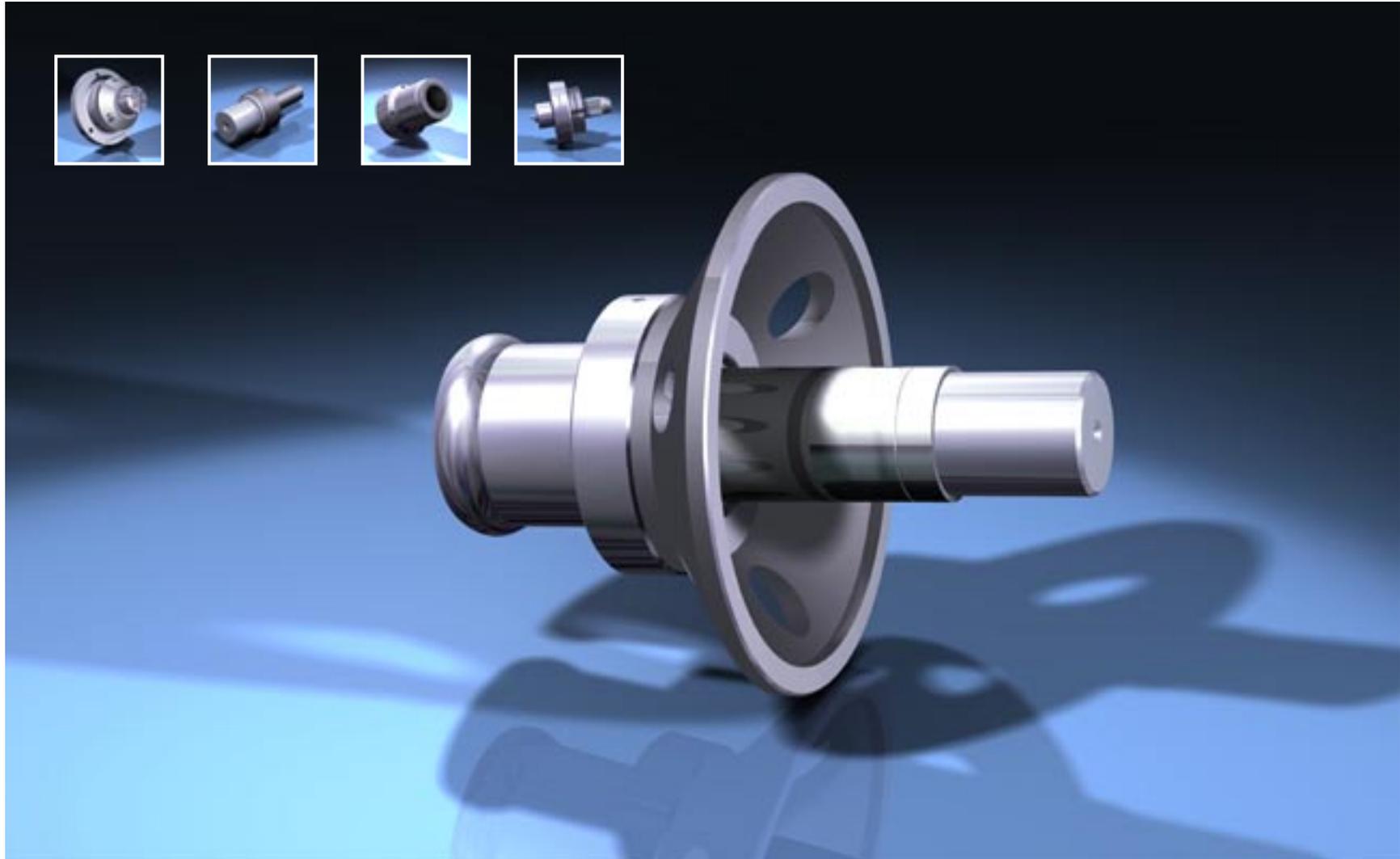
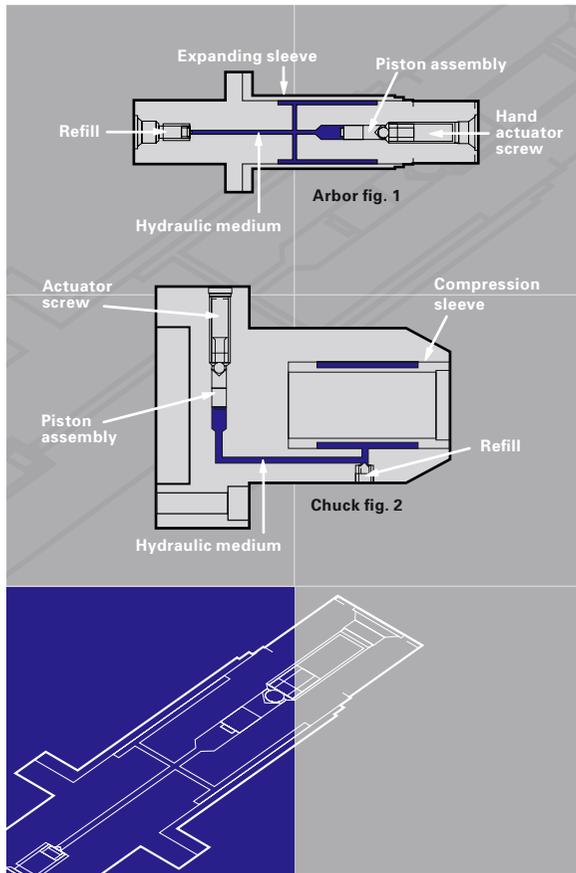


