SEMPERIT

SIGMA BULK TRANSPORT SYSTEM

SEMPERIT – SUCCESSFUL ALL OVER THE WORLD

The Austrian based **Semperit AG** is one of the world's leading companies active in developing, manufacturing and marketing high quality rubber and plastic products. Founded in 1824, the company is one of the Europe's oldest rubber manufacturers.

Gained from our company's long tradition, our expertise in the production and use of rubber and plastic products, together with our commitment to maintain the highest quality standards in every area, as well as our dedication to customer service all guarantee a continued strengthening of our position as a global leader.

Our **Sempermed, Semperflex, Sempertrans** and **Semperform** divisions offer our customers a comprehensive and innovative assortment of high quality products and solutions, from medical and industrial gloves, to hydraulic, industrial hoses and rubber sheet, industrial mouldings, as well as conveyor belts.

Semperflex industrial hose division develops, manufactures and markets industrial hoses throughout the world. These high quality products are produced in our Semperflex plants in Austria, the Czech Republic and Italy, based on knowledge gained by many years of experience. Significant ongoing investments in R&D provide us with continually improving quality and products highly adapted for today's markets.

Businesses and industries of all sizes have a wide range of hose requirements. Whether it's in the chemical industry, the building industry, the food industry or in recycling, Semperflex, your partner for hose solutions, offers the right product for you for almost every imaginable application.

The hoses shown in this literature are schematic diagrams only.

Print date: April 2005, 1st edition

SIGMA-BULK TRANSPORT SYSTEM

SIGMA material handling hose is a flexible modular system developed for easy integration into existing installations.

Since the setting up of the SIGMA system does not need much time, unnecessary downtimes are avoided and thus costs are reduced.

The right choice of elements of the SIGMA system makes the transport of a wide range of media possible.

It is sufficient to have regular visual inspections; unlike steel pipes it is not necessary to have a protective coating when used outdoors.

All elements are easy to install. You do not need specially trained staff or special tools.

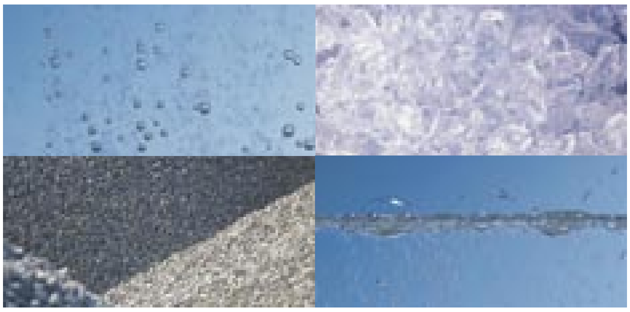
The metallic flange couplings are reusable.
The required hose length can be cut on site.

Noise from dry goods transmitted through steel pipes can be significantly reduced when converting to the SIGMA system. The energy absorbing characteristics of the rubber tube gratly reduces noise levels - this is especially so on indoor applications where noise is retained within the building.

In order to significantly extend service life the hose can be rotated along it`s axis, by loosening the flange bolts. Especially with dry media it is benefitial on bends, where the hose is benefitial on bends, where the hose is subject to high levels of abrasion.

SIGMA – FS 3310

HYDRAULIC TRANSPORT
OF ABRASIVE MATERIAL



Application:

A suction and delivery hose for the hydraulic transport of abrasive materials, such as gypsum, ashes, bauxite, corundum, dolomite, ores, feldspar, waste glass, wood chips, industrial waste, coal, metallic powder, etc.

Temperature range: -35°C / +70°C

Tube: NR, light tone, wear resistant and elastic, (non conductive).

Reinforcement: Textile wrapped, zinc plated steel wire helix.

Cover: CR, black, corrugated, resistant to abrasion, oil, weather and sea water, cloth impression electrically conductive.

Identification: Continuous layline, red: „SEMPERIT S Sigma FS 3310".

SIGMA – FS 3320

HYDRAULIC AND PNEUMATIC TRANSPORT
OF ABRASIVE MATERIAL

Application:

A suction and delivery hose for conveying abrasive materials, such as cement, sand, phosphates, quartz, dolomite, glass splinters, dry mixed animal food, grain, bark, wood shavings, etc. pneumatically and hydraulically.

