Standard Bearing Tubes

General Information

Exempel? BQ-Steel is a bearing quality clean steel that has been optimized for fatigue strength by a strict control of steel cleanliness. BQ-Steel is also ideal for new design solutions in a wide array of demanding applications outside the bearing industry that require longer performance and higher loads. Our extensive stock program can catter for all your demensional needs.

Hot Rolled Tubes

OD-Tolerance

OD	Tolerance
≥ 40–≤ 80	± 0.4 mm
≥ 80–240 mm	± 0.5 % of OD

Wall tolerance

Wall	Tolerance on average wall
> 12 mm	± 0.7 mm
≥ 12 mm	± (0.05 * Wall + 0.1 mm)

Out of roundness: Max 65 % of the OD tolerance

Straightness: The maximum deaviation from the straight line is 1 mm On a gauge lenght of 1000 mm Surface imperfections*)

Bearing quality: OD/ID max 0.5 mm

Other qualities: OD < 100 max 0.5 mm OD > 100 max 0.5 % * OD

Decarburization depth: OD/ID

Standard lenghts: 4–9 m, depending on the tube size

Definitions

Cut ring: A component cut from tube with a width less than the OD

Fix lengths: Length cut to narrow tolerance with lengths longer than OD. This definition also includes multiple lengths

Machined component: Chamfering can be done at fix lengths, max length 350 mm max OD 130 mm and weight 3.5 kg

Deviation from square cut are within the tolerance above, however limited to the following values:

- Deviation from square cut max 1.0 % of OD.
- Deviations from square cut determinate the tolerance when the delviation exceed the tolerance.

Parted off tubes

The difference between parted off and cut tubes is that the parted off tubes have closer tolerances and better finish of the cut surface.

Size range: 80–179 mm OD

Lenghts: 14,5–69 mm

Max weight: 5.0 kg

Max wall: + 0.8/–0 mm

Conocity: max 0.4 mm

Fix lengths mm	10 – 100	(100) – 600	(600) – 1200	(1200) – 5000
OD 30 –100	+ 1.0/–0	+ 2.0/–0	+ 3.0/–0	+ 5.0/–0
OD (100) –254	+ 2.0/–0	+ 3.0/–0	+ 4.0/–0	+ 6.0/–0

Ovako 803F

Type 100Cr6 – Ovako 803 is a group of through hardening bearing steels intended for rolling contact and other high fatigued applications. In the hardened condition the high hardness, high strength and high cleanliness provides the steel with the right properties to withstand high cycle, high stress fatigue. 100Cr6 is mainly used for small and medium sized bearing components. It is also regularly used for other machine components that require high tensile strength and high hardness. The hardenability approximately corresponds to a ring with max. 17 mm wall thickness. It is possible to get the steel in several different modifications. The most common are listed below.

Comparable standard designations

EN	DIN	ASTM/SAE	AFNOR	SS
100Cr6	100 Cr 6	52100	100 C 6	2258

Chemical composition

Grade	Q	%	C	Si	Mn	P	S	CR	Ni	Mo
100Cr6/803J	BQ	min. max.	0.95 1.00	0.20 0.35	0.20 0.40	0.025	0.015	1.35 1.60	0.25	0.08
100Cr6N/803N	BQ	min. max	0.98 1.05	0.20 0.40	0.25 0.40	0.025	0.015	1.35 1.60	0.25	0.08
100Cr6F/803F	BQ	min. max.	0.95 1.00	0.20 0.35	0.30 0.40	0.020	0.005 0.015	1.40 1.60	0.20	0.08
100Cr6P/803P	CQ	min. max.	0.98 1.05	0.20 0.35	0.25 0.40	0.020	0.008	1.35 1.60	0.20	0.06
100Cr6D/803D	BQ	min. max.	0.98 1.05	0.20 0.35	0.30 0.40	0.025	0.017 0.023	1.40 1.60	0.25	0.08
100Cr6Z/803Z	BQ	min. max.	0.92 1.00	0.15	0.25 0.40	0.025	0.003 0.015	1.40 1.50	0.25	0.08
100Cr6Q/803Q	IQ	min. max.	0.90 1.00	0.15 0.40	0.25 0.40	0.020	0.002	1.40 1.60	0.25	0.10

