

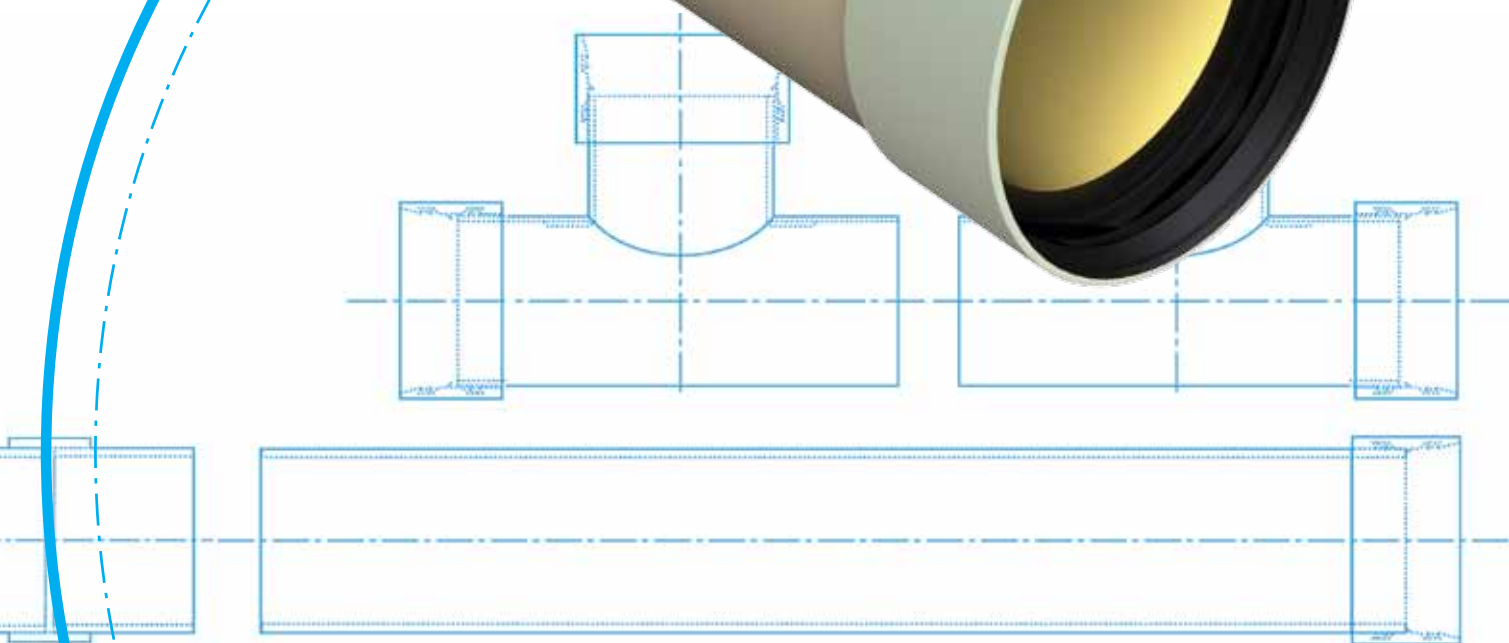
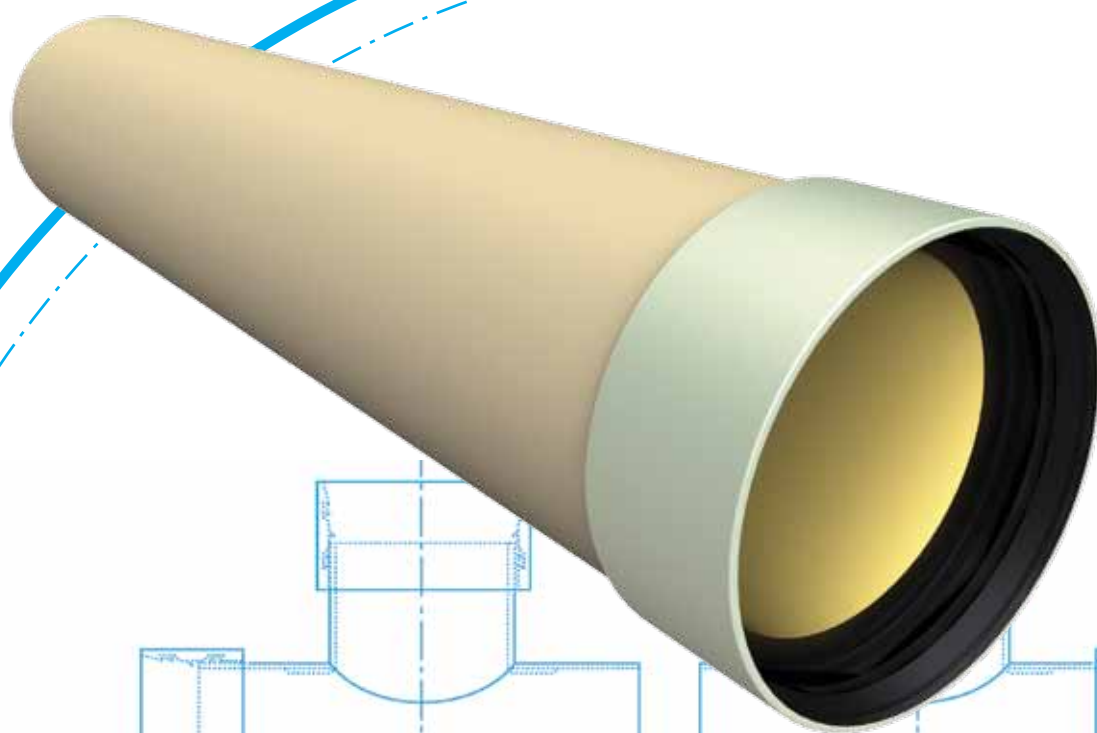


Make things happen. **HOBAS®**

HOBAS®

Technical Product Data

Gravity Pipe Systems PN 1



HOBAS Gravity Pipe Systems

Wide spread field of applications

Sewers, storage systems, hydropower lines, industrial applications and many more: HOBAS Gravity Pipe Systems made of glass fiber reinforced plastic (GRP) are used all around the world in numerous different fields of application. The roots of this composite material's 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:

- Sewer systems
- Relining with circular pipe systems
- Relining with non circular pipe systems
- Jacking
- Industrial pipe systems
- Air pipe systems
- Shafts and manholes
- Bridge lines
- Retention systems
- etc.

Features and advantages:

- Low weight and simple coupling technology decrease installation time
- Homogenous wall structure through patented centrifugal casting process
- High abrasion resistance
- Corrosion resistance
- Little incrustations and sludge deposition
- Very smooth inner surface (roughness ≤ 0.01 mm) and outer surface
- Non-sensitive to frost and high temperatures
- Very low expansion coefficient
- High UV resistance
- High load capacity
- High chemical resistance
- Long lifetime
- Deflection in coupling is possible
- Numerous fittings available including shafts and manholes (seamless)
- Simple handling and shortening on site
- Installation is not dependent on weather conditions
- etc.

Abbreviations:

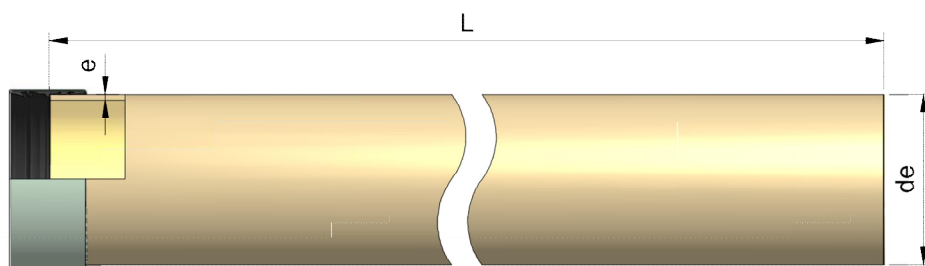
α	Angle (bend, deflection)
B1	de to product standard (EN 1796/EN 14364)
B2	de to GRP and casting standards
B3	de to GRP and PVC standards
B4	de to GRP and steel standards
BL	Pipe length
DC	GRP coupling with sealing rings
de	Pipe external diameter
DEC	Coupling external diameter
DN	Nominal diameter
e	Pipe wall thickness
EPDM	Ethylene propylene diene monomer rubber
FWC	Filament wound GRP coupling with full width EPDM gasket
GRP	Glass fiber reinforced plastic
L	Length
LC	Coupling width
m	Mass
NBR	Nitrile butadiene rubber
PN	Nominal pressure
R	Radius
SN	Nominal stiffness

PIPES	A01	Gravity Pipes DN 150 - 1000
	A01	Gravity Pipes DN 1100 - 3600
	A02	Double Pipes
	A03	Relining Pipes DN 750 - 1500
	A03	Relining Pipes DN 1535 - 3600
	A04	NC Line (extract)
	A05	Jacking Pipes de 272 - 501
	A05	Jacking Pipes de 530 - 752
	A05	Jacking Pipes de 820 - 1099
	A05	Jacking Pipes de 1229 - 1535
	A05	Jacking Pipes de 1638 - 2160
	A05	Jacking Pipes de 2250 - 3600
PIPE JOINTS	B01	Standard Pipe Joints
	B02	Special Couplings
FITTINGS	C01	Bends DN 150 - 1000
	C01	Bends DN 1100 - 3600
	C02	T-Pieces DN 150/150 - 1200/650
	C02	T-Pieces DN 1280/150 - 3600/650
	C02	T-Pieces DN 700/700 - 3600/1600
	C03	Y-Pieces DN 150/150 - 1200/650
	C03	Y-Pieces DN 1280/150 - 3600/650
	C03	Y-Pieces DN 700/700 - 3600/1600
	C04	Glued Saddles DN 200 - 400
	C04	Glued Saddles DN 500 - 1600
	C05	Screwed Saddles DN 300 - 700
	C05	Screwed Saddles DN 700 - 1200
	C06	Reducers
	C07	Loose Flanges GRP / Steel PN 1
	C08	Fixed Flanges GRP PN 1
	C09	Blind Flanges GRP / Steel PN 1
MANHOLES	D01	Standard Manholes DN 1000 - 3600
	D02	Tangential Manholes DN 1000 - 3600
ACCESSORIES	E01	Masonry Couplings DN 150 - 1000
	E01	Masonry Couplings DN 1100 - 3600
	E02	Manhole Liner
	E03	Structural Adapters DN 150 - 1000
	E03	Structural Adapters DN 1100 - 3600
	F01	Material Data

This version replaces all previous versions.

For all current data and values please visit our website www.hobas.com.

Gravity Pipes DN 150 - 1000



The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

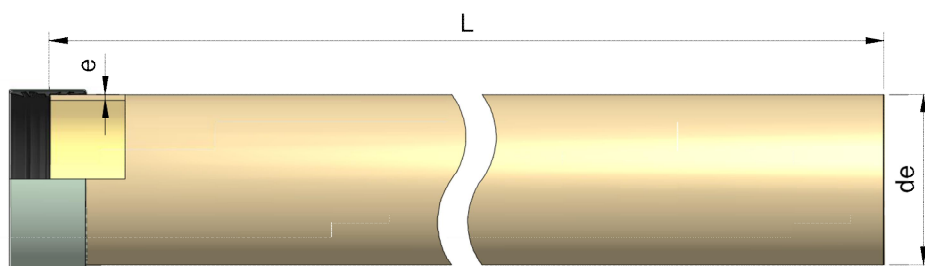
DN	Diameter series	de [mm]	SN 2500		SN 5000		SN 10000		SN 15000		SN 16000		SN 20000	
			m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]	m [kg/m]	e [mm]
150	B2	168					5	5	6	6	6	6	6	6
200	B2	220					8	7	9	7	10	7	10	8
250	B2	272					13	8	14	9	14	9	15	9
300	B2 B4	324					18	9	20	10	20	10	21	11
350	B2	376	15	7	19	8	24	10	26	11	27	12	29	12
400	B3	401	17	7	21	9	26	11	29	12	30	12	32	13
400	B2	427	19	8	24	9	30	11	33	13	34	13	36	14
450	B2	478	22	8	27	9	34	11	38	13	39	13	42	14
500	B3	501	24	8	30	10	37	12	42	13	43	14	46	14
500	B2	530	27	8	33	10	41	12	47	14	48	14	51	15
550	-	550	29	9	36	11	45	13	51	15	52	15	55	16
600	B1	616	36	10	45	12	56	14	63	16	64	17	69	18
650	-	650	40	10	50	12	62	15	70	17	72	17	76	19
700	B1	718	48	11	60	13	75	17	85	19	87	19	93	20
750	-	752	53	11	66	14	82	17	93	19	95	20	102	21
800	B1	820	63	12	78	15	98	19	110	21	113	21	120	23
860	-	860	69	13	86	16	107	19	121	22	124	22	132	24
900	B1	924	79	14	99	17	124	21	139	23	142	24	152	26
960	-	960	86	14	107	18	133	22	150	24	153	25	164	27
1000	B1	1026	98	15	122	19	151	23	171	26	174	26	187	28

Wall thicknesses and masses are guidelines (plus tolerances).

