

MADE TO MEASURE. MARGAGE



The latest information on MARGAGE products can be found on our website:

www.mahr.com, WebCode 10397

▶ | In 1871, at the foundation of the German Empire and during the introduction of the metric system, Mahr was already supplying dimensional standards to the weights and measurement office of several individual German states. Today, the measurement standards such as gage blocks are the basis of dimensional metrology, they are used as a setting standard for an indicating measuring instrument or applied in the calibration laboratory as a reference standard. Due to our accreditation from the PTB - Physikalisch-Technischen Bundesanstalt (German metrology institute providing scientific and technical services) and the careful selection of the materials we use, we can grant you the highest possible quality! | ◀

► | MarGage. Standards, Gages and Gage Blocks

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MarGage. Standards, Gages and Gage Blocks

RECTANGULAR GAGES BLOCKS

Application

- As comparison reference and utilization standards in the field of length measurement
- For checking gages and measuring instruments
- For setting devices of all types designed for length measurement and in particular their displays
- Can be used individually or in combinations by wringing several blocks together (see illustration)

Accuracy

The manufacturing process is based on DIN EN ISO 3650, Mahr gage blocks are produced with the utmost care.

Marking

Gage blocks of all grades are clearly and individually marked with an identification number.

Material

Mahr gage blocks are made either of stainless steel or of the ceramic compound zirconium oxide ZrO_2 (Circonimar).

Heat Expansion Coefficient

Steel	$11.5 \times 10^{-6} K^{-1}$
Circonimar	$9.5 \times 10^{-6} K^{-1}$

Calibration Certificate

Gage blocks in sets are supplied with a Mahr calibration certificate stating deviations from the nominal size, this confirms the traceability to National Standards.

For single gage blocks Mahr calibration certificates are available on request.

A calibration certificate from the Mahr DKD Calibration Laboratory is recommended for gage blocks of calibration grade K in the range between 0.5 and 100 mm

Dimensions

	Nominal dimension mm	Cross section mm
from	0.5 - 10	30 x 9
over	10 - 1000	35 x 9



DEUTSCHER KALIBRIERDIENST

DKD

GERMAN CALIBRATION SERVICE
Calibration Laboratory for Length
Measurement

ACCREDITED BY THE PHYSIKALISCH-
TECHNISCHE BUNDESANSTALT (PTB)

As a part of the German Calibration Service, the Mahr Calibration Laboratory calibrates steel and ceramic gage blocks of all brands in the range between 0.5 and 100 mm and issues calibration certificates. The gage block sets are marked with the official DKD calibration label.

Calibration is based on the contract concluded between the Physikalisch-Technischen Bundesanstalt in Braunschweig and the company Mahr.

Selection of Rectangular Gage Block Sets

There are three criteria's to be considered:

1 Calibration and Tolerance classes according to DIN EN ISO 3650

Four tolerances classes are available.

Calibration class K

As primary factory standard, particularly for the calibration of subsidiary test laboratories, e.g. for gage blocks of lower tolerance classes. Supplied on request with DKD calibration certificate, indicating the deviation from the nominal size for each gage block.

Calibration class 0

For maximum accuracy requirements. To be used as basic standards in test laboratories and precision inspection rooms, where other gage blocks and high accuracy measuring instruments are calibrated.

Tolerance class 1

For high standards of accuracy. As reference gage block for the inspection room. Designed to perform particularly accurate measurements. For setting indicating measuring instruments and for checking precision gages.

Tolerance class 2

For checking production gages of quality IT 6 and IT 7. For setting indicating measuring instruments and for checking accurate dimensions in the jig and tool industry.



404

2 Material

Steel or ceramic, depending on application.

3 Size of Sets

The gage block sets 404 or 404 C are very convenient, each set contains 46 gage blocks including one for each decimal. Larger sets are particularly suited to inspection rooms and gage testing facilities, since they offer the following advantages:

- A required dimension can be made up quicker as fewer gage blocks are needed
- Several gage block combinations can be formed from the same dimension
- Greater accuracy as individual deviations add up to smaller overall error
- Less wear as a given gage block is not used as often

Rectangular Gage Blocks made of Steel

Sets

- Vertical arrangement to save space
- Scope of supply: wooden case with clear labeling strips, Mahr calibration certificate (see Page 13-2)
- See the following table for nominal sizes, increments and tolerance classes:

Catalog no.	Tolerance class	Order no.	Quantity per set	Nominal sizes mm	Increments mm	Gage blocks
402/K	K	4800403	32	1.005	-	1
402/0	0	4800400		1.01 - 1.09	0.01	9
402/1	1	4800401		1.1 - 1.9	0.1	9
402/2	2	4800402		1 - 9	1	9
				10 - 30	10	3
				50	-	1
404/K	K	4800003	46	1.001 - 1.009	0.001	9
404/0	0	4800000		1.01 - 1.09	0.01	9
404/1	1	4800001		1.1 - 1.9	0.1	9
404/2	2	4800002		1 - 9	1	9
				10 - 100	10	10
406/K	K	4800014	87	0.5	-	1
406/0	0	4800010		1.001 - 1.009	0.001	9
406/1	1	4800011		1.01 - 1.49	0.01	49
406/2	2	4800012		1 - 9.5	0.5	18
				10 - 100	10	10
408/K	K	4800027	111	0.5	-	1
408/0	0	4800020		1.001 - 1.009	0.001	9
408/1	1	4800021		1.01 - 1.49	0.01	49
408/2	2	4800022		1 - 24.5	0.5	48
				25 - 100	25	4
409/K	K	4800033	121	0.5	-	1
409/0	0	4800030		1.001 - 1.009	0.001	9
409/1	1	4800031		1.01 - 1.49	0.01	49
409/2	2	4800032		1.6 - 1.9	0.1	4
				1 - 24.5	0.5	48
				25, 30, 40, 50, 60, 70, 75, 80, 90, 100		10

