CROMSTEEL

Machined parts

for hydraulic and pneumatic cylinders

Machined parts for hydraulic and pneumatic cylinders

Cromsteel offers a vast range of products for applications in hydraulics and pneumatics.
Our chrome plated rods, hollow rods and cylinder barrels are available in several steel grades and surface treatments in order to meet the needs of cylinder manufacturers.
Prime quality products in stock, a long commercial experience on the Italian and worldwide markets, an in-house machining workshop with a powerful stack of CNC lathes, a strong attention towards the customer: these are the elements that make Cromsteel the ideal partner for the production of high performance cylinders.

Cromsteel has built a fully equipped workshop to provide any kind of machining according to customer's drawing, e.g.:

- cutting
- axial drilling (with or without tapping)
- flat milling
- diameter reduction
- hardened surface annealing
- deep drilling

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Steel grade equivalents*

Product	Euronorm	DIN	Werkstoff-Nr.	AFNOR	BS	JIS	ASTM
BAC **BATC**	**C45E** EN 10083-2	**Ck45** DIN 10083	**1.1191**	**XC45**	**080N45**	**S45C**	**1045**
BACM **BATCM**	**—**	**20MnV6**	**1.5217**	**E420**	**55M**	—	**A572**
BACV **BATCV**	**38MnVS6** EN 10267	**38MnVS5** DIN 10267	**1.1303**	**30MV6**	—	—	**1045V**
BOC **BOTC**	**42CrMo4** EN 10083-3	**42CrMo4** DIN 10083-3	**1.7225**	**42CD4**	**708M40**	**SCM440(H)**	**4140**
BACI 304	**X5CrNi18-10**	**X5CrNi18-10**	**1.4301**	**Z7CN18-09**	**304517**	**SUS304**	**304**
BACI 316	**X5CrNiMo17-12-2**	**X5CrNiMo17-12-2**	**1.4401**	**Z3CND-11-02**	**316S11**	—	**316**
TUC **TUL** **TUCL** **TTS**	**E355** EN 10305-1 EN 10305-2	**St52.3** DIN 2391 DIN 2393	**1.0580**	**E36-4**	**4360-50D**	**SM490A**	**1024**

*) The above shown equivalents are purely indicative: steel grades manufactured according to different standards may not exactly match

Chemical composition*

Steel grade		C	Si	Mn	P	S	Cr	Ni	Mo	V	N	Al
C45E	min	0,42		0,50								
	max	0,50	0,40	0,80	0,030	0,035	0,40	0,40	0,10			
20MnV6	min	0,15	0,10	1,20		0,020				0,08		
	max	0,22	0,80	1,70	0,035	0,060	0,30			0,20	0,10	
38MnVS6	min	0,34	0,15	1,20		0,020				0,08		
	max	0,41	0,80	1,60	0,025	0,060	0,30		0,08	0,20		
42CrMo4	min	0,38		0,60			0,90		0,15			
	max	0,45	0,40	0,90	0,025	0,035	1,20		0,30			
X5CrNi18-10 (AISI 304)	min						17,0	8,0				
	max	0,07	1,00	2,00	0,045	0,03	20,0	10,5			0,11	
X5CrNi17-12-2 (AISI 316)	min						16,5	10,0	2,0			
	max	0,07	1,00	2,00	0,045	0,03	18,5	13,0	2,5		0,11	
E355	min					0,015						
	max	0,22	0,55	1,60	0,025	0,040						

