

Crushing Systems



One Source

Crushing, screening, feeding and plant solutions

FLSmidth crushing system capabilities



FLSmidth is more than just an equipment supplier, we are a solutions provider. We offer extensive global leading equipment lines for complete flowsheets.

FLSmidth has created an unmatched portfolio of accomplishments by combining the proven reliability and quality of the industry's leading brands: ABON, Buffalo, CEntry, Conveyor Engineering, Dawson Metallurgical Laboratories, Decanter Machine, Dorr-Oliver, EIMCO, Essa, FFE, Fuller-Traylor, KOCH, Knelson, Krebs, Ludowici, MAAG Gear, Mayer Bulk, M.I.E. Enterprises, Möller, MVT, PERI, Phillips Kiln Services, Pneumapress, RAHCO, Raptor, Roymec, Shriver, Summit Valley, Technequip, WEMCO, Vecor, and Ventomatic.

FLSmidth integrates testing, detailed design engineering, global procurement, expert process control and localized services to ensure fully customized solutions for our clients. Along with equipment, FLSmidth provides the support you need to be sure that your plant gets up and running quickly and stays maintained for maximum performance.

FLSmidth equipment, whether it is our gyratory or cone crushers, Ludowici screens or feeders, has continuously withstood the harshest requirements found in the world's mines and rock quarries for over a century. Our equipment delivers the rugged dependability needed to keep your plant running while delivering the results you're looking for.

With improved safety, maintenance and performance features, FLSmidth allows you to get more out of your operations with higher reliabilities and safer maintenance.

FLSmidth's Minerals division combines heritage equipment with successful track records under one roof, enabling our customers to access the best technology and processes for their projects. The crushing & screening products within the mineral processing portfolio provide our customers with the a variety of options in developing a best-in-class solution to their process, whether is it for a mine, quarry, or construction site.

FLSmidth's expertise can help to develop the best solution for your project. We are capable of going from raw material testing, to installation and commissioning for a project of any size anywhere on the globe. Although FLSmidth prides itself on large minerals processing plants, it has also used this expertise to develop smaller flowsheets and equipment for all crushing and screening applications. FLSmidth's capabilities currently extend from large fixed plants to mobile / semi-mobile and also portable plants for our smaller sized equipment. All supplied equipment is available as a standard design or customized for a specific application and location.

Once the equipment has been installed and commissioned, FLSmidth's Operations and Maintenance group can assist with all of our a customer's needs. We have the capabilities of operating and servicing a plant, providing training to personnel, process optimization, or simply provide support for our customer on as as-needed basis.



Products	Available Configurations		
	Portable	Mobile & Semi-Mobile	Fixed
Gyratory crushers		■	■
Jaw crushers	■	■	■
ABON sizers		■	■
Cone crushers	■		■
Impact crushers	■		■
Screens	■		■

Gyratory crushers



FLSmidth's legacy of quality crushers dates back to the Traylor and Fuller-Traylor gyratory crushers of the early 1900s. FLSmidth crushers have continuously withstood the harshest requirements found in the world's mines and rock quarries. Through constant and continual improvements in engineering to meet customer needs, FLSmidth is a proven and preferred crusher supplier throughout the industry.

Design

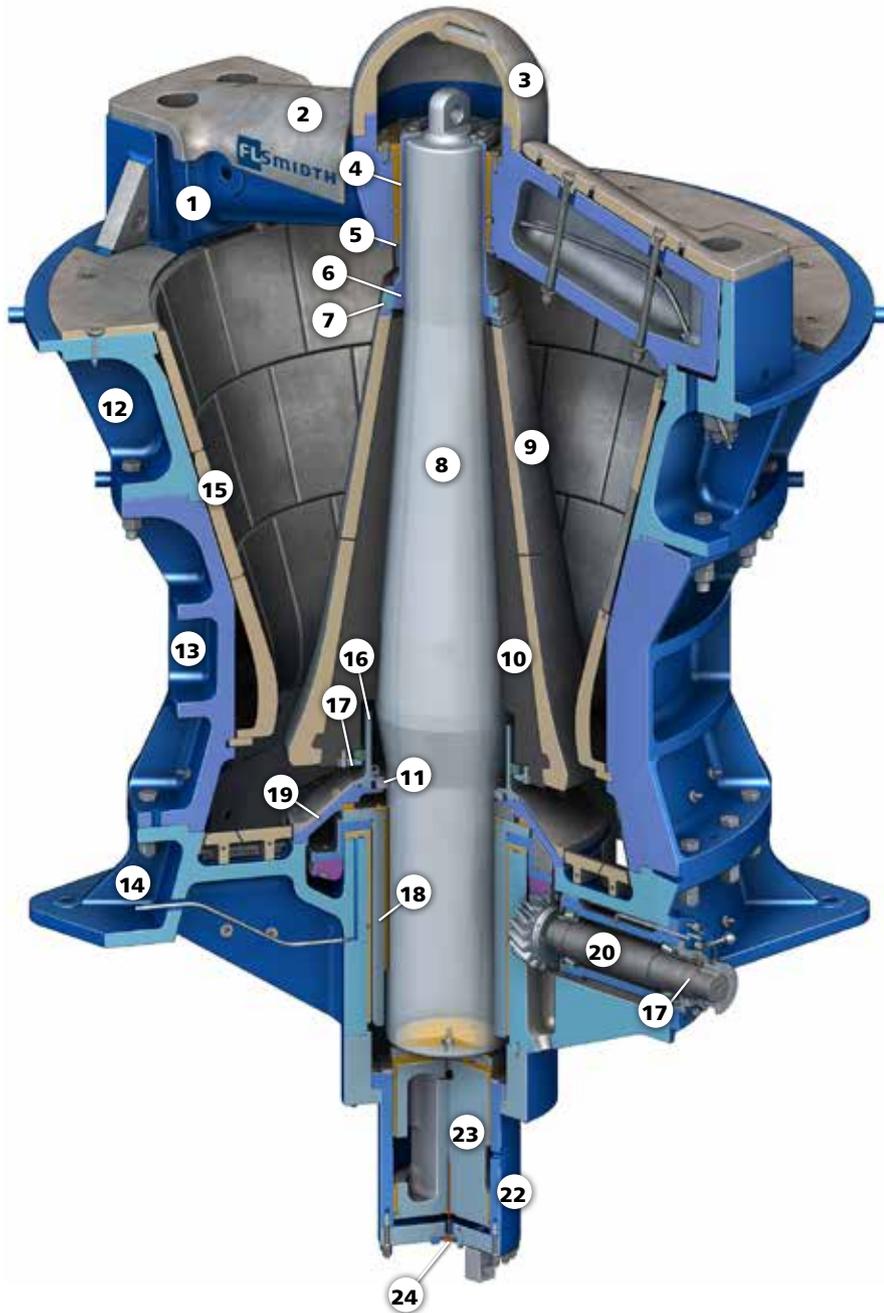
Both the bottom service (NT) and top service (TS) crushers are available from FLSmidth to meet any process requirement. Machines are available for surface or underground installations (in standard or split-shell configurations), for stationary, mobile or semi-mobile operations, and for applications in climates that range from tropical to arctic.

