O-1 OIL HARDENING DRILL ROD

SERIES 453:

Typical Analysis: C 1.00, Mn .40, Si .20

O-1 Tool Steel is a general purpose oil-hardening tool and die steel. Normal care in treatment gives good results in hardening and produces small dimensional changes. It has good abrasion resistance, and sufficient toughness for normal tool and die applications. When compared to a 1 percent carbon steel, 0-1 has a machinability rating of 90.

Tempering Temp.°F	Hardness Rockwell C
none	65
300	63
350	61
400	60.5
450	59
500	58
600	56
800	48-49

Preheat: 1200°F until thoroughly soaked. Harden at 1475°F. Hold 20 minutes per inch of greatest cross section after tool reaches furnace temperature (minimum holding time - 20 minutes). Quench in warm oil to 150° F. Temper immediately 2 hours per inch of greatest cross-section at temperatures shown to achieve the desired hardness.

W-1 WATER HARDENING DRILL ROD

SERIES 628:

Typical Analysis: C 1.00, Mn .40, Si .20

W-1 Tool Steel is a general purpose water-hardening tool steel with a 1.00% Carbon content. It offers an excellent combination of physical properties with an outer case that is abrasion resistant in the 60 Rockwell "C" range with a soft, ductile inner core. W-1 is the easiest of all steels to machine with a machinability rating of 100 as a basis for comparison with other tool steels.

Tempering Temp.°F	Hardness Rockwell C
none	67
300	64
400	61
500	59
600	55
800	46

Heat slowly to 1450° F. Hold 20 minutes per inch of greatest cross-section after tool reaches furnace temperature (minimum holding time-20 minutes). Quench in water or 10% brine solution to 150/200°F. Temper immediately 2 hours per inch of greatest cross-section at temperatures shown to achieve the desired hardness.

A-2 AIR HARDENING DRILL ROD

SERIES 629:

Typical Analysis: C 1.00, Mn .70, Cr 5.00, Mo 1.10, V .25

A-2 Tool Steel is a general purpose, 5% chrome air hardening tool steel. A-2 is popular because it has better wear resistance compared to S-7, A-6 and A-8 Tool Steel. A-2 is tougher and more ductile that D-2 Tool Steel. A-2 is also a very safe grade of tool steel to harden, and can be heat treated in most tool room furnaces without problem. When compared to a 1% carbon steel, A-2 has a machinability rating of 65.

Tempering Temp.°F	Hardness Rockwell C
none	64.5
300	63
350	62
400	61
450	60
500	59
600	58
800	57

Preheat: 1200°F until thoroughly soaked. Harden at 1775°F. Hold 20 minutes/inch of greatest cross-section after tool reaches furnace temperature (min. holder time-30 mins). Air quench to 150°F. Temper immediately 2 hrs./inch of greatest cross-section at temps. shown to achieve the desired hardness.

Dia.	Oil Hardening		Water Hardening		Air Hardening	
	Order No.	Price	Order No.	Price	Order No.	Price
1/16	2535004		6280004		6290004	
5/64	2535005		6280005		6290005	
3/32	2535006		6280006		6290006	
7/64	2535007		6280007		6290007	
1/8	2535008		6280008		6290008	
9/64	2535009		6280009		6290009	
5/32	2535010		6280010		6290010	
11/64	2535011		6280011		6290011	
3/16	2535012		6280012		6290012	
13/64	2535013		6280013		6290013	
7/32	2535014		6280014		6290014	
15/64	2535015		6280015		6290015	
1/4	2535016		6280016		6290016	
17/64	2535017		6280017		6290017	
9/32	2535018		6280018		6290018	
19/64	2535019		6280019		6290019	
5/16	2535020		6280020		6290020	
21/64	2535021		6280021		6290021	
11/32	2535022		6280022		6290022	
23/64	2535023		6280023		6290023	
3/8	2535024		6280024		6290024	
25/64	2535025		6280025		6290025	
13/32	2535026		6280026		6290026	
27/64	2535027		6280027		6290027	
7/16	2535028		6280028		6290028	
29/64	2535029		6280029		6290029	
15/32	2535030		6280030		6290030	
31/64	2535031		6280031		6290031	
1/2	2535032		6280032		6290032	
33/64	2535033		6280033		-	
17/32	2535034		6280034		6290034	
35/64	2535035		6280035		-	
9/16	2535036		6280036		6290036	
37/64	2535037		6280037		-	
19/32	2535038		6280038		6290038	
39/64	2535039		6280039		-	
5/8	2535040		6280040		6290040	
41/64	2535041		6280041		-	
21/32	2535042		6280042		6290042	
43/64	2535043		6280043		-	
11/16	2535044		6280044		6290044	
45/64	2535045		6280045		-	
23/32	2535046		6280046		6290046	
47/64	2535047		6280047		-	
3/4	2535048		6280048		6290048	
49/64	2535049		6280049		-	
25/32	2535050		6280050		-	
51/64	2535051		6280051		-	
13/16	2535052		6280052		6290052	
53/64	2535053		6280053		-	
27/32	2535054		6280054		-	
55/64	2535055		6280055		-	
7/8	2535056		6280056		6290056	
57/64	2535057		6280057		-	
29/32	2535058		6280058		-	
59/64	2535059		6280059		-	
15/16	2535060		6280060		6290060	
61/64	2535061		6280061		-	
31/32	2535062		6280062		-	
63/64	2535063		6280063		-	
1	2535064		6280064		6290064	
1-1/16	2535068		6280068		6290068	
1-1/8	2535072		6280072		6290072	
1-3/16	2535076		6280076		-	
1-1/4	2535080		6280080		6290080	
1-5/16	2535084		6280084		-	
1-3/8	2535088		6280088		6290088	
1-7/16	2535092		6280092		-	
1-1/2	2535096		6280096		6290096	
1-9/16	2535136		6280136		-	
1-5/8	2535140		6280140		-	
1-11/16	2535144		6280144		-	
1-3/4	2535148		6280148		6290148	
1-13/16	2535152		6280152		-	
1-7/8	2535156		6280156		-	
1-15/16	2535160		6280160		-	
2	2535200		6280200		6290200	

