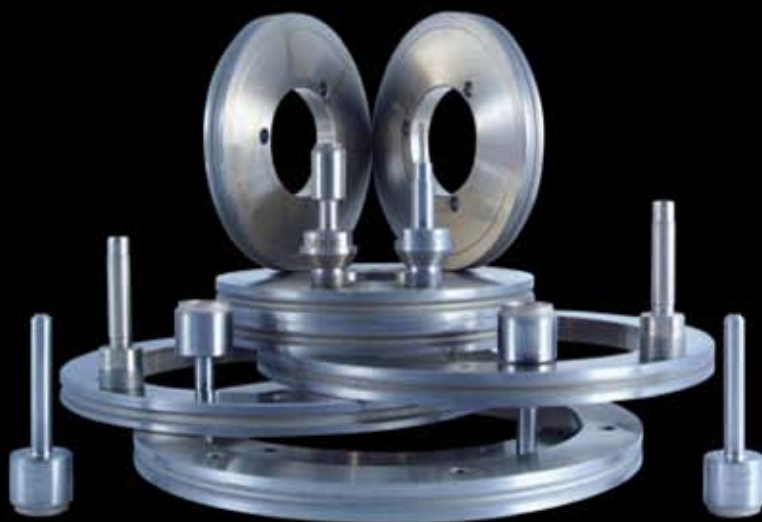
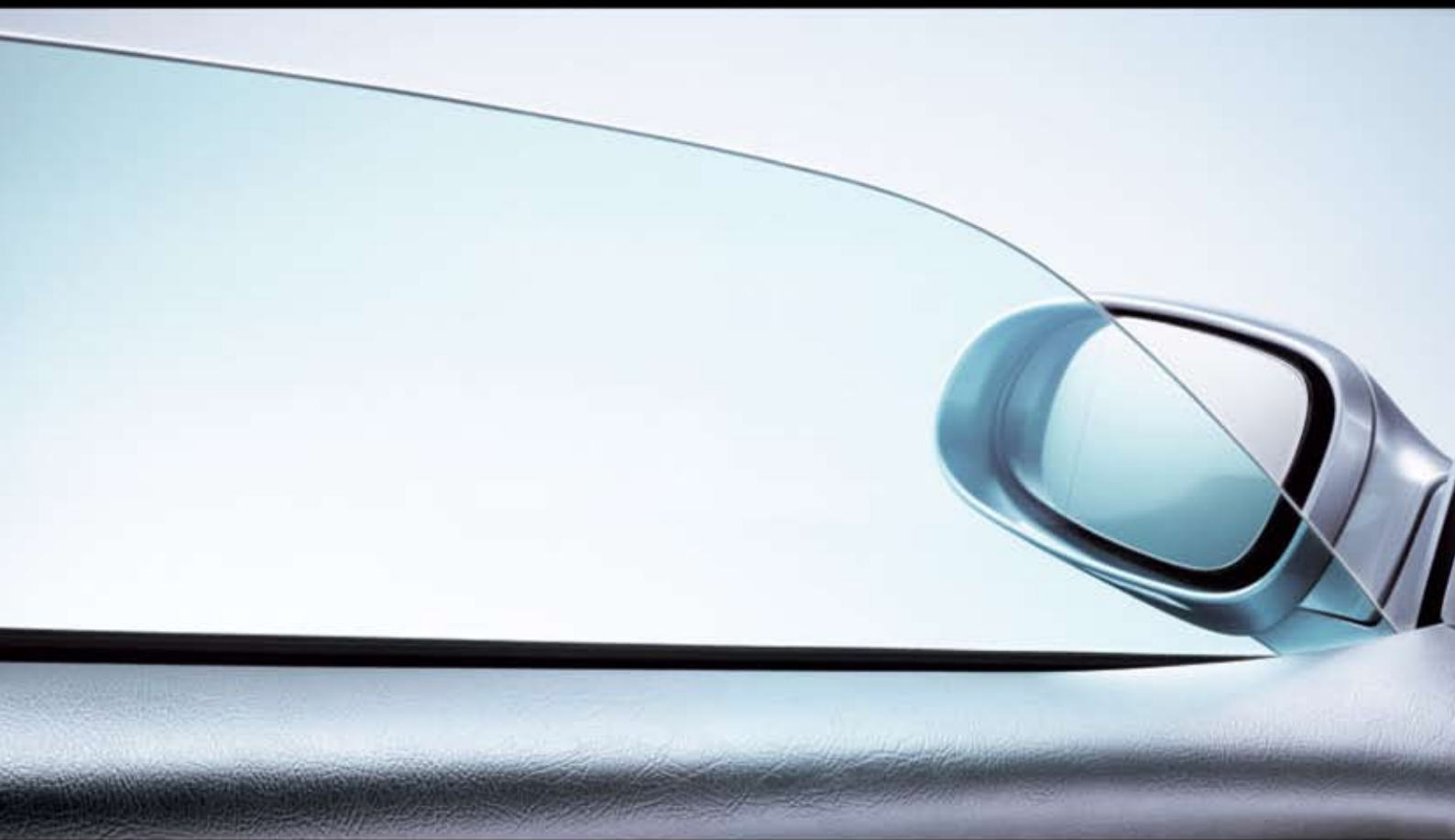


