



ZHENGZHOU ZHONGYUAN SUPER HARD TOOLS CO.,LTD

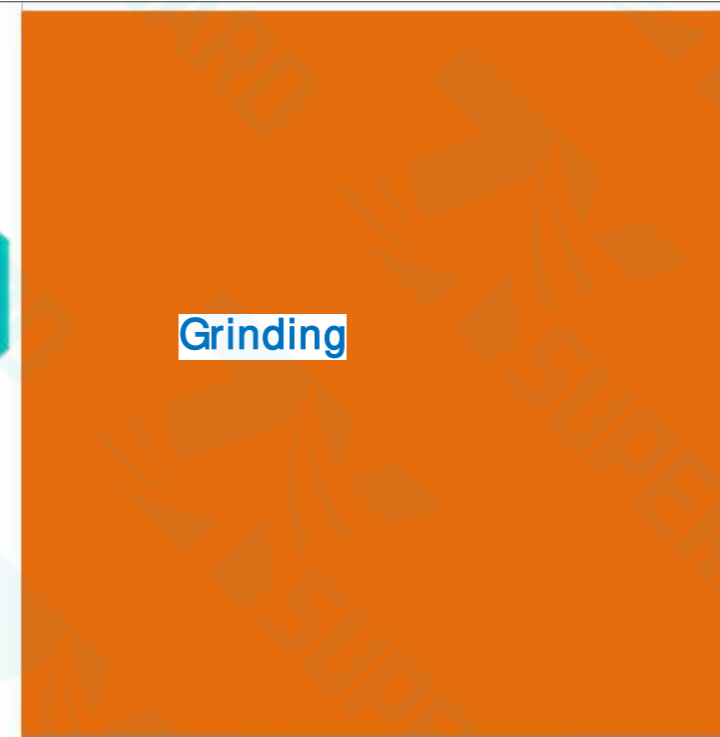
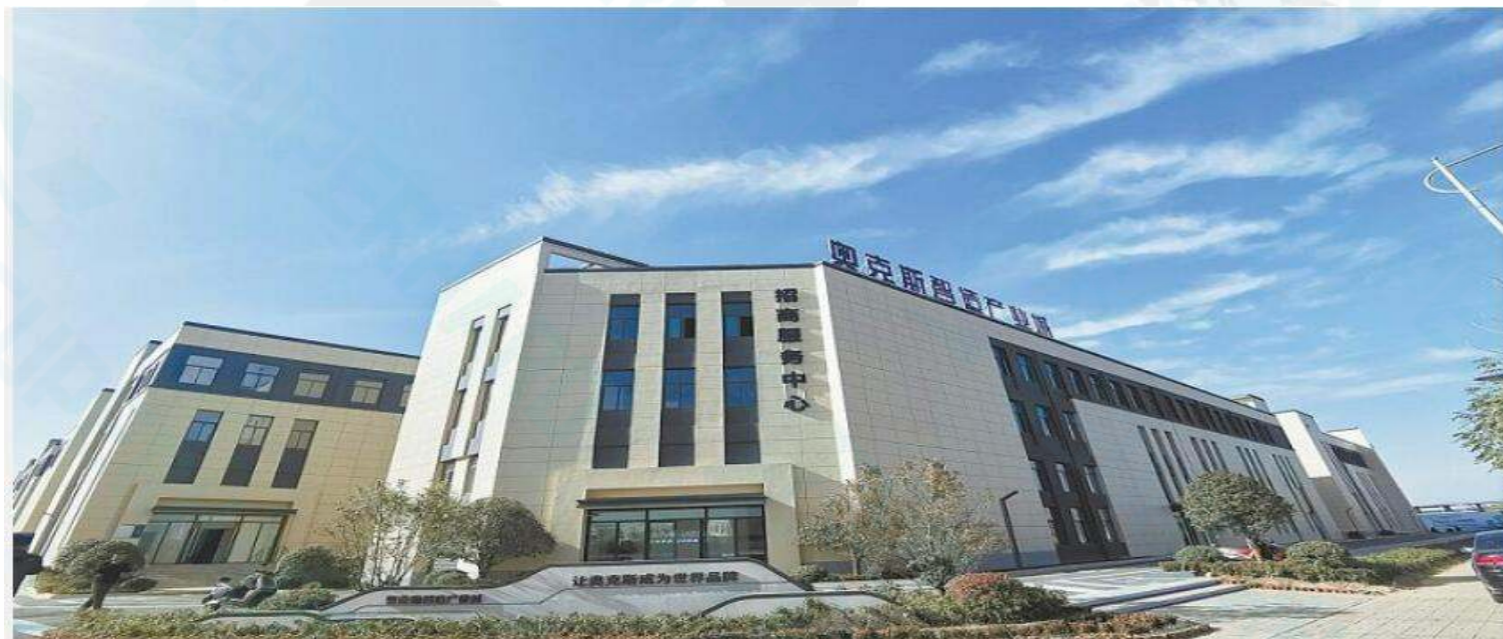
--Yiwu Qiaochu e-commerce company(subsidiary company)

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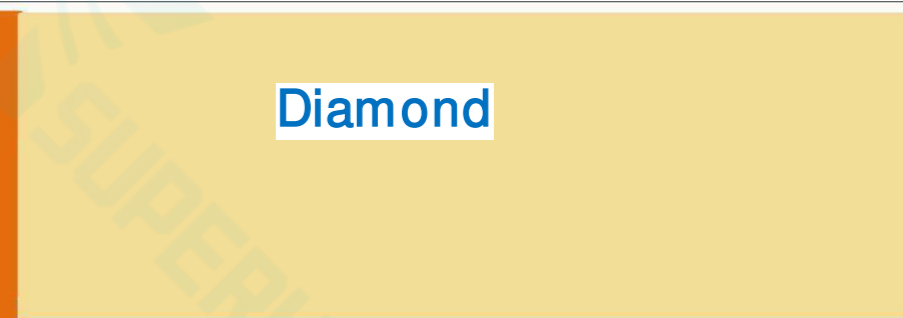
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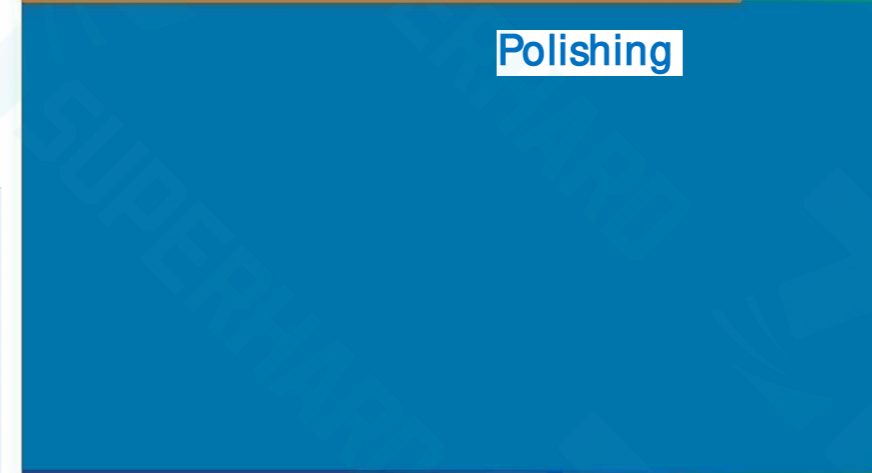
Grinding



