

**ZS ZYLINDER-SERVICE GMBH**  
**Pressure is our business!**





## ZS ZYLINDER-SERVICE GMBH

The company ZS Zylinder-Service GmbH engineers and supplies hydraulic cylinders and hydraulically driven special machines including aggregates and electrical control.

**ZS** is specialized in the fabrication of special cylinders which are designed to match customers' needs. Besides some smaller cylinders these are mainly cylinders with piston diameters between 200 and 1000 mm and pressures between 180 and 480 bar. Building new cylinders and repairing more than 50.000 hydraulic cylinders for coal mining and other industries has created a big potential of technical know-how in **ZS**. As an expert in fabrication of cylinders **ZS** has quite some experience with sealing systems, scrapers, guiding systems, vibration, fluctuating pressure and with corrosion.

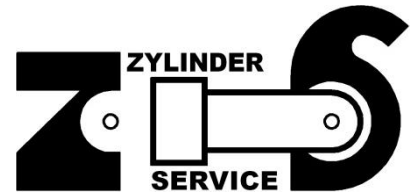
**ZS** always tries to find out the exact environmental conditions of the customer application and then to do the design work and fabrication accordingly. This

approach often leads to new solutions, saving time and money for the customer.

Here are some examples of products designed by **ZS**:

- **cylinders for grinding rollers in coal mills**
- **cylinders for scrap scissors**
- **cylinders, aggregates and control units for steel construction in civil hydraulic engineering, including the installation of the hydraulic systems, the hydraulic pressure piping by ZS' own technicians**
- **cylinders and aggregates for filter presses**
- **cylinders with a pivoting piston (our own patent) in grinding mills**
- **cylinders for big pipe welding plants**
- **special devices to pull out grinding rollers in coal power plants**

Due to the supply of hydraulic cylinders, aggregates and control units from one single source it becomes easier for the customer to control the interface.



**The head quarter of ZS is situated in Xanten, Germany/Lower Rhine.** Here is the administration, with the sales, engineering and purchasing. Furthermore Xanten delivers maintenance and service for all types of cylinders, made by ZS or other manufacturers.

**The production location of ZS has been established in Stupno,** in the Czech Republic. It is called ZS Bohemia s.r.o. The combination of a close relationship to the customer and favorable manufacturing structures allows ZS to deliver quality products at competitive prices. For any questions about hydraulic cylinders and systems we are glad to assist you:

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#### **ZS MACHINERY**

Typical ZS cylinders are 200 to 1000mm in diameter of the piston.

The lathes are suited for the fabrication of pieces with diameters up to 1.600mm and a length of 14m.

ZS is able to do honing from pipe diameters 200mm to 1000mm and up to a length of 15m.

ZS does round grinding up to 400 mm diameter and a length of 8m.

Whenever pieces are bigger or longer than the mentioned dimensions, ZS cooperates with qualified and reliable partners.

For many of these special cylinders ZS has built own handling and manufacturing devices; e.g. a semi automatic turning device for welding, assembly pits and assembly rigs, testing rigs.

For chroming of piston rods ZS has partners in Czech Republic and in Germany.

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## HYDRAULIC CYLINDER

ZS is focused on the development and delivery of hydraulic cylinders, adapted to customer needs.

Our core area in mechanical engineering is the design and production of cylinders with pistons in the range between 200 and 1.000 mm in diameter. For special sizes and designs, our production is well aligned.

Typical ZS hydraulic cylinders are:

- **Heading and return cylinder**
- **Single- and double acting cylinders**
- **Telescopic cylinder**
- **Positioning cylinder**
- **High speed cylinder**
- **Flat cylinder**
- **Plunger cylinder**
- **Press and bottle lift cylinder**
- **Test cylinder**



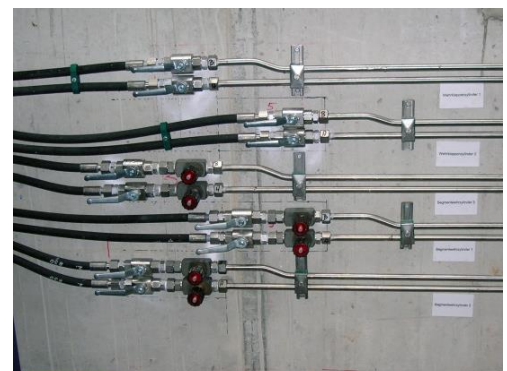
If necessary, there are various cylinder types and equipment options to use:

- **Cylinder with end-of-stroke cushioning**
- **Position measuring system**
- **Limit switches and sensors**
- **Special sealing systems**
- **Hydraulic aggregates**
- **Cylinders made of corrosion resistant materials**
- **Coatings according to building/environmental directives**

One of the patented developments, for example, is the ZS swiveling piston cylinder for heavy loads and tilts up to 2 degrees (see separate sheet).

