

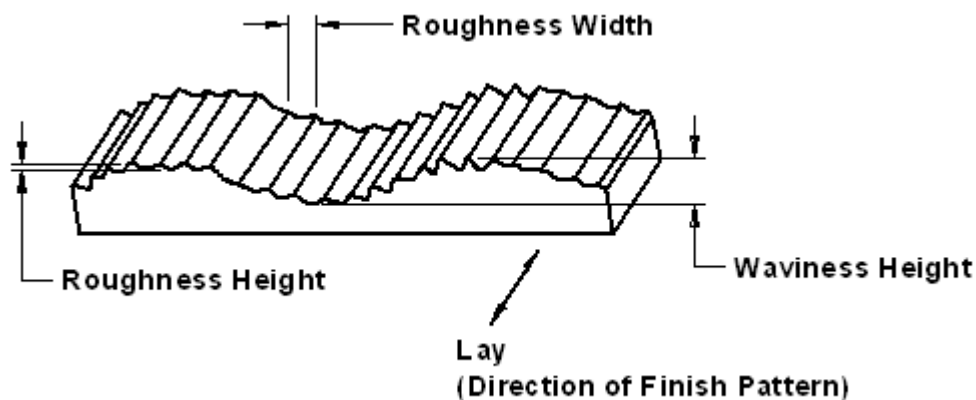
SURFACE FINISH**SURFACE ROUGHNESS PROCESS TABLES****DSF 3.1.1****Definition:** (BS 1134:2010)

Surface Roughness (R_a) is a component of Surface Texture (Finish). It is measured by the deviation of the actual surface from its ideal form. If these deviations are large the surface is rough, if they are small the surface is smooth.

Surface Texture (Finish) is defined by a combination of:-

- **Lay:** The direction of the predominant surface pattern.
- **Surface Roughness:** Measurement of finely spaced surface regularities.
- **Waviness:** Measurement of surface irregularities, with a spacing greater than surface roughness, such as deflection during machining.

Different manufacturing processes create different ranges of surface roughness. Typically, a rough surface is quicker (cheaper) to achieve but is likely to wear more quickly and have a higher friction than a smooth (more expensive) surface.

**Properties:**

Surface Roughness selection is dependant on the following:-

- Appearance
- Stressing and load bearing conditions
- Component size & function
- Production costs.

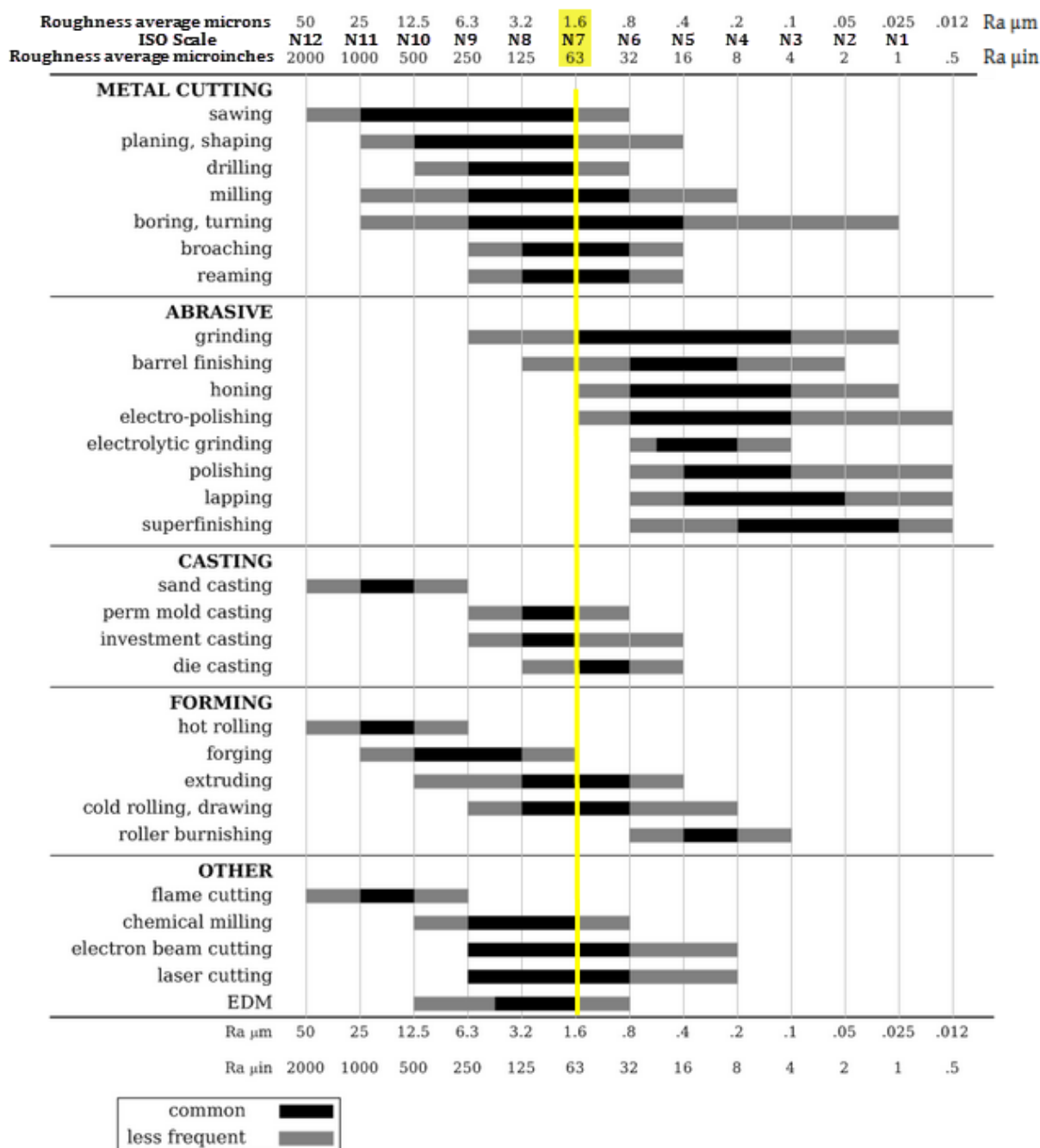
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SURFACE FINISH