Temperature range: -35°C / +70°C

Tube: NR/BR, black, antistatic, abrasion-resistant.

Reinforcement: Textile, wrapped, zinc plated steel wire helix .

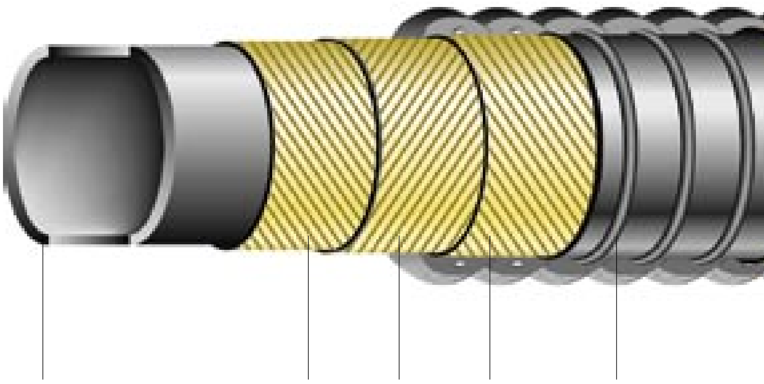
Cover: CR, black, corrugated, resistant to abrasion, oil, weather and sea water, cloth impression electrically conductive.

Identification: Continuous layline, blue: „SEMPERIT S Sigma FS 3320".

CONSTRUCTION AND TECHNICAL DATA OF THE SIGMA BULK TRANSPORT SYSTEM

The construction warrants diameter stability with pressure, suction and gravity transport.

Working pressure:	max.10 bar
Safety factor:	3.2 : 1
Vacuum resistance:	up to –0.9 bar



Ffurther information on request.

Status: April 2005

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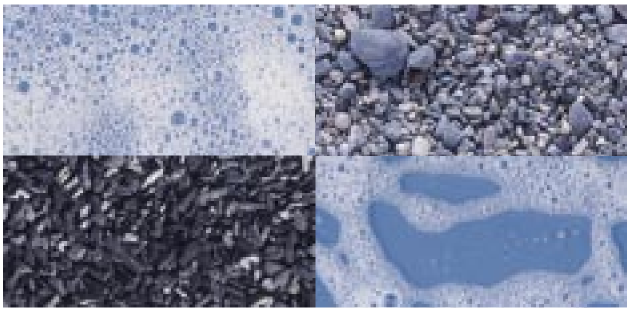
SIGMA – FS 3330

TRANSPORT OF SOLID MEDIA AND CORROSIVE LIQUIDS



Application:

A suction and delivery hose for conveying solid substances contained in liquids, especially corrosive substances such as acids and bases.

Temperature range: -35°C / +95°C

Tube: CSM, light tone, acid resistant, (non-conductive).

Reinforcement: Textile, wrapped, zinc plated steel wire helix .

Cover: CR, black, corrugated, resistant to abrasion, oil, weather and sea water, cloth impression electrically conductive.

Identification: Continuous layline, green: „SEMPERIT S Sigma FS 3330“.

SIGMA – FS 3340

PNEUMATIC AND HYDRAULIC TRANSPORT OF SOLID AND DUST-LIKE FOOD STUFFS

Application:

A suction and delivery hose for conveying solid and dust-like food stuffs, such as animal feed, silo products, grain, light coloured plastic granulates and oil-laden substances, etc., pneumatically and hydraulically.

