



ContiPipe

High-Speed Closed-Trough Belt Conveyor
Systems for especially tight curves
and high productivity

Pipe Belt Conveyor System



Born of intensive development work and experience



Continental Industrial Solutions

Continental is the most comprehensive, high-performance conveyor belt systems provider in the world.

We offer a wide range of products, services and technologies for mining and industrial applications. Our full-service capabilities include planning and commissioning, technical advice, training, digital monitoring and on-site maintenance for the life of the conveyor operation.

As your global innovation and development partner, we strengthen mining, mineral processing and construction projects around the world. We do this by exceeding your specific needs and requirements. That's because we push the boundaries of what's possible by developing solutions for tomorrow's challenges.

Continental is one of the world's largest developers and providers of innovative rubber and plastic solutions, technologies and services for a wide range of industries including automotive, construction, agriculture, chemicals, petrochemicals and mining.

Research, development and experience

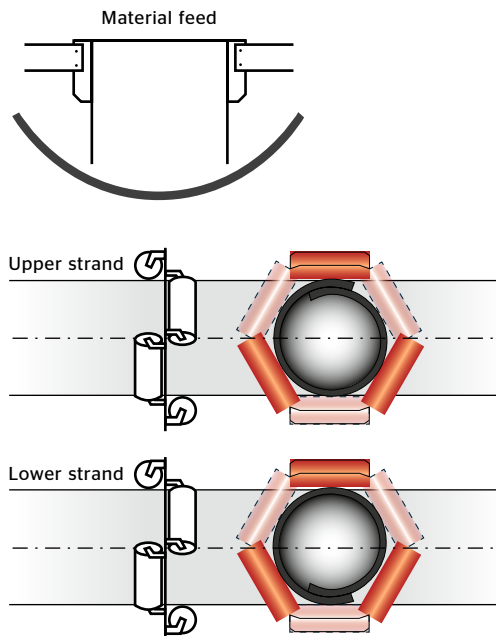
In collaboration with its business partners, Continental has developed a pipe belt conveyor system which meets the most stringent demands of conveying technology.

After intensive research and development and decades of experience in this field, Engineers at Continental have made further improvements to pipe belts' technical properties. The strength of our application engineering has paid real dividends in the know-how relating to pipe belt conveyor systems. This expertise guarantees reliable advice and ultimate product quality. We also offer a comprehensive service and can manufacture pipe conveyor belts tailored to your specific customer requirements.

