

CEMENT

Industry Solutions



Solid Solutions for the Cement Industry

Complete Solutions for the Cement industry

$$V_p = \frac{Q_p \times S_p}{C \times T}$$

V = Value Q = Quality S = Service
C = Cost T = Time P = Perceived

The Value Formula illustrates the importance of
Quality, Service, Cost and Time
in shaping our customers' perception of Value.

BALDOR • DODGE®

BALDOR • RELIANCE®

BALDOR®

A MEMBER OF THE ABB GROUP

Electric Motor

Success Story

Application Review

When calculating monetary loss from a cement kiln stop, it is important to remember that the calculation is not simply one of lost production. There are other cost factors that must be considered. These factors make even relatively short, frequent stops costly in the longer term. Kilns consume copious amounts of fuel to drive the reactions required to manufacture cement clinker. Each stop results in wasted fuel, as the kiln needs to be reheated and stabilized in order to make a quality product. Additionally, frequent kiln stops result in premature failure of the refractory lining installed in a cement kiln.

The Opportunity

In an effort to reduce the effects of the dust, plants will often implement short term solutions that reduce the long term life of the equipment. In this case, the customer has attempted to filter the dust from the air by installing blue, HVAC filter material over the existing motor filters. This filter material restricts the airflow to the motor and raises the stator temperature, reducing the winding life.

The Solution

TEAAC (Totally Enclosed Air to Air Cooled) motors would be sealed from the outside environment and keep the dust out of the motor, prolonging the motor's life and eliminating the need for annual cleaning of the rotor and stator. This retrofit could be accomplished onsite or in an authorized service facility where the motor could be properly cleaned, altered and returned to the plant for reinstallation. Cooling water for the TEAAC enclosure was supplied by the same system which currently supplies water to the Sleeve Bearings, making the field modification relatively uncomplicated and inexpensive.

Quantify the End Result Value

In the current configuration, the motor must be removed annually for cleaning in a service facility. The cost of this service and the associated local cost for removal and transportation is approximately \$20,000 annually. Conversion of the current motor to TEAAC would cost \$75,000. After the retrofit, the motor would no longer require frequent removal for service. The avoidance of 13 days of downtime in this facility is worth over \$4,000,000.



