Pipe wear protection



Cera Pipe · Cera Flex

System solutions with ceramic components

Wear protection in the toughest of operating conditions



Conventional materials reach their limits in many industrial areas. Entirely new perspectives often arise when ceramic high-performance materials are used.
Ceramics can be deployed to an advantage everywhere where wear and corrosion resistance and high temperature stability are needed.

As the technological market leader for ceramic lined industrial valves and pipeline components, we continually open up new areas of application together with our customers.
Our range of services consists of the design, testing, production and delivery of such systems. An optimum customer service is in place thanks to our after sales service. Our system solutions enable a great economic benefit in many applications.

There is a comprehensive range of tried and tested standard products available to our customers. Many of our ceramic lined products can be delivered economically and at short notice.

Due to the fact that our products are used in almost all industrial sectors, our application engineers understand the different problems and are usually already aware of the customer-specific solution.
Our standard products are designed for use in extreme conditions. If particular fields of application cannot be covered by our delivery programme, we develop new solutions in close cooperation with our customers.

Advantages for your smooth production process

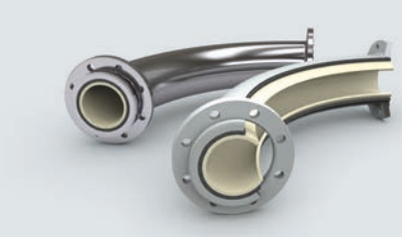


Our products have a joint-free, ceramic lining.
Ceramic materials display a high level of wear resistance against abrasive wear but less resistance against impact wear. A lining without joints and butt joints minimises impact wear, thus ensuring significantly greater service lives. Our systems are fundamentally compact and ceramically lined without joints.

We supply the best wear protection with a low weight.
Ceramic that is not thick achieves the best wear protection. In fact, it is important to prevent the onset of wear with a good and suitable ceramic. The reason for this is the fact that hard substances with steep angles of impact have a much greater erosion than flat angles of impact. With our thin-walled ceramic, we supply pipelines that conform with the nominal sizes and, as a result, also achieve a weight advantage.

We guarantee nominal size conformity.
Our wear-protected components fit into every existing pipe system. They can also be replaced at a later date with little effort. As a result, wear-related production losses are effectively minimised.

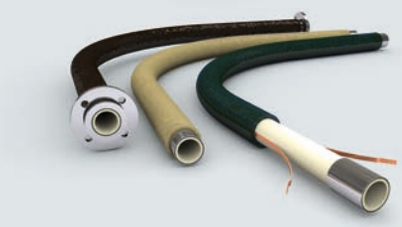
Pipe wear protection



Steel / stainless steel pipe elbows
The ceramic lined pipe elbows are used in highly-abrasive media. A monolithic curved ceramic segment is threaded into a steel jacket with respective flange connections and specially attached with putty. Thanks to the thin-walled ceramic, it is possible to manufacture these pipe elbows with nominal size conformity. Leg extensions adjust the components so that they meet the required installation dimensions.



Pipe elbows coated in HALAR
We produce pipe elbows with a HALAR coated steel shell that can be used with abrasive and corrosive substances. This option is only available with fixed flanges.



Pipe elbows with GRP casing
The monolithic curved ceramic segment is wrapped in a glass fibre reinforced polyester resin (GRP). Respective connecting units (flanges, couplings, clamping pieces, etc.) can also be ceramically lined and wrapped. An ideal level of wear protection is ensured thanks to the use of premium engineering ceramics and an appropriate dimensioning of the radius. Such pipe elbows are characterised by their low weight.



Pipes and reducers
Pipes with ceramic lining are available for delivery in all nominal sizes and with all options. Reducers serve as a central transition between two pipe sizes in order to reduce or extend. The ceramic lining protects the pipeline and ensures long operating service lives.



T and Y pieces
For technological reasons, pipe branches and junctions with different angles are used. In the case of a flow redirection, severe turbulences occur that cause a high level of wear when solid-laden media is used. Ceramic lined T and Y pieces can resist this wear and ensure a long service life.

Conveying shoes
Ceramic lined conveying shoes have a significantly longer wear resistance. Thanks to our technology, the infeed curve, which is the main element of the conveying shoe can be monolithically manufactured from one piece of ceramic.



Ceramic hoses
The patented ceramic conveying hose comprises of ceramic rings that are cured together with special rubber materials. Due to the geometry of the ceramic rings, the rubber joint remains away from the area of flow and is therefore protected. The excellent service life is primarily achieved by the fact that the ceramic lining does not have any joints along the conveying direction.



Ceramic system solutions
We provide ceramic solutions for system components exposed to particular strain as well as complete system solutions. Comparable loads, such as those in pipe elbows and T pieces can be found in distribution devices such as V boxes, feeder shoes and jet distributors as well as in throttle systems, in mixing systems such as static mixers and flotation mixing chambers, in cyclones and nozzles for the spraying of suspensions.



Design:

Wear-resistant, corrosion-proof, joint-free and nominal size-compliant design

Normal size range:

DN 20 to DN 250 (3/4″ to 10″)

Pressure range:

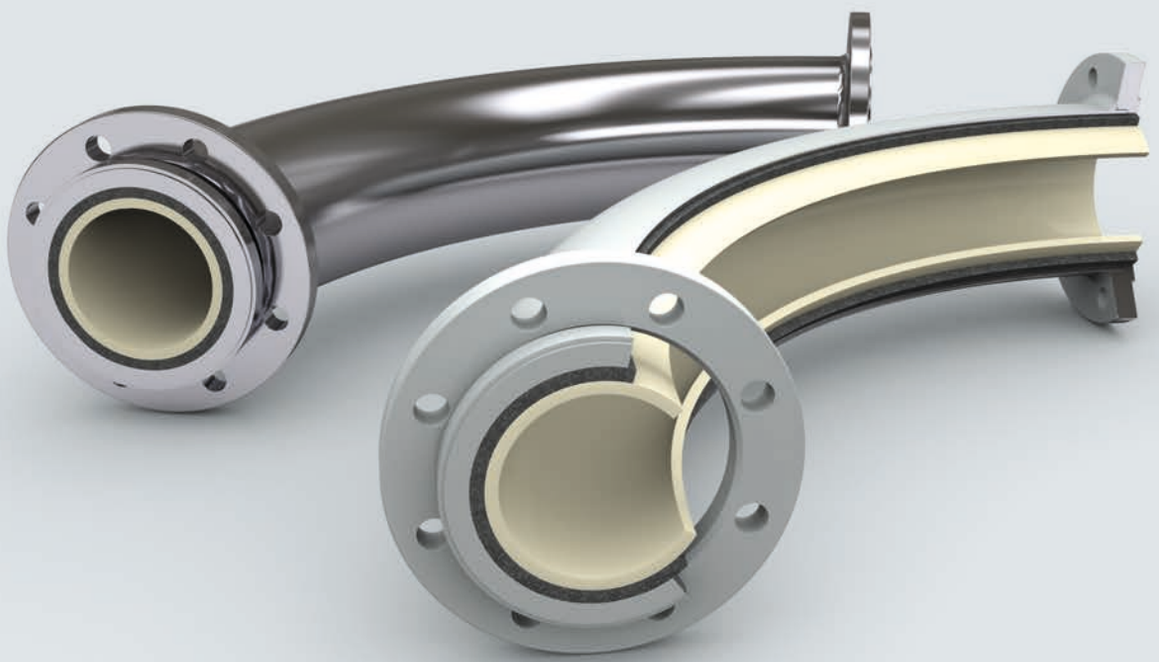
PN 10 up to PN 40, ANSI class 150, class 300
Other nominal pressure ranges on request

Temperature range:

-25 °C to +950 °C / -13 °F to +482 °F possible

Many system solutions for ceramic wear protection require engineering experience and technological knowledge of the processes. Please ask our sales engineers for the ideal technical and economic solutions for your particular requirements.

Ceramic pipe elbows with steel jacket



Standard	
Steel jacket with flanges	Carbon Steel P235GH (St 35.8I) – priming paint
Ceramic liner	Aluminium oxide
Putty	Cement

Options	
Steel jacket with flanges	Stainless Steel 1.4301 or 1.4571
Ceramic liner	Silicon carbide
Putty	Silicon, PUR (Polyurethane), HT putty

Function:

The ceramic lined pipe elbows are used in highly-abrasive media. A monolithic curved ceramic segment is threaded into a steel jacket with respective flange connections. The gap between the steel jacket and the ceramic is filled with temperature-resistant putty and has a dampening effect. An ideal level of wear protection is ensured thanks to the use of premium engineering ceramics and an appropriate dimensioning of the radius. Thanks to thin-walled ceramic, it is possible to manufacture these pipe elbows with nominal size conformity. As a result, the ceramic pipe elbows can be retrofitted into existing plants without the need to make pipeline adjustments. Radii can be adjusted by means of respective leg extensions.

