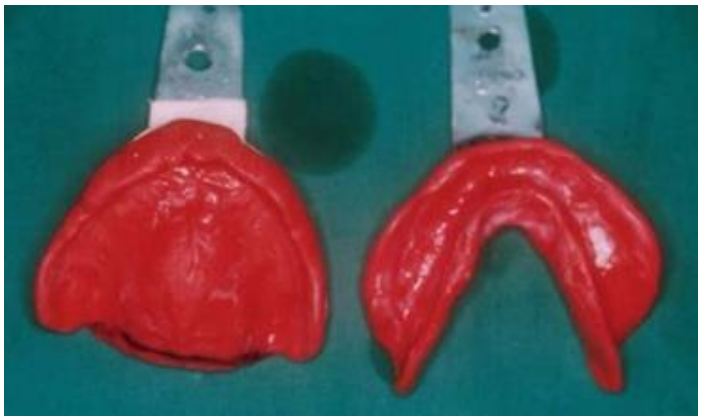
Impression materials

2.Impression compound is one of the oldest impression materials. It is classified as inelastic (rigid), hydrophobic, mucocompressive and reversible thermoplastic (it softens when heated and on cooling it hardens) impression material, which sets by physical change. It is mainly used for making impression of edentulous mouth (primary impression).



Alternative Names

- Dental compound
- Model compound
- Model plastic

Dispensing: present as cakes, sticks and cones.

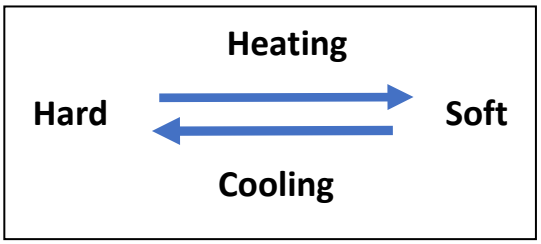






Setting Reaction

Impression compound is a thermoplastic material, i.e. they soften when heated and harden when cooled, without occurrence of a chemical reaction.



Composition: in general impression compound is a mixture of:

Component	Wt%	Functions
Natural or synthetic resin - **Copal resin** - **rosin**	40	• Provides thermoplasticity. • Gives the qualities of flow and cohesion.
Waxes (Bee's wax, carnauba wax, paraffin wax)	7	• Provides thermoplasticity. • Characterizes the softening temperature and produces smooth surface.
Stearic acid, shellac, and gutta-percha	3	Acts as a plasticizer, which improves plasticity and workability (added to overcome brittleness).
Diatomaceous earth, French chalk, or talc	50	Acts as filler. • Increases strength. • Reduces flow at mouth temperature. • Reduces COTE (minimize shrinkage due to thermal contraction) • Overcome tackiness.
Coloring agent	Trace	Gives characteristic color

Types of impression compound: it classified into ***two*** types:

1. **Type I – Low fusing material,** e.g.
   - ***Sheets or cakes impression compound:*** It is supplied in the form of sheets or cakes about 4 – 5 mm thick. It is used to take primary impression for edentulous ridges using stock tray, softened using water bath (55-60) C (found to be ideal for kneaded with fingers in order to obtain plasticity throughout the impression compound). Storage in water should not be so long to prevent leaching of important constituents such as stearic acid over heating make the compound sticky and difficult to handle.
   - ***Stick impression compound:*** Supplied in stick form and available in different colors such as green, black, gray, brown and white. The composition of stick compound is almost similar to that of impression compound with more plasticizers. Used for border molding of special trays during fitting of the special tray, It is softened by waving over a gas flame and kneaded (dry

kneading). The compound should not allow boiling, otherwise the plasticizer is volatilized.

2. Type II – High fusing material, e.g.

- ***Tray compound:*** They are usually supplied in the shape of tray, which may be black or white in color. it is stiffer and has less flow than regular impression compound and require higher temperature at which they soften (70° C). They are used to prepare custom made preliminary impression (special tray) that will later hold a second impression material, which will record final impression (secondary impression). Tray compounds lack strength and dimensional stability; hence they have been replaced to a large extent by trays made from self-cure acrylic resins.

