



# **Hafner-Pneumatik**

*Excellence in Pneumatics*



*Pneumatic for railway applications*

## HAFNER Pneumatik: Your expert for pneumatics for rail vehicles

Hafner valves are well received in the railway industry because of their robust design and ability to work in low temperatures down to  $-50^{\circ}\text{C}$ . No matter if for train door controls, train couplings or wagon construction – Hafner has the right solution!

Some technical features make Hafner valves especially valuable in railway applications:

- Solenoid systems with a voltage tolerance of  $\pm 30\%$  in railway-typical voltages
- Applicable for an ambient temperature as low as  $-50^{\circ}\text{C}$
- Robust design
- High flow with compact design
- Maximum sealing efficiency at low pressure
- Solenoid valves with up to IP67 protection



We cooperate with the company NASS MAGNET which has experience in solenoid systems for the railway industry for decades.

### Solenoid systems



- Voltage tolerance: +/- 30%
- Voltages: 24VDC / 110VDC, others on request
- Fire safety: Fire safety regulations according to DIN EN 45545-2 possible
- Temperature range: -40°C to +60°C
- IP-protection: IP 65, IP67 on request
- Feature: With adhesive protection ring for safe dropping of the anchor in der operator system even with residual voltage

An additional O-ring at the operator system leads to a superior protection against dirt and water ingress.



Our valves can be offered from  $-50^{\circ}\text{C}$  up to  $+120^{\circ}\text{C}$  in order to cover the temperature requirements in railways from Siberia to Saudi Arabia.



„Hafner on the Rocks“  
Valves for  $-50^{\circ}\text{C}$



- Manually-, mechanically-, electrically-, and pneumatically actuated valves
- Port sizes from M5 to G 1/2" (up to 3.000 NI/min air-flow)



Also available:  
Valves for high temperatures  $+80^{\circ}\text{C}$  /  $+120^{\circ}\text{C}$

Our customers have a wide choice of different materials and coatings.

Aluminum anodized  
Thickness 5-8  $\mu\text{m}$



Standard version, endcap and manual override made from brass, pilot-head made from PA, inner parts made from brass, POM and NBR.

Low temperature versions with PUR seals.

Alu. hard-anodized  
Thickness 15-20  $\mu\text{m}$



Like standard version, but with a hard-anodized body.

Also available as a brass-free version.

Aluminum Emataliert



Sea-water resistant version. Tested in salt spray chamber.

Aluminum body with Ematal-treatment, all other parts made from stainless steel.

1.4404 Stainless steel



Valve entirely made from 316L / 1.4404 stainless steel. Also the inner parts.

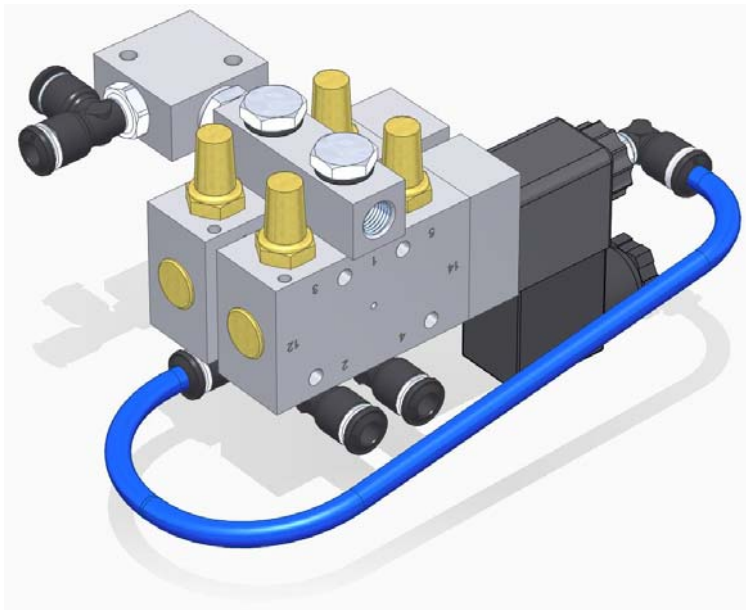
Epoxy-coating or C5 coating (Norsok M501)



