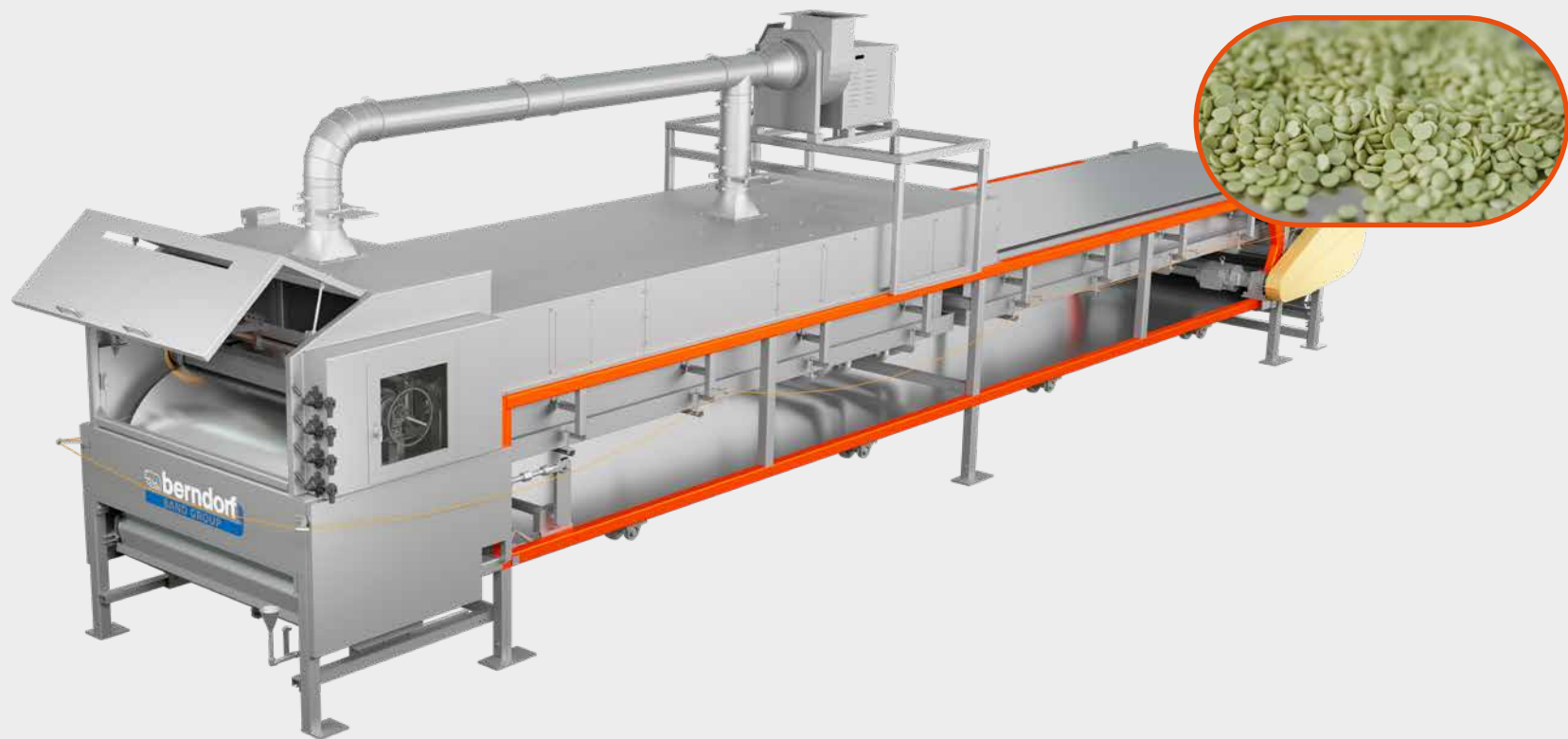


COOLING & SOLIDIFICATION SYSTEMS FOR SULPHUR BENTONITE PROCESSING



PROCESS EQUIPMENT FOR THE FERTILIZER INDUSTRY

OUR EXPERTISE

The Berndorf Band Group has stood for quality and innovation in the fields of engineering and manufacturing since 1843. We continue to be active in the fertilizer industry and have successfully installed Solidification and Cooling Systems for the processing of sulphur and sulphur-based fertilizers worldwide. Our expertise extends far beyond the solidification process for sulphur bentonite applications. Berndorf Band Group is your reliable partner for turn-key applications.

