

Permanent workholding magnets

with fine pole division



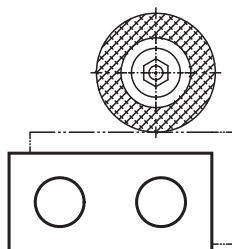
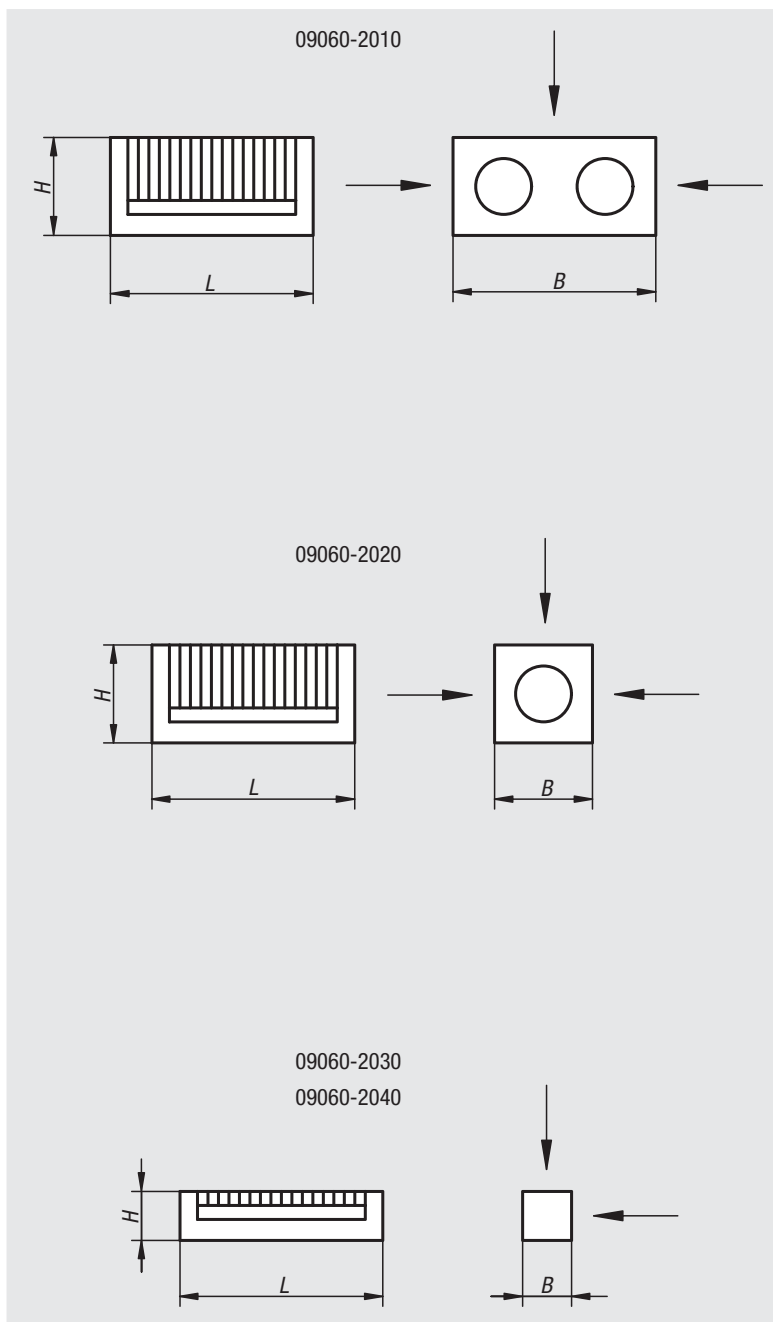
Sample order:
nlm 09060-2020

Note:

The workholding magnets 09060-2010 to 09060-2030 consist of a permanent magnetic system with fine pole divisions (4 mm) which are effective on two or three faces.

To clamp extremely thin steel parts we recommend the magnet 09060-2040 with the finest pole division of 1.3 mm. The magnetic lifespan of the workholding magnets under conditions prevalent in industrial machining is unlimited.

Approximately half the height of the workholding magnets can be ground down or polished away with no significant impairment of the magnetic strength.



Order No.	L	B	H	Max. angular deviation	Magnetic surfaces mm
09060-2010	100	100	50	10'	1x 100x100 2x 100x50
09060-2020	100	50	50	10'	3x 100x50
09060-2030	100	25	25	10'	2x 100x25
09060-2040	100	25	25	10'	2x 100x25

Technical data for pot magnets

Structure:

Pot magnets are magnets that, due to their structure have only one attracting surface. No other surface is magnetic. This construction makes it possible to limit the three-dimensional affect of the magnetic field so that no unintentional magnetization of the entire workpiece in contact with the pot magnet, or of the machine elements surrounding the magnet occurs.

Designs:

The deep pot magnets series:

09060, 09061 and 09063

have a core made of the permanent magnetic material AlNiCo, which is inserted for magnetic shielding into a soft iron pot with an intervening sleeve made of a non-magnetic material.

The shallow pot magnets series:

09064 and 09065

have a core made of the permanent magnetic ceramic material SrFe (hard ferrite) . This is also inserted into soft iron pot to create the desired magnetic shielding.

