

**Gauge blocks / Optical flats and parallel optical flats
Feeler gauges / Roughness specimens**



C11.001-EN-dealer.20110825

Gauge blocks general

Which gauge block is the most suitable for you?

MATERIALS

Steel

Steel is the oldest material and remains the most commonly accepted for gauge blocks. If well taken care of, steel gauges guarantee many years of useful life. They must be cleaned carefully before and after use and stored in a protective case in a dry environment.

Tungsten carbide

When a higher degree of hardness is needed, tungsten carbide is the material to choose. It is less sensitive to wear and damage compared to hardened steel. Especially when used frequently, tungsten carbide has an increased life span compared to steel gauge blocks.

Ceramics

Ceramics is relatively wear resistant and has a high degree of strength and stability. It will not rust and is unaffected by chemicals.



ACCURACY CLASSES

Gauge blocks are classified in upgrading order of accuracy according EN ISO 3650: 1998 in the classes: 2–1–0–K. The ISO 3650 is an international standard, which is adopted by national standards such as RvA, DKD, UKAS, BKO, SCS and COFRAC.

Class 2

Class 2 gauge blocks are intended for general workshop use by skilled workers to set up, for example, measuring instruments.

Class 1

Class 1 gauge blocks are used as working standards in inspection rooms within the production to set and calibrate measuring instruments and equipment as well as to inspect tools, fixtures and machines.

Class 0

Class 0 gauge blocks, with their high accuracy, are intended for use by measuring technicians in environmentally controlled inspection rooms, for example to calibrate measuring equipments.

Class K

Class K gauge blocks have the highest class of accuracy. They are *the* length standards in a calibration laboratory and other calibration values are derived from these gauges. Only with a UKAS certificate – or with another certificate, accepted by UKAS as equivalent (e.g. DKD, RvA and COFRAC) – will these gauge blocks be at their best. The most accurate gauges can meet a tolerance of $\pm 0.05 \mu\text{m}$.

Accuracy according ISO 3650

Nominal size mm	Class K		Class 0		Class 1		Class 2	
	Tolerance on nominal size μm	Deviation* μm	Tolerance on nominal size μm	Deviation* μm	Tolerance on nominal size μm	Deviation* μm	Tolerance on nominal size μm	Deviation* μm
0.5 - 10	± 0.20	0.05	± 0.12	0.10	± 0.20	0.16	± 0.45	0.30
10 - 25	± 0.30	0.05	± 0.14	0.10	± 0.30	0.16	± 0.60	0.30
25 - 50	± 0.40	0.06	± 0.20	0.10	± 0.40	0.18	± 0.80	0.30
50 - 75	± 0.50	0.06	± 0.25	0.12	± 0.50	0.18	± 1.00	0.35
75 - 100	± 0.60	0.07	± 0.30	0.12	± 0.60	0.20	± 1.20	0.35

* Deviation of the measuring face.

Steel gauge blocks

- Hardness measuring surfaces: 63-65 HRC.
- Expansion coefficient: $(12 \pm 1) \cdot 10^{-6}/^{\circ}\text{C}$.
- ISO 3650.



Steel gauge blocks in sets

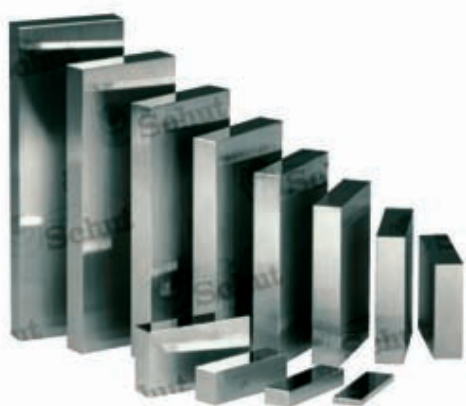
Item No.	Class	Price	Size mm	Increment mm	Pieces
M32:			1.005	–	1
906.622	2		1.01 - 1.09	0.01	9
906.621	1		1.1 - 1.9	0.1	9
906.620	0		1 - 9	1	9
			10 - 30	10	3
			50	–	1
M47:			1.005	–	1
906.625	2		1.01 - 1.09	0.01	9
906.624	1		1.1 - 1.9	0.1	9
906.623	0		1 - 24	1	24
			25 - 100	25	4
M87:			1.001 - 1.009	0.001	9
906.613	2		1.01 - 1.49	0.01	49
906.612	1		0.5 - 9.5	0.5	19
906.611	0		10 - 100	10	10
M88:			1.0005	–	1
906.628	2		1.001 - 1.009	0.001	9
906.627	1		1.01 - 1.49	0.01	49
906.626	0		0.5 - 9.5	0.5	19
			10 - 100	10	10
M112:			1.0005	–	1
906.631	2		1.001 - 1.009	0.001	9
906.630	1		1.01 - 1.49	0.01	49
906.629	0		0.5 - 24.5	0.5	49
			25 - 100	25	4

