

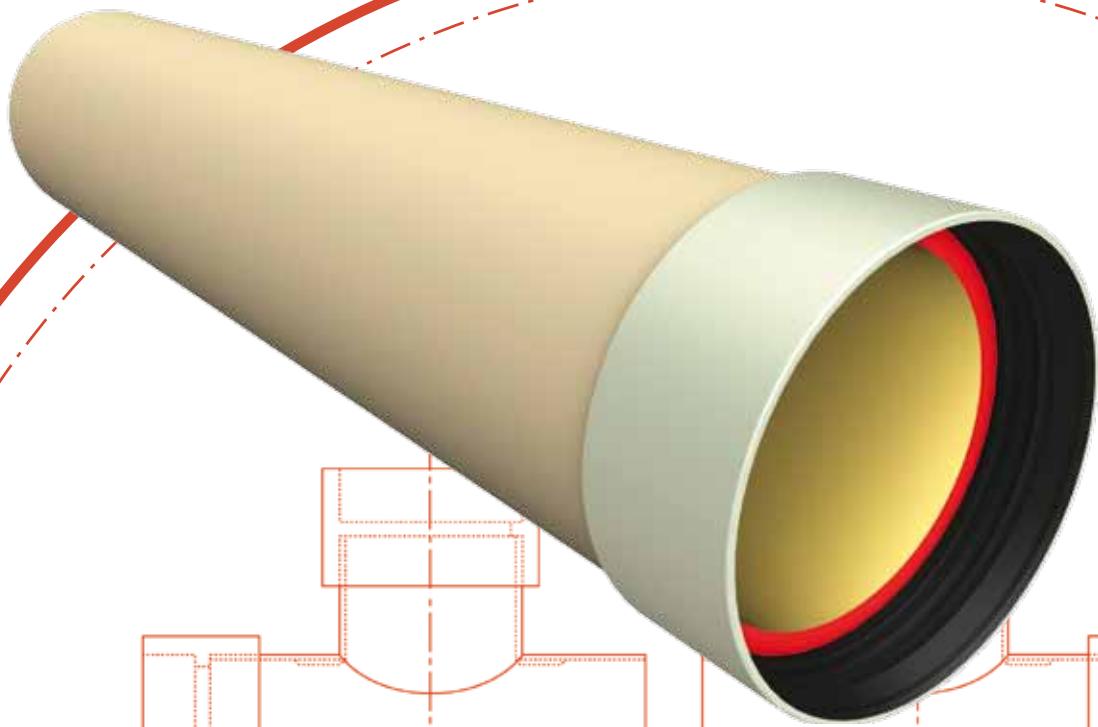


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Technical Product Data

CC Pressure Pipe Systems



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Responsible for content: Stefan Scheiflinger, Manuela Wendt, Wilfried Sieweke
Cover layout: Alexandra Dobnigg | **3D Graphics:** Benjamin Angerer, Patrick Morak
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HOBAS Pressure Pipe Systems

Wide spread field of applications

Whether for potable disposal, retaining channels, hydropower lines or industrial applications: HOBAS Pressure Pipe Systems made of glass fiber reinforced plastic (GRP) are used around the world in many different areas. The roots of the composite material technology can be found in the automotive, aerospace and shipbuilding industry. HOBAS has been producing GRP pipes since the 1950s, the material has been further developed over the years and is today available for complex challenges for instance in the following fields of application:

Fields of applications:

- Potable water
- Wastewater / Sewage
- Hydropower
- Trenchless installations
- Ventilation systems
- Industrial plants
- Cooling water lines
- Rehabilitation of pipe systems

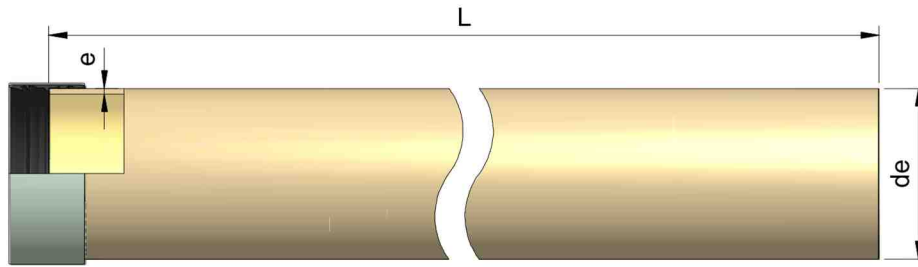
Features and advantages

- low weight and simple jointing technology increase installation rate
- homogenous wall structure thanks to patented centrifugal casting process
- high abrasion resistance
- reduced incrustations and sludge precipitations
- very smooth inner surface (roughness ≤ 0.1 mm)
- unsusceptible to frost and high temperatures (thermoset characteristics)
- very low expansion coefficient
- high UV resistance
- high loading capacity
- high chemical resistance
- long service life
- curved installation without fittings (bends) possible
- comprehensive range of available fittings including shafts and manholes (seamless)
- simple handling
- installation independent of weather conditions
- low sound propagation velocity (water hammer)

B	Width
B1	de to product standard (EN 1796/EN 14364)
B2	de to GRP and casting standards
B3	de to GRP and PVC standards
B4	de to GRP and steel standards
de	Pipe external diameter
DEC	Coupling external diameter
DN	Nominal diameter
e	Pipe wall thickness
FWC	GRP coupling with full width EPDM gasket
FWC-L	Restrained GRP coupling with full width EPDM gasket
GRP	Glass reinforced plastic (glass fiber reinforced, unsaturated polyester resin)
L	Length
LC	Coupling length
m	Mass
n	Number
p_{max}	Maximum operating pressure
PN	Nominal pressure
R	Radius
SN	Nominal stiffness
α	Angle (bend, deflection)

PIPES	A21	Pressure Pipes DN 150 - 1000 PN 6, 10
	A21	Pressure Pipes DN 1100 - 3600 PN 6, 10
	A21	Pressure Pipes DN 150 - 1000 PN 16, 20
	A21	Pressure Pipes DN 1100 - 3600 PN 16, 20
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	A22	Restrained Pressure Pipes DN 200 - 1200 PN 6, 10
	A23	Jacking Pressure Pipes de 427 - 752 PN 6, 10
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	C21	Pressure Bends DN 1100 - 3600 PN 6
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	C21	Pressure Bends DN 1100 - 3600 PN 10
	C22	T-pieces DN 150/150 - 1535/800 PN 6, 10
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	E22	Connection to Building Structures DN 150 - 1000
	E22	Connection to Building Structures DN 1100 - 3600
	F21	Material Specifications

Pressure Pipes DN 150 - 1000 PN 6, 10



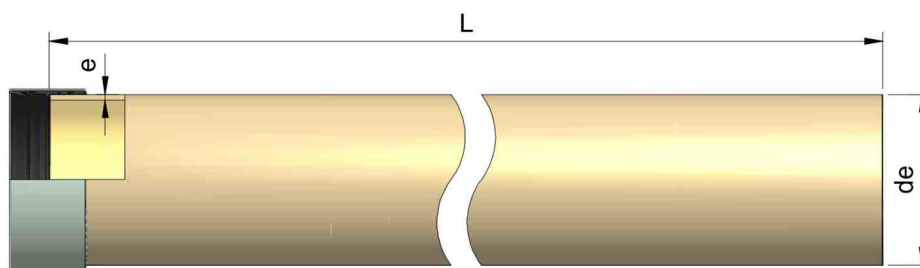
The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request.

DN	Diameter series	de [mm]	PN 6						PN 10					
			SN 5000		SN 10000		SN 20000		SN 5000		SN 10000		SN 20000	
			m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]
150	B2	168			5	6	6	7			10	6	6	7
200	B2	220			9	8	11	9			9	7	10	9
250	B2	272			14	9	17	11			13	9	15	10
300	B2 B4	324			20	10	25	13			17	10	22	12
350	B2	376	21	10	27	12	32	14	18	9	23	12	29	14
400	B3	401	23	10	29	12	35	15	20	10	26	12	32	15
400	B2	427	26	10	33	13	40	15	23	10	29	13	36	15
450	B2	478	30	11	38	13	46	16	25	10	33	13	41	16
500	B3	501	32	11	41	14	50	16	28	11	36	13	45	16
500	B2	530	38	12	46	14	55	17	31	11	40	14	50	17
550	-	550	40	12	49	15	60	18	35	12	43	15	54	18
600	B1	616	50	14	61	16	74	19	42	13	53	16	67	20
650	-	650	55	14	68	17	82	20	46	14	59	17	74	20
700	B1	718	66	15	81	18	101	23	56	15	71	18	91	23
750	-	752	72	16	89	19	110	24	61	15	77	19	99	24
800	B1	820	85	17	105	21	130	25	71	16	91	20	117	25
860	-	860	93	18	114	21	142	26	78	17	99	21	128	27
900	B1	924	106	19	134	23	163	28	89	18	116	23	147	28
960	-	960	114	19	144	24	175	29	95	19	125	24	158	29
1000	B1	1026	129	21	163	25	199	31	108	20	142	25	179	31

Wall thicknesses and masses as guidelines (plus tolerances)

The standard length is 6 m (+0/-60 mm). Shorter pipes can be supplied depending on availability.

Pressure Pipes DN 1100 - 3600 PN 6, 10



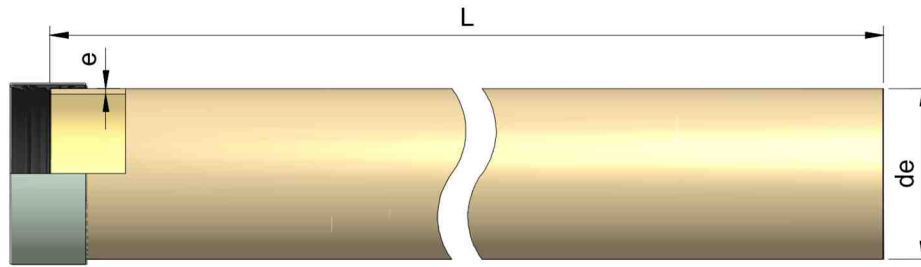
The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request.

DN	Diameter series	de [mm]	PN 6						PN 10					
			SN 5000		SN 10000		SN 20000		SN 5000		SN 10000		SN 20000	
			m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]
1100	-	1099	151	23	187	27	228	33	124	21	162	27	205	33
1200	B1	1229	187	25	231	30	282	36	156	24	200	29	254	37
1280	-	1280	201	26	249	31	305	38	169	24	217	31	274	38
1350	-	1350	222	27	275	32	336	39	186	25	239	32	304	40
1400	B1	1434	249	28	309	34	379	41	209	27	269	34	342	42
1500	-	1499	271	29	336	35	413	43	221	28	286	35	365	43
1535	-	1535	286	30	355	36	436	44	234	28	304	36	389	45
1600	B1	1638	323	32	402	39	495	47	266	30	344	38	441	47
1720	-	1720	355	33	442	40	543	49	292	31	378	39	485	49
1800	B1	1842	404	35	504	43	621	52	333	33	430	42	554	53
1940	-	1940	445	37	555	45	685	55	367	35	474	44	611	55
2000	B1	2047	494	39	617	47	763	58	403	36	528	46	680	58
2160	-	2160	548	40	684	49	847	61	448	38	591	49	755	61
2200	B1	2250	592	42	740	51	917	63	484	40	640	51	819	63
2400	-	2400	673	45	841	55	1042	67	550	42	726	54	930	68
2400	B1	2454	702	46	877	56	1087	68	574	43	757	55	971	69
2555	-	2555	759	47	949	58	1178	71	621	45	819	57	1051	72
2740	-	2740	869	50	1087	62	1351	76						
3000	-	3000	1034	55	1297	67	1611	83						
3600	-	3600												

Wall thicknesses and masses as guidelines (plus tolerances)

The standard length is 6 m (+0/-60 mm). Shorter pipes can be supplied depending on availability.