Performance

The TSU, top service, ultra-duty model, with its larger motor and heavier components can allow for process optimization (greater throughput/higher reduction) after installation.

Maintenance

The TS gyratory crusher is distinguished from other gyratory crushers by its revolutionary design which allows major service and maintenance functions to be safely performed. The top service feature greatly simplifies safety procedures, reduces costs and helps to increase availability for the equipment over more traditional bottom service crushers.



- | | |
|------------------------------|---------------------------------|
| 1. Spider | 15. Concave |
| 2. Spider Arm Shield | 16. Dust Seal Bonnet |
| 3. Spider Cap | 17. Dust Seal Assembly |
| 4. Spider Bushing | 18. Eccentric Assembly |
| 5. Spider Grease Seal | 19. Gear Cover Assembly |
| 6. Threaded Mainshaft Sleeve | 20. Countershaft |
| 7. Headnut | 21. Countershaft Taconite Seals |
| 8. Mainshaft | 22. Hydraulic Cylinder Assembly |
| 9. Mantle | 23. Hydraulic Piston Assembly |
| 10. Mantle Core | 24. Mantle Position Indicator |
| 11. Split Contact Oil Seal | |
| 12. Top Shell | |
| 13. Middle Shell | |
| 14. Bottom Shell | |

Available TS Crusher Sizes (mm)

900 x 1400
1100 x 1800
1300 x 1800
1400 x 2100
1600 x 2400
1600 x 2900
1600 x 3000

Features

- **The bar-type spider's** 4-bolt design reduces the amount of time required to remove and its slim design reduces the overall amount of space necessary during maintenance.
- **The countershaft assembly** is rotatable to allow for fine adjusting of gear mesh during installation and includes self-adjusting bearings that do not require maintenance of pre-load.
- **Top serviceable eccentric and hydraulic piston** are faster, more efficient, and safer than a traditional bottom service gyratory crusher.
- **Threadless mainshaft** design improves strength by minimizing peak stresses during demanding crushing operations.
- FLSmidth designs **custom chamber profiles** for each application and customer requirements.
- **Integral mainshaft lifting eye** ensures that it is never misplaced.

Jaw crushers



FLSmidth's history with the design and manufacture of jaw crushers dates back more than 100 years with the Traylor and Fuller-Traylor double toggle jaw crushers. FLSmidth is proud to add their new line of single toggle jaw crushers, the TST, to the heritage the double toggle crushers established.

Design

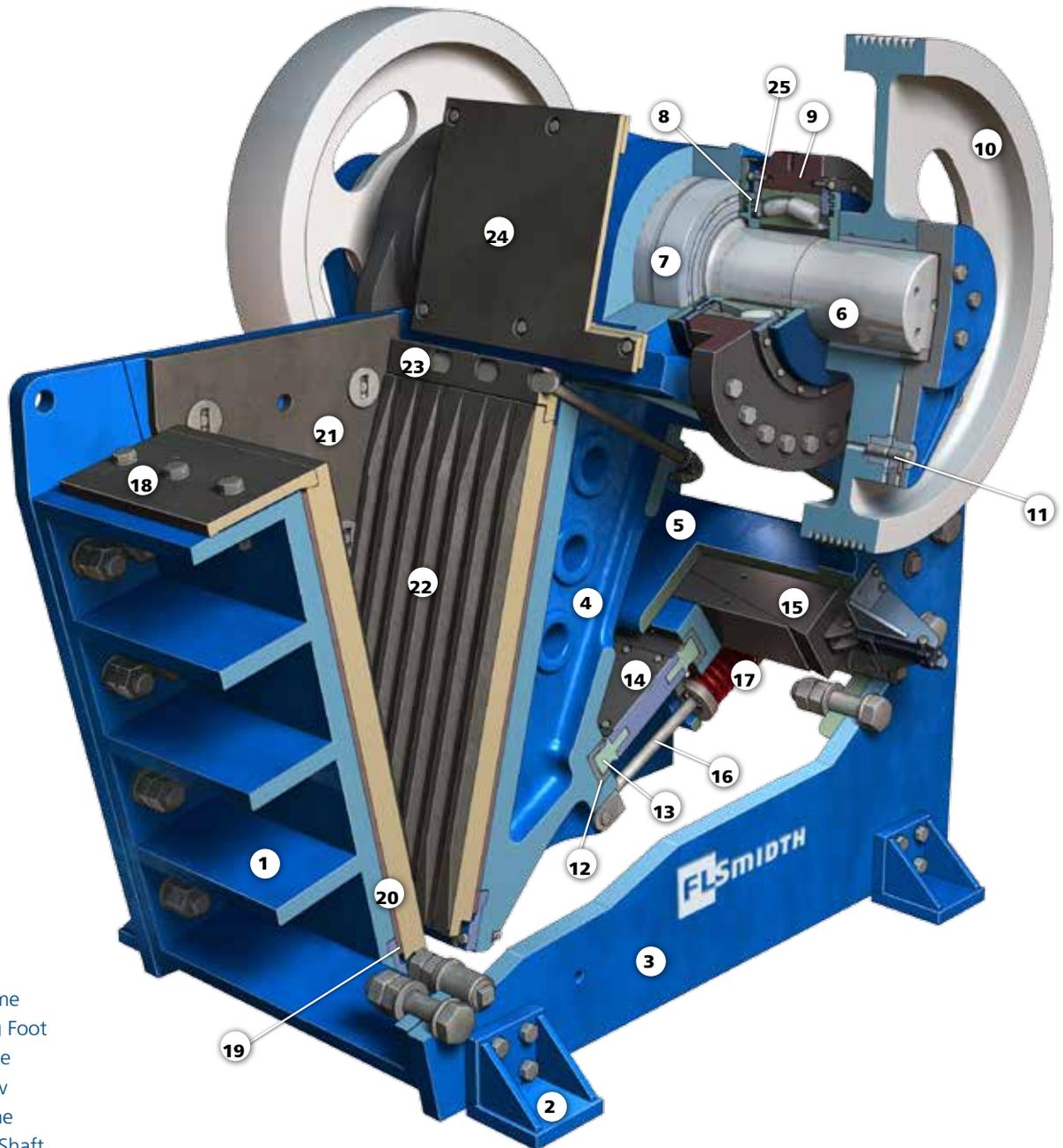
The TST jaw crushers are engineered for trouble-free operation, characterized by safe and easy serviceability. The most modern analysis techniques and features available to date ensure a strong and reliable crusher design. The TST is equipped with an efficient crushing motion, modular frame and a simple, low maintenance design to handle increasingly hard ores and remote site locations.

