

## Pistons and Shafts

Ceramaret manufactures high quality pistons in Sapphire, High Purity Alumina and TZP (Tetragonal Zirconia Polycrystalline) Zirconia ( $ZrO_2$ ) ceramics for HPLC pumps and precision liquid dispensers. The materials are inert and resistant to most solvents. Their extreme hardness combined with a perfect surface finish ( $R_a < 0,025\mu m$  or 1  $\mu inch$ ) insure minimum friction and maximum seal life.

Ceramaret also manufactures piston / liner sets for metering pumps and valve applications. Adjustment between the piston and the cylinder is within 3 microns, insuring a leak free adjustment and maximum durability. Custom-made shafts in TZP zirconia ( $ZrO_2$ ) and in alumina ceramics ( $Al_2O_3$ ) are also available. These are made from a range of blanks available from stock and finished upon request. These shafts, just as the pistons, can be delivered bare or mounted on a ferule to customer's specifications.



# Pistons for HPLC pumps and precision dispensers

## General dimensions:

- Minimum** : - Diameter 0,40 mm (.016") with length up to 30,00 mm (1,181").  
 - Diameter 0,50 mm (.020") with length up to 50,80 mm (2,000").
- Maximum** : - Diameter 25,40 mm (1,000") with length up to 150,00 mm (5,900").
- General Tolerances** : - OD  $\geq$  +/- 0,005 mm (+/- .0002").  
 - Length +/- 0,100 mm (+/- .004").
- Surface finish** : - N1 (<1  $\mu$ in) obtainable between diameter 0,50 mm (.020") by maximum length of 50,80 mm (2,000") and 10,00 mm (.394") by maximum length of 44,45 mm (6/16").  
 - N3 for diameters > 10,00 mm (.394") in zirconia.  
 - N4 for diameters > 10,00 mm (.394") in alumina.

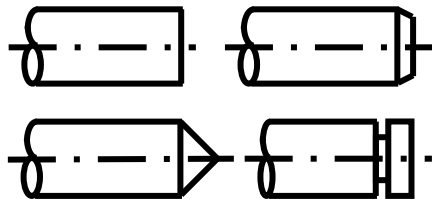
## Quality assurance procedure

Dimensions and characteristics to be tested	Test equipment	AQL
<b><u>Piston only</u></b>		
Piston diameter	Digital micrometer	1 Level II
Piston length	Caliper	1 Level II
Geometry of ends	Shadowgraph 20X	1 Level S4
Roundness	Talyrond	1 Level S4
Surface finish	Talysurf	5 samples 0 A 1 R
Groove (if any)	Shadowgraph 20X	1,5 Level II
Visual inspection for chips, cracks, internal and external defects	Binocular 25X	1,5 Level II
<b><u>Piston with ferule</u></b>		
Dimensions of the ferule	Micrometer and caliper	1 Level II
Length of the piston from a reference surface of the ferule	Vertical micrometer	1 Level II
Concentricity of the piston with the ferule	Maret test-fixture	1 Level S4
Resistance traction / compression	Maret assembly press	100%

## **Pistons with ferule are assembled by cold press-fitting giving:**

- Optimal traction / compression resistance and maximum concentricity between both components (0,050 to 0,100 mm or .002" to .004").
- No distortion of the ferule and no thermal shock to both components, as opposed to fitting by heat shrinking.
- No needs for adhesives sensitive to chemical solvents

## General configuration available (one or both ends)



Other configurations available on request