# SELF-LOCKING VACUUM CUPS WITH TRACTION RELEASE

These cups do not require a connection to any vacuum source, since the object onto which they are laid on evacuates the air inside them. A built-in non-return valve prevents the air from entering again, thus maintaining the vacuum.

To release the piece, simply lift it a few millimetres, thus opening the non-return valve, which restores the atmospheric pressure inside the cup, by letting the air in.

Since possible losses cannot be recovered, these cups a recommended only for holding objects with smooth and impermeable surfaces, such as glass, polished sheets, and other similar objects. They are particularly suited for glass carrying trolleys feeding trolleys for robotic systems.

They are made with nickel-plated brass with a steel drive bush, which can be provided in the anti-rotation version upon request.
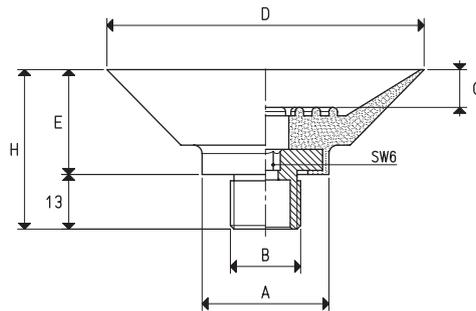
VACUUM CUPS WITH FEMALE VULCANISED SUPPORT, SPARE PART

Item	Force Kg	Volume cm³	A Ø	B Ø	D Ø	E	G	H	Support material	Weight g
08 50 40 *	4.90	9.8	31	G3/8"	50	16.0	6.5	29.0	acciaio steel	38.5
08 75 40 *	11.04	27.8	31	G3/8"	75	25.0	9.0	38.0	acciaio steel	57.9
08 100 40 *	19.62	41.3	32	G3/8"	100	26.0	9.0	39.0	acciaio steel	78.3
08 100 50 *	19.62	70.3	32	G3/8"	100	30.5	15.0	43.5	acciaio steel	74.8

* Complete the code indicating the compound: B= BENZ rubber; N= natural para rubber; S = silicon
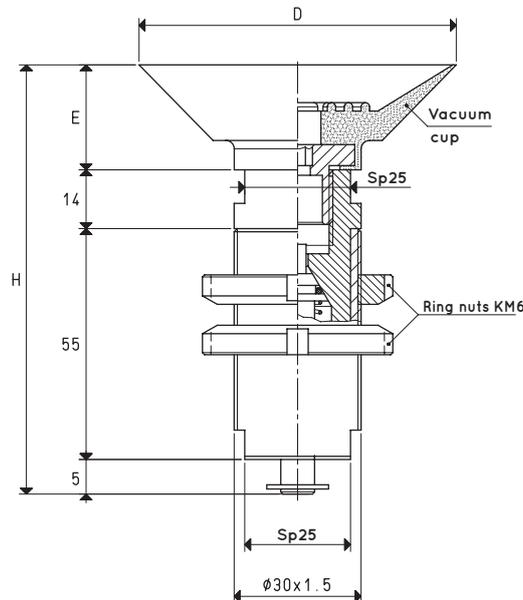
SELF-LOCKING VACUUM CUPS WITH TRACTION RELEASE

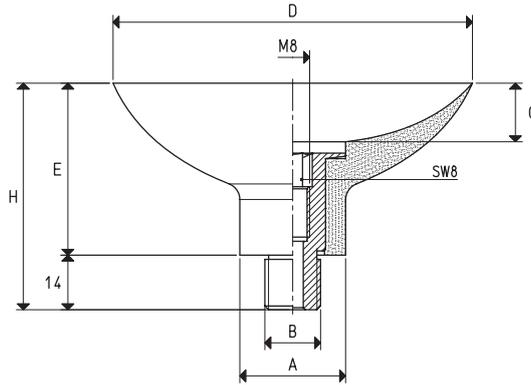| Item	Force Kg	D Ø	E	H	Vacuum cup item	Weight g
17 50 40 *	4.90	50	16	90	08 50 40	436
17 75 40 *	11.04	75	25	99	08 75 40	458
17 100 40 *	19.62	100	26	100	08 100 40	474
17 100 50 *	19.62	100	30	104	08 100 50	473

* Complete the code indicating the compound: B= BENZ rubber; N= natural para rubber; S = silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity) $\quad$ inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$

SELF-LOCKING VACUUM CUPS WITH TRACTION RELEASE

VACUUM CUPS WITH SUPPORT, SPARE PART

Item	Force Kg	Volume cm³	A Ø	B Ø	D Ø	E	G	H	Vacuum cup item	Support item	Support material	Weight g
08 60 10 *	7.06	16.1	15	G1/4"	60	22	9.5	36	01 60 10	00 08 22	aluminium	20.8
08 85 10 *	14.18	48.8	25	G1/4"	85	41	14.0	55	01 85 10	00 08 28	aluminium	49.3

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon
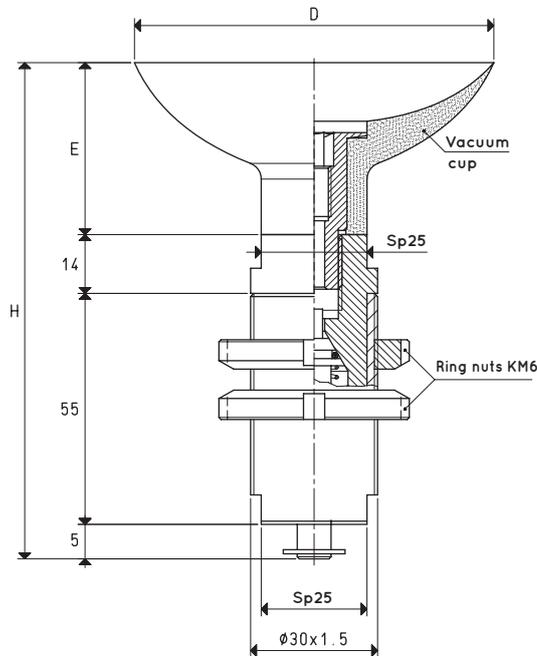
SELF-LOCKING VACUUM CUPS WITH TRACTION RELEASE

Item	Force Kg	D Ø	E	H	Vacuum cup item	Weight g
17 60 10 *	7.06	60	22	96	08 60 10	415
17 85 10 *	14.18	85	41	115	08 85 10	444

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$

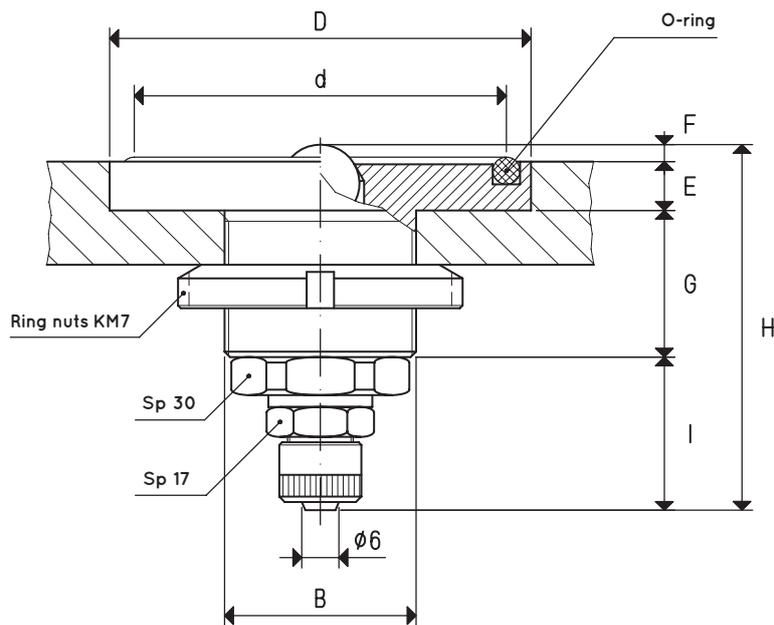# BUILT-IN VACUUM CUPS WITH BALL VALVE

The main feature of these cups is that they open, and therefore they produce a vacuum, only when the load to be handled activates the sealing ball. In this version, the gripping surface is limited by a silicon O-ring which guarantees the vacuum seal. They have been specially designed for vacuum beds and they are fully made with anodised aluminium.

BUILT-IN VACUUM CUPS WITH BALL VALVE

Item	Force Kg	Volume cm³	B Ø	d Ø	D Ø	E	F	G	H	I	O-ring item	Weight g
05 01 10	9.80	2.1	35 x 1.5	50	59	9	3	27	66	27	00 05 14	248
05 02 10	13.60	3.0	35 x 1.5	59	68	9	3	27	66	27	00 05 15	268
05 03 10	18.10	3.9	35 x 1.5	68	77	9	3	27	66	27	00 05 16	294
05 04 10	29.70	6.3	35 x 1.5	87	96	9	3	27	66	27	00 05 19	358

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$
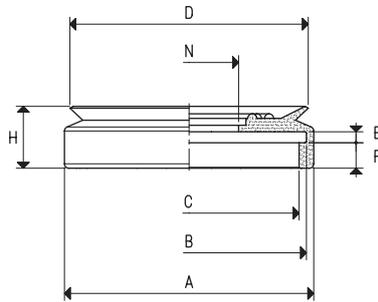
BUILT-IN VACUUM CUPS WITH BALL VALVE

The main feature of the these cups is the same as described above; they differ only in the seal which, in these, consists of the flat vacuum cups listed in the table.