Performance

An often overlooked, but very important, characteristic of the single toggle jaw crusher is its kinematic design. FLSmidth's chamber design enables the TST to efficiently crush hard material via a combination of shaft eccentricity, toggle angle and chamber layout. The steep nip angle enables the units to easily crush the hardest rock at high production rates, while maintaining the necessary product size.

Maintenance

The TST design utilizes a tramp relief shear pin (FLSmidth's safety pin) which, when un-crushable material is encountered, shears and protects the crusher. The safety pin works by removing the flywheel's kinetic energy from the crusher shaft, thus preventing overstressing the crusher. This feature greatly simplifies safety procedures over more traditional/breakable toggle jaw crushers.



- | | | | |
|----------------------|-----------------------------|------------------------|--------------------------|
| 1. Front Frame | 12. Replaceable Toggle Seat | 17. Tension Rod Spring | 21. Cheek Plate |
| 2. Mounting Foot | 13. Toggle End | 18. Jaw Retainer | 22. Jaw Plate |
| 3. Side Frame | 14. Toggle Plate | 19. Replaceable Tip | 23. Retaining Wedge |
| 4. Swing Jaw | 15. Adjustment Wedge | 20. Backing Plate | 24. Swing Jaw Wear Plate |
| 5. Rear Frame | 16. Tension Rod | | 25. V-Ring Seal |
| 6. Eccentric Shaft | | | |
| 7. Roller Bearings | | | |
| 8. Labyrinth Seal | | | |
| 9. Bearing Cap | | | |
| 10. Flywheel | | | |
| 11. Safety Shear Pin | | | |

Available TST Crusher Sizes

TST1100

TST1200

TST1400

TST1550

TST1900

Features

- FLSmidth's bolted and pinned frame assembly comes together for a very strong and robust design
- Swing jaw & front frame employ replaceable jaw plate holders in the event of wear.
- Rolling toggle design and replaceable abrasion resistant toggle seats provide long life
- Hydraulic cylinder wedge adjustment takes up wear seen on the jaw plates
- Safety shear pin provides faster and safer maintenance than a typical breakable toggle plate
- Spherical roller bearings use a multi-pass labyrinth and grease to minimize dust and dirt ingress

ABON™ low speed sizers



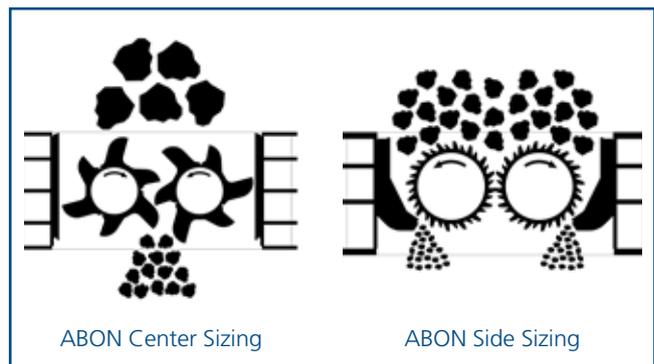
FLSmidth ABON has been manufacturing low speed sizers since the mid-1960s. The sizers are successful in multiple applications and are often the preferred choice in iron ore, coal and bauxite applications.

Design

ABON sizers are built using the highest quality components and highest design standards. This combination results in a robust design and a dedicated customer base.

Performance

Low Speed Sizing is one of the more unique crushing technologies in the world today. A combination of high torque and low roll speeds with a unique tooth profile in the ABON equipment leads to a specified product with a minimum of fines creation.