Nominal size range:

DN 20 (3/4″) to DN 250 (10″)
Nominal size-conformant

Options:

- Leg extension (single and dual sided)
- Various connection types (Kamlok, Storz coupling; dairy pipe connection; binding clamps; etc.)
- Nominal size steps
- Wall thickness monitoring
- Electrically-conductive ceramic (silicon carbide)
- Oil and grease-free design (oxygen)
- Lance design
- Other materials for the steel jacket available on request
- High-temperature designs with inner insulations

Putty materials:

- Cement mortar
- PUR, silicon
- HT putty

Type of connection:

R250 – R2000 Fixed flange – flush and lose flange
D4 / D6 Fixed flange – flush and lose flange on request

Pressure range:

PN 10 to PN 40
ANSI class 150 and class 300
Other nominal pressure ranges on request

Temperature range:

-30 °C to +75 °C / -22 °F to +167 °F for PUR
up to +230 °C / 446 °F for silicon putty
up to +350 °C /662 °F for cement putty

Typical application areas:

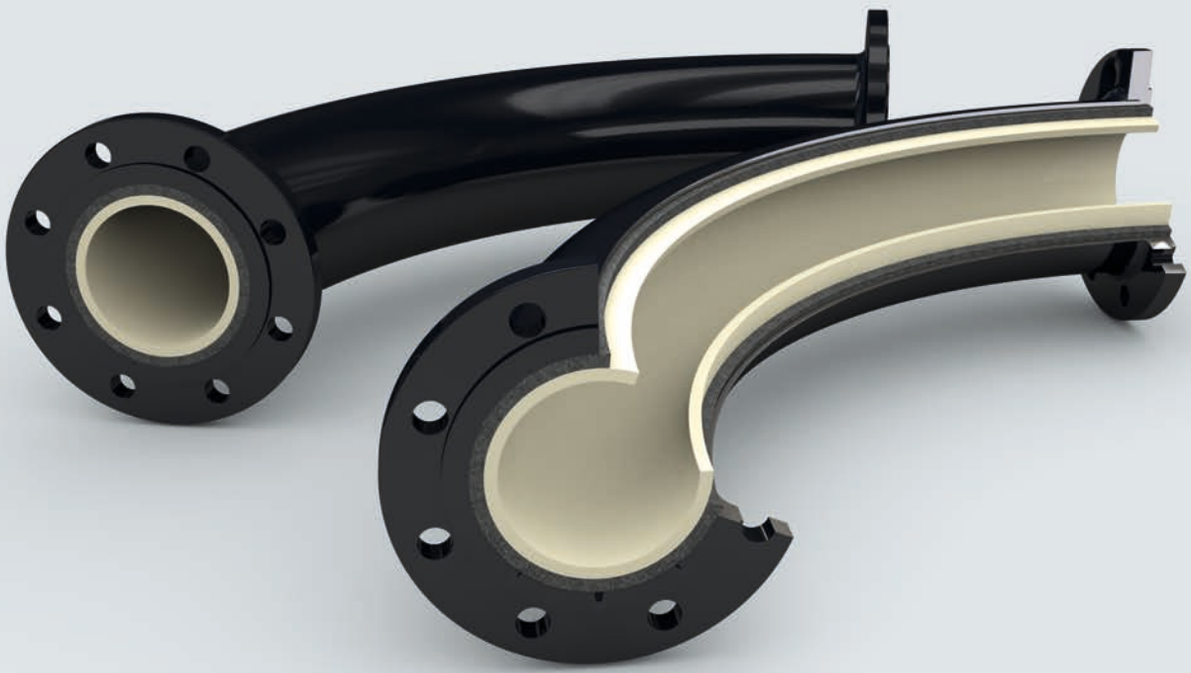
Pneumatic transportation of:

- Flue dust in power stations and waste incineration plants
- Titanium oxide and iron oxide in pigment production
- Ores (e.g. copper) in mining
- Rutilit (blast furnace), sinter dust (sinter plants), Coal dust (EAF+PCI), lime + magnesium (pig iron desulphurisation), substitute fuels
- in steel works and blast furnaces
- Moulding sand in foundries
- Shards in glass plants
- Mineral animal feed in the feed industry
- Sanding material in the timber industry
- Clinker dust, lime, cement, slag sand, flue dust in cement plants
- Substitute for deflection pots:
- Pipe elbows with small radii (6D, R250)

Available Radii:

			Radius in mm						
	$Ø_A$-Steel-		Type						
NPS	jacket	Ceramic	6D	R250	R500	R750	R1000	R1500	R2000
DN 20	48,3	20/31	110	250	500				
DN 25	48,3	25/36	110	250	500				
DN 32	60,3	32/43	140	250	500	750			
DN 40	76,1	42/54	180	250	500	750	1000		
DN 50	88,9	50/62	210		500	750	1000		
DN 65	108,0	65/77	255		500	750	1000		
DN 80	114,3	80/92	275		500	750	1000	1500	
DN 100	139,7	102/116	335		500	750	1000	1500	
DN 125	168,3	125/140	395			750	1000	1500	2000
DN 150	193,7	150/168	460			750	1000	1500	2000
DN 175	219,1	175/191	515	[1] to PN 25			1000	1500	2000
DN 200[1]	244,5	200/216	585	[2] from PN 40			1000	1500	2000
DN 200[2]	273,0	200/216	655	(only with threaded holes)				1500	2000

Ceramic pipe elbows with coated steel jacket



Standard	
Steel jacket with flanges	Carbon Steel P235GH (St 35.8I) – HALAR-coated
Ceramic liner	Aluminium oxide
Putty	Cement

Options	
Ceramic liner	Silicon carbide
Putty	Silicon, PUR (Polyurethane)

Function:

The ceramic lined pipe elbows are used in highly-abrasive and corrosive media. A monolithic curved ceramic segment is threaded into a HALAR-coated steel jacket with fixed flanges. The gap between the steel jacket and the ceramic is filled with temperature and chemical-resistant putty and has a dampening effect. An ideal level of wear protection is ensured thanks to the use of premium engineering ceramics and an appropriate dimensioning of the radius. Thanks to thin-walled ceramic, it is possible to manufacture these pipe elbows with nominal size conformity. As a result, the ceramic pipe elbows can be retrofitted into existing plants with the need to make pipeline adjustments. Radii can be adjusted by means of respective leg extensions.

Nominal size range:

DN 20 (3/4″) to DN 250 (10″)
Nominal size-conformant

Type of connection:

Fixed flange

Pressure range:

PN 10 to PN 40
ANSI class 150 and class 300
Other nominal pressure ranges on request

Options:

- Leg extension (single and dual sided)
- Nominal size steps
- Wall thickness monitoring
- Electrically-conductive ceramic (silicon carbide)

Putty materials:

- Cement mortar
- PUR, silicon

Temperature range:

-30 °C to +75 °C / -22 °F to +167 °F for PUR
up to +160 °C / 320 °F for silicon or cement putty

Typical application areas:

Dye production:

- Titanium oxide suspension
- Iron oxide suspension

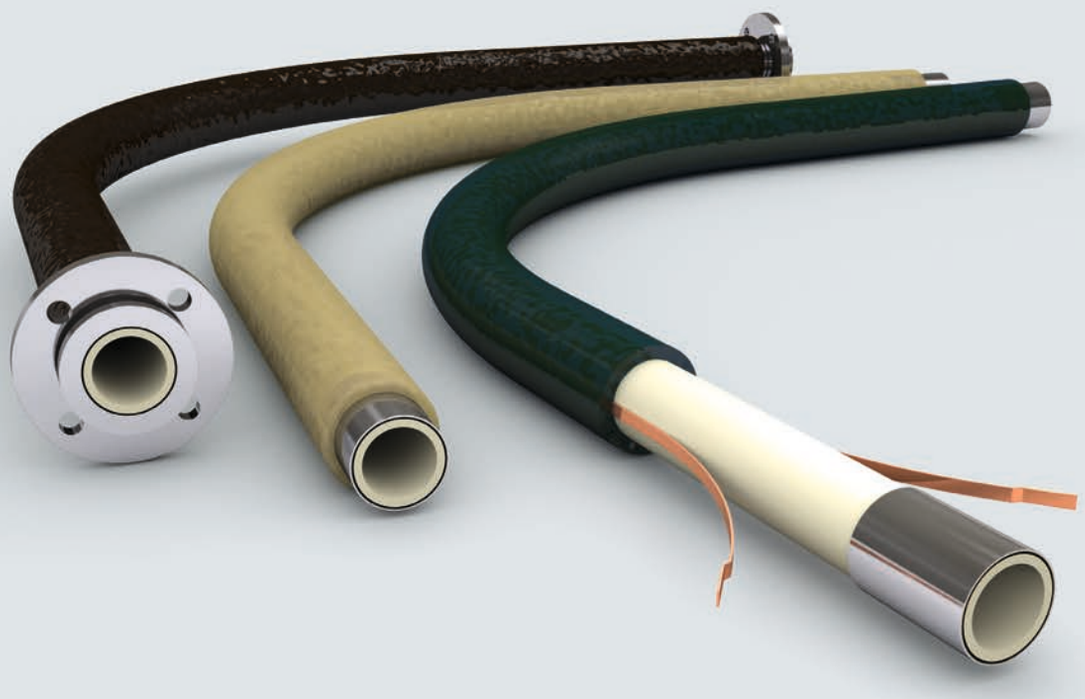
Waste incineration plants:

