



Putzmeister



Faster. Further. More economic.

Efficient and flexible tunnel construction solutions from Putzmeister

Efficient, impressive tunnel construction in all areas



Our concrete range meets all requirements

- **Mortar machines** e.g. for micro pile filling
- **Highly modern pumps** for efficient concrete logistics
- **Shotcrete solutions** for primary and secondary cladding
- **Mechanised or manual shotcrete solutions**
- **Premium truck-mounted or stationary pumps** for floors and ceilings

Get further with fewer resources

Users aiming to achieve more while incurring minimal costs, employing fewer personnel and achieving maximum speed and perfection will find that they have a lot in common with us. Decades of experience and process expertise in the concrete sector means that we offer sophisticated tunnel construction solutions and the safety you need in the challenges you face. Just one example out of many economic innovations: The FORMKRET automated formwork filling system developed by Putzmeister.

PUTZMEISTER SOLUTIONS

MIN.	MAX.
TOTAL TUNNEL CONSTRUCTION TIME	SPEED
COSTS	SAFETY
CLEANING WORK	FLEXIBILITY
PERSONNEL DEPLOYMENT	

Overview: Putzmeister tunnel construction solutions

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The Putzmeister promise

The name Putzmeister stands for solutions that enable you to work with extreme productivity and go beyond purely being competitive. To this end, we provide extraordinarily innovative technologies alongside top quality and excellent service. We are fully dedicated to supporting you both around the world and around the clock. Because every Putzmeister employee is aware of the fact that your products play a major role – today and in the future.

Your Putzmeister Team

Automated formwork filling – tunnel concreting by the fastest possible means

Manual becomes automatic, subsequent becomes parallel

Conventional formwork filling systems won't get you too far. You can save all of the considerable personnel deployment required for installing, assembling, maintaining, cleaning and operating the various components. You can also avoid long project runtimes and the risk of damage to machines and personal injury.

With a combination of intelligent concrete logistics and the Putzmeister innovation FORMKRET, you can reduce installation times and improve safety on construction sites while deploying fewer personnel.

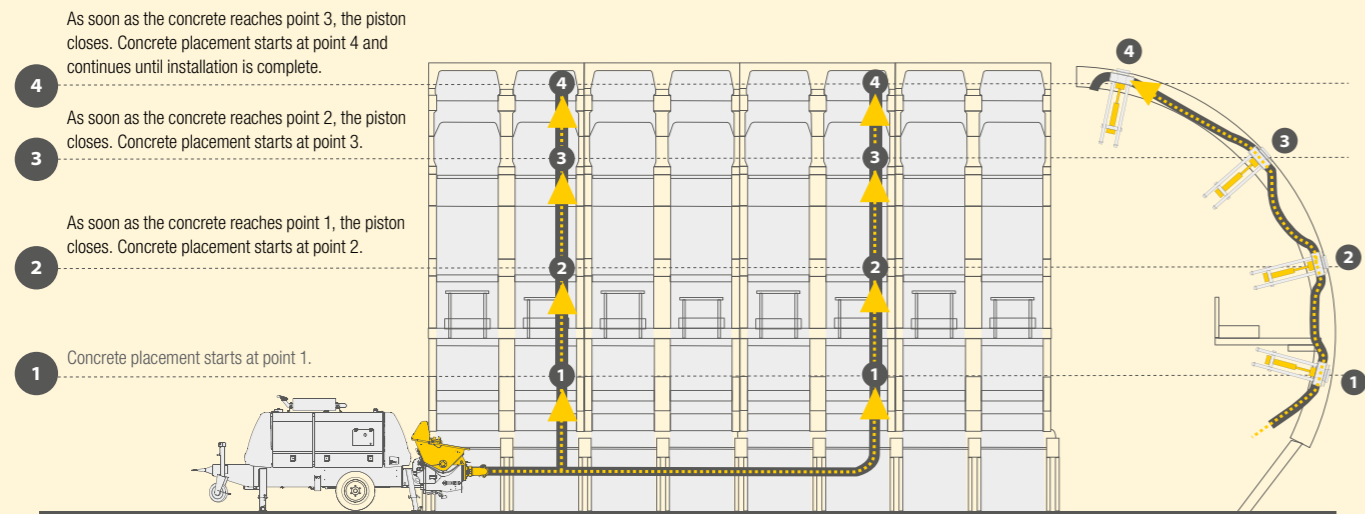
Individual complete solution from a single source

We work to design a solution to your exact construction site specifications that includes all machines, delivery lines and accessory components. You also receive comprehensive servicing and maintenance support.