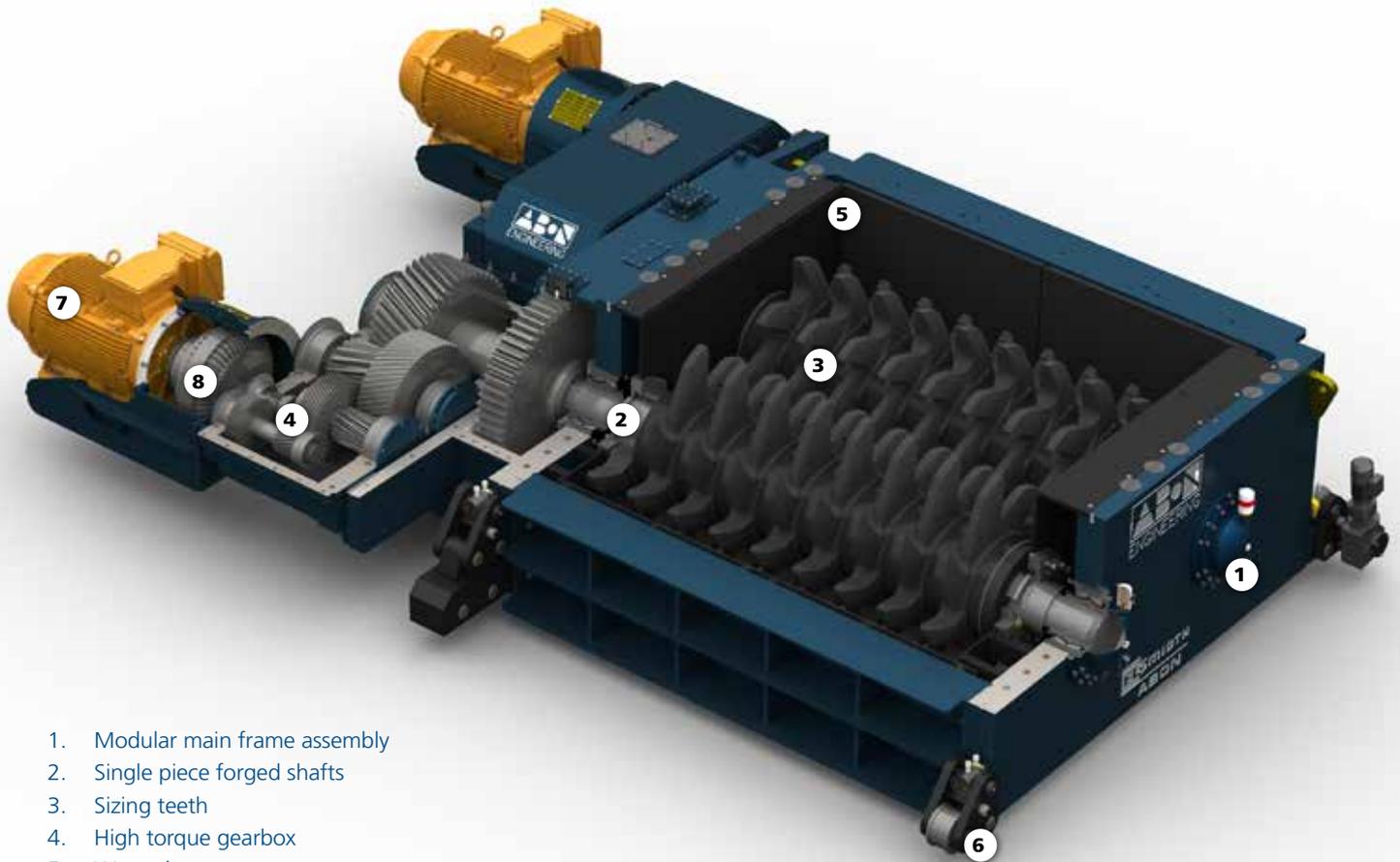


Maintenance

The sizer teeth are fully adjustable and maintainable to allow for accommodating changes in process. The can easily be taken apart and moved without any specialized tools.

Features

- ROM feed size up to 2,000 mm
- Capabilities in excess of 12,000 mtph
- Insensitive to clay and sticky materials
- Pre-scalping of undersize not required
- Exceptionally low headroom requirements
- Environmental features of low noise, low dust and minimal fines creation
- Simple Infrastructure requirements due to minimal dynamic loads placed on surrounding supports and structure
- Long wear life of consumable elements due to positive bite and minimal feed slip
- Largest sizer models supplied and operating on the market
- Ideal for In Pit Crushing & Conveying (IPCC) systems



1. Modular main frame assembly
2. Single piece forged shafts
3. Sizing teeth
4. High torque gearbox
5. Wear plates
6. Wheel assemblies
7. Drive motor
8. Safety coupling

Raptor® cone crushers



Raptor® cone crushers have been proven in some of the most demanding applications worldwide. No matter the application (aggregate, minerals, pebble), the Raptor cone crushers offer more flexibility in production to meet customer requirements.

Design

Raptor cone crushers have been designed with input from plant operations and maintenance people around the globe. This input has led to many designs and features that reduce maintenance time and increase production.

Raptor cone crushers' critical load bearing components meet specifications that typically exceed what is commonly offered in a conventional cone crusher. Our major components are cast of high grade steel, and our eccentric material selection provides greater certainty of a reliable

surface finish, even after many years of service.

Performance

FLSmidth's Raptor cone crushers are designed to be the most productive units on the market. The crushers are equipped with a high pivot point design that allows for greater crushing force and contributes to improved throughput and better reduction.

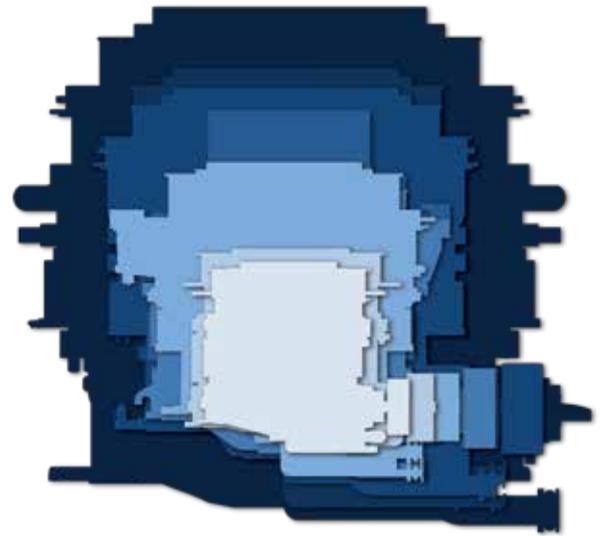
Maintenance

New Raptor cone crushers have been designed to give better access to the inside of the crusher through features like Main Frame Inspection Doors, Cartridge Countershaft Boxes and the new Socket-less design.

