INVESTMENT BASICS

What is INVESTMENT?

- > A castable REFRACTORY plasterlike material
- > Used to make MOLDS for casting alloy into
- Used to make MOLDS for pressing ceramic into

Or...Powdered stuff in bags

TYPICAL GYPSUM INVESTMENT



PHOSPHATE BONDED INVESTMENT



There are TWO main types of Investment used in dental labs

- > Gypsum bonded investments
 - Low temperature (<1200°F burnout)
 - Only suitable as casting investment (no pressing)
 - Only used with Crown and Bridge (full cast) alloys e.g. JRVT, JCB
 - e.g. Beauty-cast, Novacast, Degussa California
- > Phosphate bonded investments
 - High temperature (up to 1700°F burnout)
 - Phosphate casting investments can be used with C&B and PFM alloys
 - All Pressing investments are Phosphate bonded
 - Microstar HS, HS-PC, and Partial Plus are Phosphate bonded

Gypsum bonded investments

- > Are not common these days.
- > Are much WEAKER and SOFTER than phosphate investments.
- usually provide a smoother casting than phosphate investments
- Foday, widely considered a specialty product for high precision gold castings such as Tucker technique.

Phosphate bonded invesments

- > Are the workhorse products of the modern dental lab
- > Are more versatile as casting investments
- SOME phosphate investments can be used for both PRESSING and CASTING
- SOME phosphate investments can utilize a rapid burnout or "rush" technique
- MOST phosphate investments are strong enough for a ringless technique

This is what HS rings look like:



Casting ring

Pressing ring



This is what a ring of Prestobalite looks like:





Safety is a BIG DEAL with Investment products

Investments contain CRYSTALLINE SILICA

- Can cause the lung disease SILICOSIS
- > Silicosis is VERY BAD to have
- Refer to MSDS for guidance on safe handling

How it's used Open the pre-weighed bag



Measure your liquids

Distilled water for gypsum investments
 Water plus "special" expansion liquid for phosphate investments



Put the liquid in the bowl



Add the powder



Hand mix according to directions



Vacuum mix as directed



Pour the mix into the ring



Metal casting ring, gypsum bonded investment and ring liner



Flex ring for press ceramic, HS investment

- Bench set...No picture here. Kinda like watchin' grass grow.
- > BUT...this is a CRITICAL STEP. The investment changes from a wet mix of goo to a hard, strong solid. Like Magic!
- While it's setting, it gets HOT and it
 EXPANDS. This is important, so remember it.

Burnout - two ways to do it

- Slow burnout / overnight technique / conventional technique
 - Bench set until ring has cooled down
 - Put cold ring in cold oven
 - Slowly heat to intermediate temperature and soak
 - Continue heating until final temperature and soak
- Call it "two stage" burnout because you heat and soak, heat and soak
- Rates, soak times, and 1st stage temp are dictated by investment manufacturer
- Final temp dictated by alloy manufacturer

And the other way to burnout...

- Is called RAPID burnout, High Speed burnout, or Rush technique
- After a very SPECIFIC AMOUNT of bench set, and while ring is still hot, you pop it right into a preheated oven
- No, it doesn't explode. Not usually, anyhow.

That's about it!

After burnout, you cast or press, and recover your part.

SIMPLE, right?

....Uh...not exactly.

Truth is...

Investments play a CRITICIAL role in

The efficiency of the lab
The quality of the restorations
The success or failure of new systems



- Investments are possibly the most technique critical materials used in the dental lab.
- Investments may be the most variable material used in the dental lab.
- Investments take the blame for an awful lot of problems in the dental lab...for right or wrong.

Expansion

- When investment sets, there is a volume expansion. Call this "Setting Expansion".
- When you put the ring in an oven and heat it up, it expands more. This is "Thermal Expansion".
- How much it expands will dictate the ultimate size of the final casting or pressing. Investment expansion controls the final fit of the restoration.

For phosphate bonded investments, all these factors affect expansion.

- Ratio of expansion liquid to water
- Ratio of powder to liquid
- Temperature of liquid
- Mixing time
- Mixing speed
- Mixing quality

- Bench set time
- Burnout temperature
- Age of powder
- Age of liquid
- Characteristics of powder (batch-tobatch variation)
- Characteristics of liquid (batch-to-batch variation)

But wait there's more!

Hardness of the wax

Thermal expansion of material being formed Type of ring the investment is cast into

All effect the final size of the restoration too.

Investments are all about

CONSISTANCY

- From bag to bag, bottle to bottle
- From technician to technician
- From day to day, month to month