

**Advanced Materials INDEX**

Offering a comprehensive range of circular saws, cutters and router bits for processing solid surface materials, aluminum, composites, high-pressure laminates, plastics and sandwich panels.

- Tools for sizing, carved routing and surface engraving in plastics
- Sizing and carve-routing in aluminum
- Tools for cutting and routing solid surface materials
- Special tools engineered for long life and accuracy in machining composite materials (reinforcing fibers and polymer matrix)

Important factors such as carbide-type, tool geometry, grinding process and cutting edge finish, greatly influence the success of working with advanced materials. Dimar provides a superior solution featuring longer tool life and excellent cutting quality.

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Plastic



Solid Surface Materials

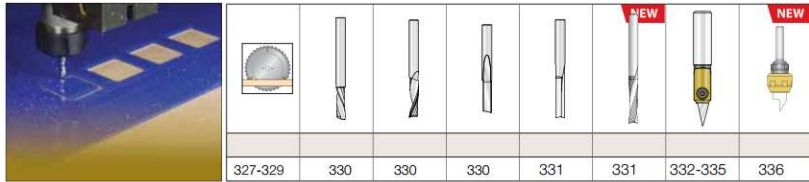


Aluminum



Composites

# Plastic



### Generic Name for Materials Made from Polymer Chains

There is enormous variety of plastics. Various combinations of Polymer structures & sizes could create new mechanical properties. Those different materials are spread over the complete scale of each property (very soft to very hard, clear to blank, heat sensitivity to heat resistance, e.g.). No doubt it is difficult to define the exact cutting condition of rotation speed in related to the cutting feed.

### Kindly, refer to a couple guidelines to optimize cutting process:

- The larger the chip size, the larger the tool lifetime.
- For "elastic/soft" material, we highly recommend to work with a minimal number of cutting edges; For instance, it is preferable to work with 1 flute, not with 2 flutes.
- For "hard/ breakable" material, it is preferable to use with additional cutting edges; for instance: Using 300 diameter saw with 96 teeth, not 60 teeth.
- Tools for use in plastics are characterized by extremely sharp cutting angles. Carbide tips is required to support an angle in order not to crumble during cutting.

### In order to define the material it is recommended to use the table below:

Polymer	Tensile Strength MPa	(%) Elongation	Tensile Modulus MPa
HDPE	21-35	15-100	700-1400
LDPE	7-21	50-800	100-250
PP	30-40	150-600	1150-1550
PS	33-35	1-4	2400-3350
PVC	35-63	2-30	2000-4200
ABS	35-48	15-80	1750-2500
PA 6/6	84	60-100	2070-3245
PA 6/12	62	150-340	2100
PC	63	110	2400
PMMA	55-75	5	2400-3100
Polyester	56	300	2400
Polysulfones	70.3	5-6	2482
PEEK	100	40	3900
PET	45-145		2300-10300
PVDC	19	350	345-552
Cellulosics	14-15	6-60	690-2100
PAI	125-185	5-12	710-4900
Polycrylates	69	50	2400-16600
PPO	55	50	2484-2622
Polyimides	69	50	3588

The property of the tensile modulus and the elongation can give a good idea where the material belongs: is it more breakable or is it considered to be soft?

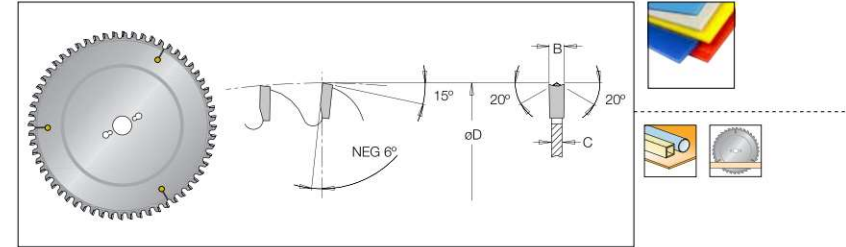
As the tensile modulus gets bigger and the elongation gets smaller, the material becomes harder and more cutting edges can be used.

This table can also give a perspective of a new material regarding a material that is already known.



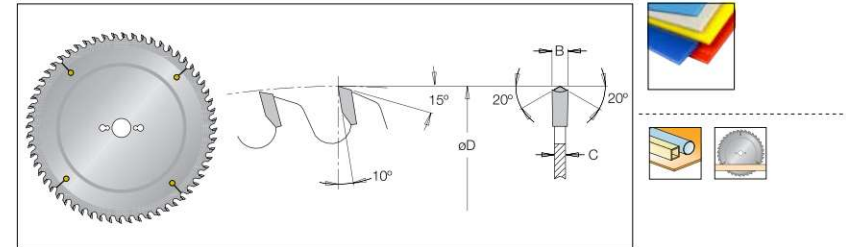
# Plastic

## Trimming & Sizing Saw Blade, MEDN



øD	Teeth	Code No.	B	c	n	m/min	ød
220	42	90110656	3.2	2.2	6000-8600	13-18	30
253	48	90110136	3.2	2.2	5200-7500	12-17	30
303	60	90110856	3.2	2.2	4400-6300	13-19	30

## Trimming & Sizing Saw Blade, MED



øD	Teeth	Code No.	B	c	n	m/min	ød
253	48	90110106	3.2	2.2	5200-7500	12-18	30
303	60	90110256	3.3	2.4	4400-6300	13-19	30
350	72	90110306	3.2	2.2	3800-5400	14-19	30



Plastic



Solid Surface Materials



Aluminum



Composites



Plastic



Solid Surface Materials



Aluminum



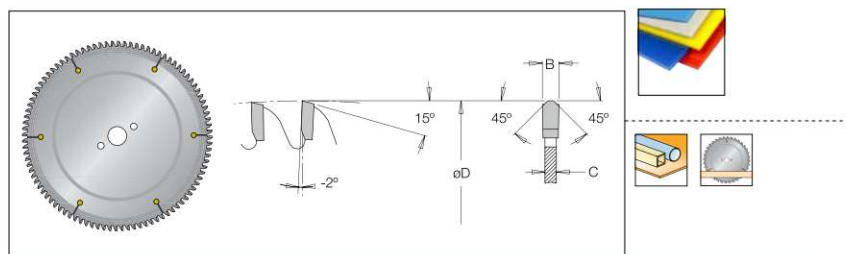
Composites

# Plastic



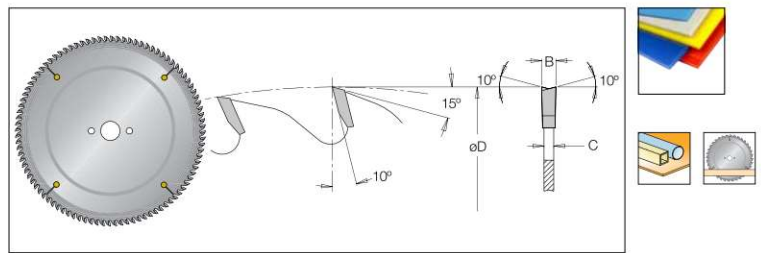
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## Plastic Trimming & Sizing Saw Blade, MFUP



øD	Teeth	Code No.	B	c	ød
250	80	90107036	2.5	1.8	30
300	96	90107066	3.3	2.6	30
350	108	90107096	3.7	3.0	30

## Soft & Hard Trim & Cross-cut Saw Blade, MEW, MFW



øD	Teeth	Code No.	B	c	ød	n	m/min	
150	30	90103506	3.0	2.0	30	6300-10100	32-52	MEW
	48	90105306	3.0	2.0	30	6300-10100	51-82	MFW
180	42	90103806	3.0	2.0	30	5300-8400	38-60	MEW
	58	90105406	3.0	2.0	30	5300-8400	52-83	MFW
200	48	90104006	3.0	2.0	30	4700-7600	38-62	MEW
	64	90105506	3.0	2.0	30	4700-7600	51-83	MFW
220	48	90104036	3.0	2.0	30	4300-6900	35-56	MEW
	64	90105596	3.0	2.0	30	4300-6900	47-75	MFW
250	60	90104106	3.2	2.2	30	3800-6100	39-62	MEW
	60	90104206	3.2	2.2	30	3100-5000	32-51	MEW
300	72	90104306	3.2	2.2	30	3100-5000	38-61	MEW
	72	90104406	3.5	2.5	30	2700-4300	33-53	MEW
350	84	90104506	3.5	2.5	30	2700-4300	39-61	MEW
	108	90105906	3.5	2.5	30	2700-4300	50-79	MFW
400	96	90104606	3.5	2.5	30	2300-3800	38-62	MEW
	120	90106006	3.5	2.5	30	2300-3800	47-78	MFW
450	108	90104626	4.0	2.8	30	2100-3300	39-61	MEW
	132	90106036	4.0	2.8	30	2100-3300	47-74	MFW
500	120	90104636	4.4	3.0	30	1900-3000	39-61	MEW

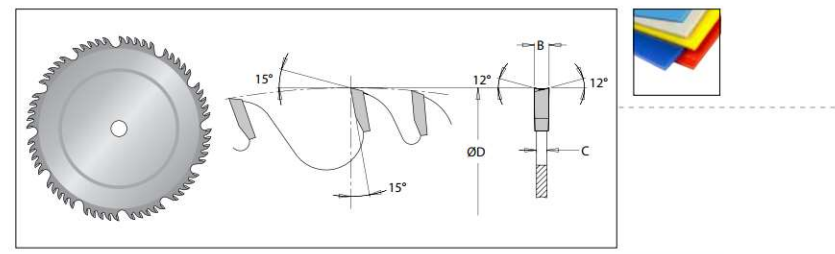
■ Available upon request



# Plastic

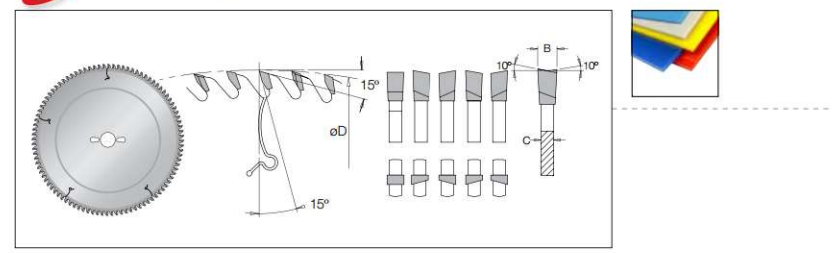


## Combination Multipurpose Cut Saw Blade, MEC



øD	Teeth	Code No.	B	c	n	m/min	ød
200	40	90800106	3.2	2.2	8900-12000	21-29	30
230	40	90800206	3.2	2.2	6600-9000	21-29	30
250	50	90800406	3.4	2.4	5300-7600	27-38	30
300	60	90800506	3.8	2.8	5300-7600	21-30	30
350	70	90800606	3.8	2.8	5300-7600	27-38	30
400	80	90800706	4	3	4400-6300	21-30	30