Pressure Pipes DN 150 - 1000 PN 16, 20



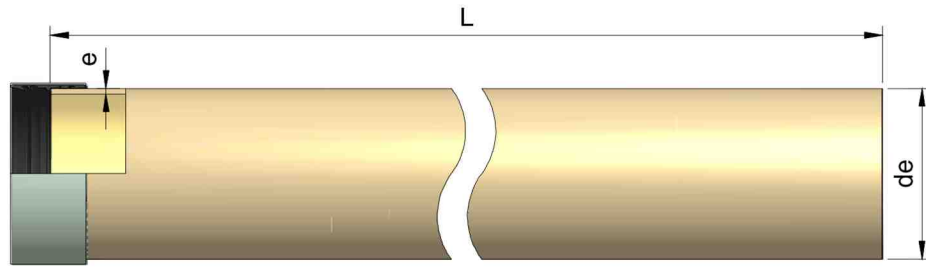
The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request.

DN	Diameter series	de [mm]	PN 16				PN 20			
			SN 10000		SN 20000		SN 10000		SN 20000	
			m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]
150	B2	168	4	6	6	7	4	6	6	7
200	B2	220	8	7	10	9	8	7	10	9
250	B2	272	11	9	15	10	11	8	14	10
300	B2 B4	324	16	10	21	12	15	10	20	12
350	B2	376	21	11	27	14	20	11	26	13
400	B3	401	25	12	31	14	23	12	30	14
400	B2	427	28	12	34	15	26	12	33	15
450	B2	478	31	13	39	15	29	12	38	15
500	B3	501	34	13	42	16	32	13	41	16
500	B2	530	37	14	47	17	35	13	47	17
550	-	550	40	14	51	17	38	14	51	18
600	B1	616	50	16	62	19	46	15	62	19
650	-	650	56	16	69	20	51	16	68	20
700	B1	718	65	17	85	22	61	17	81	21
750	-	752	71	18	93	23	66	18	90	23
800	B1	820	84	19	109	25	77	19	106	24
860	-	860	92	20	120	26	84	20	116	25
900	B1	924	108	22	137	27	96	21	132	27
960	-	960	116	23	147	28	103	21	142	28
1000	B1	1026	132	24	167	30	119	23	162	30

Wall thicknesses and masses as guidelines (plus tolerances)

The standard length is 6 m (+0/-60 mm). Shorter pipes can be supplied depending on availability.

Pressure Pipes DN 1100 - 3600 PN 16, 20



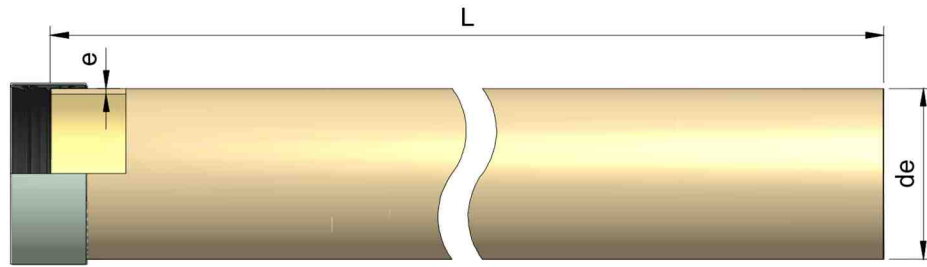
The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request.

DN	Diameter series	de [mm]	PN 16				PN 20			
			SN 10000		SN 20000		SN 10000		SN 20000	
			m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]
1100	-	1099	151	26	192	32	135	25	185	32
1200	B1	1229	186	29	237	35	166	27	230	35
1280	-	1280	202	30	256	37	179	28	248	36
1350	-	1350	222	31	283	38	227	32	275	38
1400	B1	1434	251	33	319	41	256	34	309	40
1500	-	1499	278	35	337	42	239	32	329	42
1535	-	1535	293	36	357	43	251	33	347	43
1600	B1	1638	332	38	404	45	283	35	393	45
1720	-	1720	On request							
1800	B1	1842								
1940	-	1940								
2000	B1	2047								
2160	-	2160								
2200	B1	2250								
2400	-	2400								
2400	B1	2454								
2555	-	2555								
2740	-	2740								
3000	-	3000	On request							
3600	-	3600								

Wall thicknesses and masses as guidelines (plus tolerances)

The standard length is 6 m (+0/-60 mm). Shorter pipes can be supplied depending on availability.

Pressure Pipes DN 150 - 1000 PN 25, 32



The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request.

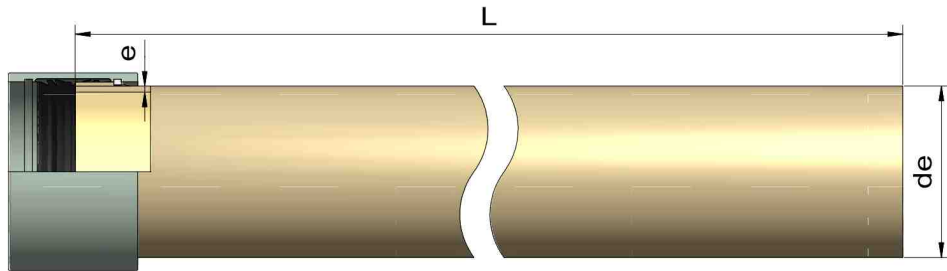
DN	Diameter series	de [mm]	PN 25				PN 32			
			SN 10000		SN 20000		SN 10000		SN 20000	
			m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]
150	B2	168	4	6	5	7	5	7	5	7
200	B2	220	8	7	9	9	9	8	9	9
250	B2	272	11	8	14	10	13	10	13	10
300	B2 B4	324	15	10	20	12	17	11	19	12
350	B2	376	20	11	26	13	23	12	24	13
400	B3	401	23	12	29	14	26	13	27	14
400	B2	427	26	12	33	15	28	13	30	14
450	B2	478	29	12	38	15	35	15	35	15
500	B3	501	32	13	41	16	37	15	38	15
500	B2	530	35	13	47	17	41	16	42	16
550	-	550	38	14	51	18	45	16	45	16
600	B1	616	46	15	61	19	54	18	55	18
650	-	650	51	16	68	20	60	18	60	19
700	B1	718	60	17	84	22	71	20	72	20
750	-	752	66	18	91	23	77	21	79	21
800	B1	820	77	19	104	24	93	23	94	23
860	-	860	84	19	113	25	101	24	103	24
900	B1	924	95	21	129	27	115	25	117	25
960	-	960	102	21	139	28	123	26	126	26
1000	B1	1026	118	23	157	29	139	27	142	28

> DN 1000 on request

Wall thicknesses and masses as guidelines (plus tolerances)

The standard length is 6 m (+0/-60 mm). Shorter pipes can be supplied depending on availability.

Restrained Pressure Pipes DN 200 - 1200 PN 6, 10



The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request.

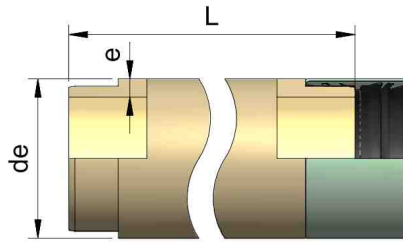
DN	Diameter series	de [mm]	PN 6		PN 10	
			SN 10000		SN 10000	
			m [kg/m]	e [mm]	m [kg/m]	e [mm]
200	B2	220	9	8	8	8
250	B2	272	13	9	11	9
300	B2 B4	324	18	10	15	10
350	B2	376	24	12	20	11
400	B3	401	30	13	25	12
450	B2	478	38	14	31	14
500	B3	501	46	15	38	15
550	-	550	50	16	41	15
600	B1	616	62	16	51	17
700	B1	718	83	20	75	19
800	B1	820	104	22	86	21
900	B1	924	134	24	111	24
1000	B1	1026	161	27	133	26
1100	-	1099	185	29		
1200	B1	1229	229	32		

Higher pressure classes and diameters on request

Wall thicknesses and masses as guidelines (plus tolerances)

The standard length is 6 m (+0/-60 mm). Shorter pipes can be supplied depending on availability.

Jacking Pressure Pipes de 427 - 752 PN 6, 10



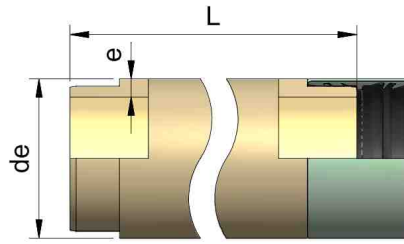
Allowable jacking forces for GRP Jacking Pressure Pipes with flush (GRP) couplings. The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request, wall thickness is for both PN 6 and PN 10 valid.

		Allowable jacking force [kN]*											
de [mm]		SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN
Coupling		32000	40000	50000	64000	80000	100000	128000	160000	200000	320000	640000	1000000
427	e [mm]												39
	m [kg/m]												102
	F [kN]												391
478	e [mm]											41	46
	m [kg/m]											122	135
	F [kN]											506	664
530	e [mm]											44	51
	m [kg/m]											145	166
	F [kN]											665	911
550	e [mm]										38	47	53
	m [kg/m]										133	161	179
	F [kN]										522	860	1078
616	e [mm]										43	50	58
	m [kg/m]										168	193	220
	F [kN]										756	1052	1381
650	e [mm]									38	44	54	62
	m [kg/m]									159	182	219	248
	F [kN]									570	846	1292	1637
718	e [mm]										48	59	68
	m [kg/m]										221	265	300
	F [kN]										684	1205	1635
752	e [mm]								42	45	51	62	72
	m [kg/m]								205	219	245	293	334
	F [kN]								912	1074	1392	1959	2459

Wall thicknesses and pipe masses as minimum or guidelines plus tolerances to HOBAS Company standard.

* The jacking force (kN) corresponds to a safety factor of 3.5 times the calculated failing load. Static calculations for specific projects can result in differing allowable jacking forces.

Jacking Pressure Pipes de 820 - 1280 PN 6, 10



Allowable jacking forces for GRP Jacking Pressure Pipes with flush (GRP) couplings. The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request, wall thickness is for both PN 6 and PN 10 valid.

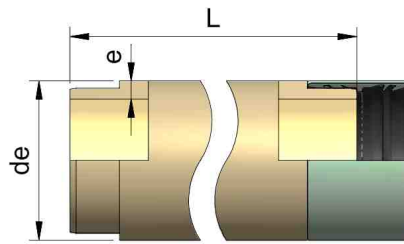
		Allowable jacking force [kN]*												
de [mm]		SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	
Coupling		32000	40000	50000	64000	80000	100000	128000	160000	200000	320000	640000	1000000	
820	e [mm]								42	45	49	54	67	78
	m [kg/m]								223	238	258	282	343	393
	F [kN]								972	1150	1384	1674	2408	3008
860**	e [mm]								43	47	51	58	72	
	m [kg/m]								240	261	281	317	386	
	F [kN]								1464	1713	1959	2384	3210	
924	e [mm]								50	54	62	77		
	m [kg/m]								297	320	363	442		
	F [kN]								1230	1495	2017	2967		
960	e [mm]						42	44	48	52	56	64	80	
	m [kg/m]						263	275	298	322	345	390	478	
	F [kN]						1167	1308	1589	1866	2142	2684	3738	
1026	e [mm]								52	56	61	68		
	m [kg/m]								346	371	401	444		
	F [kN]								1429	1725	2092	2600		
1099	e [mm]										64	73		
	m [kg/m]										452	510		
	F [kN]										2234	2933		
1229	e [mm]				46	53	56	61	66	71	81			
	m [kg/m]				397	427	450	487	524	561	634			
	F [kN]				2115	2479	2751	3200	3645	4086	4956			
1280	e [mm]					55	59	64	68					
	m [kg/m]					461	492	531	562					
	F [kN]					2887	3263	3731	4101					

Wall thicknesses and pipe masses as minimum or guidelines plus tolerances to HOBAS Company standard.

* The jacking force (kN) corresponds to a safety factor of 3.5 times the calculated failing load. Static calculations for specific projects can result in differing allowable jacking forces.

** PN 10 on request

Jacking Pressure Pipes de 1434 - 2047 PN 6, 10



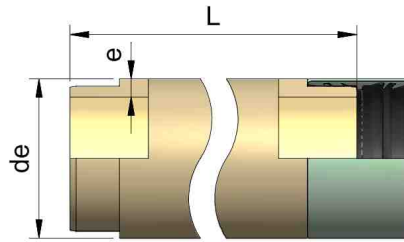
Allowable jacking forces for GRP Jacking Pressure Pipes with flush (GRP) couplings. The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request, wall thickness is for both PN 6 and PN 10 valid.