- Suspension in the HCL prewasher

Available Radii:

				Radius in mm						
	$Ø_A$-Steel-			Type						
NPS	jacket	Ceramic	Flange	6D	R250	R500	R750	R1000	R1500	R2000
DN 20	48,3	20/31	DN 20	110	250	500		1000		
DN 25	48,3	25/36	DN 25	110	250	500		1000		
DN 32	60,3	32/43	DN 32	140	250	500	750	1000		
DN 40	76,1	42/54	DN 40	180	250	500	750	1000		
DN 50	88,9	50/62	DN 50	210	250	500	750	1000		
DN 65	108,0	65/77	DN 65	255		500	750	1000		
DN 80	114,3	80/92	DN 80	275		500	750	1000	1500	
DN 100	139,7	102/116	DN 100	335		500	750	1000	1500	
DN 125	168,3	125/140	DN 125	395			750	1000	1500	2000
DN 150	193,7	150/168	DN 150	460			750	1000	1500	2000
DN 175	219,1	175/191	DN 175	515	[1] to PN 25			1000	1500	2000
DN 200[1]	244,5	200/216	DN 200	585	[2] from PN 40			1000	1500	2000
DN 200[2]	273,0	200/216	DN 200	655	(only with threaded holes)				1500	2000

Ceramic pipe elbows with coated GRP casing



Standard	
Casing	GRP
Connecting units	Stainless Steel 1.4301
Ceramic liner	Aluminium oxide

Options	
Casing	GRP-conductive
Connecting units	Stainless Steel 1.4571, PP
Ceramic liner	Silicon carbide

Function:

These ceramic-lined pipe elbows can be used with very abrasive and corrosive media. The monolithically curved ceramic segment is sheathed in glass fiber reinforced plastic. Corresponding connection pieces (flanges, couplings, clamps etc.) can also be ceramic-lined and sheathed. By using high-quality engineered ceramic and the right radius, we guarantee optimum wear protection. Thanks to thin-walled ceramics, pipe elbows can be manufactured that conform to standard nominal pipe sizes. This means that ceramic elbows can be retrofitted into existing systems without having to make changes to the pipeline. Radii can be adapted using shank extensions. This model is characterized by its light weight design.

Nominal size range:

DN 20 (3/4″) to DN 250 (10″)
Standard nominal sizes

Type of connection:

Clamp connection

Pressure range:

PN 10
ANSI class 150
Other standard pressure ranges available upon request

Options:

- Shank extension (single and double sided)
- Various types of connections (Kamlok, Storz couplings; dairy pipe connection; flange; etc.)
- Nominal width jumps
- Wall thickness monitoring
- Electrically conductive ceramics (silicon carbide)
- Electrically conductive glass fiber reinforced plastic

Temperature range::

max. 80°C / 176°F

Typical application areas:

Plastics industry:
- Pneumatic transportation of glass fiber reinforced plastics

Food industry:
- Pneumatic transportation of rice and muesli
- Pneumatic transportation of mineral feed

Sanitation:
- Pneumatic transportation of enamel

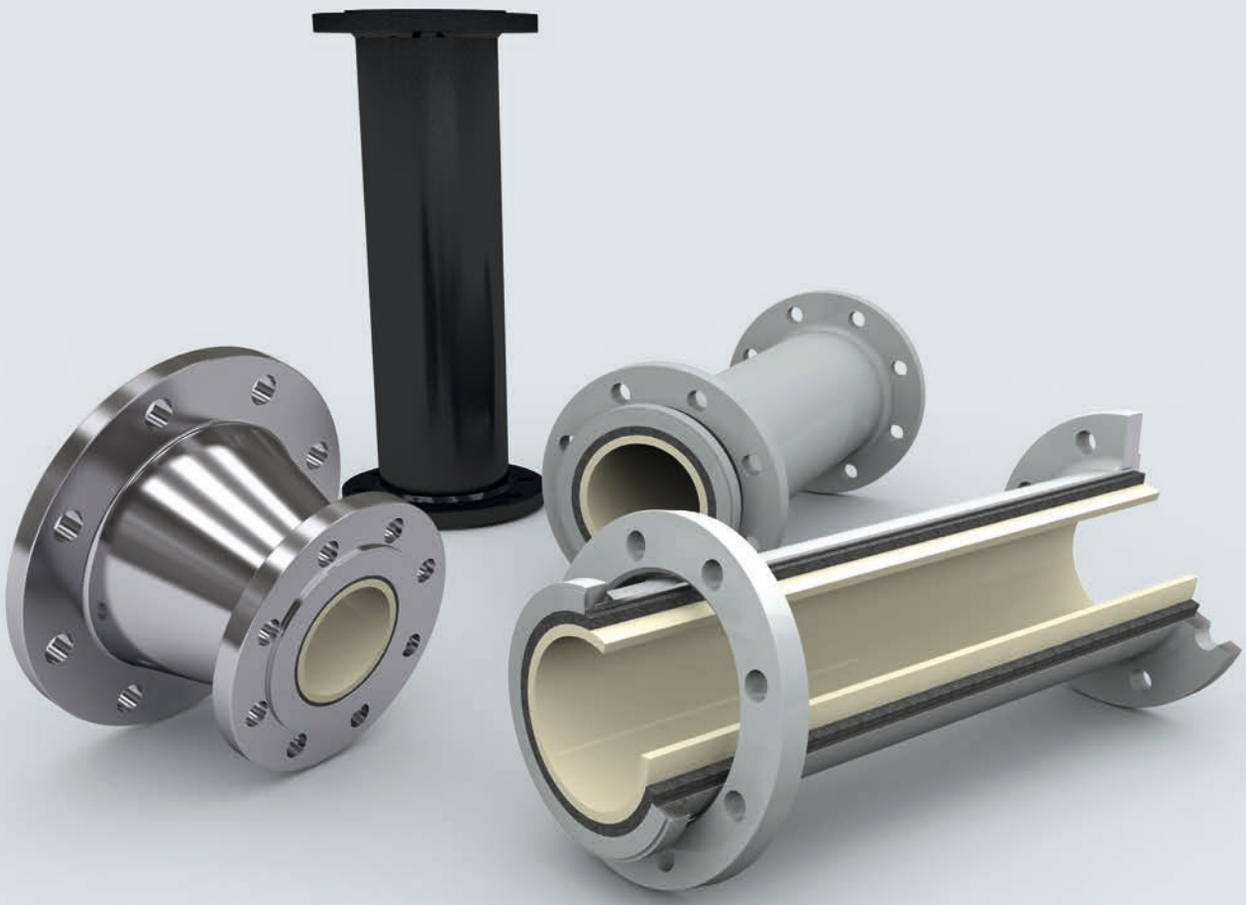
Metal industry:
- Suction systems (e.g. metal swarf)

Blast furnaces:
- Pneumatic transportation of substitute fuels (plastics)

Available Radii:

			Radius in mm						
		Ø- pipe-	Type						
NPS	Ceramic	connection	6D	R250	R500	R750	R1000	R1500	R2000
DN 20	20/31	35	110	250	500				
DN 25	25/36	40	110	250	500				
DN 32	32/43	50	140	250	500	750			
DN 40	42/54	57	180	250	500	750	1000		
DN 50	50/62	65	210		500	750	1000		
DN 65	65/77	80	255		500	750	1000		
DN 80	80/92	100	275		500	750	1000	1500	
DN 100	102/116	128	335		500	750	1000	1500	
DN 125	125/140	154	395			750	1000	1500	2000
DN 150	150/168	204	460			750	1000	1500	2000
DN 175	175/191	204	515				1000	1500	2000
DN 200	200/216	219	655					1500	2000
DN 250	250/270		780					1500	2000

Pipes and reducers



Standard	
Steel jacket with flanges	Carbon Steel P235GH (St 35.8I) – priming paint
Ceramic liner	Aluminium oxide
Putty	Cement

Options	
Steel jacket with flanges	Stainless Steel 1.4301 or 1.4571
	St 37 / HALAR coated
	GRP, GRP-conductive
Ceramic liner	Silicon carbide
Putty	Silicon, PUR (Polyurethane)

Function:

Pipes with ceramic lining are used in highly-abrasive media.
- Points that are particularly exposed are:
- Points downstream of pipe elbows
- Points downstream of control valves
- Extensions downstream of pumps
- Branches

A ceramically-lined calming section of 10 x D (pipe nominal size) should be provided at this point. As the pipes with ceramic lining are manufactured with nominal size conformity, it is possible to perform retrofitting without the need to make pipeline adjustments. Reducers serve as a central transition between two pipe sizes in order to reduce or extend. Additional turbulences occur as a result of the nominal size transitions, which can lead to a high level of wear when solid-laden media is used. The ceramic lining protects the pipeline at these points and ensures long operating service lives. Two lengths are offered as standard. The short length is the shortest possible transition with a gradient angle of below 15°. The long length is primarily recommended for cases where a smaller resistance is required or where there is a risk of the media being crushed or destroyed.

