

LP OxoSM Technology

The World's Leading Oxo Alcohol Technology





LP OxoSM Technology: The World's Leading Oxo Alcohol Technology

The LP OxoSM Technology is the world's leading technology for use in the manufacture of oxo alcohols from olefins. The LP OxoSM Technology from Dow Global Technologies, Inc., a subsidiary of The Dow Chemical Company ("Dow"), and Davy Process Technology Limited ("DPT") offers licensees a combination of superior catalyst systems and a simple flow sheet, which results in few equipment items, low investment cost, and high feedstock efficiency in a plant that is environmentally compliant, reliable, easy to operate, and maintain.

The globally proven LP OxoSM Technology has been licensed in more than 30 plants in 15 countries around the world. Plants utilizing the LP OxoSM Technology collectively produce more than 60 percent of the world's butyraldehyde and contribute to more than 85 percent of the world's licensed propylene based oxo capacity.



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Dow and DPT have an extensive proven track record for delivering successful projects. Our licensing organization is also dedicated to continuing technology advancements and ongoing support to help our licensees maintain their competitive advantage and adapt to market dynamics. Licensees can be confident that LP OxoSM Technology will meet their needs.

Serving a variety of markets and applications, the LP OxoSM Technology has been principally utilized to produce 2-ethylhexanol (2-EH), n-butanol, and isobutanol via propylene hydroformylation for the plasticizer and solvent alcohol markets.

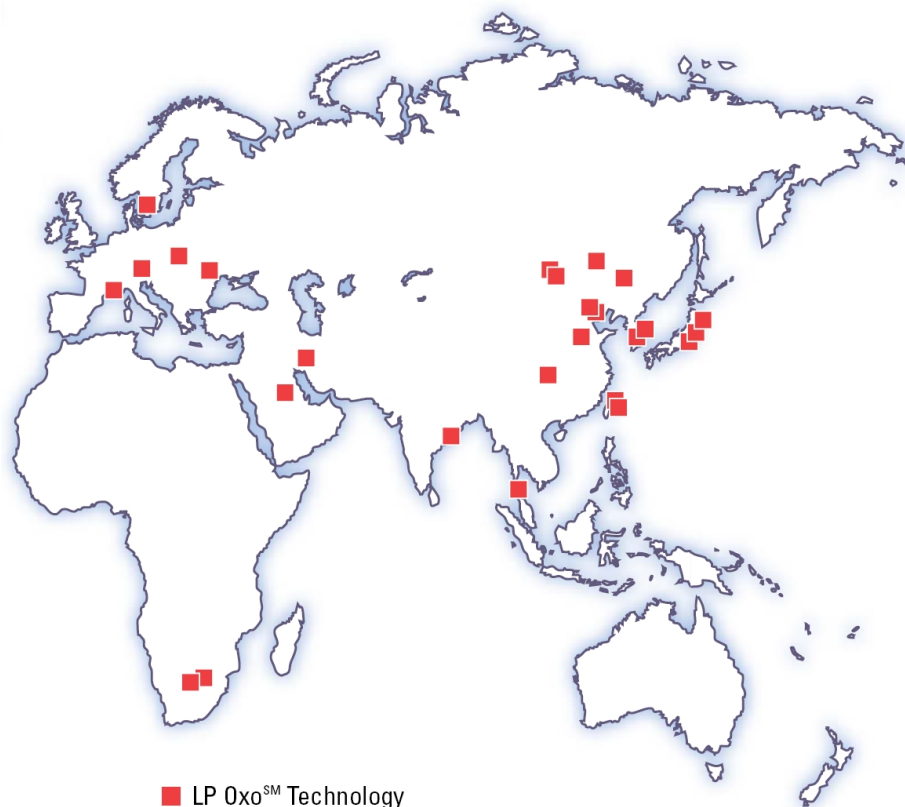
LP OxoSM SELECTORSM Technology

LP OxoSM Technology is used in the manufacture of oxo alcohols from olefins by low pressure rhodium catalyzed hydroformylation, combining state-of-the-art catalyst know-how, leading process technology and engineering skills, and world-class operating expertise. It received the Kirkpatrick Chemical Engineering Achievement Award, as well as an R&D 100 Award for a new generation of catalysts.

For applications using propylene, the LP OxoSM Technology offers different catalyst systems depending on the desired selectivity of conversion to normal and iso-butyraldehydes. The majority of current propylene licensees operate plants that utilize the LP OxoSM SELECTORSM 10 Technology. The SELECTORSM 10 Technology employs a phosphine ligand to provide a normal butyraldehyde isomer ratio of 10:1. An alternative is the LP OxoSM SELECTORSM 30 Technology which enables a normal to isomer ratio of 30:1. This technology utilizes the proprietary NORMAXTM Catalyst, an organophosphite ligand available from Dow, and sets the industry standard for excellence as the technology providing the highest commercially proven isomer selectivity in favor of normal butyraldehyde production. Several licenses have been granted for plants that use the LP OxoSM SELECTORSM 30 Technology employing the NORMAXTM Catalyst.

Today, we can offer technology which allows the isomer selectivity to be varied online, allowing product mix changes to address changing market needs. This is another example of how Dow and DPT deliver innovative solutions to enable our licensees to adapt to the changing demands of their market.

