

# Non destructive dimensional control



**TESA**  
TECHNOLOGY

### ***Non-destructive control***

Non-destructive control (NDC) is a discipline that brings together processes and techniques that allow a user to measure and ensure the conformity and integrity of a material or a part without having to destroy or alter it. Non-destructive control can even avoid the need to dismantle or move a part.

The use of non-destructive measurement techniques is essential for industry. Indeed, NDC techniques are very important for a company because they allow to save a lot of money by not destroying parts that can sometimes be very expensive.

There are several very popular non-destructive evaluation techniques today. The metrology and quality control industries are improving these technologies year after year and are allowing them to replace more and more destructive testing, which is still too present in the industry.

One of these techniques is inspection by impression. This control procedure aims at injecting a liquid or pasty product on the surface or in the part whose conformity is to be checked. The products being bi-components, their contact in the part or on the surface causes a polymerization reaction which transforms the liquid into solid.

Once the liquid is hard, we have a perfect negative impression of the part or the surface. All that is left to do is to extract it thanks to the elastic properties of the product.

The advantages of impression taking are that it can be used on almost all materials. It allows a user to highlight a lot of defects: dimensions, angles and geometry of the part, surface condition, surface roughness, presence of micro defects, etc.



### ***Dimensional control of internal shapes***

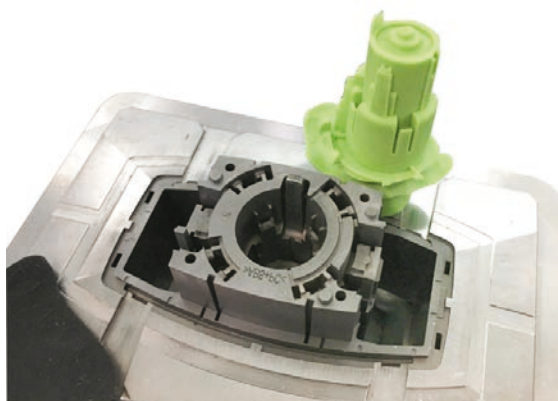
Dimensional inspection is a very important step to ensure the conformity of your parts after their production.

When you undertake to make the impression of a specific area inside a part, the first imperative is to evaluate its constraints.

The most important constraint is the extraction constraint, which is a simple mathematical calculation that allows you to evaluate the possibility of demolding the impressions. The higher the extraction stress, the more difficult it will be to extract the impression, and therefore, the choice of the product to be used will have to be adapted.

The extraction stress (or undercut) is a ratio that is calculated as follows:  

$$(\text{Minimum dimension of the extraction hole}) / (\text{Maximum internal dimension}) = \text{extraction stress in \%}$$



## Non destructive dimensional control

### ***Dimensional control of external shapes***

Measuring an external shape requires to consider additional elements compared to measuring an internal shape. The choice of the product is made according to the zone to be controlled, how difficult to control the zone is and its external environment (orientation, etc).

TESA non-destructive dimensional control range includes products of different consistencies (rigid, semi-flexible, pasty, malleable, etc). Each of them can be suitable for an external impression, even if pasty or malleable solutions are recommended because of their non-flowing properties.

When the surface to be controlled does not have a complex shape that could prevent demolding (zero extraction stress), it is recommended to choose a product with a semi-flexible final consistency. The result can be sliced by the double blade cutter, which makes it much easier to control.

If the constraint is too high, it will be necessary to opt for the softest products.



### ***Ra roughness measurement***

Some products have the technical capacity to carry out indirect Ra roughness controls.

In fact, the P80Ra, as its name indicates, is a product capable of copying the roughness of a part and retranscribing it identically on its impression which, sometimes, is not accessible for measuring instruments.

When the Ra of the surface to be controlled is greater than or equal to  $0,4 \mu\text{m}$ , the roughness can be measured directly on the impression using a roughness gauge, and the result is faithful to the original. For a lower roughness, the inspection of the impression can be done with a laser metrology instrument, or an interferometer.