Nominal size range:

Flange connections DN 15 (1/2″) up to DN 400 (16″)

Pressure range:

PN 10 to PN 40
ANSI class 150 and class 300
up to PN 160 / ANSI class 900 on request

Typical application areas:

- Following pumps as an extension
- At system transition points
- Points downstream of throttle sections as an extension

Temperature range:

-30 °C to +75 °C / -22 °F to +167 °F for PUR
up to +180 °C / +356 °F for HALAR coating
up to +230 °C / +446 °F for silicon putty
up to +350 °C / +662 °F for cement putty

Options:

- Various connection types (Kamlok, Storz coupling; dairy pipe connection; binding clamps; etc.)
- Nominal size steps
- Wall thickness monitoring
- Electrically-conductive ceramic (silicon carbide)
- Oil and grease-free design (oxygen)
- Other materials for the steel jacket available on request
- High-temperature designs with inner insulations

Putty materials:
- Cement mortar
- PUR, silicon
- HT putty

Available lengths:

- Pipes: All lengths available for delivery, maximum length for a pipe section app. 3 m / 10 ft
- Pipe reducers

Nominal size	Length in mm		Nominal size	Length in mm	
	Short pipe reducers	Long pipe reducers		Short pipe reducers	Long pipe reducers
DN 15 / 20	42,5	150	DN 80 / 100	104,5	350
DN 15 / 25	47,5	160	DN 80 / 125	129,5	400
DN 15 / 32	57,5	180	DN 80 / 150	169,5	480
DN 15 / 40	67,5	200	DN 100 / 125	117	400
DN 15 / 50	82,5	230	DN 100 / 150	157	480
DN 25 / 32	47,5	180	DN 100 / 200	217	600
DN 25 / 40	57,5	200	DN 125 / 150	134	480
DN 25 / 50	72,5	230	DN 125 / 200	194	600
DN 25 / 65	102,5	290	DN 125 / 250	259	730
DN 40 / 50	76,5	230	DN 150 / 200	179,5	600
DN 40 / 65	106,5	290	DN 150 / 250	244,5	730
DN 40 / 80	116,9	310	DN 150 / 300	304,5	850
DN 50 / 65	99,5	290	DN 150 / 400	429,5	1100
DN 50 / 80	109,5	310	DN 200 / 250	192,5	730
DN 50 / 100	129,5	200	DN 200 / 300	252,5	850
DN 50 / 125	154,5	400	DN 200 / 400	377,5	1100
DN 65 / 80	92	310	DN 250 / 300	235	850
DN 65 / 100	112	350	DN 250 / 400	360	1100
DN 65 / 125	137	400			

T and Y pieces



Standard	
Steel jacket with flanges	Carbon Steel P235GH (St 35.8I) – priming paint
Ceramic liner	Aluminium oxide
Putty	Cement

Options	
Steel jacket with flanges	Stainless Steel 1.4301 or 1.4571
	St 37 / HALAR coated
	GRP, GRP-conductive
Ceramic liner	Silicon carbide
Putty	Silicon, PUR (Polyurethane)

Function:

For technological reasons, pipe branches and junctions at different angles are used. Depending upon the angle, they are called T pieces (90°) or Y pieces. Additional, severe turbulences occur in the event of a flow deflection, which can lead to enormous signs of wear when solid-laden media is used. Ceramic lined T and Y pieces can resist this wear and ensure a long service life.

Nominal size range:

DN 10 (3/8″) to 200 (8″)
Flange shapes can be manufactured
according to the wishes of the customer

Pressure range:

PN 10 to PN 40
ANSI class 150 and class 300
up to PN 160 / ANSI class 900 on request

Typical application areas:

– At system transition points

Options:

– Various connection types (Kamlok, Storz coupling; dairy pipe connection; binding clamps; etc.)
– Nominal size steps
– Wall thickness monitoring
– Electrically-conductive ceramic (silicon carbide)
– Oil and grease-free design (oxygen)
– Other materials for the steel jacket available on request
– High-temperature designs with inner insulations

Putty materials:

– Cement mortar
– PUR, silicon
– HT putty

Temperature range:

-30 °C to +75 °C / -22 °F to +167 °F for PUR
up to +180 °C / +356 °F for HALAR coating
up to +230 °C / +446 °F for silicon putty
up to +350 °C / +662 °F for cement putty

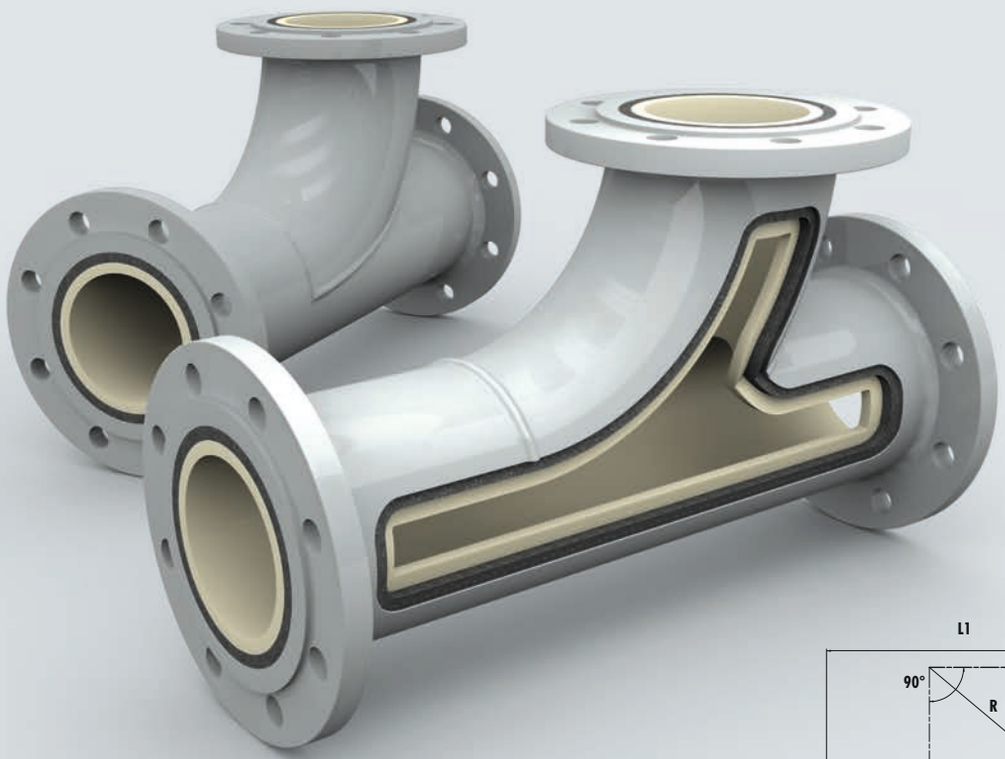
Available lengths:

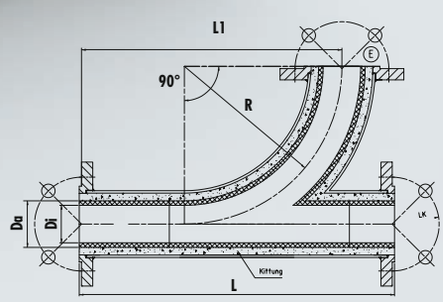
* do not correspond to Standard DIN 2848

T pieces PN 16			DIN 2848
Nominal diameter	jacket	Ceramic	Length
DN 10	33,7	10/20	190/95 *
DN 15	48,3	17/27	190/95 *
DN 20	48,3	20/31	190/95
DN 25	48,3	25/36	220/110
DN 32	60,3	32/43	260/130
DN 40	76,1	42/54	300/150
DN 50	88,9	50/62	240/120
DN 65	108,0	65/77	280/140
DN 80	114,3	80/92	330/165
DN 100	139,7	102/116	410/205
DN 125	168,3	125/140	490/245
DN 150	193,7	150/166	570/285
DN 175	219,1	175/191	600/300 *
DN 200	244,5	200/216	600/300 *

