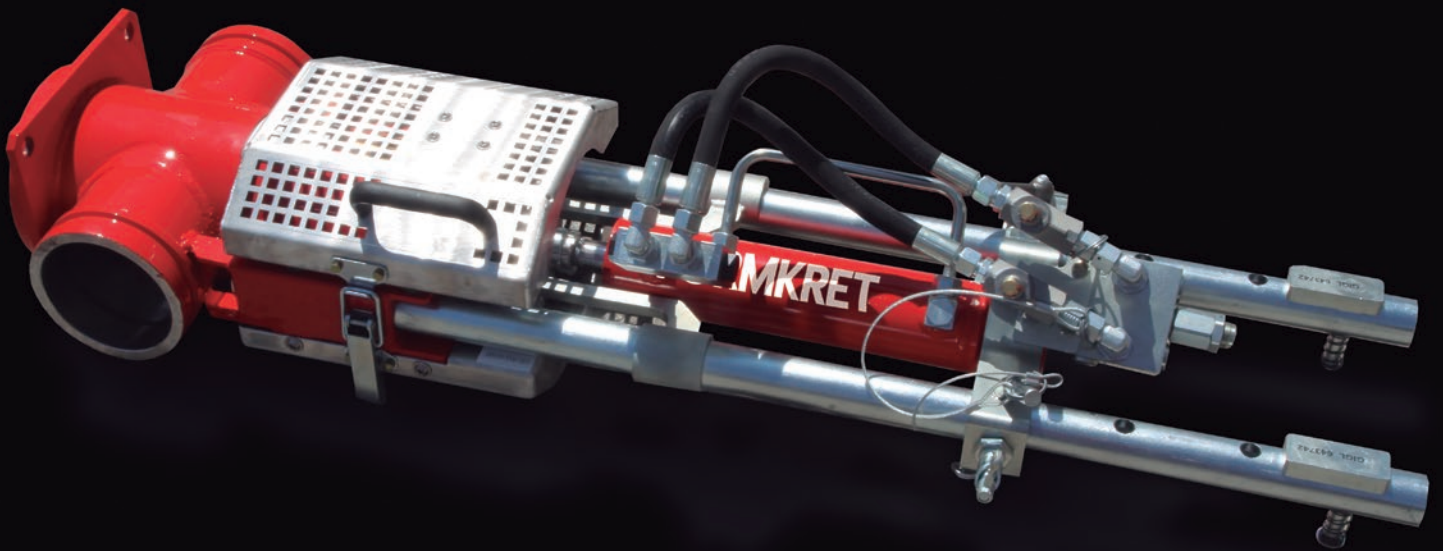




**Putzmeister**



# Formkret

Integrated secondary concrete lining solutions for tunnels

# Value-added Engineering

## State-of-the-art Secondary Concrete Lining Solutions

Final tunnel lining with concrete formwork (cast-in-place concrete lining for large or complex tunnel sections) is currently a manual, labor-intensive process.

The state-of-the-art automated formwork filling system Putzmeister Formkret is designed to enhance safety, reduce workforce-related costs and project timelines, while allowing other work to be carried out onsite simultaneously.

Clients are given a one-stop solution for all their concrete-related needs in tunneling: after carrying out an in depth consultation regarding their site requirements, clients will be provided with a bespoke report outlining the technology solutions designed for their site, dealing with a sole provider of equipment and services.

This integrated solution for concrete delivery in tunneling is an integral part of our premium services, and highlights our commitment to engineering excellence.