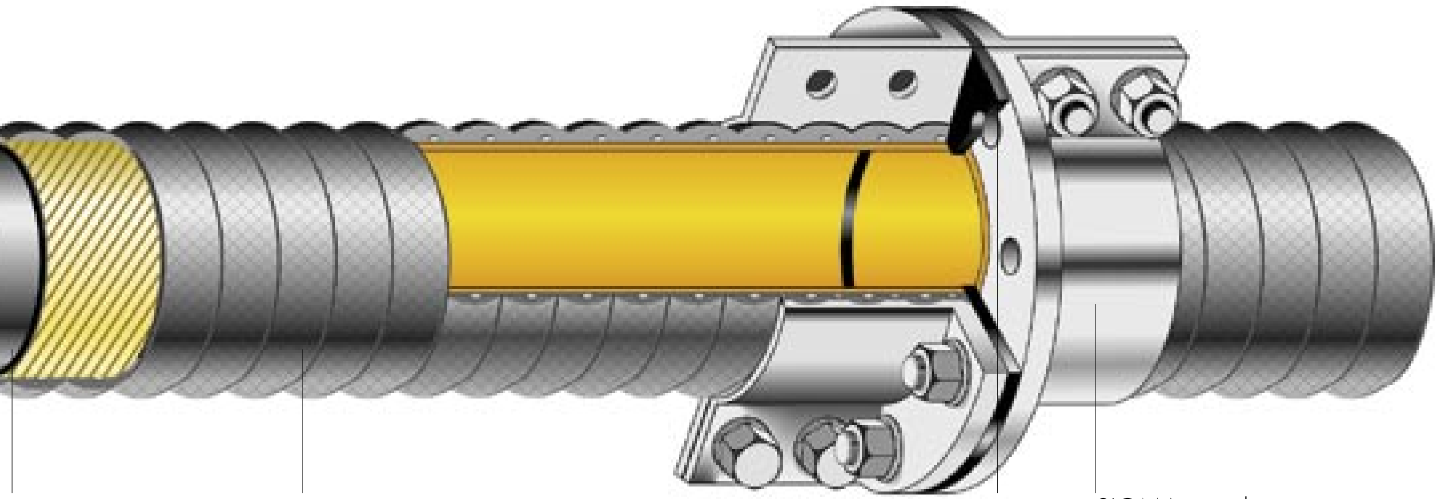
Temperature range: -35°C / +80°C

Tube: NBR, white, abrasion resistant, food quality, (antistatic).

Reinforcement: Textile, wrapped, zinc plated steel wire helix .

Cover: CR, black, corrugated, resistant to abrasion, oil, weather and sea water, cloth impression electrically conductive.

Identification: Continuous layline, white: „SEMPERIT S Sigma FS 3340“.



Status: April 2005

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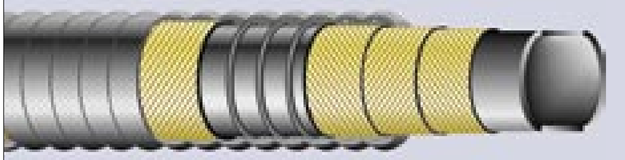
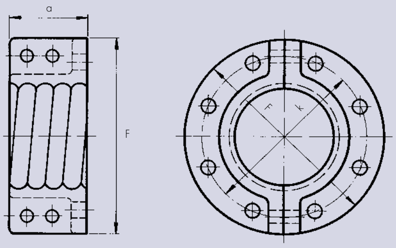
BASIC ELEMENTS

1 SIGMA HOSE



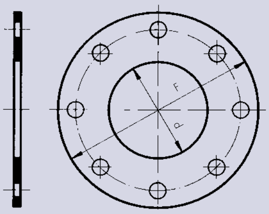
2 COUPLING KU 3311



Pitch circle diameter is given by the individual standard.

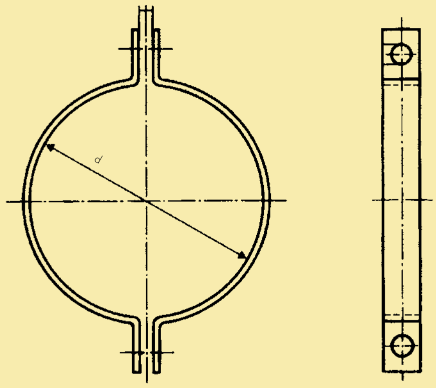
Due to the construction of the split flange the number of drillings can deviate from the values given in the table "Dimensions of Connections". The right angle of the drillings is maintained.