		Allowable jacking force [kN]*											
de [mm]		SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN
Coupling		32000	40000	50000	64000	80000	100000	128000	160000	200000	320000	640000	1000000
1434	e [mm]					61	65	71	76				
	m [kg/m]					572	607	660	703				
	F [kN]					3785	4208	4837	5356				
1499	e [mm]							68	74	79			
	m [kg/m]							669	724	769			
	F [kN]							3917	4575	5119			
1535	e [mm]					66	70	76	81				
	m [kg/m]					666	704	761	807				
	F [kN]					4302	4755	5429	5987				
1638	e [mm]			60	65	70	75	81					
	m [kg/m]			648	699	750	800	860					
	F [kN]			3506	4117	4723	5326	6043					
1720	e [mm]		59	64	68	73	78						
	m [kg/m]		672	726	769	822	875						
	F [kN]		3683	4327	4840	5477	6110						
1842	e [mm]		63	68	73	78	83						
	m [kg/m]		768	826	883	940	997						
	F [kN]		4374	5064	5751	6434	7113						
1940	e [mm]	62	67	72	77								
	m [kg/m]	800	861	921	982								
	F [kN]	4446	5177	5903	6626								
2047	e [mm]	65	70	75	81								
	m [kg/m]	884	949	1013	1089								
	F [kN]	5170	5942	6709	7625								

Wall thicknesses and pipe masses as minimum or guidelines plus tolerances to HOBAS Company standard.

* The jacking force (kN) corresponds to a safety factor of 3.5 times the calculated failing load. Static calculations for specific projects can result in differing allowable jacking forces.

Jacking Pressure Pipes de 2160 - 3000 PN 6, 10



Allowable jacking forces for GRP Jacking Pressure Pipes with flush (GRP) couplings. The standard length of the pipe is 6 m. 1, 2 and 3-meter lengths are available on request, wall thickness is for both PN 6 and PN 10 valid.

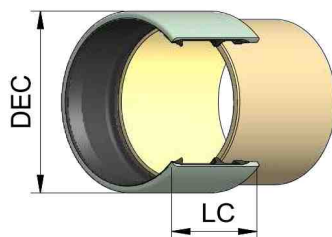
		Allowable jacking force [kN]*											
de [mm]		SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN
Coupling		32000	40000	50000	64000	80000	100000	128000	160000	200000	320000	640000	1000000
2160	e [mm]	69	74	79									
	m [kg/m]	991	1059	1127									
	F [kN]	6094	6908	7717									
2252	e [mm]	71	76	82									
	m [kg/m]	1059	1130	1215									
	F [kN]	6749	7597	8611									
2400	e [mm]	76	81	86									
	m [kg/m]	1212	1288	1363									
	F [kN]	8058	8962	9863									
2454	e [mm]	80	84	88									
	m [kg/m]	1309	1371	1433									
	F [kN]	9420	9790	10897									
2555	e [mm]	82	85	92									
	m [kg/m]	1391	1439	1551									
	F [kN]	9785	10363	11707									
3000**	e [mm]	94	100	108									
	m [kg/m]	1878	1992	2142									
	F [kN]	14214	15574	17378									

Wall thicknesses and pipe masses as minimum or guidelines plus tolerances to HOBAS Company standard.

* The jacking force (kN) corresponds to a safety factor of 3.5 times the calculated failing load. Static calculations for specific projects can result in differing allowable jacking forces.

** PN 10 on request

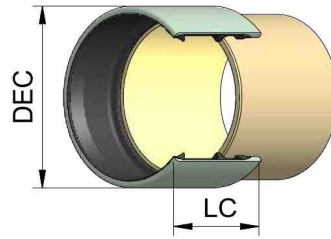
Pressure Pipe Joints DN 150 - 1000 PN 6, 10, 16



HOBAS Pipes are generally delivered with a pre-mounted coupling. The standard pressure pipe joint is a FWC coupling consisting of a GRP sleeve with a permanently fitted, full width EPDM gasket. FWC couplings are available for all nominal pressure ratings of pipes (see A21), for > PN 16 FWC couplings on request.

DN	de [mm]	PN 6		PN 10		PN 16	
		LC [mm]	DEC [mm]	LC [mm]	DEC [mm]	LC [mm]	DEC [mm]
150	168	200	200	200	200	200	200
200	220	200	255	200	255	200	255
250	272	200	306	200	306	200	306
300	324	200	350	200	350	200	350
350	376	200	410	200	410	200	410
400	401	200	436	200	436	200	436
400	427	200	462	200	462	200	462
450	478	200	513	200	513	200	513
500	501	200	536	200	536	200	536
500	530	200	565	200	565	200	565
550	550	200	585	200	585	200	585
600	616	200	651	200	651	200	661
650	650	200	685	200	695	200	695
700	718	200	755	250	755	250	760
750	752	250	787	250	787	250	795
800	820	250	855	250	855	250	860
860	860	250	895	250	898	250	898
900	924	250	960	250	960	250	965
960	960	250	995	250	998	250	1003
1000	1026	250	1062	250	1065	250	1070

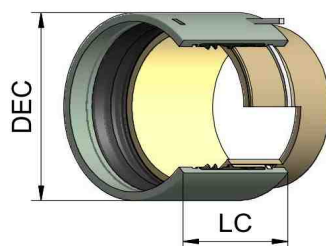
Pressure Pipe Joints DN 1100 - 3600 PN 6, 10, 16



HOBAS Pipes are generally delivered with a pre-mounted coupling. The standard pressure pipe joint is a FWC coupling consisting of a GRP sleeve with a permanently fitted, full width EPDM gasket. FWC couplings are available for all nominal pressure ratings of pipes (see A21), for > PN 16 FWC couplings on request.

DN	de [mm]	PN 6		PN 10		PN 16	
		LC [mm]	DEC [mm]	LC [mm]	DEC [mm]	LC [mm]	DEC [mm]
1100	1099	250	1135	250	250	1138	250
1200	1229	250	1265	250	250	1275	250
1280	1280	250	1318	250	250	1325	250
1350	1350	250	1384	250	250	1390	250
1400	1434	250	1472	290	290	1475	290
1500	1499	290	1540	290	290	1545	290
1535	1535	290	1575	290	290	1580	290
1600	1638	290	1680	290	290	1685	290
1720	1720	290	1765	290	290	On request	
1800	1842	290	1880	290	290		
1940	1940	290	1980	290	290		
2000	2047	290	2090	290	290		
2160	2160	290	2200	290	290		
2200	2250	290	2295	290	290		
2400	2400	290	2440	290	290		
2400	2454	290	2495	290	290		
2555	2555	290	2605	290	290		
2740	2740	320	2795				
3000	3000	320	3060				
3600	3600	320	3680				

Restrained Pressure Pipe Joints PN 6, 10

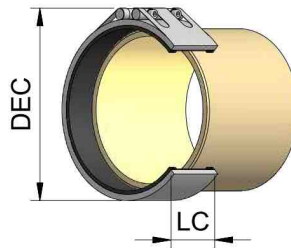


HOBAS Pipes are generally delivered with a pre-mounted coupling. The restrained pressure pipe joint is a FWC coupling consisting of a GRP sleeve with a permanently fitted, full width EPDM gasket and locking key. FWC-L couplings are available for all nominal pressure ratings of pipes (see A22).

DN	de [mm]	PN 6		PN 10	
		LC [mm]	DEC [mm]	LC [mm]	DEC [mm]
200	220	297	272	297	278
250	272	305	324	305	334
300	324	315	378	315	386
350	376	327	438	331	446
400	427	345	493	345	501
450	478	357	552	357	560
500	501	367	604	367	614
550	550	375	628	375	636
600	616	389	686	389	714
700	718	395	792	465	826
800	820	409	902	487	938
900	924	423	1010	513	1058
1000	1026	435	1120	535	1168
1100	1099	447	1197		
1200	1229	467	1337		

Higher pressure classes on request

Special Pressure Joints PN 6, 10, 16



Mechanical coupling:

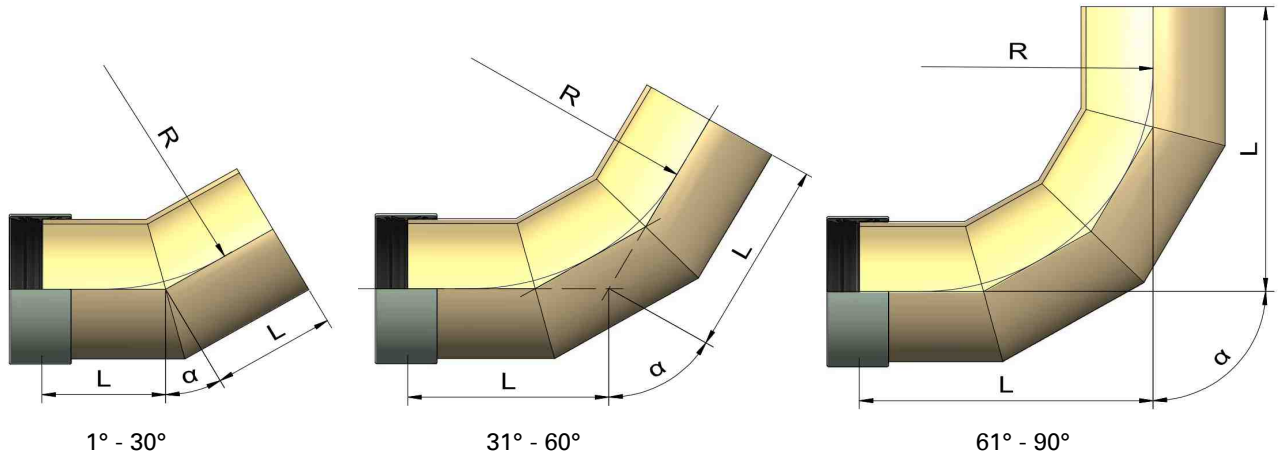
The mechanical coupling consists of a stainless steel sleeve with a screw connection and EPDM (NBR also possible on request) rubber seal. By default systems from Straub or Teekay are used.

DN	de [mm]	PN 6			PN 10			PN 16		
		LC [mm]	DEC [mm]	m [kg]	LC [mm]	DEC [mm]	m [kg]	LC [mm]	DEC [mm]	m [kg]
150	168	110	190	3	110	190	3	110	190	3
200	220	110	244	3	110	244	3	110	244	3
250	272	110	295	4	110	295	4	110	295	4
300	324	110	348	4	110	348	4	110	348	4
350	376	140	434	7	140	434	7	140	434	7
400	427	140	485	8	140	485	8	140	485	8
450	478	140	536	9	140	536	9	140	536	9
500	530	140	588	10	140	588	10	210	602	16
600	616	140	674	11	140	674	11	210	688	17
700	718	140	776	13	140	776	13	210	790	23
800	820	140	878	14	140	878	14	210	892	25
900	924	140	982	16	140	982	16	210	996	28
1000	1026	140	1084	17	140	1084	17	210	1098	30
1100	1099	210	1171	38	210	1171	38	210	1171	38
1200	1229	210	1301	41	210	1301	41	210	1301	41
1280	1280	210	1382	48	210	1382	48			
1400	1434	210	1536	51	210	1536	51			
1500	1499	210	1601	53	210	1601	53			
1600	1638	210	1740	57	210	1740	57			
1720	1720	210	1822	60	210	1822	60			
1800	1842	210	1944	62	210	1944	62			
1940	1940	210	2042	64	210	2042	64			
2000	2047	210	2149	65	210	2149	65			
2160	2160	210	2262	68	210	2262	68			
2200	2250	210	2352	71	210	2352	71			
2400	2400	210	2502	76	210	2502	76			
2555	2555	210	2657	80	210	2657	80			