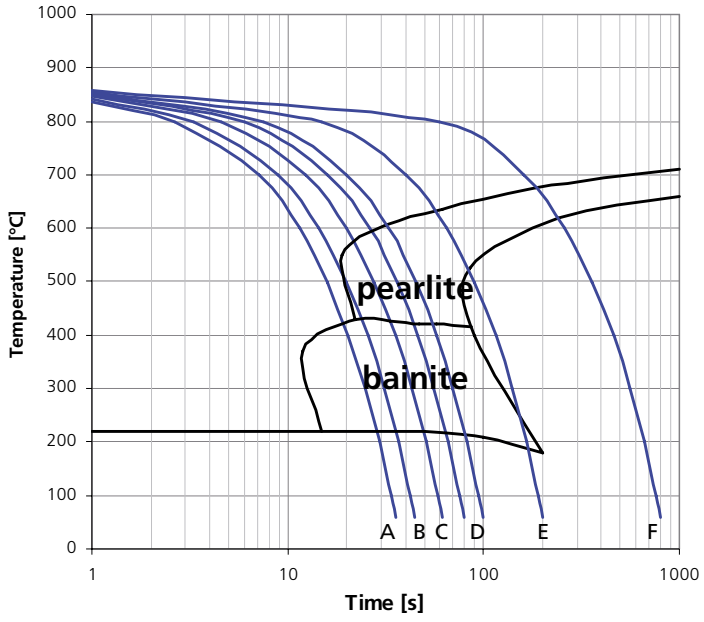
Hardenability

The hardenability approximately corresponds to a ring with 17 mm wall thickness.

	A	B	C	D	E	F
t_{8-5}	13	17	23	30	75	300
Hv_{30}	854	844	751	640	366	308

CCT

Austenitized in 860°C for 10 min



Ovako 824

Type 100CrMo7 – Ovako 824B is a through hardening bearing steels intended for rolling contact and other high fatigued applications. In the hardened condition the high hardness, high strength and high cleanliness provides the steel with the right properties to withstand high cycle, high stress fatigue. 100CrMo7 is mainly used for small and medium sized bearing components. It is also regularly used for other machine components that require high tensile strength and high hardness. The hardenability approximately corresponds to a ring with maximum 20 mm wall thickness. It is suitable for both martensitic and bainitic hardening.

Comparable standard designations

EN	DIN	ASTM/SAE	AFNOR	SS
100CrMo7	100CrMo7		100CD7	

Chemical composition

Grade	Q	%	C	Si	Mn	P	S	CR	Ni	Mo
100CrMo7/803J	BQ	min. max.	0.93 1.02	0.25 0.35	0.25 0.40	0.025	0.015	1.65 1.95	0.25	0.15 0.25

Steel cleanliness

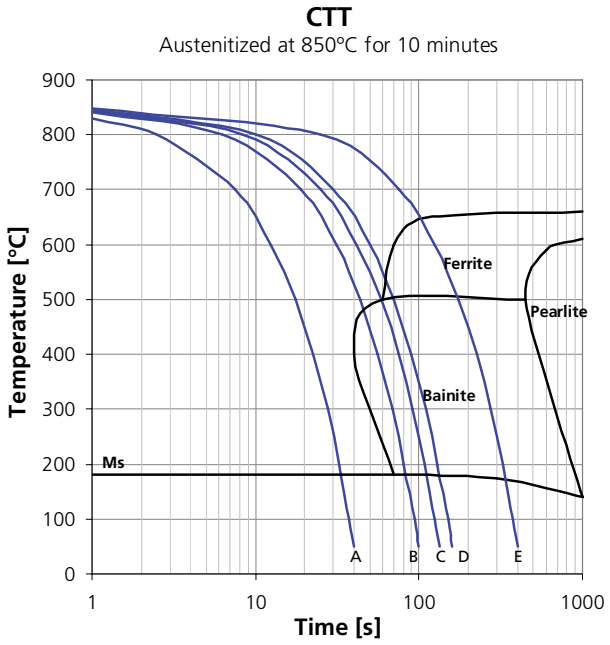
Micro inclusions – BQ								
Applied standard	ASTM E45							
Sampling	ASTM A295							
Maximum avarage limits	A		B		C		D	
	Th	He	Th	He	Th	He	Th	He
	2.0	1.5	0.5	0.1	0	0	0.2	0.1

Macro inclusions – BQ	
Applied standard	ISO 3763 (Blue fracture)
Sampling	Statistical testing on billets
Limits	< 2.5 mm/dm^2

Hardenability

The hardenability approximately corresponds to a ring with 20 mm wall thickness.

