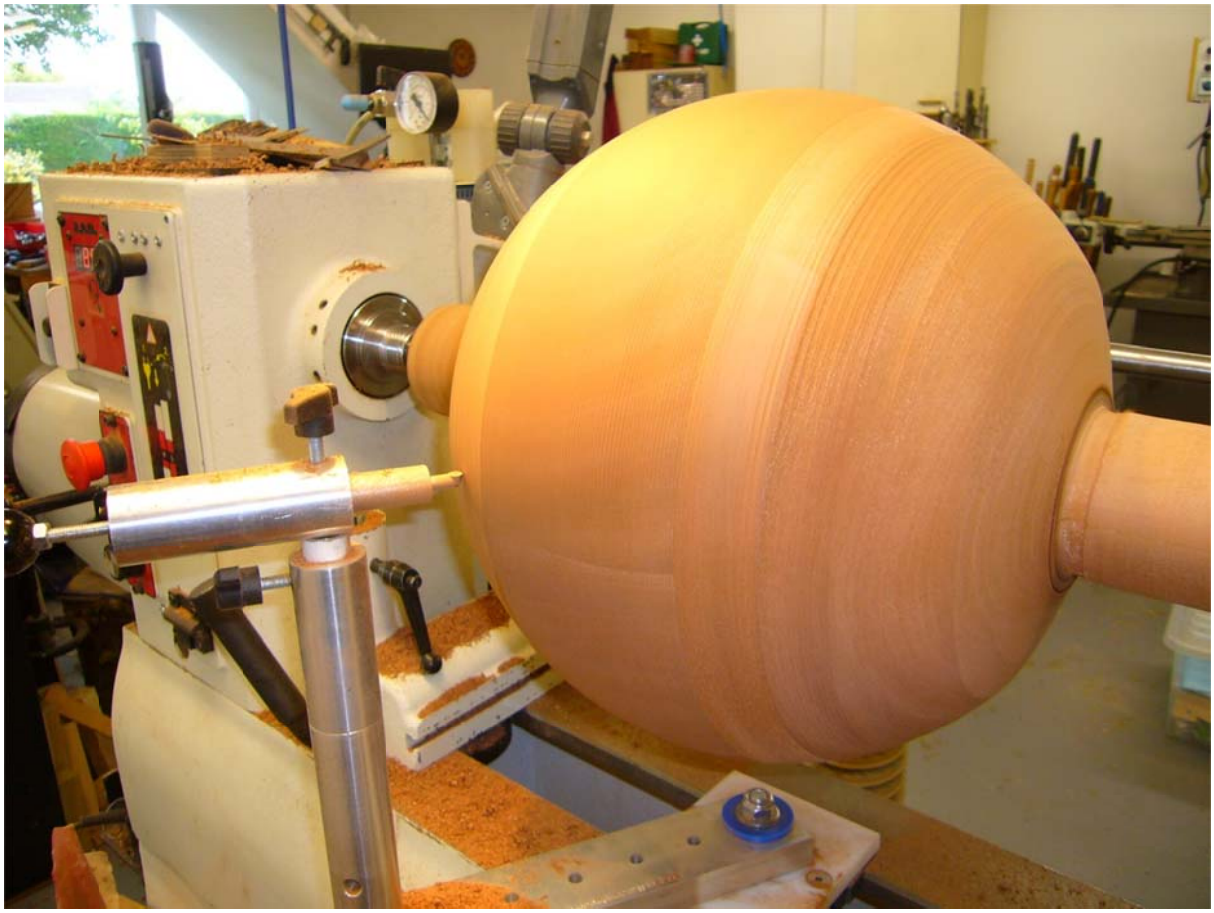
Paul Howard Sphere Turning Jig

Turn Spheres from Small to 300mm Diameter

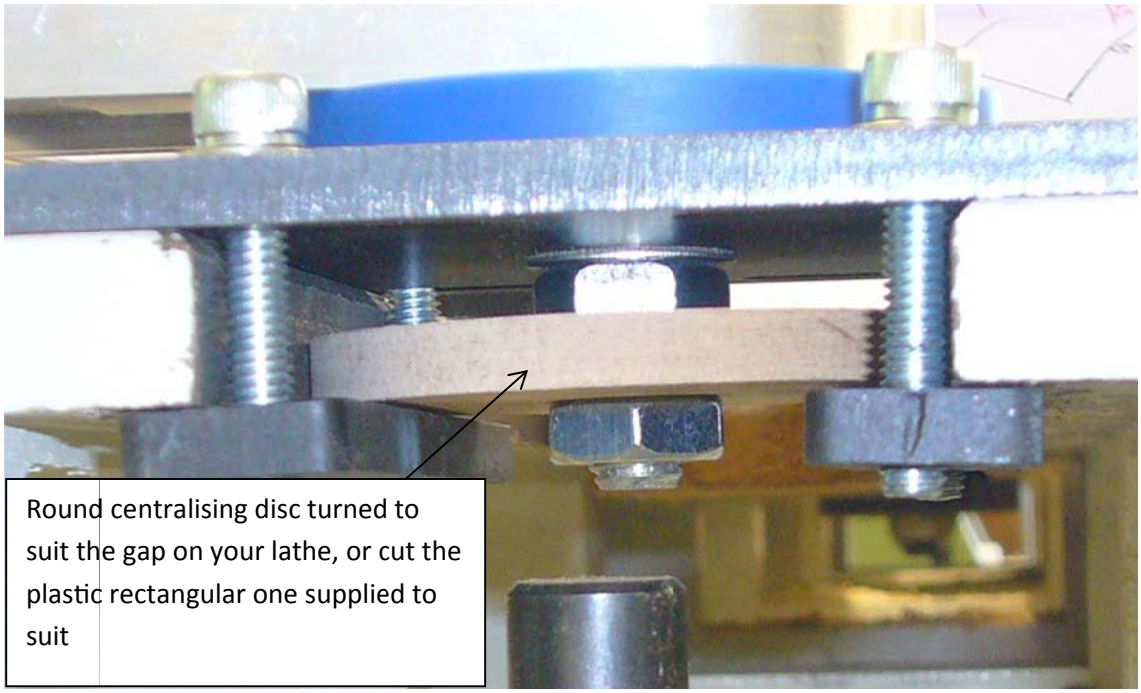
www.paulhowardwoodturner.co.uk

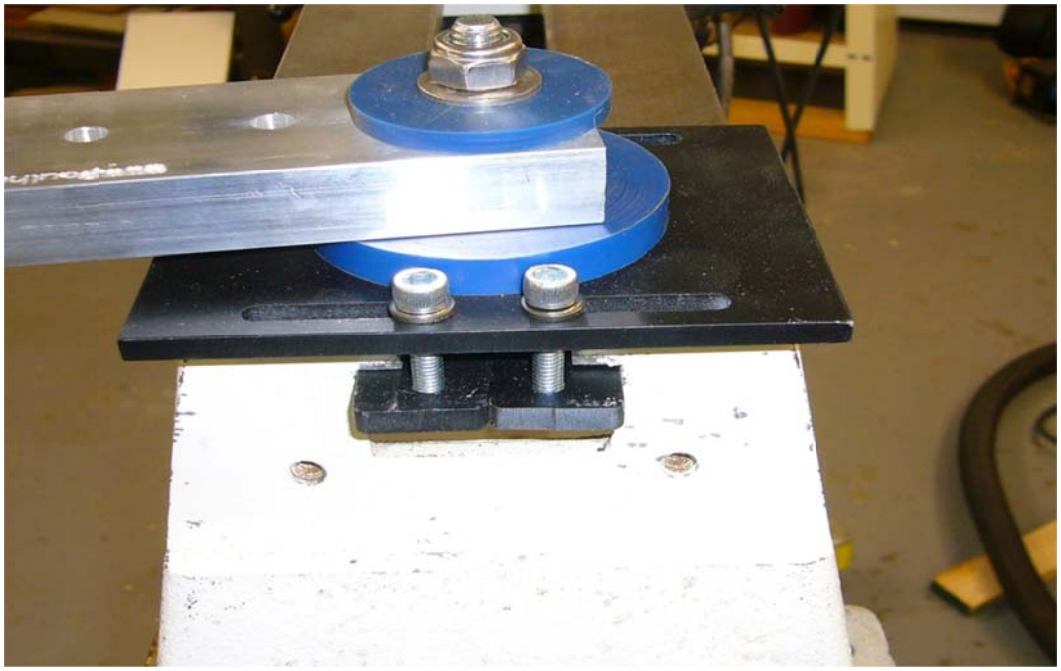


1x40mm and 1x80mm Riser Blocks include. Will fit flatbed lathes and dual round bed lathes with spindle