## Molding product M70, malleable

- USE
  - Malleable
  - Can be applied by hand
  - With a consistency similar to modeling clay, it is convenient for controlling shapes that are difficult for the injector gun to reach



Final consistency	Semi-flexible
Final hardness	70
Max. extraction coefficient	5%
Working time at 20°C	± 0,75 min
Setting time at 20°C	± 4 min
Included in delivery	1x jar A, 450 ml 1x jar B, 450 ml Measuring spoon

Article number	Designation
<b>06869121</b>	M70, 2 x 450 ml

### Accessories

Article number	Designation
<b>06869111</b>	Cutter with two blades



## Molding product

### Molding product P80Ra, pasty

- USE
  - Non-flowing (pasty)
  - Can be applied on hard to reach surfaces (vertical, overhanging, etc)
  - Specially developed for roughness control
  - Recommended for surfaces  $R_a > 0,4 \mu m$



Final consistency	Rigid
Final hardness	80
Max. extraction coefficient	0%
Working time at 20°C	± 0,5 min
Setting time at 20°C	± 6 min

Article number	Designation
<b>06869118</b>	P80Ra, 8 x 50 ml + 48 nozzles + 6 fine nozzles

#### Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs
<b>06869112</b>	Injector gun



## Molding product F20, liquid

### • USE

- Flowing, it infiltrates the interior of any type of part, whether small (diameter up to 0,1 mm) or medium size
- Very flexible final impression, which allows it to be strongly stretched and deformed during demolding
- Recommended for impressions in complex internal shapes (threads, internal grooves and grooves)
- High precision final impression, all surface details (shape, size, aspect, surface condition, etc) are reproduced to the  $\mu\text{m}$
- Unaltered replica during the extraction stage, leaves no trace in the controlled area
- Can also be used for protection (can substitute a gasket for example)



Final consistency	Flexible
Final hardness	20
Max. extraction coefficient	30%
Working time at 20°C	$\pm 1,5$ min
Setting time at 20°C	$\pm 8$ min

Article number	Designation
<b>06869102</b>	F20, 8 x 50 ml + 48 nozzles + 6 fine nozzles
<b>06869120</b>	F20, 8 x 50 ml + 48 nozzles + 6 fine nozzles

### Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs



## Molding product

### Molding product F50, liquid

- USE
  - Semi-flowing
  - Semi-flexible final impression, can be used in shapes that are not very complex to demould
  - Efficient to create custom-made protections, caps, and savings against surface treatments
  - Very high precision final impression, all the surface details (shape, dimension, aspect, surface condition, etc) are reproduced in  $\mu\text{m}$



Final consistency	Semi-flexible
Final hardness	50
Max. extraction coefficient	10%
Working time at 20°C	$\pm 1$ min
Setting time at 20°C	$\pm 8$ min

Article number	Designation
<b>06869101</b>	F50, 8 x 50 ml + 48 nozzles + 6 fine nozzles
<b>06869119</b>	F50, 8 x 50 ml + 48 nozzles + 6 fine nozzles

#### Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs



## Case



Included in delivery

1x injector gun  
1x double blade cutter  
1x cutter extractor  
1x cutting guide for cutter  
1x Plastin (0,25 kg)  
3x rings, Ø 4 mm, H = 15 mm  
3x rings, Ø 6 mm, H = 15 mm  
3x rings, Ø 8 mm, H = 16 mm  
3x rings, Ø 12 mm, H = 18 mm  
3x rings, Ø 15 mm, H = 20 mm  
3x rings, Ø 20 mm, H = 20 mm  
3x rings, Ø 25 mm, H = 25 mm  
3x cartridges F50, 50 ml  
3x cartridges F20, 50 ml  
2x cartridges P80Ra, 50 ml  
50x nozzles  
12x nozzle's tips

Article number	Designation
<b>06869122</b>	Case

## Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs



## Molding product

### *Tips for standard nozzle*

- USE
  - To control the output of the injector-mixers and avoid air bubbles
  - Bird's beak shape to reach hard to reach spaces
  - Can be used to stir the product inside the part



Article number	Designation
<b>06869109</b>	Nozzle's tip, 20 pcs

### *Nozzles*

- USE
  - For mixing cartridges' components
  - Mixes the two components of a cartridge with a 1 to 1 ratio, making them homogeneous at its exit
  - Fits all cartridges



Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips

### *Accessories*

Article number	Designation
<b>06869109</b>	Nozzle's tip, 20 pcs



## Manual gun

- USE
  - Manual, allows to control the injection flow
  - Guarantees a precise and constant 1:1 mixing ratio



Article number	Designation
06869112	Injector gun

## Technical modelling paste



Article number	Designation
06869110	Plastin

## Double blade cutter



Article number	Designation
06869111	Cutter with two blades