Technical Datasheet

CarTech® 201 Modified Stainless

Type Analysis

Single figures are nominal except where noted.

Carbon (Maximum)	0.15 %	**Manganese**	7.00 to 9.00 %
Phosphorus (Maximum)	0.060 %	**Sulfur (Maximum)**	0.030 %
Silicon (Maximum)	1.00 %	**Chromium**	15.00 to 17.00 %
Nickel	1.50 to 3.00 %	**Nitrogen**	0.15 to 0.30 %
Iron	Balance		

General Information

Description

CarTech 201 Modified stainless is a high-manganese, nitrogen-strengthened austenitic stainless steel that provides substantially higher yield and tensile strengths than CarTech 304 stainless and has general-corrosion resistance between that of CarTech 430 and CarTech 304 stainless. Compared with CarTech 201, CarTech 201 Modified stainless is lower in nickel content, which results in higher cold worked strength. CarTech 201 Modified stainless is essentially nonmagnetic in the annealed condition but becomes magnetic after cold working to high-strength levels.

Applications

CarTech 201 Modified stainless may be considered in high-strength applications such as revetment or reinforcement wire, antenna, cables, lashing and ball wire, industrial belts and screens.

Scaling

The safe scaling temperature for continuous service is 1600ºF (871ºC).

Corrosion Resistance

Carpenter Stainless Type 201 Modified has good resistance to atmospheric corrosion. Its resistance to some acids and corrosive products is comparable to that of Type 304 stainless.

Intergranular corrosion may be a problem if the material is heated between 800ºF (427ºC) and 1650ºF (899ºC) or cooled slowly through that range.

For optimum corrosion resistance, surfaces must be free of scale, lubricants, foreign particles, and coatings applied for drawing and heading. After fabrication of parts, cleaning and/or passivation should be considered.

Important Note: *The following 4-level rating scale is intended for comparative purposes only. Corrosion testing is recommended; factors which affect corrosion resistance include temperature, concentration, pH, impurities, aeration, velocity, crevices, deposits, metallurgical condition, stress, surface finish and dissimilar metal contact.*

Nitric Acid	Good	Sulfuric Acid	Restricted
Phosphoric Acid	Restricted	Acetic Acid	Moderate
Sodium Hydroxide	Moderate	Salt Spray (NaCl)	Moderate
Humidity	Excellent		

Properties

Physical Properties

Specific Gravity	7.84	
Density	0.2830	lb/in³

Typical Mechanical Properties

Effect of Cold Work on Ultimate Tensile Strength – Carpenter Stainless Type 201 Modified

% Cold Work	Ultimate Tensile Strength	
	ksi	MPa
0% (annealed)	113	780
70%	278	1918

Typical Room Temperature Annealed Mechanical Properties – Carpenter Stainless Type 201 Modified

.139" (3.53mm) round wire, strand annealed
.265" (6.73 mm) round wire, batch annealed

Annealing Method	0.2% Yield Strength		Ultimate Tensile Strength		% Elongation in 2" (50.8 mm)	% Reduction of Area
	Ksi	Mpa	Ksi	Mpa		
Strand	68	469	129	890	71.0	72.0
Batch	57	393	113	780	63.0	66.0

Heat Treatment

Annealing

Heat to 1900/2000°F (1038/1093°C) and quench in water. Typically, hardness as annealed is Rockwell B95. When strand annealing, higher temperatures 2000/2150°F (1093/1177°C), set point can be used.

Hardening

Carpenter Stainless Type 201 Modified cannot be hardened by heat treatment; however, this material can be hardened through cold work.

Workability

Hot Working

Carpenter Stainless Type 201 Modified can be readily forged, hot rolled, hot headed and upset.

For hot working, heat uniformly to 2100/2300°F (1149/1260°C). Preheating to an intermediate temperature is not required. Do not forge below 1700°F (927°C). Forgings can be air cooled without danger of cracking.

For maximum corrosion resistance, annealing after hot working is required.

Cold Working

Carpenter Stainless Type 201 Modified is readily cold worked by conventional methods.

Cold working causes martensitic transformation in Carpenter Type 201 Modified, resulting in a significant increase in magnetic permeability.

Because of its metastability, Carpenter Stainless Type 201 Modified is characterized by a high tensile strength in both annealed and cold worked conditions.

Machinability

Carpenter Stainless Type 201 Modified machines at about 50% of the rates used for Type 304 stainless. Its machinability is similar to that of other nitrogen-strengthened alloys, like 18-Cr-2Ni-12Mn stainless. A rigid setup, heavy positive feeds, and ample coolant flow are recommended.

Weldability

Carpenter Stainless Type 201 Modified can be satisfactorily welded by the shielded fusion and resistance welding processes. Oxyacetylene welding is not recommended since carbon pickup in the weld may occur.

When a filler metal is required, consider AWS E/ER240 welding consumables that should provide welds with strength approaching that of the base metal. If high weld strength is not necessary, then consider E/ER308.

Resistance to intergranular corrosion can be restored by a postweld annealing treatment.

Other Information

Forms Manufactured

- Bar-Rounds
- Billet
- Wire
- Wire-Rod

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