



*Diamond Tools for
Contact Lenses*

CONTOUR FINE TOOLING

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- CONTROLLED WAVINESS CONTACT LENS TOOLS
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T H E C U T T I N G E D G E

Over the past 25 years, Contour Fine Tooling has earned a reputation for innovation, precision, quality and value for money in the field of single point diamond cutting tools. With manufacturing sites and repair facilities in England, The Netherlands, the United States and Japan, Contour Fine Tooling has evolved to provide local customer support on a global basis.

Anticipating market requirements and working with customers in both industry and academia, Contour Fine Tooling has developed application-orientated solutions covering the spectrum of ultra-precision manufacturing and optics. Amongst applications are the machining of contact and intra-ocular lenses, photo-receptor drums, scanning polygons, infra-red and laser optics, and components used in consumer electronics such as DVD players, camcorders, mobile phones and digital cameras.

Standard and special tools are offered, with varying levels of precision, utilising both natural and synthetic single crystal stones. This is complemented by Contour's hallmark of quality and extensive applications support. On site technical support and education is provided to allow tool management and care programs to be implemented, thus optimising your investment.

Contour Fine Tooling continues to adapt and enhance its product range, manufacturing and business processes, to suit ever-changing customer and technological demands. We look forward equally to our continued support of our existing customers, and to developing similar partnerships with new users both large and small.





STANDARD CONTACT LENS TOOLS

FEATURES

- CERTIFICATE OF CONFORMANCE
- CHIP FREE AT X500 NOMARSKI
- GUARANTEED QUALITY
- OPTIMUM TOOL LIFE
- VACUUM BRAZED

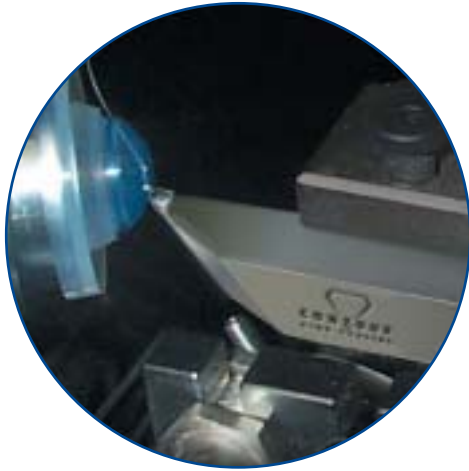
Contour Fine Tooling has developed a complete range of tools to meet the requirements of today's contact lens manufacturer. For optimum cutting efficiency the correct tool geometry must be used for any given material. Available with either natural or synthetic single crystal diamond, a range of radius size and rake angle is offered. Tools can either be solid or insert style; they have a standard arc of 120° although larger angles are available. Contour Fine Tooling orientates the diamond to maximise the wear-resistant characteristics.

The radius, although not controlled in terms of waviness, is generated to be smooth and facet-free. The edge is inspected to be chip free, at x500 Nomarski. Standard Tools can also be used for roughing operations.

OPTIONS

- NATURAL DIAMOND
- SYNTHETIC SINGLE CRYSTAL DIAMOND
- VARIOUS GEOMETRIES
- SOLID SHANK
- INSERT SYSTEM
- CONICAL CLEARANCE