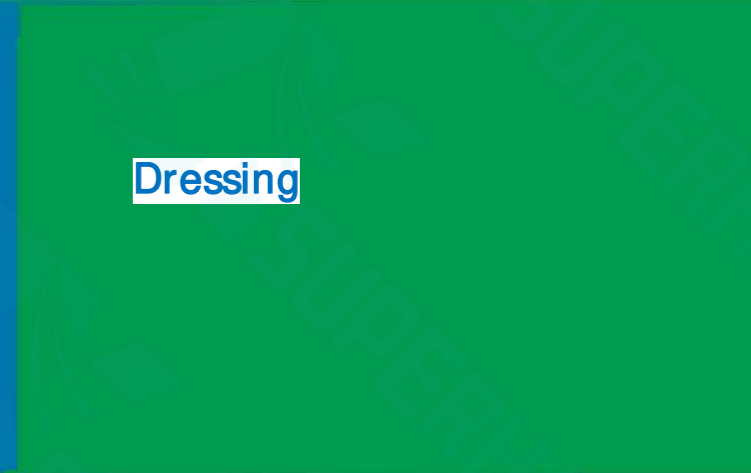
Diamond



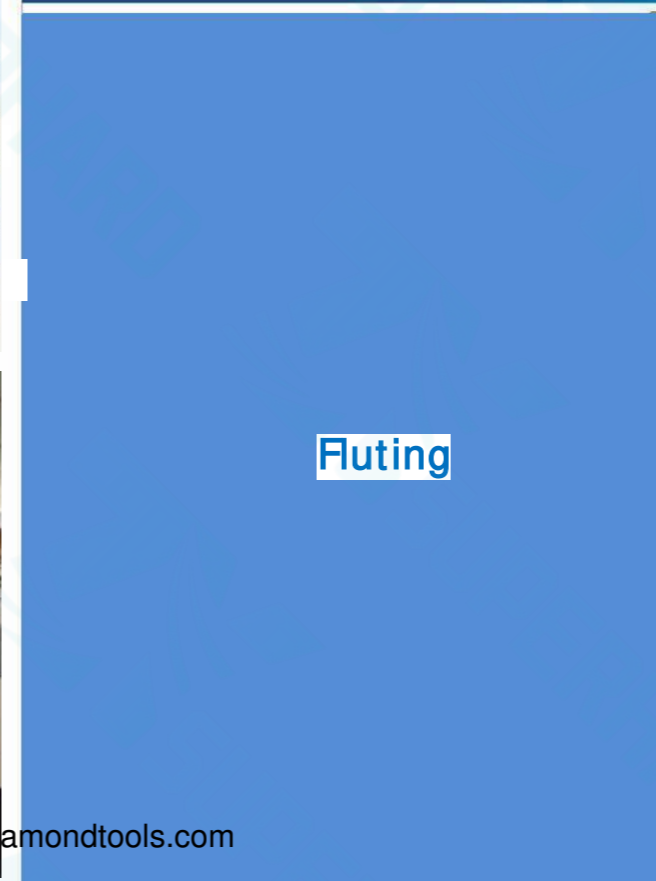
CBN



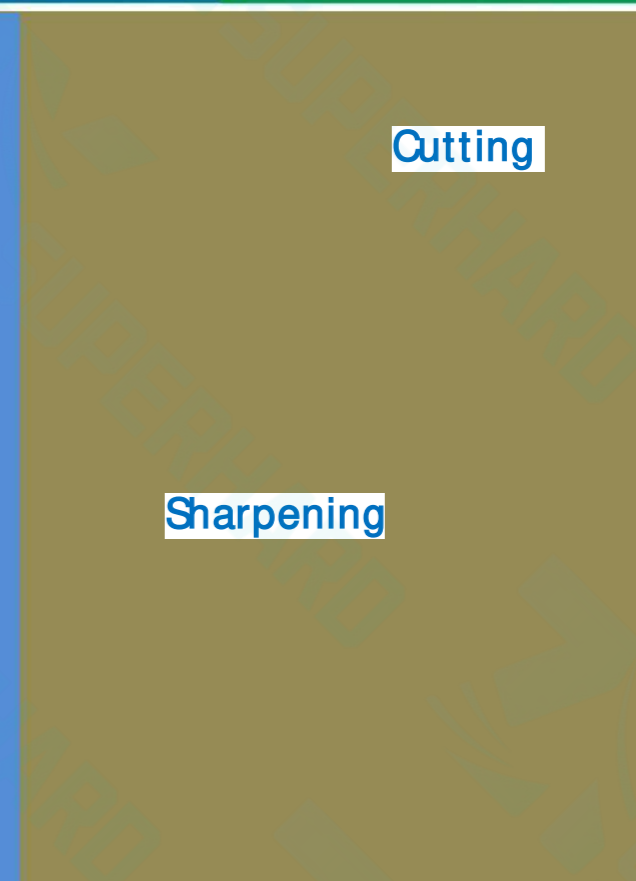
Polishing



Dressing



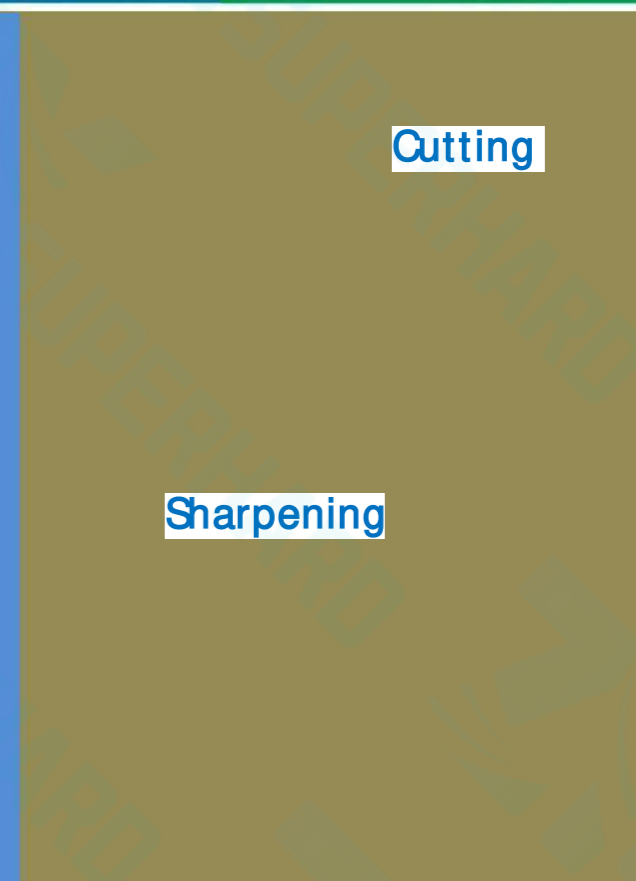
Fluting



Cutting



Gashing



Sharpening

COMPANY PROFILE

Grinding Wheels

SHARPENING

POLISHING

DRESSING

GASHING

FLUTING

CUTTING



Our company is a professional enterprise with various patents and innovation. It is engaged in researching, manufacturing and selling diamond tools. The enterprise now has various production lines in resin bond, metallic bond, bronze sintering, ceramic bond, electroplated-bonded diamond, CBN (Cubic Boron Nitride) super-hard material. The enterprise has a complete range of products specifications and also can provide customization service according to drawings and samples from guests.

The product is widely used in cutting, grinding and polishing hard materials like cemented carbide, fine ceramic, glass, magnetic materials, diamond, sapphire, silicon wafer, hard-brittle materials, alloy, semiconductor, optical fiber, and touch screen etc. The company has already cooperated with multitudinous entities nationwide and globally, majored in optical, semiconductor, hard alloy, fine ceramics, and aero equipment fields. With excellent product quality, honesty and trustworthiness, good after sales service, the company is well appraised.

The enterprise established scientific management system to monitor product quality and has a young, dynamic, innovative and professional team with high responsibility. It has been adhered to the "quality of survival, innovation for development" as belief, sticking to service aim "immediate response" to meet customers' needs and succeed expectation, insisting on Honesty operation philosophy. The company is looking forward to cooperate with you hand in hand in the spirit of objectivity, concentration, innovation and progress.

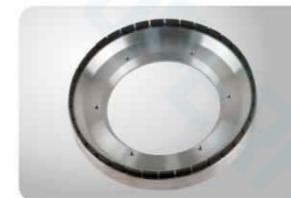
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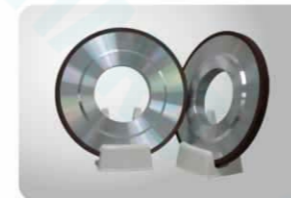
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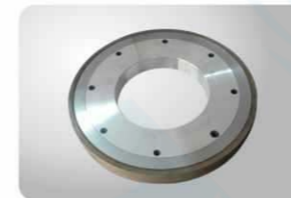
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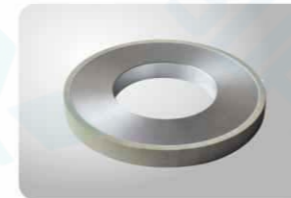
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Ordering Instructions



Please provide the information as follows for choosing the most suitable grinding wheel for you, when placing order for the first time:

Model: e.g. 1A1, 14a1, 1A1R, 1B1, 1E1, 3A1 and so on

Specification: abrasive material, granularity, binding agent, external diameter, thickness, inner diameter, working layer abrasive material width, thickness and basic thickness

Application: grinder machine information, tool name, grinding material, grinding dimension.

