

# SVENDBORG BRAKES

GLOBAL  
LEADING  
EXPERTS

## SUPERIOR SOLUTIONS

Svendborg Brakes is the global market leader in intelligent braking solutions. This is why.



# TRUST

*Reliable solutions,  
optimal uptime.  
That's why you can trust us.*

Actually, trust is our primary commodity. When you choose products, solutions and services from the Global Leading Experts in intelligent braking solutions, trust is what you buy. Our global mindset and vision combined with a market-leading position and decades of accumulated expertise all add up to this one, decisive word. Trust us, and you can rely on your operation.

#### THE PREFERRED AND TRUSTED PROVIDER

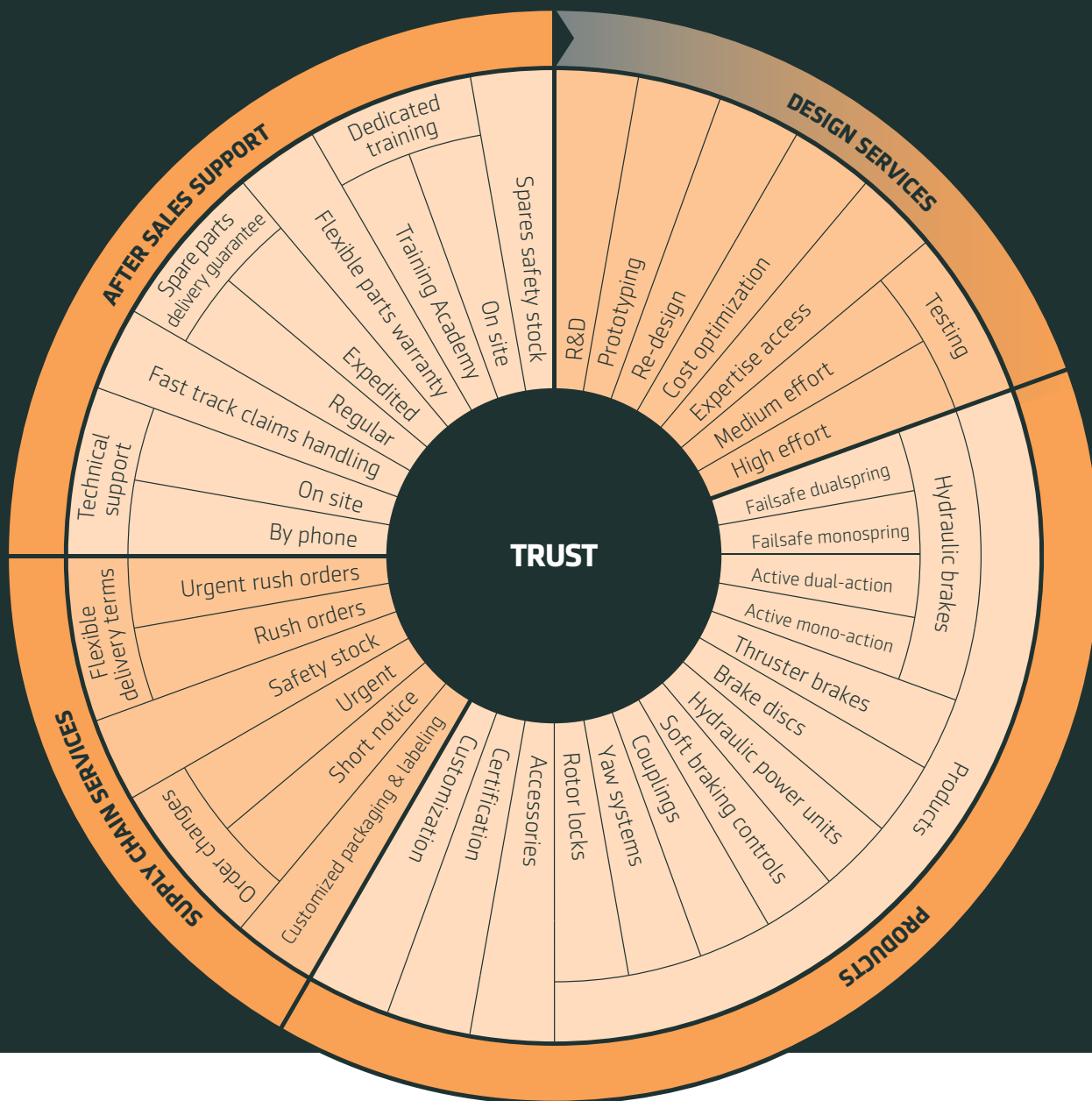
Svendborg Brakes creates high growth for our customers by innovating, testing and delivering world-class braking

