Technical Data Sheet
UGI® KCN35N

Chemical analysis (%)

C	Si	Mn	Ni	Cr	Co	Mo	Ti	P	S	B	Fe
≤0,03	≤0,15	≤0,15	33 - 37	19 - 21	BAL.	9 – 10,5	≤1,0	≤0,015	≤0,01	≤0,01	≤1,0

10-01-2010 – REV01

General presentation

UGI® KC35N is an nonmagnetic nickel- cobalt- chromium-molybdenum alloy of the multiphase alloy system that possesses an outstanding combination of ultra-high tensile strength, good ductility and toughness, and excellent corrosion resistance; In addition, this alloy display exceptional resistance to sulfidation, high temperature oxidation , hydrogen embrittlement

Classification

Nonmagnetic nickel- cobalt- chromium-molybdenum alloy with a fully austenitic structure

Designation

Material No.

Europe EN	USA UNS	Japan SUS
	R30035	

Standards

ISO 5832-6

ASTM F562

AMS 5758, AMS 5844, AMS 5845

NACE MR0175 / ISO 15156

Mechanical properties

Young's modulus , E	20°C	200°C	500°C
MPa x 1000 (Annealed)	233	216	201
MPa x 1000 (Cold drawn and aged)	235	219	201

Shear modulus G (torsion)	20°C	200°C	500°C
MPa x 1000 (Annealed)	83.4	77.8	70.6
MPa x 1000 (Cold drawn and aged	80.9	74.7	67.8

UGI® KC35N can be produced to answer specific requirements.

It is possible to manufacture this alloy in a large range of nominal values mechanical properties from annealed temper (UTS: 800 – 1000 MPa) up to cold drawn condition (tensile running from 1300 MPa to 2000 MPa) within a range of +/- 100 MPa.

The influence of the heat treatment, negligible in the annealed condition, becomes more important as the cold drawn hardening increases.

However, even if the level of the request mechanical resistance can be reached only by cold drawing, it is preferable to use lighter cold drawing temper and achieve the requested mechanical properties after heat treatment; the heat treatment stabilizing the material.

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Bars

These bars are obtained by straightening from coil. On same level of cold drawing, this process involves a decrease of around 10% of the UTS compared to the coil form.

Physical properties:

Properties	
Specific weight	8.43 g/cm^3
Specific weight	1315 – 1440°C
Resistivity	20°C
μΩcm	1.03
Thermal conductivity	20°C
W/m/K	11.24
Mean coefficient of thermal expansion	0 – 100°C
°C-1.(x 10-6)	12,80
Magnetic permeability μmax	500 / 1000 Oe
	1,0009

Corrosion resistance

UGI® KC35N possesses excellent resistance to sulfidation, high temperature oxidation, hydrogen embrittlement, saline solutions and most mineral acids. It's features exceptional resistance to stress corrosion cracking at very high strength level under severe environmental conditions that can crack most conventional alloys. It is also highly resistant to other forms of localized attack, such as pitting and crevice corrosion.

As UGI® KC35N is a an extremely noble alloy, this can result in galvanic corrosion when electrically coupled with more active metals such as carbon steel, type 316 stainless, or K MONEL®.

UGI® KC35N alloy is included in NACE MR0175 to a maximum hardness of Rockwell HRC 35 (maximum hardness of Rockwell HRC 48 in specific cold reduced plus aged condition). This material requirements lists sulfide stress cracking resistant materials for exposure to sour environment, such as in gas and oil well service.

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Media	Level
Acetic acid	Excellent
Sulfuric acid	Good
Sea water	Excellent
Humidity	Excellent
Salt spray (NaCl)	Excellent
Nitric acid.	Good
Phosphoric acid	Good
Sodium hydroxide	Good

Machinability

The high mechanical properties in the as drawn condition and the ability of cold hardening during machining, need to take particular precautions for machining:

- Robust and rigid machines
- moderate Cutting speeds
- Carbides tools, or brazed pastilles, with large rake angles
- Cutting fluid with high performances of cooling and lubrication

Machinability studies have shown that this alloy possesses machining characteristics superior to those of Waspaloy®, a widely used standard for Nickel-Cobalt-Chromium bas alloy machinability. Machining parameters for UGI® KC35N are similar those used for Waspaloy® alloy

Welding

UGI® KC35N alloy can be successfully TIG welded. In general, welding properties are similar to those of type 304 stainless. Similar preparations and precautions should be employed.

The welding parameters should be adjusted to ensure that the heat input per pass is low. Approximately ½ to 2/3 of the heat input used to weld maraging steel and type 304 stainless steel should be used.

Heat treatment

UGI® KC35N can be aged in the temperature range of 430 / 650 °C /Air cool

For optimum properties, cold worked KC35N alloy should ne aged @ 540 – 600 °C

The influence of the treatment on annealed material is negligible but become very important on cold drawn products

Products available

- Available in wire (coil form) and in straightened ground bars (minimum diameter: 1 mm)
- Annealed condition: Dia 0,60 mm up to 18 mm
- Hard condition: Dia 0,05 mm up to 15 mm

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Applications

- Medical: prothesis et fixation screws, pacemaker's electrodes, vascular stent, veina cava filter, orthodonty, ancillary…
- Aerospace industries: springs torsion bar, gyroscopes's parts
- Naval equipment: fittings, springs and cables
- Watches Industry: springs, parts of wrist-watch strap , pins, crown, push button's springs,
- Electronic's industry : non magnetic parts,
- Force and pressure sensors:
  - Oil and gas industry: springs ,non magnetic parts, corrosion and abrasion'resistant parts