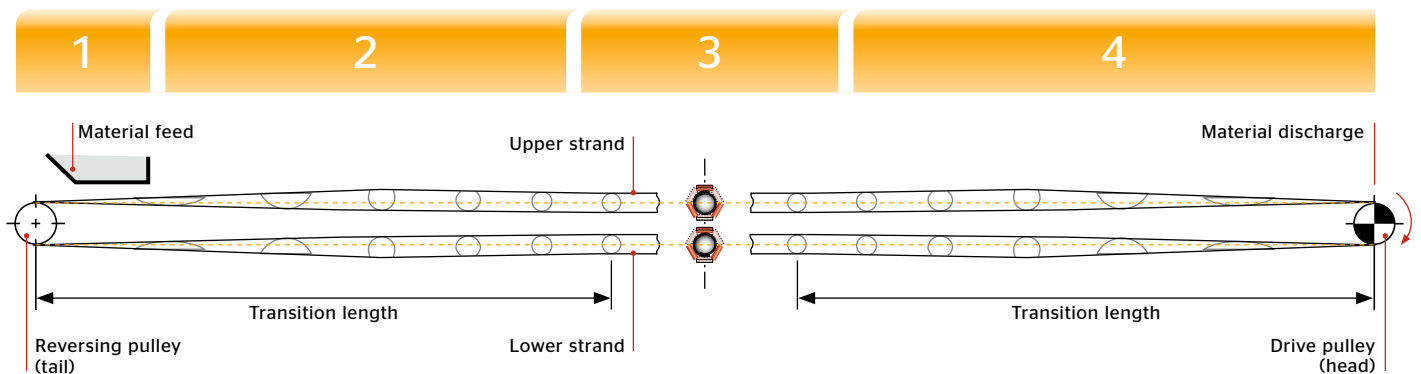


Design and function of a pipe conveyor system

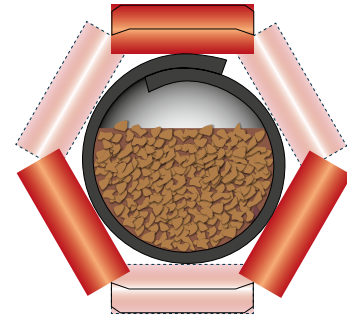
- 1** The pipe belt works in accordance with a specific operating principle: at the material feed point (after the tail pulley) the conveyor belt is troughed and is fed at this point like a conventional conveyor belt.
- 2** After the material feed point the conveyor belt is formed into a closed belt pipe by specially configured finger rollers.
- 3** Further idlers set along the conveyor route guarantee that the belt is kept closed. As a result, the material conveyed remains protected by the closed belt system.
- 4** At the end of the belt run (before the head pulley) the closed belt is opened as a result of the configuration of the finger rollers and adopts a flat shape at the pulley. The material conveyed can then be discharged in the same way as with conventional belt systems.



Typical design of a pipe conveyor system



Properties of the pipe belt conveyor system



Design-based benefits

A pipe conveyor belt differs from a conventional, troughed belt in its design and splicing technology and performs special conveying tasks (see table: Overview of benefits). Mining and industrial applications often require relatively large inclines and tight curves to be overcome in tight spaces and at high mass flow rates. The particular features of modern pipe belt conveyors include: no transfer points, no material spillage along the conveyor route, and tight 3D curves. Pipe belt conveyors save space thanks to their compact design, navigate natural and infrastructural terrains, including steep conveyor angles up to 30°.

Fabric or steelcord carcass - Fire or oil resistant

Depending on requirements, the pipe belt is equipped with high-quality fabric or steel-cord strength members and a system of transverse reinforcements. This ensures a stable, durable tubular form. The high-tensile steel-cord pipe belts (> 5,400 N/mm) offer new prospects, for example in surface and underground mining operations.

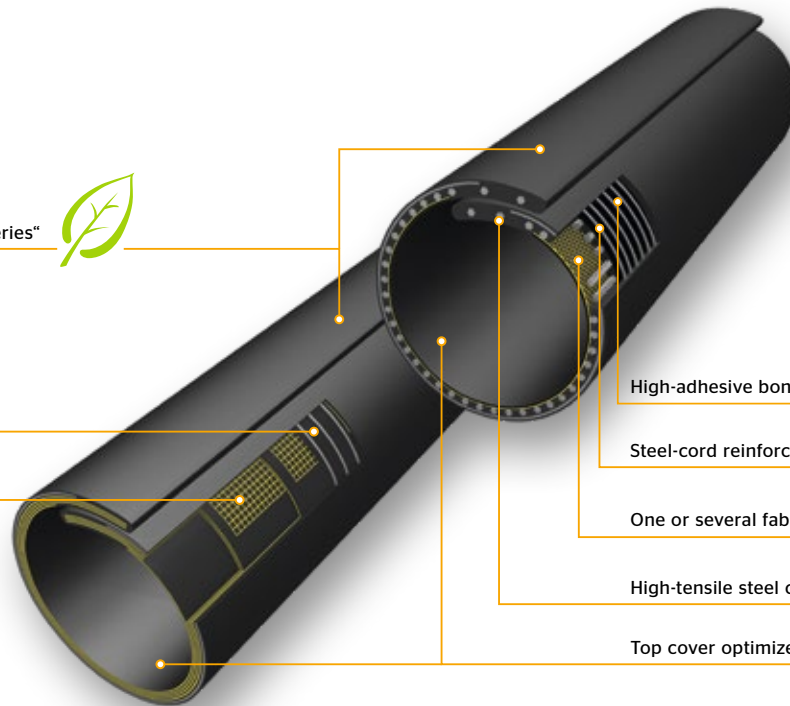
On request the top and bottom covers of a ContiPipe belt may be equipped with standard or special rubber compounds protecting the pipe belt against very hot, abrasive, oily or chemical aggressive bulk materials.

Energy Saving Bottom Cover „ECO Series“



High-adhesive bonding rubber layer

Transversely reinforced fabric plies



High-adhesive bonding rubber layer

Steel-cord reinforcement

One or several fabric or combined reinforcements

High-tensile steel cords

Top cover optimized for bulk material



The Energy Saving Bottom Cover „ECO Series“ reduces the Indentation Rolling Resistance of a pipe belt and consequently the total energy consumption of a long-distance pipe conveyor system up to 35 %*. This also has a significant impact on the design and price of both – the pipe belt and the pipe conveyor system.

