Thermiculite® 870 is a high temperature sealing material designed for low stress sealing in solid oxide fuel cells. It is based on the mineral vermiculite and contains no organic components.

Service:
Thermiculite® 870 is specifically designed for use in solid oxide fuel cells (SOFC) and solid oxide electrolyzers (SOE) and has a high degree of compression combined with good sealing under low applied surface stresses.

Thermiculite® 870 contains only two minerals, vermiculite and steatite. There are no organic materials or other elements (such as phosphorous or sulphur) that would contaminate SOFC or SOE cell chemistry.

Gasket Test Data:
For some SOFC designs a softer, more compressible sealing material is required. TH870 is significantly more compressible under low loads, e.g. 1 MPa. TH870 is around ten times more compressible than TH866. Figure 1 (below) shows load vs deflection for TH870 compared to TH866.

At a stress of 1 MPa TH870 compresses 0.22mm whereas TH866 gasket only compresses 0.02mm under the same load.

Availability:
Thermiculite® 870 is available in sheet form:
Standard sheet size: 450mm x 350mm
Standard thicknesses: 0.5mm, 0.7mm and 1.0mm*

*Please note that these nominal thicknesses are provided as a guide. As the material is very soft the measured thicknesses may differ slightly due to compression during measurement.

Special thicknesses between 0.3mm and 1.0mm are available on request. Flexitallic can provide a gasket cutting service, ideally a .dxf file of the gasket shape would be provided by the customer. Flexitallic will review the dimensions and design and advise if cutting is feasible and provide a quote.

Sample material available on request.

This Data Sheet refers to the material as supplied. The information contained herein is given in good faith, but no liability will be accepted by the Company in relation to same.

We reserve the right to change the details given on this Data Sheet as additional information is acquired. Customers requiring the latest version of this Data Sheet should contact our Applications Engineering Department.

The information given and, in particular, any parameters, should be used for guidance purposes only. The Company does not give any warranty that the product will be suitable for the use intended by the customer.

Health & Safety
For further Health and Safety information please see the relevant Material Safety Datasheets or contact Flexitallic UK Ltd.
Thermiculite® 870 also seals at least as effectively as TH866, but at much lower applied loads. This is the case at ambient and elevated temperatures. Figure 2 (below) shows an 80 hour leakage test at ambient temperature.

![Figure 2](image_url)

**Table 1** (right) shows the effect of gasket thickness on leak rate for TH870 gaskets. It is recommended that the thinnest material is chosen after taking account of other requirements e.g. flange surface imperfections, spacing requirements between cells or for the gasket to compensate for tolerances throughout the stack.

<table>
<thead>
<tr>
<th>TH870 Thickness (mm)</th>
<th>Leak rate after 100 hours (ml/min/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4</td>
<td>2.036</td>
</tr>
<tr>
<td>0.7</td>
<td>2.621</td>
</tr>
<tr>
<td>1.0</td>
<td>3.525</td>
</tr>
</tbody>
</table>

**TABLE 1. Leak Rate Variation with Gasket Thickness.**

(700°C, 1 MPa Gasket Stress, He Test Pressure 100 mbar)

**Table 2** (right) shows the leak rate of TH870 at elevated temperature at three different gasket stresses. For a given temperature the leakage rate reduces as gasket stress is increased.

A representative 120 hour leakage plot is shown in **figure 3** (on the following page).

**Table 2. TH870 Leak Rate Variation with Gasket Stress and Temperature.**

(0.7mm Gasket Thickness, He Test Pressure 100 mbar)

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>1 MPa</th>
<th>3 MPa</th>
<th>5 MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>600°C</td>
<td>1.307</td>
<td>0.628</td>
<td>0.433</td>
</tr>
<tr>
<td>700°C</td>
<td>2.621</td>
<td>2.023</td>
<td>0.305</td>
</tr>
<tr>
<td>800°C</td>
<td>3.064</td>
<td>1.724</td>
<td>1.377</td>
</tr>
</tbody>
</table>
A representative 120 hour leakage plot is shown in Figure 3 (below).

**Further Information**