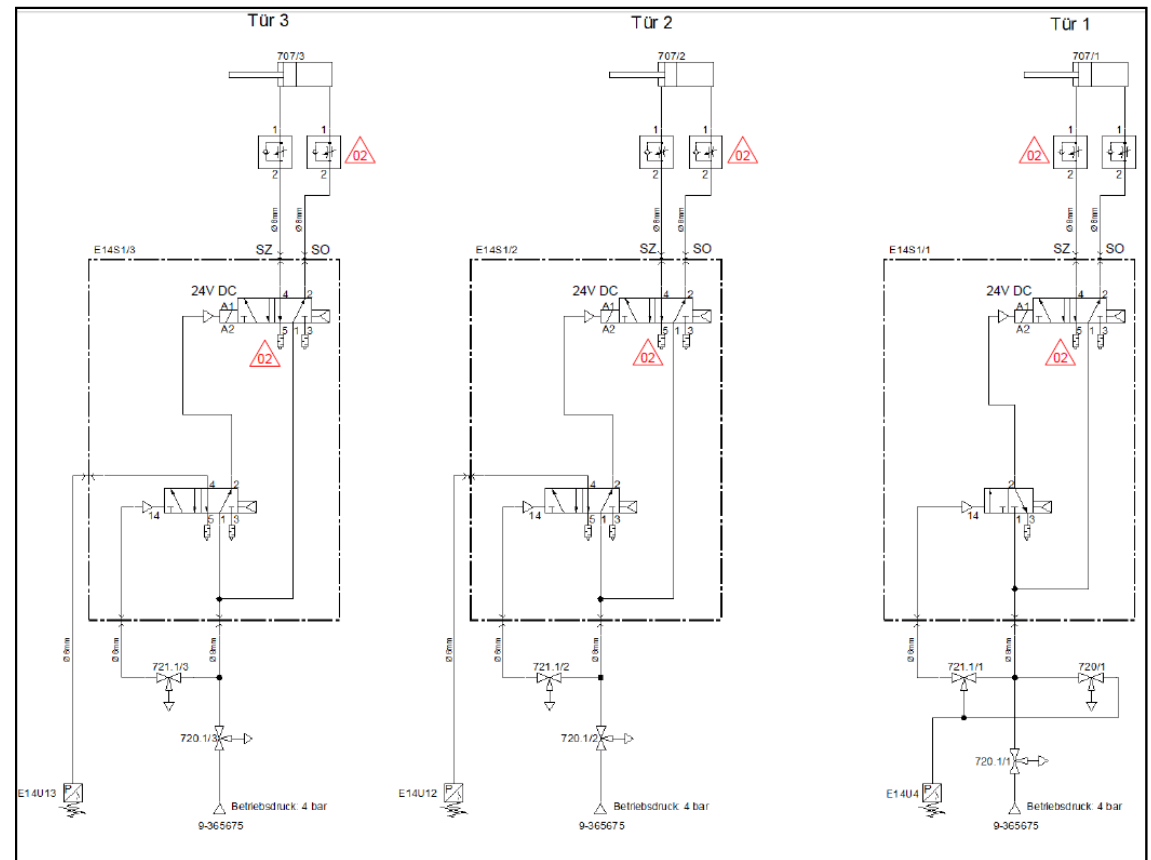
Cylinder tube with Epoxy- or C5 coating, piston rod in stainless steel and with rubber gaiter on request.

## Exemplary application:

Combination of pneumatically- and electrically actuated valve used in the door control of Swiss railways.