solutions. We are value-driven and customer-focused, and we continuously strive for superior and unmatched quality in design, products, testing, certification and services. This makes us the preferred and trusted designer and supplier in the field of intelligent braking solutions to the world's renewable energy and heavy industries.





*Trust is key when you partner up with Svendborg Brakes, and the uptime of your operation is our key driver in everything we do. From finding or designing your braking solution to supporting you once it is installed and operating. In other words, trust is what we deliver all the way around The Wheel – our value and business model.*



### THE WHEEL

The Wheel illustrates Svendborg Brakes' value and business model. Trust is the overt centre around which all of our solutions and services revolve. The rim constitutes the braking solution, which is the core of our business, and the boundary within which our solutions and services are designed, developed and delivered.

Once you claim to be Global Leading Experts in your field, you must come full circle. Svendborg Brakes does just that in the field of intelligent braking solutions and services to

renewable energy and heavy industries. The Wheel illustrates this very clearly by singling out every area of expertise throughout the entire process and making it all come together – from design services and products to supply chain and after sales support. This is why some of the world's most demanding operations trust us to deliver reliable solutions and services.

**DESIGN SERVICES** is the starting point of The Wheel, ensuring that your braking solution is just right for your specific operation.



**PRODUCTS** covers our wide range of different solutions for your operation. Our extensive testing is second to none and your primary guarantee for top quality.



**SUPPLY CHAIN SERVICES** allows us to meet your needs no matter what they are – and no matter where you are.



**AFTER SALES SUPPORT** is your guarantee that we will never let your operation out of mind or sight. With us you do not just buy a product. You also buy training and services that keep it working.



## OUR WAY – OUR STRATEGY

### AMBITION – WHAT WE WANT

To create high growth and value by being the preferred and trusted provider of braking solutions and services.

### POSITION – WHAT WE OFFER

Global Leading Experts on braking solutions offering superior quality, unmatched design and world-class after sales support.

### EXPERTISE – WHAT WE DO

We innovate and deliver market-leading braking solutions in terms of design, products, testing, certification, logistics and services.

### VALUES – WHO WE ARE

Customer-focused, value-driven, team and partner oriented, trusting, respectful and dedicated to mutual success.





# DESIGN

*Experienced R&D and extensive testing ensures solutions you can trust.*

Value- and customer-driven innovation have always been at the very core of Svendborg Brakes. Our customers depend on us to be the Global Leading Experts in intelligent braking solutions. We are obliged to live up to that and earn your trust by constantly focusing on and refining our R&D and testing efforts.

## **SPEAK UP – WE WILL LISTEN**

We have a strong tradition for gathering unique market insights from every customer we encounter as well as from the market in general. We use this insight as the primary

driver in our well-founded and extremely practically oriented R&D division. The innovating, designing, prototyping and testing that we do is what ensures you the best, safest and most contemporary solutions in the market. We constantly strive to meet your demands and needs, and at the same time we always have an eye for improving what we have already engineered. Even world-leading solutions can be improved, and even more value can be added – in durability, quality, endurance, and so forth. Improvement never ceases.



