



BASIC SURFACE TREATMENTS— Machining and Surface Texture Symbols

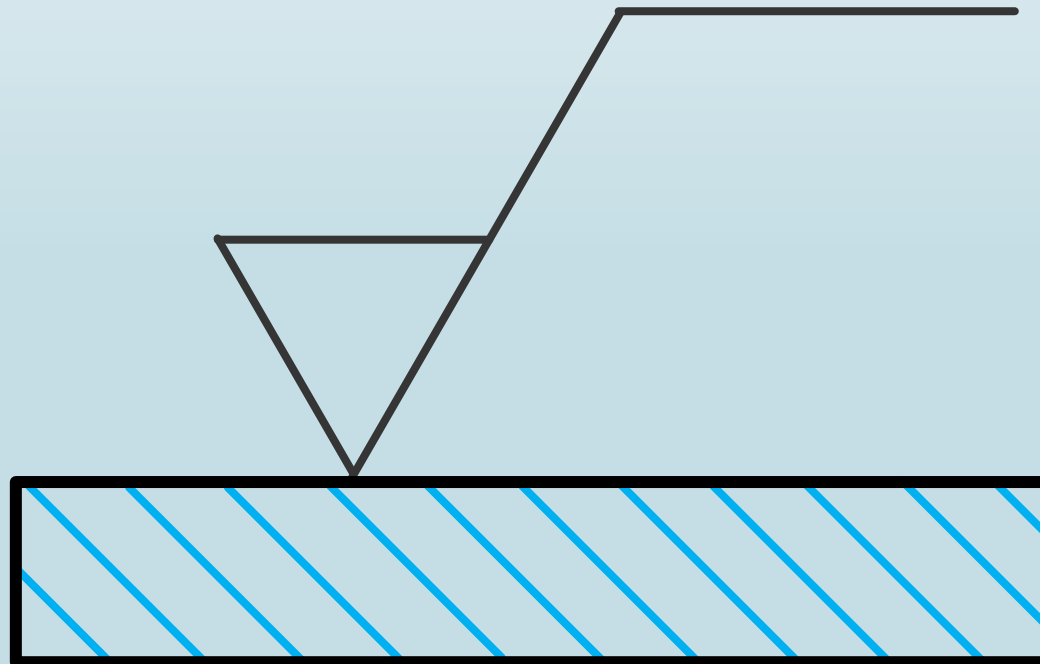
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SURFACE TREATMENT & SYMBOLS

- The surface of any mechanical part has a certain roughness value.
- Surfaces with a higher roughness value will create more friction.
- Roughness of a surface is measured by taking the average arithmetic deviation of a component over a given length.

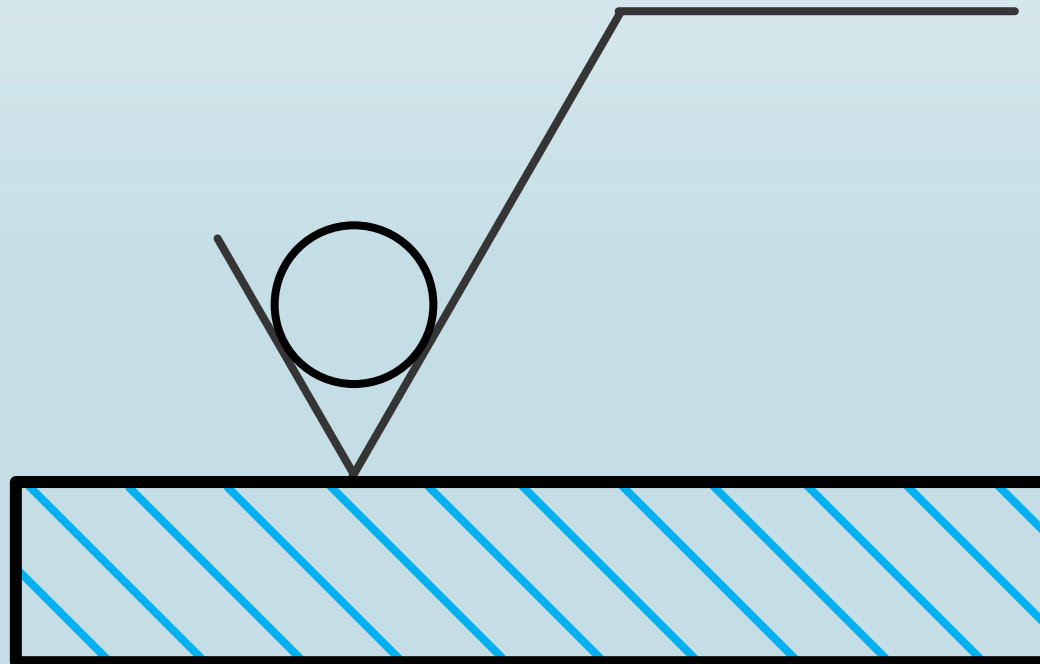
SURFACE TREATMENT & SYMBOLS

- ▶ A clear triangle indicate that machining is allowed.