Test Sets for Calipers

Catalog no.	Tolerance class	Order no.	Quantity per set	Nominal sizes mm
411/1	1	4800343	5	30 / 41.3 / 131.4 / 243.5 / 281.2
411/2	2	4800344	5	30 / 41.3 / 131.4 / 243.5 / 281.2
415/1	1	4800339	6	30 / 41.3 / 131.4 / 243.5 / 281.2 / 481.1
415/2	2	4800340	6	30 / 41.3 / 131.4 / 243.5 / 281.2 / 481.1

Individual Rectangular Gage Blocks 417

- Tolerance classes K, 0, 1, 2
- Nominal sizes greater than 125 mm, the gage blocks are supplied in a wooden case
- Special sizes are available on request

Tolerance Class K	XX=34
Tolerance Class 0	XX=10
Tolerance Class 1	XX=12
Tolerance Class 2	XX=14

Tolerance Class K	XX=35
Tolerance Class 0	XX=11
Tolerance Class 1	XX=13
Tolerance Class 2	XX=15

Nominal sizes	Order no.	Nominal sizes	Order no.
0.50	480XX09	1.31	480XX59
1	480XX19	1.32	480XX60
1.001	480XX20	1.33	480XX61
1.002	480XX21	1.34	480XX62
1.003	480XX22	1.35	480XX63
1.004	480XX23	1.36	480XX64
1.005	480XX24	1.37	480XX65
1.006	480XX25	1.38	480XX66
1.007	480XX26	1.39	480XX67
1.008	480XX27	1.40	480XX68
1.009	480XX28	1.41	480XX69
1.01	480XX29	1.42	480XX70
1.02	480XX30	1.43	480XX71
1.03	480XX31	1.44	480XX72
1.04	480XX32	1.45	480XX73
1.05	480XX33	1.46	480XX74
1.06	480XX34	1.47	480XX75
1.07	480XX35	1.48	480XX76
1.08	480XX36	1.49	480XX77
1.09	480XX37	1.5	480XX78
1.10	480XX38	1.6	480XX79
1.11	480XX39	1.7	480XX80
1.12	480XX40	1.8	480XX81
1.13	480XX41	1.9	480XX82
1.14	480XX42	2	480XX83
1.15	480XX43	2.5	480XX84
1.16	480XX44	3	480XX85
1.17	480XX45	3.5	480XX86
1.18	480XX46	4	480XX87
1.19	480XX47	4.5	480XX88
1.20	480XX48	5	480XX89
1.21	480XX49	5.5	480XX90
1.22	480XX50	6	480XX91
1.23	480XX51	6.5	480XX92
1.24	480XX52	7	480XX93
1.25	480XX53	7.5	480XX94
1.26	480XX54	8	480XX95
1.27	480XX55	8.5	480XX96
1.28	480XX56	9	480XX97
1.29	480XX57	9.5	480XX98
1.30	480XX58	10	480XX99

Nominal sizes	Order no.	Nominal sizes	Order no.
10.5	480XX00	175	480XX41
11	480XX01	200	480XX42
11.5	480XX02	250	480XX43
12	480XX03	300	480XX44
12.5	480XX04	400	480XX46
13	480XX05	500	480XX48
13.5	480XX06	600	480XX49
14	480XX07	700	480XX50
14.5	480XX08	800	480XX51
15	480XX09	900	480XX52
15.5	480XX10	1000	480XX53
16	480XX11		
16.5	480XX12		
17	480XX13		
17.5	480XX14		
18	480XX15		
18.5	480XX16		
19	480XX17		
19.5	480XX18		
20	480XX19		
20.5	480XX20		
21	480XX21		
21.5	480XX22		
22	480XX23		
22.5	480XX24		
23	480XX25		
23.5	480XX26		
24	480XX27		
24.5	480XX28		
25	480XX29		
30	480XX30		
40	480XX31		
50	480XX32		
60	480XX33		
70	480XX34		
75	480XX35		
80	480XX36		
90	480XX37		
100	480XX38		
125	480XX39		
150	480XX40		

Rectangular Gage Blocks made of Ceramic



406 C

Features

- Resistant to both impact and breakage. Virtually no warping of material if surfaces become scratched or edges damaged. Longer retention of wringing ability
- Extremely durable, thus providing a long service life as well being highly robust compared to all other materials currently be used in metrology. Therefore the interval between inspections are distinctly greater
- The corrosion-resistant Circonimar is even without protective measures extremely resistant to alkalis, acids, oil, grinding fluid and other aggressive media
- Similar coefficient of expansion to steel, thus allowing unrestricted use even at unfavorable temperatures
- Non-magnetic Circonimar is anti-static, anti-magnetic and non-conductive. It does not attract dust or dirt and is suitable to use in the presence of magnetic fields
- Ideal for all applications. The outstanding features of all ceramic gage blocks from Mahr provide unrivalled flexibility in practical use. Circonimar is equally well suited to inspection-room conditions and the rigors of workshop applications
- Easy to handle. No material is easier to handle than Circonimar; Circonimar has excellent wringing properties, no corrosion, no need for lubrication, low weight and scratch resistant