*Innovating the solutions you need at a desk is one thing. At Svendborg Brakes our skilled engineers can literally take their drawing from the desk and into the workshop and test center right next door, allowing them to test how products, materials and constructions react to e.g.:*

- *Temperatures ranging from minus 50 to plus 70°C*
- *Static, dynamic, fatigue and destructive tests in different conditions*
- *Full-scale, 24-hour testing*
- *The exact setting and environment of a specific operation*
- *Maritime conditions with high concentrations of corrosives*



#### **WORLD LEADING TEST FACILITIES**

Our test center is in many ways the heart, pride and joy of Svendborg Brakes. The center is an integrated part of our Danish production facilities, literally making the distance between idea and reality, between theory and practice, very short indeed. The wide variety of testing options at the center provide optimal conditions for our skilled engineers and ensures that the solution we recommend will work exactly the way it is intended. We can simulate virtually any operation, any environment, and any condition – even yours.

At our test center we also put materials from our suppliers and potential suppliers to the test. These materials include e.g. valves, pistons and coatings. We are even able to simulate our customers' complete setup and put it to the test in order to ensure that all components will work as intended under the exact conditions provided.





# PRODUCTS

*Proven and applied technology that you can trust anywhere.*

The entire Svendborg Brakes product range is designed, tested and engineered based on decades of experience. The product you buy is a product you can trust. Your operation allows no margin for error and no time for failure. That is why you need proven, applied technology at its very best, and that is exactly what we offer you. Our products are engineered to last for decades – and we have built in decades of know-how to make sure that they will.

#### WE KNOW YOU

Your primary advantage in purchasing products from Svendborg Brakes however, might not even be the proven

quality and durability of the product itself. Our experience is what really sets our solutions apart. Due to our decades of accumulated know-how and experience within wind and other heavy industry operations in even remote and harsh conditions, we know you! That is to say, we know what you need, and our complete solutions can be individually customized and certified.

#### NOTHING MORE – NOTHING LESS

We have an extensive knowledge of wind turbines, both on- and offshore, and of other heavy industry operations such





*All Svendborg Brakes products are engineered and constructed with:*

- *Fewest possible moving parts for very low maintenance*
- *Good torque control and stability for controlled and effective braking*
- *High heat capacity to cope with very heavy braking loads*
- *Fast reaction time which is vital in case of an emergency*
- *Compact size for easy installation even in existing facilities*
- *Extensive testing and proper certification for all types of operations and conditions.*



as mining, cranes and marine installations. Chances are, we know your operation. This allows us to deliver and install exactly the right braking solution and to train you and service it accordingly, making sure that it will last for as long as possible and always be 100% fail-safe.

Our products are designed and engineered to make your operation safer and to work even if everything else fails. Time and testing have proven that our products and solutions do just that. Work! In any environment, at any facility, anywhere.

*The Svendborg Brakes product range includes:*

- *Hydraulic brakes with clamping forces from 500 N to 1,000,000 N*
- *Thruster brakes*
- *Hydraulic power units*
- *Soft braking controls*
- *Couplings*
- *Yaw systems*
- *Rotor locks*

## OUR PRODUCT RANGE

Svendborg Brakes' comprehensive product range makes us your answer to one-stop brake shopping and supply. Our complete braking solutions include extensive design services, market-leading products, a quality-focused supply chain and unmatched after sales services.

Our extensively tested and certified products are, of course, at the core of our business. These are products crafted by decades of experience and devoted employees, who will never let you down. We know that you cannot afford to fail, so neither can we. The safety and uptime of your operation is our primary concern. It is, in fact, our reason for existence – which is why our customers trust us.

