

WE CONVEY QUALITY



# BUCKET ELEVATOR

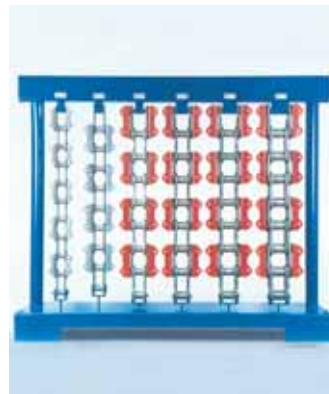


## BUCKET ELEVATOR WITH CENTRAL CHAIN TYPE BWZ

The characteristic features of the AUMUND Bucket Elevator type BW-Z with forged central chain are high conveying capacities obtained through a close bucket spacing and standardized bucket widths ranging from 200 to 1,000 mm. They are primarily applied to convey abrasive bulk materials such as cement clinker in continuous operation. Due to the close bucket spacing, the conveyed material is fully taken by the buckets and discharged in a continuous manner to the subsequent conveying systems.

### New Development

The forged chains AU 06, 13 and 15 are available with labyrinth seals and lubricated bolt and bush connection. Field tests have resulted in a considerably better wear behaviour. The central chains are available in standard sizes determined by the required center distance and conveying capacity. The symmetrical design of the chain links, which are fabricated from high-quality forgings, contributes to a longer service life. Bolts and bushes are made of special steel and are highly wear-resistant due to the hardening process applied. The design of the links with forged cams permits the support on the shoulders of the untoothed drive wheel (friction ring). This results in a favourable load distribution between chain and drive wheel: the so-called three-point support formed by the contact points of the chain bush and the side bars with the drive wheel. Uniform wear of the drive wheel is reached by a constant shifting of the contact points chain/wheel, which is ensured by the determination of the wheel diameter (not a multiple of the chain pitch). For the buckets, AUMUND has chosen an angular bracket fixing, which is simple and reliable at the same time. The angular brackets are not rigidly connected to the chain bolts. Due to the play between chain bolts and angular brackets (an AUMUND-patent), the transmission of vibrations is reduced and the formation of cracks on buckets and welding seams is reduced to a minimum. In addition, the angular brackets make bucket assembly much easier.



Standard chain sizes



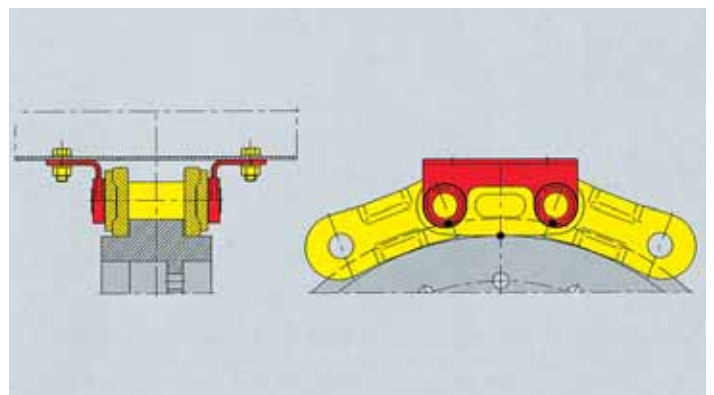
Standard chain sizes



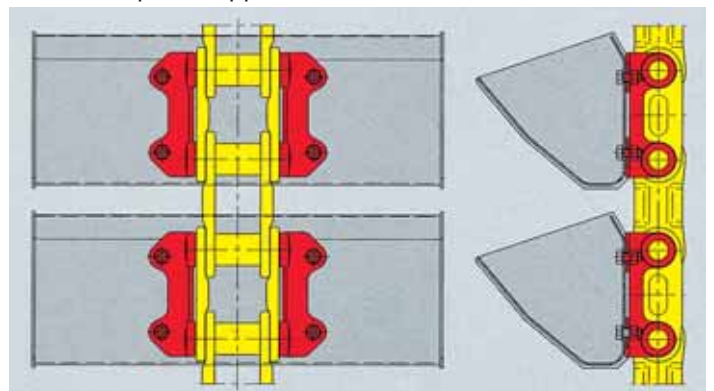
Central chain with angular bracket



Untoothed drive wheel



Three-point support of the chain on the drive wheel



Bucket fixing by angular brackets

# BUCKET ELEVATOR WITH CENTRAL CHAIN TYPE BWZ

- Conveying capacities exceeding 600 t/h
- Lifting heights of more than 60 m
- Long service life – even in continuous operation
- Forged central chain with large link surfaces
- Heat-resistant in continuous operation, designed to withstand short material temperature peaks of up to 400° C
- Segmented drive ring
- Creep drive for maintenance

Bucket sizes and bucket spacing are related to certain chain sizes. The combination of chains and buckets is shown in the table on page 4.

