OVERVIEW

Air Liquide Advanced Separations (ALaS) Model 5840 is a high performance, best in class hollow fiber membrane element offering excellent CO₂ removal efficiency in natural gas applications. The higher and constant selectivity of the 5840 membrane improves hydrocarbon recovery and ultimately lengthens the replacement cycle. The 5840 is designed specifically for drop-in replacement of spiral wound cellulose acetate elements in natural gas service. No modification of the existing membrane tubes or piping network is needed.

OPERATING CHARACTERISTICS

MAXIMUM OPERATING TEMPERATURE: 90°C (194°F)
MAXIMUM OPERATING PRESSURE DIFFERENTIAL: 100 bar-d (1470 psi-d)
MAXIMUM PARTICLE CONTENT: 100% removal of >1μm size
LIQUID CONTENT: Pressure Dew Point Margin of +20°C
WEIGHT (MEMBRANE MODULE): 20.4kg (45 lb)

CUSTOMER BENEFITS

- High and constant selectivity means more sales gas in pipeline
- Greater hydrocarbon resistance means longer life
- Achieve lower CO₂ pipeline specifications
- Estimated payback typically less than 1 year

COMMERCIAL SCALE DEMONSTRATION - 950 PSI, 16.5%-7.5% CO₂

<table>
<thead>
<tr>
<th>Parameter</th>
<th>(ALaS) Model 5840</th>
<th>Spiral Wound CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed flow, MM scfd:</td>
<td>126.4</td>
<td>126.4</td>
</tr>
<tr>
<td>Sales gas flow, MM scfd:</td>
<td>108.6</td>
<td>103.7</td>
</tr>
<tr>
<td>Customer CO₂ Spec in sales gas (%)</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Number of elements:</td>
<td>215</td>
<td>288</td>
</tr>
<tr>
<td>Hydrocarbon losses (%):</td>
<td>5 - 7</td>
<td>10 - 17</td>
</tr>
</tbody>
</table>
EXAMPLE SIDE-BY-SIDE COMPARISON - 950 psi, 16.5%-7.5% CO₂

Reduced HC losses result in increased revenue.

Spiral Wound CA
Aged

Spiral Wound CA
New

MEDAL NG2 Hollow Fiber

HC Loss in Permeate to Flare

Time

2 Months
4 Months
5 Months
7 Months
9 Months
10 Months
12 Months

Model 5840
CA Membrane

RETROFIT INSTALLATION INSIDE EXISTING TUBE

5840 elements are shipped in Unit 1, Unit 2 and Unit 3 configurations. The elements are shipped individually.

UNIT 1 is pushed into the existing vessel along with the residue side seal assembly attached.

The required number of UNIT 2 elements are sequentially installed.

UNIT 3 is installed and connected to the permeate collection tube of the existing vessel using all existing hardware.

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