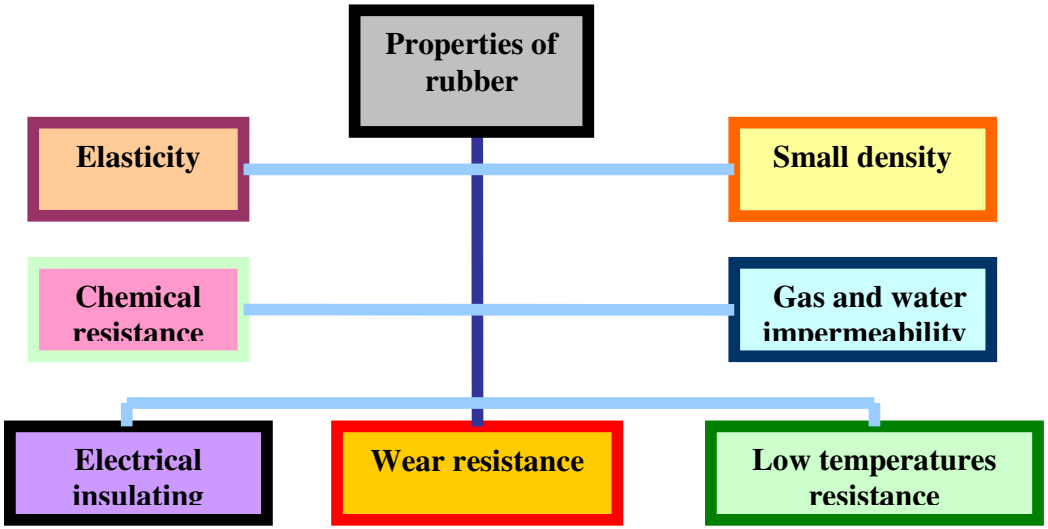
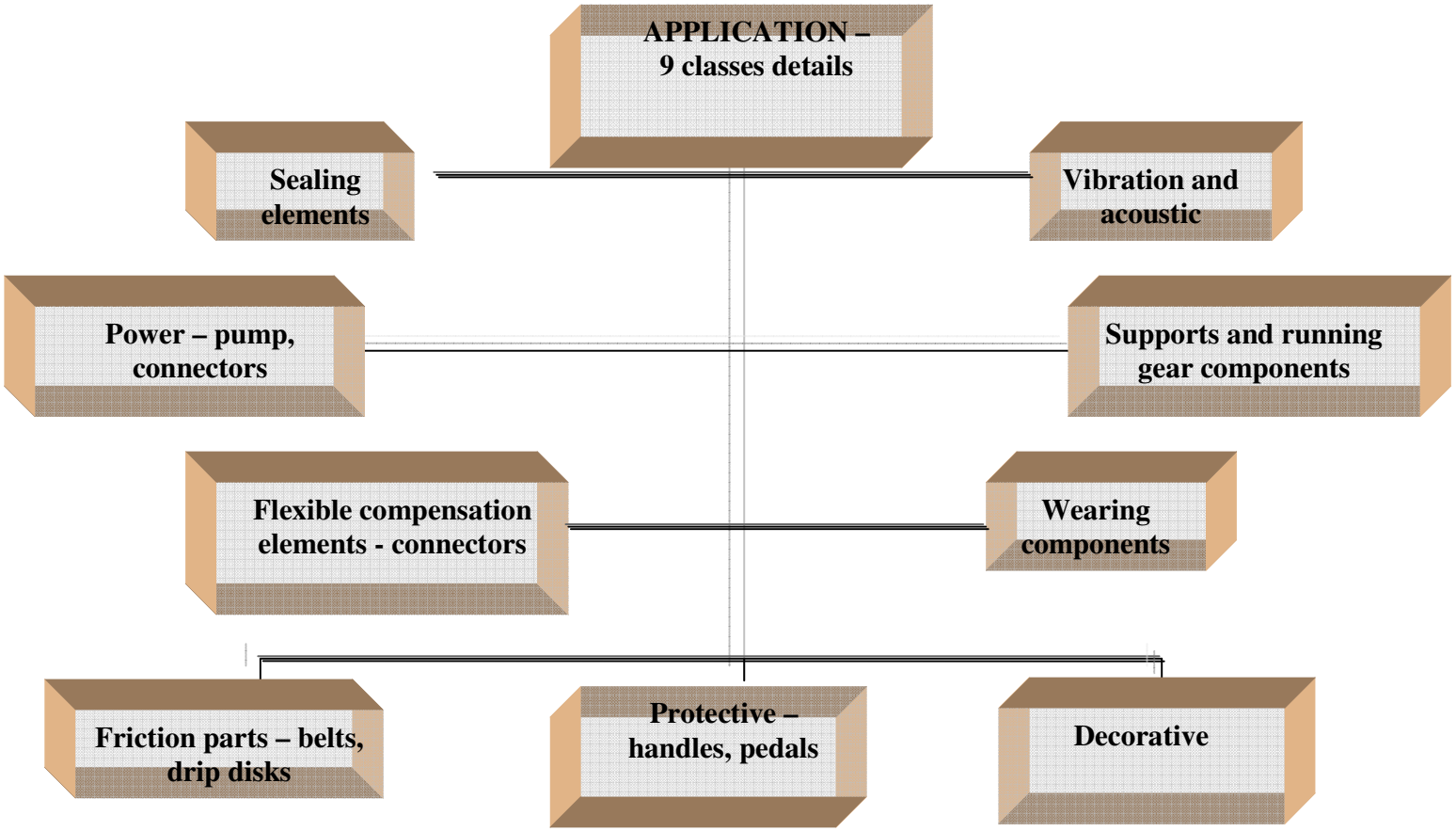
TECHNOLOGY FOR PRODUCTION OF RUBBER PRODUCTS. SOURCE MATERIALS. MORPHOLOGY. VULCANIZATION.

