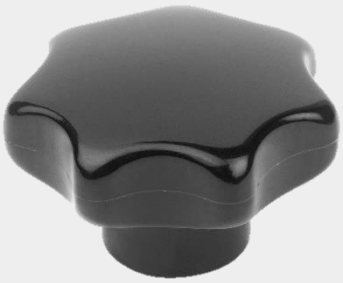
Erlemann Huckenbeck



Plastic Operating Handles

CATALOGUE EH 1100

Contents

Catalogue „EH 1100 Plastic Operating Handles“
7th issue (06/2019)

Imprint:
Erlemann & Huckenbeck GmbH & Co KG
Elberfelder Straße 122
42477 Radevormwald/Germany

Preface

ERLEMANN+HUCKENBECK. MADE IN GERMANY FOR MORE THAN 80 YEARS.

Erlemann+Huckenbeck is a manufacturer of technical moulded parts in thermoset and thermoplastic. We offer a range of stable, long-lasting operating handles. Most of them are in stock and quickly available. We also manufacture customer orders. With our own mould making dept. and a large vertical range of manufacture in Germany, we are highly flexible for customer-specific solutions and series production.

COMPANY

Ernst Erlemann and Walter Huckenbeck founded our medium-sized company in 1936. Today the operation in Radevormwald is managed by the third generation of Thorsten Scheider. 30 employees work on more than 50 production machines related to plastics processing.

CORE COMPETENCE

We are experts in high quality plastic parts. Our core competence lies in the production of technical molded parts and handles - predominantly in thermoset. These items are produced using the press and injection molding process. Products from less than a gram to large parts of 10 kg and more are manufactured on our production machines - Made in Germany.

CERTIFICATION

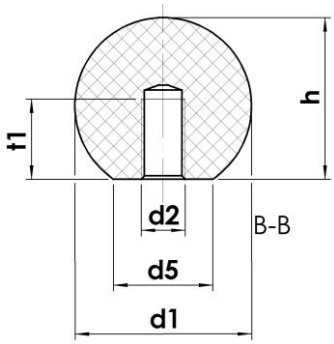
High quality materials, production in Germany and strictly optimized workflows. We attach great importance to this. That is why Erlemann+Huckenbeck is certified by DNV GL according to ISO 9001: 2015.

We would be delighted if you could also count among our satisfied customers in the future.

Sandro Luceri, Managing Director

Ball Knob DIN 319

thermosetting plastic, glossy
Form C with plastic thread



d_1	d_2		d_5 ~	h ~	t_1 min.
12	M4	---	6	11,2	6
16	M4	M5	8	15	6
20	M5	M6	12	18	7,5
25	M6	M8	15	22,5	9
32	M8	M10	18	29	12
40	M10	M12	22	37	15
50	M12	---	28	46	18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- The version C 12 x M4 is only available with a vibratory ground finish.
- The DIN standard specifies only one thread size per diameter (1st line). As a non-standard we sometimes also offer the next larger thread size (2nd line).
- We offer further sizes of ball knobs under the factory standard “EH 319” (page 11/12).
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the form identifying letter „C“
- the outside diameter d_1
- the thread size d_2

Order example:
Ball knob DIN 319 - C 25 x M6
Ball knob DIN 319 - C 40 x M12

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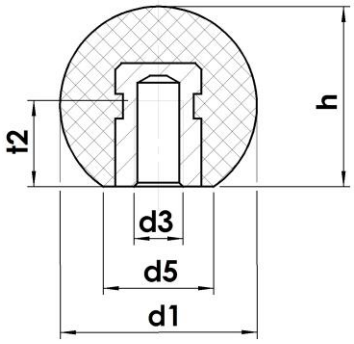
1100e_7_r2_0319_d_c

Ball Knob DIN 319

thermosetting plastic, glossy
Form E with bush made of electro zinc-plated steel or brass



d_1	d_3		d_5 ~	h ~	t_2 min.
16	M4	---	8	15	6
20	M5	M6	12	18	7,5
25	M6	M8	15	22,5	9
32	M8	M10	18	29	12
40	M10	M12	22	37	15
50	M12	---	28	46	18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel
- Brass (non-standard)
  Version E 16 x M4 with brass bush only

Remarks:

- The DIN standard specifies only one thread size per diameter (1st line). As a non-standard we sometimes also offer the next larger thread size (2nd line).
- We offer further sizes of ball knobs under the factory standard “EH 319” (page 11/12).
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the form identifying letter „E“
- the outside diameter d_1
- the thread size d_3
- the suffix “Ms”, if a brass bush is required

Order example:
Ball knob DIN 319 - E 20 x M6
Ball knob DIN 319 - E 32 x M8 Ms

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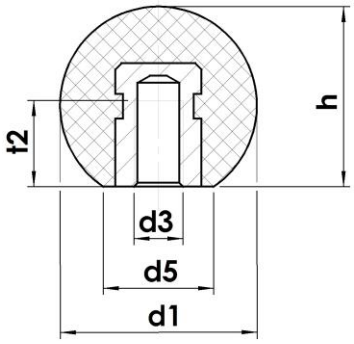
Ball Knob DIN 319

thermosetting plastic, glossy
Form E with bush made of stainless steel



d_1	d_3	d_5 ~	h ~	t_2 min.
20	M5	12	18	7,5
25	M6	15	22,5	9
32	M8	18	29	12
40	M10	22	37	15
50	M12	28	46	18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Stainless steel (A2)

Remarks:

- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the form identifying letter „E“
- the outside diameter d_1
- the thread size d_3
- the suffix „A2“

Order example:
Ball Knob DIN 319 - E 20 x M5 A2
Ball Knob DIN 319 - E 50 x M12 A2

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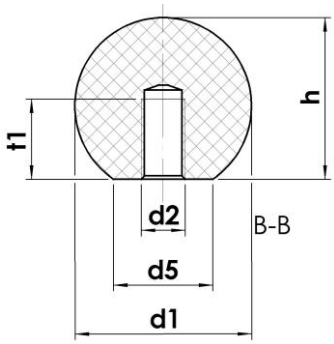
Ball Knob DIN 319

thermoplastic, matt
Form C with plastic thread



d_1	d_2		d_5 ~	h ~	t_1 min.
16	M4	M5	8	15	6
20	M5	M6	12	18	7,5
25	M6	M8	15	22,5	9
32	M8	M10	18	29	12
40	M10	M12	22	37	15

Execution:

Plastic:
- thermoplastic, glass reinforced PA6, matt, black

Remarks:

- The DIN standard specifies only one thread size per diameter (1st line). As a non-standard we also offer the next larger thread size (2nd line)
- The sizes 12 and 50 mm is only available in the thermoset version.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the letter “T” for thermoplastic
- the form identifying letter „C“
- the outside diameter d_1
- the thread size d_2

Order example:
Ball knob DIN 319 - TC 25 x M6
Ball knob DIN 319 - TC 40 x M12

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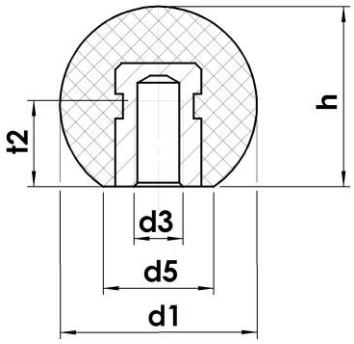
1100e_7_r2_0319_t_c

Ball Knob DIN 319

thermoplastic, matt
Form E with bush made of electro zinc-plated steel or brass



d_1	d_3		d_5 ~	h ~	t_2 min.
20	M5	M6	12	18	7,5
25	M6	M8	15	22,5	9
32	M8	M10	18	29	12

Execution:

Plastic:
- thermoplastic, glass reinforced PA6, matt, black

Bush:
- Electro zinc-plated steel
- Brass (non-standard)

Remarks:

- The DIN standard specifies only one thread size per diameter (1st line). As a non-standard we also offer the next larger thread size (2nd line)
- The sizes 12, 16, 40 and 50 mm are only available in the thermoset version.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the letter “T” for thermoplastic
- the form identifying letter „E“
- the outside diameter d_1
- the thread size d_3
- the suffix “Ms”, if a brass bush is required

Order example:
Ball knob DIN 319 - TE 20 x M6
Ball knob DIN 319 - TE 32 x M8 Ms

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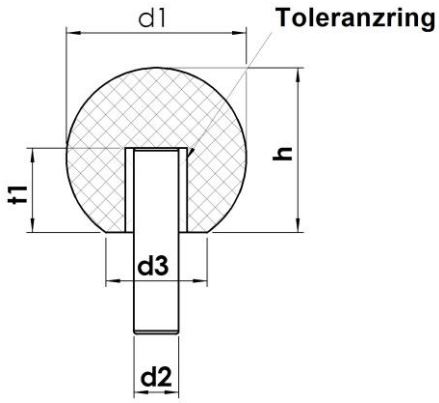
1100e_7_r2_0319_t_e