Grinding Method: plain grinding, cylindrical grinding, internal grinding, grooving, and cutting and so on.

Grinding Condition: grinding wheel speed, feed speed, approach, dry grinding, wet grinding etc.

Grinding Requirements: grinding accuracy, fineness, roughness, integrity and so on

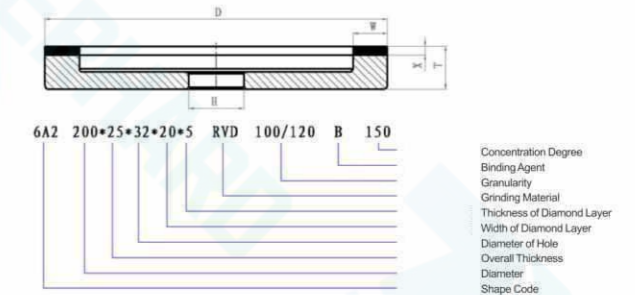
Please attach drawings or samples, as well as parameter and requirements for special customization

Attention for operation

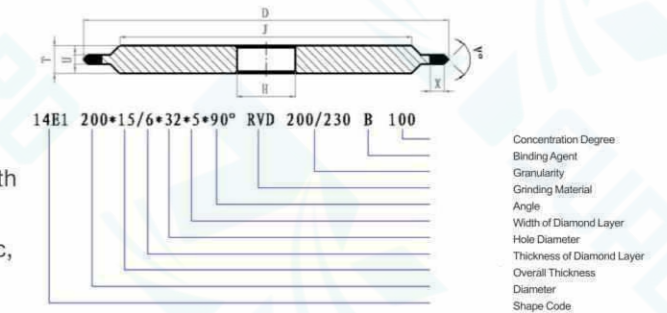
1. Please check the grinding wheel carefully. For any notch or damage, please stop using it immediately.
2. For grinding wheels marked with rotating direction, please make sure the rotate turning direction of machine is the same. The grinding wheel's efficiency will be affected for wrong direction operation.
3. For any abnormal conditions during grinding, please stop the machine and check the problems immediately.
4. When the grinding wheel is not sharp, it is required to get it edged. Continuous operation may cause overheating and overload and then damage the grinding wheel.
5. It is forbidden to use hand or any part of body to grind or touch grinding wheel.
6. Special-designed grinding wheel is not suggested to common grinding, in order to avoid any abnormality or damage.

Diamond and CBN Grinding Wheel Mark Sequence

According to GB/T6409-1996, the feature and writing sequence for diamond or CBN grinding tools are as follows:
Shape Code, Dimension, Grinding Material Model, Granularity, Binding Agent, Concentration



The mark of Dimension sequence is
External Diameter x Overall Thickness x Hole Diameter x Width of Grinding Material Layer x Thickness of Grinding Material Layer
For some grinding wheels with bevel edge or circular arc, the angle of edge or the radius of arc should be marked.



Binding Agent Choose

Diamond/CBN grinding wheel is divided in to different kinds according to agent sorts, like resin binder, metallic bond, ceramic bond and Electroplated bond. Suitable binding agent must be chosen according to processing objectives and requirements.

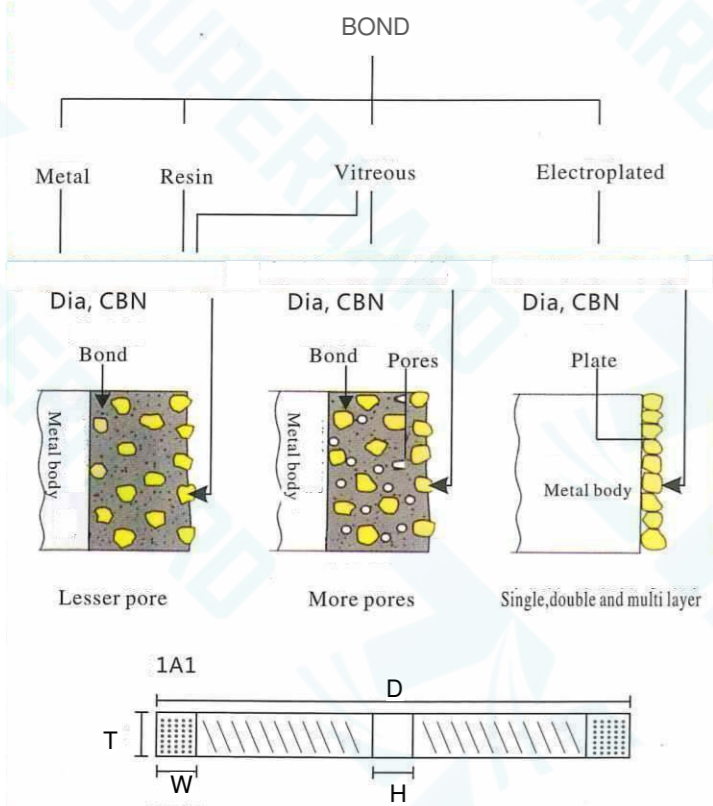
Binding Agent	Code	Main Application
Resin Binder	B	Diamond applies to grinding and polish hard alloy, magnetic material, precise metal ceramic products and non-metallic material. CBN applies to grind and polish high-vanadium, high-speed tool edges, stainless steel, heat-resisting alloy steel and other hard-brittle materials.
Metallic Bond	M	Diamond applies in glass, ceramic, dimension stone for rough grinding, precise grinding, gear grinding, electrolysis grinding. CBN is used to grind alloy steel.
Ceramic Bond	V	Diamond applies to grinding PCD, PCBN tools and clad sheet. CBN is used in crank axle, long axis, spindle, cam shaft, minor bearing, large precise tool, instrument and alloy and so on for precise and final grinding.
Electroplated Bond	P	Diamond applies to grinding glass, jewels, ceramic, hard alloy, crystal, ferrite magnetic material and various special profiles, micro-hole grind, special-shaped grinding tool and shaped grinding wheel and so on. CBN applies to cold shock cast iron, gray iron, cast alloy steel, titanium alloy and other metal materials. It also can be applied in small size mechanic production, grinding geometric shape manufacture and wheel finishing.

Granularity (Grit Size)Choose

The roughness degree of artificial diamond is shown as granularity code. The surface roughness degree is affected by granularity directly. The principle of choosing granularity is to choose thick ones, base on the premise of meeting processing unit requirements. Therefore, the grinding efficiency is reinforced and loss of grinding wheel is reduced. The granularity of diamond is between 30# and W1 as follows:

Grinding Procedure	Granularity Recommended
Rough Grinding	30#-120#
Half-precise Grinding	150#-240#
Precise Grinding	280#-W40
Polishing	W40-W1

Type and feature of bond



Bond	Symbol	Grinding performance	Lifespan
Electroplated	P	Strong ↑ ↓	Long ↓ ↑
Resin	B		
Vitreous	V		
Metal	M		

Abrasive content			
Concentration	Code	Volume	Carat/cm ³
25%	25	6.25	1.1
50%	50	12.5	2.2
75%	75	18.75	3.3
100%	100	25	4.4
150%	150	37.5	6.6

LED SAPPHIRE SUBSTRATE REDUCING GRINDING WHEEL



Main Feature:

To reduce LED sapphire substrate epitaxial slice, equipped steadily with main grinding machine in Japan, South Korea and Taiwan market. It can be used to process epitaxial slice in small size like 2, 4, 6 inch. This grinding wheel is also with high stable quality, high working efficiency and long service life. It is also helpful in reducing processing cost. The quality of our grinding wheel is equal or higher than similar products imported.