Concrete placement

FORMKRET is automatically regulated via radio remote control using two-way valves that are integrated into the formwork structure. The entire system is linked in successive rows that are connected by a single delivery line and multiple formworks are filled in parallel, if necessary. This shortens the project runtime considerably.

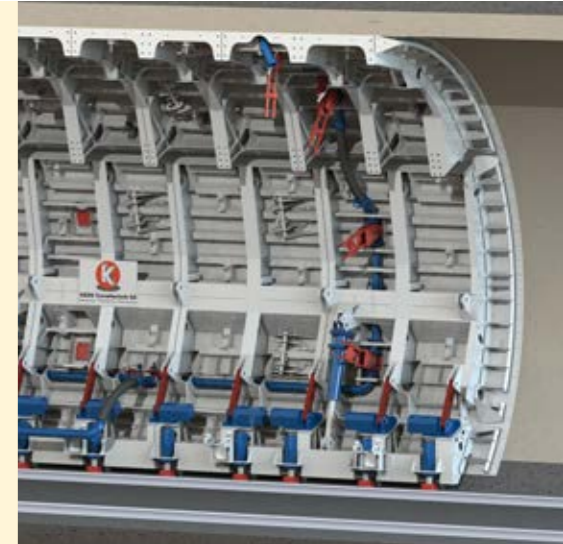
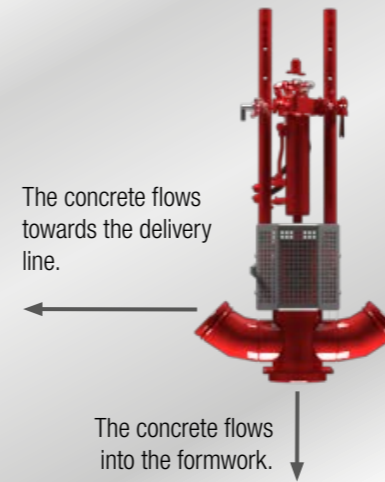


Cleaning phase

The entire system is cleaned in a manner that saves as much time as possible. In one movement, sponge balls are pressed through the delivery line using compressed air. They are collected in a container at the end of the delivery line along with excess material.

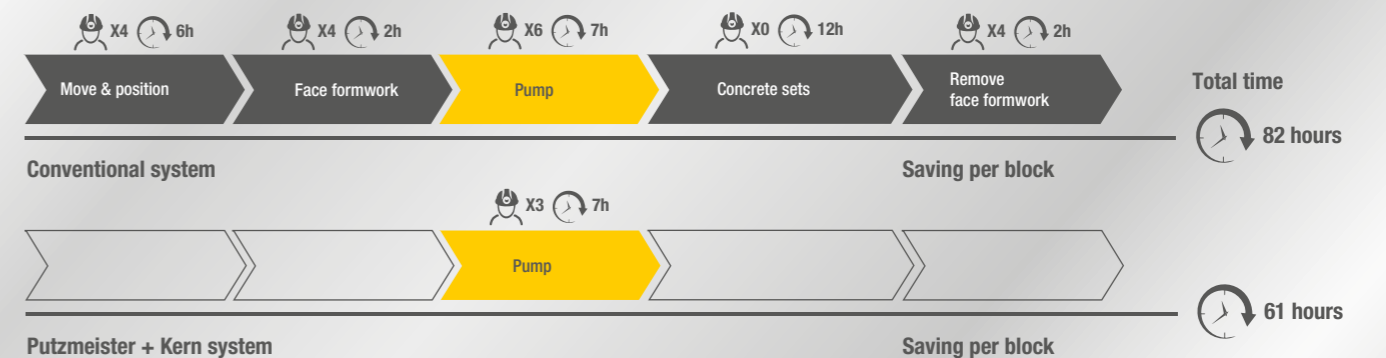
It's as easy as this:

1. The concrete flow into the formwork is regulated by a transfer tube in order to ensure that the climb speed remains synchronous on both sides.
2. The transfer tube automatically switches the concrete flow between the two "halves"; if the concrete reaches the optimum fill level in one row, the valves close. The formwork filling process continues in the next row.



