CUTTING PARAMETERS FOR RP1000 / 1300 MILLING MACHINE

USE OF ABRASIVE STONES

CAST IRON HEADS

The standard machine is supplied with stones for cast iron heads, code MT0095. In this case, the rotation speed of the grinding wheel must always be 1400 rpm, with a standard flat of 355mm. The maximum deterioration is approximately of 0.025-0.040mm per run and with the table speed set on position 2-3 of the potentiometer.

ALUMINUM HEADS

For aluminum heads, the UT0003 standard tool is usually employed. The rotation speed of the plateau should measure 600-700 rpm, with a deterioration of up to 0.3-0.4mm per run and with the table feed set on position 2 of the potentiometer.

ALUMINUM HEADS WITH PRE-CHAMBERS

There are two ways to flatten this type of heads: either with abrasive grinding wheels or with the tool.
It is recommended to use MTB095 grinding wheels, which ensure excellent surface quality and a long duration. The rotation speed is 1400 rpm, whereas the table feed speed is set approximately on position 2 of the potentiometer. The depth of cut should measure 0.02-0.03mm.

Another way is to mount the ALP insert on the UT0018 insert holder. In this case it is recommended to keep a rotation speed of 550-650 RPM and a light depth of cut amounting to 0.02-0.03mm. The table feed is almost on position 2 of the potentiometer.

USE OF CBN / PCD / ALP INSERTS

The use of CBN PCD or ALP inserts has become the standard method to flatten most heads and motor-cylinder blocks.

ROTATION SPEED

UT1355 CBN inserts are mounted on the UT1330 tool holder and are employed in the machining of cast iron heads. They have a diameter of 1/2" (12.7 mm), they are double-faced, i.e. they are coated to be effectively used on both sides. Due to their circular shape, they also have many cutting faces, so as to rotate the cutting edge once it presents wears and to ensure a long life of the insert.
With a milling cutter flat of 14"(355 mm) the recommended rotation speed of the grinding wheel should be around 1000-1200 rpm.
With a milling cutter flat of 16" (405 mm), the recommended rotation speed is 700-800 rpm.

UT1356 PCD inserts are mounted on the UT1330 tool holder and are employed in the machining of aluminum heads. They have a diameter of 1/2" (12.7 mm), they are single-faced, i.e. they are coated only on a single side. This insert has a thin PCD layer applied on a carbide disc. The hardness of the diamond resists the abrasive nature of silica in aluminum heads and blocks. The RPM speed with a milling cutter measuring 14" (355 mm) can vary depending on the quality of finishing
you want to obtain. It varies approximately from 900 to 1300 rpm.
With a milling cutter flat increased by 16" (405 mm) the speed decreases to almost 800-1000 rpm.

DEPTH OF RUN

Please be aware that the CBN or PCD inserts always require a minimal "workload", in order to prevent burning in case of wearing on the surface.
This can also result in a poor surface finishing and a short life of the insert.
It is therefore recommended to adjust the depth of deterioration at least at 0.025mm (i.e. a notch of the vernier gauge). The roughing can be performed with a depth of run amounting to 0.05mm-0.25mm, even if several aspects have to be considered, such as the cylinder head's or motor-cylinder block's size. A good performance of finishing can be achieved with runs of 0.05 to 0.125mm. It is advised to carry out the first two roughing runs of the head with a side of the insert that has been previously used, with a consistent depth of deterioration. For the finishing, rotate then the plate where the cutting edge is

still unused, so as to obtain a shiny and perfectly leveled surface. The above-mentioned information may be valid for both cast iron and aluminum heads.

FEED SPEED
Feeds are marked in mm/min. COMEC machines are equipped with a variable head speed running from 0 to 1500 mm/min. The potentiometer's scale measures 0-10. For cast iron heads we recommend you select position 1½-2 (almost 200mm/min), while for aluminum heads you can bring the potentiometer to up to 3 (400mm/min). The feed speed determines the surface finishing: higher speeds correspond to higher roughness and vice versa. 2 runs are usually performed: the first run at a higher speed for the roughing and the second run at a slower speed for the finishing.

ALP INSERT

A different machining should be employed for heads with pre-chambers. In this particular use, it has been noticed that the CBN performs better, despite its much faster wears in inserts and poor quality of finishing. For this heads a special insert is employed, i.e. the UT1392, which is mounted on a UT1390 tool holder. This insert has a high clearance angle and offers good quality of finishing and a long performing duration.
In this case, the number of turns of the tool holder plate will be lower than the number of the CBN/PCD. Good results can be pursued at speeds of around 550-650 RPM.
The depth of run should be very light, i.e. 0.025 to 0.030mm. The feed should also measure no more than 1.5/2 in the potentiometer scale.

IMPORTANT INFORMATION
Please note that all above-mentioned working parameters (speed, feed, depth of run) are purely indicative, because many different features, such as the quality of materials, hardness, dimensions of the workpiece, and tool wears may influence the results.
Therefore, little adjustments may be required to obtain the best results.