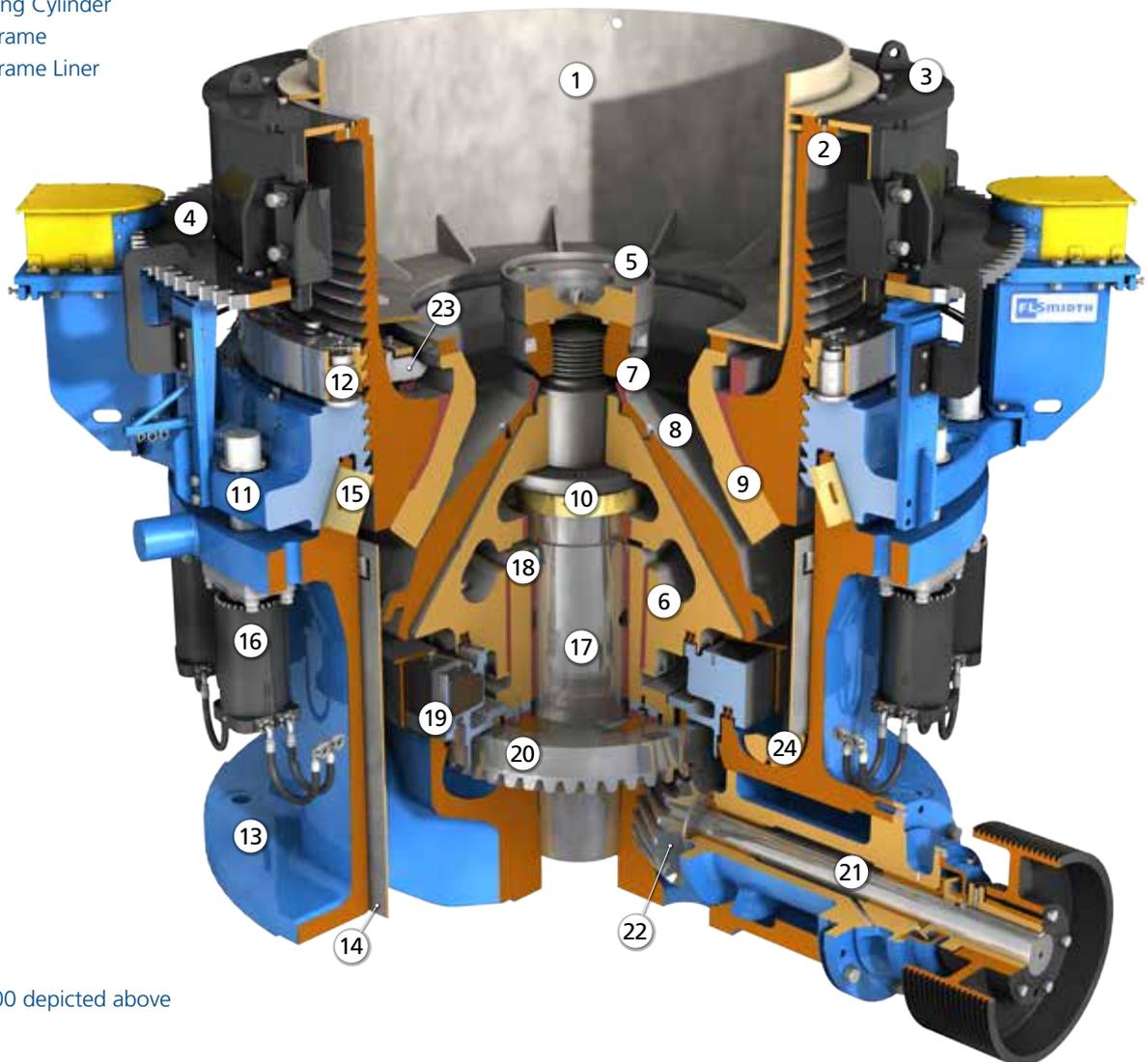
Features

- Integral counter shaft box ensures a stronger design and decreased dust ingress
- Socketless design facilitates eccentric assembly removal
- Fail-safe hydraulic system allows crusher to be operable after a failed piston
- Main frame inspection doors allow operator to view wear liners without disassembly or crawling underneath the machine

- | | |
|------------------------|----------------------------|
| 1. Hopper Assembly | 15. Main Frame Seat Liner |
| 2. Bowl | 16. Tramp Release Cylinder |
| 3. Adjustment Cap | 17. Main Shaft |
| 4. Drive Ring | 18. Eccentric |
| 5. Feed Plate Assembly | 19. Counterweight |
| 6. Head Assembly | 20. Gear |
| 7. Torch Ring | 21. Countershaft |
| 8. Mantle | 22. Pinion |
| 9. Bowl Liner | 23. Wedge |
| 10. Socket Liner | 24. Arm Guard |
| 11. Adjustment Ring | |
| 12. Clamping Cylinder | |
| 13. Main Frame | |
| 14. Main Frame Liner | |

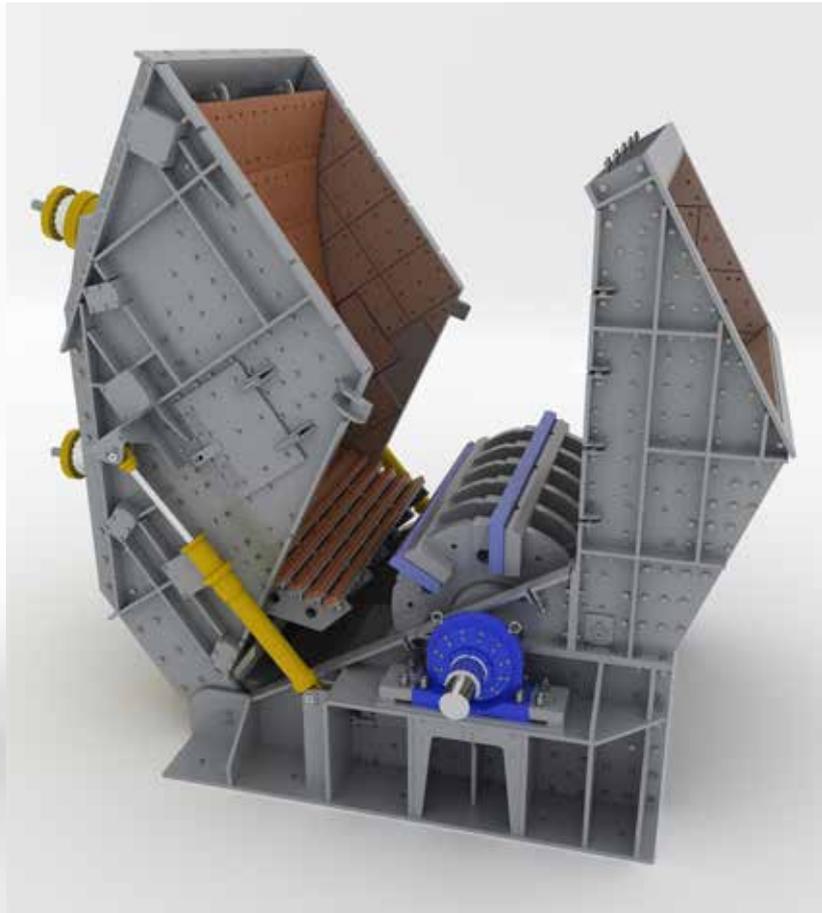


Raptor® cone crushers come in the following models: 200, 300, 400, 500, 600, 900, 1000, 1100, 1300 and 2000



Raptor® 1300 depicted above

FLSmidth® Strike-Bar™ crusher



The Strike-Bar™ crusher is FLSmidth's horizontal impact crusher designed for soft to medium-hard ores, mainly for primary applications.

Design

The FLSmidth Strike-Bar (SB) crusher is one of the newest products available through FLSmidth. Our extensive knowledge of impact and hammer crushers has been implemented in combination with the industry's most modern techniques, making this crusher one of the most cutting-edge designs on the market.