OUR SOLUTIONS

We offer equipment for the entire production process:

- » Engineering and manufacturing of required Process Equipment, from molten sulphur and bentonite powder handling, trough mixing, solidification, to final pastille handling and bagging
- » Start-up and process technology support
- » Plant layout design
- » Equipment specifications



- ✓ RAW MATERIAL HANDLING
- ✓ MIXING
- ✓ FILTERING
- ✓ SOLIDIFYING
- ✓ PASTILLE HANDLING
- ✓ BAGGING SYSTEMS

THE FINAL PRODUCT: SULPHUR BENTONITE

Sulphur is referred as the fourth major nutrient in agriculture. The elemental sulphur characteristics are non-metallic chemical elements, a yellow crystalline solid, insoluble in water, odorless and 99.5 % pure. The bentonite in sulphur bentonite is typically a clay composed of minerals which exhibit a significant amount of plasticity, cohesion, swelling, and shrinkage. Micronutrients including zinc, boron, copper, manganese, iron, magnesium, and others can be added to meet your specific plant nutrition needs. The addition of micronutrients provides a cost-effective method to maintain proper soil levels.

PASTILLATION WITH BERNDORF EQUIPMENT

Our team of experts offers complete support for the addition of bentonite clay to the sulphur matrix, along with desired micronutrients, to create a mixed homogenized product. Each pastille contains a uniform amount of sulphur, clay, and/or micronutrients according to the customer's needs.



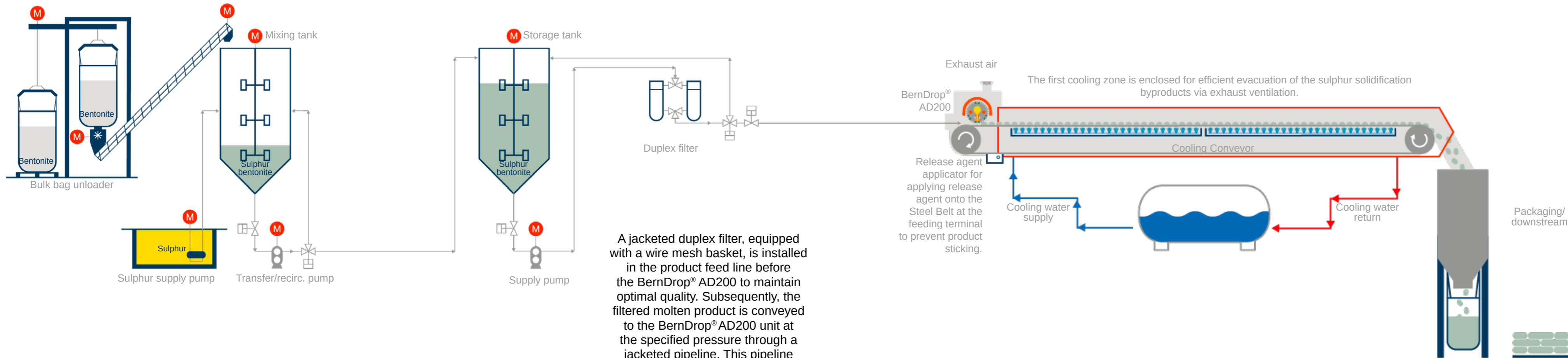
- ✓ BENTONITE HAS THE CAPACITY TO SWELL UP TO 15 TIMES ITS DRY VOLUME WHEN EXPOSED TO WATER
- ✓ THE CLAY IN THE SULPHUR PASTILLES ABSORBS SOIL MOISTURE AND SWELLS, CAUSING THE SULPHUR PASTILLES TO FRACTURE INTO VERY SMALL PARTICLES
- ✓ SMALLER SULPHUR PARTICLES PROVIDE A GREATER SURFACE AREA FOR BACTERIA TO FEED ON THE SULPHUR AND OXIDIZE IT TO SULPHATE, ENHANCING PLANT GROWTH

CHARACTERISTICS

Shape	Hemispherical
Size	2 – 6 mm
Moisture content (H ₂ O)	Less than 0.5 %
Bulk density	> 1,040 kg/m ³ loose
Angle of repose	in the range of 28°–30°
Friability performance test	less than 2 % fines

PRODUCTION PROCESS FOR SULPHUR BENTONITE PASTILLES

SCAN ME



Bulk bag unloader with screw conveyor to meter the bentonite powder into the mixing tank.