## DIMAX Trimming & Cross Cut Saw Blade, DFCC



øD	Teeth	Code No.	B	c	n	m/min	ød
300	100	96035306	3.0	2.2	3800-6300	27-45	30

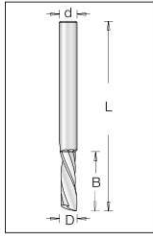


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# Plastic

## Single Spiral O Flute, Down Shear Angle, Mirror Finish



(Metric)

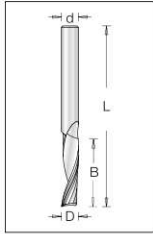
D	B	Code No.	L	ød
2.5	8.0	<b>NEW</b> 185419Z	50	3.0
3.0	11.0	185411Z	50	3.0
4.0	13.0	185412Z	50	4.0
5.0	18.0	185413Z	60	5.0
6.0	20.0	1854143	60	6.0

(Imperial)

D	B	Code No.	L	ød
3.2	12.7	185417Z	50.8	3.2
3.2	12.7	<b>NEW</b> 1854164	50.8	6.35
4.76	15.9	185423Z	50.8	4.76
4.76	15.9	<b>NEW</b> 1854234	50.8	6.35
6.35	19.05	<b>NEW</b> 1854334	63.5	6.35
6.35	25.4	<b>NEW</b> 1854324	63.5	6.35
6.35	31.75	<b>NEW</b> 1854354	76.2	6.35



## Single Spiral O Flute Up Shear Angle Mirror Finish



(Metric)

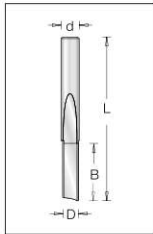
D	B	Code No.	L	ød
2.5	8.0	<b>NEW</b> 185519Z	50	3.0
3.0	11.0	185511Z	50	3.0
4.0	13.0	185512Z	50	4.0
5.0	18.0	185513Z	60	5.0
6.0	20.0	1855143	60	6.0

(Imperial)

D	B	Code No.	L	ød
3.2	12.7	185517Z	50.8	3.2
3.2	12.7	<b>NEW</b> 1855164	50.8	6.35
4.76	15.9	185523Z	50.8	4.76
4.76	15.9	<b>NEW</b> 1855234	50.8	6.35
6.35	19.05	<b>NEW</b> 1855334	63.5	6.35
6.35	25.4	<b>NEW</b> 1855324	63.5	6.35
6.35	31.75	<b>NEW</b> 1855354	76.2	6.35



## Single Straight O Flute



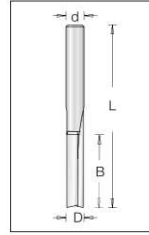
D	B	Code No.	L	ød
3.18	12.75	1850104	50	6.35
4.76	16.0	1850224	50	6.35
6.35	19.05	1850304	50	6.35
6.35	25.4	1850324	65	6.35
6.35	25.4	L1850324	90	6.35

■ Available upon request



# Plastic

## Double Straight Flute

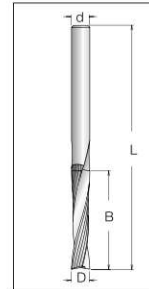


D	B	Code No.	L	ød
3.15	12.7	1870104	50	6.35
4.75	16.0	1870224	50	6.35
6.35	25.4	1870324	64	6.35
9.5	25.4	1870406	64	9.5
12.7	25.4	1870508	77	12.7

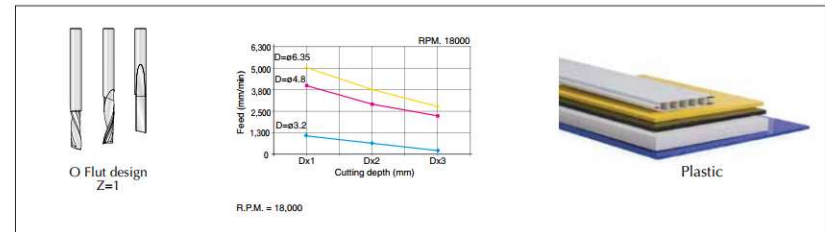
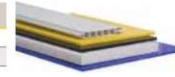


## Double Spiral O Flute Up Shear

**NEW**



D	B	Code No.	Z	L	ød
7.94	25.4	185133Z	2	63.5	8
9.52	31.75	1852416	2	76.2	9.52
12.7	38.1	1851538	2	90.0	12.7



Plastic



Solid Surface Materials



Aluminum



Composites



Plastic



Solid Surface Materials



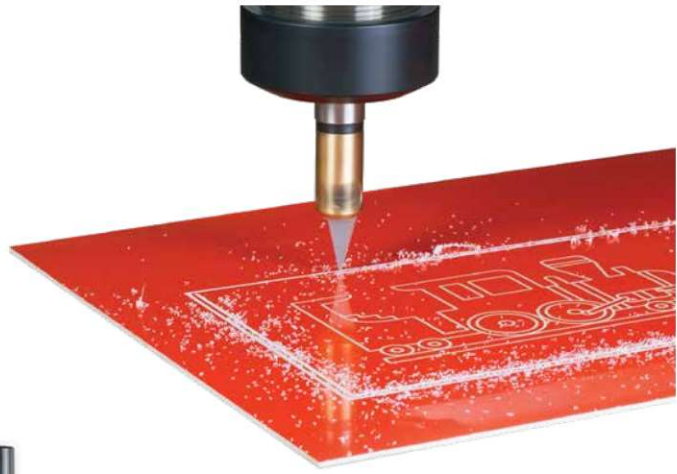
Aluminum



Composites

# Plastic

## Engraving System



The versatile Engraving Insert System features one tool body with 40 unique insert knives of the highest industrial quality, to ensure cleaner cuts and longer life than most other standard solid router bits.

Designed for a wide variety of applications including straight cut, core box, round corner, V-grooves and cutting & chamfering. Ideal for cutting laminated materials, veneers, MDF, plastics, wood and solid surfaces.

The system was specially engineered to enable a quick, easy exchange of inserts while mounted in CNC machines; eliminating setup-time while maintaining consistent cutting accuracy. The balanced design minimizes vibration resulting in superior cutting.

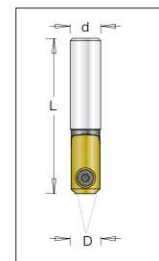


# TBOX

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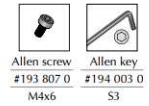
# Plastic

## Engraving System



Code No.	D	L	ød
G1853x05*	12	65	8
G1853x09*	12	65	12

Also available with 1/4 & 1/2 diameter shank.  
\*Body only.



<p>V-Groove 30° Engraving Insert Knives</p> <table border="1"> <thead> <tr> <th>Code No.</th> <th>D</th> </tr> </thead> <tbody> <tr><td>* 3185005</td><td>0.12</td></tr> <tr><td>* 3185006</td><td>0.24</td></tr> <tr><td>3185007</td><td>0.5</td></tr> <tr><td>3185008</td><td>0.75</td></tr> <tr><td>3185009</td><td>1.0</td></tr> <tr><td>3185010</td><td>1.5</td></tr> <tr><td>3185011</td><td>2.25 7.5</td></tr> </tbody> </table>	Code No.	D	* 3185005	0.12	* 3185006	0.24	3185007	0.5	3185008	0.75	3185009	1.0	3185010	1.5	3185011	2.25 7.5	<p>V-Groove 60° Engraving Insert Knives</p> <table border="1"> <thead> <tr> <th>Code No.</th> <th>D</th> </tr> </thead> <tbody> <tr><td>* 3185018</td><td>0.12</td></tr> <tr><td>* 3185019</td><td>0.25</td></tr> <tr><td>3185020</td><td>0.5</td></tr> <tr><td>3185021</td><td>0.75</td></tr> <tr><td>3185022</td><td>1.0</td></tr> <tr><td>3185023</td><td>1.5</td></tr> <tr><td>3185024</td><td>2.25</td></tr> </tbody> </table>	Code No.	D	* 3185018	0.12	* 3185019	0.25	3185020	0.5	3185021	0.75	3185022	1.0	3185023	1.5	3185024	2.25	<p>V-Groove 90° Engraving Insert Knives</p> <table border="1"> <thead> <tr> <th>Code No.</th> <th>D</th> </tr> </thead> <tbody> <tr><td>3185014</td><td>0.12</td></tr> <tr><td>3185015</td><td>0.24</td></tr> <tr><td>3185016</td><td>0.5</td></tr> <tr><td>3185017</td><td>1</td></tr> </tbody> </table>	Code No.	D	3185014	0.12	3185015	0.24	3185016	0.5	3185017	1	<p>Straight Engraving Insert Knives</p> <table border="1"> <thead> <tr> <th>Code No.</th> <th>D</th> <th>B</th> </tr> </thead> <tbody> <tr><td>3185032</td><td>3.2</td><td>5</td></tr> <tr><td>3185033</td><td>4.76</td><td>6</td></tr> <tr><td>3185034</td><td>6.35</td><td>7</td></tr> <tr><td>3185035</td><td>7.94</td><td>8</td></tr> </tbody> </table>	Code No.	D	B	3185032	3.2	5	3185033	4.76	6	3185034	6.35	7	3185035	7.94	8
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3185035	7.94	8																																																										

\* Only for use with controllable feed rate machines.

<p>Core box Engraving Insert Knives</p> <table border="1"> <thead> <tr> <th>Code No.</th> <th>R</th> <th>B</th> </tr> </thead> <tbody> <tr><td>3185028</td><td>1.6</td><td>5</td></tr> <tr><td>3185029</td><td>2.4</td><td>6</td></tr> <tr><td>3185030</td><td>3.2</td><td>7</td></tr> <tr><td>3185031</td><td>4.0</td><td>8</td></tr> </tbody> </table>	Code No.	R	B	3185028	1.6	5	3185029	2.4	6	3185030	3.2	7	3185031	4.0	8	<p>Corner round Engraving Insert Knives</p> <table border="1"> <thead> <tr> <th>Code No.</th> <th>R</th> <th>B</th> </tr> </thead> <tbody> <tr><td>3185025</td><td>1.6</td><td>8</td></tr> <tr><td>3185026</td><td>2.4</td><td>8</td></tr> <tr><td>3185027</td><td>3.2</td><td>8</td></tr> </tbody> </table>	Code No.	R	B	3185025	1.6	8	3185026	2.4	8	3185027	3.2	8	<p>Cutting and chamfering Engraving Insert Knives</p> <table border="1"> <thead> <tr> <th>Code No.</th> <th>B</th> <th>Code No.</th> <th>B</th> </tr> </thead> <tbody> <tr><td>3185040</td><td>0.5</td><td>3185043</td><td>4.3</td></tr> <tr><td>3185036</td><td>1.0</td><td>3185013</td><td>4.6</td></tr> <tr><td>3185002</td><td>1.5</td><td>3185003</td><td>5</td></tr> <tr><td>3185037</td><td>1.8</td><td>3185044</td><td>5.5</td></tr> <tr><td>3185041</td><td>2.3</td><td>* 3185038</td><td>6.3</td></tr> <tr><td>3185042</td><td>3.3</td><td>* 3185039</td><td>8.3</td></tr> <tr><td>3185012</td><td>3.6</td><td></td><td></td></tr> </tbody> </table> <p>* Only for Chamfer operation.</p>	Code No.	B	Code No.	B	3185040	0.5	3185043	4.3	3185036	1.0	3185013	4.6	3185002	1.5	3185003	5	3185037	1.8	3185044	5.5	3185041	2.3	* 3185038	6.3	3185042	3.3	* 3185039	8.3	3185012	3.6		
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# TBOX