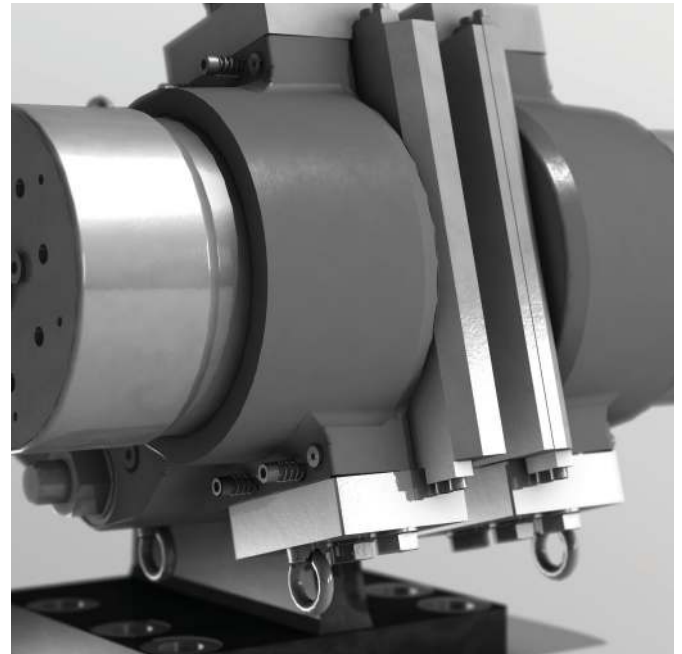
*The Svendborg Brakes product range comprises:*

- Hydraulic and thruster brakes
- Hydraulic power units
- Soft braking controls
- Couplings

## HYDRAULIC BRAKES

The basis of our business is making things stop. Safely and timely. This is why the word “brakes” is still a part of our company name, despite the fact that our product range has been expanded over the years to include a variety of related products. Our market-leading and reliable braking solutions are guaranteed to meet your specific requirements. Every braking solution we supply is comprehensively tested and can be individually customized and certified to comply with your particular operation and environment.

Our brake product range comprises both active brake calipers, which are hydraulic pressure-applied, and failsafe brake calipers, which are spring-applied and hydraulically released. The brakes are available in a variety of versions, for example with offshore finish for corrosive environments.



*Key benefits of our brakes are:*

- Few moving parts, resulting in easy maintenance and reduced costs
- Small air gap combined with few moving parts, which mean short response time and fast braking
- Different types of spring packages available, reducing loss of force and providing higher levels of safety
- Drain ports for hydraulic oil leakage, preventing the presence of oil on brake discs and further increasing safety levels
- Tested down to -40°C



## HYDRAULIC POWER UNITS

Hydraulic power units are important for ensuring fast, controlled and safe braking. Our broad range of standard and specialized hydraulic power units is engineered to meet any requirement. In order to minimize downtime, our hydraulic power units are equipped with various indicators to immediately identify any failure and thereby prevent further damage. Fast operation of the hydraulics, with optional manual control, is a significant feature of our hydraulic power units.

Hydraulic power units from Svendborg Brakes are available in a variety of models, in which safety and reliability are always paramount. Thousands of installations around the world, including wind turbines, cranes, conveyors, mine hoists, escalators, ship propulsion and marine winches, testify to the reliability of our power units.



*Special features of our hydraulic power units include:*

- *Fast braking and retraction time*
- *Redundant return valves, ensuring a fast and secure operation*
- *Hand pump for manual brake release in case of power failure*
- *Brake on/off indication*
- *Operational in cold climatic conditions – as low as -30°C/-22°F*

## SOFT BRAKING CONTROLS

Soft braking control is a unique brake control unit which provides a range of safety and durability benefits in heavy industry applications. Deceleration and the stopping of heavy loads are vital for modern technology, and controlled braking is essential for a significant reduction of torque peaks.



*The soft braking control offers a wide range of benefits and features – all taking the highest safety aspects into consideration:*

- *Controlled braking independent of load and load position*
- *Braking on time or distance*
- *Adjustable brake ramp/curves*
- *Compensating for variable friction factors*
- *Controlled start-up*
- *Real time monitoring of brake sequence*

## COUPLINGS

Svendborg Brakes' full couplings product range, including hydrodynamic units, helps complete our one stop shop concept for the wind and other heavy industry sectors.