Y pieces PN 16				DIN 2848
Nominal diameter	jacket	Ceramic	Angle	Length L1/L3
DN 10	33,7	10/20	30°, 45°, 60°	95/95 *
DN 15	48,3	17/27	30°, 45°, 60°	95/95 *
DN 20	48,3	20/31	30°, 45°, 60°	95/95
DN 25	48,3	25/36	30°, 45°, 60°	110/110
DN 32	60,3	32/43	30°, 45°, 60°	130/130
DN 40	76,1	42/54	30°, 45°, 60°	150/150
DN 50	88,9	50/62	30°, 45°, 60°	120/120
DN 65	108,0	65/77	30°, 45°, 60°	140/140
DN 80	114,3	80/92	30°, 45°, 60°	330/165
DN 100	139,7	102/116	30°, 45°, 60°	205/205
DN 125	168,3	125/140	30°, 45°, 60°	245/245
DN 150	193,7	150/166	30°, 45°, 60°	285/285
DN 175	219,1	175/191	30°, 45°, 60°	300/300 *
DN 200	244,5	200/216	30°, 45°, 60°	300/300 *

Conveying shoes





Standard	
Steel jacket with flanges	P235GH (St 35.8I) – priming paint
Ceramic liner	Aluminium oxide
Putty	Cement

Options	
Steel jacket with flanges	1.4301 or 1.4571
	St 37 / HALAR coated
	GRP, GRP-conductive
Ceramic liner	Silicon carbide
Putty	Silicon, PUR (Polyurethane)

Function:

When it comes to pneumatic conveying systems for solids, the task is always to move the material that is to be conveyed from a silo and into a central continuous conveying line. When deflecting the conveyed material from the vertical fall direction and into the horizontal conveying direction, the conveyed material rubs against the pipe wall and causes wear at that point. A heavy stress caused by the pipe material also occurs in this area due to the turbulences where the solid enters the main conveying flow. The lining of the conveying shoes with ceramic achieves a significant extension of the service life. Thanks to our technology, the infeed curve, which is the main element of the conveying shoe can be monolithically manufactured from one piece of ceramic. The ceramic linings are either completely joint-free or the joints are only arranged transversely to the direction of flow. As a result, there are no points of attack located in the critical area where wear could set in. The sheer hardness of the ceramic lining also ensures that no material erosion caused by the conveyed material could occur.

Nominal size range:

DN 25 (1˝) to 150 (6˝)
Flange shapes can be manufactured according to the wishes of the customer
Nominal sizes of the individual connections can be designed differently on request

Pressure range:

PN 10 to PN 40
ANSI class 150 and class 300
up to PN 160 on request

Temperature range:

-30°C to +75°C for PUR
up to +230°C for silicon putty
up to +350°C for cement putty

Options:

Housing:
- Leg extension (single and dual sided)
- Various connection types (Kamlok; Storz coupling; dairy pipe connection; flanges etc.)
- Nominal size steps
- Wall thickness monitoring
- Electrically-conductive ceramic (silicon carbide)
- Oil and grease-free design (wall thicknesses for oxygen application)
- Other materials for the steel jacket available on request
- High-temperature designs with inner insulations

Putty materials:
- Cement mortar
- PUR, silicon
- HT putty

Typical application areas:

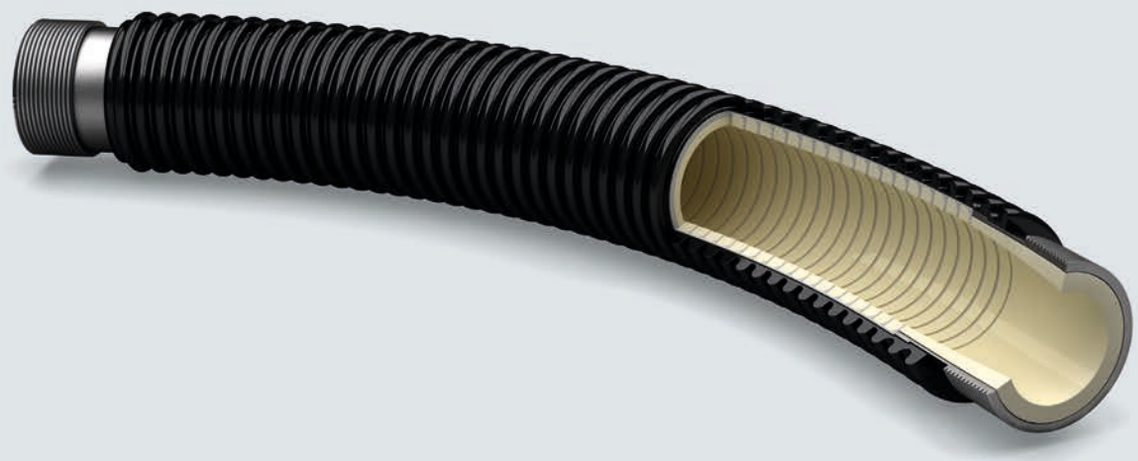
- At silo infeed points into the main conveying line
- As an injector conveying shoe

Available dimension:

Other lengths and special shapes on request

Conveying shoe					
Nominal size	**R**	**L**	**L1**	**Di**	**Da**
DN 25	110	280	230	25	36
DN 32	140	280	230	32	43
DN 40	180	360	300	42	54
DN 50	210	420	350	50	62
DN 65	255	510	420	65	77
DN 80	275	550	460	80	92
DN 100	335	670	560	102	116
DN 125	395	790	660	125	141
DN 150	500	1000	820	150	168

Ceramic hose



Standard:	
Casing	SBR
Ceramic rings	Aluminium oxide

Options:	
Casing	FPM
Ceramic liner	Silicon carbide

Function:

The patented ceramic conveying hose comprises of ceramic rings that are cured together with special rubber materials. The ceramic rings have a slight conical shape so that rubber joint remains protected away from the area of flow. Up to 3 layers of reinforcement fabric are inserted into the rubber layers in order to achieve the appropriate pressure resistance. CeraFlex is manufactured in three pressure stages, also for vacuum. In order to prevent electrostatic charging in the media, antistatic types of rubber are used. Furthermore, electrically-conductive ceramic rings are used for media that are heavily prone to charge separation. When it comes to this type of construction, it is primarily hoses with a small diameter that can be manufactured inexpensively. The weight of the hoses is amazingly low and the flexibility is equivalent to rubber conveyor hoses. The possible bending radius amounts to ten times the diameter. The excellent service life of Cera Flex is primarily achieved by the fact that the ceramic lining does not have any joints along the conveying direction. The medium is always guided back into the centre by the conically arranged ceramic rings. The transition to the connection is metallic complete with ceramic lining. In order to exclude wear in the coupling, the required connecting unit is also ceramically lined.

Nominal size range:

DN 20 (3/4″) to 80 (3″)

Bending radius:

Greater or equal to 10xD

Hose length:

At customer request
Standard length 2 m / 6.5 ft

Pressure range:

PS 3 (also for vacuum conveying), PS 6 and PS 10
44 psi (also for vacuum conveying), 87 psi and 145 psi

Temperature range:

-10 °C to +90 °C / 14 °F to +197 °F for SBR
-10 °C to +180 °C / 14 °F to +356 °F for FPM

Options:

- Various connection types (Kamlok, Storz coupling); dairy pipe connection; flanges
- threaded connection)
- Optional conductive and non-conductive rubber compounds
- Conductive ceramic
- Wear monitoring

Typical application areas:

Pigments:
- Titanium oxide, iron oxide

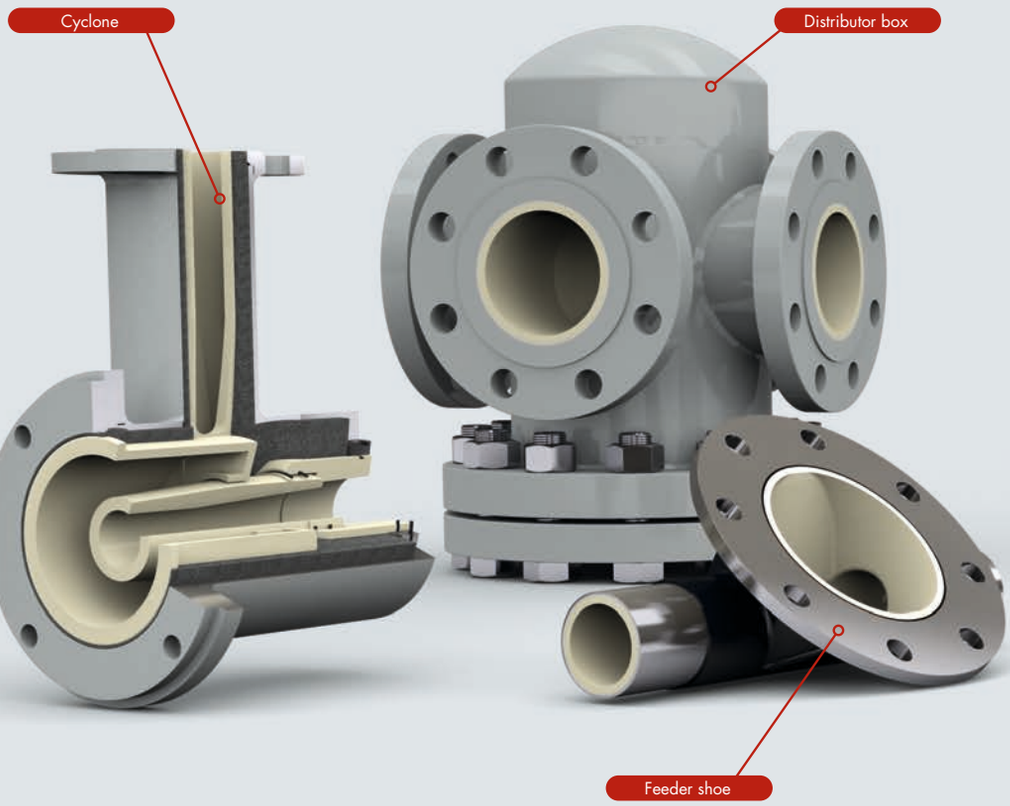
Steel works, blast furnaces:
- Rutilit, substitute fuels, plastics (blast furnace)
- Sinter dust (sinter plant)
- Coat dust (PCI+EAF),
- Lime, magnesium (pig iron desulphurisation)