*) As % on weight

Mechanical properties

Product code	Steel grade	Diameter	Tensile strength (Rm)	Yield strength ($Rp_{0.2}$)	Elongation (A5)	Core hardness	Impact test KV at -20°C
		mm	MPa	MPa	%	HB	J
BAC BATC	C45E	Ø ≤ 16	min. 710	min. 500	min. 5	min. 200	—
		16 < Ø ≤ 20	min. 650	min. 410	min. 7	min. 200	
		20 < Ø ≤ 100	min. 580	min. 305	min. 16	180 - 225	
		100 < Ø ≤ 200	min. 560	min. 275	min. 16	180 - 225	
BACM BATCM	20MnV6	Ø ≤ 19	min. 700	min. 620	min. 10	min. 200	min. 27
		19 < Ø ≤ 70	min. 550	min. 450	min. 18	163 - 200	
		70 < Ø ≤ 160	min. 550	min. 420	min. 18	163 - 220	
BACV BATCV	38MnVS6	Ø < 20	min. 850	min. 600	min. 6	min. 250	—
		20 ≤ Ø ≤ 200	min. 800	min. 520	min. 12	min. 230	
BOC BOTC	42CrMo4	Ø ≤ 16	1000 - 1200	min. 750	min. 8	298 - 359	—
		16 < Ø ≤ 40	1000 - 1200	min. 750	min. 11	298 - 359	
		40 < Ø ≤ 100	900 - 1100	min. 650	min. 12	271 - 331	
		100 < Ø ≤ 200	800 - 950	min. 550	min. 13	225 - 271	
BACI-AISI 304	X5CrNi18-10 (AISI 304)	20 ≤ Ø ≤ 40	600 - 850	min. 190	min. 30		—
		40 < Ø ≤ 63	580 - 850	min. 190	min. 30		
		63 < Ø ≤ 160	500 - 700	min. 190	min. 45		
BACI-AISI 316	X5CrNi17-12-2 (AISI 316)	20 ≤ Ø ≤ 63	500 - 830	min. 200	min. 30		—
		63 < Ø ≤ 160	500 - 700	min. 200	min. 40		
TUC TUL TUCL	E355 +SR EN 10305-1	(all)	min. 620	min. 520	min. 15		min. 27
TUC TUCL	E355 +SR EN 10305-2	(all)	min. 620	min. 520	min. 15		min. 27
TTS	E355 +C EN 10305-2	(all)	min. 620	min. 520	min. 7		—

Tips for reading product sheets

Each product sheet contains all standard parameters for the given product, including the identification color used for marking the rod ends.

Length tolerance for cut parts

Standard tolerance on the length of the cut parts (not machined):

- diameters from 6 mm to 30 mm: ±1 mm
- diameters above 30 mm: ±2 mm

N.B. Any request for special length tolerance of cut pieces will be evaluated case by case.

Packaging types

Standard packaging for chrome plated rods (standard and hollow): plastic sleeve on each rod (OD from 14 mm to 120 mm), plastic rings (diameters < 14 mm), cardboard sleeve (diameters above 120 mm).

On request:

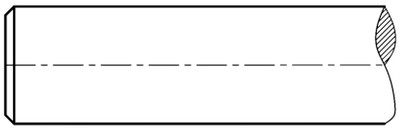
- cardboard sleeve on each rod (diameter 16 mm and above)
- plastic rings
- sea freight: seaworthy vacuum aluminium bags
- other packaging types: wooden boxes, pallets, pallets with sides and cover etc.

Recommendations for proper storage and handling

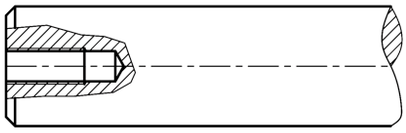
- stock the rods / barrels in warehouses with controlled humidity
- avoid direct sunlight
- avoid direct contact with floors
- the rods / barrels must lay on supporting surfaces padded with rubber or wood
- whenever possible, use a crane for loading/unloading operations; if a forklift must be used, be sure to pad any contact surface with wood, plastic or rubber
- upon handling, lift the bundles with plastic or tissue belts (never use metal belts)
- always lift the rods / barrels from two points: lifting them from one point (e.g. in the middle of the length) may damage their straightness and create dangerous situations
- beware the risk of corrosion when stocking the rods / barrels; environments with high pollution or with high salt concentration are very corrosive