heights from 125mm to 250mm (305mm with additional 80mm Riser)

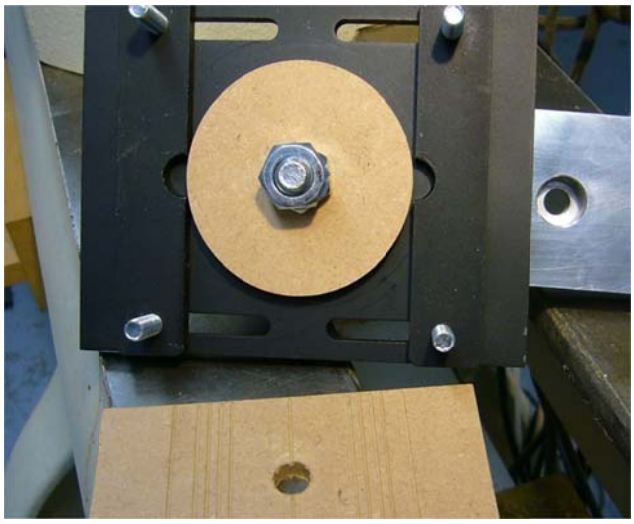
Fitting the jig to the Lathe

With larger bed gaps the clamp plates will pass through the gap and they will clamp to the underside of the bed.





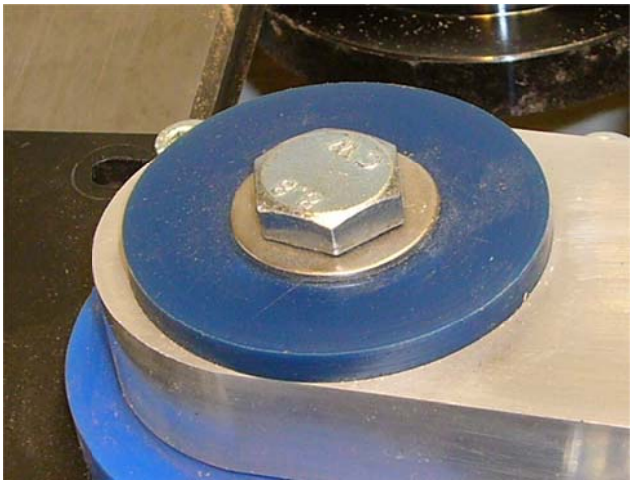
Lathes with a bed gap of 32 mm it is better to remove the tailstock and slide the Jig base plate and clamp plates in from the end of the bed.



A centralizing plate is supplied ready to be turned or cut to fit your lathes bed gap, also supplied is material to make your own to suit other bed gaps.

Two sets of screws are supplied as some lathes have beds that are up to 30mm thick.

