

Frequently Asked Questions

What is Vacuum Chucking? Can the Nova 3000 Lathe do this?

Date Raised: 03.05.01

Safe practises should always be employed to ensure the Health and Safety of yourself, employees and customers (if applicable) Refer to product manuals, exploded drawings and our website if further assistance is required, or contact us on service@teknatool.com

Date Amended:

Question:

Can you tell me more about vacuum chucking on the Nova 3000 lathe? Like does it allow you to use a shop vac as a vacuum source or does it require a different kind of source like a venturi pump or air compressor? I have not even been able to see a picture of one - does it have a bearing it?

Answer:

Firstly, we'll provide a little insight into Vacuum Chucking and outline some do's and don'ts. Then, we'll explore what Teknatool offers for the Nova 3000 lathe and it's other lathes for vacuum chucking.

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What is Vacuum Chucking?

Vacuum Chucking is the use of the air suction to hold a work piece for turning. For more information, view the video by clicking on the image below:



The Nova 3000, Mercury, Comet and 1500 Lathes are all able to perform the vacuum chucking operations, as the Headstock spindles are hollow.

Teknatool makes 3 products for the operation of Vacuum Chucking:

- The Lathe Handwheel
- The Vacuum Coupler
- The Vacuum Faceplate

Safety warnings, cautions and general questions

The Vacuum coupler system is designed for high volume low pressure usually from a shop vac or household vacuum cleaner system. This allows for loss of vacuum from the fit between work piece and rubber sealing plate and the various seals and fittings. In is actually important for the vacuum cleaner type system to have a by pass flow of air to keep the motor cool.

It is essential to provide an air bleed (a deliberate leak) in this type of system to prolong the life of the vacuum cleaner as the motor relies on the air flow to keep cool. If you have a perfect seal, you will burn the cleaner motor out

The vacuum type pump produces a high vacuum, but has low capacity to extract air (so that the pump cant keep ahead of the in flow of air) It is difficult to maintain a good seal between work piece and vacuum chuck face. The high volume of the vacuum cleaner means that the pressure against the faceplate will be maintained under turning conditions regardless of the movement or flexing of the work piece. With a low

volume pump there is a danger of any loss of seal causing the vacuum to de-pressurise and the work piece coming loose. The margin between successful holding and loss of work piece pressure is very finite. It is not recommended to use a vacuum pump, but if one is used the pump needs to be able to deliver good volume

In general vacuum chucking needs to be treated with caution and turning should always be done at low speeds, a faceplate and other precautions are required. Only light cutting and sanding finishing should be attempted.

Vacuum chucking works successfully with larger diameter pieces as the diameter reduces the pressure differential holding force reduces, small pieces may not hold successfully.

Avoid too much pressure - higher vacuums can impose high forces and break or distort a work piece, monitor pressure with a gauge and regulate with some by pass.

What is the thread size of the inside of the Headstock Spindle?

The thread is the outboard of the Nova 3000, Nova 1500 and Nova Comet is Metric M20 x 1.5 mm pitch left hand. It is an internal (female thread in the spindle) and takes a male thread fitting for example the lathe Handwheel / hand brake.

Is it necessary to use the Teknatool Nova Vacuum Faceplate, or can I use some other product?

The vacuum faceplate we supply is for use with the Nova and Super Nova chucks. This allows for quick changing of the chucks between different modes and the chuck doesn't need to come off the spindle from roughing of the blank to fine finishing on the underside with vacuum. However any type of chuck can be used as the backing plate for the vacuum faceplate. It is normally a piece of MDF (or similar timber disk) and has foam rubber glued on the front face, also often a series of grooves are cut in the face to take cardboard and plastic tubes. Both the 80mm and 150 mm faceplates are suitable as backing plates.

Notes on Vacuum pressure and forces (This information is from Woodturning News group)

Atmospheric pressure is about 15 pounds per square inch at sea level. This force goes in all directions. When you apply a vacuum you remove most of the pressure from one side of the item. You can calculate the push force by reading the gauge (vacuum gauge) and multiply the result by 0.50. Vacuum level is commonly measured in inches of mercury (Hg). For every 2" of Hg measured you get about 1 pound of force generated. For example:

6" diameter vacuum chuck with a gauge reading of 20.

area of a circle = $\pi \times \text{Radius Squared}$.

3.14 multiplied by 3 multiplied by 3 multiplied by gauge reading of 20 multiplied by .5

$3.14 \times 3 \times 3 \times 20 \times .5 = 282.6$ pounds of force on your object.

if you apply 20" Hg to an object that is 1 foot square the calculation would be:

$20 \times .5 \times 144 = 1140$ means you generate 1140 pounds of clamping force.

Outline of products that Teknatool Supply for Vacuum Chucking

The Nova 3000, Mercury, Comet and 1500 Lathes are all able to perform the vacuum chucking operations, as the Headstock spindles are hollow.

Teknatool makes 3 products for the operation of Vacuum Chucking:

- The Lathe Handwheel
- The Vacuum Coupler
- The Vacuum Faceplate

All these items can be bought separately or all together in one handy package. If you wish to purchase all three items together, the codes are: VCU - Combined Faceplate, Handwheel and adapter for Nova 3000 and 1500 lathes.

VCUML - Combined Faceplate, Handwheel and adapter for Nova Mercury and Comet lathes.

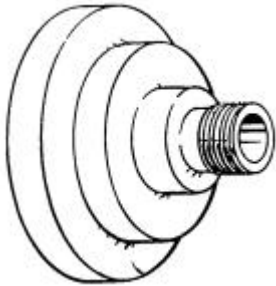
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The Lathe Handwheel Unit

Codes:

LHB for Nova 3000, 1500 lathes

CMLHB for Mercury, Comet lathes



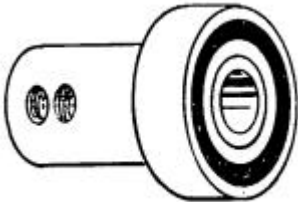
This Handwheel is threaded, and screws into the back of the Headstock spindle on the Nova Lathes.

The Handwheel can be used simply in a Handwheel function - for turning work on spindle easily prior to switching on the lathe and so on. Many users turn a smooth Wooden disk attachment that they fix to the outside diameter for the Handwheel to use as a Handbrake (See this project on our website, www.teknaatool.com)

The Handwheel also has a stepped section inside, which fits the Vacuum Coupler attachment.

The Vacuum Coupler Unit

Code: 25008



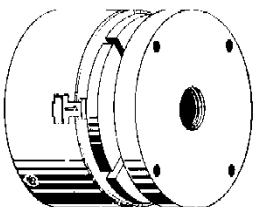
The Vacuum Coupler is a separate unit that fits into the Handwheel Accessory. This unit then works in conjunction with the vacuum faceplate for vacuum chucking work. Includes a manual for the set up and operation of the unit.



Photos showing the Handwheel and Adaptor

The Vacuum Faceplate Unit

Code: FPV



This is designed to fit into the standard Nova and SuperNova chuck 50mm jaws. This provides a faceplate facility to enable you to vacuum chuck. Includes a manual for the set up and operation of the unit.

For any further information on these products or any other Teknaatool Products, please visit our comprehensive website: www.teknaatool.com
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