Source: Teekay 2011

Higher pressure classes and diameters on request

Pressure Bends DN 150 - 1000 PN 6



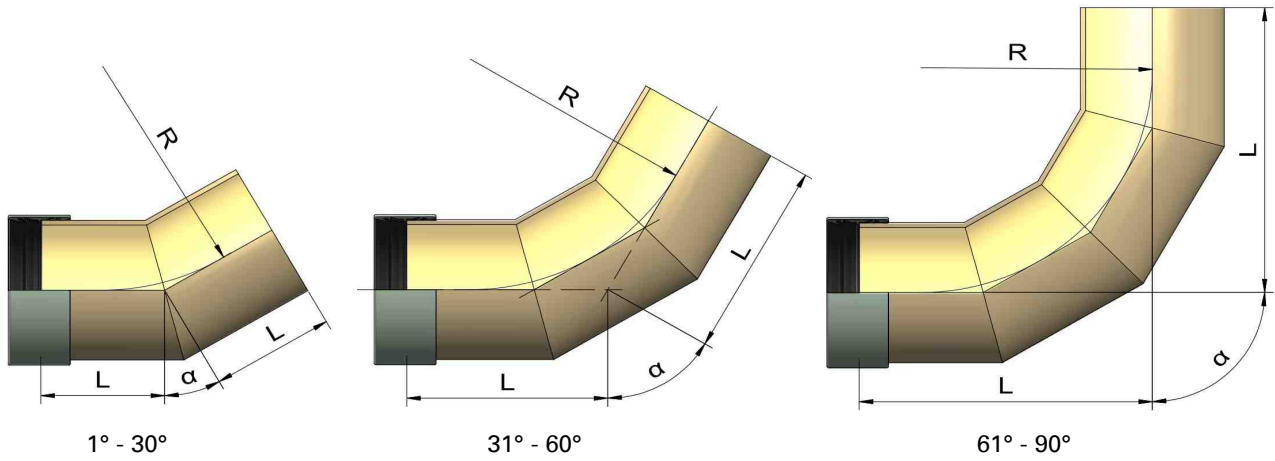
Installation lengths for bends consisting of segments

Angle α	11,25°		15°		22,5°		30°		45°		60°		90°		
Segments:	2		2		2		2		3		3		4		
DN	de [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]
150	168	225	300	225	300	225	300	225	300	500	350	400	400	400	550
200	220	300	300	300	300	300	300	300	300	500	400	400	400	400	550
250	272	375	300	375	300	375	300	375	300	550	400	450	425	450	600
300	324	450	300	450	300	450	300	450	300	550	400	450	450	450	650
350	376	525	325	525	325	525	325	525	325	600	425	525	500	525	700
400	401	600	350	600	350	600	350	600	350	600	450	600	525	600	750
400	427	600	375	600	375	600	375	600	375	600	450	600	550	600	800
450	478	675	375	675	375	675	375	675	375	700	500	675	575	675	850
500	501	750	400	750	400	750	400	750	400	750	525	750	600	750	900
500	530	750	400	750	400	750	400	750	400	750	525	750	625	750	950
550	550	825	450	825	450	825	450	825	450	825	600	825	650	825	1000
600	616	900	450	900	450	900	450	900	450	900	600	900	700	900	1075
650	650	975	475	975	475	975	475	975	475	1000	650	975	750	975	1100
700	718	1050	475	1050	475	1050	475	1050	475	1050	650	1050	775	1050	1200
750	752	1125	500	1125	500	1125	500	1125	500	1125	700	1225	800	1225	1300
800	820	1200	525	1200	525	1200	525	1200	525	1200	700	1200	850	1200	1350
860	860	1290	550	1290	550	1290	550	1290	550	1290	725	1290	875	1290	1400
900	924	1350	550	1350	550	1350	550	1350	550	1350	725	1350	875	1350	1400
960	960	1440	575	1440	575	1440	575	1440	575	1440	750	1440	900	1440	1450
1000	1026	1270	575	1270	575	1270	575	1270	575	1270	750	1270	925	1270	1450

HOBAS fittings products > PN 10 on request

Sizes can be adapted to meet transportation requirements, special transportation might be necessary

Pressure Bends DN 1100 - 3600 PN 6



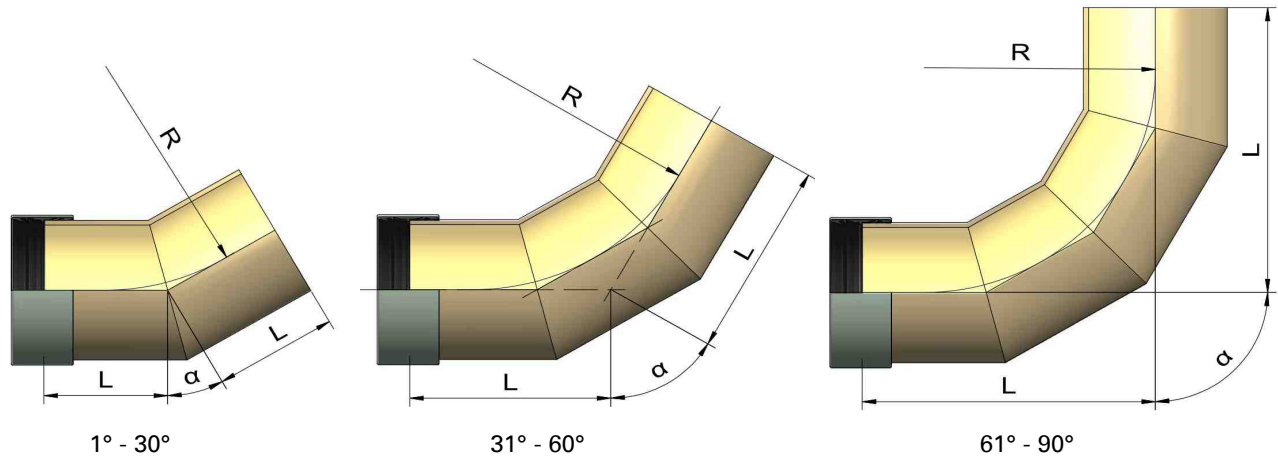
Installation lengths for bends consisting of segments

Angle α		11,25°		15°		22,5°		30°		45°		60°		90°	
Segments:		2		2		2		2		3		3		4	
DN	de [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]
1100	1099	1320	600	1320	600	1320	600	1320	600	1320	825	1320	1025	1320	1610
1200	1229	1370	600	1370	600	1370	600	1370	600	1370	825	1370	1025	1370	1600
1280	1280	1400	650	1400	650	1400	650	1400	650	1400	850	1400	1050	1400	1650
1350	1350	1450	650	1450	650	1450	650	1450	650	1450	850	1450	1050	1450	1650
1400	1434	1550	675	1550	675	1550	675	1550	675	1550	900	1550	1100	1550	1700
1500	1499	1600	800	1600	800	1600	800	1600	800	1600	1100	1600	1300	1600	2000
1535	1535	1650	800	1650	800	1650	800	1650	800	1650	1100	1650	1300	1650	2000
1600	1638	1700	800	1700	800	1700	800	1700	800	1700	1100	1700	1300	1700	2000
1720	1720	1800	800	1800	800	1800	800	1800	800	1800	1200	1800	1400	1800	2200
1800	1842	1950	850	1950	850	1950	850	1950	850	1950	1200	1950	1400	1950	2200
1940	1940	2000	850	2000	850	2000	850	2000	850	2000	1300	2000	1500	2000	2200
2000	2047	2100	900	2100	900	2100	900	2100	900	2100	1300	2100	1500	2100	2400
2160	2160	2170	900	2170	900	2170	900	2170	900	2170	1300	2170	1500	2170	2400
2200	2250	2280	950	2280	950	2280	950	2280	950	2280	1400	2280	1600	2280	2600
2400	2400	2470	1000	2470	1000	2470	1000	2470	1000	2470	1500	2470	1700	2470	2600
2453	2454	2500	1000	2500	1000	2500	1000	2500	1000	2500	1500	2500	1700	2500	2600
2555	2555	2600	1000	2600	1000	2600	1000	2600	1000	2600	1500	2600	1700	2700	2600
3000	3000	On request													
3600	3600	On request													

HOBAS fittings products > PN 10 on request

Sizes can be adapted to meet transportation requirements, special transportation might be necessary

Pressure Bends DN 150 - 1000 PN 10



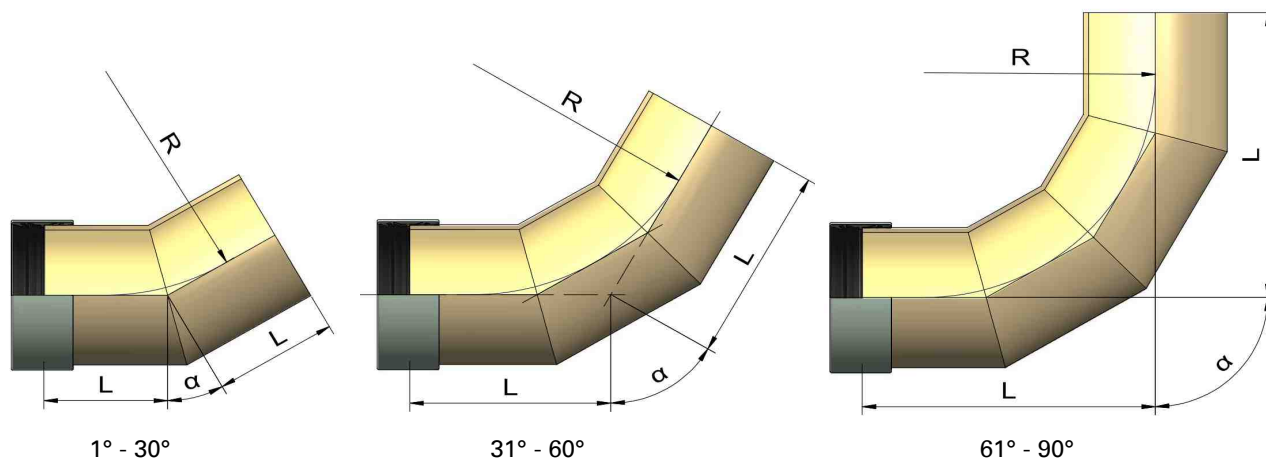
Installation lengths for bends consisting of segments

Angle α	11,25°		15°		22,5°		30°		45°		60°		90°		
Segments:	2		2		2		2		3		3		4		
DN	de [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]
150	168	225	300	225	300	225	300	225	300	500	350	400	400	400	550
200	220	300	300	300	300	300	300	300	300	500	400	400	400	400	550
250	272	375	300	375	300	375	300	375	300	550	400	450	425	450	600
300	324	450	300	450	300	450	300	450	300	550	400	450	450	450	650
350	376	525	325	525	325	525	325	525	325	600	425	550	500	550	700
400	401	600	350	600	350	600	350	600	350	700	500	550	525	600	750
400	427	600	375	600	375	600	375	600	375	700	500	600	550	600	800
450	478	675	375	675	375	675	375	675	375	700	500	675	575	675	850
500	501	750	400	750	400	750	400	750	400	750	525	750	600	750	900
500	530	750	400	750	400	750	400	750	400	750	525	750	625	750	950
550	550	825	450	825	450	825	450	825	450	825	600	825	650	825	1000
600	616	900	450	900	450	900	450	900	450	900	600	900	700	900	1075
650	650	975	475	975	475	975	475	975	475	1000	650	975	750	975	1100
700	718	1050	475	1050	475	1050	475	1050	475	1050	650	1050	775	1050	1200
750	752	1125	500	1125	500	1125	500	1125	500	1125	700	1225	800	1225	1300
800	820	1200	525	1200	525	1200	525	1200	525	1200	700	1200	850	1200	1350
860	860	1290	550	1290	550	1290	550	1290	550	1290	725	1290	875	1290	1400
900	924	1350	550	1350	550	1350	550	1350	550	1350	725	1350	875	1350	1500
960	960	1440	575	1440	575	1440	575	1440	575	1440	750	1440	900	1440	1550
1000	1026	1270	575	1270	575	1270	575	1270	575	1360	900	1270	925	1270	1450

HOBAS fittings products > PN 10 on request

Sizes can be adapted to meet transportation requirements, special transportation might be necessary

