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CEMENTED CARBIDE RODS & BARS

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Prodution Capacity

The company has 2 production bases and complete product process from spray granulation to precision pressing forming, sintering and inspection.

We have the production capacity to produce 2000 tons of cemented carbide and 10 million high-performance carbide inserts annually. The products are exported to markets such as Europe, America, Japan, South Korea, India, Pakistan, Southeast Asia, the Middle East, and Australia, with an export proportion of over 40%.

Innovation Ability

At VKD, we treat our people as the greatest asset and believe that " talent is the key to leading the industry, after that we could grow together". It is our goal to create a working environment that encourage innovation, originality and autonomy. Until now, we have obtained 20 patents as result of constant research and development.

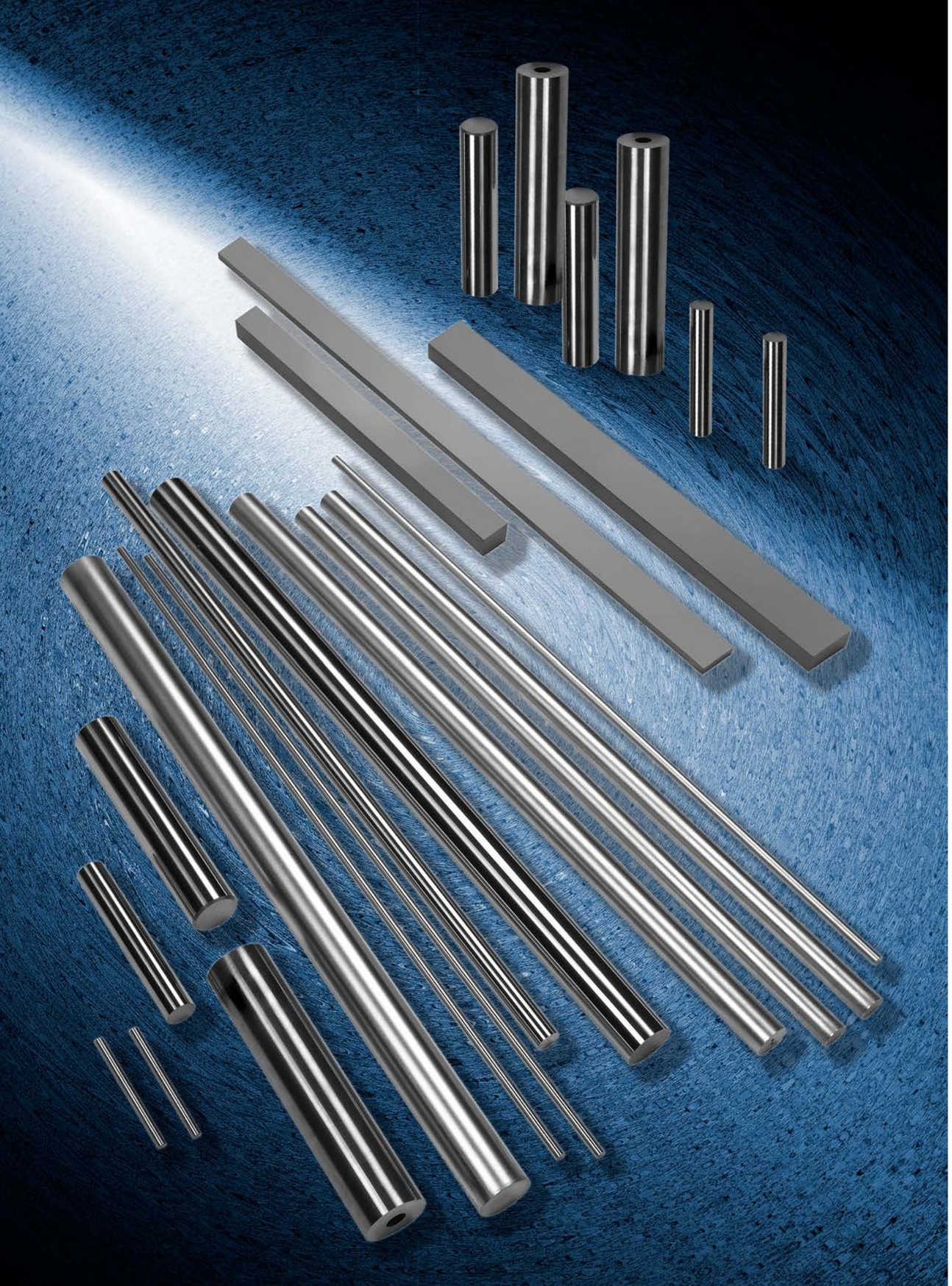
In the journey of exploring advanced hard materials, VKD Corporation has been recognized for several national demonstration programs in the industry.