Significantly shorter project runtime

Save 21 hours per block



For efficient processes – our innovative concrete feeder

The stationary concrete pumps

The perfect coordination of individual components such as the drive, long-stroke piston pump, free-flow hydraulics, S transfer tubes and electronic EPS control system (Ergonic® Pump System) ensures maximum pump output and ultra-quiet operation.

- **Ideal for longer distances**
- **For all types of concrete**, particularly high-strength and steel fibre concrete
- **Small installation area**
- **Comprehensive standard equipment** and functional accessories
- **Choice of different low-noise electric motors** with varying power levels



Save time and money during cleaning and maintenance

- **The position of hydraulics and switch cylinder outside the concreting area prevents pollution**
- **Optimised hopper shape** simplifies the job of cleaning and reduces interruptions in the supply of concrete and cuts down on concrete residue
- **Long-stroke piston pumps** for maximum performance and ultra-quiet operation combined with minimal wear
- **More power transmission** provided by the closed circuit on the free-flow hydraulics
- **S transfer tube** can even cope supremely well with materials that are difficult to pump, and assures a uniform flow of concrete



The 24-4

The small truck-mounted concrete pump is ideally suited for concreting work in tunnels and halls. Places concrete precisely.

- **Quiet, flexible 4-arm boom** with Z roll-and-fold system
- **Low unfolding height and optimum slip characteristics**
- **Vertical reach 23.6 m**
- **Concreting can be carried out up to the driver's cab**
- **Agile 2-axle chassis**
- **Weight reserves for containers, pipelines, etc.**
- **Short wheelbase without overhanging boom**
- **Flexible, space-saving support**, robust and secure
- **Easy maintenance and servicing** with low service costs



The ergonomic remote control with clear display can be operated conveniently with two hands without the need to change positions

Ergonic® 2.0 – intelligently controlled power

Ergonic® 2.0 forms the brain of our machines. Ergonic® inside – the optimised computer-supported control system in your machines. They are ready for use in less time and achieve high placing output alongside low wear and fuel consumption.

ergonic
inside

Highly productive partners for concreting floors and ceilings

The rotary distributors

They are ideally suited for concreting work in tunnels and halls. They place concrete precisely.

- Addition to stationary concrete pumps and delivery lines
- Ready for use in no time (set up by two people in approx. 10 min)
- Compact, flexible small equipment
- Easy to transport thanks to compact, lightweight design
- Small dimensions for space-saving transport in trucks or trailers



- **RV 7**
compact 7 m horizontal reach and versatile options
- **RV 10**
10 m horizontal reach with a concreting area of up to 320 m²
- **RV 12 (Lift)**
column specialist with a horizontal reach of 12 m and vertical options
- **RV 13**
13 m horizontal reach, ideal for large areas and ceilings of up to 500 m²



The P7 truck mixer

They are in their element when working under the toughest construction site conditions in tunnels.

- TBL steel with 30% higher wear resistance (Hardox)
- Material thickness 4.5–6 mm depending on the wear zone with edge protection on the spirals
- Fully electronic Ergonic® Mixer Control (EMC) control system
- Closed mixer frame made of S500 steel
- Minimal wear and operating costs

The MIXKRET vehicles

The low, compact and particularly robust vehicles place concrete in the right place in tunnels.