Excellence in automotive glass pre-processing
by Vincent[®]

TYROLIT



TYROLIT IN THE WORLD - GLASS DIVISION



THE COMPANY

Tyrolit Vincent s.r.l., part of the Tyrolit Group, was founded in 1994 in Thiene (Vicenza – Italy). The company designs, produces and distributes in Italy and in rest of the world with Tyrolit and Vincent trademarks for the following fields:

- Glass and Optics: complete product range of diamond tools for glass grinding and cutting.
- Natural / Engineered Stone and Ceramics: integrated product range from quarrying and primary cutting to slab/tiles calibrating, edging, profiling and polishing.

TYROLIT WORLDWIDE POLICY

TYROLIT has activated a globalisation process with a "local worldwide" operating policy. The result is in offering locally an integrated product range and customized solutions with high standard quality meeting customers' requirements and offering active assistance, as well as continuous technical training.



- SALES OFFICE
- PRODUCTION SITE

QUALITY CERTIFIED

TYROLIT is also present world-wide and operates in the main strategic markets through its affiliated companies, distributors and numerous branches.

The quality of TYROLIT tools is EN ISO 9001:2000 certified, which ensures compliance with the most demanding quality procedures and standards in all phases of design, manufacture and distribution. In 1999, the company also obtained the EN ISO 14001 environmental certification.