Foundries:
- Moulding sand

Glass plants:
- Shards, sand, quartz

Cement plants:
- Clinker dust, lime, cement, slag, flue dust,
- plaster

Ceramic system solutions



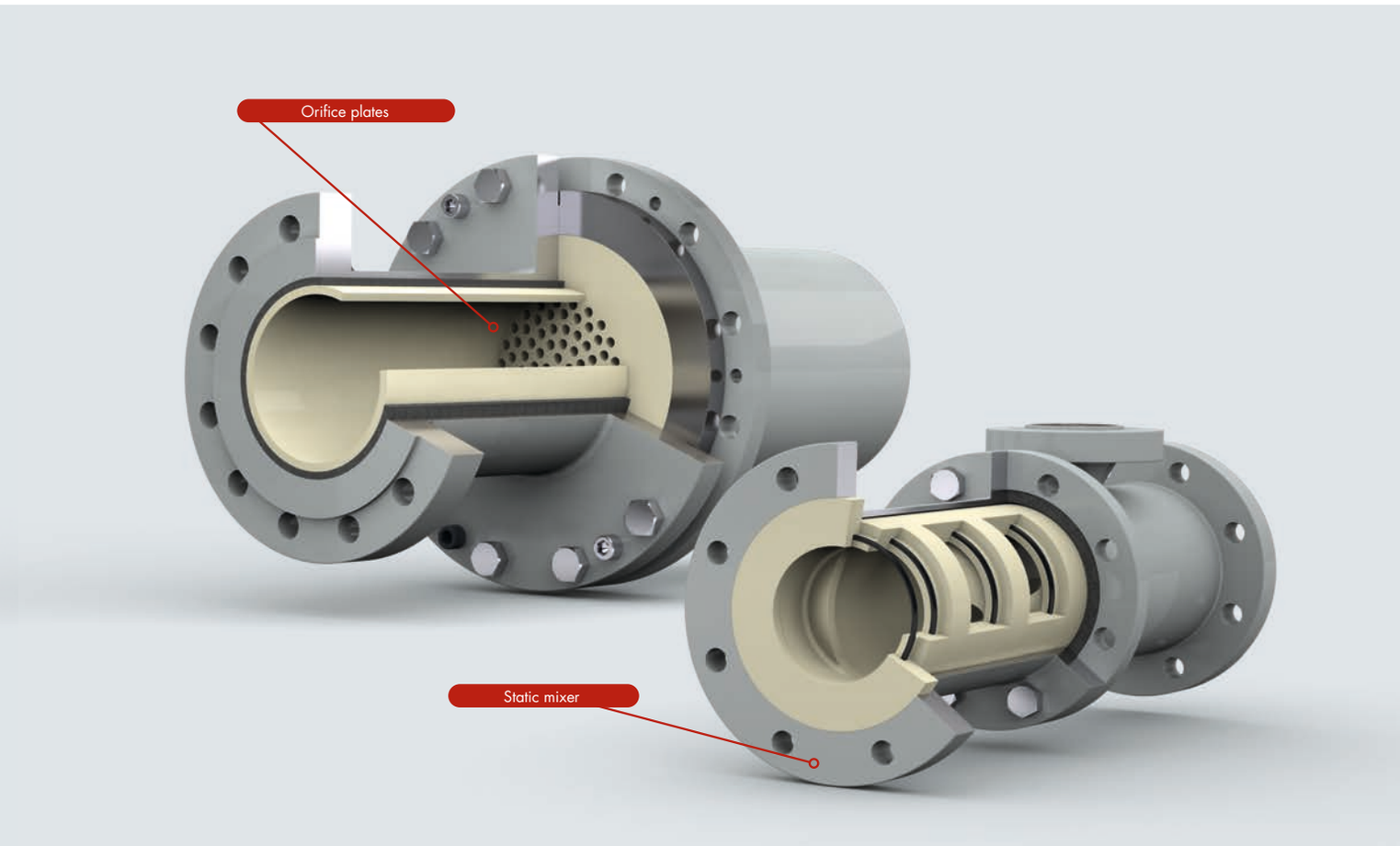
Function and description:

Understandably, individual components such as pipe elbows and T pieces are only used in combination with many others in the system. It is therefore obvious that respective solutions are offered for such systems. Comparable conditions and therefore comparable loads, such as those in pipe elbows and T pieces can be found in distribution devices such as V boxes, feeder shoes and jet distributors as well as in throttle systems (perforated plates and orifice plates) in mixing systems such as static mixers and flotation mixing chambers, in cyclones and nozzles for the spraying of suspensions (full cone nozzles).

Therefore, Cera System provides ceramic solutions for system components exposed to particular strain as well as complete system solutions.

This includes:

- Trace heating and cooling
- Inner and outer insulations
- Support systems for the compensation of thermal expansion



Nominal size range:

DN 10 (3/8″) to DN 400 (16″)
Flange shapes can be manufactured according to the wishes of the customer

Pressure range:

PN 10 to PN 40
ANSI class 150 and class 300
up to PN 160 / ANSI class 900 on request

Sizes:

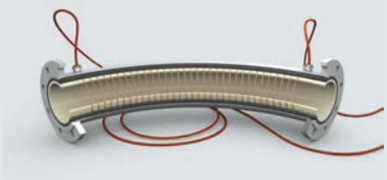
In monolithic form, ceramic parts can be realised up to a diameter of 900 mm / 3 ft and a length of 2000 mm / 6.5 ft. Larger dimensions are possible when combined.

Options:

Housing:
- Housing materials at customer request
- High-temperature design with inner insulations

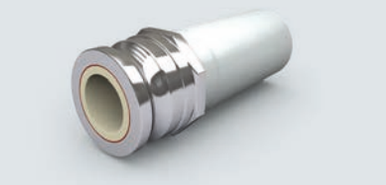
Putty materials:
- Cement mortar

Options · Additional equipment to protect pipes against wear









Wear monitoring
As all components belonging to the Cera Pipe system are either equipped with a steel jacket or are wrapped with GRP or CFK, a wire can be applied directly onto the ceramic that, in the event of a rupture or the transmission of the ceramic, can be evaluated by means of a resistance measurement.

Electrically-conductive ceramic
When dealing with electrostatic charging and heated pipelines, we also offer a conductive "silicon carbide" ceramic as an alternative to the "aluminium oxide" standard ceramic.

Leg extensions
Extensions (leg extensions) can be made to each component belonging to the Cera Pipe system by attaching an appropriate pipe section. When dealing with pipe elbows, all levels of radii can be produced using appropriate leg extensions in combination with pipe elbows with available standard radii. As a result, it is possible to retrofit our wear-protected components into every "normally" constructed pipe system without having to perform any changes or adjustments.

Kamlok coupling and clamp connection
When dealing with pipes in a metal jacket, it is usually the case that flange connections in all standard dimensions are installed as are special flanges according to the wishes of the customer and all types of couplings. On GRP pipe systems, simple metallic pipe ends are often laminated and are then connected with clips. The couplings are fully lined with ceramic on all systems.

Trace heaters / cooling jackets / heating jackets

Electric trace heating systems are also offered with metal shell models either in the putty itself or as a simple attached heating system. Liquid heating and cooling is, naturally, also available with the double shell design.

