

The 10 Gypsum Rules



Preparation

For the best results it is essential that the equipment is clean and free from residue before mixing the gypsum. Any residue would have a negative effect on the setting time and expansion of the mixture. The gypsum should be mixed under vacuum, if possible, and to the exact water/powder ratio. The gypsum should be sprinkled into the water. Follow the manufacturer's instructions for mixing time and speed.



Measuring the water/powder ratio by rule of thumb will automatically lead to considerable variations and poor results.

Mixing water

Dental gypsum should be mixed with distilled water in room temperature. Tap water is not recommended because of its varying temperature and its different hardening. Tap water contains minerals, chloride, sulfates and carbonates. The crystallization can to the (Dihydrate) be affected negatively and the quality of the dental gypsum be accordingly decreased by these components. If the tap water is extremely hard, the setting time could change.



Sprinkling

The gypsum must be quickly and evenly sprinkled into the water within 10 seconds. In accordance with EN ISO 6873, timing starts whenever the gypsum and water come into contact. After the gypsum has been soaked for 20 seconds, it can be mixed with a spatula. Mixing in a vacuum mixer improves the quality of the mixture and saves time. Manual mixing requires approx. 60 seconds and mechanical mixing 30 seconds (280 rounds/min. with 5-6 bar). The vacuum should not be set too high when mixing. Impression plaster (type 1) are always mixed manually for 30 seconds. Adding water or gypsum when the consistency is too thick or too thin affects the setting process and damages the crystalline structure of the gypsum.



Pouring the impression

Only the amount required for two to three impressions should be mixed at a time. The impression should be poured immediately after mixing. Pouring the impression should be completed within the working time. The gypsum begins to crystallize at the end of the working stage. No further work can be carried out because fine details can no longer be accurately reproduced after setting begins. The strength of the gypsum is also greatly reduced. This even happens when using a vibrator, though its use always greatly reduces blows and improves compressive strength and flow. Vibration should be completed before the setting stage.



Cutting and shaping gypsum

Gypsum have an exact setting time. If hard stone has a setting time (final set) of e.g. 10 - 12 minutes, it can be worked on for approx. 5 minutes (approx. half the setting time). When the surface of the stone loses its shine, it can still be shaped for approx. 1 minute. After this the setting time begins. At this point no further work can be done, as this would affect crystallization.



Material	Alginate	Polyether	Hydrocolloids	A-Silicones
Characteristics	Moist, soft delicate fragile	Affinity to water hydrophilic (water drops disperse)	Like alginate, distinguishable by water tube on	Water-repellent hydrophobic (water drops form a ball)
Properties	Shrinkage due to loss of moisture. Cannot be stored indefinitely. Can be kept moist for max. 1 hr.	Not suitable with heavy bleeding or salivation because of hydrophilic properties. Do not store moist or together with alginate.	Pour immediately to avoid considerable volumetric changes.	No volumetric changes. Dimensionally stable. Robust. N.B. "C" silicones can only be stored for 6 hrs.
Preparation	Completely remove saliva and blood residue. Neutralise by putting into trimmer water or gypsum powder (for 3 min. only or risk of water uptake)	Remove saliva or blood residue under running water. Wait at least 3 hrs before pouring. Do not dry completely to avoid the gypsum soaking into the surface.	Completely remove blood and saliva residue.	Remove blood and saliva residue under running water. Wait at least 3 hrs before pouring.

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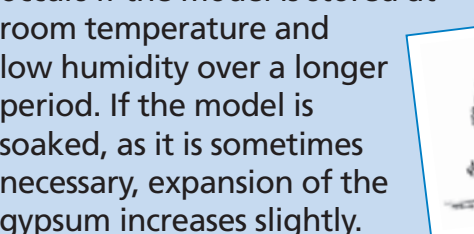
Removing the model

The set model must not be removed from the impression until 30 minutes after pouring. Following cleaning, disinfecting and neutralising, alginate and hydrocolloid impressions should be poured immediately with gypsum because they are not volumetrically stable. The impression should be removed after 30 minutes because these impression materials react aggressively with gypsum. It is advisable to leave other impression materials for up to an hour before removing them.