S P E C I F I C A T I O N

MAKE OF LATHE	SHANK	CODE	SPECIAL	PMMA & RGP	HYDROPHILIC NON-BRITTLE	HYDROPHILIC BRITTLE
			0.25mm	0.50mm	0.75mm	1.00mm
			RADIUS IN MM			
CHASE (+5° toolholder)	6.35mm Sq.	S	S010	S020	S030	S040
CHASE (parallel toolholder)	6.35mm sq.	SP	SP010	SP020	SP030	SP040
CITY CROWN	6.35mm sq.	R	R010	R020	R030	R040
CITY CROWN	6.35mm sq. x 19mm step	TR	TR010	TR020	TR030	TR040
CITY CROWN	8.0mm x 6.35mm	ATR	ATR010	ATR020	ATR030	ATR040
COBURN 8000	6.35mm sq.	C	C010	C020	C030	C040
DAC	6.35mm sq.	J	JCL010	JCL020	JCL030	JCL040
DAC	7.5mm x 6.35mm	JB	JCR010	JCR020	JCR030	JCR040
DAC	8.0mm sq.	JC	J010	J020	J030	J040
DAC	8.0mm sq. x Offset Left	JCL	JB010	JB020	JB030	JB040
DAC	8.0mm sq. x Offset Right	JCR	JC010	JC020	JC030	JC040
GFELLER	8.0mm sq.	G	G010	G020	G030	G040
MICROTURN	6.35mm sq.	M	M010	M020	M030	M040
NISSEL (17° toolholder)	5.0mm sq.	A	A010	A020	A030	A040
NISSEL (parallel toolholder)	5.0mm sq.	AP	AP010	AP020	AP030	AP040
NISSEL (1/4 Sq.)	6.35mm sq.	R	R010	R020	R030	R040
POLYTECH	6.0mm sq.	W	W010	W020	W030	W040

Tools can be specified using the following table

(S/M)

R

020 (i)

If (i) is stated,
Insert system is used

SYNTHETIC

S - SUMITOMO
M - MONODIE
No prefix if natural
Diamond is used

**TOOL HOLDER
CODE**

City Crown 1/4" sq.

**RADIUS
SIZE**

Imperial = 020"
Metric = 0.50mm

To guide you in selecting the correct tool, Contour have a tool numbering system relating to the machine. The system gives the radius size in inches and material but can be converted to metric by adding m, e.g. R020 becomes R050m. Please contact us if you are unsure of your exact requirement. A prefix of "S" means a Sumitomo diamond and a prefix of "M" means a Monodie diamond.

CONTROLLED WAVINESS TOOLS

FEATURES

- CONICAL CLEARANCE
- WAVINESS 0.4 μ m
- CERTIFICATE OF CONFORMANCE
- CHIP FREE AT X500 NOMARSKI
- GUARANTEED QUALITY
- OPTIMUM TOOL LIFE
- VACUUM BRAZED

In response to the increasing use of advanced two axis machining systems, for the direct lathing of contact lenses, Contour Fine Tooling has developed a range of tools with conical or cylindrical clearance. These tools are available with natural or synthetic single crystal diamond and with the traditional solid shank or the Insert system

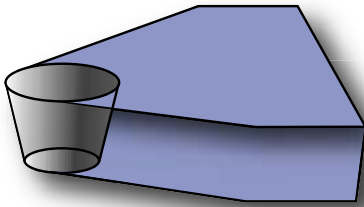
Unlike established contact lens lathes that operate on the R theta principle, 2 axis lathes dictate that the diamond tool must have a radius with controlled waviness. The control software of the machine in conjunction with the tool radius form combine to generate the lens geometry. Any errors in the tool form will translate directly into the machined work piece. Evolved from the demanding requirements of the electro-optics manufacturing industries, controlled waviness contact lens tools offer an extremely high level of performance at an affordable price.



OPTIONS

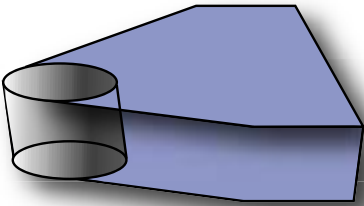
- WAVINESS DOWN TO 0.05 μ m
- CYLINDRICAL CLEARANCE
- NATURAL DIAMOND
- SYNTHETIC SINGLE CRYSTAL DIAMOND
- VARIOUS GEOMETRIES
- SOLID SHANK
- INSERT SYSTEM

S P E C I F I C A T I O N



CONICAL CLEARANCE

Representing the ultimate controlled waviness characteristics for this product group, Contour's conical clearance tools have a truly circular edge, guaranteed to be within $0.4\mu\text{m}$ and often in the order of $0.25\mu\text{m}$. Tools can be manufactured with nominal radii of 0.1-1.0 mm. It should be noted that as standard, these tools have a 12.5° clearance angle and 100° of arc. Increased arc is available. 120° or more must be manufactured using a synthetic single crystal diamond. The accuracy of conical clearance is only seen when a 0° rake is used.



