



## Diameter and length

# Diameter and length of an injection packer

### Does size matter?

Both diameter and length are important.

First, we would like to present an understanding of diameters in Hamm packers. For example, the PI-SPH 10/110 packer is a packer for a 10mm injection hole (in reality, the unexpanded rubber has a diameter of 9.7mm and fits perfectly into a 10mm hole), while the PI-SPH 14/110 packer is a packer for a 14mm hole, and in reality, has a diameter of 13.3mm and fits perfectly into a 14mm injection hole.

### LEGEND:

**Length of packer seating** - the length required to anchor the packer in the hole, which does not actively participate in the injection process. If this part of the packer encounters a crack, the crack will not be sealed by the resin, but by the packer during injection.

**(D.O.V.) - DEPENDS ON VARIABLES** - quality of material / structure / angle of drilling / length of drilling / quality of drills and their wear and tear

**Reaming leveling** - the higher it is, the better the packer will anchor in excessively drilled holes.

### Injection borehole filling volume calculator

In this section, we will present the relationship between the consumption of injection material and the filling of an injection borehole (without its dispersion in cracks and material, only the filling of the borehole with injection material).

For ease of reference, we have assumed:

❖ Consumption in milliliters (ml) per borehole - a borehole of 400mm in length with a given diameter filled with injection material.

	ø8x400	ø10x400	ø12x400	ø14x400
ml per borehole	20 ml	31 ml	45 ml	61 ml

❖ Consumption in liters (L) per 10 linear meters of sealing - that is, the consumption per borehole (as above) multiplied by 80 injection packers (8 packers per 1 linear meter of sealing).

	ø8x400 x80	ø10x400 x80	ø12x400 x80	ø14x400 x80
L/10m	1,60 L	2,48 L	3,60 L	4,88 L

*The above calculations do not include injection of the element, only the pressureless filling of the borehole (these are values of resin "losses" for individual diameters).*

## Flow rate of injection packer

The flow of the packer depends on the "bottleneck" created by the injection nozzle. The diameter of the injection hose, the nozzle, or the supply hose can also be a bottleneck.

- ❖ m6x1 tapered injection nozzle - approx. Ø1mm  
(polyurethane/epoxy resins, acrylic gels, silicates, water dispersions)
- ❖ m6x1 flat injection nozzle - approx. Ø1.5mm  
(polyurethane/epoxy resins, acrylic gels, silicates, water dispersions)
- ❖ plastic tapered injection nozzle - approx. Ø2mm  
(polyurethane/epoxy resins, acrylic gels, silicates, water dispersions, cement suspensions with a grain size of up to 0.5mm)
- ❖ plastic flat injection nozzle - approx. Ø3mm  
(polyurethane/epoxy resins, acrylic gels, silicates, water dispersions, cement suspensions with a small grain size of up to 0.75mm)
- ❖ m10x1 / G 1/4' flat injection nozzle - approx. Ø4mm  
(polyurethane/epoxy resins, acrylic gels, silicates, water dispersions, cement suspensions with a grain size of up to 1mm)  
used in plastic and steel packers as well as injection hoses
- ❖ m10x1 / G 1/4' claw coupling - approx. Ø7.5mm  
(polyurethane/epoxy resins, acrylic gels, silicates, water dispersions, cement suspensions with a grain size of up to 2mm)  
used in plastic and steel packers as well as injection hoses.

## Diameter of injection packer

### Ø8mm

Small but strong packer

- ❖ Embedment length: approx. 38mm (30mm expansion rubber + approx. 8mm body)
- ❖ High tightness even at very high pressures above 200 BAR (D.O.V.)
- ❖ Good reaming leveling
- ❖ Flow rate: m6x1
- ❖ Calculation of the volume of a 400mm borehole: 20ml



### Ø10mm

The most popular diameter among metal packers in EU

- ❖ Embedment length: about 50mm (rubber expansion 39mm + about 10mm of the body)
- ❖ Very high tightness even at very high pressures above 250 BAR (D.O.V.)
- ❖ Very good reaming leveling (possible version with anchoring leaves)
- ❖ Flow: m6x1
- ❖ Borehole volume calculator for 400mm length: 31ml



## Ø12mm (plastic)

The most popular diameter among plastic packers. The diameter is often recommended for structural injections due to the good saturation ratio of the building material.