Sets

- Vertical arrangement to save space
- Scope of supply: wooden case with clear labeling strips, Mahr calibration certificate (see Page 13-2)

Nominal sizes, increments and tolerance classes

Please refer to the table below:

Catalog no.	Tolerance class	Order no.	Quantity per set	Nominal sizes mm	Increments mm	Gage blocks
402 C/K	K	4800094	32	1.005	-	1
402 C/0	0	4800095		1.01 - 1.09	0.01	9
402 C/1	1	4800096		1.1 - 1.9	0.1	9
402 C/2	2	4800097		1 - 9	1	9
				10 - 30	10	3
				50	-	1
404 C/K	K	4800088	46	1.001 - 1.009	0.001	9
404 C/0	0	4800008		1.01 - 1.09	0.01	9
404 C/1	1	4800009		1.1 - 1.9	0.1	9
404 C/2	2	4800004		1 - 9	1	9
				10 - 100	10	10
406 C/K	K	4800016	87	0.5	-	1
406 C/0	0	4800018		1.001 - 1.009	0.001	9
406 C/1	1	4800019		1.01 - 1.49	0.01	49
406 C/2	2	4800017		1 - 9.5	0.5	18
				10 - 100	10	10
408 C/K	K	4800025	111	0.5	-	1
408 C/0	0	4800028		1.001 - 1.009	0.001	9
408 C/1	1	4800029		1.01 - 1.49	0.01	49
408 C/2	2	4800026		1 - 24.5	0.5	48
				25 - 100	25	4
409 C/K	K	4800036	121	0.5	-	1
409 C/0	0	4800038		1.001 - 1.009	0.001	9
409 C/1	1	4800039		1.01 - 1.49	0.01	49
409 C/2	2	4800037		1.6 - 1.9	0.1	4
				1 - 24.5	0.5	48
			25, 30, 40, 50, 60, 70, 75, 80, 90, 100			

Individual Rectangular Gage Blocks 417 C

- Tolerance classes K, 0, 1, 2
- Special sizes are available on request

Tolerance Class K	XX=46
Tolerance Class 0	XX=40
Tolerance Class 1	XX=42
Tolerance Class 2	XX=44

Tol. Class K	XX=47
Tol. Class 0	XX=41
Tol. Class 1	XX=43
Tol. Class 2	XX=45

Nominal sizes	Order no.	Nominal sizes	Order no.	Nominal sizes	Order no.	Nominal sizes	Order no.
0.50	480XX00	1.21	480XX40	1.7	480XX71	15	480XX00
1	480XX10	1.22	480XX41	1.8	480XX72	15.5	480XX01
1.001	480XX11	1.23	480XX42	1.9	480XX73	16	480XX02
1.002	480XX12	1.24	480XX43	2	480XX74	16.5	480XX03
1.003	480XX13	1.25	480XX44	2.5	480XX75	17	480XX04
1.004	480XX14	1.26	480XX45	3	480XX76	17.5	480XX05
1.005	480XX15	1.27	480XX46	3.5	480XX77	18	480XX06
1.006	480XX16	1.28	480XX47	4	480XX78	18.5	480XX07
1.007	480XX17	1.29	480XX48	4.5	480XX79	19	480XX08
1.008	480XX18	1.30	480XX49	5	480XX80	19.5	480XX09
1.009	480XX19	1.31	480XX50	5.5	480XX81	20	480XX10
1.01	480XX20	1.32	480XX51	6	480XX82	20.5	480XX11
1.02	480XX21	1.33	480XX52	6.5	480XX83	21	480XX12
1.03	480XX22	1.34	480XX53	7	480XX84	21.5	480XX13
1.04	480XX23	1.35	480XX54	7.5	480XX85	22	480XX14
1.05	480XX24	1.36	480XX55	8	480XX86	22.5	480XX15
1.06	480XX25	1.37	480XX56	8.5	480XX87	23	480XX16
1.07	480XX26	1.38	480XX57	9	480XX88	23.5	480XX17
1.08	480XX27	1.39	480XX58	9.5	480XX89	24	480XX18
1.09	480XX28	1.40	480XX59	10	480XX90	24.5	480XX19
1.10	480XX29	1.41	480XX60	10.5	480XX91	25	480XX20
1.11	480XX30	1.42	480XX61	11	480XX92	30	480XX21
1.12	480XX31	1.43	480XX62	11.5	480XX93	40	480XX22
1.13	480XX32	1.44	480XX63	12	480XX94	50	480XX23
1.14	480XX33	1.45	480XX64	12.5	480XX95	60	480XX24
1.15	480XX34	1.46	480XX65	13	480XX96	70	480XX25
1.16	480XX35	1.47	480XX66	13.5	480XX97	75	480XX26
1.17	480XX36	1.48	480XX67	14	480XX98	80	480XX27
1.18	480XX37	1.49	480XX68	14.5	480XX99	90	480XX28
1.19	480XX38	1.5	480XX69			100	480XX29
1.20	480XX39	1.6	480XX70				

Pair of Protective Rectangular Gage Blocks 418 C

Catalog no.	Tolerance class	Order no.	Quantity per set	Nominal sizes mm	Increments mm	Gage blocks
418 C/0	0	4800085	2	2	-	2
418 C/1	1	4800086	2	2	-	2

