These magnetic chucks are specially designed to hold pieces for machining in lathes, although they can be used in other machine tools. These chucks have transversal pole spacing with the iron strips in the top plate forming alternate North and South poles. It is adequate for machining different types of pieces depending on the model of chuck.

**STANDARD POLE:** 6-5 pole spacing (6 mm of iron and 5 mm of brass). Adequate for all types of pieces, from 2 mm thick and up. Ideal for use on grinding machines, spark erosion machines and other similar equipment.

**FINE POLE:** 6-1.5-2-1.5 pole spacing (6 mm of iron, 1.5 mm of brass, 2 mm of iron and 1.5 mm of brass). This model is adequate for the smallest of pieces (less than 2 mm thick) up to the biggest. Ideal for use on grinding machines, spark erosion machines.

**ATTENTION:**
1. The temperature of the chuck must not exceed 140°F (60°C), as it may affect performance or damage the chuck.
2. Due to the nature of magnetic holding it is advisable to take precautions before starting any job, as the piece could come loose. A safe distance must be maintained from the machine while it is in operation and one should not position oneself in the path of the piece if it were to be expelled.

**NOTE!** Due to the type of construction of the chuck it cannot be used for work where the top plate might receive knocks or blows. Also, do not drill holes in the top plate without prior consultation, as this may damage the chuck beyond repair.

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**Installation - Rectangular Chucks**

All chucks leave the factory with the base and the top plate ground to a perfectly smooth finish, ready for use. To fit the chucks into the machine follow these instructions:

1. Check that the machine table is clean and free from nick and burrs.
2. Carefully clean the base of the chuck and check that it has not been damaged during transport.
3. Place the chuck on the machine table, in the work area. Check that it is well seated and that there is nothing between the table and the base of the chuck. The chuck lever must be accessible and easy to turn (the lever has to be able to turn through 180°).
4. Fix the chuck in place with clamps (included) on the ledges at the ends of the chuck.
5. If the chuck is mounted on a grinding machine, the it should be ground before starting work. In this case follow these instructions: Magnetize the chuck by turning the lever(s) 180° (there are chucks with 2 levers). Grind the chuck surface to make it perfectly flat using abundant coolant during this process to avoid excessive heating.
6. When fitting a chuck on top of a bigger magnetic chuck that has already been ground and is perfectly flat, no additional grinding is required.
7. When not using the chuck, apply a thin coat of grease or oil to its surface to prevent oxidation.
8. Due to the welding process used in the construction of the top plate of the chuck, it is possible that small amounts of the chemical substance used will be present, producing small marks on the surface of the chuck. These marks do not affect in any way either the quality or the performance of the chuck.

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**Operating Instructions - Rectangular Chucks**

Before using the chuck read the section. Factors affecting the magnetic holding force include:

1. The contact surfaces of the chuck and the pieces must be perfectly flat and clean.
2. Place the pieces on the chuck, distributing them uniformly and avoiding the edges. When working with a single work piece, place it in the center of the chuck.
3. To magnetise, rotate the lever or levers 180° in a clockwise direction.
4. Check by hand that the pieces are firmly held in position before starting work.
5. Machine the pieces, using the end stops if needed (see section: Recommendations for use).
6. Once the chuck has been used, demagnetise by turning the key 180° counter-clockwise.
Installation - Round Chucks

All chucks leave the factory with the base and the top plate ground to a perfectly smooth finish, ready for use. The chuck is fitted to the machine with a chuck backplate, in the same way as normal chucks with jaws. To fit the chuck into the machine follow these instructions:

1. Mount the chuck onto the chuck backplate and fix in place with screws. Ensure that the chuck is properly seated and that contact surface is clean and free from nicks and burrs caused by knocks.

2. When not using the chuck, apply a thin coat of grease or oil to its surface to prevent oxidation.

3. Due to the welding process used in the construction of the top plate of the chuck, it is possible that small amounts of the chemical substance used will be present, producing small marks on the surface of the chuck. These marks do not affect in any way either the quality or the performance of the chuck.

![Table of Chuck and Fittings Sizes](image)

Operating Instructions - Round Chucks

Before using the chuck read the section. Factors affecting the magnetic holding force:

1. The contact surfaces of the chuck and the pieces must be perfectly flat and clean.

2. Place the pieces in the central part of the chuck, avoiding the edge, especially where the shaft passes; this part of the chuck has less magnetism due to the space occupied by the magnetising mechanism.

3. The chuck magnetisation is progressive, which makes centering the pieces easier. It can be magnetised so that the piece is only just held on, then centering the piece and finally totally magnetising the chuck. The magnetic face of the chuck has concentric rings marked to help with centring the piece.

4. Chucks of 250 mm / 6" diameter or more are constructed to accept a hole in the center of the top plate, to fit a stop or centering device. This hole must not be larger than 20mm dia x 15 mm deep. It is recommended that inserts be of a non-magnetic material (brass, stainless steel, etc).