precision workholding equipment





Hydraulic workholding | Principles of operation

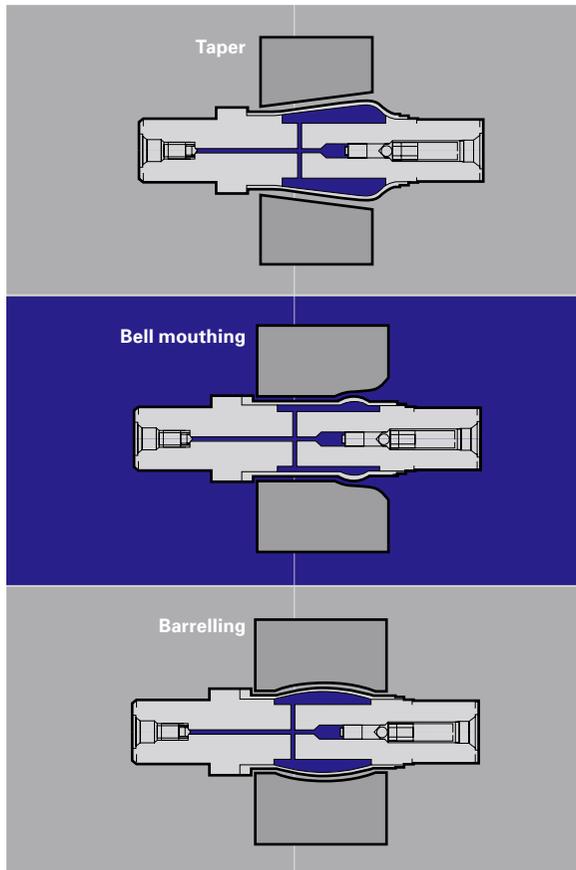
Acugrip arbors and chucks function by expanding or compressing the sleeve material within its elastic limit under hydraulic pressure. The hydraulic system is integral and may be manually or power actuated.

Figures 1 and 2 illustrate the basic principles of typical manually operated arbors and chucks. The actuator screw is rotated clockwise to advance the intensifier piston assembly to pressurise the system. The sleeves are expanded in the case of an arbor and compressed in the case of a chuck over the gripping area between the seals, they do not expand or contract beyond the seal area.

Extreme accuracy in component location is assured as the sleeves expand or contract under equalised hydraulic pressure uniformly from their geometric axis.

Accuracy – Acugrip high precision hydraulic arbors and chucks are manufactured and guaranteed to run within 0,005mm (0.0002”) T.I.R. although component variables may affect this.