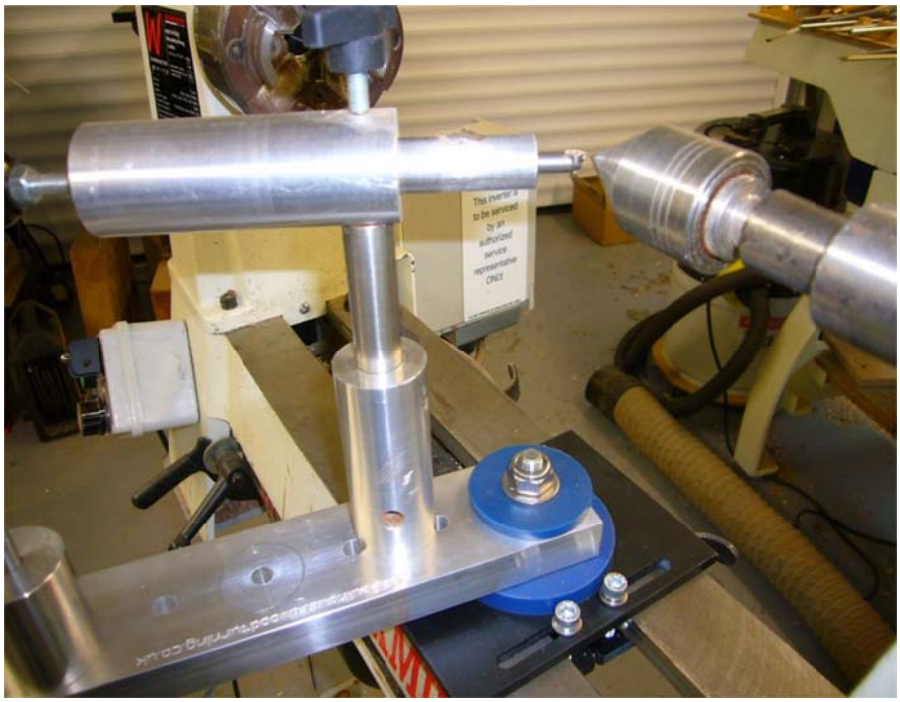
To fit the plate remove the locknut at the bottom of the jig base plate and then fit the size plate to suit your lathe bed and tighten the bolt. Check the plate is square to the base plate with a set square if a square one is used or measure each side with a rule. The disc will work as well as a square but you will need to set it square across the bed of the lathe. The early units had the head of the bolt at the bottom but it has now been changed to the top.



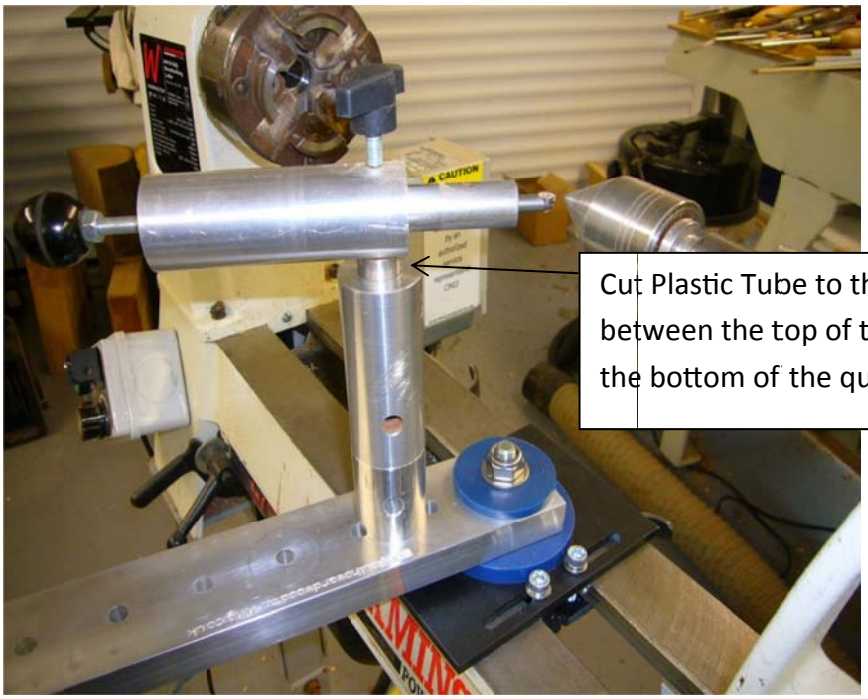
When refitting the locknut at the bottom to hold the centralizing plate in position only light pressure is needed, ensure that the base arm moves freely from side to side.