The illustration bottom left shows a typical design of the bucket elevator head with pillow-block bearings. The system is driven by a shaft-mounted bevel fixed spur gear by a shrink collar to the drive shaft.

An integrated backstop and a maintenance creep drive as well as a hydraulic coupling between motor and gearbox are provided as a standard.

Upon request, the hydraulic coupling between motor and gearbox can be provided with an additional disc brake, which prevents the fully loaded bucket strand from moving downwards in case of a back stop failure. Another safety device is installed on the shaft end opposite to the drive unit:

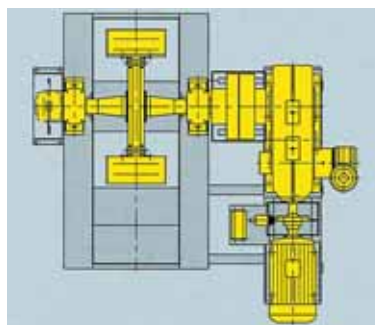
a blocking device, which avoids unintentional chain movements during maintenance work at the drive unit (optional).

If the motor is equipped with a frequency converter, the creep drive shown will not be required. AUMUND also applies variable speed drive systems of this kind for Belt Bucket Elevators and Pan Conveyors.

For smaller and for medium-sized bucket elevators, the drive shaft can be supported in flanged bearings, which results in a cost and space saving design of the bucket elevator head.

The tensioning box consists of the guide frame and the tail shaft with integrated tension weight.

Bucket Elevator with central Chain Type BWZ											
The indicated conveying capacities correspond to a 100% bucket filling (water filling). • Recommended filling degree: 75%.											
Preferred sizes											
Bucket				Theoretical capacity m <sup>3</sup> /h							
Width mm	Protrusion mm	Volume dm <sup>3</sup>	Spacing mm	Conveyor speed m/s							
				without hydraulic coupling			with hydraulic coupling				
				1.06	1.16	1.29	1.25	1.39	1.56	1.72	1.87
				Drive wheel mm							
				600	655	730	790	890	1.005	1.115	1.215
200	210	3.9	280	53							
200	210	3.9	560	27							
250	210	4.8	280	65							
250	210	4.8	560	33							
250	250	6.8	305		93	104					
250	250	6.8	610		47	52					
280	210	5.4	280	74							
280	210	5.4	560	37							
280	250	7.6	305		104	116					
280	250	7.6	610		52	58					
315	210	6.1	280	83							
315	210	6.1	560	42							
315	250	8.6	305		118	131					
315	250	8.6	610		59	65					
355	210	6.9	280	94							
355	210	6.9	560	47							
355	250	9.7	305		133	148					
355	250	9.7	610		66	74					
400	210	7.8	280	106							
400	210	7.8	560	53							
400	250	10.9	305		149	166					
400	250	10.9	610		75	83					
400	285	16.8	356				212	236	265	292	318
450	250	12.3	305		168	187					
450	285	18.9	356				239	266	298	329	357
500	285	21.0	356				265	295	331	365	397
560	285	23.5	356				297	330	371	409	444
630	285	26.4	356				334	371	416	459	499
710	285	29.8	356				377	419	470	518	564
800	285	33.6	356				425	472	530	584	635
900	285	37.8	356				478	531	596	657	715
1.000	285	41.9	356				530	589	661	729	792
1.100	285	46.1	356				583	648	727	802	872



Bucket Elevator head – pillow-block bearing



Tension box



# DOUBLE BUCKET ELEVATOR TYPE BWZ-D

Higher kiln capacities and new grinding processes in the cement industry require bucket elevators with conveying capacities of more than 1,300 t/h or with center distances exceeding 60 m.