Machining examples

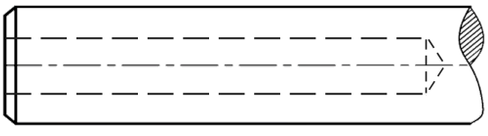
Cutting and chamfering



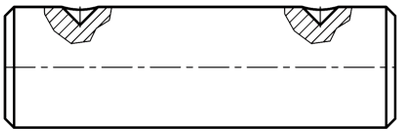
Axial drilling and tapping



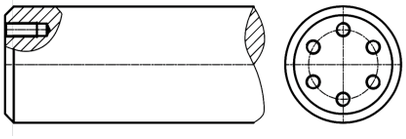
Deep drilling



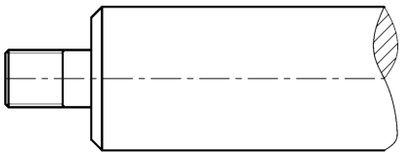
Screw seats



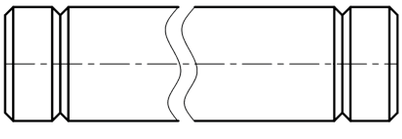
Pitch circle drilling and tapping



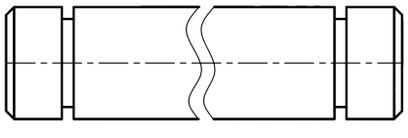
Threaded reduced diameters



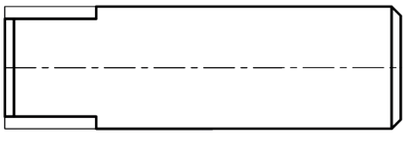
Circumference grooves



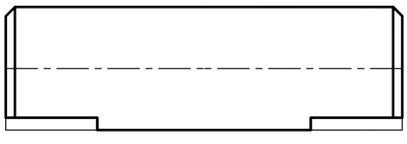
Snap ring grooves



Plain milling for keys



Plain milling



C45E (1.1191)

BAC

CHROME PLATED ROD

Standard parameters

Diameter range (metric)
5 - 200 mm

Diameter range (imperial)
1/4” - 8”

Diameter tolerance (EN ISO 286-2)
standard: f7; on request: h7

Roundness
max. 1/2 of diameter tolerance

Standard length
Ø < 60 mm: 5500 - 6200 mm
Ø ≥ 60 mm: 5500 - 7200 mm

Surface roughness
Ra max. 0,20 µm

Corrosion resistance

Standard
Ø < 20 mm: Rating 9 after 120 h in NSS
Ø ≥ 20 mm: Rating 9 after 200 h in NSS

On request
Ø ≥ 20 mm: Rating 9 after 500 h in NSS

Packaging

Standard: plastic sleeve
On request: cardboard sleeve, wooden box, seaworthy packaging, Branorost, Lamiflex

BATC

CHROME PLATED AND INDUCTION HARDENED ROD

Chrome layer thickness
Ø < 20 mm: min. 15 µm
Ø ≥ 20 mm: min. 20 µm

Chrome layer hardness
min. 900 $HV_{(0.1)}$

Straightness
Ø < 20 mm: max. 0,3:1000 mm
Ø ≥ 20 mm: max. 0,2:1000 mm

Residual magnetism
max. 50 Gauss

Surface hardness (only for BATC)
min. 55 HRC

Hardening depth (only for BATC)

Ø mm	SHD* mm	Ø mm	SHD* mm
6	0,5 - 0,8	25	1,5 - 1,7
8	0,6 - 0,9	28	1,5 - 1,8
10	0,7 - 1,0	30 - 38	1,5 - 1,9
12 - 14	0,8 - 1,2	40 - 45	1,6 - 2,0
14	0,9 - 1,3	50 - 85	2,2 - 2,6
15	1,0 - 1,4	90 - 100	2,2 - 3,2
16 - 18	1,1 - 1,5	105 - 140	2,4 - 3,3
20 - 22	1,2 - 1,5	150 - 203,5	2,5 - 3,5
24	1,4 - 1,6		

