Well Stimulation Materials

US Industry Study with Forecasts for 2018 & 2023

Study #3160 | June 2014 | $5300 | 335 pages
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Growth will be driven by high oil prices, rebounding natural gas prices, and newer technologies (e.g., horizontal drilling; high-volume, multistage fracturing) that use more materials per well.

US demand to rise 10.6% annually through 2018

Demand for well stimulation materials in the US is forecast to climb more than 10 percent annually to $15.2 billion in 2018. Historically high oil prices and rebounding natural gas prices are expected to be the main factors promoting continuing growth in well completion activity. In addition, the use of newer technologies such as horizontal drilling and high-volume, multistage hydraulic fracturing will increase the amount of materials used per well. The development of unconventional resources is expected to continue unabated, resulting in further stimulus to product demand. Proppants will remain the highest volume material used in well stimulation, although demand for chemicals will be boosted by an emphasis on higher-value, more environmentally friendly formulations.

Resin-coated sand to be fastest growing proppant

Proppants are by far the highest volume product type and also account for more than half of the market in dollar terms. Although raw sand dominates the market in terms of volume sales, value-added coated sand and ceramic proppants each account for a greater share of dollar demand. Resin-coated sand proppants are expected to register the fastest growth as proppant loads continue to expand and operators develop formations with higher closure pressures. Gelling agents account for the highest dollar sales of stimulation chemicals and are expected to do so over the forecast period. However, due to a price correction for guar gum, sales of gelling agents are projected to be lower in 2018 than they were in 2013.

Hybrid system to be fastest growing fluid

Concerns about the effects of hydraulic fracturing on local water supplies have led to calls for restrictions (if not outright bans) on the practice. As a result, well stimulation material suppliers have focused on developing green chemicals that have a reduced impact on the environment. The use of slickwater fracturing fluids, which have become more prevalent over the past decade, has helped reduce chemical loadings and lowered costs, but as proppant loads have grown, pure slickwater fracturing techniques have become less effective. In response, companies have started to use hybrid fracturing treatments. Hybrid formulations can reduce water use and also cause less formation damage than jobs using polymer gelling agents alone. Moving forward, hybrid systems are expected to see the fastest growth, although the industry continues to look for new formulations that reduce water usage while increasing well productivity.
Demand for surfactants used in the stimulation of oil and gas wells is expected to increase 9.8 percent annually to $267 million in 2018. In volume terms, sales are expected to reach 191 million pounds over the same period. As with many other well stimulation materials, gains will be fueled by the increasing number of deep unconventional wells with long laterals, as the vast majority of these wells require significantly greater volumes of fracturing fluids, leading to increased use of products like surfactants.

Surfactants may be generally described as surface active agents used to affect the interaction between two fluids or a fluid and a solid surface. This definition encompasses a broad range of different chemicals with a similarly diverse set of oilfield applications. Surfactant chemicals can be used as cleaners, emulsifiers, foamers, lubricants, wetting agents, and viscosifiers, as well as for a variety of other specific needs. Nonionic surfactants have become increasingly popular in recent years due to their relatively low cost and reduced likelihood of reaction with other ionic additives such as potassium chloride. However, in certain situations anionic and cationic surfactants may be utilized.

One application of surfactants in the oil and gas industry is their usage in viscoelastic surfactant (VES) fracturing fluids, which to date have seen their greatest success in natural gas wells. These fluids boast increased viscosity and elasticity, allowing for the transport of small proppant loads without the viscosity requirements of more conventional fluids. VES formulations require limited chemical loadings outside of surfactants. The absence of polymers in most of these fluids means less formation damage from polymer residue. However, VES fluids are temperature and pressure-sensitive, meaning their use is limited in many of the deep, high pressure unconventional wells that drive US oil and gas demand. Additionally, VES formulations are temperature and pressure-sensitive, meaning their use is limited in many of the deep, high pressure unconventional wells that drive US oil and gas demand.