RUBBER – a product of vulcanization of rubber and sulfur with various additives (ingredients), which has high elastic properties in a wide range of temperatures



RUBBER PRODUCTS



OUTPUT MATERIALS

Basic material on each rubber is caoutchouc

- Natural – NR or
- Synthetic – SR

It is crucial for:

- The plasticity of the Starting rubber mixture;
- The main physical – Mechanical properties of The rubber material

OUTPUT MATERIALS

Natural – NR	**Product of the coagulation of the milky sap (latex) of the Brazilian rubber tree**
Synthetic – SR	**Product of polymerization of homogeneous or heterogeneous monomers Hydrocarbon, nitrile, sulfide, etc..types**
MAIN TYPES OF SYNTHETIC rubbers with industrial significance	
Butadiene – SRB	**By polymerization of butadiene in the presence of a catalyst - sodium**
Butadiene – styrene – SBS	**Joint product of polymerization of butadiene with stirol**
Isoprene – SRI	**Product of the catalytic polymerization of isoprene**
Chloroprene	**Product of the emulsion polymerization of chloroprene**
Butadiene - nitrile	**Joint product of polymerization of butadiene with acrylic acid nitrile**
Ethylene – propylene	**Non-crystallizable product of joint polymerization of ethylene with propylene**
Siloxane	**Silicon-organic polymer compounds**

OUTPUT MATERIALS

VULCANIZERS

VULCANIZATION – an essential process in the processing of rubber in rubber, whereby creating additional cross-links between linear macromolecules of rubber when heated under the action of special vulcanizing agents.
VULCANIZARS – directly involved in the formation of cross links between macromolecules

- Sulfur – the most widely used
- 5 % S – soft tires with high elasticity and large- mesh structure
- Increasing the amount of S leads to compaction of the structure and getting rubber with high hardness
- in 32 % S – maximum saturation – formed solid material – EBONITE

OUTPUT MATERIALS

ACCELERATORS –accelerating the reaction of interaction of rubber with sulfur .

FILLERS – powder and tissues

Key features:

1. Modification of physical-mechanical properties and confer special properties of the tires – ACTIVE FILLELRS
2. Facilitate the processing of rubber mixtures
3. Lowering the sot of products – INACTIVE FILLERS

SOLVENTS – increasing fluidity of rubber compounds both in the amount of adhesives and filling in complicated forms – gasoline, benzene, ethylene

OUTPUT MATERIALS

PLASTICIZER – 8-30% of the total – petrolatum, paraffin oils. Must be compatible with rubber, resistant to temperatures of processing and curing, non-toxic. Introduces in rubber to facilitate:

1. Mixed with other components
2. Filling the form of a rubber mixture in the molding process
3. Increasing the adhesive of the rubber to the tissues
4. Increasing the flexibility of the rubber

RESISTANCE TO WEAR – organic substances which increase the resistance of the rubber to the impact of oxygen from the air and the heat

Arising as a result of hysteresis losses in rubber deformation

COLORS – to giv a better appearance of the product and keep the light (radiations) aging as a part of the radiation absorbed.

