

Classification of investment materials

CLASSIFICATION

Investments are classified :

- × According to type of binder used*
- × According to the type of silica used*
- × According to use and melting range of alloy.*

According to the types of binders used:

- 1. Gypsum Bonded Investment (G.B.)**
- 2. Phosphate Bonded Investment (P.B)**
- 3. Silica Bonded Investment (S.B.)**

According to the types of silica used:

- 1. Quartz investments**
- 2. Cristobalite investments**

According to the use and melting range alloy:

- 1. Gypsum Bonded Investment (G.B.)**

They are used for casting gold alloys.

They can withstand temp up to 700 C°.

G.P. divided into 3 types

Type I: For casting inlays\ crowns.

Mode of expansion: Thermal

Type II: For casting inlays\onlays\crowns.

Mode of expansion: Hygroscopic.

Type III: For partial dentures with gold alloys

2. Phosphate Bonded Investment (P.B)

For alloys used to produce copings or frameworks for metal-ceramic prosthesis, pressable ceramic.

Divided into 2 types

Type I: For inlay, crowns, and other fixed restorations.

Type II: For partial dentures and other casts, removable restorations.

3. Silica Bonded Investment (S.B.)

Use principally in casting of partial dentures in the base metal alloy.

Brazing investment or soldering investment.

Used for brazing parts of restorations such as clasps on partial dentures.

Divided into 2 parts

Type I: gypsum-bound dental brazing investment.

Type II: phosphate-bounded brazing investment.

(P.B.) have certain advantages than (G.B.):

1-They are more stable at high temperatures of 650° C (1200° F), and thus are the casting material of choice.

2- They expand rapidly at high temperatures;

the expansion is due to the following factors:

A. Heat from setting reaction.

B. The increasing strength of the material at high temperatures restricts the shrinkage of the alloy as it cools.

C. The powder mix with colloidal silica reduces the surface roughness of the casting and it also increases the expansion.

Types of Expansion of Investment Material

1. Normal setting expansion, this will occur with investment during the change from the fluid state to the solid state. The percentage of this type is (0.034-0,4%) it occurs when the investment becomes hard as a result of crystallization.

2. Hygroscopic setting expansion. In this case, the investment set after is put in a water bath of 35C and the amount of this type of expansion is 0.35% occurs only in (G.B.) investment.

3. Thermal expansion, occurs during the burn-out procedure, due to heating the investment in the oven and it's about 1.45%.

Expansion varies according to the:

1- Investment formula.

2- Water/ powder ratio.

3- Increase spatulation both in rate and time.

4- Aging & storage.

DENTAL CASTING ALLOY

Introduction:

Today the dental profession has access to a wide variety of casting alloys.

These alloys are designed for specific clinical purposes like:

- . Inlays
- . Onlays
- . Crowns
- . Bridges
- . Partial dentures; and
- . Porcelain fused to metal restorations.

Dental applications:



Alloy is any combination of two or more metals. An alloy system is a blend of two or more. **Example: the Gold-Copper system includes all the possible alloys of gold and copper.** The distinguished binary system, which involves only two metals. The ternary system includes three metals.

Casting Something has been cast in a mold, an object formed by the solidification of a fluid that has been poured or injected into a mold.



Nickel chromium dental casting al



Titanium-copper (Ti- Cu mixture)

General requirements of dental alloy

1. **Biocompatibility:** the alloys should not react with oral fluids and release any harmful products in oral environments.
2. **Resistance to tarnish:** *A tarnish is a thin film of a surface deposit or an interaction layer that is adherent to the metal surface.*

Tarnish is usually on silver alloys and on gold alloys with higher silver content.

3. **Resistance to corrosion:** *Corrosion is the gradual deterioration of metals caused by the action of air, moisture, or a chemical reaction (such as an acid) on their surface.*

Released metallic components may cause a metallic taste in the mouth.

4. **Nonallergic:** all the toxic materials are eliminated from the alloys.

5. **Aesthetic:** the alloys must be in optimal balance among the properties of aesthetics.

6. **Ease to fabricate:** They must be easy to melt, cast, cut, and grind.

7. **Hardness:** should be sufficient enough to resist wear by the opposing tooth restorations.

8. **Ease to solder.**

THANK YOU