

DATA SHEET



**LATROBE SPECIALTY
STEEL COMPANY**

Latrobe, PA 15650-0031 USA

MP35N[®] ALLOY

Typical Composition	Ni	Co	Cr	Mo
	35	35	20	10

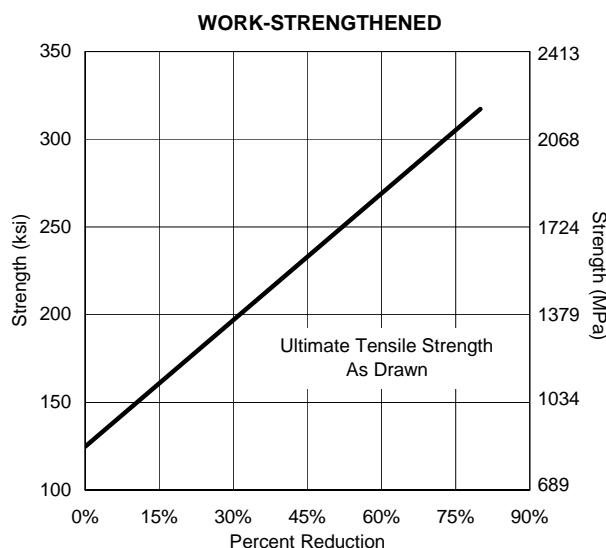
INTRODUCTION

MP35N is a nickel-cobalt base alloy of the Multiphase[®] alloy system that has a unique combination of properties - ultra high strength, toughness, ductility *and* outstanding corrosion resistance. The alloy is work-strengthened and aged to obtain strength levels of 260 to 300 ksi (1793-2086 MPa) in its full strength condition. With less cold work reduction, the alloy has the best balance of strength and stress corrosion cracking resistance (SCC) for harsh environments. MP35N alloy resists corrosion in hydrogen sulfide, salt water and other chloride solutions, as well as the mineral acids (nitric, hydrochloric, sulfuric). In addition, it has exceptional resistance to crevice corrosion cracking in seawater and other hostile environments.

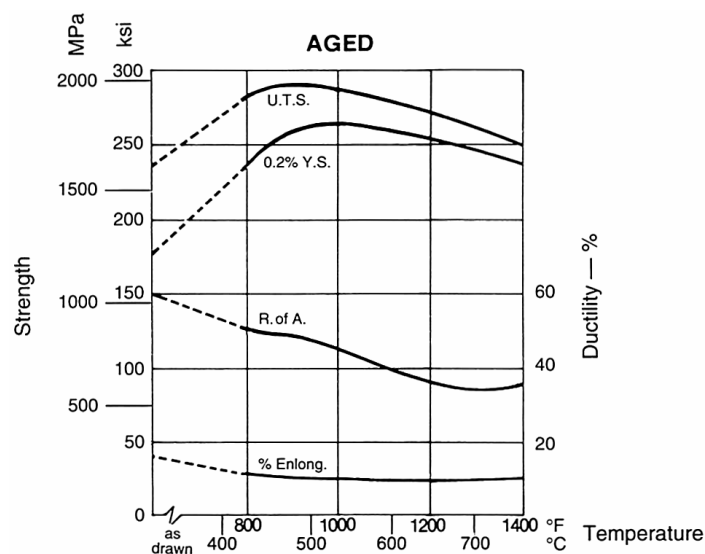
HEAT TREATMENT (AGING)

MP35N should be aged at the temperature required to achieve the final properties desired. The amount of cold work in MP35N defines the recommended aging treatments. For AMS 5844 (full strength/ heavily cold worked) material, the alloy should be aged at 1000°F - 1200°F for 4 hours. For optimum sulfide SCC resistance, less-heavily cold worked material can be aged at 1300°F or 1350°F for 4 hours or at 1425°F for 6 hours as indicated in NACE MR-0175. The 1425°F aging treatment provides the best sulfide SCC resistance, but at the expense of strength. Exposure to temperatures much above the recommended aging temperatures may result in a significant (and non-recoverable) loss in strength caused by the reversion of the cold-worked metallurgical structure to the much softer annealed structure.