- ❖ Embedment length: approximately 30-50mm (depending on the material)
- ❖ Maximum tightness: up to 60-80 BAR (D.O.V.)
- ❖ Very good reaming leveling.
- ❖ Flow: plastic cone/flat chisel
- ❖ Volume calculator for a 400mm drill hole: 45ml



## Ø12mm

Diameter often recommended for structural injections due to the good saturation ratio of the building material.

- ❖ Embedment length: approximately 50mm (rubber grommet 39mm + approximately 10mm of the body) - steel packer
- ❖ Very high tightness even at very high pressures above 250 BAR (D.O.V.)
- ❖ Very good reaming leveling
- ❖ Flow: m6x1
- ❖ Volume calculator for a 400mm drill hole: 45ml



## Ø14mm

The strongest of the m6x1 packers. The best saturation for m6x1 due to the diameter.

- ❖ Embedment length: approximately 50mm (rubber grommet 39mm + approximately 10mm of the body)
- ❖ Very high tightness even at very high pressures above 300 BAR (D.O.V.)
- ❖ Excellent reaming leveling
- ❖ Flow: m6x1
- ❖ Volume calculator for a 400mm drill hole: 61ml



## Packers above Ø14mm and injection lances

Above, we mentioned the most basic packer diameters that are sufficient for most injection tasks. Additionally, it is worth paying attention to:

- ❖ Injection lances Ø13mm / Ø21.3mm
- ❖ Wedge packers for driving in
- ❖ Corner packers
- ❖ Packers for wood and underlay injection Ø6mm
- ❖ Packers for cement injection Ø14mm - Ø18mm
- ❖ Packers for gas injection Ø38mm.

***The selection of the injection packer diameter depends on the type of injection and the parameters we want to achieve, such as flow rate, saturation capacity, anchoring strength, and borehole leveling.***

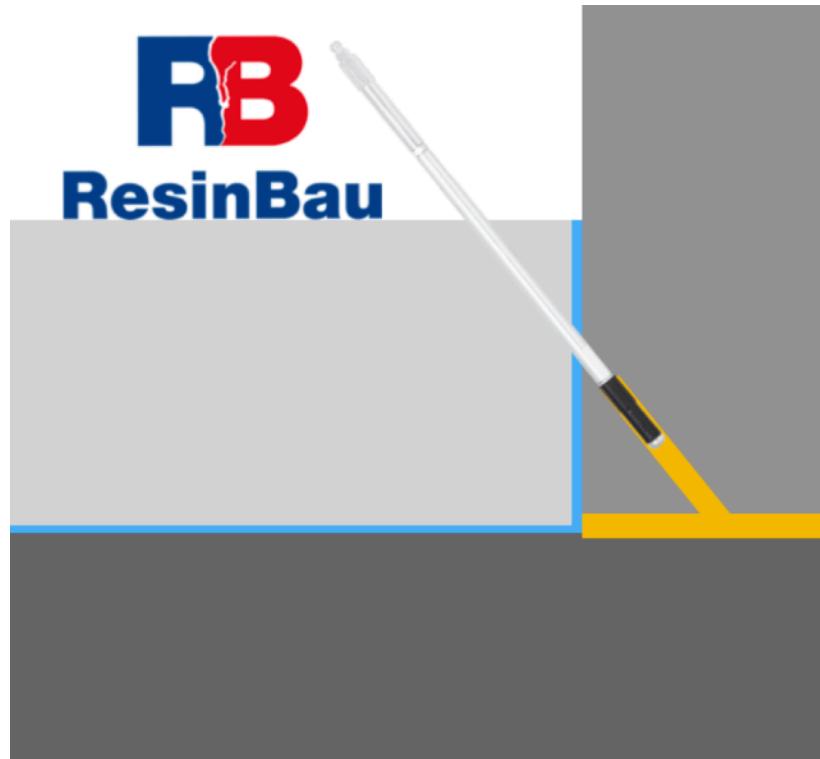
## Length of injection packer

Injection packers typically have a total length sufficient for most injection tasks.

When do we need longer packers?

For example, when we need to anchor the packer deeper than usual, such as:

- ❖ The need for injection of the joint between the foundation wall and the slab through the floor
- ❖ An air passage between the walls
- ❖ Double building elements that require injection only in the lower (farther) element due to the construction
- ❖ Others



- ❖ **Extensions for injection packers** - Thanks to the innovative "Packer Connector" system, you don't have to buy a packer in a specific length. Now, you can extend a standard 110mm packer with sections of 15cm each. Using the PI-SCREW nipple with a special pre-application coating, we guarantee that the seal will be maintained even at high pressures.



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