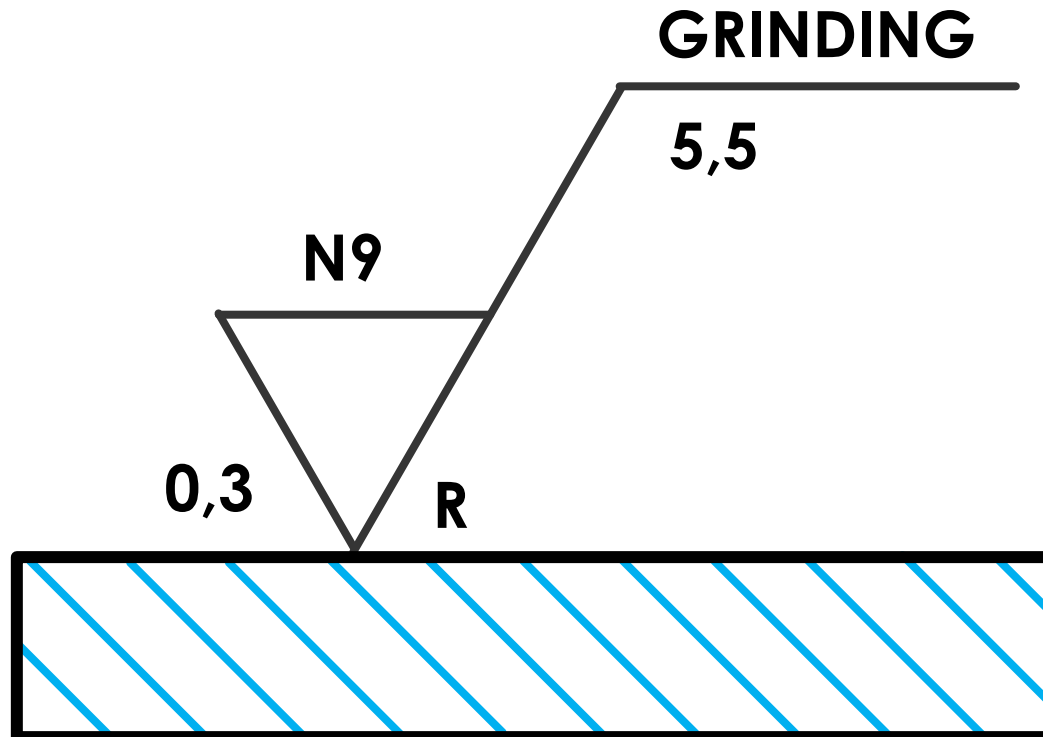


SURFACE TREATMENT & SYMBOLS

- The circle indicates that machining is **NOT** allowed.

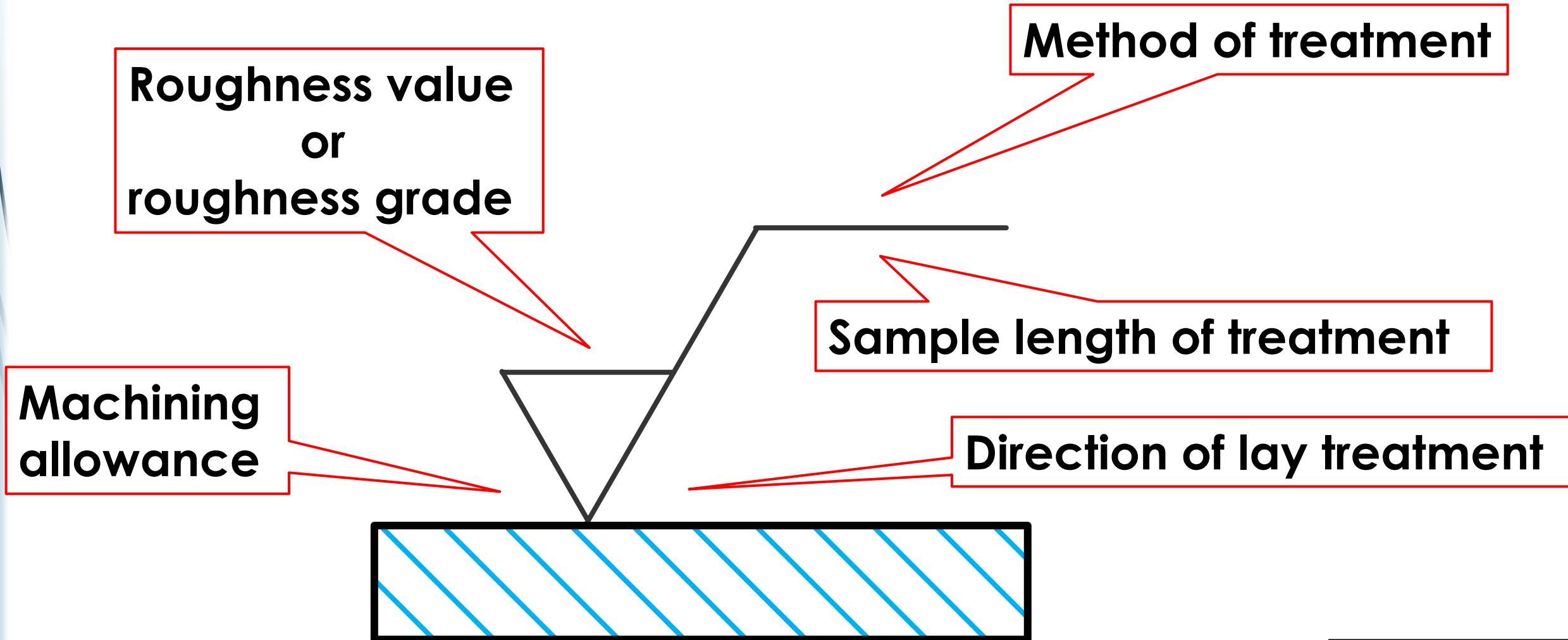


SURFACE TREATMENT & SYMBOLS



- A treatment symbol will show different information.

