

Drill Rod

Chemistry and Specifications

Uniform machining properties and consistent response to heat treatment are obtained through careful control of chemical analysis. Identification of each production lot is carefully maintained, and certified chemical analysis can be supplied upon request.

The very high polish on Precision-Marshall drill rod allows it to be utilized without the need for further expensive grinding or polishing. Because our ground and polished drill rod is **guaranteed** to be 100% **free of decarburization, seams, laps, pits and other surface imperfec-**

tions, heat treatment can be confidently undertaken without further metal removal.

Our modern annealing furnace and instrumentation produces finely-controlled microstructures that are consistent lot-to-lot. Precision-Marshall drill rod has guaranteed 90% minimum spheroidization. This, coupled with closely controlled processes, assures uniform machining and response to heat treatment.

Dimensional accuracy is very closely controlled within narrow limits.

Precision-Marshall drill rod is guaranteed to the limits shown below. Machines can be set up for working to a certain tolerance with confidence that there will be no variation.

All ends of our ground and polished drill rod in 3/8- through 3-inch diameters are saw-cut and chamfered or deburred. This protects other lengths from scratching, facilitates set-ups and ensures safety in handling. Smaller diameters are accurately and precisely cut on automatic die-cutters.

ARISTOCRAT Air-hardening Ground and Polished Drill Rod AISI/SAE D-2

ARISTOCRAT drill rod is fine quality, air-hardening, electric furnace melt tool steel. The combination of superior abrasion resistance and toughness found in D-2 results from its high carbon and high chromium analysis. ARISTOCRAT is an extraordinary tool steel that can be specified for the most demanding application. It is, of course, supplied in the full spheroidized condition, 100% free of decarb and other surface imperfec-

tions. ARISTOCRAT's low sulphur content makes it non-freemachining.

HEAT TREATMENT Preheat thoroughly to 1450-1500°F, then raise temperature to 1800-1850°F and hold until uniformly heated through. Soak at temperature 45-60 minutes per inch of thickness. To minimize surface decarburization use salt bath, controlled atmosphere furnace or pack harden. Use high side of hardness for larger diameters.

TEMPERING DATA	
Temper°F	Rockwell C Hardness
As Hardened	62-65
400	60-60
500	59-62
600	57-59
700	57-59
800	57-59
900	59-61

Chemical Compositions (%)

Grade	A.I.S.I. S.A.E. Type	Carbon	Manganese	Silicon	Phosphorus (max)	Sulphur (max)	Chromium	Vanadium	Tungsten	Molybdenum
WATERCRAT	W-1	.95/1.05	.30/.40	.10/.25	.025	.025	.15 Max	.10 Max	.15 Max	.10 Max
OILCRAT	O-1	.85/1.00	1.00/1.40	.50 Max	.030	.030	.40/.60	.30 Max	.40/.60	—
AIR-TRUE	A-2	.95/1.05	1.00 Max	.50 Max	.030	.030	4.75/5.50	.15/.50	—	.90/1.40
SUPER-7	S-7	.45/.55	.20/.80	.20/1.00	.030	.030	3.00/3.50	.20/.30	—	1.30/1.80
ARISTOCRAT	D-2	1.40/1.60	.60 Max	.60 Max	.030	.030	11.00/13.00	1.10 Max	—	.70/1.20
TRM-2	M-2	.85 Max	.30 Max	.30 Max	—	—	4.00 Max	2.00 Max	6.00 Max	5.00 Max
FIRECHROME44	H-13	.40	—	1.00	—	.100	5.25	1.00	—	1.35

Specifications

Grade	A.I.S.I. S.A.E. Type	UNS* Designation	S.A.E.	A.S.T.M.	Federal
WATERCRAT	W-1	T72301	J-437	A-686-79	QQT-580 Rev. C.
OILCRAT AIR-	O-1	T31501	J-437	A-681-76	QQT-570 Rev. C.
TRUE	A-2	T30102	J-437	A-681-76	QQT-570 Rev. C.
SUPER-7	S-7	T41907	J-437	A-681-76	QQT-570 Rev. C.
ARISTOCRAT	D-2	T30402	J-437	A-681-76	QQT-570 Rev. C.
TRM-2	M-2	T11302	J-438-b	A-600-79	QQT-570 Rev. C.
FIRECHROME44	H-13	--	--	--	--

*New designation in accordance with ASTM E 527 and SAE J1086. Recommended for numbering metals and alloys (UNS).

Dimensional Tolerances

Diameter	Round Drill Rod		
	Standard Tolerance* (section)	Straightness (max T.I.R. in 12")	Standard Tolerance (length)
3.000" to 0.500"	±.0010"	.005"	+1/8",-.0
0.499" to 0.125"	±.0005"	.005"	+1/8",-.0
0.124" and smaller	±.0003"	.005"	+1/8",-.0

Size	Flat and Square Drill Rod	
	Standard Tolerance* (section)	Standard Tolerance (length)
1.000" through 0.750" (largest dim.)	±.0015"	+1/8",-.0"
0.749" through 0.250" (largest dim.)	±.001"	+1/8",-.0"
0.249" and smaller	±.0005"	+1/8",-.0"

*Closer tolerances than standard can be produced upon inquiry.

Physical Properties

Size	Hardness (max)		Machinability
	Brinell	Rockwell	
to .125" dia.	341	R _b 110	WATERCRAT = 100
.125" to .250"	275	R _b 104	OILCRAT = 95
.250" to .876"	241	R _b 101	AIR-TRUE = 65
.876" and larger	207	R _b 96	SUPER-7 = 95
			ARISTOCRAT = 50
			TRM-2 = 65
			FIRECHROME44

Surface Finish and Quality

Size	Surface Finish (max)	Surface Quality (max allowable depth of defect)
3.000" to .875" diameter	30 RMS	.000"
.875" to .500" diameter	20 RMS	.000"
.500" to .125" diameter	15 RMS	.000"
.125" and smaller	10 RMS	.000"
Cold drawn squares and flats	50 RMS	.008"/side



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