Coniflex® blades

They are toothed disks, as shown in Figure N°03.1. These blades are used for generate straight bevel gears in either low or medium volumes.
The cutting tools is composed by two discs: one with right cutting direction and the other with left cutting direction, they are interlocked to machine both sides of the tooth spaces simultaneously.
The complete gear is produced cutting one tooth and than indexing to cut the others.

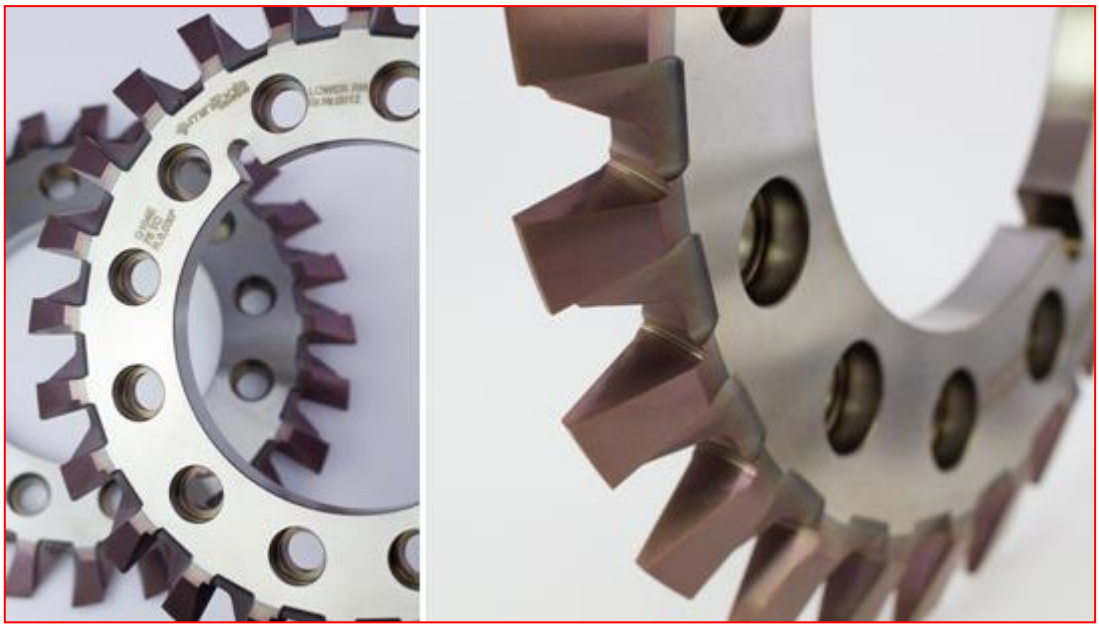

Figure N°03.1 - *Blades Coniflex®*

The two disks (or blades) are interlocked to each other and generate teeth with crowning in the lenghtwise direction. The shape and the position of the disks give to the cutting edges a curvilinear trajectory, with a longitudinal section view of the tooth.

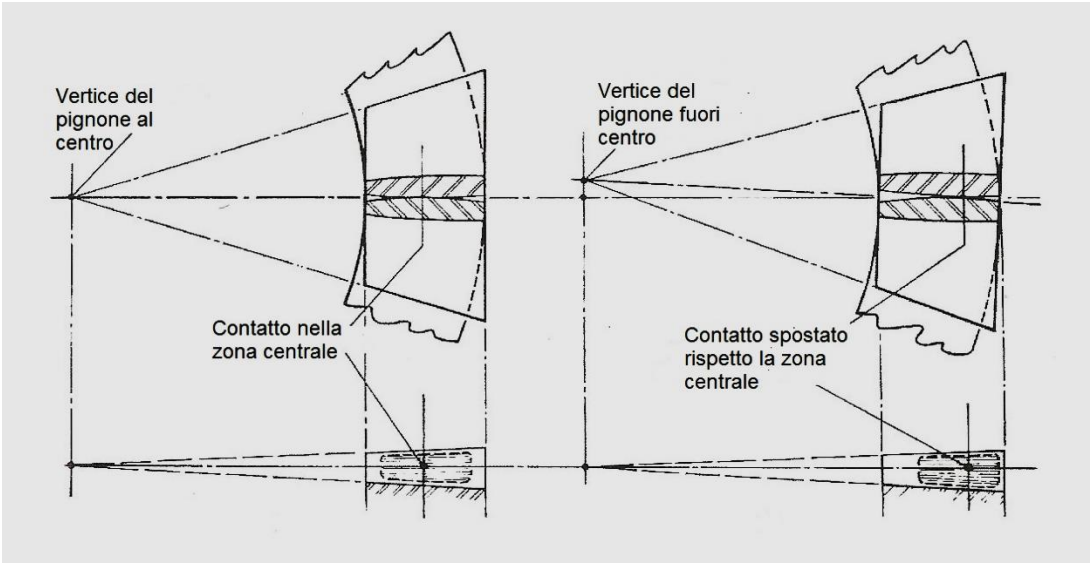

Figure N°03.2

This curvature in the bevel gears with spur teeth, is used to move the contact zone between the pinion and crown and may be useful for compensating the downturn caused by the load,

thereby avoiding contacts concentrated to the edges. These cutters do not have longitudinal movement with respect to the tooth and therefore the bottom of the tooth is slightly concave.
The Coniflex® system is very fast, up to 4 - 5 times greater than the hobbing system with two rectilinear tools, and it is used for large production runs.
For the construction of these tools only modern numerical control machines are utilized, adopting processing cycles which guarantee maximum geometric precision and an accurate surface finishing.

