

# Bonding - Types of Impregnation - Coolant

## Bonding

The vitrified bonds are based on kaolin, feldspar, quartz and boron silicates. The required honing effect can be achieved by using different mixes of these raw materials combined with precise firing techniques during the manufacturing process.

The honing stone can be exactly suited to the application due to the large variety of vitrified bonds available. The bonding has the function of retaining the grain particle in the honing stone until it is blunted by the machining process;

at this point, the bond should then discard the grain particle in order to allow new sharp particles to be presented. Honing stones are manufactured mainly in vitrified bonds. In special cases, honing stones in a resin bond are used.

## Honing stones with graphite

Honing stones containing graphite are manufactured without exception from white aluminium oxide in a vitrified bond in 400 - 1000 grit sizes. The special feature of this type of stone is the retention of graphite in the vitrified bonding mixture; this provides a high stock removal rate with a good surface finish. Main areas of application can be found in the roller bearing, shock absorber and steel industries.

## Types of impregnation

Sulphurized or wax impregnated honing stones produce a film during the honing process between the stone and the workpiece; this provides the following advantages:

- ⇒ Better surface finish
- ⇒ Less honing stone wear
- ⇒ Better swarf removal

Impregnation	Identification
Sulphur	S
Wax	W

Sulphurized honing stones should not be used on non-ferrous metals due to the possibility of discolourization of the surface.



## Coolant / Filtration

A low viscosity (thin) honing oil is mainly used. The temperature of the honing oil can also have an influence; a cold honing oil (eg. after a weekend in winter in an unheated factory) increases the viscosity. In summer and/or as a result of using a coolant tank with too little capacity, the honing oil can become too thin due to the higher temperature. Due to heat expansion of the machine and the workpiece, it can lead to problems in holding dimensional tolerance. Ideally, the honing oil temperature should be 20-25 °C.

To achieve the best possible surface finish, it is essential to maintain an adequate filtration system.

Poor filtration means unfiltered particles, which in turn leads to deep scratch marks. The industry does however provide a wide selection of filtration systems.

Cause	Effect
<b>Too cold</b>	⇒ high viscosity (thick) poor surface finish
<b>Too hot</b>	⇒ low viscosity (thin) dimensional errors due to heat expansion
<b>Insufficient filtration</b>	⇒ no stock removal poor surface finish
<b>Ideal:</b> <b>Honing oil temperature 20-25 °C</b>	