Pressure Bends DN 1100 - 3600 PN 10



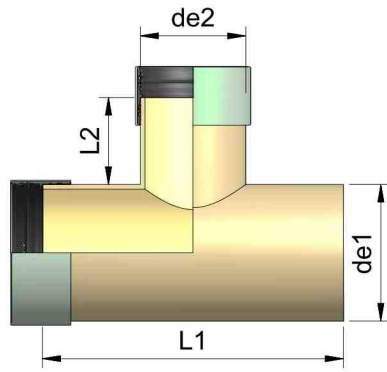
Installation lengths for bends consisting of segments

Angle α	11,25°		15°		22,5°		30°		45°		60°		90°								
Segments:	2		2		2		2		3		3		4								
DN	de [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]						
1100	1099	1320	600	1320	600	1320	600	1320	600	1520	900	1320	1025	1320	1610						
1200	1229	1370	600	1370	600	1370	600	1370	600	1640	900	1400	1025	1500	1650						
1280	1280	1400	650	1400	650	1400	650	1400	650	1660	900	1500	1050	1600	1750						
1300	1350	1450	650	1450	650	1450	650	1450	650	1820	1000	1550	1050	1650	1800						
1400	1434	1550	675	1550	675	1550	675	1550	675	1870	1000	1700	1200	1800	1950						
1500	1499	1600	800	1600	800	1600	800	1600	800	2050	1100	1800	1300	1900	2100						
1535	1535	1650	800	1650	800	1650	800	1650	800	2050	1100	1800	1300	1900	2100						
1600	1638	1700	800	1700	800	1700	800	1700	800	2170	1100	1950	1300	2000	2200						
1720	1720	1800	800	1800	800	1800	800	1800	800	On request											
1800	1842	1950	850	1950	850	1950	850	1950	850												
1940	1940	2000	850	2000	850	2000	850	2000	850												
2000	2047	2100	900	2100	900	2100	900	2100	900												
2160	2160	2170	900	2170	900	2170	900	2170	900												
2200	2250	2280	950	2280	950	2280	950	2280	950												
2400	2400	2470	1000	2470	1000	2470	1000	2470	1000												
2453	2454	2500	1000	2500	1000	2500	1000	2500	1000												
2555	2555	2600	1000	2600	1000	2600	1000	2600	1000												
3000	3000																				
3600	3600																				

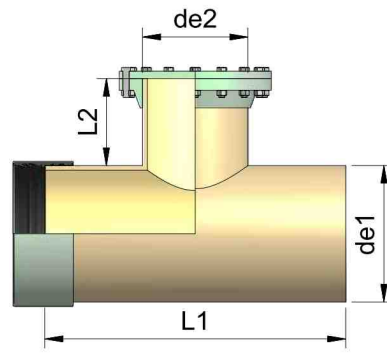
HOBAS fittings products > PN 10 on request

Sizes can be adapted to meet transportation requirements, special transportation might be necessary

T-pieces DN 150/150 - 1535/800 PN 6, 10



Tee



Inspection piece

T-shaped fitting consisting of segments, lengths of main pipe and branch. Branch with standard coupling or inspection opening, values are for both PN 6 and PN 10 valid.

DN 2	150	200	250	300	350	400	500	600	700	800
de2 [mm]	168	220	272	324	376	427	530	616	718	820
L 2*	288	301	329	350	400	425	501	551	631	729

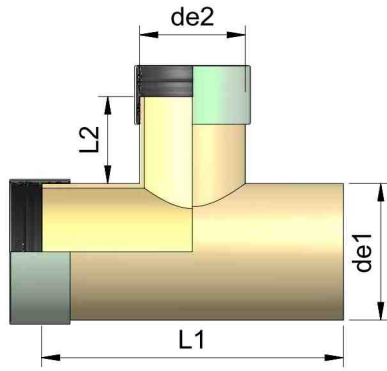
DN 1	de1 [mm]	L 1* [mm]									
150	168	1000									
200	220	1000	1000								
250	272	1000	1000	1000							
300	324	1000	1000	1000	1000						
350	376	1000	1000	1000	1000	1500					
400	427	1000	1000	1000	1000	1500	1500				
500	530	1000	1000	1000	1500	1500	1500	1500			
550	550	1000	1000	1000	1500	1500	1500	1500			
600	616	1000	1000	1000	1500	1500	1500	1500	1500		
650	650	1000	1000	1000	1500	1500	1500	1500	1500		
700	718	1000	1000	1000	1500	1500	1500	1500	2000	2000	
750	752	1000	1000	1000	1500	1500	1500	1500	2000	2000	
800	820	1000	1000	1500	1500	1500	1500	1500	2000	2000	2000
900	924	1000	1000	1500	1500	1500	1500	1500	2000	2000	2000
1000	1026	1000	1500	1500	1500	1500	1500	2000	2000	2000	2000
1100	1099	1000	1500	1500	1500	1500	1500	2000	2000	2000	2000
1200	1229	1500	1500	1500	1500	1500	1500	2000	2000	2000	2500
1280	1280	1500	1500	1500	1500	1500	1500	2000	2000	2000	2500
1350	1350	1500	1500	1500	1500	1500	1500	2000	2000	2000	2500
1400	1434	1500	1500	1500	1500	1500	1500	2000	2000	2000	2500
1500	1499	1500	1500	1500	1500	1500	2000	2000	2000	2000	2500
1535	1535	1500	1500	1500	1500	1500	2000	2000	2000	2000	2500

HOBAS fittings products > PN 10 on request

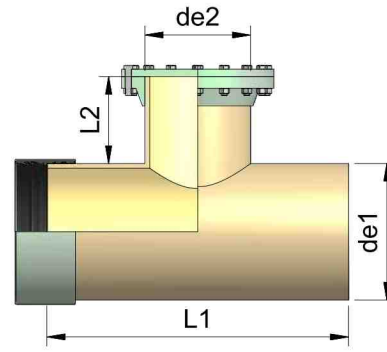
* (± 10 mm)

Tolerances to HOBAS Product Certificates

T-pieces DN 1600/150 - 3600/800 PN 6, 10



Tee



Inspection piece

T-shaped fitting consisting of segments, lengths of main pipe and branch. Branch with standard coupling or inspection opening, values are for both PN 6 and PN 10 valid.

DN 2	150	200	250	300	350	400	500	600	700	800
de2 [mm]	168	220	272	324	376	427	530	616	718	820
L 2*	288	301	329	350	400	425	501	551	631	729

DN 1	de1 [mm]	L 1* [mm]										
1600	1638	1500	1500	1500	1500	1500	2000	2000	2000	2500	2500	
1720	1720	1500	1500	1500	1500	2000	2000	2000	2000	2500	2500	
1800	1842	1500	1500	1500	2000	2000	2000	2000	2000	2500	2500	
1940	1940	1500	1500	1500	2000	2000	2000	2000	2000	2500	2500	
2000	2047	1500	1500	2000	2000	2000	2000	2000	2000	2500	2500	
2160	2160	1500	1500	2000	2000	2000	2000	2000	2500	2500	2500	
2200	2250	1500	1500	2000	2000	2000	2000	2000	2500	2500	2500	
2400	2400	1500	1500	2000	2000	2000	2000	2000	2500	2500	2500	
2400	2454	1500	1500	2000	2000	2000	2000	2000	2500	2500	2500	
2555	2555	1500	1500	2000	2000	2000	2000	2000	2500	2500	2500	
3000**	3000	1500	1500	2000	2000	2000	2000	2000	2500	2500	2500	
3600	3600	On request										

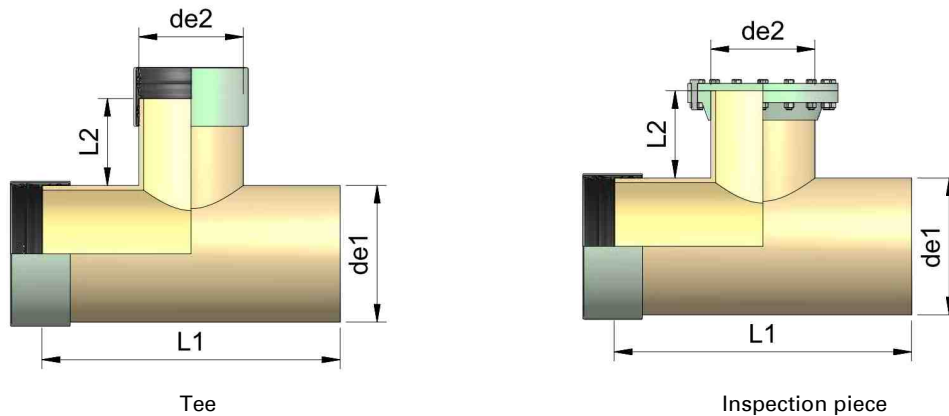
HOBAS fittings products > PN 10 on request

* (± 10 mm)

** PN 10 on request

Tolerances to HOBAS Product Certificates

T-pieces DN 900/900 - 3600/1600 PN 6, 10



T-shaped fitting consisting of segments, lengths of main pipe and branch. Branch with standard coupling or inspection opening, values are for both PN 6 and PN 10 valid.

DN 2	900	1000	1100	1200	1280	1300	1400	1535	1600
de2 [mm]	924	1026	1099	1229	1280	1350	1434	1535	1638
L 2*	777	874	924	927	951	1051	1101	1251	1351

DN 1	de1 [mm]	L 1* [mm]									
900	924	2500									
1000	1026	2500	2500								
1100	1099	2500	2500	2500							
1200	1229	2500	2500	2500	3000						
1280	1280	2500	2500	2500	3000	3000					
1350	1350	2500	2500	2500	3000	3000	3000				
1400	1434	2500	2500	3000	3000	3000	3000	3000			
1500	1499	2500	2500	3000	3000	3000	3000	3000			
1535	1535	2500	2500	3000	3000	3000	3000	3000	3000		
1600	1638	2500	2500	3000	3000	3000	3500	3500	3500	3500	
1720	1720	2500	3000	3000	3000	3000	3500	3500	3500	3500	
1800	1842	2500	3000	3000	3000	3000	3500	3500	3500	3500	
1940	1940	2500	3000	3000	3000	3000	3500	3500	3500	3500	
2000	2047	2500	3000	3000	3000	3000	3500	3500	3500	3500	
2160	2160	3000	3000	3000	3000	3000	3500	3500	3500	3500	
2200	2250	3000	3000	3000	3000	3000	3500	3500	3500	3500	
2400	2400	3000	3000	3000	3000	3000	3500	3500	3500	3500	
2400	2454	3000	3000	3000	3000	3000	3500	3500	3500	3500	
2555	2555	3000	3000	3000	3000	3000	3500	3500	3500	3500	
3000**	3000	3000	3000	3000	3000	3000	3500	3500	3500	3500	
3600	3600	On request									

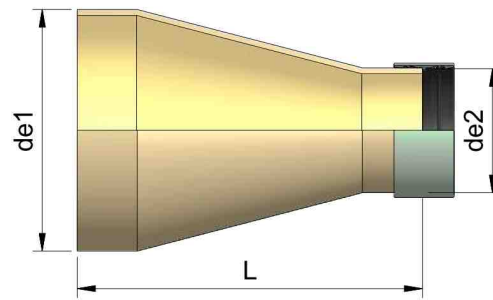
HOBAS fittings products > PN 10 on request

* (± 10 mm)