Processing Objective: Sapphire substrate epitaxial slice, SiC substrate epitaxial, Si substrate epitaxial slice.

Tool Material: Artificial Sapphire, SiC, Monocrystalline Silicon.

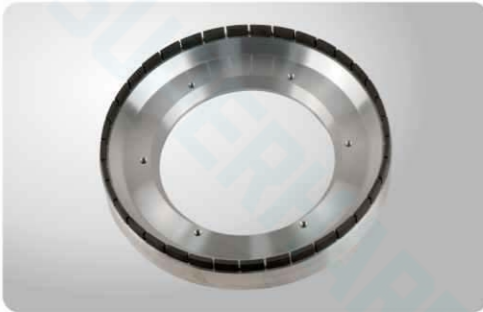
Grinding Machine Matched: NTS GALAXY SPEEDAM, WEC, SHUWA.

Specification

Shape code	Profile Sketch	Grinder
6A2T		SPEEDFAM
6A2T		NTS
6A2T		WEC GALAXY SPEEDFAM



Back grinding wheel is applied in semiconductor wafer reducing and precise polishing. Our silicon wafer can replace imported products and be used stably in various grinder globally made in Japan, Germany, America, South Korea and China. It works efficiently in grinding and material removing, and with lowest damage to tool surface. The wafer is also with fine surface and long service life.



Processing Objective: Discrete Device, Integrated Circuit Substrate Silicon Wafer, Original Silicon Wafer.

Tool Material: Monocrystalline Silicon Semiconductor Material

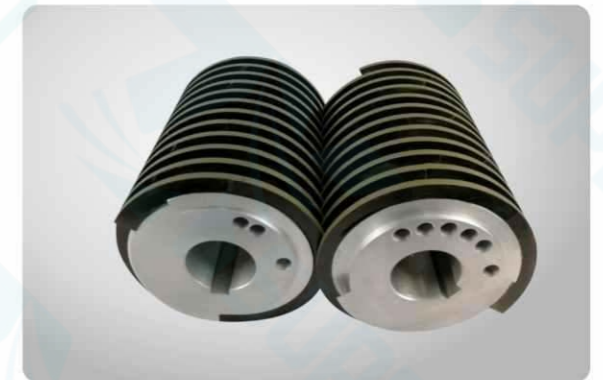
Processing Procedure: Back Thinning, Rough Grinding for Front Grinding, Precise Polishing

Shape code	Profile Sketch	Conventional specification		
		D	T	H
6A2 or 6A2H		175	30、35	76
		200	35	76
		350	45	127
6A2T		195	22.5、25	170
		280	30	228.6
6A2T Noncircular		350	35	235
		209	22.5	158

T,E,W,X according to the customer's requirements



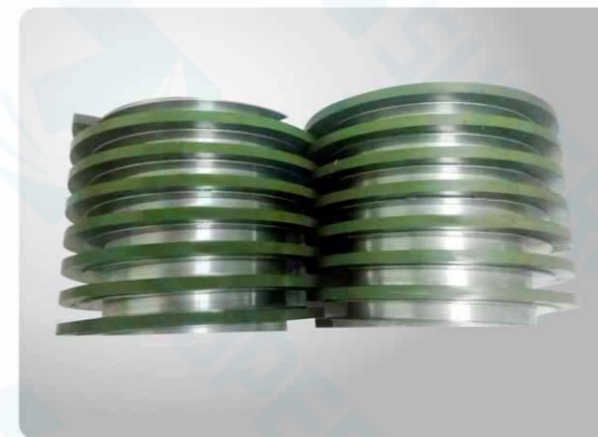
Helical Grinding Wheel is mainly applied in grinding and polishing knife cutting edge and mirror. It also can be used for textile pin grinding processing. Grinding wheel produced by us can replace the common version and is with high grinding efficiency. It is stable, long service life, cost-effective and no need to finish. The grinding wheel is suitable for rough grinding, precise grinding and polishing and can be customized according to requests.



Processing Objective: Die-cutting Rule, Ceramic Knife, Textile Pin, Razor Slices.

Processing Material: High-carbon Steel, High-speed Steel, Metal Special Ceramics.

Processing Procedure: Knife Cutting Edge Grinding and Mirror Polishing.

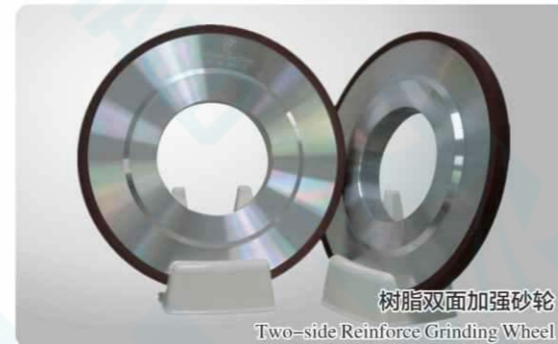




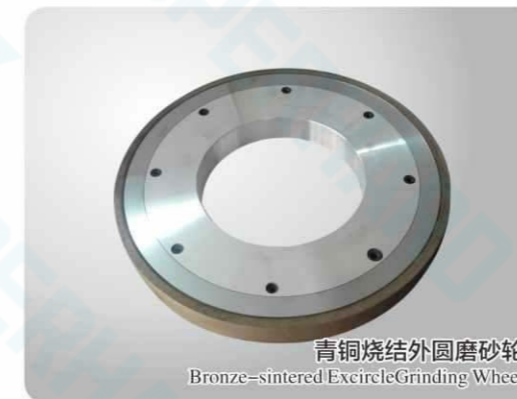
Resin binder tool has the feature of good self-sharpening, sharp cutting and efficient grinding. It is also with low surface roughness, less internal heating to protect processing tool. It can be applied in material rough grinding, half-precise grinding, blade grinding, polishing and so on.

Resin bond diamond product series are mainly used for processing hard alloy, special fine ceramic, magnetic material, silicon material, jewel, glass, as well as hard crisp nonmetallic mineral materials.

CBN series are used for processing hard crisp material like high-speed steel, die steel, quenched steel, stainless steel, heat-resisting alloy steel as well as cast iron.