They are especially designed for the glass industry vacuum and in all those cases where the use of a magnetic plane is not possible.
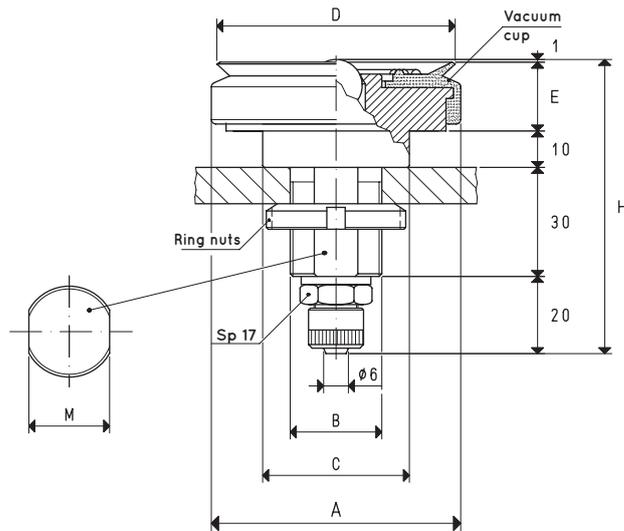
They are made of anodised aluminium but can be manufactured with other metals upon request.

SPARE VACUUM CUP

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 65 15 *	8.29	9.1	68	63	59	65	3	7	17	27	21.4

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon
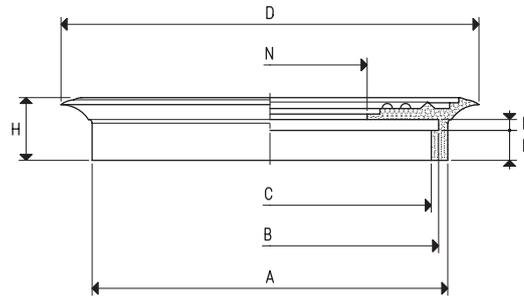
BUILT-IN VACUUM CUPS WITH BALL VALVE

Item	Force Kg	A Ø	B Ø	C Ø	D Ø	E	H	M	Ring nut	Vacuum cup item	Weight g
05 65 15 *	8.29	69	25 x 1.5	40	65	19	80	22	KM 5	01 65 15	262

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)

$$\text{inch} = \frac{mm}{25.4} \quad ; \quad \text{pounds} = \frac{g}{453.6} = \frac{Kg}{0.4536}$$

BUILT-IN VACUUM CUPS WITH BALL VALVE

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 85 15 *	14.18	13.0	68	63	59	85	3	7	17	27	29.7
01 110 10 *	23.74	24.9	96	91	87	114	3	8	17	54	44.3
01 150 10 *	45.00	75.7	133	125	118	154	4	11	23	64	112.0

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

BUILT-IN VACUUM CUPS WITH BALL VALVE

Item	Force Kg	A Ø	B Ø	C Ø	D Ø	E	H	M	Ring nut	Vacuum cup item	Weight g
05 85 15 *	14.18	69	25 x 1.5	40	85	19	80	22	KM 5	01 85 15	272
05 110 10 *	23.74	97	25 x 1.5	40	114	19	80	22	KM 5	01 110 10	422
05 150 10 *	45.00	135	35 x 1.5	80	154	25	86	32	KM 7	01 150 10	894

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6} = \dfrac{Kg}{0.4536}$

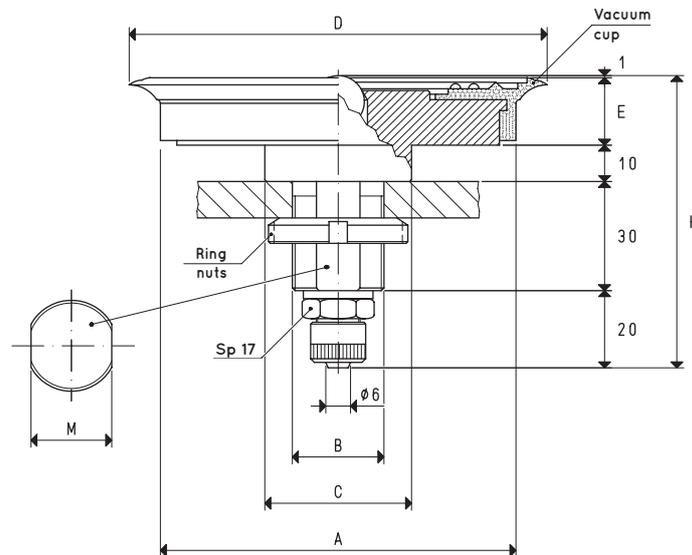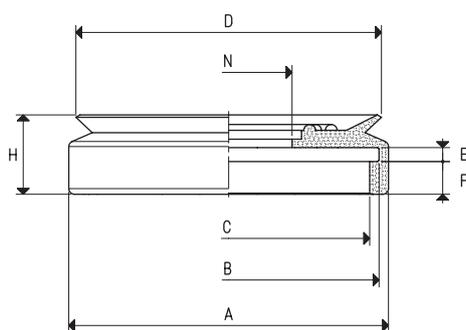# SPECIAL BUILT-IN VACUUM CUPS WITH BALL VALVE

Their main feature is that they open suction and therefore they produce a vacuum, only when the load to be handled activates the sealing ball.

Especially designed for the vacuum operated beds of woodworking machines, they differ from the previously described ones because of the high precision of their cylindrical support, which is ground to size, and because of their square closing block, which prevents the cup from rotating and enables connection to vacuum.

The cold fitted cups are the flat ones listed in the table, in the various compounds.
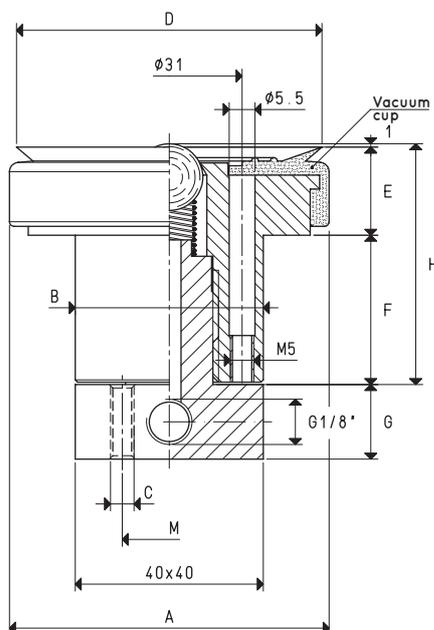
The support of these cups is made of anodised aluminium, while the closing block is made of brass.

SPARE VACUUM CUP

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 65 15 *	8.29	9.1	68	63	59	65	3	7	17	27	21.4

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon
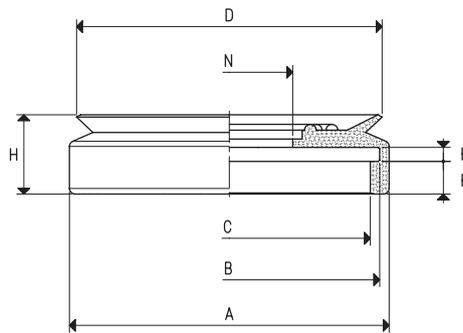
SPECIAL BUILT-IN VACUUM CUP WITH BALL VALVE

Item	Force Kg	A Ø	B Ø	C Ø	D Ø	E	F	G	H	M	Vacuum cup item	Weight g
05 65 15 M *	8.29	69	40	M5	65	19	31.5	16.0	51.5	20	01 65 15	456

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$
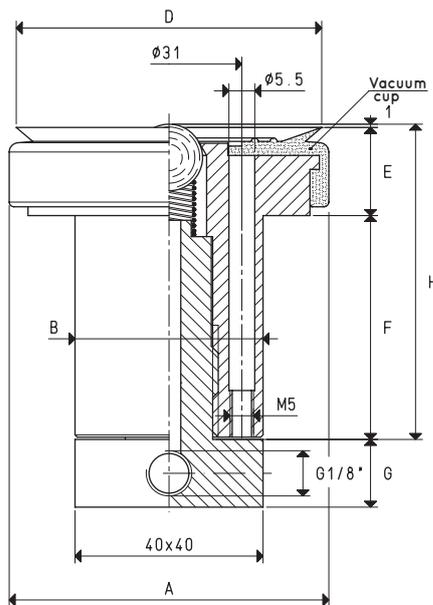
SPECIAL BUILT-IN VACUUM CUPS WITH BALL VALVE

SPARE VACUUM CUP

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 65 15 *	8.29	9.1	68	63	59	65	3	7	17	27	21.4

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

SPECIAL BUILT-IN VACUUM CUP WITH BALL VALVE

Item	Force Kg	A Ø	B Ø	D Ø	E	F	G	H	Vacuum cup item	Weight g
05 65 65 *	8.29	69	40	65	19	47.5	14.5	67.5	01 65 15	528

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon
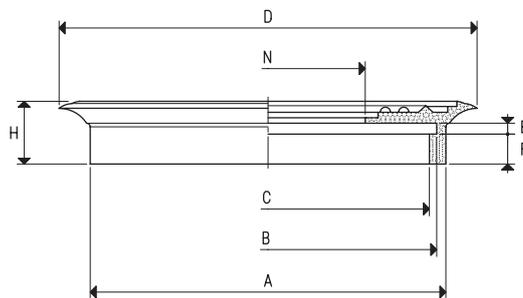
Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\frac{mm}{25.4}$; pounds = $\frac{g}{453.6}$ = $\frac{Kg}{0.4536}$
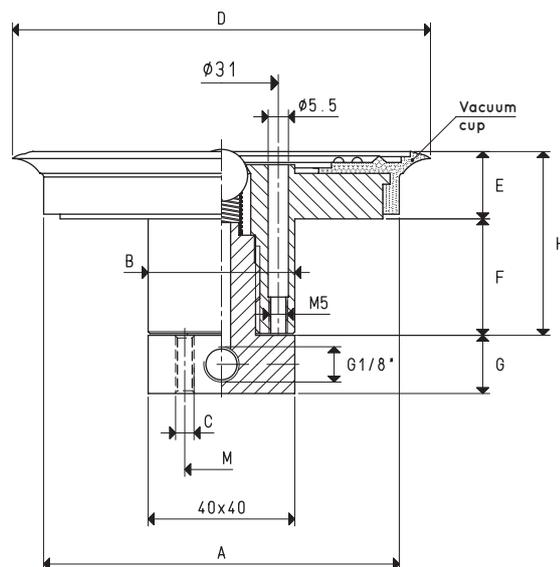
SPECIAL BUILT-IN VACUUM CUPS WITH BALL VALVE