CYLINDRICAL CLEARANCE

Where a relaxed work piece geometry can be tolerated, cylindrical clearance tools offer a suitable alternative. Cylindrical clearance tools have an elliptical form, which is proportional to radius size, clearance angle and rake angle.

For example: for a 0.5mm radius, 100° arc, 12.5° front clearance and 0° rake will have an elliptical form deviating from a true circle by $0.4\mu\text{m}$. This figure does not include manufacturing tolerances.

Tools can be specified using the following table:

(S/M)

K

C

O20

(m)

L

F

(C)

(I)

S - SUMITOMO
M - MONODIE
No prefix if natural
Diamond is used

Type of
Machine
K - OPTOFORM
Q - EPT
J - DAC

Type of
radius
C - CONTROLLED
WAVINESS
TOOL

Radius size
Imperial
eg.
O20 = 0.50mm
radius

Radius size
Metric
eg.
0.50mm = .020"
radius

Top rake
K $2\frac{1}{2}^\circ$
L 0°
M $-2\frac{1}{2}^\circ$
N -5°

Front clearance
E - 15° F - $12\frac{1}{2}^\circ$
G - 10° H - $7\frac{1}{2}^\circ$
J - 5°

If 'C' is
stated
conical
clearance

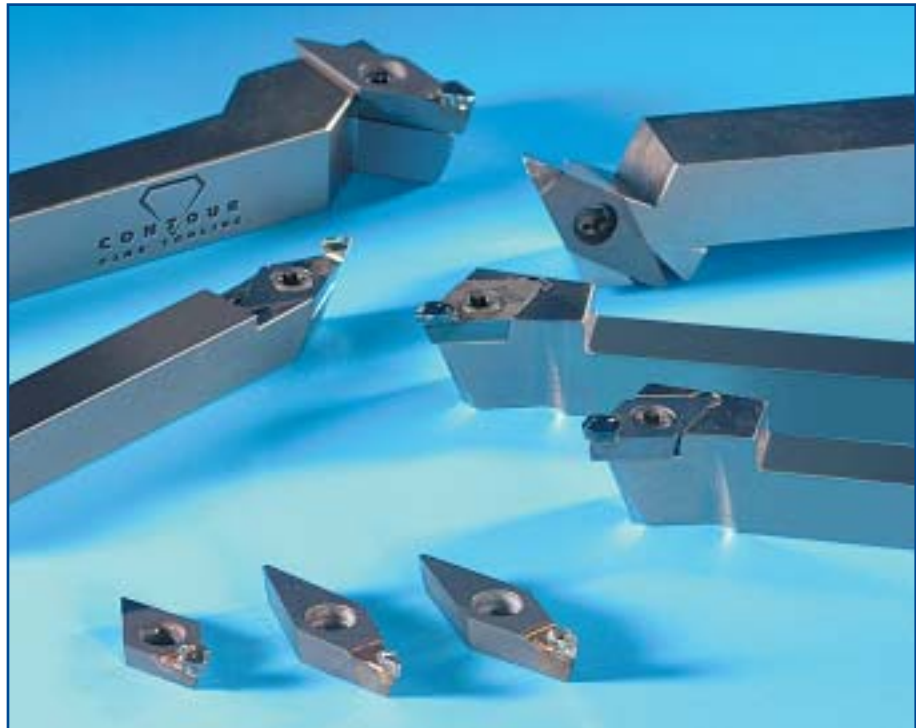
If 'I' is
stated
insert
system
is used

INSERT SYSTEM

FEATURES

- IMPROVED ACCESSIBILITY
- ADAPTABILITY
- REDUCED TOOL INVENTORY
- GUARANTEED QUALITY
- OPTIMUM TOOL LIFE
- CHIP FREE AT X500 NOMARSKI
- FAST REPLACEMENT
- VACUUM BRAZED
- COLOUR CODED (CONTROLLED WAVINESS ONLY)