Performance

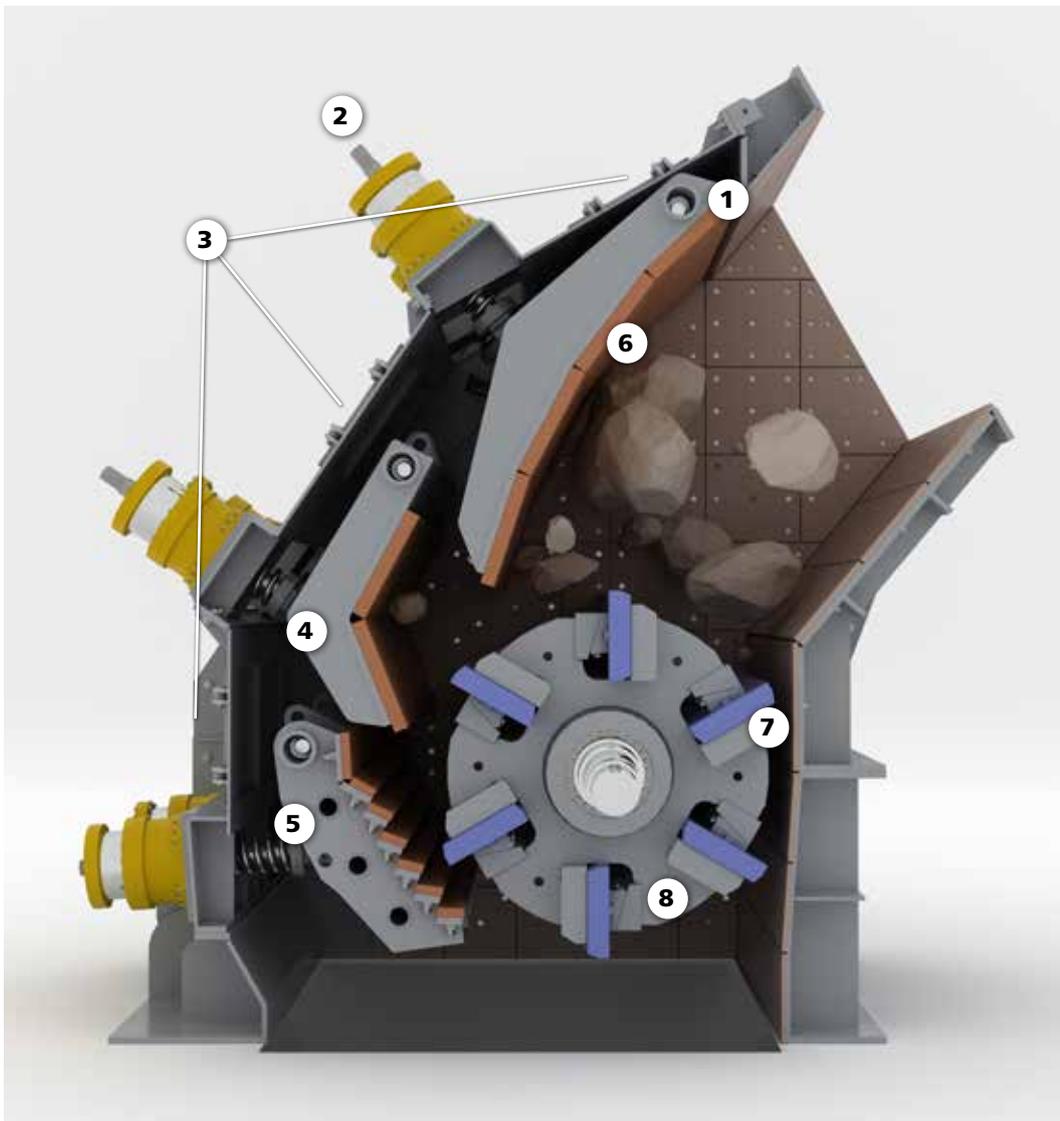
The SB crusher accommodates clay and sticky materials better than compression-type crushers. It provides high reduction ratios and top size control which produce a cubically shaped product.

Maintenance

Hydraulic cylinders open the rear housing section to provide complete and easy access to the internal wear parts. Additionally, the SB crusher has multiple, easy-to-access, maintenance doors and bolted wear liners for quick changeouts.

Features

- Achieves size reduction ratios up to 1:40
- The crusher requires little floor space and installation height
- The SB crusher is designed to simplify plant layout and reduce civil cost
- Final grinding plate effectively controls the top size of the crushed product and maintains a consistent flow to the conveyor
- Hydraulic opening of the breaker side provides easy access to the interior of the crusher
- The impact bars remain serviceable at >50% of their initial weight wear
- The hydraulic adjustable breaker plates allows compensating for wear on impact bars
- Using a gear unit instead of a V-belt drive facilitates maintenance



1. Breaker plate (primary)
2. Breakers plate adjustment
3. Maintenance access doors
4. Breaker plate (secondary)
5. Breaker plate (tertiary)
6. Wear liners
7. Rotor impact bars
8. Rotor

Ludowici® BRU™ linear motion vibrating screens



The BRU™ exciter driven linear motion screens have long life-span providing customers with confidence and maximum operational efficiency.

