



Bull's eye levels and Screw-on levels



Standard Machine Elements Worldwide



Bull's eye levels and screw-on levels

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Bull's eye levels and screw-on levels

Technical Information

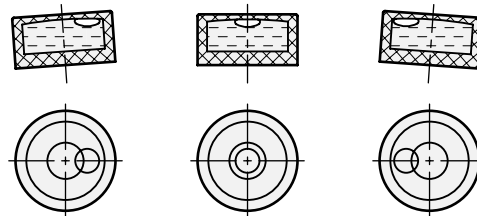
Definition of terms

A spirit level is a hollow body filled with a fluid and a gas bubble which is used to check the horizontal position of an object. The position of the gas bubble in the fluid shows the angle and the direction at which the object is inclined in relation to the horizontal level.

The function

The hollow body containing the fluid and the gas bubble has a defined radius at its top side, causing the gas bubble to float by its buoyancy always to the highest point.

The transparent upper section normally carries markings or a circle centric to the middle position. If the gas bubble is centered precisely inside the marking and if the air level is properly adjusted, the object to be checked is in the horizontal position.



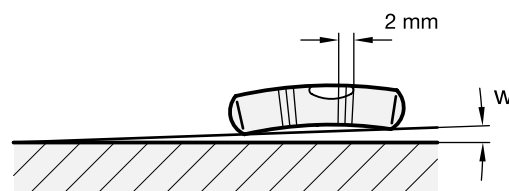
Types of spirit levels

Spirit levels are available as bull's eye levels or screw-on levels.

Bull's eye levels simultaneously measure the angle of inclination and the angular position, e.g. of a certain level, whereas screw-on levels indicate the angle of inclination in one dimension only along the axis of the level.

Sensitivity

The sensitivity of spirit levels is given as angle of inclination, e.g. 30 angular minutes or 0.5 degrees. This is the angle of inclination by which the spirit level must be tilted to make the bubble move by 2 mm. A spirit level with a sensitivity of 6 angular minutes therefore has a higher sensitivity than a spirit level with a sensitivity of 30 angular minutes.



Angle of inclination and difference in altitude

Sensitivity is sometimes also given in millimetre per metre, i.e. as difference in altitude per unit of length. See also the reference table opposite.

Difference in altitude in millimetre per metre	Angle w	
	in angular minutes	Degree, decimal
0.3	1	0.0167
0.9	3	0.0500
1.7	6	0.1000
2.9	10	0.1667
5.8	20	0.3333
8.7	30	0.5000
11.6	40	0.6667
14.5	50	0.8333
17.5	60	1.0000

GN 2277

Bull's eye levels

Specification

Sensitivity

30 Angle minutes, bubble move by 2mm

Types

Type **A**: Mounting flange, for bolting to surface

Type **B**: Mounting flange, for inserting (collar)

Housing

Aluminium

anodized, natural colour **ALN**

anodized, black **ALS**

Spirit level element

Glass plastic body

Filling

colourless-transparent **K**

Casting compound

mineral-based

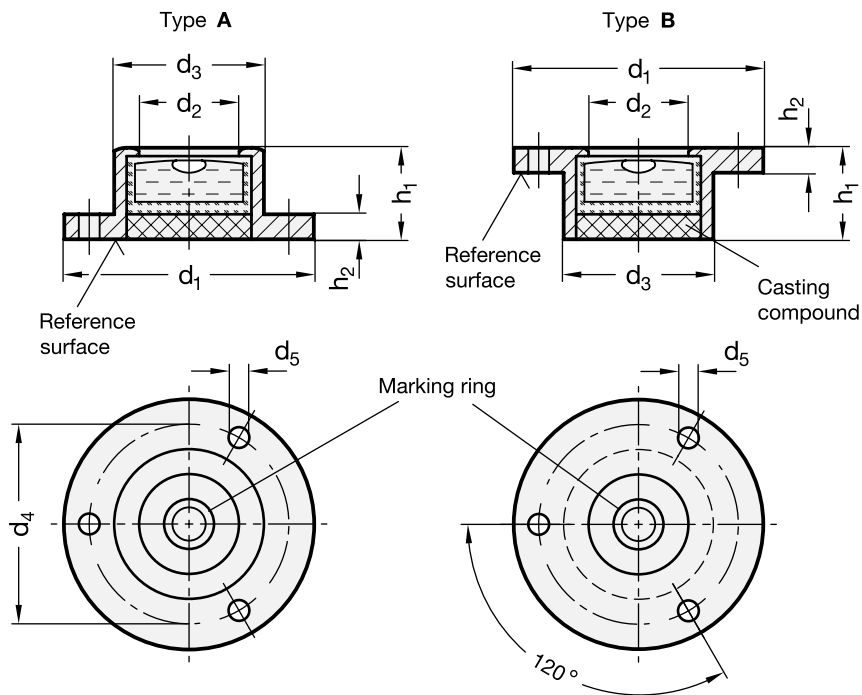
Information


Bull's eye levels GN 2277 with mounting flange are used to check the horizontal position of jigs, machines, devices, appliances and instruments.