If component parameters allow, it is possible to supply to a run-out tolerance of 0,0025mm (0.0001”) T.I.R.



Hydraulic workholding | Arbors and Chucks

| Precision capability

Absolute centring – The diagrams adjacent illustrate how the gripping sleeve of hydraulic arbors conform to the part bore surface. This ensures part positioning on the true axis whilst compensating for acceptable component geometry variations such as taper, bell mouthing, barrelling and out of round.

Size Availability

Arbors – minimum component size 6,00mm (.240")

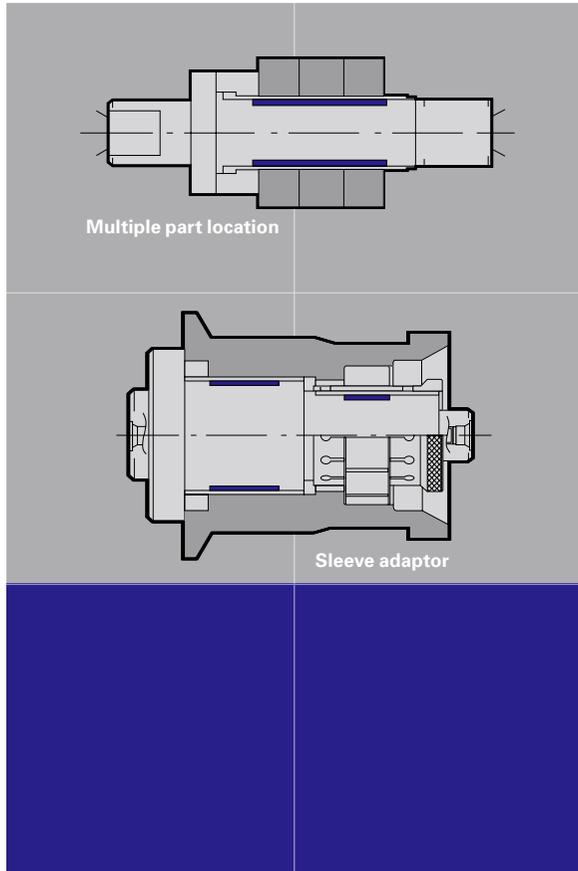
Chucks – minimum component size 1,00mm (0.40")

Maximum component size is unlimited for both types of workholder but dependent upon component type, part tolerance and operation requirements.

Gripping Force – Acugrip hydraulic work-holders are individually designed to locate the component with the correct gripping force for each application. This force ranges from hundreds to several thousand pounds per square inch and is ideally suited for most high accuracy production operations together with sensitive inspection requirements.

Expansion Limits – The amount of expansion is controlled by the tried and tested elastic limit of the sleeve material used and is shown in table. Workholding can be supplied to suit component tolerances in excess of these figures but is subject to application.

Component Diameter	Amount of Expansion
6,35mm (.25")	0,018mm (.0007")
13,00mm (.50")	0,040mm (.0015")
19,00mm (.75")	0,060mm (.0025")
25,00mm (1.0")	0,090mm (.0035")
50,00mm (2.0")	0,115mm (.0045")
75,00mm (3.0")	0,150mm (.0060")
100,00mm (4.0")	0,180mm (.0070")
125,00mm (5.0")	0,200mm (.0080")

