

The consistency of the interior surface has a great impact on the quality of an aseptic system process. By means of polishing, the interior contact surface is reduced. The specified surface quality of the valve body is achieved through mechanical polishing and electro polishing. According to the standards SED offers surfaces with a surface finish up to a quality of 0,25 μm and 10 Ra. At SED the stated surface finish always describes the maximum surface roughness value.

The surface finish is reached by automatic or manual mechanical polish processing. The methods that are applied depend on the internal contour and size of the valve body.

The surfaces of the valve bodies with the highest quality are produced through polishing with different grit sizes up to size 400.

The advantages of premium surfaces are a smoother interior surface as well as the reduction of the contact between the surface and the process medium.

Thus a more efficient cleaning and sterilization, lower risk of contamination by process fluids, and lower danger of product adhesion to the interior surface is achieved.

Electro Polishing

Electro polishing is an electrochemical process where the polishing part serves as anode and for example, copper as electrode.

The valve body is submerged into an electrolyte solution and a voltage between 2 and 25 volts is charged.

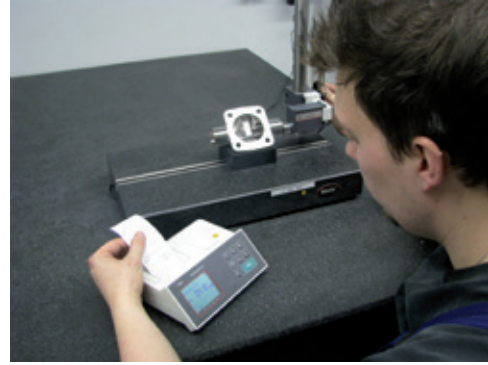
Through the current a strong chemical reaction develops which removes material from the anode.

According to the standardized procedure, the process has to be controlled in a way that at least 20 μm of surface material is removed.

The highest metal removal is achieved at the peaks of the metal surface.

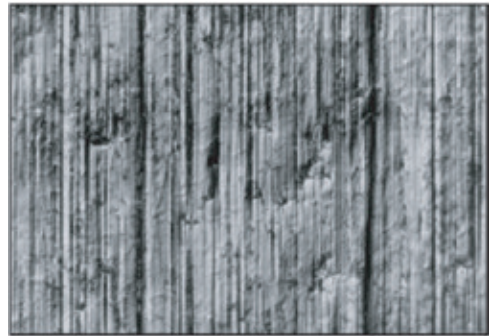
Reasons for Electro Polishing

- High lustrous appearance
- Smoothing of the peaks of the surface finish
- Reduction of the surface tension and adhesion of the process medium
- Removal of non-metallic inclusions
- Improved corrosion resistance through accumulation of chromium of the surface

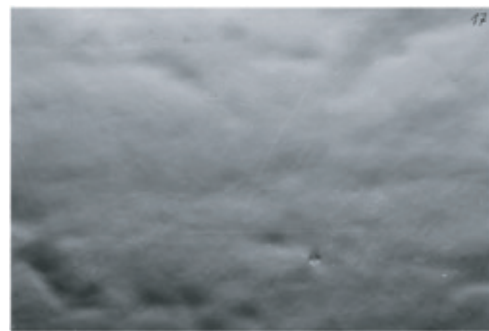


The surface finish, roughness, is measured and recorded at defined reference points according to DIN EN ISO 4287.

Microscopic view:



Microscopic view of mechanically polished surface with grit 400 Ra 0,25 μm / 10 $\mu\text{-inch}$

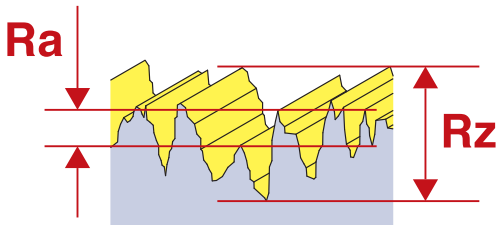


Microscopic view of mechanically polished and electro polished Ra 0,25 μm / 10 $\mu\text{-inch}$

Ra-Value

The arithmetic average Ra is used as parameter for the surface finish profile.

$L_t = 5,6$ mm traversing length and $l_n = 4,0$ mm measuring range split in 5 single measuring sections $l_r = 0,8$ mm each measured transverse to the polished image.

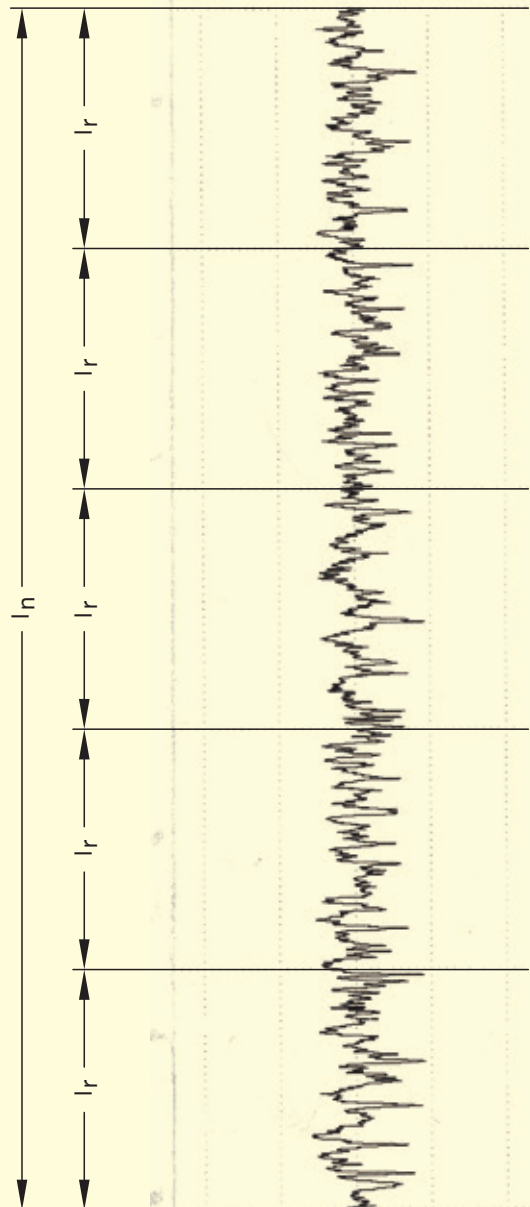


Tape Print Out of Surface Finish

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Perthometer M1
Objekt
Name
#
Lt (AUTO)    5.600 mm
Lc           0.800 mm
Ra           0.484 µm
Rz           3.37 µm
Rmax         3.77 µm
R Pc(0.5,-0.5) 108 /c

R Profil
Lc           0.800 mm
VER         2.50 µm
    
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Definition of the SED codes for Ra-Values

Allocation to the standard DIN 11866:

SED		DIN 11866	Mechanically Polished	Mechanically Polished and Electro-polished
Code	Ra max	hygiene class		
02	0,8		●	
03	0,8	HE3c		●
07	0,6		●	
08	0,6			●
09	0,4		●	
10	0,4	HE4c		●
14	0,25		●	
16	0,25	HE5c		●

Allocation to the standard ASME BPE Table SF-2.4-1:

SED and ASME BPE	Ra max		Mechanically Polished	Mechanically Polished and Electro-polished
	µ-inch	µm		
SF0	No Finish Requirement			
SF1	20	0,51	●	
SF2	25	0,64	●	
SF3	30	0,76	●	
SF4	15	0,38		●
SF5	20	0,51		●
SF6	25	0,64		●