High Purity Grade
Hydrogen Peroxide
Introduction

As the semiconductor industry continues to narrow the line widths in the wafer manufacturing process, it also demands ever higher purity of its wet processing chemicals. Solvay has for many years used leading edge technology to produce high purity grades of hydrogen peroxide for the electronics industry worldwide. This brochure provides information on Solvay’s global capabilities for the manufacture and distribution of high purity grades of hydrogen peroxide as well as the related services available from the world’s largest producer of hydrogen peroxide.
History
Solvay has produced high purity grades of hydrogen peroxide since the 1960’s. As the purity requirements of the industry increased, Solvay, working in collaboration with the semiconductor manufacturers, further developed the purification, analysis, and packaging technologies required to meet these demands.

Solvay currently manufactures and distributes four main high purity grades, including a stabilized product and three stabilizer-free grades as well as customized grades as required. This technology is now showcased in Solvay’s main production sites in Deer Park, Texas, Bernburg, Germany and Map-ta-Phut, Thailand.

Uses of Hydrogen Peroxide in the Semiconductor Industry
Most semiconductor manufacturing processes require a very high level of cleanliness throughout the various process steps in order to achieve acceptable yield levels. High purity grades of hydrogen peroxide are used in, amongst others, RCA Clean (SC1, SC2), SPM (Piranha bath) and CMP slurries.

Recent published studies have confirmed that minimizing contamination during cleaning operations by using the highest purity chemicals, helps chip producers to reach the highest possible yields.

A Global Presence
Solvay operates dedicated business units in North America, Europe and Asia to better serve the needs of the semiconductor industry.

The North American business unit is based in Houston, Texas with nearby manufacturing facilities in Deer Park.

The European business unit is based in Brussels, Belgium with production facilities in Bernburg, Germany.

The Asian region business unit is based in Bangkok, Thailand with nearby production facilities located in Map-ta-Phut and a regional sales office has been established in Shanghai, China.
Production Capability

Solvay is a fully integrated producer of hydrogen peroxide using the Auto-Oxidation process to combine the basic raw materials oxygen and hydrogen for manufacturing technical grades of hydrogen peroxide on a large scale. A special production grade from this process becomes the feedstock for the high purity H₂O₂ facility where additional post-purification steps are used to produce the various high purity grades. Solvay production techniques include the latest technology for automation and SPC to ensure the quality and consistency for each of the different steps in the process.

Product Specifications

<table>
<thead>
<tr>
<th>Solvay Designation</th>
<th>SEMI Spec.</th>
<th>Grade</th>
<th>Cation Spec.</th>
<th>Mean Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interox®-EG-ST</td>
<td>Grade 1</td>
<td>VLSI</td>
<td>&lt; 200 ppb</td>
<td>Stabilizer dependent</td>
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<tr>
<td>Interox®-EG-10</td>
<td>Grade 2</td>
<td>ULSI</td>
<td>&lt; 10 ppb</td>
<td>1.00 ppb</td>
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<tr>
<td>Interox®-EG-1</td>
<td>Grade 3</td>
<td>SLSI</td>
<td>&lt; 1 ppb</td>
<td>0.10 ppb</td>
</tr>
<tr>
<td>Interox®-Pico</td>
<td>Grade 4</td>
<td>XLSI</td>
<td>&lt; 0.1 ppb</td>
<td>0.01 ppb</td>
</tr>
</tbody>
</table>

Technical data sheets and statistical quality data are available on the web at www.solvaysemiconductor.com.

The Solvay Integrated Plant Concept

[Diagram showing the production process from raw materials to final product with stages: Hydrogenation, Oxidation, Extraction, Multiple Stage Purification, Storage and Cleanroom Filling Facility, Customer's Fab, Transport in Bulk to Customer (Solvay also supplies in IBCs), Clean Connect Box. S = Sampling point]
Analytical Capability
To assure full production and product quality control, the Solvay production facilities are equipped with state-of-the-art analytical laboratories including class 10 cleanrooms and leading edge laboratory instruments. Solvay’s highly trained analytical chemists are recognized in the industry for their expertise in trace analysis of hydrogen peroxide.

Delivery Capability
Solvay’s primary focus is on bulk supply of high purity grades of hydrogen peroxide to the semiconductor industry. For users with sufficiently large consumption, bulk delivery results in very substantial benefits in terms of:

- Purity – less manipulation and large lot size
- Cost – savings through bulk supply and reduced handling
- Logistics – fewer deliveries, orders and administration
- Safety – fewer handling steps result in reduced risk of exposure or direct contact
In addition Interox®-Pico grade customers have the option to benefit from Solvay’s proprietary bulk delivery system, PicoPack, where the isocointainer is used as both the delivery vessel and the on-site storage vessel. This concept allows the customer to transfer peroxide from the bulk container into the day tank where the CDU is used to dispense peroxide to the fab. The benefits of this high purity delivery and storage system include increased quality and consistency and reduced costs.

Solvay also supplies product in IBC’s (tote tanks). Product supplied in drums and bottles is available for qualification purposes. Solvay can provide bar coding on delivery containers.

Quality Programs and Certification

Solvay is fully committed to Total Quality Management (TQM) principles and practices in all areas of activity, including production, research and product development, customer relationships, and technical support. All of Solvay’s manufacturing sites have achieved ISO 9001-2000. Some manufacturing sites have achieved ISO 14001. Solvay is actively applying FMEA as a tool for continuous improvement of systems and processes. SQC data is available to customers upon request.
Environmental and Safety Management

Solvay is fully committed to the chemical industry's Responsible Care® program. Solvay also maintains its own Product Stewardship programs, offering, for example, training in product safety at customer sites. More detailed information is available on the web at www.solvaychemicals.com or www.solvaychemicals.us

Product Development

Solvay has ongoing research programs to develop next generation products, focusing on the production, analytical, and delivery capabilities needed to assure continued improvement in product purity and consistency. By our active participation in industry associations such as SEMI, Solvay continues to anticipate and prepare for the future needs of the semiconductor industry.

Technical Support

For assistance with product applications technology, the design of facilities for the storage and handling of high purity grades of hydrogen peroxide or with concerns about safe handling, please contact Solvay Chemicals at one of the addresses below.
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