The pot magnets series:

09066 and 09067

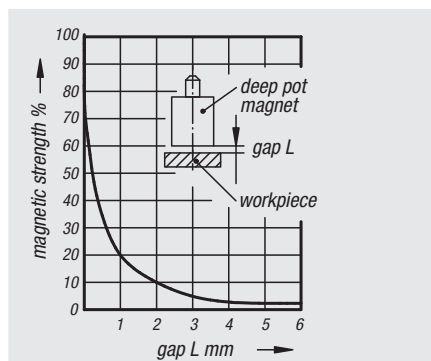
have an SmCo core, an alloy of rare metallic elements together with cobalt. SmCo increases the magnetic force by three to five times that of AlNiCo or hard ferrite magnets by the same magnet size.

Magnetic strengths:

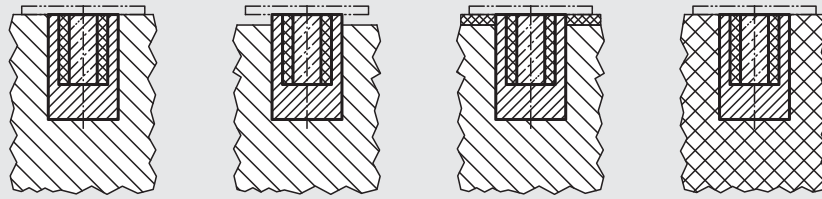
The values indicated in the table are minimum values that are achieved for a vertical pull-down with full-surface contact of the pot magnets on soft iron or low-carbon steel workpieces of sufficient thickness. By unclean pole faces or uneven workpieces, air gaps are formed which sharply decrease the attractive force. It is therefore advisable to always ensure a clean pole face and to clean it from time to time if necessary.

Diagram:

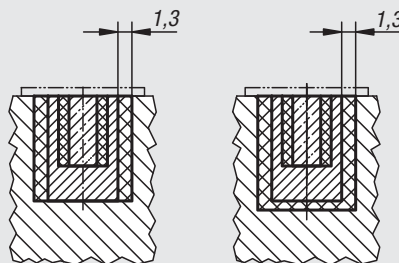
Reduction of the magnetic strength of a deep pot magnet with increasing air gap (non-magnetic intermediate layers have the same effect as air gaps).



Mounting instructions for shielded pot magnets without pins



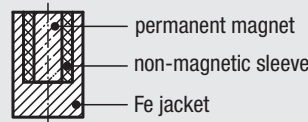
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not correct correct

SmCo pot magnets (deep or shallow) must not be mounted directly in iron, but must be screwed, glued, pressed or cast into a sleeve of non-magnetic material (see illustration below).

Magnet series shielded system



- workpiece to be held
- iron
- Non-magnetic material such as MS, Al, Cu or plastic

Installation or fastening possibilities of pot magnets

Order No.	Description	System	Temperature* max. °C	Fastening possibility
from 09060-01 to 09060-10	deep pot	shielded	450	Press in/shrink-fit/ glue in
from 09061-01 to 09061-09	deep pot	shielded	450	Solder in (soft solder)/ gluing in
from 09063-01 to 09063-10	deep pot	shielded	450	Rivet pin/ screw in
from 09064-01 to 09064-10	shallow pot	shielded	100	Press in/glue in
from 09065-01 to 09065-26	shallow pot	shielded	100	Screw in
from 09066-01 to 09066-18	shallow pot	shielded	200	Press in/glue in
from 09067-01 to 09067-15	deep pot	shielded	200	Press in/glue in screw in

*Long-term heating or alternating thermal stresses may lead to mechanical changes in the magnet system. In many cases they have no influence on the function. The same applies for chemical stresses (chemical baths, aggressive gases, etc).

01000
02000
03000
04000
05000
06000
07000
08000
09000
10000
20000
21000
22000
23000

Magnets deep pot

AlNiCo with fitting tolerance



Material:

Housing, steel.
Magnetic core AlNiCo.

Version:

Bright.

Sample order:

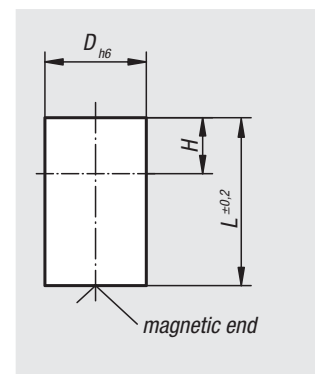
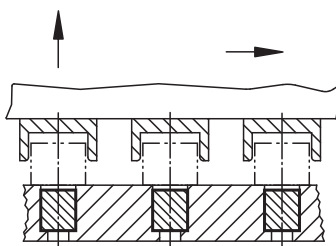
nIm 09060-01

Note:

Shielded system. Diameter "D" ground to a h6 tolerance.
Fastening possibilities by pressing, shrink-fit or gluing.
Deep pot magnets can be shortened by the dimension "H" with no loss of attracting force.

Temperature range:

max. 450°C.



Order No.	D	L	H	Magnetic force N
09060-01	6	10	2	1,5
09060-02	8	12	3	3,5
09060-03	10	16	6	7
09060-04	13	18	7	10
09060-05	16	20	5	18
09060-06	20	25	6	42
09060-07	25	30	5	96
09060-08	32	35	3	180
09060-09	40	45	5	240
09060-10	50	50	2	420

09061

Magnets deep pot

AlNiCo without fitting tolerance



Material:

Housing, steel.
Magnetic core AlNiCo.

Version:

galvanized.

Sample order:

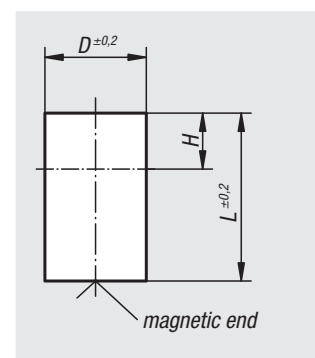
nIm 09061-01

Note:

Shielded system. Diameter "D" without fitting tolerance.
Fastening possibilities are pressing, shrink-fit or gluing.
Deep pot magnets can be shortened by the dimension "H" with no loss of attracting force.

