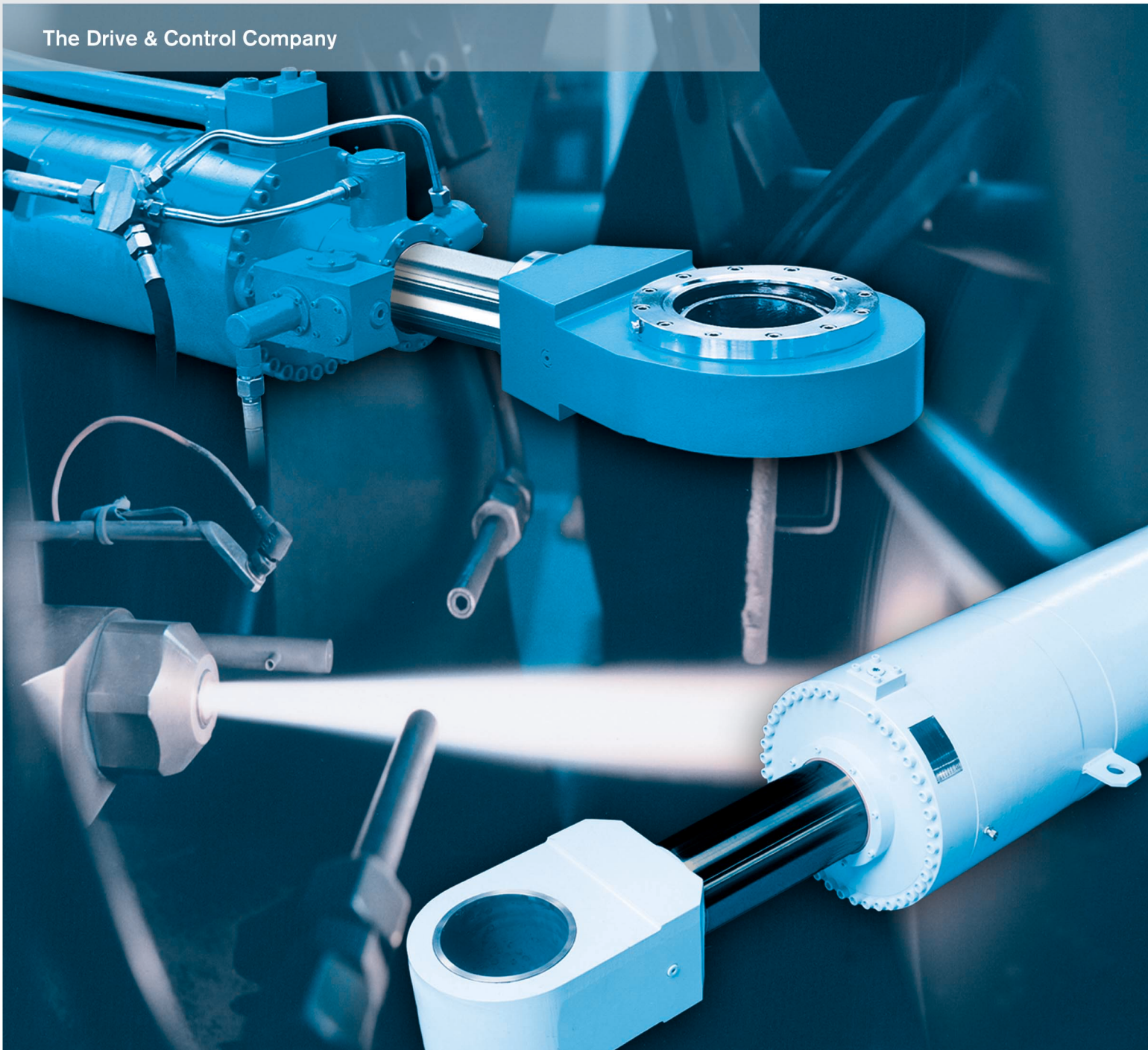
Rexroth
Bosch Group

Rexroth Hydraudyne Ceramax Engineered Coating

The Drive & Control Company



Split hopper dredger with
ABS Hydro Cylinders

Bosch Rexroth,
the basis for partnership

Bosch Rexroth is a group of companies specializing in the field of drive and control technology, with locations in all important industrial areas in more than 80 countries. The Bosch Rexroth Hydro Cylinder range is unique in the world thanks to the product scope, and the geographical distribution of both production and sales locations. Cylinder production facilities for standard cylinders, tie-rod and mill type up to 320 mm bore and 3 meter stroke are located in Germany, Sweden, Brazil, the United States and China. The larger bore and stroke cylinders as well as the ABS and special cylinders are produced for the world market in the Netherlands.