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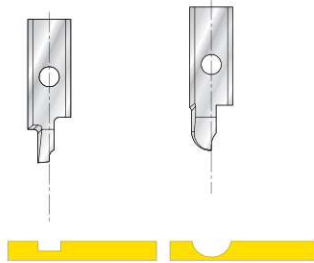
# Plastic

## Engraving System Feed Rates



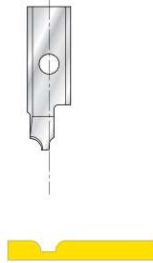
### Straight and core box max feed Vars. RPM (cutting depth 1D) mm/min

Head diameter (mm)	3.2	4.76	6.35	7.93
Rotation speed (RPM)	Recommended feed rate (mm/min)			
6000	600	780	900	1080
7000	700	910	1050	1260
8000	800	1040	1200	1440
9000	900	1170	1350	1620
10000	1000	1300	1500	1800
11000	1100	1430	1650	1980
12000	1200	1560	1800	2160
13000	1300	1690	1950	2340
14000	1400	1820	2100	2520
15000	1500	1950	2250	2700
16000	1600	2080	2400	2880
17000	1700	2210	2550	3060
18000	1800	2340	2700	3240
19000	1900	2470	2850	3420
20000	2000	2600	3000	3600
21000	2100	2730	3150	3780
22000	2200	2860	3300	3960
23000	2300	2990	3450	4140
24000	2400	3120	3600	4320
25000	2500	3250	3750	4500
26000	2600	3380	3900	4680
27000	2700	3510	4050	4860
28000	2800	3640	4200	5040



### Round corner recommended feed Vars. RPM mm/min

Knife radius (mm)	1.6	2.4	3.2
Rotation speed (RPM)	Recommended feed rate (mm/min)		
6000	1500	1320	1200
7000	1750	1540	1400
8000	2000	1760	1600
9000	2250	1980	1800
10000	2500	2200	2000
11000	2750	2420	2200
12000	3000	2640	2400
13000	3250	2860	2600
14000	3500	3080	2800
15000	3750	3300	3000
16000	4000	3520	3200
17000	4250	3740	3400
18000	4500	3960	3600
19000	4750	4180	3800
20000	5000	4400	4000
21000	5250	4620	4200
22000	5500	4840	4400
23000	5750	5060	4600
24000	6000	5280	4800
25000	6250	5500	5000
26000	6500	5720	5200
27000	6750	5940	5400
28000	7000	6160	5600



# Plastic



### V-groove routing recommended max feed Vars. RPM (inch/min)

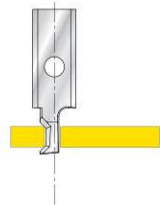
Head diameter (D) mm	0.1	0.25	0.5	0.75	1	1.5
Rotation speed (RPM)	Max. feed rate mm/min					
6000	480	1200	2400	3600		
7000	560	1400	2800			
8000	640	1600	3200			
9000	720	1800	3600			
10000	800	2000	4000			
11000	880	2200				
12000	960	2400				
13000	1040	2600				
14000	1120	2800				
15000	1200	3000				
16000	1280	3200				
17000	1360	3400				
18000	1440	3600				
19000	1520	3800				
20000	1600					
21000	1680					
22000	1760					
23000						
24000	1920					
25000	2000					
26000	2080					
27000	2160					
28000	2240					

NO LIMIT



### Sizing and chamfering recommended feed Vars. RPM mm/min

Material thickness (mm)	2	3	4.6	5.6	6	7.2	8
rotation speed (RPM)	Recommended feed rate (mm/min)						
6000	1500	1320	1200	1080	1500	1320	1200
7000	1750	1540	1400	1260	1750	1540	1400
8000	2000	1760	1600	1440	2000	1760	1600
9000	2250	1980	1800	1620	2250	1980	1800
10000	2500	2200	2000	1800	2500	2200	2000
11000	2750	2420	2200	1980	2750	2420	2200
12000	3000	2640	2400	2160	3000	2640	2400
13000	3250	2860	2600	2340	3250	2860	2600
14000	3500	3080	2800	2520	3500	3080	2800
15000	3750	3300	3000	2700	3750	3300	3000
16000	4000	3520	3200	2880	4000	3520	3200
17000	4250	3740	3400	3060	4250	3740	3400
18000	4500	3960	3600	3240	4500	3960	3600
19000	4750	4180	3800	3420	4750	4180	3800
20000	5000	4400	4000	3600	5000	4400	4000
21000	5250	4620	4200	3780	5250	4620	4200
22000	5500	4840	4400	3960	5500	4840	4400
23000	5750	5060	4600	4140	5750	5060	4600
24000	6000	5280	4800	4320	6000	5280	4800
25000	6250	5500	5000	4500	6250	5500	5000
26000	6500	5720	5200	4680	6500	5720	5200
27000	6750	5940	5400	4860	6750	5940	5400
28000	7000	6160	5600	5040	7000	6160	5600

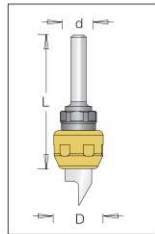


# Plastic

## Mini Engraving 1/8" Shank

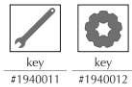
1/8" shank mini engraving system for small CNC machines with seven different knife profiles for curving and engraving. Ideal for cutting veneers, MDF, plastics, wood and solid surfaces.

**NEW**



Code No.	D	L	ød
G1853x3Z*	10.3	28	3.18

\*Body only.



V-Groove 45°  
Engraving  
Insert Knives

Code No.	D
3185202	0.2

V-Groove 60°  
Engraving  
Insert Knives

Code No.	D
3185203	0.2

V-Groove 90°  
Engraving  
Insert Knives

Code No.	D
3185204	0.2

Core Box  
Engraving  
Insert Knives

Code No.	R	B
3185200	2.3	5

Corner round  
Engraving  
Insert Knives

Code No.	R	B
3185201	1.3	6

Straight  
Engraving  
Insert Knives

Code No.	D	B
3185206	2.3	5

Straight  
Engraving  
Insert Knives

Code No.	D	B
3185205	3.3	6



# Solid Surface Materials

## Router Bits for Fabricating Solid Surface Materials

#1250	#1540	#1014	#1014	#1072	#1510	#1031	#1040	#1612	#1520	#1612	#1530	#1530	#1530
337	337	338	338	340	340	341	341	341	342	342	342	343	343

#1130	#1559	#1553	#1550	#1564	1554	1564	1062	1592	1590	1594	#1621	#1600	#1084
343	344	344	344	345	345	346	346	347	347	347	348	348	349

### Corian, Fountainhead Avonite, etc.

Dimar has developed a world class line of router bits for solid surface materials.

Tools profile produced for such materials provide a complete solution for all applications & profiles in this category.

Tooling's shape & measurements shall comply with the particular processing stages.

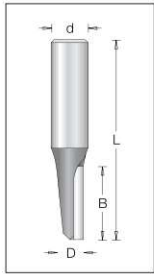
Working with a bearing guide: In order to protect the product from harm, the bearings are wrapped in reinforced plastic material, which is molded to the bearing and eliminates a split from the bearing while operating. The bearing shape is determined according to the existing profile of the product.



# Solid Surface Materials

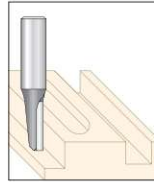


## Plunge Bit - Single Fluted

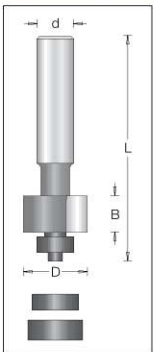


øD	B	Code No.	L	ød	Z
9.5	25.4	1250229	70	12	1

⚠ Can be supplied with 1/2" shank.



## Face Inlay Bit



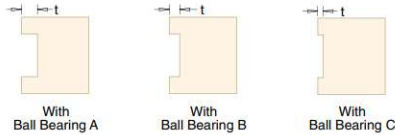
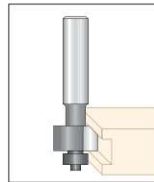
øD	B	Code No.	t	L	ød	Z	
6.35	1540019	1.6	78	12	C	2	
6.35	1540029	3.2	76	12	B	2	
6.35	1540039	4.8	76	12	A	2	
22.2	9.5	1540159	4.8	78	12	A	2
12.7	1540049	1.6	82	12	C	2	
12.7	1540059	3.2	80	12	B	2	
12.7	1540069	4.8	80	12	A	2	

■ Available upon request

⚠ Can be supplied with 1/2" shank.

Spare Parts:

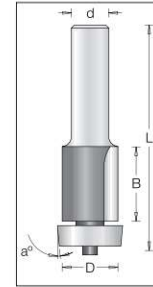
A. Ball Bearing #191 003 0 12.7x6.3x4.7	B. Ball Bearing #191 005 0 16x6.3x5	C. Ball Bearing #191 014 0 19x6.3x7



# Solid Surface Materials



## Inlay Trimming Bit

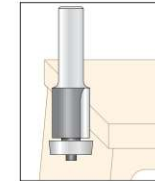


øD	a	B	Code No.	L	ød	Z	
19.0	5°	25.4	1014159	80	12	A	2
19.6	5°	38.1	1014209	84	12	B	2

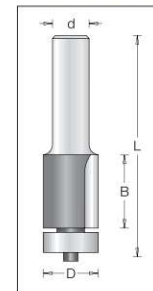
⚠ Can be supplied with 1/2" shank.

Spare Parts:

A. Molded Bearing #191 936 05 22.2x6.3x5.2x5°	B. Molded Bearing #191 999 05 25.4x6.3x8.2x5°



## Inlay Trimming Bit

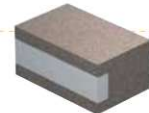
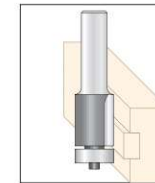


øD	B	Code No.	L	ød	Z
19	25.4	1014169	80	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:

Molded Bearing #1919 3405 19x6.3x5.7





# Solid Surface Materials

## Trimming Bit



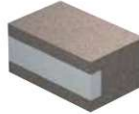
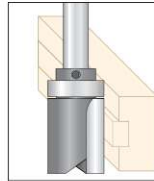
øD	B	Code No.	L	ød	Z
28.6	38.1	1072399	92	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:



Ball Bearing  
#191 018 0  
12.7x28.6x8



Plastic



Solid Surface Materials

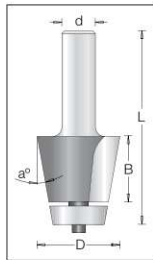


Aluminum



Composites

## Bevel Bit



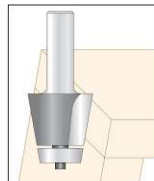
øD	a	B	Code No.	L	ød	Z
32	12°	25.4	1510049	80	12	A 2
39	12°	32.0	1510109	78	12	B 2

⚠ Can be supplied with 1/2" shank.