Quality Assurance

We have been recognized as a "National Green Factory" and obtained certifications for four major systems, including the "Occupational Health and Safety Management System." With advanced testing equipment and a rigorous and meticulous inspection process, we start from the minutest details to ensure the all-around product quality.

Cemented Carbide Rods

Carbide rod products belong to the Cemented carbide Division. We built a designated plant for our cemented carbide rods product line, and hired a team of experts in the industry for constant innovation and development. The company produces a complete range of solid rods,rods with coolant channels, and sheet products, offering different series to better meet customer demands. These products are widely utilized in the fields of engines, power transmission components, precision parts for the 3C industry, and mold manufacturing, providing extensive services in these domains.



Grade Introduction

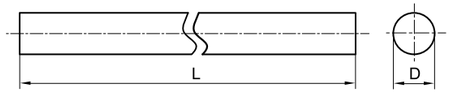
Grade	ISO	Granularity μm	Co Wt%	HRA	TRS N/mm$_2$	Recommended Application
VKD30F	K30-K40	0.8	10	91.5	3800	Suitable for processing ordinary carbon steel, cast iron, non-ferrous metals and non-metallic materials.
VKD40S	K20-K30	0.6	12	92.0	4000	Suitable for milling of ordinary carbon steel and die steel.
VKD45S	K20-K30	0.6	12	91.8	4500	Suitable for machining stainless steel and titanium alloys.
VKD25UF	K05-K10	0.4	9	93.5	4000	Suitable for processing hardened steel and die steel.
VKD40UF	K10-K20	0.4	12	92.4	4200	Suitable for finishing of stainless steel and die steel.

*Note: TRS is the C sample value of ISO3327 standard.

Recommended Applications

Recommended Grade（★：Best；▲：Suitiable）									
Grade	Stainless steel	Hardened steel	Ordinary carbon steel	cast iron	Non-ferrous metals	High Temperature Alloys	Titanium Alloy	Die Steel	Plastic
VKD30F	▲		★	★	★				★
VKD40S			★	★				★	
VKD45S	★						★		
VKD25UF		★				★			
VKD40UF	★							★	

Solid Rods–Metric



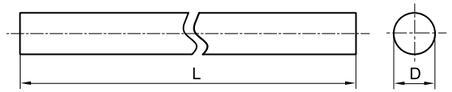
unit：mm

D			L			
ΦD	Min Tolerance	Max Tolerance	①	②	Min Tolerance	Max Tolerance
3.0	+0.1	+0.3	330	310	0	+5
3.2	+0.1	+0.3	330		0	+5
3.5	+0.1	+0.3	330		0	+5
4.0	+0.2	+0.5	330	310	0	+5
4.5	+0.2	+0.5	330		0	+5
5.0	+0.2	+0.5	330	310	0	+5
5.5	+0.2	+0.5	330		0	+5
6.0	+0.2	+0.5	330	310	0	+5
6.5	+0.2	+0.5	330		0	+5
7.0	+0.2	+0.5	330		0	+5
7.5	+0.2	+0.5	330		0	+5
8.0	+0.2	+0.5	330	310	0	+5
8.5	+0.2	+0.5	330		0	+5
9.0	+0.2	+0.5	330		0	+5
9.5	+0.2	+0.5	330		0	+5
10.0	+0.2	+0.5	330	310	0	+5
10.5	+0.2	+0.5	330		0	+5
11.0	+0.2	+0.5	330		0	+5

Note: 1. Various blank bars with a length less than 330mm can be customized.