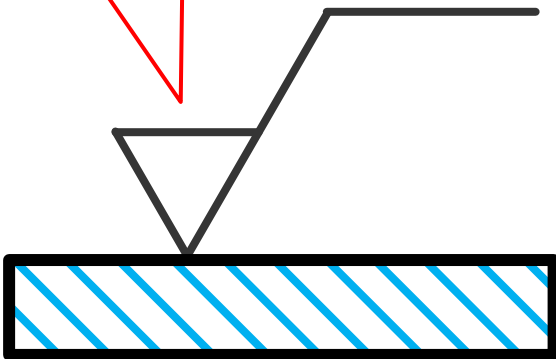
SURFACE TREATMENT & SYMBOLS



SURFACE TREATMENT & SYMBOLS

- **Roughness value** or roughness grade
 - This can be showed in microns (μm)

Roughness value
or
roughness grade



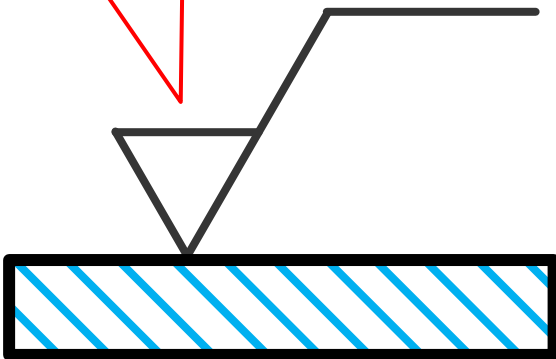
Roughness value

Microns (μm)	50	25	12.5	6.3	3.2	1.6	0.8	0.4	0.2	0.1	0.05	0.025
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SURFACE TREATMENT & SYMBOLS

- **Roughness value** or roughness grade
 - This can be showed by a grade number

Roughness value
or
roughness grade



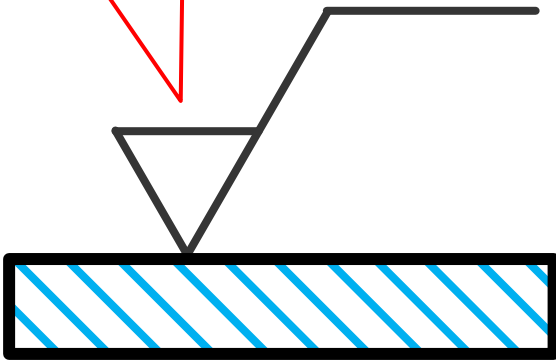
Roughness value

Grade number	N12	N11	N10	N9	N8	N7	N6	N5	N4	N3	N2	N1
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SURFACE TREATMENT & SYMBOLS

- **Roughness value** or roughness grade
 - This can be showed by an upper and lower limit

Roughness value
or
roughness grade



Roughness value

Upper and lower limit	0,2 0,06
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SURFACE TREATMENT & SYMBOLS

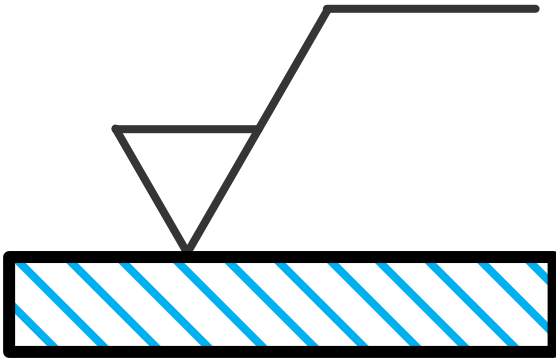
► **Method of treatment** can be achieved by:

► Coating e.g.

► **Painting**

► **Plating**

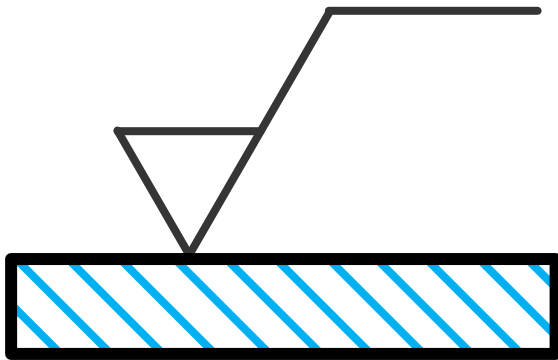
Method of treatment



SURFACE TREATMENT & SYMBOLS

- ▶ **Method of treatment** can be achieved by:
 - ▶ Method during production
 - ▶ **Chemical**

Method of treatment



SURFACE TREATMENT & SYMBOLS

► **Method of treatment** can be achieved by:

