Schmidt + Clemens Group

Centralloy® G 4852

MATERIAL DATA SHEET

Designation: GX40NiCrSiNb35-25

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Contents:

Features

Centralloy® G 4852 is a cast austenitic steel with 35% nickel, 25% chromium plus niobium. The alloy possesses excellent structural stability, good high temperature stress rupture strength, oxidation and carburisation resistance.

The presence of carbon leads to the formation of a series of carbides:

a) Intergranularly occuring primary carbides, nitrides or carbonitrides of the general form M(C,N) where M is usually niobium. These greatly affect the generation of good high temperature properties. The phase is visible in unetched micro specimens, its color varying from the orange/yellow of the nitride to the grey/mauve of the carbide.

b) Chromium-rich intergranular carbides of the M_7C_3 and $M_{23}C_6$ types. These carbides have a profound influence on properties due to decomposition and re-precipitation reactions in service producing secondary carbides in a rather uniform dispersion. By this mechanism dislocation movement is impeded with the result of significant strengthening at elevated temperatures.

Product Forms

Centralloy® G 4852 was designed as centrispun tube material to meet specific design criteria in terms of carburisation and oxidation resistance, creep rupture strength and weldability. It is available as centrispun tubes, statically cast and investment cast product forms.

Other forms may be supplied upon request. Further information regarding these topics, and maximum and minimum sizes, may be obtained from the sales department.

Chemical Composition(*)

	mass percentage
Carbon	0.40
Silicon	1.50
Manganese	1.50
Chromium	25.00
Nickel	35.00
Niobium	1.50
Iron	Balance

(*) This is a typical composition which may be slightly modified according to the application.