ZS provides complete hydraulic systems with aggregates and installation from one source. Our experienced installation team guarantees the correct bringing into service. To ensure full functionality and durability the ZS-service team can take over the regular maintenance works.

The products and services of ZS Zylinder-Service GmbH and ZS-Bohemia s.r.o are certified according to DIN EN ISO 9001.







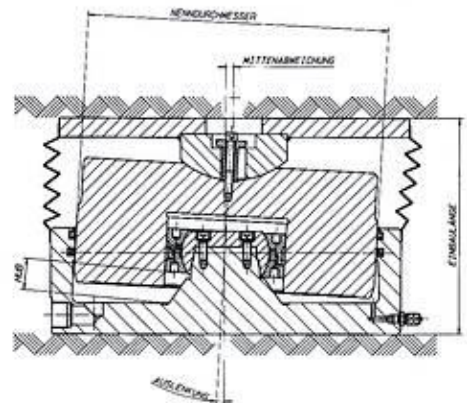
## CYLINDER WITH SWIVELING PISTON

This kind of flat cylinder is used e.g. in rolling mills, where very high working forces and however small strokes are required. The patented ZS design allows a swiveling tilt of up to 2 degrees under very tough working conditions.

By separating the outer sealing surface from the inner guide the ZS design excludes jamming and friction. This leads to a material saving and reliable operation unit.

With a high power density and short mounting space, this design has been proved in a lot of rolling and briquetting facilities.

We like to support the development and adaptation of solid technical solutions for new application fields. This may lead to a close cooperation or even a development partnership.



### TECHNICAL DATA

**Piston diameter** 150 – 1000 mm

**Stroke** 10 – 250 mm

**Operation pressure** up to 5000 psi

**Operating forces** up to 30.000 kN

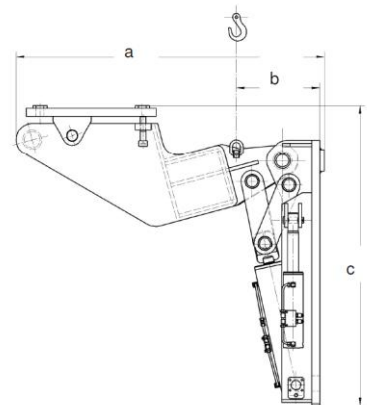
**Swiveling tilt**  $\pm 2$  degrees

*\*for differing dimensions and values please ask us*



## SPECIAL MACHINES & DEVICES

We are eager to know each hydraulic cylinder and its operating conditions as precisely as possible. According to this knowledge we can develop new ideas and propose optimal technical solutions. This development process can also affect the surrounding components and devices of hydraulic-actuated machines. ZS is open for a joint development process, whereas when needed ZS supplies the whole design and manufacturing of special purpose machines.