Ball Knob DIN 319

thermosetting plastic, glossy
Form L with tolerance ring
for pressing on shafts without thread



d_1	d_2		d_3 ~	h ~	t_1 ~
16	4	---	8	15	11
20	5	---	12	18	13
25	6	8	15	22,5	16 / 15
32	8	10	18	29	15 / 20
40	10	12	22	37	20 / 23
50	12	16	28	46	20 / 23

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Tolerance ring:
- Carbon steel / Stainless steel

Remarks:

- Form L DIN 319 ball knobs are used where the mating part does not have a thread. They are lightly tapped onto the mating part (shaft tolerance h9, shaft end lightly chamfered) using a soft faced hammer and hold with adhesive.
- The tolerance ring is supplied loose for self-installation.
- As the material thermoset is very brittle, where possible the thermoplastic versions (only Form M size 16 to 40 mm) should be preferred.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the form identifying letter „L“
- the outside diameter d_1
- the shaft dimension d_2

Order example:
Ball knob DIN 319 - L 16 x 4
Ball knob DIN 319 - L 32 x 10

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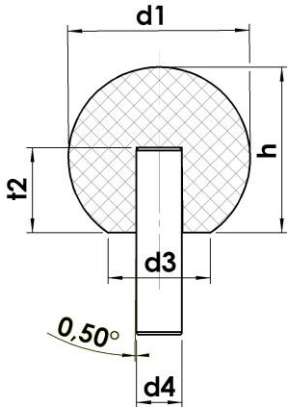
1100e_7_r2_0319_d_l

Ball Knob DIN 319

thermosetting plastic, glossy
Form M with conical bore
for pressing on shafts without thread



d_1	d_3 ~	d_4		h ~	t_2 ~
16	8	4	---	15	9
20	12	5	---	18	12
25	15	6	8	22,5	15
32	18	8	10	29	15
40	22	10	12	37	20
50	28	12	16	46	22

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- Form M DIN 319 ball knobs are used where the opposing part does not have a thread. They are lightly tapped onto the mating part (shaft tolerance h9, shaft end lightly chamfered) using a soft faced hammer and hold with adhesive.
- As the material thermoset is very brittle, where possible the thermoplastic versions (only Form M size 16 to 40 mm) should be preferred.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the form identifying letter „M“
- the outside diameter d_1
- the shaft dimension d_4

Order example:
Ball knob DIN 319 - M 20 x 5
Ball knob DIN 319 - M 40 x 12

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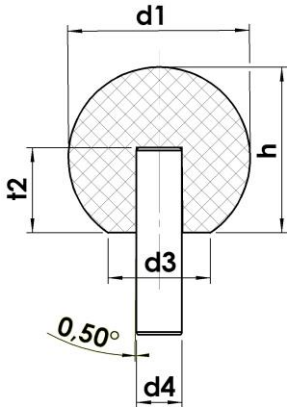
1100e_7_r2_0319_d_m

Ball Knob DIN 319

thermoplastic, matt
Form M with conical bore
for pressing on shafts without thread



d_1	d_3 ~	d_4		h ~	t_2 ~
16	8	4	---	15	9
20	12	5	---	18	12
25	15	6	8	22,5	15
32	18	8	10	29	15
40	22	10	12	37	20

Execution:

Plastic:
- thermoplastic, glass reinforced PA6, matt, black

Remarks:

- Form M DIN 319 ball knobs are used where the opposing part does not have a thread. They are lightly tapped onto the mating part (shaft tolerance h9, shaft end lightly chamfered) using a soft faced hammer and hold with adhesive.
- The size 50 mm is only available in the thermoset version.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 319“
- the letter “T” for thermoplastic
- the form identifying letter „M“
- the outside diameter d_1
- the shaft dimension d_4

Order example:
Ball knob DIN 319 - TM 20 x 5
Ball knob DIN 319 - TM 32 x 10

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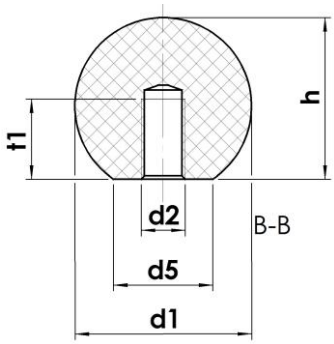
Ball Knob EH 319

thermosetting plastic, glossy
Form C with plastic thread



d_1	d_2		d_5 ~	h ~	t_1 min.
18	M5	---	10	17	7,5
22	M6	---	12	20	9
28	M8	---	15,5	26	12
30	M8	---	16	28,5	12
36	M8	M10	16,5	34,5	12
45	M10	M12	17	44	15

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- DIN 319 specifies only 7 ball knob sizes, some of which are not suitable for certain applications. Therefore we offer further sizes and designs under the designation “Ball knob EH 319”.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 319“
- the form identifying letter „C“
- the outside diameter d_1
- the thread size d_2

Order example:
Ball knob EH 319 - C 22 x M6
Ball knob EH 319 - C 36 x M10

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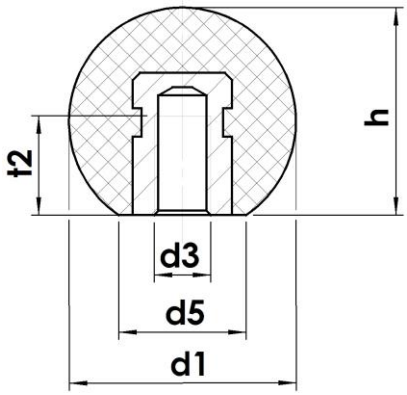
Ball Knob EH 319

thermosetting plastic, glossy
Form E with bush made of electro zinc-plated steel



d_1	d_3		d_5 ~	h ~	t_2 min.
18	---	---	10	17	7,5
22	M6	---	12	20	9
28	M8	---	15,5	26	12
30	M8	---	16	28,5	12
36	M10	---	16,5	34,5	15
45	M10	M12	17	44	15

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel

Remarks:

- DIN 319 specifies only 7 ball knob sizes, some of which are not suitable for certain applications. Therefore we offer further sizes and designs under the designation “Ball knob EH 319”.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 319“
- the form identifying letter „E“
- the outside diameter d_1
- the thread size d_3

Order example:
Ball knob EH 319 - E 22 x M6
Ball knob EH 319 - E 45 x M10

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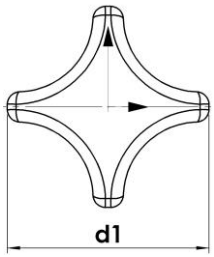
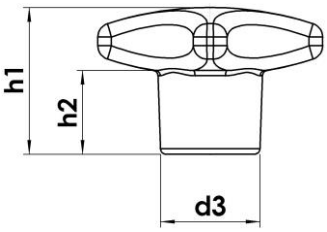
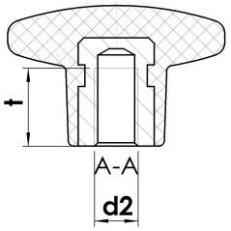
Palm Grip DIN 6335

thermosetting plastic, glossy
Form K with bush made of electro zinc-plated steel or brass







d_1	d_2	d_3 ~	h_1 ~	h_2 ~	t min.
20	M4	10	13	6	6,5
25	M5	12	16	8	9,5
32	M6	14	20	10	12
40	M8	18	25	13	14
50	M10	22	32	20	18
63	M12	26	40	25	22
80	M16	35	50	30	30
100	M20	34	65	38	30

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel
- Brass (non-standard)
  Version K 20 x M4 with brass bush only

Remarks:

- The size 100 mm is not specified in the DIN standard.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6335“
- the form identifying letter „K“
- the head diameter d_1
- the thread size d_2
- the suffix “Ms”, if a brass bush is required

Order example:
Palm grip DIN 6335 - K 25 x M5
Palm grip DIN 6335 - K 40 x M8 Ms

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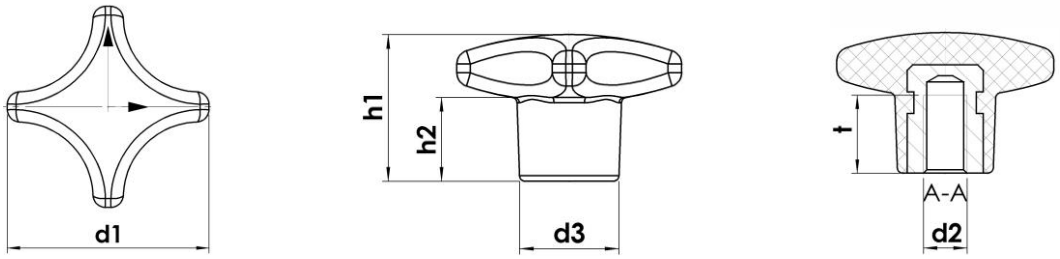
1100e_7_r2_6335_d_k