- Mixing and transport with minimum profile and turning circle
- Flexible thanks to the height of the concrete delivery
- Powerful, long-lasting engines (diesel)
- Continuously adjustable hydrostatic gear system (ICVD) for optimum climbing power, driving speed and starting acceleration combined with minimum fuel consumption



- **MIXKRET 3**
3 m³ mixing capacity and a unique height of 2.2 m
- **MIXKRET 4**
capacity of 4 m³ with an efficient six-cylinder engine (130 kW/174 hp)
- **MIXKRET 5**
capacity of 5 m³ with a powerful six-cylinder engine (168 kW/225 hp)
- **MIXKRET 6**
capacity of 6 m³, ideal for projects demanding higher volumes of concrete



Shotcrete machines for remote-controlled high-performance concreting

WETKRET – automated systems for high spraying accuracy and efficiency

Especially economically efficient, reliable shotcrete machines on an all-wheel drive chassis or crawler chassis that you can depend on. Depending on the task, our stationary pump and nozzle systems may also be suitable for use.

**HIGH OUTPUT
+ QUICK AND EASY
MANOEUVRABILITY
= EFFICIENCY**

- **Remote control for all movements of the support legs, spraying arm, spraying head and concrete pump**
- **Integrated on-board compressor** (optionally with diesel drive for autonomous work, compressor output up to 11 m³/min)
- **High shotcrete quality thanks to automatic additive dosing proportional to the concrete flow**
- **Operating panel for easy machine function control**
- **Optional with automatic fire extinguishing system**

WETKRET 4

For small tunnel cross-sections and mining operations

- **Spraying arm ideal for your galleries requirements** with a maximum vertical and horizontal reach of 8.5 m
- **Powerful PM 1510 concrete pump** up to 20 m³/h
- **All-wheel steering and drive**
- **FOPS/ROPS certified driver's cab facing in the direction of travel**
- **Up to 9 m³/min compressor power** (optional)
- **Diesel engine according to your local standards**



WETKRET 5

The reliable shotcrete system for all terrain, specifically for medium to large tunnel construction sites

- **Auger dosing pump**
- **High power up to 30 m³/h delivery rate**
- **Powerful diesel engine (EU-StageV)**
- **Remote control** (control all functions)
- **Flow meter for additive delivery**



SPM 500 WETKRET

The ideal machine for medium and large tunnels, mining galleries and slopes

- **High power up to 30 m³/h output**, minimum variation
- **2-way telescopic spraying arm in a single section**
- **Remote control** with automatic spraying arm movement and nozzle oscillation
- **Optimum manoeuvrability**



SPM 4210 WETKRET

It works under the toughest conditions in small and medium-sized tunnels.

- **Vertical reach of 10 m and max. output of 20 m³/h**
- **Manual roller with 50/100 m cable**
- **Reinforced axles**
- **Dual Drive version** (all components can be operated using a diesel engine or electric motor)
- **Electric air compressor integrated in the chassis** (optional)
- **FOPS/ROPS certified driver's cab facing across the direction of travel**



WETKRET 3

The "small" WETKRET is ideal for difficult-to-access tunnel sections thanks to its compact crawler chassis. It optimally adapts to slopes and gradients.

- **Vertical spraying reach of 8.5 m and horizontal reach of 7 m**
- **Telescopic spraying arm** for working in sections that are at least 2.5 m high
- **Electric (spraying) and diesel (spraying and driving) drive**
- **Remote control (cable or radio)** for all movements of the crawler chassis, support legs, spraying arm and spraying head
- **Optional tilt system for +/- 30° slopes or gradients**
- **Hydraulically driven support legs**



SPM 715 Synchro

The SPM 715 Synchro is available as both a roadworthy version with a trailer for easy transport and good manoeuvrability, and a stationary version (SE and SD version). Ideal for manual spraying applications and for combination with manipulators.

- **Automatic synchronisation of the additive dosing (PLC)**
- **Support foot for better stability**
- **Light, robust hood**
- **Large concrete hopper with agitator and rubber collar**
- **Safety strainer with vibrator**
- **Trailer or stationary concrete pump**
- **Electric or diesel drive**
- **Perfection thanks to shotcrete equipment from Putzmeister**



Mortar injection for micro piles – S5 EVTVM, P 13

Micro pile filling – stability with pumping power

Injecting and filling with mortar

Should walls and ceilings be stabilised using (micro) piles and the loadbearing capacity be increased? Even in very confined spaces, our auger and piston pumps guarantee easier, quicker work and therefore improve economic efficiency.