Temperature range:

max. 450°C.



Order No.	D	L	H	Magnetic force N
09061-01	6	20	12	1,5
09061-02	8	20	11	3,5
09061-03	10	20	10	7
09061-04	13	20	9	10
09061-05	16	20	5	18
09061-06	20	25	6	42
09061-07	25	35	10	96
09061-08	32	40	8	180
09061-09	40	50	10	240

09063

Magnets deep pot with pin

AlNiCo

**Material:**

Housing, steel.
Magnetic core AlNiCo.

Version:

galvanized.

Sample order:

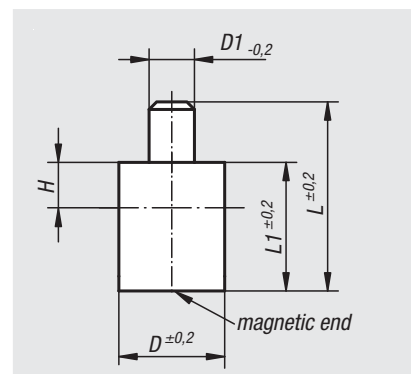
nlm 09063-01

Note:

Deep pot magnets with smooth pin, shielded system.
The magnets can be shortened by the dimension "H"
(to lengthen the pin) with no loss of attracting force.

Temperature range:

max. 450°C.



Order No.	D	D1	L	L1	H	Magnetic force N
09063-01	6	3	28	20	2	1,7
09063-02	8	3	28	20	3	4
09063-03	10	4	28	20	6	8,5
09063-04	13	4	28	20	7	12
09063-05	16	5	28	20	5	20
09063-06	20	6	33	25	6	50
09063-07	25	8	45	35	5	115
09063-08	32	10	50	40	3	200
09063-09	40	15	70	50	5	240
09063-10	50	18	85	60	2	420

09064

Magnets shallow pot

hard ferrite

**Material:**

Housing, steel.
Magnetic core hard ferrite.

Version:

Housing, galvanized.

Sample order:

nlm 09064-01

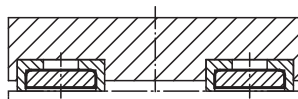
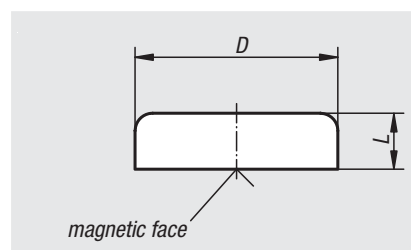
Note:

Shallow pot magnets without threaded bush. These magnets are pressed or glued into the receiving holes.

Hairline cracks in the magnetic material are unavoidable for technical reasons in the D=80 version. They do not impair the attracting function of the magnets in any way.

Temperature range:

max. 200°C.



Order No.	D	L	Magnetic force N
09064-01	10 ±0,15	4,5	4
09064-02	13 ±0,15	4,5	10
09064-03	16 ±0,15	4,5	18
09064-04	20 ±0,15	6	30
09064-05	25 ±0,15	7	40
09064-06	32 ±0,20	7	80
09064-07	40 ±0,20	8	125
09064-08	50 ±0,20	10	220
09064-09	63 ±0,20	14	350
09064-10	80 ±0,25	18	600

Magnets shallow pot with thread

hard ferrite



Material:

Housing, steel.
Magnetic core hard ferrite.

Version:

Housing, galvanized.

Sample order:

nlm 09065-01

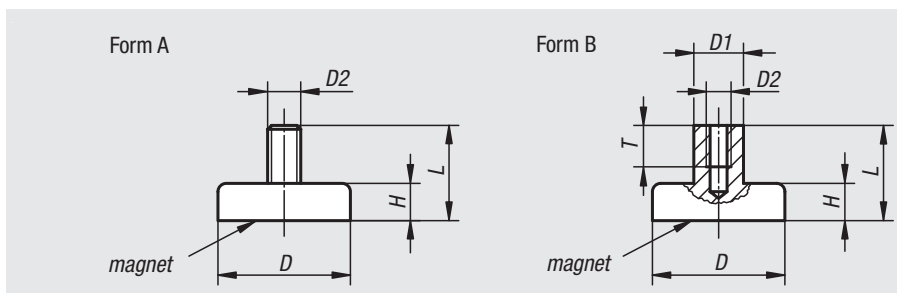
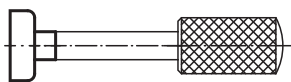
Note:

Shallow pot magnets, shielded system.

Hairline cracks in the magnetic material are unavoidable for technical reasons in D=80, D=100 and D=125 versions. They do not impair the attracting function of the magnets in any way.

Temperature range:

max. 200°C.



Order No. Form A	Order No. Form B	D	D1	D2	L	H	T	Magnetic force N
09065-21	09065-01	10 ±0,15	-/6	M3	11,5	4,5	-/5	4
09065-22	09065-02	13 ±0,15	-/6	M3	11,5	4,5	-/5	10
09065-23	09065-03	16 ±0,15	-/6	M3	11,5	4,5	-/5	18
09065-24	09065-04	20 ±0,15	-/6	M3	13	6	-/5	30
09065-25	09065-05	25 ±0,15	-/8	M4	15	7	-/6	40
09065-26	09065-06	32 ±0,20	-/8	M4	15	7	-/6	80
-	09065-07	40 ±0,20	10	M5	18	8	8	125
-	09065-08	50 ±0,20	12	M6	22	10	10	220
-	09065-09	63 ±0,20	15	M8	30	14	14	350
-	09065-10	80 ±0,25	20	M10	34	18	14	600
-	09065-11	99 ±0,25	22	M12	42	22	17	900
-	09065-12	125 ±0,25	25	M14	50	26	20	1.300

09066

Magnets shallow pot

SmCo



Material:

Housing, steel.
Magnetic core, SmCo.