Palm Grip DIN 6335

thermosetting plastic, glossy
Form K with bush made of stainless steel



d_1	d_2	d_3 ~	h_1 ~	h_2 ~	t min.
25	M5	12	16	8	7,5
32	M6	14	20	10	9
40	M8	18	25	13	12
50	M10	22	32	20	15
63	M12	26	40	25	18
80	M16	35	50	30	24

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Stainless steel (A2)

Remarks:

- Please note: the effective thread depth (t min.) by this version is shorter compared to the current standard.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6335“
- the form identifying letter „K“
- the head diameter d_1
- the thread size d_2
- the suffix “A2”

Order example:
Palm grip DIN 6335 - K 25 x M5 A2
Palm grip DIN 6335 - K 40 x M8 A2

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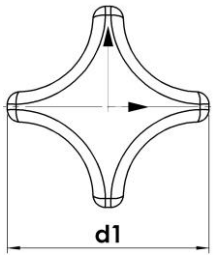
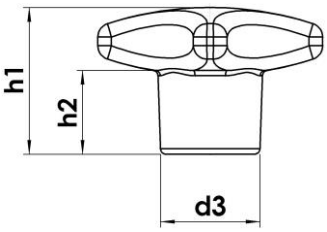
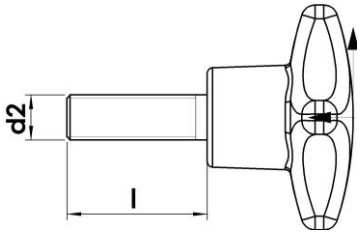
1100e_7_r2_6335_d_k_n

Palm Grip DIN 6335

thermosetting plastic, glossy
Form K with threaded pin made of electro zinc-plated steel
complies with DIN 6335, Form L







d_1	d_2	d_3 ~	h_1 ~	h_2 ~	l	l *
20	M4	10	13	6	15 20	10 25 30
25	M5	12	16	8	15 20 25	10 30
32	M6	14	20	10	20 30 40	10 15 25 35
40	M8	18	25	13	20 30 40 50	15 25 35 45
50	M10	22	32	20	25 30 40 50	20 35 45
63	M12	26	40	25	30 40 50 60	20 35 35
80	M16	35	50	30	30 40 50 60	20
100	M20	34	65	38	---	40 50 60

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- The DIN standard only provides for 2 to 4 pin lengths each (column l). In addition, further non-standard pin lengths (row l*) are available.
- The size 100 mm is not specified in the DIN standard.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6335“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_2
- the pin length l

Order example:
Palm grip DIN 6335 - B 20 x M4 x 20
Palm grip DIN 6335 - B 50 x M10 x 40

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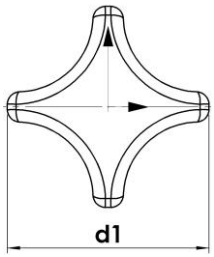
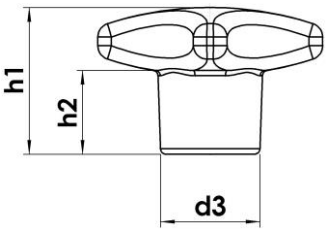
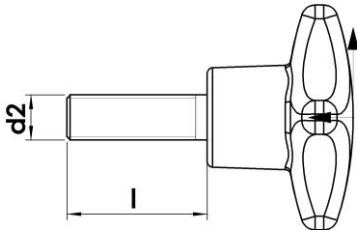
1100e_7_r2_6335_d_b

Palm Grip DIN 6335

thermosetting plastic, glossy
Form K with threaded pin made of stainless steel
complies with DIN 6335, Form L







d_1	d_2	d_3 ~	h_1 ~	h_2 ~	l
25	M5	12	16	8	15 20 25
32	M6	14	20	10	20 30 40
40	M8	18	25	13	20 30 40 50
50	M10	22	32	20	25 30 40 50
63	M12	26	40	25	30 40 50 60
80	M16	35	50	30	30 40 50 60

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Stainless steel (A2)

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6335“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_2
- the pin length l
- the suffix “A2”

Order example:
Palm grip DIN 6335 - B 32 x M6 x 30 A2
Palm grip DIN 6335 - B 63 x M12 x 40 A2

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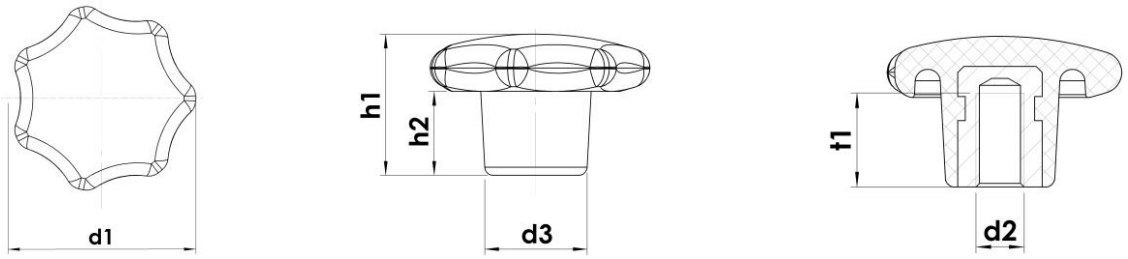
Star Knob DIN 6336

thermosetting plastic, glossy
Form K with bush made of electro zinc-plated steel or brass



d_1	d_2	d_3 ~	h_1 ~	h_2 ~	t_1 min.
20	M4	10	13	7	6,5
25	M5	12	16	8	9,5
32	M6	14	20	10	12
40	M8	18	25	13	14
50	M10	22	32	17	18
63	M12	26	40	21	22
80	M16	35	50	25	30

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel
- Brass (non-standard)
  Version K 20 x M4 with brass bush only

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6336“
- the form identifying letter „K“
- the head diameter d_1
- the thread size d_2
- the suffix “Ms”, if a brass bush is required

Order example:
Star knob DIN 6336 - K 20 x M4 Ms
Star knob DIN 6336 - K 63 x M12

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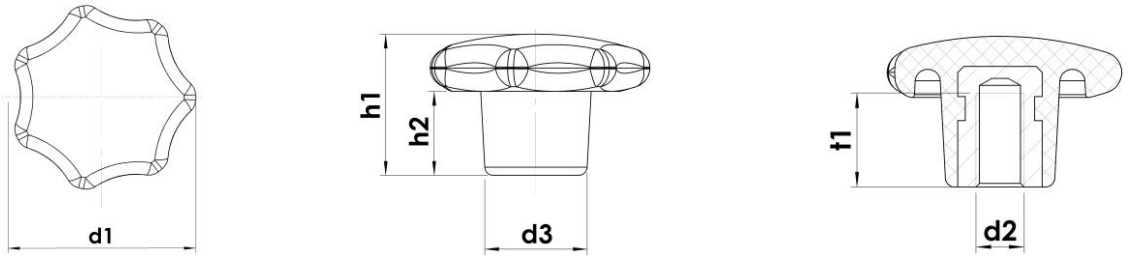
1100e_7_r2_6336_d_k

Star Knob DIN 6336

thermosetting plastic, glossy
Form K with bush made of stainless steel



d_1	d_2	d_3 ~	h_1 ~	h_2 ~	t_1 min.
25	M5	12	16	8	7,5
32	M6	14	20	10	9
40	M8	18	25	13	12
50	M10	22	32	17	15
63	M12	26	40	21	18
80	M16	35	50	25	24

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Stainless steel (A2)

Remarks:

- Please note: the effective thread depth (t1 min.) by this version is shorter compared to the current standard.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6336“
- the form identifying letter „K“
- the head diameter d_1
- the thread size d_2
- the suffix “A2”

Order example:
Star knob DIN 6336 - K 25 x M5 A2
Star knob DIN 6336 - K 40 x M8 A2

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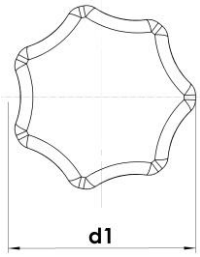
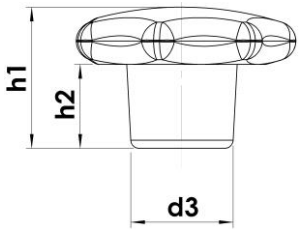
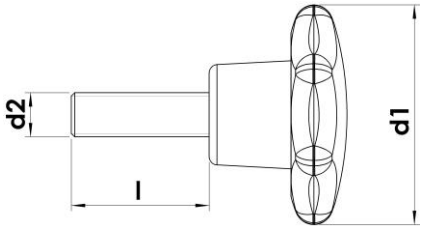
1100e_7_r2_6336_d_k_n

