VULCOFAC TAIC-70

04.2007

- **Composition:**
  
  . **Active ingredient:**
    . Triallyl isocyanurate
  . **Formula:** \( \text{C}_{12}\text{H}_{15}\text{N}_{3}\text{O}_{3} \)

  ![Chemical Structure](image)

  . **N° CAS:** 1025 – 15 – 6
  . **N° EINECS:** 213 – 834 – 7

- **Supplier:**
  
  . **Origin:** Safic-Alcan UK
  . **Availability:** regularly available

- **Function:**
  
  . **Main function:** Crosslinking agent for peroxide cure elastomers
  . **Compatibility:**
    . good compatibility with:
      - EPDM
      - FKM
      - CPE
      - Q
      - EVA
      - Vamac
      - HNBR

  . **Final uses:**
    . fire resistant cable sheathing
    . cable insulations
    . gaskets
- **Synonyms**:
  - 1,3,5 – triallyl isocyanurate
  - 1,3,5 – triallyl isocyanuric acid
  - Triallyl – s – triazine –2,4,6 – trione
  - Isocyanuric acid triallyl ester
  - 1,3,5 – tri – 2 propenyl –1,3,5 triazine – 2,4,6 - trione

- **Characteristics**:
  - Reactive polyfunctional triazine
  - Tri functional allylic monomer
    - the effectiveness of allylic crosslinking coagent is much more superior to vinyl compound (because radicals created in allylic compounds are stabilized by the allylic resonance)
  - It has a thermally stable triazine ring
  - It is used as crosslinking agent (co activator) for peroxide or radiation crosslinking elastomers
  - TAIC cured vulcanisaes show improved:
    - crosslinking density (higher modulus, higher hardness)
    - compression set (very low compression set)
    - lower compound viscosity
    - better oil, fuel and chemical resistance
    - heat resistance (because of the triazine ring)
  - TAIC has minimal effect on scorch compared to coagents like TMPTMA, ZDMA, HVA 2
  - TAIC enhances the electrical properties of elastomer
  - TAIC improved also resistance to hydrolysis and weathering
  - Liquid above 27 °C
  - At low temperatures (below 10 °C), the dry liquid tends to crystallise and depending on the storage conditions, the state of aggregation may change which leads to caking of the powder; the product will easily revert to a free-flowing powder by mechanical influence
    - To maintain the physical form of the product, it is recommended to store the dry liquid at temperature between 10 and 20 °C
. Level range : from 0.5 to 4 phr of active TAIC
    ✤ as dosage of peroxide and co activator, we recommend approximately 2:1

. In FKM, the standard level of TAIC is 3 phr
    ✤ a lower level of TAIC will result in lower modulus and hardness and higher elongation with a minimal impact on compression set
    ✤ higher levels of TAIC, up to 5 phr will increase modulus and hardness, modestly improve compression set and increase the flow

. In polyolefins, TAIC offers a superior insolubility to solvents and the tensile strength at high temperature could be improved

. In CPE, TAIC is effective modifier to heat resistance with increasing of crosslinking density (TAIC acts as an acceptor of HCI which is involved from CPE)

. In EVA, TAIC is the most effective coagent for crosslinking EVA
    ✤ the effectiveness of crosslinking coagent which acts in peroxide crosslinking of EVA is as follow:
    \[ \text{TAIC} = \text{TAC} > \text{TMPTMA} > \text{EGDMA} \]

. In EPDM, TAIC preferably contributes to promote crosslinking rate and also to improve its heat resistance, compression set and abrasion resistance

. In HNBR/HXNBR, TAIC at a level of 1.5 phr can be used

. TAIC is effective to improve of crosslink density in the vulcanisation of millable polyurethane

. It is less reactive than other vinyl type monomers

. Other functions:
    ✤ crosslinking agent for plastic
    ✤ intermediate for flame retardant

. Raw materials:
    ✤ cyanuric chloride

- **Typical formulations:**

\[
\begin{array}{ccc}
1 / & - \text{FKM (Viton GFLT)} & 100 \text{ phr} \\
& - \text{ZnO} & 3 \\
& - \text{MT Black N 990} & 30 \\
& - \text{TAIC} & 3 \\
& - \text{Luperox 101 XL} & 3
\end{array}
\]
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<tr>
<th></th>
<th>Component</th>
<th>Amount (phr)</th>
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<tr>
<td>2</td>
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<tr>
<td></td>
<td>Barium sulfate</td>
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<tr>
<td></td>
<td>Titanium dioxide</td>
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</tr>
<tr>
<td></td>
<td>Calcium silicate</td>
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<tr>
<td></td>
<td>TAIC</td>
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<tr>
<td></td>
<td>Paraffin wax</td>
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<tr>
<td></td>
<td>Chlorinated paraffin</td>
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<tr>
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<td>2,5-dimethyl hexane peroxide</td>
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<tr>
<td>3</td>
<td>EVA</td>
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<tr>
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<td>ZnO</td>
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<tr>
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<td></td>
<td>TOTM</td>
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<tr>
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<td>Perkdox 17/40</td>
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</table>
- **Technical Specifications**:
  - **Appearance**: White / Off white powder
  - **Ash residue**: 27 - 33 %
  - **Molecular mass (active ingredient)**: 249.27 g / mol
  - **Density 15 °C (active ingredient)**: 1.17
  - **Active substance (active ingredient)**: 98 - 100 %
  - **Viscosity 25 °C (active ingredient)**: 230 mPas
  - **Bromine value (active ingredient)**: 183 - 188
  - **Melting point (active ingredient)**: 23 - 25 °C
  - **Boiling point (active ingredient)**: 149-152 °C
  - **Purity (active ingredient)**: 90 min %
  - **Acid value (active ingredient)**: < 1
  - **Solubility**:
  - **Packaging**: 20 kg cardboard box
  - **Shelf life**: 3 months

- **Dangers**:
  - **Handling risk**: R 22 Harmful if swallowed
  - **Transport Risk**: no danger