The spirit levels are aligned in relation to the reference surface such that the bubble is located inside the marking ring once the vertical position of the contact surface is reached.

On request

- Filling, green-transparent
- Other sensitivities
- Housing in brass or Stainless Steel



Standard Elements	Main dimensions							
Description	d ₁	d ₂	d ₃	d ₄	d ₅	h ₁	h ₂	g
GN 2277-ALN-20-K-30-A	20	10	14	17	1.8	10	1.8	3
GN 2277-ALS-20-K-30-A	20	10	14	17	1.8	10	1.8	3
GN 2277-ALN-25-K-30-A	25	12	17	21	2.2	10	2	5
GN 2277-ALS-25-K-30-A	25	12	17	21	2.2	10	2	5
GN 2277-ALN-30-K-30-A	30	12	18	24	3.2	11	3	7
GN 2277-ALS-30-K-30-A	30	12	18	24	3.2	11	3	7
GN 2277-ALN-40-K-30-A	40	20	28	34.5	3.2	14	4	14
GN 2277-ALS-40-K-30-A	40	20	28	34.5	3.2	14	4	14
GN 2277-ALN-50-K-30-A	50	25	34	43	3.2	15	5	25
GN 2277-ALS-50-K-30-A	50	25	34	43	3.2	15	5	25
GN 2277-ALN-20-K-30-B	20	10	14	17	1.8	10	1.8	3
GN 2277-ALS-20-K-30-B	20	10	14	17	1.8	10	1.8	3
GN 2277-ALN-25-K-30-B	25	12	17	21	2.2	10	2	5
GN 2277-ALS-25-K-30-B	25	12	17	21	2.2	10	2	5
GN 2277-ALN-30-K-30-B	30	12	18	24	3.2	11	3	7
GN 2277-ALS-30-K-30-B	30	12	18	24	3.2	11	3	7
GN 2277-ALN-40-K-30-B	40	20	28	34.5	3.2	14	4	14
GN 2277-ALS-40-K-30-B	40	20	28	34.5	3.2	14	4	14
GN 2277-ALN-50-K-30-B	50	25	34	43	3.2	15	5	25
GN 2277-ALS-50-K-30-B	50	25	34	43	3.2	15	5	25

Adjustment plates

Specification

Stainless Steel **NI** AISI 303

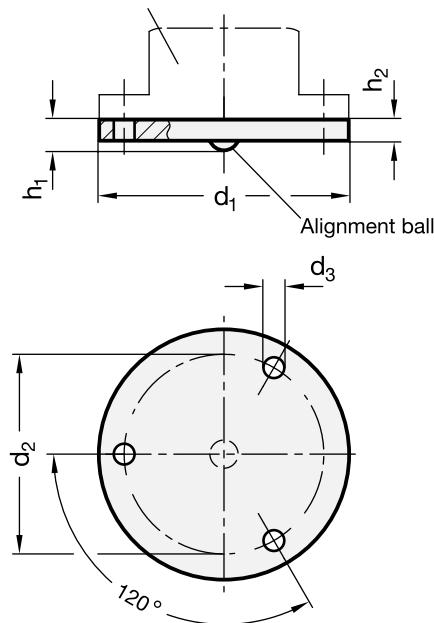
Information

Adjustment plates GN 2277.1 are used in combination with bull's eye levels GN 2277, Type A (see page 4).

The mounting bore holes offset by 120° allow the bull's eyes levels and the mounting plate to be aligned in relation to the mounting surface. An alignment ball at the bottom surface of the adjustment plates serves as tilting point. Specific tightening torques of the bolts allow to be achieved, so that the bubble is located inside the marking ring once the horizontal alignment is reached.



