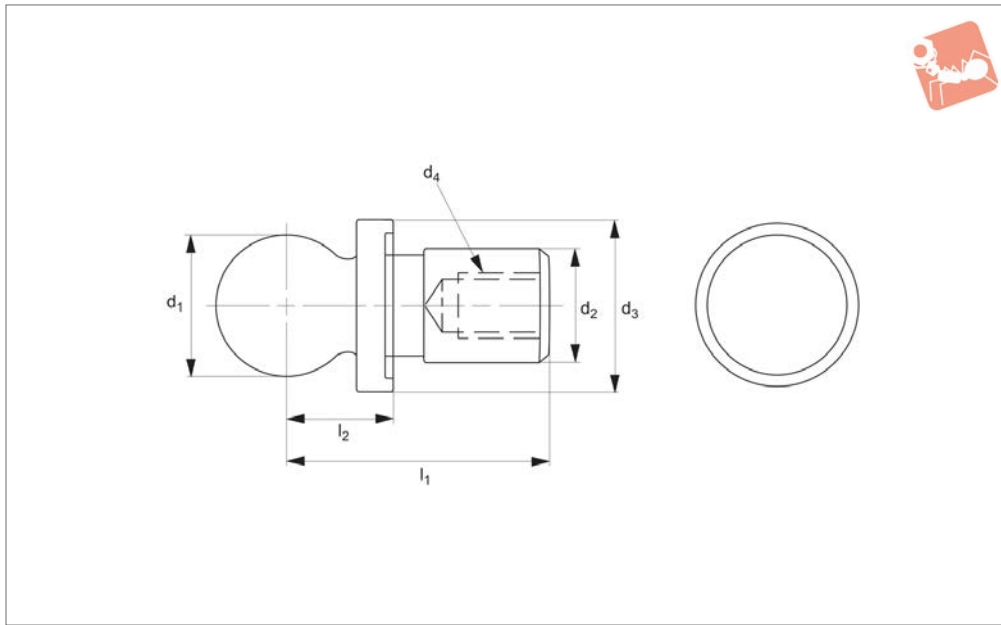




# Inspection Balls - Imperial

short shank - one piece construction

## Gauging & Inspection



**20500**

GAUGING & INSPECTION

### Material

Steel (AISI 8620).

### Technical Notes

Case hardened.

Concentricity of ball to shank ,0001 T.I.R.

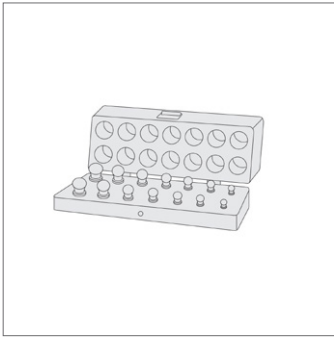
### Important Notes

Used as reference points for inspection applications in conjunction with CMMs to

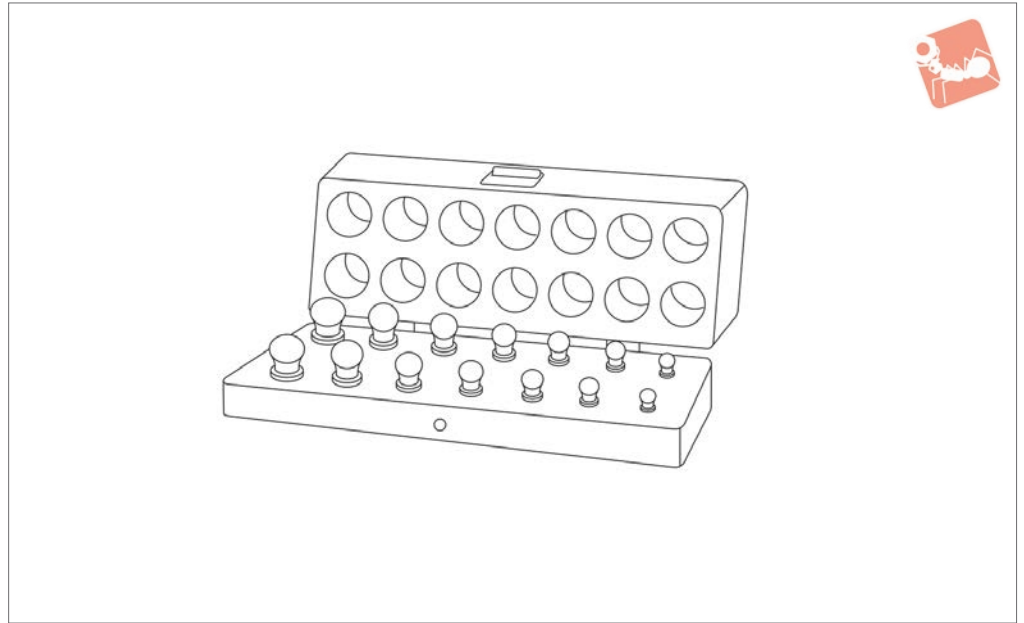
accurately measure the workpiece.