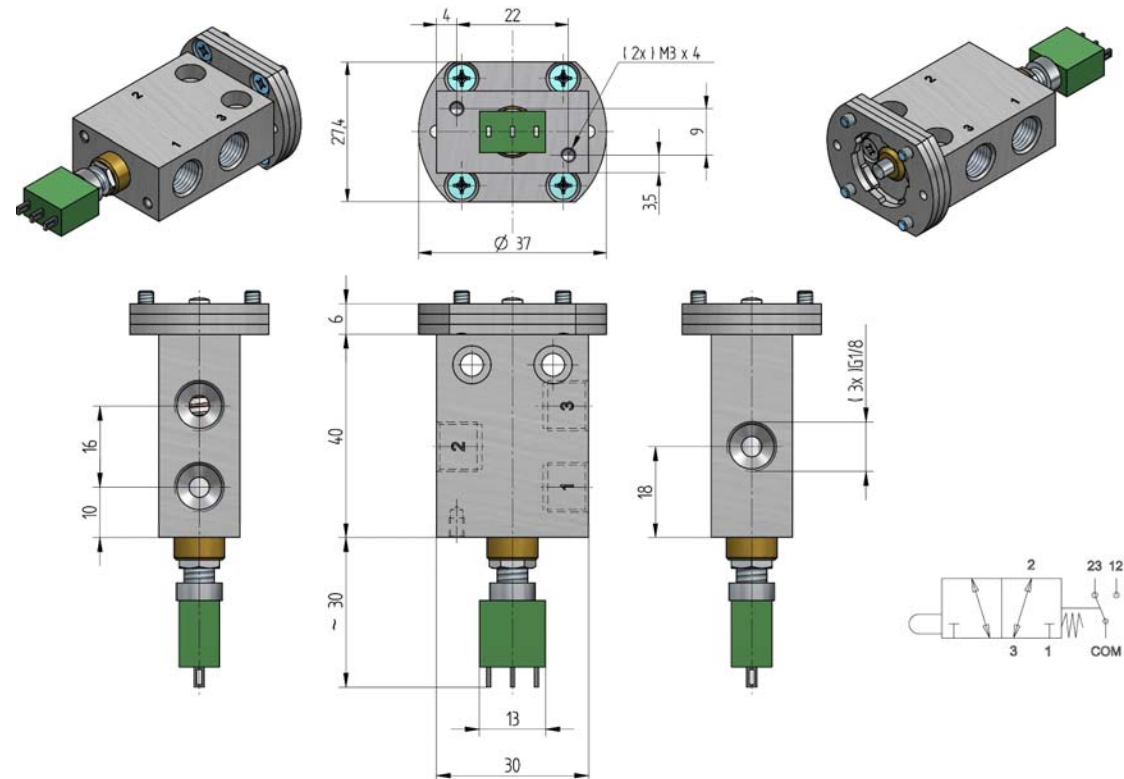
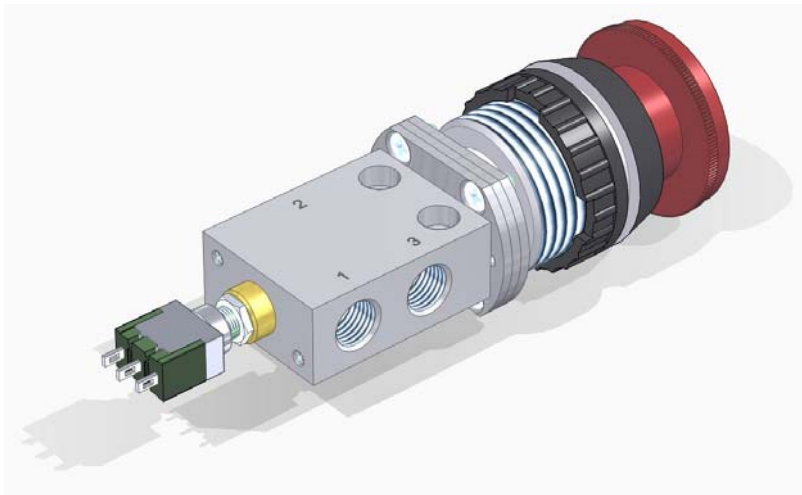
Valves for -50°C



## Exemplary application:

Manually actuated 3/2-way valve with electric switch. Actuation by emergency stop button.

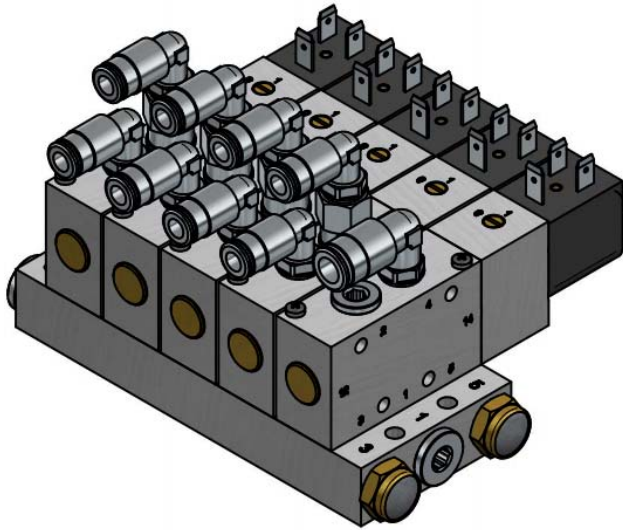
Product was developed for Chinese work trains.



