36CRNIMO16, 1.6773

36CrNiMo16 is a highly advanced alloy steel with exceptional strength and durability. Widely used in various industries, this alloy offers superior performance in demanding applications. With its unique composition, 36CrNiMo16 exhibits excellent resistance to wear, corrosion, and high temperatures. Its exceptional toughness ensures optimal performance even under extreme conditions. This makes it an ideal choice for applications that require strength, reliability, and longevity. In addition to its exceptional physical properties, 36CrNiMo16 offers excellent machinability, enabling precision engineering and seamless integration into complex structures. Its versatility and adaptability make it a preferred choice for a wide range of industries, including automotive, aerospace, and manufacturing. By choosing 36CrNiMo16, you are selecting a high-quality material that guarantees outstanding performance and reliability. Our commitment to excellence ensures that you receive a product that meets the highest standards and surpasses your expectations. Upgrade to 36NiCrMo16 and experience the difference in quality and performance. Contact us today to learn more about how this advanced alloy can benefit your specific application.

Chemical Composition

Grade	Chemical Composition %								
	C	Mn	Si	P	S	Cr	Mo	Ni	Other
36CrNiMo16, 1.6773	0.32 - 0.39	0.50 - 0.80	max 0.40	max 0.025	max 0.025	1.6 - 2.0	0.25 - 0.45	3.6 - 4.1	-
35NCD14, 35NiCrMo14	0.30 - 0.40	0.20 - 0.50	0.10 - 0.40	max 0.030	max 0.025	1.2 - 1.6	0.20 - 0.40	3.20 - 3.70	-
AIR 9160 **35NCD16, 35 NCD 16**	0.37	0.45	-	-	-	1.80	0.45	4.00	-
AIR 9160 30NCD16, E30NCD16	0.3	0.50	-	-	-	1.40	0.45	4.00	-
AFNOR 35NiCrMo16	0.34 - 0.40	0.15 - 0.60	0.15 - 0.40	-	-	1.6 - 2.0	0.3 - 0.6	3.5 - 4.50	-
UNI 35NiCrMo15	0.30 - 0.38	0.30 - 0.60	0.15 - 0.35	max 0.025	max 0.02	1.6 - 1.9	0.25 - 0.45	3.50 - 4.00	-
DIN 30NiCrMo16-6, 1.6747	0.27 - 0.33	0.40 - 0.60	0.15 - 0.35	max 0.035	max 0.035	1.3 - 1.5	0.40 - 0.50	3.80 - 4.20	-
EN 30NiCrMo16-6, 1.6747	0.26 - 0.33	0.50 - 0.80	max 0.40	max 0.025	max 0.025	1.2 - 1.5	0.30 - 0.60	3.30 - 4.30	-
GOST 36Ch2N4MA, 36Kh2N4MA, 36H2N4MA, 36X2H4MA	0.32 - 0.39	0.50 - 0.80	max 0.40	max 0.025	max 0.025	1.6 - 2.0	0.25 - 0.45	3.60 - 4.10	-
TU 34ChN3M, 34KhN3M, 34XH3M	0.30 - 0.40	0.50 - 0.80	0.17 - 0.37	max 0.03	max 0.03	0.7 - 1.1	0.25 - 0.40	2.75 - 3.25	-

Mechanical Properties

- Tensile strength: 980-1180 MPa
- Yield strength: 785-930 MPa
- Elongation: 9-16%
- Reduction of area: 40-55%
- Hardness: 269-321 HB
- Impact strength: 40-80 J/cm²

Physical Properties

The physical properties of 36CrNiMo16 steel may vary slightly depending on the specific manufacturing process and heat treatment applied, but generally, this steel has the following physical properties:

1. Density: The density of 36CrNiMo16 steel is typically around 7.85 g/cm³ (0.283 lb/in³).

2. Melting Point: The melting point of 36NiCrMo16 steel is approximately 1420-1470°C (2588-2678°F).

3. Thermal Expansion: The coefficient of thermal expansion for 36NiCrMo16 steel is around 11.5 x 10^-6 /°C (6.4 x 10^-6 /°F) in the temperature range of 20-100°C (68-212°F).

4. Electrical Conductivity: 36CrNiMo16 steel is a conductive material with a moderate electrical conductivity.

5. Magnetic Properties: 36CrNiMo16 steel is a magnetic material and exhibits ferromagnetic properties.

It is important to note that these physical properties are general guidelines and may vary depending on the specific composition and processing of the steel. It is always recommended to consult the manufacturer or refer to the technical datasheet for the precise physical properties of 36NiCrMo16 steel.