SEAL DI 3312



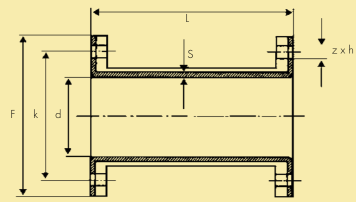
ELEMENTS

3 HOSE CLIP BS 3395

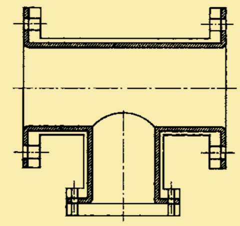


4 ADAPTER

AD 3392



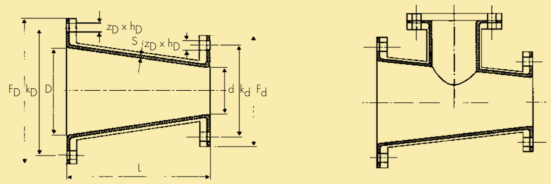
AD 3398



BASIC ELEMENTS														ELEMENTS	
SIGMA – General Data				1 Hose FS 3310 – FS 3340				2 Coupling KU 3311 & Seal DI 3312						3 BS 3395	
								DIN EN 1092-1 (2576)			ASA 150				
Ø inside [mm]	[inch]	L [m]	P* [O/---]	d_A [mm]	S [mm]	R_{min} [m]	M [kg/m]	F_{DIN} [mm]	k_{DIN} [mm]	z_{DIN} x h_{DIN} [Pc] [mm]	F_{ASA} [inch]	k_{ASA} [inch]	z_{ASA} x h_{ASA} [Pc] [inch]	d [mm]	M [kg]
51,0	2	40	O	75	5	0,30	3	165	125	8 x 18	4 3/4	6	8 x 3/4	77	0,45
63,5	2 1/2	40	O	88	5	0,30	4	185	145	8 x 18	5 1/2	7	8 x 3/4	90	0,50
76,0	3	40	O	114	11	0,35	8	200	160	8 x 18	6	7 1/2	8 x 3/4	118	0,60
82,0	3 1/4	40	O	114	8	0,40	7	200	160	8 x 18				118	0,60
90,0	3 1/2	40	O	133	12	0,50	9,6	220	180	8 x 18	7	8 1/2	8 x 3/4	136	0,65
102,0	4	40	O	133	7	0,50	8	220	180	8 x 18	7 1/2	9	8 x 3/4	136	0,65
127,0	5	20	O	162	7	0,65	12,4	250	210	8 x 18	8 1/2	10	8 x 7/8	166	0,80
152,0	6	20	O	188	7	0,75	14,3	285	240	8 x 22	9 1/2	11	8 x 7/8	192	0,90
178,0	7	12	---	215	8	1,20	17,2	315	270	8 x 22				219	1,00
203,0	8	12	---	241	8,5	1,75	18,8	340	295	8 x 22	11 3/4	13 1/2	8 x 7/8	245	1,05
254,0	10	12	---	292	8,5	2,00	22,6	395	350	12 x 22	14 1/4	16	12 x 1	296	1,25
305,0	12	12	---	348	8,5	2,50	29	445	400	12 x 22	17	19	12 x 1	349	1,45
355,0	14	12	---	409	12	3,00	40,8	505	460	16 x 22	18 3/4	21	16 x 11/8	411	1,70
405,0	16	12	---	458	11	3,50	47	565	515	16 x 26	21 1/4	23 1/2	16 x 11/8	461	1,85
457,0	18	12	---	512	10	4,5	52,5	615	565	20 x 26				514	2,05

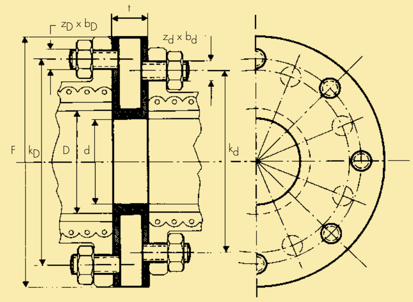
Status: April 2005   Additional dimensions available on request   *O = coiled/ --- = straight

5 REDUCER RE 3391 RE 3397



Infinitely variable transition with or without drainage piece.
Direction of flow eligible.

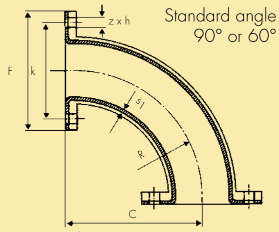
8 FLANGE ADAPTATER RING FA 3394

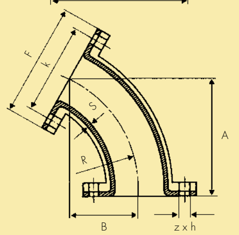


Change in diameter with limited space without taking into account the flowing conditions. Two-sided rubber layer functioning as seal.
Direction of flow always from the smaller to the larger diameter.