2. Bars with h5/h6 precision can be customized.

Solid Rods–M



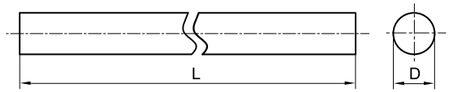
unit：mm

D			L			
ΦD	Min Tolerance	Max Tolerance	①	②	Min Tolerance	Max Tolerance
11.5	+0.2	+0.5	330		0	+5
12.0	+0.2	+0.5	330	310	0	+5
12.5	+0.25	+0.6	330		0	+5
13.0	+0.25	+0.6	330		0	+5
13.5	+0.25	+0.6	330		0	+5
14.0	+0.25	+0.6	330		0	+5
14.5	+0.25	+0.6	330		0	+5
15.0	+0.25	+0.6	330		0	+5
16.0	+0.25	+0.6	330	310	0	+5
17.0	+0.25	+0.6	330		0	+5
18.0	+0.25	+0.6	330		0	+5
19.0	+0.25	+0.6	330		0	+5
20.0	+0.25	+0.6	330	310	0	+5
21.0	+0.25	+0.65	330		0	+5
22.0	+0.25	+0.65	330		0	+5
23.0	+0.25	+0.65	330		0	+5
24.0	+0.25	+0.65	330		0	+5
25.0	+0.25	+0.65	330		0	+5

Note: 1. Various blank bars with a length less than 330mm can be customized.

2. Bars with h5/h6 precision can be customized.

Solid Rods–Inch



Unground

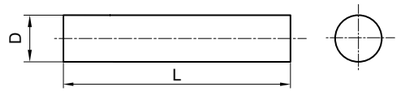
Ground

unit：inch

D			L		
ΦD	Min Tolerance	Max Tolerance	L	Min Tolerance	Max Tolerance
1/8	0.135	0.15	12.2	0	+0.2
9/64	0.151	0.166	12.2	0	+0.2
5/32	0.166	0.181	12.2	0	+0.2
11/64	0.182	0.197	12.2	0	+0.2
3/16	0.198	0.213	12.2	0	+0.2
13/64	0.213	0.228	12.2	0	+0.2
7/32	0.229	0.244	12.2	0	+0.2
1/4	0.260	0.275	12.2	0	+0.2
9/32	0.291	0.306	12.2	0	+0.2
5/16	0.323	0.338	12.2	0	+0.2
11/32	0.354	0.369	12.2	0	+0.2
3/8	0.385	0.400	12.2	0	+0.2
13/32	0.416	0.431	12.2	0	+0.2
7/16	0.448	0.463	12.2	0	+0.2
15/32	0.479	0.494	12.2	0	+0.2
1/2	0.51	0.525	12.2	0	+0.2
5/8	0.635	0.650	12.2	0	+0.2
3/4	0.76	0.775	12.2	0	+0.2
7/8	0.886	0.901	12.2	0	+0.2
1	1.011	1.026	12.2	0	+0.2

Note: 1. Various blank bars with length less than 13" can be customized.
2. h5/h6 precision bars with various lengths can be customized.