► A method after production

► **Chemical**

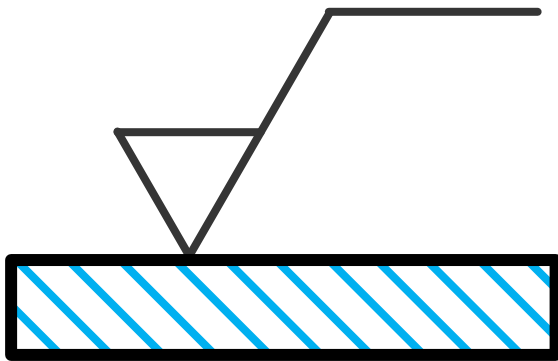
► **Grinding**

► **Lapping**

► **Honing**

► **Machining**

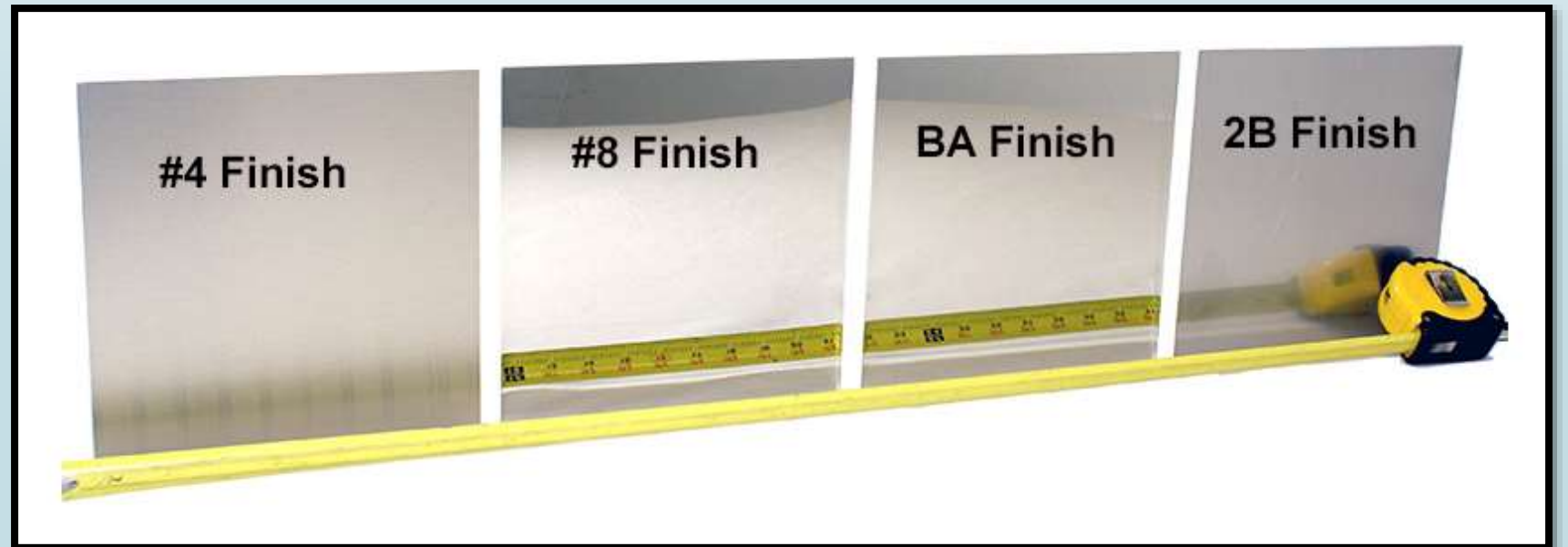
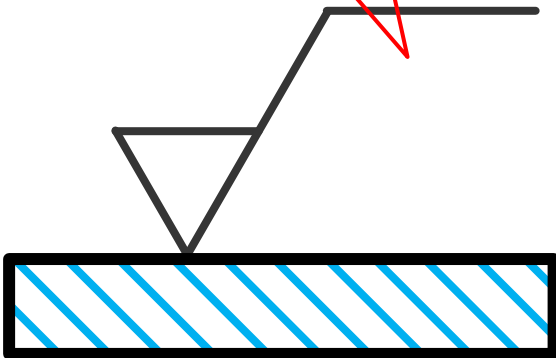
Method of treatment



SURFACE TREATMENT & SYMBOLS

- Specified the length over which the treatment should occur over an area

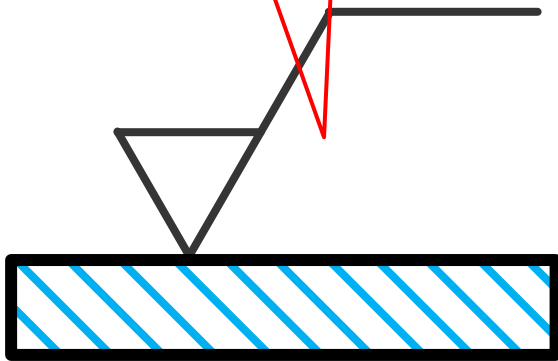
Sample length of treatment



SURFACE TREATMENT & SYMBOLS

- **Direction of lay treatment** indicate the surface pattern resulted from the method of treatment used or method of manufacturing.