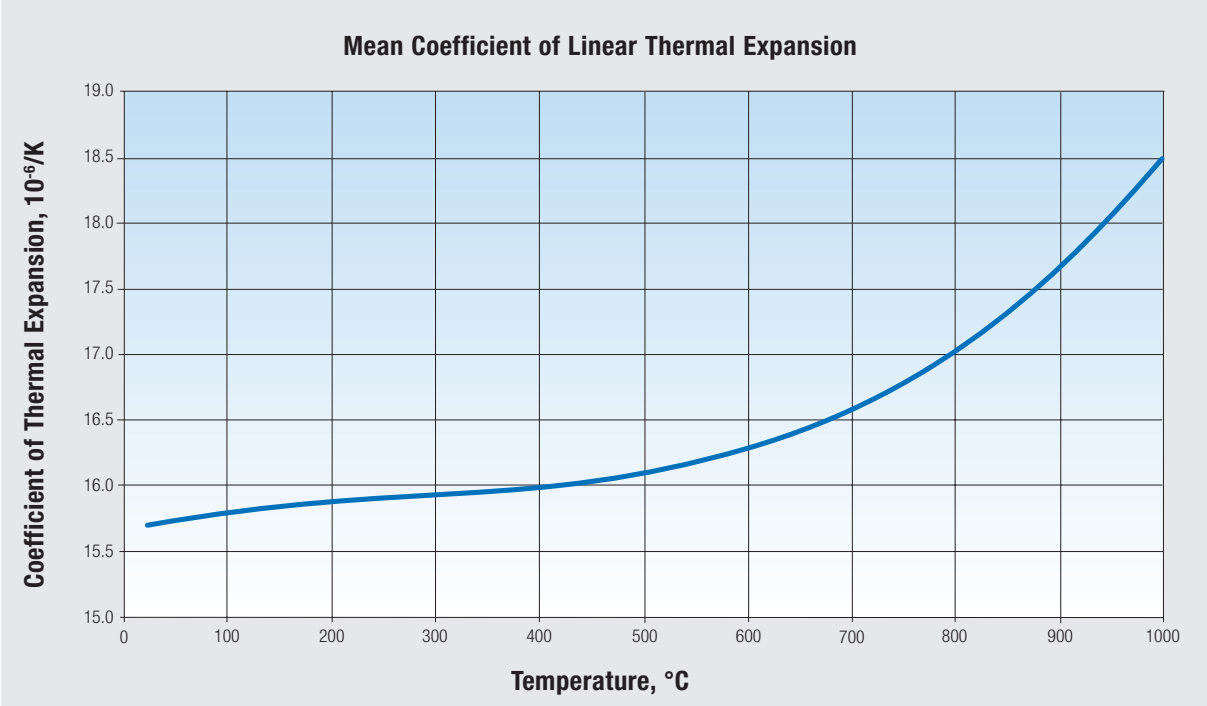
Applications

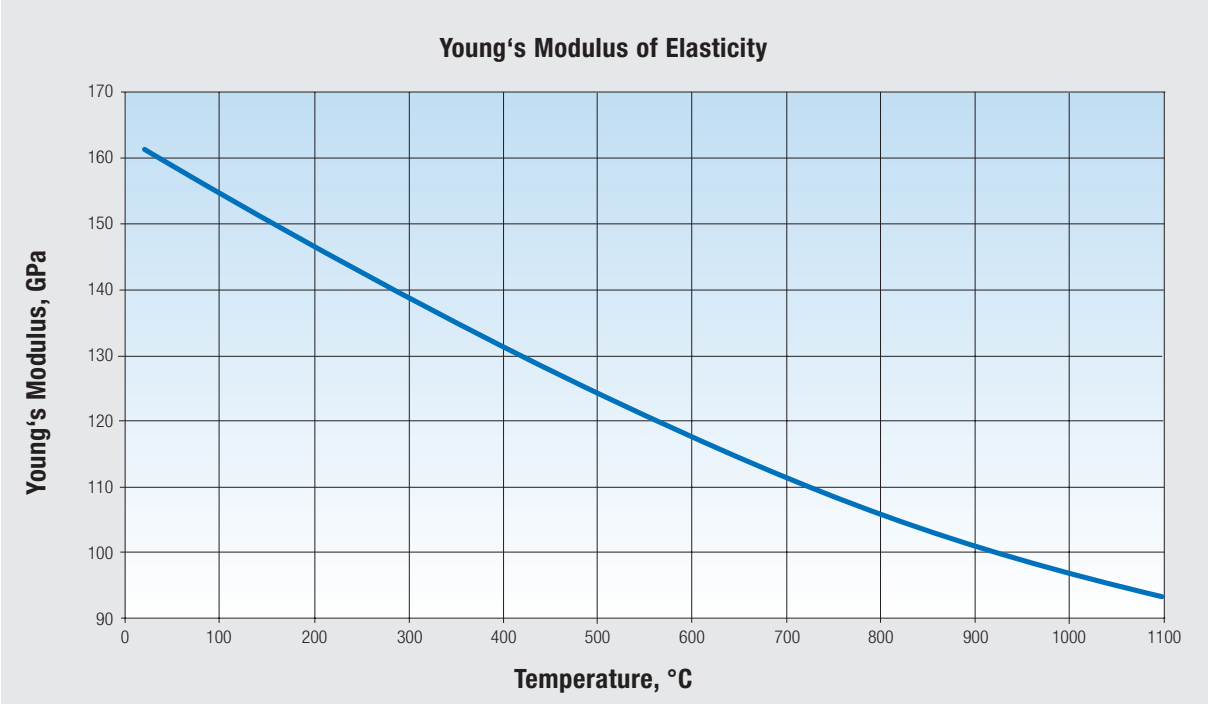
Tubular systems requiring high creep rupture strength combined with good oxidation and carburisation resistance. No heat treatment is required for most applications of this alloy. Main high temperature applications for the material are:

Process:	max. operating temperature, °C
Steam cracking	1100
Steam reforming	1100
Direct reduction of iron ore	1100