** PN 10 on request

Tolerances to HOBAS Product Certificates

Reducers PN 6, 10



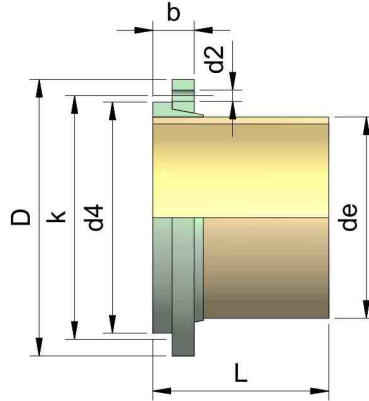
Lengths for concentric reducers (PN 6 und PN 10)

de1 [mm]	de2 [mm]	L [mm]	de2 [mm]	L [mm]	de2 [mm]	L [mm]	de2 [mm]	L [mm]
220	168	750						
272	220	750	168	900				
324	272	750	220	900	168	1000		
376	324	750	272	900	220	1000	168	1200
427	376	750	324	900	272	1000	220	1200
478	427	750	376	900	324	1000	272	1200
530	478	750	427	1000	376	1000	324	1200
550	530	750	478	1000	427	1000	376	1200
616	550	750	530	1000	478	1000	427	1200
650	616	750	550	1000	530	1000	478	1200
718	650	1000	616	1000	550	1200	530	1200
752	718	1000	650	1000	616	1200	550	1200
820	752	1000	718	1000	650	1200	616	1200
860	820	1000	752	1000	718	1200	650	1200
924	860	1000	820	1000	752	1200	718	1200
960	924	1000	860	1000	820	1200	752	1200
1026	960	1000	924	1000	860	1200	820	1500
1099	1026	1000	960	1000	924	1200	860	1500
1229	1099	1100	1026	1200	960	1500	924	1500
1280	1229	1100	1099	1200	1026	1500	960	1500
1350	1280	1100	1229	1200	1099	1500	1026	1750
1434	1348	1100	1280	1200	1229	1500	1099	1750
1499	1434	1100	1348	1200	1280	1500	1229	1750
1535	1499	1100	1434	1200	1348	1500	1280	1750
1638	1535	1200	1499	1200	1434	1500	1348	1750
1720	1638	1200	1535	1500	1499	1500	1434	1750
1842	1720	1200	1638	1500	1535	1750	1499	1750
1940	1842	1200	1720	1500	1638	1750	1535	2000
2047	1940	1200	1842	1500	1720	1750	1638	2000
2160	2046	1200	1940	1500	1842	1750	1720	2000
2250	2160	1500	2046	1500	1940	2000	1842	2250
2400	2250	1500	2160	1750	2046	2000	1940	2250
2454	2400	1500	2250	1750	2160	2000	2046	2250
2555	2454	1500	2400	1750	2250	2000	2160	2250

HOBAS fittings products > PN 10 on request

Sizes can be adapted to meet transportation requirements, special transportation might be necessary

Loose Flange GRP/Steel PN 6, 10



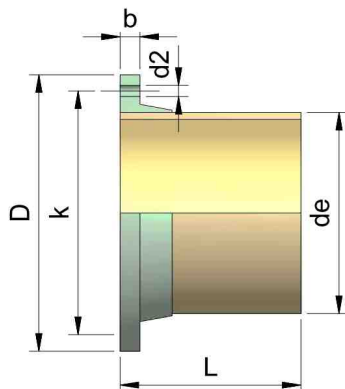
Collar flanges are made from either galvanized steel or GRP. The given flange dimensions are valid up to a nominal pressure of PN 10. The flange drilling complies with DIN 2501 / EN 1092-1, values are for both PN and PN 10 valid.

DN	de [mm]	L [mm]	D [mm]	k [mm]	d4 [mm]	d2 [mm]	n*	Screws	GRP b [mm]	Steel b [mm]
150	168	400	285	240	214	22	8	8 x M20	53	47
200	220	400	340	295	268	22	8	8 x M20	57	49
250	272	400	395	350	320	22	12	12 x M20	62	54
300	324	400	460	400	376	22	12	12 x M20	68	58
350	376	400	520	460	436	22	16	16 x M20	74	64
400	427	400	565	515	487	26	16	16 x M24	82	72
450	478	400	640	565	535	26	20	20 x M24	80	80
500	530	400	670	620	592	26	20	20 x M24	98	86
600	616	400	780	725	693	30	20	20 x M28	112	98
700	718	400	910	840	808	30	24	24 x M28	125	111
800	820	500	1025	950	915	33	24	24 x M30	138	124
900	924	500	1125	1050	1015	33	28	28 x M30	167	147
1000	1026	500	1225	1160	1122	36	28	28 x M33	177	158
1200	1229	500	1484	1380	1339	39	32	32 x M36	180	170

* Number of holes

HOBAS fittings products > PN 10 on request

Fixed Flange GRP PN 6, 10



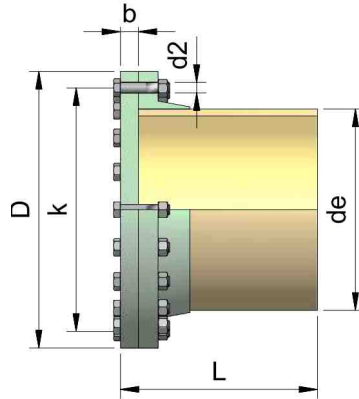
The fixed flange consists of a pipe section with the same pressure class as the pipeline and a affixed flange. The given flange dimensions are valid up to a nominal pressure of PN 10. The flange drilling complies with DIN 2501 / EN 1092-1 for PN 10, values are for both PN and PN 10 valid.

DN	de [mm]	L [mm]	D [mm]	k [mm]	d2 [mm]	n*	Screws	b [mm]
150	168	400	285	240	22	8	8 x M20	23
200	220	400	340	295	22	8	8 x M20	25
250	272	400	395	350	22	12	12 x M20	28
300	324	400	460	400	22	12	12 x M20	32
350	376	400	520	460	22	16	16 x M20	36
400	427	400	565	515	26	16	16 x M24	40
450	478	400	640	565	26	20	20 x M24	44
500	530	400	670	620	26	20	20 x M24	48
600	616	400	780	725	30	20	20 x M28	54
700	718	400	910	840	30	24	24 x M28	61
800	820	500	1025	950	33	24	24 x M30	68
900	924	500	1125	1050	33	28	28 x M30	85
1000	1026	500	1225	1160	36	28	28 x M33	90
1200	1229	500	1484	1380	39	32	32 x M36	95

* Number of screws

HOBAS fittings products > PN 10 on request

Blind Flange GRP/Steel PN 6, 10

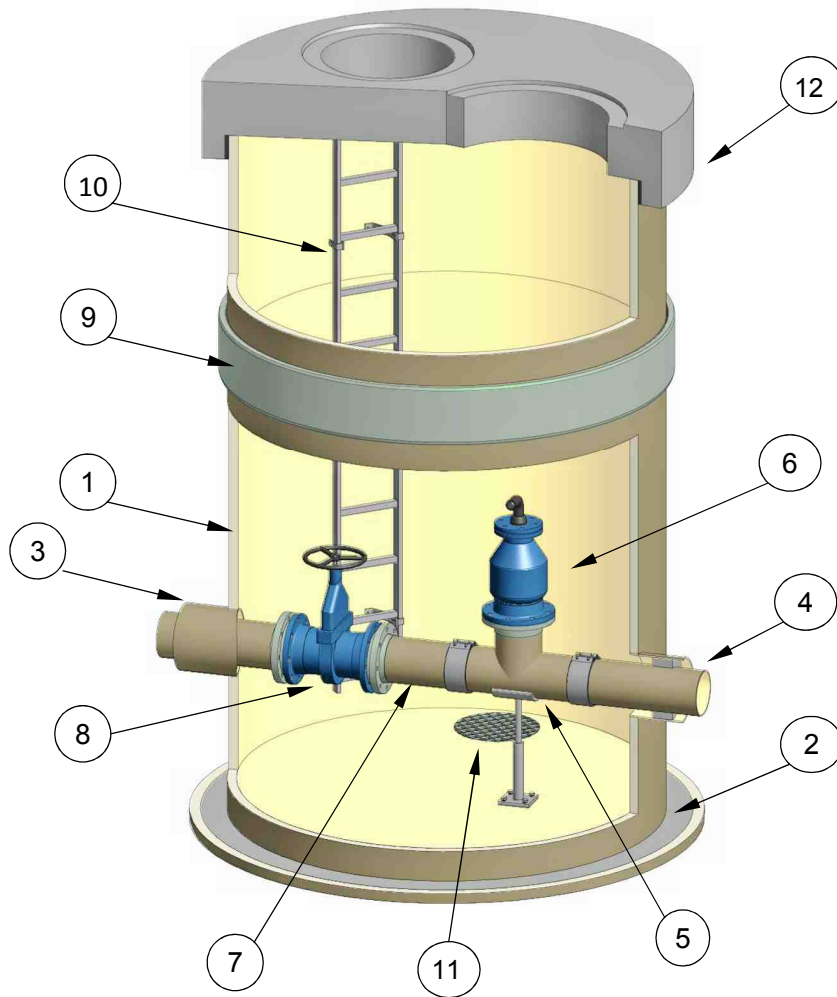


Blind flanges are made from either GRP or galvanized steel. The given flange dimensions are valid up to a nominal pressure of PN 10. The flange drilling complies with DIN 2501 / EN 1092-1 for PN 10, values are for both PN and PN 10 valid.

DN	de [mm]	L [mm]	D [mm]	k [mm]	d2 [mm]	n*	Screws	GRP b [mm]	Steel b [mm]
150	168	400	285	240	22	8	8 x M20	30	22
200	220	400	340	295	22	8	8 x M20	24	24
250	272	400	395	350	22	12	12 x M20	28	26
300	324	400	460	400	22	12	12 x M20	32	26
350	376	400	520	460	22	16	16 x M20	34	26
400	427	400	565	515	26	16	16 x M24	38	26
450	478	400	640	565	26	20	20 x M24	50	28
500	530	400	670	620	26	20	20 x M24	50	30
600	616	400	780	725	30	20	20 x M28	66	34
700	718	400	910	840	30	24	24 x M28	75	38
800	820	500	1025	950	33	24	24 x M30	80	42
900	924	500	1125	1050	33	28	28 x M30	100	48
1000	1026	500	1225	1160	36	28	28 x M33	110	54
1200	1229	500	1484	1380	39	32	32 x M36	120	60

* Number of screws

HOBAS fittings products > PN 10 on request

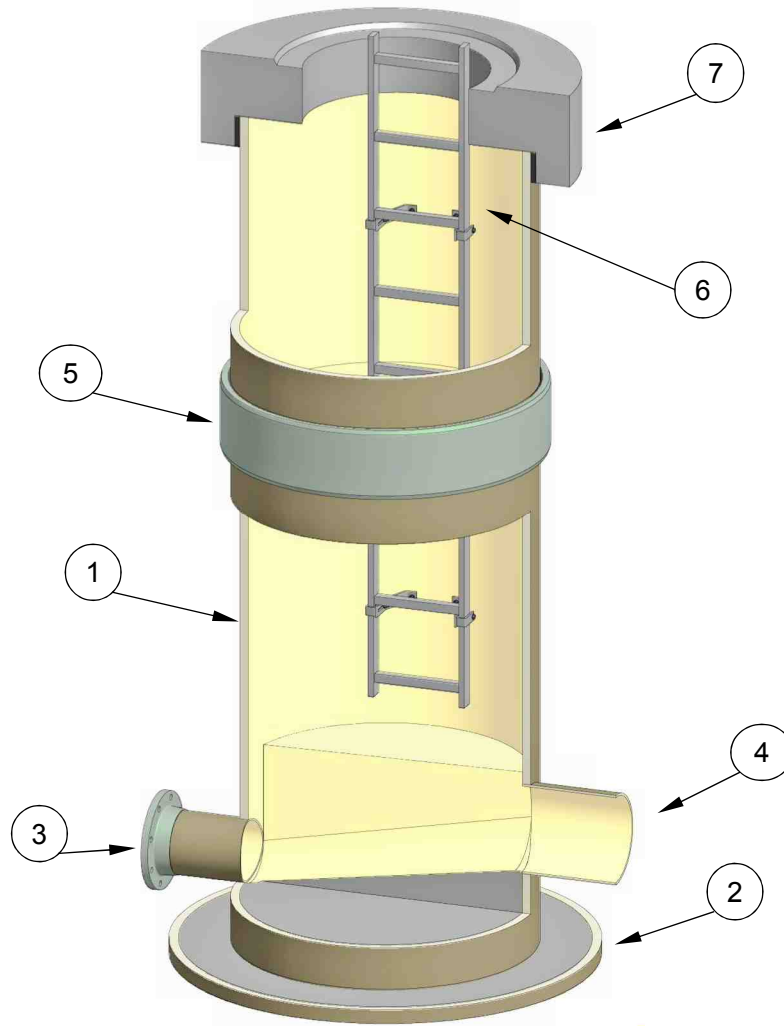


HOBAS Utility Shafts consist of:

1. Pipe shaft
2. Anti-buoyance measure
3. Pipe socket (protective pipe)
4. Pressure pipe
5. Tee (joined with mechanical couplings)
6. Aeration equipment
7. Flanged spigot
8. Slide valve with flanged joints
9. Laminated pipe shaft coupling (on multi-unit design)
10. Ladder
11. Sump well
12. Manhole top

Utility shafts consist of a HOBAS Shaft Pipe, a base plate and a floor channel. The pressure pipe leads through pipe sockets. The annular space is sealed and impermeable to water. Depending on general conditions (manufacture, transportation, installation) the shaft are produced in one or multiple units. Utility shafts are available with or without anti-buoyancy measure.