* Depending on pipe belt type, conveying circumstances, center distance etc.

Properties of the pipe belt conveyor system

Maximum incline angle = 30°

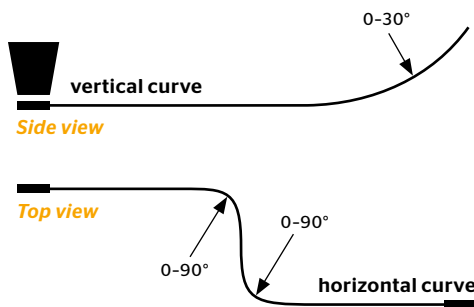


Guide dimensions for design:

Belt width	B = 600 to 3,200 mm*
Outer diameter	D _O = 150 mm to 900 mm*
Recommended max. fill level	$\eta_F = 70\%$
Max. volumetric flow rate l_V at conveyor speed $v_F = 1$ m/s, max. outer diameter D _O = 900 mm* and fill level $\eta_F = 70\%$:	$l_{Vmax} \approx 1,500 \text{ m}^3/\text{h}^*$
Recommended max. conveyor speeds (depending on idler diameter)	$v_F = \text{up to } 6.5 \text{ m/s}^*$
Max. lump size (depending on pipe inner diameter and operating data)	up to 350 mm

* Outer diameters greater than D_O = 650 mm are handled using our new product CONTI® MegaPipe. We will be happy to provide further information on request.

Deviation angle for horizontal and vertical curves

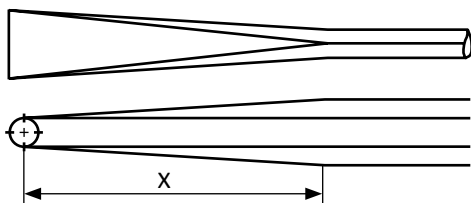


Minimum radius of curve for horizontal and vertical curves

- R = D_O x 300** for fabric belts
- R = D_O x 600** for steel-cord belts

**Given factors present recommendations for usual conveyor designs. In cases of non-standard forces or a difficult conveyor routing higher values may be required. For specific evaluation please contact our application engineering department.

Minimum transition length



Minimum transition length

For Fabric Pipe Belts:

- x = D_O x 30 at more than 90% of max. tension (typically at the head station)
- x = D_O x 24 at less than 60% of max. tension (typically at the tail station)

For Steel Cord Pipe Belts:

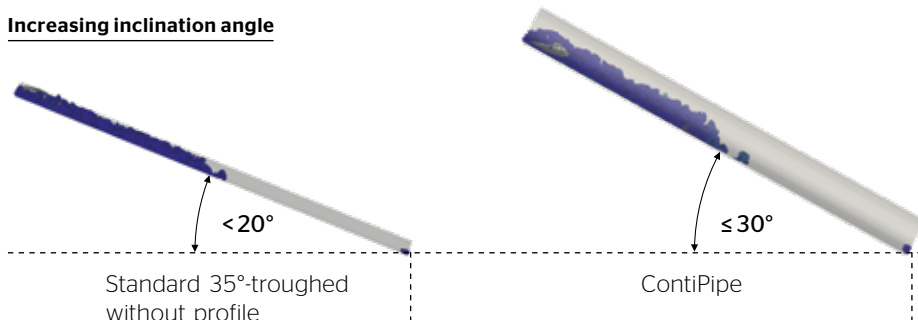
- x = D_O x 60 at more than 90% of max. tension (typically at the head station)
- x = D_O x 47 at less than 60% of max. tension (typically at the tail station)

The maximum inclination angle

The maximum inclination angle for the **discharging** condition sets the application limits of a conveyor system and strongly depends on bulk material properties, the belt type and the shape and geometry of selected chevron ribs. Our application

engineers can help you to select the "right" chevron-type with help of a pipe test rig or realistic DEM-FEM-simulations. Comparison and adjustment of the real and simulated angle of repose is a very important step in every DEM-FEM-simulation!

