly cleaned before treatment. Tempering without gas-shielding will form a brownish oxide layer on the surface of the parts. The maximum operating temperature is up to approximately 250 °C. In general, tempering also has a positive effect on the fatigue strength limit and on the thermal stress relaxation.

The 1.4369, alloy in which the austenitic microstructure is very stable during cold working. Thus, it is possible to obtain mechanical properties similar to those of 1.4310, AISI 301, while maintaining its non-magnetic structure. In addition, the weak magnetic permeability is not influenced by tempering.



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## Typical uses

This alloy combines high mechanical strength and non-magnetic structure that makes it desirable for the manufacturing of springs or other parts requiring high mechanical strength, such as those used in electronics and in the watch industry. It can also be used in the manufacturing of instruments to be exposed to magnetic fields, e.g. surgery under MRI. Further uses include spring components in generators or non-magnetic housing in measuring instruments.

## Typical manufacturing range

| | | Thickness (mm) | Width (mm) | Length (mm) |
|---|---|---|---|---|
| **Rolled products** | Strip in coils [1] | 0.010 - 0.400 | 1.5 - 200.0 | - |
| | Strip as sheets [1] | 0.015 - 0.400 | 10.0 - 200.0 | 100 - 3000 |

[1] Not all our production possibilities are presented here. Other dimensions or product forms available upon request. Some combinations of thicknesses and widths are not possible.

## Mechanical properties of strips

| Temper | | $Rp_{0.2}$ ($N/mm^2$) | $R_m$ ($N/mm^2$) | $A_{50mm}$ [2] (%) | Hardness HV |
|---|---|---|---|---|---|
| C750 | soft | 300 - 600 | 750 - 950 | 40 | 170 - 290 |
| C1000 | ¼ hard | 800 - 1100 | 1000 - 1200 | 10 | 250 - 375 |
| C1200 [1] | ½ hard | 900 - 1200 | 1200 - 1400 | 7 | 310 - 440 |
| C1300 [1] | hard | 1050 - 1350 | 1300 - 1600 | 2 | 410 - 500 |
| C1600 [1] | extra hard | 1300 min. | 1600 min. | - | 480 min. |

[1] Additional mill tempering can be ordered for these tempers

[2] Valid only for a strip thickness ≥ 0.1mm

## Physical properties

| | | |
|---|---|---|
| Modulus of elasticity | $kN/mm^2$ | 190 |
| Poisson ratio | | 0.29 |
| Density | $g/cm^3$ | 7.90 |
| Melting point / Melting range | °C | 1400 - 1450 |
| Linear dilatation coefficient | $10^{-6}$·/ °C | 18 |
| Thermal conductivity at 20°C | W/m °K | 15 |
| Electrical resistivity | µΩcm | 70 |
| Electrical conductivity | MS/m | 1.4 |
| Specific heat at 20°C | J/(kg. K) | 460 |
| Magnetic properties | | Non-magnetic in soft and cold worked tempers<br>µ = 1.002, 1.2 (annealed, cold worked temper) |

## Tolerances (strip and foil)

**Thickness**

The table shown is an outline of our typical thickness tolerances available. They are tighter than industry standards.

Our "LMSA Precision" and "LMSA Extreme" tolerances are available upon request.

| Thickness (mm) | | Lamineries MATTHEY | | |
|---|---|---|---|---|
| ≥ | < | LMSA Standard | LMSA Precision | LMSA Extreme |
| - | 0.025 | - | - | ± 0.001 |
| 0.025 | 0.050 | ± 0.003 | ± 0.002 | ± 0.0015 |
| 0.050 | 0.065 | ± 0.004 | ± 0.003 | ± 0.002 |
| 0.065 | 0.100 | ± 0.006 | ± 0.004 | ± 0.003 |
| 0.100 | 0.125 | ± 0.008 | ± 0.006 | ± 0.003 |
| 0.125 | 0.150 | ± 0.008 | ± 0.006 | ± 0.004 |
| 0.150 | 0.250 | ± 0.010 | ± 0.008 | ± 0.004 |
| 0.250 | 0.300 | ± 0.012 | ± 0.008 | ± 0.005 |
| 0.300 | 0.400 | ± 0.012 | ± 0.009 | ± 0.005 |
| 0.400 | 0.500 | ± 0.015 | ± 0.010 | ± 0.006 |
| 0.500 | 0.600 | ± 0.020 | ± 0.012 | ± 0.007 |
| 0.600 | 0.800 | ± 0.020 | ± 0.014 | ± 0.007 |
| 0.800 | 1.000 | ± 0.025 | ± 0.015 | ± 0.009 |
| 1.000 | 1.200 | ± 0.025 | ± 0.018 | ± 0.012 |
| 1.200 | 1.250 | ± 0.030 | ± 0.020 | ± 0.012 |
| 1.250 | 1.500 | ± 0.035 | ± 0.025 | ± 0.014 |

**Width**

Our width tolerances "Standard" is +0.2, -0.0 (or ± 0.1 mm upon request). They are available for slit widths < 125 mm and thicknesses < 1.00 mm. Special tolerances upon request.

**Camber**

Our tolerance "LMSA Standard" respects the EN Standard 1654 (Length of measurement 1000 mm).
Other tolerances upon request.

| Width (mm) | | Camber max. (mm/m) | | | |
|---|---|---|---|---|---|
| | | LMSA standard | | LMSA extreme | |
| > | ≤ | ≤ 0.5 mm | > 0.5 mm | ≤ 0.5 mm | > 0.5 mm |
| 3 | 6 | 12 | - | 6 | - |
| 6 | 10 | 8 | 10 | 4 | 5 |
| 10 | 20 | 4 | 6 | 2 | 3 |
| 20 | 250 | 2 | 3 | 1 | 1.5 |

**Surface**

Special surface qualities upon request

**Flatness**

Special requirement on the longitudinal or transversal flatness upon request


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