A Bellville Spring Washer is now fitted under the head of the bolt so finger tightness is all that is needed

On the later models the bolt head is on top of the jig to make it easier to fit the centralising plate or disc. The bolt can be reversed on the early models.



Set the base arm at 90 degrees to the bed and adjust the cutter height to the centre height of the lathe. The white plastic tube supplied can be cut to the length of the exposed stem on the cutter assembly and then fitted on to the stem so that the assembly can be removed and replaced without re-setting the height. The setting shown above is ok but is better with the short 40mm riser block fitted as shown in the next picture.



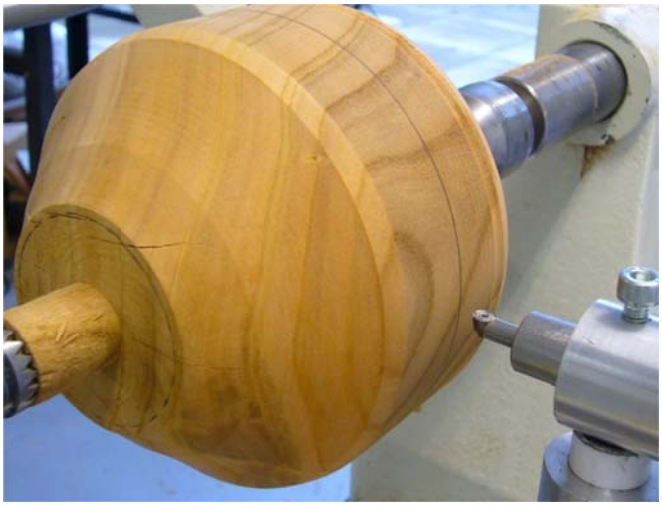
Adjust the position of the tool holder on the base arm to suit the size sphere to be turned.

Set the tool position at 90 degrees to the bed and centrally to the work.

When the correct height is set the white plastic tube can be cut to be used as a spacer between the quill assembly and the holder. This can be seen in place on the next picture

Pre prepared blank ready to be finished with the Jig

The tool is set on the centre line of the Sphere.



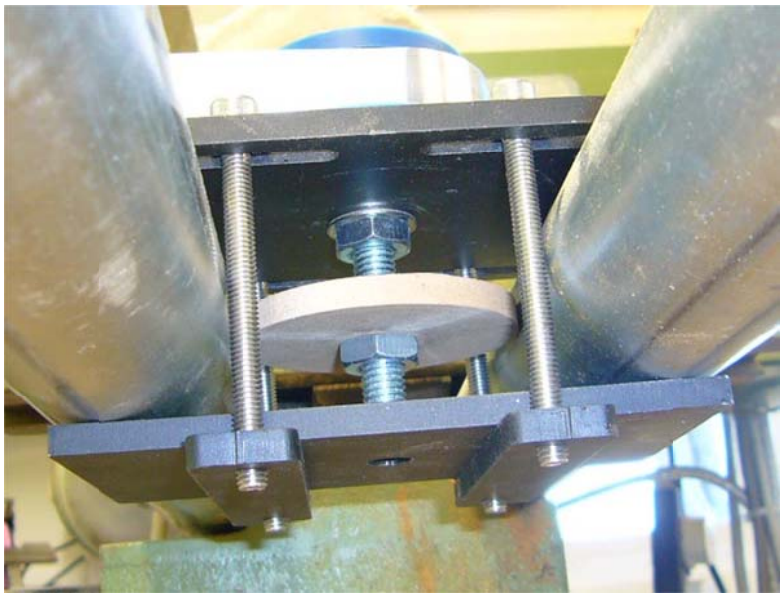
The cutter head can be moved to the position shown in the next picture to get closer to the centre The jig is designed to take light cuts so it is best to rough turn the shape of the Sphere first. Please see separate sheets. The clamping screw on the top of the Quill assembly only needs light pressure.