6 ELBOW KR 3390

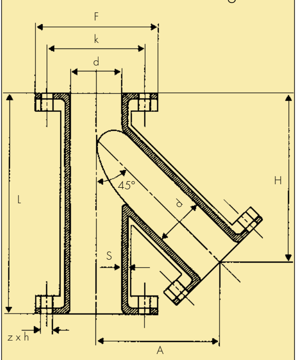
Standard angle
90° or 60°





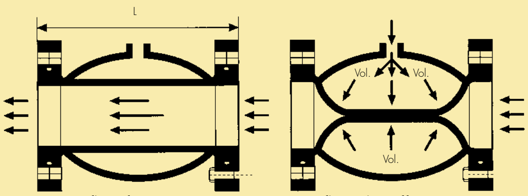
7 BRANCH AB 3393

Standard angle 45°



9 SHUT-OFF VALVE AO 3396

Control media connection (compressed air or water).



flow free flow shut-off

Four-part squeeze valve simple but robust construction.
Control media compressed air or water squeezes the cylindrical, elastic sleeve, flow is shut-off or reduced.

4 AD 3392 AD 3398		5 RE 3391 RE 3397			6 KR 3390					7 AB 3393				8 FA 3394		9 AO 3396		
L [mm]	S [mm]	L [mm]	d [mm]	D [mm]	R [mm]	A [mm]	B [mm]	C [mm]	S [mm]	L [mm]	H [mm]	A [mm]	S [mm]	d [mm]	D [mm]	L [mm]	M [kg]	V [dm^3]
		380	51	63,5	160	160	82	175	6,6	350	276	178	6	51	63,5	167	9,0	0,8
		380	63,5	76	190	186	108	205	6,3	350	276	178	6	63,5	76 82	184	11,5	1,1
		380	76	102 127	238	228	132	254	9,2	400	314	206	9	76	90 102	226	16,0	2,2
380	6				238	228	132	254	6,2	400	314	206	6					
					270	256	148	285	8,5	400	314	206	9					
380	8	380	102	127 152	300	282	163	315	8,5	420	328	220	9	102	114 127	282	22,0	3,9
380	8	380	127	152 203	360	334	193	375	8,2	480	371	263	8	127	140 152	350	35,0	8,0
380	7	380	152	178 203	430	394	228	445	7,9	520	399	291	8	152	203	420	48,0	14,0
380	14	380		203	520	472	273	535	14,6	540	413	305	14	178	203			
380	14	380	178	254	600	542	313	615	14,4	540	413	305	14	203	254	559	94,0	32,0
380	15	380	203	305	720	646	373	735	15,1	640	490	362	15	245	305			
380	17	380	254	355	860	767	443	875	17,3	720	546	418	17	305	340 355			
380	17		305		980	871	503	995	16,9	820	617	489	17	355	388 405			
380	16				1140	1009	583	1155	16,1	950	718	560	16					

Last up-date: April 2005

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SIGMA SPECIAL PRODUCTS

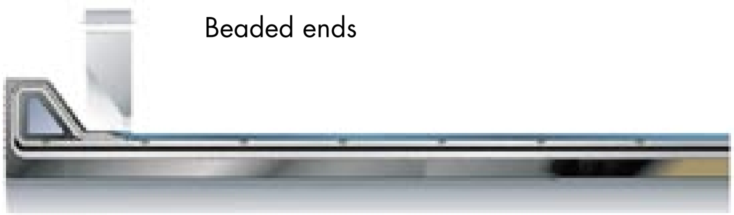
Our large assortment of standard hoses can be used for numerous applications. If, however, you do not find the right hose in this catalogue, or if you have special requests with regard to hose ends or fittings, please contact our sales department.