Steel gauge blocks, per piece

Size mm	Increment mm	ISO 3650/1 Price	ISO 3650/0 Price
0.5	–		
1	–		
1.0005	–		
1.001 - 1.009	0.001		
1.01 - 1.50	0.01		
1.6 - 2.0	0.1		
2.5 - 7.5	0.5		
8.0 - 10.0	0.5		
10.5 - 25.0	0.5		
30	–		
40	–		
50	–		
60	–		
70	–		
75	–		
80	–		
90	–		
100	–		

Select steel gauge blocks

The steel gauge blocks are available in all accuracy classes of ISO 3650. Only the most commonly used sizes can be found in this catalog. The gauge blocks are delivered with an inspection report or on request with a DKD certificate, UKAS acknowledged. Sets delivered in luxurious case. Special sizes and sets are available on request, as well as special sets for calibration of micrometers and calipers.



Steel gauge blocks, per piece

Size mm	Increment mm	ISO 3650/1 Price	ISO 3650/0 Price
0.5	–		
1	–		
1.0005	–		
1.001 - 1.009	0.001		
1.01 - 1.49	0.01		
1.5 - 1.9	0.1		
2.0 - 5.5	0.5		
6.0 - 10.0	0.5		
10.5 - 15.0	0.5		
15.5 - 20.0	0.5		
20.5 - 25.0	0.5		
30	–		
40	–		
50	–		
60	–		
70	–		
75	–		
80	–		
90	–		
100	–		

Steel gauge blocks in sets

Item No.	Class	Price	Size mm	Increment mm	Pieces
M32:					
831.915	1		1.005	–	1
			1.01 - 1.09	0.01	9
831.914	0		1.1 - 1.9	0.1	9
			1 - 10	1	10
			20 - 50	10	3
M46:					
831.913	1		1.001 - 1.009	0.001	9
			1.00 - 1.09	0.01	10
831.912	0		1.1 - 1.9	0.1	9
			2 - 10	1	9
			20 - 100	10	9
M47:					
831.911	1		1.005	–	1
			1.00 - 1.09	0.01	10
831.910	0		1.1 - 1.9	0.1	9
			2 - 25	1	24
			50 - 100	25	3
M87:					
831.909	1		0.5	–	1
			1.001 - 1.009	0.001	9
831.908	0		1.00 - 1.50	0.01	51
			2.0 - 10.0	0.5	17
			20 - 100	10	9
M103:					
831.907	1		0.5	–	1
			1.005	–	1
831.906	0		1.00 - 1.50	0.01	51
			2.0 - 25.0	0.5	47
			50 - 100	25	3
M112:					
831.905	1		0.5	–	1
			1.0005	–	1
831.904	0		1.001 - 1.009	0.001	9
			1.00 - 1.50	0.01	51
			2.0 - 25.0	0.5	47
			50 - 100	25	3
M122:					
831.903	1		0.5	–	1
			1.0005	–	1
831.902	0		1.001 - 1.009	0.001	9
			1.00 - 1.50	0.01	51
			1.6 - 1.9	0.1	4
			2.0 - 25.0	0.5	47
			30 - 70	10	5
			75	–	1
			80 - 100	10	3

G11.210/EN-dec/20110825

Tungsten carbide gauge blocks

Tungsten carbide gauge blocks with a low expansion coefficient. High resistance against corrosion.

- Hardness measuring surfaces: 70 - 72 HRC.
- Expansion coefficient: $(8.5 \pm 1) \cdot 10^{-6}/^{\circ}\text{C}$.
- ISO 3650.