Rods–Metric

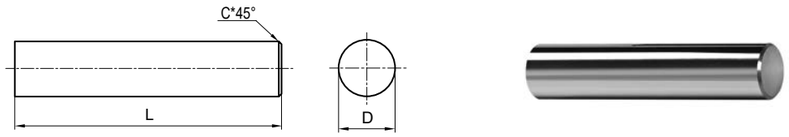


unit：mm

D			L		
ΦD	Min Tolerance	Max Tolerance	L	Min Tolerance	Max Tolerance
3.0	+0.1	+0.15	38	+0.5	+1.0
3.0	+0.1	+0.15	40	+0.5	+1.0
3.2	+0.1	+0.15	38	+0.5	+1.0
4.0	+0.1	+0.15	50	+0.5	+1.0
4.0	+0.1	+0.15	100	+0.5	+1.5
6.0	+0.1	+0.15	50	+0.5	+1.0
6.0	+0.1	+0.15	60	+0.5	+1.0
6.0	+0.1	+0.15	100	+0.5	+1.5
8.0	+0.1	+0.15	50	+0.5	+1.2
8.0	+0.1	+0.15	60	+0.5	+1.2
8.0	+0.1	+0.15	100	+0.5	+1.5
10.0	+0.1	+0.15	75	+0.5	+1.2
10.0	+0.1	+0.15	100	+0.5	+1.5
12.0	+0.1	+0.15	75	+0.5	+1.2
12.0	+0.1	+0.15	100	+0.5	+1.5

Note: 1. Various blank bars with diameter not exceeding φ16.0mm and length not exceeding 100mm can be customized.
2. Bars with h5/h6 precision can be customized.

Ground Rods with Chamfer–Inch (h5/h6)

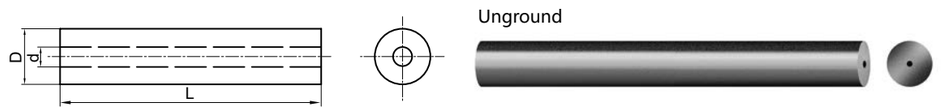


unit：inch

D (h5/h6)	L (+0.04/0)	Chamfer Size		Chamfer Angle (Tol./±3 °)
		C	Tolerance	
1/8	1-1/2	0.015	±0.004	45°
3/16	2	0.015	±0.004	45°
3/16	2-1/2	0.015	±0.004	45°
3/16	3	0.015	±0.004	45°
1/4	2	0.015	±0.004	45°
1/4	2-1/2	0.015	±0.004	45°
1/4	3	0.015	±0.004	45°
5/16	2	0.015	±0.004	45°
5/16	2-1/2	0.015	±0.004	45°
5/16	3	0.015	±0.004	45°
5/16	4	0.015	±0.004	45°
3/8	2-1/2	0.015	±0.004	45°
3/8	3	0.015	±0.004	45°
3/8	3-1/2	0.015	±0.004	45°
3/8	4	0.015	±0.004	45°
1/2	2-1/2	0.031	±0.008	45°
1/2	3	0.031	±0.008	45°
1/2	4	0.031	±0.008	45°

Note: 1. Various rods with inch diameter not greater than 5/8" and length not greater than 4" can be customized.
2. h5/h6 finely ground rods can be customized.

Rods Blanks with One Straight Coolant Hole

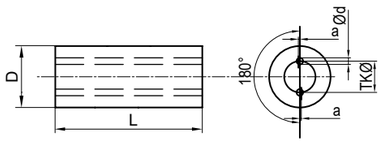


unit：mm

D		d		e	L (Tolerance 0/+5)
ϕD	Tolerance	ϕd	Tolerance		
3.0	+0.2/+0.5	0.5	±0.10	0.20	330
4.0	+0.2/+0.5	1.0	±0.10	0.20	330
5.0	+0.2/+0.5	1.0	±0.10	0.20	330
6.0	+0.25/+0.6	1.0	±0.15	0.20	330
7.0	+0.25/+0.6	1.0	±0.15	0.20	330
8.0	+0.25/+0.6	1.5	±0.15	0.20	330
9.0	+0.25/+0.6	1.5	±0.15	0.25	330
10.0	+0.25/+0.6	1.5	±0.15	0.25	330
11.0	+0.25/+0.6	1.5	±0.15	0.25	330
12.0	+0.3/+0.7	1.75	±0.15	0.25	330
13.0	+0.3/+0.7	1.75	±0.15	0.25	330
14.0	+0.3/+0.7	1.75	±0.15	0.25	330
15.0	+0.3/+0.7	1.75	±0.15	0.25	330
16.0	+0.3/+0.7	2.0	±0.20	0.25	330
18.0	+0.3/+0.8	2.0	±0.20	0.30	330
20.0	+0.3/+0.8	2.5	±0.25	0.30	330
22.0	+0.3/+0.8	2.5	±0.25	0.30	330
24.0	+0.3/+0.8	3.0	±0.25	0.30	330
25.0	+0.3/+0.8	3.0	±0.25	0.30	330