The screw holding the carbide tip holder must be below the surface of the quill, if other types of cutting tools are used a flat will need to be ground on the same as the existing tool holder. Small light cuts give the best results.

The tool can now be swung around the pivot point to form the sphere, moving the cutter in a small amount after each full cut.

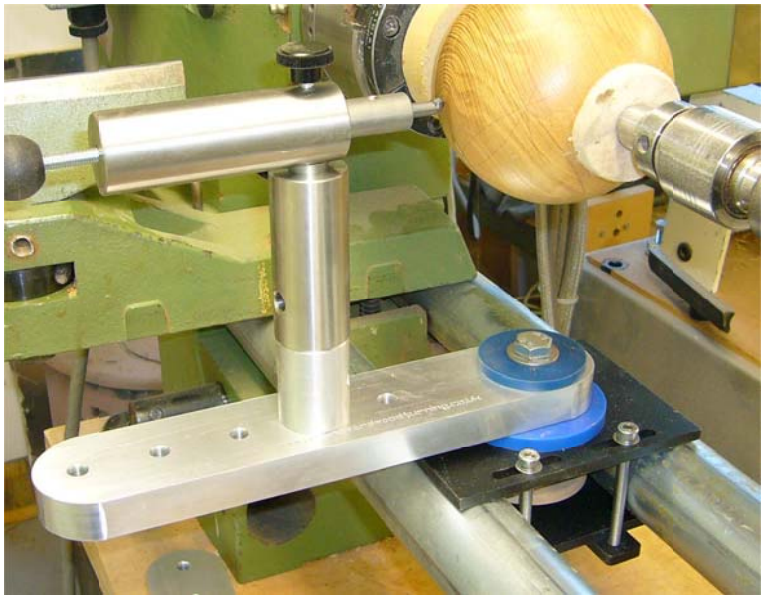
To get closer to the centre at each end the cutter assembly can be moved to the position shown below or the opposite side for the other end of the sphere.

Jig Fitted to Dual Round Bed Bar Lathe



Centralizing Plate is now fitted to the longer bolt supplied in the Round Bed Bar adaptor kit.

An extra clamp plate is also supplied to fit under the bed bars with the 4 longer screws



Screws are supplied to fit bed bars round or square up to 65mm

The diameter of the Spheres can now be repeated with the cutter depth stop.
The ball can be unlocked when the final size of the first Sphere is achieved and then screwed forwards to the back of the quill assembly. The wing nut is then used to lock the ball in place. The tool can now be retracted and the next sphere will be the same size when the ball reaches the back of the quill assembly.

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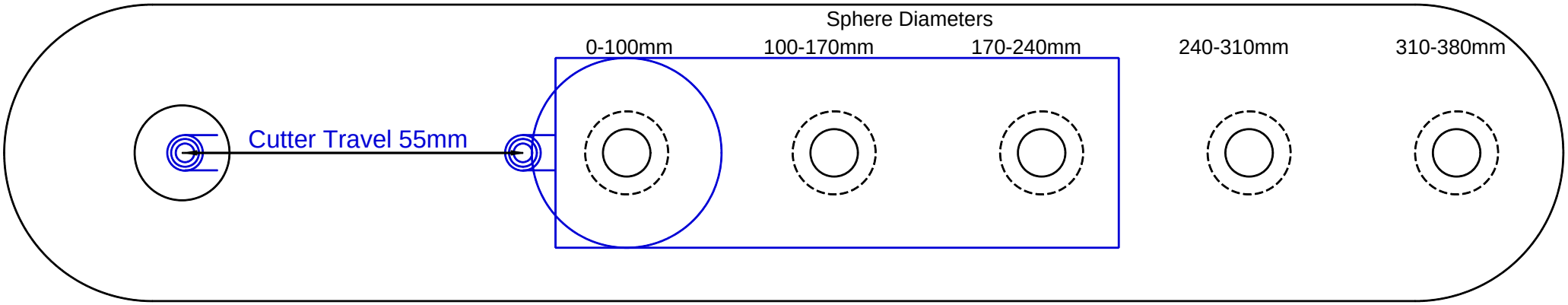
Sphere Diameters
0-100mm
100-170mm
170-240mm
240-310mm
310-380mm
Cutter Travel 55mm