	A	B	C	D	E
t_{8-5} (S)	15	38	50	60	150
Hv_{30}	880	730	680	560	420



Typical mechanical properties

Condition	Hardness	Yield strength $R_{p0.2}$ (MPa)	Ultimate tensile strength R_m (MPa)	Elongation A_5 (%)
Hot rolled soft annealed	200 HB	420	700	27
Hardened (martensite)	61 HCR	1700	2300	2
Hardened (bainite)	59 HCR	2000	2200	7

Ovako 825

Ovako 825 is a through hardening bearing steel that is mainly used for medium sized bearing rings, but it can also be used for machine components that require high tensile strength, hardness and toughness.

- Through hardenability corresponding to a ring with approximately 30 mm wall thickness (≈ Ø50 mm bar), quenched in oil
- Suitable for martensitic or banitic hardening
- Good machinability in soft annealed condition
- Good dimensional stability

Comparable standard designations

EN	DIN	ASTM/SAE	AFNOR	SS
100CrMo7-3		A485 (B6)		

Chemical composition

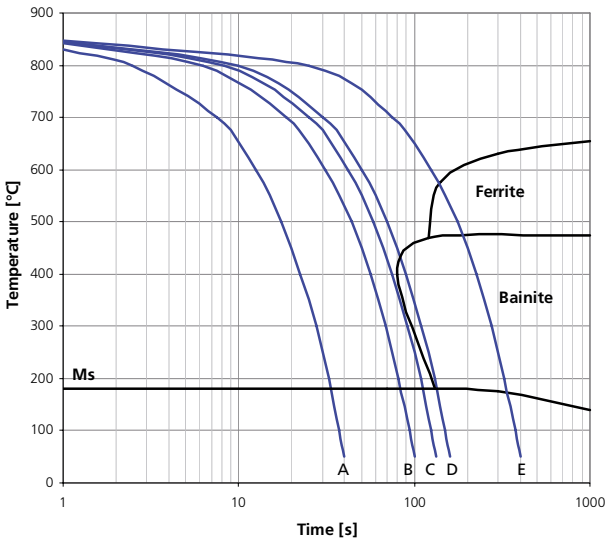
Grade	Q	%	C	Si	Mn	P	S	CR	Ni	Mo
825B	BQ	min. max.	0.93 1.05	0.20 0.40	0.60 0.80	0.025	0.015	1.65 1.95	0.25	0.20 0.35
825T	BQ	min. max.	0.90 1.02	0.30 0.40	0.70 0.80	0.025	0.003 0.008	1.70 1.85	0.25	0.25 0.35
825Q	BQ	min. max.	0.93 1.05	0.20 0.40	0.60 0.80	0.025	0.003	1.65 1.95	0.25	0.20 0.35

Hardenability

	A	B	C	D	E	F
t_{8-5} (S)	15	38	50	60	150	**300**
Hv_{30}	910	905	905	840	635	**308**