TEAAC Motor on Fan Application



TEAAC Motor on Test Stand

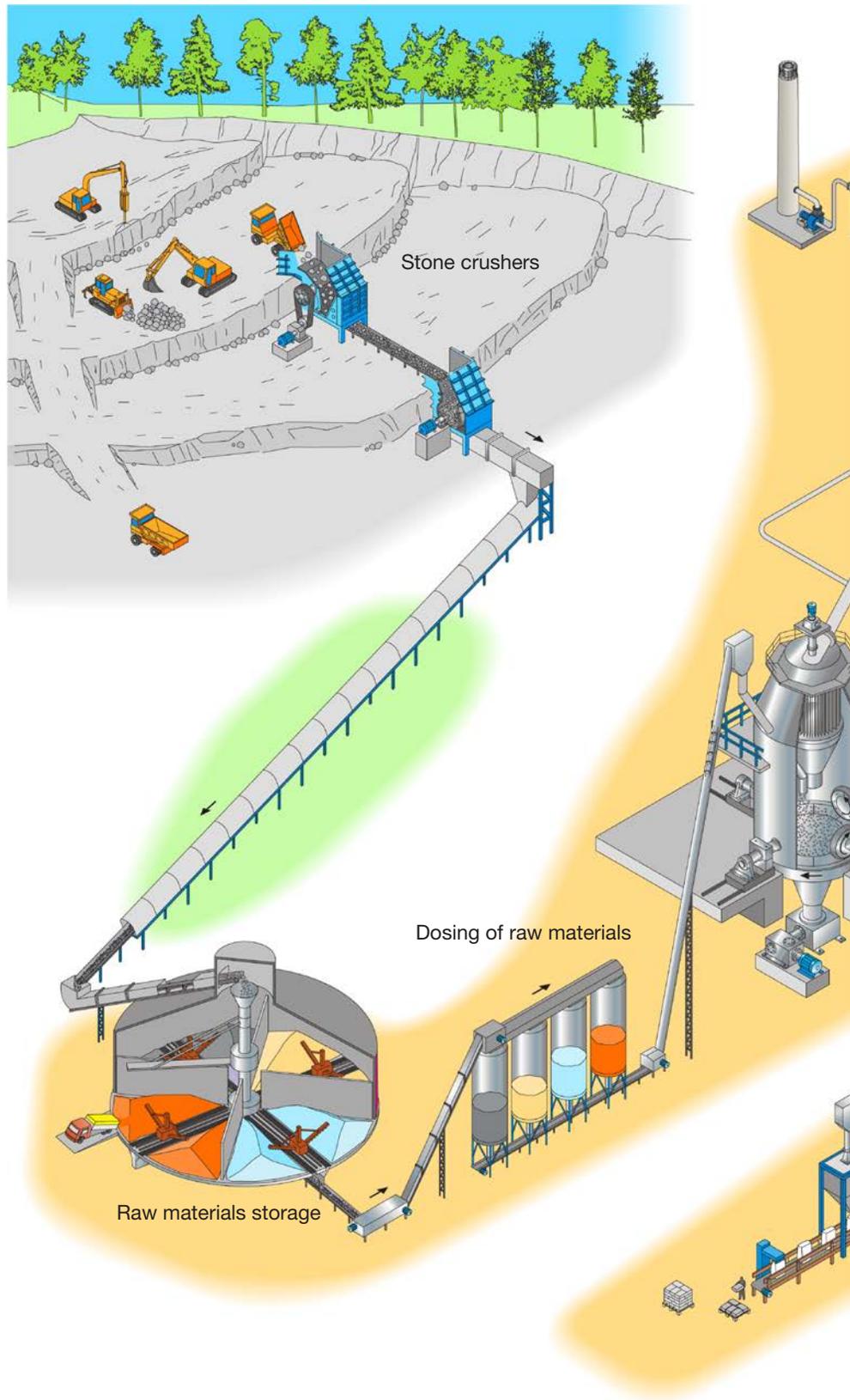
Baldor Cement Products

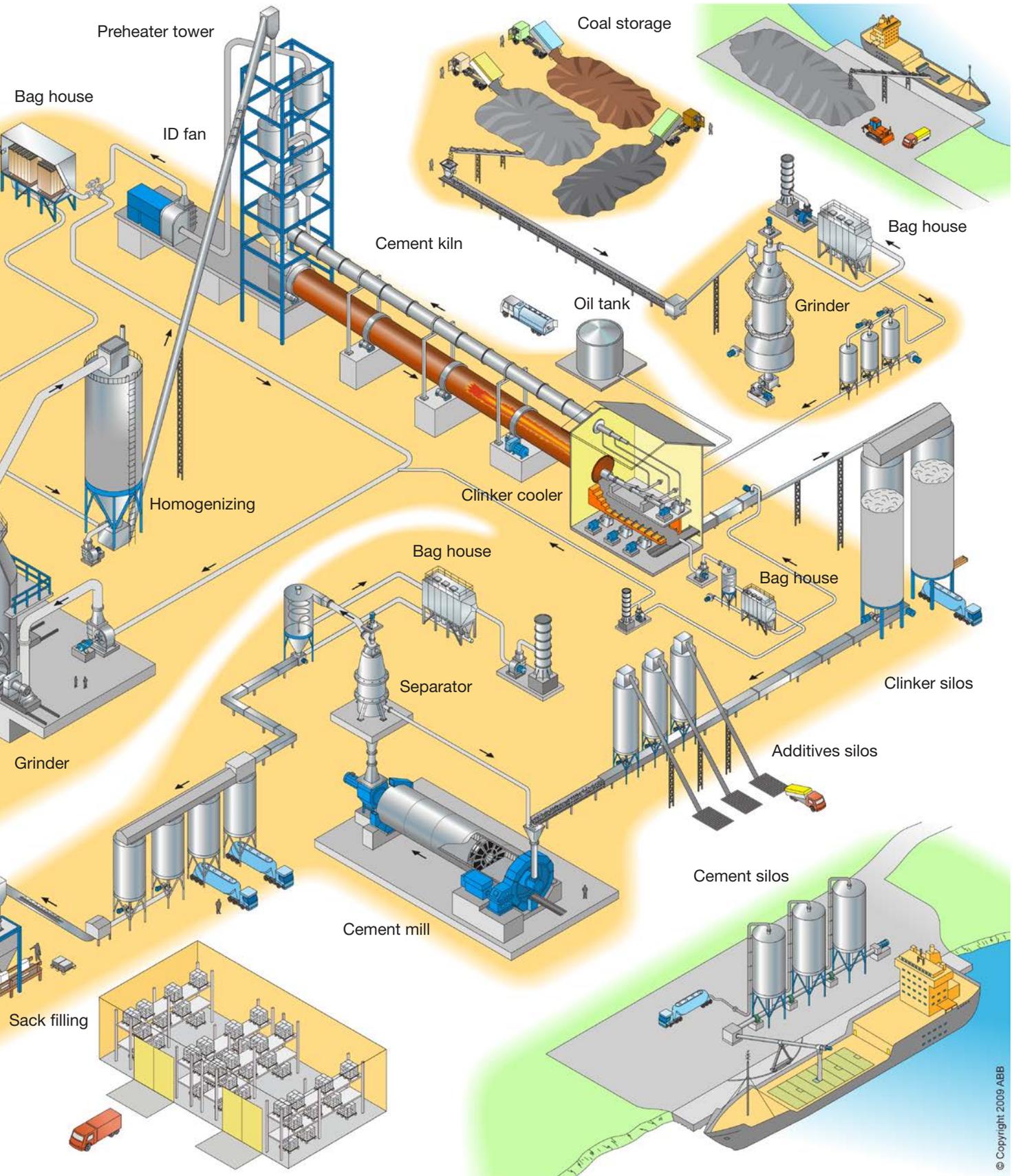
Cement Production Map

The production of cement requires precise control of the chemistry and the raw material manufacturing process. Producers are challenged to carefully balance process, environmental responsibilities, and cost to maintain a sustainable operation.

Baldor offers solutions that help cement producers meet today's challenges with ABB variable frequency drives (VFD) for medium, low and high voltage applications, ABB robotics for packing and palletizing, Baldor•Reliance energy efficient motors, and the Baldor•Dodge line of bearings, gearing and mechanical power transmission components including pulleys, couplings, and sheaves.

For well over a century, Baldor brand products have helped the cement industry increase productivity and profitability of their operations. By focusing on the cement industry and concentrating on its specific needs, we have developed innovative product solutions and advanced technologies that help improve output, reduce energy consumption, and reduce life cycle costs.





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Solutions for the

Cement Industry

The harsh duty environments of a Cement Operation requires a reliable Open Control System and products that ABB and Baldor Electric deliver.

Productivity

Baldor offers a wide variety of product solutions that increase uptime and prevent unnecessary downtime. With long warranties on our motor product line to higher AGMA ratings that exceed those of our gearing competition, and bearings with improved seal design