**All dimensions in inches.**

Order No.	$d_1$ +0.0000 -0.0002	$d_2$ +0.0000 -0.0002	$d_3$	$d_4$	$l_1$	$l_2$ $\pm 0.0002$	Weight oz
20500.W0025I	0.250	0.125	1/4"	-	0.58	0.200	0.16
20500.W0037I	0.375	0.187	3/8"	-	0.74	0.300	0.16
20500.W0038I	0.375	0.313	1/2"	8-32	0.74	0.300	0.48
20500.W0050I	0.500	0.250	1/2"	6-32	0.63	0.313	0.48
20500.W0051I	0.500	0.250	1/2"	6-32	0.93	0.400	0.48
20500.W0052I	0.500	0.250	1/2"	6-32	0.88	0.500	0.48
20500.W0053I	0.500	0.375	5/8"	10-24	1.31	0.375	0.96
20500.W0063I	0.625	0.312	5/8"	8-32	1.08	0.450	0.96
20500.W0064I	0.625	0.375	5/8"	10-24	1.42	0.450	1.12
20500.W0068I	0.688	0.375	3/4"	10-24	1.47	0.500	1.44
20500.W0075I	0.750	0.375	3/4"	10-24	1.53	0.562	2.08
20500.W0100I	1.000	0.500	1"	10-24	1.64	0.700	4.00



**20501**



**Material**

Steel (AISI 8620).

**Important Notes**

For individual part dimensions see 20500.

**Order No.**

**20501.W0001I**

**Set contents**

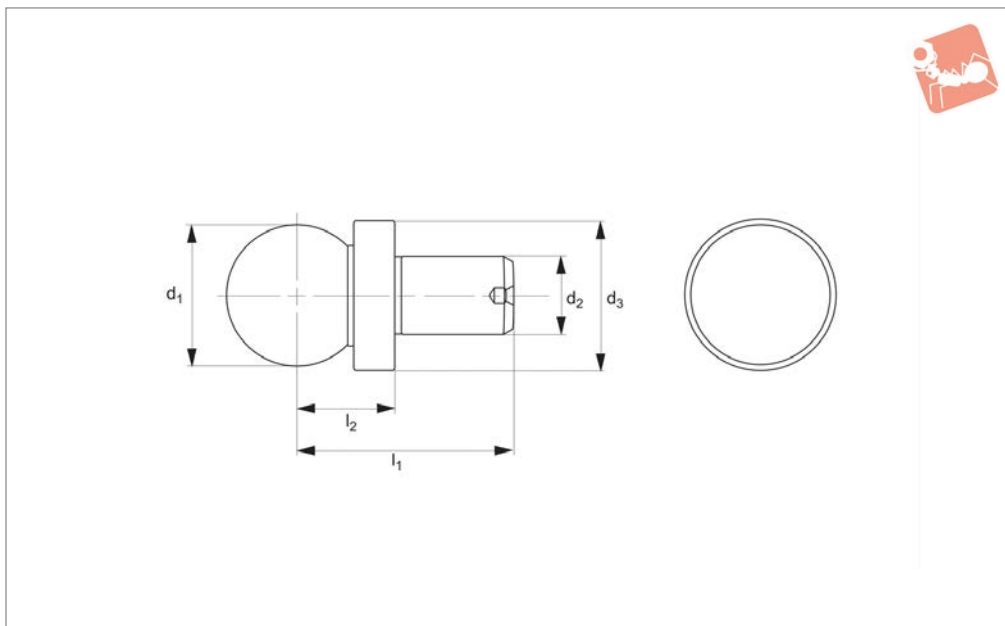
- 2 x 20500.W0025I
- 2 x 20500.W0037I
- 2 x 20500.W0038I
- 2 x 20500.W0050I
- 2 x 20500.W0051I



# Precision Balls - Imperial

slip-fit - shoulder type

## Gauging & Inspection



**20504**

GAUGING & INSPECTION

### Material

Hardened and ground steel (440 stainless).

### Technical Notes

Concentricity of ball to shank: ,0002 T.I.R.