Test Set for Micrometers 419 C (DIN 863)

Catalog no.	Tolerance class	Order no.	Quantity per set	Nominal sizes mm
419 C/1	1	4800090	10	2.5 / 5.1 / 7.7 / 10.3 / 12.9 / 15.0 / 17.6 / 20.2 / 22.8 / 25 plus 1 optical parallel dia. 30 mm



Accessories for Rectangular Gage Blocks



Rectangular Gage Block Holder and Measuring Jaws Accessory Set 420

- To be used in conjunction with Gage Blocks for gaging both work pieces and fixtures
- To check, set and adjust setting gages and measuring instruments
- For scribing and marking
- Supplied with:
Wooden case

Order no. 4800100

Components include:

- 2 Pairs of Measuring Jaws 420 m
- 1 Scriber Point 420 a
- 1 Centering Point 420 z
- 3 Holder 420 h for Gages Blocks
clamping width 0-70, 0-120, 100-220 mm
- 1 Stand 420 f for Gage Block Holder

Individual Accessories

Components included in the 420 set are also individually available:

Measuring Jaws 420 m

Cross section 9 x 9 mm

For internal and external measurements in conjunction with a Gage Block Holder 420 h and Gage Blocks

Thickness mm	Order no.
2 x 2 mm = 4 mm	4800110
2 x 5 mm = 10 mm	4800111

Scriber Point 420 a cross section 9 x 9 mm

Centering Point 420 z cross section 9 x 9 mm

Order no. 4800113

Holder 420 h for Rectangular Gage Blocks

Clamping width mm	Order no.
0 - 70	4800120
0 - 120	4800121
100 - 220	4800122
100 - 420	4800123
400 - 820	4800124

Stand 420 f for Holder 420 h*

Hardened and lapped. Height 25 mm
Tolerance $\pm 2 \mu\text{m}$

Order no. 4800114

* Clamping width up to 420 mm

Optical Flat 421

- To test the surface flatness on precision components or measuring instruments according to the interference principle
- Supplied with:
Wooden case



Dia. mm	Thickness mm	Flatness deviation μm	Order no.
45	11	≤ 0.1	4800140
100	20	≤ 0.1	4800135
150	30	≤ 0.1	4800136
300	50	≤ 0.4	4800137

Optical Parallel 421 P

Dia. mm	Thickness mm	Flatness deviation μm	Parallelism deviation μm	Order no.
30	12	≤ 0.15	0.4	4800180

Contact Thermometer 422



- For checking/taking the temperature
- With silver contact base, gold-plated to prevent tarnishing
- With a holding magnet to be attached to the thermometer in vertical or on inclined surfaces
- U-shaped with clamping screw
- Supplied with:
Thermometer, magnet and wooden case

Readings 0.2°C
Measuring range 16-26°C

Order no. 4800170

Wooden Tongs 423

- To prevent heat transfer when handling gage blocks
- Self closing. See illustration below.

Order no. 4800142

Maintenance Set 424

- The most important equipment for inspecting and maintaining gage blocks
- Supplied with: Wooden case

Order no. 4800130



Components include:

Optical Flat 421

- To test the surface flatness of measuring surfaces according to the interference principle. Diameter 45 mm

Wooden Tongs 423

- To prevent heat transfer when handling gage block, self closing

Granite lapping stone

- To remove burr and other damage on surfaces of gage blocks. High accuracy version

Jar of special Vaseline

- To protect steel gage blocks against the rust

Brush and suede cloth

- To clean the gage blocks

Inch Gage Blocks

Features

- Long used as the practical standards of dimensional measurement in precision manufacturing. With accuracies, materials and manufacturing methods greatly refined, gage blocks are now of highest quality and precision.
 - As comparison reference and utilization standards in the field of length measurement.
 - For checking gages and measuring instruments.
 - Used individually or in combinations by wringing several blocks together.
- Mahr Federal gage blocks are available from stock individually and as full sets in inch (rectangular only).
- Sets are manufactured to Grade **0** only, which meet or exceed ASME B89.1.9-2002 specifications.
- Offered in steel to suit a wide range of service conditions. Steel blocks are extremely stable, hardened to Rc 62 minimum, and processed through a thorough seasoning cycle to relieve internal stresses before finish lapping.
- All sets blocks are serialized and supplied in a fitted storage case. Certification priced separately.

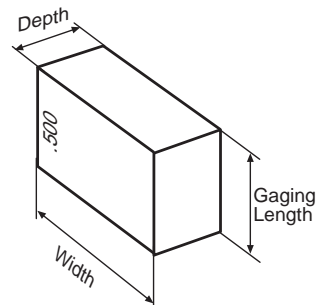


Mahr Federal Calibration System is certified to ISO-17025 and accredited by NVLAP and ISO-9001 certified by NQA

Technical Data

Dimensions – Standard Size Blocks

Block Style	Gaging Length	Width		Depth	
		mm	inch	mm	inch
Inch – Rectangular	.400" or less	30	1.181"	9	.352"
	.400" and over	35	1.378"	9	.352"



Inch Gage Blocks Set

Ordering Information

Inch Rectangular

An 81 block set containing

Series	Number of blocks	Size
.0001"	9	.1001 - .1009
.001"	49	.101 - .149
.050"	19	.050 - .950
1.000"	4	1.000 - 4.000