Molten sulphur product must be continuously fed at 130 °C to 140 °C | 266 °F to 284 °F.



Once the bentonite has been mixed thoroughly, the mixture is moved to a batch tank before being pumped to the designated Cooling Conveyor.



A jacketed duplex filter, equipped with a wire mesh basket, is installed in the product feed line before the BernDrop® AD200 to maintain optimal quality. Subsequently, the filtered molten product is conveyed to the BernDrop® AD200 unit at the specified pressure through a jacketed pipeline. This pipeline is equipped with all necessary instrumentation and valves and is heated by hot steam (or oil), ensuring that the product remains in a molten state throughout the process.



The BernDrop® AD200 pastillation head, featuring a special shaped raised shell, ensures uniform sized drops deposited onto the running Steel Belt.



The solidification of the pastilles formed on the Steel Belt occurs as a result of heat transfer caused by cooling water being sprayed on the underside of the Steel Belt.



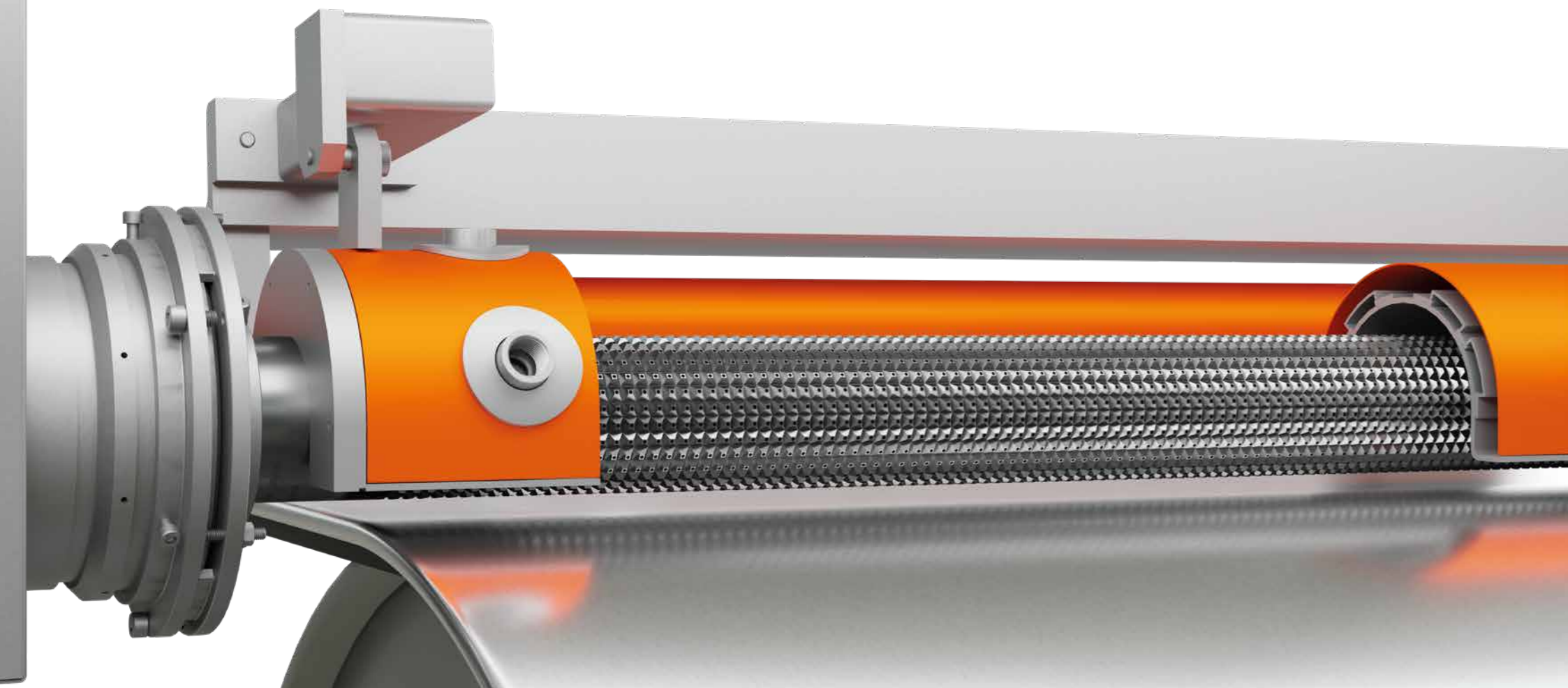
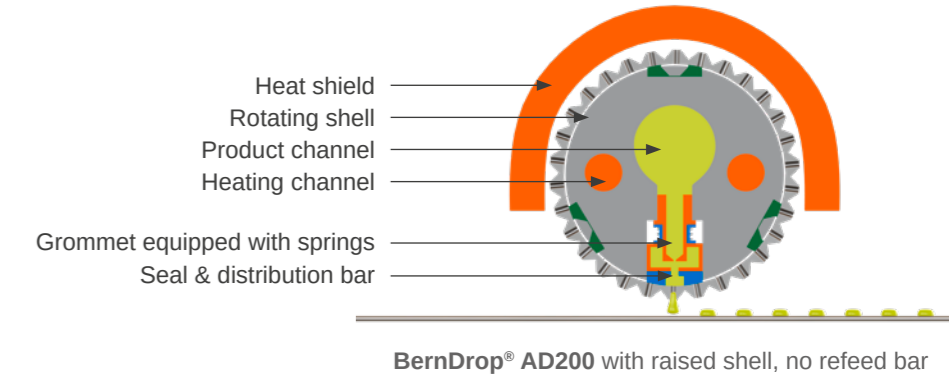
The solidified pastilles are transported to the bagging system and the customized handling systems.