MECHANICAL PROPERTIES



This figure shows the effect of work-strengthening (by cold drawing) on MP35N alloy tensile strength.



This figure shows the effect of aging 4 hours at temperature on tensile properties of MP35N alloy work-strengthened before aging by cold drawing to 240 ksi.

MECHANICAL PROPERTIES - BAR

Bar Dia. (in)	Age	Guaranteed Minimum Properties					Nominal Properties*					Specifications**
		UTS (ksi)	YS (0.2%) (ksi)	Elong. (%, 4D)	RA (%)	HRC	UTS (ksi)	YS(0.2%) (ksi)	Elong. (%,4D)	RA (%)	HRC	
Annealed												
NA		115 - 145	35 - 65	50	65	99 B max	125	55	60	75	91 HRB	AMS 5758
Cold Drawn - Full Strength												
≤2.25	NA						255	225	12	50	45	AMS 5844
	1050°F/4	260	230	8	35	44 min	285	275	9	45	50	AMS 5844/5845
Cold Drawn - Reduced Strength												
≤ 2.25	1050°F/4	220	210	10	45		240	230	13	55		AMS 5844/5845, except 220 ksi UTS
	1050°F/4	200	190	10	45		220	200	16	60		AMS 5844/5845, except 200 ksi UTS
	1300°F/4	220	210	10	40	51 max	235	225	11	45	38-51	NACE MR0175
	1350°F/4	210	200	10	40	51 max	225	215	13	50	38-51	NACE MR0175
	1425°F/6	190	180	10	40	51 max	210	200	15	55	38-51	NACE MR0175
Pilgered - Reduced Strength												
2.23 to	1050°F/4	185	175	12	48		205	200	18	60		AMS 5844/5845, except 185 ksi UTS
2.50	1050°F/4	200	190	10	45		220	200	16	60		AMS 5844/5845, except 200 ksi UTS
	1300°F/4	190	180	10	40	51 max						NACE MR0175
	1350°F/4	190	180	10	40	51 max	210	200	15	50	36-51	NACE MR0175
	1425°F/6	190	180	10	40	51 max	200	190	15	50	36-51	NACE MR0175

Larger bar sizes may be referred to Latrobe Specialty Steel on an individual basis.

*Nominal properties are provided for information only, and are not to be used for design purposes.

**AMS 5844 material is supplied in the cold drawn or pilgered conditions, "capable of" full strength after aging (1000-1200°F/4 hrs).

**AMS 5845 and NACE MR0175 materials are supplied in the aged condition.

SHEAR STRENGTH - BAR

AMS 5844 and AMS 5845 material in bar sizes up to 1.00" diameter can be guaranteed to a minimum shear strength value of 150 ksi. Larger diameter bar product (up to 1.80" diameter) is considered capable of meeting the 150 ksi shear strength value, but cannot be certified as meeting because of testing equipment limitations.

MECHANICAL PROPERTIES - TUBING

Age	Guaranteed Minimum Properties					Specifications
	UTS (ksi)	0.2%YS (ksi)	Elong. (%, 4D)	RA (%)	Hardness HRC	
1050°F		220				AMS 5845, except 220 ksi YS
1300°F/4	YS + 10	200			51 max	NACE MR0175, SH407269AC
1350°F/4		190			51 max	NACE MR0175, BMS-U101
1425°F/6	190	180	10	40	51 max	NACE MR0175, Baker Atlas 059337-000, Western Atlas 059989-000

Current Sizes Produced (other tubing sizes will be considered upon request)

1.312" x 1.000"	2.610" x 2.190"	3.340" x 3.080"	4.830" x 3.875"
1.390" x 1.050"	2.660" x 2.240"	3.540" x 3.261"	
1.720" x 1.387"	3.070" x 2.830"	4.500" x 4.100"	

AVAILABLE PRODUCT FORMS

Bar, Rod, Billet, Tubing - Latrobe Specialty Steel, Latrobe, PA, 724-537-7711

Sheet, Strip, Plate - H. C. Starck, Cleveland, OH, 216-692-3990

Tubing 1.00" (25.4 mm) O.D. and under - Dearborn Precision Tubular Products, Inc., Fryeburg, ME, 207-935-2171



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