Order No. 2176361

Inch Rectangular

An 49 block set containing

Series	Number of blocks	Size
.0001"	9	.1001 - 1.009
.001"	9	.101 - .109
.01"	9	.010 - .090
.01"	9	.110 - .190
.10"	9	.100 - .900
1.000"	4	1.000 - 4.000

Order No. 2176362



Technical Data

Grade 0 Length Tolerances

Nominal Length

Greater than	Less than or equal to	Unit 0.000001" (1 μinch)
0	0.4	± 5
0.4	1	± 6
1	2	± 8
2	3	± 10
3	4	± 12

Pin Gages 426 according to DIN 2269



Features

- To be used as setting standards for indicating measuring instruments, testing the distances between axes, tapers and other work pieces in conjunction with gage blocks. Can also be used for determining pitch diameter of threads or pitch circle diameter on gears and serrations

Pin Gages 426 made from steel, without a handle from dia. 5.01 mm inscribed with diameter on the end face

		Wear-resistant gage steel, hardened, multi-aged, ground and lapped Grade 0, DIN 2269 Manufacturing tolerance $\pm 0.5 \mu\text{m}$ 426/0			Wear-resistant gage steel, hardened multi-aged, ground and lapped Grade 1, DIN 2269 Manufacturing tolerance $\pm 1.0 \mu\text{m}$ 426/1			Wear-resistant gage steel, hardened multi-aged and precision ground Better than Grade 2, DIN 2269 Manufacturing tolerance $\pm 1.5 \mu\text{m}$ 426/2		
		Increments		Increments		Increments		Increments		
		Order no.	Order no.	Order no.	Order no.	Order no.	Order no.	Order no.	Order no.	
		0.01 mm	0.001 mm	0.01 mm	0.001 mm	0.01 mm	0.001 mm	0.01 mm	0.001 mm	
\varnothing mm	mm									
0.30 - 0.49	30	4828103	4828303	40	4828113	4828313	40	4828133		
0.50 - 0.99	30	4828104	4828304	40	4828114	4828314	40	4828134		
1.00 - 2.99	60	4828105	4828305	70	4828115	4828315	70	4828135		
3.00 - 5.99	60	4828106	4828306	70	4828116	4828316	70***	4828136		
6.00 - 9.99	60	4828107*	4828307*	70	4828117	4828317	70	4828137		
10.00 - 11.99				70**	4828118	4828318	70	4828138		
12.00 - 13.99				70	4828119	4828319	70	4828139		
14.00 - 15.99				70	4828120	4828320	70	4828140		
16.00 - 18.99				70	4828121	4828321	70	4828141		
19.00 - 20.00				70	4828122	4828322	70	4828142		

* applies up to dia 10 mm

** dia. 10 mm = 50 mm long

*** dia. 3 - 4 mm = 50 mm long,
> 4 - 5 mm = 60 mm long,
> 5 mm = 70 mm long

Pin Gages 426 G made from steel, with a handle

		Wear-resistant gage steel, hardened, multi-aged, ground and lapped Grade 0, DIN 2269 Manufacturing tolerance $\pm 0.5 \mu\text{m}$ 426 G/0			Wear-resistant gage steel, hardened, multi-aged, ground and lapped Grade 1, DIN 2269 Manufacturing tolerance $\pm 1.0 \mu\text{m}$ 426 G/1			Wear-resistant gage steel, hardened multi-aged and precision ground Better than Grade 2, DIN 2269 Manufacturing tolerance $\pm 1.5 \mu\text{m}$ 426 G/2		
		Increments		Increments		Increments		Increments		
		Order no.	Order no.	Order no.	Order no.	Order no.	Order no.	Order no.	Order no.	
		0.01 mm	0.001 mm	0.01 mm	0.001 mm	0.01 mm	0.001 mm	0.01 mm	0.001 mm	
\varnothing mm	mm									
0.10 - 0.19	28	4828151	4828351	33	4828161	4828361	33	4828171		
0.20 - 0.29	28	4828152	4828352	33	4828162	4828362	33	4828172		
0.30 - 0.49	28	4828153	4828353	33	4828163	4828363	33	4828173		
0.50 - 0.99	28	4828154	4828354	33	4828164	4828364	33	4828174		
1.00 - 2.99	57	4828155	4828355	62	4828165	4828365	62	4828175		
3.00 - 5.99	57	4828156	4828356	62	4828166	4828366	62***	4828176		
6.00 - 10.00	57*	4828157	4828357	62**	4828167	4828367	62	4828177		

* dia. 6 mm = 25 mm long

** dia. 6 mm = 25 mm long

*** dia. 3 - 4 mm = 43 mm long,
> 4 - 5 mm = 53 mm long,
> 5 mm = 62 mm long

Length of handle see Page 13-12 (426 D)

Accessories

Wooden case with plastic inlay for pin gages up to D = 10 mm

Number of pin gages

Order no.

max. 50 pin gages (without handle)

4827609

max. 50 pin gages (with handle)

4827610

max. 100 pin gages (without handle)

4827611

Pin Gage sets 426 S made of steel, without a handle in a high quality wooden box with pedestral