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

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Gravity Pipes DN 1100 - 3600



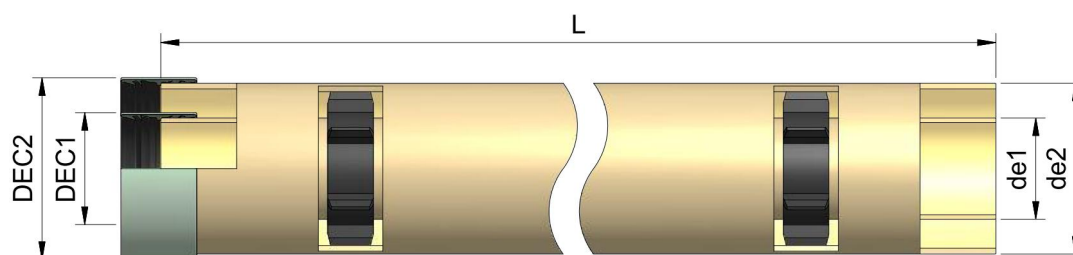
The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

DN	Diameter series	de [mm]	SN 2500		SN 5000		SN 10000		SN 15000		SN 16000		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	112	16	141	20	175	25	196	28	201	28	215	30
1200	B1	1229	140	18	174	22	216	27	244	31	249	31	267	34
1280	-	1280	152	19	189	23	236	28	265	32	270	33	289	35
1348	-	1348	169	20	210	24	262	30	294	34	300	34	321	37
1400	B1	1434	190	21	237	26	294	32	331	36	338	36	362	39
1500	-	1499	208	21	258	27	322	33	362	37	368	38	395	41
1535	-	1535	220	22	274	27	340	34	382	38	389	39	418	42
1600	B1	1638	249	23	312	29	387	36	434	41	443	41	475	44
1720	-	1720	274	25	343	31	425	38	478	42	491	44	522	46
1800	B1	1842	314	26	393	33	487	40	547	45	559	46	599	50
1940	-	1937	346	27	434	34	538	42	609	48	621	49	661	52
2000	B1	2047	386	29	484	36	600	45	675	50	688	51	738	55
2160	-	2160	432	31	539	38	667	47	750	53	765	54	821	58
2200	B1	2250	465	31	584	39	723	49	813	55	836	56	890	60
2400	-	2400	533	34	665	42	823	52	926	59	945	60	1012	64
2400	B1	2453	557	35	694	43	860	53	968	60	987	61	1059	66
2555	-	2555	604	36	752	45	932	55	1048	62	1069	64	1147	68
3000	-	3000	829	42	1033	52	1281	65	1440	73	1469	74	1575	80
3270	-	3270	932	46	1166	58	1472	73	1681	83	1715	85	1846	91
3600	-	3600	1189	50	1485	62	1840	77	2085	88	2127	89	2265	95

Wall thicknesses and masses are guidelines (plus tolerances).

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

Double Pipes



HOBAS Pipes can be used as pipe-in-pipe systems in e.g. water protection areas or applications such as thermally insulated bridge drainage. Possible combinations are shown in the table. For technical details, available designs and recommendations for installation, please contact the HOBAS Application Engineering Department.

The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

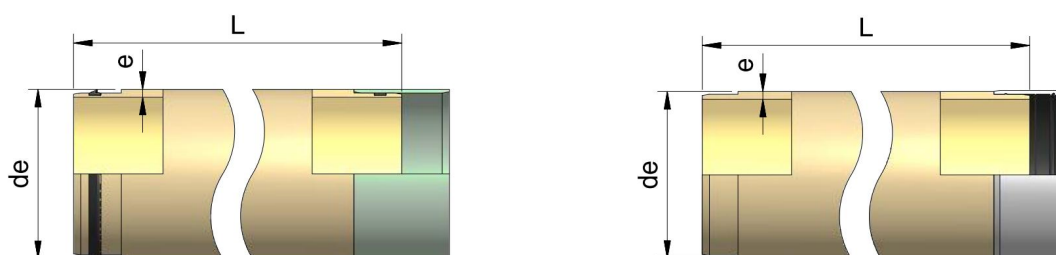
Double Pipe	Medium pipe (SN 10000)		Host pipe (SN 10000)	
	Outside diameter	Coupling outside diameter	Outside diameter	Coupling outside diameter
	de1 [mm]	DEC1 [mm]	de2 [mm]	DEC2 [mm]
200 / 300	220	239	324	343
250 / 350	272	291	376	394
300 / 400	324	343	427	445
350 / 450	376	394	478	496
400 / 500	427	445	530	548
500 / 600	530	548	616	635
600 / 700	616	635	718	736
700 / 800	718	736	820	841
800 / 900	820	841	924	944
900 / 1000	924	944	1026	1047
1000 / 1200	1026	1047	1229	1252
1100 / 1200	1099	1120	1229	1252
1200 / 1400	1229	1252	1434	1459
1280 / 1400	1280	1303	1434	1459
1348 / 1500	1348	1372	1499	1524
1400 / 1600	1434	1459	1638	1664
1500 / 1600	1499	1524	1638	1664
1500 / 1720	1535	1563	1720	1746
1600 / 1800	1638	1664	1842	1870
1720 / 1940	1720	1746	1937	1968
1800 / 2000	1842	1870	2047	2075

Wall thicknesses and weights are guidelines (plus tolerances).

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

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Relining Pipes DN 750 - 1500



Relining pipes are available with flush couplings (GRP or stainless steel). Alternatively, relining pipes are also available as standard pipes with FW Couplings (FWC), see A01. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

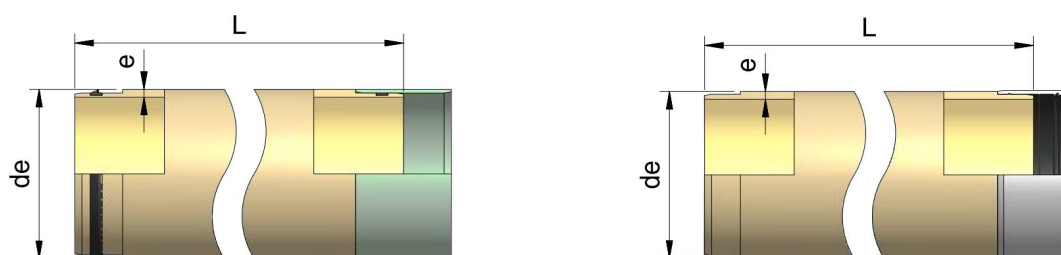
Allowable insertion force for pipes with flush couplings:

DN	de [mm]	Coupling	SN 5000			SN 10000			SN 16000			SN 20000		
			m [kg/m]	e [mm]	F* [kN]	m [kg/m]	e [mm]	F* [kN]	m [kg/m]	e [mm]	F* [kN]	m [kg/m]	e [mm]	F* [kN]
750	752	stainless steel										106	20	1142
800	820	stainless steel										127	21	1428
860	860	stainless steel										139	23	1756
900	924	GRP										161	25	1641
900	924	stainless steel										161	25	2042
960	960	GRP										174	26	1795
960	960	stainless steel										174	26	2265
1000	1026	GRP										193	28	2238
1000	1026	stainless steel							180	23	1938	193	28	2726
1100	1099	GRP							207	27	2097	221	30	2600
1100	1099	stainless steel				185	23	2063	207	27	2740	221	30	3245
1200	1229	GRP							257	30	2709	281	34	3460
1200	1229	stainless steel				224	25	2677	257	30	3625	281	34	4377
1280	1280	GRP							284	32	3117	301	36	3899
1280	1280	stainless steel				242	27	3197	284	32	4183	301	36	4965
1348	1348	GRP							309	34	3600	335	37	4218
1348	1348	stainless steel				273	30	4053	309	34	4882	335	37	5501
1400	1434	GRP				310	32	3238	348	36	4119	376	39	4776
1400	1434	stainless steel	253	26	3383	310	32	4716	348	36	5598	376	39	6256
1500	1499	GRP				334	33	3525	383	38	4675	413	41	5362
1500	1499	stainless steel	275	27	3643	334	33	5037	383	38	6190	413	41	6878

Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable insertion force implies a safety factor of 1.75 of the maximum force calculated.

Relining Pipes DN 1535 - 3600



Relining pipes are available with flush couplings (GRP or stainless steel). Alternatively, relining pipes are also available as standard pipes with FW Couplings (FWC), see A01. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

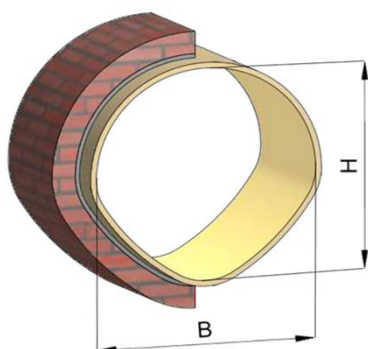
Allowable insertion force for pipes with flush couplings:

DN	de [mm]	Coupling	SN 5000			SN 10000			SN 16000			SN 20000		
			m [kg/m]	e [mm]	F* [kN]	m [kg/m]	e [mm]	F* [kN]	m [kg/m]	e [mm]	F* [kN]	m [kg/m]	e [mm]	F* [kN]
1535	1535	GRP	282	27	2142	353	34	3809	404	39	4990	434	42	5695
1535	1535	stainless steel	282	27	2413	353	34	4083	404	39	5266	434	42	5971
1600	1638	GRP	322	29	2665	398	36	4440	452	41	5698	484	44	6448
1600	1638	stainless steel	322	29	3134	398	36	4910	452	41	6169	484	44	6921
1720	1720	GRP	361	31	2444	441	38	4307	509	44	5890	531	46	6415
1720	1720	stainless steel	361	31	3805	441	38	5668	509	44	7253	531	46	7779
1800	1842	GRP	412	33	3112	498	40	5108	571	46	6807	619	50	7933
1800	1842	stainless steel	412	33	4658	498	40	6657	571	46	8358	619	50	9485
1940	1937	GRP	447	34	2321	550	42	4726	639	49	6814	677	52	7704
1940	1937	stainless steel	447	34	5166	550	42	7572	639	49	9659	677	52	10549
2000	2047	GRP	500	36	4004	622	45	6855	703	51	8742	756	55	9993
2000	2047	stainless steel	500	36	6097	622	45	8951	703	51	10840	756	55	12093
2160	2160	GRP	556	38	4107	685	47	7123	785	54	9443	841	58	10764
2160	2160	stainless steel	556	38	7393	685	47	10405	785	54	12729	841	58	14050
2200	2250	GRP	595	39	4934	745	49	8419	848	56	10840	907	60	12216
2200	2250	stainless steel	595	39	7794	745	49	11283	848	56	13706	907	60	15083
2400	2400	GRP	683	42	6008	842	52	9722	968	60	12669	1031	64	14135
2400	2453	GRP	716	43	6345	879	53	10148	1008	61	13167	1089	66	15043
2555	2555	GRP	780	45	7206	949	55	11165	1101	64	14700	1168	68	16263
3000	3000	GRP	1059	52	6806	1318	65	12850	1495	74	17002	1613	80	19756
3270	3270	GRP	On request											
3600	3600	GRP												

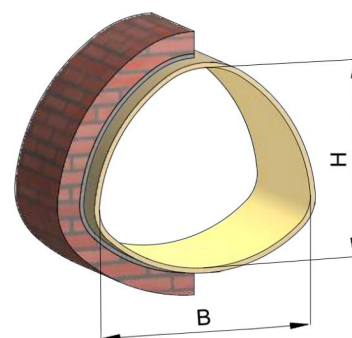
Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable insertion force implies a safety factor of 1.75 of the maximum force calculated.

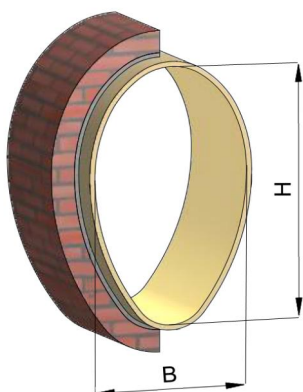
NC Line (extract)



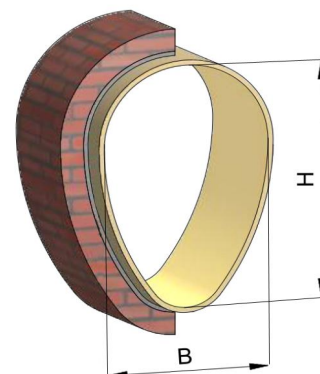
DN B / H	DN _{Th} * [mm]	A [m ²]	BL [m]
1600 / 1600	1600	2,011	3,0
1800 / 1800	1798	2,539	3,0



DN B / H	DN _{Th} * [mm]	A [m ²]	BL [m]
1360 / 1570	1469	1,596	2,0
2680 / 2590	2618	5,170	2,3



DN B / H	DN _{Th} * [mm]	A [m ²]	BL [m]
480 / 800	649	0,290	2,5
510 / 810	672	0,320	2,5
400 / 1000	752	0,310	2,5
750 / 1500	1182	0,920	2,5
1100 / 1400	1271	1,220	3,0
1080 / 1650	1375	1,350	2,5
1600 / 1800	1721	2,310	2,5



DN B / H	DN _{Th} * [mm]	A [m ²]	BL [m]
300 / 500	409	0,120	2,5
400 / 600	505	0,180	2,5
500 / 750	632	0,290	2,5
600 / 900	757	0,410	2,5
680 / 1050	873	0,540	3,0
800 / 1200	1010	0,740	2,5
900 / 1350	1136	0,930	2,5
1000 / 1500	1262	1,150	2,5
1200 / 1800	1515	1,650	3,0
1400 / 2100	1767	2,250	3,0

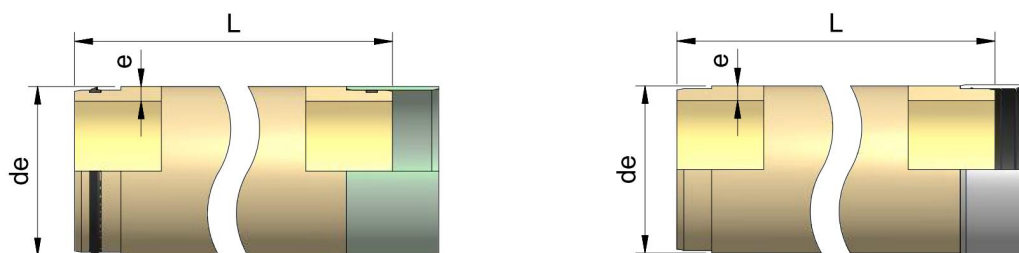
Extract from the range of non-circular cross-sections that can be supplied for rehabilitation and new installations to customer specifications.