SURFACE ROUGHNESS PROCESS TABLES

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Surface Roughness Chart



In general, the ASM (DEK) preferred surface roughness is 1,6 Ra μm .

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6.3 μm : Suitable for appearance surfaces where a clean surface is required or on mounting surfaces which need to be generally flat.

3.2 μm : Suitable for cosmetic surfaces where a reasonably good finish is required or on flat mating surfaces on castings.

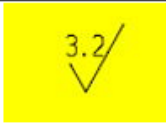
1.6 μm : Suitable for surfaces where close fits are required, **except** rotating shafts, axles and components subject to extreme vibration.

0.8 μm : Suitable for surfaces where a good finish is required for running, clearance, transition or interference fits. This finish can also be applied to external surfaces for an enhanced appearance.

0.4 μm : Suitable for surfaces where a better quality of finish is required, ideal for running fits on smaller components, or to extended service life.

To control production costs, the selection of the maximum roughness value in the manufacturing range is encouraged.

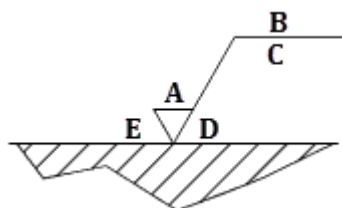
Surface Roughness: Basic Drawing Symbols

Surface Roughness Symbols.	Explanation
	Symbol without additional indications. Basic symbol. The meaning must be explained by additional indications.
	Symbol with additional indications. Any production method, with specified roughness.
	Symbol without additional indications. Removal of material by machining, without specified roughness.
	Symbol with additional indications. Removal of material by machining, with specified roughness.
	Symbol without additional indications. Removal of material is not permitted (surface is as supplied)
	Symbol with additional indications. Made without removal of material (non-cutting) with specified roughness.

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SURFACE FINISH**SURFACE ROUGHNESS PROCESS TABLES****DSF 3.1.1****Surface Roughness & Finish: Expanded Drawing Symbols**

Placement of auxillary machining data, **if required**.



A = Surface Roughness Value ($R_a \mu\text{m}$; $R_a \mu\text{in}$ or N)

B = Manufacturing process, surface treatment or coating.

C = Sampling length (mm).

D = Lay symbol.

E = Machining deviation (mm).

Surface Texture (LAY): Drawing Symbols

Symbol	Meaning	Illustration
=	The trace left by a cutting instrument is parallel to the projection plane in the drawing. Ex. Shaped Surface	
⊥	The trace left by a cutting instrument is perpendicular to the projection plane in the drawing. Ex. Shaped Surface (Side View) Circular Cut, Cylindrical Cut	
X	The pattern left by a cutting instrument diagonally crosses the projection plane in the drawing. Ex. Honed Surface	
M	The pattern left by a cutting instrument crosses in various directions or has no grain direction. Ex. Lapped Surface, Superfinished Surface and Surface Finished with a Front Mill or End Mill	
C	The pattern left by a cutting instrument is virtually concentric around the center of the plane in the drawing. Ex. Faced Surface	
R	The pattern left by a cutting instrument is virtually radial around the center of the plane in the drawing.	

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