Weight indications for ceramic pipe sections

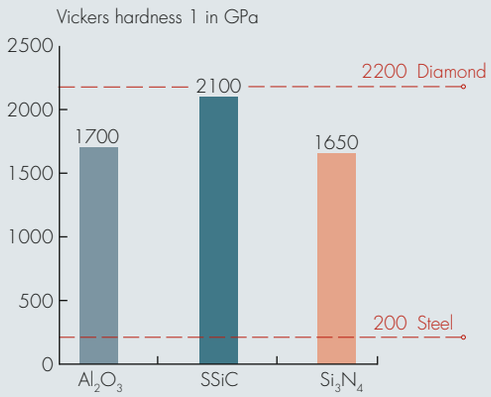
Approximate weight indications for 1 running metre / 3.3 ft of wear-protected pipe sections (without flange)

Nominal size		P235GH/aluminium oxide/cement		GRP/aluminium oxide	
		kg	lbs	kg	lbs
DN20	3/4"	6	13	3	7
DN25	1"	6	13	3	7
DN32	1 1/4"	9	20	4	9
DN40	1 1/2"	12	26	6	13
DN50	2"	16	35	8	18
DN65	2 1/2"	22	49	8	18
DN80	3"	22	49	12	26
DN100	4"	29	64	15	33
DN125	5"	40	88	19	42
DN150	6"	52	115	22	49
DN175	7"	61	134	26	57
DN200	8"	71	157	38	84
DN250	10"	127	280	47	104

Ceramic materials
Properties – Advantages and distinctive features

Hardness and wear resistance:

The wear resistance of pipelines and pipeline components is significantly influenced by the respective type of strain. Thanks to their extremely high hardness, ceramic materials have a wear resistance against friction that is many times higher than metals. However, this advantage can only be used if the particles do not hit the ceramics at too great an angle, i.e. the pipe elbow radii are sufficiently large enough, no or few joints are installed and the components have been constructed in such a manner that the particles belonging to the solid can only hit the ceramic wall or ceramic fitted part with as low an angle as possible.

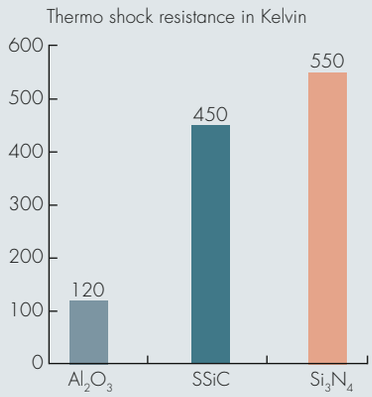


Corrosion resistance:

Compared to other materials, the corrosion resistance of the ceramic materials is significantly more universal and higher. Ceramics are completely resistant against the majority of solvents. Aqueous brines are generally no problem. The advantage of ceramic linings primarily bears fruit where the particles belonging to the solid destroy the corrosion protection.

Thermo shock resistance:

In contrast to the maximum operating temperature, the thermo shock resistance must be closely observed. Ceramic components maintain their shape and strength as well as their further physical characteristics up to extremely high temperatures. In addition to the material dependency, the thermo shock resistance is also highly dependent upon the geometry. Simple geometric shapes such as pipes are less sensitive than such parts that have highly differing wall thicknesses for example.



Anti-static:

Electrostatic charging (=charge separation) can occur due to the friction of the conveying material on the wall and the friction within the media itself when solids and liquids are conveyed through chargeable pipes (Al_2O_3) and hoses.

Essentially, the standard lining manufactured from Al_2O_3 is installed in a conductive, metallic housing or, in the event of GRP casing, is equipped with protective earthing The GRP casing can also be implemented as an electrically-conductive component (black colour).
Taking this issue into consideration, conductive ceramic materials are also used in the form of a lining. As a result, the pipelines are electrically-conductive.
However, the safest protective measure is and remains the prevention of electrostatic charges from the offset by selecting the correct pipe or hose.

Despite the fundamental suitability of the pipes and hoses manufactured by Cera System Verschleißschutz GmbH for use in explosive areas, it is recommended that the following measures are taken depending upon the ignitability of the medium and the present danger zone:

Sufficient in many cases:

– Earthing of the metal jacket wall (metal-reinforced pipes) or the cased earthing line (GRP pipe) when using a conductive jacket material on the pipes or hoses, manufactured using a chargeable inner wall (surface resistance > 109 Ω, e.g. aluminium oxide ceramic), that must be earthed.

Maximum protection:

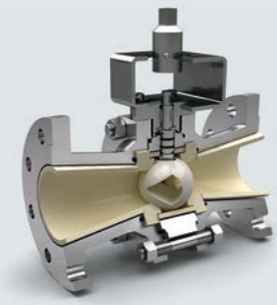
– Use of an electrically-conductive inner wall (lining with conductive ceramic) with a specific resistance of ≤103 Ω that must be earthed via the earthing strand.

Al_2O_3 is insulating (≥ 109 Ωm)
SSiC is conductive (≤ 104 Ωm)
Ceramic hose is conductive (≤ 103 Ωm)

The correct ceramic!

It is a common mistake that it is necessary to mainly use extremely thick-walled ceramic.
When dealing with ceramic pipe wear protection, it is of great importance to use ceramic in such a manner that its advantages can be taken full advantage of. Therefore, the correct approach is to use a ceramic that can prevent or severely delay the onset of wear.
When dealing with pneumatic transport lines, the primary consideration should be the consequences of blast wear. Furthermore, it must also be taken into consideration that many substances become electrically charged during pneumatic transport.
Flow turbulences and possible cavitations must also be taken into consideration when dealing with lines for hydraulic transport.
When working at high temperatures, it must be investigated and observed how high possible thermal shocks can be and whether a temperature gradient can also occur.

Products and services



Ball valves
Cera System offers wear and corrosion resistant ball valves for open / close and control function. The use of ceramic lined valves is sensible in all cases where standard valves reach their limits (abrasion, corrosion, temperature and pressure). A large range of metallic and ceramic materials permits solutions for almost all industrial sectors. Special applications are solved in close cooperation with our customers.

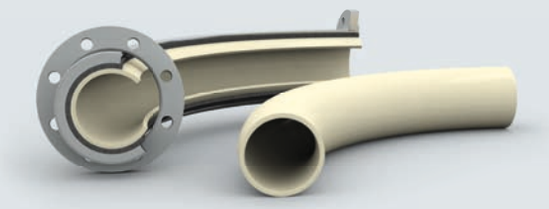


Sliding disc valve
Cera System offers wear and corrosion resistant disc slide valves for open / close and control function. With this type of construction just the ceramic are wetted by the fluid. It is therefore suitable for highly corrosive media. Further advantages: Excellent control of small amounts containing solids – completely cavity free. The slide valve is available from DN 2 (5/6″) up to DN 50 (2″).

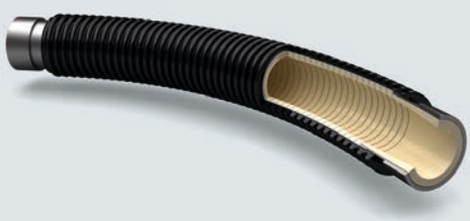


Ceramic components
Cera System develops and produces customer-specific ceramic precision components in small batch sizes through to series production for the most diverse areas of application. Focal points are sealing and control discs for air conditioning, sanitary fittings as well as many other applications. Ceramic components for the sensor, food engineering and building services sectors round off our portfolio.

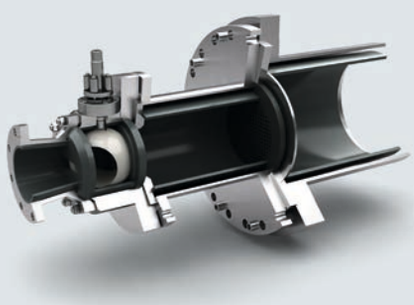
Pipe waer protection
Cera System offers wear resistant pipe elbows, Y and T parts as well as other shaped pieces. The most diverse of ceramics are used. The ceramic is solid (wall thickness approx. 6 mm (¼″)). All solutions are nominal size conformant, they can be assembled problem-free without having to adjust the pipelines. The clear width corresponds to the flange connection. Our speciality: the ceramic pipe elbows are actually curved (no apposition of straight sections).

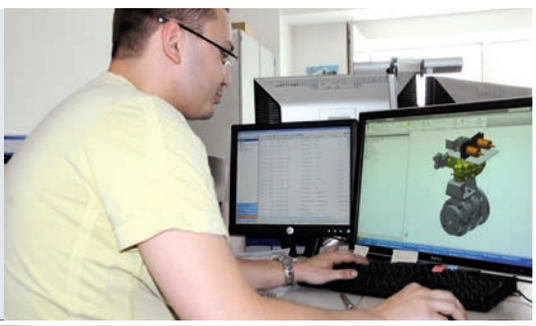


Ceramic hoses
Cera System supplies wear resistant flexible solutions. Ceramic hoses manufactured by Cera System can be used everywhere where hoses regularly wear and must be replaced. The hose consists of ceramic rings that are vulcanised together with special reinforced rubber materials. Pressures of up to 10 bar / 145 psi are permitted.