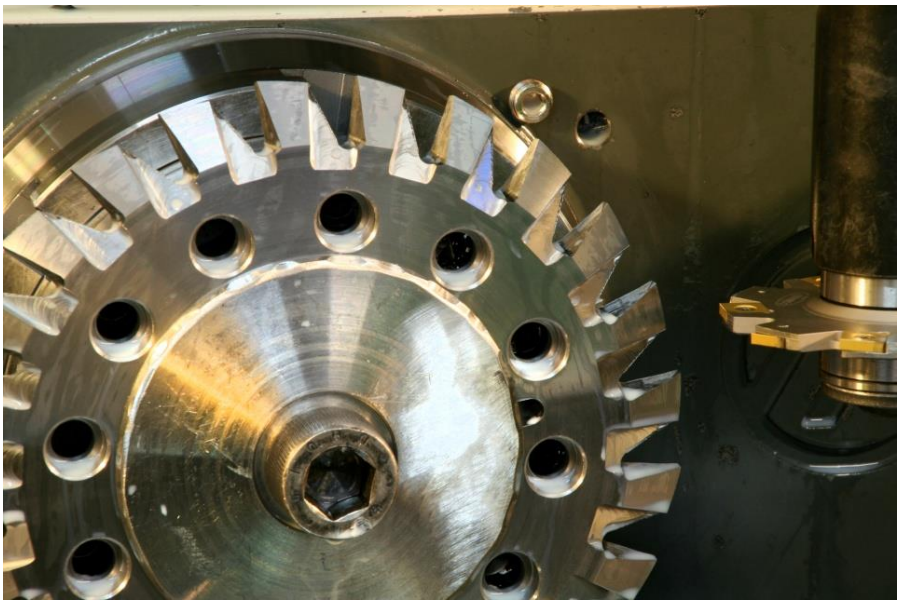

Figure N°03.3

The solid blades Coniflex may have a diameter of 9 inches, with 16 or 24 cutting edges (the most common type) or with a diameter of 4.25 inches, used for smaller gear production. They are always formed by two coupled toothed discs, of which one works a tooth flank and the other works the other side.
Depending on the Point Width of the blades the desired thickness of the tooth it is obtained.
The discs have a standard thickness of half inch and are fixed to the machine spindle through a series of 12 holes which are to be phased respect to the teeth, in order to create the correct interlocking of the blades.
As the two discs work simultaneously a tooth space, they must have the same external diameter, with a tolerance of about 0.03 mm.
This tolerance should be maintained even after the successive re-sharpening.
A pair of Coniflex blades is identified by a code, for example G104E-60-T-C, where the figures have the following meanings:

G104E	**60**	**T**	**C**
Type of machine	*PW (Point Width)*	*Number of teeth*	*Pressure angle*
indicates that the blades are used in the machine mod.G104	*in thousandths of an inch*	*T = 24*	*A = 22° 30'*
			B = 22° 12'
			C = 21° 30'
		U = 16	*D = 20° 0'*
			E = 17° 30'
			F = 14° 30'

(*) edge radius is related to PW, but special values can be obtained.

Figure N°03.4 shows a tooth profile of a Coniflex blade and the naming of the major features.

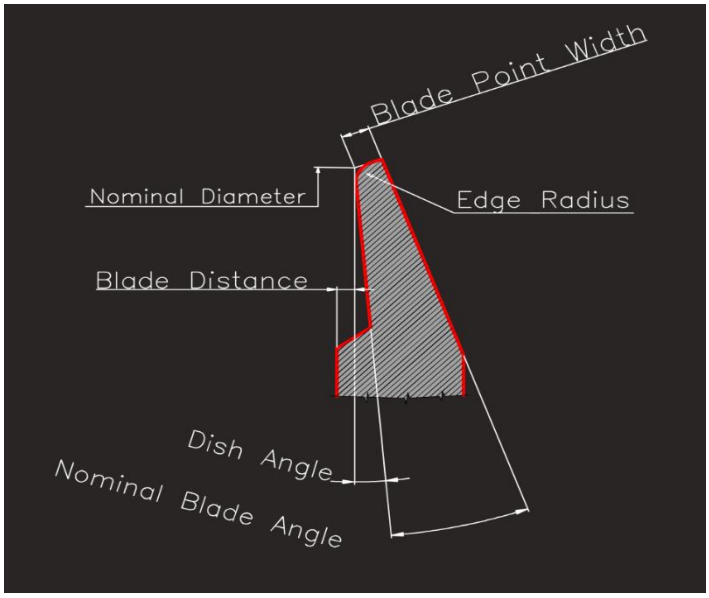

Figure N°03.4

Besides the need for having the tooth profile with precise pressure and clearance angles, the Coniflex blades must have the side faces of support perfectly parallel and perpendicular with the axis of the centering hole. It is evident that even a small squareness error, considering the large diameter of the disc, causes significant errors on the profile of the gear teeth.
The miniToolsCoating guarantees this squareness by grinding simultaneously the reference sides and the hole.
Special care is also dedicated to the planarity of the contact sides, which must not have irregularities because, otherwise, when you lock the blade on the spindle with the twelve screws, the blade may be deformed by generating toothing errors.