Heat Treatment

The heat treatment of 36CrNiMo16 steel typically involves the following steps:

1. Preheating: The steel is heated to around 600-650°C (1112-1202°F) to reduce the risk of cracking during the subsequent heating process.
2. Quenching: The steel is heated to a temperature of 900-950°C (1652-1742°F) and then rapidly cooled in oil or water. This process is known as quenching and it helps to achieve the desired hardness and strength in the steel.
3. Tempering: After quenching, the steel is tempered by reheating it to a temperature of 500-650°C (932-1202°F) for several hours. This step helps to reduce the brittleness and improve the toughness of the steel.
4. Stress relieving: The steel may undergo stress relieving after tempering to reduce internal stresses that may have been caused during the heat treatment process. This is typically done by heating the steel to a temperature of around 550-650°C (1022-1202°F) and then slowly cooling it.

The specific temperatures and durations for each step of the heat treatment process may vary depending on the desired mechanical properties and specific requirements of the application. It is always recommended to consult with the manufacturer or refer to the specific technical datasheet for precise heat treatment instructions for 36CrNiMo16 steel.

Welding Properties

36CrNiMo16 steel can be welded using various methods, including manual metal arc welding (MMA), gas metal arc welding (GMAW/MIG), and submerged arc welding (SAW). However, it is essential to follow proper welding procedures to ensure a strong and reliable weld. Here are some key considerations for welding 36CrNiMo16 steel: 1. Preheat and Interpass Temperature: Preheating the steel before welding is usually necessary to reduce the risk of cracking. The preheat temperature should typically be in the range of 200-300°C (392-572°F). Additionally, maintaining an appropriate interpass temperature during multi-pass welding is important to prevent excessive cooling and maintain weld quality. 2. Welding Consumables: Selecting the appropriate welding consumables is crucial for achieving good weld quality and mechanical properties. Low hydrogen electrodes or wires with compatible strength and composition should be used for welding 36NiCrMo16 steel. 3. Post-Weld Heat Treatment: Heat treatment after welding may be required to relieve residual stresses and improve the mechanical properties of the weld. This typically involves a tempering process at a suitable temperature range, which depends on the desired properties and the steel's composition. 4. Joint Design and Preparation: Proper joint design and preparation, including beveling and cleaning the joint surfaces, are essential for achieving a sound weld. Ensuring a proper fit-up and adequate root gap is also important to achieve proper penetration and fusion. 5. Welding Technique: Employing appropriate welding techniques, such as controlling the heat input, maintaining the correct arc length, and using suitable travel speed, can help prevent defects like porosity, cracking, or excessive distortion. It is always recommended to refer to the welding procedure specifications (WPS) provided by the steel manufacturer or consult qualified welding experts for specific recommendations and guidance when welding 36NiCrMo16 steel.

Machining Properties

When machining 36CrNiMo16 steel, it is important to consider its high strength and hardness. This steel has a relatively low machinability rating, which means it can be challenging to machine compared to softer materials. However, with the right tools and techniques, it is still possible to achieve good results. Here are some general guidelines for machining 36CrNiMo16 steel:1. Tool Selection: Use high-speed steel (HSS) or carbide cutting tools with sharp edges and a robust design to withstand the high cutting forces and prevent premature tool wear. Coated or cermet inserts may also be suitable for certain applications.
2. Cutting Speed: Start with conservative cutting speeds and gradually increase to find the optimal cutting speed for the specific operation. It is essential to strike a balance between maintaining cutting efficiency and avoiding excessive heat buildup, which can lead to tool wear or workpiece damage.
3. Feed Rate: Use a moderate feed rate to ensure chip evacuation and prevent tool overload. A feed rate that is too high can cause tool breakage or poor surface finish, while a feed rate that is too low can cause excessive heat buildup.
4. Cutting Fluid: Apply an appropriate cutting fluid or coolant to help dissipate heat and lubricate the cutting zone. This can improve tool life and reduce the risk of workpiece deformation. Flood coolant or high-pressure coolant systems may be necessary for efficient chip evacuation.
5. Machine Rigidity: Ensure that the machine tool and workholding are rigid and stable to minimize vibrations and maintain accuracy during machining. Any excessive vibrations can lead to poor surface finish or dimensional inaccuracies.
6. Tool Geometry: Use appropriate tool geometry, such as a positive rake angle and sharp cutting edges, to reduce cutting forces and improve chip control. Consider using inserts with chip breakers to enhance chip evacuation and prevent chip clogging.
7. Workpiece Hardness: 36CrNiMo16 steel is typically supplied in a hardened and tempered

condition. If machining after heat treatment, it is important to select appropriate cutting parameters and tools for hardened materials.It is advisable to consult the steel supplier for specific machining recommendations or seek the expertise of experienced machinists to optimize the machining process for 36CrNiMo16 steel.