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 85 15 *	14.18	13.0	68	63	59	85	3	7	17	27	29.7
01 110 10 *	23.74	24.9	96	91	87	114	3	8	17	54	44.3

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

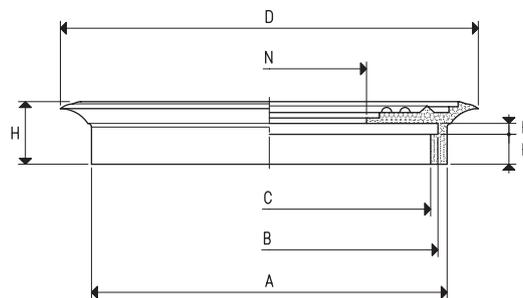**SPECIAL BUILT-IN VACUUM CUPS WITH BALL VALVE**

Item	Force Kg	A Ø	B Ø	C Ø	D Ø	E	F	G	H	M	Vacuum cup item	Weight g
05 85 15 M *	14.18	69	40	M5	85	19	31.5	16.0	51.5	20	01 85 15	466
05 110 10 M *	23.74	97	40	M5	114	19	32.0	16.0	52.0	20	01 110 10	614

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\frac{mm}{25.4}$; pounds = $\frac{g}{453.6}$ = $\frac{Kg}{0.4536}$
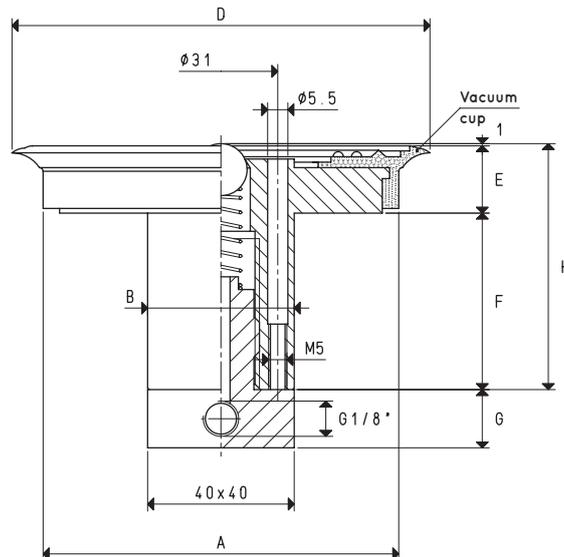
SPECIAL BUILT-IN VACUUM CUPS WITH BALL VALVE

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 85 15 *	14.18	13.0	68	63	59	85	3	7	17	27	29.7
01 110 10 *	23.74	24.9	96	91	87	114	3	8	17	54	44.3

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

SPECIAL BUILT-IN VACUUM CUPS WITH BALL VALVE

Item	Force Kg	A Ø	B Ø	D Ø	E	F	G	H	Vacuum cup item	Weight g
05 85 65 *	14.18	69	40	85	19	47.5	14.5	67.5	01 85 15	536
05 110 65 *	23.74	97	40	114	19	48.0	14.5	68.0	01 110 10	674

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$
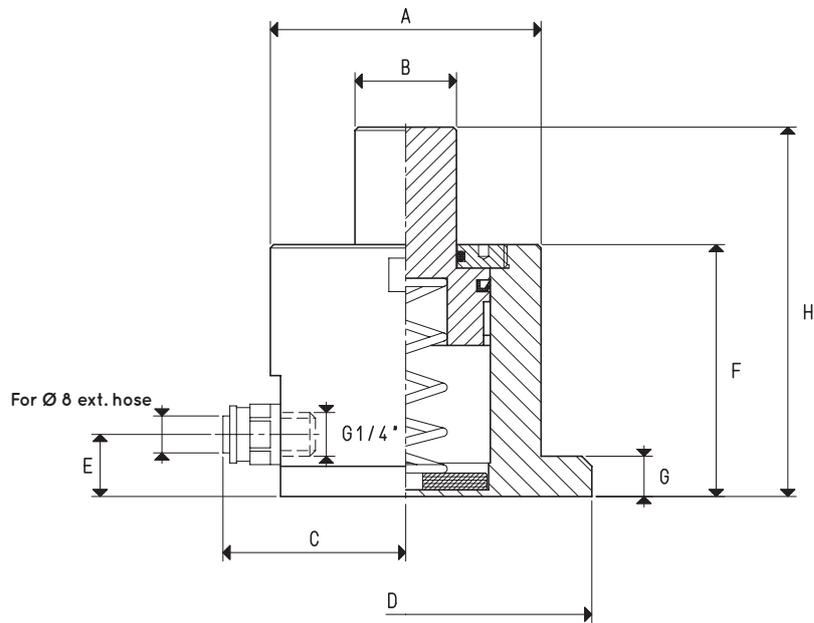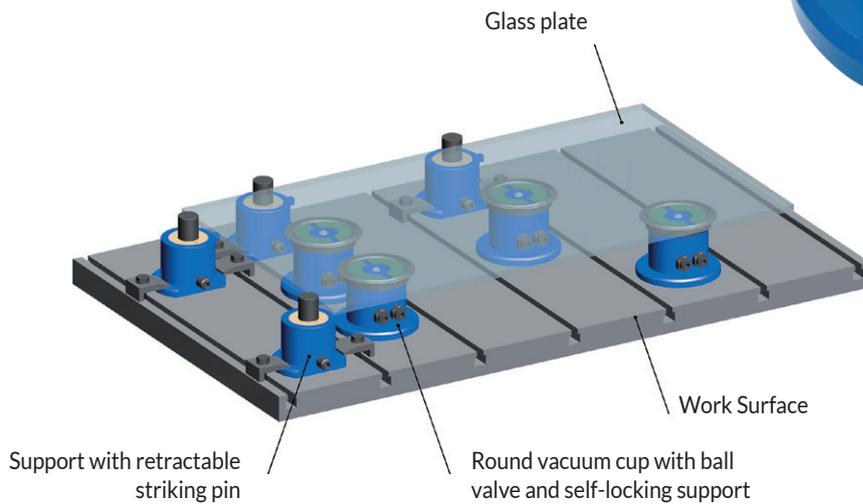
SUPPORTS WITH RETRACTABLE STRIKING PIN

These supports with retractable striking pins have been designed to allow a quick centring of the load to be clamped to the machine work surface via the cups.

The striking pin is solidly connected to a piston and it is activated by the vacuum while retracting and while remaining in its housing and also by a stainless steel spring while coming out.

These supports are mechanically fixed to the work surface.

The striking pin is made of plastic material, while the support is made of anodised aluminium.

They are supplied standard with a quick coupling for vacuum connection.

Glass plate

Work Surface

Support with retractable striking pin

Round vacuum cup with ball valve and self-locking support

For Ø 8 ext. hose

G 1 / 4 '

SUPPORTS WITH RETRACTABLE STRIKING PIN

Item	A Ø	B Ø	C	D Ø	E	F	G	H	Weight Kg
23 01 10	80	30	53	110	18	45	12	63	0.690
23 01 15	80	30	53	110	18	64	12	99	0.846
23 02 10	80	30	53	110	18	75	12	110	0.956
23 05 10	80	30	53	110	18	110	12	180	1.280

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$
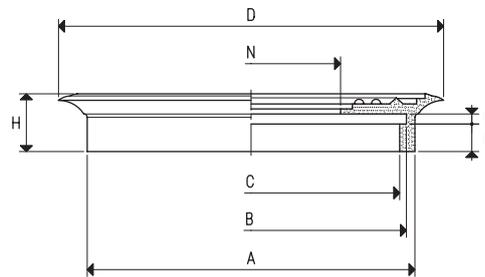
ROUND VACUUM CUPS WITH SELF-LOCKING SUPPORT

These cups represent a true mobile clamping system. They are composed of:
- A sturdy anodised aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard circular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- Two quick couplings for vacuum connection.

The detection of vacuum for gripping and releasing the support from the bearing surface and gripping and releasing the load can be made via three-way vacuum valves or solenoid valves.
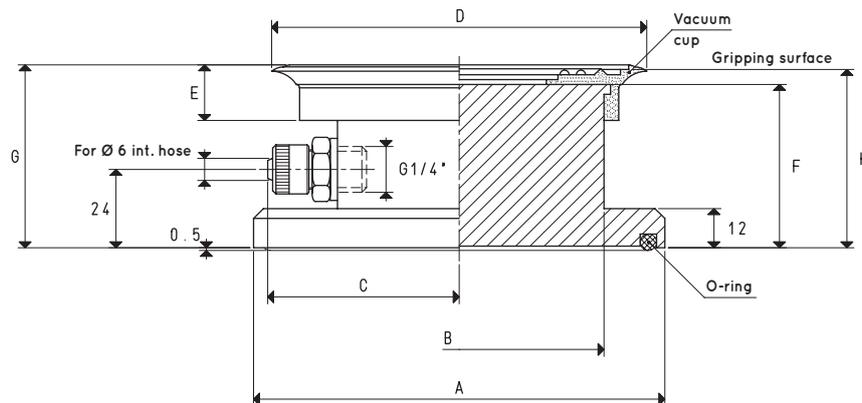
All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.