FEEDING DEVICE FOR PRODUCING UNIFORM DROPS OF SULPHUR BENTONITE

The variety of Berndorf feeding devices has been developed to meet different process requirements for a wide range of products. The **BernDrop® AD200** is the world's preferred feeding device for the solidification of sulphur and sulphur derivatives like sulphur bentonite. The rotating, special shaped shell design eliminates the possibility of product deposits on the outer surface of the shell. Any product which remains on the shell surface is forced to the peak to join the next drop.

BERNDROP® AD200

In addition, this increased surface area causes forced convection, which pre-cools the product and slightly increases viscosity. As a result it can achieve higher production speeds than the competition. The shell design enables a production of sulphur bentonite pastilles without a refeed bar and external seals. Consequently, the **BernDrop® AD200** has the advantage of lower operating costs.



ADVANTAGES OF BERNDROP® AD200



RAISED SHELL FOR OPTIMAL PASTILLE QUALITY



PERFECT FOR ABRASIVE MATERIALS LIKE SULPHUR BENTONITE



NO REFEED BAR OR EXTERNAL SEALS NEEDED, REDUCING MAINTENANCE COSTS



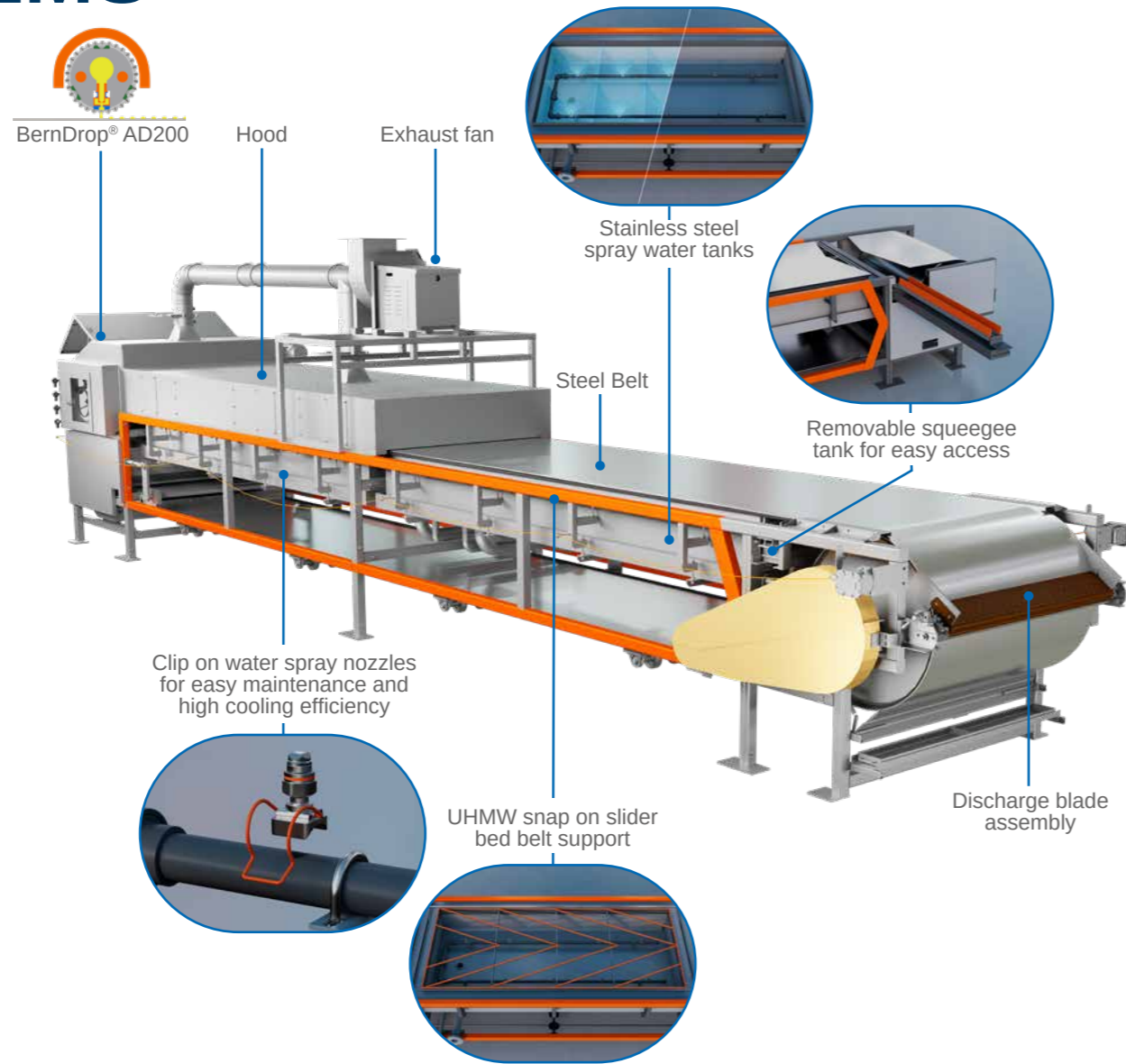
EASY ACCESSIBILITY FOR SERVICE & MAINTENANCE

SINGLE BELT COOLING SYSTEMS

Berndorf Cooling Systems excel in heat transfer, efficiently evacuating escaping heat during the cooling and hardening processes of diverse products through our cutting-edge indirect cooling technology.

The **Single Belt Coolers** are equipped with unique features such as the **clip on water spray nozzles**, the **UHMW snap on slider bed belt support**, and a **removable squeegee tank assembly**, ensuring the highest cooling efficiency and easy maintenance. The high-quality **Steel Belt** guarantees a reliable operation.

