



At the heart of a reliable operation of, for example sluice doors, dams, docks and marine vessels lies the hydraulic piston rod. In day-to-day practice this indispensable mechanical part is exposed to extreme and continuous environmental conditions that can easily cause serious malfunction and down time of the complete installation.

To ensure a greatly extended, care free lifespan of hydraulic piston rods our engineers have developed yet another innovation in surface treatment technology: **Aludra's Engineered Based Coating or EBC type CB24.2**

In terms of mechanical and physical properties Aludra's newly engineered EBC type CB24.2 coating performs measurably better than conventional hard-chromium coatings.



PROVEN IMPROVEMENT

As clearly indicated in extensive everyday practice and by countless resistance tests Aludra's new EBC type CB24.2 performs measurably better than conventional hard-chromium coatings (in terms of mechanical and physical properties). Once applied by our thermal spraying division through means of Atmospheric Plasma Spraying, Aludra's mechanics will finish the job by carefully machining the part to its final dimensions.

LET'S START WHERE IT COUNTS, RIGHT AT THE SURFACE!

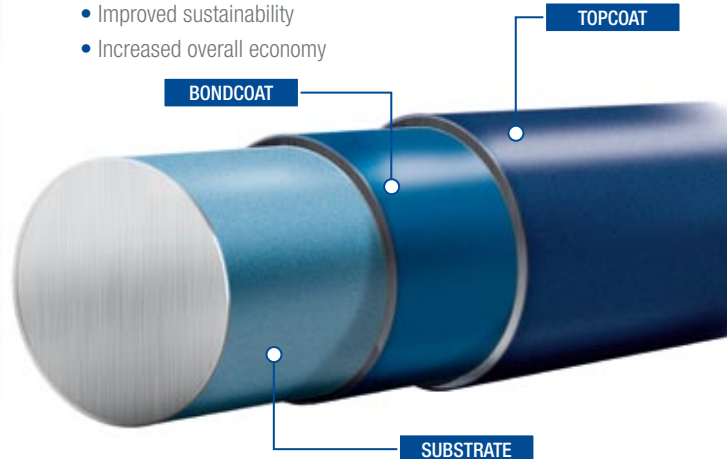
With Aludra's advanced EBC, thermal spraying technology and pre- & post machining facilities you can count on properties such as:

- Improved atmospheric resistance
- Improved hardness
- Increased bend and bond strength
- Decreased coefficient of friction (no stick slip)
- Improved topography

TAKE ADVANTAGE OF ALUDRA'S SURFACE ADDED STRENGTH

And ensure your self of a great return on investment, with a solid pay back in terms of:

- Longer lifespan
- Less maintenance (down time & costs)
- Increased production liability
- Improved sustainability
- Increased overall economy



IN HOUSE PRE- AND POST TREATMENT FACILITIES

Aludra's total surface treatment services include an experienced machining department which is fully equipped to perform all pre- and post machining activities such as turning & grinding, super finishing & lapping, drilling, milling and boring.

ENHANCEMENT OF UNDERSIZED OR WORN PARTS

One of Aludra's money saving specialties is the treatment of undersized or worn parts with a variety of enhancement techniques such as (computer guided) plasma spraying.



AT YOUR SURFACE! FOR MORE THAN FORTY YEARS

As a - former - division of Stork Industries, Aludra started in 1968. Since that time the company has build a leading position in the field of surface treatment technology, appliance and consultancy. Nowadays Aludra operates independently and is staffed by ± 30 enthusiastic and professional employees. The technicians are trained comprehensively in order to achieve an unparalleled level of consistent quality that will safeguard Aludra's position at the national and international top of sustainable surface treatment specialists.



HYDRAULIC PISTON RODS NEWLY ENGINEERED BASED COATINGS

- troughs and deflectors
- worm gear pump spindles
- dairy valves
- 2-stroke piston rods
- exhaust manifolds

- advanced thermal spraying technology
- specially developed engineered coatings
- extensive in house machining facilities

- objective consulting and advising
- single parts or high volume production runs
- new construction or repair possibilities



EXTENSIVE THERMAL ENHANCEMENT SPRAYING KNOWLEDGE AND TECHNIQUES

For over forty years Aludra is specialized in the lifespan improvement of a wide range of mechanical parts used in most (production) industries such as Petro/Chemical, Power Generation, Oil & Gas, Marine, Automotive, Aerospace, Dredging, Food, Hydraulics, etc..

Part of Aludra's services consists out of the appliance of a protective coating by means of several thermal spraying methods. With these techniques the protective coating particles are converted to a semi molten phase, using temperatures up to 15.000° C and then accelerated to the substrate with velocities up to 1.500 m/sec.. As only the injected coating particles are heated, the subjected machine part will not exceed temperatures over $\pm 125^{\circ}$ C and will therefore not undergo structural changes.

THERMAL SPRAYING PROCESSES UP TO $\varnothing 2000^* 180000$ mm

- AWS** Arc Wire Spraying
- APS** Atmospheric Plasma Spraying
- CPS** Combustion Powder Spraying
- HVOF** High Velocity Oxygen Fuel



REFERENCES:

Panama Canal SOUTH AMERICA

40 x $\varnothing 250^* 9.000$ mm
Replacement of the original valve and mitter gate mechanism of the Panama Canal in 1998. Piston rods were coated with Aludra engineered CB24.2. In total 2 x 44 piston ($\varnothing 250^* 9000$ mm) rods were treated.

Saemangeum SOUTH KOREA

44 x $\varnothing 320^* 10.000$ mm
Prestigious water win project in South Korea. Sluice doors were build into a 33 kilometer dam. In total 44 piston rods with integrated linear measurements system were coated with CB24.2. Lead time in total 4 months. Project finalized in 2005.

Pilling Barge CHINA

2 x $\varnothing 650^* 10.000$ mm
2 Giant $\varnothing 460$ mm* 13500 mm piston rods (part of the construction of a 36 kilometer bridge in Shanghai) coated with CA15.1 ceramic coating. The project was executed in December 2003. Total lead time 1 week.

Civil projects EUROPE

over 1000 rods
Several civil projects varying from the complete manufacturing of piston rods coated with CB24.2 for bridge, sluice doors and gates to the treatment of 16 piston rods that were placed 40 meters below water level of the Danube river in Gabcikova, Slovenia. The later project was finalized in 2007.

Off-shore EUROPE, AFRICA, SOUTH AMERICA

diameters from $\varnothing 190 - \varnothing 400$
Lengths from 50-16.000 mm
Coating of piston rods for hoisting cylinders, tension riseners, handling cranes for several drilling rigs (such as Stena Tay) with CA15.1 and CB24.2. Clients: Hydralift, Maritime Hydraulics and others.

Off-shore SALVAGE EUROPE

Manufacturing and treatment of piston rods with CB24.2 used in raising Russian submarine Kursk in 2001.



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