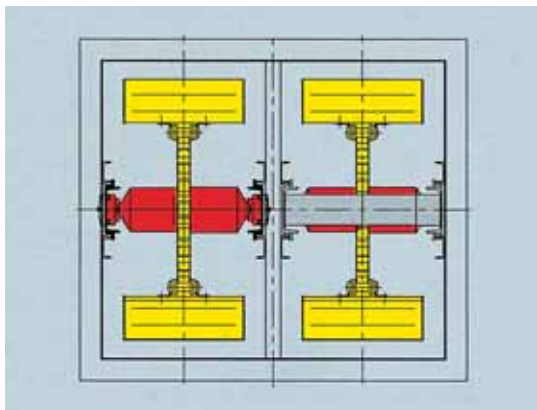
These latest requirements are met by the AUMUND-Double Bucket Elevator type BWZ-D:

By combining two standard Bucket Elevators with central chain, the conveying capacity can be doubled.

The drive head illustration shows the two bucket strands on a common drive shaft, which is supported in pillow-block bearings. Twin drives are installed in order to provide the high drive power required. The weight of each drive unit can thus be reduced and the bucket elevator casing can be symmetrically loaded. In addition, the exercise of forces to the drive shaft is more uniform.

Without being mechanically connected, the two bucket strands are arranged in one and the same casing. The chutes in the feeding area direct the material to the bucket strands by way of a material flow divider.

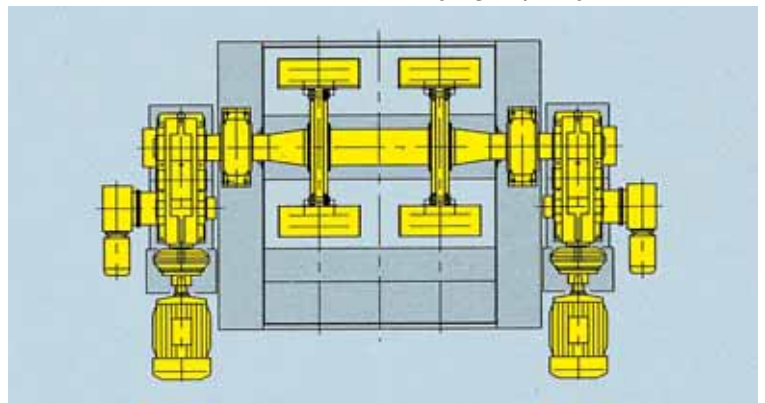
Both sprockets with their tail axles are supported in separate bearings. Different chain elongations can thus be independently compensated.



Double Bucket Elevator with twin drive



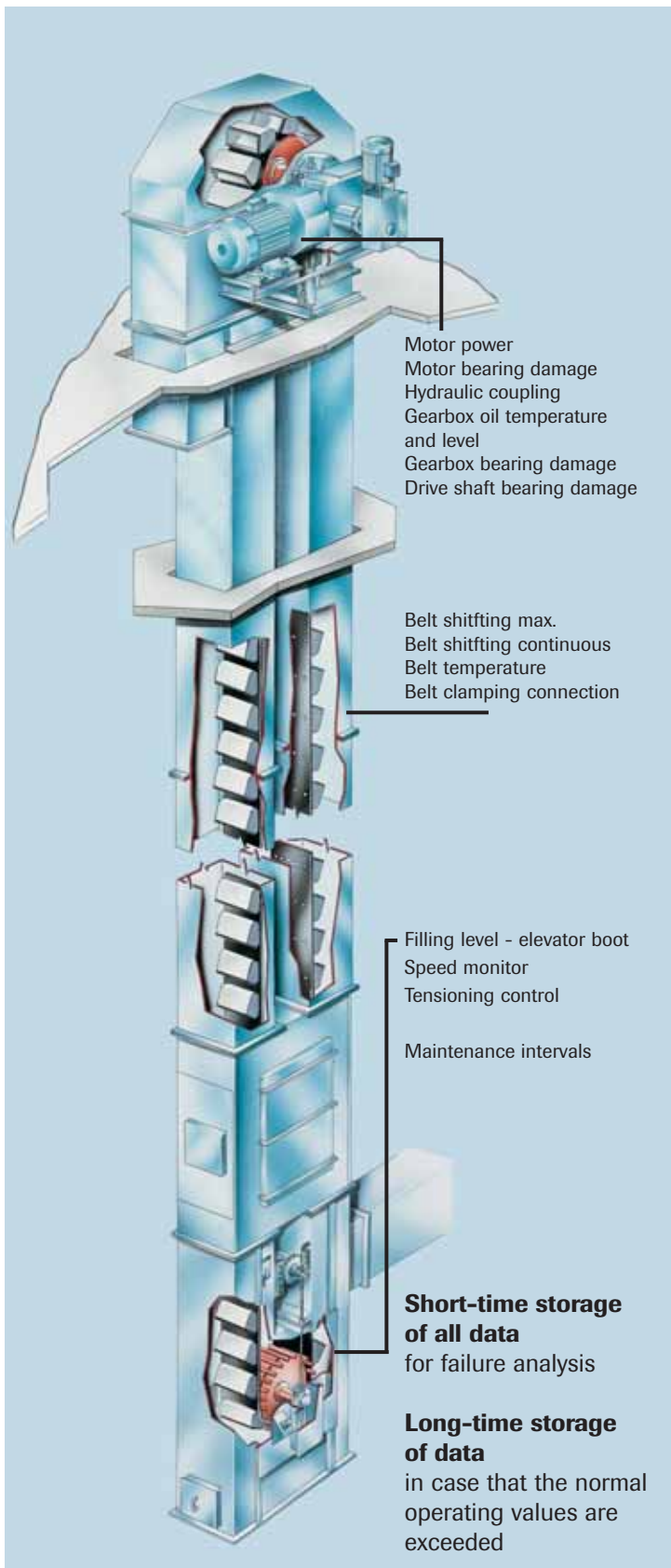
Double Bucket Elevator for a conveying capacity of 1,300 t/h