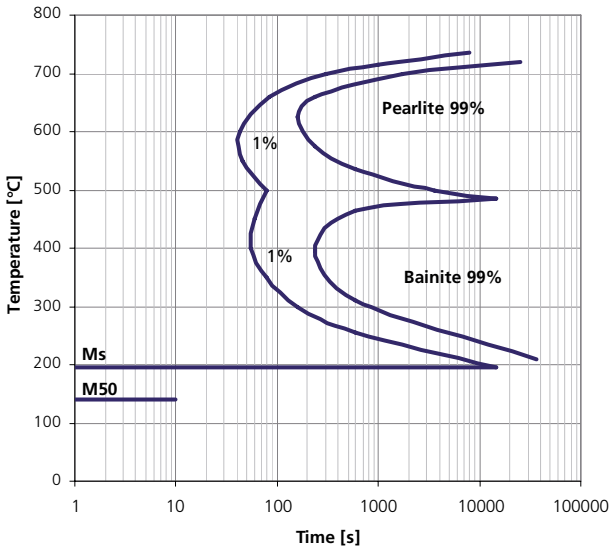
CCT

Austenitized at 860°C for 10 min



TTT

Austenitized at 860°C for 10 min



STANDARD BEARING TUBES

Minimum quantity 1,000 kg

Delivery sizes			Guaranteed finished sizes			Grade
OD (mm)	ID (mm)	Wall (mm)	Weight kg/m	OD (mm)	ID (mm)	
50.60	31.70	9.45	9.59	49.20	34.40	803
51.00	35.00	8.00	8.48	49.60	37.70	803
54.80	36.80	9.00	10.17	53.40	39.50	803
55.00	32.00	11.50	12.34	53.60	34.70	803
55.00	35.00	10.00	11.10	53.60	37.70	803
55.00	37.00	9.00	10.21	53.60	39.70	803
55.00	39.00	8.00	9.27	53.60	41.70	803
55.00	41.00	7.00	8.29	53.60	43.70	803
56.30	36.40	9.95	11.37	54.90	39.10	803
56.70	37.80	9.45	11.01	55.30	40.50	803
56.90	35.60	10.65	12.15	55.50	38.30	803
58.50	35.50	11.50	13.33	57.10	38.20	803
58.50	38.50	10.00	11.96	57.10	41.20	803
58.50	40.50	9.00	10.99	57.10	43.20	803
58.50	42.50	8.00	9.96	57.10	45.20	803
58.50	44.50	7.00	8.89	57.10	47.20	803
59.00	36.70	11.15	13.16	57.60	39.40	803
59.90	36.20	11.85	14.04	58.50	38.90	803
59.90	41.70	9.10	11.40	58.50	44.40	803
61.00	48.00	6.50	8.74	59.60	50.70	803
61.20	37.80	11.70	14.28	59.80	40.50	803
61.20	41.60	9.80	12.42	59.80	44.30	803
61.50	27.70	16.90	18.59	60.10	30.90	803
62.50	41.50	10.50	13.47	61.10	44.20	803
62.50	43.20	9.65	12.58	61.10	45.90	803
63.30	36.30	13.50	16.58	61.70	39.10	803
63.30	40.30	11.50	14.69	61.90	43.00	803
63.30	42.30	10.50	13.67	61.90	45.00	803
63.30	43.30	10.00	13.14	61.90	46.00	803
63.30	45.30	9.00	12.05	61.90	48.00	803
63.30	47.30	8.00	10.91	61.90	50.00	803
63.30	48.80	7.25	10.02	61.90	51.50	803
63.30	49.30	7.00	9.72	61.90	52.00	803
63.30	50.00	6.65	9.29	61.90	52.70	803
63.90	44.80	9.55	12.80	62.50	47.50	803
63.90	32.10	15.90	18.82	62.50	35.20	803
65.00	46.50	9.25	12.72	63.60	49.20	803
65.30	37.10	14.10	17.80	63.90	40.00	803
65.60	46.00	9.80	13.49	64.20	48.70	803
65.80	43.90	10.95	14.81	64.40	46.60	803
66.10	40.10	13.00	17.02	64.70	42.90	803
66.60	41.80	12.40	16.57	65.30	44.55	803
67.00	39.00	14.00	18.30	65.60	41.90	803
67.00	44.00	11.50	15.74	65.60	46.70	803
67.00	47.00	10.00	14.06	65.60	49.70	803
67.00	47.80	9.60	13.59	65.60	50.50	803
67.00	49.00	9.00	12.87	65.60	51.70	803
67.00	51.00	8.00	11.64	65.60	53.70	803
67.80	39.40	14.20	18.77	66.40	42.35	803
67.80	44.10	11.85	16.35	66.40	46.85	803
68.20	51.60	8.30	12.26	66.75	54.35	803
69.90	41.00	14.45	19.76	68.45	44.00	803
70.80	49.70	10.55	15.68	69.35	52.45	803
70.80	52.30	9.25	14.04	69.35	55.05	803
71.10	46.90	12.10	17.61	69.65	49.65	803
71.10	52.90	9.10	13.91	69.65	55.65	803
71.50	32.60	19.45	24.97	70.05	36.10	803