1

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 85 15 *	14.18	13.0	68	63	59	85	3	7	17	27	29.7
01 110 10 *	23.74	24.9	96	91	87	114	3	8	17	54	44.3
01 150 10 *	45.00	75.7	133	125	118	154	4	11	23	64	112.0

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

VACUUM CUPS WITH SELF-LOCKING SUPPORT

Item	Force Kg	A Ø	B Ø	C	D Ø	E	F	G	H	Vacuum cup item	O-ring item	Weight Kg
16 85 15 *	14.5	98	60	41	85	17	49.0	56.0	54.5	01 85 15	00 16 06	0.542
16 110 10 *	24.0	125	88	58	114	17	50.0	56.0	54.5	01 110 10	00 16 07	1.056
16 150 10 *	45.0	165	120	76	154	23	49.5	57.5	54.5	01 150 10	00 16 08	1.858

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)

$$inch = \frac{mm}{25.4} \; ; \; pounds = \frac{g}{453.6} = \frac{Kg}{0.4536}$$
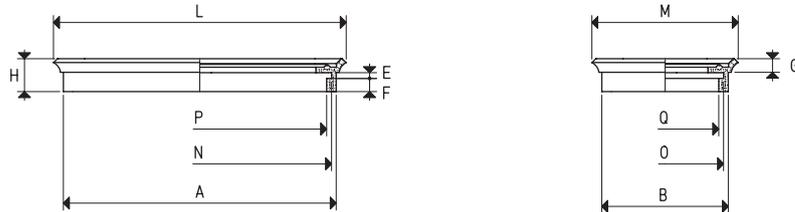
RECTANGULAR VACUUM CUPS WITH SELF-LOCKING SUPPORT

These cups represent a true mobile clamping system. They are composed of:
- A sturdy anodised aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard rectangular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- Two quick couplings for vacuum connection.

The detection of vacuum, for gripping and releasing the support, can be made via three-way vacuum valves or solenoid valves.
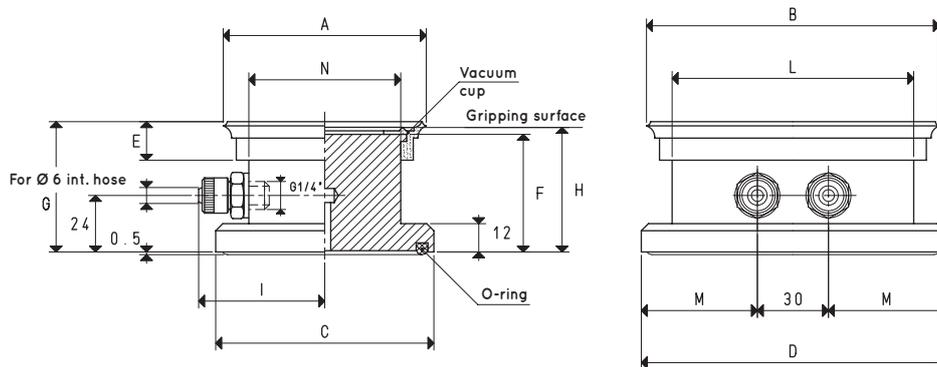
All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A	B	E	F	G	H	L	M	N	O	P	Q	Weight g
01 40 75 *	6.7	9.2	64	29	3	7.5	6.5	16.0	75	40	59	24	54	19	15.6
01 120 90 *	24.0	42.9	107	78	3	7.5	7.5	17.5	117	87	102	73	97	68	38.8
01 150 75 *	25.0	43.5	137	62	3	7.5	7.5	16.5	147	72	132	57	127	52	41.2

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

VACUUM CUPS WITH SELF-LOCKING SUPPORT

Item	Force Kg	A	B	C	D	E	F	G	H	I	L	M	N	Vacuum cup item	O-ring item	Weight Kg
16 40 75 *	6.7	41	76	48	83	16.0	51	56.5	54.5	30.5	55	26.5	20	01 40 75	00 16 09	0.260
16 120 90 *	24.0	90	120	98	128	17.5	50	57.0	54.5	56.0	102	49.0	70	01 120 90	00 16 10	1.166
16 150 75 *	25.0	75	150	83	144	16.5	50	57.0	54.5	48.0	130	57.0	55	01 150 75	00 16 10	1.177

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)

$$inch = \frac{mm}{25.4} \; ; \; pounds = \frac{g}{453.6} = \frac{Kg}{0.4536}$$
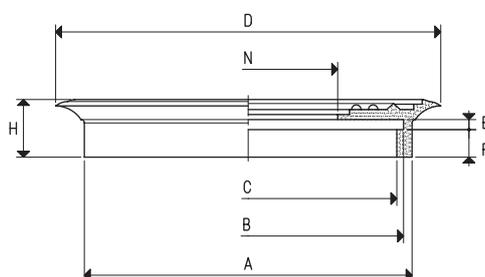
ROUND VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

These cups represent a true mobile clamping system. They are composed of:
- A sturdy anodised aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard circular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.

The detection of vacuum, for gripping and releasing the support, can be made via three-way vacuum valves or solenoid valves.
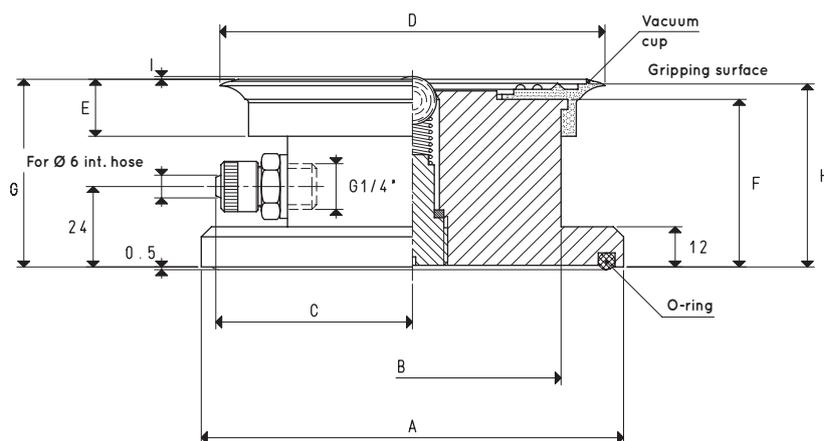
All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 85 15 *	14.18	13.0	68	63	59	85	3	7	17	27	29.7
01 110 10 *	23.74	24.9	96	91	87	114	3	8	17	54	44.3
01 150 10 *	45.00	75.7	133	125	118	154	4	11	23	64	112.0

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

Item	Force Kg	A Ø	B Ø	C Ø	D Ø	E	F	G	H	I	Vacuum cup item	O-ring item	Weight Kg
18 85 15 *	14.5	98	60	41	85	17	49.0	56.0	54.5	1	01 85 15	00 16 06	0.580
18 110 10 *	24.0	125	88	58	114	17	50.0	56.0	54.5	1	01 110 10	00 16 07	1.106
18 150 10 *	45.0	165	120	76	154	23	49.5	57.5	54.5	1	01 150 10	00 16 08	1.926

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6} = \dfrac{Kg}{0.4536}$
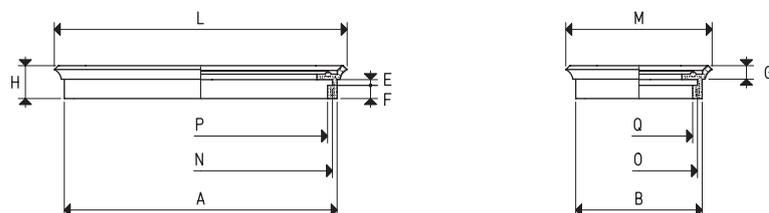
RECTANGULAR VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

These cups represent a true mobile clamping system. They are composed of:
- A sturdy anodised aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard rectangular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.
The detection of vacuum, for gripping and releasing the support, can be made via three-way vacuum valves or solenoid valves.
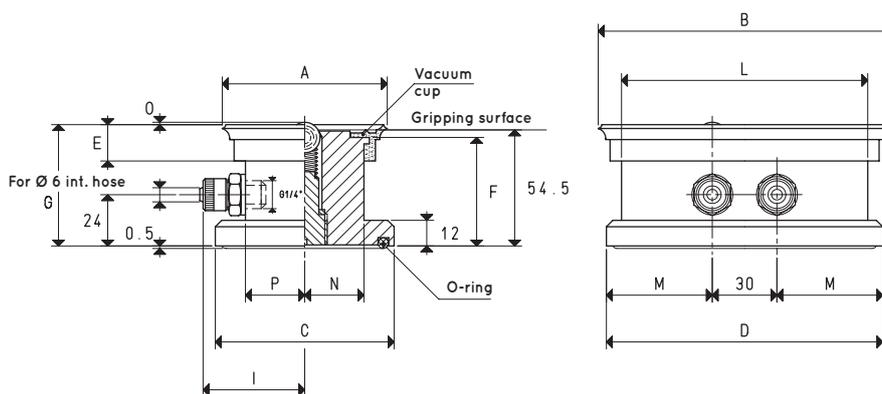All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A	B	E	F	G	H	L	M	N	O	P	Q	Weight g
01 40 75 *	6.7	9.2	64	29	3	7.5	6.5	16.0	75	40	59	24	54	19	15.6
01 120 90 *	24.0	42.9	107	78	3	7.5	7.5	17.5	117	87	102	73	97	68	38.8
01 150 75 *	25.0	43.5	137	62	3	7.5	7.5	16.5	147	72	132	57	127	52	41.2

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

Item	Force Kg	A	B	C	D	E	F	G	I	L	M	N	O	P	Vacuum cup item	O-ring item	Weight Kg
18 40 75 *	6.7	41	76	48	83	16.0	51	56.5	41.5	55	26.5	15.0	2	21.0	01 40 75	00 16 09	0.352
18 120 90 *	24.0	90	120	98	128	17.5	50	57.0	56.0	102	49.0	35.0	1	35.0	01 120 90	00 16 10	1.224
18 150 75 *	25.0	75	150	83	144	16.5	50	57.0	48.0	130	57.0	27.5	1	27.5	01 150 75	00 16 10	1.194

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$

ROUND VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

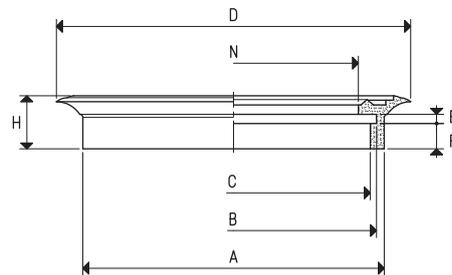These cups represent a true mobile clamping system.
They are composed of:
- A sturdy aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard circular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.