Tungsten carbide gauge blocks, per piece

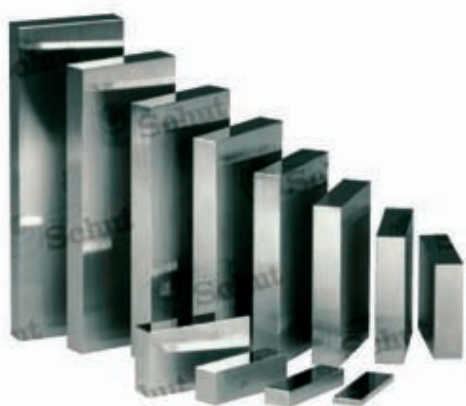
Size mm	Increment mm	ISO 3650/1 Price	ISO 3650/0 Price
0.5	–		
1	–		
1.0005	–		
1.001 - 1.009	0.001		
1.01 - 1.50	0.01		
1.6 - 1.9	0.1		
2.0 - 10.0	0.5		
10.5 - 15.0	0.5		
15.5 - 25.0	0.5		
30	–		
40	–		
50	–		
60	–		
70	–		
75	–		
80	–		
90	–		
100	–		

Tungsten carbide gauge blocks in sets

Item No.	Class	Price	Size mm	Increment mm	Pie- ces
M32:			1.005	–	1
906.634	2		1.01 - 1.09	0.01	9
906.633	1		1.1 - 1.9	0.1	9
906.632	0		1 - 9	1	9
			10 - 30	10	3
			50	–	1
M47:			1.005	–	1
906.637	2		1.01 - 1.09	0.01	9
906.636	1		1.1 - 1.9	0.1	9
906.635	0		1 - 24	1	24
			25 - 100	25	4
M87:			1.001 - 1.009	0.001	9
906.662	2		1.01 - 1.49	0.01	49
906.661	1		0.5 - 9.5	0.5	19
906.660	0		10 - 100	10	10
M112:			1.0005	–	1
906.643	2		1.001 - 1.009	0.001	9
906.642	1		1.01 - 1.49	0.01	49
906.641	0		0.5 - 24.5	0.5	49
			25 - 100	25	4

Select tungsten carbide gauge blocks

The tungsten carbide gauge blocks are available in all accuracy classes of ISO 3650. Only the most commonly used sizes can be found in this catalog. The gauge blocks are delivered with an inspection report or on request with a DKD certificate, UKAS acknowledged. Sets delivered in luxurious case. Special sizes and sets are available on request.



SELECT

Tungsten carbide gauge blocks, per piece

Size mm	Increment mm	ISO 3650/1 Price	ISO 3650/0 Price
0.5	–		
1	–		
1.0005	–		
1.001 - 1.009	0.001		
1.01 - 1.50	0.01		
1.6 - 1.9	0.1		
2.0 - 5.5	0.5		
6.0 - 10.0	0.5		
10.5 - 15.0	0.5		
15.5 - 20.0	0.5		
20.5 - 25.0	0.5		
30	–		
40	–		
50	–		
60	–		
70	–		
75	–		
80	–		
90	–		
100	–		

Tungsten carbide gauge blocks in sets

Item No.	Class	Price	Size mm	Increment mm	Pieces
M32:			1.005	–	1
828.592	1		1.01 - 1.09	0.01	9
828.606	0		1.1 - 1.9	0.1	9
			1 - 10	1	10
			20 - 50	10	3
M46:			1.001 - 1.009	0.001	9
828.590	1		1.00 - 1.09	0.01	10
828.604	0		1.1 - 1.9	0.1	9
			2 - 10	1	9
			20 - 100	10	9
M47:			1.005	–	1
828.589	1		1.00 - 1.09	0.01	10
828.603	0		1.1 - 1.9	0.1	9
			2 - 25	1	24
			50 - 100	25	3
M87:			0.5	–	1
828.587	1		1.001 - 1.009	0.001	9
828.601	0		1.00 - 1.50	0.01	51
			2.0 - 10.0	0.5	17
			20 - 100	10	9
M103:			0.5	–	1
828.585	1		1.005	–	1
828.599	0		1.00 - 1.50	0.01	51
			2.0 - 25.0	0.5	47
			50 - 100	25	3
M112:			0.5	–	1
828.584	1		1.0005	–	1
828.598	0		1.001 - 1.009	0.001	9
			1.00 - 1.50	0.01	51
			2.0 - 25.0	0.5	47
			50 - 100	25	3
M122:			0.5	–	1
828.583	1		1.0005	–	1
828.597	0		1.001 - 1.009	0.001	9
			1.00 - 1.50	0.01	51
			1.6 - 1.9	0.1	4
			2.0 - 25.0	0.5	47
			30 - 70	10	5
			75	–	1
			80 - 100	10	3

Ceramic gauge blocks

These ceramic gauge blocks are made of high-tech material: Zirconia ceramics. Because of this, these gauge blocks are highly durable, corrosion proof and completely stable for long-term use.