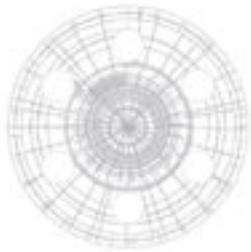
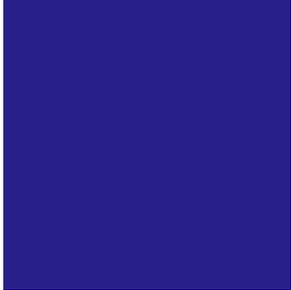
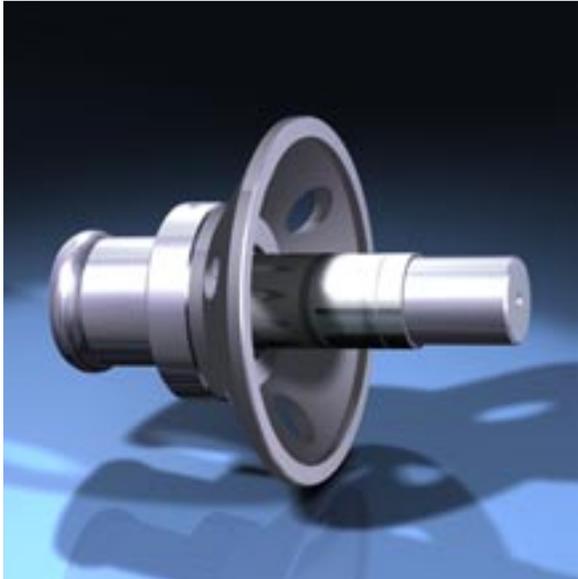


Hydraulic workholding | Arbors and Chucks | Precision application

Multiple Part Location – the chucking diameters may vary within the part print tolerances, but will be positively and accurately gripped for machining or inspection purposes.

Dual Diameter Chucking – locating parts with an interrupted bore or with two different bore sizes is often required and presents no problem to Acugrip workholders. Both diameters are expanded concentrically to position part on the common axis of both bores.

Auxiliary Sleeves – flexibility when locating similar piece parts but with different bore diameters can be achieved. These sleeves will retain the high accuracy throughout the range and may be split or slotted to differing designs to suit component types.



Hydraulic workholding | Arbors and Chucks | Gear-grinding

As the world strives for quieter more efficient gearboxes, gear grinding is becoming more and more critical in the production of precision gears.

Acugrip are able to design and manufacture hydraulic arbors to suit a range of gear grinding machine tools, giving the flexibility and extreme accuracy demanded by today's gear producers.

Precise and repeatable gear geometry, typically to 'master gear' tolerances, is produced using these extremely reliable arbors.

The operator friendly nature of the arbor allows easy loading of the part and good rigidity without the need for time consuming end clamps and nuts often associated with solid type tooling.

Shown opposite is a gear grinding arbor designed and manufactured to suit a Reischauer gear grinder with a 65mm diameter spherical location.

Acugrip also produce hydraulic arbors for gear honing, hobbing and shaving operations.



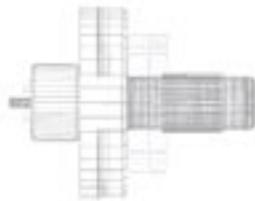
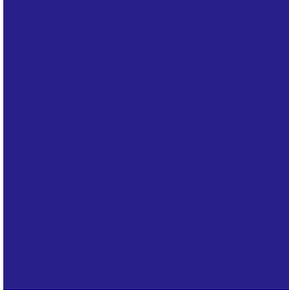
Hydraulic workholding | Arbors and Chucks | Splined serrations and gears

Acugrip hydraulically expanded arbors and chucks are the most accurate method of locating internal and external spline forms.

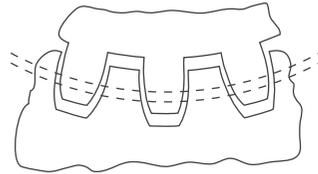
The sleeves are generally manufactured to 'GO' gauge dimensions with each tooth expanding radially from the true centre to locate on either pitch, major or minor diameters. This makes them ideally suited to machining or inspecting other features from the centre line axis of the spline.

The Splined arbor illustrated is 'power' actuated from the machine drawbar and features a 'wobble' plate backstop to ensure that a drive coupling is machined true to the spline axis.

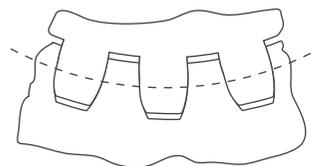
As with all Acugrip products machine spindle adaptors can be supplied.