### Important Notes

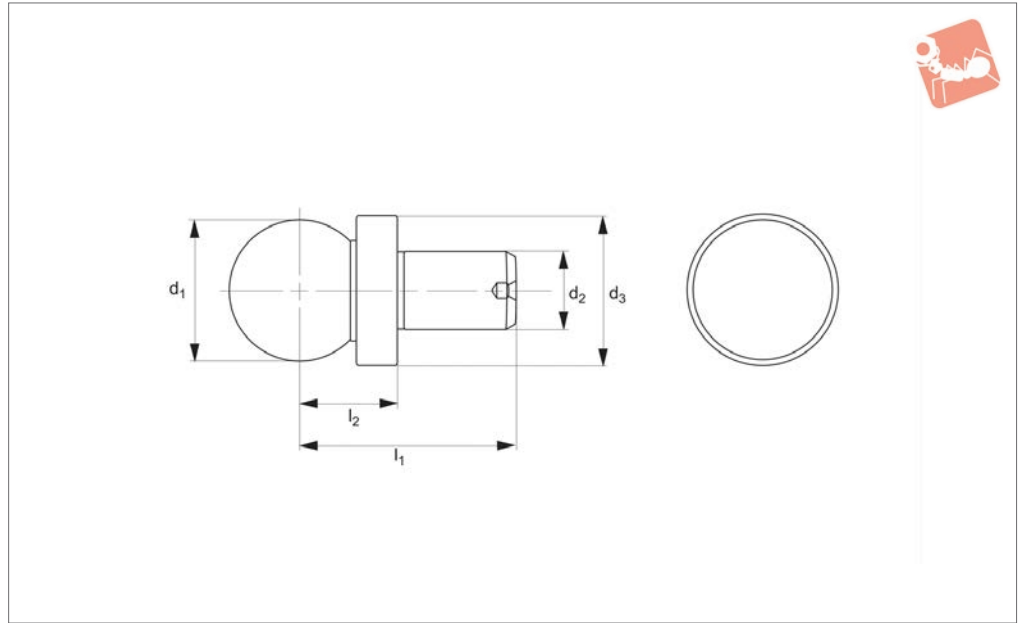
Used as reference points for inspection applications in conjunction with CMMs to accurately measure the work piece.

**All dimensions in inches.**

Order No.	$d_1$ $\pm 0.0005$	$d_2$ $+0.0000 \mid -0.0002$	$d_3$	$l_1$	$l_2$ $\pm 0.0002$	Weight oz
20504.W0025I	0.250	0.150	1/4"	9/16"	0.200	0.16
20504.W0037I	0.375	0.187	3/8"	3/4"	0.300	0.16
20504.W0050I	0.500	0.250	1/2"	15/16"	0.400	0.48
20504.W0063I	0.625	0.312	5/8"	1-1/16"	0.450	0.96
20504.W0075I	0.750	0.375	3/4"	1-1/4"	0.500	1.60
20504.W0088I	0.875	0.437	7/8"	1-7/16"	0.600	1.12
20504.W0100I	1.000	0.500	1"	1-5/8"	0.700	3.48



## 20508



### Material

Hardened and ground steel (8620 steel).

### Technical Notes

Concentricity of ball to shank:  $.0002$  T.I.R.

### Important Notes

Used as reference points for inspection applications in conjunction with CMMs to accurately measure the work piece.