- Highly wear-resistant. Can be used 5 to 10 times longer than steel gauge blocks.
- Rustproof.
- Hardness: 88-90 HRC.
- Expansion coefficient: $(10 \pm 1) \cdot 10^{-6}/^{\circ}\text{C}$ (same as steel gauge blocks, therefore they can be used at the same time).
- ISO 3650.



Ceramic gauge blocks, per piece

Size mm	Increment mm	ISO 3650/1 Price	ISO 3650/0 Price
1.0005	–		
0.5	–		
1	–		
1.01 - 1.49	0.01		
1.5 - 1.9	0.1		
2.0 - 5.5	0.5		
6.0 - 9.5	0.5		
10.0 - 20.0	0.5		
20.5 - 25.0	0.5		
30	–		
40	–		
50	–		
60	–		
70	–		
75	–		
80	–		
90	–		
100	–		

Ceramic gauge blocks in sets

Item No.	Class	Price	Size mm	Increment mm	Pieces
M32:			1.005	–	1
906.646	1		1.01 - 1.09	0.01	9
906.645	0		1.1 - 1.9	0.1	9
			1 - 9	1	9
			10 - 30	10	3
			50	–	1
M47:			1.005	–	1
906.649	1		1.01 - 1.09	0.01	9
906.648	0		1.1 - 1.9	0.1	9
			1 - 24	1	24
			25 - 100	25	4
M87:			1.001 - 1.009	0.001	9
906.652	1		1.01 - 1.49	0.01	49
906.651	0		0.5 - 9.5	0.5	19
			10 - 100	10	10
M103:			1.005	–	1
906.655	1		1.01 - 1.49	0.01	49
906.654	0		0.5 - 24.5	0.5	49
			25 - 100	25	4
M112:			1.0005	–	1
906.658	1		1.001 - 1.009	0.001	9
906.657	0		1.01 - 1.49	0.01	49
			0.5 - 24.5	0.5	49
			25 - 100	25	4

PRICE

Select ceramic gauge blocks

The ceramic gauge blocks are available in all accuracy classes of ISO 3650. Only the most commonly used sizes can be found in this catalog. The gauge blocks are delivered with an inspection report or on request with a DKD certificate, UKAS acknowledged. Sets delivered in luxurious case. Special sizes and sets are available on request, as well as special sets for calibration of micrometers and calipers.



Ceramic gauge blocks, per piece

Size mm	Increment mm	ISO 3650/1 Price	ISO 3650/0 Price
0.5	–		
1	–		
1.0005	–		
1.001 - 1.009	0.001		
1.01 - 1.50	0.01		
1.6 - 1.9	0.1		
2.0 - 5.5	0.5		
6.0 - 10.0	0.5		
10.5 - 15.0	0.5		
15.5 - 20.0	0.5		
20.5 - 25.0	0.5		
30	–		
40	–		
50	–		
60	–		
70	–		
75	–		
80	–		
90	–		
100	–		