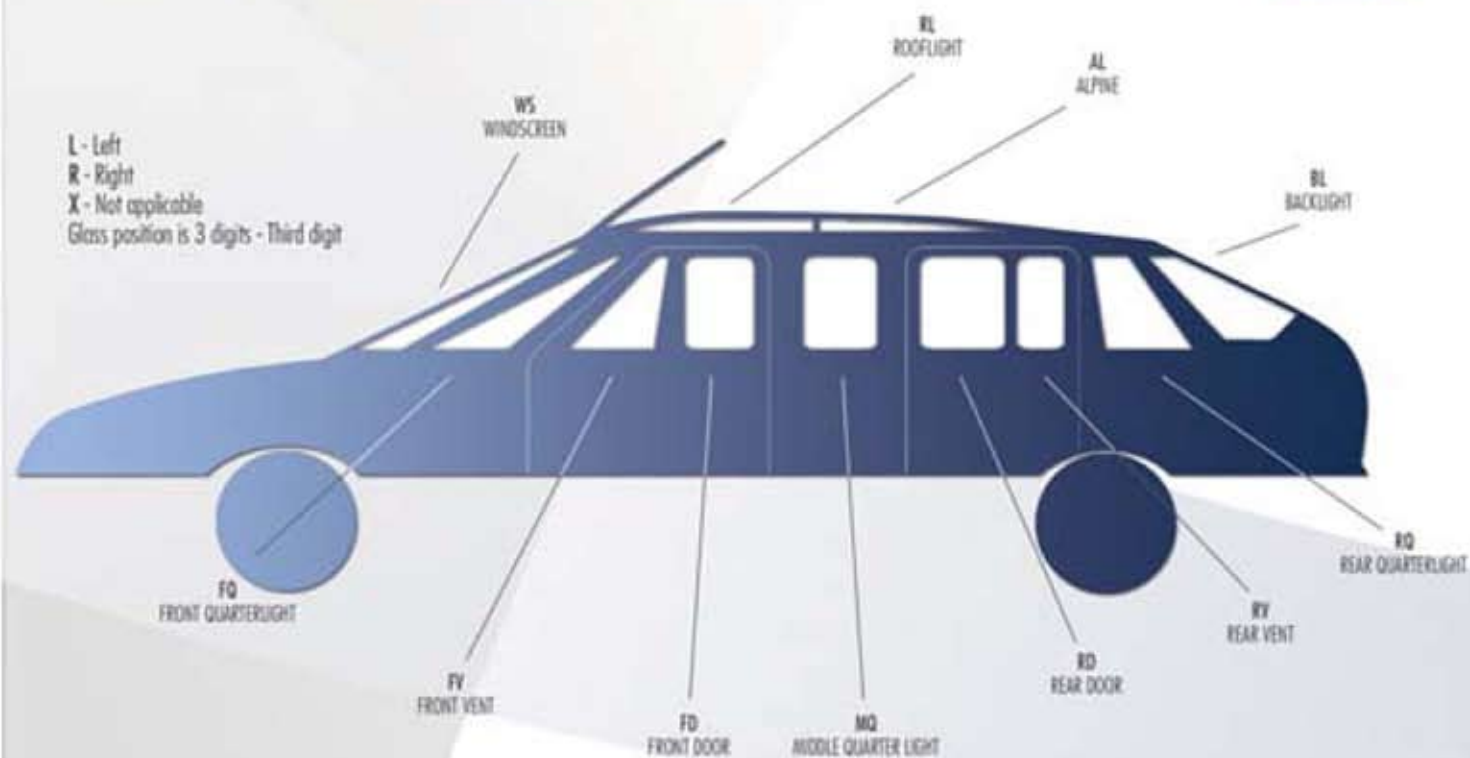
WHEELS



SEMI-FINISHED GLASS PARTS



L - Left
R - Right
X - Not applicable
Glass position is 3 digits - Third digit



tomotive



DRILLS



STICKS



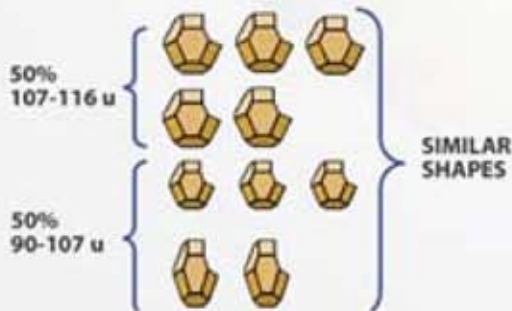
TYROLIT DIAMOND TOOLS SPECIFICATIONS

Alloys for pencil edging				Alloys for drilling		Diamond Typology	
SOFT	P10	P15	P6	P11	FVS		B M
MEDIUM	P5	P9	P40		FVA		L Q
HARD	P25	P3	P30				T S

Tyrolit R&D has developed 3 different classes of bond suitable for various work conditions. In each individual class there are bonds which have been prepared for different types of coating for diamond powder. There are also 3 classes of diamond powder solutions.