Uses:

1. For making a primary impression for edentulous ridges.
2. Border molding of special tray.
3. Constructing impression tray.

Manipulation

Softening: Impression compound can be softened by using a *thermostatically controlled water bath or open flame.* The compound is softened by immersing in the water bath at 55°C–60°C. Since the material has low thermal conductivity it must be immersed in the water bath for sufficient time to ensure complete softening.

Kneading: The compound is removed from the water bath and kneaded with the fingers in order to obtain uniform plasticity throughout the mass.

Loading: The compound is kneaded to suitable shape and placed in an impression tray (nonperforated stock tray).

Tempering: The outer surface (tissue side) of the compound can be waved over the flame or spray cold water on metal tray just before it is inserted into the mouth.

Making impression: The compound along with tray is then inserted into the mouth. The impression is retained until it cools to mouth temperature at that might take several minutes due to its lack of conductivity.

Removal: After it has completely hardened the impression is removed from the mouth and washed, dried and trimmed.

Casting: A mix of stone/plaster and water poured into the impression and allow

it to set. The safest method for removal of the impression after complete setting and hardening of the stone/plaster is to immerse it in warm water until the compound softens sufficiently to allow it to be separated easily from the cast.

Properties:

1. It is ***muco-compressive*** and it is the most viscous impression materials used (high viscous), therefore the reproduction of surface details is not very good. However, the reproduction can be improved by reheating the surface of the impression material after tacking the first impression and then reseated it in the patient's mouth even this is not good as the other impression materials.
2. ***Rigid*** once cooled not used to record undercuts (used for primary impression only).
3. ***Poor dimensional stability***, the material has high value of coefficient of thermal expansion (COTE) and undergoes considerable shrinkage on removal from mouth. also, because pressure is applied during formation of an impression (muco-compressive) residual stress exists in cool impression the gradual relief of internal stresses may cause distortion of impression (the impression should be poured as soon as possible within 1 hour).
4. ***Low thermal conductivity*** so it needs thorough heating and a water bath is preferred to soften the impression compound. We should wait for certain time in order that all the material is softened and when we introduce it into the patient mouth, we should wait enough time till the outer and the inner portion of the compound is hard before we can remove it from patient mouth.
5. It is a ***physical reaction*** not chemical reaction so the impression compound can be reused a number of times (for the same patient) in case of error; inaccurate portions can be remade without having to remake the entire impression.

Advantages	Disadvantages
Reusable	Surface detail is not very good
No need for special tray	Poor dimensional stability
No need for separating medium before pouring the plaster	High coefficient of thermal expansion.
Cheap	Technique sensitive and Must be poured within 1 hour

3. Impression waxes

It is described as a rigid, muco-static, Hydrophobic, reversible impression material which set by physical change on applying heat, it softens when heated and on cooling it hardens (thermoplastic material).
These materials consist from a mixture of low melting paraffin and bees waxes in ratio about 3:1. Waxes have high and larger coefficient of thermal expansion. Impression waxes exhibit high flow and distort on withdrawal from undercuts. Impression waxes are rarely used to record complete impression.
Wax used for taking impressions is solid at mouth temperature but is moldable at a temperature that is tolerated by oral tissues. Wax comes in many forms (sticks, strips, tubes, etc.). Wax can be thought of as a low-molecular-weight polymer. It is a thermoplastic material. It is also very weak, and the procedure technique must compensate for wax's poor mechanical properties. Wax is often used to extend tray borders or adapt a stock tray when taking impressions.

Types of impression wax

1. Corrective Impression Wax: Corrective impression wax is used as a wax over an original impression to register the detail of soft tissues in a functional state.
2. Bite-Registration Wax: Bite-registration wax is used for accurate articulation of certain models of opposing arches. the addition silicone and polyether materials have replaced waxes for bite registration.



