LATEX FOAM

Concentrated latex 60 % ( Ammonia preserved HA OR LA ) LA is better for Dunlop process

**Foam promoters and stabilizers**

*Promoters are carboxylate soaps and / or resonates*

- Castor oil soaps ( less efficient foam promoters)
- Potassium oleates etc (fast frothing and give fine textured foam)
- 0.2 – 2 phr ( is a function of expansion required)
- foaming tendency PH dependant ( 6 –9)
- ability to promote and stabilize foam is a function of hydrophobic moiety) – more length give more efficiency – less solubility

*Stabilizers are:*

1. Quaternary ammonium surface active compounds
   - n- hexadecyltrimethylammonium bromide
   - n-hexadecyl pyridinium bromide
   - n-dodecyl tri(2-hydroxyethyl)ammonium hydroxide

2. Amino compounds and amine oxides
   - Diphneylguanidine
   - Triethyltrimethylenetriamine
   - Trimethyleneetramine
   - Tetraethylenepentamine
   - N-hexadecyldimethylamine oxide

3. Organic hydroxy compounds
   - eg. Phenol and hydroxytoluenes

4. Water soluble hydro colloids
   - Glue, Casein, Cellulose derivaticw, PVA

Loading 0.1 to 0.5 of foam promoter

Action : They enhance the stability of Air/water interface
Destabilize rubber water interface relative to air /water interface so that latex gels before the foam has collapsed appreciably ( so they are also called gel sensitizers)

The adsorbed cations of foam stabilizers interact with the surface adsorbed anions
**Vulcansing system**

Sulphur 2  
ZDEC 1 phr  
ZMBT – secondary accelerator (MBT – being slightly acidic colloid destabilization, and MBTS insufficiently active at vulcanisation temperature – hence ZMBT)

ZMBT increases modulus

<table>
<thead>
<tr>
<th>ZDEC/ZMBT</th>
<th>2/0</th>
<th>1/5/.5</th>
<th>1/1</th>
<th>.5/1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus at 50%</td>
<td>16</td>
<td>35</td>
<td>32</td>
<td>34</td>
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<tr>
<td>Eb</td>
<td>345</td>
<td>277</td>
<td>273</td>
<td>233</td>
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**Fillers and softeners**

Kaolinite clays, cal.carbonate  upto 30 phr.  20 phr is more usual (upt 60 phr also encountered).  May added as dry or as dispersions.

**Softners**

Mineral oils up to 5 phr to promote interparticle coalescence during gelation. Larger amount is used to facilitate higher filler loading

**Flame retardant**

Chlorinated paraffin was, antimony trioxide, zinc borate and hydraed aluminium oxide are used

**Antioxidant**

DNPD, 2,2’ methylene bis(4-methyl – 6 – t- butyl phenol)
**PROCESS**

Latex
Oleate
Sulphur
Accelerator
Antioxidant
Filler
Oil

**MATURATION (25-30 C 1-3 days under gentle stirring)**

Foam stabilizer
ZnO
SSF

Rapid transfer to mould (with mould release agent and warmed to 40 C)
Lid closed
10 minutes (gelation)
curing in air oven / steam oven 100 C 30 – 45 mins)

**Continuous process**

- More uniform product
- Superior texture
- Uniformity of cell size and density can be easily varied
- Low density without long whipping time
- Minimised loss
- Low rejection and labour cost

**Latex for this method:**

TS not less than 61.5
DRC /TS not less than 0.98
MST not less than 540
VFA not greater than 0.2
KOH Number not greater than 1.0