**All dimensions in inches.**

**For Press Fit  $d_2$  tolerance**

**is  $+ .0003, - .0000$ .**

**For Slip Fit  $d_2$  tolerance**

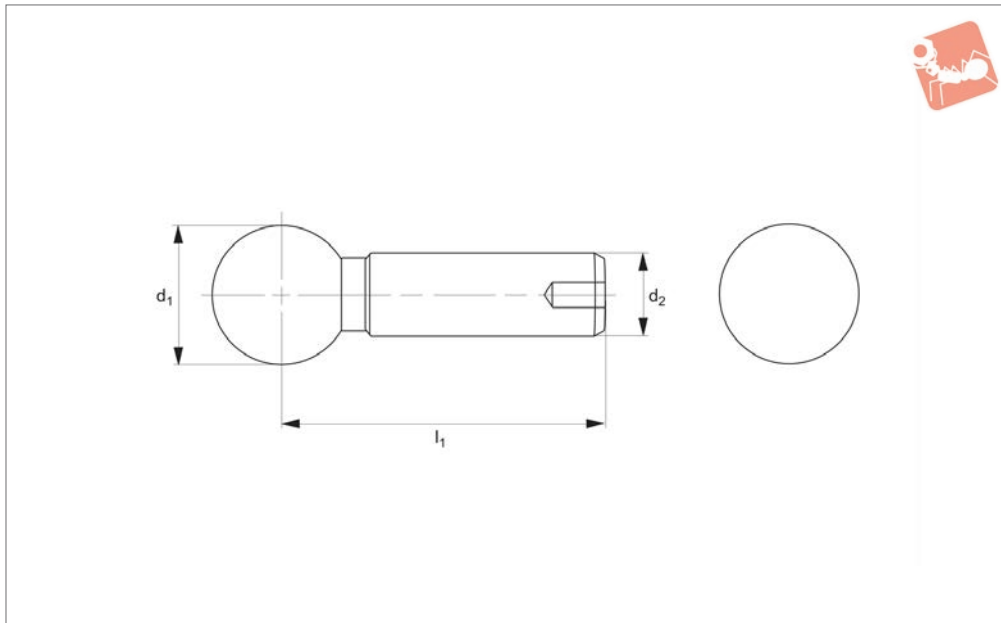
**is  $+ .0000, - .0004$ .**

Order No.	Type	$d_1$ $\pm 0.0002$	$d_2$ $+0.0003   -0.0000$	$d_3$	$l_1$	$l_2$ $\pm 0.0002$	Weight oz
20508.W0025I	Slip Fit	0.250	0.125	1/4"	9/16"	0.200	0.16
20508.W0037I	Slip Fit	0.375	0.188	3/8"	3/4"	0.300	0.16
20508.W0050I	Slip Fit	0.500	0.250	1/2"	15/16"	0.400	0.48
20508.W0051I	Slip Fit	0.500	0.250	1/2"	1-3/8"	0.500	0.64
20508.W0075I	Slip Fit	0.750	0.375	3/4"	1-1/4"	0.500	1.60
20508.W0125I	Press Fit	0.250	0.125	1/4"	9/16"	0.200	0.16
20508.W0137I	Press Fit	0.375	0.188	3/8"	3/4"	0.300	0.16
20508.W0150I	Press Fit	0.500	0.250	1/2"	15/16"	0.400	0.48
20508.W0151I	Press Fit	0.500	0.250	1/2"	1-3/8"	0.500	0.64
20508.W0175I	Press Fit	0.750	0.375	3/4"	1-1/4"	0.500	1.60



# Tooling Balls - Imperial standard - one piece construction

## Gauging & Inspection



**20510**

GAUGING & INSPECTION

### Material

Hardened and ground steel (8620 steel).

### Technical Notes

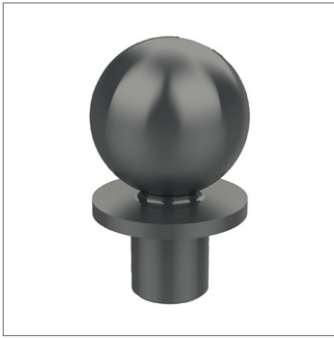
Concentricity of ball to shank: ,0002 T.I.R.

### Important Notes

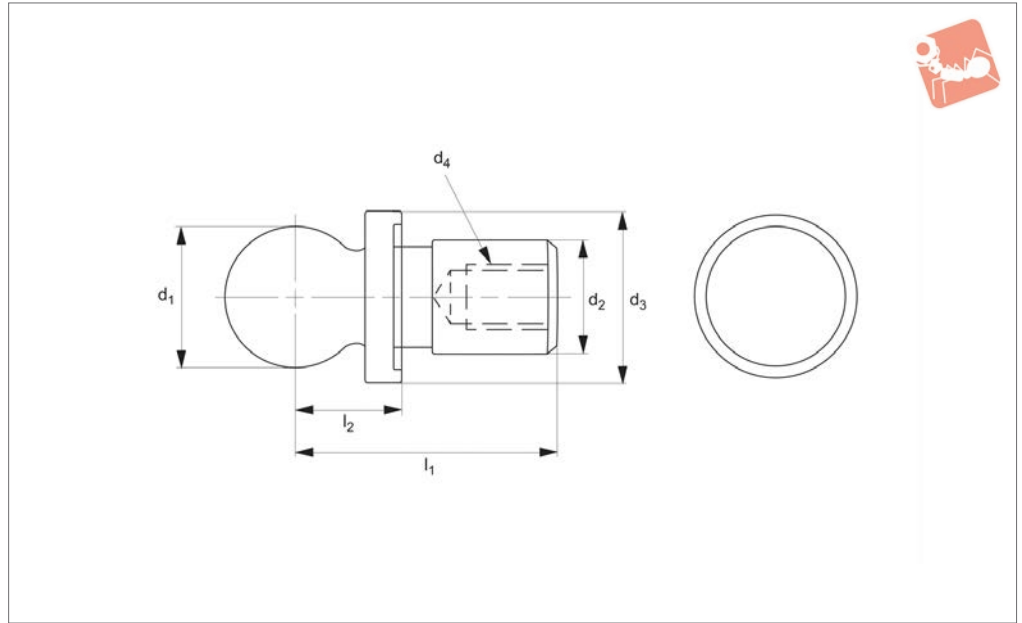
Used as reference points for inspection applications in conjunction with CMMs to accurately measure the work piece.

