

The UNI EN 10277-1:2000 standard and the surface quality of cold-finished products:

The general standard for cold-finished products deals thoroughly with material surface quality and the relevant defects.

As defects like cracks, scales, laps cannot be completely eliminated during production of warm rolled products and cannot even be removed by drawing, a quality standard should be agreed by supplier and customer.

It defines 4 surface quality classes:

Classes 1, 2 and 3 refer to drawn products with round, square, hexagonal section or to flat products.

Class 4 refers only to peeled or ground products.

Details parameters differentiating the surface quality classes:

- Allowable defect depth
- Mass percentage of delivered product with defects exceeding the specified defect level.
- Limitation in the class choice due to the product shape (round, square, hexagon etc.)

Below you will find a table summarizing the content of the European standard UNI EN 10277 – 1:2000.

Controls effected are the following:

1. **Defectomat control on bars and coils:** non-destructive control effected through eddy-current equipment that allows detecting superficial cracks with transversal orientation, such as scabs, cracks, holes.
2. **Circograph control on bars:** non-destructive control effected with equipment working with rotating probes that allows to detect superficial defects with longitudinal orientation as us rolling laps, tension cracks and drawing defects.
3. **non-cranking control:** non-destructive control effected with magnetic-inductive equipment that allows to check the material exchange (o mixing) and the heat treatment.
4. **magnetoscope testing (MT) :** non-destructive control effected with magnetic equipment that allows to detect superficial defects with transversal and longitudinal orientation.
5. **Ultrasonic Testing (UT)**

The non destructive test are conducted by ISO 9712 certified operators

Controls are effected according to European Norm UNI EN 10277-1:2000 or according to customer's specifications.

UNI EN 10277-1:2000 (Products in Bars)						
Class of Defects According to EN 10277-1	Diameter or Key [mm]	Max. Defect Admitted	Max. % of Bars with Defects Over The Limit (1)	Shape (2)		
				Round	Hexagon	Square
1	up to 15 from 15 to 100	0.3 mm 2% Diameter or key	4%	+	+	+
2	up to 15 from 15 to 75 from 75 to 100	0.3 mm 2% Diameter or key 1.5 mm	1%	+	+ ($\leq d$ 50 mm)	+ ($\leq d$ 20 mm)
3	up to 20 from 20 to 75 from 75 to 100	0.2 mm 1% Diameter or key 0.75 mm	1%	+	-	-
4	up to 100	Free of defects	0.2%	+	-	-

(1) The last column shows the quantity of defective product that cannot be detected. As well for controlled material this value cannot be zero because there are no controlling instruments granting absolute reliability. Mills is anyway always engaged in the improvement of its own controlling devices to give customers the best reliability.

(2) + means that the shape is available in the corresponding classes, - means that the shape is not available in the corresponding classes.