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LLDPE Process Summary

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Abstract

Linear low-density polyethylene (LLDPE) is a copolymer of ethylene and higher alpha-olefins such as 1-butene, 1-hexene, 4-methyl-1-pentene, and 1-octene, with a density between 0.915 and 0.940 gram per cubic centimeter. LLDPE is the third major member of the polyethylene business, along with low-density polyethylene (LDPE) and high-density polyethylene (HDPE). LLDPE accounts for about 45% of all polyethylene produced. In 2014, world production of LLDPE reached 26.9 million metric tons with an estimated market value of nearly $50 billion (at an average value of $1,868 per metric ton) and a world demand share corresponding to 31% of total polyethylene. Global LLDPE demand growth between 2014 and 2019 is expected to average 5.2% per year.

With total LLDPE capacity estimated at 31.0 million metric tons in 2014, industry capacity utilization is about 87%. LLDPE is produced commercially by solution, gas-phase, slurry, and hybrid processes. Of the total 2014 LLDPE capacity, 77% was from gas-phase units and 20% was from solution units, approximately.

This process summary reviews current LLDPE production processes, summarizes the features and differences between these processes, and compares the status of LLDPE process licensors and what they offer. A brief market overview summarizes the global supply and demand and end-use markets and demand drivers. The review presents the production economics for producing LLDPE for the following processes:

- Univation Technologies UNIPOL™ PE process
- INEOS Innovene™ G process
- LyondellBasell Spherilene™ S and C processes
- NOVA Chemical SCLAIRTECH™ process
- NOVA Chemical Advanced SCLAIRTECH™ process
- Dow Chemical DOWLEX™ process
- Chevron Phillips Chemical (CPChem) MarTECH™ loop slurry process
- Borealis Borstar™ PE process

This review also highlights the new iPEP Spectra™ cost module. The cost module, which is provided with the electronic version of this review, is a powerful interactive tool the user can use to interpret data in a flexible manner by generating pivot tables and corresponding charts. In this review, the iPEP Spectra™ cost module is demonstrated with historical economics for the LLDPE processes for different regions of the world. Until now, most process economics were presented as snapshot comparisons. Due to fluctuation and variation of feedstock and utility prices over time and in different regions, ranking of the processes using a snapshot comparison can be misleading. An iPEP Spectra™ historical economics comparison provides a more comprehensive way of assessing competing technologies, allowing for more valid investment decisions.
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