5. The chuck is magnetized by turning the shaft (the 450 mm / 18" and 500 mm / 20" chucks have 2 shafts) with the lever supplied with the chuck and which should be used to turn it. To achieve 100% magnetisation the shaft should be given 1/2 turn in a clockwise direction. Demagnetising is carried out by turning counter-clockwise.

6. Check by hand that the pieces are firmly held in position before starting work.

7. Do not exceed the revolution speed limit shown as follows:

![Table of Chuck Speeds](image)

Maintenance

Chucks hardly need maintenance. It is only necessary to grind the surface of the chuck periodically to avoid loss of holding force. The maximum thickness of material that can be removed from the surface of the chuck, which is 8 mm, should be taken into account. It is recommended that the surface of the chuck not be ground more than necessary so as to prolong its working life.

Circular chuck does not need oil in its interior for lubrication. If the chuck size is 250 mm / 6" or more, there are some openings in the side with the word "OIL" through which grease can be applied if it is necessary. The grease should be general or solid.

Rectangular chuck has oil in its interior for lubrication and damping the movement of the interior mobile plate. The chuck does not consume oil; although a loss could occur due to opening up the chuck, wear of the shaft or for other reasons. In such a case add oil through the openings in the front of the chuck marked with the word "OIL". The chuck uses hydraulic type oil (SAE-10 or ISO-32). The chuck should not be overfilled. Fill level with the openings when the chuck is in a horizontal position.

Recommendations for Use - Rectangular Chucks

- This magnetic chuck has some end stops that can be used to support the pieces to be machined. For most grinding jobs, especially for large pieces, it may not be necessary; however, when grinding smaller pieces they should be used to achieve greater holding power and to work more safely.

- Machining forces in milling machines are generally much higher than in grinding machines and the slipping force might be of an intermittent nature as each tooth or plate is tapped; also the direction of the forces change all the time. Magnetic slipping resistance is weaker than the forces of traction for which reason it is important to use the end stops. Sometimes it is necessary to place blocks between the piece and the end stops to maintain the piece in the centre of the chuck.

- During machining with milling cutters (Fig. A) operations have to be carried out in such a way that the horizontal cutting forces coincide with the end stops. In this way the magnetic chuck supports the vertical forces, and only a part of the horizontal forces. In planning (Fig. B) the direction of advance of the table must be adjusted so that the cutting forces push the piece towards the end stops.
Recommendations for Use - Rectangular Chucks

Factors Affecting the Magnetic Holding Force

The holding force depends on the magnetic flux generated by the chuck, but certain factors which limit or impede the flow of the magnetic flux to the piece and reduce the holding capacity should be taken into account: 1. The contact area. 2. The thickness of the piece. 3. The contact surface conditions. 4. The material of the piece.

1. The contact area.
The holding force is directly proportional to the contact area of the piece with the chuck. Large pieces with large contact surfaces offer sufficient resistance to the machining forces; however small pieces with small contact surfaces will not withstand certain types of machining. The piece should be placed on the chuck in such a way that it covers the largest possible number of poles (each steel strip is a pole).

2. The thickness of the piece.
The magnetic flux needs a certain minimum thickness of material (iron) to be able to work. If the pieces are really thin and do not reach this minimum thickness, then they will not be able to absorb the magnetic flux generated by the chuck and the holding force will be lessened.

3. Contact surface conditions.
To achieve good magnetic holding, the contact surfaces, both of the chuck as well as the piece, must be in optimum condition. Pieces that are not completely flat or with a rough finish have a worse holding capacity than those with a ground surface. It is important to maintain the surface of the chuck in good condition, grinding it when necessary.

4. Material
The material of the piece is very important for good magnetic holding. Soft steels (low carbon content) present the best holding (100%). However, there are others with high percentages of carbon alloys or other materials, which lose their holding capacity. Also some heat treatments reduce the capacity of steels to be held by magnetic chucks. In general, the harder the steel, the worse they behave, and have a tendency to retain magnetism once they have been removed from the chuck. Sometimes it can even be difficult to remove the piece from the chuck.

<table>
<thead>
<tr>
<th>Level of surface finish</th>
<th>Holding force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground</td>
<td>90-100 %</td>
</tr>
<tr>
<td>Fine milled</td>
<td>60-80 %</td>
</tr>
<tr>
<td>Rough milled</td>
<td>40-50 %</td>
</tr>
<tr>
<td>Cast finish</td>
<td>20-30 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Holding force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-alloy steel 0.1-0.3 % C</td>
<td>100 %</td>
</tr>
<tr>
<td>Non-alloy steel 0.4-0.5 % C</td>
<td>90 %</td>
</tr>
<tr>
<td>Nondistorting alloy-steel</td>
<td>80-90 %</td>
</tr>
<tr>
<td>Grey casting</td>
<td>40-60 %</td>
</tr>
<tr>
<td>Nondistorting alloy-steel hardened to 55-60 HRc</td>
<td>30-50 %</td>
</tr>
<tr>
<td>Austenitic stainless steel, brass, aluminium, copper</td>
<td>0 %</td>
</tr>
</tbody>
</table>