Spare Parts:



A. Molded Bearing #191 932 05  
B. Molded Bearing #191 999 05  
21.8x6.3x5.7x10° 25.4x6.3x8.2x5°

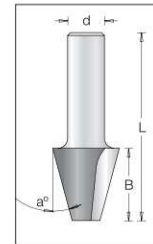


Darbagaldi & Instrumenti



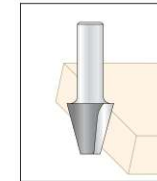
# Solid Surface Materials

## Bevel Bit

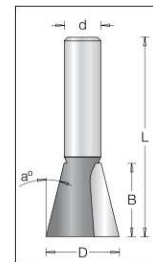


øD	a	B	Code No.	L	ød	Z
24	15°	25.4	1031139	65	12	2

⚠ Can be supplied with 1/2" shank.

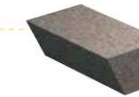
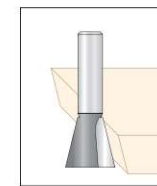


## Bevel Bit



øD	a	B	Code No.	L	ød	Z
25.4	14°	25.4	1040259	69	12	2

⚠ Can be supplied with 1/2" shank.



Plastic



Solid Surface Materials

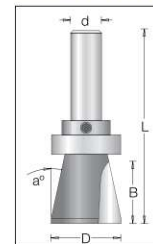


Aluminum



Composites

## Bevel Bit



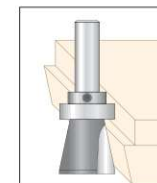
øD	a	B	Code No.	L	ød	Z
28.6	12°	26	1612449	79.4	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:



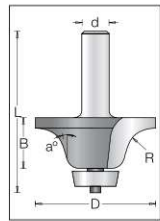
Ball Bearing  
#191 018 0  
28.6x12.7x8



# Solid Surface Materials



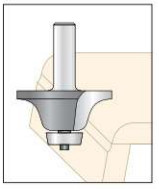
## Rounding Over Bowl Bit



øD	a	B	Code No.	R	L	ød	Z
55	15°	25.4	1520039	13	75	12.0	2
61	15°	32.0	1520049	14	86	12.0	2

■ Available upon request

Spare Parts:  
 Molded Bearing  
 #191 932 0S  
 21.8x6.3x5.7x10°



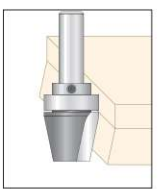
## Bevel Guided Bit



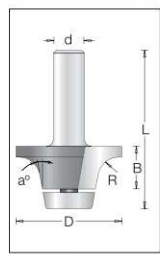
øD	a	B	Code No.	L	ød	Z
28.6	12°	25.4	1612249	77.8	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:  
 Ball Bearing  
 #191 018 0  
 28.6x12.7x8



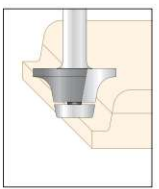
## Bevel Guided Bit



øD	a	B	Code No.	R	L	ød	Z
45.2	17°	18.2	1530059	9.5	63.5	12	2
51.0	17°	18.2	1530069	12.7	63.5	12	2
54.0	17°	25.4	1530079	12.7	71.5	12	2
57.0	17°	24.0	1530089	19.0	76.0	12	2
60.5	12°	22.2	1530099*	14.2	79.0	12	2

⚠ Can be supplied with 1/2" shank.

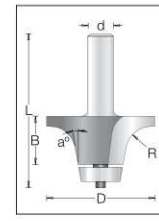
Spare Parts:  
 Molded Bearing #191 936 5S  
 Molded Bearing\* #191 999 0S  
 22.2x6.3x5.7x10° 25.4x6.3x8.2x5°



# Solid Surface Materials



## Undermount Bowl Bit



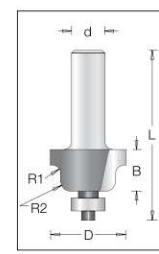
øD	a	B	Code No.	R	L	ød	Z
54	18°	25.4	1530039	13	79	12	2
57	18°	32.0	1530049	14	85	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:  
 Molded Bearing  
 #191 932 0S  
 21.8x6.3x5.7x10°



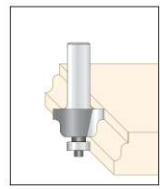
## Roman Ogee Bit



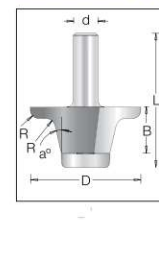
øD	B	Code No.	R1	R2	L	ød	Z
28.6	16	1130109	3.2	4	63	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:  
 Molded Bearing  
 #191 935 0S  
 12.7x4.7x5.7



## Undermount Bowl Bit



øD	a	B	Code No.	R1	R	L	ød	Z
57	13°	24	1530109	4	5	71	12	2

■ Available upon request

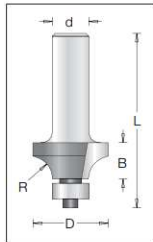
⚠ Can be supplied with 1/2" shank.

Spare Parts:  
 Molded Bearing  
 #191 999 0S  
 25.4x6.3x8.2x5°



# Solid Surface Materials

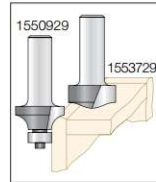
## Corner Rounding Bit



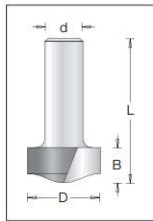
øD	R	B	Code No.	L	ød	Z
28.6	8	13.5	1550923	52	6	2
	8	13.5	1550929	61	12	2

⚠ Can be supplied with 1/4" shank.  
Can be supplied with 1/2" shank.

Spare Parts:

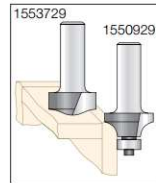


## Corner Top Bit - No Drip

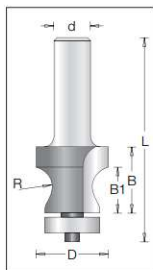


øD	B	Code No.	L	ød	Z
25.4	12.7	1553729	54	12	2

⚠ Can be supplied with 1/2" shank.



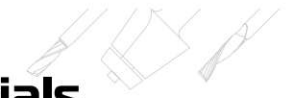
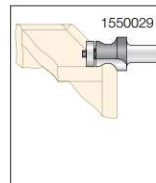
## Corner Top Bit - No Drip



øD	R	B	Code No.	B1	L	ød	Z
25	8	23	1550029	16	77	12	2
	8	29	1550039	24	83	12	2

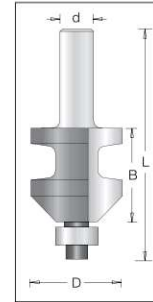
⚠ Can be supplied with 1/2" shank.

Spare Parts:



# Solid Surface Materials

## Bevel Hob Bit

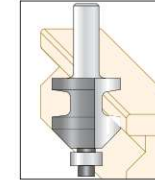


øD	B	Code No.	L	ød	Z
35	36	1564109	89	12	2

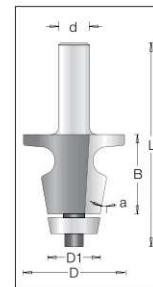
■ Available upon request

⚠ Can be supplied with 1/2" shank.

Spare Parts:



## Under Mount Profile Bowl Bit

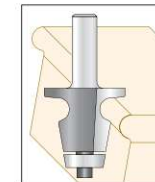


øD	B	Code No.	R	a	L	ød	Z
42	33	1554109	6	11°	83	12	2

■ Available upon request

⚠ Can be supplied with 1/2" shank.

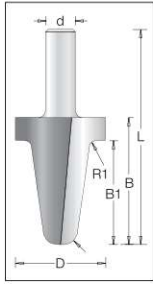
Spare Parts:



Darbagaldi & Instrumenti

# Solid Surface Materials

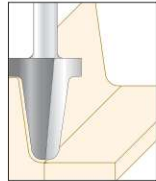
## Upstand Bit



øD	B	B1	Code No.	R	R1	L	ød	Z
40	30	1564019	■ 6	3	78	12	2	
39	55	45	1564059	■ 6	3	93	12	2

■ Available upon request

⚠ Can be supplied with 1/2" shank.



Plastic



Solid Surface Materials

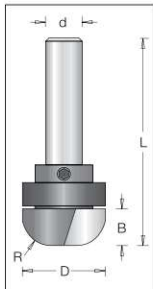


Aluminum



Composites

## Coving Bit



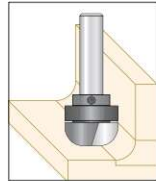
øD	B	Code No.	R	L	ød	Z
28.6	12.7	1062809	10	73	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:

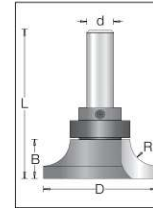


Molded Bearing  
#191 944 0  
28.6x15x8.5



# Solid Surface Materials

## Inverted (Under-Cut) Round Over Bit

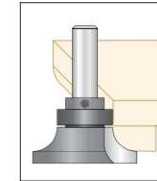


øD	R	B	Code No.	L	ød	n	Z
54.0	12.7	20.0	1592039	73	12		2
67.0	19.0	25.4	1592069	77	12	18,000	2

⚠ Can be supplied with 1/2" shank.

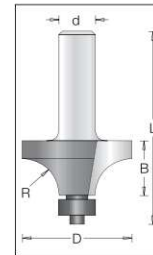


Molded Bearing  
#191 944 0  
28.6x15x8.5



Max. RPM

## Round Over Bit



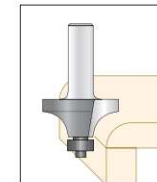
øD	R	B	Code No.	L	ød	Z
38.1	12.7	19.0	1590039	65	12	2
51.0	19.0	25.4	1590069	73	12	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:



Molded Bearing  
#191 935 05  
12.7x4.7x5.7



Plastic



Solid Surface Materials

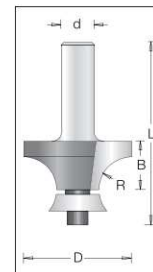


Aluminum



Composites

## Round Over Bit



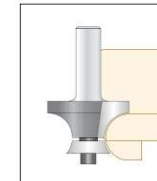
øD	R	B	Code No.	L	ød	n	Z
41.6	12.7	18.7	1594019	68.4	12	A 18,000	2
54.2	19.0	25.0	1594059	76.0	12	B 18,000	2
67.0	25.4	31.4	1594109	92.0	12	C 18,000	2

⚠ Can be supplied with 1/2" shank.