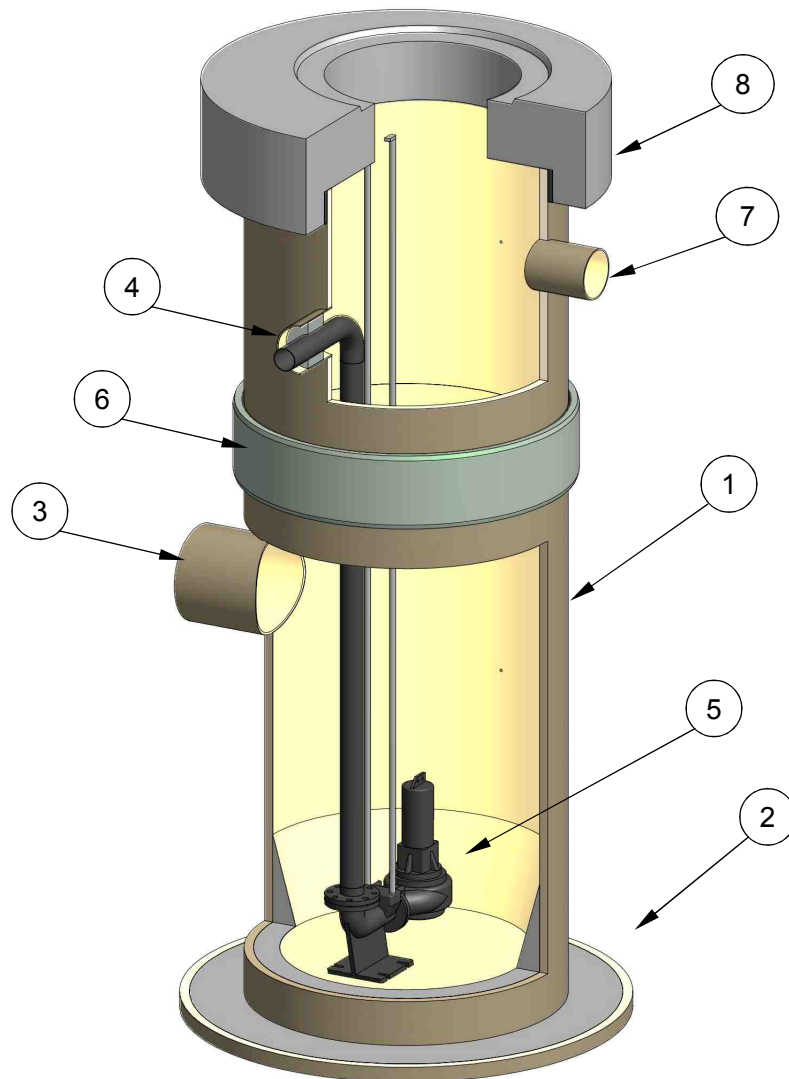
Pressure Relief Shaft



HOBAS Pressure Relief Shaft consisting of:

1. Pipe shaft
2. Anti-buoyancy slab
3. Flanged inlet socket
4. Outlet
5. Laminated pipe shaft coupling (on multi-unit design)
6. Ladder
7. Manhole top

Pressure relief shafts are used for the transition from wastewater pressure pipelines into gravity pipelines. The outlet to the gravity pipeline is designed beneath the crown of the incoming pressure pipe. HOBAS Pressure Relief Pipes have the same properties as HOBAS Standard Shafts. Due to the high corrosion resistance a HOBAS pressure release shaft is the perfect solution.

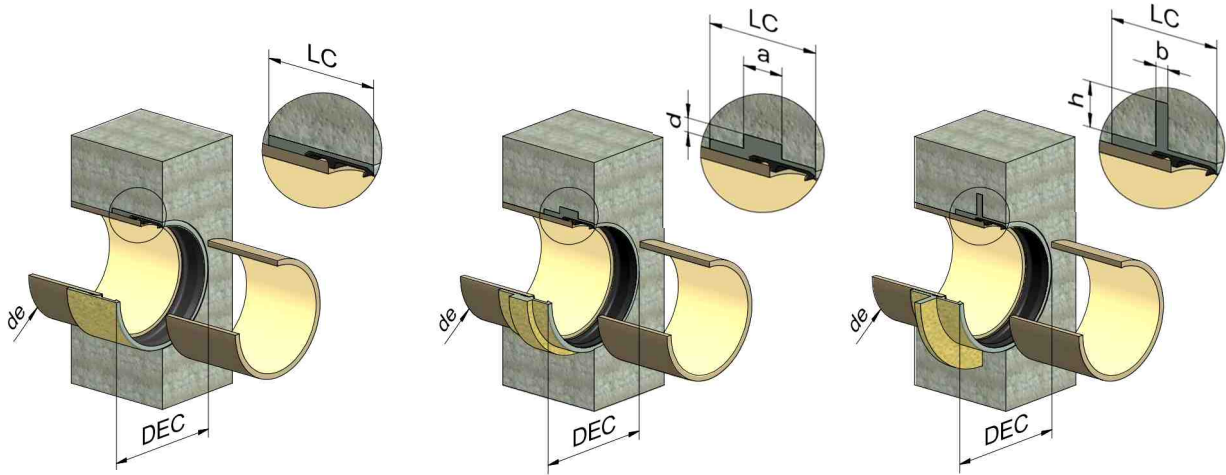


HOBAS Pump Shaft consisting of:

1. Pipe Shaft
2. Anti-buoyancy measure
3. Inlet
4. Conduit with pressure pipeline and sealed annulus
5. Immersion pump
6. Laminated pipe shaft coupling (on multi-unit design)
7. Conduit for steering and supply cable
8. Manhole top

Pump stations are employed to overcome larger differences in altitude. Shafts with immersion pumps represent an application??? Diesen Satz versteh ich auf Deutsch nicht. The size of the pump shaft generally depends on the kind, size and number of pumps as well as the required storage capacity. Gravity pipes transport sewage into the shaft. The inlet lies above the maximal filling level of storage space. The funnel-shaped design provides almost deposit-free service. A conduit for the outgoing pressure pipe, the steering and supply cable can be pre-mounted if required.

Masonry Coupling DN 150 - 1000



Masonry coupling with pipe ring, sand cover (TYPE A)

Masonry coupling with pipe ring, sand cover and thrust ring (TYPE B)

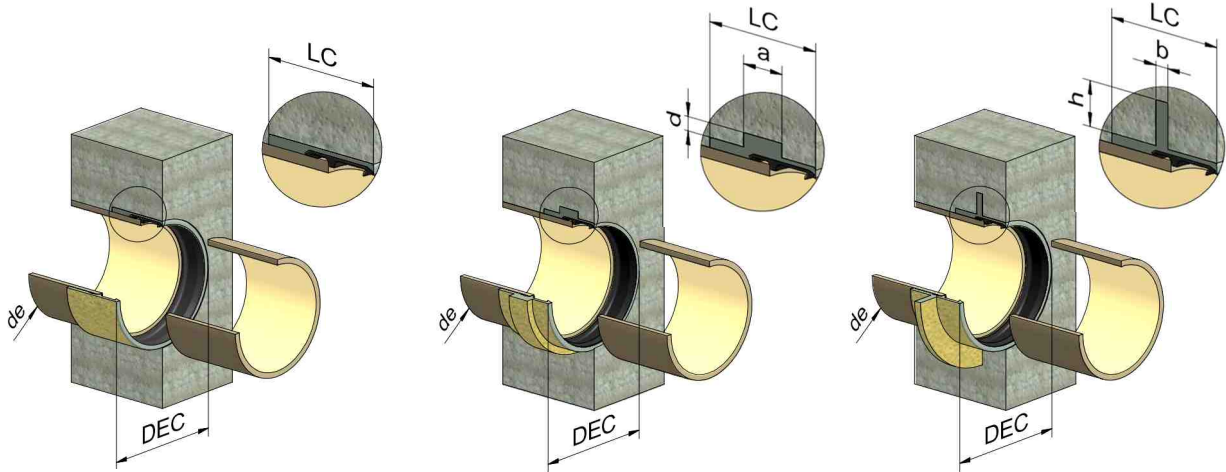
Masonry coupling with pipe ring, sand cover and collar (TYPE C)

Masonry couplings are used to join pipes to concrete manholes or masonry structures. The standard length is 300 mm. Other lengths are available if required, but should not be less than LC.

DN	de [mm]	a [mm]	b [mm]	d [mm]	h [mm]
150	168	50	8	8	80
200	220	50	8	9	80
250	272	50	8	10	80
300	324	50	8	11	80
350	376	50	8	12	80
400	427	50	8	13	80
450	478	50	8	14	80
500	530	50	8	15	80
550	550	50	8	16	80
600	616	50	8	17	80
650	650	50	8	19	80
700	718	50	8	19	80
750	752	50	8	21	80
800	820	80	10	22	80
860	860	80	10	23	80
900	924	80	10	25	80
960	960	80	10	25	100
1000	1026	80	12	27	100

Data for pipe joints (DEC, LC), see datasheet B21 "Standard Pressure Pipe Joints"

Masonry Coupling DN 1100 - 3600



Masonry coupling with pipe ring, sand cover (TYPE A)

Masonry coupling with pipe ring, sand cover and thrust ring (TYPE B)

Masonry coupling with pipe ring, sand cover and collar (TYPE C)

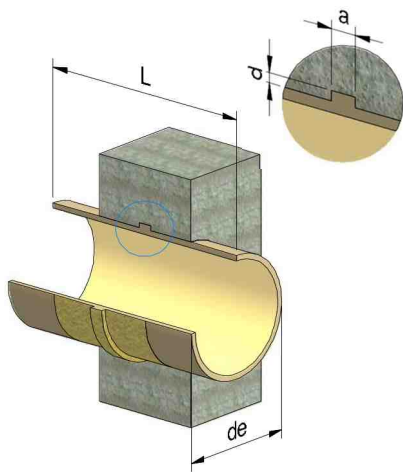
Masonry couplings are used to join pipes to concrete manholes or masonry structures. The standard length is 300 mm. Other lengths are available if required, but should not be less than LC.