Note: Various inner hole diameters and outer diameter h5/h6 precision bars can be customized.

Rods Blanks with Two Straight Coolant Hole



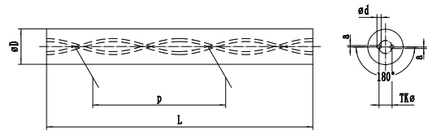
Unground

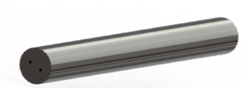
unit：mm

D		d		TKØ		a	L
ϕD	Tolerance	ϕd	Tolerance	TKϕ	Tolerance		（Tolerance 0/+5）
4.0	+0.3/+0.5	0.8	±0.10	1.80	-0.15/0	0.10	330
5.0	+0.3/+0.5	0.8	±0.10	2.00	-0.15/0	0.13	330
6.0	+0.3/+0.6	1.0	±0.15	3.00	-0.20/0	0.15	330
7.0	+0.3/+0.6	1.0	±0.15	3.50	-0.20/0	0.15	330
8.0	+0.3/+0.6	1.0	±0.15	4.00	-0.30/0	0.15	330
9.0	+0.3/+0.6	1.5	±0.15	4.00	-0.30/0	0.20	330
10.0	+0.3/+0.6	1.5	±0.15	5.00	-0.30/0	0.28	330
11.0	+0.3/+0.6	1.5	±0.15	5.00	-0.30/0	0.30	330
12.0	+0.3/+0.6	1.75	±0.15	6.00	-0.30/0	0.30	330
13.0	+0.3/+0.7	1.75	±0.15	6.00	-0.30/0	0.34	330
14.0	+0.3/+0.7	1.75	±0.15	7.00	-0.30/0	0.37	330
15.0	+0.3/+0.7	2.0	±0.15	7.00	-0.30/0	0.40	330
16.0	+0.3/+0.8	2.0	±0.20	8.00	-0.30/0	0.40	330
17.0	+0.3/+0.8	2.0	±0.20	8.00	-0.30/0	0.47	330
18.0	+0.3/+0.8	2.0	±0.20	9.00	-0.30/0	0.50	330
19.0	+0.3/+0.8	2.0	±0.20	9.00	-0.30/0	0.50	330
20.0	+0.3/+0.8	2.5	±0.25	10.00	-0.40/0	0.50	330
22.0	+0.3/+0.8	2.5	±0.25	11.00	-0.40/0	0.50	330
24.0	+0.3/+0.8	3.0	±0.25	12.00	-0.50/0	0.50	330
25.0	+0.3/+0.8	3.0	±0.25	12.00	-0.50/0	0.50	330

Note: Non-standard double straight hole carbide blank bars with diameter ≤Φ25.0mm can be customized.

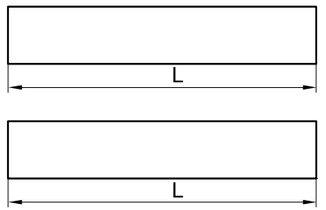
Rods with 2 Helix Coolant Holes 30°&40°





Note: Various 2-hole or 3-hole blanks or finely ground rods can be customized.