Pressure range: -0,9 – 10 bar  
Temperature range: -20°C ... +50°C  
Orifice size: 3 mm  
Air-flow: 280 NI/min

## Exemplary application:

Solenoid valves on manifold for bio-reactors to treat the sewage in train toilets.



2/2-way and 5/2-way solenoid valves on the same manifold.

- -25°C to +70°C
- Solenoids 24VDC +/- 30%

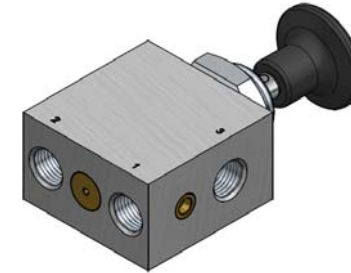


## Exemplary application:

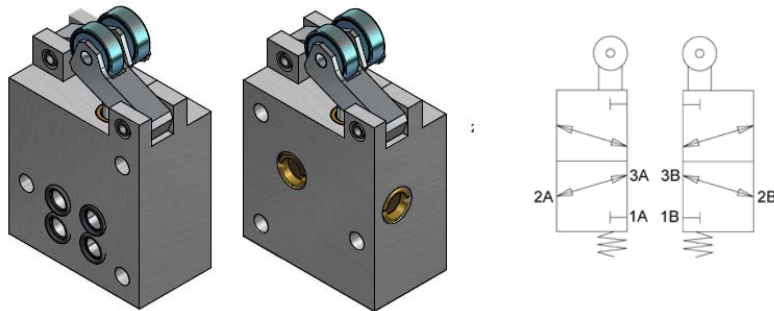
Other customized low temperature products.



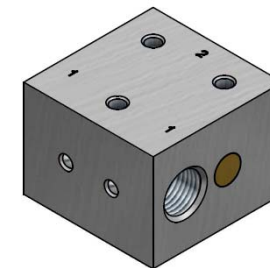
Pneumatically actuated 5/2-way valve. All ports with O-rings for manifold assembly.



Manually actuated 3/2-way valve with customized fixing holes and ports 1 and 2 on the bottom.



2 x 3/2-way roller lever valves in one body with O-rings for manifold assembly. Temperature range: -40°C to +60°C

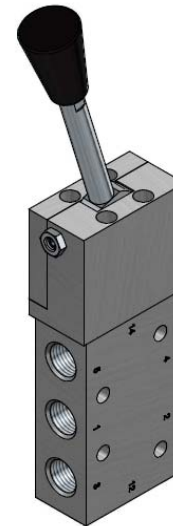


OR-gate with customized fixing holes for a temperature range of -50°C to +50°C.

## Exemplary application: Valves for train waggons.



Extremely robust roller lever- and stem actuated valves for -40°C.



Hand lever valves with a hand-lever axial to the spool.

## Exemplary application:

The precision flow regulator type EDR 1/6 has been used on pantographs for decades.



Very precise flow regulation due to a slotted spindle-design. This allows a precise regulation over the entire regulation range.

Available as a uni- and bidirectional version.

## Exemplary application:

Mechanically- and electrically actuated valves for Scharfenberg train couplings.



The solenoid valve is equipped with a railway-approved solenoid system for +/- 30% voltage tolerance and available for 24VDC and 110VDC.

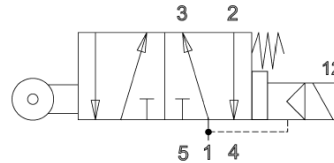
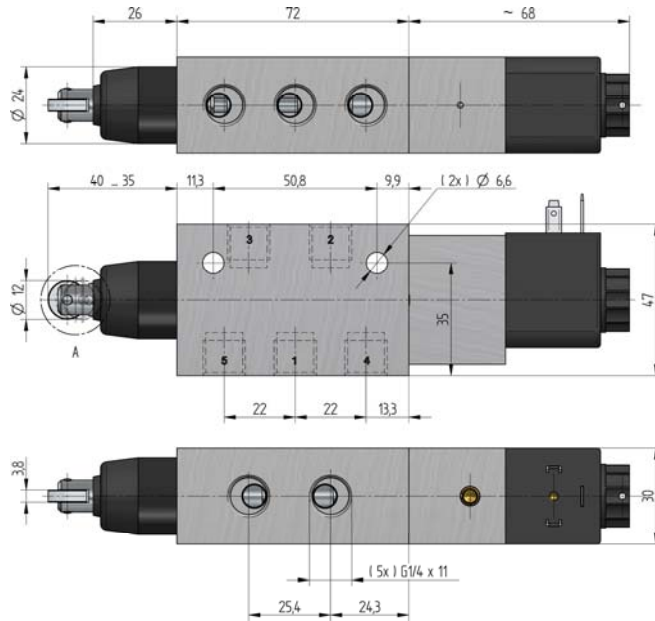
Quelle / image source: J. M. Voith SE & Co. KG