Increasing inclination angle





Quality and reliability

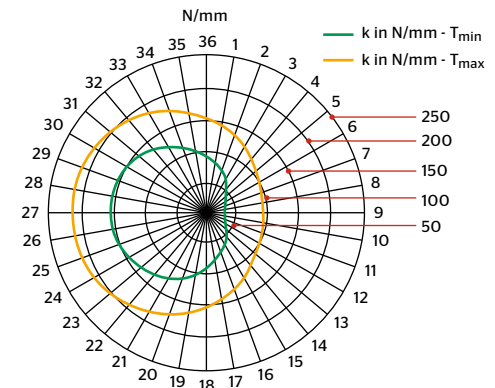
Just like our conventional conveyor belts, a key feature of our pipe belts is their extremely high quality. They are made of engineered materials which are processed using advanced production technologies. This ensures a high level of reliability and a long service life.

Precise testing

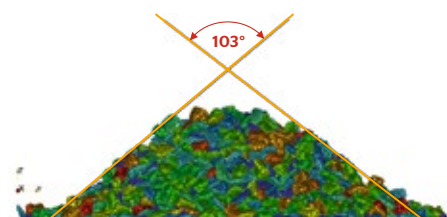
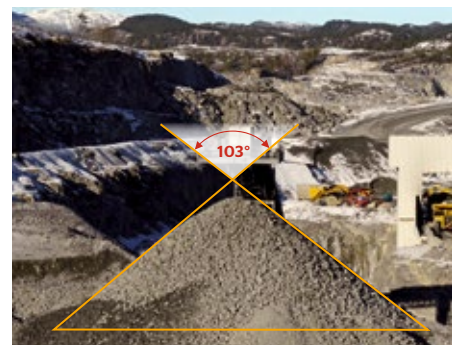
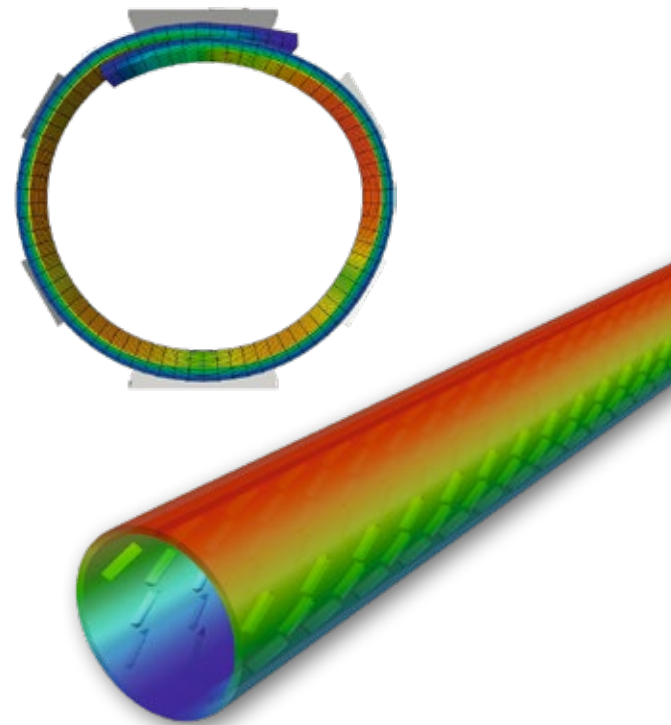
To guarantee the specified quality standards, extremely precise calculations and test/inspection measures are required. The transverse strength and form of the overlap area are extremely important in ensuring a pipe belt's optimal operation. Continental engineers test all the pipe belt's product properties in an in-house test laboratory. The go-ahead for production is only given once all the parameters have been fulfilled.

Outstanding service

Our team will assist you at every phase of your project and support you through planning, installation, commissioning and beyond. Our application engineers can call on many years of experience and extensive knowledge in the field of pipe belt conveyor systems.



Belt tensions in a right curve in N/mm



Overview of Benefits



In addition to consistent quality and technical reliability, highly engineered pipe belt conveyor systems offer a range of other benefits.