Ceramic gauge blocks in sets

Item No.	Class	Price	Size mm	Increment mm	Pieces
M32:					
831.085	1		1.005	–	1
831.084	0		1.01 - 1.09	0.01	9
			1.1 - 1.9	0.1	9
			1 - 10	1	10
			20 - 50	10	3
M46:					
831.083	1		1.001 - 1.009	0.001	9
831.082	0		1.00 - 1.09	0.01	10
			1.1 - 1.9	0.1	9
			2 - 10	1	9
			20 - 100	10	9
M47:					
831.081	1		1.005	–	1
831.080	0		1.00 - 1.09	0.01	10
			1.1 - 1.9	0.1	9
			2 - 25	1	24
			50 - 100	25	3
M87:					
831.079	1		0.5	–	1
831.078	0		1.001 - 1.009	0.001	9
			1.00 - 1.50	0.01	51
			2.0 - 10.0	0.5	17
			20 - 100	10	9
M103:					
831.077	1		0.5	–	1
831.076	0		1.005	–	1
			1.00 - 1.50	0.01	51
			2.0 - 25.0	0.5	47
			50 - 100	25	3
M112:					
831.075	1		0.5	–	1
831.074	0		1.0005	–	1
			1.001 - 1.009	0.001	9
			1.00 - 1.50	0.01	51
			2.0 - 25.0	0.5	47
			50 - 100	25	3
M122:					
831.073	1		0.5	–	1
831.072	0		1.0005	–	1
			1.001 - 1.009	0.001	9
			1.00 - 1.50	0.01	51
			1.6 - 1.9	0.1	4
			2.0 - 25.0	0.5	47
			30 - 70	10	5
			75	–	1
			80 - 100	10	3

Long gauge blocks from 125 mm

These steel gauge blocks are available in the accuracy classes 0, 1 and 2 of ISO 3650, equal to DIN 861. All gauge blocks have two coupling holes on both ends so that they can be coupled by means of a toggle clamp.



Size/mm	Item No.	Price	Item No.	Price	Item No.	Price
	ISO 3650/2:		ISO 3650/1:		ISO 3650/0:	
125	907.728		907.715		907.702	
150	907.729		907.716		907.703	
175	907.730		907.717		907.704	
200	907.731		907.718		907.705	
250	907.732		907.719		907.706	
300	907.733		907.720		907.707	
400	907.734		907.721		907.708	
500	907.735		907.722		907.709	
600	907.736		907.723		907.710	
700	907.737		907.724		907.711	
800	907.738		907.725		907.712	
900	907.739		907.726		907.713	
1000	907.740		907.727		907.714	
Gauge block set consisting of 125, 150, 175, 200, 250, 300, 400 and 500 mm:						
	907.743		907.742		907.741	
Gauge block set consisting of 600, 700, 800, 900 and 1000 mm:						
	907.746		907.745		907.744	



907.707



907.741

Toggle clamp for long series gauge blocks

Toggle clamp for the coupling of gauge blocks over 100 mm which have coupling holes on both ends.



Item No.	Description	Price
619.031	Toggle clamp for long series gauge blocks	

Select long gauge blocks from 125 mm

These steel gauge blocks are available in the accuracy classes 0, 1 and 2 of ISO 3650, equal to DIN 861. The gauge blocks are delivered with an inspection report or on request with a DKD certificate, UKAS acknowledged. All gauge blocks have two coupling holes on both ends so that they can be coupled by means of a toggle clamp.

Size/mm	Item No.	Price	Item No.	Price	Item No.	Price
	ISO 3650/2:		ISO 3650/1:		ISO 3650/0:	
125	831.019		831.008		831.000	
150	831.020		831.009		831.001	
175	831.021		831.010		831.002	
200	831.022		831.011		831.003	
250	831.023		831.012		831.936	
300	831.024		831.013		831.937	
400	831.025		831.981		831.946	
500	831.026		831.738		831.004	
600	831.027		831.014		831.947	
700	831.028		831.015		831.005	
800	831.029		831.016		831.948	
900	831.030		831.017		831.006	
1000	831.031		831.018		831.007	
Gauge block set consisting of 125, 150, 175, 200, 250, 300, 400 and 500 mm:						
	831.088		831.087		831.086	
Gauge block set consisting of 600, 700, 800, 900 and 1000 mm:						
	831.091		831.090		831.089	


G11-315-EN-dec-20110825

Gauge block accessories

Various accessories to extract the resulting size of one or more gauge blocks outside or to convert it into an inside gauge. This also enables the creation of setting gauges and marking tools. These accessories considerably increase the applicability of standard gauge blocks.