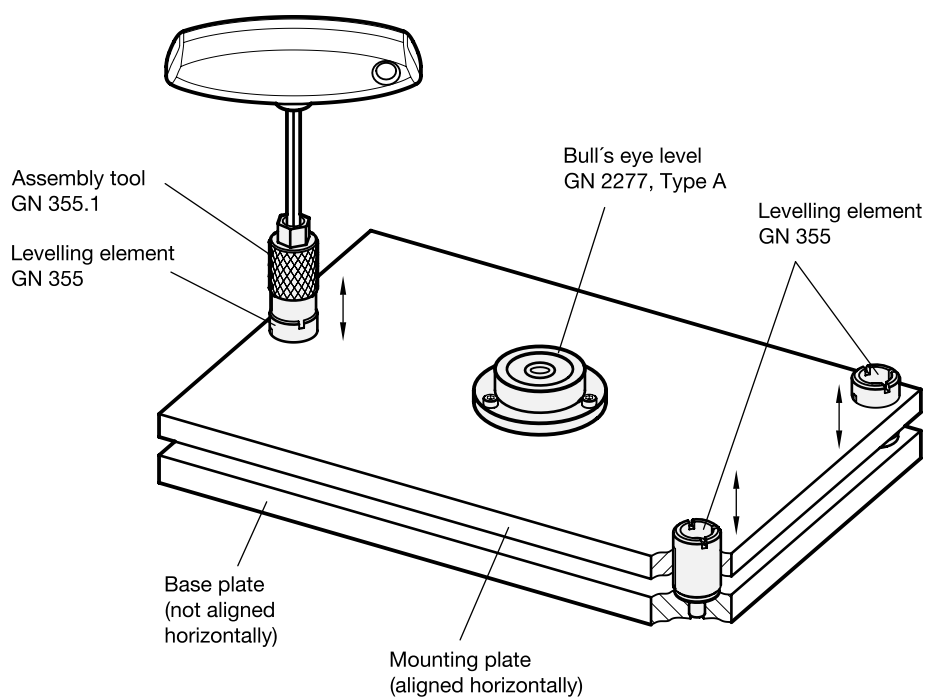
Bull's eye level GN 2277 Type A



Standard Elements	Main dimensions					△/△
Description	d ₁	d ₂	d ₃	h ₁	h ₂	g
GN 2277.1-NI-20	20	17	1.8	3.2	1.2	3
GN 2277.1-NI-25	25	21	2.2	3.2	1.2	5
GN 2277.1-NI-30	30	24	3.2	3.2	1.2	7
GN 2277.1-NI-40	40	34.5	3.2	3.2	1.2	12
GN 2277.1-NI-50	50	43	3.2	3.2	1.2	19

Bull's eye levels

Installation example - Bull's eye level GN 2277 used in conjunction with levelling elements GN 355



Installation example

Bull's eye levels and levelling elements - in this example, levelling elements GN 355 and assembly tool GN 355.1 - are ideal to use when a holding plate is to be brought into an exact horizontal position.

Even after the initial adjustment, the bull's eye level remains in the unit so that the correct alignment can be checked and adjusted again.

GN 2278

Bull's eye levels

Specification

Sensitivity

30 Angle minutes, bubble move by 2mm

Housing

Aluminium

anodized, natural colour **ALN**

anodized, black **ALS**

Spirit level element

Glass plastic body

Filling

colourless-transparent **K**

Casting compound

mineral-based



Information

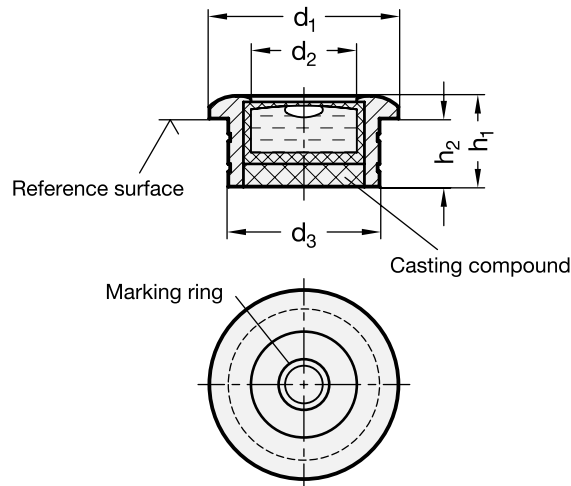
Bull's eye levels GN 2278 for insertion into bore holes are used to check the horizontal position of jigs, machines, devices, appliances and instruments.

The housing is grooved at its lower Diameter d_3 , making it easier to mount in place, e.g. by gluing.