Physical Properties

Density: 8.0 g/cm^3
Thermal Conductivity (20°C): 14.6 W/mK





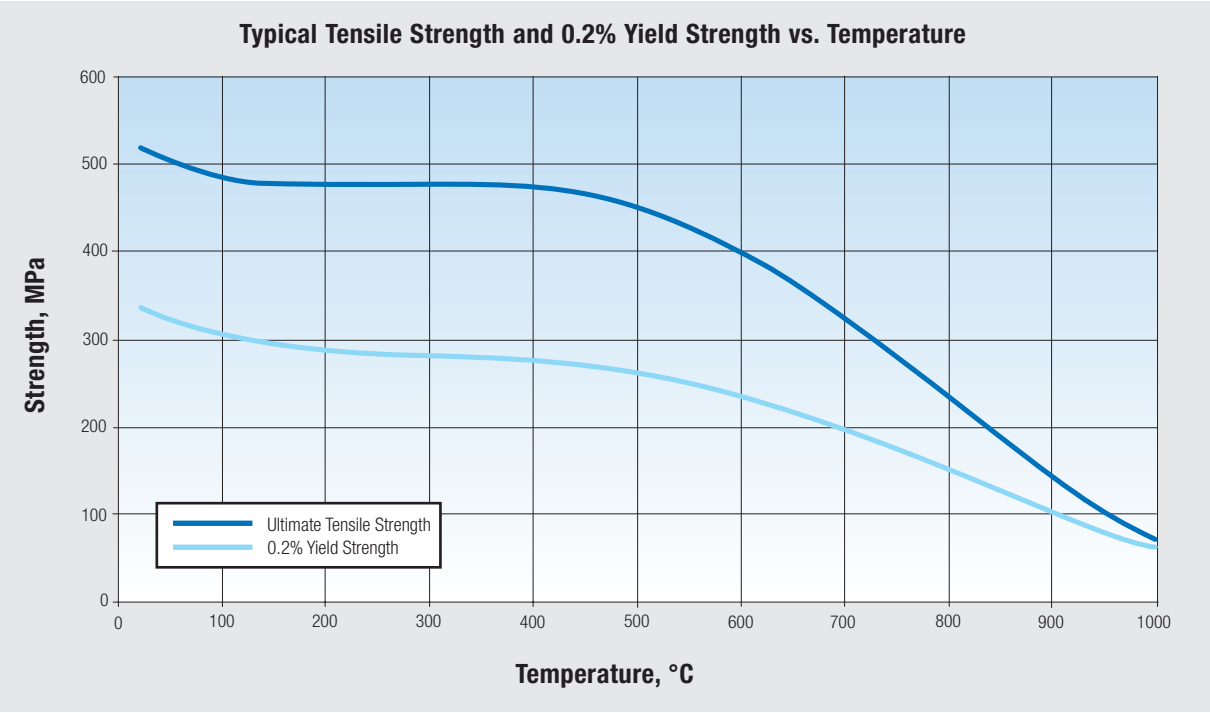
Mechanical Properties

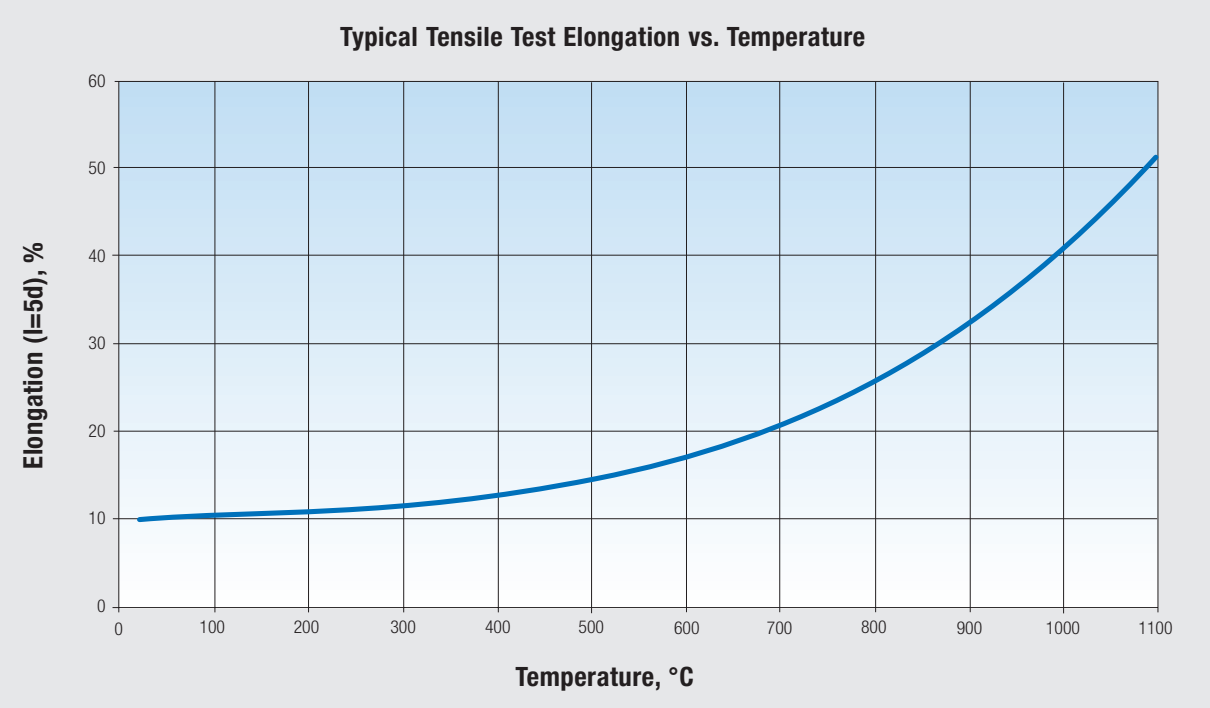
(only for wall thickness less than 25 mm in the as cast condition)