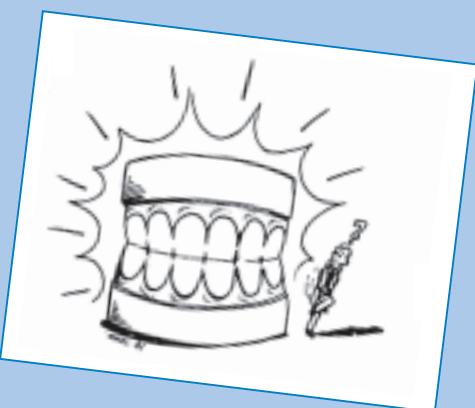
Setting expansion

All gypsum expand at the final setting. The amount of expansion depends on the composition of the gypsum and the ambient temperature or humidity. According to EN ISO 6873, comparable measurements of expansion can only be made under the same conditions. Please note that the percentage expansion of the gypsum must be measured after two hours. Compressive strength is measured in N/mm² after one hour. The standards given on page 6 are compulsory. Ensure that standards and times given are accurate when making comparisons. In practice, some expansion is necessary to compensate for the contraction of other materials. Shrinkage occurs if the model is stored at room temperature and low humidity over a longer period. If the model is soaked, as it is sometimes necessary, expansion of the gypsum increases slightly. Our gypsum are well below the expansion values allowed by the DIN standard.



Preparing the impression

Problems continually arise in the laboratory between different impression materials and gypsum. Since some impression materials react with gypsum, laboratory assistants must complete the following preparations to obtain an accurate gypsum model with a smooth surface.



Sawing and preparation

It is advisable to saw, prepare and trim dental arches within two hours of removing the impression. If models have to be sawn or prepared much later than that, they can be soaked briefly to prevent gypsum chipping off.

Tip: Placing old gypsum models in the water saturates it with calcium sulphate to prevent washing out.



Boiling out – steam-cleaning – cleaning

These standard laboratory procedures, which are often unavoidable, must be carried out very carefully. Gypsum models should never be exposed to sudden changes in temperature. We strongly recommend immersing the model in warm water at approx. 50 °C for a few minutes to avoid chipping or even completely destroying the model. Steam-cleaning the model can also lead to surface abrasion. In many cases it is better to clean the model using a soft brush and a soap solution.



Storing of dental gypsum

Storage gypsum in air sealed containers on wood pallets in cool, dry rooms. For the using in the laboratory only use reclosable containers and never let gypsum stand open. A longer storing in an open gypsum silo at high air humidity has a negative affect on the gypsum. Improper storing of gypsum leads to an absorption of humidity, which causes a clear changing of the setting time and the compressive strength.

Discover the mistake – avoid causes

1. Setting time is extended

Is usually caused by storing mistakes, the main reason for this is the absorption of humidity. Changes in the water-powder-ratio, leftovers of detergents in the mixing bowl or impressions that have been badly cleaned of blood and saliva can also be a reason for an extended setting time. Also a too short mixing, too cold or hard water and unsuitable additions for example Borax are reasons for an extended setting time.

2. Setting time is reduced – the end hardness is too low – the expansion values are increased

The powder-water-ratio is not correct, trimmer water has been added for the mixing, unsuitable additives (e.g. salt) have been used, unclean mixing bowl has been used, mixing time has been exceeded and thereby the crystalline structure of the gypsum has been damaged.

3. The attention to detail was insufficient, the model surface is porous

The storage conditions are not proper, reaction between impression and gypsum model (see also point 4), it has not been mixed under vacuum, the mixer is defect.

4. Teeth have been broken off by moving from the mould, gap between dental arche and the base

If it has been removed too early from the impression you should notice the position of the front teeth and remove in the correct direction.

Tip: By very hard impression materials take off the spoon from the impression before removing from the gypsum model. Gypsum with clearly other expansion values has been used for the base than for the dental arche.