The spirit levels are aligned in relation to the reference or contact surface, so that the bubble is located inside the marking ring once the horizontal position of the contact surface is reached.

On request

- Filling, green-transparent
- Other sensitivities
- Housing in brass or Stainless Steel



Standard Elements	Main dimensions					
Description	d_1	d_2	$d_3 \begin{smallmatrix} -0.05 \\ -0.15 \end{smallmatrix}$	h_1	h_2	g
GN 2278-ALN-20-K-30	20	12	18	10	8	4
GN 2278-ALS-20-K-30	20	12	18	10	8	4
GN 2278-ALN-25-K-30	25	14	20	12	9	7
GN 2278-ALS-25-K-30	25	14	20	12	9	7
GN 2278-ALN-30-K-30	30	20	28	13	10	11
GN 2278-ALS-30-K-30	30	20	28	13	10	11

GN 2279

Bull's eye levels

Specification

Sensitivity

30 Angle minutes, bubble move by 2 mm

Types

Type **A**: with smooth reference surface

Type **B**: with mounting thread

Housing

Aluminium

anodized, natural colour **ALN**

anodized, black **ALS**

Spirit level element

Glass plastic body

Filling

colourless-transparent **K**

Casting compound

mineral-based



Information

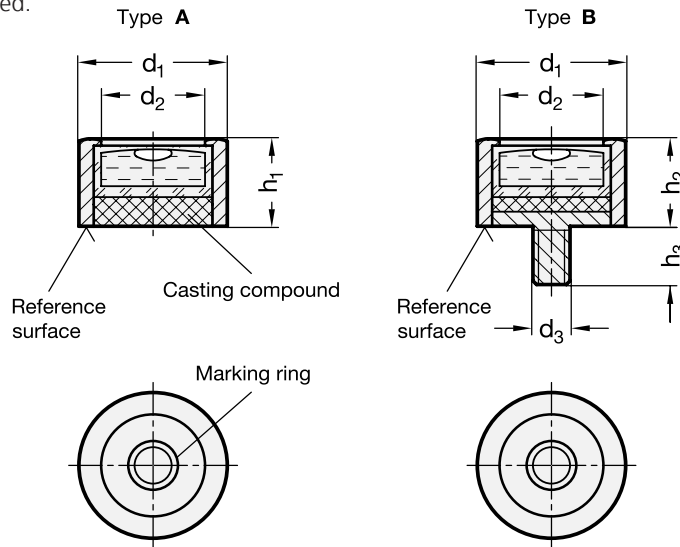
Bull's eye levels GN 2279 for surface mounting are used to check the horizontal position of jigs, machines, devices, appliances and instruments.

Type A is used if the spirit level is to be used as a tool, e.g. at different measuring points.

The air levels are aligned in relation to the reference surface such that the bubble is located inside the marking ring once the vertical position of the contact surface is reached.

On request

- Filling, green-transparent
- Other sensitivities
- Housing in brass or Stainless Steel



Standard Elements	Main dimensions						\triangle
Description	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	g
GN 2279-ALN-14-K-30-A	14	10	M 4	7.7	9.5	5	2
GN 2279-ALS-14-K-30-A	14	10	M 4	7.7	9.5	5	2
GN 2279-ALN-20-K-30-A	20	14	M 5	13	13	6	4
GN 2279-ALS-20-K-30-A	20	14	M 5	13	13	6	4
GN 2279-ALN-30-K-30-A	30	21	M 6	15	15	7.5	7
GN 2279-ALS-30-K-30-A	30	21	M 6	15	15	7.5	7
GN 2279-ALN-14-K-30-B	14	10	M 4	7.7	9.5	5	2
GN 2279-ALS-14-K-30-B	14	10	M 4	7.7	9.5	5	2
GN 2279-ALN-20-K-30-B	20	14	M 5	13	13	6	4
GN 2279-ALS-20-K-30-B	20	14	M 5	13	13	6	4
GN 2279-ALN-30-K-30-B	30	21	M 6	15	15	7.5	7
GN 2279-ALS-30-K-30-B	30	21	M 6	15	15	7.5	7

