Silicone Rubber	Heart walls drain tubes
Polyurethane	Artificial heart

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Compounding of plastic

1)Binders-Usually plastic classified depending on type of binder used for its manufacture.

The main purpose of the binder is to hold the other constituents of plastic together. It comprises 30% to 100% of plastic.

The binder used may be natural or synthetic resins or cellulose derivatives. In the presence of a catalyst they get converted to infusible crosslink form.

2)Fillers They reduce the cost of plastic

b) They reduce shrinkage on setting and brittleness

c)They impart better tensile strength hardness, opacity, finish, and workability

Ba salts	Impervious to x rays
Asbestos	Heat resistance

Carborundum Quartz, Mica	Hardness
Carbon black	Tensile strength
Shredded textile	Impact strength

Common fillers->

Cotton, corn, graphite, clay, paper pulp, wood flour, metallic oxides, Metal powders,

Fillers up to 50% added

3.Plasticisers: - Important function of plasticizer is to improve plasticity and flexibility. So as to reduce the tem and pressure required for molding.

Their properties are due to the neutralization of the intermolecular forces of attraction in resin molecules. Impart greater freedom of movement between polymeric macromolecules of the resin at same time it reduces the strength and chemical resistance. It is up to 60 % of the plastic.
Most commonly used plasticizers are vegetable oils, camphor, oleic stearic phthalic acids tributyl phosphates

4.Lubricants-: Like waxes, oils, stearates, oleats and soaps are employed to make the molding of plastic easier and impart flawless

glossy finish to products. Lubricants prevent the plastic material from sticking to fabricating equipment.

5.Catalyst or accelerators

Are added only to thermosetting plastic. For accelerating the polymerization of fusible resin during molding operation to cross link infusible form. Hydrogen peroxide benzoyl peroxide. Acetyl sulphuric acid, Metals like Ag, Cu, Pb metallic oxides like ZnO, Ammonia and its salts.

6.Stabilizers:-Improves thermal stability during processing. For Example, Vinyl Chloride and

vinylidene Chloride polymers undergo decomposition and discoloration at molding temperature so heat stabilizers are used. Commonly used stabilizers are

For Opaque molding: Salts of lead examples White lead, Red lead, Lead chromate, Lead silicate, litharge.

For transparent molding: Stearates of lead, cadmium and barium

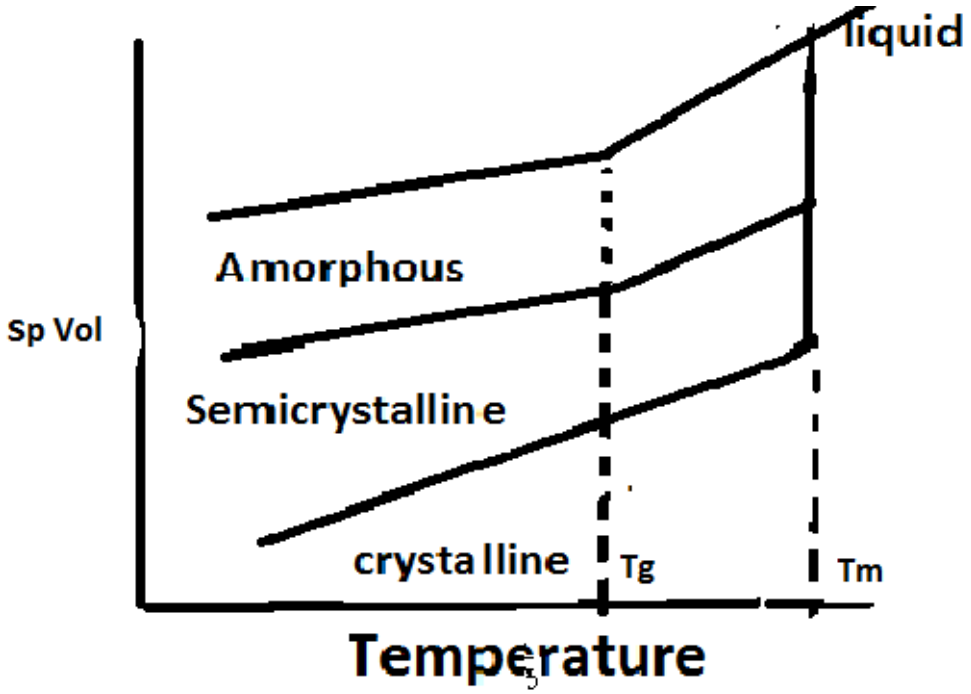
7.Dyes and Pigments: -These are meant for providing decorative colours to plastic. Colour appeal is often important in high-polymer artifacts. The main coloring materials are organic dyestuffs and opaque inorganic pigments.

The **glass transition** for short is the reversible transition in amorphous polymers (or in amorphous regions within semicrystalline polymers) when cooled below certain temperature from a hard and relatively brittle "glassy" state but above this temperature they are soft flexible and rubbery, this transition temperature of polymer is called as glass transition temperature. state,

Hard plastics like polystyrene and poly(methyl methacrylate) are used well below their glass transition temperatures, that is in their glassy state. Their T_g values are well above room temperature, both at around 100 °C (212°F).

Rubber elastomer like polyisoprene and polyisobutylene

are used above their T_g, that is, in the rubbery state, where they are soft and flexible.



Factors affecting glass transition

1. Tg depends on chain length
2. Extent of cross linking and cross linking increases Tg
3. Barriers which binding internal rotation around chain links

4. Presence of bulky group increases Tg
5. Tg depends on chain to chain flexibility.
6. Addition of plasticizers reduces Tg

Viscoelasicity

Viscoelasicity is the property of materials that exhibit both viscous and elastic properties when undergoing deformation. Viscous materials like honey resist shear flow and strain linearly with time when stress is applied. Elastic materials strain when stretched and quickly return to its original state once stress is removed.

Viscoelastic materials have elements of both of these properties and as such