- ✓ Solidification of the pastilles formed on the Steel Belt occurs due to heat transfer caused by cooling water being sprayed on the underside of the Steel Belt
- ✓ Exhaust ventilation system and hood in the first cooling zone for an efficient fume removal
- ✓ Release agent applicator to avoid pastilles sticking to the Steel Belt



STEEL BELTS

PHYSICAL & MECHANICAL PROPERTIES – TYPICAL VALUES

Material			Nicro 12.1	Nicro 94
Type			CrNi 17 7	CrNiMoN 22 5 3
Similar material		DIN AISI	1.4310 301	1.4462
Tensile strength	at 20 °C at 68 °F	N/mm ² psi	1,150 166,800	1,400 203,100
0.2 %-offset yield strength	at 20 °C at 68 °F	N/mm ² psi	950 137,800	1,050 152,300
Hardness		Rockwell HRC Vickers HV 10	37.0 360	36.0 350
Elongation 50 mm 1.97 in		%	18	9.5
Welding factor			0.70	0.65
Fatigue strength under reversed bending stress*	at 20 °C at 68 °F	N/mm ² psi	480 69,600	450 65,300
Modulus of elasticity	at 20 °C at 200 °C at 68 °F at 392 °F	N/mm ² N/mm ² ksi ksi	200,000 180,000 29,000 26,100	200,000 184,000 29,000 26,700
Density		kg/dm ³ lb/in ³	7.90 0.29	7.80 0.28
Mean coefficient of thermal expansion	20-100 °C 20-200 °C 20-300 °C 20-400 °C 68-212 °F 68-392 °F 68-572 °F 68-752 °F	10 ⁻⁶ m/m°C 10 ⁻⁶ m/m°C 10 ⁻⁶ m/m°C 10 ⁻⁶ m/m°C 10 ⁻⁶ in/in°F 10 ⁻⁶ in/in°F 10 ⁻⁶ in/in°F 10 ⁻⁶ in/in°F	16.0 17.0 8.9 9.4	13.3 13.8 7.4 7.7 7.9
Specific heat		J/g°C BTU/lb°F	0.50 0.12	0.50 0.12
Thermal conductivity	at 20 °C at 68 °F	W/m°C BTU/lb°F	15 8.7	15 8.7
Specific electric resistance	at 20 °C at 68 °F	Ω mm ² /m μΩ in	0.73 28.74	0.80 31.50
Min. permissible operating temperature		°C °F	-196 -321	-50 -58
Max. permissible operating temperature		°C °F	250 482	250 482
Tensile strength at max. permissible operating temp.		N/mm ² psi	940 136,300	1,130 163,900
0.2 %-offset yield strength at max. permissible oper. temp.		N/mm ² psi	770 111,700	990 143,600