All dimensions in inches.

Order No.	Type	$d_1$ $\pm 0.0002$	$d_2$ $+0.0000 \mid -0.0004$	$l_1$	Weight oz
20510.W0025I	Slip Fit	0.250	0.125	9/16"	1
20510.W0037I	Slip Fit	0.375	0.188	3/4"	1
20510.W0050I	Slip Fit	0.500	0.250	15/16"	3
20510.W0051I	Slip Fit	0.500	0.250	1-1/2"	3
20510.W0052I	Slip Fit	0.500	0.375	1-1/2"	10



## 20512



### Material

Hardened and ground steel (8620 steel).

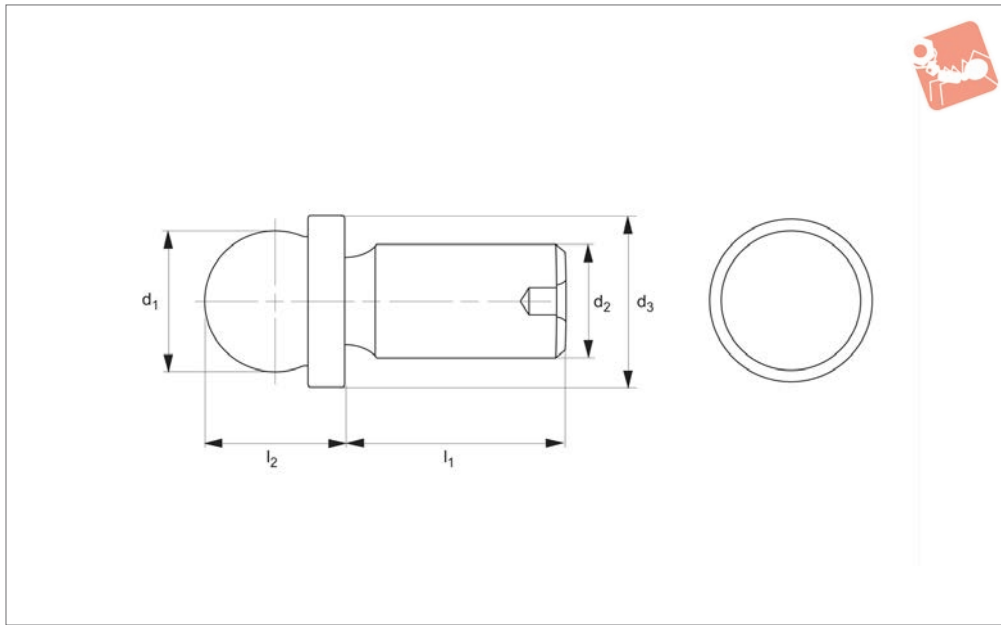
### Technical Notes

Concentricity of ball to shank: ,0002 T.I.R.

### Important Notes

Used as reference points for inspection applications in conjunction with CMMs to accurately measure the work piece.

Order No.	Type	$d_1$ inch $\pm 0.0002$ in   $\pm 0.005$ mm	$d_2$ $+0.0000$ in   $-0.0004$ in. $+0.000$ mm   $-0.010$ mm	$d_3$	$d_4$ UNC-2B	$l_1$	$l_2$ $\pm 0.0002$ in   $\pm 0.005$ mm	Weight g
20512.W0006	Inch	0,500	0,250	1/2"	6-32x3/16"	5/8"	0,313	13,6
20512.W0010	Inch	0,500	0,250	1/2"		5/8"	0,313	13,6
20512.W0012	Metric	6	3	6		16	6	4,5
20512.W0050	Metric	10	5	10		20	10	13,6
20512.W0051	Metric	12	6	12		22	12	13,6



### 20513

GAUGING & INSPECTION

#### Material

Ball: carbide.  
Shank: 440 stainless steel.

#### Important Notes

Used as reference points for inspection applications in conjunction with CMMs to accurately measure the work piece.