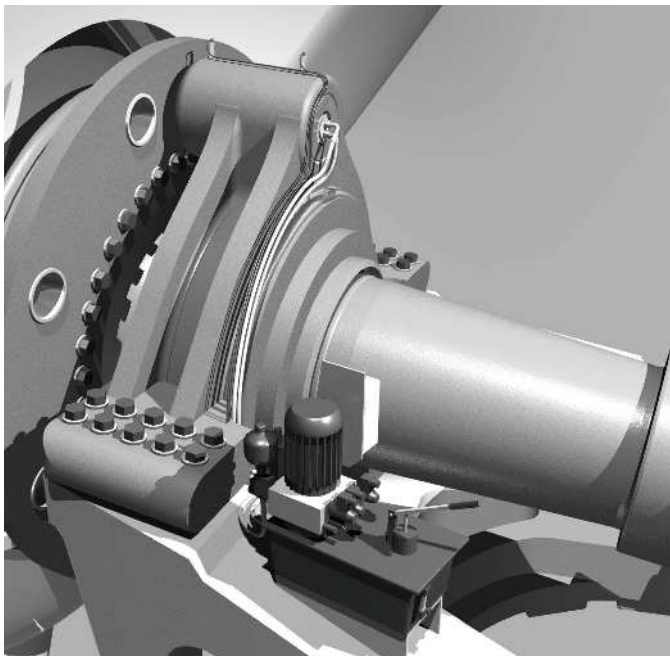
*Our couplings are:*

- *Designed for long life and high operational reliability*
- *Thoroughly tested at our world leading test facilities*
- *Perfectly fitted into our total solutions offer with our rotor brakes and hydraulic power units*

## ROTOR LOCKS

Rotor locks are used in the wind turbine industry and are typically mounted to the turbine's main rotor shaft, between the gearbox and generator. The rotor lock is activated by running the lock bolt into the lock disc using hydraulic power; a "locked" signal is then transmitted to the control system. All Svendborg Brakes rotor lock units are engineered to handle the large output torque generated by the high ratios found in wind turbine gearboxes.

Svendborg Brakes rotor lock units are today in operation in thousands of wind turbines around the world and can boast of a leading market share on the global market.



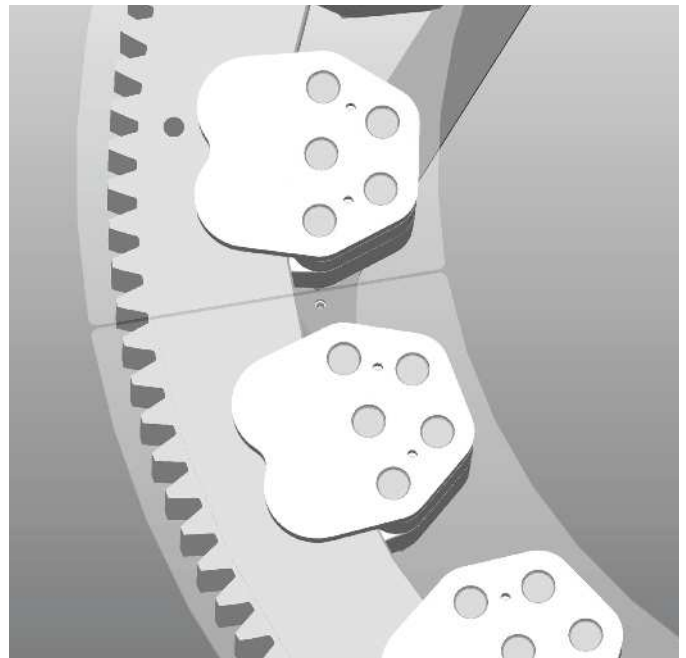
### *Key benefits of Svendborg Brakes' rotor locks for wind turbines:*

- *Control system notifies of turbine failure or breakdown*
- *Failure notice monitored by main Service Department*
- *Local service engineer dispatched to the site immediately, where a decision is taken to put the turbine into Rotor Lock Mode – saving valuable service time*
- *Turbine rotor brought to a full stop by aerodynamic and mechanical brakes*
- *Rotor Lock Mode can be activated and operated via remote control*

## YAW SYSTEMS

Svendborg Brakes yaw systems are designed and developed through significant R&D and testing investments and are considered state of the art for all modern medium and large wind turbines. In fact, Svendborg Brakes leads the market in supplying active yaw brake systems to the global wind industry.