Tensile properties

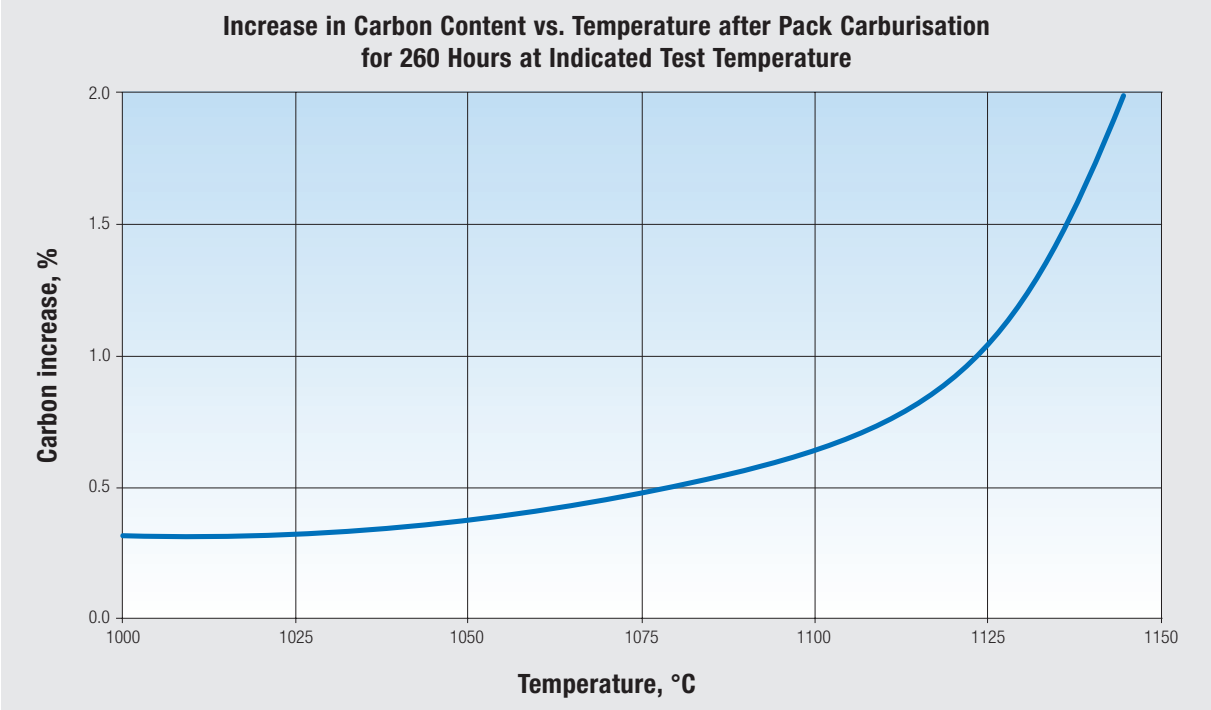
Minimum tensile properties at 20°C:

0.2% Yield strength:	230 MPa
Ultimate tensile strength:	450 MPa
Elongation (l = 5d):	8% for centricast tubes
	6% for static castings