**All dimensions in inches.**

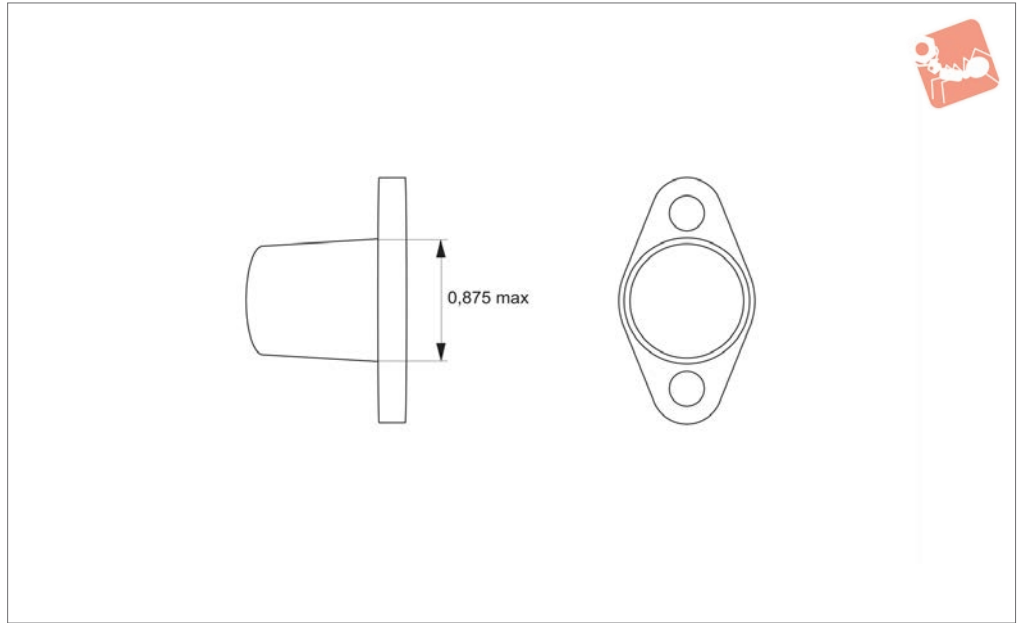
#### Technical Notes

Concentricity of ball to shank: ,0002 T.I.R.

Order No.	$d_1$ $\pm 0.0003$	$d_2$ $\pm 0.0002$	$d_3$	$l_1$	$l_2$ $\pm 0.0002$
20513.W0012I	0.125	0.126	0.19	0.28	0.156



## 20515



### Material

Durable, high impact resistant polymer.

### Technical Notes

Mounts over 0,875" diameter or smaller

tooling ball directly into jig fixture with two number 10 screws.

### Important Notes

Protects tooling and inspections balls from

damage between operations.

**All dimensions in inches.**

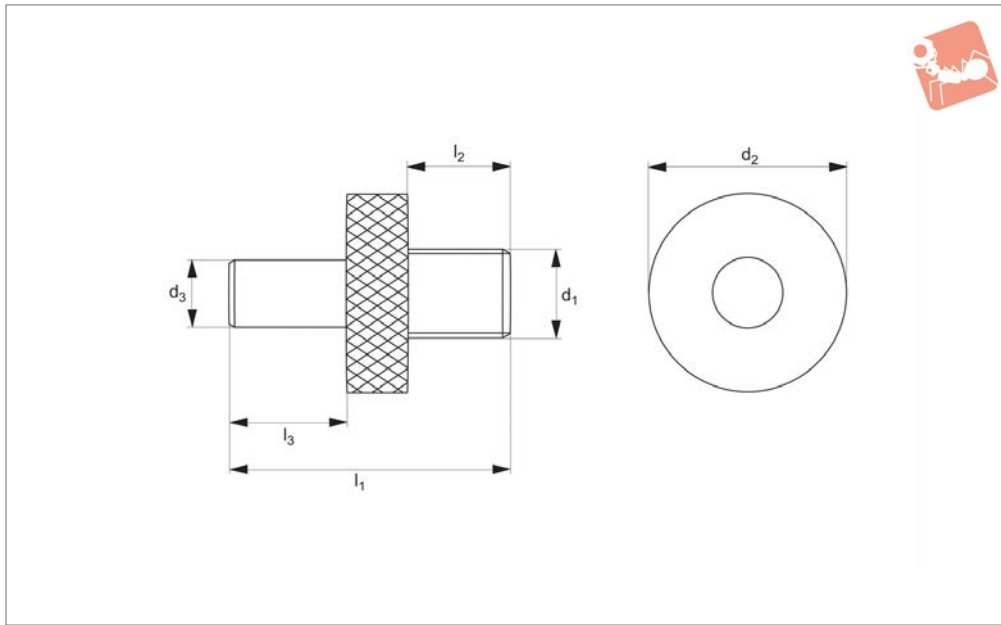
### Order No.