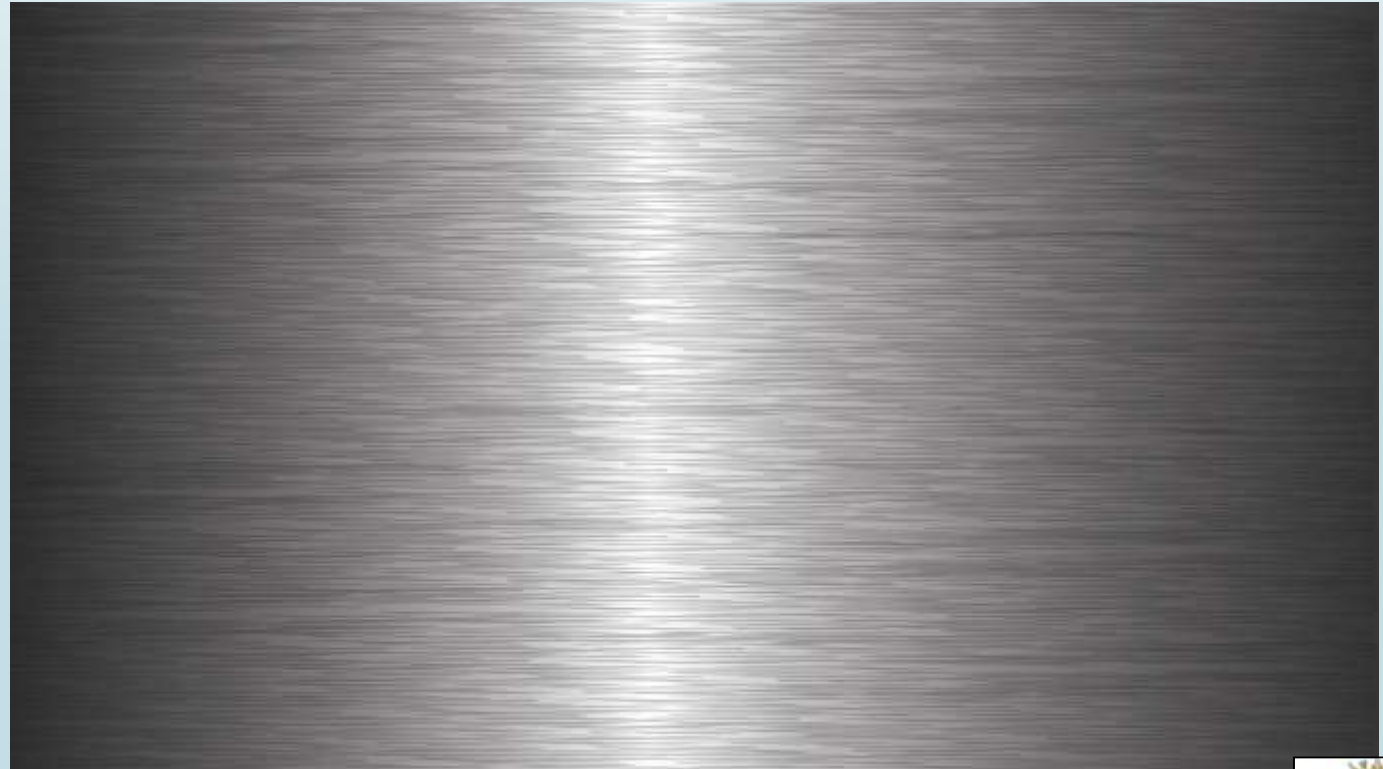
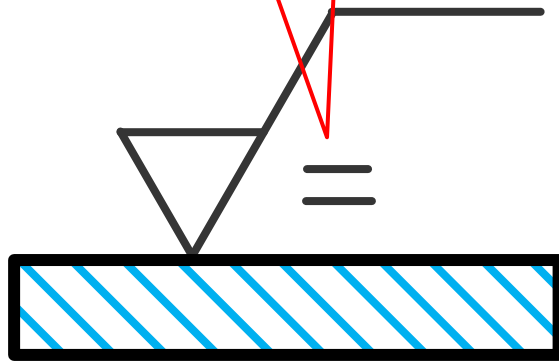
Direction of lay treatment



SURFACE TREATMENT & SYMBOLS

► **Parallel** to plane.

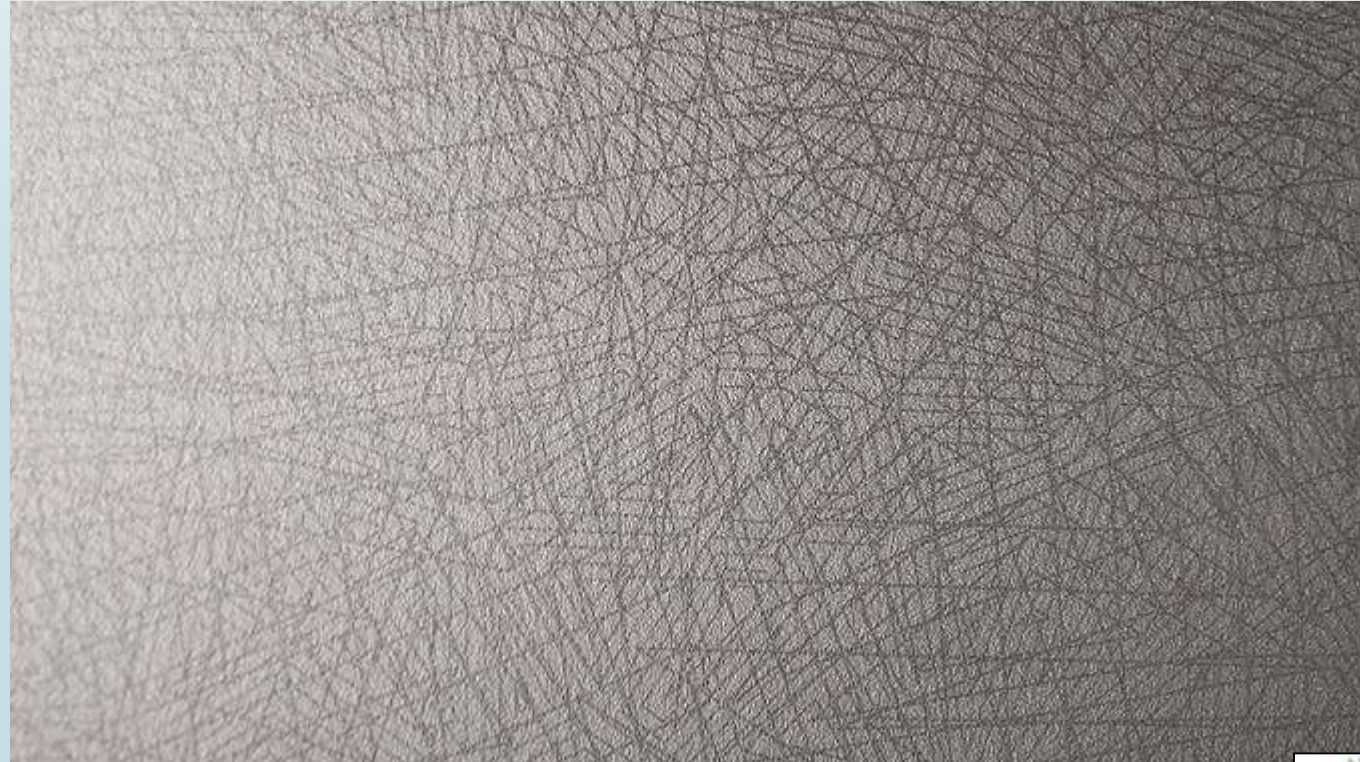
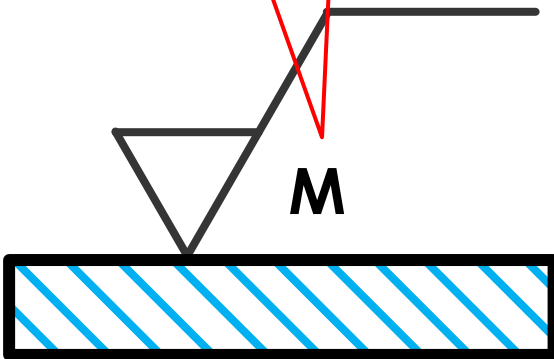
Direction of lay
treatment