Version:

Housing, galvanized.

Sample order:

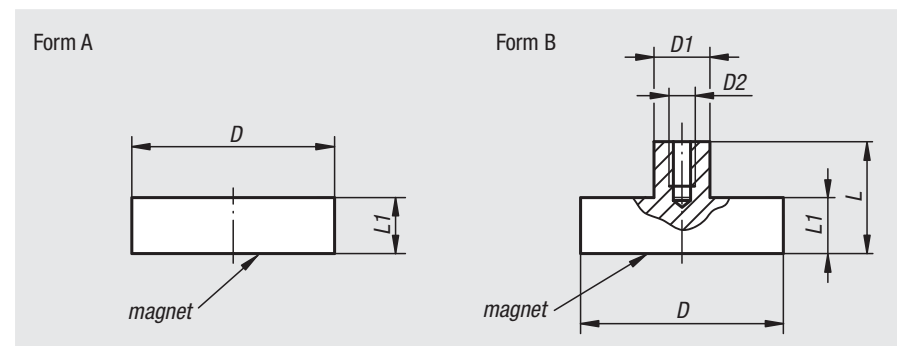
nlm 09066-01

Note:

Shallow pot magnets, shielded system. Magnets with an SmCo core have three to five times the attracting force of AlNiCo or hard ferrite magnets.

Temperature range:

max. 200°C.



Order No. Form A	Order No. Form B	D	D1	D2	L	L1	Magnetic force N
09066-01	09066-11	6 ±0,15	-/6	-/M3	-/11,5	4,5	5
09066-02	09066-12	8 ±0,15	-/6	-/M3	-/11,5	4,5	11
09066-03	09066-13	10 ±0,15	-/6	-/M3	-/11,5	4,5	20
09066-04	09066-14	13 ±0,15	-/6	-/M3	-/11,5	4,5	40
09066-05	09066-15	16 ±0,15	-/6	-/M4	-/11,5	4,5	60
09066-06	09066-16	20 ±0,15	-/8	-/M4	-/13	6	90
09066-07	09066-17	25 ±0,15	-/8	-/M4	-/14	7	150
09066-08	09066-18	32 ±0,20	-/10	-/M5	-/15,5	7	220

Magnets deep pot

SmCo



Material:

Housing brass.
Magnetic core SmCo.

Sample order:

nIm 09067-01

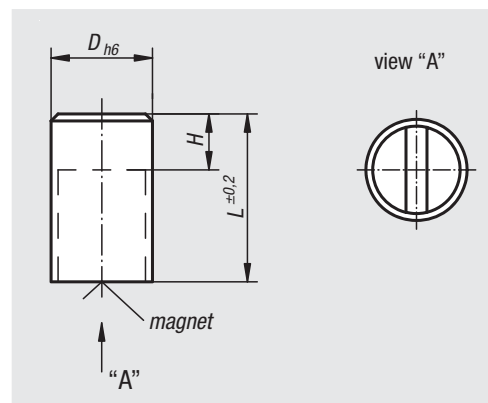
Note:

Smooth design, shielded system. Diameter "D" ground with h6 tolerance. Under no circumstances may SmCo magnets be pressed directly into iron, as otherwise loss of attractive force due to magnetic short circuits occurs. SmCo magnets are especially suitable for direct use in spot-welding machines, as no demagnetisation occurs.

Deep pot magnets can be shortened by the dimension "H" with no loss of attractive force.

Temperature range:

max. 200°C.



Order No.	D	L	H	Magnetic force N	Distance to iron wall/mm
09067-01	6	20	10	8	1,5
09067-03	8	20	10	22	1,5
09067-05	10	20	8	40	2
09067-07	13	20	6	60	2,5
09067-09	16	20	2	125	3
09067-11	20	25	5	250	4
09067-13	25	35	7	400	5
09067-15	32	40	4,5	600	6

09068

Magnets deep pot with internal thread

NdFeB



Material:

Housing, steel.
Magnetic core NdFeB.

Version:

Housing, galvanized.

Sample order:

nIm 09068-01

Note:

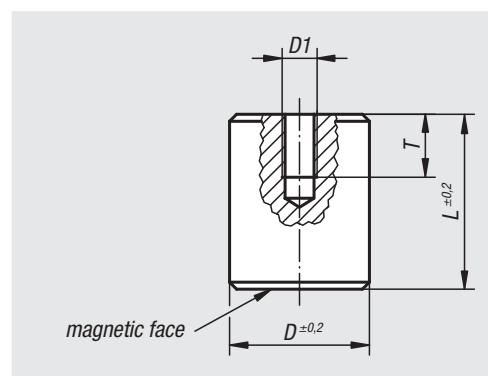
Shielded system. Deep pot magnets are used for mounting in steel and iron. This requirement is principally stipulated in plant and machine construction.

Can also be used in blind holes.

Size D=50 has 4 magnets Ø18 mm.

Temperature range:

max. 80°C.