The gripping plane of these cups is covered with a special non-slip plastic coating, which is particularly suited for clamping glass and smooth marble.
The detection of vacuum, for gripping and releasing the support, can be made via three-way vacuum valves or solenoid valves.
All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.
**Note:** Available with support for mechanical fixing with code 28, instead of 18.

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 85 15 M *	14.18	13.0	68	63	59	85	3	7	17	53	26.2
01 110 10 M *	23.74	24.9	96	91	87	114	3	8	17	80	40.1
01 150 10 M *	45.00	75.7	133	125	118	154	4	11	23	117	98.3
01 250 20 *	122.60	200.0	235	227	220	254	4	11	23	220	188.6

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond
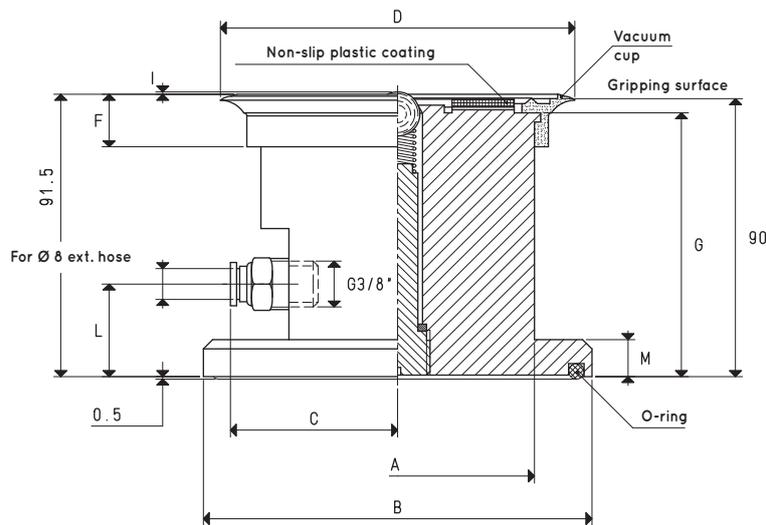
VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

Item	Force Kg	A Ø	B Ø	C	D Ø	F	G	I	L	M	Vacuum cup item	O-ring item	Weight Kg
18 85 15/90 MT *	14.18	60	98	42	85	17	85.0	1	30	12	01 85 15 M	00 16 06	0.880
18 110 10/90 MT *	23.74	88	125	51	114	17	85.5	1	30	12	01 110 10 M	00 16 07	1.704
18 150 10/90 MT *	45.00	120	165	68	154	23	85.0	1	30	12	01 150 10 M	00 16 08	3.158
18 250 20/90 MT *	122.60	223	270	121	254	23	85.0	1	33	15	01 250 20	00 18 09	10.322

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$

RECTANGULAR VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

These cups represent a true mobile clamping system.
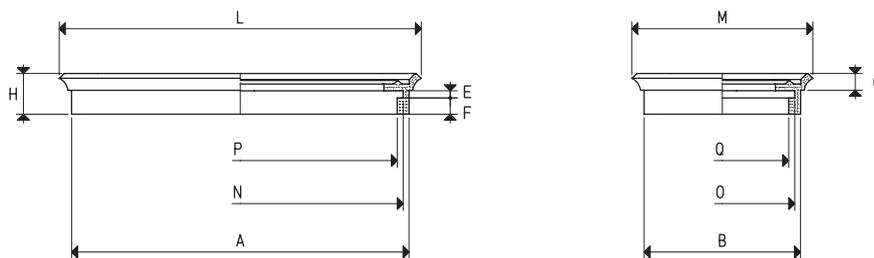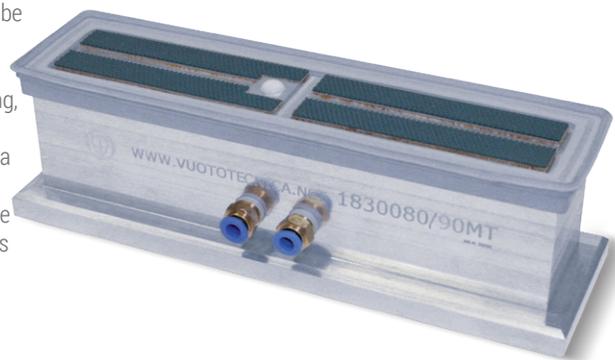They are composed of:
- A sturdy aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard rectangular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.

The gripping plane of these cups is covered with a special non-slip plastic coating, which is particularly suited for clamping glass and smooth marble.

The detection of vacuum, for gripping and releasing the support, can be made via three-way vacuum valves or solenoid valves.

All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.
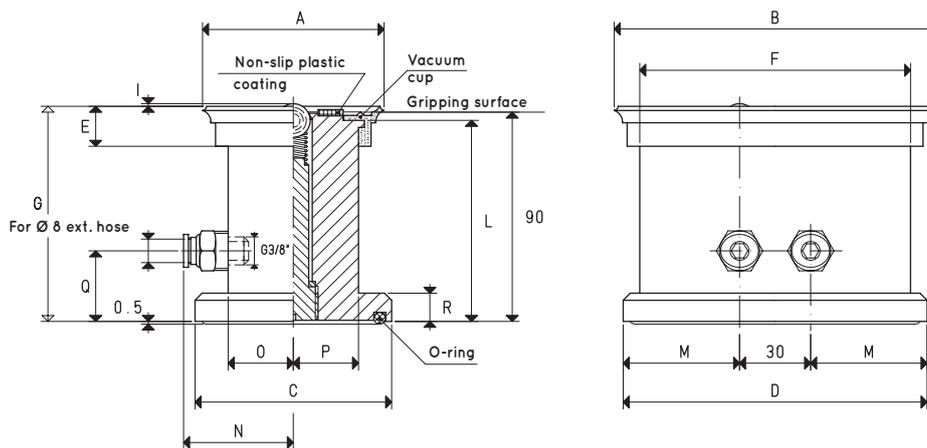
Note: Available with support for mechanical fixing with code 28, instead of 18.

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A	B	E	F	G	H	L	M	N	O	P	Q	Weight g
01 40 75 *	6.7	9.2	64	29	3	7.5	6.5	16.0	75	40	59	24	54	19	15.6
01 120 90 *	24.0	42.9	107	78	3	7.5	7.5	17.5	117	87	102	73	97	68	38.8
01 150 75 *	25.0	43.5	137	62	3	7.5	7.5	16.5	147	72	132	57	127	52	41.2
01 300 80 *	60.0	117.6	288	68	3	7.5	7.5	17.5	297	77	284	64	278	58	80.0
01 300 150 *	113.0	268.5	288	138	3	7.5	7.5	17.5	297	147	284	134	278	128	90.0

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond

VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

Item	Force Kg	A	B	C	D	E	F	G	I	L	M	N	O	P	Q	R	Vacuum cup item	O-ring item	Weight Kg
18 40 75/90 MT *	6.7	41	76	48	83	16.0	55	92.0	2	86.5	26.5	37.0	21.0	15.0	30	17	01 40 75	00 16 09	0.570
18 120 90/90 MT *	24.0	90	120	98	128	17.5	102	92.5	1	85.5	49.0	51.0	35.0	35.0	30	12	01 120 90	00 16 10	1.898
18 150 75/90 MT *	25.0	75	150	83	144	16.5	130	92.5	1	85.5	57.0	43.5	27.5	27.5	30	12	01 150 75	00 16 10	1.924
18 300 80/90 MT *	60.0	80	300	90	310	17.5	284	92.5	1	85.5	140.0	47.0	31.0	31.0	33	15	01 300 80	00 18 10	4.632
18 300 150/90 MT *	113.0	150	300	160	310	17.5	284	92.5	1	85.5	140.0	83.0	67.0	67.0	33	15	01 300 150	00 18 11	9.534

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity) inch = $\frac{mm}{25.4}$; pounds = $\frac{g}{453.6}$ = $\frac{Kg}{0.4536}$

ROUND VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT

These cups also represent a true mobile clamping system. They differ from the above cups for their exceptional height. They are composed of:
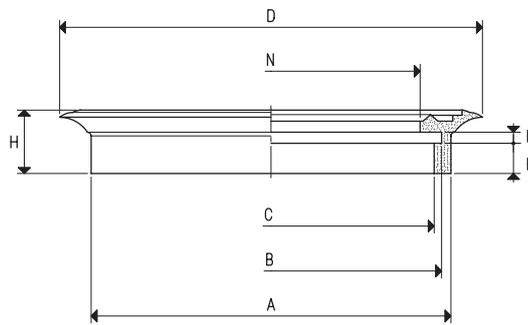- A sturdy, tall aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard circular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.

The gripping plane of these cups is covered with a special non-slip plastic coating, which is particularly suited for clamping glass and smooth marble.

The detection of vacuum for gripping and releasing the support from the bearing surface and gripping and releasing the load can be made via three-way vacuum valves or solenoid valves.