SURFACE TREATMENT & SYMBOLS

- **Multi directional** treatment.

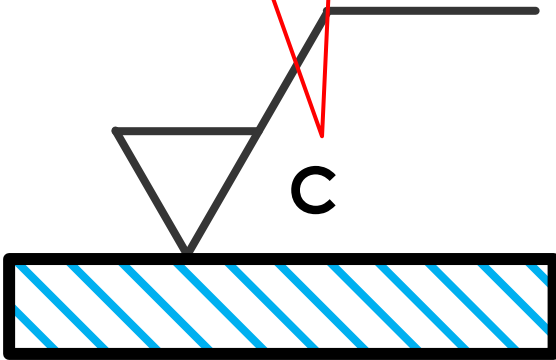
Direction of lay
treatment



SURFACE TREATMENT & SYMBOLS

► **Circular** treatment.

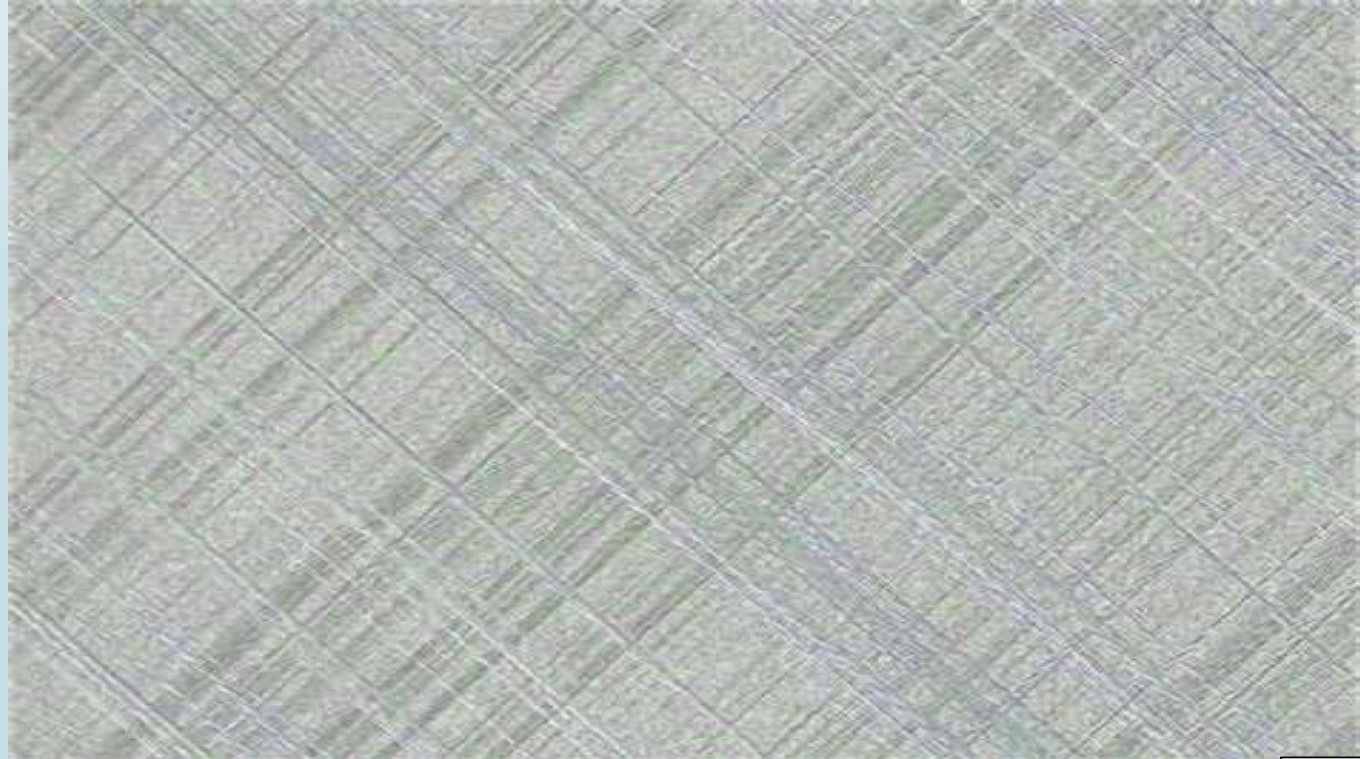
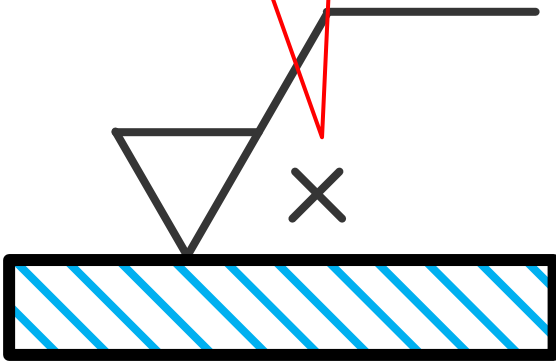
Direction of lay
treatment