**FORMKRET**

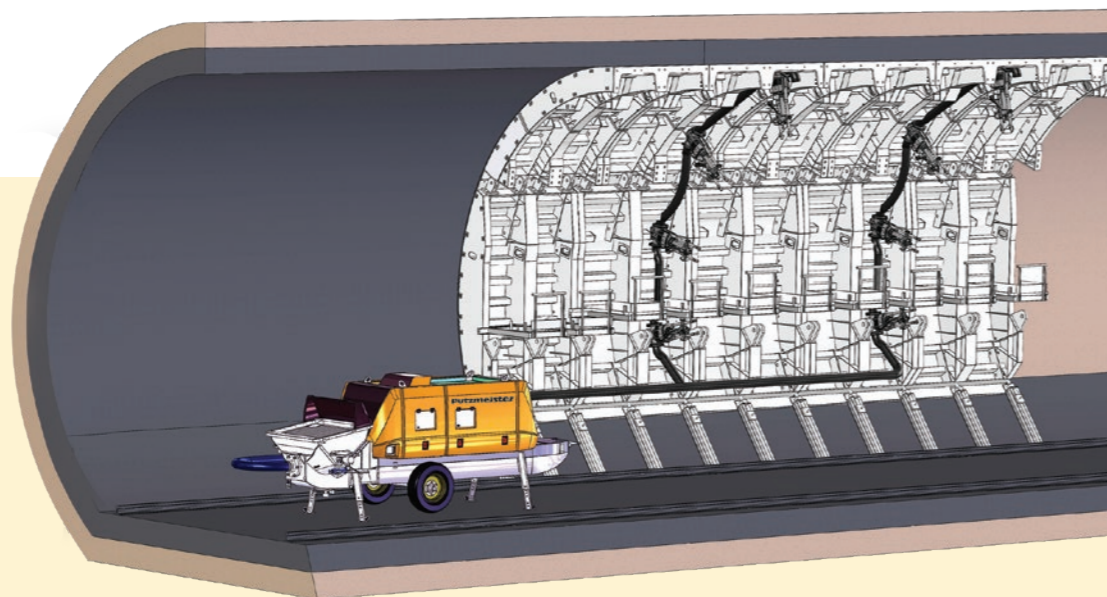
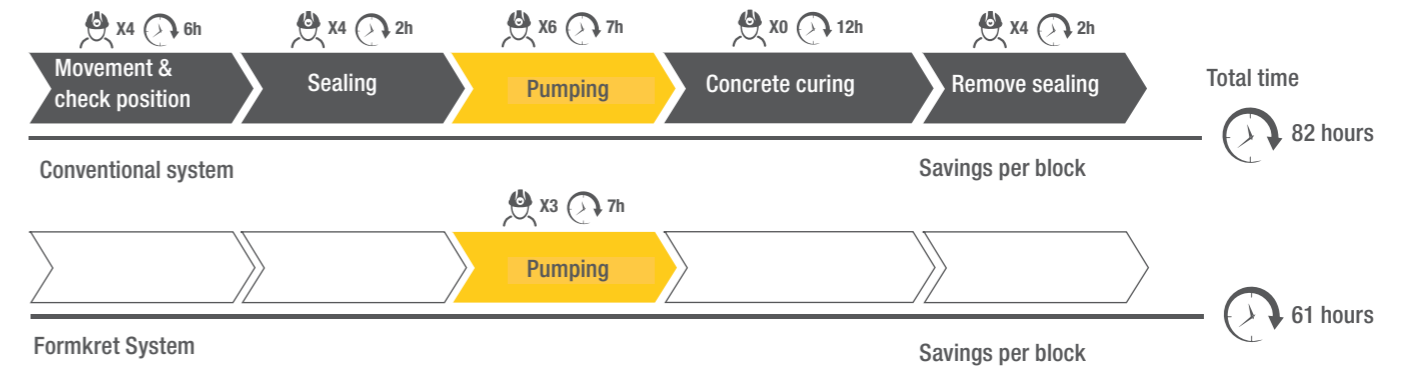


Putzmeister BSA 1408 E



All needed accessories

### Save 21 hours per block



### Automated formwork filling: Safety, Speed, Savings, Simultaneity

The automated concrete pour means the process requires less manual work, enhancing worksite safety and speeding up the overall process.

Formwork installation time is shortened, as the structure can be easily placed and aligns itself to the tunnel's geometry.

The integrated concrete delivery time eliminates need for manual hose switching, reducing worksite hazards and making it safer. The structure is then connected to the pump, which can be operated remotely.