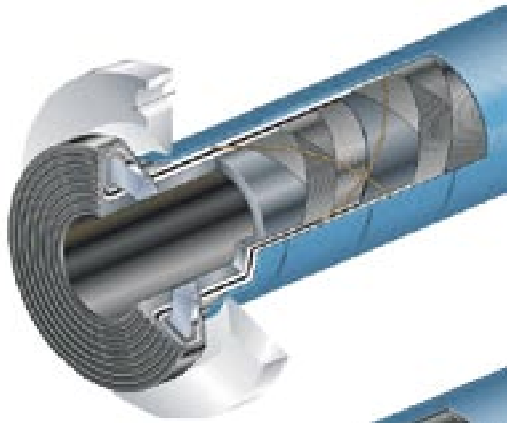
HOSE ENDS

1. Capped ends:
   The hose end is covered by a rubber seal to protect the reinforcement from humidity, dirt and corrosion.
2. Spiral-free couplings:
   The steel wire helix stops before the end of the hose to facilitate coupling. Additional textile reinforcement guarantees adequate strength.
3. Enlarged ends:
   This steel-free design has an enlarged end to match the outside diameter of the nipple.
4. Conical ends:
   The hose end is manufactured with a conical nozzle.

ALTERNATIVES FOR 2-PART SIGMA FLANGE FOR SPECIAL APPLICATIONS

Beaded ends





Integral rubber flange

Integral steel flange and nipple

The standard coupling KU 3311 is not suitable for applications with chemically aggressive substances. Plastic coated couplings (protection against corrosion) are available on request. Standard color RAL 5012/1 Blue. Additional colours available on request.

ASSEMBLY INSTRUCTION

1 Measure and mark the hose at the place where you want to cut it with a silver point pen. Use a sheet metal sleeve or put the half shells of the coupling provisionally on the hose in order to mark it straight.

2 Cut the hose at the mark with a sharp, slightly wet cutting tool (e.g. a knife or a plain saw) up to the steel wire helix.

3 Pull the two halves of the hose apart. The steel wire helix is torn out of the cut. Cut it with a hack-saw or cable cutter directly at the surface of the cut, the spiral must not overtop the hose.

4 Put both half shells of the coupling on the hose. The corrugation inside of the coupling must lie exactly on the corrugation of the hose. Use a screw clamp as an assistance.
The end of the hose must overtop the flange by 3 to 5mm.

5 Screw both half shells together up to the point where the inside of the hose shows slightly corrugated deformations. There must remain a small gap between the half shells, equally large on both sides. The service life of the system may be reduced significantly if the coupling is installed too tight or too loose.

6 Put the seal concentrically between both flange couplings. Screw the flanges tightly together. The imperviousness of the system is only maintained by pressing both hose ends against the seal.

SERVICE, MAINTENANCE AND STORAGE

Hoses are subject to a limited service life and the user must be alert to warnings of a pending hose failure, especially when the conditions under which the hose is used require a high working pressure and/or the hose is used to convey dangerous substances.

Safety warning: If the manufacturer's recommendations regarding service, maintenance and storage of the hose in question are not followed, this may lead to the hose's failure to function correctly, which in turn may lead to damage of property or serious bodily injury.

General inspection
Inspections and hydrostatic tests are to be carried out at regular intervals in order to monitor hose suitability for continued use. A visual inspection of the hose for loose covers, kinks, dents or soft spots must be carried out for the purposes of determining whether reinforcements have either broken or shifted out of position.

Couplings or other fittings must be carefully inspected for signs that they are becoming detached from the hose and must be replaced immediately if necessary.

Storage
Storing rubber hoses can be influenced by temperature, air humidity, ozone, daylight, oil solvents, corrosive liquids and vapor, insects, rodents and radioactive materials etc.

Proper storage of the hoses depends primarily on their size (diameter and length), the quantity to be stored and the packaging materials used. Hoses must not be stacked or piled up in such a way so that the stack weight causes the hoses on the bottom to become demformed. As rubber hoses differ widely in dimension, weight and length, no general recommendations can be given in this sense. A thin-walled hose can withstand less strain than a thick-walled hose or a hose reinforced with a steel wire double helix. Hoses that are delivered coiled must be stored horizontally.

Whenever possible, hoses should be stored in their original packaging, especially if these containers are wooden crates or plastic protection foils. This kind of packaging also protects the hose from sunlight.