All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.
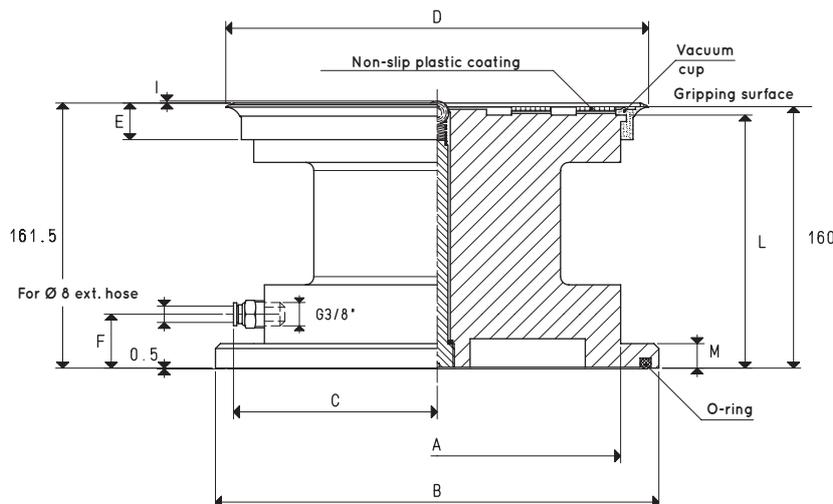
Note: Available with support for mechanical fixing with code 28, instead of 18.

1

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 110 10 M *	23.74	24.9	96	91	87	114	3	8	17	80	40.1
01 150 10 M *	45.00	75.7	133	125	118	154	4	11	23	117	98.3
01 250 20 *	122.60	200.0	235	227	220	254	4	11	23	220	188.6

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond

ROUND VACUUM CUPS WITH BALL VALVE AND HIGH SELF-LOCKING SUPPORT

Item	Force Kg	A Ø	B Ø	C	D Ø	E	F	I	L	M	Vacuum cup item	O-ring item	Weight Kg
18 110 10/160 MT *	24.0	88	125	51	114	17	30	1	155.5	12	01 110 10 M	00 16 07	2.986
18 150 10/160 MT *	45.0	120	165	68	154	23	30	1	155.5	12	01 150 10 M	00 16 08	5.042
18 250 20/160 MT *	122.6	223	270	121	254	23	33	1	155.5	15	01 250 20	00 18 09	12.634

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$

RECTANGULAR VACUUM CUPS WITH BALL VALVE AND HIGH SELF-LOCKING SUPPORT

These cups also represent a true mobile clamping system. They differ from the above cups for their exceptional height.
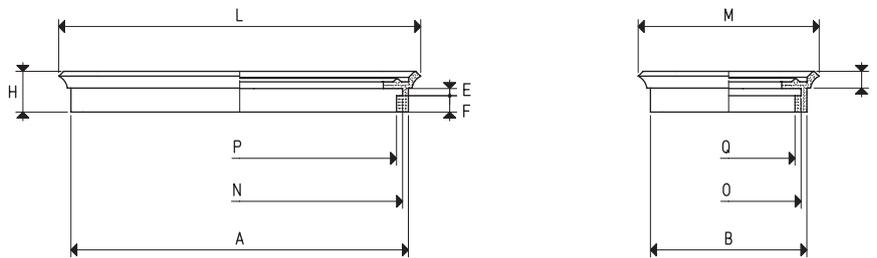They are composed of:
- A sturdy, tall aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard rectangular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.

The gripping plane of these cups is covered with a special non-slip plastic coating, which is particularly suited for clamping glass and smooth marble.
The detection of vacuum for gripping and releasing the support from the bearing surface and gripping and releasing the load can be made via three-way vacuum valves or solenoid valves.
All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.
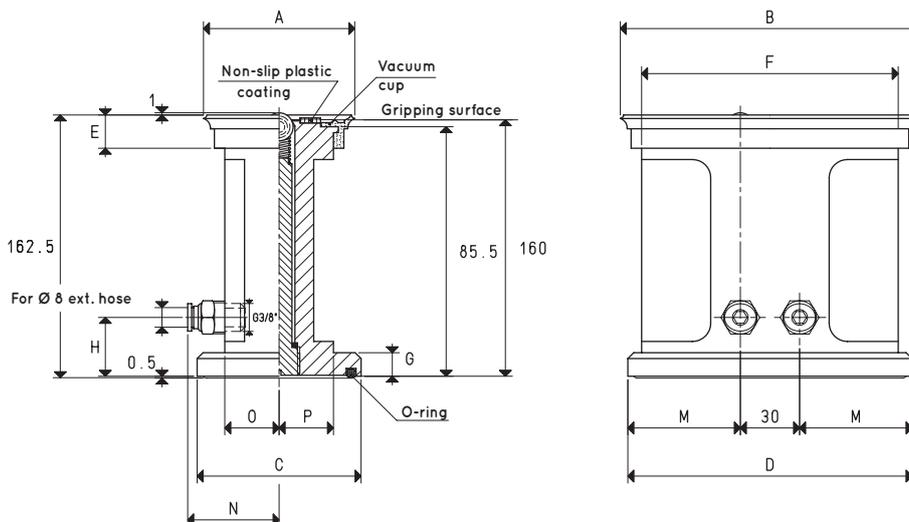
Note: Available with support for mechanical fixing with code 28, instead of 18.

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A	B	E	F	G	H	L	M	N	O	P	Q	Weight g
01 120 90 *	24.0	42.9	107	78	3	7.5	7.5	17.5	117	87	102	73	97	68	38.8
01 150 75 *	25.0	43.5	137	62	3	7.5	7.5	16.5	147	72	132	57	127	52	41.2
01 300 80 *	60.0	117.6	288	68	3	7.5	7.5	17.5	297	77	284	64	278	58	80.0
01 300 150 *	113.0	268.5	288	138	3	7.5	7.5	17.5	297	147	284	134	278	128	90.0

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond

ROUND VACUUM CUPS WITH BALL VALVE AND HIGH SELF-LOCKING SUPPORT

Item	Force Kg	A	B	C	D	E	F	G	H	M	N	O	P	Vacuum cup item	O-ring item	Weight Kg
18 120 90/160 MT *	24.0	90	120	98	128	17.5	102	12	30	49	51.0	35.0	35.0	01 120 90	00 16 10	3.450
18 150 75/160 MT *	25.0	75	150	83	144	16.5	130	12	30	57	43.5	27.5	27.5	01 150 75	00 16 10	3.262
18 300 80/160 MT *	60.0	80	300	90	310	17.5	284	15	33	140	47.0	31.0	31.0	01 300 80	00 18 10	7.906
18 300 150/160 MT *	113.0	150	300	160	310	17.5	284	15	33	140	83.0	67.0	67.0	01 300 150	00 18 11	13.110

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon; BA= stain-resistant Biond

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity) $inch = \dfrac{mm}{25.4}$; $pounds = \dfrac{g}{453.6} = \dfrac{Kg}{0.4536}$

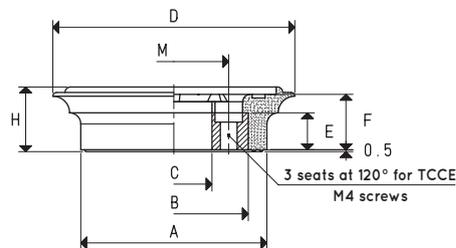# ROUND VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT, FOR GLASS

Glass machinery manufacturers require increasingly accurate and safe clamping machines. This has led us to the creation of this series of cups.

The specially designed shape of this cup guarantees a firm grip. The other main feature is the utmost precision in the height, whose nominal size has a tolerance of only five hundredths of millimetre. They are composed of:
- A sturdy aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard round flat cup which is cold-assembled onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.

The detection of vacuum, for gripping and releasing the support from the bearing surface and for gripping and release of glass can be made via three-way vacuum valves or solenoid valves.

SPARE VACUUM CUP

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	M Ø	Support material	Weight g
08 65 11 A	6.7	5.5	50	40	20.5	65	10	15	17.5	29.5	steel	90

Compound: A = oil-resistant rubber
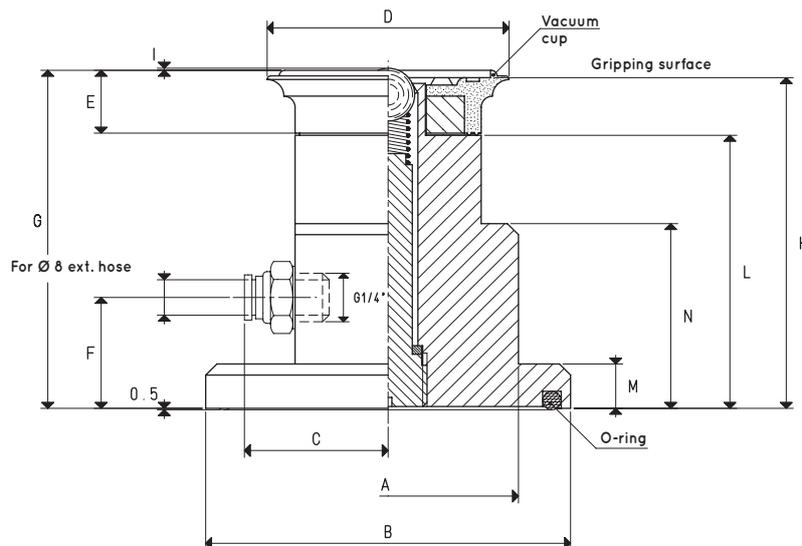
VACUUM CUP WITH BALL VALVE AND SELF-LOCKING SUPPORT

Item	Force Kg	A Ø	B Ø	C	D Ø	E	F	G	H	I	L	M	N	Vacuum cup item	O-ring item	Weight Kg
18 65 11/90 A	6.7	70	98	45	65	17.5	30	92.5	90	1	75	12	50	08 65 11 A	00 16 06	1.090

Compound: A = oil-resistant rubber

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6} = \dfrac{Kg}{0.4536}$

1

RECTANGULAR VACUUM CUPS WITH BALL VALVE AND SELF-LOCKING SUPPORT, FOR GLASS

Glass machinery manufacturers require increasingly accurate and safe clamping machines. This has led us to the creation of this series of cups.
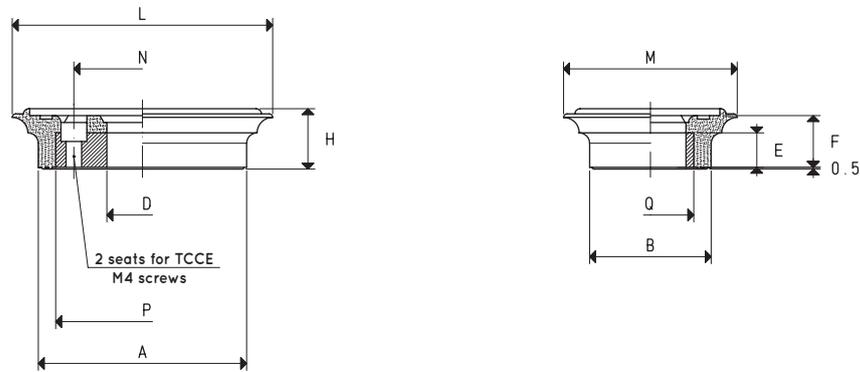The specially designed shape of this cup guarantees a firm grip. The other main feature is the utmost precision in the height, whose nominal size has a tolerance of only five hundredths of millimetre. They are composed of:
- A sturdy aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard rectangular flat cup which is cold-assembled onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- Two quick couplings for vacuum connection.
The detection of vacuum, for gripping and releasing the support from the bearing surface and for gripping and release of glass can be made via three-way vacuum valves or solenoid valves.