Other shapes available on request.

* theoretical diameter

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Jacking Pipes de 272 - 501



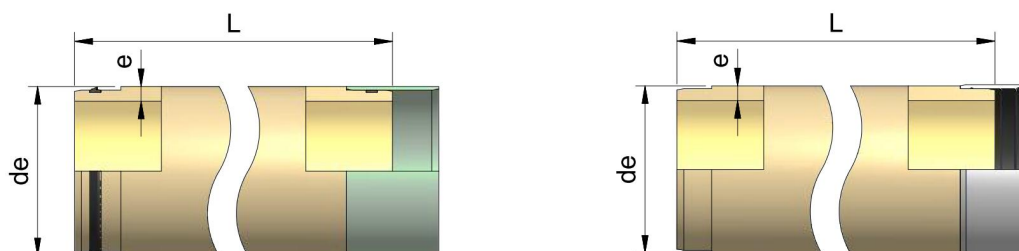
Jacking pipes with flush coupling (GRP or stainless steel), including allowable jacking forces. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

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
272	e [mm]										19	24	
	m [kg/m]										33	41	
	stainless steel F [kN]*										204	297	
324	e [mm]									20	23	28	
	m [kg/m]									42	48	57	
	stainless steel F [kN]*									273	341	452	
376	e [mm]							19	20	23	27	32	
	m [kg/m]							47	49	56	65	76	
	stainless steel F [kN]*							297	324	405	424	638	
401	e [mm]						19	20	21	24	28	34	39
	m [kg/m]						50	53	55	62	72	86	97
	stainless steel F [kN]*						315	344	373	459	572	736	868
	GRP F [kN]*											647	779
427	e [mm]						19	20	21	24	28	34	43
	m [kg/m]						54	56	59	67	77	92	114
	stainless steel F [kN]*						342	373	405	497	618	795	1049
	GRP F [kN]*											696	950
478	e [mm]					21	23	25	27	29	33	41	46
	m [kg/m]					66	72	78	84	90	101	124	137
	stainless steel F [kN]*					449	519	588	657	725	859	1120	1278
	GRP F [kN]*											1015	1173
501	e [mm]				20	22	24	26	28	30	35	43	48
	m [kg/m]				66	73	79	85	91	98	113	136	150
	stainless steel F [kN]*				434	509	582	655	727	798	974	1247	1412
	GRP F [kN]*										864	1137	1302

Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable jacking force (kN) corresponds to a safety factor of 3.5 times the ultimate force calculated. Project-related static calculations can result in differing allowable jacking forces.

Jacking Pipes de 530 - 752



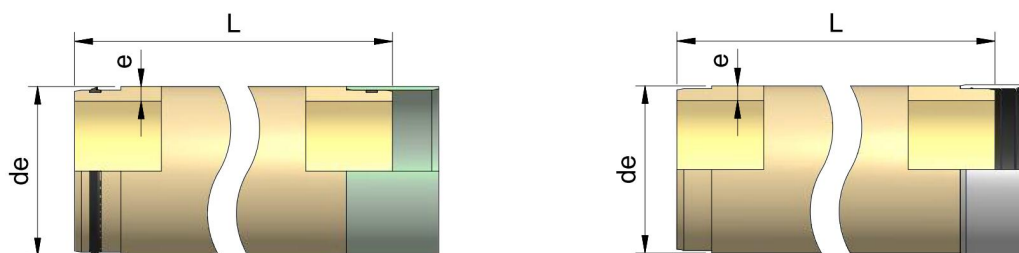
Jacking pipes with flush coupling (GRP or stainless steel), including allowable jacking forces. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

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
530	e [mm]				20	23	24	26	28	31	36	44	51
	m [kg/m]				70	81	84	90	97	107	123	148	169
	stainless steel F [kN]*				459	577	616	694	770	885	1071	1362	1608
	GRP F [kN]*										957	1247	1492
550	e [mm]		20	21	22	24	26	28	30	33	38	47	53
	m [kg/m]		73	75	80	87	94	101	108	118	134	163	182
	stainless steel F [kN]*		484	505	566	648	728	808	888	1006	1199	1537	1755
	GRP F [kN]*									893	1086	1423	1640
616	e [mm]		21	23	25	27	29	32	34	37	43	50	58
	m [kg/m]		86	94	102	110	118	129	137	148	170	196	224
	stainless steel F [kN]*		583	675	767	858	949	1083	1172	1304	1564	1860	2188
	GRP F [kN]*								1040	1172	1432	1727	2055
650	e [mm]	21	24	25	26	28	30	33	35	38	44	54	62
	m [kg/m]	91	104	108	112	120	128	141	149	161	184	222	252
	stainless steel F [kN]*	613	760	809	857	953	1049	1191	1285	1425	1700	2146	2491
	GRP F [kN]*							1055	1148	1288	1563	2008	2352
718	e [mm]	23	25	27	28	30	32	35	40	43	48	59	68
	m [kg/m]	110	120	129	134	143	152	165	187	201	222	269	305
	stainless steel F [kN]*	733	842	949	1003	1109	1215	1373	1633	1787	2040	2583	3012
	GRP F [kN]*						1121	1278	1538	1691	1944	2486	2915
752	e [mm]	24	26	28	30	33	36	39	42	45	51	62	72
	m [kg/m]	121	130	140	150	164	178	192	206	220	247	296	338
	stainless steel F [kN]*	800	913	1026	1138	1305	1470	1634	1797	1958	2276	2843	3342
	GRP F [kN]*					1231	1396	1560	1722	1882	2199	2765	3263

Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable jacking force (kN) corresponds to a safety factor of 3.5 times the ultimate force calculated. Project-related static calculations can result in differing allowable jacking forces.

Jacking Pipes de 820 - 1099



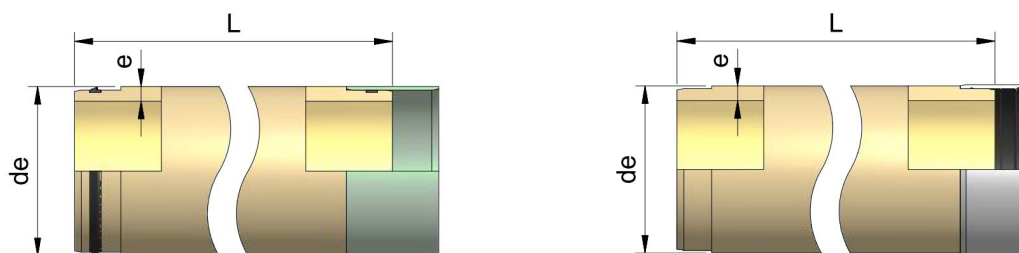
Jacking pipes with flush coupling (GRP or stainless steel), including allowable jacking forces. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

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]	25	27	29	33	35	38	42	45	49	54	67	78
	m [kg/m]	137	148	158	179	190	205	226	241	261	286	349	400
	stainless steel F [kN]*	964	1088	1211	1456	1578	1758	1998	2175	2410	2699	3433	4033
	GRP F [kN]*				1229	1351	1531	1770	1947	2181	2471	3203	3802
860	e [mm]	27	29	31	35	37	40	43	47	51	58	72	
	m [kg/m]	155	166	178	199	210	227	243	264	285	321	392	
	stainless steel F [kN]*	1140	1270	1399	1655	1783	1972	2160	2409	2655	3080	3905	
	GRP F [kN]*				1407	1534	1724	1911	2160	2406	2830	3654	
924	e [mm]	29	32	34	37	40	42	46	50	54	62	77	
	m [kg/m]	179	197	209	227	244	256	279	302	324	369	450	
	stainless steel F [kN]*	1302	1511	1649	1856	2061	2197	2466	2734	2998	3520	4470	
	GRP F [kN]*			1448	1654	1859	1995	2264	2531	2796	3316	4265	
960	e [mm]	31	34	36	39	42	44	48	52	56	64	80	
	m [kg/m]	199	217	230	244	266	278	302	326	350	396	486	
	stainless steel F [kN]*	1497	1714	1857	2072	2284	2425	2706	2983	3258	3801	4854	
	GRP F [kN]*		1478	1621	1836	2048	2189	2469	2746	3021	3563	4615	
1026	e [mm]	34	36	38	41	44	48	52	56	61	68		
	m [kg/m]	233	246	259	279	298	324	350	375	407	450		
	stainless steel F [kN]*	1830	1984	2138	2367	2595	2897	3196	3492	3859	4366		
	GRP F [kN]*	1585	1739	1893	2122	2350	2651	2950	3246	3612	4118		
1099	e [mm]	35	38	41	44	48	51	56	59	64	73		
	m [kg/m]	257	278	300	321	348	369	403	424	457	517		
	stainless steel F [kN]*	2040	2288	2535	2781	3106	3348	3748	3987	4380	5079		
	GRP F [kN]*	1717	1965	2212	2457	2781	3023	3423	3661	4054	4752		

Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable jacking force (kN) corresponds to a safety factor of 3.5 times the ultimate force calculated. Project-related static calculations can result in differing allowable jacking forces.

Jacking Pipes de 1229 - 1535



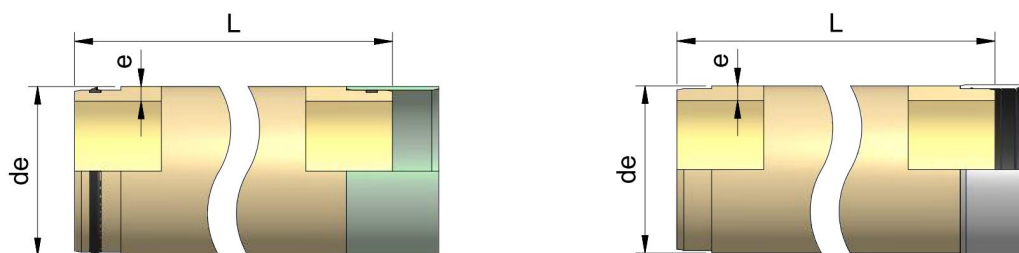
Jacking pipes with flush coupling (GRP or stainless steel), including allowable jacking forces. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

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
1229	e [mm]	40	43	46	49	53	56	61	66	71	81		
	m [kg/m]	328	352	376	399	430	454	492	530	568	642		
	stainless steel F [kN]*	2748	3026	3302	3576	3940	4212	4660	5105	5546	6415		
	GRP F [kN]*	2289	2566	2842	3116	3479	3750	4198	4643	5083	5951		
1280	e [mm]	41	45	47	52	55	59	64	68				
	m [kg/m]	351	384	400	441	465	497	537	569				
	stainless steel F [kN]*	2968	3353	3545	4022	4306	4682	5149	5520				
	GRP F [kN]*	2434	2819	3011	3487	3770	4146	4612	4983				
1348	e [mm]	44	47	50	54	58	62	67	72				
	m [kg/m]	396	422	448	483	517	551	593	635				
	stainless steel F [kN]*	3467	3771	4074	4476	4875	5272	5764	6252				
	GRP F [kN]*	2825	3129	3432	3833	4232	4628	5120	5608				
1434	e [mm]	46	49	52	57	61	65	71	76				
	m [kg/m]	441	469	496	542	578	615	668	713				
	stainless steel F [kN]*	3890	4215	4537	5072	5497	5919	6548	7067				
	GRP F [kN]*	3150	3474	3796	4330	4755	5176	5804	6323				
1499	e [mm]	48	52	56	60	64	68	74	79				
	m [kg/m]	481	520	558	596	634	672	728	775				
	stainless steel F [kN]*	4236	4688	5137	5583	6027	6469	7126	7669				
	GRP F [kN]*	3476	3927	4376	4822	5265	5705	6361	6904				
1535	e [mm]	49	53	57	62	66	70	76	81				
	m [kg/m]	504	544	583	632	671	710	767	815				
	stainless steel F [kN]*	3925	4389	4850	5423	5878	6331	7005	7562				
	GRP F [kN]*	3664	4127	4587	5159	5614	6066	6739	7296				

Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable jacking force (kN) corresponds to a safety factor of 3.5 times the ultimate force calculated. Project-related static calculations can result in differing allowable jacking forces.