Order No.	D	D1	L	T	Can be shortened by (mm)	Magnetic force N
09068-01	8	M3	12	5	3	12
09068-02	10	M4	16	7	7	24
09068-03	13	M4	18	7	3	60
09068-04	16	M4	20	7	6	90
09068-05	20	M5	25	9	9	135
09068-06	25	M6	30	9	10	190
09068-07	35	M8	40	13	10	300
09068-08	50	M12	50	13	13	550

Magnets shallow pot

NdFeB



Material:

Housing, steel.
Magnetic core NdFeB.

Version:

Housing, galvanized.

Sample order:

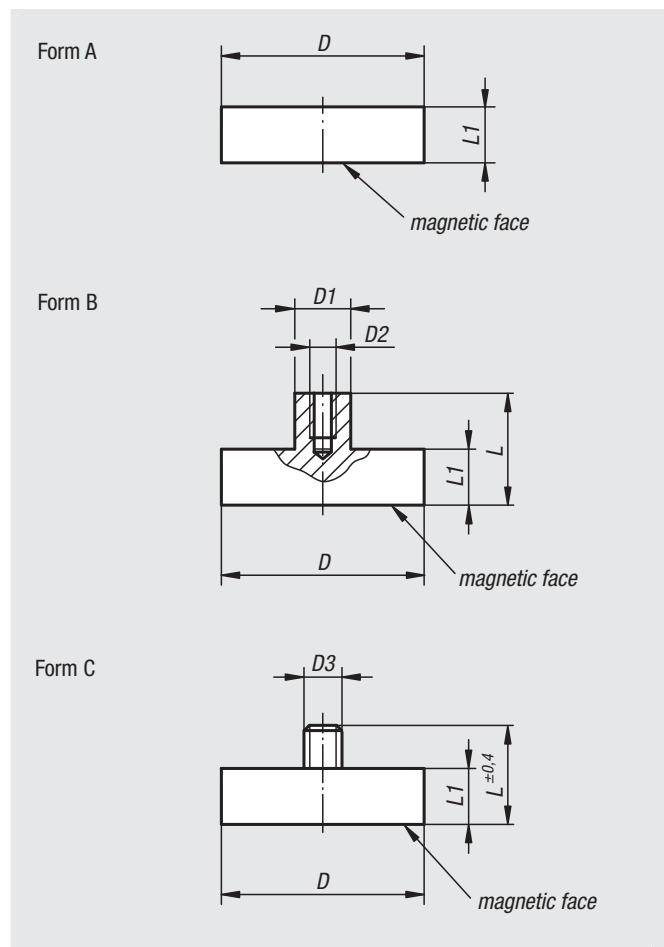
nIm 09069-01

Note:

Shielded system. With the permanent magnetic material NdFeB the attractive force increases by ca. 10-20% compared with SmCo.

Temperature range:

max. 80°C.



Order No.	Form	D	D1	D2	D3	L	L1	Magnetic force N
09069-01	A	6 ±0,15	-	-	-	-	4,5	5
09069-02	A	8 ±0,15	-	-	-	-	4,5	13
09069-03	A	10 ±0,15	-	-	-	-	4,5	25
09069-04	A	13 ±0,15	-	-	-	-	4,5	60
09069-05	A	16 ±0,15	-	-	-	-	4,5	95
09069-06	A	20 ±0,15	-	-	-	-	6	140
09069-07	A	25 ±0,15	-	-	-	-	7	200
09069-08	A	32 ±0,20	-	-	-	-	7	350
09069-11	B	6 ±0,15	6	M3	-	11,5	4,5	5
09069-12	B	8 ±0,15	6	M3	-	11,5	4,5	13
09069-13	B	10 ±0,15	6	M3	-	11,5	4,5	25
09069-14	B	13 ±0,15	6	M3	-	11,5	4,5	60
09069-15	B	16 ±0,15	6	M4	-	11,5	4,5	95
09069-16	B	20 ±0,15	8	M4	-	13	6	140
09069-17	B	25 ±0,15	8	M4	-	14	7	200
09069-18	B	32 ±0,20	10	M5	-	15,5	7	350
09069-23	C	10 ±0,15	-	-	M3	11,5	4,5	25
09069-24	C	13 ±0,15	-	-	M5	12,5	4,5	60
09069-25	C	16 ±0,15	-	-	M6	12,5	4,5	95
09069-26	C	20 ±0,15	-	-	M6	16	6	140
09069-27	C	25 ±0,15	-	-	M6	17	7	200
09069-28	C	32 ±0,20	-	-	M6	17	7	350

09070

Magnets shallow pot with counterbore

hard ferrite

**Material:**

Housing, steel.
Magnetic core hard ferrite.

Version:

Housing, galvanized.

Sample order:

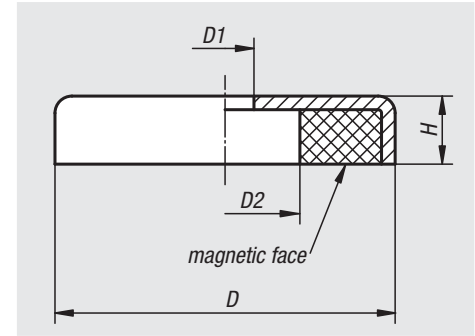
nlm 09070-50

Note:

Shielded system.

Temperature range:

max. 200°C.



Order No.	D	D1	D2	H	Magnetic force N
09070-50	50 ±0,20	8,5	22	10	180
09070-63	63 ±0,20	6,5	24	14	290
09070-80	80 ±0,25	6,5	11,5	18	540

09071

Magnets shallow pot with countersink

hard ferrite

**Material:**

Housing, steel.
Magnetic core hard ferrite.

Version:

Housing, galvanized.