that pull on and pull off the shaft, our products have the features and benefits that have stood the test of time. Robotics saves manpower and never need a lunch break for palletizing operations. ABB generators offer options for emergency power generation and UPS.

Energy Efficiency

Cement production is an energy demanding process, and producers are always examining ways to reduce energy consumption and optimize their operational efficiency.

ABB Variable frequency drives (VFD) are a world leading brand and provide unrivaled energy efficiency. VFD's reduce the need for fan damper control, creating substantial energy savings. Our product line of VFD's are used on applications including feeders, conveyors, process fans, grinding mills, kilns, and separators, which make the process control fast and simple.

ABB VFD's offer:

- Energy savings
- Reduced harmonics
- Higher process control and efficiency
- Increased throughput

The Baldor•Reliance Severe Duty motor line offers a variety of choices. These motors are designed to operate at any cement plant application and are inverter ready. There are motors for severe duty applications including Quarry Duty, Crusher Duty, and Explosion-Proof.

Total Solutions Approach

Baldor's approach has always been to help the end user reduce their life cycle costs. Our products are designed for longer life, are easy to install, and are durable. Our Industry Solutions team is dedicated to the industry with actual industry experience. They understand the challenges and concerns of the cement industry. They have an in-depth understanding of your application needs including crushers, conveyors, kiln drives, separators, and process fans.

