

Lined Pipes for any Application ...

Kalenborn Company
Standard Rd 6a (Extract, Issue 05/2010)



Hydraulic pipes



Pneumatic pipes

Design

The Kalenborn company standard Rd 6a for pipe components (straight pipes, pipe bends) is recommended for use for the reference values specified in this brochure, i.e.:

- pressure (PS):
 - ≤10 bar (up to 350 mm diameter),
 - ≤6 bar (for diameters above 350 mm)

Kalenborn is capable of offering solutions for piping components and piping systems operating at higher pressures, higher temperatures and other specifications (incl. Pressure Equipment Directive PED 97/23/EG; AD2000 etc.).

The relevant design is based on the following parameters:

- pressure (PS)
- temperature
- material selected (pipe body)
- other influence / loads
- sealing and connecting elements

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Dimensions, designations

Designation of pipe, inside diameter (d) 60 mm, length (l) 1,000 mm as defined in Kalenborn company standard Rd 6a:

- pipe Rd 6a id 60 x 1,000

Designation of pipe, inside diameter (d) 60 mm, radius (r) 1,000 mm, angle (α) 90° as defined in Kalenborn company standard Rd 6a:

- pipe bend Rd 6a id 60; r 1,000; 90°

Dimensional tolerances

The dimensional tolerances specified in the Kalenborn company standard Rd 6a are in accordance with DIN EN 1092-1, DIN 1626, DIN ISO 13920 degree of accuracy A (but length tolerance up to 1,000 mm \pm 2mm, up to 2,000 mm \pm 3 mm, greater length \pm 4 mm).

Materials

- pipes and flanges:
unalloyed structural steel S235 JR; other material specifications feasible on request
- wear protection:
taken from the Kalenborn material range –
matched to the particular application

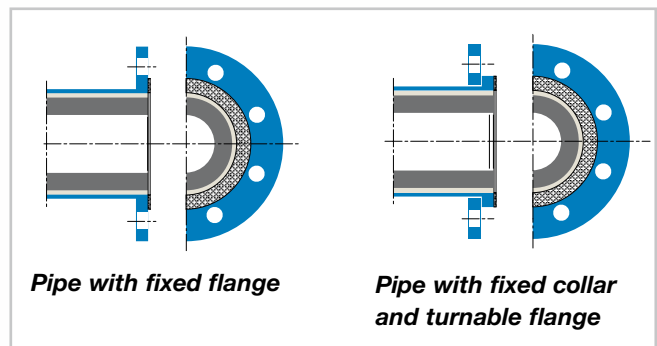
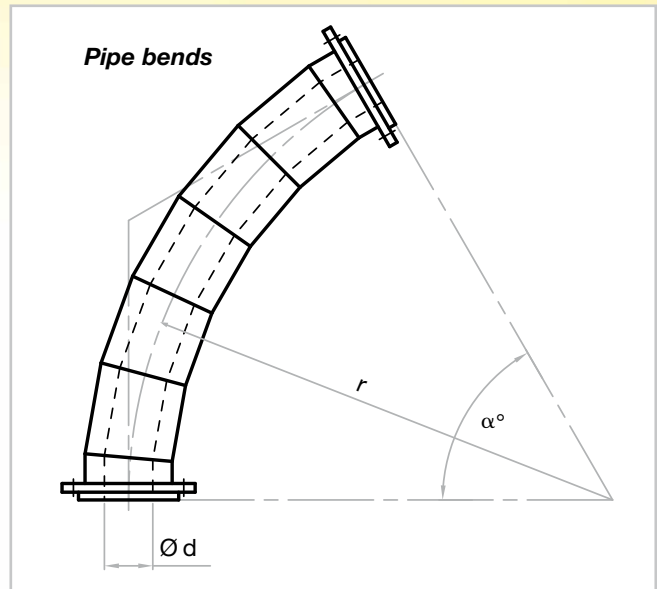
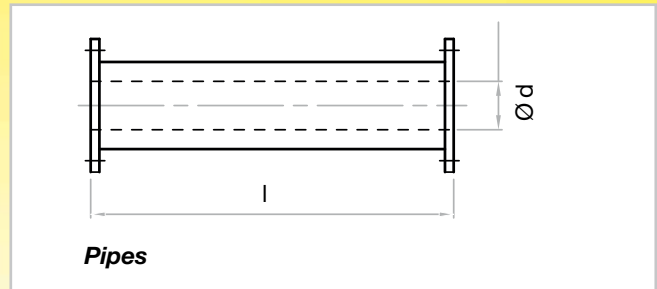
Corrosion protection (external surfaces)

- surface preparation:
DIN EN ISO 12944-4 /
DIN EN ISO 8501-1 – St 2 (manually cleaned)
- coating system:
zinc phosphate primer, red brown
(similar to RAL 3011) – NDFT 40 μ m;
suitable as transport protection

Other surface preparation methods or coating systems are feasible.

Flanges

Straight pipes are delivered with fixed flanges, pipe bends with fixed collars and turnable flanges. Other designs and other fixing systems are feasible on request.