Jacking Pipes de 1638 - 2160



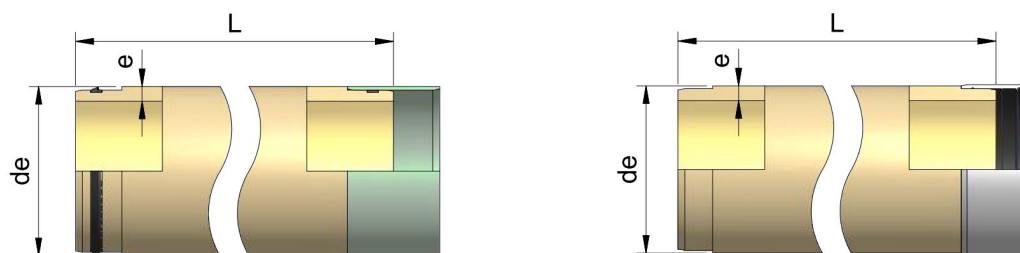
Jacking pipes with flush coupling (GRP or stainless steel), including allowable jacking forces. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

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
1638	e [mm]	52	56	60	65	70	75	81					
	m [kg/m]	569	611	653	706	757	809	870					
	stainless steel F [kN]*	4585	5079	5570	6180	6786	7388	8106					
	GRP F [kN]*	4218	4711	5202	5811	6417	7018	7734					
1720	e [mm]	55	59	64	68	73	78	84					
	m [kg/m]	632	676	731	775	830	884	948					
	stainless steel F [kN]*	5133	5651	6295	6807	7444	8077	8831					
	GRP F [kN]*	4381	4899	5542	6054	6690	7322	8075					
1842	e [mm]	59	63	68	73	78	83						
	m [kg/m]	726	774	833	892	950	1008						
	stainless steel F [kN]*	6074	6630	7320	8007	8689	9368						
	GRP F [kN]*	5224	5779	6469	7154	7836	8513						
1937	e [mm]	62	67	72	77	81	86						
	m [kg/m]	803	866	928	990	1039	1100						
	stainless steel F [kN]*	6824	7554	8281	9003	9578	10293						
	GRP F [kN]*	5325	6055	6781	7503	8078	8793						
2047	e [mm]	65	70	75	81	85							
	m [kg/m]	889	955	1021	1099	1151							
	stainless steel F [kN]*	7682	8453	9221	10136	10743							
	GRP F [kN]*	6549	7319	8086	9000	9606							
2160	e [mm]	69	74	79	85	90							
	m [kg/m]	995	1065	1134	1217	1285							
	stainless steel F [kN]*	8828	9641	10450	11416	12216							
	GRP F [kN]*	7185	8003	8808	9773	10573							

Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable jacking force (kN) corresponds to a safety factor of 3.5 times the ultimate force calculated. Project-related static calculations can result in differing allowable jacking forces.

Jacking Pipes de 2250 - 3600



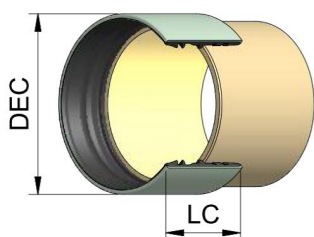
Jacking pipes with flush coupling (GRP or stainless steel), including allowable jacking forces. The standard pipe length is 6 m. Lengths of 1 / 2 / 3 m are available on request.

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
2250	e [mm]	71	76	82	87	94							
	m [kg/m]	1068	1141	1227	1299	1399							
	F [kN]*	9512	10360	11373	12212	13381							
	GRP	F [kN]*	7987	8835	9846	10685	11852						
	2400	e [mm]	76	81	86	93	100						
		m [kg/m]	1218	1295	1372	1480	1586						
		F [kN]*	9251	10154	11053	12304	13548						
2453	e [mm]	80	82	88	95	102							
	m [kg/m]	1312	1344	1438	1548	1657							
	GRP	F [kN]*	10127	10497	11602	12884	14157						
2555	e [mm]	82	85	92	99	106							
	m [kg/m]	1400	1450	1565	1679	1792							
	GRP	F [kN]*	10846	11423	12765	14099	15425						
3000	e [mm]	94	100	108	117	127							
	m [kg/m]	1887	2003	2157	2330	2520							
	GRP	F [kN]*	13068	14425	16226	18240	20462						
3270	e [mm]	102	109	117	127								
	m [kg/m]	2204	2357	2519	2712								
	GRP	F [kN]*	16054	17784	19751	21951							
3600	e [mm]	112	120	128	139								
	m [kg/m]	2700	2910	3090	3310								
	GRP	F [kN]*	20033	22478	24641	27598							

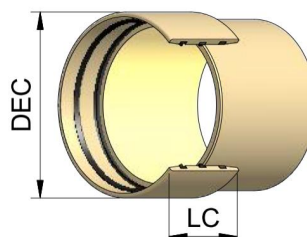
Wall thicknesses and pipe masses are minimum values or guidelines (plus tolerances).

* The allowable jacking force (kN) corresponds to a safety factor of 3.5 times the ultimate force calculated. Project-related static calculations can result in differing allowable jacking forces.

Standard Pipe Joints



FW Coupling



DC Coupling

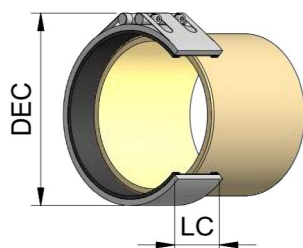
HOBAS Pipes are generally delivered with a pre-mounted coupling. The standard pipe joint is the FW Coupling (FWC), consisting of a GRP sleeve with a permanently fitted, full width EPDM gasket seal (NBR on request). FW Couplings are available for all nominal pressure ratings.

The DC Coupling is used on smaller diameters. It consists of a GRP sleeve with EPDM sealing rings.

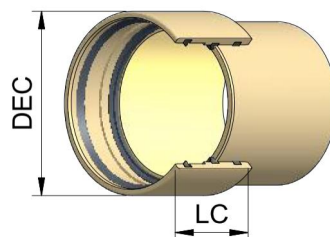
FW Coupling							
DN	de [mm]	LC [mm]	DEC min [mm]	DN	de [mm]	LC [mm]	DEC min [mm]
150	168	173	186	1100	1099	230	1120
200	220	173	239	1200	1229	230	1252
250	272	173	291	1280	1280	230	1303
300	324	173	343	1348	1348	230	1372
350	376	173	394	1400	1434	230	1459
400	401	230	419	1500	1499	310	1524
400	427	230	445	1535	1535	310	1563
450	478	230	496	1600	1638	310	1664
500	501	230	518	1720	1720	310	1746
500	530	230	548	1800	1842	310	1870
550	550	230	568	1940	1937	310	1968
600	616	230	635	2000	2047	310	2075
650	650	230	668	2160	2160	310	2189
700	718	230	736	2200	2250	310	2282
750	752	230	770	2400	2400	310	2431
800	820	230	841	2400	2453	310	2487
860	860	230	880	2555	2555	310	2591
900	924	230	944	3000	3000	350	3050
960	960	230	980	3270	3270	350	3321
1000	1026	230	1047	3600	3600	350	3657

DC Coupling			
DN	de [mm]	LC [mm]	DEC min [mm]
150	168	180	195
200	220	180	250
250	272	180	302
300	324	180	354

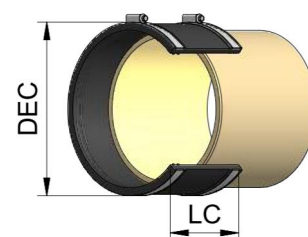
Special Couplings



Mechanical Coupling



Adapter Coupling



Sleeve Coupling

Mechanical Coupling: The mechanical coupling consists of a stainless steel sleeve with a mechanical screw connection and an EPDM gasket seal (NBR on request). Couplings are supplied depending on availability. For project-related dimensions, please consult the HOBAS Application Engineering Department in charge.

Adapter Coupling: The DC Coupling is on one side fitted to the PVC mat. It can therefore be used as GRP/PVC adapter coupling.

DN	de [mm]	LC [mm]	DEC [mm]
150	168	110	190
200	220	110	244
250	272	110	295
300	324	110	348
350	376	140	434
400	401	140	429
400	427	140	485
450	478	140	536
500	501	140	523
500	530	140	588
550	550	140	572
600	616	140	674
650	650	140	678
700	718	140	776
750	752	140	780
800	820	140	878
860	860	140	888
900	924	140	982
960	960	140	988
1000	1026	140	1084
1100	1099	210	1171
1200	1229	210	1301
1280	1280	210	1382
1348	1348	210	1390
1400	1434	210	1536
1500	1499	210	1601
1600	1638	210	1740
1720	1720	210	1822
1800	1842	210	1884

DN	de [mm]	LC [mm]	DEC [mm]
1940	1937	210	1979
2000	2047	210	2149
2160	2160	210	2262
2200	2250	210	2352
2400	2400	210	2502
2400	2453	210	2555
2555	2555	310	2657
3000	3000	310	3101
3270	3270	410	3372
3600	3600	410	3702

Source: Teekay 2013

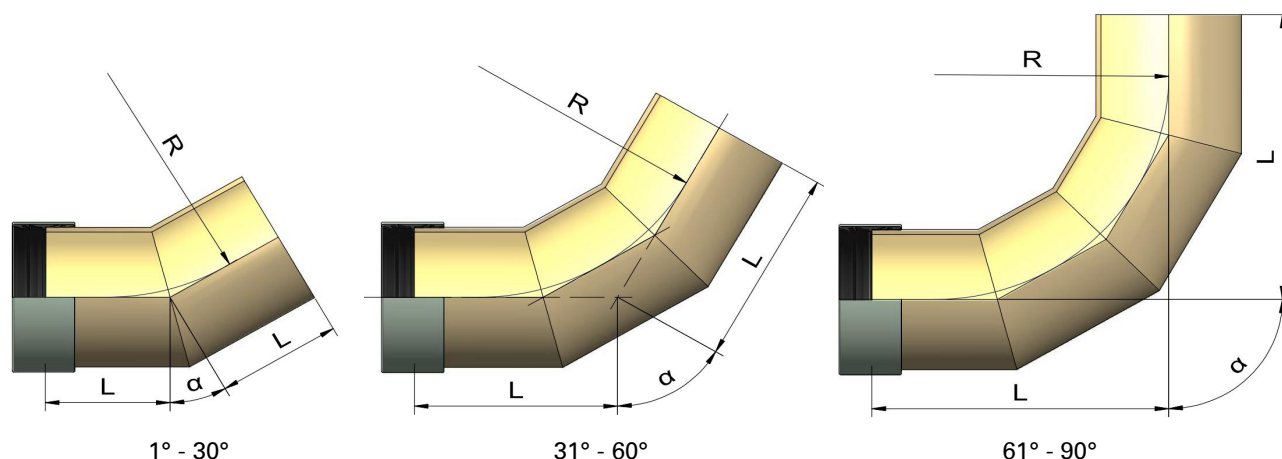
GRP		PVC	LC [mm]
DN	de [mm]	DN	
150	168	150	180
200	220	200	180
250	272	250	180
300	324	300	180

Sleeve Coupling: Coupling system from e.g. FlexSeal for later assembly of gravity pipes. Suitable for connecting different pipe materials.

DN	de [mm]	LC [mm]
150	150-175	120
200	200-225	150
250	250-275	150
300	305-335	185
350	355-385	185
400	405-430	185
500	510-540	185
600	590-620	185

Source: Flexseal 2013

Bends DN 150 - 1000



Installation lengths for bends consisting of segments according to the specified standard classes. The bends can also be supplied in project-related intermediate sizes.

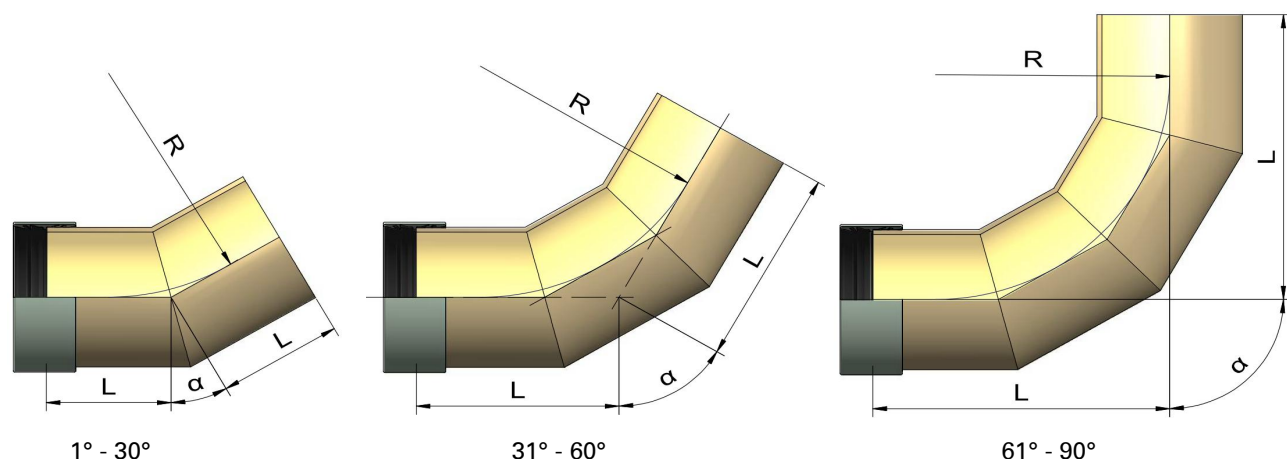
Angle α*:		11,25°		15°		22,5°		30°		45°		60°		90°	
Segments:		2		2		2		2		3		3		4	
DN	de [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]	R [mm]	L [mm]
150	168	380	300	380	300	380	300	380	300	500	350	400	400	400	550
200	220	400	300	400	300	400	300	400	300	500	400	400	400	400	550
250	272	430	300	430	300	430	300	430	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	375	600	375	600	375	600	375	600	450	600	550	600	800
400	427	600	375	675	375	675	375	675	375	700	500	675	575	675	850
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	1475
1000	1026	1270	575	1270	575	1270	575	1270	575	1270	750	1270	925	1270	1475

* For intermediate sizes, the data of the respective next higher standard class apply.

Sizes can be adapted to meet transport requirements. For project-related dimension please consult the HOBAS Application Engineering Department in charge.

Tolerances to HOBAS Product Certificates.

Bends DN 1100 - 3600



Installation lengths for bends consisting of segments according to the specified standard classes. The bends can also be supplied in project-related intermediate sizes.