Valves operate a double-acting cylinder that moves an electrical box. This creates the power supply between two train wagons during the coupling process.

## Exemplary application:

Valve with a roller plunger which can be overrode by an electrical signal.



Solenoid coil can be used to override the valve.

### Scenario:

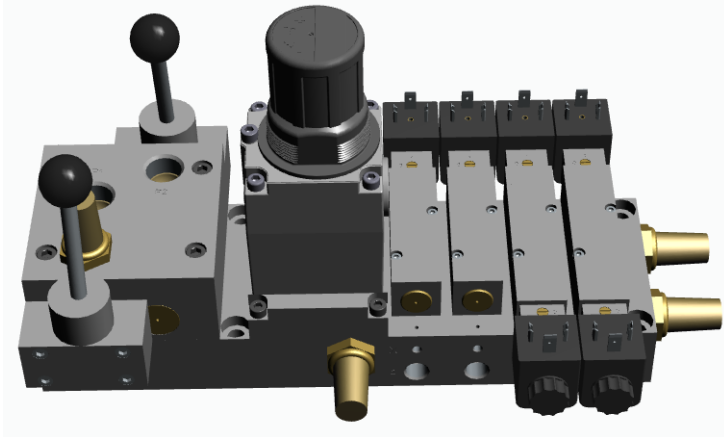
A mechanically detachable end-of-life vehicle meets a newer type of vehicle with a different electrical coupling, e.g. B. in the case of towing.

The electric coupling that is controlled via this valve must not move forward under any circumstances. In order to achieve this, the coil is activated before the coupling process, if necessary, which holds the piston valve in the non-actuated position despite the mechanical actuation of the valve.

