



INDUSTRIA ZINGARDI srl
dal 1937

DENTAL GYPSUMS

Gypsum is a natural mineral which has two chemical forms:

di-hydrated calcium sulphate $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, the most common;

anhydrous calcium sulphate, also known as natural anhydrate (anhydrate II).

A particular kind of processing transforms di-hydrated calcium sulphate into semi-hydrated calcium sulphate $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$, the classic α gypsum usually employed in dentistry which assumes differing characteristics subsequent to further processing.

If the gypsum is heated inside open air kilns at about 200°C a β gypsum, also known as "Alabastrino", is produced by dehydration; the crystals will result irregular and not so compact as α gypsum.

In dentistry, gypsum is used to take impressions, make models and dies, assemble models onto articulators, for preparing flasks and masks, as a bond for some types of casting investments or for soldering etc.. According to the type of processing or "calcination", the following three types of semi-hydrated calcium sulphate can be obtained:

semi-hydrated calcium sulphate or β gypsum (Plaster of Paris) or soft gypsum

semi-hydrated calcium sulphate, or α gypsum, hard gypsum

modified semi-hydrated calcium sulphate α or extra hard gypsum.

Furthermore, dental gypsum is classified by the international norms ISO/FDIS (E) 6873:1997 and divided into five types:

type I:	gypsum for impressions
type II:	gypsum for models
type III:	hard gypsum for models
type IV:	extra hard gypsum for dies with high hardness and low expansion
type V:	extra hard gypsum with high hardness and high expansion

The main component of type I gypsum, which is used for taking impressions, is semi-hydrated calcium sulphate β with the appropriate additives.

Type II gypsum is used to construct study models, to mount models on the articulator for preparing flasks for complete prosthesis.

Type III gypsum is used for construction models which must show a good resistance to compression and abrasion. The main component is semi-hydrated calcium sulphate α with the addition of the appropriate additives. These gypsums are used for antagonist models or for movable prosthesis.

Type IV gypsum is used for constructing models which must have a particular high resistance to compression and abrasion. It is principally employed for preparing dies for fixed prosthesis. The main component is modified semi-hydrated calcium sulphate α plus the appropriate additives; this type of gypsum requires a minimum quantity of H_2O for mixing and, once set, it is the type with the highest resistance and density.

Type V gypsum is always extra hard with high hardness for dies with a higher expansion.

Some types of extra hard gypsum are made up with synthetically prepared, semi-hydrated calcium orthophosphate α .

The main technical characteristics for dental gypsums are:

WATER/POWDER RATIO

In general, water/powder ratios for dental gypsum must fall within the following values:

- gypsum for impressions:	55-70 cc. of water x 100 g. of powder
- gypsum for models:	45-55 cc. of water x 100 g. of powder
- hard gypsum for models:	28-35 cc. of water x 100 g. of powder
- extra hard gypsum for models:	20-25 cc. of water x 100 g. of powder



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SETTING TIME

This is the amount of time required for the complete setting of the gypsum, from mixing onwards. This period is divided into three phases:

working time

is the time in which the H₂O/powder mixture can be manually or mechanically manipulated.

initial setting time

is the time in which the material acquires a minimum consistency (semi-hard, not processable).

final setting time

is the time required for the material to harden completely and can therefore undergo further processing.

The initial and final setting times are usually measured according to the "Gilmore" and "Vicat" systems. At the moment Industria Zingardi srl is using "Vicat" system.

SETTING EXPANSION

While setting, all gypsum mixtures expand; this dilation is called "setting expansion" and varies according to the different types of gypsum and it has been measured after two hours.

Setting expansion can be varied with the use of additives or by modifying the H₂O/powder ratio.

GYPSUMS RESISTANCE

The resistance of gypsum can be divided into wet resistance, after 1 hour, and dry resistance.

Wet resistance refers to gypsum which has set but still contains excess water.

Dry resistance refers to completely dry gypsum.

Obviously the gypsum has a considerably higher resistance when completely set, therefore after 24/48 hrs.

All our gypsums are produced according to the norm ISO 6873/97 and they are compatible with all impression materials.

We recommend to storage the product in dry and cool place.