Making Spheres Paul Howard

Preliminary Cuts For Turning Spheres

Dimensions of tangent cuts for turning Spheres
All dimensions in mm

Formulas	A = Diameter x 0.29275
	B = Diameter x 0.10767

This chart can be used to get a rough shape prior to using the Sphere Jig

Diameter	A	B	Diameter	A	B
10.000	2.928	1.077	105.000	30.739	11.305
15.000	4.391	1.615	110.000	32.203	11.844
20.000	5.855	2.153	115.000	33.666	12.382
25.000	7.319	2.692	120.000	35.130	12.920
30.000	8.783	3.230	125.000	36.594	13.459
35.000	10.246	3.768	130.000	38.058	13.997
40.000	11.710	4.307	135.000	39.521	14.535
45.000	13.174	4.845	140.000	40.985	15.074
50.000	14.638	5.384	145.000	42.449	15.612
55.000	16.101	5.922	150.000	43.913	16.151
60.000	17.565	6.460	155.000	45.376	16.689
65.000	19.029	6.999	160.000	46.840	17.227
70.000	20.493	7.537	165.000	48.304	17.766
75.000	21.956	8.075	170.000	49.768	18.304
80.000	23.420	8.614	175.000	51.231	18.842
85.000	24.884	9.152	180.000	52.695	19.381
90.000	26.348	9.690	185.000	54.159	19.919
95.000	27.811	10.229	190.000	55.623	20.457
100.000	29.275	10.767	195.000	57.086	20.996
			200.000	58.550	21.534

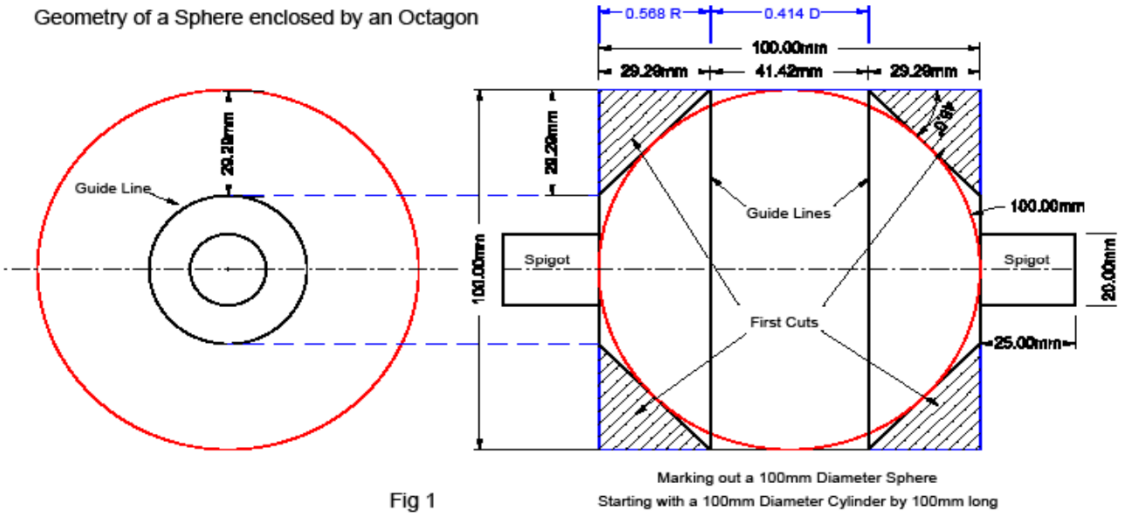

Fig 1

Marking out a 100mm Diameter Sphere
Starting with a 100mm Diameter Cylinder by 100mm long