Additional applications of the LP OxoSM Technology in commercial operation include a process for producing 2-propylheptanol (2-PH), a growing plasticizer alcohol alternative to 2-EH, from mixed butene streams and a process for producing C12 to C15 surfactant range alcohols from C11 to C14 Fischer-Tropsch olefins. The technology is also applied as a component of a process plant for converting heptene-1 that has been extracted from Fischer-Tropsch products, to co-monomer grade octene-1.



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The Collaboration Between Dow and Davy Process Technology for the LP OxoSM Technology

For more than 30 years, the LP OxoSM Technology has been licensed as a collaboration between Dow and DPT.

Dow and DPT maintain a dedicated professional licensing organization that draws on technical and commercial personnel who have devoted their efforts over many years to the development, commercialization, and licensing of LP OxoSM Technology. The dedication and shared vision both companies have to the LP OxoSM Technology have led to the successful, long term collaboration between Dow and DPT.

Both Dow and DPT are committed to further innovate the proven LP OxoSM SELECTORSM Technology as evidenced by ongoing programs directed at process technology improvements, catalyst advancements, and alternative applications designed to meet the changing needs of market segments worldwide. Dow's development activities occur at its state-of-the-art facility in Freeport, Texas, USA, where processes and catalysts are developed for full scale commercialization from laboratory scale through testing in small pilot plants. DPT's development activities occur at its world class Technology Centre at Stockton-on Tees in the UK.



Davy Process Technology Limited

DPT is a UK technology company providing licenses and know-how to enable its customers to operate advanced process technologies developed for application in the oil and gas, petrochemicals, commodity chemicals, and fine chemicals industries. The company employs around 200 people and has its headquarters in London.

DPT is a wholly owned subsidiary of Johnson Matthey Plc. Johnson Matthey is a specialty chemicals company with core skills in catalysts, precious metals, and fine chemicals. It operates in more than 30 countries, employing around 7,500 people and has manufacturing and R&D facilities across the globe.

More information about DPT can be found at www.davyprotech.com, and more information about Johnson Matthey Plc. can be found at: www.matthey.com.



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The Dow Chemical Company

Dow is a global chemical company that combines the power of science and technology with the “Human Element” to passionately innovate what is essential to human progress. Dow’s diversified industry-leading portfolio of specialty chemical, advanced materials, agrosciences, and plastics businesses delivers a broad range of technology-based products and solutions to customers in approximately 160 countries and in high-growth sectors such as electronics, water, energy, coatings, and agriculture.

In addition to the LP OxoSM Technology, other technologies are available for license from Dow and are supported by Dow Technology Licensing. Dow Technology

Licensing is an industry leader in process and catalyst technologies that enable the production of a broad range of products, with highly favorable economics. Dow Technology Licensing delivers outstanding proven technologies and catalysts that deliver sustainable, superior performance; ongoing support ensuring ease of technology implementation; access to process and catalyst technologies improvements; and technology and manufacturing experts who provide tailored solutions.

More information about Dow or Dow’s licensing offerings can be found at: www.dow.com/licensing.

References to “Dow” mean The Dow Chemical Company and its consolidated subsidiaries unless otherwise expressly noted.

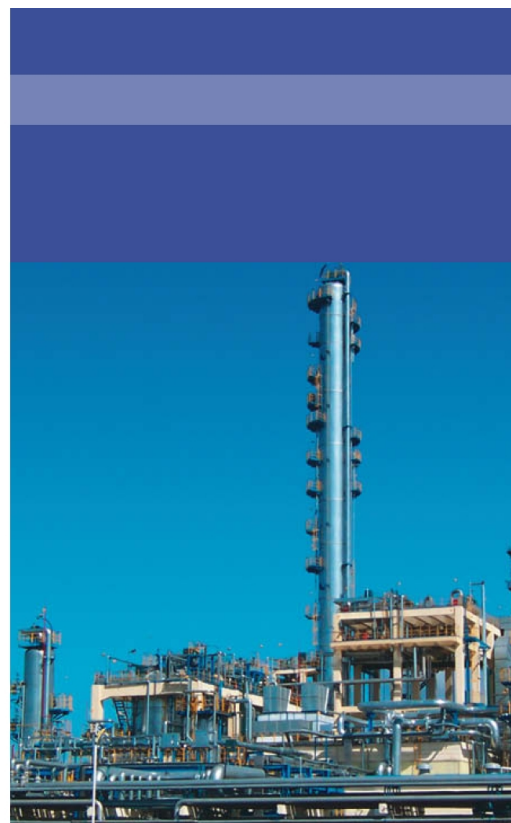


The LP OxoSM Technology is used in the manufacture of oxo alcohols from olefins by low-pressure rhodium catalyzed hydroformylation, combining state-of-the-art catalyst know-how, leading process technology and engineering skills, and world-class operating expertise.

Dow and Davy Process Technology Limited co-market technology licenses under the LP OxoSM SELECTORSM Technology service mark. Their commitment to further innovate the proven LP OxoSM SELECTORSM Technology is evidenced by ongoing programs directed at process technology improvements, catalyst advancements, and alternative applications designed to meet the needs of market segments worldwide.



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To Learn More from Davy Process Technology:

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Visit the DPT website:

www.davyprotech.com



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