Services

Our products are engineered with proven industry driven designs and patented technology that ensure greater uptime and the lowest life cycle costs. If reducing energy costs is the goal, an Installed Base Evaluation (IBE) of your operation can target key applications and determine the payback of a new, more energy efficient motor or provide the energy savings data and value of using a VFD.

VFD Drives

ABB manufactures drives that can be matched to the particular process and application. Significant energy savings can be achieved using variable frequency drives (VFD). Choosing a drive versus a mechanical damper can optimize the system for reduced energy demands on fans and pumps. ABB drives are designed for easy installation and high reliability.

Electrical Motors

When you need efficient and reliable motors that start first time and every time, look to Baldor for the solution. Baldor has the energy efficient motors to meet the needs of the industry, from crushers, conveyance, raw and finish mills, storage of clinker and bagging operations. Baldor•Reliance motors have high service factors and have regreasable bearings. Our electrical solutions help minimize the impact of higher energy costs.

Mechanical

Baldor offers a complete line of reliable, rugged mechanical components. Baldor•Dodge mechanical power transmission products have a long and proven track record with the cement industry. From Sleeve bearings to MagnaGear XTR gearing, we have robust products that provide solutions in your demanding industry.

Robotics

In this ever-changing economy when finding qualified personnel is challenging, and jobs require repetitive and consistent work actions, ABB Robots perform. In addition, utilizing robots can increase up-time and total throughput for bagging and palletizing applications. Robots are also a preferred alternative for mill sampling at the lab, to help maintain quality and consistence of the cement. They offer flexibility, reliability, and easy integration into your system.





Severe Duty Motors

TEFC and TENV - Super-E® – XT/XEX – IEEE 841 – 661XL

- 1/3 - 500 hp, IEEE: 1/2 - 250 hp
- Cast iron frames
- Inverter capable on specified models
- Standard, EPAct, NEMA Premium® efficiencies
- IEEE 841 – Inpro/Seal® on fan and drive end shafts
- 1 through 250 hp stock; to 500 hp custom
- Quarry Duty Motors with Design C Torque



Above NEMA Motors

- 250 through 15,000 hp
- NEMA or IEC specifications
- 460 through 13,800 volts
- API 541 or 547 available
- Anti-friction or sleeve bearings
- Through 1,500 hp stock



Drives and PLCs for all facets of the Cement Process

ACB330, ACB530, ACS880 and ACS2000 Series Products

AC & DC drive solutions available through:

- 7500 HP in low voltage (230, 460 and 575 Vac)
- 2000 HP in medium voltage (4160 Vac)
- Over 20,000 HP for high power DC motors
- Easy configuration and operation with or without an encoder
- Onboard process control and system interface options available



- Consistent actions for Laboratory testing
- Palletizing completed accurately
- Repetitive tasks made simple

Baldor•Dodge® Sleeveoil® RTL hydrodynamic bearings can be found on fan applications throughout cement plants. This bearing is an ideal choice because the liner design offers excellent radial and thrust load capacities and exceptional bearing life with minimal maintenance. This standard water-cooled unit is premachined for thermocouples, a vibration sensor, circulating oil and auxiliary seals to allow for monitoring and extra protection.

Plant reliability engineers have stated that there have never been any issues with these bearings and that they only require maintenance once per year to drain and replace a small amount of oil. Because of the design, these bearings reduce maintenance and never have major issues in fan applications, even in the dusty environment of a cement plant.



ISAF HYD Spherical Roller Bearings

- Patented integral hydraulic mounting and dismounting
- Built in taconite style seals in addition to conventional rubbing seals
- Four-bolt pillow blocks 5-7/16" through 15"
- 22232K through 23176K double row spherical bearings
- Ductile iron housings
- ISNX metric dimensioned housing also available

Imperial IP Spherical Roller Bearings

- Industry's only push/pull adapter mount system
- Available in 2-bolt and 4-bolt pillow blocks, flanges, and take-ups
- Accepts commercial tolerance shafting
- Full concentric shaft attachment with adaptor sleeve mount
- Virtually eliminates fretting corrosion
- Capable of withstanding static or dynamic misalignment of $\pm 1^\circ$
- Installation and removal in less than 15 minutes



ISAF Bearing

- Patented ISN "Push/Pull" adapter mounting system
- Eliminates need for feeler gauges
- Easy removal
- Expansion & non-expansion, field convertible
- Triple lip contact seals for wet or dirty applications
- Labyrinth non-contact seals for high speed & high temperature applications