907.204



907.210



907.209



907.207



907.213



907.211 907.212



Item No. Description	Price	Set		
		M8	M10	M12
Holder for gauge blocks:				
907.203 Up to 50 mm		•	•	•
907.204 Up to 100 mm		•	•	•
907.205 Up to 200 mm		•	•	•
Pair of measuring jaws, with measuring faces:				
907.206 Cylindrical \varnothing 2 mm and flat ($l=40$ mm)		•	•	•
907.207 Cylindrical \varnothing 5 mm and flat ($l=45$ mm)		•	•	•
907.208 Cylindrical \varnothing 10 mm and flat ($l=70$ mm)			•	•
907.209 Flat ($l=100$ mm, $h=19$ mm)			•	•
907.213 V-shaped ($l=60$ mm, max. \varnothing 60 mm)			•	•
907.210 Straight edge ($l=100$ mm)				•
907.211 Scriber ($l=45$ mm)		•	•	•
907.212 Center point ($l=45$ mm)		•	•	•
907.214 Base for holder ($h=25$ mm)		•	•	•
Accessory sets, delivered in a case:				
907.200 M8		↑		
907.201 M10			↑	
907.202 M12				↑



G11.275.EN-dec01r/20110825

Caliper inspection set

For checking the accuracy of DIN 862 calipers. The set consists of three special steel gauge blocks (30 mm, 41.3 mm and 131.4 mm, ISO 3650 class 1), two steel setting rings (ø4 mm and ø25 mm) and a pair of gloves.



Item No.	Description	Price
909.347	Caliper inspection set	

Gloves

Comfortable, smooth, lint-free gloves with universal, perfect fit. Ideal for handling gauge blocks and other measuring instruments.

- Perfect thermal isolation.
- Washing machine safe.



Item No.	Description	Price
191.069	Pair of gloves	

Micrometer inspection sets

For the inspection of micrometers according DIN 863. Suitable for micrometers with a measuring range up to 25 mm.

- Nominal sizes (mm):
2.5 - 5.1 - 7.7 - 10.3 - 12.9 - 15.0 - 17.6 - 20.2 - 22.8 - 25.0.
- Including plan parallel optical flat ø30 x 12 mm.



909.162



Item No.	Material	Grade	Price
909.346	steel	1	
909.345	steel	0	
909.162	ceramic	1	
909.340	ceramic	0	

Optical flats

- Flatness measuring faces: 0.3 μm .
- Delivery in a case.



Item No.	Diameter mm	Thickness mm	Price
Single optical flats, single face:			
909.201	30	15	
907.903	45	15	
909.202	50	20	
907.904	60	20	
909.204	75	20	
Single optical flats, double face:			
907.905	45	15	
909.203	50	20	
907.906	60	20	
909.205	75	20	



How to use an optical flat

The surface to be tested should be clean and free from burrs. Prevent touching the measuring faces. Finger prints should be removed instantly in order to prevent them from being imprinted in the surface. Optical flats should always be kept clean and dry in their cases.

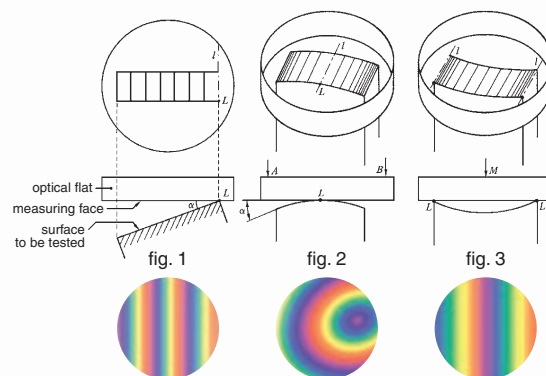
Interference fringes appear in monochromatic light when the optical flat is laid on and wiggled against the surface to be tested. The difference in height between adjacent fringes corresponds to an error in flatness of approx. 0.3 μm . A non-occurrence of interference fringes is most likely the result of dust particles between the surface to be tested and the optical flat.

In the event of a constant distance between the interference fringes, the angle between the measuring face of the optical flat and the surface to be tested is constant (fig. 1).

However, interference fringes do not usually have an even interspacing. When the fringes are close together the angle between the measuring face and the surface to be tested is large (fig. 2). In this case the surface to be tested is either convex (fig. 2) or concave (fig. 3). When putting

pressure on the sides of the optical flat, the distance between the interference fringes at a convex surface will enlarge at the outer sides; angle α is decreasing. The deviation in flatness can be "measured" by counting the interference fringes.

The interference fringes do not usually have a straight and even pattern. Curved fringes are also an indication of an uneven surface. The extent of unevenness can, again, be obtained by counting the fringes.