### Table V-6

**SOUTHERN REGION: WELLS COMPLETED BY TYPE, FORMATION, & STATE**

<table>
<thead>
<tr>
<th>Item</th>
<th>2003</th>
<th>2008</th>
<th>2013</th>
<th>2018</th>
<th>2023</th>
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<tbody>
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<td>Wells Completed</td>
<td>11,182</td>
<td>22,880</td>
<td>18,750</td>
<td>24,250</td>
<td>27,750</td>
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<tr>
<td>By Type:</td>
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<tr>
<td>Oil</td>
<td>4,108</td>
<td>8,779</td>
<td>15,040</td>
<td>16,030</td>
<td>17,820</td>
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<td>Gas</td>
<td>7,074</td>
<td>14,101</td>
<td>3,710</td>
<td>8,220</td>
<td>9,930</td>
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<td>By Formation:</td>
<td></td>
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<td></td>
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<tr>
<td>Conventional</td>
<td>8,182</td>
<td>16,489</td>
<td>11,800</td>
<td>15,600</td>
<td>17,350</td>
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<tr>
<td>Unconventional</td>
<td>3,000</td>
<td>6,391</td>
<td>6,950</td>
<td>8,650</td>
<td>10,400</td>
</tr>
<tr>
<td>By State:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Texas</td>
<td>7,440</td>
<td>17,050</td>
<td>15,000</td>
<td>18,650</td>
<td>21,000</td>
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<tr>
<td>Louisiana</td>
<td>575</td>
<td>1,230</td>
<td>900</td>
<td>1,200</td>
<td>1,600</td>
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<tr>
<td>Arkansas</td>
<td>150</td>
<td>1,075</td>
<td>615</td>
<td>850</td>
<td>1,125</td>
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<tr>
<td>Other</td>
<td>3,017</td>
<td>3,525</td>
<td>2,235</td>
<td>3,550</td>
<td>4,025</td>
</tr>
<tr>
<td>% South</td>
<td>38.6</td>
<td>42.9</td>
<td>46.8</td>
<td>49.3</td>
<td>49.1</td>
</tr>
<tr>
<td>US Wells Completed</td>
<td>29,006</td>
<td>53,314</td>
<td>40,100</td>
<td>49,150</td>
<td>56,500</td>
</tr>
</tbody>
</table>

### Chart VI-3

**CHEMICALS & GASES MARKET SHARE, 2013**
($4.1 billion)
Fores Limited
21 Frunze Street
620142 Ekaterinburg
Russia
7-343-257-75-77
http://www.foresltd.com

Annual Sales: $175 million (estimated)
Employment: more than 2,000 (estimated)
Key Products: ceramic proppants

Fores is a privately held manufacturer of ceramic proppants for use in the oil and gas industries. The Company also operates a chemical division to provide consulting services and supply pilot and custom formulated products.

The Company participates in the US well stimulation materials industry through the manufacture of ceramic proppants to boost hydrocarbon production and recovery rates in oil and gas well fracturing applications. These proppants have a magnesium silicate composition. Fores’ ceramic proppants for the North American market comprise FORES MGLIGHT and FORESRCP MGLIGHT offerings. FORES MGLIGHT intermediate-strength ceramic proppants are made in mesh sizes of 20/40 and 30/50. The Company’s FORESRCP MGLIGHT resin-coated ceramic proppant is available in a 20/40 mesh size. Manufacturing activities for Fores are carried out in Russia. The Company serves the North American market via transload facilities in the US and Canada. US transload sites are in Culbertson and Sidney, Montana; Berthold, Underwood, and Minot, North Dakota; Weatherford, Oklahoma; and Odessa, Houston, San Angelo, La Porte, and Alice, Texas.

## TABLE IV-2

<table>
<thead>
<tr>
<th>Item</th>
<th>2003</th>
<th>2008</th>
<th>2013</th>
<th>2018</th>
<th>2023</th>
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<tbody>
<tr>
<td>Wells Completed</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>000 lbs proppants/well</td>
<td></td>
<td></td>
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<tr>
<td>000$ proppants/well</td>
<td></td>
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</tr>
<tr>
<td>Proppant Demand (mil lb)</td>
<td></td>
<td></td>
<td></td>
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<td>$/lb</td>
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<td>Proppant Demand</td>
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<td>Sand Proppants</td>
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<td>Ceramic Proppants</td>
<td></td>
<td></td>
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<tr>
<td>Other Proppants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>% proppants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well Stimulation Material Demand</td>
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</table>

Well Stimulation Materials is a Freedonia study that presents historical data (2003, 2008, 2013) plus forecasts for 2018 and 2023 for sales by type in current US dollars, as well as by region and by producing state in the US. The study also examines key market environment factors, evaluates company market share and profiles 56 competitors in the US industry.
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  [ ] [ ] [ ] [ ] [ ]

  Expiration Date

  Signature

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