Star Knob DIN 6336

thermosetting plastic, glossy
Form B with threaded pin made of electro zinc-plated steel
complies with DIN 6336, Form L







d_1	d_2	d_3 ~	h_1 ~	h_2 ~	l	l *
20	M4	10	13	7	15 20	10 25 30
25	M5	12	16	8	15 20 25	10 30
32	M6	14	20	10	20 30 40	10 15 25 35
40	M8	18	25	13	20 30 40 50	15 25 35 45
50	M10	22	32	17	25 30 40 50	20 35 45
63	M12	26	40	21	30 40 50 60	20 25 35
80	M16	35	50	25	30 40 50 60	20

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- The DIN standard only provides for 2 to 4 pin lengths each (column l). In addition, further non-standard pin lengths (row l*) are available.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6336“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_2
- the pin length l

Order example:
Star knob DIN 6336 - B 32 x M6 x 30
Star knob DIN 6336 - B 80 x M16 x 50

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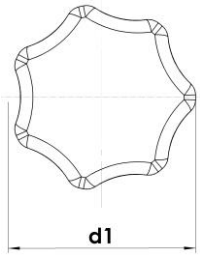
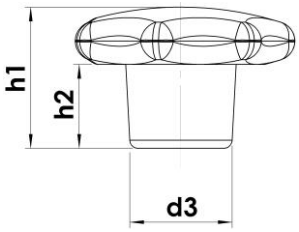
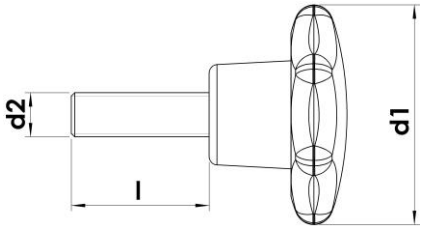
1100e_7_r2_6336_d_b

Star Knob DIN 6336

thermosetting plastic, glossy
Form B with threaded pin made stainless steel
complies with DIN 6336, Form L







d_1	d_2	d_3 ~	h_1 ~	h_2 ~	l
25	M5	12	16	8	15 20 25
32	M6	14	20	10	20 30 40
40	M8	18	25	13	20 30 40 50
50	M10	22	32	17	25 30 40 50
63	M12	26	40	21	30 40 50 60
80	M16	35	50	25	30 40 50 60

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Stainless steel (A2)

Remarks:

- The DIN standard only provides for 2 to 4 pin lengths each (column l). In addition, further non-standard pin lengths (row l*) are available.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6336“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_2
- the pin length l
- the suffix “A2”

Order example:
Star knob DIN 6336 - B 32 x M6 x 20 A2
Star knob DIN 6336 - B 63 x M12 x 30 A2

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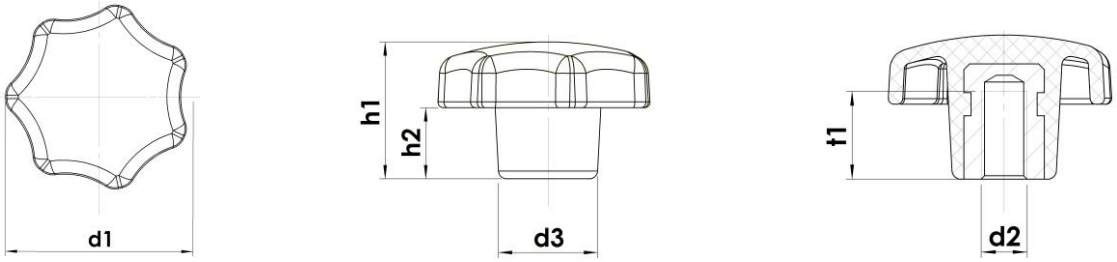
1100e_7_r2_6336_d_b_n

Star Knob DIN 6336

thermoplastic, matt
Form K with bush made of electro zinc-plated steel or brass



d_1	d_2	d_3 ~	h_1 ~	h_2 ~	t_1 min.
32	M6	14	20	10	12
40	M8	18	25	13	14
50	M10	22	32	17	18
63	M12	26	40	21	22
80	M16	35	50	25	30

Execution:

Plastic:
- thermoplastic, glass reinforced PA6, matt, black

Bush:
- Electro zinc-plated steel
- Brass (non-standard)

Remarks:

- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6336“
- the letter “T” for thermoplastic
- the form identifying letter „K“
- the head diameter d_1
- the thread size d_2
- the suffix “Ms”, if a brass bush is required

Order example:
Star knob DIN 6336 - TK 32 x M6
Star knob DIN 6336 - TK 63 x M12 Ms

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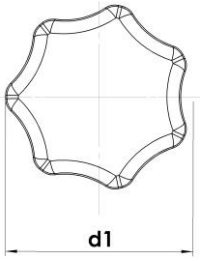
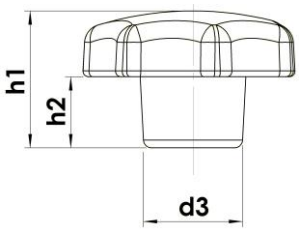
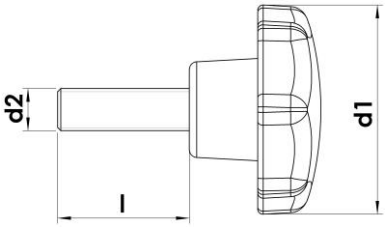
Star Knob DIN 6336

thermoplastic, matt
Form B with threaded pin made of electro zinc-plated steel
complies with DIN 6336, Form L







d_1	d_2	d_3 ~	h_1 ~	h_2 ~	l
32	M6	14	20	10	20 30 40
40	M8	18	25	13	20 30 40 50
50	M10	22	32	17	25 30 40 50
63	M12	26	40	21	30 40 50 60
80	M16	35	50	25	30 40 50 60

Execution:

Plastic:
- thermoplastic, glass reinforced PA6, matt, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- The stated pin lengths correspond to the DIN standard. Other pin lengths are also available on request.
- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 6336“
- the letter “T” for thermoplastic
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_2
- the pin length l

Order example:
Star knob DIN 6336 - TB 40 x M8 x 40
Star knob DIN 6336 - TB 63 x M12 x 50

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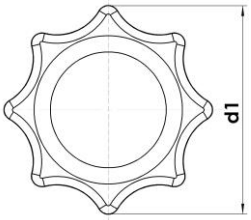
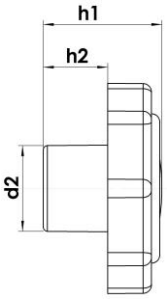
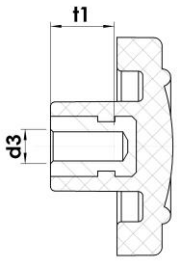
1100e_7_r2_6336_t_b

Star Knob EH 4000

thermosetting plastic, glossy
Form K with bush made of electro zinc-plated steel







d_1	d_2 ~	d_3	h_1 ~	h_2 ~	t_1 min.
30	14	M5 M6	20,5	10,5	7,5 9
40	18	M6 M8	26	15	9 12
50	20,5	M8 M10	28,5	15,5	12 15
60	23	M10 M12	36	22	15 18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4000“
- the form identifying letter „K“
- the head diameter d_1
- the thread size d_2

Order example:
Star knob EH 4000 - K 40 x M6
Star knob EH 4000 - K 50 x M10

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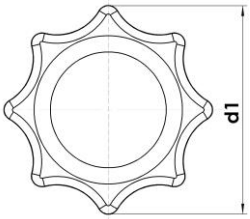
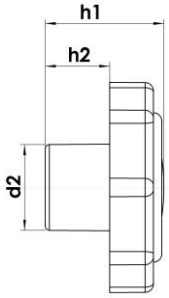
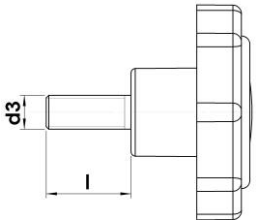
Star Knob EH 4000

thermosetting plastic, glossy
Form B with threaded pin made of electro zinc-plated steel







d_1	d_2 ~	d_3	h_1 ~	h_2 ~	h_3 ~	l
30	14	M6	20,5	10,5	10	15 20 30
40	18	M8	26	15	11	15 20 30
50	20,5	M8 M10	28,5	15,5	13	20 30 40 20 30 40
60	23	M12	36	22	14	20 30 40

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4000“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_2
- the pin length l

Order example:
Star knob EH 4000 - B 30 x M6 x 15
Star knob EH 4000 - B 60 x M12 x 20