Plan parallel optical flats

- Flatness measuring faces: 0.3 μm .
- Parallelism measuring faces: 0.7 μm .
- Diameter: 30 mm.
- Delivery in a case.



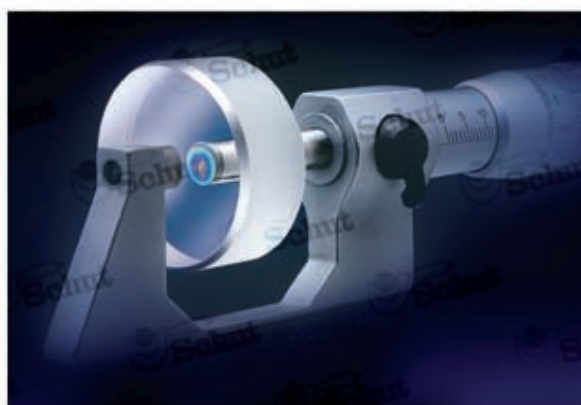
907.907



Item No.	Thicknesses/mm	Price
907.907	12.00/12.12/12.25/12.37	
907.908	25.00/25.12/25.25/25.37	
907.909	50.00/50.12/50.25/50.37	
907.910	75.00/75.12/75.25/75.37	

Plan parallel optical flats

- Max. flatness deviation: 0.3 μm .
- Max. parallelism deviation:
 - 40.62 - 66.00 mm: 0.8 μm .
 - 90.50 - 90.87 mm: 1.0 μm .
- Diameter: 40.62 - 66.00 mm: \varnothing 40 mm.
90.50 - 90.87 mm: \varnothing 50 mm.
- Delivery in a case.



Item No.	Thicknesses/mm	Price
909.540	40.62/40.75/40.87/41.00	
909.565	65.62/65.75/65.87/66.00	
909.590	90.50/90.62/90.75/90.87	



Feeler gauges

Feeler gauge sets in a holder, for individual use or in combination to measure slits and gaps and also for checking the amount of clearance in sliding guides, bearings, pistons etc.

- Measuring range: 0.03 - 1.00 mm.
- Blade length: 100 mm.
- Blade width: 12 mm (except stainless steel models: 11 mm), tapered.



856.145

Item No.	Number of blades	Measuring range mm	Material	Price
856.462	8	0.05 / 0.10 → 0.30 / 0.40 / 0.50	bright steel	
856.143	8	0.05 / 0.10 → 0.30 / 0.40 / 0.50	stainless steel	
856.146	8	0.05 / 0.10 → 0.30 / 0.40 / 0.50	brass	
856.495	13	0.05 / 0.10 → 0.30 / 0.40 → 1.00	bright steel	
856.144	13	0.05 / 0.10 → 0.30 / 0.40 → 1.00	stainless steel	
856.499	13	0.05 / 0.10 → 0.30 / 0.40 → 1.00	brass	
856.463	20	0.05 / 0.10 → 1.00	bright steel	
856.145	20	0.05 / 0.10 → 1.00	stainless steel	
856.147	20	0.05 / 0.10 → 1.00	brass	
856.130	8	0.03 / 0.04 → 0.10	bright steel	
856.131	10	0.03 / 0.04 / 0.05 / 0.10 → 0.30 / 0.40 / 0.50	bright steel	
856.132	10	0.10 / 0.20 → 1.00	bright steel	
856.133	13	0.04 / 0.05 → 0.08 / 0.10 / 0.15 / 0.20 / 0.40 / 0.50 / 0.60 / 0.80 / 1.00	bright steel	
856.134	14	0.03 / 0.04 → 0.10 / 0.15 → 0.30 / 0.40 / 0.50	bright steel	
856.135	18	0.05 / 0.06 → 0.10 / 0.15 → 0.40 / 0.50 → 1.00	bright steel	
856.136	19	0.03 / 0.04 → 0.10 / 0.15 → 0.30 / 0.40 → 1.00	bright steel	
856.137	20	0.04 / 0.05 → 0.10 / 0.15 → 0.50 / 0.60 → 1.00	bright steel	
856.139	21	0.10 / 0.12 → 0.50	bright steel	
856.140	22	0.03 / 0.04 / 0.05 / 0.10 → 1.00	bright steel	
856.141	28	0.03 / 0.04 → 0.10 / 0.12 → 0.50	bright steel	

Feeler gauges

- Measuring range: 0.05 - 1.00 mm;
8 blades: 0.05 / 0.10 → 0.30 / 0.40 / 0.50,
13 blades: 0.05 / 0.10 → 0.30 / 0.40 → 1.00,
20 blades: 0.05 / 0.10 → 1.00.
- Material: steel.
- Blade width: 12.7 mm.