Spare Parts:



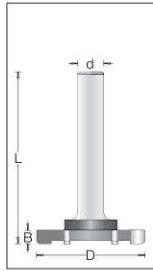
A. Molded Bearing #191 996 05 21.4x6.3xR12.7  
B. Molded Bearing #191 997 05 19.4x6.3xR19  
C. Molded Bearing #191 998 05 18.5x6.3xR25.4



Max. RPM

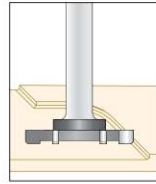
# Solid Surface Materials

## Six Wing Trimmer



øD	B	Code No.	L	ød	Z
52	6.5	1600055	83	8	6
	6.5	1600059	83	12	6

■ Available upon request



Advanced Materials



Solid Surface Materials



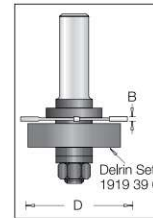
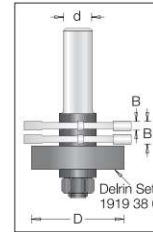
Aluminum



Composites

# Solid Surface Materials

## Tongue & Groove - Jointing Set

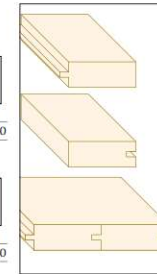


	øD	B	Code No.	L	ød
Complete	47.7	10.0	1084409	76.2	12
Cutter (x2)	47.7	4.0	1080850		
Cutter	47.7	2.0	1080760		

⚠ Can be supplied with 1/2" shank.

Spare Parts:

Arbor & Nut #190 004 9 L=76.2	Molded Bearing #191 938 0 8x43x9.6	Molded Bearing #191 939 0 8x40.7x10.5	Spacer #192 016 0 6x16
Spacer #192 050 0 0.05x16	Spacer #192 100 0 0.1x16	Spacer #192 011 0 1x16	Spacer #192 015 0 3x16
Spacer #192 040 0 3.15x16	Spacer #192 022 0 4.5x25		



Advanced Materials



Solid Surface Materials



Aluminum

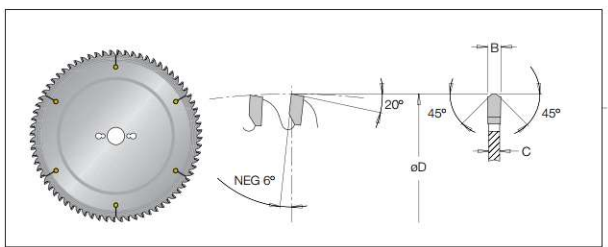


Composites

# Aluminum



## Aluminum Profiles Saw Blade, MESAN, MFSAN



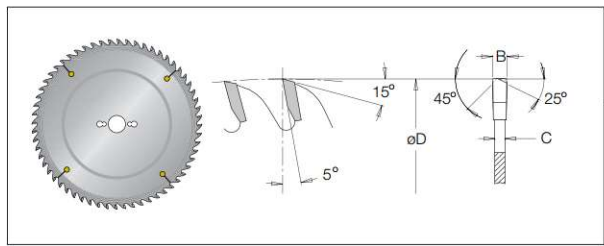
øD	Teeth	Code No.	B	c	n	m/min	ød
150	48	90202433 ■	2.8	2.2	5000-8900	12-21	20
160	48	90202443	2.8	2.2	4700-8300	11-20	20
180	58	90202486	2.8	2.2	4200-7400	12-21	30
184	58	9020245E ■	2.8	2.2	4100-7200	12-21	16
	58	90202453 ■	2.8	2.2	4100-7200	12-21	20
190	60	90202493	2.8	2.2	4000-7000	12-21	20
	60	90202496	2.8	2.2	4000-7000	12-21	30
200	48	90200706	2.8	2.2	3800-6600	9-16	30
	64	90202506	2.8	2.2	3800-6600	12-21	30
216	64	90202566	2.8	2.2	3500-6100	11-20	30
	60	90202606	2.8	2.2	3300-5800	10-17	30
230	60	90202636	2.8	2.2	3200-5600	10-17	30
	60	90200806	3.2	2.6	3000-5300	9-16	30
250	80	90202706	3.2	2.6	3000-5300	12-21	30
	100	90202756	3.2	2.6	3000-5300	15-27	30
275	72	90200857	3.2	2.6	2700-4800	10-17	32
	300	90200906	3.2	2.6	2500-4400	9-16	30
300	96	90202806	3.2	2.6	2500-4400	12-21	30
	80	90200957	3.2	2.6	2300-4000	9-16	32
330	102	90202857	3.2	2.6	2300-4000	12-20	32
	84	90201006	3.2	2.6	2100-3800	9-16	30
350	108	90202906	3.2	2.6	2100-3800	11-21	30
	100	90202956	2.8	2.2	2000-3500	10-18	30
400	96	90201106	3.8	3.2	1900-3300	9-16	30
	120	90203006	3.8	3.2	1900-3300	11-20	30
420	96	90203406	4.0	3.4	1800-3100	9-15	30
	108	90204006	4.0	3.4	1600-2900	9-16	30
450	120	90204106	4.0	3.4	1600-2900	10-17	30
	500	120	90204206	4.4	3.8	1500-2600	9-16

■ Available upon request  
 ⚠ The material must be clamped firmly to the table on both sides during cutting operation.



# Aluminum

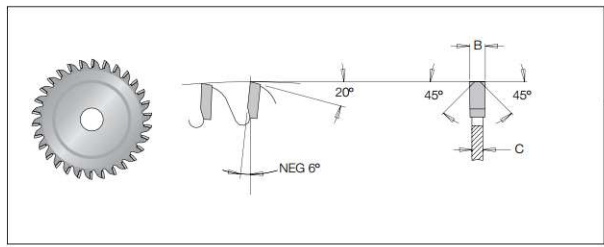
## Aluminum Bars Saw Blade, META, META, MFTA



øD	Teeth	Code No.	B	C	n	m/min	ød
300	80	90254006 ■	3.4	2.8	2500-4400	20-35	30
450	100	90250406 ■	4.0	3.4	1600-2900	16-29	30
550	120	90250606	4.4	3.8	1400-2400	16-28	30
	100	90256066 ■	4.4	3.8	1400-2400	14-24	30

■ Available upon request

## Milling Saw Blade, MEHAN



øD	Teeth	Code No.	B	c	n	ød
100	24	90200511	3.9	3.2	7600-13000	15.87
	30	90200551	3.9	3.2	7600-13000	15.87
115	24	9020061A	3.9	3.2	6600-11600	22.2
	30	9020063A	3.9	3.2	6600-11600	22.2

⚠ To be used manually with mini grinder.  
 Used extensively in the boat building industry for milling, that is cleaning up, grooving of aluminum welds and cutting out welding tacks.

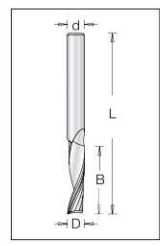


# Aluminum



Darbagaldi & Instrumenti

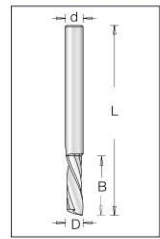
## Single Spiral O Flute, Up Shear Angle, Mirror Finish



D	B	Code No.	L	ød
3.2	8.0	185510z	40	3.2
4.75	12.7	1855224	50	6.35
6.35	16.0	1855304	50	6.35



## Single Spiral O Flute, Down Shear Angle, Mirror Finish



D	B	Code No.	L	ød
3.2	8.0	185410z	40	3.2
4.75	12.7	1854224	50	6.35
6.35	16.0	1854304	50	6.35



O Flute design  
Z=1

R.P.M. = 18,000

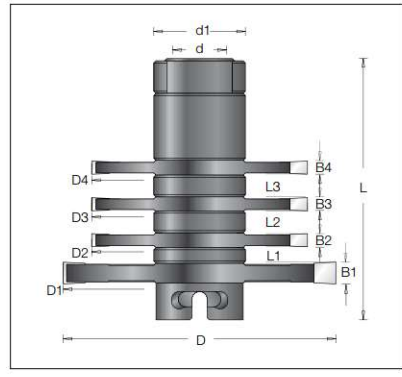
Aluminum

# Aluminum



## Custom & Milling Head

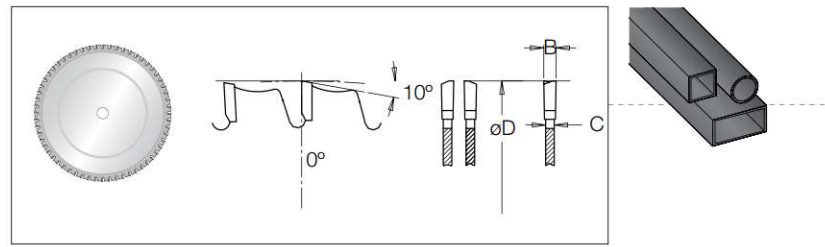
Special head made from steel sleeve and brazed cutter according to customer definition.



Special tools for working on aluminium profiles.  
To order single cutters indicate diameter, width and bore.  
To order sets supply a drawing of the requested cutter profile, dimensions; diameter, width and bore as well as the dimensions between the cutters.

d = ... , d1 = ... , L = ...  
D1 = ... , B1 = ... , L1 = ...  
D2 = ... , B2 = ... , L2 = ...

## Metal Saw Blade, MEZB,MFZB



øD	Teeth	Code No.	B	c	n. Max.	ød
185	36	90209013	2.2	1.8	1,800	20.0 MEZB
305	60	90210005	2.2	1.8	1,800	25.4 MWZB
305	80	90210055	2.2	1.8	1,800	25.4 MFZB
355	80	90210105	2.4	2.0	1,800	25.4 MFZB



# ACM



Darbagaldi & Instrumenti

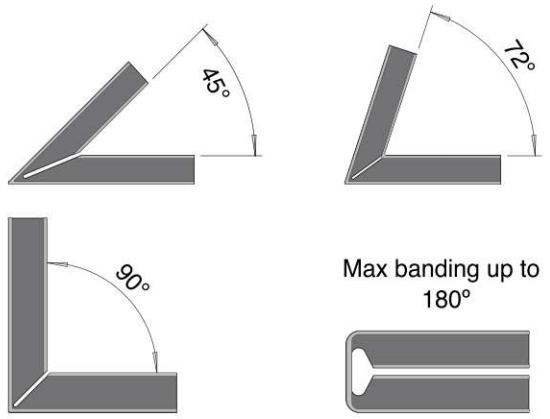
## ACM Aluminum Combined With Plastics

#1050	#1060	#1060	#5548	#G1853
355	356	356	357	7126



### Folding Routers, Cutters & Saws for Aluminum Combined with Plastics

A complete set of tools for folding applications in sandwich board consisting of aluminum and plastics, such as Alucobond or Dibond. To be used with a variety of machines and power tools: Table saws, manual circular saws, CNC machines and routers.