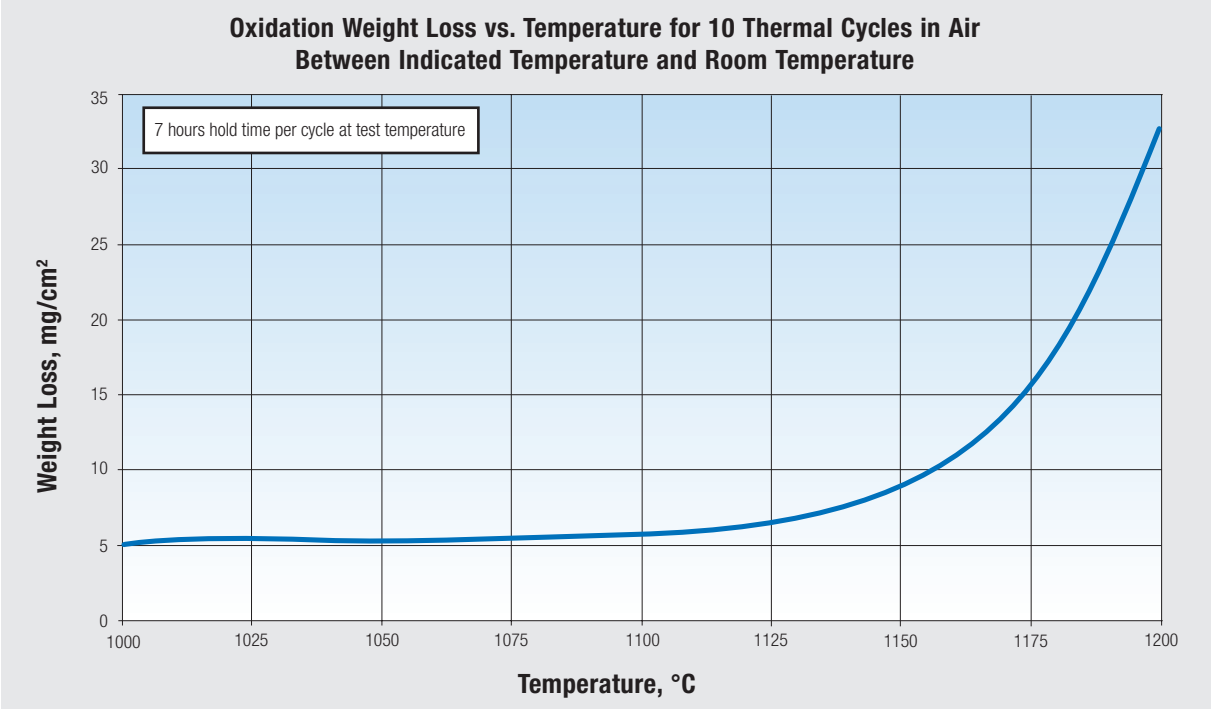




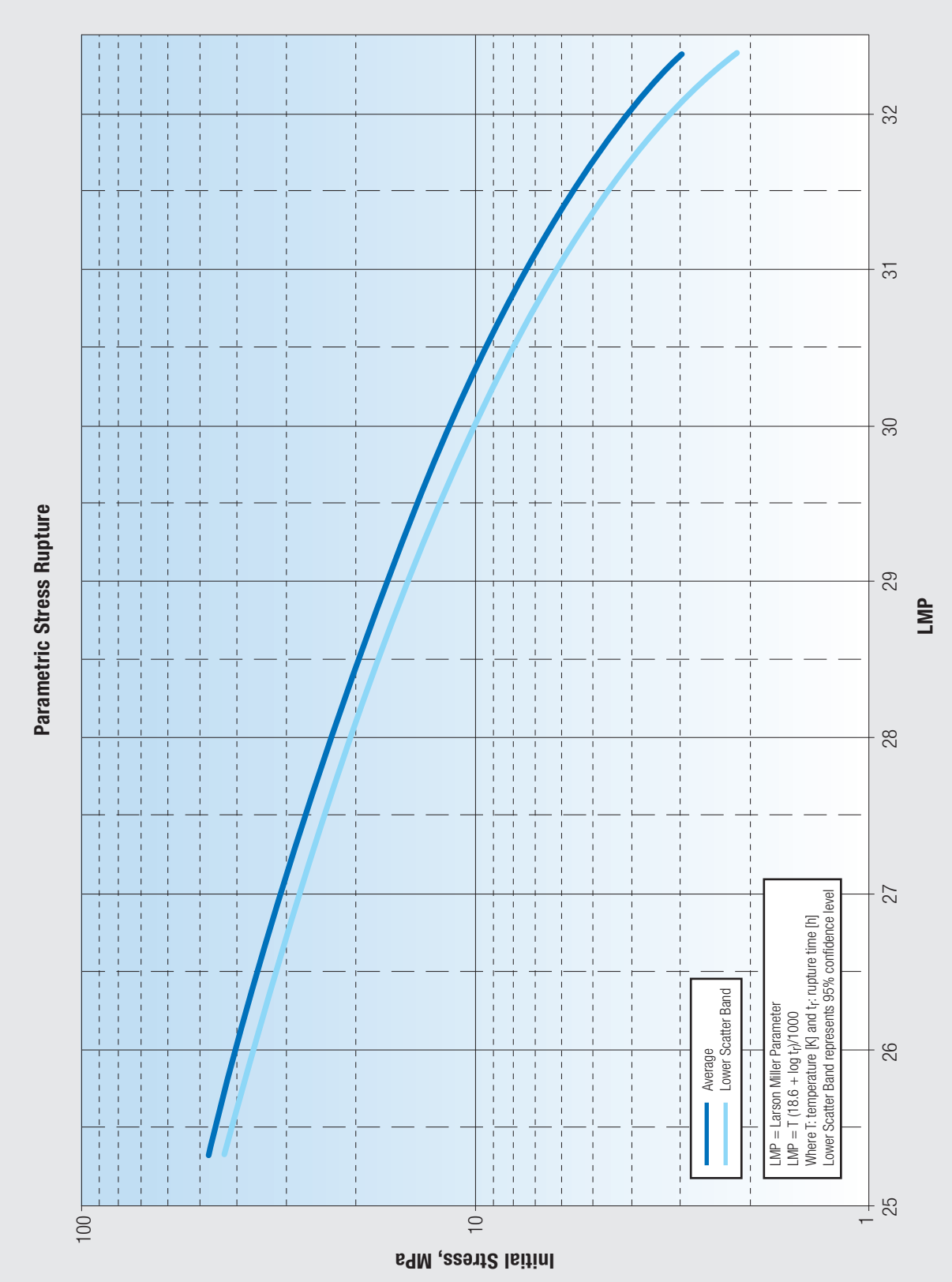
Carburisation Resistance



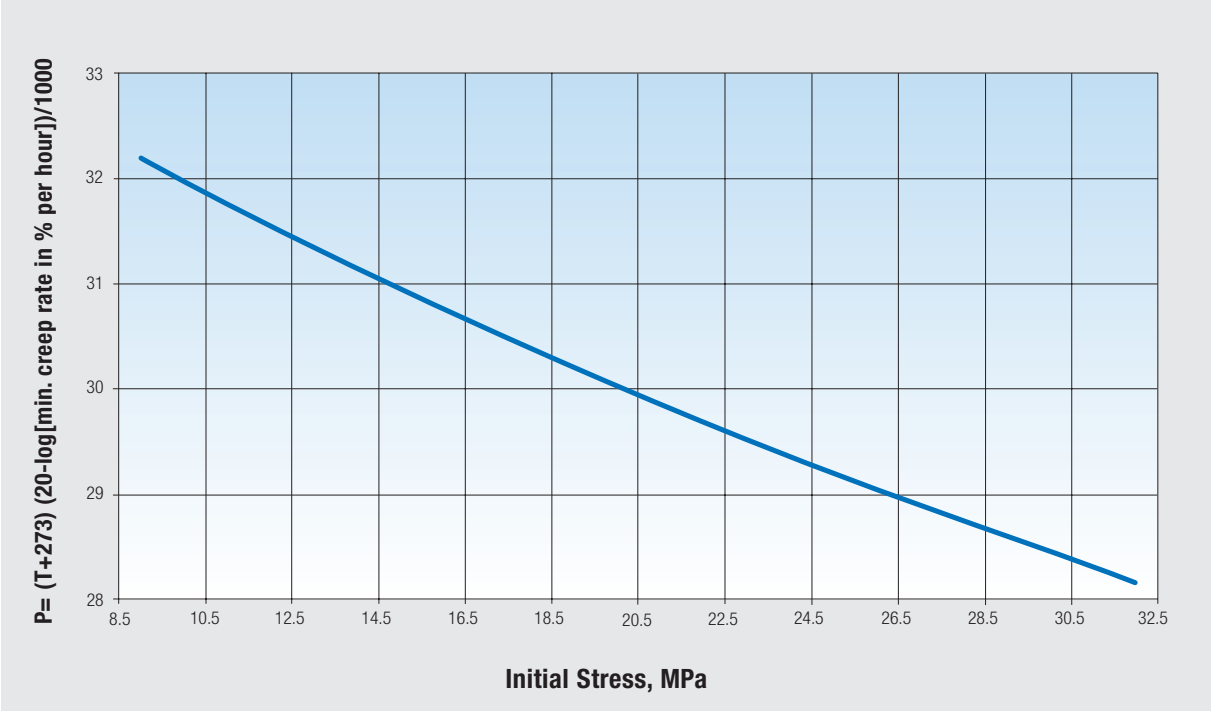
Oxidation Resistance



Parametric Stress Rupture Strength



Parametric Minimum Creep Rate



Manufacturing Characteristics

Machining

In general terms the machinability of Centralloy® G 4852 is similar to that of other heat resistant alloys.