The following contains general instructions for properly storing hoses in accordance with the standards laid down in DIN 7716: 1982 "Rubber products; requirements for storage, cleaning and maintenance", Paragraph 3. Improper storage can significantly shorten the service life of the hose.

Storage room: The storage room should be cool, dry, free from dust and moderately well ventilated. Storage out in the open that does not protect against the weather is not suitable.

Temperature: Rubber products should not be stored below -10° C or above +15° C, whereby this limit can be exceeded up to +25° C.
Higher temperatures are only allowable for very short periods of time.

Heating: In heated storage rooms rubber products must be protected from heat sources. The distance between the heat source and the stored materials must be at least one meter.

Humidity: Storage in humid storage rooms should be avoided. It is important to make sure that condensation does not form. Best is a relative air humidity not exceeding 65° C.

Lighting: Rubber products should be protected from light, especially from direct sunlight and strong artificial light with a high quantity of UV rays. The windows of the storage rooms are, for this reason, to be covered with a red or orange (but never blue) protective coat of paint. Using normal light bulbs for lighting is preferable.

Ozone: As ozone is particularly harmful, storage rooms must not contain any ozone generating equipment, such as electric motors or other kinds of equipment which could generate a spark or other kind of electrical charge. Combustible gasses and vapours which could generate ozone by way of photochemical processes should be removed.

Finally, all rubber products should be stored according to the "first in, first out" principle, as an unusually long storage period can deteriorate the physical properties of rubber products even under the best of conditions.

HANDLING GUIDELINES FOR THE SIGMA MATERIALS HANDLING HOSE SYSTEM

In addition to the general handling guidelines for rubber hoses, it is important to observe the following points when using SIGMA materials handling hose system due to their large physical dimensions and measurements:

- In principle, SIGMA hoses are to be handled on pallets regardless of delivery method (coiled, up to DN 152, straight, above that) so as to prevent any damage to the hose.
- When delivered straight, it is recommended that the hoses be handled at least by two fork lifts.
- Hoisting eyes must be used if individual hoses or hose bundles must be moved by fork lifts without the use of pallets.
- When transporting the hoses they must be sufficiently secured every time so as to prevent any damage during transport.
- SIGMA hoses must not be dragged across the ground or over sharp-edged objects.
- Before installation a change of length under operational pressure has to be calculated.
- At no time, neither during transport nor storage, may objects be placed on the SIGMA hose; otherwise embedded wire helixes will be in danger of becoming permanently deformed. Only SIGMA hoses may be stored on top of each other.
- It is very important to note that pressure sensitivity increases with the increasing nominal diameter of the hose.
- Due to the high mass of the SIGMA materials handling hose system, it is recommended that hoisting equipment and the like be used when handling the hoses for ergonomic reasons.
- All metallic elements of the SIGMA system have to be protected against weather and sun when they are stored before use.

Attention: Each individual element of the SIGMA system matched has been developed in close co-operation with our users over many decades and have carefully been with each other. The functioning of the system can only be expected if original SIGMA parts are used (hose, coupling, seal, ...). The application conditions affect the service life of the system.

Our ISO 9001: 2000 certified quality management system ensures the same high level product quality in all stages of the manufacturing process. In accordance with ever-more demanding user requirements, the tubes and covers of our Semperit hoses are made from carefully selected and tested rubber mixtures. We make state-of-the-art hoses combined with textile and metal reinforcements to meet the requirements for the application.

Important Notes. This catalogue has been carefully prepared to provide our customers with comprehensive advice. The information contained herein is the result of many years of tests and trials or based on the endurance specifications defined by ISO 7620-1986(E) for the specified media. The individual operating conditions affect the use of every product. Products can therefore only offer the safety that can be expected on the basis of the information provided by us in the written product information. In the event of improper treatment such as crushing, tearing, stretching, and loading with impermissible media this safety cannot be expected. All hoses are manufactured in conformity with EN ISO 1307:1995 unless stated otherwise.

Danger! Before using with new or untested media or for applications that are not included in the product information, written information must be obtained from a specialist dealer or a Semperit applications engineer. All hoses must be regularly checked for operating safety. In the case of damage, in particular to the hose cover, hoses must be replaced for safety reasons.
Subject to change, without notice.

Subject to misprints and errors.

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