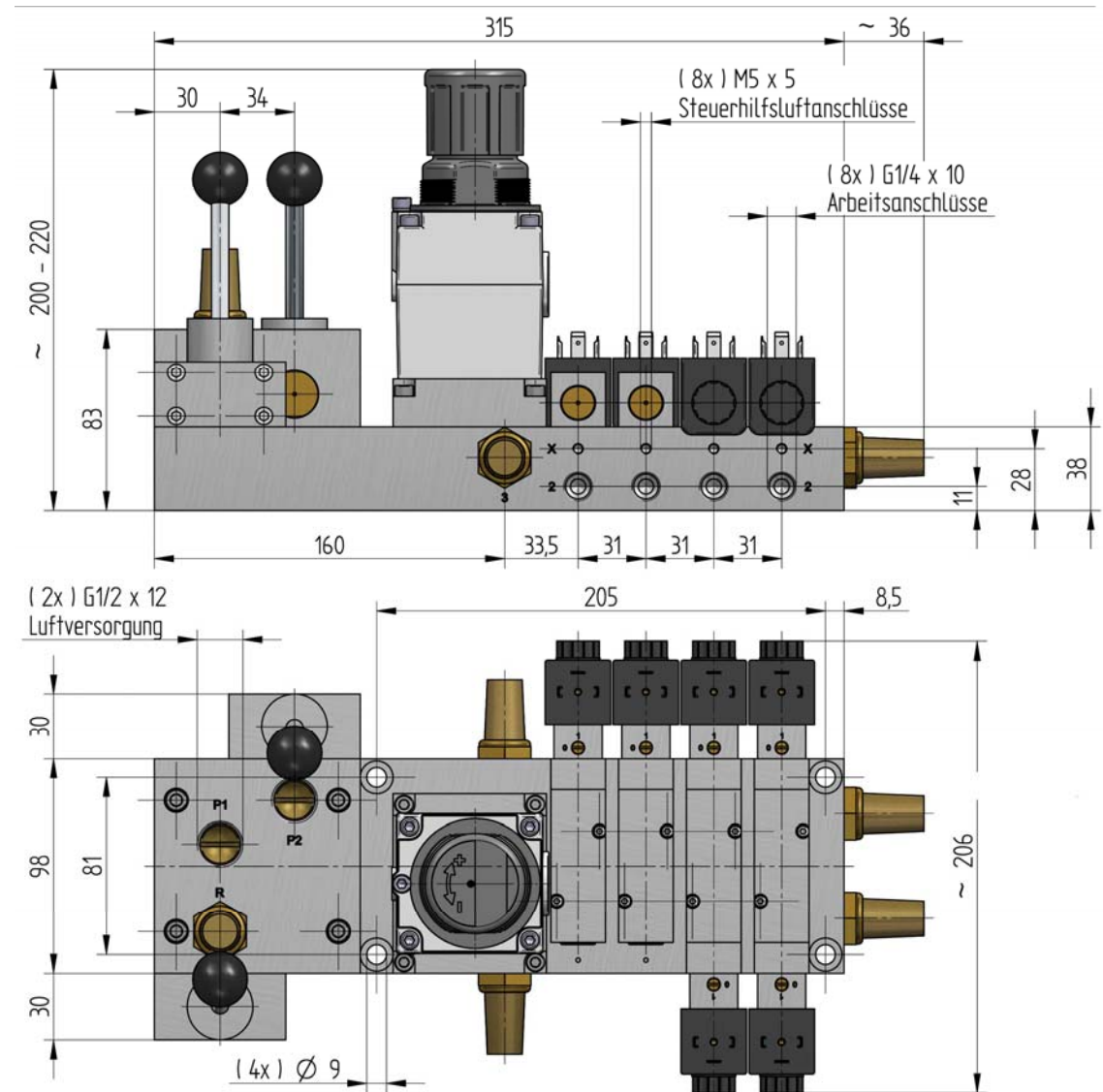
- Pressure range: 3 - 10 bar
- Temperature range: -40°C - +60°C
- Orifice size: 5 mm
- Air-flow: 650 NI/min
- Actuating forces:
  - Standard: approx. 35 - 40 N
  - Overriding: approx. 100 - 110 N
- Voltage: 110 VDC +/-30%
- Power consumption: 6 W

## Exemplary application:

Module to control 4 pneumatic cylinders in the bow of a train.



Module with 2 x on/off valves, pressure regulator, 2 x monostable solenoid valves and 2 x bistable solenoid valves.





## Exemplary application:

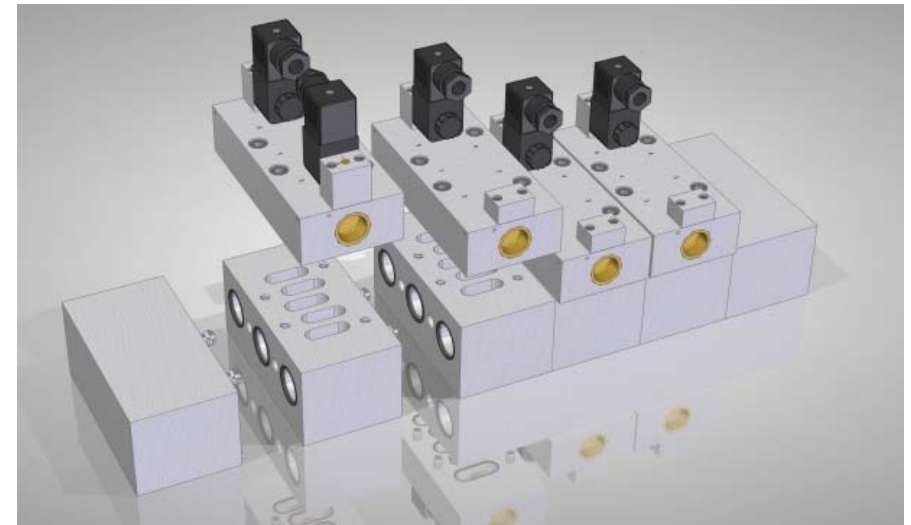
Stainless steel cylinder for transmission brake and snow blower.