Maintenance costs are also kept in check because of the use of pipes, which can withstand higher delivery pressures and have a longer service life than hoses.

In addition, the reduced overall footprint of the formwork structure means other equipment can work onsite simultaneously, optimizing the construction process.

### Safety & environment

- Automation means reduced workforce onsite

### Speed

- Faster overall tunnel construction
- Quicker hydrostatic filling process

### Savings (time + costs)

- Reduced labor-related needs

### Simultaneity

- Compact structure allows simultaneous work

# Complete package

## 2-way valves: Formkret

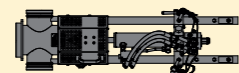
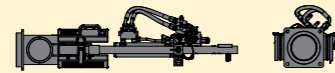
The Putzmeister Formkret system has been designed to optimize the support system in any type of tunnel construction that is completed using forms.

Formkret valves can be actuated remotely either hydraulically or electro-hydraulically, further increasing operator safety.

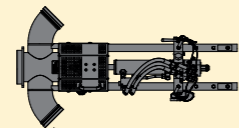
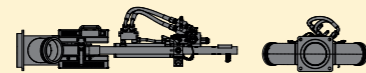
Their small dimensions have been carefully designed to adapt to all types of forms and can withstand the demanding conditions seen in this type of construction.

## Data sheet

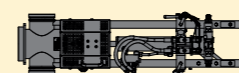
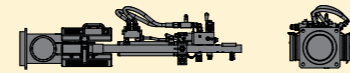
**Straight hydraulically actuated valve**



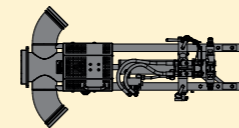
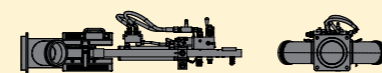
**Hydraulically actuated valve with 45° elbow**



**Straight electro-hydraulically actuated valve**



**Electro-hydraulically actuated valve with 45° elbow**



Dimensions (length / height / width)	
Straight Formkret hydraulically actuated valve	1255 / 361 / 362 mm
Straight Formkret electro-hydraulically actuated valve	1255 / 361 / 362 mm
Formkret hydraulically actuated valve with 45° elbow	1255 / 361 / 690 mm
Formkret electro-hydraulically actuated valve with 45° elbow	1255 / 361 / 690 mm
<b>Maximum hydraulic pressure</b>	200 bar
<b>Maximum flow pressure</b>	85 bar
<b>Diameter of flow lines</b>	125 mm
<b>Maximum ambient temperature</b>	-15 / 50 °C

## All needed accessories

The Formkret system is not only made up of bi-directional valves, but also includes a full line of accessories and add-ons to make sure you have a complete solution:

### - Concrete pipes, elbows and couplings

(\*Photos 1, 2)

Using pipe allows for much higher pressures and optimizes costs since it is more durable than hoses. Quality Putzmeister DN125 85 bar pipe should be used on this system.

We design your piping with the necessary elbows and couplings.

### - Hydraulic diversion valve (\*Photo 3)

Optimizing available space on your project, we design a clean path that allows for other work to be performed simultaneously.

### - Gate valves (\*Photo 4)

We optimize the use of Formkret valves, using only those that are strictly necessary, and we complete the design using knife gate valves, all inside the structure of your forms.

### - Hoses (\*Photo 5)

Electro-hydraulically actuated valves are actuated remotely, increasing safety since the operator is located away from the danger zone.

### - Remote control

Electro-hydraulically actuated valves are actuated remotely, increasing safety since the operator is located away from the danger zone.

### - Cleaning kit (\*Photo 6)

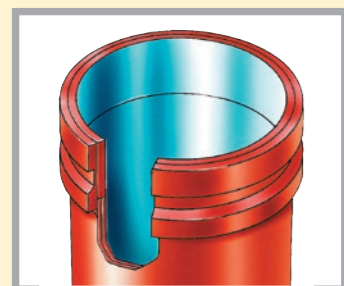
Once forms are filled, the entire system is easily cleaned by pushing sponge balls through the flow pipe using compressed air. Sponge balls, like any remaining material, are recovered without difficulty using a basket at the end of the flow pipe.