TECHNOLOGY FOR MAKING RUBBER PRODUCTS

- PREPARATION OF THE INGREAIENTS
- BATCHING
- MIXING
- DEVELOPMENT OF A SEMI-MANIFACTURED ARTICLES
- MOLDING

TECHNOLOGY FOR MAKING RUBBER PRODUCTS

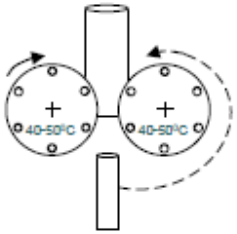
PREPARATION OF RAW MATERIALS

- Most difficult stage of technological process
- Rubber is cut into pieces and subjected to

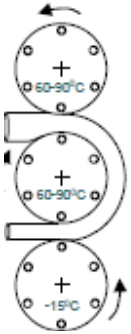
Decrystalization and plasticization

- Dry the powdery fillers

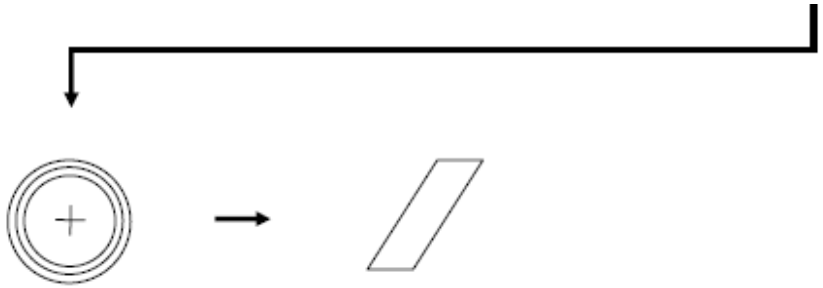
1) cutting



2) plastification and mixing
With other ingredients



3) calendaring



4) winding drums 5) shearing

- The output component parts are Dosed and bring in sequentially. Sulfur is added last

- The product mix in heated to 90 – 110 ºC, to obtain a uniform distribution of ingredients

- The resulting calendered Mixture through heated rollers to Obtaining lists of raw Rubber with a thickness

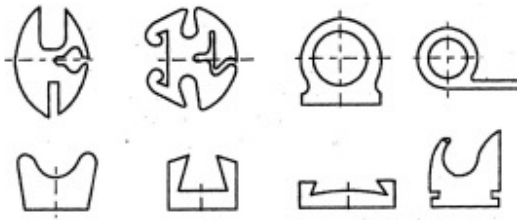
- The sheets are rolled With tissue between layers To prevent them sticking together

- The semi-finished rubber compound Can stand up to 6 months at 5 – 20 ºC.

TECHNOLOGY FOR MAKING RUBBER PRODUCTS

MORPHOLOGY

APPLICATION – making a
Unformed products – seals for windows and doors, rubber cords,
Sealing parts for household appliances.



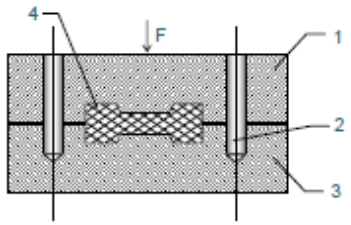
Types of rubber profiles obtained by injection

TECHNOLOGY FOR MAKING RUBBER PRODUCTS

MORPHOLOGY

PRESSING

APPLICATION - for making
Damper seal rings,
Seals, collars,
Plugs, bushings, etc..



1 – upper semi-form; 2- guide; 3 – down semi-form;
4 – rubber product

TECHNOLOGY FOR MAKING RUBBER PRODUCTS

VULCANIZATION

VULCANISING
- HOT – up to 150 ºC
- COLD – at room temperature

- Final operation of the process
- Thermal process in the retention device in structure forming a cavity temperature – 130-150 ºC
- Basic parameter – time standing
- When the curing process to create cross-links between macromolecules of rubber
- The linear molecular structure becomes a space-mesh

THANK YOU!