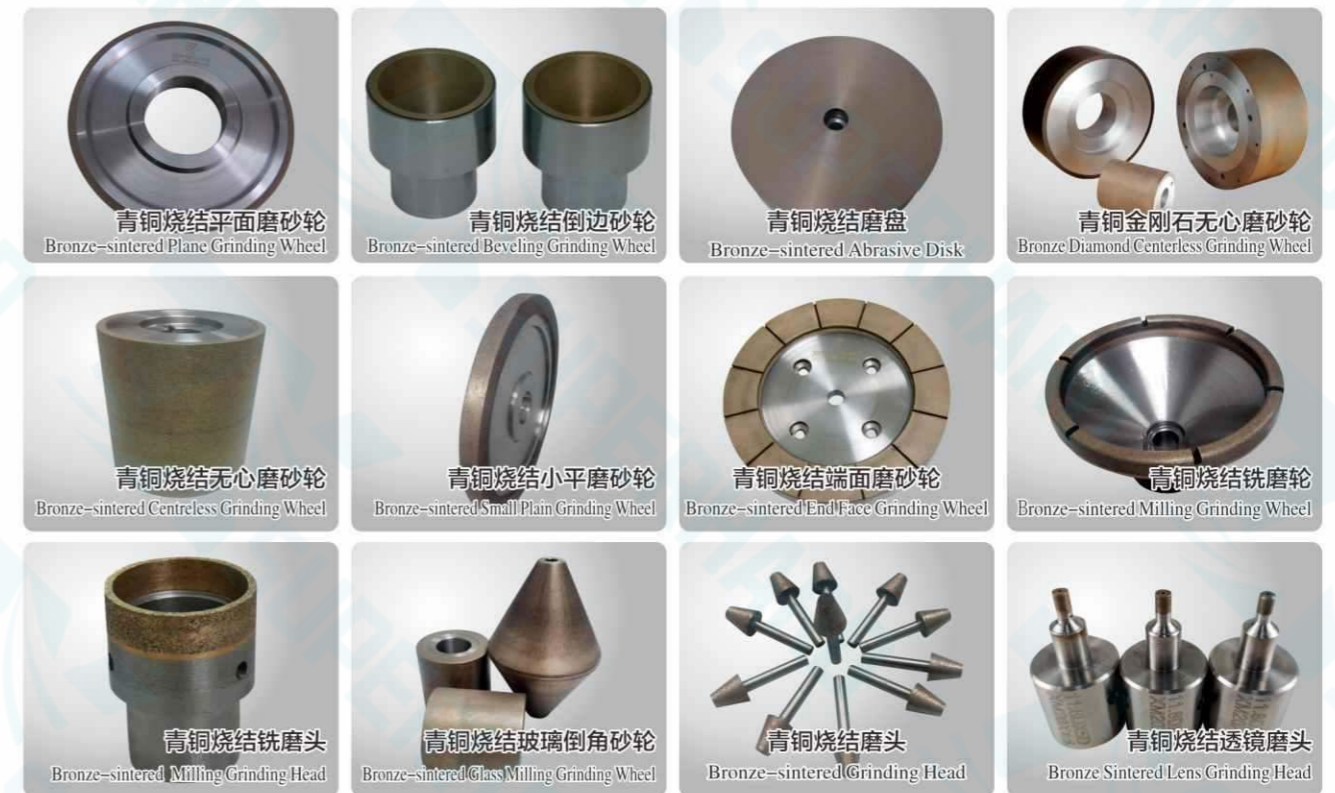


Bronze bonded diamond grinding wheel, with high abrasive grains strength, has high wear resistance, small wear erosion, good formation and long service life. It is also high-temperature resistant, with good thermal conductivity and abrasive resistance as well as relatively high load capacity.



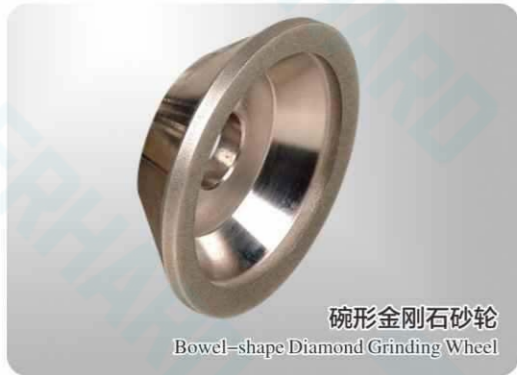
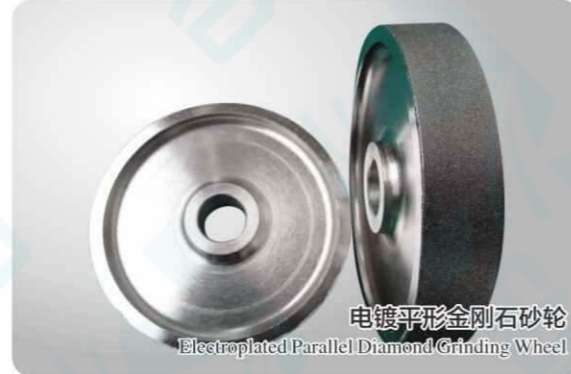
Bronze Bonded Series: It is mainly applied in rough grinding, precise grinding and glass cutting, ceramic, stone material, building material, concrete, semiconductor materials and nonmetallic materials. In some cases, it also can be used in hard alloy, shape grinding, honing and electrolytic grinding.

Bronze CBN Grinding Wheel: It is mainly used in electrolytic grinding in high-carbon steel, high-speed steel, and other composite super-hard materials.





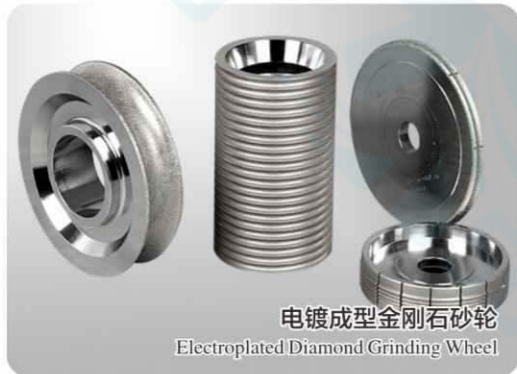
Electroplated bond grinding wheel is with high concentration, sharp grinding, high working efficiency and no need to finish. The product can be made into different shapes. It is especially suitable for complicated, thin, small, geometrical shapes or processing products precise dimensions required. It helps a lot in promoting working efficiency and solving grinding problems for some special products and extremely suitable for dry grinding.



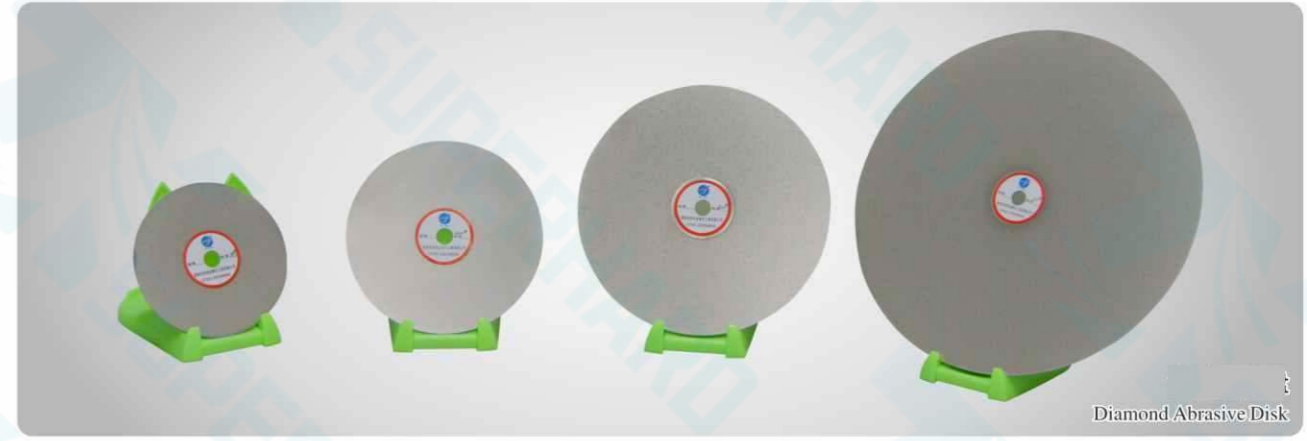
碗形金刚石砂轮
Bowl-shape Diamond Grinding Wheel

Electroplated Diamond Series
It is mainly used in processing ceramics, glass, hard alloy, ferrite, and high-hardness nonmetallic materials.

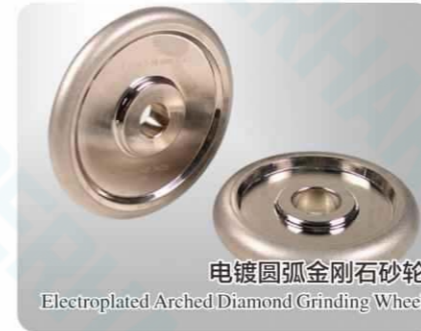
CBD Series
It is mainly used in processing metal materials like chilled cast iron, cast alloy steel, titanium alloy.