HIGH QUALITY STEEL BELTS

- » Optimum flatness & straightness due to special production method
- » Corrosion resistant
- » Smooth Surface
- » Perfect adhesion of vee-ropes

VEE-ROPES

We ensure perfect adhesion of vee-ropes.

Vee-rope-material	Operating temperatures
Nitrile rubber	-20 °C to +100 °C -4 °F to +212 °F
Natural rubber	-60 °C to +60 °C -76 °F to +140 °F

*50 % of the test specimens withstand 2,000,000 load cycles. If not otherwise specified, the values given apply at room temperature. Subject to change due to technological progress. Errors and omissions excepted. Special materials available upon request.

REFERENCES PROCESS EQUIPMENT

At Berndorf Band Group, we pride ourselves on delivering unparalleled solutions that not only meet but exceed expectations. With a steadfast commitment to innovation, quality, and client satisfaction, we have established ourselves as leaders in the **Cooling & Solidification** sector for **sulphur** and **sulphur bentonite**.



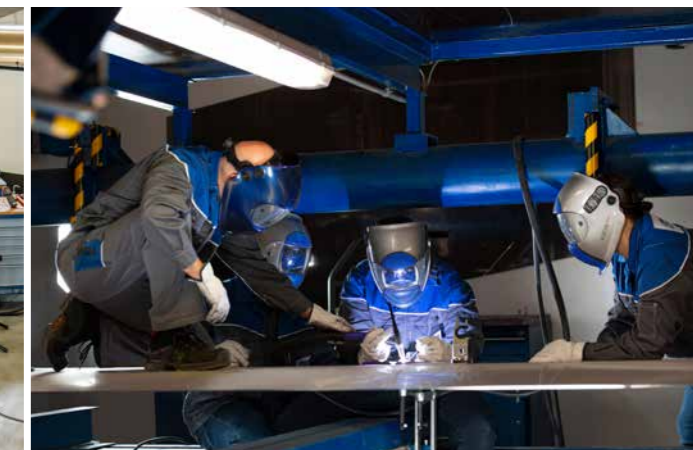
OUR EXPERTISE

- ✓ +100 MACHINES IN OPERATION
- ✓ PROVISION OF 1-4 MACHINES FOR SULPHUR BENTONITE PROJECTS
- ✓ MACHINE DESIGN THAT ALLOWS FOR SWITCHING BETWEEN PRODUCING SULPHUR AND SULPHUR BENTONITE
- ✓ PROJECT SPECIFIC SCOPE FROM PASTILLATOR & STEEL BELT COOLER TO COMPLETE ENGINEERING PACKACKE FOR UP- & DOWNSTREAM

GLOBAL SERVICE THAT NEVER STOPS

To ensure that your operations run at the highest productivity possible, the Berndorf Band Group offers extensive services and pioneering service equipment centered around Steel Belts and Belt Systems. From installation management to commissioning, we support and advise you on how to get the best use out of your machine. With our highly qualified service technicians and our innovative methods, we ensure customer satisfaction around the globe.

- ✓ SPARE & WEAR PART MANAGEMENT
- ✓ RETROFITTING: UPGRADES & UPDATES
- ✓ REMOTE SUPPORT
- ✓ TRAINING FOR YOUR IN-HOUSE TECHNICIANS
- ✓ INNOVATIVE WELDING & REPAIR TECHNOLOGIES, PATENTED EQUIPMENT
- ✓ INSPECTION & MAINTENANCE TO ELIMINATE BELT TRACKING ISSUES



OUR WORLDWIDE SALES AND SERVICE NETWORK

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