- Stainless steel cylinder made of 1.4404
- Piston diam. 140 mm
- Temperature range – 40°C ... +80°C
- Including fixing accessories

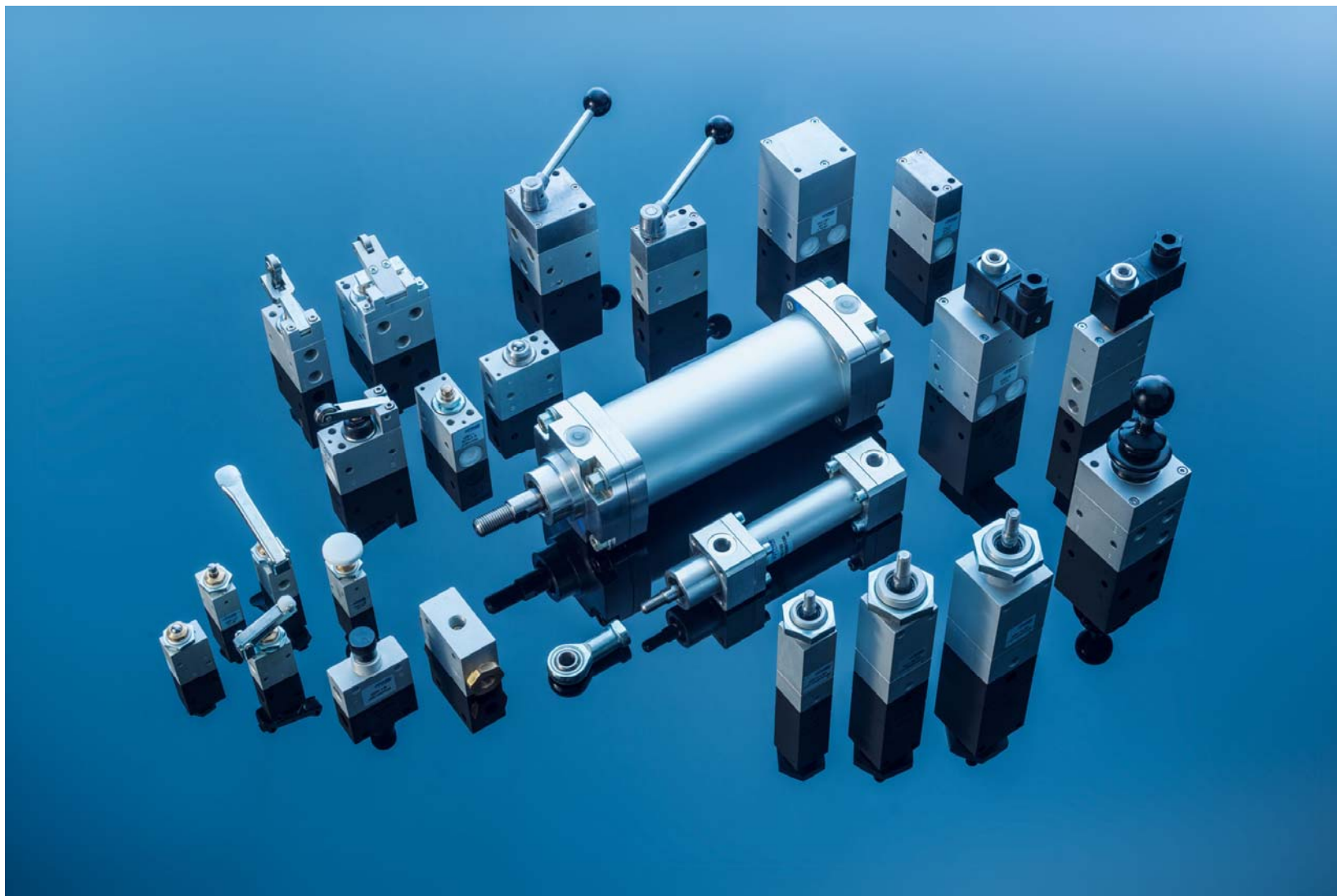
## Exemplary application:

Cylinder according to ISO 15552 with piston- $\varnothing$  250 and 320 mm for hopper wagons.



... suitable pilot-valves with up to 6.000 NI/min air-flow to control the cylinders are also available.

Various railway applications have been using valves and cylinders from the Knorr series for decades.





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