Double Bucket Elevator with twin drive

Double Bucket Elevator Type BWZ-D									Preferred sizes
The indicated conveying capacities correspond to a 100% bucket filling (water filling). - Recommended filling degree: 75%.									
Bucket				Theoretical capacity m <sup>3</sup> /h					
Width mm	Protrusion mm	Volume dm <sup>3</sup>	Spacing mm	Conveyor speed m/s with hydraulic coupling					
				1.25	1.39	1.56	1.72	1.87	
				Drive wheel Ø mm					
				790	890	1,005	1,115	1,215	
500	285	42.0	356	531	590	663	731	794	
560	285	47.0	356	594	661	741	817	889	
630	285	52.8	356	667	742	833	918	998	
710	285	59.6	356	753	838	940	1,037	1,127	
800	285	67.2	356	849	945	1,060	1,169	1,271	
900	285	75.6	356	956	1,063	1,193	1,315	1,430	
1,000	285	83.8	356	1,059	1,178	1,322	1,458	1,585	
1,100	285	92.2	356	1,165	1,296	1,454	1,604	1,744	

Central chains according to AUMUND standard for Type BWZ and BWZ-D						
Type	Chain pitch mm	Breaking load kN	Bolt and bush surface cm <sup>2</sup>	Bucket spacing mm	Bucket depth mm	Bucket width mm
AU 01.1	140	540	17.5	280	210	200 to 400
AU 01.1 T2	140	540	17.5	560	210	200 to 400
AU 02.2	152.35	625	24.0	304.7	250	250 to 450
AU 02T2	152.35	625	24.0	609.4	250	250 to 450
AU 04.1	177.80	800	32.0	355.6	285	400 to 800
AU 06.2	177.80	1,080	40.0	355.6	285	400 to 900
AU 13.2	177.80	1,440	51.0	355.6	285	400 to 1,100
AU 15.2	177.80	1,800	64.0	355.6	285	400 to 1,100



ContInfo-System

## ELECTRONIC MONITORING SYSTEM TYPE CONTINFO

- **Prevention of failures and analysis, if necessary**
- **Optimizing the operating time of conveying systems**
- **For Bucket Elevators and Pan Conveyors**

ContInfo, the electronic monitoring system offered by AUMUND prevents system failures and essentially contributes to an efficiency increase of complete conveying systems. All relevant operating conditions are monitored by means of sensors. The central processing unit compares actual values to setpoint values, which are initially entered as limit values.

By means of a display or an online connection with the control room, the operator can check the current status. A short-time storage saves current data of the operating conditions of the last 15 min. continuously. In case that the limit values are exceeded or in case of deviations from normal operating conditions, the data are transferred to the long-time storage with a memory for several years. In case of sudden failures, valuable data can then be retrieved. Besides, the system offers the chance to realize a preventive failure diagnosis by way of long-term studies and to avoid technical defects.

Maintenance or service related messages conditioned by actual operating hours and based on experienced values or values determined by AUMUND are displayed and/or transmitted to the central control room.

Straight running of the belt, speed, operating temperatures, oil levels, no-load power, normal power and max. power, etc. can also be checked and analysed, in order to guarantee trouble-free operation.



Central Processing Unit

## BELT BUCKET ELEVATOR TYPE BWG

AUMUND-Belt Bucket Elevators are successfully applied for vertical conveying of fine-grained materials, such as raw meal and cement.

