



PRECISION MARSHALL STEEL COMPANY
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DRILL ROD TYPICAL MATERIAL CERTIFICATE

STANDARD INFORMATION

STANDARD CHEMICAL COMPOSITION

AISI / SAE	UNS	Carbon	Manganese	Silicon	Phosphorous	Sulfur	Chromium	Vanadium	Tungsten	Molybdenum
W1	T72301	.90/1.05	.30/.40	.10/.25	.025 Max	.025 Max	.15 Max	.10 Max	.15 Max	.10 Max
O1	T31501	.85/1.00	1.00/1.40	.10/.50	.030 Max	0.030 Max	.40/.70	.30 Max	.40/.60	--
A2	T30102	.95/1.05	.40/1.00	.50 Max	.030 Max	0.030 Max	4.75/5.50	.15/.50	--	.90/1.40
S7	T41907	.45/.55	.20/.90	.20/1.00	.030 Max	0.030 Max	3.00/3.50	.35 Max	--	.10 Max
D2	T30402	1.40/1.60	.10/.60	.10/.60	.030 Max	0.030 Max	11.00/13.00	.50/1.10	--	.70/1.20
M2	T11302	.85 Max	.30 Max	.20/.45	--	--	4.00 Max	2.00 Max	6.00 Max	5.00 Max
H13	--	.40	--	1.00	--	.100	5.25	1.00	-	1.35

SPECIFICATIONS

SURFACE / STRUCTURE

MACHINABILITY

AISI	SAE	ASTM	FEDERAL	Size	Finish (Max)	Quality (Max Defect)	Grade	Rating
W1	J-437	A686-92(2010) (1)	QQ-T-580 Rev.C	.000-.1250	10 RMS	0.000	W1	100
O1	J-437	A681-08 (2)	QQ-T-570 Rev.C	.1251-.2500	15 RMS	0.000	O1	90
A2	J-437	A681-08 (2)	QQ-T-570 Rev.C	.2501-.8750	20 RMS	0.000	A2	65
S7	J-437	A681-08 (2)	QQ-T-570 Rev.C	.8751-2.000	30 RMS	0.000	S7	95
D2	J-437	A681-08 (2)	QQ-T-570 Rev.C	All CD Flats	50 RMS	.008/side	D2	50
M2	J438-B	A600-92a(2016)	QQT-570 Rev. C				M2	65

1 Certain heats may not meet the ASTM specification for Manganese
 2 Certain sizes may not meet the ASTM specification for hardness.

* Grain Size: 5-8 (McQuade-Ehn)
 * Microstructure: 85% min. spheroidization

HARDNESS

SIZE

LENGTH

Size	W1	O1	A2	S7	D2	H13	Diameter	Tolerance	Length	Tolerance
.0000-.1250	166,000 psi	116,000 psi	128,000 psi	123,000 psi	131,000 psi	40-48 HRC	.0000-.1249	+/- .0003	3'	36" +1/8,-0
.1251-.2500	28 HRC	100 HRB	27 HRC	25 HRC	28 HRC	40-48 HRC	.1250-.499	+/- .0005	6'	72" +1,-0
.2501-.5000	23 HRC	100 HRB	27 HRC	25 HRC	28 HRC	40-48 HRC	.500-3.00	+/- .001	12'	144" +2,-0
.5001-2.000	96 HRB	100 HRB	27 HRC	25 HRC	28 HRC	40-48 HRC				

* For sizes under 5/32" diameter, a tensile strength is obtained.

All material RoHS Compliant

Precision Marshall Steel Company hereby attests that drill rod items as supplied have been tested and certified to meet all of the standards and limitations for drill rod as set forth above.

Certified: PM Support Services
 Support Services

Date: 10/28/2020