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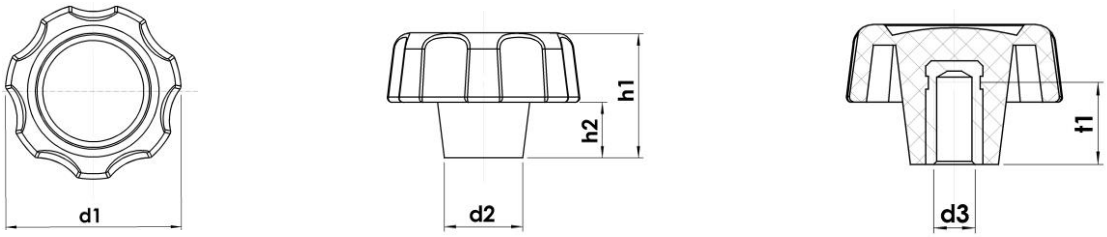
Star Knob EH 2200

thermoplastic, matt
Form K with bush made of electro zinc-plated steel



d_1	d_2	d_3 ~	h_1 ~	h_2 ~	t_1 min.
22	9	M4 M5	23	9	6 7,5
28	13	M5 M6	24	10	7,5 9
35	15	M6 M8	23	10	9 12
42	17	M8 M10	27	12	12 15
50	22	M10	32	14	15
60	25	M12	35	17	18

Execution:

Plastic:
- thermoplastic, glass reinforced PA6, matt, black

Bush:
- Electro zinc-plated steel
- K 22 x M4/M5 have a brass bush

Remarks:

- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 2200“
- the form identifying letter „K“
- the head diameter d_1
- the thread size d_3

Order example:
Star knob EH 2200 - K 22 x M4 Ms
Star knob EH 2200 - K 42 x M8

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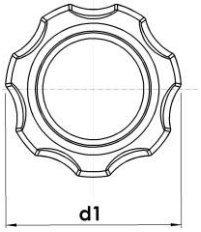
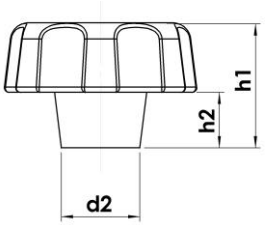
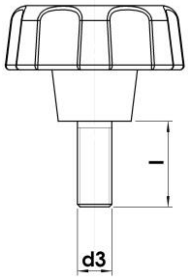
Star Knob EH 2200

thermoplastic, matt
Form B with threaded pin made of electro zinc-plated steel







d_1	d_2	d_3 ~	h_1 ~	h_2 ~	l
22	9	M5	23	9	10 15 20
28	13	M5 M6	24	10	10 15 20 15 20 30
35	15	M6 M8	23	10	15 20 30 15 20 30 40
42	17	M8 M10	27	12	15 20 30 40 20 30 40 50
50	22	M10	32	14	20 30 40
60	25	M12	35	17	20 30 40

Execution:

Plastic:
- thermoplastic, glass reinforced PA6, matt, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- Other versions and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 2200“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_3
- the pin length l

Order example:
Star knob EH 2200 - B 28 x M6 x 20
Star knob EH 2200 - B 50 x M10 x 40

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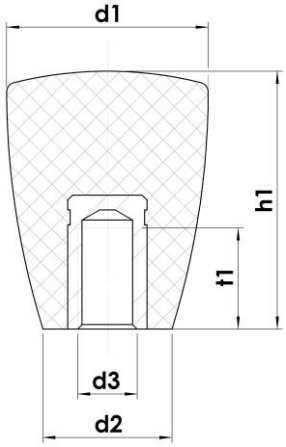
1100e_7_r2_2200_t_b

Knob Handle EH 4520

thermosetting plastic, glossy
Form E with bush



d_1	d_2	d_3	h_1	t_1 min.
20	10	M4 M5	12	6 7,5
22	12	M6 M8	30	9 12
30	20	M8	40	12
39	26	M12	52	18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel
- E 20 x M4/M5 have a brass bush

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

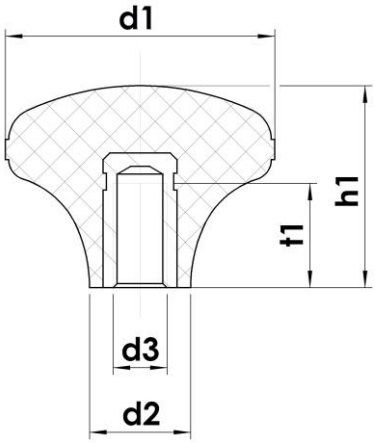
our article code:

The article description consists of
- the works standard „EH 4520“
- the form identifying letter „E“
- the head diameter d_1
- the thread size d_3

Order example:
Knob handle EH 4520 - E 20 x M5 Ms
Knob handle EH 4520 - E 39 x M12

Knob Handle EH 4580

thermosetting plastic, glossy
Form E with bush



d_1	d_2 ~	d_3	h_1 ~	t_1 min.
40	15	M8	30	12
50	20	M10	37	12

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4580“
- the form identifying letter „E“
- the head diameter d_1
- the thread size d_3

Order example:
Knob handle EH 4580 - E 40 x M8
Knob handle EH 4580 - E 50 x M10

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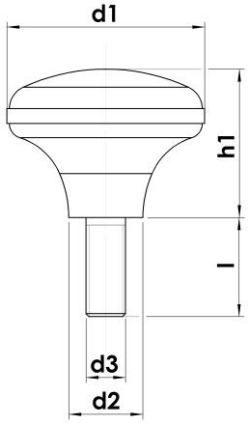
Knob Handle EH 4580

thermosetting plastic, glossy
Form B with threaded pin



d_1	d_2 ~	d_3	h_1 ~	l
40	15	M8	30	15 20 30 40
50	20	M8	37	20 30 40

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4580“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_3
- the pin length l

Order example:
Knob handle EH 4580 - B 40 x M8 x 15
Knob handle EH 4580 - B 50 x M10 x 40

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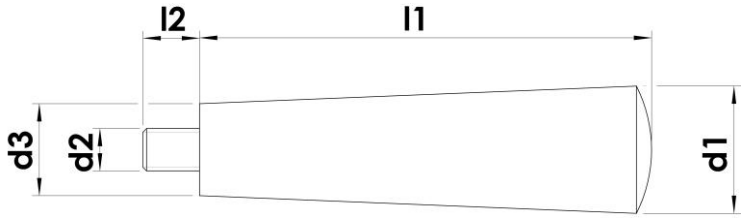
Tapered Handle EH 4430

thermosetting plastic, glossy
Form B with threaded pin



d_1	d_2	d_3	l_1	l_2
12	M5	9	40	7
15	M5 M6	11	50	7 8
18	M6	13	64	8
21	M6 M8	15	72	8 10 10
25	M8	17	90	10
26	M8 M10	20	100	10 12

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4430“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_2
- the pin length l

Order example:
Tapered handle EH 4430 - B 15 x M6 x 8
Tapered handle EH 4430 - B 21 x M6 x 10

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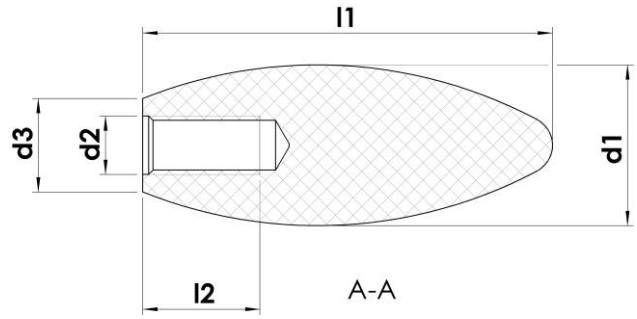
Baling Handle EH 4100

thermosetting plastic, glossy
Form C with plastic thread



d_1	d_2	d_3	l_1	l_2 min.
23	M6 M8	14	60	17 22
26	M8 M10	16	70	19 25
35	M10 M12	22	85	25 25

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4100“
- the form identifying letter „C“
- the head diameter d_1
- the thread size d_2

Order example:
Baling handle EH 4100 - C 23 x M6
Baling handle EH 4100 - C 35 x M12

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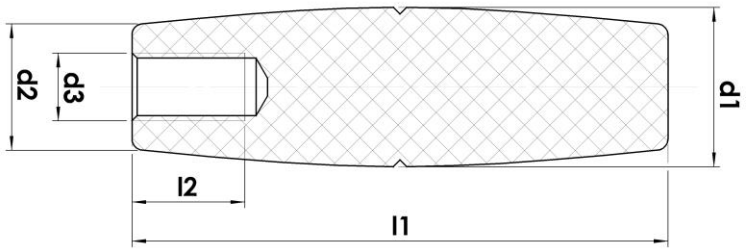
Baling Handle EH 4120

thermosetting plastic, glossy
Form C with plastic thread



d_1	$d_{2\sim}$	d_3	l_1	l_2 min.
28	22	M12	95	20

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- This article is identified by a circumferential groove.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4120“
- the form identifying letter „C“
- the head diameter d_1
- the thread size d_3