Sample order:

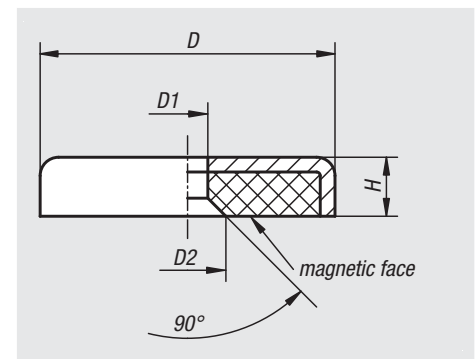
nlm 09071-01

Note:

Shielded system.

Temperature range:

max. 200°C.



Order No.	D	D1	D2	H	Magnetic force N
09071-01	16 ±0,15	3,3	7	4,5	14
09071-02	20 ±0,15	4,2	9	6	27
09071-03	25 ±0,15	5,5	11	7	36
09071-04	32 ±0,20	5,5	11	7	72
09071-05	40 ±0,20	5,5	11	8	90

Magnets shallow pot with internal thread

NdFeB



Material:

Housing, steel.
Magnetic core NdFeB.

Version:

Housing, galvanized.

Sample order:

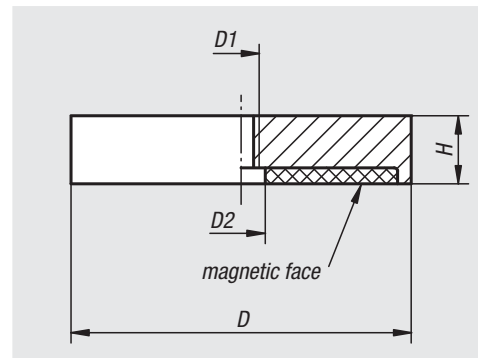
nIm 09072-01

Note:

Shielded system

Temperature range:

max. 80°C.



Order No.	D	D1	D2	H	Magnetic force N
09072-01	32	M5	5,5	7	330
09072-02	40	M5	10,5	8	550
09072-03	63	M10	11,7	14	1.100
09072-04	75	M10	13	15	1.750

09094

Magnets deep pot



Material:

Housing, steel.
Magnetic core AlNiCo.

Version:

Housing painted red.

Sample order:

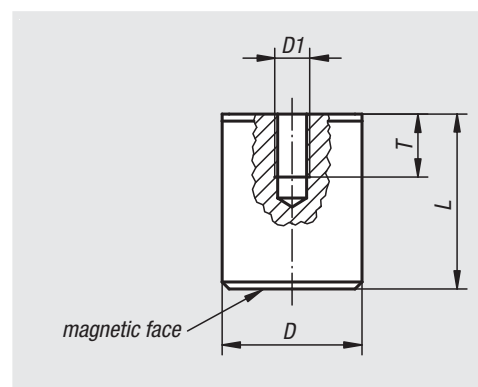
nIm 09094-01

Note:

Hard magnet in aluminium housing and steel jacket. Shielded system. Pot magnets are used for retaining, lifting and mounting in fixtures.

Temperature range:

max. 450°C.



Order No.	D	D1	L	T	Magnetic force N
09094-01	17	M6	16	4	18
09094-02	21	M6	19	5	28
09094-03	27	M6	25	6	65
09094-04	35	M6	30	9	115
09094-05	65	M12	43	13	400

09096

Magnets shallow pot


Material:

Housing, steel.
Magnetic core AlNiCo.

Version:

Housing painted red.

Sample order:

nIm 09096-01

Note:

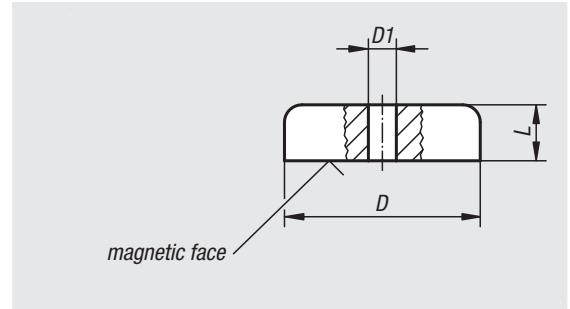
Shielded system. Shallow pot magnets are used in fixtures with minimal space.

Temperature range:

max. 450°C.

On request:

Other colours.



Order No.	D	D1	L	Magnetic force N
09096-01	19	3,5	8	30
09096-02	29	5	9	55
09096-03	38	5	10,5	95

09098

Magnets button


Material:

Magnetic core AlNiCo.

Version:

painted red.

Sample order:

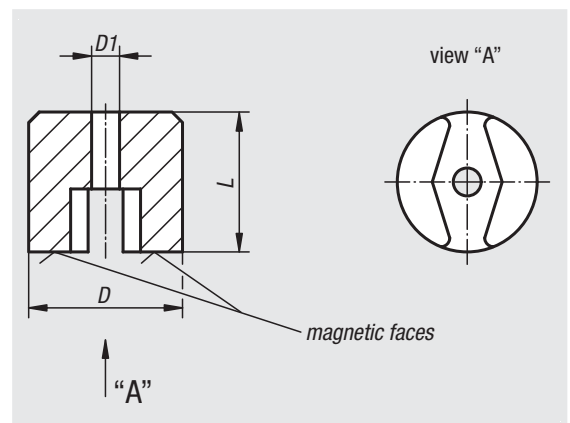
nIm 09098-01

Note:

Split attractive surface with through hole. Non-shielded system. Button magnets are used in laboratories, inspection rooms and for holding metal objects.