20515.W0088I

### Tooling ball diameter

max.  
0.875





**20530**

GAUGING & INSPECTION

**Material**

Body: 52100 steel.  
Collar: 12L14 steel, blackened.

spread - all diameters are concentric within .0002 T.I.R.  
Thread: class 3A.

holes in a workpiece.  
**All dimensions in inches.**

**Technical Notes**

Shaft size  $l_3$  is the same diameter on all gauges to simplify calculation of the hole

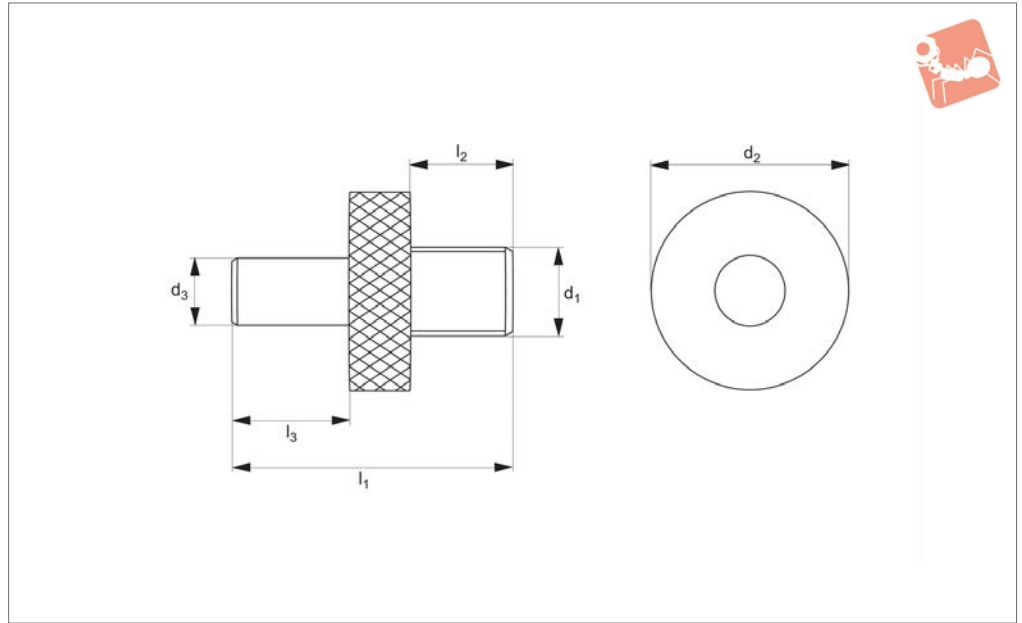
**Important Notes**

Two piece construction. Use to accurately measure the distance between two tapped

Order No.	Type	$d_1$ tol. 3A	$d_2$	$d_3$ +0.0002 -0.0000	$l_1$	$l_2$	$l_3$	Weight g
20530.W0014I	UNF	6-40	5/16"	0.25	7/8"	1/4"	0.38	4.5
20530.W0019I	UNF	10-32	5/16"	0.25	7/8"	1/4"	0.38	4.5
20530.W0025I	UNF	1/4"-28	3/8"	0.25	1"	3/8"	0.38	9.1
20530.W0031I	UNF	5/16"-24	1/2"	0.25	1"	3/8"	0.38	13.6
20530.W0037I	UNF	3/8"-24	1/2"	0.25	1"	3/8"	0.38	13.6
20530.W0043I	UNF	7/16"-20	7/8"	0.25	1"	3/8"	0.38	18.1
20530.W0050I	UNF	1/2"-20	7/8"	0.25	1"	3/8"	0.38	27.2
20530.W0063I	UNF	5/8"-18	7/8"	0.25	1"	3/8"	0.38	27.2
20530.W0108I	UNC	2-56	5/16"	0.25	7/8"	5/16"	0.38	4.5
20530.W0111I	UNC	4-40	5/16"	0.25	7/8"	5/16"	0.38	4.5
20530.W0112I	UNC	5-40	5/16"	0.25	7/8"	5/16"	0.38	4.5
20530.W0114I	UNC	6-32	5/16"	0.25	7/8"	5/16"	0.38	4.5
20530.W0116I	UNC	8-32	5/16"	0.25	7/8"	5/16"	0.38	4.5
20530.W0119I	UNC	10-24	5/16"	0.25	7/8"	5/16"	0.38	4.5
20530.W0125I	UNC	1/4"-20	3/8"	0.25	1"	3/8"	0.38	13.6
20530.W0131I	UNC	5/16"-18	1/2"	0.25	1"	3/8"	0.38	13.6
20530.W0137I	UNC	3/8"-16	1/2"	0.25	1"	3/8"	0.38	13.6
20530.W0143I	UNC	7/16"-14	7/8"	0.25	1"	3/8"	0.38	13.0
20530.W0150I	UNC	1/2"-13	7/8"	0.25	1"	3/8"	0.38	27.2
20530.W0163I	UNC	5/8"-11	7/8"	0.25	1"	3/8"	0.38	27.2
20530.W0175I	UNC	3/4"-10	1"	0.25	1-1/8"	1/2"	0.38	54.4



## 20531



### Material

Body: 52100 steel.  
Collar: 12L14 steel, blackened.

gauges to simplify calculation of the hole spread - all diameters are concentric within .0002 T.I.R. Thread class 6G

measure the distance between two tapped holes in a workpiece.

