



Industrie-Reibbeläge
M.I.C.K.E. Brühmann GmbH

Technical information MICKE ceramic pulley lagging



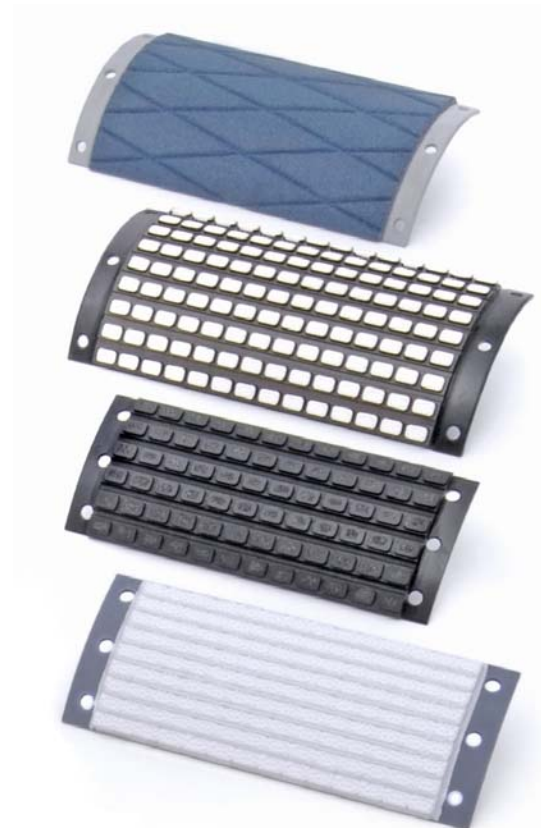
General aspects for applications



Material data



Supplementary Information



CERASHELL
all-ceramic
lagging

CERASINT
rubber-ceramic
lagging

CERALITE
rubber-ceramic
lagging

NORUB
all-ceramic
lagging



General aspects for applications

Ceramic pulley lagging maximizes the friction force between belt and pulley

The following aspects are important advantages offered by ceramic lagging:

- **Flawless and failsafe operation**

slip-free belt operation at all times and under any working conditions from arctic cold to all-wet tropical environments. Suitable for high drive powers and belt speeds, heavy belt tensions and work loads (e.g. steel cord belts).

- **Belt protection**

Form-closure and positive interlocking with the belt eliminates differential speeds and thus protects the belt from premature wear for a maximum lifetime.

- **Wear protection**

Greatly enhanced lifetime of both lagging and pulley is achieved by the extreme hardness and high level of abrasion resistance of the ceramics.

- **Saving maintenance costs**

Without the need of frequent lagging replacement/repair downtime of the conveyor and the associated loss of production is minimized very much.





General aspects for applications

Rubber-ceramic lagging

Rubber-ceramic lagging features single ceramic blocks hot moulded into a rubber backing including a bond-friendly CN-layer. Advanced TBT-Design („Tread Bar Technology“) for water and dirt drainage.



Ceramic surface covering	52 %
Single ceramic block size	20 x 10 x 30 mm
Max. shear strength (bond line)	12 - 15 N/mm ²

All-ceramic lagging

All-ceramic lagging is directly bonded onto the pulley metal surface by our special **CERABOND** organo-ceramic glue systems.



Ceramic surface covering	100 %
Single ceramic block size	20 x 10 x 30 mm
Max. shear strength (bond line)	40 - 50 N/mm ²

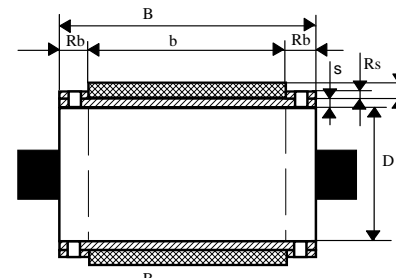
The very high shear strength value makes the all-ceramic lagging the most suitable and reliable choice especially for highest belt tensions.

Due to its inert properties it may also be used in surroundings where chemicals such as oil, tar or inorganic salts, phosphates, etc. are handled.

SHELL-LAG System

Any type of friction lagging can be supplied on precisely made steel shells for any pulley dimension. The shells are mounted by bolting or welding.

SHELL-LAG is a „plug & play“ system for easy and quick installation; Shells may be fixed on site without removal of the pulley from site.



Number of segments	
Pulley dia. to 315 mm	in 2 parts
315 – 630 mm	in 2 – 3 parts
630 - 1000 mm	in 3 – 4 parts
1000 - 1400 mm	in 4 – 5 parts
over 1400 mm	in 5 parts or more
Steel shell thicknesses	
Pulley width to 1150 mm	4 mm
1150 – 1400 mm	5 mm
1400 – 1600 mm	5 – 6 mm
over 1600 mm	6 mm

Border reinforcements of shells	
Pulley width to 600 mm	30 x 4 mm
600 – 1150 mm	40 x 4 mm
over 1200 mm	50 x 4 mm
Bores	
Border reinforcement 30 x 4 mm for M12	
40 x 4 mm and 50 x 4 mm for M16	
Bolts (similar DIN603) with nose	
M12 x 40 mm, M 16 x 50 mm, standard or galvanized execution	

All dimensions are advisory only and may be adapted to special customer requirement.