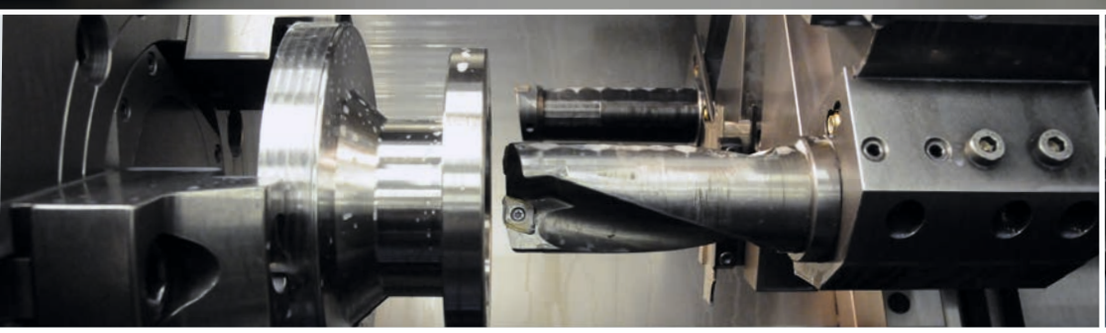
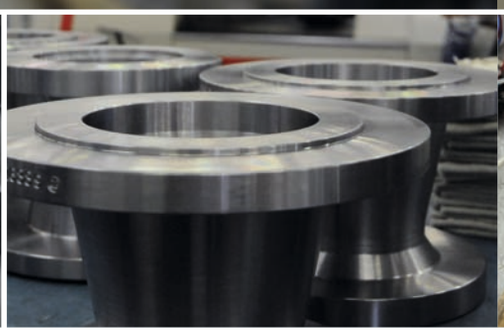


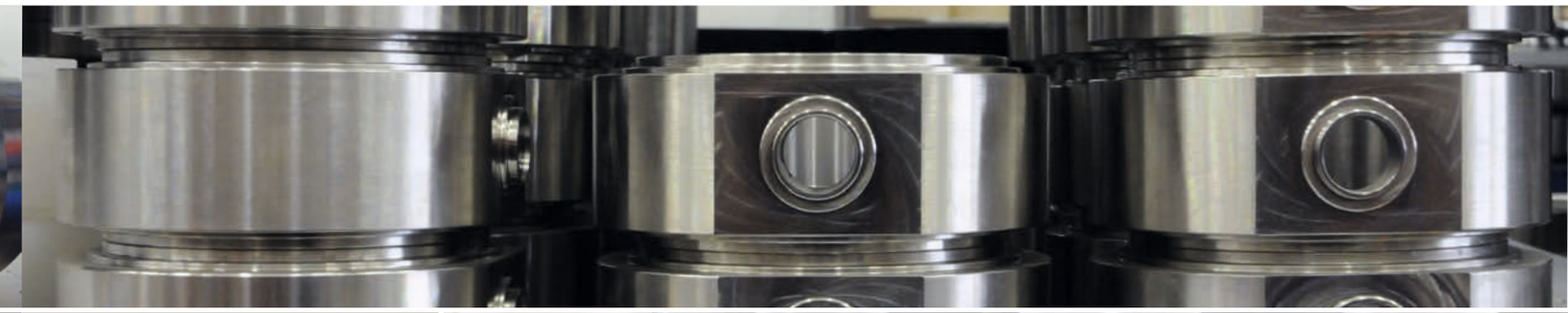
Ceramic system solutions
Cera System offers system solutions with ceramic components. In-house development and sales engineers ensure for the complete design of ceramic systems and create economical, customer-specific complete solutions all over the world. Product developments in the coal gasification and photovoltaic sector are only examples of numerous other industry-specific applications.



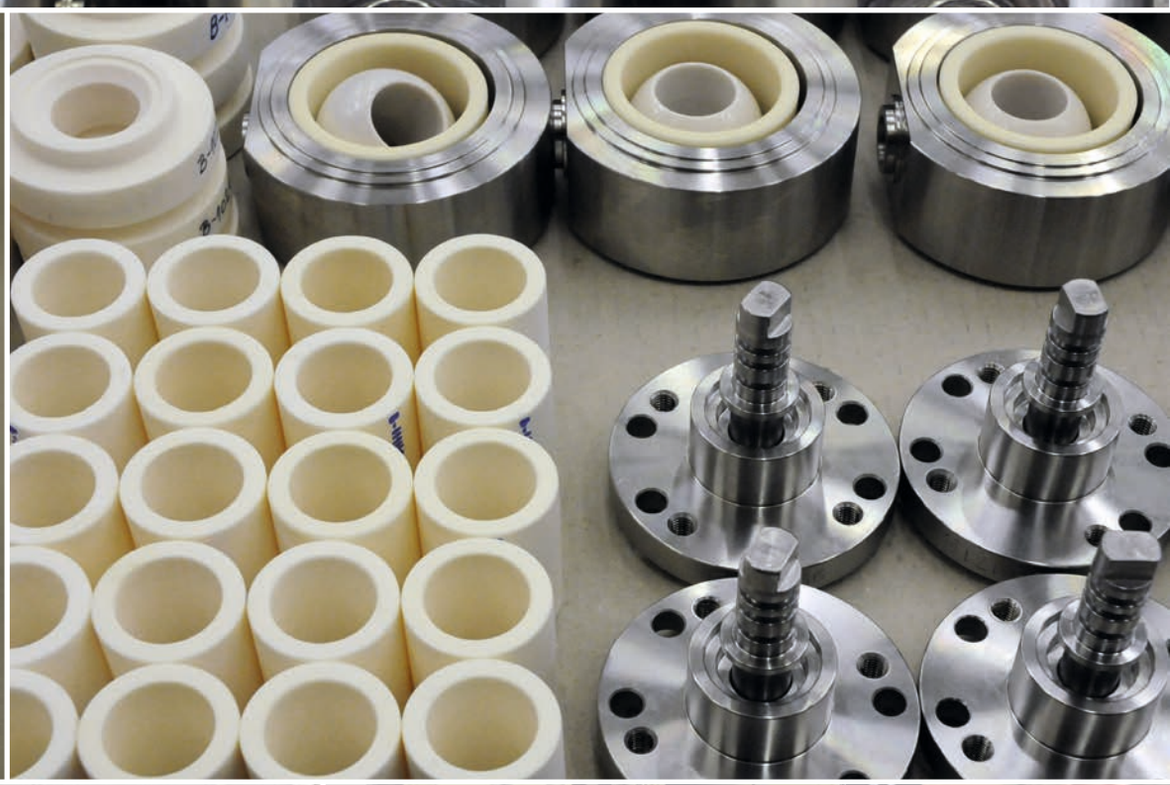














SAMSON AT A GLANCE

EMPLOYEES

- Worldwide 4.300
- Europe 3.300
- Asia 500
- America 200
- Frankfurt am Main, Germany, 1.800

MARKETS

- Chemicals and petrochemicals
- Power and energy
- District energy and building automation
- General industry
- Industrial gases
- Food and beverages
- Metallurgy and mining
- Oil and gas
- Pharmaceuticals and biotechnology
- Marine equipment
- Water and wastewater
- Pulp and paper

PRODUCTS

- Valves
- Self-operated regulators
- Actuators
- Accessories
- Signal converters
- Automation systems
- Sensors and thermostats
- Digital solutions

SALES LOCATIONS

- More than 50 subsidiaries in over 40 countries
- More than 200 agencies

PRODUCTION SITES

- SAMSON Germany, Frankfurt, established 1916
  Total plot and production area: 150.000 m²
- SAMSON France, Lyon, established 1962
  Total plot and production area: 23.400 m²
- SAMSON Turkey, Istanbul, established 1984
  Total plot and production area: 11.053 m²
- SAMSON USA, Baytown, TX, established 1992
  Total plot and production area: 9.200 m²
- SAMSON China, Beijing, established 1998
  Total plot and production area: 10.138 m²
- SAMSON India, Pune district, established 1999
  Total plot and production area: 18.000 m²
- SAMSON Russia, Rostov-on-Don, established 2015
  Total plot and production area: 5.000 m²
- SAMSON AIR TORQUE, Bergamo, Italy
  Total plot and production area: 27.684 m²
- SAMSON CERA SYSTEM, Hermsdorf, Germany
  Total plot and production area: 14.700 m²
- SAMSON KT-ELEKTRONIK, Berlin, Germany
  Total plot and production area: 1.060 m²
- SAMSON LEUSCH, Neuss, Germany
  Total plot and production area: 18.400 m²
- SAMSON PFEIFFER, Kempen, Germany
  Total plot and production area: 35.400 m²
- SAMSON RINGO, Zaragoza, Spain
  Total plot and production area: 18.270 m²
- SAMSON SED, Bad Rappenau, Germany
  Total plot and production area: 10.370 m²
- SAMSON STARLINE, Bergamo, Italy
  Total plot and production area: 26.409 m²
- SAMSON VDH PRODUCTS, Netherlands
- SAMSON VETEC, Speyer, Germany
  Total plot and production area: 27.090 m²

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