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	1600
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
1348	1348	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	1937	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
2400	2453	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	2600	2700
3000	3000	3000	1000	3000	1000	3000	1000	3000	1000	3000	1800	3000	2000	3000	3100
3270	3270	3000	1000	3000	1000	3000	1000	3000	1000	3200	1800	3000	2000	3000	3100
3600	3600	3600	1100	3600	1100	3600	1100	3600	1100	3600	1900	3600	2200	3600	3700

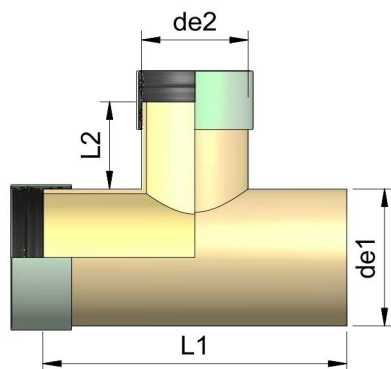
* For intermediate sizes, the data of the respective next higher standard class apply.

Sizes can be adapted to meet transport requirements. For project-related dimension please consult the HOBAS Application Engineering Department in charge.

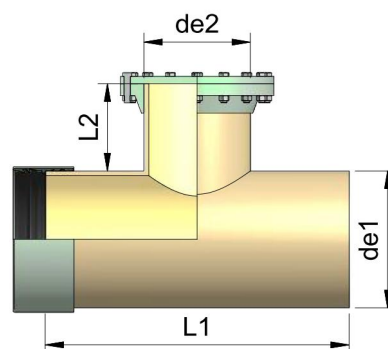
Tolerances to HOBAS Product Certificates.

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T-Pieces DN 150/150 - 1200/650



Tees



Inspection pieces

T-pieces consisting of pipe segments, standard lengths of main pipe and branch, other lengths on request. The branch can be supplied with FW Coupling (FWC), flange coupling or inspection opening.

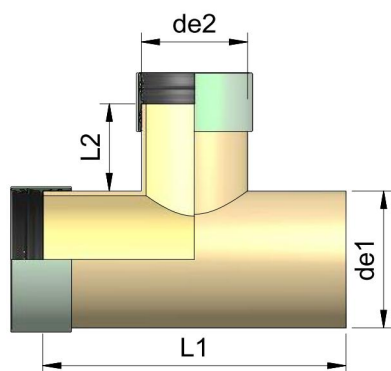
DN 2	150	200	250	300	350	400	400	450	500	500	550	600	650
de2 [mm]	168	220	272	324	376	401	427	478	501	530	550	616	650
L 2 [mm]	250	250	250	250	250	300	300	300	300	300	300	300	300

DN 1	de1 [mm]	L 1 [mm]												
150	168	750												
200	220	750	1000											
250	272	750	1000	1000										
300	324	750	1000	1000	1000									
350	376	750	1000	1000	1000	1000								
400	401	750	1000	1000	1000	1000	1500							
400	427	750	1000	1000	1000	1000	1500	1500						
450	478	1000	1000	1000	1000	1000	1500	1500	1500					
500	501	1000	1000	1000	1000	1000	1500	1500	1500	1500				
500	530	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500			
550	550	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500		
600	616	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	
650	650	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
700	718	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
750	752	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
800	820	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
860	860	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
900	924	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
960	960	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
1000	1026	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
1100	1099	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
1200	1229	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

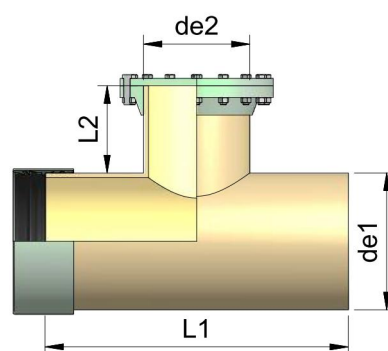
Tolerances to HOBAS Product Certificates.

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T-Pieces DN 1280/150 - 3600/650



Tees



Inspection pieces

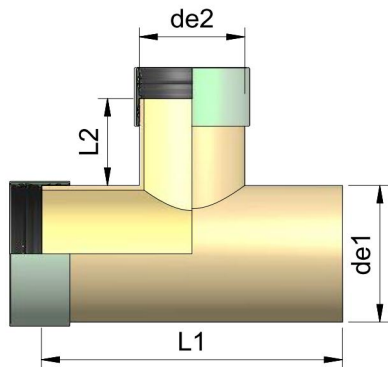
T-pieces consisting of pipe segments, standard lengths of main pipe and branch, other lengths on request. The branch can be supplied with FW Coupling (FWC), flange coupling or inspection opening.

DN 2	150	200	250	300	350	400	400	450	500	500	550	600	650
de2 [mm]	168	220	272	324	376	401	427	478	501	530	550	616	650
L 2 [mm]	250	250	250	250	250	300	300	300	300	300	300	300	300

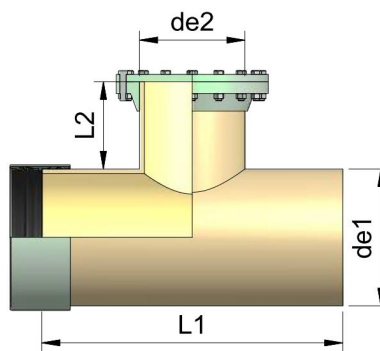
DN 1	de1 [mm]	L 1 [mm]												
1280	1280	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
1348	1348	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
1400	1434	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1500	1499	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1535	1535	1500	1500	1500	1500	2000	2000	2000	2000	2000	2000	2000	2000	2500
1600	1638	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1720	1720	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1800	1842	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1940	1937	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2000	2047	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2160	2160	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2200	2250	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2400	2400	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2400	2453	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2555	2555	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
3000	3000	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
3270	3270	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
3600	3600	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000

Tolerances to HOBAS Product Certificates.

T-Pieces DN 700/700 - 3600/1600



Tees



Inspection pieces

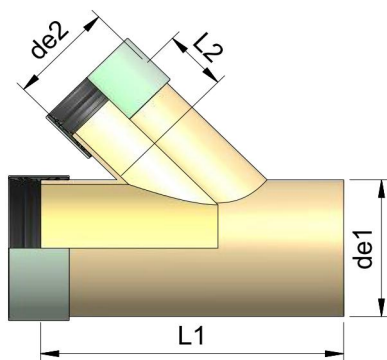
T-pieces consisting of pipe segments, standard lengths of main pipe and branch, other lengths on request. The branch can be supplied with FW Coupling (FWC), flange coupling or inspection opening.

DN 2	700	750	800	860	900	960	1000	1100	1200	1280	1348	1400	1500	1535	1600
de2 [mm]	718	752	820	860	924	960	1026	1099	1229	1280	1348	1434	1499	1535	1638
L 2 [mm]	350	350	350	350	350	350	350	400	400	400	400	400	400	400	450

DN 1	de1 [mm]	L 1 [mm]														
700	718	1500														
750	752	1500	1500													
800	820	1500	1500	1500												
860	860	1500	2000	2000	2000											
900	924	1500	2000	2000	2000	2000										
960	960	1500	2000	2000	2000	2000	2000									
1000	1026	1500	2000	2000	2000	2000	2000	2000								
1100	1099	1500	2000	2000	2000	2000	2000	2000	2000							
1200	1229	1500	2000	2000	2000	2000	2500	2500	2500	3000						
1280	1280	1500	2000	2000	2000	2000	2500	2500	2500	3000	3000					
1348	1348	1500	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000				
1400	1434	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000			
1500	1499	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000		
1535	1535	2500	2500	2500	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	
1600	1638	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
1720	1720	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
1800	1842	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
1940	1937	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2000	2047	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2160	2160	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2200	2250	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2400	2400	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2400	2453	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2555	2555	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
3000	3000	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
3270	3270	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
3600	3600	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000

Tolerances to HOBAS Product Certificates.

Y-Pieces DN 150/150 - 1200/650



Y-pieces consisting of pipe segments, standard lengths of main pipe and branch, other lengths on request. It can be connected to other materials with suitable transition couplings. Standard angles are 45° and 60°, other angles are available on request.

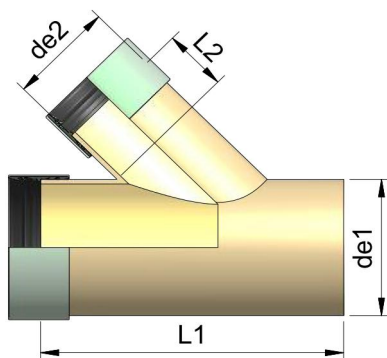
DN 2	150	200	250	300	350	400	400	450	500	500	550	600	650
de2 [mm]	168	220	272	324	376	401	427	478	501	530	550	616	650
L 2 [mm]	250	250	250	250	250	300	300	300	300	300	300	300	300

DN 1	de1 [mm]	L 1 [mm]												
150	168	750												
200	220	750	1000											
250	272	750	1000	1000										
300	324	750	1000	1000	1000									
350	376	750	1000	1000	1000	1000								
400	401	750	1000	1000	1000	1000	1500							
400	427	750	1000	1000	1000	1000	1500	1500						
450	478	1000	1000	1000	1000	1000	1500	1500	1500					
500	501	1000	1000	1000	1000	1000	1500	1500	1500	1500				
500	530	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500			
550	550	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500		
600	616	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	
650	650	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
700	718	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
750	752	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
800	820	1000	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500
860	860	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
900	924	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
960	960	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
1000	1026	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
1100	1099	1000	1000	1000	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500
1200	1229	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

Tolerances to HOBAS Product Certificates

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Y-Pieces DN 1280/150 - 3600/650



Y-pieces consisting of pipe segments, standard lengths of main pipe and branch, other lengths on request. It can be connected to other materials with suitable transition couplings. Standard angles are 45° and 60°, other angles are available on request.

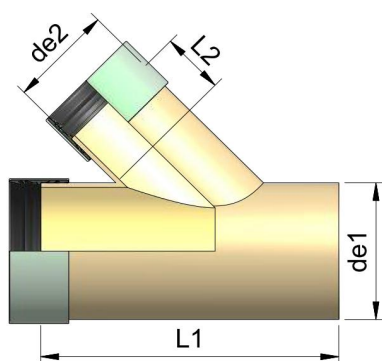
DN 2	150	200	250	300	350	400	400	450	500	500	550	600	650
de2 [mm]	168	220	272	324	376	401	427	478	501	530	550	616	650
L 2 [mm]	250	250	250	250	250	300	300	300	300	300	300	300	300

DN 1	de1 [mm]	L 1 [mm]												
1280	1280	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
1348	1348	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
1400	1434	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1500	1499	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1535	1535	1500	1500	1500	1500	2000	2000	2000	2000	2000	2000	2000	2000	2500
1600	1638	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1720	1720	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1800	1842	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
1940	1937	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2000	2047	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2160	2160	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2200	2250	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2400	2400	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2400	2453	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
2555	2555	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
3000	3000	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
3270	3270	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000
3600	3600	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	2000	2000	2000

Tolerances to HOBAS Product Certificates

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Y-Pieces DN 700/700 - 3600/1600



Y-pieces consisting of pipe segments, standard lengths of main pipe and branch, other lengths on request. It can be connected to other materials with suitable transition couplings. Standard angles are 45° and 60°, other angles are available on request.

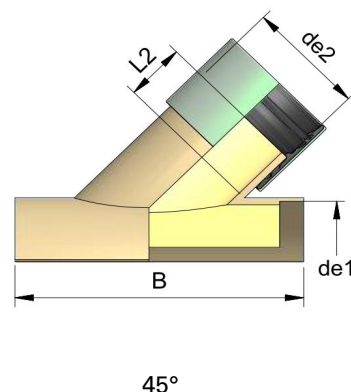
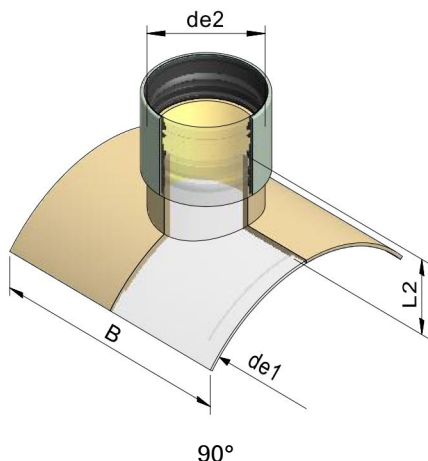
DN 2	700	750	800	860	900	960	1000	1100	1200	1280	1348	1400	1500	1535	1600
de2 [mm]	718	752	820	860	924	960	1026	1099	1229	1280	1348	1434	1499	1535	1638
L 2 [mm]	350	350	350	350	350	350	350	400	400	400	400	400	400	400	450

DN 1	de1 [mm]	L 1 [mm]														
700	718	1500														
750	752	1500	1500													
800	820	1500	1500	1500												
860	860	1500	2000	2000	2000											
900	924	1500	2000	2000	2000	2000										
960	960	1500	2000	2000	2000	2000	2000									
1000	1026	1500	2000	2000	2000	2000	2000	2000								
1100	1099	1500	2000	2000	2000	2000	2000	2000	2000							
1200	1229	1500	2000	2000	2000	2000	2500	2500	2500	3000						
1280	1280	1500	2000	2000	2000	2000	2500	2500	2500	3000	3000					
1348	1348	1500	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000				
1400	1434	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000			
1500	1499	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000		
1535	1535	2500	2500	2500	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	
1600	1638	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
1720	1720	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
1800	1842	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
1940	1937	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2000	2047	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2160	2160	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2200	2250	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2400	2400	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2400	2453	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
2555	2555	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
3000	3000	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
3270	3270	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000
3600	3600	2000	2000	2000	2500	2500	2500	2500	2500	3000	3000	3000	3000	3000	3000	3000

Tolerances to HOBAS Product Certificates

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Glued Saddles DN 200 - 400



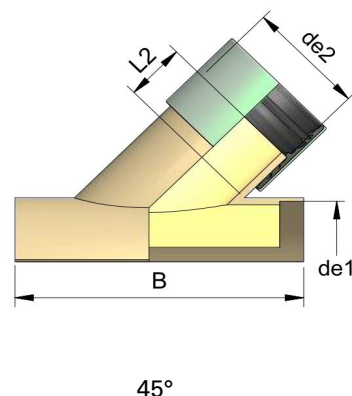
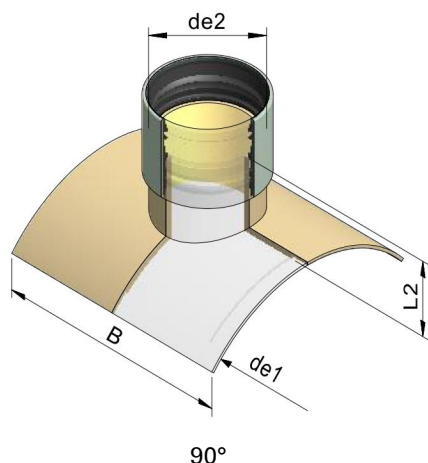
HOBAS supplies glued and screwed saddles for the subsequent connection of sewers. The outlet of glued saddles is generally at an angle of 45° or 90°. On request, saddles are produced for a flush fit on the inside of the pipe. The dimensions can vary depending on national regulations. A transition to other materials is possible.