The structure of these elevators corresponds to that of the Bucket Elevators with central chain. The bucket design and the close bucket spacing are proven assets for this system as well. Almost continuous material take-up and discharge are obtained.

- **Lifting heights of more than 128 m**
- **Conveying capacities exceeding 1,500 t/h**
- **Material temperatures up to 130° C - short term peaks up to 150° C**
- **Almost continuous material take-up and discharge due to the close bucket spacing**

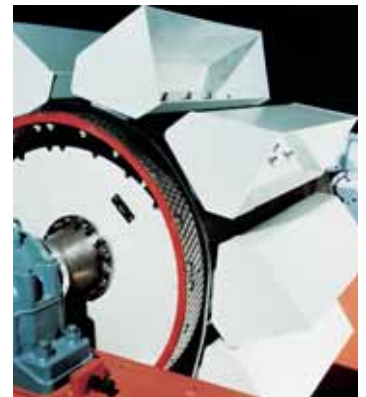
For all bucket sizes, standardized drive pulleys with diameters from 630 to 1,250 mm are available. These pulleys are provided with exchangeable friction linings. The segments can be easily exchanged without opening the belt.

In the elevator boot a bar-type drum ensures the guided return of the belt. Its horizontal position determines the belt's straight run. Precise parallel guidance is ensured by two toothed wheels which are arranged at the ends of the tension weight. Engaging precisely with respective racks, these toothed wheels ensure the safe parallel guidance.

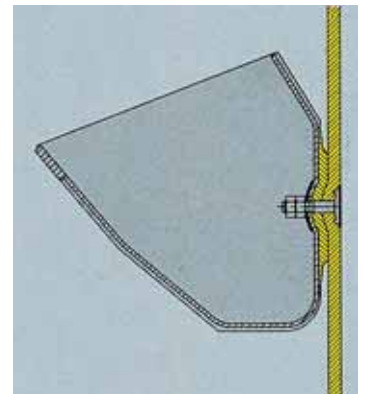
For the transport of dusty materials, buckets with or without reinforced wear lips can be provided. The buckets are fastened to the elevator belt with flat head screws. By means of its forged teeth, the flat head with a diameter of 40 mm engages in the longitudinal and cross steel-wire ropes. Utmost resistance to tearing is thus guaranteed for the buckets. Between bucket and belt, soft-rubber strips are installed, which prevent material from entering when the belt passes round the pulleys.



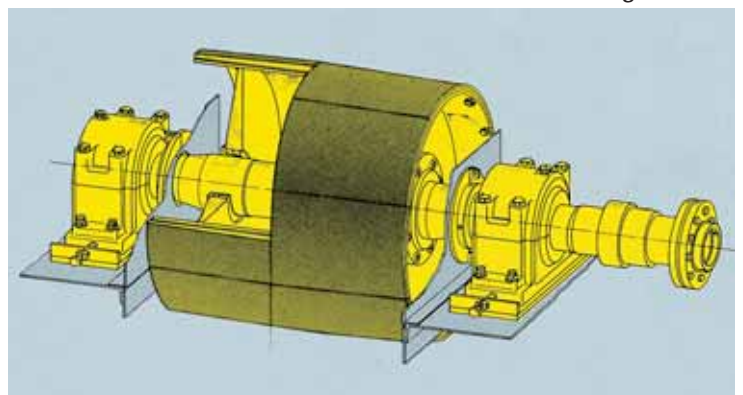
Bucket strand



Drive pulley



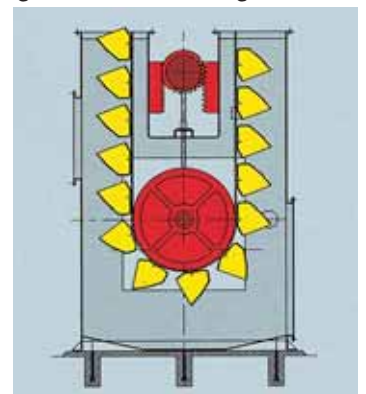
Bucket fixing



Drive pulley with exchangeable friction lining



Parallel tensioning device



Take-up station with parallel tensioning device



# BELT BUCKET ELEVATOR TYPE BWG

Belt splicing is made with a clamp connection. The clamps are made of aluminium, which makes them lighter. With simple textile belts, which are used for small Bucket Elevators and lower material temperatures, it is sufficient to bolt the clamps. Steel-wire reinforced belts, however, which have to stand extreme service conditions, are additionally equipped with a casting compound box. The rope ends are connected by means of clamps and then cast with a special casting compound.