Delivery sizes			Guaranteed finished sizes			Grade
OD (mm)	ID (mm)	Wall (mm)	Weight kg/m	OD (mm)	ID (mm)	
71.50	41.80	14.85	20.75	70.05	44.85	803
72.70	34.40	19.15	25.29	71.25	37.85	803
72.70	46.00	13.35	19.54	71.25	48.90	803
72.70	51.30	10.70	16.36	71.25	54.05	803
74.00	46.00	14.00	20.72	72.55	48.95	803
74.00	51.00	11.50	17.73	72.55	53.75	803
74.00	54.00	10.00	15.78	72.55	56.75	803
74.00	56.00	9.00	14.43	72.55	58.75	803
74.00	58.00	8.00	13.02	72.55	60.75	803
74.40	54.80	9.80	15.61	72.95	57.55	803
74.80	55.70	9.55	15.37	73.35	58.45	803
75.00	44.20	15.40	22.64	73.55	47.30	803
75.30	45.60	14.85	22.14	73.80	48.65	803
77.40	36.70	20.35	28.63	75.90	40.30	803
77.40	46.30	15.55	23.72	75.90	49.45	803
77.40	51.60	12.90	20.52	75.90	54.45	803
77.40	56.60	10.40	17.18	75.90	59.35	803
78.10	50.10	14.00	22.13	76.60	53.10	803
78.10	52.10	13.00	20.87	76.60	55.00	803
78.10	55.10	11.50	18.89	76.60	57.90	803
78.10	56.80	10.65	17.72	76.60	59.60	803
78.10	58.10	10.00	16.79	76.60	60.90	803
78.10	58.80	9.65	16.29	76.60	61.60	803
78.10	60.10	9.00	15.34	76.60	62.90	803
78.10	62.10	8.00	13.83	76.60	64.90	803
78.10	66.10	6.00	10.67	76.60	68.90	803
80.50	50.70	14.90	24.11	79.00	53.80	803
80.50	56.40	12.05	20.34	79.00	59.20	803
81.70	37.30	22.20	32.58	80.15	41.10	803
81.70	52.70	14.50	24.03	80.15	55.75	803
81.70	62.40	9.65	17.15	80.15	65.20	803
82.20	60.00	11.10	19.46	80.65	62.80	803
82.20	62.70	9.75	17.42	80.65	65.50	803
82.20	66.60	7.80	14.31	80.65	69.40	803
82.60	64.30	9.15	16.57	81.05	67.10	803
84.30	59.40	12.45	22.06	82.75	62.25	803
84.80	61.50	11.65	21.02	83.25	64.30	803
86.20	61.60	12.30	22.42	84.60	64.45	803
86.80	56.60	15.10	26.70	85.20	59.75	803
87.00	70.70	8.15	15.85	85.40	73.50	803
87.60	61.10	13.25	24.30	86.00	64.05	803
87.60	66.10	10.75	20.37	86.00	68.95	803
88.00	52.00	18.00	31.07	86.40	55.45	803
88.00	57.00	15.50	27.71	86.40	60.20	803
88.00	60.00	14.00	25.55	86.40	63.05	803
88.00	62.00	13.00	24.05	86.40	64.95	803
88.00	65.00	11.50	21.70	86.40	67.85	803
88.00	68.00	10.00	19.24	86.40	70.85	803
88.00	70.00	9.00	17.53	86.40	72.85	803
88.00	72.00	8.00	15.78	86.40	74.85	803
90.20	52.20	19.00	33.36	88.55	55.75	803
90.20	55.30	17.45	31.31	88.55	58.70	803
90.20	64.30	12.95	24.67	88.55	67.25	803
91.50	72.20	9.65	19.48	89.85	75.05	803
91.80	47.40	22.20	38.11	90.15	51.25	803
91.80	57.30	17.25	31.71	90.15	60.65	803
92.20	71.10	10.55	21.24	90.55	73.95	803