GN 2280

Bull's eye levels

Specification

Sensitivity

30 Angle minutes, bubble move by 2 mm

Housing

Aluminium

anodized, natural colour **ALN**

anodized, black **ALS**

Spirit level element

Glass plastic body

Filling

colourless-transparent **K**

Casting compound

mineral-based

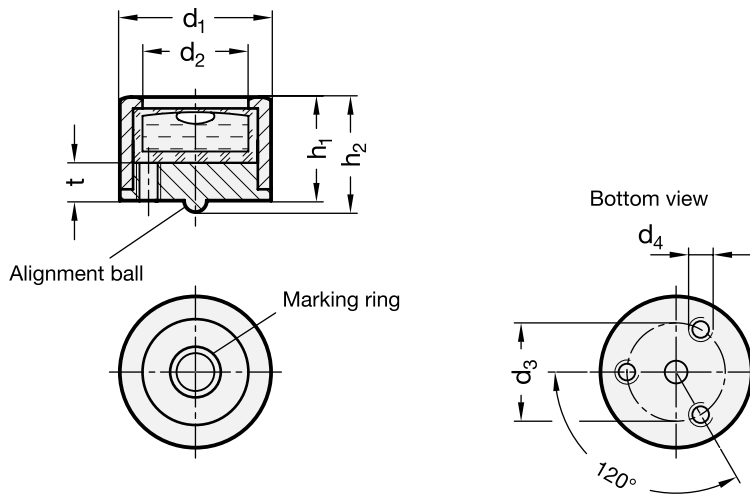
Information

Bull's eye levels levels GN 2280 with mounting threads are used to check the horizontal position of jigs, machines, devices, appliances and instruments.

The mounting threads offset by 120° allow the air levels are aligned in relation to the mounting surface. An alignment ball at the bottom surface of the adjustment plate serves as tilting point. Specific tightening torques for the bolts allow to be achieved, so that the bubble is located inside the marking ring once the horizontal alignment is reached.

On request

- Filling, green-transparent
- Other sensitivities
- Housing in brass or Stainless Steel



Standard Elements	Main dimensions							⚖
	d1	d2	d3	d4	h1	h2	t	
GN 2280-ALN-17-K-30	17	13	12	M 3	13	14.5	5	6
GN 2280-ALS-17-K-30	17	13	12	M 3	13	14.5	5	6
GN 2280-ALN-20-K-30	20	13	14	M 3	15	17	5	8
GN 2280-ALS-20-K-30	20	13	14	M 3	15	17	5	8
GN 2280-ALN-24-K-30	24	15	16	M 3	17	20	5	12
GN 2280-ALS-24-K-30	24	15	16	M 3	17	20	5	12

GN 2281

Bull's eye levels

Specification

Sensitivity

Type **10**: Angle minutes, bubble move by 2 mm (only Version ALS)

Type **40**: Angle minutes, bubble move by 2 mm (only Version KT)

Identification no.

No. **1**: without contrast ring

No. **2**: with contrast ring (only version KT for d=12...18)

Housing

- Aluminium

anodized, natural colour **ALS** / Viewing window, glass

- Plastic, white **KT** / Viewing window, transparent

Filling

- colourless-transparent **K**

- green-transparent **G** (only Version KT)

Information

Due to their cylindrical design, bull's eye GN 2281 are suitable for installations in plates and housings where they serve to check the horizontal position of jigs, machines and devices.

Bull's eye levels are not aligned, i.e. there is no reference to the external outline of the level. The vertical position must be ensured by aligning the holding building element.

The black housing of the version ALS creates a reflection at the edge of the bubble which significantly improves the readability. Version KT is available with contrast ring inside the air level housing (Identification no. 2) which creates the same effect.

Alternatively, the contrast can also improved by a dark surface inside the mounting bore hole.

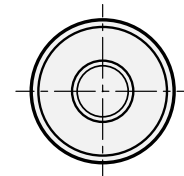
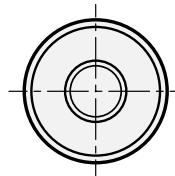
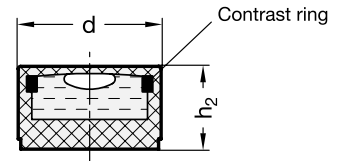
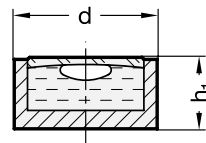
On request