CRYSTAL BLEND ENGINEERED

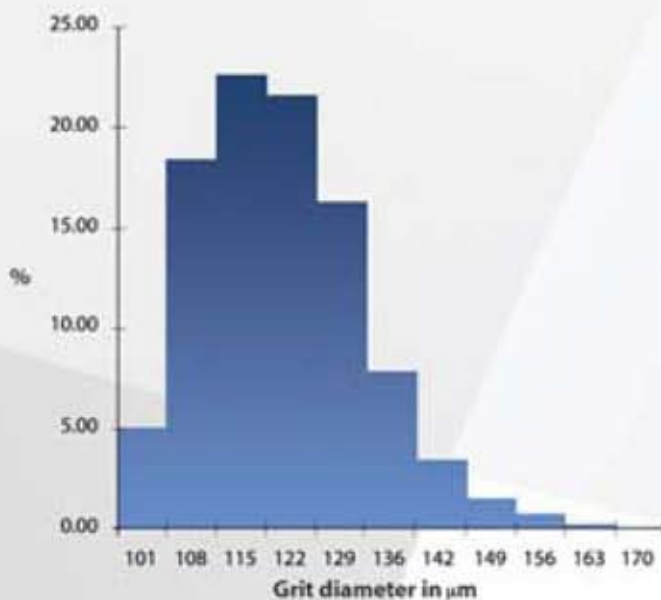
DIAMOND TYPE "L"



DIAMOND TYPE "M"



Crystal Blend Engineered For Specific Applications Example: differences between two different diamond classes (types L and M).



HISTOGRAM OF GRIT SIZE

Example of diamond grit distribution.

■ Mean 120.76 (μm)

EXCENTRICITY VS SHAPE FACTOR C

Different types of diamond with friability, shape, granulometric range and thermal resistance characteristics.