Delivery sizes			Guaranteed finished sizes			Grade
OD (mm)	ID (mm)	Wall (mm)	Weight kg/m	OD (mm)	ID (mm)	
92.20	76.00	8.10	16.80	90.55	78.85	803
92.40	66.00	13.20	25.78	90.75	68.95	803
92.80	49.20	21.80	38.17	91.15	53.05	803
92.80	56.60	18.10	33.34	91.15	60.05	803
92.80	66.80	13.00	25.58	91.15	69.75	803
92.80	70.00	11.40	22.88	91.15	72.85	803
92.80	74.50	9.15	18.88	91.15	77.35	803
92.80	76.90	7.95	16.64	91.15	79.75	803
93.20	61.10	16.05	30.54	91.55	64.35	803
93.70	64.10	14.80	28.80	92.00	67.25	803
94.80	55.20	19.80	36.62	93.10	58.85	803
95.70	59.70	18.00	34.49	94.00	63.15	803
95.70	64.70	15.50	30.66	94.00	67.90	803
95.70	67.70	14.00	28.21	94.00	70.75	803
95.70	69.70	13.00	26.51	94.00	72.65	803
95.70	72.70	11.50	23.88	94.00	75.55	803
95.70	75.70	10.00	21.13	94.00	78.55	803
95.70	77.70	9.00	19.24	94.00	80.55	803
95.70	79.70	8.00	17.30	94.00	82.55	803
96.20	51.20	22.50	40.90	94.50	55.10	803
97.00	62.50	17.25	33.93	95.30	65.90	803
97.00	71.90	12.55	26.14	95.30	74.85	803
97.00	76.50	10.25	21.93	95.30	79.35	803
97.80	81.60	8.10	17.92	96.05	84.50	803
98.30	76.40	10.95	23.59	96.55	79.30	803
98.90	62.30	18.30	36.38	97.15	65.80	803
100.00	65.00	17.50	35.61	98.25	68.45	803
101.20	82.60	9.30	21.08	99.45	85.50	803
101.30	54.30	23.50	45.09	99.55	58.35	803
101.30	74.00	13.65	29.51	99.55	77.05	803
101.50	62.00	19.75	39.82	99.75	65.65	803
101.60	67.40	17.10	35.63	99.85	70.80	803
102.20	47.00	27.60	50.78	100.40	51.45	824
102.70	82.50	10.10	23.07	100.90	85.40	803
102.70	84.40	9.15	21.11	100.90	87.30	803
103.30	67.30	18.00	37.87	101.50	70.80	803
103.30	75.30	14.00	30.83	101.50	78.40	803
103.30	77.30	13.00	28.95	101.50	80.30	803
103.30	80.30	11.50	26.04	101.50	83.20	803
103.30	83.30	10.00	23.01	101.50	86.20	803
103.30	87.30	8.00	18.80	101.50	90.20	803
104.80	81.00	11.90	27.26	103.00	83.90	803
105.10	60.50	22.30	45.54	103.30	64.45	803
105.30	71.60	16.85	36.76	103.50	75.00	803
106.10	57.50	24.30	49.02	104.25	61.65	803
106.40	61.80	22.30	46.25	104.60	65.80	803
106.90	70.10	18.40	40.16	105.05	73.65	803
107.30	71.60	17.85	39.38	105.45	75.10	803
107.70	65.70	21.00	44.90	105.85	69.50	803
108.50	85.40	11.55	27.62	106.65	88.35	803
110.00	74.00	18.00	40.84	108.15	77.55	803
110.40	68.10	21.15	46.55	108.50	71.95	803
112.00	86.30	12.85	31.42	110.10	89.35	803
112.30	57.00	27.65	57.72	110.40	61.50	824
112.30	71.80	20.25	45.97	110.40	75.55	803
112.30	87.60	12.35	30.44	110.40	90.60	803
112.80	88.80	12.00	29.83	110.90	91.75	803
112.80	91.30	10.75	27.05	110.90	94.25	803
112.80	93.40	9.70	24.66	110.90	96.35	803
113.30	76.00	18.65	43.53	111.40	79.60	803

Delivery sizes			Guaranteed finished sizes			Grade
OD (mm)	ID (mm)	Wall (mm)	Weight kg/m	OD (mm)	ID (mm)	
113.30	84.60	14.35	35.02	111.40	87.80	803
114.00	74.80	19.60	45.63	112.10	78.50	803
114.00	80.10	16.95	40.57	112.10	83.55	803
114.20	85.50	14.35	35.34	112.30	88.70	803
114.60	65.00	24.80	54.92	112.65	69.25	803
116.20	88.20	14.00	35.29	114.25	91.35	803
116.20	96.20	10.00	26.19	114.25	99.15	803
116.20	98.20	9.00	23.79	114.25	101.15	803
116.50	72.90	21.80	50.91	114.55	76.85	803
117.40	99.10	9.15	24.43	115.45	102.05	803
118.00	80.70	18.65	45.69	116.05	84.35	803
118.00	90.70	13.65	35.13	116.05	93.85	803
118.30	85.00	16.65	41.74	116.35	88.45	803
118.50	95.00	11.75	30.93	116.50	98.00	803
119.00	70.30	24.35	56.84	117.00	74.50	803
119.30	83.90	17.70	44.35	117.30	87.45	803
120.30	79.60	20.35	50.16	118.30	83.40	803
120.80	80.30	20.25	50.21	118.80	84.10	803
122.20	61.80	30.20	68.52	120.20	66.60	824
122.20	82.10	20.05	50.51	120.20	85.90	803
122.20	96.00	13.10	35.25	120.20	99.10	803
122.70	85.60	18.55	47.65	120.65	89.25	803
122.70	92.30	15.20	40.30	120.65	95.60	803
123.10	100.30	11.40	31.40	121.05	103.30	803
123.20	101.60	10.80	29.94	121.15	104.60	803
123.50	95.90	13.80	37.33	121.45	99.10	803
123.90	91.10	16.40	43.48	121.85	94.55	803
124.50	89.90	17.30	45.74	122.45	93.45	803
125.80	82.40	21.70	55.71	123.75	86.40	803
125.90	89.10	18.40	48.78	123.85	92.75	803
126.80	89.00	18.90	50.29	124.70	92.70	803
127.10	94.50	16.30	44.54	125.00	97.95	803
127.50	85.40	21.05	55.26	125.40	89.35	803
127.60	104.60	11.50	32.93	125.50	107.60	803
127.60	107.60	10.00	29.00	125.50	110.60	803
127.60	109.60	9.00	26.32	125.50	112.60	803
128.00	99.90	14.05	39.48	125.90	103.15	803
128.60	106.10	11.25	32.56	126.50	109.15	803
130.20	76.50	26.85	68.43	128.10	81.00	803
130.60	95.00	17.80	49.52	128.50	98.60	803
130.60	97.40	16.60	46.67	128.50	100.90	803
132.00	102.30	14.85	42.90	129.85	105.65	803
132.60	113.20	9.70	29.40	130.45	116.25	803
133.00	99.30	16.85	48.27	130.85	102.85	803
133.30	66.60	33.35	82.21	131.15	71.80	824
133.30	89.10	22.10	60.61	131.15	93.15	803
133.30	90.10	21.60	59.50	131.15	94.10	824
133.90	92.70	20.60	57.56	131.75	96.60	803
133.90	110.70	11.60	34.99	131.75	113.75	803
133.90	113.70	10.10	30.84	131.75	116.75	803
135.70	104.50	15.60	46.20	133.50	107.90	803
136.20	110.90	12.65	38.54	134.00	114.05	803
137.20	92.80	22.20	62.96	135.00	96.90	803
138.60	89.50	24.55	69.05	136.40	93.85	803
140.60	98.00	21.30	62.67	138.35	102.00	803
141.80	112.20	14.80	46.35	139.55	115.55	803
142.70	76.50	33.10	89.47	140.45	81.70	824
143.40	94.50	24.45	71.72	141.20	98.90	824
143.40	113.20	15.10	47.78	141.10	116.60	803
143.40	116.40	13.50	43.25	141.10	119.65	803