SURFACE TREATMENT & SYMBOLS

► Crossed pattern treatment

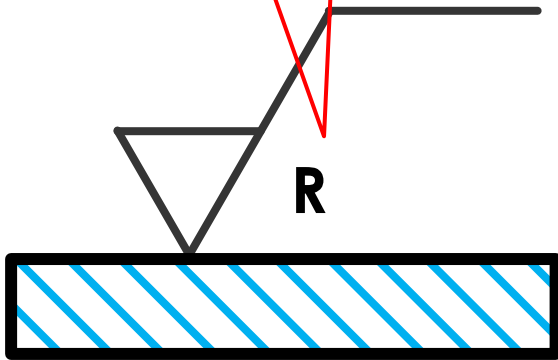
Direction of lay
treatment



SURFACE TREATMENT & SYMBOLS

► Radial pattern treatment

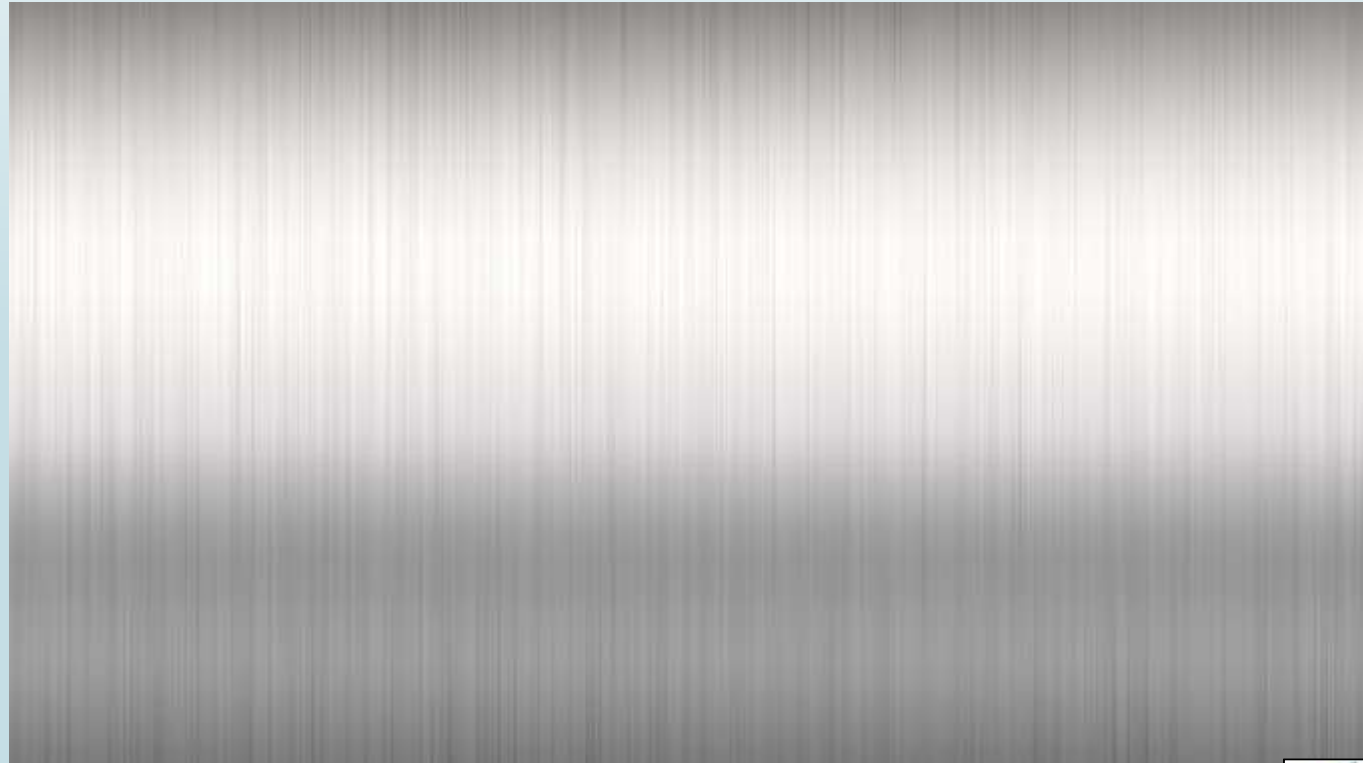
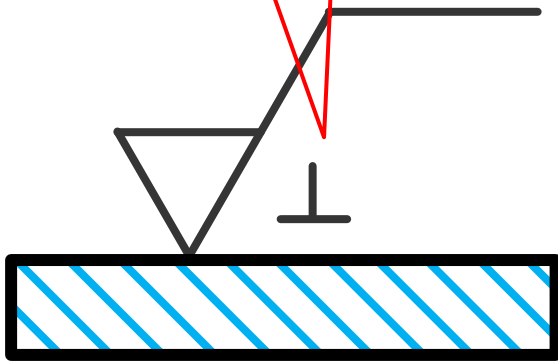
Direction of lay
treatment



SURFACE TREATMENT & SYMBOLS

- **Perpendicular** to plane Treatment.