Design

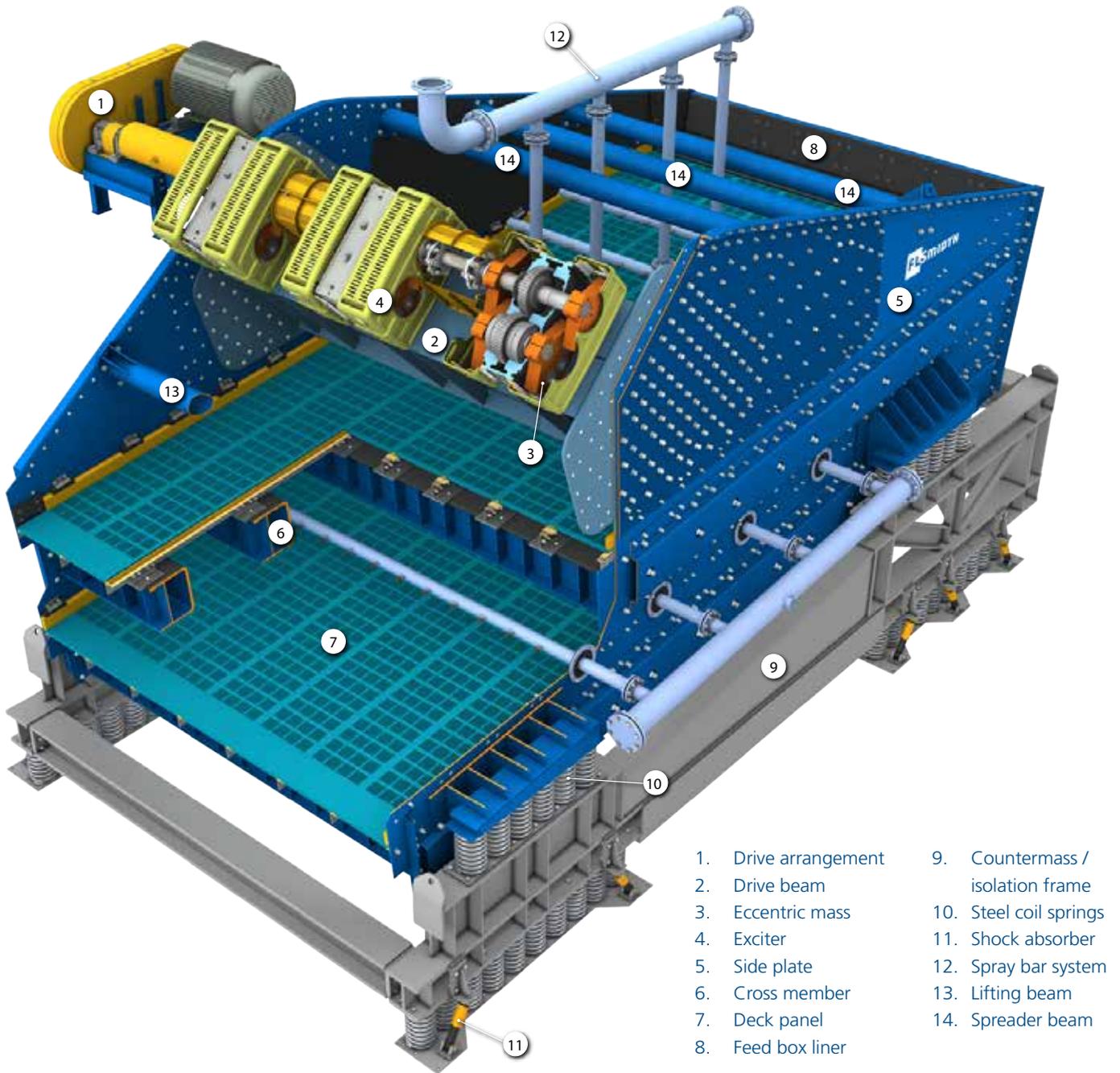
FLSmidth's BRU screens feature full continuous fillet welding and stress-relieving of all major fabricated parts and a full quality assurance and quality control system in line with world's best practices. These screens come in a wide range of sizes ranging from 0.9 m to 4.8 m wide and up to 11.0m long.

Performance

They are available in horizontal, multi-slope and inclined versions coupled with single, double and triple deck configurations. These are the largest size screens available to achieve the maximum possible capacity. FLSmidth technical experts are on hand to advise on the optimum screen size and configuration for any application.

Maintenance

All major components are computer generated ensuring spare parts will fit with ease. Worldwide spare parts network and service capability.



- | | |
|----------------------|----------------------------------|
| 1. Drive arrangement | 9. Countermass / isolation frame |
| 2. Drive beam | 10. Steel coil springs |
| 3. Eccentric mass | 11. Shock absorber |
| 4. Exciter | 12. Spray bar system |
| 5. Side plate | 13. Lifting beam |
| 6. Cross member | 14. Spreader beam |
| 7. Deck panel | |
| 8. Feed box liner | |

Features

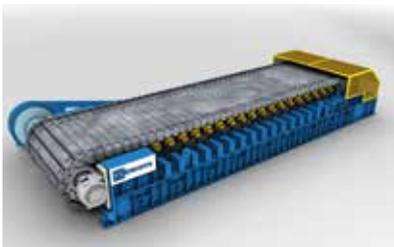
- Wide range of sizes with widths - up to 4.8 m wide and 11 m long
- High G-force operation of up to 5.0 for optimum screening efficiency
- Floor mounted on galvanized steel coil springs to give up to 98% vibration isolation
- Linear motion provided by the reliable 'Honert Brute Force' geared exciter
- Suitable for a large range of screen media including modular panels, cross tensioned screen cloths and bolted screen panels
- Available in single, double and triple deck configurations
- Available in horizontal, multi-slope and inclined versions

Feeders

FLSmidth offers multiple feeders to meet most customers' needs, FLSmidth produces heavy duty apron and grizzly feeders for primary ROM applications as well as medium duty apron, grizzly and pan feeders for crushed primary or secondary feed.

FLSmidth has supplied feeders for more than 65 years and continues to modernize their design to meet the demands of the industry. The rugged and reliable construction makes installations easy to operate and maintain, and only a minimum of operator attention is required. The feeders are designed for uninterrupted service.

Equipment	Application		
	Primary	Secondary	Tertiary
Apron Feeder	■	■	■
Ludowici BRU	■		
Ludowici PGM		■	■
Belt Feeder		■	■
Rollerscreen		■	■
Feeder Breaker	■		



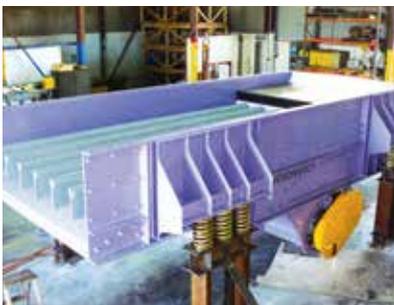
Apron Feeders

FLSmidth offers horizontal and inclined Apron Feeders for extracting bulk materials from under a dump hopper or regulated feed to a crusher. Apron Feeders can provide volumetric feed and even metering to prevent flooding. They can also provide a constant mass feed if there is feedback from a beltscale.

FLSmidth apron feeders come in different sizes for any feeding application.

Features

- Main frame construction designed to absorb impact when loading big lumps
- Effective take-up system to ensure constant chain tension
- Available with either an electromechanical or hydraulic drive
- Can be installed horizontally or on an incline
- Aprons and chains can be accessed from the take-up end of the feeder for inspection and replacement



Eccentric shaft – linear motion pan feeders and grizzly feeders

The Ludowici® PGM range is a medium and heavy duty design of linear motion pan feeders and grizzly feeders. It offers powerful straight-line motion through geared mechanism drive and a high G-force action to guarantee maximum efficiencies.