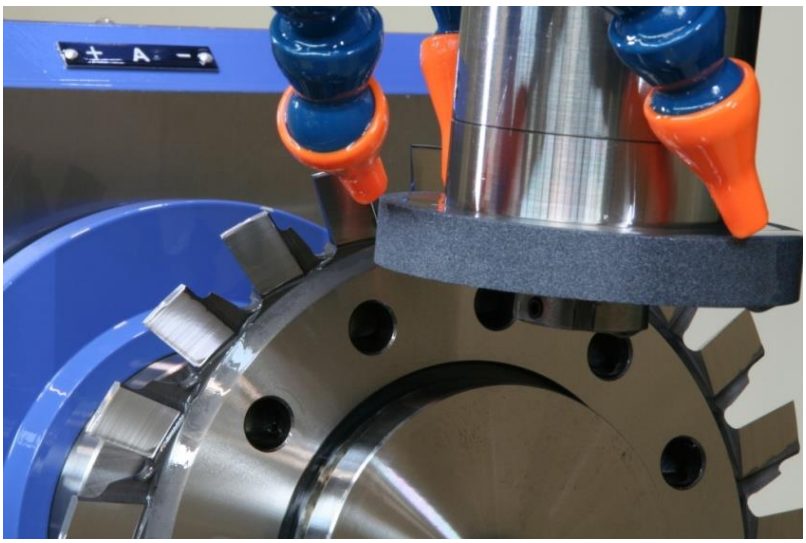

Figure N°03.5

The profile control is done with a high-precision optical device that determines, with no contact sensors, angles, fillet radii and all main dimensions.

The machine provides the chart and the complete report, highlighting the quote out of tolerance.
One of the most important characteristics to which miniToolsCoating wants to focus is the use of high-quality HSS (High Speed Steel), such as ASP2023 or S390, combined with the exclusive SILICUT coating, based on Silicon, which, thanks to high hardness and toughness and low coefficient of friction, allows a higher performance than conventional tools.

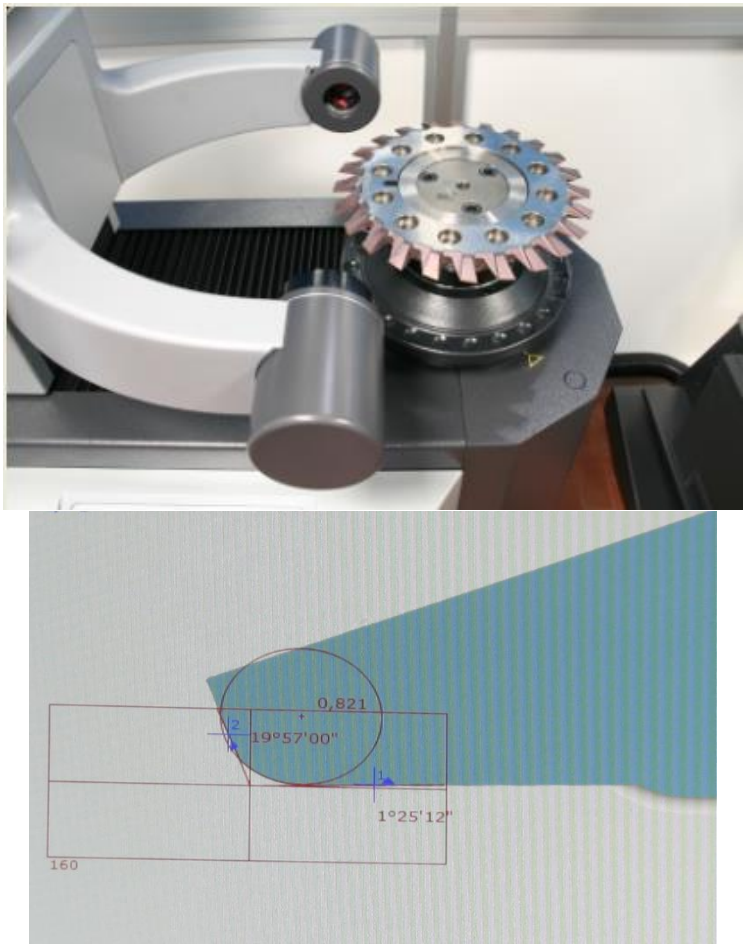

Figure N°03.6