## Putzmeister concrete pump

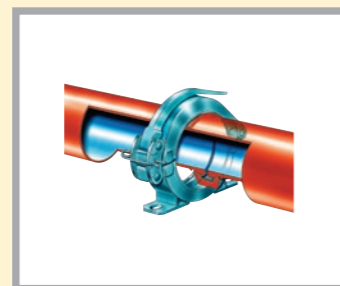
Putzmeister is famous for being the leading manufacturer of concrete pumps for more than 60 years. Our BSA Putzmeister stationary pumps are ideal for filling forms in tunnels while using the Formkret system. Once the formwork is fully set-up and secured in place, a Putzmeister BSA concrete pump is connected to the formwork: these pumps have an output capacity of up to 79 m³/h.

<b>Output</b>	79/53 m³/h*
<b>Delivery pressure</b>	71/106 bar*
<b>Engine/motor power</b>	110 kW
<b>Hopper</b>	RS 909
<b>Capacity</b>	approx. 600 l
<b>Filling height</b>	approx. 1.3 m
<b>Remote control</b>	Wireless / 10m cable

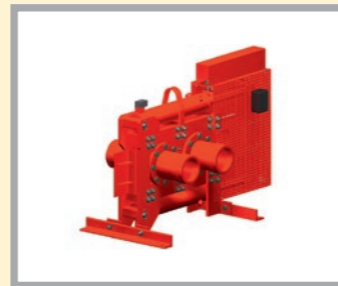
Values for hydraulic fluid being fed to piston-side. All data maximum theoretica.



(1) Pipes and elbows  
SK 125 - 5,5" 85 bar  
Elbows 30°, 45°, 90°



(2) Couplings  
SK-H lever coupling



(3) Hydraulic diversion valve  
5/2 SK 125/5,5" 130bar



(4) Gate valve  
GVM 2/2 ZX 125/5,0" 130bar



(5) Hoses  
SK 125 - 5,5" 85bar



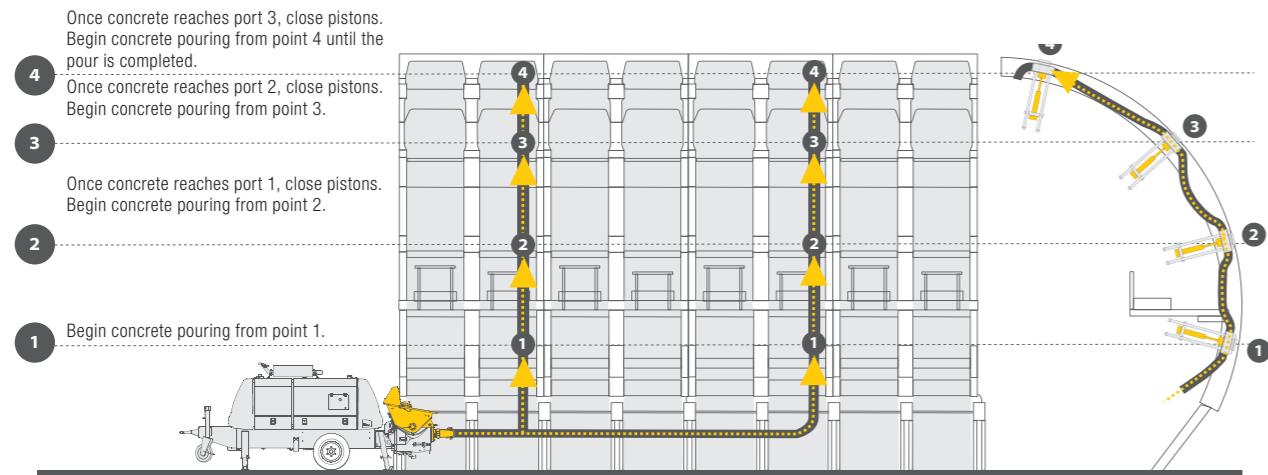
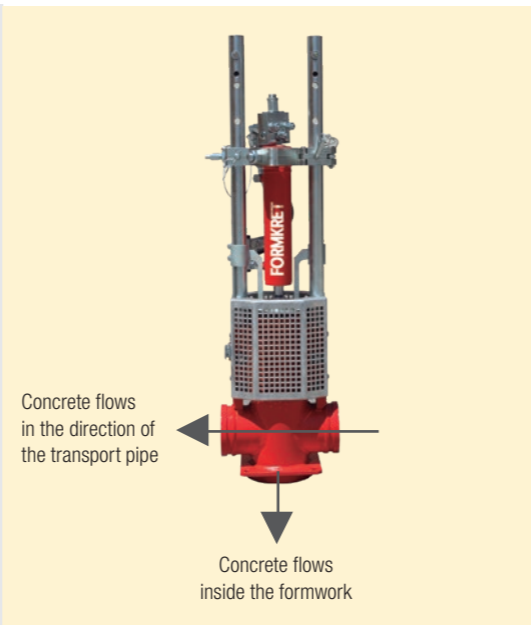
(6) Cleaning Kit: balls, sponge and balls retrievers