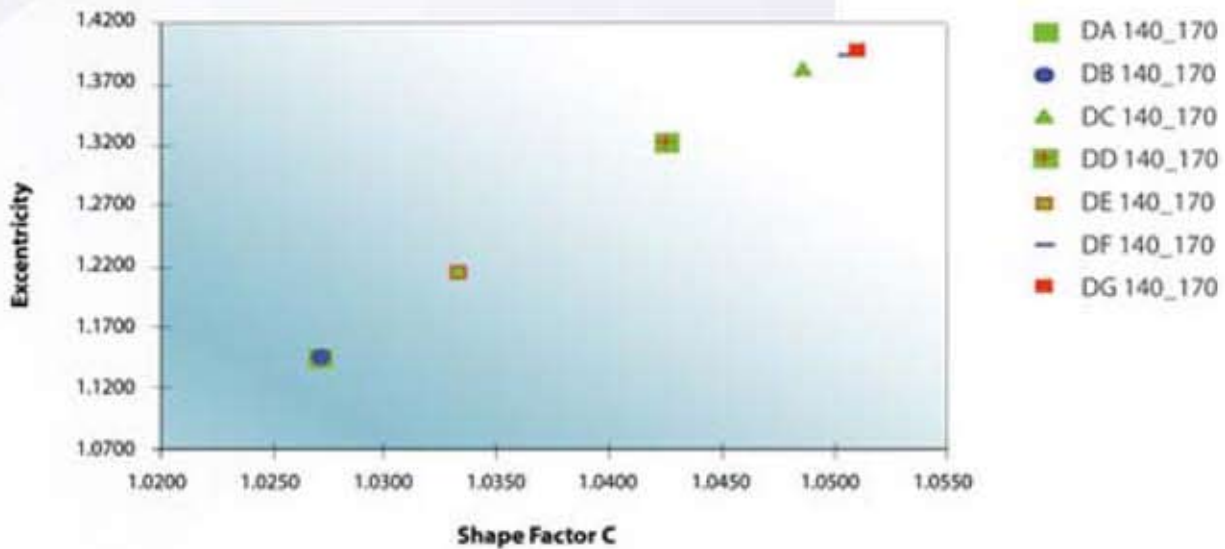


TABLE OF DENSITY

ABRASIVE SIZE	ABRASIVE CONCENTRATION							
	FEPA	25	35	50	75	100	150	200
U.S. mesh	FEPA							
500/600	D33							
400/500	D39							
325/400	D46	1240	1737	2481	3721	4962	7443	9923
270/325	D54	767	1074	1534	2300	3067	4601	6134
230/270	D64	460	645	921	1382	1842	2763	3685
200/230	D76	275	385	550	825	1100	1650	2200
170/200	D91	160	224	320	481	641	961	1282
140/170	D107	98	138	197	296	394	591	788
120/140	D126	60	84	120	181	241	362	482
100/120	D151	35	49	70	105	140	210	280
80/100	D181	20	28	40	60	81	120	160
60/80	D252	7	11	15	23	30	45	60

Table of density vs number of particles per mm³



Diamond type S
Less pull-out due to coating effects



Standard diamond type L/Q

ACCEPTANCE CRITERIA

Admitted defect

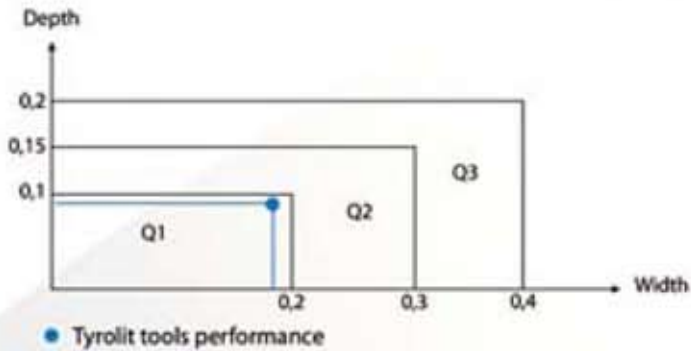
Q3 max 4 uniformly distributed on 100 mm
 Q2 max 12 not more than 3 each 10 mm

Q3 = "not good" grinding, visible defect

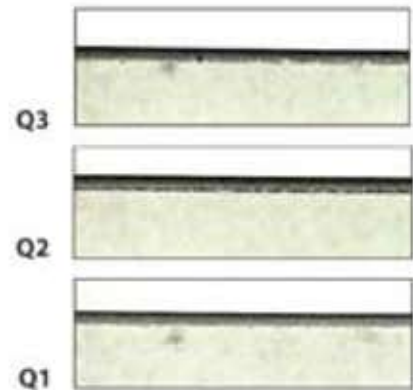
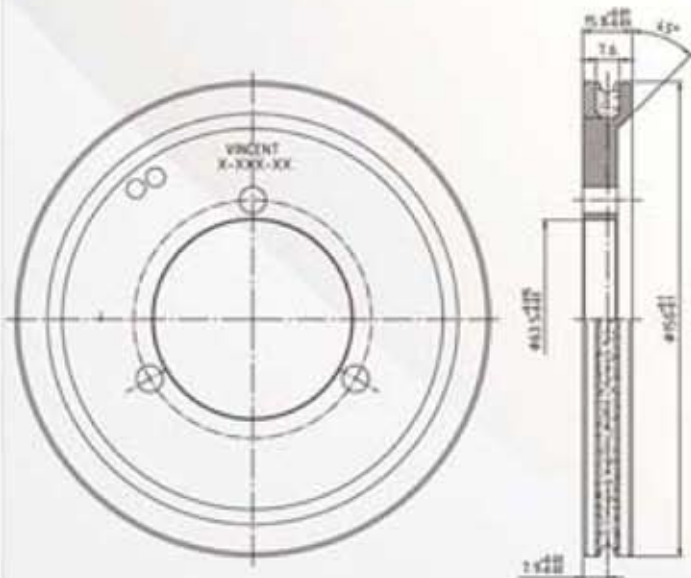
Q2 = acceptance limit