Features

- Widths and lengths to suit all applications
- Grizzly bars can be incorporated later if required
- Horizontal or declined configuration with fully lined pan
- Wear resistant grizzly bars
- Fully replaceable pan wear liners
- Linear motion provided by the Malco dual eccentric shaft mechanism



Exciter driven pan feeders and grizzly feeder

The Ludowici® BRU™ model grizzly feeders are used in primary sizing applications. The machines are specifically designed to handle large material lump sizes at high feed rates. Operating at up to 5.0 G-force, the grizzly feeders are guaranteed to minimise pegging and deliver efficient separation.

Features

- Wide range of sizes with widths up to 3.6 m
- Extra-heavy duty design and driven by our proven exciter mechanisms
- Deck cross-members are individually bolted for ease of replacement
- Guaranteed maximum positive displacement and material throughout
- High G-force performance provides increased capacities and efficient separation

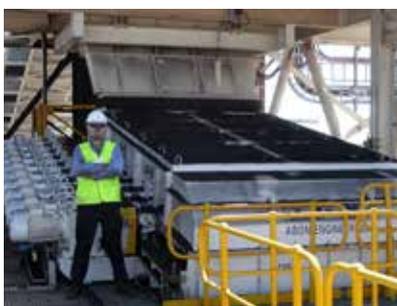


Belt feeder

FLSmidth's references include several of the world's largest belt feeders. Well known for their ruggedness and ease of maintenance, we have custom designed and developed belt training systems and take-up mechanisms to better handle the arduous duty under which a belt feeder operates.

Features

- Specially designed belt training systems and take-up mechanisms for arduous duty
- World's largest belt feeders with widths up to 3150 mm and capacities in excess of 12,000 tons per hour
- Variable frequency drives for high tonnage feeder applications



Rollerscreen

FLSmidth offers rollerscreens to feed crushers and sizers while removing undersize material from the feed stream. Rollerscreens are typically used for size separation when the feed characteristics prevent the use of traditional vibrating screens. They are ideal for applications with high moisture levels and/or sticky feed.

Features

- Insensitive to wet / sticky feed
- Independently driven shafts eliminates chains and belts
- Self-cleaning disc arrangement
- Adjustable disc settings for easy wear-part replacement and screen size modifications
- Roll-out maintenance design



Feeder breakers

FLSmidth offers flight-bar feeders, flightless-feeders, and feeder breakers for truck-fed, loader-fed, and dozer-fed applications. The FLSmidth Buffalo line of feeders and breakers are ideal for low-height applications such as underground mining, and also open-pit reclaim operations. This equipment can be supplied for fixed or semi-mobile installations.

Features

- Flightless feeders continue to operate with a damaged chain
- Low head height
- Capacities of 100 to 3,000 mtph
- Electromechanical or hydraulic drive options

Testing & services



Plant & field services

FLSmidth is your One Source for spare parts, service, maintenance, asset management and operational services. Our Customer Services support mineral processing equipment and systems including raw material testing, process design, equipment installation, troubleshooting, process and mechanical analysis and commissioning of new plants.

Customers are our most important assets. Once we have designed and installed your processing systems, we do everything possible to ensure that those systems continue to operate at optimum levels, all the time. We deliver on this promise.

Technical services

- Erection & commissioning
- Operations & maintenance
- Expert services
- Technical assistance
- Training

Operation and maintenance

Our Customer Services experts have the know-how to help plan your preventive maintenance and shutdown programs, manage scheduled repairs, and can even implement these programs for you.

- Mill management
- Plant maintenance
- Asset management
- Optimization



Rebuilds & modernizations

Keep your equipment current with the latest advancements to enhance your operations and provide for better efficiencies. FLSmidth can rebuild your equipment or provide the most current state-of-the-art equipment improvements and/or system upgrades for operational efficiency and enhanced functionality.

Quality & reliable OEM parts

Contact our trained service personnel to get authentic, high quality, original equipment manufacturer (OEM) spare and replacement parts for your FLSmidth®, Fuller®, Traylor™, ABON®, EIMCO®, Raptor®, Conveyor Engineering™, Krebs®, KOCH®, Knelson™, Ludowici®, Möller®, MVT™, Pneumapress®, RAHCO®, WEMCO®, Dorr-Oliver®, Shriver®, Summit Valley™, and FLSmidth supplied equipment. FLSmidth is the only place to find field engineers and technicians trained specifically to deal with the unique characteristics of this equipment.

Products

- Original OEM spares
- Product review & improvement
- Life cycle analysis
- Repairs & Retrofits

Supercenters

FLSmidth® Supercenters provide localized service with facilities customized to our global customers' needs. Supercenters are able to offer strategic OEM spare parts stock, training facilities, satellite testing facilities and world-class personnel ready to assist with specific requirements.

Testing

FLSmidth continues to look for ways to improve service to our clients and now operates a Minerals Testing and Research Center. This facility has created expanded services for increased process testing capabilities.

The Minerals Testing and Research Center houses the

- Separation Technology Laboratory
- Dawson Metallurgical Laboratory
- Analytical Laboratory
- Ore Characterization & Process Mineralogy Laboratory
- Research & Development Laboratory

Testing capabilities

- Ore amenability testing
- Process development
- Flowsheet layout
- Plant design
- Detailed engineering
- Constructability analysis
- Quantitative XRD Rietveld mineralogy
- SEM and optical microscopy
- Automated mineral analysis
- NIR data base development
- Clay analysis
- AAS, ICP, ICP-MS, LECO and fire assay
- Hydrometallurgical testing
- Flotation concentration
- Grinding & classification
- Bench testing
- Pilot testing

Research and development

FLSmidth is committed to strong and on-going research and development, which is focused on developing new and improved equipment and processing technologies that provide solutions to the ever-changing needs of our customers and the industries that we serve. Our R&D and technology centers are globally located. In addition to our own facilities, we foster and fund cooperative R&D efforts with global universities and contracted research organizations. Interaction with our customers is the foundation of many of our R&D activities, as seen by the numerous projects being conducted jointly with customers throughout the world.

One Source

For Gyratory, Jaw, and Cone Crushers, Screens or Vibrating Feeders contact:

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E-mail: info.sl@flsmidth.com

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Airport West, Victoria
Australia 3042
Tel: 61-3-9338 7011
Fax: 61-3-9338 3765
Email: aboninfo@flsmidth.com

For Impact Crushers & medium duty apron feeders contact:

Cement Project Centre

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Fax: +45 3630 1820
E-mail: info@flsmidth.com

For HD Apron and Belt Feeders contact:

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