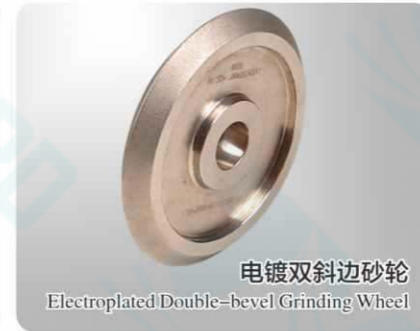
电镀成型金刚石砂轮
Electroplated Diamond Grinding Wheel



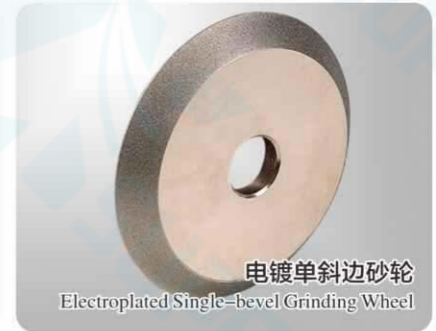
Diamond Abrasive Disk



电镀圆弧金刚石砂轮
Electroplated Arched Diamond Grinding Wheel



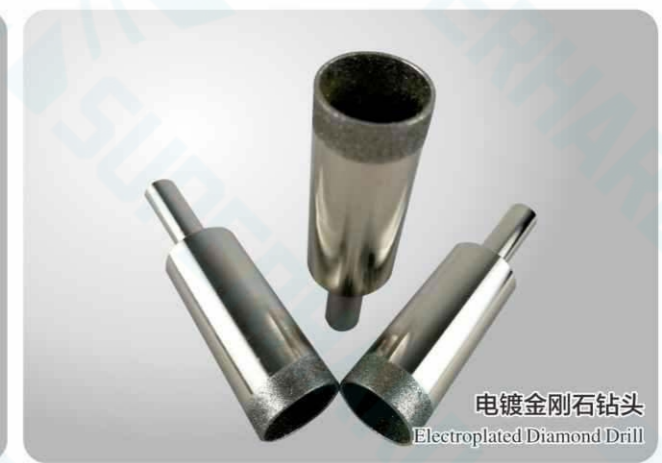
电镀双斜边砂轮
Electroplated Double-bevel Grinding Wheel



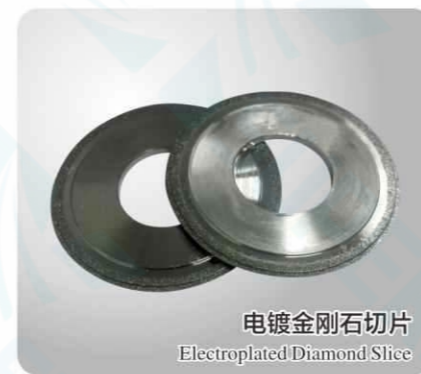
电镀单斜边砂轮
Electroplated Single-bevel Grinding Wheel



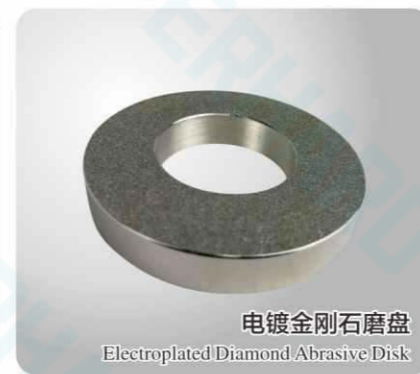
电镀金刚石磨头
Electroplated Diamond Grinding Head



电镀金刚石钻头
Electroplated Diamond Drill



电镀金刚石切片
Electroplated Diamond Slice



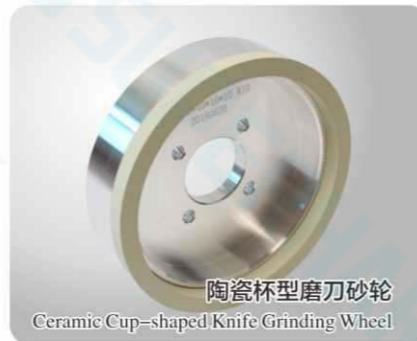
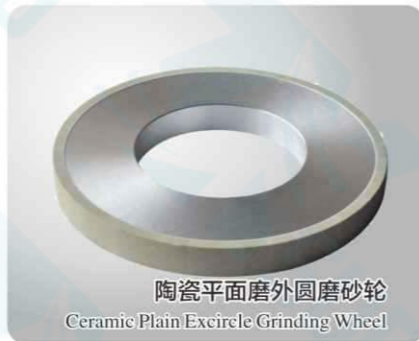
电镀金刚石磨盘
Electroplated Diamond Abrasive Disk



电镀金刚石磨棒
Electroplated Diamond Grinding Stick



Ceramic bonded grinding wheel is with high grinding efficiency, high rigidity, good surface chip, sharp grinding and low thermal expansion. It is easy to control the processing accuracy and mainly applied in rough grinding, half-precise grinding and large surface shape grinding.



Ceramic Diamond Grinding Wheel

Applied in processing PCD, PCNB, diamond clad sheet.

Ceramic CBN Grinding Wheel Series

Applied in hard-brittle metal, vehicle material like camshaft, crankshaft, gear box, bearing and precise processing like machine unit and aerospace equipment.

Synthetic diamond powder



Synthetic powder is mainly used in making grinding grease grinding liquid, flexible discs, polishing pads, finishing pellets, wortle and clad sheet. It can be also applied in polishing high-hardness materials like hard alloy, ceramic, jewel, glass and electronic unit .