Technical Data

			Wear-resistant gage steel, hardened, multi-aged, ground and lapped Grade 0, DIN 2269			Wear-resistant gage steel, hardened, multi-aged, ground and lapped Grade 1, DIN 2269			Wear-resistant gage steel, hardened multi-aged and precision ground Better than Grade 2, DIN 2269		
			Manufacturing tolerance $\pm 0.5 \mu\text{m}$			Manufacturing tolerance $\pm 1.0 \mu\text{m}$			Manufacturing tolerance $\pm 1.5 \mu\text{m}$		
dia. mm	Increments	Quantity	Order no.	Increments	Anzahl	Order no.	Increments	Quantity	Order no.		
1.00 - 10.00				0.1	91	4828190	0.1	91	4828210		
0.10 - 0.50	0.01	41	4828181	0.01	41	4828191	0.01	41	4828211		
0.50 - 1.00	0.01	51	4828182	0.01	51	4828192	0.01	51	4828212		
0.10 - 1.00	0.01	91	4828183	0.01	91	4828193	0.01	91	4828213		
1.00 - 2.00	0.01	101	4828184	0.01	101	4828194	0.01	101	4828214		
2.00 - 3.00				0.01	101	4828195	0.01	101	4828215		
3.00 - 4.00				0.01	101	4828196	0.01	101	4828216		
4.00 - 5.00				0.01	101	4828197	0.01	101	4828217		
5.00 - 6.00				0.01	101	4828198	0.01	101	4828218		
6.00 - 7.00				0.01	101	4828199	0.01	101	4828219		
7.00 - 8.00				0.01	101	4828200	0.01	101	4828220		
8.00 - 9.00				0.01	101	4828201	0.01	101	4828221		
9.00 - 10.00				0.01	101	4828202	0.01	101	4828222		

Pin gage lengths are the same as the individual pin gages

Individual Plug Gages 426 D made from steel, with a handle

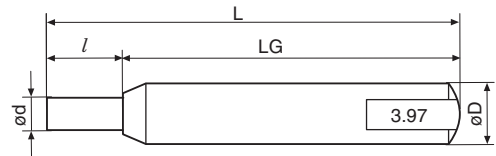


Features

- For testing diameters of small bores
- To be used as setting standards for indicating measuring instruments, testing the distances between axes, grooves and slots on work pieces in conjunction with gage blocks
- Unbreakable plastic handle inscribed with the diameter
- Supplied with:
Wooden case with plastic inlay

Technical Data

Wear-resistant gage steel, hardened, multi-aged, ground and **lapped**
 plastic handle inscribed with the diameter
 Manufacturing tolerance $\pm 0.5 \mu\text{m}$
 Increment 0.01 mm



Dimensions

dia. d mm	Order no.	dia. d mm	l mm	dia. D	LG	L
0.06 - 0.09	4828230	0.06 - 0.30	2.0	4	32	34
0.10 - 0.19	4828231	> 0.30 - 0.50	3.5	4	32	35.5
0.20 - 0.29	4828232	> 0.50 - 1.50	5.0	4	32	37
0.30 - 0.49	4828233	> 1.50 - 2.00	6.0	4	32	38
0.50 - 0.99	4828234	> 2.00 - 3.50	8.0	5	35	43
1.00 - 2.99	4828235	> 3.50 - 6.00	10.0	5	45	55
3.00 - 5.99	4828236	> 6.00 - 8.00	14.0	10	45	59
6.00 - 10.00	4828237	> 8.00 - 10.00	18.0	10	45	63

Plug Gage Sets 426 DS made from steel, with a handle in a high quality wooden box with pedestal

Technical Data

Wear-resistant gage steel, hardened, multi-aged, ground and **lapped**
 plastic handle inscribed with the diameter

Manufacturing tolerance $\pm 0.5 \mu\text{m}$
 Supplied with: Wooden case with plastic inlay

dia. mm	Increment	Quantity	Length	Order no.	dia. mm	Increment	Quantity	Length	Order no.
0.06 - 0.50	0.01	45	2*	4825000	5.01 - 5.50	0.01	50	10	4825010
0.51 - 1.00	0.01	50	5	4825001	5.51 - 6.00	0.01	50	10	4825011
1.01 - 1.50	0.01	50	5	4825002	6.01 - 6.50	0.01	50	14	4825703
1.51 - 2.00	0.01	50	6	4825003	6.51 - 7.00	0.01	50	14	4825704
2.01 - 2.50	0.01	50	8	4825004	7.01 - 7.50	0.01	50	14	4825705
2.51 - 3.00	0.01	50	8	4825005	7.51 - 8.00	0.01	50	14	4825706
3.01 - 3.50	0.01	50	8	4825006	8.01 - 8.50	0.01	50	18	4825707
3.51 - 4.00	0.01	50	10	4825007	8.51 - 9.00	0.01	50	18	4825708
4.01 - 4.50	0.01	50	10	4825008	9.01 - 9.50	0.01	50	18	4825709
4.51 - 5.00	0.01	50	10	4825009	9.51 - 10.00	0.01	50	18	4825710

*dia. > 0.3 mm = 3.5 mm long

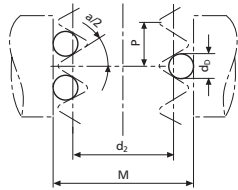
Thread Pin Gages 426 M in holders 426 A with an eyelet



426 M



426 A



Features

426 M

- For determining pitch diameter of external threads according to the three-wire method
- In conjunction with micrometers, indicating measuring instruments or measuring machines
- Each pair consists of:
1 holder with 1 pin gage and
1 holder with 2 pin gages
- Holder has a satin chrome finish, the retainer ring can be locked yet the measuring spindle can still rotate

finish, the retainer ring can be locked yet the measuring spindle can still rotate

- Pin gages are hardened and lapped. Freely floating in holder to allow proper positioning and contact with thread flanks

Manufacturing tolerance $\pm 0.5 \mu\text{m}$
 Mounting hole 7.5 mm
 (Mounting hole 6.35 mm = 1/4", 6.5 mm and 8 mm on request)

426 MS

Set of thread Pin Gages in
 Holder consists of:
 18 Holder Pairs 426 M

Diameter 0.17 - 3.2 mm
 Delivered in a wooden box

Order no.

