CLIFFS

305
STAINLESS STEEL

- **Appliances**
- **Deep Drawn Parts**
- **Kitchen Utensils**
- **Tanks Covers**

TYPE 305 is an austenitic, chromium-nickel stainless steel that can be spun and deep drawn more easily due to an increased nickel content that decreases work hardening. It is non-magnetic and cannot be hardened by heat treatment.

Typical uses include appliances, kitchen utensils, tank covers and other deep drawn parts.

305 STAINLESS STEEL

SPECIFICATIONS

Type 305 is covered by the following specifications:

- AMS 5514
- ASTM A240

Composition		(wt %)
Carbon	(C)	0.12 max.
Manganese	(Mn)	2.00 max
Phosphorus	(P)	0.045 max.
Sulfur	(S)	0.030 max.
Silicon	(Si)	1.00 max.
Chromium	(Cr)	17.00 – 19.00
Nickel	(Ni)	10.00 – 13.00
Iron	(Fe)	Balance

AVAILABLE FORMS

Cleveland-Cliffs produces Type 305 in thicknesses from 0.01 – 0.125 in. (0.25 – 3.18 mm) and widths up to 36 in. (914 mm). For other thicknesses and widths, contact your Cleveland-Cliffs sales representative.

Values shown in this bulletin were established in U.S. customary units. The metric equivalents may be approximate.

PHYSICAL PROPERTIES

Density, lbs/in.^{3} (g/cm^3)	0.283 (7.81)
Electrical Resistivity, $\mu\Omega$•in. ($\mu\Omega$•cm)	27.0 (68.5)
Thermal Conductivity, BTU/hr./ft./°F W/(m•K)	
212 °F (100 °C)	9.4 (16.2)
932 °F (500 °C)	12.4 (21.4)
Coefficient of Thermal Expansion, in./in./°F (μm/m/K)	
32 – 212 °F (0 – 100 °C)	8.7 x 10^{-6} (15.7)
32 – 600 °F (0 – 315 °C)	9.7 x 10^{-6} (17.5)
32 – 1000 °F (0 – 538 °C)	10.2 x 10^{-6} (18.4)
32 – 1200 °F (0 – 649 °C)	10.5 x 10^{-6} (18.9)
32 – 1600 °F (0 – 871 °C	11.3 x 10^{-6} (20.3)
Modulus of Elasticity, ksi. (MPa)	28.6 x 10^3 (197 x 10^3)
Magnetic Permeability, (H/m at 200 Oersteds)	Annealed 1.02
Specific Heat, BTU/lbs./°F (kJ/kg/K)	
32 – 212 °F (0 – 100 °C)	0.12 (0.50)
Melting Range, °F (°C)	2550 – 2650 (1399 –1454)

Mechanical Properties

TABLE 1 – TYPICAL ROOM TEMPERATURE MECHANICAL PROPERTIES

UTS, ksi. (MPa)	0.2% YS, ksi. (MPa)	Elongation % in 2" (50.8 mm)	Rockwell Hardness, B
85 (586)	35 (241)	55	70

TABLE 2 – IMPACT ENERGY

Izod V-Notch Rockwell, ft.•lbs (J)	110 (140)

CORROSION RESISTANCE

Type 305 is similar to Type 304 with respect to corrosion resistance. It offers good protection from a wide variety of solutions used in the chemical, textile, petroleum, dairy and food industries.

If the grade is heated or cooled slowly through the 900 – 1600 °F (482 – 871 °C) temperature range, a carbide network may form at the grain boundaries, thereby decreasing corrosion resistance. Annealing, followed by rapid cooling, alleviates the situation.

Type 305 provides good oxidation resistance in air up to about 1650 °F (899 °C), and can be used for intermittent exposure to about 1500 °F (816 °C).

FORMABILITY

Type 305 can be readily formed and deep drawn into complex shapes. Due to its lower strength and work hardening rate, Type 305 requires less power to form than either Type 301 or Type 304. Unlike Type 301 and Type 304, this material will remain non-magnetic after cold work.

WELDABILITY

The austenitic class of stainless steels is generally considered to be weldable by the common fusion and resistance techniques. Special consideration is required to avoid weld "hot cracking" by assuring formation of ferrite in the weld deposit. This particular alloy is generally considered to have comparable weldability to Types 304 and 304L. However, autogenous welds in Type 305 are more sensitive to hot cracking than welds in Types 304 or 304L, as little or no ferrite forms on solidification. Use of a weld filler such as AWS E/ER 308 is often recommended if hot cracking occurs. Annealing after welding will be needed to offset any chromium carbide precipitation which might occur. When a weld filler is needed, AWS E/ER 308 is most often specified.

HEAT TREATMENT

Type 305 is not hardenable by heat treatment.

Annealing: Anneal is 1850 – 2050 °F (1010 – 1121 °C), then water quench or rapidly air cool.

305 STAINLESS STEEL

About Cleveland-Cliffs Inc.

Cleveland-Cliffs is a leading North America-based steel producer with focus on value-added sheet products, particularly for the automotive industry. The Company is vertically integrated from mined raw materials, direct reduced iron, and ferrous scrap to primary steelmaking and downstream finishing, stamping, tooling, and tubing. Cleveland-Cliffs is headquartered in Cleveland, OH with mining, steel and downstream manufacturing operations located across the U.S. and Canada. For more information, visit www.clevelandcliffs.com.

CLIFFS

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