*) SHD hardening depth according to EN ISO 15787

ISO tolerances by diameter range

Ø	>3 mm ≤6 mm	>6 mm ≤10 mm	>10 mm ≤18 mm	>18 mm ≤30 mm	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm	>180 mm ≤200 mm
f7	–10 µm –22 µm	–13 µm –28 µm	–16 µm –34 µm	–20 µm –41 µm	–25 µm –50 µm	–30 µm –60 µm	–36 µm –71 µm	–43 µm –83 µm	–50 µm –96 µm
h7	0 µm –12 µm	0 µm –15 µm	0 µm –18 µm	0 µm –21 µm	0 µm –25 µm	0 µm –30 µm	0 µm –35 µm	0 µm –40 µm	0 µm –46 µm

20MnV6 (1.5217)

BACM

CHROME PLATED ROD

Standard parameters

Diameter range (metric)
5 - 200 mm

Diameter range (imperial)
1/4” - 8”

Diameter tolerance (EN ISO 286-2)
standard: f7; on request: h7

Roundness
max. 1/2 of diameter tolerance

Standard length
Ø < 60 mm: 5500 - 6200 mm
Ø ≥ 60 mm: 5500 - 7200 mm

Surface roughness
Ra max. 0,20 µm

Corrosion resistance

Standard
Ø < 20 mm: Rating 9 after 120 h in NSS
Ø ≥ 20 mm: Rating 9 after 200 h in NSS

On request
Ø ≥ 20 mm: Rating 9 after 500 h in NSS

Packaging

Standard: plastic sleeve
On request: cardboard sleeve, wooden box, seaworthy packaging, Branorost, Lamiflex

BATCM

CHROME PLATED AND INDUCTION HARDENED ROD

Chrome layer thickness
Ø < 20 mm: min. 15 µm
Ø ≥ 20 mm: min. 20 µm

Chrome layer hardness
min. 900 $HV_{(0.1)}$

Straightness
Ø < 20 mm: max. 0,3:1000 mm
Ø ≥ 20 mm: max. 0,2:1000 mm

Residual magnetism
max. 50 Gauss

Surface hardness (only for BATCM)
min. 42 HRC

Hardening depth (only for BATCM)

Ø mm	SHD* mm	Ø mm	SHD* mm
6	0,5 - 0,8	25	1,5 - 1,7
8	0,6 - 0,9	28	1,5 - 1,8
10	0,7 - 1,0	30 - 38	1,5 - 1,9
12 - 14	0,8 - 1,2	40 - 45	1,6 - 2,0
14	0,9 - 1,3	50 - 85	2,2 - 2,6
15	1,0 - 1,4	90 - 100	2,2 - 3,2
16 - 18	1,1 - 1,5	105 - 140	2,4 - 3,3
20 - 22	1,2 - 1,5	150 - 203,5	2,5 - 3,5
24	1,4 - 1,6		

*) SHD hardening depth according to EN ISO 15787

ISO tolerances by diameter range

Ø	>3 mm ≤6 mm	>6 mm ≤10 mm	>10 mm ≤18 mm	>18 mm ≤30 mm	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm	>180 mm ≤200 mm
f7	–10 µm –22 µm	–13 µm –28 µm	–16 µm –34 µm	–20 µm –41 µm	–25 µm –50 µm	–30 µm –60 µm	–36 µm –71 µm	–43 µm –83 µm	–50 µm –96 µm
h7	0 µm –12 µm	0 µm –15 µm	0 µm –18 µm	0 µm –21 µm	0 µm –25 µm	0 µm –30 µm	0 µm –35 µm	0 µm –40 µm	0 µm –46 µm

38MnVS6 (1.1303)

BACV

CHROME PLATED ROD

Standard parameters

Diameter range (metric)
20 - 115 mm

Diameter range (imperial)
1” - 4” ¼

Diameter tolerance (EN ISO 286-2)
standard: f7; on request: h7

Roundness
max. 1/2 of diameter tolerance

Standard length
Ø < 60 mm: 5500 - 6200 mm
Ø ≥ 60 mm: 5500 - 7200 mm

Surface roughness
Ra max. 0,20 µm

Corrosion resistance

Standard
Rating 9 after 200 h in NSS

On request
Rating 9 after 500 h in NSS

Packaging

Standard: plastic sleeve
On request: cardboard sleeve, wooden box, seaworthy packaging, Branorost, Lamiflex