Granularity Range

W50 W40 W28 W20 W14 W10 W7.0 W5.0 W3.5 W2.5 W1.5 W1.0 W0.5 W0.25



Diamond Polishing Paste

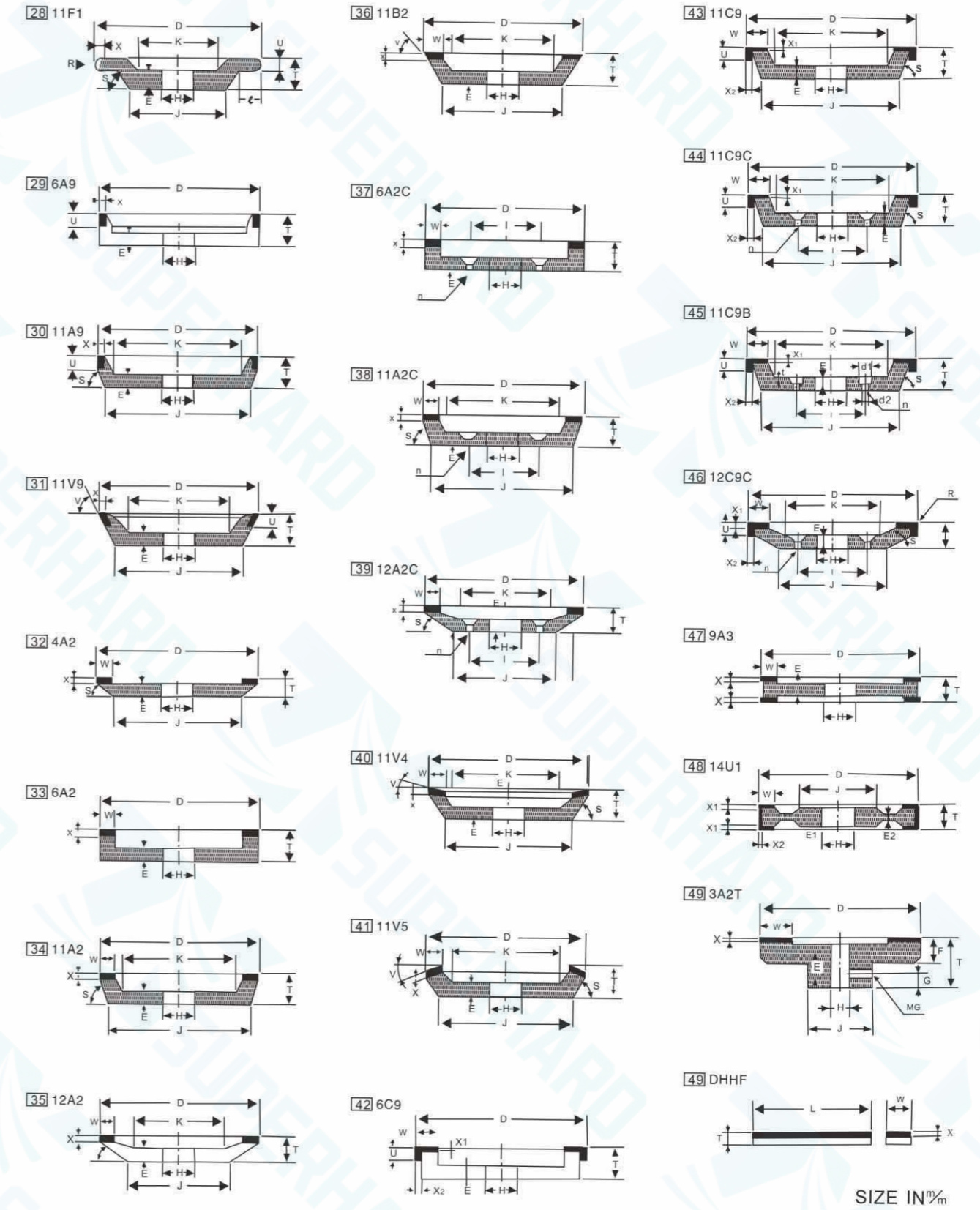
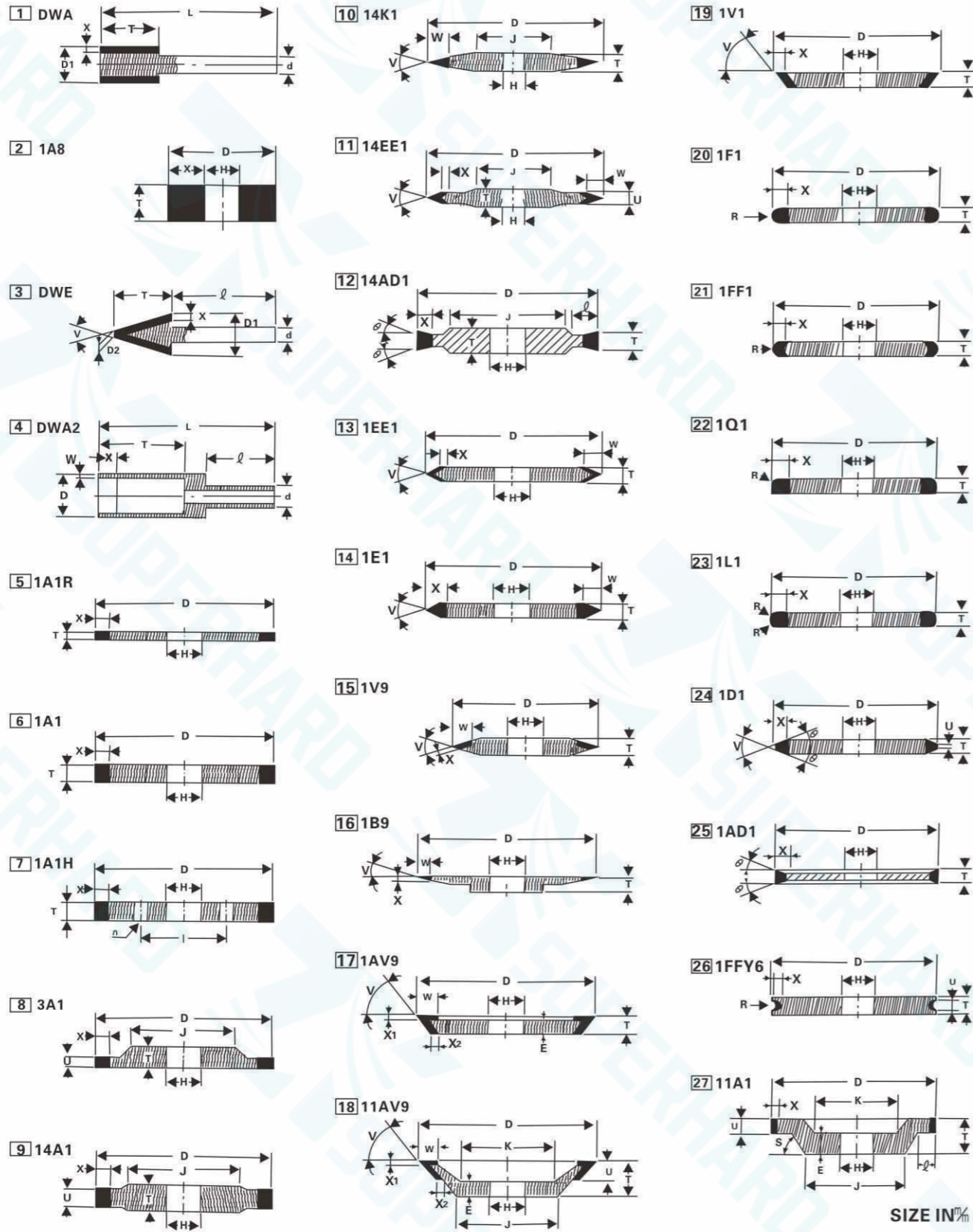
Diamond polishing paste is one of grinding and polishing material made by diamond micro mist. It is suitable for magnetic materials like hard alloy, ceramic, jewel as well as high-hardness materials like mold, measuring tool and cutting tool. It is with high grinding efficiency, good surface quality and easy to use. There are oil intermingled and water-intermingled two sorts.



DIAMOND GRINDING LIQUID



Diamond grinding liquid is widely used in grinding and polishing precise ceramic, integrated circuit chip, various jewels, ferrite head, quartz plate, super-hard alloy, LED substrate, phone screen, bronze and so on. It radiates quickly during working and is easy to clean and with no harm.



Grain	GB/T 6406-1996		ISO 6106-1979			FEPA-1977 DIN 848-1988		ANSI B74.16-1971 JIS 4130-1982		ГОСТ 9202-80	
	Grain	Size	Grain I	Grain II	Size	Grain	Size	Grain	Size	Grain	Size
22#	18/20	1000/850	1001	18/20	1000/850	D1001	1000/850	18/20	1000/850	16#	1250/1000
24#	20/25	850/710	851		850/710	D851	850/710			20#	1000/800
30#	25/30	710/600	711		710/600	D711	710/600	20/30	820/600	24#	800/630
36#	30/35	600/500	601		600/500	D601	600/500			30#	630/500
40#	35/40	500/425	501		500/425	D501	500/425	30/40	600/425	36#	500/400
46#	40/45	425/355	426		425/355	D426	425/355				
54#	45/50	355/300	356		355/300	D356	355/300	40/50	425/300	46#	400/315
60#	50/60	300/250	301	50/60	300/250	D301	300/250	50/60	300/250	60#	315/250
70#	60/70	250/212	251		250/212	D251	250/212			70#	250/200
80#	70/80	212/180	213		212/180	D213	212/180	60/80	250/180		
90#	80/100	180/150	181	80/100	180/150	D181	180/150	80/100	180/150	80#	200/160
100#	100/120	150/125	151	100/120	150/125	D151	150/125	100/120	150/125	100#	160/125
120#	120/140	125/106	126	120/140	125/106	D126	125/106	120/140	125/106	120#	125/100
150#	140/170	106/90	107	140/170	106/90	D107	106/90	140/170	106/90		
180#	170/200	90/75	91	170/200	90/75	D91	90/75	170/200	90/75	150#	100/80
200#	200/230	75/63	76	200/230	75/63	D76	75/63	200/230	75-63	180#	80/63
240#	230/270	63/53	64	230/270	63/53	D64	63/53	230/270	63/53	240#	63/50
280#	270/325	53/45	54	270/325	53/45	D54	53/45	270/325	53/45		
	325/400	45/38	46	325/400	45/38	D46	45/38	325/400	45/38	280#	50/40

JB/T7990-1998	DE Beers	DIN848-65		FEPA		ANSI B74.20-81		JIS 6002-63		JB 2808-79		ГОСТ 9206-80
Grain and Size	Grain and Size	Grain	Size	Grain	Size	Grain	Size	Grain	Size	Grain	Size	Grain and Size
	80-40			M63	42-84	60	54-80					
M36/54	60-30	D45	40/50	M40	27-53	45	36-54			W50	40-50	60/40
M22/36	40-20	D35	32/40					400	37/34	W40		
	35-15	D25	25/32	M25	16-34	30	22-36	500	34/28		28-40	40/28
M20/30		D20	25/40					600	28/24			
M12/22		D20A	25/30					700	24/20	W28	20-28	28/20
M10/20	20-10	D20B	30/40	M16	10-22	15	12-22	800	20/16	W20	14-20	20/14
M8/12,M6/12	16-8	D15	15/25	M10	6-14	9	8-12	1000	16/13			
M5/10	12-6	D15A	10/15					1200	13/10	W14	10-14	14/10
M4/8		D15B	15/20	M6.3	4-9			1500	10/8	W10	7-10	10/7
M3/6	8-4	D15C	20/25			6	4-8	2000	8/6			
M2.5/5	6-3	D7	5/10					2500	6/5	W7	5-7	7/5
M2/4		D3	2/5	M4.0	2.5-5.5			3000	5/4	W5	3.5-5	5/3
M1.5/3	4-2			M2.5	1.5-3.5	3	2-4	4000	4/3	W3.5	2.5-3.5	3/2
M0/2	3-1.5			M1.6	1.0-2.5			5000	3/2			
M0.5/1.5	2-1	D1	1/2			1	0-2	8000	2/1	W2.5	1.5-2.5	
M0.5/1	1.5-0.75			M1.0	0.5-1.5					W1.5	1-1.5	
M0/1	1-0.5;1-0	D0.7	0.5/1			1/2	0-1	15000	1/0	W1	0-1	1/0
M0/0.5	0.5-0	D0.25	<0.5							W0.5	0-0.5	

GRINDING PARAMETER

All works request the wheels rotating in a high speed. The wheel speed namely is grinding speed. According to the following formula.

$$V_s = \frac{\pi d_s n_s}{60 \times 1000}$$

V_s = Peripheral speed(m/s), d_s = Grinding wheel diameter(mm)
 n_s = Grinding wheel speed(r/min=r.p.m), Generally, V_s is 30-35m/s, when $V_s > 50$ m/s, It's high speed grinding.