Q1 = "good" grinding, not visible defect

	DEPTH	WIDTH
Q3	$>0,15 \text{ e } < 0,2$	$>0,3 \text{ e } < 0,4$
Q2	$>0,1 \text{ e } < 0,15$	$>0,2 \text{ e } < 0,3$
Q1	$< 0,1$	$< 0,2$

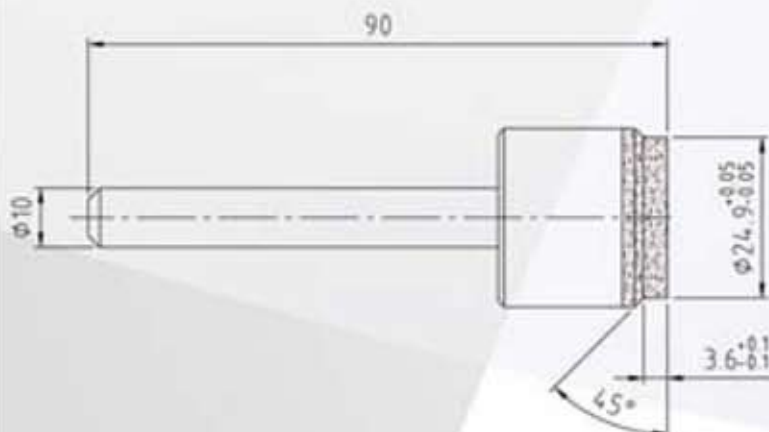


TYROLIT WHEELS PERFORMANCES



Wheels Tyrolit performance

TYROLIT DRILLS PERFORMANCES



WHEEL PERFORMANCE RECORD

	Date	Reference number	ø EXT	ø 1	MTL	Notes
New						
Reprofile						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
TOTAL						

Company _____

Address _____

Contact person _____

E mail _____

Telephone _____

Fax _____

Machine/line _____

Glass thickness _____

Process improver _____

Telephone _____

Fax _____

E mail _____

Tyrolit wheel details

Diameter _____

Hole _____

Specification _____

Thickness _____

Serial number _____

FOR FURTHER INFORMATION, PLEASE CONTACT

Tel. +39.0445.359911

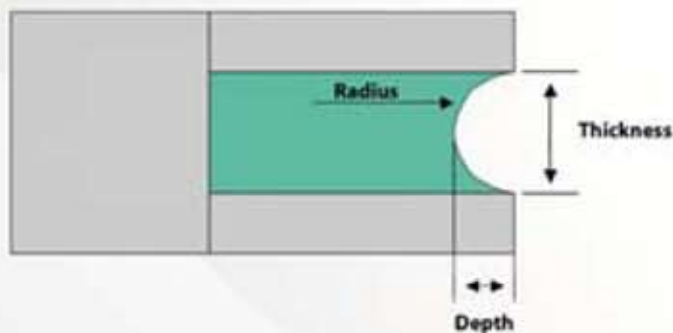
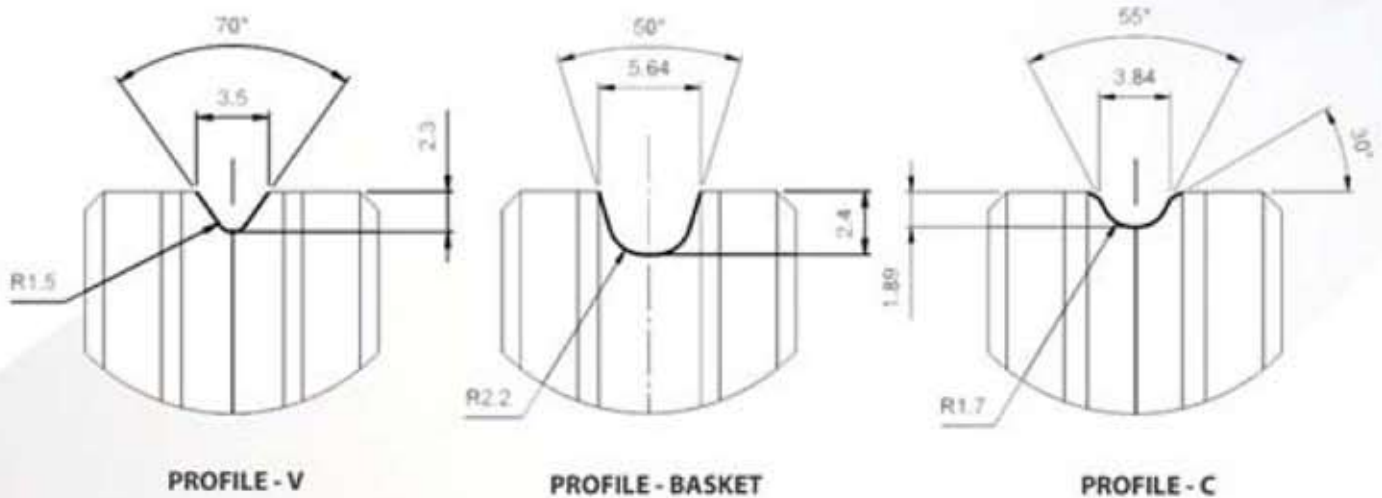
Fax +39.0445.359944