Delivery sizes			Guaranteed finished sizes			Grade
OD (mm)	ID (mm)	Wall (mm)	Weight kg/m	OD (mm)	ID (mm)	
143.40	118.30	12.55	40.50	141.10	121.45	803
143.80	97.30	23.25	69.12	141.50	101.55	803
143.80	109.60	17.10	53.43	141.50	113.20	803
144.60	98.00	23.30	69.70	142.30	102.25	803
144.90	104.20	20.35	62.51	142.60	108.15	803
146.80	125.10	10.85	36.38	144.50	128.20	803
147.10	108.30	19.40	61.10	144.80	112.15	803
148.40	103.80	22.30	69.35	146.05	107.95	824
148.70	104.40	22.15	69.13	146.35	108.55	803
149.10	114.80	17.15	55.81	146.75	118.45	803
149.80	101.50	24.15	74.83	147.45	105.85	803
150.20	104.50	22.85	71.76	147.85	108.70	803
152.90	86.40	33.25	98.11	150.50	91.65	824
153.00	119.90	16.55	55.69	150.60	123.50	803
153.00	122.90	15.05	51.20	150.60	126.35	803
153.00	129.10	11.95	41.57	150.60	132.25	803
153.20	122.20	15.50	52.64	150.80	125.70	803
153.60	113.60	20.00	65.90	151.20	117.55	803
153.60	129.70	11.95	41.75	151.20	132.85	803
154.10	131.70	11.20	39.47	151.70	134.85	803
154.80	125.30	14.75	50.94	152.40	128.75	803
156.80	102.20	27.30	87.19	154.35	106.90	803
157.30	125.00	16.15	56.22	154.85	128.60	803
158.60	102.80	27.90	89.93	156.15	107.55	824
158.60	111.40	23.60	78.57	156.15	115.75	803
158.60	113.80	22.40	75.24	156.15	118.00	824
158.70	121.90	18.40	63.66	156.25	125.70	803
159.50	125.50	17.00	59.74	157.05	129.20	803
160.10	111.00	24.55	82.07	157.60	115.45	803
163.00	96.20	33.40	106.75	160.50	101.55	824
163.00	131.80	15.60	56.71	160.50	135.35	803
163.00	133.50	14.75	53.93	160.50	136.95	803
163.70	113.50	25.10	85.79	161.20	118.00	803
163.70	120.40	21.65	75.84	161.20	124.55	803
163.70	123.50	20.10	71.18	161.20	127.50	803
163.70	127.40	18.15	65.15	161.20	131.20	803
163.70	134.60	14.55	53.52	161.20	138.05	803
164.60	118.80	22.90	80.03	162.05	123.10	803
166.40	132.90	16.75	61.82	163.85	136.60	803
168.80	145.00	11.90	46.05	166.20	148.25	803
170.90	124.10	23.40	85.12	168.30	128.50	824
173.00	142.00	15.50	60.21	170.35	145.60	803
173.10	106.30	33.40	115.07	170.45	111.70	824
173.60	132.30	20.65	77.89	170.95	136.40	803
173.60	138.00	17.80	68.39	170.95	141.85	803
173.70	111.90	30.90	108.82	171.05	117.05	824
174.70	123.30	25.70	94.44	172.05	127.95	803
177.40	145.50	15.95	63.51	174.70	149.15	803
179.10	155.00	12.05	49.64	176.40	158.30	803
180.60	112.00	34.30	123.75	177.85	117.50	824
183.00	116.20	33.40	123.23	180.25	121.65	824
183.00	145.80	18.60	75.41	180.25	149.75	803
183.70	134.50	24.60	96.52	180.95	139.05	824
183.70	150.20	16.75	68.96	180.95	153.95	803
184.00	144.00	20.00	80.89	181.25	148.10	824
184.30	132.50	25.90	101.18	181.55	137.20	803
185.10	148.70	18.20	74.91	182.30	152.65	803
185.70	145.00	20.35	82.98	182.90	149.15	824
190.40	153.40	18.50	78.43	187.55	157.40	803
192.20	156.60	17.80	76.56	189.35	160.50	803