MEAN SURFACE ROUGHNESS

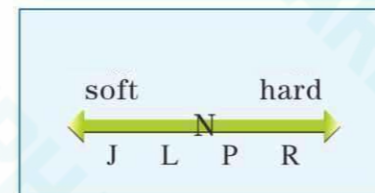
Ra(μm)	0.02	0.03	0.05	0.07	0.09	0.10	0.12	0.14	0.15	0.17	0.20	0.24	0.27	0.31
Rz(μm)	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.1	1.3	1.4	1.6
Rmax(μm)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8

Ra(μm)	0.34	0.41	0.48	0.54	0.61	0.68	0.77	0.85	0.94	1.02	1.19	1.36	1.53	1.70
Rz(μm)	1.8	2.2	2.5	2.9	3.2	3.6	4.1	4.5	5.0	5.4	6.3	7.2	8.1	9.0
Rmax(μm)	2.0	2.4	2.8	3.2	3.6	4.0	4.5	5.0	5.5	6.0	7.0	8.0	9.0	10.0

◆ (concentration)

C %	ct/cm ³ (mg/cm ³)
150	6.6 (1320)
125	5.5 (1100)
100	4.4 (880)
75	3.3 (660)
50	2.2 (440)

◆ (hardness)



Diamond grinding wheel surface roughness contrast diagram Ra(um)

Resin Diamond Grinding Wheel(80#--400#)			Diamond Grinding Grease W40(600#)-W0.5(3000#)		
Old International Granularity	Roughness Value Ra(um)	New International Granularity	Old International Granularity	Roughness Value Ra(um)	New International Granularity
80#	0.8-3	80/100	W40	0.4-0.2	36/54
100#	0.63-2.5	100/120	W28	0.3-0.2	22/36
120#	0.32-0.63	120/140	W20	0.1-0.2	12/22
150#	0.2-0.25	140/170	W14	0.1-0.15	10/20
180#	0.16-0.2	170/200	W10	0.1-0.08	6/12
240#	0.14-0.18	200/230	W7	0.1-0.05	4/8
280#	0.14-0.16	230/270	W5	0.05-0.03	3/6
320#	0.1-0.14	270/320	W3.5	0.03-0.025	2/4
400#	0.06-0.1	325/400	W2.5	0.025-0.02	1.5/3
			W1.5	0.02-0.018	1/2
Grinding Wheel Roughness Value increase one level: Resin < Bronze < Electroplate			W1	0.018-0.012	0/1
Diamond Grinding Wheel: Solidation grinding. Grinding Grease: Free abraise grinding			W0.5	0.012-0.01	0/0.5

The reason for rougness value fluctuation is depending on processing way, grinder accuracy, grinding depth, working speed, rotating speed, grinding wheel hardness and the way of cooling. The purity degree of cooling liquid and air conditon can also have influence.

Ra(um) Roughness and Finish Degress Comparison Chart

100Ra	50Ra	25Ra	12.5Ra	6.3Ra	3.2Ra	1.6Ra	0.8Ra	0.4Ra	0.2Ra	0.1Ra	0.05Ra	0.025Ra	0.012Ra
▽1	▽2	▽3	▽4	▽5	▽6	▽7	▽8	▽9	▽10	▽11	▽12	▽13	▽14

The reason for rougness value fluctuation is depending on processing way, grinder accuracy, grinding depth, working speed, rotating speed, grinding wheel hardness and the way of cooling. The purity degree of cooling liquid and air conditon can also have influence.

Grain size	Infeed(mm)
#40~ #80	0,1-0.04
#100~#140	0.04-0.015
#170~ #230	0.015-0.005
#270~ #400	0.005 0.001

Table Infeed Rate	
Tools Grinding	0.5~ 3.0m/min
Surface Grinding	8.0m 2.4m/min
External Cylindrical Grinding	1.0~ 2.0m/min
Internal Grinding	0.3~2.0m/min

Wet Grinding		
DIAMOND WHEELS	CUP WHEELS	PERIPHERAL WHEELS
Diamond Wheel shapes	11V9, 12V9, 15V9, etc.	1A1, 1VI, 1AIR, etc,
Resin Bond Wheels	25 to 40 m/s	25 to 40 m/s
Metal Bond Wheels		20 to 30 m/s
Vitrified Bond Wheels	15 to 30 m/s	15 to 30 m/s
Dry Grinding		
DIAMOND WHEELS	CUP WHEELS	PERIPHERAL WHEELS
Diamond Wheel shapes	11V9, 12V9, 15V9, etc.	1A1, 1VI, 1AIR, etc,
Resin Bond Wheels	14 to 18 m/s	14 to 18 m/s
CBN WHEELS	15 to 30 m/s	15 to 30 m/s

Diameter		Speed (M/S)								
		15	20	25	30	35	40	45	60	80
inch	mm	RPM								
1"	25	11500	15300	19100	23000	26750	30550	34370	45840	61000
1 1/2"	40	71600	9550	11940	14320	16700	19100	21500	28700	38200
2"	50	5730	7650	9550	11450	13400	15275	17185	22900	30500
2 1/2"	65	4400	5900	7350	8800	10300	11750	13200	17600	23500
3"	75	3825	5100	6380	7650	9000	10185	11455	15300	20400
3 1/2"	90	3185	4245	5300	6370	7430	8490	9560	12750	17000
4"	100	2865	3825	4775	5730	6700	7640	8600	11450	15300
4 1/2"	115	2490	3320	4150	4980	5815	6640	7470	9965	13300
5"	125	2300	3035	3800	4600	5300	6110	6875	9200	12200
6"	150	1900	2550	3200	3800	4450	5100	5730	7640	10200
7"	175	1635	2200	2730	3270	3800	4365	4910	6550	8950
8"	200	1440	1910	2390	2875	3350	3820	4300	5730	7640
9"	225	1275	1700	2100	2550	2975	3395	3820	5100	6840
10"	250	115	1525	1900	2300	2675	3050	3440	4575	6100
12"	300	950	1275	1590	1900	2230	2550	2865	3820	5100
14"	350	820	1090	1370	1640	1900	2180	2450	3275	4360
16"	400	725	960	1220	1450	1675	1910	2150	2780	3820
18"	450	635	850	1060	1275	1485	1700	1910	2550	3400
20"	500	575	770	960	1150	1340	1525	1720	2290	3050
22"	550	515	700	850	1030	1200	1390	1565	2080	
24"	600	475	640	800	950	1110	1295	1430	1910	
26"	650	440	590	730	875	1030	1175	1320	1750	
28"	700	405	540	675	810	950	1090	1225	1640	
30"	750	380	510	635	765	890	1020	1145	1530	
32"	800	360	475	600	715	835	955	1075	1435	
34"	850	340	450	565	675	790	900	1010		
36"	900	320	425	530	640	750	850	955		
38"	950	300	400	500	600	700	805	905		
40"	1000	285	380	480	570	670	765	860		
42"	1050	275	365	455	550	640				
44"	1100	260	350	430	520	600				