Main pipe		Outlet	L2 = 250 mm (+/-10)			B (min) [mm]	
DN 1	de1 [mm]	DN 2	de2 [mm]			Outlet	
			GRP	VC*	PVC	45°	90°
200	220	150	168	186	160	470	400
250	272	150	168	186	160	470	400
		200	220		200	520	440
300	324	150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
350	376	150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
		300	324		315	690	560
400	401	150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
		300	324		315	690	560
400	427	150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
		300	324		315	690	560
		350	376		350	730	590

* For DN 150: with GRP sleeve (normal load)

All figures quoted are values and may vary slightly from the finished product due to manufacturing tolerances. The information and recommendations reflect the state of knowledge at the time of publication. They cannot therefore be construed as an express or implied warranty. The details must be checked and, if necessary, agreed in each individual case. HOBAS cannot accept any liability. This also applies to errors, omissions and changes to technical data without notice.

Glued Saddles DN 500 - 1600

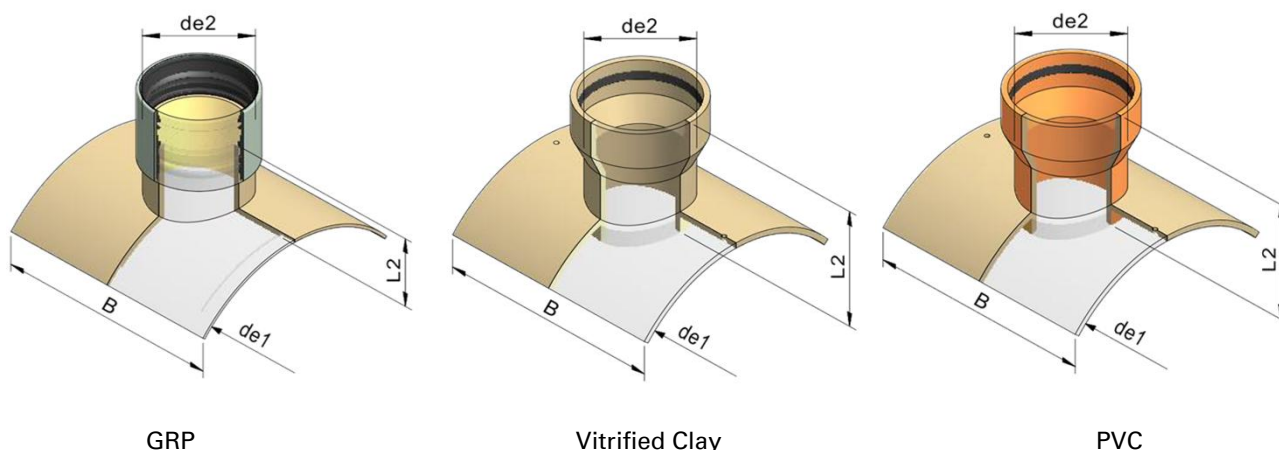


HOBAS supplies glued and screwed saddles for the subsequent connection of sewers. The outlet of glued saddles is generally at an angle of 45° or 90°. On request, saddles are produced for a flush fit on the inside of the pipe. The dimensions can vary depending on national regulations. A transition to other materials is possible.

Main pipe		Outlet	L2 = 250 mm (+/-10)			B (min)	
DN 1	de1 [mm]	DN 2	de2 [mm]			Outlet	
			GRP	VC*	PVC	45°	90°
500	501	150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
		300	324		315	690	560
		350	376		350	730	590
500	530	150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
		300	324		315	690	560
		350	376		350	730	590
550	550	150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
		300	324		315	690	560
		350	376		350	730	590
600-1600	616-1638	400	427		400	810	640
		150	168	186	160	470	400
		200	220	242	200	520	440
		250	272		250	590	490
		300	324		315	690	560
600-1600	616-1638	350	376		350	730	590
		400	427		400	810	640
		500	530		500	950	740

* For DN 150: with GRP sleeve (normal load)

Screwed Saddles DN 300 -700



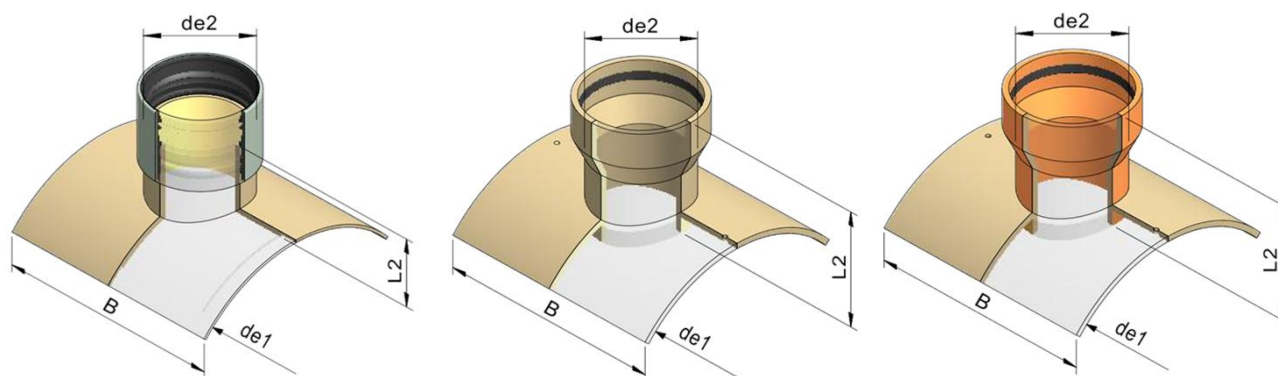
HOBAS supplies glued and screwed saddles for the subsequent connection of sewers. The outlet of screwed saddles is generally realized in an angle of 90°. On request, saddles are produced for a flush fit on the inside of the pipe. The dimensions can vary depending on national regulations. A transition to other materials is possible.

Main pipe		Outlet	de2 [mm]			B (min)	L2 (min)
DN 1	de1 [mm]	DN 2				[mm]	[mm]
			GRP	VC*	PVC		
300	324	150	168	186	160	370	200
350	376	150	168	186	160	370	200
400	401	150	168	186	160	370	200
		200	220		200	420	200
400	427	150	168	186	160	370	200
		200	220		200	420	200
500	501	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
500	530	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
550	550	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
600	616	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250
650	650	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250
700	718	150	168	186	160	370	200

* for DN 150: with GRP sleeve for VC (normal load)

All figures quoted are values and may vary slightly from the finished product due to manufacturing tolerances. The information and recommendations reflect the state of knowledge at the time of publication. They cannot therefore be construed as an express or implied warranty. The details must be checked and, if necessary, agreed in each individual case. HOBAS cannot accept any liability. This also applies to errors, omissions and changes to technical data without notice.

Screwed Saddles DN 700 - 1200



GRP

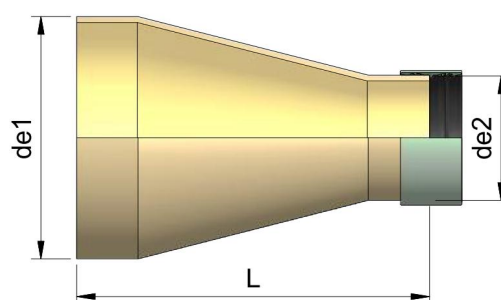
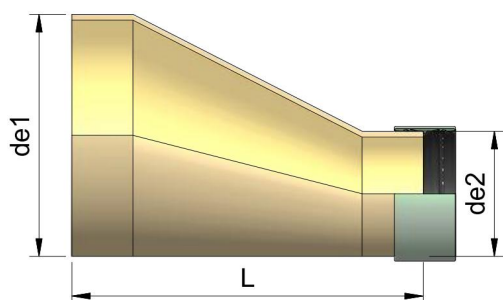
Vitrified Clay

PVC

HOBAS supplies glued and screwed saddles for the subsequent connection of sewers. The outlet of screwed saddles is generally realized in an angle of 90°. On request, saddles are produced for a flush fit on the inside of the pipe. The dimensions can vary depending on national regulations. A transition to other materials is possible.

Main pipe		Outlet	de2 [mm]			B (min)	L2 (min)
DN 1	de1 [mm]	DN 2				[mm]	[mm]
			GRP	VC*	PVC		
700	718	200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250
750	752	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250
800	820	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250
860	860	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250
900	924	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250
960 - 1200	960 - 1229	150	168	186	160	370	200
		200	220		200	420	200
		250	272		250	480	250
		300	324		315	530	250

* for DN 150: with GRP sleeve for VC (normal load)

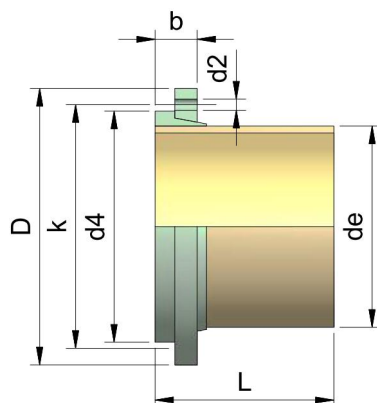


Lengths for concentric and eccentric reducers. Project-related dimensions are to be coordinated with the HOBAS Application Engineering Department in charge.

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	1300	960	1500	924	1500
1280	1229	1100	1099	1300	1026	1500	960	1750
1348	1280	1100	1229	1300	1099	1500	1026	1750
1434	1348	1100	1280	1300	1229	1500	1099	1750
1499	1434	1100	1348	1300	1280	1500	1229	1750
1535	1499	1100	1434	1300	1348	1500	1280	1750
1638	1535	1200	1499	1300	1434	1500	1348	1750
1720	1638	1200	1535	1500	1499	1500	1434	1750
1842	1720	1200	1638	1500	1535	1750	1499	1750
1937	1842	1200	1720	1500	1638	1750	1535	2000
2047	1937	1200	1842	1500	1720	1750	1638	2000
2160	2047	1200	1937	1500	1842	1750	1720	2250
2250	2160	1500	2047	1500	1937	2000	1842	2250
2400	2250	1500	2160	1750	2047	2000	1937	2250
2453	2400	1500	2250	1750	2160	2000	2047	2250
2555	2453	1500	2400	1750	2250	2000	2160	2250
3000	2555	2100	2453	2500	2400	2500	2250	3000
3270	3000	On request						
3600	3270							

All figures quoted are values and may vary slightly from the finished product due to manufacturing tolerances. The information and recommendations reflect the state of knowledge at the time of publication. They cannot therefore be construed as an express or implied warranty. The details must be checked and, if necessary, agreed in each individual case. HOBAS cannot accept any liability. This also applies to errors, omissions and changes to technical data without notice.

Loose Flanges GRP / Steel PN 1



Flanges are made of either galvanized steel or GRP. The flange drilling complies with EN 1092-1 for PN 10. The required nominal pressure class must be indicated when placing an order.

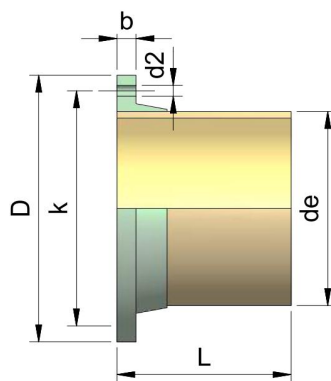
DN	de [mm]	L [mm]	k [mm]	d4 [mm]	d2 [mm]	Screws	GRP		Steel		
							b [mm]	D [mm]	Galvanized steel *	Stainless steel	D [mm]
									b [mm]	b [mm]	
150	168	400	240	214	22	8 x M20	53	285	47	35	285
200	220	400	295	268	22	8 x M20	57	340	49	37	340
250	272	400	350	320	22	12 x M20	62	395	54	43	395
300	324	400	400	376	22	12 x M20	68	460	58	47	445
350	376	400	460	436	22	16 x M20	74	520	64	51	505
400	427	400	515	487	26	16 x M24	82	585	72	55	565
450	478	400	565	535	26	20 x M24	94	640	80	59	615
500	530	400	620	592	26	20 x M24	63	670	66	48	670
600	616	400	725	693	30	20 x M27	72	780	76	54	780
700	718	400	840	808	30	24 x M27	80	910	86	61	895
800	820	500	950	915	33	24 x M30	83	1025	94	68	1015
900	924	500	1050	1015	33	28 x M30	85	1125	102	70	1115
1000	1026	500	1160	1122	36	28 x M33	93	1255	115	80	1230
1200	1229	500	1380	1339	39	32 x M36	95	1484	128	95	1455
1400	1434	500	1590	1535	42	36 x M39	120	1685	-	-	1675

> DN 1400 on request

For project-related dimensions and torque settings please consult the HOBAS Application Engineering Department in charge.