Material data

Porous and dense ceramics

We manufacture a wide range of porous and dense sintered SiO₂, Al₂O₃ and SiC ceramics for any type of application.

Both porous and dense ceramics are available in the following rubber-ceramic and full ceramic lagging quality types:

Rubber-ceramic qualities	
CERALITE	porous
CERAGRIP	
SILCARFLEX	
CERADRIIVE	dense
CERASINT	

All-ceramic qualities	
COMBI	porous
CERASHELL	
CERADRIIVE NORUB	dense
CERASINT NORUB	

The operation principle of the **porous ceramics** is based on micro-cogging effects between the rubber belt and the porous ceramic surface. As its main advantage porous ceramic lagging maintains its adhesion value and performance over the whole lifetime of the lagging.

Dense metal oxides ceramics feature excellent wear resistance by the extreme hardness of the material. High adhesion values are achieved by a **2 mm friction teeth surface profile** for 3D-interlocking with the belt.



The choice of lagging type is based on specific requirements regarding friction value, belt tension, drive power and working conditions.

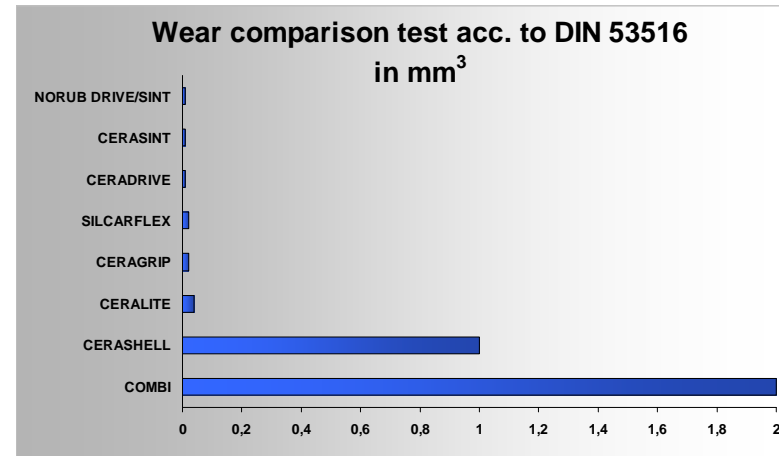
CERALITE	
Ceramic colour / binding system	Black / organic
Density ceramics	2.0 g/cm ³
Max. surface pressure	Ceramics: 200 N/mm ² / Rubber: 27 N/mm ²
Shore hardness rubber	65° – 70° ShoreA
Wear index acc. to DIN 53516 (depending on choice of elastomere)	Ceramics: 0.04 mm ³ Rubber: 80 – 120 mm ³
CERAGRIP	
Ceramic colour / binding system	green / inorganic
Density ceramics	2.5 g/cm ³
Max. surface pressure	Ceramics: 500 N/mm ² / Rubber: 27 N/mm ²
Shore hardness rubber	65° – 70° ShoreA
Wear index acc. to DIN 53516 (depending on choice of elastomere)	Ceramics: 0.02 mm ³ Rubber: 80 – 120 mm ³
SILCARFLEX	
Ceramic colour / binding system	grey / inorganic-metallic
Density ceramics	3.0 g/cm ³
Max. surface pressure	Ceramics: 1000 N/mm ² / Rubber: 27 N/mm ²
Shore hardness rubber	65° – 70° ShoreA
Wear index acc. to DIN 53516 (depending on choice of elastomere)	Ceramics: 0.02 mm ³ Rubber: 80 – 120 mm ³
CERADRIIVE (drive pulleys) + CERASINT (non-drive pulleys)	
Ceramic colour / binding system	white / inorganic
Density ceramics	3.7 g/cm ³
Max. surface pressure	Ceramics: 3000 N/mm ² / Rubber: 27 N/mm ²
Shore hardness rubber	65° – 70° ShoreA
Wear index acc. to DIN 53516 (depending on choice of elastomere)	Ceramics: ≤ 0.01 mm ³ Rubber: 80 – 120 mm ³