Plant engineering	Product	Protection
Benefits of technical plant design:	The belt properties result in the following product benefits:	The closed system performs a range of protective functions:
Very tight curves and incline angles up to 30° possible, hence optimal adaptation to local features / terrain / systems	The high strength and ability to negotiate curves mean that long center distances without intermediate transfer stations are possible	Protection of the material conveyed against environmental conditions (e.g. rain, snow, sun and wind)
Low space requirement thanks to compact design, thus also ideal for mining, cement factories, steel mills and power plants	The low-stretch strength member enables short take-ups	Protection of the material conveyed against dissipation and falsification due to extraction or addition of parts of the material
No transfer stations as a result of tight horizontal and vertical curves and relatively high incline angles	Stable tracking. The special tension member configuration ensures an effective seal in the overlap area	Protection of the environment and people since hazardous, contaminated, dusty or strong-smelling materials (chemicals, refuse, ash, overburden etc.) cannot escape
Low maintenance and cleaning input thanks to standardized, abrasion-resistant components. No material spillage along the conveyor route, because the material conveyed remains closed in a pipe belt in both – top and bottom strands of a pipe conveyor.	High volumetric flow rates and transport of large material lumps (up to 350 mm) thanks to outer diameters up to 900 mm. Direct transport of ores or overburden after the primary crusher possible in mining operations	Significantly reduced CO ₂ emissions compared with convention transport by truck. Environmental protection in accordance with our guiding principle: Engineering Green Value
Steeper conveying angles compared with conventional, troughed conveyor belts	Belt design offers a long service life and extreme reliability	
High conveying speed	High product quality	



Guiding principle for our overall strategic position

The guiding principle of Engineering Green Value underlies our strong corporate commitment to, and technological expertise in, the development and use of Continental products. In order to ensure sustainable business for the good of both present and future generations, Continental makes the issues of environmental and climate protection an integral part of the product development process.

Application Examples



Coal-Fired power plant „Reftinskaya GRES“, Russia

Partner: TAKRAF

The TC tube conveyor system in Siberia with a conveying capacity of 2,200 t/h is one of the most exciting systems in the world because it transports hot ash at +90 °C in an outside temperature of -45 °C at a conveying speed of 5.2 m/s. The temperature differential can actually become even more extreme. The tube conveyor system with its center distance of 4,390 m and a 30 m lift uses a 2,000 mm wide ContiPipe ST 2500, 8:7, Vulcan Classic with an outer diameter of Ø570 mm. This is optimally adapted to the conveyor configuration with one vertical and five horizontal curves with a min. curve radius of 420 m.



SINCOR, Jose, Venezuela

Partner: TAKRAF

The CR-408 harbor tube conveyor with a center distance of 1,215 m and a lift of 10 m is equipped with a 2,200 mm wide ContiPipe ST 1400, 7:6, Shield Oil SG which has an outer diameter Ø623 mm in the upper strand and Ø588 mm in the lower strand. The pipe belt has oil-resistant and flame-retardant covers which can also convey material with a temperature of up to 80 °C. The system runs over one horizontal and two vertical curves of the wharf and carries approx. 2,000 t/h of petroleum coke or approx. 800 t/h of granulated sulfur at a max. conveyor speed of 4.2 m/s.



Bowie Resources Skyline Mine, USA

Partner: thyssenkrupp

The BC-8 pipe belt conveyor in the Skyline mine with a 1,600 mm wide ContiPipe ST 1000, 8:6, StackerPlus in the mountains of the US state of Utah is one of the most challenging infrastructure and materials handling solutions worldwide. With a pipe belt outer diameter of approx. Ø 452 mm, the conveyor features 22 horizontal and 45 vertical tight curves with a minimum curve radius of 365 m. The conveyor route precisely follows the existing topographic terrain. With a center distance of 3,414 m and a difference in elevation of $\Delta H = -172$ m, BC-8 carries approx. 1,270 t/h of coal at a conveyor speed of 4.18 m/s to a railroad loading facility.



HKM Steel Mill, Germany

Partner: thyssenkrupp

In the coal handling plant in Duisburg 800 t/h of coal is carried on a conveyor with a center distance of approx. 736 m at a conveyor speed of 2.09 m/s. The 1,800 mm wide ContiPipe 1000/5 with a nominal pipe diameter of Ø 500 mm (oval) guarantees reliable, stable operation without twisting of the belt in the vertical and horizontal curves.