BATCV

CHROME PLATED AND INDUCTION HARDENED ROD

Chrome layer thickness
Ø < 20 mm: min. 15 µm
Ø ≥ 20 mm: min. 20 µm

Chrome layer hardness
min. 900 $HV_{(0.1)}$

Straightness
Ø < 20 mm: max. 0,3:1000 mm
Ø ≥ 20 mm: max. 0,2:1000 mm

Residual magnetism
max. 50 Gauss

Surface hardness (only for BATCV)
min. 55 HRC

Hardening depth (only for BATCV)

Ø mm	SHD* mm	Ø mm	SHD* mm
6	0,5 - 0,8	24	1,4 - 1,6
8	0,6 - 0,9	25	1,5 - 1,7
10	0,7 - 1,0	28	1,5 - 1,8
12 - 14	0,8 - 1,2	30 - 38	1,5 - 1,9
14	0,9 - 1,3	40 - 45	1,6 - 2,0
15	1,0 - 1,4	50 - 85	2,2 - 2,6
16 - 18	1,1 - 1,5	90 - 100	2,2 - 3,2
20 - 22	1,2 - 1,5	105 - 140	2,4 - 3,3

*) SHD hardening depth according to EN ISO 15787

ISO tolerances by diameter range

Ø	>18 mm ≤30 mm	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm
f7	–20 µm –41 µm	–25 µm –50 µm	–30 µm –60 µm	–36 µm –71 µm
h7	0 µm –21 µm	0 µm –25 µm	0 µm –30 µm	0 µm –35 µm

42CrMo4 +QT (1.7225)

BOC

CHROME PLATED ROD

Standard parameters

Diameter range (metric)
20 - 200 mm

Diameter range (imperial)
1/4” - 8”

Diameter tolerance (EN ISO 286-2)
standard: f7; on request: h7

Roundness
max. 1/2 of diameter tolerance

Standard length
Ø < 60 mm: 5500 - 6200 mm
Ø ≥ 60 mm: 5500 - 7200 mm

Surface roughness
Ra max. 0,20 µm

Corrosion resistance

Standard
Ø < 20 mm: Rating 9 after 120 h in NSS
Ø ≥ 20 mm: Rating 9 after 200 h in NSS

On request
Ø ≥ 20 mm: Rating 9 after 500 h in NSS

Packaging

Standard: plastic sleeve
On request: cardboard sleeve, wooden box, seaworthy packaging, Branorost, Lamiflex

BOTC

CHROME PLATED AND INDUCTION HARDENED ROD

Chrome layer thickness
Ø < 20 mm: min. 15 µm
Ø ≥ 20 mm: min. 20 µm

Chrome layer hardness
min. 900 $HV_{(0.1)}$

Straightness
Ø < 20 mm: max. 0,3:1000 mm
Ø ≥ 20 mm: max. 0,2:1000 mm

Residual magnetism
max. 50 Gauss

Surface hardness (only for BOTC)
min. 55 HRC

Hardening depth (only for BOTC)

Ø mm	SHD* mm	Ø mm	SHD* mm
6	0,5 - 0,8	25	1,5 - 1,7
8	0,6 - 0,9	28	1,5 - 1,8
10	0,7 - 1,0	30 - 38	1,5 - 1,9
12 - 14	0,8 - 1,2	40 - 45	1,6 - 2,0
14	0,9 - 1,3	50 - 85	2,2 - 2,6
15	1,0 - 1,4	90 - 100	2,2 - 3,2
16 - 18	1,1 - 1,5	105 - 140	2,4 - 3,3
20 - 22	1,2 - 1,5	150 - 203,5	2,5 - 3,5
24	1,4 - 1,6		