Delivery sizes			Guaranteed finished sizes			Grade
OD (mm)	ID (mm)	Wall (mm)	Weight kg/m	OD (mm)	ID (mm)	
193.10	126.10	33.50	131.86	190.20	131.60	824
193.50	164.50	14.50	64.01	190.60	168.10	803
194.50	148.50	23.00	97.28	191.60	152.95	803
194.50	152.90	20.80	89.10	191.60	157.15	803
196.80	141.70	27.55	114.99	193.90	146.60	803
196.80	144.30	26.25	110.41	193.90	149.10	824
198.80	154.50	22.15	96.50	195.85	158.90	824
202.60	156.40	23.10	102.26	199.60	160.90	803
204.00	143.30	30.35	129.97	200.00	148.50	825
204.30	164.30	20.00	90.90	201.30	168.50	803
204.70	156.00	24.35	108.30	201.70	160.65	803
204.70	163.20	20.75	94.13	201.70	167.50	803
209.30	169.30	20.00	93.37	205.00	173.50	803
209.30	158.80	25.25	114.61	205.00	163.50	824
209.30	148.30	30.50	134.49	205.00	153.50	825
209.30	137.80	35.75	153.01	205.00	143.50	825
209.30	128.80	40.25	167.80	205.00	135.00	825
209.30	118.30	45.50	183.60	205.00	125.00	825
213.10	174.30	19.40	92.67	210.00	178.50	803
213.10	163.80	24.65	114.56	210.00	168.50	824
213.10	153.30	29.90	135.09	210.00	158.50	825
213.10	142.70	35.20	154.43	210.00	148.50	825
213.10	133.80	39.65	169.61	210.00	140.00	825
213.10	123.30	44.90	186.25	210.00	130.00	825
218.20	179.30	19.45	95.33	215.00	183.50	803
218.20	168.80	24.70	117.87	215.00	173.50	824
218.20	158.20	30.00	139.24	215.00	163.50	825
218.20	147.70	35.25	159.04	215.00	153.50	825
218.20	138.80	39.70	174.76	215.00	145.00	825
218.20	128.20	45.00	192.21	215.00	135.00	825
223.20	184.30	19.45	97.73	220.00	188.50	803
223.20	173.70	24.75	121.13	220.00	178.50	824
223.20	163.20	30.00	142.94	220.00	168.50	825
223.20	152.70	35.25	163.39	220.00	158.50	825
223.20	142.10	40.55	182.66	220.00	148.50	825
223.20	133.20	45.00	197.76	220.00	140.00	825
229.00	189.20	19.90	102.62	225.00	193.50	803
229.00	178.70	25.15	126.44	225.00	183.50	824
229.00	168.20	30.40	148.89	225.00	173.50	825
229.00	157.60	35.70	170.19	225.00	163.50	825
229.00	147.10	40.95	189.91	225.00	153.50	825
234.40	183.70	25.35	130.69	230.00	188.50	824
234.40	173.10	30.65	154.01	230.00	178.50	825
234.40	162.60	35.90	175.74	230.00	168.50	825
234.40	152.10	41.15	196.11	230.00	158.50	825
238.40	188.60	24.90	131.10	235.00	193.50	824
238.40	178.10	30.15	154.84	235.00	183.50	825
238.40	167.60	35.40	177.22	235.00	173.50	825
243.50	193.60	24.95	134.48	240.00	198.50	824
243.50	183.10	30.20	158.86	240.00	188.50	825

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