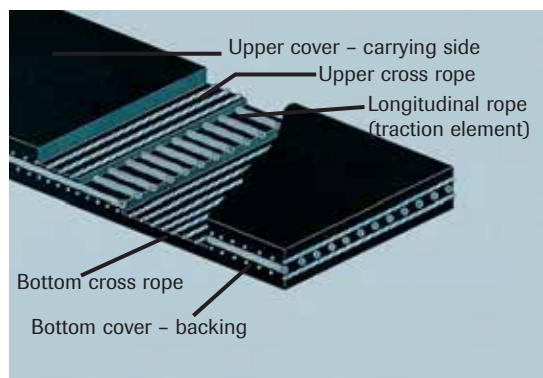
For Belt Bucket Elevators, AUMUND uses special steel-reinforced belts with a belt thickness of 13 to 15 mm even for the highest strength class. Due to this comparatively low belt thickness, smaller pulley diameters can be chosen.

Depending on the strength class, longitudinal steel ropes with a diameter of 2.8 up to 4.4 mm and arranged at a distance of 5 to 8 mm are applied as traction elements. Together with the additional cross ropes, they form a rigid network structure

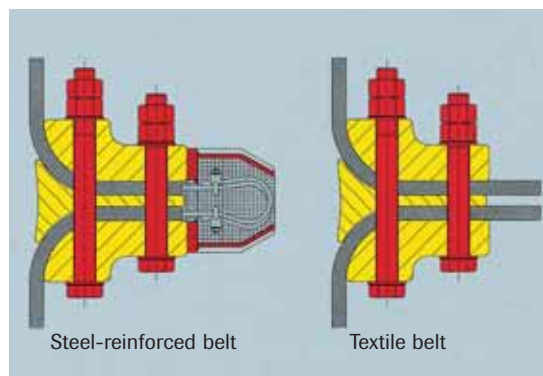
ensuring the high resistance that prevents the bucket fixing screws from tearing off. Depending on the strength class, the cross ropes are either provided on one or on both sides.

AUMUND developed a special belt punching tool, which cuts off two ropes only for each hole. This reduction of the traction strands is, of course, considered in the calculation of the belt strength. For the belt covers, heat-resisting rubber compounds yielded the best results.

- **Continuous operation with low maintenance requirements**
- **Standard safety equipment: level control, parallel tensioning device, speed monitor**
- **Compact buckets**
- **High tensile strength of the steel-reinforced belts by means of longitudinal and cross ropes**
- **Creep drive for maintenance**
- **Segmented friction linings**
- **Belt-centering design of the drive pulley**



Steel reinforced elevator belt



Standard type

Belt clamp connection

Belt Bucket Elevator Type BWG											
The indicated conveying capacities correspond to a 100% bucket filling (water filling). - Recommended filling degree: 75%.											
Preferred sizes											
Bucket				Theoretical capacity m <sup>3</sup> /h							
Width mm	Protru- sion mm	Volume dm <sup>3</sup>	Speed m/s ø Pulley mm	Bucket spacing mm				Conveyor speed without hydraulic coupling			
				240	280	320	360				
160	160	1.9	1.00	29	24	21					
200	160	2.4	500	36	31	27					
250	220	5.2	1.25		84	73	65				
315	220	6.6			106	93	83				
355	220	7.4			119	104	93				
400	220	8.4			135	118	105				
Bucket				Theoretical capacity m <sup>3</sup> /h							
Width mm	Protru- sion mm	Volume dm <sup>3</sup>	Speed m/s ø Pulley mm	Bucket spacing mm							
				320	360	400	440	480	520	560	
400	280	14.5	1.37		223	199	179				
500	280	18.0	800		277	247	222				
630	320	29.0	1.54			447	402	365	335		
800	320	37.0				570	513	466	427		
1,000	320	46.0		1,000			708	638	580	531	
1,000	360	58.0	1.72				898	816	748	691	
1,250	360	73.0	1,125				1,180	1,027	942	869	
800	360	46.5	1.88				787	715	656	605	
1,000	360	58.0					981	892	818	755	
1,250	360	73.0		1,250				1,235	1,123	1,029	950
1,400	400	99.0	1.88					1,523	1,396	1,289	1,196
1,600	400	114.0	1,250					1,754	1,607	1,484	1,378



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