*) SHD hardening depth according to EN ISO 15787

ISO tolerances by diameter range

Ø	>18 mm ≤30 mm	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm	>180 mm ≤200 mm
f7	–20 µm –41 µm	–25 µm –50 µm	–30 µm –60 µm	–36 µm –71 µm	–43 µm –83 µm	–50 µm –96 µm
h7	0 µm –21 µm	0 µm –25 µm	0 µm –30 µm	0 µm –35 µm	0 µm –40 µm	0 µm –46 µm

AISI 304 (1.4301)

BACI 304

STAINLESS STEEL
CHROME PLATED ROD

Standard parameters

Diameter range
8 - 60 mm

Diameter tolerance (EN ISO 286-2)
standard: f7; on request: h7

Roundness
max. 1/2 of diameter tolerance

Standard length
Ø < 60 mm: 5500 - 6200 mm
Ø ≥ 60 mm: 5500 - 7200 mm

Surface roughness
Ra max. 0,20 µm

AISI 316 (1.4401)

BACI 316

STAINLESS STEEL
CHROME PLATED ROD

Chrome layer thickness
Ø < 20 mm: min. 15 µm
Ø ≥ 20 mm: min. 20 µm

Chrome layer hardness
min. 900 $HV_{(0.1)}$

Straightness
Ø < 20 mm: max. 0,3:1000 mm
Ø ≥ 20 mm: max. 0,2:1000 mm

Residual magnetism
max. 50 Gauss

Corrosion resistance *)

Standard
BACI 304: Rating 9 after 1200 h in NSS
BACI 316: Rating 9 after 1440 h in NSS

*) corrosion resistance parameters for stainless steel chrome plated rods is approximate and is provided as solely indicative

Packaging

Standard: plastic sleeve
On request: cardboard sleeve, wooden box, seaworthy packaging, Branorost, Lamiflex

ISO tolerances by diameter range

Ø	>3 mm ≤6 mm	>6 mm ≤10 mm	>10 mm ≤18 mm	>18 mm ≤30 mm	>30 mm ≤50 mm	>50 mm ≤80 mm
f7	–10 µm –22 µm	–13 µm –28 µm	–16 µm –34 µm	–20 µm –41 µm	–25 µm –50 µm	–30 µm –60 µm
h7	0 µm –12 µm	0 µm –15 µm	0 µm –18 µm	0 µm –21 µm	0 µm –25 µm	0 µm –30 µm

E355 +SR (1.0580)

EN 10305-1/2

TUC

OUTSIDE CHROME PLATED HOLLOW ROD

Standard parameters

Diameter range
12 - 200 mm

Diameter tolerance (EN ISO 286-2)
f7

Roundness
max. 1/2 of OD tolerance

Standard length
5500 - 7000 mm

Surface roughness
Ra max. 0,20 µm

Chrome layer thickness
Ø < 20 mm: min. 15 µm
Ø ≥ 20 mm: min. 20 µm

Chrome layer hardness
min. 900 $HV_{(0.1)}$

Straightness
Ø < 20 mm: max. 0,3:1000 mm
Ø ≥ 20 mm: max. 0,2:1000 mm

Residual magnetism
max. 50 Gauss

Corrosion resistance

Standard
Ø < 20 mm: Rating 9 after 120 h in NSS
Ø ≥ 20 mm: Rating 9 after 200 h in NSS

On request
Ø ≥ 20 mm: Rating 9 after 500 h in NSS

Packaging

Standard: plastic sleeve
On request: cardboard sleeve, wooden box, seaworthy packaging, Branorost, Lamiflex

ISO tolerances by diameter range

Ø	>10 mm ≤18 mm	>18 mm ≤30 mm	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm	>180 mm ≤200 mm
f7	–16 µm –34 µm	–20 µm –41 µm	–25 µm –50 µm	–30 µm –60 µm	–36 µm –71 µm	–43 µm –83 µm	–50 µm –96 µm

E355 +SR (1.0580)