### Technical Notes

Shaft size  $l_3$  is the same diameter on all

### Important Notes

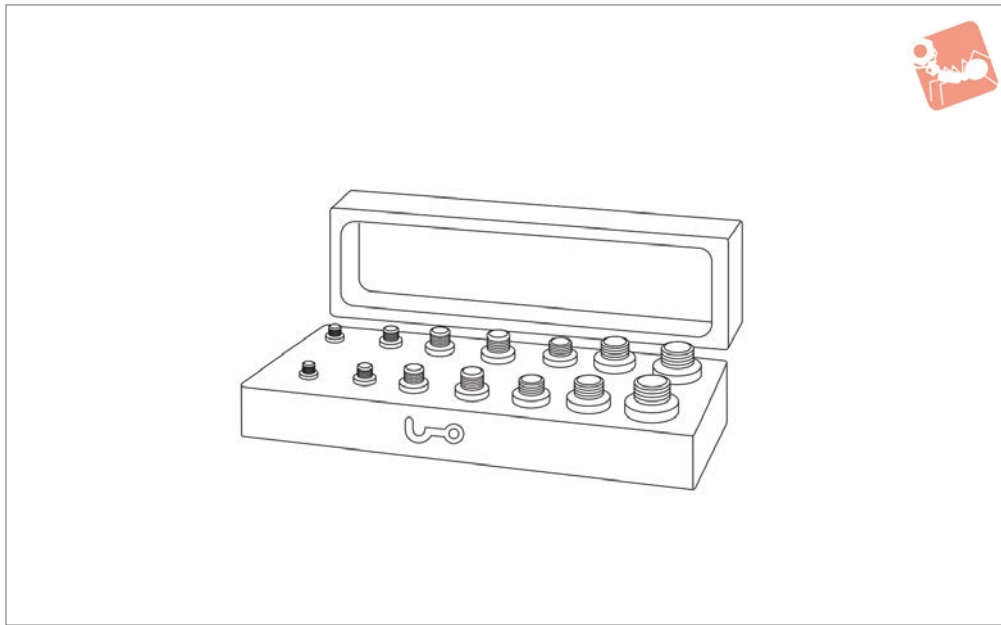
Two piece construction. Use to accurately

Order No.	$d_1$ tol. 6G	$d_2$	$d_3$ +0.0002 -0.0000	$l_1$	$l_2$	$l_3$	Weight g
20531.W0001	M 1,6x0,35	7.95	6.4	22	6.4	9.5	4.5
20531.W0002	M 2x0,40	7.95	6.4	22	6.4	9.5	4.5
20531.W0003	M 2,5x0,45	7.95	6.4	22	6.4	9.5	4.5
20531.W0004	M 3x0,50	7.95	6.4	22	6.4	9.5	4.5
20531.W0005	M 4x0,70	7.95	6.4	22	6.4	9.5	4.5
20531.W0006	M 5x0,80	9.53	6.4	22	6.4	9.5	0.2
20531.W0008	M 6x1,00	9.53	6.4	22	6.4	9.5	6.2
20531.W0010	M 8x1,25	12.70	6.4	28	12.7	9.5	12.2
20531.W0012	M10x1,50	12.70	6.4	28	12.7	9.5	20.4
20531.W0016	M12x1,75	22.23	6.4	28	12.7	9.5	24.9
20531.W0020	M16x2,00	22.23	6.4	28	12.7	9.5	34.0
20531.W2508	M20x2,50	25.40	6.4	28	12.7	9.5	45.4



# Location Gauges - Tapped Hole - Set imperial

## Gauging & Inspection



**20532**

GAUGING & INSPECTION

### Material

Body: 52100 steel.  
Collar: 12L14 steel, blackened.

### Important Notes

For individual part dimensions see 20530.

Order No.	Set contents	Type	Weight g
20532.W0001I	2 x 20530.W0019I 2 x 20530.W0025I 2 x 20530.W0031I 2 x 20530.W0037I 2 x 20530.W0043I	UNF	454
20532.W0002I	2 x 20530.W0119I 2 x 20530.W0125I 2 x 20530.W0131I 2 x 20530.W0137I 2 x 20530.W0143I	UNC	454
20532.W0003I	2 x 20530.W0108I 2 x 20530.W0111I 2 x 20530.W0112I 2 x 20530.W0114I 2 x 20530.W0014I	UNC	454