* Flange ring based on EN 1092-1 up to DN 600, then according to HOBAS Specifications.

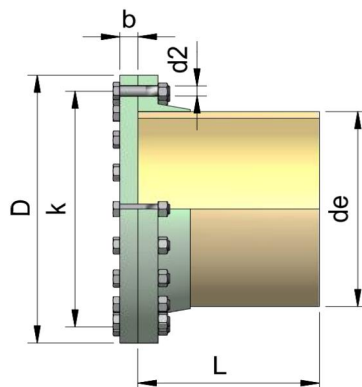
Fixed Flanges GRP PN 1



The fixed flange consists of a piece of pipe with the same pressure class as of the pipeline and a permanently fixed collar. The flange drilling complies with EN 1092-1 for PN 10. The required nominal pressure class must be indicated when placing an order.

DN	de [mm]	L [mm]	D [mm]	k [mm]	d2 [mm]	Screws	b [mm]
150	168	400	285	240	22	8 x M20	23
200	220	400	340	295	22	8 x M20	25
250	272	400	395	350	22	12 x M20	28
300	324	400	445	400	22	12 x M20	32
350	376	400	505	460	22	16 x M20	36
400	427	400	565	515	26	16 x M24	40
450	478	400	640	565	26	20 x M24	44
500	530	400	670	620	26	20 x M24	28
600	616	400	780	725	30	20 x M27	34
700	718	400	895	840	30	24 x M27	36
800	820	500	1015	950	33	24 x M30	38
900	924	500	1115	1050	33	28 x M30	40
1000	1026	500	1230	1160	36	28 x M33	45
1200	1229	500	1484	1380	39	32 x M36	55
1400	1434	500	1685	1590	42	36 x M39	60
1600	1638	500	1930	1820	48	40 x M45	70
1800	1842	500	2130	2020	48	44 x M45	75
2000	2047	500	2345	2230	48	48 x M45	80
2200	2250	500	2555	2440	56	52 x M53	90
2400	2400	500	2760	2650	56	56 x M53	95

Blind Flanges GRP / Steel PN 1



Blind flanges are made of either steel or GRP. The flange drilling complies to EN 1092-1 for PN 10. The required nominal pressure class must be indicated when placing an order.

The image above shows a blind cover in combination with a fixed flange (C08). Combinations with loose flanges (C07) are also possible.

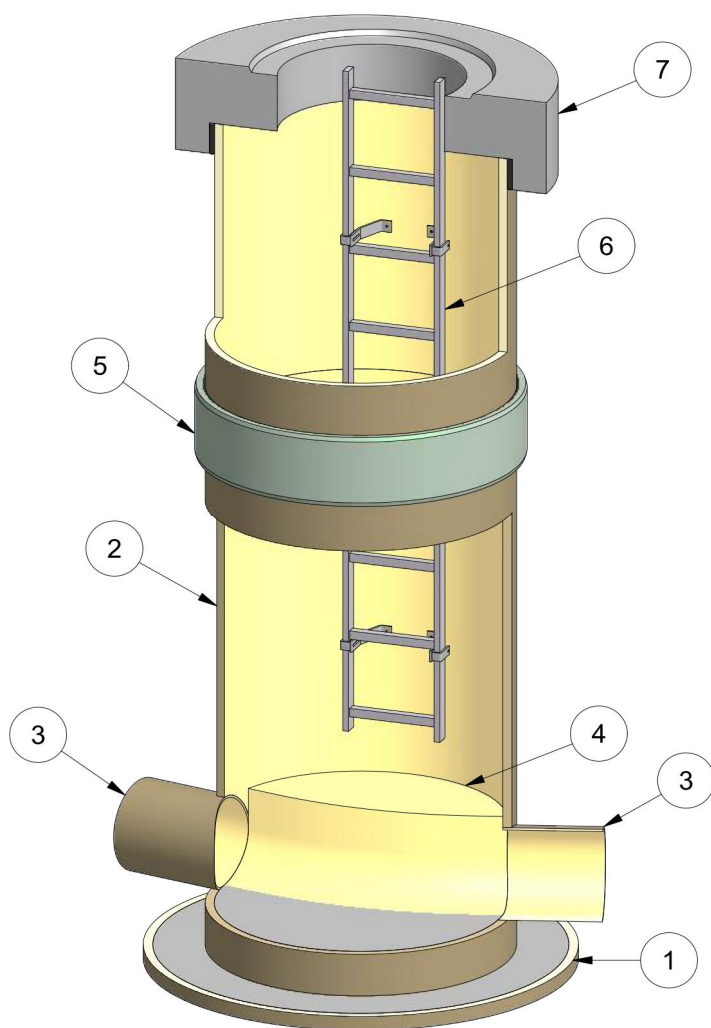
DN	de [mm]	L [mm]	k [mm]	d2 [mm]	Screws	GRP		Steel		
						b [mm]	D [mm]	Galvanized steel *	Stainless steel	D [mm]
								b [mm]	b [mm]	
150	168	400	240	22	8 x M20	30	285	22	12	285
200	220	400	295	22	8 x M20	24	350	24	12	340
250	272	400	350	22	12 x M20	28	395	26	15	395
300	324	400	400	22	12 x M20	32	445	26	15	445
350	376	400	460	22	16 x M20	34	505	26	15	505
400	427	400	515	26	16 x M24	24	565	26	15	565
450	478	400	565	26	20 x M24	28	640	28	15	615
500	530	400	620	26	20 x M24	28	670	28	15	670
600	616	400	725	30	20 x M27	34	780	34	20	780
700	718	400	840	30	24 x M27	38	910	40	25	895
800	820	500	950	33	24 x M30	44	1025	44	25	1015
900	924	500	1050	33	28 x M30	50	1125	48	25	1115
1000	1026	500	1160	36	28 x M33	55	1255	52	30	1230
1200	1229	500	1380	39	32 x M36	60	1484	60	30	1455

> DN 1200 on request

For project-related dimensions and torque settings please consult the HOBAS Application Engineering Department in charge.

* Flange cover based on EN 1092-1 up to DN 600, then according to HOBAS Specifications.

Standard Manholes DN 1000 - 3600



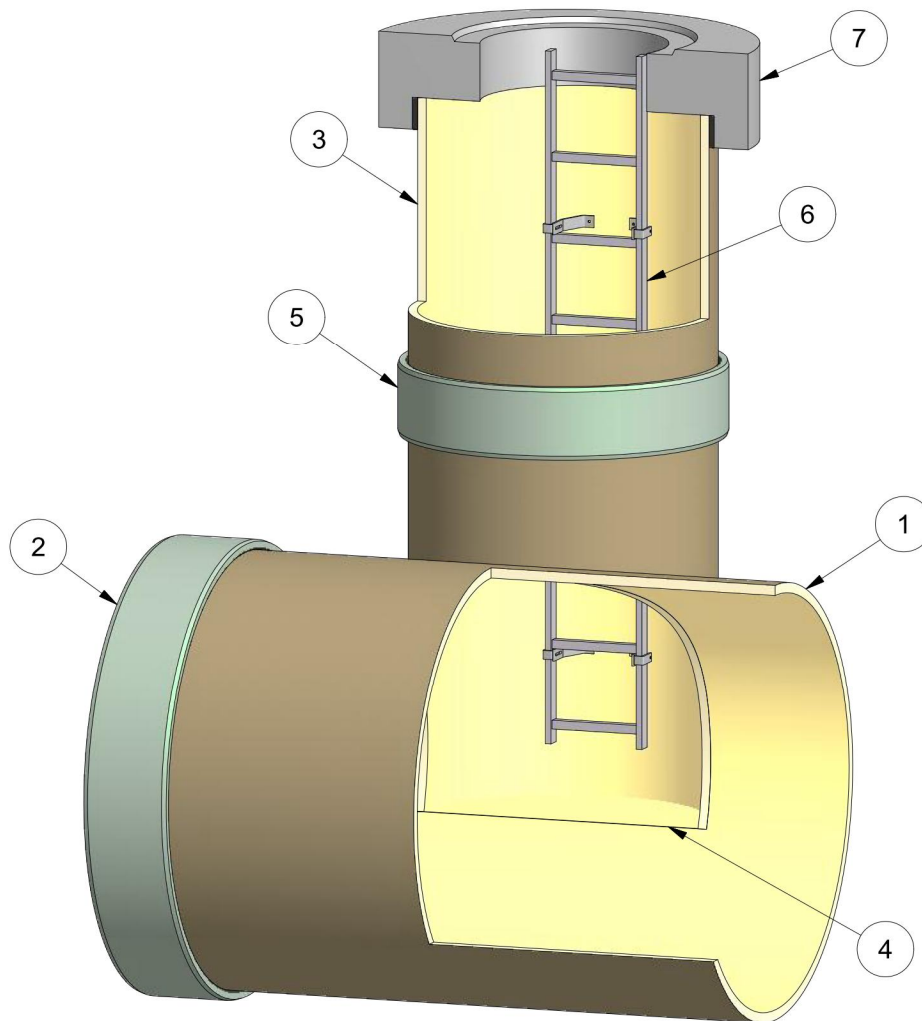
DN	Outlet [mm]
1000	150 - 500
1100	150 - 500
1200	150 - 600
1400	150 - 800
1500	150 - 900
1600	150 - 1100
1720	150 - 1200
1800	150 - 1200
2000	150 - 1600
2200	150 - 1700
2400	150 - 2000
2555	150 - 2000
3000	150 - 2400
3600	150 - 2400

Standard Manhole consisting of:

- 1 Anti-buoyancy measure (either as GRP base plate or laminated concrete upturn)
- 2 Shaft pipe
- 3 Connecting branch
- 4 Berm (depending on national circumstances on site or pre-mounted)
- 5 Coupling on shaft pipe (for design in several parts)
- 6 Ladder
- 7 Manhole cover (accessories on request)

The HOBAS Standard Manhole is made of GRP and is hence corrosion resistant on both the inside and outside. It consists of a HOBAS Pipe with a suitably designed channel.

Tangential Manholes DN 1000 - 3600

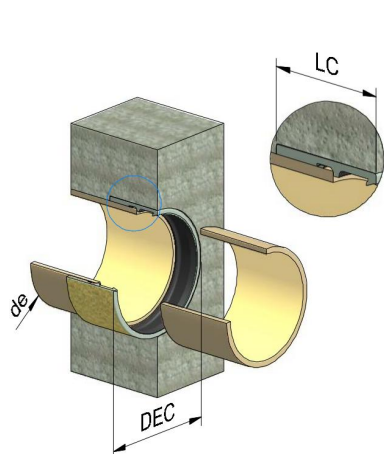


Tangential Manhole consisting of:

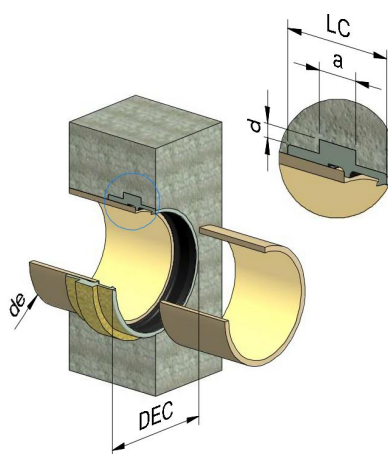
- 1 Main pipe (from DN 800)
- 2 Coupling on main pipe
- 3 Shaft pipe (Standard DN 1000 or DN 1200)
- 4 Berm (sanded)
- 5 Coupling on manhole pipe (for design in several parts)
- 6 Ladder
- 7 Manhole cover (accessories on request)

The HOBAS Tangential Manhole consists of GRP and is corrosion resistant on both the inside and outside. To prevent excessive loads on the laminates at the joints between the actual manhole and pipe, HOBAS Tangential Manholes are generally cast in concrete.

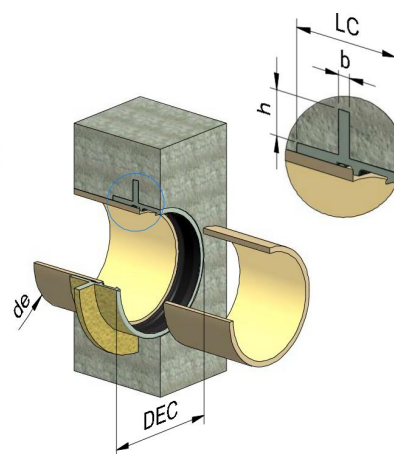
Masonry Couplings DN 150 - 1000



Masonry coupling, sanded, with pipe ring, optionally with sealing tape (TYPE A)



Masonry coupling, sanded, with pipe ring and thrust ring, optionally with sealing tape (TYPE B)

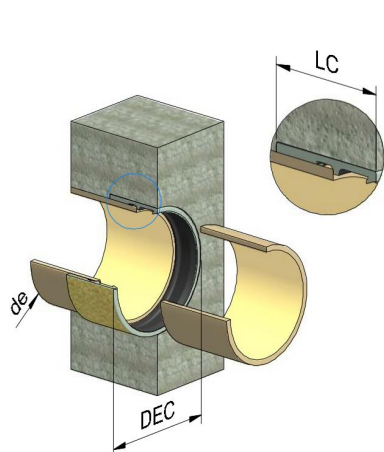


Masonry coupling, sanded, with pipe ring and collar, optionally with sealing tape (TYPE C)

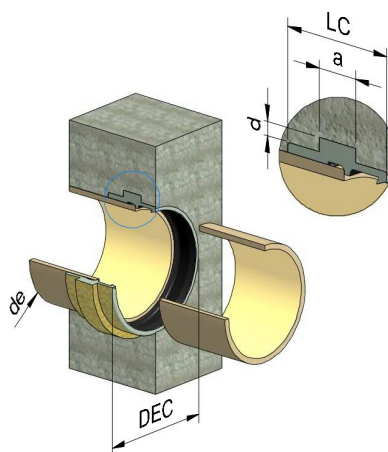
The masonry coupling is used for joining pipes to concrete shafts and walls. Lengths can be selected as required in consideration of the pipe joint data. For data of pipe joints (DEC, LC) see datasheet B01.