Gaskets

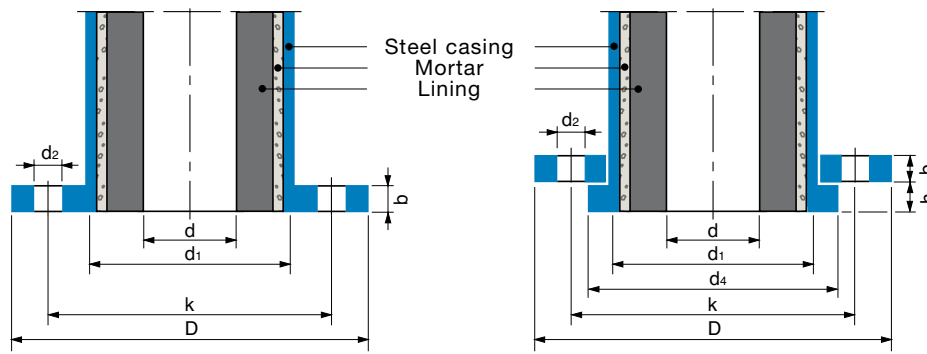
Recommended gasket geometry:

- outside diameter $\underline{\Delta}$
outside diameter of the collar (d_4)
- inside diameter $\underline{\Delta}$
outside diameter of the steel pipe (d_1)
- thickness \geq 2 mm

Connecting elements

When using soft material seals:

Element	Standard	Property class
Hexagon bolt	DIN ISO 4016	4.6
Hexagon nut	DIN ISO 4034	5



Pipes / bends
with fixed flanges

Pipes / bends with fixed
collars and turnable
flanges





Pipes and bends	
Lining inside Ø mm	Steel casing outside Ø * mm
d	d ₁
40	127
50	139,7
55	139,7
60	139,7
65	159
70	159
75	159
80	159
88	159
95	168,3
100	177,8
107	193,7
110	193,7
113	193,7
120	193,7
125	193,7
132	219,1
146	219,1
150	219,1
162	244,5
170	255
175	255
178	255
183	255
190	273
200	273/290
205	273/290
225	315
242	323,9/345
250	323,9/345
260	355,6
275	355,6
280	355,6
294	385
300	385/406,4
311	406,4
325	420
350	435
375	457
400	485
430	515
450	540
475	590
500	590
525	610
610	711

Flanges					
Flange outside Ø mm	Bolt circle Ø mm	Number of holes	Holes Ø mm	Flange thickness mm	
D	k		d ₂	b	
220	180	8	18	16	
234	187	8	18	16	
234	187	8	18	16	
234	187	8	18	16	
254	207	8	18	16	
254	207	8	18	16	
254	207	8	18	16	
254	207	8	18	16	
254	207	8	18	16	
254	207	8	18	16	
269	222	8	18	16	
275	228	8	18	18	
286	240	8	18	18	
286	240	8	18	18	
286	240	8	18	18	
300	253	8	18	18	
313	266	8	22	18	
313	266	8	22	18	
327	280	8	22	18	
327	280	8	22	18	
347	300	8	22	18	
372	323	8	22	19	
372	323	8	22	19	
372	323	8	22	19	
372	323	8	22	19	
404	353	8	22	19	
404	353	8	22	19	
404	353	8	22	19	
430	379	12	22	19	
460	410	12	22	24	
460	410	12	22	24	
490	440	12	22	24	
490	440	12	22	24	
490	440	12	22	24	
516	465	12	22	24	
516	465	12	22	24	
516	465	12	22	24	
516	465	12	22	24	
545	495	12	22	24	
568	517	16	22	24	
588	537	16	22	24	
618	567	16	22	28	
648	592	16	22	28	
668	618	20	22	29	
730	688	20	22	29	
730	688	20	22	29	
755	705	20	22	29	
860	810	24	26	29	

Rings	
Ring outside Ø mm	Ring thickness mm
d ₄	h
158	15
166	15
166	15
166	15
186	15
186	15
186	15
186	15
186	15
186	15
201	15
207	16
219	16
219	16
219	16
232	17
241	17
241	17
255	17
255	17
275	17
298	18
298	18
298	18
298	18
328	18
328	18
328	18
328	18
354	18
382	19
382	19
413	19
413	19
413	19
440	19
440	19
440	19
440	19
440	19
470	24
490	24
510	24
535	24
565	24
585	24
650	28
650	28
670	28
775	28

* First figure for pipes, second figure for bends.

An Optimal Solution for Every Application: Kalenborn Lining Materials at a Glance

Lining	Material Hardness		Process Parameter					
	Mohs	Vickers HV *	Max. conveying velocity m/s	Material density g/cm ³	Max. temperature °C / °F **	Thermal shock resistance	Impact wear resistance	
 KALOCER High alumina ceramics	9.1	(2,100)	> 30	> 3.0	350 / 662	0	+	
 KALCOR Zirconium corundum	9	(2,000)	> 30	> 3.0	800 / 1,472	++	++	
 KALCOR-S Sintered Zirconium corundum	8.5	(1,600)	> 25		800 / 1,472	+++	++	
 ABRESIST Fused cast basalt	8	(1,140)	22	≤ 3.0	350 / 662	0	+	

* The Vickers HV values are only valid for metallic materials. Only comparative values (in parenthesis) have been given for other materials.

** The specified temperatures are only valid for standard applications.
Other temperatures shall be agreed upon with the technical departments of Kalenborn.

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