Other sensitivities



Version **ALS**

Version **KT**



Standard Elements	Main dimensions			
	Description	d	h1	h2
GN 2281-ALS-10-K-10-1	10	6.9	-	1
GN 2281-ALS-12-K-10-1	12	6.4	-	2
GN 2281-ALS-14-K-10-1	14	6.2	-	2
GN 2281-ALS-15-K-10-1	15	7.4	-	3
GN 2281-ALS-18-K-10-1	18	7.3	-	4
GN 2281-KT-10-G-40-1	10	-	6	1
GN 2281-KT-10-K-40-1	10	-	6	1
GN 2281-KT-12-G-40-1	12	-	7	2
GN 2281-KT-12-G-40-2	12	-	7	2
GN 2281-KT-12-K-40-1	12	-	7	2
GN 2281-KT-12-K-40-2	12	-	7	2
GN 2281-KT-14-G-40-1	14	-	8	2
GN 2281-KT-14-G-40-2	14	-	8	2
GN 2281-KT-14-K-40-1	14	-	8	2
GN 2281-KT-14-K-40-2	14	-	8	2
GN 2281-KT-15-G-40-1	15	-	8	2
GN 2281-KT-15-G-40-2	15	-	8	3
GN 2281-KT-15-K-40-1	15	-	8	3
GN 2281-KT-15-K-40-2	15	-	8	3
GN 2281-KT-18-G-40-1	18	-	9	4
GN 2281-KT-18-G-40-2	18	-	9	4
GN 2281-KT-18-K-40-1	18	-	9	4
GN 2281-KT-18-K-40-2	18	-	9	4

GN 2282

Screw-on levels

Specification

Sensitivity

Type **6**: Angle minutes, bubble move by 2 mm

Type **50**: Angle minutes, bubble move by 2 mm

Identification no.

No. **1**: Viewing window top

No. **2**: Viewing window top - front

No. **3**: Viewing window top - front - back

Housing brass

plastic coated, textured finish

black, RAL 9005 **MSW**

silver, RAL 9006 **MSR**

Spirit lever element

Glass plastic body

Filling

green-transparent **G**

Casting compound

mineral-based



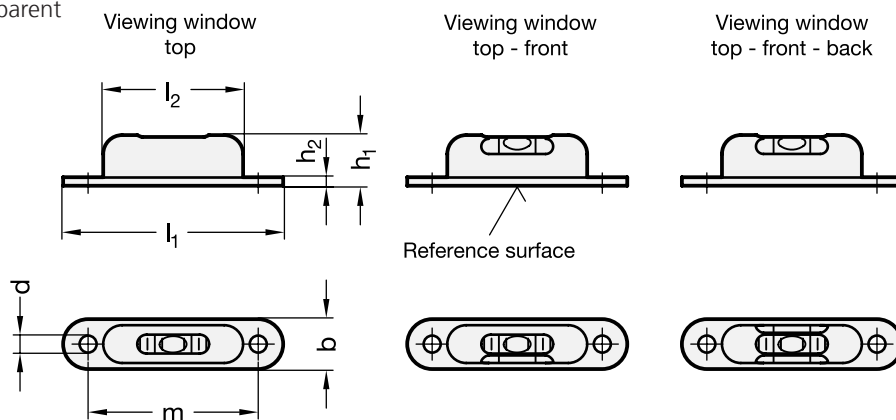
Information

Screw-on levels GN 2282 for mounting screws are used to check the horizontal position of the jigs, machines, devices, appliances and instruments.

The spirit levels are aligned in relation to the finished reference surface so that the bubble is centered in the middle of the marking lines once the horizontal position of the contact surface in the longitudinal direction is reached.

On request

- Filling, colourless-transparent
- Other sensitivities
- Other colours



Standard Elements	Main dimensions							Δ
	l_1	b	d	h_1	h_2	l_2	m	
GN 2282-MSW-57-G-6-1	57	12	4.5	13	1	37	45	12
GN 2282-MSR-57-G-6-1	57	12	4.5	13	1	37	45	12
GN 2282-MSW-57-G-6-2	57	12	4.5	13	1	37	45	12
GN 2282-MSR-57-G-6-2	57	12	4.5	13	1	37	45	12
GN 2282-MSW-57-G-6-3	57	12	4.5	13	1	37	45	12
GN 2282-MSR-57-G-6-3	57	12	4.5	13	1	37	45	12
GN 2282-MSW-57-G-50-1	57	12	4.5	13	1	37	45	12
GN 2282-MSR-57-G-50-1	57	12	4.5	13	1	37	45	12
GN 2282-MSW-57-G-50-2	57	12	4.5	13	1	37	45	12
GN 2282-MSR-57-G-50-2	57	12	4.5	13	1	37	45	12
GN 2282-MSW-57-G-50-3	57	12	4.5	13	1	37	45	12
GN 2282-MSR-57-G-50-3	57	12	4.5	13	1	37	45	12



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