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	401	50	8	13	80
400	427	50	8	13	80
450	478	50	8	14	80
500	501	50	8	15	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

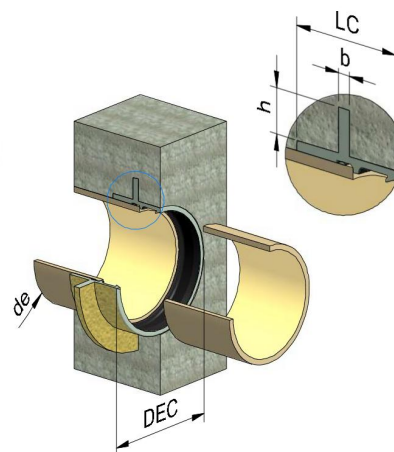
Masonry Couplings DN 1100 - 3600



Masonry coupling, sanded, with pipe ring, optionally with sealing tape (TYPE A)



Masonry coupling, sanded, with pipe ring and thrust ring, optionally with sealing tape (TYPE B)

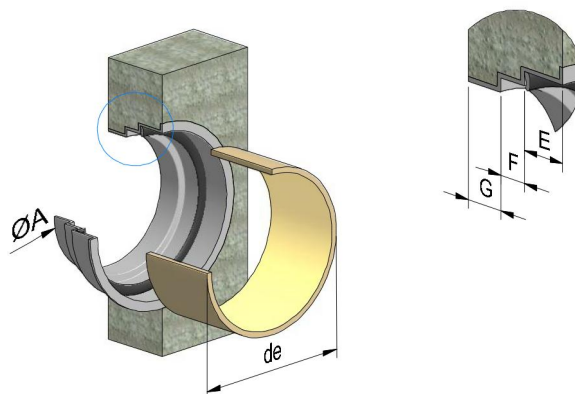


Masonry coupling, sanded, with pipe ring and collar, optionally with sealing tape (TYPE C)

The masonry coupling is used for joining pipes to concrete shafts and walls. Lengths can be selected as required in consideration of the pipe joint data. For data of pipe joints (DEC, LC) see datasheet B01.

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
1348	1348	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	1937	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	2453	120	20	55	120
2555	2555	120	20	67	150
3000	3000	150	20	67	150
3270	3270	150	20	67	150
3600	3600	150	20	67	150

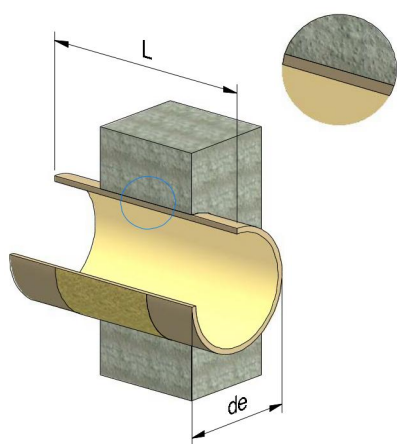
Manhole Liner



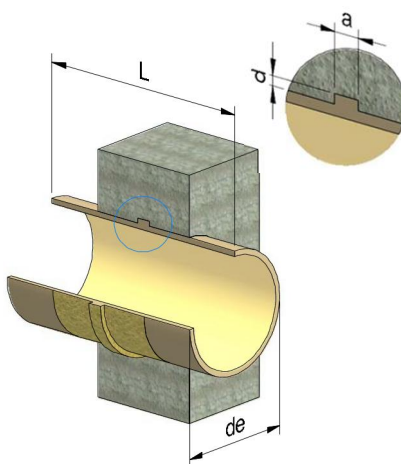
Manhole liners are made of polypropylene, polystyrene (< DN 300) or GRP (> DN 400). They have a water barrier on the outside or quartz sand coating, depending on the manufacturer. For data of pipe joints (DEC, LC) see datasheet B01.

DN	de [mm]	allowable deflection	ØA [mm]	E [mm]	F [mm]	G [mm]
150	168	3°	150	70	40	55
200	220	3°	207	70	40	55
250	272	3°	256	70	40	55
300	324	3°	306	70	40	55
350	376	3°	355	70	40	55
400	427	3°	404	70	40	55
450	478	3°	455	70	40	55
500	530	3°	502	70	40	55
600	616	2°	585	70	40	55
700	718	2°	683	70	40	55
800	820	2°	780	70	40	55
900	924	2°	878	70	40	55
1000	1026	1°	975	70	40	55
1200	1229	1°	1170	70	40	55

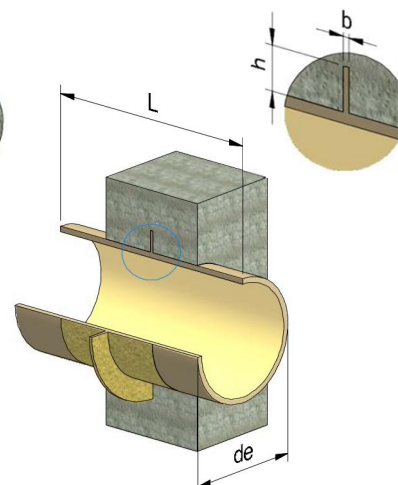
Structural Adapters DN 150 - 1000



Structural adapter, sanded, optionally with sealing tape (TYPE F)



Structural adapter, sanded, with thrust ring, optionally with sealing tape (TYPE E)

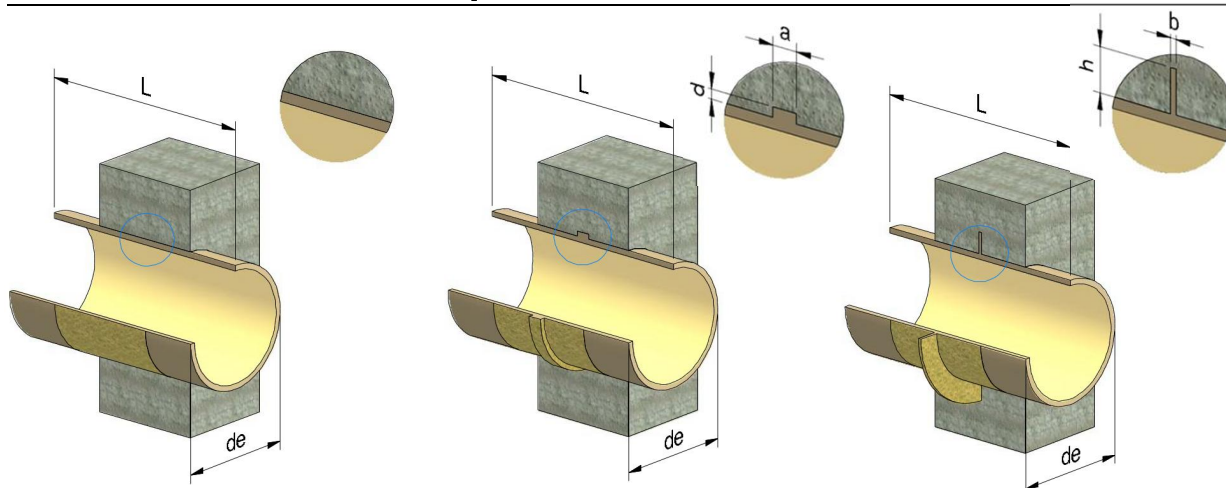


Structural adapter, sanded, with collar, optionally with sealing tape (TYPE G)

The structural adapter consists of a sanded pipe, on request also with sealing tape, a thrust ring or masonry collar. The standard length is 0.5 or 1 m up to DN 1100 and 0.5 or 1.5 m for DN 1200 according to national standards. Other lengths are 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	401	50	8	13	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

Structural Adapters DN 1100 - 3600



Structural adapter, sanded, optionally with sealing tape (TYPE F)

Structural adapter, sanded, with thrust ring, optionally with sealing tape (TYPE E)

Structural adapter, sanded, with collar, optionally with sealing tape (TYPE G)

The structural adapter consists of a sanded pipe, on request also with sealing tape, a thrust ring or masonry collar. The standard length is 0.5 or 1 m up to DN 1100 and 0.5 or 1.5 m for DN 1200 according to national standards. Other lengths are available on request.

DN	de [mm]	a [mm]	b [mm]	d [mm]	h [mm]	L [mm]
1100	1099	80	12	29	100	500 / 1000
1200	1229	80	12	30	100	500 / 1500
1280	1280	80	12	32	100	500 / 1500
1348	1348	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	1937	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	2453	120	20	55	120	500 / 1500
2555	2555	120	20	67	150	500 / 1500
3000	3000	150	20	67	150	500 / 1500
3270	3270	150	20	67	150	500 / 1500
3600	3600	150	20	67	150	500 / 1500

Material Data

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 data in the table should therefore be considered as a guideline. We can provide more accurate material data for specific pipes on request.

Properties / long-term values:

The properties of the pipes, such as stiffness, ring deflection and longitudinal tensile strength, are routinely checked as part of quality assurance. 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.

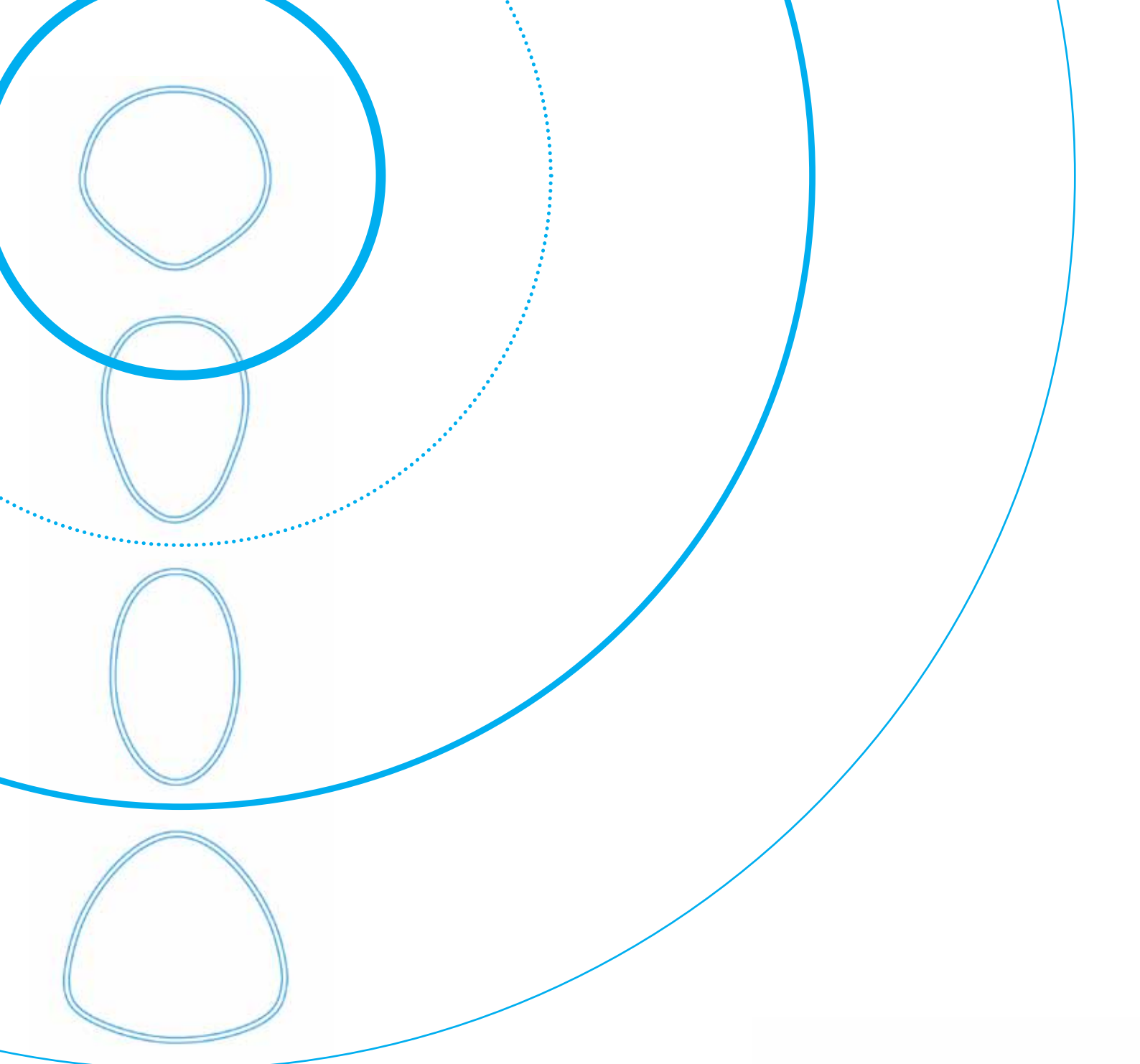
Information on long-term properties and other material tests such as abrasion, hydraulic properties, chemical resistance, etc. is available on request.

Properties of HOBAS GRP Pipes:

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 **	
Thermal expansion coefficient	1/K	26 - 30 x 10 ⁻⁶	
Thermal conductivity	W/(mK)	0.5 - 1.0	
Heat capacity	J/(kgK)	1000-1400	
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



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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.