4820000
4820003

Mounting hole 7.5 mm
 Mounting hole 6.5 mm

426 A

- For determining pitch diameter of external threads according to the three-wire method

- Designed to be suspended over a test specimen
- Set consists of 3 Pin Gages

Manufacturing tol. $\pm 0.5 \mu\text{m}$
 Pin gage length 32 mm

Technical Data

Pin Gage	Order no.			for thread pitch							
	426 M Pair dia. 7.5 mm	426 M Pair dia. 6.5 mm	426 A Set	Metric mm		Whitworth range tpi		American UST range tpi		Trapezoid mm	
0.17	4820010	4820132	4821000	0.25	0.3						
0.195	4820011	4820149	4821001					80			
0.22	4820012	4820133	4821002	0.35				72			
0.25	4820013	4820131	4821003	0.4				64			
0.29	4820014	4820134	4821004	0.45	0.5			56			
0.335	4820015	4820135	4821005	0.6				48			
0.39	4820016	4820150	4821006			40		44	40		
0.455	4820017	4820137	4821007	0.7	0.75	0.8		32	36		
0.53	4820018	4820151	4821008				28	32	28		
0.62	4820019	4820139	4821009	1			26	24	24		
0.725	4820020	4820140	4821010	1.25			22	20	20		
0.895	4820021	4820141	4821011	1.5			19	18	16		
1.1	4820022	4820142	4821012	1.75			14	16	14		
1.35	4820023	4820143	4821013	2			12	11	11	2	
1.65	4820024	4820144	4821014	2.5			10	9	10	3	
2.05	4820025	4820145	4821015	3	3.5		8	7	8	4	
2.55	4820026	4820146	4821016	4	4.5		6	6	6	5	
3.2	4820027	4820147	4821017	5	5.5		5	4 1/2	5	4 1/2	
4	*4820028	*4820152	4821018	6			4	3 1/2	4	7	

* These holder pairs require the use of a 3 mm gage block for the holder with 2 pin gages to enlarge the measuring face. This gage block is inserted into the holder recess provided.

Setting Standards for indicating measuring instruments

AGD Masters



Master Rings

- Traceable certification and calibration available on request.
- Lapped to size and polished.
- Non-gaging areas black oxidized — ring faces ground.
- Meet all requirements of ANSI Specification B47.1-1988
- Manufactured in accordance with ANSI Specification B89.1.6-1984.

Master Plugs

- Traceable certification and calibration available on request.
- Stabilized and hardened.
- 100 % usable gaging surface.
- Ends ground square
- Lapped finish.

Master Discs AGD Style 3

- Traceable certification and calibration available on request.
- Lapped to size and polished.
- Non-gaging areas black oxidized — ring faces ground.
- Meet all requirements of ANSI Specification B47.1-1988
- Manufactured in accordance with ANSI Specification B89.1.5.
- Furnished with clear insulators.
- All dimensions are AGD style 3.

Setting Standards for indicating measuring instruments

Ring Gages 355 E



Features

- Special wear-resistant gage steel. Hardened and lapped

Dimensions	DIN 2250, Type C
Manufacturing tolerance	DIN 2250
Uncertainty of actual deviation	1/2 IT 1
Nominal diameter	1 - 200 mm

Diameter increments 1mm

ø mm	Order no.	ø mm	Order no.	ø mm	Order no.	ø mm	Order no.	ø mm	Order no.	ø mm	Order no.*
1	4710006	21	4710041	41	4710061	61	4710081	81	4710101	>100-105	4714201*
2	4710010	22	4710042	42	4710062	62	4710082	82	4710102	>105-110	4714202*
3	4710014	23	4710043	43	4710063	63	4710083	83	4710103	>110-115	4714203*
4	4710018	24	4710044	44	4710064	64	4710084	84	4710104	>115-120	4714204*
5	4710020	25	4710045	45	4710065	65	4710085	85	4710105	>120-125	4714205*
6	4710022	26	4710046	46	4710066	66	4710086	86	4710106	>125-130	4714206*
7	4710024	27	4710047	47	4710067	67	4710087	87	4710107	>130-135	4714207*
8	4710026	28	4710048	48	4710068	68	4710088	88	4710108	>135-140	4714208*
9	4710028	29	4710049	49	4710069	69	4710089	89	4710109	>140-145	4714209*
10	4710030	30	4710050	50	4710070	70	4710090	90	4710110	>145-150	4714210*
11	4710031	31	4710051	51	4710071	71	4710091	91	4710111	>150-155	4714211*
12	4710032	32	4710052	52	4710072	72	4710092	92	4710112	>155-160	4714212*
13	4710033	33	4710053	53	4710073	73	4710093	93	4710113	>160-165	4714213*
14	4710034	34	4710054	54	4710074	74	4710094	94	4710114	>165-170	4714214*
15	4710035	35	4710055	55	4710075	75	4710095	95	4710115	>170-175	4714215*
16	4710036	36	4710056	56	4710076	76	4710096	96	4710116	>175-180	4714216*
17	4710037	37	4710057	57	4710077	77	4710097	97	4710117	>180-185	4714217*
18	4710038	38	4710058	58	4710078	78	4710098	98	4710118	>185-190	4714218*
19	4710039	39	4710059	59	4710079	79	4710099	99	4710119	>190-195	4714219*
20	4710040	40	4710060	60	4710080	80	4710100	100	4710120	>195-200	4714220*