Miranda, Brazil equipped with
ABS radial gate cylinders

The Company

Since 1953, Rexroth Hydraudyne B.V. has been gaining expertise in the sale, design and manufacture of engineered to order hydraulic cylinders. Piston diameters range up to 1,450 mm and stroke lengths can be as long as 45,000 mm.

Cylinder with Ceramax for a
Ram Rig drilling package

ABS roll change cylinders

Ceramax
As world market leader in the design and manufacturing of customized hydraulic cylinders, Rexroth Hydraudyne is a prominent pioneer in the field of piston rod protection.

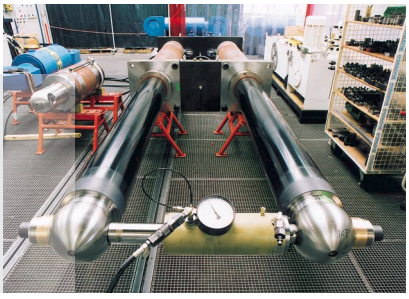
With the introduction of Ceramax to the market in 1989, Rexroth Hydraudyne set a new global standard for piston rod coatings. With Ceramax an inherent corrosion problem was solved in the application of hydraulic cylinders in different applications. Ceramax has clearly proven its

Typical corrosion on chromium plated piston rods

Ceramax Coating Center at Rexroth Hydraudyne B.V.

excellence as a universal rod coating. Since the market introduction in 1989, over 14,000 hydraulic cylinders with Ceramax rod coatings have been in operation in a wide range of demanding applications, all to full customer satisfaction.

Side load test 262 kN
at full stroke 2550 mm,
deflection 52 mm



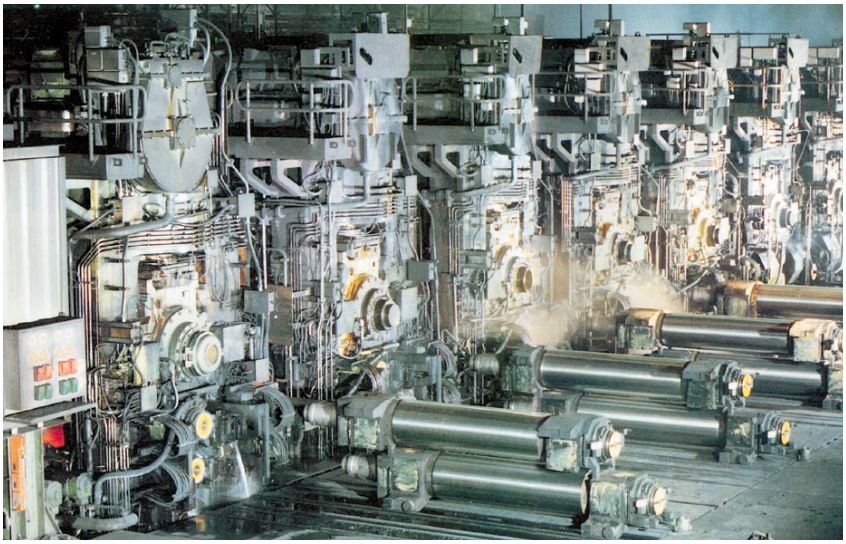
Cylinder production at
Rexroth Hydraudyne B.V.

Continuous improvement
The urge to create added value for our customers and thus outperform our competition is the basis for the continuous improvement of our products. These improvements range from specific product features to rod coatings and alternative materials. As a result, new coating processes were developed which allows fine tuning the layers to specific application demands. These vary from general industrial applications to severe applications requiring high wear and impact resistance, in combination with exceptional corrosion and chemical resistance.