Item No.	Number of blades	Blade length/mm	Price
856.466	8	200	
856.468	8	300	
856.515	8	400	
856.420	8	500	
856.496	13	200	
856.497	13	300	
856.498	13	400	
856.421	13	500	
856.467	20	200	
856.469	20	300	
856.532	20	400	
856.514	20	500	



Feeler stock coils

Feeler stock coils made of hardened or stainless steel.

- Measuring range: 0.01 - 1.00 mm.
- Length: 5 m.
- Width: 12.7 mm.



Thickness mm	Item No.	Price	Item No.	Price
	Hardened steel:		Stainless steel:	
0.01	909.928		909.950	
0.02	909.929		909.951	
0.03	909.930		909.952	
0.04	909.931		909.953	
0.05	909.932		909.954	
0.06	909.933		909.955	
0.07	909.934		909.956	
0.08	909.935		909.957	
0.09	909.936		909.958	
0.10	909.937		909.959	
0.15	909.938		909.960	
0.20	909.939		909.961	
0.25	909.940		909.962	
0.30	909.941		909.963	
0.35	909.942		909.964	
0.40	909.943		909.965	
0.50	909.944		909.966	
0.60	909.945		909.967	
0.70	909.946		909.968	
0.80	909.947		909.969	
0.90	909.948		909.970	
1.00	909.949		909.971	

Roughness specimens

Series of roughness specimens, type Microsurf, covering the nine most frequently occurring manufacturing operations; per set eight specimens will be delivered. In addition to the roughness value *Ra* in μm , the roughness value *CLA* in μin and the *N* values are specified.



Item No.	Machining-method	Number of specimens per set	Roughness <i>Ra</i> μm	Roughness <i>CLA</i> μin	<i>N</i> values	Price
850.315	Surface grinding	8	0.025 - 3.2	1 - 125	1 - 8	
850.316	Cylindr. grinding	8	0.025 - 3.2	1 - 125	1 - 8	
850.319	Face turning	8	0.4 - 50	16 - 2000	5 - 12	
850.320	Turning	8	0.4 - 50	16 - 2000	5 - 12	
850.321	End milling	8	0.4 - 50	16 - 2000	5 - 12	
850.322	Reaming & drilling	8	0.4 - 12.5	16 - 500	5 - 10	
850.323	Horizontal milling	8	0.4 - 50	16 - 2000	6 - 13	
850.325	Planing	8	0.8 - 100	32 - 4000	6 - 13	
850.331	Spark erosion	8	0.4 - 50	16 - 2000	5 - 12	

Available with declaration of conformity on request.

Wall chart

Eight Microsurf roughness specimens, mounted on a general reference chart, can be obtained for the following manufacturing operations:

- Surface grinding, cylindrical grinding, face turning, turning, end milling, reaming & drilling, horizontal milling and planing.
- Dimensions *w x h*: 740 x 310 mm.

Item No.	Description	Price
850.314	Microsurf	



Roughness specimens in a set

This set consists of 30 specimens, mounted in an attractive wallet with instruction card. In addition to the R_a values, the standardized N values and the R_z values are specified.



Set composition

Number of specimens	Machining method	Roughness $R_a/\mu\text{m}$
3	Flat lapping	0.05 - 0.2
3	Reaming	0.4 - 1.6
6	Grinding	0.05 - 1.6
6	Horizontal milling	0.4 - 12.5
6	Vertical milling	0.4 - 12.5
6	Turning	0.4 - 12.5

Item No.	Language	Price
850.130	English	
850.131	French	
850.132	German	

On request available with a declaration of conformity.

Roughness specimens for blasted surfaces

- Each plate consists of four roughness specimens for grit and shot blasting.
- Delivery in a solid, leather wallet.
- Standardized to ISO specifications.

Item No.	Description	Price
850.017	Shot blasting	
850.018	Grit blasting	