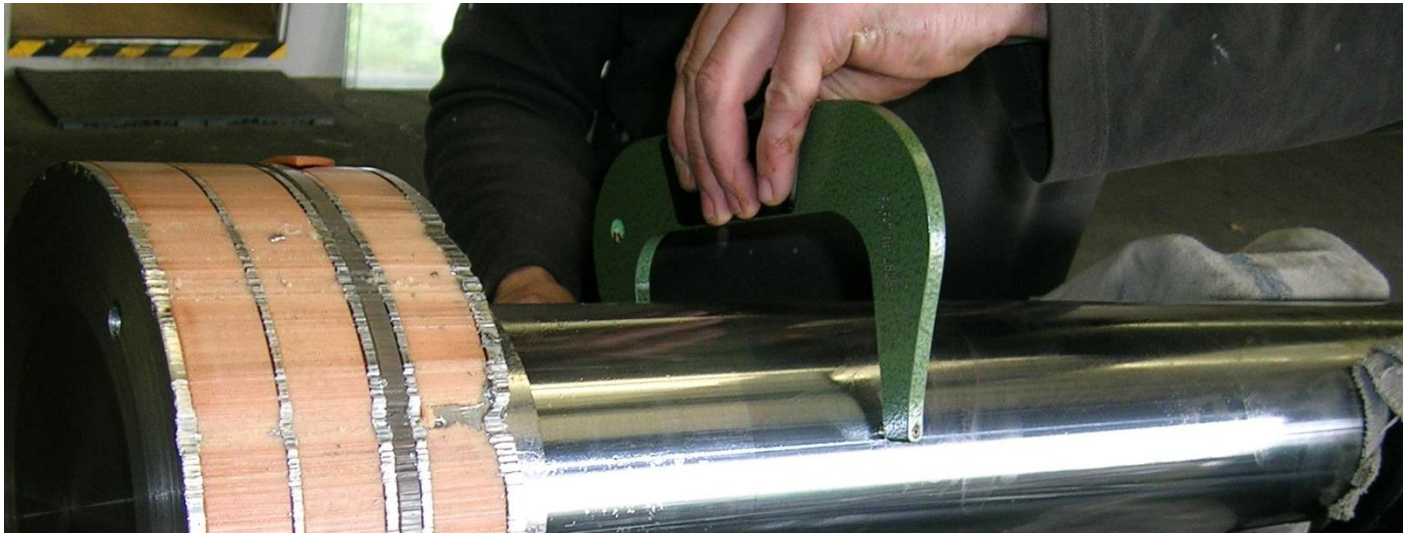


References in this section are:

- **Press for grinding wheels with working forces up to 20.000 kN**
- **Swing-out and exchange device for grinding rolls in coal mills (see pictures righthand)**
- **Device for pipe test rigs with testing pressure of 4000 psi and up to pipe diameters about 1.400 mm**
- **Lifting tables**
- **Test rigs for bearings**







## REPAIR & MAINTENANCE

ZS takes over the repair and maintenance of hydraulic cylinders of any size and make. Our expertise is based on more than 50,000 hydraulic cylinders built and repaired for the mining industry and various other industrial sectors.

Experienced technicians can carry out the cylinder repair in our workshop or in the customers' plants. Immediate repair is ZS' prime importance when production machinery stands still, due to a cylinder problem. Inside Europe the ZS technicians are able to be on site within 48 hours.

ZS is prepared to produce complete spare parts within a few days and when necessary even within hours. Important for ZS is the professional research of the reason or origin of cylinder problems.

### DIRECT CONTACT TO THE SERVICE WORKSHOP IN XANTEN

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*The engineering inspection is extremely important at ZS in all cases of cylinder failure:*

### **Why was the cylinder damaged?**

*During repairs, it is frequently determined that operating conditions were different to those encountered by ZS when designing the cylinder.*

*Repairs provide the first findings which can be transformed into a basis for sustained improvement of the product (e.g. ice wipers instead of standard polyurethane or nitrile butadiene rubber wipers, a bronze bush rod guide instead of guiding belts, alternative sealing systems)*





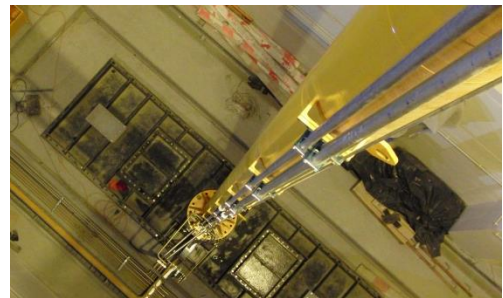
## CIVIL HYDRAULIC ENGINEERING

Hydraulic structures are permanently exposed to water and weather. Thus, high demands are placed on the entire hydraulic system. A high level of operational safety and pressure strength are to be ensured. Within these special features we are familiar. E.g. we use corrosion free bearings and suitable water-proof measuring systems.

The first priority is to protect the human and environment. We are aware about that and of course meet all construction and environmental regulatory standards.

ZS cylinders for weirs, shutters, sluices, rake cleaning systems are in use in Germany and across all Europe. A reference with special dimensions is the Picote hydropower plant in Portugal, where ZS cylinders with a stroke up to 11.7 m are installed.

Please contact us for a detailed reference list of our water engineering projects.



### REFERENZPROJECTS

- **Rader Siel:** Cylinder and aggregate for dyke relays
- **Baunatal:** Cylinder and aggregate for flood detention basins
- **Schaalseekanal:** Cylinder, aggregate, hydraulic control and remote servicing of the channel flow
- **Laubenheim:** Cylinder and aggregate for the Rhine-flood-regulation
- **Wolterdingen:** Cylinder and aggregate for shutters and relays
- **Talsperre Klingenberg:** Cylinder and aggregate for water relief channel and operational passage
- **Antoniusbrücke:** Cylinder, aggregate, hydraulic control for the level regulation
- **Rheinfelden:** Cylinders for relays and rake cleaning