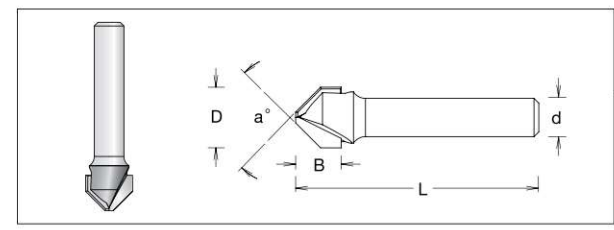


# ACM

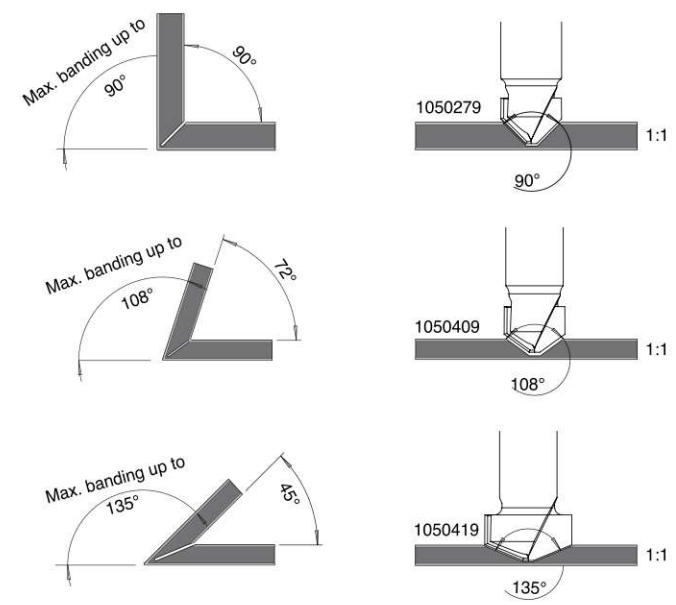


## Folding Router for Routing Machines

NEW



øD	Code No.	a°	B	Z	L	ød	n
12.7	1050265	90°	9.5	2	50.8	8	28,000
	1050279	90°	9.5	2	50.8	12	28,000
	1050405	108°	11.5	2	50.8	8	28,000
	1050409	108°	11.5	2	62.0	8	28,000
18.2	1050419	135°	9.5	2	52.0	12	28,000

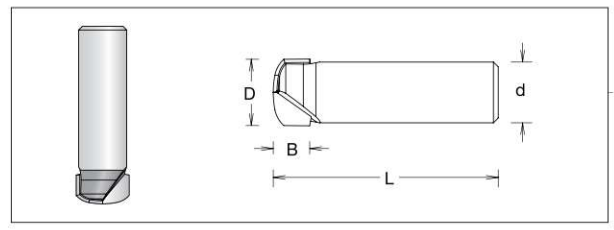




# ACM

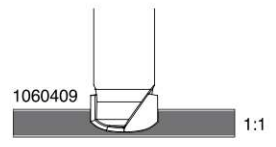
## Folding Router for 180° Bending

**NEW**



øD	Code No.	B	Z	L	ød	n
14.0	1060479	7.5	2	47	12	28,000

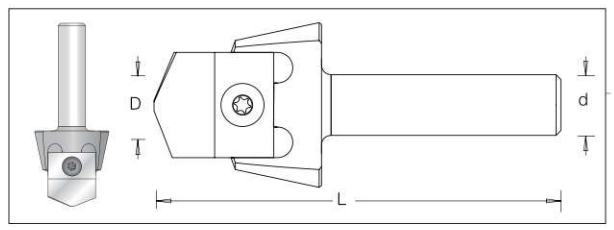
Max banding up to 180°



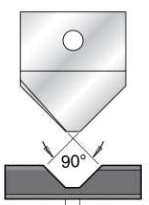
## Folding Router with Replaceable Inserts

For use on CNC machines.

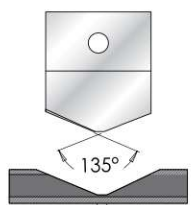
**NEW**



øD	Code No.	Z	L	ød	n
22	G1853x19	2	85	12	24,000



Code No.	D
3185100	3.27

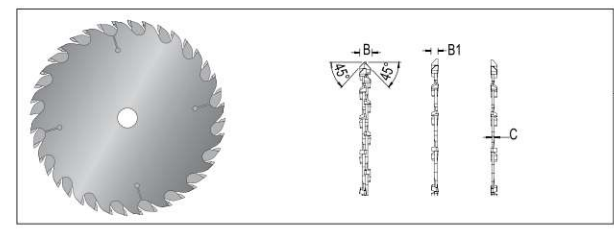


Code No.	D
3185106	2.0

# ACM

## Adjustable Folding Saw Blade

**NEW**

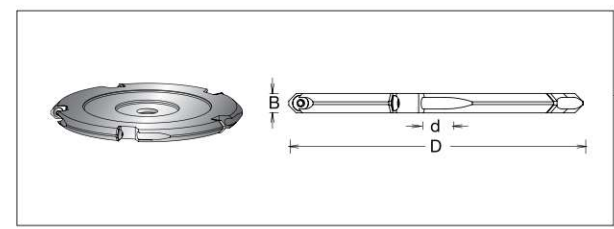


øD	Code No.	B	B1	Z	C	ød	n
250	5548061	10.2	6	2	2.4	25.4	7,600-5,300

## Folding Cutter with Replaceable Inserts

For use with manual sawing machines.

**NEW**



øD	Code No.	B	Z	ød	n
152.4	712685Z	10.1	5	5/8*	9,000

Spare Parts:

T.C. Blade #3208569 12X10X2	Torx screw #19314828 M4x5.6	Torx key #1941015 T15



# Composites



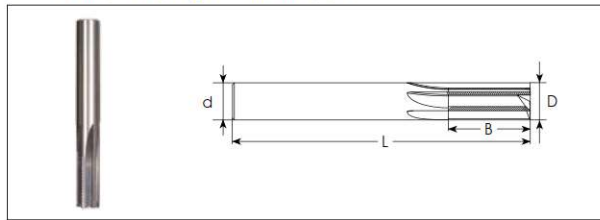
## Composites



### Aramid Endmill

Solid carbide straight router suitable for sizing and pocket milling of honeycomb parts, combined with AFRP layers. Nano grain carbide with super finish grinding for maximum durability against wear.

**NEW**

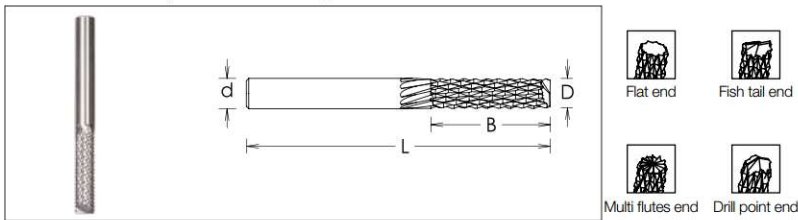


øD	B	L	d	No. of Flutes	Uncoated
6	16	60	6	2+2	73011013
10	22	80	10	2+2+2	73011027

### Burrs Tools

Solid tungsten carbide endmill suitable for sizing ,pockets and milling holes, roughfinish. For use on routers and machining centers with or without CNC systems.

**NEW**



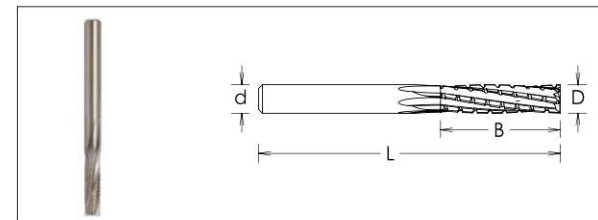
øD	Flat end	Fish tail end	Multi flutes end	Drill point end	B	L	ød
6.35	73001284	73001364	73001444	73001714	25.4	63.5	6.35
9.52	73001316	73001396	73001476	73001746	38.1	82.5	9.52
12.7	73001328	73001408	73001488	73001778	50.8	101.6	12.7

# Composites

## Multi Flutes Endmill - Up Shear

Solid tungsten carbide endmill suitable for sizing ,pockets and milling holes, finefinish. Upcut spiral for optimum chip flow and improved finish on the bottom of the FRP parts. For use on routers and machining centers with or without CNC systems.

**NEW**

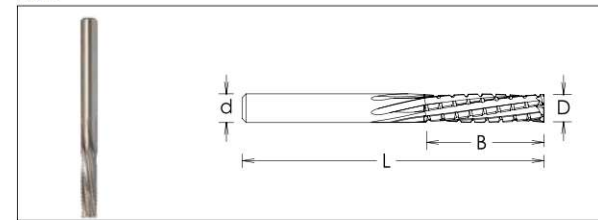


øD	Uncoated	CA Coating	B	Z	L	ød
6.35	73003054	CA73003054	25.4	6	63.5	6.35
7.94	7300306Z	CA7300306Z	32.0	9	76.0	7.94
9.52	73003076	CA73003076	38.1	10	82.5	9.52
12.7	73003088	CA73003088	50.8	12	101.6	12.7

## Multi Flutes Endmill - Down Shear

Solid tungsten carbide endmill suitable for sizing ,pockets and milling holes, fine finish. Upcut spiral for optimum chip flow and improved finish on the bottom of the FRP parts. For use on routers and machining centers with or without CNC systems.

**NEW**



øD	Uncoated	CA Coating	B	Z	L	ød
6.35	73005054	CA73005054	25.4	6	63.5	6.35
7.94	7300506Z	CA7300506Z	32.0	9	76.0	7.94
9.52	73005076	CA73005076	38.1	10	82.5	9.52
12.7	73005088	CA73005088	50.8	12	101.6	12.7



Advanced Materials

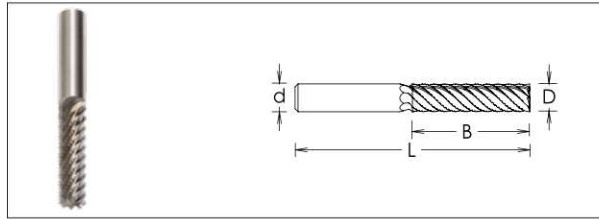
Advanced Materials



# Composites

## Hogger End Mill

Solid tungsten carbide endmill, suitable for sizing and flatness of honey comb parts. Carbide will offer maximum durability. For use on routers and machining centers with or without CNC systems.

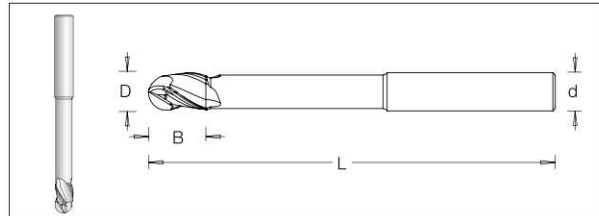


**NEW**

øD	Uncoated	B	Z	L	ød
6.35	73017204	25.4	3	63.5	6.35
9.52	73017216	38.1	4	76	9.52
12.7	73017228	50.8	5	101.6	12.7

## Ball Nose End Mill

Solid tungsten carbide router, suitable for round corner, edges, pockets and 3D curving. For use in all types of materials such as MDF, plastics and aluminium. All tools made with neck clearance for deep cuts.