Plates



L×W×T×a	limit	Tolerance
T（mm）	3.0≤T≤16.0	+0.20/+0.60
W（mm）	3.0≤W≤25.0	+0.20/+0.6
L（mm）	L≤330	0/+5.0
a（°）	0~35°	±1°

Note: 1. Various lengths of pressed strips can be customized. L≤2.5m.
2. Processing tolerance, shape and Ra can be customized.

Appendix

Explanation of Material Performance Terms

- Hardness（ISO 3738 及ISO 3878）

  The ability of a material to resist local plastic deformation. The commonly used hardness determination methods for cemented carbide are Rockwell hardness or Vickers hardness measurement, with units of HRA and HV respectively. It should be noted that since the two measurement methods are different, the conversion of the two hardness values should be converted according to the reference table of the measured material.

- TRS（ISO 3327）

  Bending strength refers to the ability of a material to resist bending without breaking. Its value is the stress measured at the breaking point of the material in a standard three-point bending test. When this test is applied to cemented carbide, a standard fixture and specimen (Φ3.25mm×38.7mm) are used. TRS uses the average of several measured values as the measured value. This value can vary greatly depending on the specimen geometry, surface condition and experimental equipment. It should be pointed out in particular that this result is very sensitive to surface finish, surface residual stress, surface corrosion and defects inside the material. It must be noted that the TRS value cannot be used alone as the standard for grade selection.

- Density（ISO 3369）

  Density is the ratio of a material's mass to its volume and is usually determined using the liquid displacement method. Density is commonly used in the cemented carbide industry to determine the accuracy of a grade's composition. Contrary to popular belief, the porosity level of modern cemented carbides cannot be determined by measuring density. The density of tungsten carbide (WC) is 15.7 g/cm3 and the density of cobalt (Co) is 8.9 g/m^3. Therefore, for WC-Co grades, as the cobalt content increases, the density decreases.

Other

- Tolerance Grade

Diameter	Tolerance	
	h5	h6
0-3.0 mm 0-0.11811 in.	0.004 mm 0.00015 in	0.006 mm 0.00024 in
3.001-6.0 mm 0.11812-0.23622 in	0.005 mm 0.00020 in	0.008 mm 0.00031 in
6.001-10.0 mm 0.23623-0.39370 in	0.006 mm 0.00024 in	0.009 mm 0.00035 in
10.001-18.0 mm 0.39371-0.70866 in	0.008 mm 0.00031 in	0.011 mm 0.00043 in
18.001-30.0 mm 0.90867-1.18110 in	0.009 mm 0.00035 in	0.013 mm 0.00051 in
30.001-50.0 mm 1.8111-1.96850 in	0.011 mm 0.00043 in	0.016 mm 0.00063 in

Appendix

Hardness Comparison

3R			HV30 30Kg
HRA 60Kg Diamond	HRC 150Kg Diamond	HRD 100Kg Diamond	
93.0	81.0		1800
92.5	80.5		1700
92.0	80.0		1600
91.5	79.0		1550
91.0	78.0		1500
90.5	77.0		1450
90.0	76.0		1400
89.5	75.0		1350
89.0	74.0		1300
88.5	73.0		1250
88.0	72.0		1200
87.5	71.5		1150
87.0	71.0		1140
86.5	70.0		1076
86.0	69.0		1004
85.6	68.0	76.9	940
85.3	67.5	76.5	920
85.0	67.0	76.1	900
84.7	66.4	75.7	880
84.4	65.9	75.3	860
84.1	65.3	74.8	840
83.8	64.7	74.3	820
83.4	64.0	73.8	800
83.0	63.3	73.3	780
82.6	62.5	72.6	760
82.2	61.8	72.1	740
81.8	61.0	71.5	720
81.3	60.1	70.8	700
81.1	59.7	70.5	690
80.8	59.2	70.1	680
80.6	58.8	69.8	670
80.3	58.3	69.4	660
80.0	57.8	69.0	650