Contour Fine Tooling have refined the insert system to the point that it is now in widespread use by contact lens manufacturers around the world. The diamond itself is vacuum brazed to a tungsten insert. The insert can then be fitted to a toolholder of our existing design to suit its intended application. Toolholders are made by Contour in standard and customised offsets. Contour controlled waviness inserts provide easily visible colour coding for cylindrical (yellow) or conical (red) clearance.



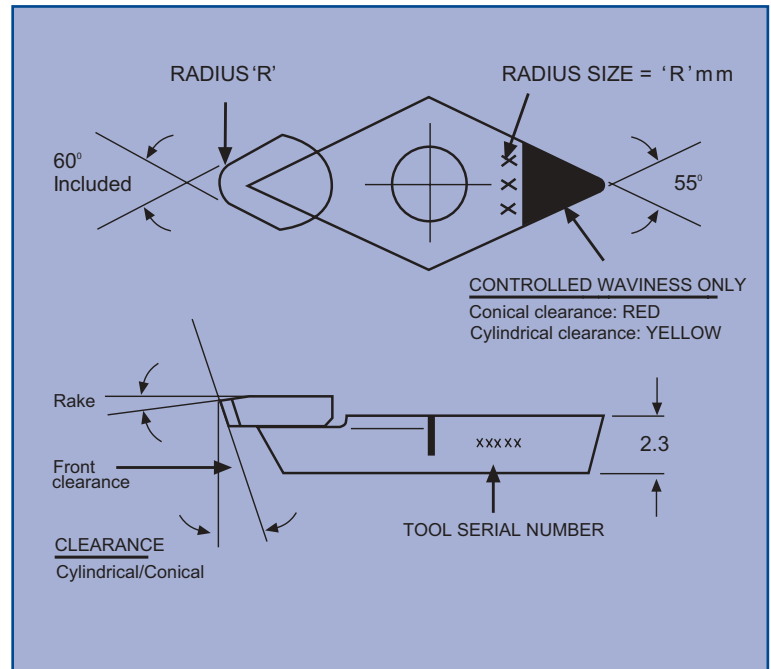
OPTIONS

- STRAIGHT TOOLHOLDER
- OFFSET TOOLHOLDER
- NATURAL DIAMOND
- SYNTHETIC SINGLE CRYSTAL DIAMOND

S P E C I F I C A T I O N

TOOL HOLDER NUMBERING SYSTEM

MAKE OF LATHE	SHANK	CODE
CHASE (+5° toolholder)	6.35mm Sq.	S
CHASE (parallel toolholder)	6.35mm sq.	SP
CITY CROWN	6.35mm sq.	R
CITY CROWN	6.35mm sq. x 19mm step	TR
CITY CROWN	8.0mm x 6.35mm	ATR
COBURN 8000	6.35mm sq.	C
COBURN 9000	6.35mm sq.	CP
DAC	6.35mm sq.	J
DAC	7.5mm x 6.35mm	JB
DAC	8.0mm sq.	JC
DAC	8.0mm sq. x Offset Left	JCL
DAC	8.0mm sq. x Offset Right	JCR
EPT	8.0mm sq.	Q
GFELLER	8.0mm sq.	G
MICROTURN	6.35mm sq.	M
POLYTECH	6.0mm sq.	W
PRECITECH/OPTOFORM	6.35mm sq. x 10.5mm C.H.	K
NANOTECH	6.35mm sq. x 10.5mm C.H.	U
OPTEQ	8.00mm sq	Q