SPARE VACUUM CUP

Item	Force Kg	Volume cm³	A	B	D Ø	E	F	H	L	M	N	P	Q	Support material	Weight g
08 50 75 A	7.5	6.1	60	35	20.5	10	15	17.5	75	50	39.5	50	25	steel	92

Compound: A = oil-resistant rubber
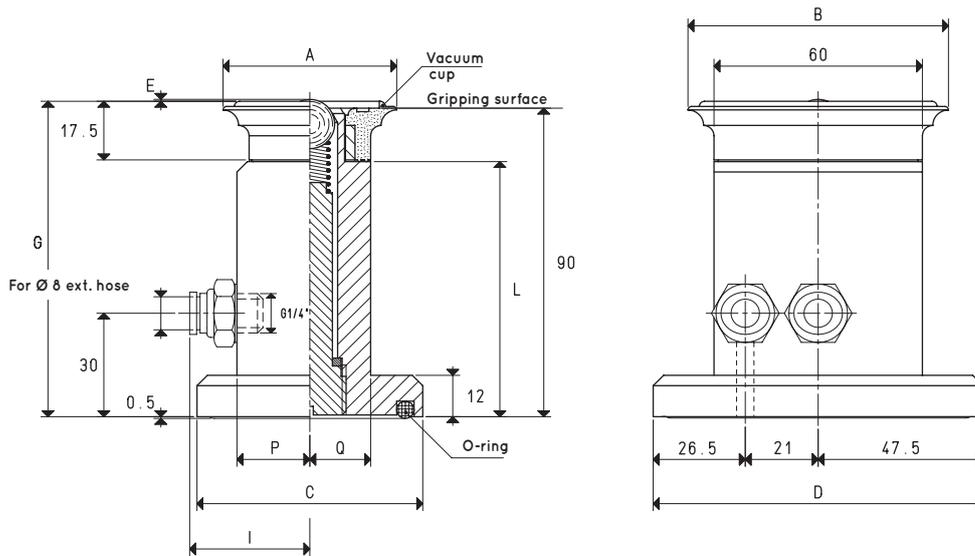
VACUUM CUP WITH BALL VALVE AND SELF-LOCKING SUPPORT

Item	Force Kg	A	B	C	D	E	G	I	L	P	Q	Vacuum cup item	O-ring item	Weight Kg
18 50 75/90 A	7.5	50	75	65	95	1	92.5	41	75	21	17.5	08 50 75 A	00 16 06	0.762

Compound: A = oil-resistant rubber

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity) inch = $\frac{mm}{25.4}$; pounds = $\frac{g}{453.6}$ = $\frac{Kg}{0.4536}$

1.152

ROUND VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON, FOR GLASS
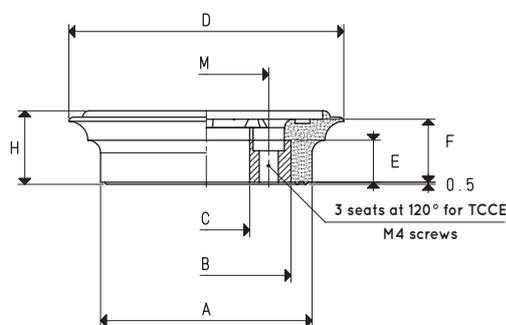
Glass machinery manufacturers require increasingly accurate and safe clamping machines. This has led us to the creation of this series of cups.

The specially designed shape of this cup guarantees a firm grip. The other main feature is the utmost precision in the height, whose nominal size has a tolerance of only five hundredths of millimetre. They are composed of:

- A sturdy anodised aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard round flat cup which is cold-assembled onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- A release button that allows placing the support even with the vacuum inserted.
- Two quick couplings for vacuum connection.

The detection of vacuum, for gripping and releasing the support from the bearing surface and for gripping and release of glass can be made via three-way vacuum valves or solenoid valves.

1

SPARE VACUUM CUP

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	M Ø	Support material	Weight g
08 85 11 A	12	7.7	70	60	40.5	85	10	15	17.5	49.5	steel	92

Compound: A = oil-resistant rubber
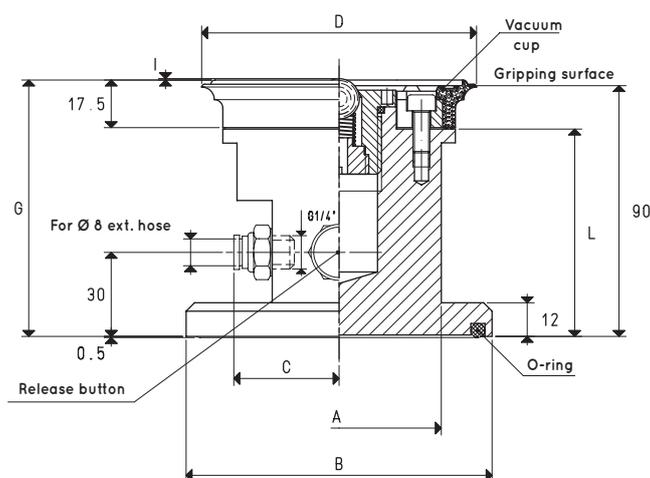
VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

Item	Force Kg	A Ø	B Ø	C	D Ø	G	I	L	Vacuum cup item	O-ring item	Weight Kg
21 85 11/90 A	12.0	70	98	42	85	92.5	1	75	08 85 11 A	00 16 06	1.090

Compound: A = oil-resistant rubber

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.
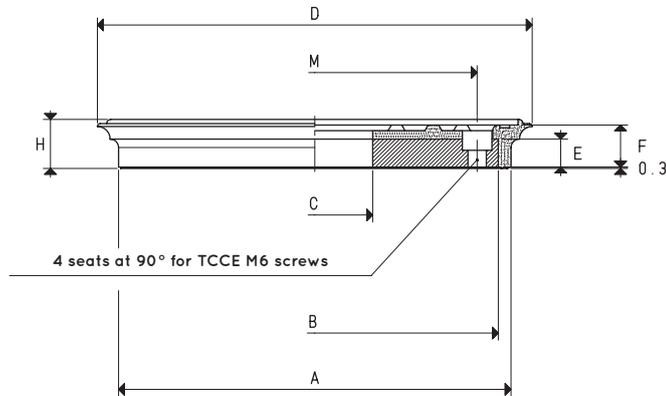
Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\frac{mm}{25.4}$; pounds = $\frac{g}{453.6}$ = $\frac{Kg}{0.4536}$

ROUND VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON, FOR GLASS

SPARE VACUUM CUP

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	M Ø	Support material	Weight Kg
08 150 11 A	42.7	47.1	139	130	41.0	150	10	15	17.5	115.0	steel	1.0

Compound: A = oil-resistant rubber
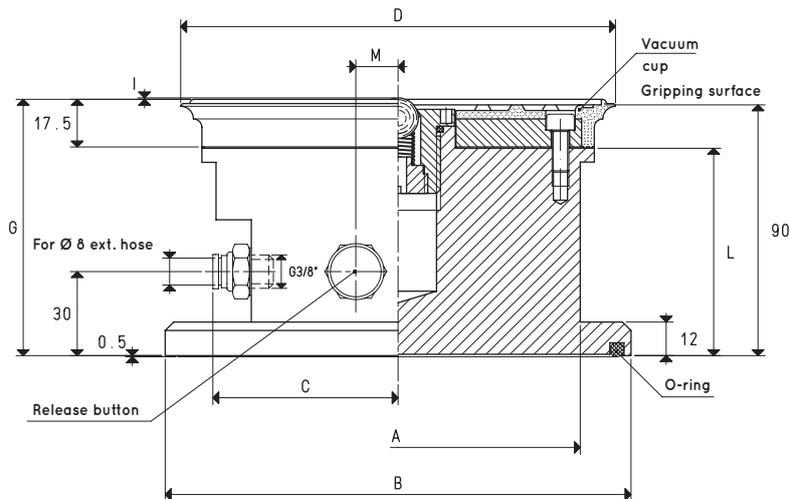
VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

Item	Force Kg	A Ø	B Ø	C	D Ø	G	I	L	M	Vacuum cup item	O-ring item	Weight Kg
21 150 11/90 A	42.7	129	165	73	150	92.5	1	75	15	08 150 11 A	00 16 08	3.938

Compound: A = oil-resistant rubber

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6} = \dfrac{Kg}{0.4536}$

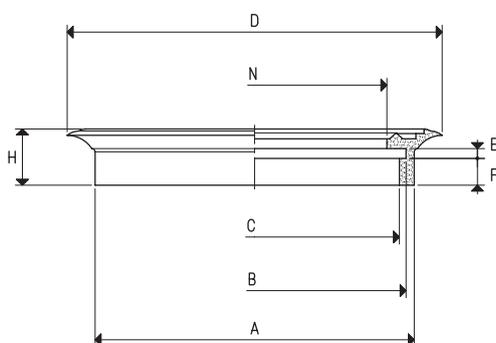# ROUND VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

These cups represent a true mobile clamping system.
They are composed of:
- A sturdy anodised aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard circular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- A release button that allows placing the support even with the vacuum inserted.
- Two quick couplings for vacuum connection.