**NEW**

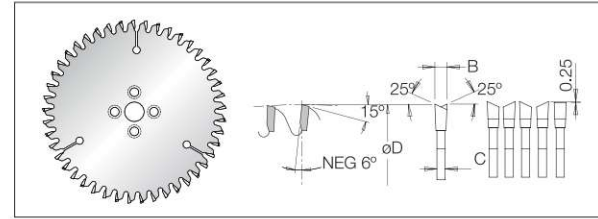
øD	Code No.	B	Z	L	ød	n
6.0	SO1063763	9.0	3	80.0	6	
8.0	SO1063775	12.0	3	85.0	8	
10.0	SO1063787	15.0	3	100.0	10	
12.0	SO1063799	16.0	3	100.0	12	

øD	Uncoated	B	Z	L	ød
6.35	73034064	9.52	3	76.0	6.35
7.95	7303407Z	12.7	3	88.9	7.94
9.52	73034086	15.87	3	101.6	9.52
12.7	73034098	19.05	3	127	12.7

# Composites

## Solid Carbide Tipped Disk

Solid carbide tipped disk mounted on an arbor. Suitable for straight, fast cutting of edges at variable heights. Can be used on 5-axis CNC machines. Ideal for use on honeycomb parts with outer layer of CFRP- Glass Fiber Reinforced Thermosetting Plastics, CFRP- Carbon Fiber Reinforced Thermosetting Plastics, diamond and AFRP- Aramid Fiber Reinforced Plastics.

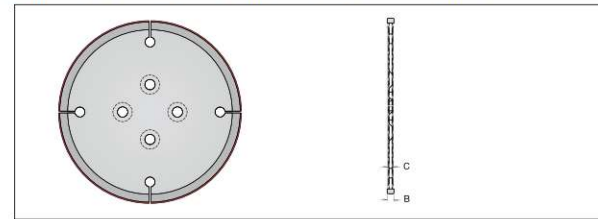


**NEW**

øD	B	Code No.	c	Teeth	ød	∠
100	2.4	95801611	1.8	30	15.87	4x7.1xø30
150	2.4	95801621	1.8	45	15.87	4x7.1xø30

## Electro-Plated Diamond Disk

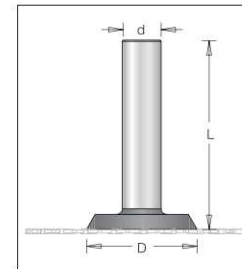
Electro-plated diamond disk mounted on an arbor. Suitable for straight, fast cutting of edges at variable heights. Can be used on 5-axis CNC machines. Ideal for CFRP- Glass Fiber Reinforced Thermosetting Plastics and CFRP- Carbon Fiber Reinforced Thermosetting Plastics. Diamond grain size can be adapted to the cutting quality required.



**NEW**

øD	B	Code No.	c	ød	∠	n
100	3.0	73033161	2.0	15.87	4x6.5xø30	4x6.5xø30
150	3.0	73033171	2.6	15.87	4x5.3xø30	4x5.3xø30

## CNC Arbor



**NEW**

øD	øD1	Code No.	L	∠	ød
45.0	15.87	1901218	82.55	4xM5xø30	12.7
40.0	15.87	1902292	150.0	4xM5xø30	19.05
40.4	15.87	1902290	150.0	4xM5xø30	20.0

Spare Parts:



**TBOX**  
Darbagaldi & Instrumenti



# Index

75005	94	615061	122	1040053	299	SO1053155	88
75006	199	615062	122	1040055	299	E1053505	251
75007	199	615063	122	1040073	299	1053509	88
440071	223	615064	122	1040109	299	1053529	87
440082	223	615065	122	1040139	299	1053569	87
440094	223	615070	122	1040169	299	1053609	87
440119	223	615073	122	1040199	299	1053619	87
440125	223	615074	122	1040229	299	1053629	87
440143	223	615077	122	1040243	299	1053649	87
440155	223	615078	122	1040259	299	1053669	87
440164	223	615079	122	1040259	343	1053689	87
443001	223	615080	122	1040369	299	1053700	86
443003	223	615090	122	1040379	299	1053800	86
443004	223	615091	122	1040853	299	1053909	87
443005	223	615092	122	1040863	299	1054009	87
443007	223	615098	122	1040865	299	1054059	87
443008	223	615099	122	1041013	253	1054069	87
443010	223	615100	122	1042043	300	1060013	262
445001	223	615105	122	1042053	300	1060015	262
445003	223	615106	122	1042513	300	1060033	262
445005	223	615108	122	1043003	253	1060035	262
615001	122	615109	122	1050013	252	1060063	262
615002	122	615110	122	1050015	252	1060065	262
615003	122	615111	122	1050019	252	1060073	262
615004	122	615115	122	1050043	252	1060075	262
615005	122	615116	122	1050045	252	1060093	261
615006	122	615117	122	1050103	252	1060095	261
615007	122	615118	122	1050105	252	1060099	261
615008	122	641011	122	1050109	252	1060119	262
615009	122	641012	122	1050133	252	1060123	261
615010	122	641019	122	1050135	252	1060125	261
615011	122	641021	122	1050139	252	1060129	261
615012	122	641030	122	1050163	252	1060139	262
615030	122	641031	122	1050165	252	1060149	262
615031	122	643001	122	1050169	252	1060153	261
615032	122	643002	122	1050173	252	1060155	261
615040	122	650010	123	1050193	252	1060159	261
615041	122	650011	123	1050195	252	1060169	262
615042	122	650013	123	1050199	252	1060173	262
615043	122	650014	123	1050229	252	1060179	262
615044	122	650015	123	1050259	252	1060183	261
615046	122	650016	123	1050265	357	1060185	261
615048	122	650017	123	1050279	357	1060189	261
615049	122	650018	123	1050319	252	1060199	262
615051	122	650020	123	1050405	357	1060203	262
615053	122	650031	123	1050409	357	SOT1060204	88
615054	122	650040	123	1050419	357	SOT1060214	88
615055	122	650050	123	1052103	251	1060215	261
615056	122	E1013075	248	1053043	323	1060219	261
615060	122	1040049	299	1053045	323	1066199	270

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SOT1060234	88	1066229	270	1070375	234	1071005	234
1060243	261	SO1070013	67	1070403	233	1071039	235
1060245	261	SO1070013	232	1070405	234	1071069	235
SOT1060248	88	1070013	233	1070423	233	1071083	233
1060249	261	1070015	234	1070433	233	1071093	233
SOT1060258	88	SO1070043	67	1070435	234	L1071095	234
1060299	262	SO1070043	232	1070463	233	1071095	234
1060309	262	1070043	233	1070465	234	1071108	65
1060339	261	1070045	234	1070469	235	1071109	65
1060379	261	1070049	235	1070493	233	1071109	94
1060409	261	SO1070073	67	L1070495	234	1071148	65
1060449	264	SO1070073	232	1070495	234	1071159	235
1060469	264	1070073	233	1070499	235	1071183	233
1060479	358	1070075	234	1060479	235	1071185	234
1060623	263	1070079	235	1070559	235	1071195	234
1060633	263	1070083	233	1070563	233	1071199	235
1060639	260	SO1070103	67	1070565	234	1071209	235
1060699	260	SO1070103	232	1070579	235	1071219	235
1062123	264	1070103	233	1070583	233	1071249	235
1062623	263	1070105	234	L1070585	234	1071265	234
1062633	263	1070109	235	1070585	234	1071279	235
1062639	263	1070113	233	1070615	234	1071289	235
1062699	263	1070123	233	1070619	235	1071299	235
1062809	348	SO1070133	67	1070649	235	1071309	235
SO1063032	89	1070133	233	1070653	233	1071315	234
SO1063043	89	1070135	234	1070655	234	1071339	235
SO1063043	323	1070163	233	1070673	233	1071369	235
SO1063085	89	1070165	234	1070675	234	1071429	235
SO1063085	323	1070169	235	1070703	233	1071459	235
SO1063097	89	1070173	233	L1070705	234	1072049	240
SO1063097	323	1070193	233	1070705	234	1072229	240
E1063505	264	1070223	233	1070709	235	1072379	240
1063629	90	1070225	234	1070723	233	1072399	240
1063649	90	1070229	235	1070739	235	1072399	342
1063669	90	1070253	233	1070769	235	1072403	240
1063689	90	L1070255	234	1070779	235	1072463	240
SO1063763	89	SO1070255	67	1070793	233	1072483	240
SO1063763	362	1070255	234	L1070795	234	1072583	240
SO1063775	89	1070259	235	1070795	234	1072663	240
SO1063775	362	1070273	233	1070829	235	1072746	240
SO1063787	89	1070283	233	1070859	235	1072758	65
SO1063787	362	1070285	234	1070863	233	1072759	65
SO1063799	89	1070289	235	1070883	233	1072979	240
SO1063799	362	1070313	233	1070885	234	1073015	239
1066049	270	1070315	234	1070893	233	1073023	239
1066079	270	1070319	235	1070919	235	1073025	239
1066109	270	1070343	233	1070979	235	1073033	239
1066139	270	L1070345	234	1070989	235	1073039	239
1066169	270	1070345	234	1071003	233	1073065	245
1066199	270	1070349	235	L1071005	234	1073073	245

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1073075	245	1074839	238	1075829	236	1077769	237
1073085	245	1074869	63	1075829S	238	1077789	237
1073089	245	1074879	63	1075839	236	1077795	237
1073149	246	1074889	238	1075839S	238	1077849	237
1073189	246	1074899	63	1075849	236	1077899	237
1073229	246	1074929	238	1075859	236	1078013	233
1073415	239	1075003	232	1075889	236	1078023	233
1073500	72	1075013	232	1075919	236	1078023	253
1073509	242	1075043	232	1075929	236	1078025	253
1073540	72	1075053	232	1075949	236	1078333	233
1073549	242	1075063	232	1075979	236	1078343	233
1073559	242	1075073	232	1076009	236	1078353	233
1073589	243	1075093	232	1076039	236	SO1078587	67
1073599	241	1075099	236	1076049	236	1080100	305
1073609	242	1075103	232	1076099	236	1080130	305
1073629	243	1075109	236	1076129	236	1080160	305
1073633	241	1075133	232	1076159	236	1080190	305
1073649	242	1075139	236	1076189	236	1080600	303
1073669	243	1075143	232	1076219	236	1080630	303
1073689	242	1075163	232	1076249	236	1080670	303
1073709	243	1075193	232	1076259	236	1080700	303
107373H	71	1075203	232	1076309	236	1080730	303
107374H	71	1075223	232	1076339	236	1080760	303
107376H	71	1075229	236	1076369	236	1080790	303
107377H	71	1075253	232	1076379	236	1080820	303
1073789	243	1075259	236	1076429	236	1080850	303
E1073815	242	1075283	232	1076459	236	1080880	303
1073829	243	1075289	236	1076489	236	1080910	303
1073835	239	1075313	232	1076499	236	1082010	303
1073899	239	1075319	236	1077005	237	1082020	303
1073915	239	1075319S	238	1077039	237	1082030	303
107398H	71	1075343	232	1077225	237	1082040	303
1074159	238	1075349	236	1077229	237	1082050	303
1074189	238	1075403	232	1077285	237	1082060	303
1074313	237	1075409	236	1077289	237	1082070	303
1074343	237	1075433	232	1077399	238	1083010	303
1074349	238	1075463	232	1077435	237	1083020	303
1074433	237	1075469	236	1077459	238	1083030	303
1074453	237	1075493	232	1077465	237	1083040	303
1074463	237	1075499	236	1077469	237	1083050	303
1074469	238	1075499S	238	1077489	238	1083060	303
1074499	238	1075583	232	1077495	237	1083070	303
1074569	238	1075589	236	1077529	237	1084009	305
1074595	63	1075613	232	1077559	237	1084409	351
1074659	238	1075643	232	1077619	237	1084605	304
1074703	237	1075653	232	1077649	237	1084655	304
1074733	237	1075669	236	1077675	237	1084659	304
1074809	63	1075673	232	1077679	237	1086100	304
1074819	63	1075703	232	1077705	237	1086109	304
1074829	238	1075733	232	1077709	237	1086510	304