TOOL INSERT NUMBERING SYSTEM

	SPECIAL APPLICATION	PMMA & RGP	HYDROPHYLIC NON-BRITTLE	HYDROPHYLIC BRITTLE
R=	010i	020i	030i	040i

TORIC FLY-CUTTING TOOLS

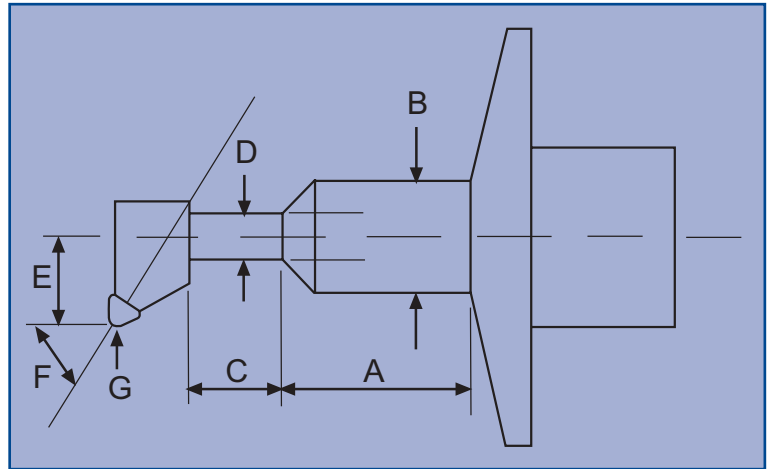
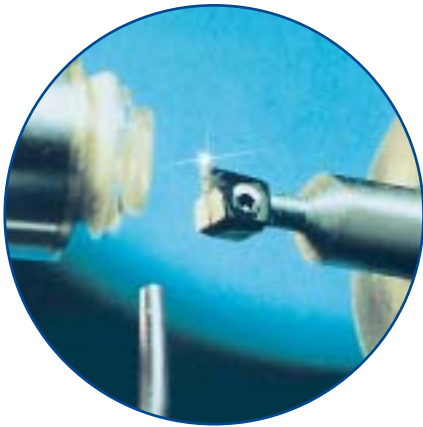
FEATURES

- GUARANTEED QUALITY
- OPTIMUM TOOL LIFE
- CHIP FREE AT X500 NOMARSKI
- PRE-ADJUSTED OFFSET

Contour Fine Tooling supply specialist tools to suit the various contact lens lathes that are able to cut toric geometries by fly-cutting. In this case, the tool is rotated off-axis to the spindle to create the meridian while the work piece is swept off axis on the radius quadrant to generate the 2nd meridian. Contour's toric tools come ready for attachment to the machine. Typically manufactured in natural diamond with 0.5mm radius, these tools can be supplied with virtually any offset of your choice.



S P E C I F I C A T I O N



When ordering toric tools for DAC lathes please specify the following:-

EXAMPLE

Lathe Type DAC	Ref.	Example
Large shaft length (x.x)	A	12.0mm
Large shaft diameter (x)	B	8.0mm
Small shaft length (x.x)	C	11.5mm
Small shaft diameter (x.x)	D	3.5mm
ϕ to diamond tip (x.x)	E	6.5mm
Offset angle (xx°)	F	30°
Radius size (x.xx)	G	0.5mm

When ordering toric tools for City Crown or Gfeller, please specify the following:-

EXAMPLE

Lathe Type City Crown	Ref.	Example
ϕ to diamond tip (x.x)	E	6.5mm
Offset angle (xx°)	F	30°
Radius size (x.xx)	G	0.5mm

Special Requirements

Contour Fine Tooling has extensive knowledge and experience in designing specialist tooling to suit specific requirements. If there is not a standard tool available then please contact us with your special requirements and we will be happy to design one.



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