The detection of vacuum for gripping and releasing the support from the bearing surface and gripping and releasing the load can be made via three-way vacuum valves or solenoid valves.

All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.

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SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A Ø	B Ø	C Ø	D Ø	E	F	H	N Ø	Weight g
01 110 10 M *	23.74	24.9	96	91	87	114	3	8	17	80	40.1
01 150 10 M *	45.00	75.7	133	125	118	154	4	11	23	117	98.3

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon
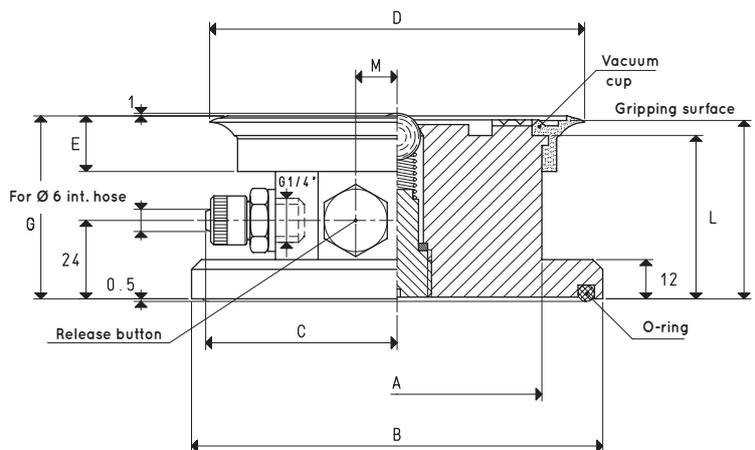
VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

Item	Force Kg	A Ø	B Ø	C Ø	D Ø	E	G	H	L	M	Vacuum cup item	O-ring item	Weight Kg
21 110 10 *	24	88	125	58	114	17	56.0	54.5	50.0	10	01 110 10 M	00 16 07	1.148
21 150 10 *	45	120	165	76	154	23	57.5	54.5	49.5	28	01 150 10 M	00 16 08	2.042

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$

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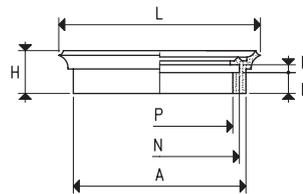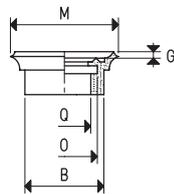# RECTANGULAR VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

These cups represent a true mobile clamping system.
They are composed of:
- A sturdy anodised aluminium support with a wide surface at the base limited by a seal whose purpose is to fix it to the bearing surface.
- A standard rectangular flat cup which is cold fitted onto the upper part of the support for gripping the load.
- A ball valve that opens up creating vacuum, only when activated by the load to be gripped.
- A release button that allows placing the support even with the vacuum inserted.
- Two quick couplings for vacuum connection.

The detection of vacuum for gripping and releasing the support from the bearing surface and gripping and releasing the load can be made via three-way vacuum valves or solenoid valves.

All cups with self-locking support of this and other ranges with the gripping plane at the same height can be used simultaneously, even if they are of different types or have different sizes.
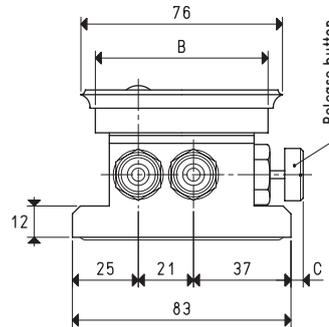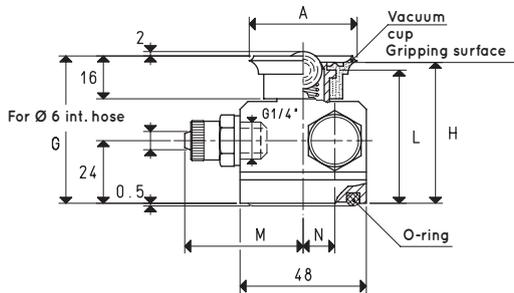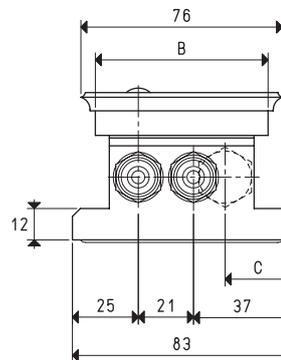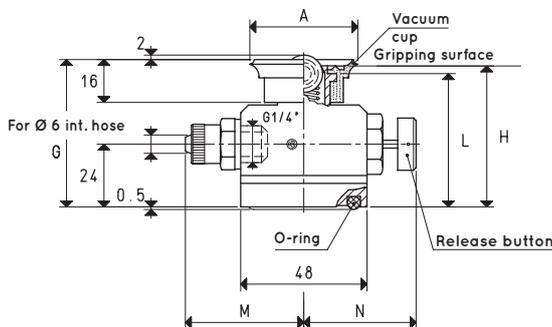
SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A	B	E	F	G	H	L	M	N	O	P	Q	Weight g
01 40 75 *	6.7	9.2	64	29	3	7.5	6.5	16.0	75	40	59	24	54	19	15.6

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Item 21 40 75 PL

Item 21 40 75 PP

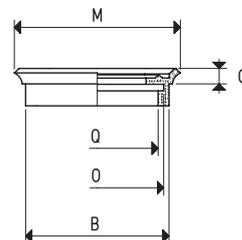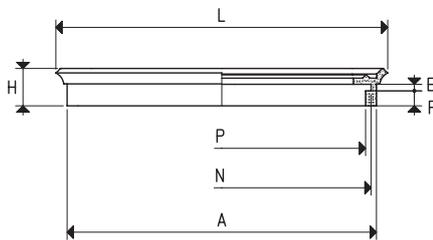### VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

Item	Force Kg	A	B	C	G	H	L	M	N	Vacuum cup item	O-ring item	Weight Kg
21 40 75 PL *	6.7	41	55	7	56.5	54.5	51	45.5	12	01 40 75	00 16 09	0.460
21 40 75/84 PL *	6.7	41	55	7	86.5	84.0	81	45.5	12	01 40 75	00 16 09	0.702
21 40 75 PP *	6.7	41	55	25	56.5	54.5	51	45.5	45	01 40 75	00 16 09	0.460
21 40 75/ 84 PP *	6.7	41	55	25	86.5	84.0	81	45.5	45	01 40 75	00 16 09	0.702

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$
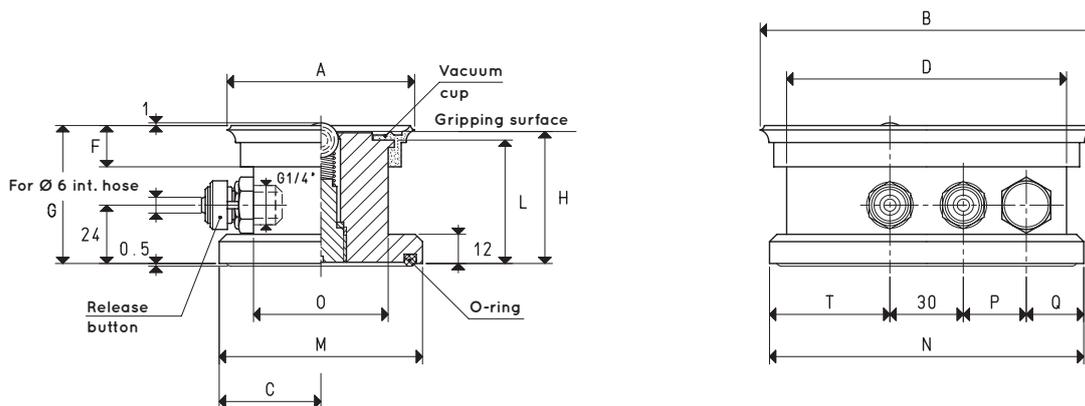
RECTANGULAR VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

SPARE VACUUM CUPS

Item	Force Kg	Volume cm³	A	B	E	F	G	H	L	M	N	O	P	Q	Weight g
01 120 90 *	24.0	42.9	107	78	3	7.5	7.5	17.5	117	87	102	73	97	68	38.8
01 150 75 *	25.0	43.5	137	62	3	7.5	7.5	16.5	147	72	132	57	127	52	41.2

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

VACUUM CUPS WITH BALL VALVE, SELF-LOCKING SUPPORT AND RELEASE BUTTON

Item	Force Kg	A	B	C	D	F	G	H	L	M	N	O	P	Q	T	Vacuum cup item	O-ring item	Weight Kg
21 120 90 *	24	90	120	56	102	17.5	57.0	54.5	50	98	128	70	24	25	49	01 120 90	00 16 10	1.320
21 150 75 *	25	75	120	48	130	16.5	57.0	54.5	50	83	144	55	25	32	57	01 150 75	00 16 10	1.236
21 150 75/84 *	25	75	150	48	130	16.5	86.5	84.0	80	83	144	55	25	32	57	01 150 75	00 16 10	1.924

* Complete the code indicating the compound: A= oil-resistant rubber; N= natural para rubber; S= silicon

Note: The force of the vacuum cups indicated in the table represents 1/3 of the value of the theoretical force calculated at a level of vacuum of -75 KPa and a factor of safety 3.

Transformation ratio: N (newton) = Kg x 9.81 (force of gravity)   inch = $\dfrac{mm}{25.4}$; pounds = $\dfrac{g}{453.6}$ = $\dfrac{Kg}{0.4536}$