TAF Tapered Roller Bearings

- Tapered rolling elements
- Completely assembled, factory adjusted, and properly lubricated – shaft ready
- Extra protection – E-TECT seal option
- Comparable mounting dimensions with ball bearings
- E-XTRA allows easy upgrade from ball bearings



Type EXL Tapered Roller Bearings

- Type "E" mounting dimensions
- Bore size available from 1-3/16" to 5"
- Splithoused, 2 & 4 bolt pillow blocks
- Expansion & non-expansion
- XTS-triple lip sealing system
- High strength ductile iron housing



Magnagear XTR for Raw Material

- Parallel shaft right angle configurations available
- Torque capacities from 100,000 to 2,000,000 lb-in available
- Global product design to fit all markets



Quantis ILH, MSM and RHB C-Face Reducers/ Integral Geared Motors

- 8 sizes
- Fractional to 75 hp
- Ratios: 1.41 to 359.30
- Up to 123,914 (lb-in) torque
- Mounting flexibility
- Direct coupled



Motorized Torque-Arm® II

- Heavy Duty AGMA rated design
- Tapered roller bearings on all helical shafts
- Premium HNBR oil seals
- Reduced assembly time
- Reduced guarding costs
- Reduced maintenance requirements
- Two motor speeds and multiple gear ratios provide a wide spectrum of output speeds
- Standard and short shaft twin-tapered bushings
- Industry leading backstop design
- Rugged, high efficiency, case carburized helical/bevel gearing



Torque-Arm™ II Shaft Mount Reducers

- 12 new reducer sizes with modular accessories
- All reducers can be shaft mounted, screw conveyor, vertical, and flange mounted
- Horsepower ratings through 400 hp
- Torque ratings through 500,000 lb-in
- Standard 5, 9, 15, 25, and up to 40:1 gear ratios
- Nearly 300:1 speed reduction with V-belt drives
- Twin-tapered bushing bores: 1" through 7"
- Highly efficient helical gearing
- Meets or exceeds AGMA standards, including 5,000 hours L10 life and 25,000 average hour life
- New heavy duty lip seals for extended wear life, -40° to + 300° F
- 100% factory noise and leak tested
- New metal shield sealing system with excluder lip



Sheaves

- Manufactured in North America using the highest quality materials and standards
- Designed for harsh environments
- Sheaves, synchronous sprockets, bushings and belts connect the driver and the driven components



System-1

- System-1 packages utilize all Baldor products
- Optimized design and product selection of all Baldor products
- Competitive solutions with package pricing
- Pre-assembled packages for ease of installation
- Project coordination to final destination



Pulley Assemblies

- Pulley assemblies fit CEMA dimensions and exceed the CEMA application standards by three to five times
- One-piece integral hubs eliminate welded hub heat-affected zones (HAZ)
- 360° welding of internal center disc
- Up to 1" (1/2" on wing) vulcanized 45, 60, and 70 durometer SBR and 45, 60, and 70 durometer Neoprene rubberlagged with plain and groove surfaces
- Crowned or straight face
- Vulcanized 60 durometer D-Lag with 73% more abrasion resistance than 60 durometer SBR
- MDX® Wing pulleys designed for use with MDX Drum pulleys
- Rugged wing-on-drum construction incorporating 2" x 3/4" thick contact bars and 3/8" thick wings



Para-Flex®, Grid-Lign®, Gear, Rigid and Fluid Couplings

- Baldor offers 10 different types of Elastomeric and Metallic couplings
- Torque ratings ranging up to 1,000,000 + lb-ins (113 kN-m)
- Bore sizes up to 12+ inches
- Shaft mounting available with clearance fit, interference fit, bushings (QD, Taper-Lock® and Grip-Tight)
- Application specific couplings: spacer, flywheel, floating shaft, mill motor
- Rigid moment coupling for rigid mounting Baldor•Dodge Magnagear to conveyor shafts.
- Single/multiple delay-fill and control fill fluid couplings available.

MISSION

**Our mission is to be the best (as determined by our customers)
marketers, designers and manufacturers of industrial electric motors,
drives and mechanical power transmission products.**



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