Application Examples



AES Maritza East 1, Bulgaria

Partner: TAKRAF

The TC-3A tube conveyor in the AES Maritza East 1 power plant with its center distance of 4,532 m and a lift of approx. 25 m offers an excellent fit with the local conditions and the existing infrastructure in Galabovo (railroad, village). The conveyor is equipped with a ContiPipe ST 1500, 7:6, StackerPlus and has 8 horizontal and 7 vertical tight curves. With an outer pipe diameter of Ø 430 mm in the upper strand and Ø 400 mm in the lower strand, 1,400 t/h of ash is carried by the pipe belt at a conveyor speed of 4.8 m/s.



Qatalum Handling System, Qatar

Partner: thyssenkrupp

A pipe belt conveyor with a 2,100 mm wide ContiPipe 1600/5 carries up to 2,200 t/h of alumina and petroleum coke from the ship unloading facility to the Qatalum smelter. With a pipe outer diameter of Ø 590 mm and a belt speed of 3.3 m/s, the material conveyed is safely carried through the vertical and horizontal curves with radii of 220 - 280 m.



Linz Service GmbH, Austria

Partner: BEUMER

The pipe belt conveyor carries 40 t/h at a conveyor speed of 1.3 m/s and is in operation at Linz Service GmbH on Industriezeile in the inland port of Linz, which is located on the River Danube. The conveyor carries household and industrial waste and sewage sludge from the Asten sewage treatment plant out of a treatment building and over a public street to the power plant where it is used to generate district heat and electricity for utility company Linz AG's networks.

The pipe belt conveyor bridges a difference in elevation of 24 meters. The pipe belt system with its center distance of 475 m and a nominal diameter of Ø 300 mm is equipped with a 1,200 mm wide ContiPipe 630/3. The conveyor is in operation around the clock.



Indocement, Indonesia

Partner: BEUMER

Indocement, the second largest cement manufacturer in Indonesia, is owned by construction materials corporation Heidelberg-Cement. A BEUMER pipe belt conveyor with a capacity of 200 t/h and a speed of 1.35 m/s is in operation which supplies secondary fuels to the rotary kiln. The system overcomes an elevation of 89 m. The pipe belt conveyor is equipped with a 1,200 mm wide ContiPipe 800/4 which has a nominal diameter Ø 300 mm and a center distance of 340 m.

Application Examples



Moorburg Power Plant, Germany

Partner: FAM

Two FAM pipe belt conveyors are in operation for stacking and reclaiming coal in two circular stacker-reclaimers in the Moorburg power plant. Each has a capacity of 3,000 t/h for stacking and 1,200 t/h for reclaiming. The curved pipe belt conveyors for stacking with a length of 260 m and a pipe outer diameter of Ø 630 mm overcome a difference in elevation of 40 m with a belt speed of 5.41 m/s and are equipped with an ContiPipe 1000/4. The reclaiming conveyors with a pipe outer diameter of Ø 530 mm and a belt speed of 3.02 m/s are 215 m long and are equipped with an ContiPipe 1250/4. Two further FAM pipe belt conveyors with a length of 365 m and a lift of 68 m each carry 1200 t/h of coal with a belt speed of 3.11 m/s into the generating unit's boiler bunkers. These conveyors with a pipe outer diameter of Ø 530 mm are equipped with Continental pipe belts ContiPipe 1250/4 as well.

The Moorburg power plant also houses an FAM pipe belt conveyor for stacking gypsum in a circular stacker-reclaimer with a capacity of 1,000 t/h with a belt speed of 2.18 m/s. The curved conveyor with a length of 482 m and a lift of 28 m is equipped with a ContiPipe 1000/4 for a pipe outer diameter of Ø 530 mm.





Vigier Cement Plant, Switzerland

Partner: FLSmidth

The KOCH Pipe Conveyor® manufactured for the Vigier cement plant in 1989 has been operating successfully for over 25 years.

In 2006 the existing belt was replaced with a ContiPipe 1000/4. The 944 m long pipe conveyor overcomes a difference in elevation of $\Delta H = -93$ m with an incline angle of up to $\alpha = -26^\circ$ in challenging terrain. It crosses roads, highways and rail tracks which are reliably protected from the material conveyed thanks to the pipe belt design. The horizontal and vertical curves of the pipe belt conveyor allow optimal adaptation to the topographic features. Its pipe outer diameter of $\varnothing 458$ mm and a belt speed of 3 m/s enable up to 1,400 t/h of limestone to be carried which is then discharged into various silos.



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