(Continued)

PRECISION GROUND AND POLISHED DRILL ROD (TOOL STEEL)

SERIES 453: O-1, OIL HARDENING; SERIES 629: A-2, AIR HARDENING

Size	Decimal Equiv. Inches	Oil Hardening Order No.	Price
1	0.227	2535301	
2	0.219	2535302	
3	0.212	2535303	
4	0.207	2535304	
5	0.204	2535305	
6	0.201	2535306	
7	0.199	2535307	
8	0.197	2535308	
9	0.194	2535309	
10	0.191	2535310	
11	0.188	2535311	
12	0.185	2535312	
13	0.182	2535313	
14	0.180	2535314	
15	0.178	2535315	
16	0.175	2535316	
17	0.172	2535317	
18	0.168	2535318	
19	0.164	2535319	
20	0.161	2535320	
21	0.157	2535321	
22	0.155	2535322	
23	0.153	2535323	
24	0.151	2535324	
25	0.148	2535325	
26	0.146	2535326	
27	0.143	2535327	
28	0.139	2535328	
29	0.134	2535329	
30	0.127	2535330	
31	0.120	2535331	
32	0.115	2535332	
33	0.112	2535333	
34	0.110	2535334	
35	0.108	2535335	
36	0.106	2535336	
37	0.103	2535337	
38	0.101	2535338	
39	0.099	2535339	
40	0.097	2535340	
41	0.095	2535341	
42	0.092	2535342	
43	0.088	2535343	
44	0.085	2535344	
45	0.081	2535345	
46	0.079	2535346	
47	0.077	2535347	
48	0.075	2535348	
49	0.072	2535349	
50	0.069	2535350	
51	0.066	2535351	
52	0.063	2535352	

Size	Decimal Equiv. Inches	Oil Hardening Order No.	Price	Air Hardening Order No.	Price
2mm	0.0787	2535502		6290502	
3mm	0.1181	2535503		6290503	
4mm	0.1575	2535504		6290504	
5mm	0.1969	2535505		6290505	
6mm	0.2362	2535506		6290506	
7mm	0.2756	2535507		6290507	
8mm	0.3150	2535508		6290508	
9mm	0.3543	2535509		6290509	
10mm	0.3937	2535510		6290510	
11mm	0.4331	2535511		6290511	
12mm	0.4724	2535512		6290512	
13mm	0.5118	2535513		6290513	
14mm	0.5512	2535514		6290514	
15mm	0.5906	2535515		6290515	
16mm	0.6299	2535516		6290516	
17mm	0.6693	2535517		6290517	
18mm	0.7087	2535518		6290518	
19mm	0.7480	2535519		6290519	
20mm	0.7874	2535520		6290520	
21mm	0.8268	2535521		6290521	
22mm	0.8661	2535522		6290522	
23mm	0.9055	2535523		6290523	
24mm	0.9449	2535524		6290524	
25mm	0.9843	2535525		6290525	
30mm	1.1811	2535530		-	

Size	Decimal Equiv. Inches	Oil Hardening Order No.	Price
A	0.234	2535801	
B	0.238	2535802	
C	0.242	2535803	
D	0.246	2535804	
E	0.250	2535805	
F	0.257	2535806	
G	0.261	2535807	
H	0.266	2535808	
I	0.272	2535809	
J	0.277	2535810	
K	0.281	2535811	
L	0.290	2535812	
M	0.295	2535813	
N	0.302	2535814	
O	0.316	2535815	
P	0.323	2535816	
Q	0.332	2535817	
R	0.339	2535818	
S	0.348	2535819	
T	0.358	2535820	
U	0.368	2535821	
V	0.377	2535822	
W	0.386	2535823	
X	0.397	2535824	
Y	0.404	2535825	
Z	0.413	2535826	

Please Inquire for:

- **Other Grades**
- **12 Foot Lengths**
- **Special Sizes**