EN 10305-1/2

TUCL

OUTSIDE CHROME PLATED
INSIDE SKIVED AND ROLLER BURNISHED HOLLOW ROD

Standard parameters

Diameter range (outside diameter)
40 - 200 mm

Diameter tolerance (EN ISO 286-2)
OD: f7
ID: H8/H9, depending on wall thickness

Roundness
OD: max. 1/2 of diameter tolerance
ID: within diameter tolerance

Standard length
5000 - 7000 mm

Surface roughness
OD: Ra max. 0,20 µm
ID: Ra max. 0,40 µm

Chrome layer thickness
min. 20 µm

Chrome layer hardness
min. 900 $HV_{(0.1)}$

Straightness
Ø > 40 mm: max. 0,2:1000 mm

Residual magnetism
max. 50 Gauss

Eccentricity
EN 10305-1: max. 10% of wall thickness
EN 10305-2: max. 3% of wall thickness

Corrosion resistance

Standard
Ø < 20 mm: Rating 9 after 120 h in NSS
Ø ≥ 20 mm: Rating 9 after 200 h in NSS

On request
Ø ≥ 20 mm: Rating 9 after 500 h in NSS

Packaging

Standard: plastic sleeve
On request: cardboard sleeve, wooden box, seaworthy packaging, Branorost, Lamiflex

ISO tolerances by diameter range (OD)

Ø	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm	>180 mm ≤200 mm
f7	-25 µm -50 µm	-30 µm -60 µm	-36 µm -71 µm	-43 µm -83 µm	-50 µm -96 µm
h7	0 µm -25 µm	0 µm -30 µm	0 µm -35 µm	0 µm -40 µm	0 µm -46 µm

ISO tolerances by diameter range (ID)

Ø	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm	>180 mm ≤200 mm
H8	+39 µm 0 µm	+46 µm 0 µm	+54 µm 0 µm	+63 µm 0 µm	+72 µm 0 µm
H9	+62 µm 0 µm	+74 µm 0 µm	+87 µm 0 µm	+100 µm 0 µm	+115 µm 0 µm

E355 +SR (1.0580)

EN 10305-1

TUL

SKIVED AND ROLLER BURNISHED CYLINDER BARREL

Standard parameters

Diameter range (outside diameter)
40 - 300 mm

Diameter tolerance (EN ISO 286-2)
ID: H8

Roundness
ID: within diameter tolerance

Standard length
5000 - 8000 mm

Surface roughness
ID: Ra max. 0,40 µm

Straightness
max. 1,0:1000 mm

Total deviation
L ≤ 6 m: max. 3,5:6000 mm
L ≤ 7 m: max. 4,0:7000 mm
L ≤ 8 m: max. 4,5:8000 mm

Eccentricity
max. 10% of wall thickness

Packaging

Standard: protective oil on ID, bundles
On request: seaworthy packaging, wooden boxes, pallets

ISO tolerances by diameter range (ID)

Ø	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm	>180 mm ≤200 mm
H8	+39 µm 0 µm	+46 µm 0 µm	+54 µm 0 µm	+63 µm 0 µm	+72 µm 0 µm
H9	+62 µm 0 µm	+74 µm 0 µm	+87 µm 0 µm	+100 µm 0 µm	+115 µm 0 µm

E355 +C (1.0580)

EN 10305-2

TTS

WELDED READY TO USE CYLINDER BARREL

Standard parameters

Diameter range (outside diameter)
30 - 150 mm

Diameter tolerance (EN ISO 286-2)
ID: H9

Roundness
ID: within diameter tolerance

Standard length
5000 - 7000 mm

Surface roughness
ID: Ra max. 0,80 µm

Straightness
max. 1,0:1000 mm

Eccentricity
max. 3% of wall thickness

Packaging

Standard: protective oil on ID, bundles
On request: seaworthy packaging, wooden boxes, pallets

ISO tolerances by diameter range (ID)

Ø	>18 mm ≤30 mm	>30 mm ≤50 mm	>50 mm ≤80 mm	>80 mm ≤120 mm	>120 mm ≤180 mm
H9	+52 µm 0 µm	+62 µm 0 µm	+74 µm 0 µm	+87 µm 0 µm	+100 µm 0 µm

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