



# 1.3964

X2CrNiMnMoNb21-16-5-3

**C** max. 0.03 **Mn** 4.00 – 6.00 **Cr** 20.00 – 21.50 **Ni** 15.00 – 17.00 **Mo** 3.00 – 3.50 **Nb** max. 0.25

## Heat treatment and mechanical properties

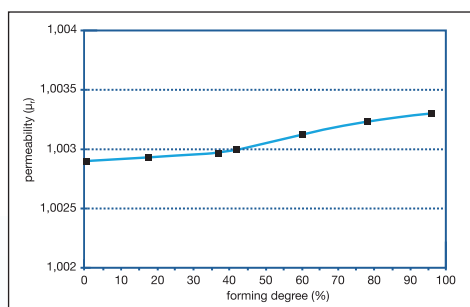
Optimal physical and fabrication properties are realised after solution annealing in the temperature range 1020 °C – 1050 °C followed by rapid cooling in air or water. In the solution annealed condition, the following mechanical properties may be attained when testing in the longitudinal direction:

Property		Specification	Typical
yield strength (N/mm <sup>2</sup> )	R <sub>p0.2</sub>	≥ 365	560
tensile strength (N/mm <sup>2</sup> )	R <sub>m</sub>	700 – 950	890
tensile elongation (%)	A <sub>5</sub>	≥ 35	39
impact energy (J) 25 °C	ISO-V	≥ 85	150

The mechanical properties (d ≥ 160 mm) have to be agreed on for thicker dimensions, or the delivered product is based on the values given.

## Magnetic permeability

The low magnetic permeability of AMANOX® 3964 stems from its austenitic microstructure.



The diagram shows the variation of permeability against cold forming degree.

## Welding

As a result of the low carbon content of 1.3964, welding will not result in the formation of chromium carbides. Should a filler material be required, then the grades 1.3954 and 1.3984 can be used. Should heat treatment after welding be unavoidable, due to extensive cold deformation or due to high wall thickness, then the aforementioned heat treatment may be undertaken.

## Forging

When forging 1.3964, the work pieces are usually pre-heated to between 950 °C – 1150 °C with forging taking place between 900 °C and 1100 °C. After forging, the forged component must be rapidly cooled in either air or water to avoid the formation of any undesirable phases which might adversely affect the corrosion and/or mechanical properties.

## Machining

As a result of its high alloying addition, 1.3964 is difficult to machine. The following machining parameters can be used as a guideline when machining 1.3964 using coated hard metal cutting tools.

	Depth of cut (mm)	6	3	1
	Feed rate (mm/r)	0.5	0.4	0.2
<b>Solution annealed</b>	Cutting speed			
<b>R<sub>m</sub> 560 – 640 N/mm<sup>2</sup></b>	(m/min)	110	125	150