## ETHYL SILICATE

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Capacity</td>
<td></td>
</tr>
<tr>
<td>Plant and machinery cost</td>
<td>0.00 Lakh</td>
</tr>
<tr>
<td>Working Capital</td>
<td>0.00 Lakh</td>
</tr>
<tr>
<td>Rate of return (ROR)</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Break Even Point (BEP)</td>
<td>0.00 %</td>
</tr>
<tr>
<td>TCI</td>
<td>0.00 Lakh</td>
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<tr>
<td>Cost of Project</td>
<td>0.00 Lakh</td>
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PRODUCT PROFILE Ethyl silicate is a colorless flammable liquid ester (C2H5)4SiO4 that hydrolyzes to silica and ethyl alcohol and is used esp. in paints and coatings (as for weatherproofing stone and cement) and as a bonding agent (as for molds for casting metals) called also tetraethoxysilane, tetraethyl orthosilicate. Ethyl silicate, the common name for tetra ethyl orthosilicate (TEOS), has found worldwide acceptance in applications when a liquid precursor of silica (SiO2) is needed. When properly hydrolyzed, ethyl silicate produces very fine particles of silica which can act as a binder to adhere refractories into ceramic shapes or provide corrosion-resistant coatings in combination with zinc dust. When vaporized and thermally decomposed upon the surfaces of semiconductor chips ethyl silicate forms electrically insulating layers of silica glass which are necessary in the fabrication of integrated circuits. The chemical applications for ethyl silicate, including cross linking of silicones, is numerous and new applications for this versatile chemical are constantly being developed.  

Product characteristics  
- **Appearance** - Colorless transparent liquid  
- **Color (APHA)** - 30 MAX  
- **Chemical formula** - Si (OC2 H5) 4  
- **Silica Content by wt. as SiO2** - 28  
- **Acidity (as HCl)** - <0.01  
- **Low Boiling** - <2%  
- **Iron** - 0-5 ppm  
- **Viscosity (20°C)** - 1-3 cps  
- **Appearance** - Achromatic transparent liquid  
- **Monomer content** - 96% min  
- **Specific Gravity at 20°C (68°F)** - 0.930-0.940  

The product is stable and incompatible with strong oxidizing agents, water, alkalies, mineral acids. When vaporized and thermally decomposed upon the surfaces of semiconductor chips, ethyl silicate forms electrically insulating layers of silica glass, which are necessary in the fabrication of integrated circuits.  

Applications of ethyl silicate:  
- As cross linking agent in silicone polymers  
- A precursor to silicon dioxide in the semiconductor industry  
- It is used in the production of aero gel  
- Used in a sector such as paints and coatings  
- Use in investment casting  
- Chemical function-resistant paint  
- Organic silicon solvent precise casting veneer preparation  
- Gum constituent in organic silicon veneer preparation and seal glue  

Zinc-rich inorganic coatings based on ethyl silicate give corrosion protection, chemical resistance, and heat resistance, abrasion resistance, welding and cutting properties. Ethyl silicate (alcohol-based and chemically set), is used as binder in investment casting to hold the refractory material in place.  

GLOBAL SCENARIO: Ethyl silicate is manufactured mostly by integrated process with metallurgical silicon as starting material. The silicon tetrachloride method is inherently prone to trace metal contamination and process variability. Indian production of ethyl silicate is around 1200 tonnes per annum. Total demand for ethyl silicate including paint and investment casting is 1500 tonnes per annum. Imports for the year 2009-2010 of ethyl silicate is 160 tonnes per annum and exports for the year 2009 to 2010 is of negligible quantity.