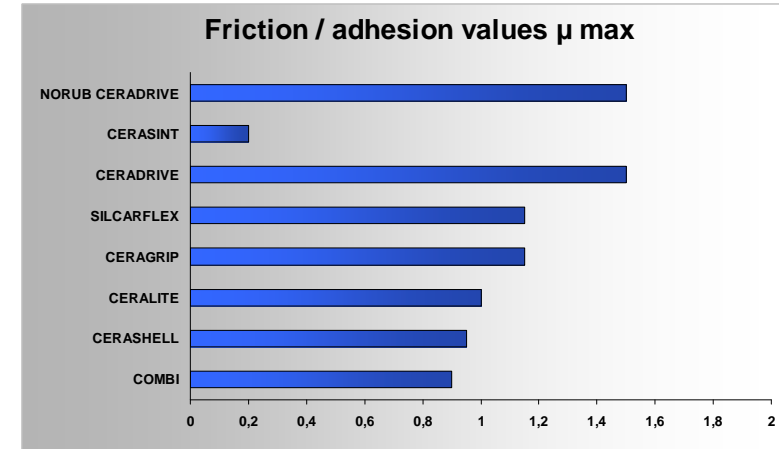
Material data

COMBI	
Ceramic colour / binding system	red / organic
Density ceramics	2.0 g/cm ³
Max. surface pressure	200 N/mm ²
Wear index acc. to DIN 53516	2 mm ³
CERASHELL	
Ceramic colour / binding system	blue / organic
Density ceramics	2.7 g/cm ³
Max. surface pressure	300 N/mm ²
Wear index acc. to DIN 53516	1 mm ³
CERADRIVE NORUB + CERASINT NORUB	
Ceramic colour / binding system	white / inorganic
Density ceramics	3.7 – 3.8 g/cm ³
Max. surface pressure	3000 N/mm ²
Wear index acc. to DIN 53516	0.02 mm ³
CERABOND 209/210 bonding system for NORUB installation	
colour / binding system (depending on CERABOND type)	off-white, yellow-white, light blue / 2-component organo-ceramic
Density	1.8 g/cm ³
Shore hardness	90° - 95° ShoreD
Wear index acc. to DIN 53516	< 10 mm ³

Further information on material data will be provided by the specific material data sheet for each quality.



Note: Wear of rubber elastomeres = 80 – 200 mm³



Friction/adhesion values $\mu > 1$ are theoretically impossible acc. to Coulomb's friction law. In reality, however, these values occur with rubber-elastic materials due to the micro-gearing between the different surface roughnesses of the adhesion partners (rigid ceramics together with the „non-porous“ surface of the flexible rubber belt). These so-called positive locking effects add up to the opposite directional force and generate $\mu > 1$.



Supplementary information

Delivery form and options

<Rubber ceramic lagging>

- **Standard strip size:** 280 x 1125 mm; available cut-to-size or joined together to multiples (2250 mm, 3375 mm, 4500 mm, ..) on request
- **Available thicknesses:** 15 mm (standard), 20 and 25 mm on request
- **Rubber types:** 1014 (standard), 2014 (oil- and fat-resistant) and 3014 FRAS (fire resistant anti-static rubber quality) acc. to MSHA and German LOBA certificate

Material quantity requirement of MICKE friction lagging strips
280 x 1125 mm [11 x 44.3"] for different pulley sizes

Dia. mm [inch]	Pulley face width mm [inch]						
	750–1150 [29.5–45.3]	1250 [49.2]	1400 [55.1]	1600 [63]	1800-2200 [70.9-88.6]	2500 [98.4]	2800 [110.2]
320 [12.6]	4	5	5	6	8	10	12
400 [15.7]	5	6	7	8	10	13	15
500 [19.7]	6	7	8	9	12	15	18
630 [24.8]	8	9	10	12	16	20	24
800 [31.5]	10	11	13	15	20	25	30
1000 [39.4]	12	14	15	18	24	30	36
1250 [49.2]	15	17	19	22	30	38	45
1500 [59.1]		19	22	26	34	43	51
1800 [70.9]			27	32	42	53	63
2000 [78.5]				35	46	58	69
2200 [88.6]					50	63	75

This table provides an estimate on the required number of lagging strips for your convenience. All calculated figures were adjusted upwards to the next full digit. Quantities for multiple pulleys may vary due to usable offset. You may contact us to confirm your calculation.

<All-ceramic lagging>

COMBI / CERASHELL

- **Available thicknesses:** 8, 10, 12 (standard), 15, 18, 20 and 25 mm
- **Lagging surface shape:** cylindrical (standard), crowned on request

NORUB CERADRIIVE / CERASINT

- **Standard sheet size:** 440 x 480 mm; may be cut after each single block
- **Thickness:** 10 mm ceramic; total lagged thickness approx. 12 mm
- **Available NORUB glue systems:**
 - CERABOND 209/210 (operating Temp. -50°C to +90°C)
 - CERABOND 209/210 HT (-50°C to +200°C)
 - CERABOND 209/210 FR (FRAS execution)

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