Order example:
Baling handle EH 4120 - C 28 x M12

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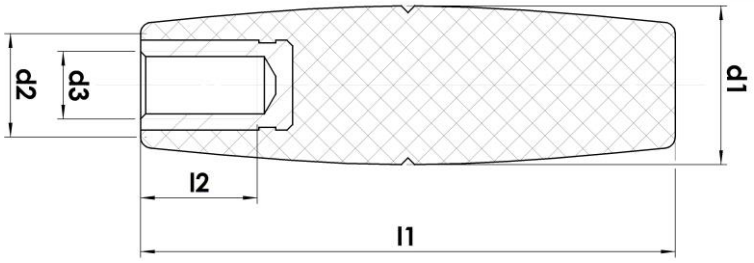
Baling Handle EH 4120

thermosetting plastic, glossy
Form E with bush



d_1	$d_{2\sim}$	d_3	l_1	l_2 min.
28	22	M10 M12	95	15 18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel

Remarks:

- This article is identified by a circumferential groove.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4120“
- the form identifying letter „E“
- the head diameter d_1
- the thread size d_3

Order example:
Baling handle EH 4120 - E 28 x M12

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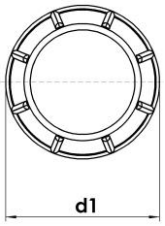
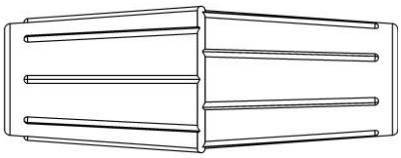
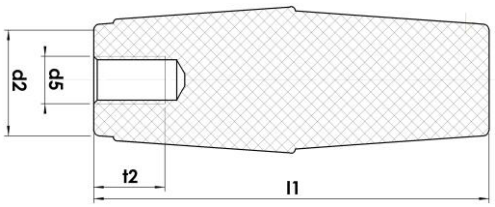
Hand Grip EH 4300

thermosetting plastic, glossy
Form C with plastic thread







d_1	$d_{2\sim}$	d_5	l_1	t_2 min.
37	28	M12	100	18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4300“
- the form identifying letter „C“
- the head diameter d_1
- the thread size d_5

Order example:
Hand grip EH 4300 - C 37 x M12

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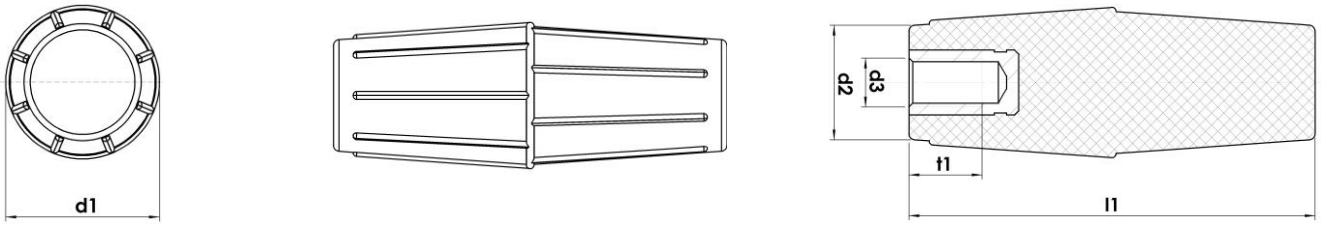
Hand Grip EH 4300

thermosetting plastic, glossy
Form E with bush



d_1	$d_{2\sim}$	d_3	l_1	t_1 min.
37	28	M10 M12	100	15 18

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4300“
- the form identifying letter „E“
- the head diameter d_1
- the thread size d_3

Order example:
Hand grip EH 4300 - E 37 x M10
Hand grip EH 4300 - E 37 x M12

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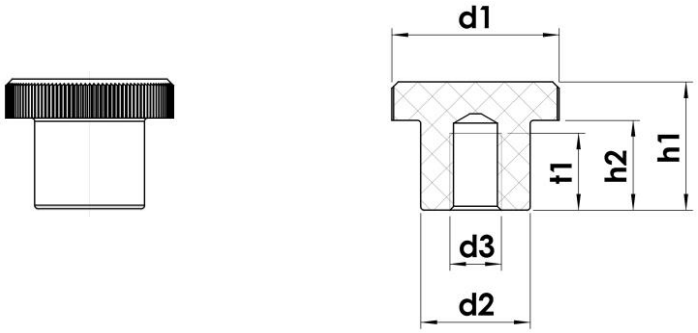
Knurled Knob EH 4630

thermosetting plastic, glossy
Form C with plastic thread



d_1	d_2 ~	d_3	h_1 ~	h_2 ~	t_1 min.
22	12	M5 M6	13	7	7,5 9
26	17	M6 M8	20	14	9 12

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4630“
- the form identifying letter „C“
- the head diameter d_1
- the thread size d_3

Order example:
Knurled knob EH 4630 - C 22 x M6
Knurled knob EH 4630 - C 26 x M8

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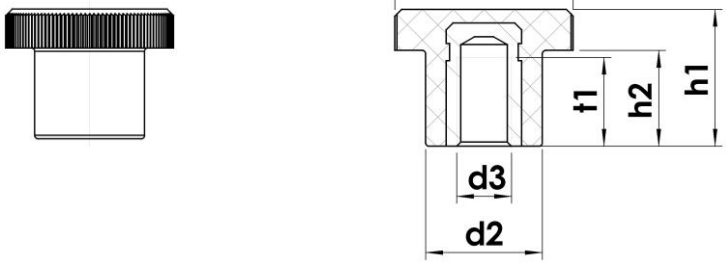
Knurled Knob EH 4630

thermosetting plastic, glossy
Form E with bush



d_1	d_2 ~	d_3	h_1 ~	h_2 ~	t_1 min.
22	12	M5 M6	13	7	7,5 6
26	17	M6 M8	20	14	9 10

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Bush:
- Electro zinc-plated steel where d1 = 26
- Brass where d1 = 22

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4630“
- the form identifying letter „E“
- the head diameter d_1
- the thread size d_3

Order example:
Knurled knob EH 4630 - E 22 x M5 Ms
Knurled knob EH 4630 - E 26 x M6

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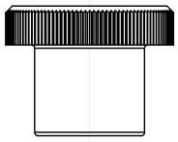
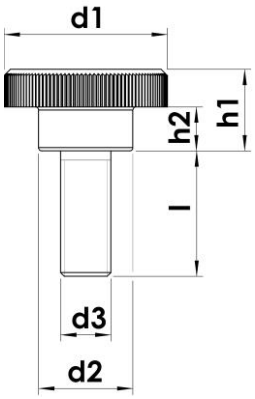
1100e_7_r2_4630_d_e

Knurled Screw EH 4640

thermosetting plastic, glossy
Form E with threaded pin





d_1	d_2 ~	d_3	h_1 ~	h_2 ~	l
22	12	M5 M6	13	6	10 15 20 10 15 20 30
26	15	M6 M8	13	6	10 15 20 30 10 15 20 30

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Threaded pin:
- Electro zinc-plated steel

Remarks:

- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the works standard „EH 4640“
- the form identifying letter „B“
- the head diameter d_1
- the thread size d_3
- the pin length l

Order example:
Knurled screw EH 4640 - B 22 x M5 x 15
Knurled screw EH 4640 - B 26 x M8 x 30

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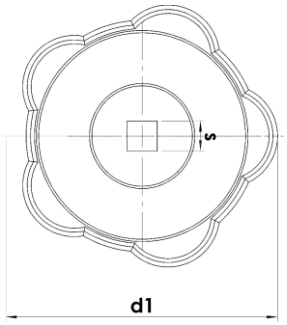
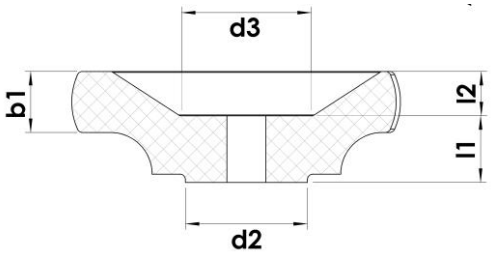
Hand Wheel DIN 388

thermosetting plastic, glossy
Form C with ripple rim and plastic square





d_1	s H11	b_1 ~	d_2 ~	d_3 ~	l_1 ~	l_2 ~
50	6	10	22	22	12	6
63	7	11	22	24	12	8
80	8	12	28	28	14	8

Execution:

Plastic:
- Thermoset, PF 31, highly polished, black

Remarks:

- The standard 388 has now been withdrawn. However, the hand wheel is still available from us.
- Other versions (specifically with special reinforcing parts according to customer specifications) and colours on request.
- Technical information see page 44 ff.

our article code:

The article description consists of
- the standard „DIN 388“
- the form identifying letter „C“
- the outside diameter d_1
- the square s

Order example:
Hand wheel DIN 388 – C 50 x 6
Hand wheel DIN 388 – C 80 x 8

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1100e_7_r2_0388_d_c

Technical Information

I. Execution notes

All of our handles are compactly implemented, therefore not, as many similar products available at the market, hollow. Articles of thermosetting moulding compounds are generally deburred; such ones of thermoplastic moulding compounds are flash free due to the method. All inserted bushes and pins are form-locked and moulded. It does not consequently exist the risk that the armouring parts - also when loaded permanently - resolve themselves.