All systems include a means of rotatable connection between the nacelle and the tower, and act as a rotation restriction of the nacelle. The actual components of the systems vary depending on the design characteristics.



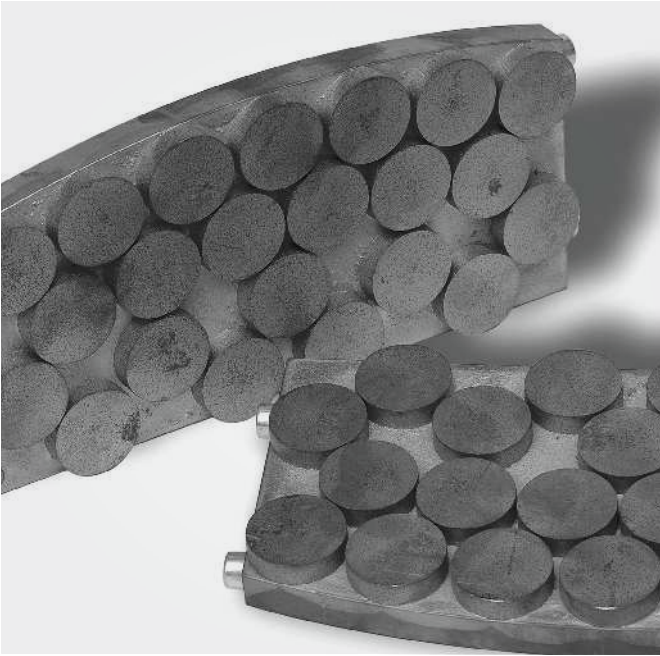
### *Svendborg Brakes yaw systems will reduce:*

- *Noise*
- *Stress*
- *Peak*
- *Wear*
- *Service*



## SPARE PARTS AND ACCESSORIES

Once you have purchased our solution and implemented it in your operation, the expertise of our unique after sales support will be there for you. This commitment to good and reliable service is worth far more than compromising on prices and quality. After sales support includes technical support either on site or by phone, and a spare parts delivery guarantee.



*Having access to adequate spare parts stocks is of vital importance for our customers, and we have therefore put together an extensive spare parts package, including:*

- Brake linings
- Sealing
- Sensors
- Pistons
- Hydraulic equipment, e.g. level sensors, valves, filters and accumulators

*Svendborg Brakes offers a wide selection of accessories to accompany individual braking installations, including:*

- Brake brackets
- Brake linings
- Indicators
- Brake discs

## CUSTOMIZATION

Due to the complex nature of intelligent braking products, customers often require solutions which match their specific operation and conditions. In such cases, Svendborg Brakes puts special focus on offering the right solution for the given challenge, focusing on the design, development and delivery of a solution adapted to the application in question. In other words, Svendborg Brakes offers individually customized and certified braking solutions – giving our customers intelligent and easily accessible one-stop braking solutions.



*For more information about our product range, visit our website on:*  
[www.svendborg-brakes.com](http://www.svendborg-brakes.com)



# SUPPLY

*The right delivery, in the right place, at the right time. Every time.*

Fundamentally you can trust Svendborg Brakes to deliver the right product, at the right place, at the right time. Regardless of the requirements, location and time frame. A fine-tuned and efficient assembly setup is crucial for us to deliver on that promise.

## ONE GLOBAL SUPPLY CHAIN

Because we are a value-driven operation, our business model and value chain are based on what is important to our customers – in order to provide maximum value to everyone involved. We know our place in your value chain,

and we always strive to build long-term relationships with our customers.

This is based on the firm conviction that long-term cooperation is of mutual benefit to all parties involved, and therefore it also applies to our suppliers and our own value chain. We create exactly the right balance between our in-house assembly and the supplies we get from our trusted partners all over the world. The word partner is the key to ensuring a superior supply chain.