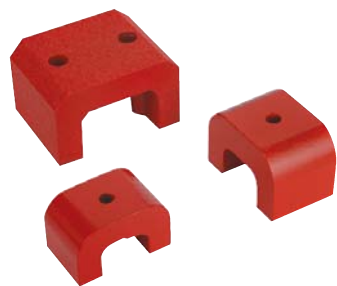
Temperature range:

max. 450°C.



Order No.	D	D1	L	Magnetic force N
09098-01	13	4,2	10	7
09098-02	19	5,4	13	19
09098-03	25	5,4	16	29
09098-04	32	7	25	66

Magnets strong


Material:

Magnetic core AlNiCo.

Version:

Painted red.

Sample order:

nIm 09100-01

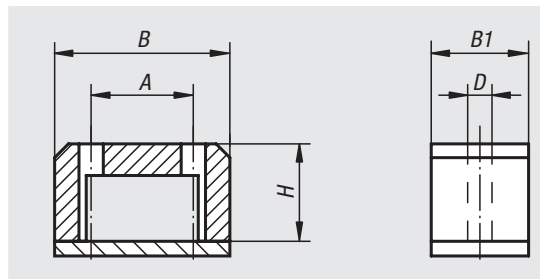
Note:

Horseshoe magnets with high attractive force. Non-shielded system. The magnets are supplied with a galvanised protective plating and are used for holding, sorting and lifting.

Sizes 1, 2 and 3 have only one attachment hole in the centre.

Temperature range:

max. 450°C.



Order No.	Size	A	B	B1	D	H	Magnetic force N
09100-01	1	-	30	20	5	20	45
09100-02	2	-	40	25	5	25	90
09100-03	3	-	45	29	5	30	120
09100-04	4	32	57	45	8	35	230
09100-05	5	38	70	57	8	41	320

09110

Protective rubber caps

for shallow pot magnets


Material:

Synthetic rubber.

Version:

black.

Sample order:

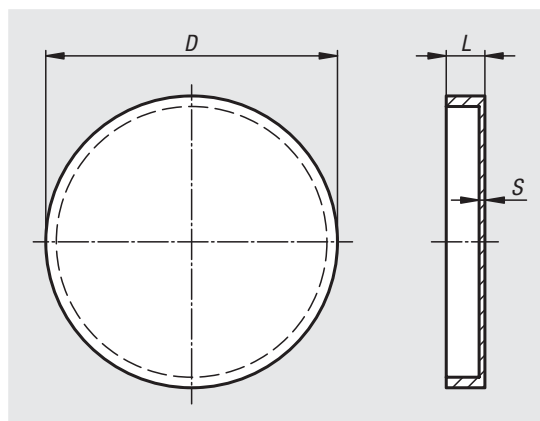
nIm 09110-50

Note:

For protecting sensitive surfaces. The rubber protective caps are slipped over the magnetic surfaces. The shear force with which the magnet can be displaced is doubled and achieves almost the original attractive force of the magnet.

Temperature range:

max. 60°C.



Order No.	D	L	S
09110-50	52	6	0,5
09110-63	65	8	0,5
09110-80	83	11	0,5

Magnets shallow pot with internal thread

NdFeB, with rubber protective jacket



Material:

Housing, steel.
Magnetic core NdFeB (neodym).
Protective rubber jacket, synthetic rubber.

Version:

Housing, galvanized.
Black protective rubber jacket.

Sample order:

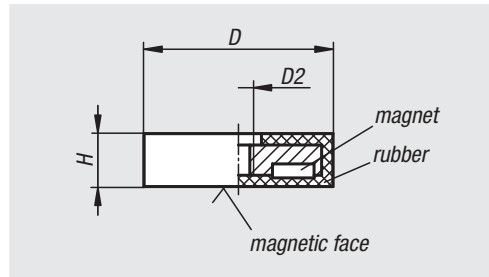
nIm 09112-01

Note:

Shallow pot magnet with internal thread. Shielded system.
With rubber protective jacket for protecting sensitive surfaces. The coefficient of friction is increased by the rubber jacket so that high lateral friction is achieved.

Temperature range:

max. 60°C.



Order No.	D	D2	H	Magnetic force N
09112-01	22	M4	6	35
09112-02	31	M5	6	75
09112-03	43	M4	6	85
09112-04	66	M6	8,5	180
09112-05	88	M6	8	420

Magnets shallow pot with tapped pin

NdFeB, with rubber protective jacket



Material:

Housing, steel.
Magnetic core NdFeB (neodym).
Protective rubber jacket, synthetic rubber.

Version:

Housing, galvanized.
Black protective rubber jacket.

Sample order:

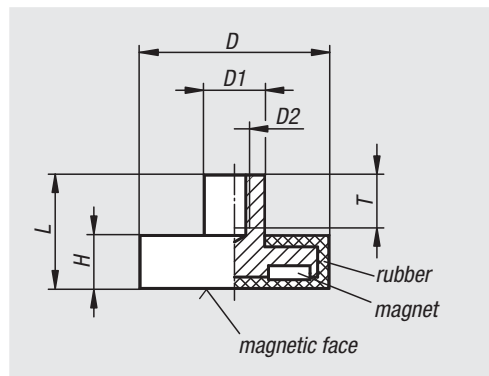
nIm 09114-01

Note:

Shallow pot magnets with tapped pin, shielded system.
With rubber protective jacket for protecting sensitive surfaces. The coefficient of friction is increased by the rubber jacket so that high lateral friction is achieved.

Temperature range:

max. 60°C.