DN	de [mm]	a [mm]	b [mm]	d [mm]	h [mm]
1100	1099	80	12	29	100
1200	1229	80	12	30	100
1280	1280	80	12	32	100
1350	1350	80	12	34	100
1400	1434	100	15	35	100
1500	1499	100	15	38	100
1535	1535	100	15	38	100
1600	1638	120	15	39	100
1720	1720	120	20	42	100
1800	1842	120	20	45	120
1940	1940	120	20	46	120
2000	2047	120	20	49	120
2160	2160	120	20	49	120
2200	2250	120	20	50	120
2400	2400	120	20	55	120
2400	2454	120	20	55	120
2555	2555	120	20	67	150
3000**	3000	150	20	67	150
3600	3600	On request			

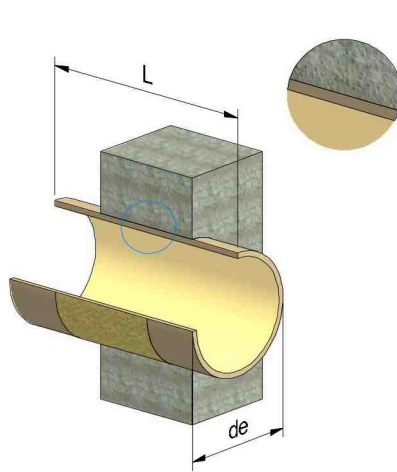
Data for pipe joints (DEC, LC), see datasheet B21 "Standard Pressure Pipe Joints"

** PN 10 on request

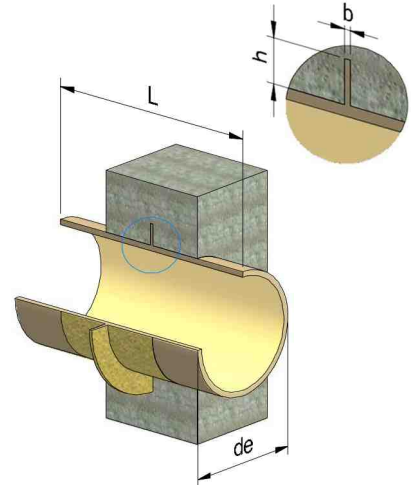
Connection to Building Structures DN 150 - 1000



Structural adapter, sand covered with thrust ring (TYPE E)



Structural adapter, sand covered (TYPE F)

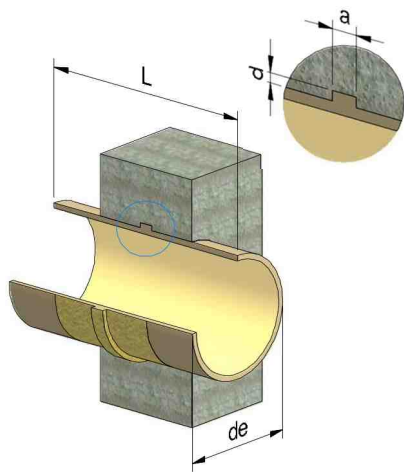


Structural adapter, sand covered with collar (TYPE G)

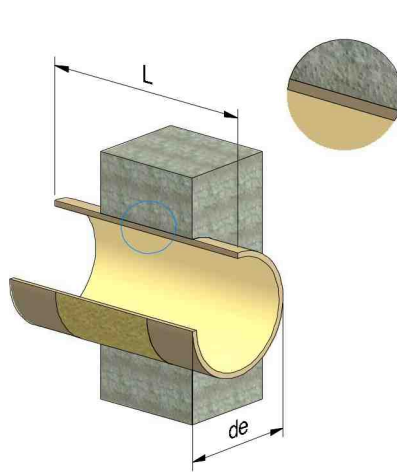
It consists of a modified pipe with sandsurface and can be equipped with a thrust ring or masonry collar if required. Up to DN 1100 the standard length is 0.5 or 1 m; up to DN 1200 it is 0.5 m or 1.5 m according to national standards. Other lengths available on request.

DN	de [mm]	a [mm]	b [mm]	d [mm]	h [mm]	L [mm]
150	168	50	8	8	80	500 / 1000
200	220	50	8	9	80	500 / 1000
250	272	50	8	10	80	500 / 1000
300	324	50	8	11	80	500 / 1000
350	376	50	8	12	80	500 / 1000
400	427	50	8	13	80	500 / 1000
450	478	50	8	14	80	500 / 1000
500	530	50	8	15	80	500 / 1000
550	550	50	8	16	80	500 / 1000
600	616	50	8	17	80	500 / 1000
650	650	50	8	19	80	500 / 1000
700	718	50	8	19	80	500 / 1000
750	752	50	8	21	80	500 / 1000
800	820	80	10	22	80	500 / 1000
860	860	80	10	23	80	500 / 1000
900	924	80	10	25	80	500 / 1000
960	960	80	10	25	100	500 / 1000
1000	1026	80	12	27	100	500 / 1000

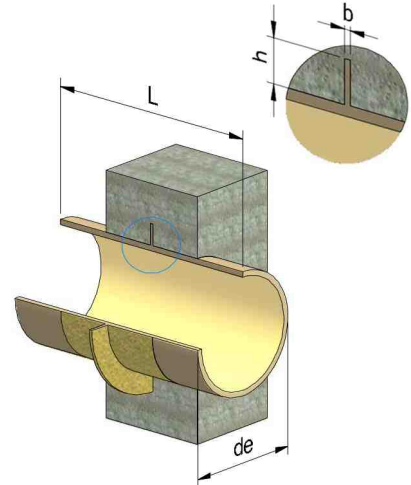
Connection to Building Structures DN 1100 - 3600



Structural adapter, sand covered with thrust ring (TYPE E)



Structural adapter, sand covered (TYPE F)



Structural adapter, sand covered with collar (TYPE G)

It consists of a modified pipe with sand surface and can be equipped with a thrust ring or masonry collar if required. Up to DN 1100 the standard length is 0.5 or 1 m; up to DN 1200 it is 0.5 m or 1.5 m according to national standards. Other lengths available on request.

DN	de [mm]	a [mm]	b [mm]	d [mm]	h [mm]	L [mm]
1100	1099	80	12	29	100	500/ 1500
1200	1229	80	12	30	100	500/ 1500
1280	1280	80	12	32	100	500/ 1500
1350	1350	80	12	34	100	500/ 1500
1400	1434	100	15	35	100	500/ 1500
1500	1499	100	15	38	100	500/ 1500
1535	1535	100	15	38	100	500/ 1500
1600	1638	120	15	39	100	500/ 1500
1720	1720	120	20	42	100	500/ 1500
1800	1842	120	20	45	120	500/ 1500
1940	1940	120	20	46	120	500/ 1500
2000	2047	120	20	49	120	500/ 1500
2160	2160	120	20	49	120	500/ 1500
2200	2250	120	20	50	120	500/ 1500
2400	2400	120	20	55	120	500/ 1500
2400	2454	120	20	55	120	500/ 1500
2555	2555	120	20	67	150	500/ 1500
3000**	3000	120	20	72	150	500/ 1500
3600	3600	On request				

** PN 10 on request

Material Specifications

The laminate structure of HOBAS GRP Pipes may vary, depending on the requirements such as pressure class (PN), stiffness (SN) or longitudinal tensile strength. The material specifications in the table is therefore simply to be regarded as a guideline.

More accurate material specifications for specific pipes on request.

Properties/long-term values:

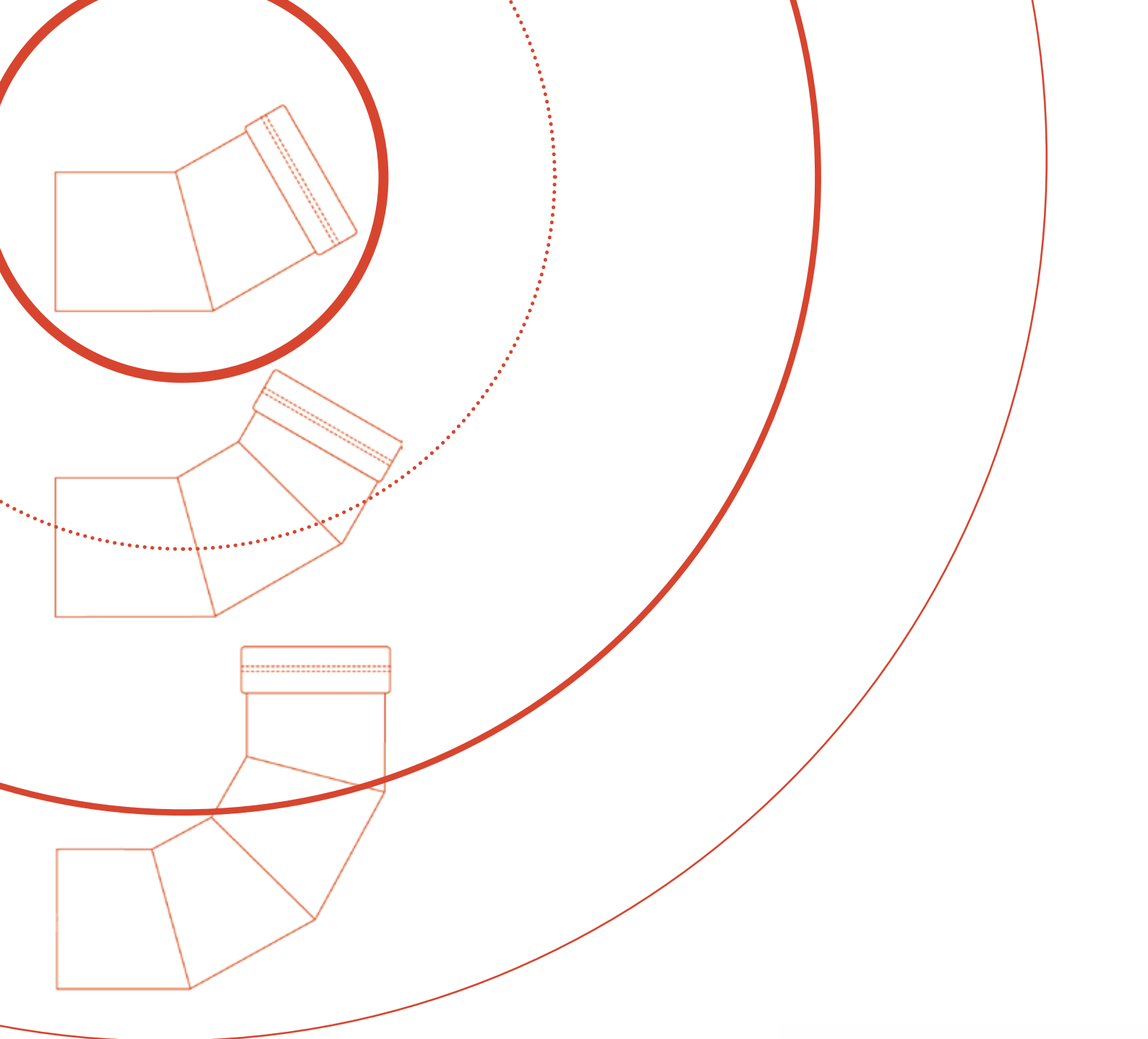
Pipe properties, such as stiffness, ring deflection and longitudinal tensile strength are routinely tested as part of quality control. Geometric properties, such as wall thickness, outside diameter and liner thickness, are measured and checked to internal quality standards.

Test procedures and regulations are defined in the applicable standards. Find out more detailed information about these and other material tests such as abrasion, long-term values, hydraulic properties, chemical resistance, etc. from your HOBAS representative.

Material data	Unit	Orientation	
		Circumferential	Longitudinal
Density	kg/m ³	~ 2000	
Tensile elastic modulus (at 23°C)	MPa	10000 - 15000	10000 - 12000
Tensile strength (standard)	MPa	90 - 130	15 - 40
Tensile strength (locked design)	MPa	200	80 - 100
Tensile strain (at break): < PN 10	%	1.2 - 1.5	0.25
Tensile strain (at break): ≥ PN 10	%	1.8 - 2.0	1.0 - 1.4
Poisson's ratio	-	~ 0.3	~ 0.25
Compressive elastic modulus (at 23°C)	MPa	12000 - 18000	12000 - 18000
Compressive strength	MPa	130 - 140	90 - 100
Compressive strain (at break)	%	1.2 - 1.5	1.8 - 2.0
Flexural modulus	MPa	10000 - 15000	-
Flexural strength	MPa	120 - 140	15 - 40
Flexural strain (at break)	%	1.6 - 2.2	1.0
Circumferential strain at PN	%	0.2 - 0.3	-
Circumferential strain at 1.5 x PN	%	0.3 - 0.4	-
Temperature resistance	°C	≤ 40 *	
Chemical resistance (pH range)	pH	1 - 10 **	
Temperature expansion coefficient	1/K	26 - 30 x 10 ⁻⁶	
Thermal conductivity	W/m/K	0.5 - 1.0	
Heat capacity	kJ/kg/K	1.0 - 1.4	
Pressure wave propagation rate	m/s	~ 450	
Roughness (to Colebrook White) k	mm	0.01 - 0.016	

*Temperature up to 80°C on request

**Higher/lower pH on request



HOBAS Engineering Austria

Pischeldorfer Strasse 128
9020 Klagenfurt | Austria

T +43.463.48 24 24

F +43.463.48 21 21

info@hobas.com

www.hobas.com

HOBAS Group Worldwide

HOBAS manufactures and markets HOBAS GRP Pipe Systems. The HOBAS Network includes HOBAS Production Facilities and Sales Organizations in Europe and throughout the world.

We develop and manufacture HOBAS Products conserving nature's resources and with respect for our environment. Visit our website to find out more about the HOBAS Environmental Policy.