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1086519	304	1099013	274	1120159	278	1170043	265
1086520	304	1099015	274	1120189	278	1170045	265
1086529	304	1099043	274	E1123065	277	1170049	265
1086530	304	1099045	274	1130013	279	1170073	265
1086539	304	1099073	274	1130015	279	1170075	265
1086540	304	1099075	274	1130019	279	1170079	265
1086550	304	1099103	274	1130043	279	1170105	265
1086559	304	1099105	274	1130045	279	1170109	265
1089009	306	1099133	274	1130049	279	1170139	265
1089019	306	1099135	274	1130109	345	1170179	265
1090013	272	1099163	274	1133043	278	1171509	266
1090015	272	1099165	274	1133049	278	1171559	266
1090019	272	1099169	274	1140013	314	1171609	266
1090043	272	1099193	274	1140015	314	1173029	268
1090045	272	1099195	274	1140019	314	1173049	268
1090049	272	1099199	274	1140053	314	1180013	256
1090053	272	1099229	274	1140063	314	1180015	256
1090055	272	1099259	274	1140065	314	1180019	256
1090059	272	1099269	274	1140069	314	1180049	256
1090073	272	1099289	274	1141013	250	1180079	256
1090075	272	1099319	274	1141015	250	1180099	256
1090079	272	1099339	274	1141033	250	1181003	256
1090103	272	1100013	250	1141035	250	1181009	256
1090105	272	1100043	250	1141083	241	1190013	273
1090109	272	1100045	250	1141093	241	1190015	273
1090133	272	1100163	250	1143019	298	1190019	273
1090135	272	1100193	250	1143109	298	1190043	273
1090139	272	1110013	238	E1143205	297	1190045	273
1090163	272	1110043	238	1144063	314	1190049	273
1090165	272	1110073	238	1144065	314	1190053	273
1090169	272	1110075	238	1144069	314	1190055	273
1090193	272	1110129	238	1146109	297	1190059	273
1090195	272	1110139	238	1150015	251	1190073	273
1090199	272	1120013	278	1150046	251	1190075	273
1090209	272	1120015	278	1150079	251	1190079	273
1090229	272	1120019	278	1153079	251	1190103	273
1090259	272	1120023	278	1160010	257	1190105	273
1090269	272	1120033	278	1160040	257	1190109	273
1090289	272	1120035	278	1160070	257	1190133	273
1090309	272	1120043	278	1160200	257	1190135	273
1090319	272	1120045	278	1160210	257	1190139	273
1090339	272	1120049	278	1160219	257	1190163	273
1090349	272	1120073	278	1161019	257	1190165	273
1090503	272	1120075	278	1161049	257	1190169	273
1090509	272	1120079	278	1161079	257	1190193	273
1092183	276	1120103	278	1161209	257	1190195	273
1092189	276	1120105	278	1170013	265	1190199	273
1092289	308	1120109	278	1170015	265	1190209	273
E1093215	259	1120133	278	1170019	265	1190229	273
E1093255	276	1120135	278	1170039	265	1190259	273

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1190289	273	1240209	284	1270013	267	1270013	267
1192183	276	1240239	284	1270015	267	1270015	267
1192189	276	1240519	285	1270023	267	1270023	267
1192289	308	1241053	285	1270043	267	1270043	267
1199013	275	1241083	285	1270053	267	1270053	267
1199015	275	1241085	285	1270055	267	1270055	267
1199043	275	1241089	285	1270063	267	1270063	267
1199045	275	1241113	285	1270075	267	1270075	267
1199073	275	1241115	285	1270083	267	1270083	267
1199075	275	1241119	285	1270089	267	1270089	267
1199105	275	1241133	285	1272023	267	1272023	267
1199163	275	1241135	285	1272043	267	1272043	267
1199165	275	1241139	285	1272063	267	1272063	267
1199195	275	1241179	285	1272083	267	1272083	267
1210013	282	1242045	283	1280049	268	1280049	268
1210015	282	1242049	283	1290019	309	1290019	309
1210019	282	1242519	285	1291079	309	1291079	309
1210049	282	1243019	291	1300043	268	1300043	268
1210073	282	1243049	291	1300045	268	1300045	268
1210075	282	1243059	291	1300073	268	1300073	268
1210079	282	1243089	287	1300075	268	1300075	268
1210109	282	1243093	288	1300079	268	1300079	268
1210159	282	1243139	284	1310013	269	1310013	269
1220019	311	1243179	284	1310015	269	1310015	269
1220129	311	1243209	284	1310043	269	1310043	269
1221049	310	1243239	284	1310045	269	1310045	269
1222079	310	1243329	288	1310049	269	1310049	269
1224079	313	1248269	284	1310075	269	1310075	269
1224089	313	1250013	241	1310079	269	1310079	269
1224099	313	1250023	241	1312053	269	1312053	269
1229049	311	1250043	241	1312229	269	1312229	269
1229079	312	1250073	241	1320103	290	1320103	290
1229129	312	1250103	241	1330209	307	1330209	307
1230019	310	1250133	241	1340013	281	1340013	281
1240013	284	1250139	241	1340015	281	1340015	281
1240015	284	1250163	241	1340019	281	1340019	281
1240019	284	1250169	241	1340043	281	1340043	281
1240043	284	1250199	241	1340045	281	1340045	281
1240045	284	1250229	241	1340049	281	1340049	281
1240049	284	1250229	340	1350013	283	1350013	283
1240073	284	1250239	241	1350015	283	1350015	283
1240075	284	1250259	241	1350019	283	1350019	283
1240079	284	1250289	241	1350023	283	1350023	283
1240103	284	1250319	241	1350025	283	1350025	283
1240105	284	1250349	241	1350029	283	1350029	283
1240109	284	1250359	241	1350035	283	1350035	283
1240135	284	1260109	244	1350039	283	1350039	283
1240139	284	1260149	244	1350043	283	1350043	283
1240159	284	1260149s	244	1350045	283	1350045	283
1240179	284	1260239	244	1350069	283	1350069	283

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1350079	283	1430160	315	1490519	301	1581009	286
1350089	283	1431010	319	1490529	301	1583009	286
1352053	269	143101L	321	1490733	307	1584009	287
1352055	269	1431110	322	1490753	307	1590039	349
1352229	269	1431150L	321	1492743	307	1590069	349
1360013	279	1431210	317	1510049	342	1592039	349
1360015	279	1432015	322	1510109	342	1592069	349
1360019	279	1432019	322	1520039	344	1594019	349
1360023	279	1433015	317	1520049	344	1594059	349
1360029	279	1433019	317	1530039	345	1594109	349
1360035	279	1434015	316	1530049	345	1600055	350
1360039	279	1434019	316	1530059	344	1600059	350
1360043	279	1440015	320	1530069	344	1612249	344
1360049	279	1440019	320	1530079	344	1612449	343
1360069	279	1441010	320	1530089	344	1620043	289
1360089	279	1450029	321	1530099	344	1620053	289
1363079	280	1450039	317	1530109	345	1620063	289
1370043	270	1450049	318	1540019	340	1620109	289
1370045	270	1450099	318	1540029	340	1622023	289
1370049	270	1450179	315	1540039	340	1622053	289
1373029	266	1450229	316	1540049	340	1623029	288
1373069	266	1450240	318	1540059	340	1623049	288
1380013	280	1450259	319	1540069	340	1623059	288
1380015	280	1450260	319	1540159	340	1623069	288
1380019	280	1450289	321	1550029	346	1630049	296
1380023	280	1450339	315	1550039	346	1630119	296
1380025	280	1460106	271	1550923	346	1630129	296
1380029	280	1460109	271	1550929	346	1640073	240
1380033	280	1460146	271	1553729	346	1640079	240
1380043	280	1460206	271	1554109	347	1640149	240
1380045	280	1460209	271	1560039	295	1640189	240
1380049	280	1460239	271	1560079	294	1642073	240
E1383065	281	1460709	271	1560089	295	1642079	240
1390013	282	1470063	270	1560139	294	1642149	240
1390019	282	1470065	270	1560219	293	1642189	240
1390023	282	1470069	270	1560409	291	1650049	308
1390025	282	1470109	270	1560419	281	1650079	308
1410013	258	1473059	266	1560449	290	1650109	294
1410043	258	1473109	266	1560479	292	1650139	309
1410045	258	1480195	289	1560539	290	1670019	300
1410073	258	1480199	289	1563019	292	1681009	302
1410075	258	1480315	289	1563029	293	1681010	302
1410103	258	1480319	289	1563069	291	1682009	302
1410105	258	1480379	289	1564019	348	1682010	302
1420015	320	1490013	300	1564059	348	1734050	68
1420019	320	1490039	300	1564099	347	1734055	69
1421010	320	1490049	301	1570043	282	1734100	68
1430015	319	1490053	301	1570083	282	1734105	69
1430019	319	1490069	301	1570123	282	1734155	69
1430150	315	1490139	301	1580009	286	1734160	68

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1734203	68	1743480	73	1854132	332	1924600	211
1734203S	68	1743560	73	1854143	332	1924610	211
1734205	69	1743580	73	1854164	332	1929030	38
1734255	69	1748405	74	1854172	332	1929040	38
1734265	68	1748507	74	1854192	332	1929050	38
1734265S	68	1748609	74	1854224	354	1929080	38
1734307	68	1748815	74	1854232	332	1929090	38
1734327	68	1748827	74	1854234	332	1929100	38
1734359	68	1748839	74	1854304	354	1929105	38
1734379	68	1749123	245	1854324	332	1929110	38
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1742359S	72	G1853X19	358	1924530	211	1929870	298
1743203	73	G1853x3Z	121	1924540	211	1929880	298
1743275	73	G1853x3Z	338	1924550	211	1929890	298
1743337	73	185410Z	354	1924560	211	1929900	298
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