# Concrete pour procedure: how it works

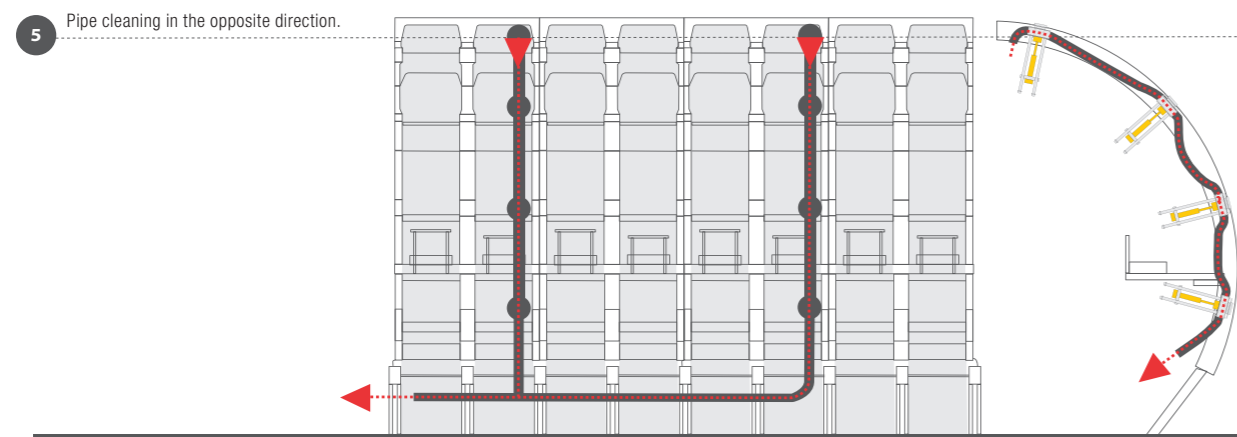
The Automated Formwork Filling System is regulated by a set of 2-way valves (Formkret) integrated in the formwork structure, and connected by a single delivery line that links the entire system in sequential rows.

The concrete flow into the formwork is regulated by a diversion valve to ensure that the filling rate is synchronized on both sides. The diversion valve, regulated by the concrete pump, switches the concrete flow automatically between both 'halves'.

As the concrete reaches the optimal filling level in each row, the valves close, re-directing the concrete towards the delivery line, and allowing the formwork filling process to continue sequentially towards the next row. The operation of the 2-way valve is done automatically by radio remote-steered hydraulics.