Auger pump S 5 EVTVM – the specialist for micro piles

- **Pan mixer** enables injection mortar, filling mortar and anchor mortar to be mixed
- **Plug-in cardan shaft** for easy auger part replacement
- **Protective grille can be opened wide**
- **Central arrangement of all operating elements and control cabinet with 32 A connection**
- **Vario drive with high delivery**
- **Range of practical optimised accessory components (optional)**
- **Continuously adjustable output regulation**

Piston pump P 13 – 3-in-1 for mixing, pumping and spraying

- **Ideal for injecting and filling**
- **Powerful high-pressure compensation piston pump KA 230**
- **Integrated compressor**
- **Large forced mixer**
- **Powerful engine**
- **Can be equipped with spraying equipment NW 35**
- **Robust and low-maintenance** for the toughest construction site mixtures

Practical example: Solving challenges in Spain with all-terrain shotcrete machines

The longest national motorway in Europe: A stretch of road around nine kilometres long now connects the cities of Cádiz and Gibraltar in the south with Barcelona in the north east. Among those present on the construction site were Putzmeister shotcrete machines – three mobile SPM 500 WETKRET were initially used to secure the gradient around the gantries and later used to secure the material excavated from the tunnel.

The challenges

- **Quality:** Applying shotcrete for one of the most frequently travelled motorways in Europe
- **Time:** Parallel working ahead in each of the three double tunnels over a length of 5 km within the overall 9 km long stretch

Three double tunnels



Advancing work



Concrete in total



You can rely on Putzmeister in tunnel construction – service, parts, training

Everything that sets service apart

Swift assistance, meaningful advice and a reliable supply of genuine Putzmeister accessories and parts – in over 120 countries worldwide. This is what we at Putzmeister understand as first-class service.

Ideally placed to support you

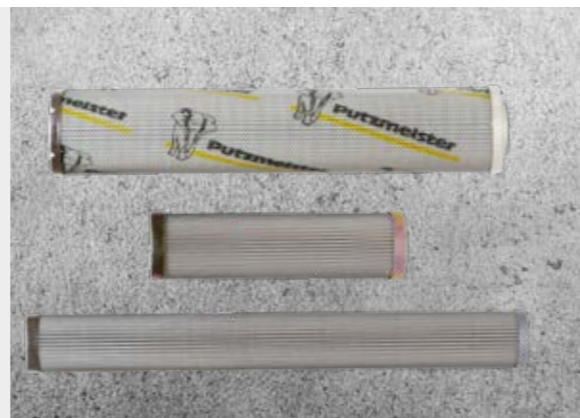
We provide continuous training for our service technicians, provide a close-knit information network and the latest equipment and consistently strive to meet our customers' needs.

Thanks to state-of-the-art technology, our employees have all the relevant technical information about your machine at their fingertips, should the need arise. Allowing us to provide you with the best possible support for emergencies, repairs or preventive maintenance.