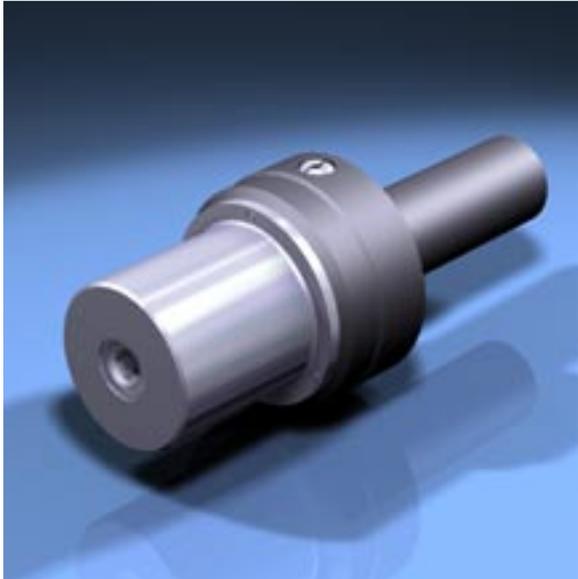


Involute tooth form retracted



Involute tooth form expanded





Hydraulic workholding | Arbors and Chucks | Lightweight

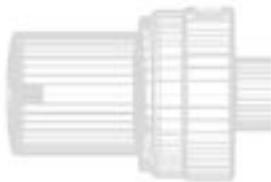
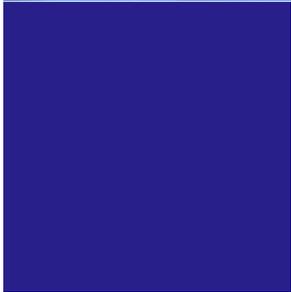
Acugrip in its pursuit to improve and increase its range of workholding products, realised that in many applications weight could become a problem.

To overcome this we have produced a lightweight alternative to our range of arbors and chucks.

Manufactured to the same exacting standards as their hardened steel counterparts these hard anodised aluminium bodied arbors are less than half the weight of their equivalent in steel.

This weight saving can be critical in applications requiring manual lifting and loading or where machine spindle capacities are likely to be exceeded.

Shown opposite is a lightweight gear inspection arbor, where operator fatigue was eliminated from the inspection method previously employed.





Hydraulic workholding | Chucks

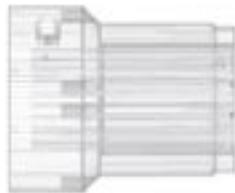
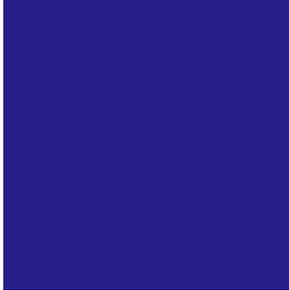
Acugrip hydraulic chucks have proved invaluable for locating parts securely and with consistent accuracy for many manufacturing operations.

These include turning, boring and grinding as well as delicate inspection procedures.

Gripping pressures can range from just a few pounds, for use on a fragile thin walled component, to several thousand pounds for more aggressive machining.

Their ability to hold component diameters with geometric errors such as 'taper' and 'out of round' make them far superior to conventional jaw type chucks.

The illustration opposite shows a hydraulic chuck with interchangeable split sleeves for accurately gripping a rotor assembly during turning.





Mechanical workholding | Arbors and Chucks

Acugrip mechanical arbors and chucks are specifically engineered to give maximum rigidity when clamping components including parts with short location lengths.

The design features include solid support centre body, flanged collet with taper location and the unique 'pull back' action of the component onto the backstop. This concept produces a high gripping force allowing heavy rates of feed and higher speeds.

The large expansion range of up to 0,50mm (.020") make it ideally suited to both automatic and manual loading.

Actuation and release of the workholder can be via the machine drawbar, integral hydraulics, 'fail safe' spring or we can design a machine tool specific system.

Interchangeable collets can be supplied to locate on internal and external diameters, splines and serrations. All are silicone rubber sealed to protect from the ingress of coolant and swarf.

General accuracy for this product is 0,010mm (.0004") T.I.R. but on certain inspection applications runout and repeatability of less than 0,005mm (0.0002") have been achieved.

Adaptor plates to suit all machine tools can be supplied.



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