Order No.	D	D1	D2	H	L	T	Magnetic force N
09114-01	12	8	M4	7	14,8	6	10
09114-02	22	8	M4	6	11,5	6	50
09114-03	31	8	M4	6	11,5	5	75
09114-04	43	8	M4	6	10,5	5	85
09114-05	66	10	M5	8,2	15	8	180
09114-06	88	12	M8	8,2	17	11	420

01000
02000
03000
04000
05000
06000
07000
08000
09000
10000
20000
21000
22000
23000

Magnets shallow pot with threaded pin

NdFeB, with rubber protective jacket



Material:

Housing, steel.
Magnetic core NdFeB (neodym).
Protective rubber jacket, synthetic rubber.

Version:

Housing, galvanized.
Black protective rubber jacket.

Sample order:

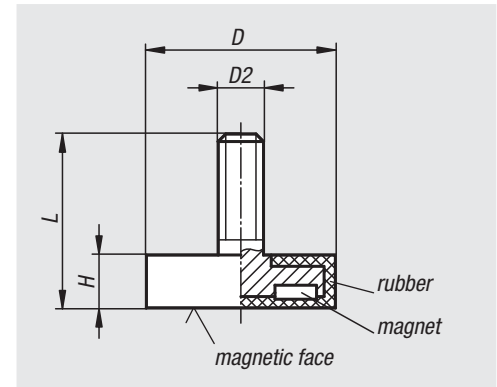
nIm 09116-01

Note:

Shallow pot magnets with threaded pin, shielded system. With rubber protective jacket for protecting sensitive surfaces. The coefficient of friction is increased by the rubber jacket, so that high lateral friction is achieved.

Temperature range:

max. 60°C



Order No.	D	D2	H	L	Magnetic force N
09116-01	22	M4	6	12,5	50
09116-02	43	M6	6	21	85
09116-03	66	M8	8,2	23	180
09116-04	88	M8	8,2	23,5	420

09118

Magnets shallow pot with through hole

NdFeB, with rubber protective jacket



Material:

Housing, steel.
Magnetic core NdFeB (neodym).
Protective rubber jacket, synthetic rubber.

Version:

Housing, galvanized.
Black protective rubber jacket.

Sample order:

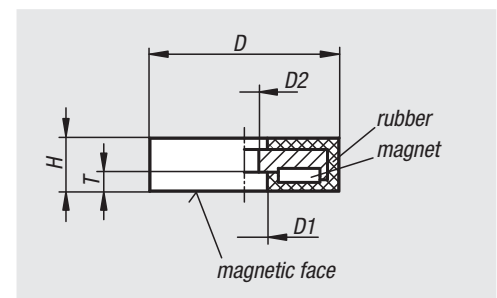
nIm 09118-01

Note:

Shallow pot magnets, shielded system. With rubber protective jacket for protecting sensitive surfaces. The coefficient of friction is increased by the rubber jacket so that high lateral friction is achieved.

Temperature range:

max. 60°C.



Order No.	D	D1	D2	H	T	Magnetic force N
09118-01	22	8	4	6	3,5	35
09118-02	31	9	6	6	3,5	75
09118-03	43	12,8	7	6	4,2	85
09118-04	57	25,3	8	7,6	3,3	175
09118-05	66	22	5,5	8,5	3,2	210

Magnetic Pickup


Version:

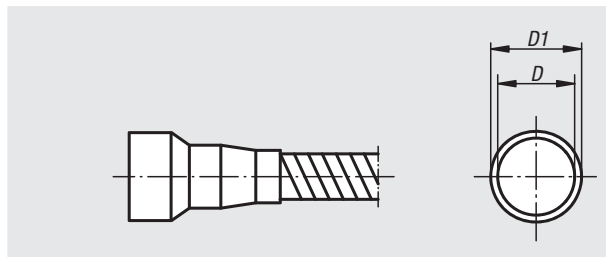
Strong permanent magnet with flexible brass tube and black plastic grip. Surface chromed.

Sample order:

nIm 09150-04

Note:

Pickup magnetics are primarily used for removing or searching for steel parts in inaccessible places.



Order No.	Size	D	D1	total length mm	Magnetic force N
09150-01	1	6	8	450	5
09150-02	2	10	12	450	10
09150-03	3	13	15	520	18
09150-04	4	17	19	520	30

09210

Magnetic base permanent


Version:

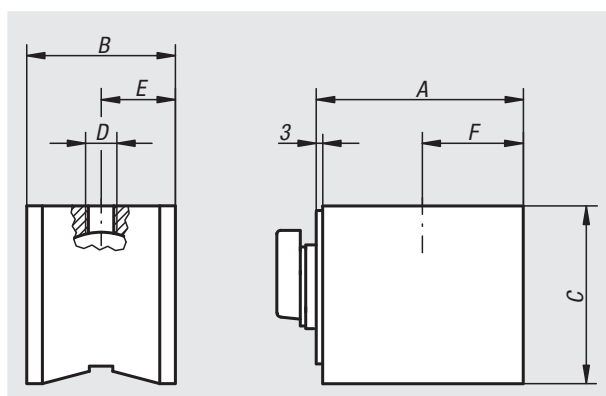
Permanent magnetic base with high magnetic force. On / off switch. Surface black.

Sample order:

nIm 09210-03

Note:

Permanent magnetic bases are used in fixtures as retaining magnets, as gauge stands etc.



Order No.	A	B	C	D	E	F	Magnetic force N
09210-01	61	50	55	M8x8	25	29	600
09210-02	76	50	55	M8x8	25	36,5	900
09210-03	76	50	55	M10x8	25	36,5	900