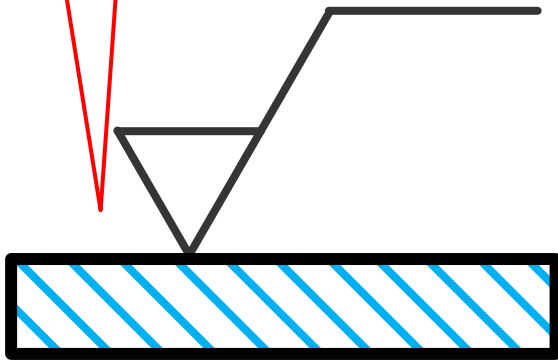
Direction of lay
treatment



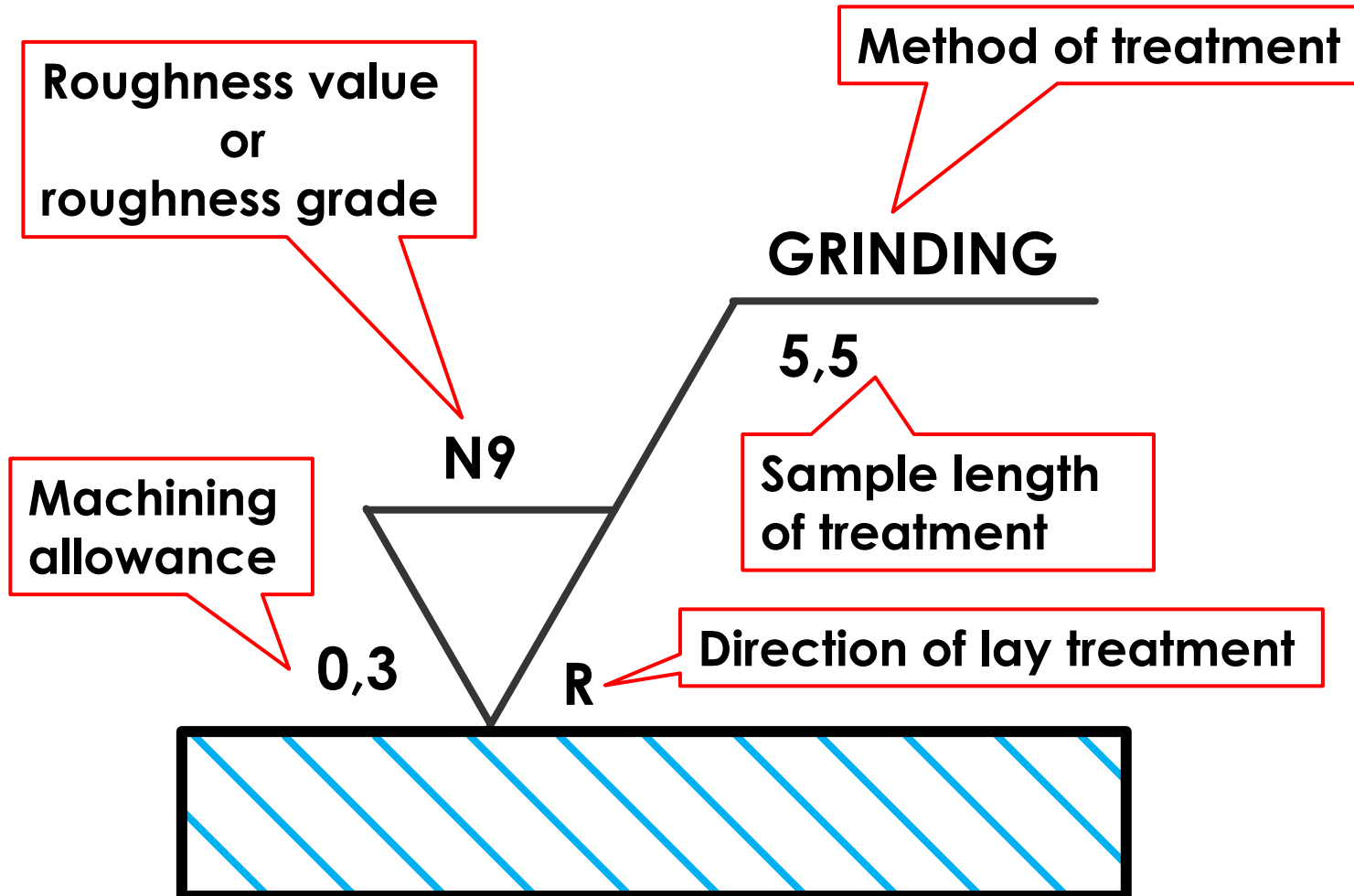
SURFACE TREATMENT & SYMBOLS

- **Machining allowance** indicate the degree of permissible variance (tolerance) in millimetres over a specified distance.

Machining allowance



SURFACE TREATMENT & SYMBOLS



- Method of treatment
 - Grinding
- Sample length of treatment
 - 5,5
- Direction of lay treatment
 - Radial
- Machining allowance
 - 0,3
- Roughness value
 - N9 or 6,3 μm (microns)