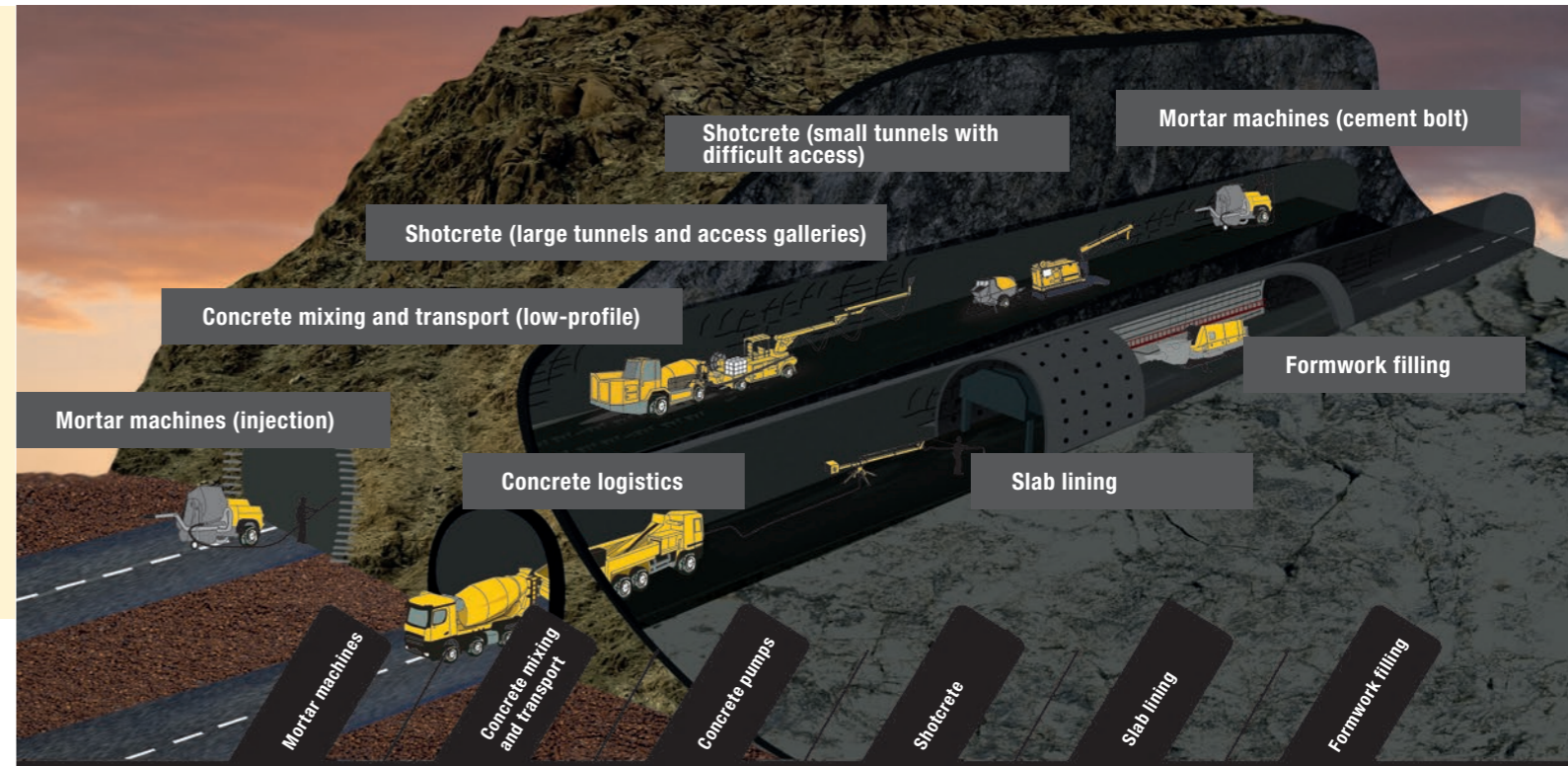


## Casting procedure



## Cleaning phase

# Full concreting range for tunnelling



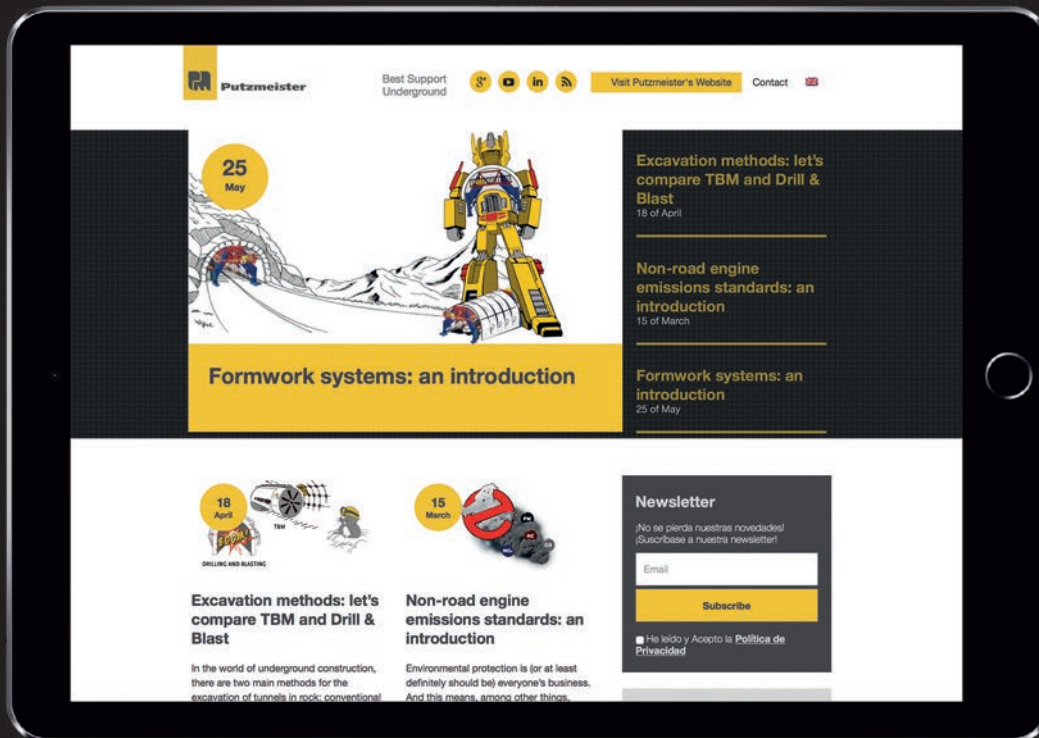
S5 EVTM	Truck Mixer P7	BSA 2109 HD BSA 2109 HE	SPM 500 WETKRET	BSF 24-4	BSA 1005 E C
P13	Truck Mixer P9	BSA 2110 HP D	WETKRET 5	Mechanical Distributor RV7/10/12/13	BSA 1408 E
MIXKRET 3	BSA 2108 HP	WETKRET 4	BSA 1005 E	FORMKRET	
MIXKRET 4	BSA 14000 HP D BSA 14000 HP E	WETKRET 3	BSA 1408 E		
MIXKRET 5		SPM 715 SYNCHRO			

# Putzmeister Underground Technology

## Visit our blog

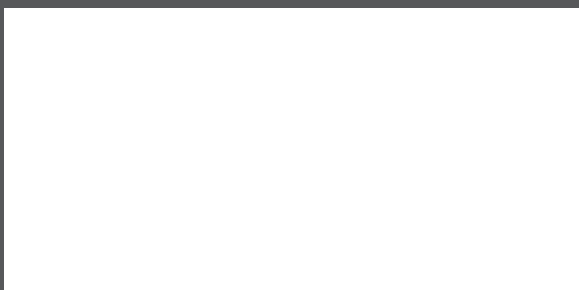
[Bestsupportunderground.com](http://Bestsupportunderground.com)

Shotcrete in underground mining  
and much more...



This is a merely informative, non-binding document. Maximum theoretical values listed. Specifications are subject to change without prior notice. Photos and drawings are for illustrative purposes only. For available options, please consult the factory.  
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**Putzmeister Ibérica S.A.**

Camino de Hormigueras 173 · 28031, Madrid (Spain)

Tel. +34 91 428 8100 · [contacto@putzmeister.com](mailto:contacto@putzmeister.com)

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