Welding

For critical, highly stressed and corrosion resistant joints coated electrodes, flux cored wire and bare filler material are commercially available. These welding consumables have high strength properties at elevated temperatures with good retained ductilities. Besides fillerless PAW, TIG and MAW have been used satisfactorily for component fabrication or repair welding. Preheating and postweld heat treatment of the joint is not necessary. For dissimilar weld joints to austenitic materials the same filler materials are recommended. Further information can be supplied upon request.

Health and Safety Information

The operation and maintenance of welding equipment should conform to the provisions of relevant national standards for the protection of personnel.

Mechanical ventilation is advisable, and under certain conditions in confined spaces, is necessary during welding operations in order to prevent possible exposure to hazardous fumes, gases, or dust that may occur.

Nickel- and iron-base materials may contain, in varying concentrations, elemental constitutions of chromium, iron, manganese, molybdenum, cobalt, nickel, tungsten and aluminium. Inhalation of metal dust from welding, grinding, melting and dross handling of these alloy systems may cause adverse health effects.

Schmidt + Clemens Group

Spun Casting – Petrochemical Industry

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- Petrochemicals
- Iron-ore direct reduction

Services
- Business consulting
- Analysis of operational data
- Training of customer personnel
- Welding supervision

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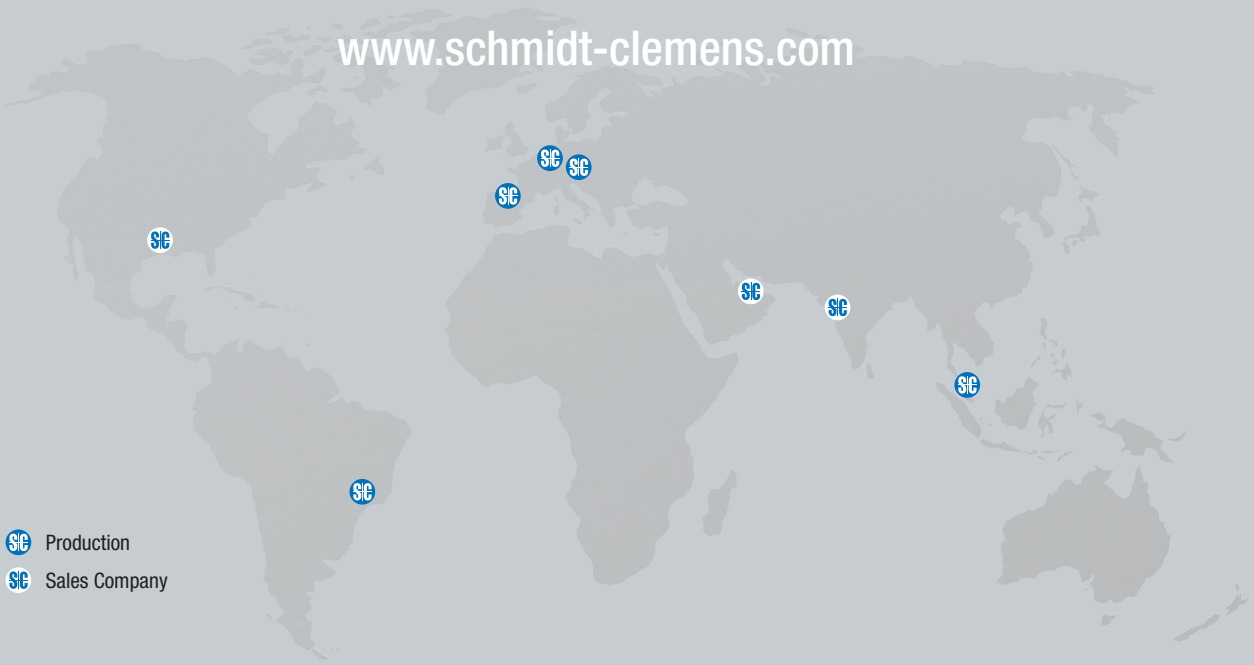

Production
Sales Company