

# ICIS CHEMICAL BUSINESS

## CHEMICAL PROFILE: 1-OCTENE

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### USES

The main use of 1-octene is as a co-monomer in the production of linear low density polyethylene (LLDPE). World-wide, 56% of 1-octene is used in this application alone. Regionally, about 47% of 1-octene is consumed in LLDPE in the US, with 46% in western Europe, 80% in Asia-Pacific and 86% in Japan.

Other uses include plasticizers (33%), surfactants (4%), pulp and paper (3%), lubricants (2%), synthetic acids (1%) and alpha-olefin epoxides and rubber processing chemicals (0.3% each).

### SUPPLY/DEMAND

According to TranTech, global capacity for 1-octene stood at 608,500 tonnes in 2006, 232,000 tonnes of which was in the US followed by western Europe and South Africa with 128,000 tonnes and 100,000 tonnes, respectively. Canada, eastern Europe, Japan and Asia/Middle East had capacities of 70,000 tonnes, 40,900 tonnes, 25,900 tonnes and 11,400 tonnes, respectively.

Global consumption was 578,000 tonnes; split 48.3% in the US, 25.2%, in western Europe, 5.8% in Canada, 5.1% in Asia-Pacific, 4.3% in Japan, 4.2% in Asia/Middle East, 2% in Latin America and 1% in Africa. South Africa was the largest exporter with 89,000 tonnes and the Asia-Pacific region was the largest importer with 29,500 tonnes.

### PRICES

The price of 1-octene depends on its purity. The co-monomer grade requires high purity of at least 99%. June contracts for high purity grade was negotiated between 83 cents-88 cents/lb, €1.50-1.60/kg and \$1.91-2.01/kg, in the US, Europe and Asia, respectively.

### TECHNOLOGY

Linear alpha olefins including 1-octene are commonly manufactured by two main routes: oligomerization of ethylene and by Fischer-Tropsch synthesis followed by purification. There are four commercial processes which oligomerize ethylene at high pressure to produce wide distributions of linear alpha olefins. These are by INEOS, Chevron Phillips, Shell Oil (SHOP) and Idemitsu.

Sasol's new process based on conversion of 1-heptene to 1-octene was due onstream last month. Sasol is also working on selective tetramerization of ethylene to 1-octene to be commercialized before 2020.

Sabic/Linde's new LAO process, alpha-Salbin, being commercialized by SABIC for 2008. This is a low-pressure ethylene oligomerization process over a heterogeneous catalyst in a slurry bed.

UOP has developed a new ethylene oligomerization LAO process but no commercial plants have been built to date. Sasol operates the only commercial process to isolate LAO from synthetic crude.

### HEALTH AND SAFETY

The chemical 1-octene is a flammable liquid with a gasoline-like odor. It is partially soluble in acetone and very slightly soluble in methanol. It can irritate the skin, eyes and lungs.

### OUTLOOK

Demand has been rising fast, mainly from Dow Chemical's use in its LLDPE. Annual global growth is forecast at an annual 7.4% to 2011. The highest growth rates are expected in Asia-Pacific (18%/year), and Asia/Middle East (12%/year). Markets in western Europe will grow at 8%/year, and at 6%/year in the US, Canada and eastern Europe. Australia/New Zealand, Africa, Latin America and Mexico will see demand rise at 5.5%/year with Japan at 4%/year.

Sasol's 100,000 tonne/year plant in Secunda, South Africa, was due online in July. SABIC plans a 150,000 tonne/year LAO plant in Saudi Arabia in 2008, including 30,000 tonnes/year of 1-octene. Iran's National Petrochemical Co. (NPC) plans a 150,000 tonne/year LAO plant, producing 25,500 tonnes/year 1-octene, for 2009. But TranTech warns that despite these investments, there will be a shortage of capacity by 2011.

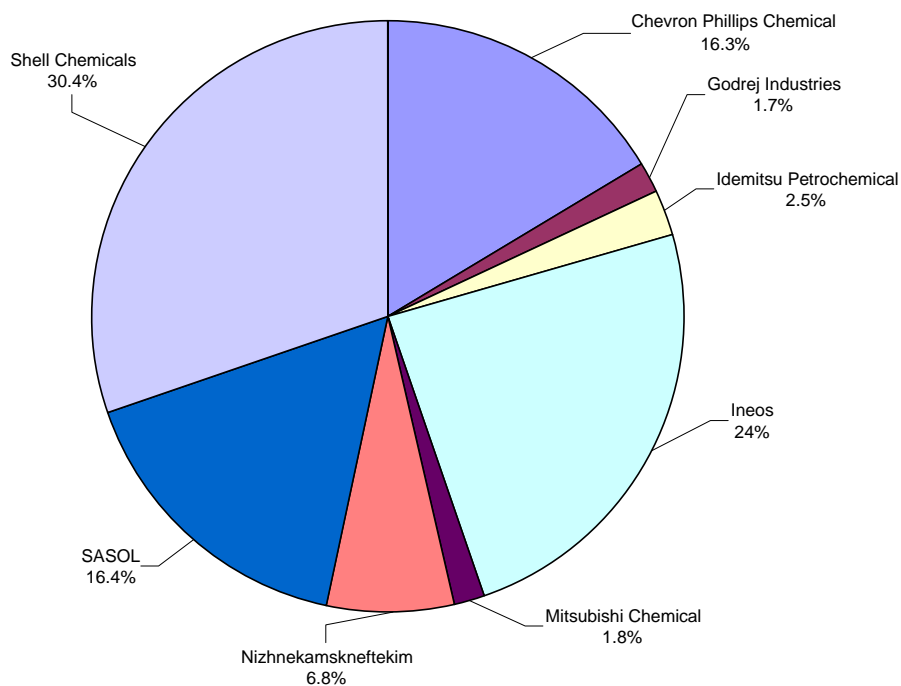
### Global 1-octene CAPACITY(2006) '000 TONNES/year

Company	Location	Capacity
Chevron Phillips Chemical	Cedar Bayou, Texas, US	98.5
Godrej Industries	Bharuch, India	11.4
Idemitsu Petrochemical	Chiba, Japan	15
INEOS	Feluy, Belgium	76.4
INEOS	Joffre, Alberta, Canada	70
Mitsubishi Chemical	Mizushima, Japan	10.9
Nizhnekamskneftekhim	Nizhnekams, Russia	40.9
Sasol	Secunda, South Africa	100
Shell Chemicals	Geismar, Louisiana, US	133.9
Shell Chemicals	Stanlow, UK	51.6

SOURCE: TRANTECH CONSULTANTS

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### OCTENE-1 GLOBAL MARKET SHARES (2006) TOTAL WORLD DEMAND 578,000 tonns/year



SOURCE: TRANTECH