technicalglass@tyrolit.com



TYROLIT WHEEL PROFILES

Different Tyrolit's profiles:



In order to produce the most suitable profile Tyrolit needs 3 parameters:

1. Thickness of glass
2. Type of machine
3. Type of application

→ DETERMINING THE TYROLIT PROFILE

Wheel profiles are characterised by the following elements:

1. DETERMINING THE THICKNESS

- The thickness of the different profiles is mostly determined by the thickness of the glass and a 0.5mm oversize of glass thickness can be considered standard for normal applications.
- As soon as this value falls to 0.3-0.2-0.1 it will be easier to obtain profile centering on glass for thicknesses up to 5 mm

2. DETERMINING THE DEPTH

- The depth of the profile is also determined by the thickness of the glass, therefore for glass thickness of 4 mm the standard depth for processing with visible edges will be 2 mm
- This parameter plays a very important role in determining the tool lifetime as the greater the depth is, the more the profile will wrap around the first parts thus obtaining a level profile after a greater number of metres covered.

3. DETERMINING THE RADIUS

- The exit angle and the internal radius of the profile are the characteristics which influence the quality of visible edges the most as the outer glass surfaces are affected considerably by contact with the tool.

Producing specific profiles for every individual application improves:

- Start up quality
- The lifetime of each application
- Work speed
- Process reproducibility

ELECTRICAL DISCHARGE MACHINING (EDM)



NEW



ERODED



AFTER DRESSING PROCESS

Electrical discharge machining (or EDM) is a machining method primarily used for hard metals or those that would be impossible to machine with traditional techniques. EDM only works with materials that are electrically conductive. EDM can cut small or odd-shaped angles, intricate contours or cavities in pre-hardened steel without the need for heat treatment.

Some of the advantages of EDM include machining of complex shapes that would otherwise be difficult to produce with conventional cutting tools, machining of extremely hard material to very close tolerances, and machining of very small work pieces where conventional cutting tools may damage the part from excess cutting tool pressure.



The EDM Machine utilised by Tyrolit

TOOL QUALITY CERTIFICATION

TYROLIT VINCENT SRL TOOL QUALITY CERTIFICATION - Pencil edge wheels		Mod. 00106A	
Description			
Type		Specification	
Job order		Serial number	
Diameter (mm)		Bore Ø (H)	
HRB average		Balance	
Allowance design		Treatment	
Tester		Date	

Tyrolit issues a tool quality certificate after every dressing process

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The logo for TYROLIT, featuring the word "TYROLIT" in a bold, sans-serif font. The letters are white with a black outline, and the entire word is set within a white, rounded rectangular shape that has a slight 3D effect, appearing to sit on a dark surface.