II. Used plastics, characteristics

In the case of the thermosetting articles we use the moulding compound PF 31, well known as “Bakelite”. The thermoplastic handles are made of high-quality glass reinforced polyamide 6 (nylon, PA6 GV). Subsequently we mention some characteristic values of these raw materials *:

property	norm	PF 31	PA6 GV
density	ISO 1183	1,35 g/cm^3	1,35 g/cm^3
flexural strength	ISO 178	70-100 MPa	---
tensile strength	ISO 527	---	160 N/mm^2
flexural modus	ISO 178	6-8 kN/mm^2	---
tensile modus	ISO 527	---	9 kN/mm^2
Charpy notched impact strength	ISO 179	1,5-2,0 kJ/m^2	10-13 kJ/m^2
max. application temperature	DIN 44904	120-140 °C	80-100 °C
flammability	UL 94	V0 / 3,2 mm	---
well constant against (selection)		water alcohol petrol mineral oil grease	petrol oil grease light bases some alcohols
not or not well well constant against (selection)		boiling water strong bases strong acids	mineral acids strong bases glycols

* all information is based on manufacturer’s specifications and therefore, not binding standard values are only

Technical Information

III. Coloring

The coloring of our handles is black in standard; the color red (approx. RAL 3003) represents a Substandard for Ball Knobs DIN 319 (Forms C and E). As special production multiple other colors are possible, here thermoplastic articles are advantageous because these raw materials can be dyed ourselves, whereas thermosetting materials have to be purchased as colored compound.

IV. Differing executions, possibilities

In our catalogue usual executions are mentioned concerning bores, screw threads and armouring parts. In excess of these specifications various other executions are still available without special costs, which could not be listed on account of the limited position possibilities. If you should not find the required execution we ask for your purposeful inquiry. Particularly we would like to refer here to our diverse possibilities; almost any geometry of inserted armouring parts (specific ends of screw thread, crossing bores, fine-pitch threads etc.) is possible. Furthermore, bushes and bolts materials differing from standard (high-grade steel, brass etc.) and surface treatment (burnishing, nickel plating etc.) are possible of course. Also there are several possibilities of special raw materials to be used for any purpose, such as in the case of highest thermal stress to 300 °C, during special electrical requirements or in highly shockproof ranges).

V. Screw thread dimensional accuracy

The armouring parts pressed in or injected (bushes and bolts) are made of steel (at least strength class 4.8) produced and general with a layer thickness of 6 to 8 µm dovetailed. The limits of size normally correspond to the tolerance zone 6g at male threads and 6H with internal screw-threads (teaching test). At male threads in excess widths (> 40 mm) or such ones in M4 resp. M16 and larger, it can come for tolerance zone displacement in exceptions after 6h. Concerning plastic threading (without bush) these allowances as a rule cannot be kept for manufacturing reasons, the test occurs by means of standard screws.

Technical Information

VI. General allowances

Our manufacturing and inspection of the control elements may fit if not different specified, the general tolerances in accordance with DIN 16742 (plastic) and DIN 7168m (armouring part) as a basis. For measures without function tolerances might not be kept. Bolts those decree more than one screw thread exhaust passage after DIN 76 are case-hardened differingly from this in the case of articles with male threads (as a rule 2 to 3 mm of screw thread exhaust passage). The protruding length of the threaded bolts it is for manufacturing reasons tolerated +/- 0.5 mm (at protruding length to 50 mm) and +/- 0.7 (at protruding length over 50 mm).

General terms and conditions of the plastics processing industry (T&Cs of the PPI)

As of: 27 November 2001

Validity: the provisions below shall apply only with respect to business persons, legal persons under public law and special funds under public law.

I. Application

1. Orders shall only become binding once they have been confirmed by the supplier. Changes and additions are to be made in writing. All quotations are without obligation unless they are designated as binding quotations.
2. In the case of regular business transactions, these terms and conditions also apply to future transactions even if no explicit reference is made to them, provided that the customer has been advised of these terms and conditions as part of an earlier order confirmed by the supplier.
3. Terms and conditions of the customer shall not apply unless the supplier explicitly accepts them.
4. If individual provisions are or become invalid, this shall not affect the remaining provisions.

II. Prices

1. In cases of doubt, prices apply ex-works excluding freight, customs duties, incidental import charges and packaging plus value added tax at the statutory rate.
2. Should fundamental cost factors change significantly between the point that the quotation is issued or the order is confirmed and delivery, the supplier and customer shall come to an agreement regarding adjustment of the prices and the share of the costs for moulds.
3. Should the price be agreed on the basis of component weight, the final price shall be calculated from the weight of the approved initial samples.
4. The supplier is not bound to previous prices in the case of subsequent orders (= follow-up orders).

III. Obligation to deliver and take delivery

1. Delivery periods shall start following receipt of all documents required to carry out the order, receipt of the advance payment and the timely provision of materials, where agreed. The delivery period is deemed to have been met upon notification of readiness for delivery, even if shipment is delayed or is impossible through no fault of the supplier.
2. Should an agreed delivery period not be met through the fault of the supplier, but not due to gross negligence or intent, the customer shall be entitled, to the exclusion of any further claims, to demand compensation or to withdraw from the contract following a reasonable grace period. The compensation shall be limited to a maximum of 5% of the portion of the delivery that was not supplied in accordance with the contract. Withdrawal from the contract is excluded if the customer is in default of acceptance. The customer reserves the right to prove that a higher level of damage has been incurred.
3. Reasonable partial deliveries and deviations from the order volumes up to plus/minus 10% are permissible.
4. In the case of call-off orders for which no agreement is made regarding duration, production batch sizes and acceptance dates, the supplier may demand binding specification of these points no later than three months after the order is confirmed. If the customer does not respond to this request within three weeks, the supplier shall be entitled to set a grace period of two weeks and may withdraw from the contract and/or demand compensation following expiration of this period.
5. If the customer does not fulfil its obligations to take delivery of the items, the supplier is not bound by the regulations regarding self-help sale, without prejudice to other rights, and may sell the items on the open market provided it has notified the customer in advance.
6. In the event of force majeure, the supplier shall be entitled to postpone delivery by the duration of the disruption plus a reasonable start-up period, or to withdraw from the contract either in full or in part on account of the non-fulfilled part of the contract. Force majeure shall include strikes, lockouts or unforeseeable, unavoidable circumstances such as interruptions to operations which, notwithstanding all reasonable efforts, make it impossible for the supplier to make timely delivery; the supplier must furnish evidence of incidents of force majeure. This shall also apply if the aforementioned disruptions occur during default or with respect to a subcontractor. The customer may ask the supplier to declare within two weeks whether it intends to withdraw from the contract or make delivery within a reasonable grace period. If the supplier does not respond, the customer may withdraw from the part of the contract that has not been fulfilled. The supplier shall inform the customer without delay if a case of force majeure such as that described in this clause occurs. The supplier must keep any negative impacts on the customer to a minimum, if necessary by returning the moulds to the customer for the duration of the disruption.

IV. Packaging, shipping, transfer of risk and default in acceptance

1. Unless agreed otherwise, the supplier shall choose the packaging, shipping method and route.
2. Risk shall be transferred to the customer when the delivery leaves the supplier's premises, including in the case of carriage-paid delivery. In the event of dispatch delays that are attributable to the customer, risk shall be transferred as soon as notification of readiness for delivery is provided.
3. When requested in writing by the customer, the items shall be insured against the risks specified by the customer at its own expense.