*We have set high standards for our entire value chain within:*

- *Product quality*
- *Quality management system and testing*
- *Sustainability*
- *Health and safety*



### **QUALITY HOLDS THE CHAIN TOGETHER**

Svendborg Brakes' culture of quality is the vital link that holds the value chain together. It is incorporated in every link of the supply chain, and it is at the core of everything we do. From the drawing board to the finished product and on to the lifetime and ultimate recycling or disposal of the product. We constantly strive to be best in class, and we have set up an appropriate quality management group to ensure this. Furthermore, we fight to ensure that the rest of the value chain lives up to our high standards.



# SUPPORT

*Extensive services to help you protect your investment and operation.*

When you purchase a braking solution you make an investment, and investments need to be protected. Our brakes are designed with as few moving parts as possible in order to minimize the need for maintenance. Our braking solutions are the toughest and most durable in the market, designed, tested and engineered to work and keep your operation safe for decades. Furthermore, they have as few moving parts as possible. All in order to minimize the need for maintenance. This however, can never be completely avoided. This is when you will truly appreciate the fact that you have purchased much more than just a world-class product. Whether it be training, service, technical support or upgrades,

the after sales support that you will eventually need is as highly valued by our customers as our products – making your purchase with us a complete solution.

## **TAILOR-MADE SERVICE PACKAGES**

We never just deliver your product and then leave you hanging. We have designed our solutions to work. It is a matter of value for you and your operation, and a matter of pride for us. Our tailor-made service packages ensure you professional, technical expertise and maintenance by authorized and dedicated Svendborg Brakes personnel. Furthermore, you have a guarantee that only original





*A scheduled service visit by Svendborg Brakes ensures you:*

- *A preventive maintenance plan that minimizes downtime*
- *That only original spare parts are fitted and installed on site*
- *Correct adjustments of brakes, hydraulic and electrical systems*
- *A complete picture of the braking solution's performance and history through documentation*



spare parts are installed. Regular service also means a hands on and constant up-to-date knowledge of the condition and performance of your braking solution. Frequency of service and spare parts stocks, amongst other aspects, are individual to every installation. This is why we discuss your needs with you before coming up with a tailor-made service package to meet these needs.

#### **TRAINING AND SUPPORT TO HELP YOU HELP YOURSELF**

As a customer of Svendborg Brakes you are also invited to join our extensive and acknowledged training programs, which we offer at our training academy or on site. Our training gives you

valuable insight into the installation, operation and maintenance of your braking solution. This can of course be of great value to you and make your everyday operation less dependent on us.

#### **SERVICE MUST BE QUICK – AND RIGHT**

When you need our services you will experience that we respond and move both quickly and competently. Both virtues are equally important when it comes to providing you the after sales support in which we take such great pride. We know that you need our support, our service visit or spare parts as quickly as possible. But we also know that you need our actions to be adequate.



DENMARK	Svendborg Brakes A/S	Tel +45 63 255 255	sb@svendborg-brakes.com
GERMANY	Svendborg Brakes A/S	Tel +49 5422 9272 00	sb@svendborg-brakes.com
CHINA	Svendborg Brakes Co., Ltd.	Tel +86 21- 60580600	sb@svendborg-brakes.com
USA	Svendborg Brakes, USA Inc.	Tel +1 (303) 285 1271	sb@svendborg-brakes.com
	Aftermarket Wind, USA, C. Andersen	Tel +1 (312) 705 3814	sb@svendborg-brakes.com
AUSTRALIA	Svendborg Brakes Australia Pty., Ltd.	Tel +61 (0) 8 94 160300	sb@svendborg-brakes.com
KOREA	Svendborg Brakes, Korea Co., Ltd.	Tel +82 0 70 4190 0979	sb@svendborg-brakes.com
SOUTH AFRICA	Svendborg Brakes S.A.	Tel +27 11 964 1101/2/3	sb@svendborg-brakes.com
CHILE	Svendborg Brakes Chile	Tel +56 9 5629 5291	sb@svendborg-brakes.com
SPAIN	Svendborg Brakes ES	Tel +34 (975) 2336 55	sb@svendborg-brakes.com