Ram Rig cylinders on a
Semi-submersible Rig

CEC – Ceramax Engineered Coating
As a logical development to the original Ceramax coating, Rexroth Hydraudyne introduced a full range of coatings at the Hannover fair in April 2001 called Ceramax Engineered Coating (CEC). This range of coatings varies from Ceramic based coatings (CEC 1.x range) to metal-matrix based coatings (CEC 2.x range). To apply these layers, either the plasma spraying process is used, or the HVOF (High Velocity Oxygen Fuel) spraying process, or a combination of the two. High temperature and relatively low powder velocity characterize the plasma process. The HVOF technology uses a lower temperature range, allowing the application of a metal matrix.

This new range of coatings opens the possibility to engineer coatings to highly specific applications. All CEC coatings can be used as a basis for the Rexroth Hydraudyne position measuring system CIMS (Ceramax Integrated Measuring System).



Hot strip mill with roll change system, equipped with ABS roll change cylinders

Selection table:

CEC Ceramax Engineered Coating 1.x

Universal rod coating for corrosive and abrasive conditions

- Hard	>>>	wear protection
- Galvanic isolation	>>>>	corrosion protection
- Oxides	>>	chemical protection

CEC Ceramax Engineered Coating 2.x

Rod coating for extreme corrosive, abrasive and saline conditions, protection against exposure to aggressive chemicals.

- Programmable composition	>>>>	per application
- Programmable hardness + carbides	>>>>	wear protection
- Physical isolation/permeability	>>>	corrosion protection
- Metal matrix alloy	>>>>	chemical protection and flexibility

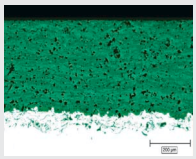
Ceramax cylinders for the Storm Surge Barrier in the Hartel canal at Rotterdam

Unique features of CEC:

Ceramax Engineered Coatings
- Application oriented coating
- Wear resistant against abrasives and erosion attack
- High impact strength
- Excellent sealing properties
- Excellent corrosion resistance
- Long life time
- Logical development of the Ceramax concept
- Environmentally friendly
- State of the art rod coatings

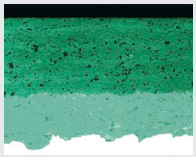
Ceramax Engineered Coatings

Universal rod coating



CEC 1.0

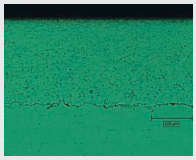
For general industrial applications



CEC 1.2

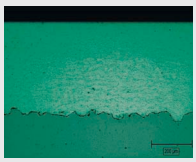
For industrial applications in combination with severe corrosion

Heavy-duty rod coating



CEC 2.0

For heavy industrial applications and intensive use, requiring high wear and impact resistance



CEC 2.2

For severe applications and intensive use, requiring high wear and impact resistance in combination with exceptional corrosion and chemical resistance

Rexroth
Bosch Group

Bosch Rexroth Corporation
Industrial Hydraulics
2315 City Line Road
Bethlehem, PA 18017-2131
Telephone (610) 694-8300
Facsimile (610) 694-8467
www.boschrexroth-us.com

Bosch Rexroth Corporation
Corporate Headquarters
5150 Prairie Stone Parkway
Hoffman Estates, IL 60192-3707
Telephone (847) 645-3600
Facsimile (847) 645-6201

Bosch Rexroth Corporation
Electric Drives and Controls
5150 Prairie Stone Parkway
Hoffman Estates, IL 60192-3707
Telephone (847) 645-3600
Facsimile (847) 645-6201

Bosch Rexroth Corporation
Linear Motion and
Assembly Technologies
816 E. Third Street
Buchanan, MI 49107
Telephone (616) 695-0151
Facsimile (616) 695-5363

Bosch Rexroth Corporation
Pneumatics
1953 Mercer Road
Lexington, KY 40511-1021
Telephone (859) 254-8031
Facsimile (859) 281-3491

Bosch Rexroth Corporation
Mobile Hydraulics
1700 Old Mansfield Road
Wooster, OH 44691-0394
Telephone (330) 263-3300
Facsimile (330) 263-3333

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