V. Reservation of title

1. The supplier reserves title to the deliveries until all claims of the supplier against the customer have been met, even if the purchase price for specifically designated receivables has been paid. In the case of open accounts, the title reserved to the deliveries (goods subject to reservation of title) is regarded as security for the balanced owed to the supplier. If the supplier becomes liable based on a bill of exchange in association with payment of the purchase price, the reservation of title shall continue to apply until the bill has been honoured by the purchaser as the drawee.
2. Any processing by the customer is performed on behalf of the supplier to the exclusion of acquisition of title under Section 950 of the German Civil Code; the supplier becomes the co-owner of the item created by processing according to the ratio of the net invoice value of the supplier's goods to the net invoice value of the processed goods, with the item created by processing serving as the goods subject to reservation of title for the purpose of securing the supplier's claim as per clause 1.
3. If the customer processes (combines/mixes) the items with other items which do not belong to the supplier, the provisions of Sections 947 and 948 of the German Civil Code shall apply, with the consequence that the supplier's co-owned share of the new item shall then be deemed to be the goods subject to reservation of title as defined in these terms and conditions.
4. The customer shall only be permitted to resell the goods subject to reservation of title in the normal course of business and under the condition that it also agrees reservation of title with its clients in accordance with clauses 1 to 3. The customer is not entitled to dispose of the goods subject to reservation of title in any other way, in particular it may not pledge or assign them as security.
5. In the event of resale, the customer hereby assigns to the supplier the receivables owed to the supplier from resale and any other claims against its clients with all subsidiary rights. Such assignment shall apply until all the claims of the supplier have been settled. At the request of the supplier, the customer shall without delay provide the supplier with all information and documentation required to assert the rights of the supplier vis-à-vis the client of the customer.
6. If the goods subject to reservation of title are resold by the customer following processing as defined in clause 2 and/or 3 along with other items which do not belong to the supplier, assignment of the purchase price claim as defined in clause 5 shall only apply to the value of the invoice of the supplier's goods subject to reservation of title.
7. If the value of securities granted to the supplier exceed its total claims by more than 10%, the supplier is obligated – at the customer's request – to release the securities to this extent. The supplier shall nominate the securities to be released.
8. The supplier must immediately be notified of any attachment or seizure of the goods subject to reservation of title by a third party. Any intervention costs incurred as a result shall be charged in each case to the customer if they are not borne by third parties.
9. If the supplier exercises its reservation of title in line with the above provisions by taking back the goods subject to reservation of title, it is entitled to sell the goods on the open market or have them auctioned. The value of the reclaimed goods subject to reservation of title shall be as sold or auctioned, and no higher than the agreed delivery price. The right to make further claims for compensation, in particular for loss of profit, is reserved.

VI. Liability for material defects

1. Initial samples, which are presented to the customer for inspection at the request of the supplier, are essential when it comes to ensuring quality and designing the products. Any reference to technical standards is made for the purposes of describing the items or services and is not to be interpreted as a guarantee of quality.
2. If the supplier has provided advice to the customer in addition to its contractual obligations, the supplier shall only be liable for the reliability and suitability of the performance if this has specifically been assured in advance.
3. Claims regarding defects must be made immediately in writing. If defects are hidden, the claim must be made as soon as the defect is identified. In either case, all claims regarding defects shall become time-barred twelve months after risk has been transferred, unless agreed otherwise. These conditions apply unless longer periods are prescribed by law in accordance with Section 438 Paragraph 1 No. 2 German Civil Code, Section 479 Paragraph 1 German Civil Code and Section 634a Paragraph 1 No. 2 German Civil Code.

4. If claims for defects are justified – whereby the initial samples approved by the customer in writing define the expected quality and design – the supplier is obligated to render subsequent performance. If the supplier fails to meet this obligation within a reasonable period of time or fails to remedy the defects despite repeated attempts, the customer shall be entitled to reduce the purchase price or to withdraw from the contract. Further claims, in particular claims for reimbursement of expenses or damages on account of defects or consequential damage, shall only exist in line with the provisions defined under VII. Replaced parts shall be returned to the supplier at its request and cost.
5. Unauthorised reworking and improper treatment of items shall invalidate all claims based on defects. After giving the supplier prior notification, the customer shall only be entitled to rectify defects and to claim reimbursement for reasonable costs in order to prevent unreasonable damage or if the supplier fails to remedy the defects.
6. No warranty claims may be asserted for wear or tear caused by normal usage.
7. Rights of recourse in accordance with Sections 478 and 479 of the German Civil Code shall only be possible to the extent that the claim asserted by the consumer was justified and to the extent of the law, but not for goodwill provisions that have not been agreed with the supplier. These rights of recourse are subject to the fulfilment of obligations on the part of the beneficiary of the recourse claim, in particular compliance with defect notification obligations.

VII. General liability limitations
In all cases deviating from the terms mentioned above in which the supplier is obligated to pay damages or reimburse expenses on account of contractual or statutory bases for claims, the supplier shall only be liable if it, its executive employees or vicarious agents are guilty of intent, gross negligence or injury of life, limb or health. This shall not affect liability regardless of fault in accordance with the German Product Liability Act. Liability for culpable breach of fundamental contractual obligations shall also not be affected;
in this respect, liability is however limited to foreseeable damage typical of the contract, except in the cases outlined in clause 1 of this section.
The preceding provisions do not constitute a change to the burden of proof to the disadvantage of the customer.

VIII. Terms of payment
1. All payments shall be made in € (EURO) to the supplier only.
2. Unless agreed otherwise, the purchase price for deliveries or other performance is payable with a discount of 2% within 14 days or without a discount within 30 days from the date of the invoice. Entitlement to an early payment discount requires all previously due, undisputed invoices to have been settled. No discount shall be granted for any payment by bill of exchange.
3. If payment is not made within the agreed period, interest amounting to the statutory interest rate of 8% above the respective basic interest rate of the ECB shall be calculated unless the supplier provides evidence of a higher level of damage. The customer reserves
the right to prove that a lower level of damage has been incurred.
4. The supplier reserves the right to refuse cheques or bills of exchange. Cheques and rediscountable bills of exchange shall only be accepted with view to performance; all associated costs shall be borne by the customer.
5. The customer may only off set payments or assert a right of retention if its claims are undisputed or established by a final judgement.
6. Should the customer persistently fail to comply with payment terms or should circumstances arise which cast serious doubts on the creditworthiness
of the customer, all claims on the part of the supplier shall become due immediately. In such cases, the supplier is also entitled to demand advance payments for any outstanding deliveries and to withdraw from the contract once a reasonable grace period has passed.

IX. Moulds (tools)
1. The price for moulds also includes the costs for the one-off creation of samples; however, it does not include the costs of test and processing equipment as well as costs for modifications requested by the customer. Costs for further samples for which the supplier is responsible shall be borne by the supplier.
2. Unless agreed otherwise, the moulds produced for the customer by the supplier itself or by a third party engaged by the supplier are and shall remain the property of the supplier. Moulds shall only be used for orders of the customer as long as the customer fulfils its payment and acceptance obligations. The supplier is obligated to replace these moulds free of charge only if this is necessary to produce the quantity promised to the customer. The supplier's obligation to retain the moulds shall expire two years after the last parts produced from the mould have been delivered and after notifying the customer.
3. Should the customer become the owner of the moulds in line with an agreement, title shall be transferred to the customer once the purchase price
for the moulds has been paid in full. As a substitute for transferring the moulds to the customer, the moulds shall be stored
on the customer's behalf. Irrespective of the customer's statutory right to claim possession and of the service life
of the moulds, the supplier is entitled to exclusive possession of the moulds until the termination of the contract. The supplier must
mark the moulds as third-party property and – at the request of the customer – insure said property at the customer's expense.
4. If the customer's own moulds as defined in clause 3 are used and/or moulds are supplied on loan by the customer, the supplier's liability concerning storage and maintenance shall be limited to the level of care exercised in its own business. Costs for maintenance and insurance shall be borne by the customer. The supplier's obligations shall expire if
the moulds are not collected within a reasonable period of time following the completion of the order and corresponding notification of the customer. The supplier
shall in all cases have the right to retain the moulds should the customer have failed to meet its contractual obligations in full.

X. Provision of materials
1. If materials are supplied by the customer, they are to be delivered in good time and in perfect condition at the customer's expense and risk and with an appropriate excess quantities of at least 5%.
2. If these requirements are not met, the delivery time shall be extended by a reasonable period of time. Except in cases of force majeure,
the customer shall bear any resulting additional costs, including those arising from interruption of production.

XI. Industrial property rights and defect of title
1. If the supplier is to supply items based on drawings, models, samples or using parts provided by the customer, the customer warrants that no property rights of third parties in the destination country of the items are breached as a result of this. The supplier shall inform the customer of any rights of which it has knowledge. The customer must release the supplier from any claims of third parties and must reimburse any damages incurred. If a third party prohibits production or supply by the supplier by invoking a property right it holds, the supplier shall – without reviewing the legal situation – be entitled to stop work until the legal situation has been clarified by the customer and the third party. Should it no longer be
reasonable for the supplier to continue with the order on account of the delay, the supplier shall be entitled to withdraw from the contract.
2. Any drawings and samples provided to the supplier which have not led to an order shall be returned on request; if no such request is made, the supplier shall be entitled to destroy the items provided three months after the quotation has been submitted. This obligation applies to the customer accordingly. The party authorised to destroy the items must inform the contracting partner of its intention to destroy them well in advance
of this taking place.
3. The supplier holds copyrights and, if applicable, industrial property rights, particularly all rights of use and exploitation, to the models, moulds, equipment, drafts and
drawings which it has designed or which a third party has designed on its behalf.
4. For all other defects of title, section VI applies accordingly.

XII. Place of performance and legal venue
1. The place of performance is the location of the supplier's premises.
2. Legal venue is – at the supplier's option – either the supplier's headquarters or the registered office of the customer, including for proceedings regarding documentation, bills of exchange and cheques.
3. German law shall apply exclusively. Application of the United Nations Convention of 11 April 1980 on contracts for the national sale of goods (German Civil Code 1989 p. 586) for the Federal Republic of Germany (German Civil Code 1990 p. 1477) is excluded