* When placing an order please inform us of the diameter

Diameter increments 0,001 mm

ø mm	Order no.*	ø mm	Order no.*	ø mm	Order no.*	ø mm	Order no.*	ø mm	Order no.*
1-1,8	4732600	>35-40	4732607	>85-90	4732617	>130-135	4732623	>175-180	4732630
>1,8-3	4732641	>40-45	4732608	>90-95	4732618	>135-140	4732639	>180-185	4732631
>3-5	4732642	>50-55	4732610	>95-100	4732619	>140-145	4732624	>185-190	4732632
>5-10	4732635	>55-60	4732611	>100-105	4732620	>145-150	4732640	>190-195	4732633
>10-15	4732602	>60-65	4732612	>105-110	4732636	>150-155	4732625	>195-200	4732634
>15-20	4732603	>65-70	4732613	>110-115	4732621	>155-160	4732626		
>20-25	4732604	>70-75	4732614	>115-120	4732637	>160-165	4732627		
>25-32	4732605	>75-80	4732615	>120-125	4732622	>165-170	4732628		
>32-35	4732606	>80-85	4732616	>125-130	4732638	>170-175	4732629		

* When placing an order please inform us of the diameter

Setting Standards for indicating measuring instruments

Reference Discs 390



Features

- Special wear-resistant gage steel. Hardened and lapped.

Manufacturing tolerance	$\pm 1/2 IT 2$
Uncertainty of actual deviation	$1/2 IT 0$
Nominal diameter over	10 - 100 mm

Setting standards with a DKD calibration certificate from the Mahr Calibration Laboratory are available on request (threads are excluded)

Pin Gages from dia.	3 mm
Ring Gages dia.	10 - 100 mm
Reference Discs dia.	3 - 100 mm

Thread Setting Ring Gage 708 E

Features

- With full thread profile
- Actual deviation is engraved on the gage
- For setting indicating thread measuring instruments
- For metric threads for tolerance class "H" according to DIN 2241
- For other thread types please state tolerance requirements

Thread Setting Plug Gage 715 E



Features

- With full thread profile
- Actual deviation is engraved on the gage
- For setting indicating thread measuring instruments
- Metric threads in accordance with DIN 2241: Tolerance class h applies to standard threads dia. 1 - 1.4 mm and for pitches 0.2 and 0.25, for all other sizes the tolerance class g is applicable
- For other thread types please state tolerance requirements

Thread Gages



705



708 N



708 G

Thread Limit Plug Gage 705

- Special wear-resistant gage steel. Hardened and ground
- GO end with full thread profile, pitch diameter corresponds to minimum permissible dimension of internal thread
- NO-GO end has only 3 threads and a shortened flank profile, pitch diameter corresponds to maximum permissible dimension of internal thread
- Accuracy for metric ISO threads according to DIN ISO 1502 (up to 40 mm the GO end and NO-GO end are on a common handle. Over 40 mm the GO / NO-GO end are on separate handles for easier handling)
- Nominal diameter 1 - 100 mm. For all standard and special threads

Thread Ring Gages

- Special wear-resistant gage steel. Hardened and ground. Accuracy of metric ISO threads according to DIN ISO 1502
- Nominal diameter 1 - 200 mm
- For all standard and special threads

GO Thread Ring Gage 708 G

- With full thread profile. Pitch diameter corresponds to the maximum permissible dimension of an external thread. The external diameter is relieved

NO-GO Thread Ring Gage 708 N

- With reduced thread profile. For checking minimum permissible dimension of pitch diameter on external thread

Calibration Services

International Standards require complete documentation and calibration of all gaging instruments. Mahr Federal Inc., as well as being a manufacturer of quality dimensional measuring instruments, is an established primary source or high accuracy dimensional measurement services.

Mahr Federal offers an inspection and recalibration program for dimensional standards including:

- gage blocks / master rings / master discs and plugs / masterballs (roundness)
- cylindrical form and precision reference specimens surface roughness standards.



For these services, we have created an ideal environment - a metrology laboratory in Providence, Rhode Island that is ranked as one of the world's finest:

- High quality measurements - 0.06 micron / 2.3 microinch uncertainty of measurement on gage blocks (up to 50 mm / 2" long).
- All measurements traceable to the Standards of the United States.
- Grand Masters/Primary standards used in our Measurement Center have been certified by NIST.
- Calibration system is certified to ISO-9001:2008 by NQA, USA and accredited to ISO 17025 NVLAP Lab Code 200605-0.
- We offer Fast turnaround and competitive prices.



Mahr Federal also specializes in the calibration and certification of the following gages including:

- Dial, Digital & Test Indicators
- Mikrokators®
- Micrometers
- Dial & Vernier Calipers
- Pin & Radius Gages
- Snaps, I.D. / O.D. & Bore Gages
- Dimentron® Plugs
- Plug & Ring Gages
- Groove, Caliper, Thickness
- Air Gages & Magnification Kits
- Electronic Amplifiers & Gage Heads
- Surface Finish Gages
- Level Systems