Genuine parts for maximum availability

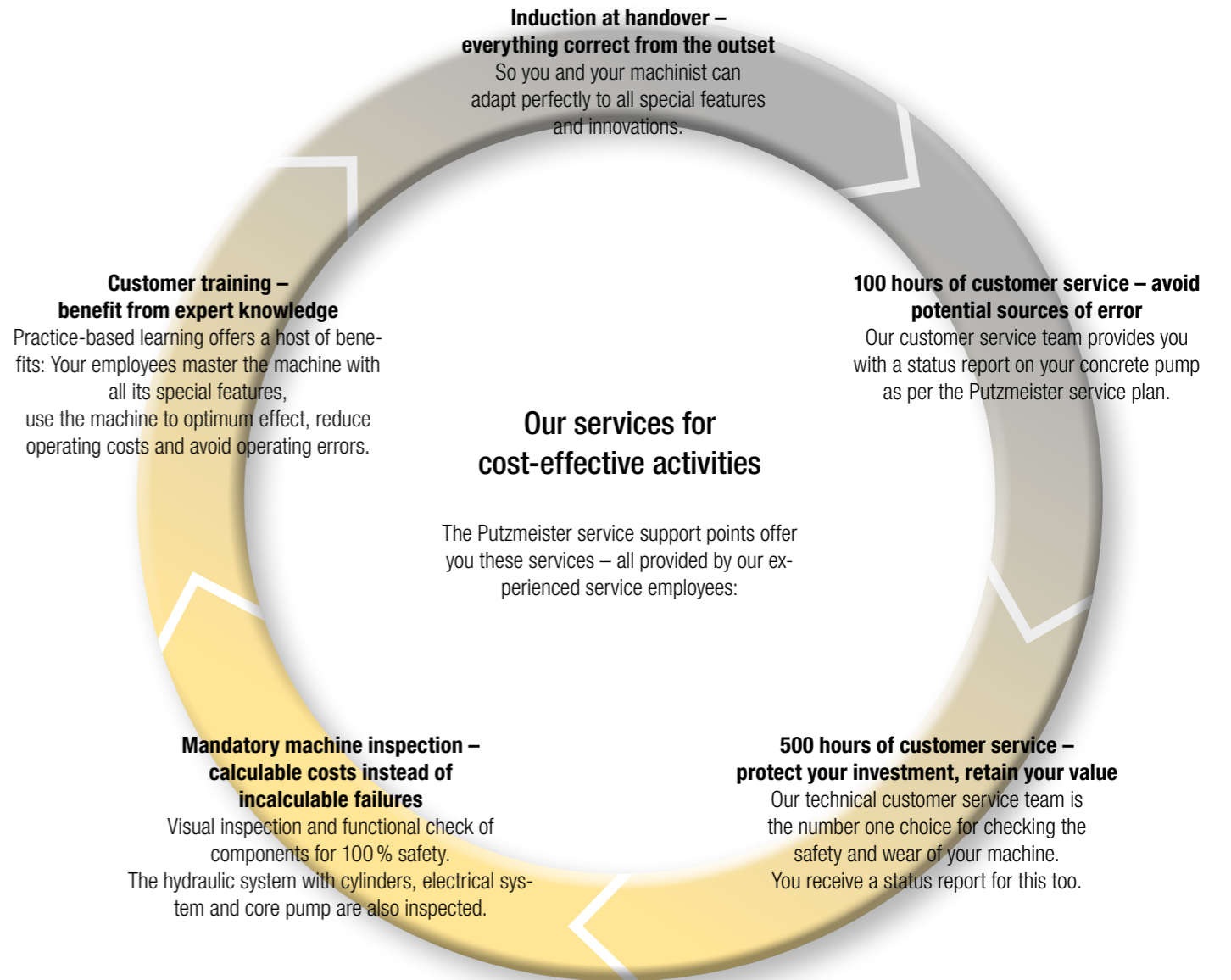
It goes without saying that we use only genuine Putzmeister parts in our workshops. This is the only way to guarantee consistent quality, checked for interoperability. And you can be absolutely sure that your machine meets the tough requirements with maximum performance and availability.



Excellent customer proximity and superb advice

Decades of experience, sound know-how on all processes in concrete delivery and innovation make us competent advisors. Rely on our planning support for small or large-scale projects, for existing or imminent production and for all issues relating to concreting logistics and concrete technology.

Your Putzmeister project engineers



Our range of training courses and seminars

For concrete pump machinists

- Training and development seminars Concrete pumps
- Training and development seminars PUMI® with piston and rotor pumps
- Regional / company seminars (in your region or on your premises)

For concrete pumps mechanics

- Training and development seminars concrete pumps

For concrete pump machinists and mechanics

- Practical days in Aichtal
- Training: Handover and induction, on-the-job training

For workshop managers and foremen

- Overview of current developments in Putzmeister concrete pumps
- Qualification at the customer workshops for requisite maintenance work

Further information can be found at: www.pm-akademie.de



The benefits at a glance

Flexible solutions for all tunnel construction processes

- Suitable for the toughest concretes
- Minimises personnel deployment, cleaning work and overall construction time
- Maximises speed, safety and flexibility
- Automated formwork filling reduces manual work
- Efficient solutions for concrete logistics
- Shotcrete machines for remote-controlled concreting up to 17 m wide and 30 m³/h
- Economically efficient solutions for stabilising mortar injection
- Complete solution and comprehensive service from a single supplier



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