Sphere Jig Alternative Clamps

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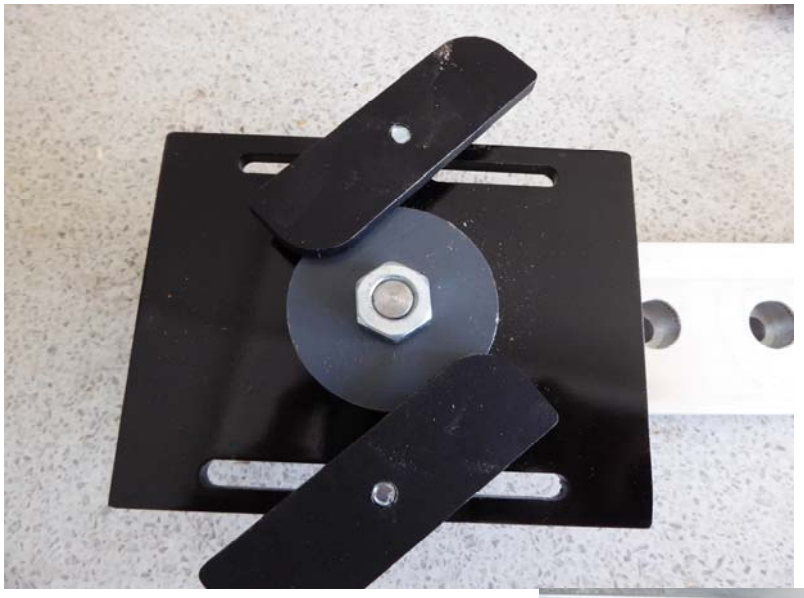

Alternative Clamp Plates

This type of clamping will fit machines with bed gaps from 42 mm to 64 mm

The original clamp plates (2 hole type) will fit the smaller Lathes

Select the best length screws to suit your lathe

<u>Do not over tighten the bolts, just sufficient to hold the plate in place.</u>

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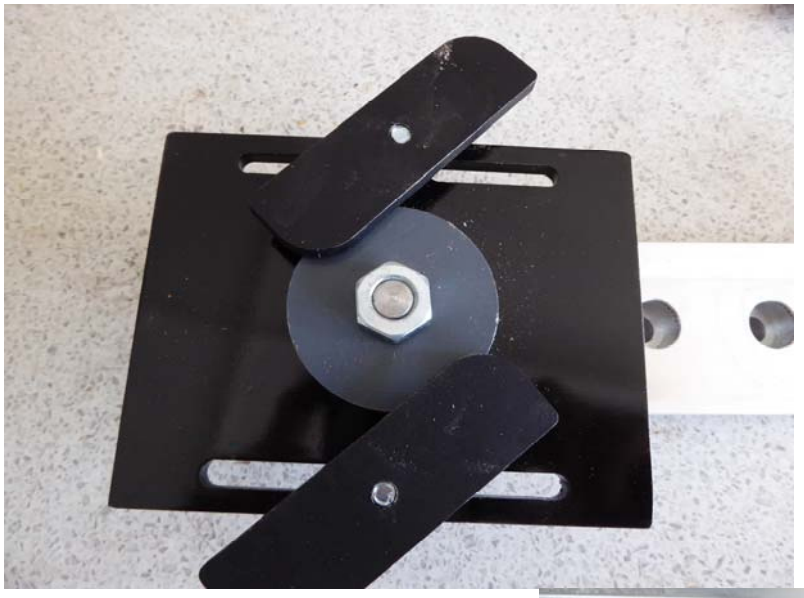

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