Overview

Although pre-baking a hermetic package may prevent some out gassing, \( \text{H}_2 \) may still be released over time. The Hermetic Solutions Group has developed a number of solutions to address this issue, including the HR1 hydrogen getter.

The HR1 hydrogen getter is a great solution for hermetic packages with limited space available for another package component. Available in a foil format, the Hermetic Solutions Group’s HR1 getter is easy to integrate into an existing design.

Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Absorption</td>
<td>455 ppm / in(^2) / min</td>
</tr>
<tr>
<td>Capacity</td>
<td>20 cc / cc getter</td>
</tr>
<tr>
<td>Material</td>
<td>Solid metal foil</td>
</tr>
<tr>
<td>Thickness</td>
<td>0.004” or 0.002”</td>
</tr>
<tr>
<td>Maximum Operating Temperature</td>
<td>500°C</td>
</tr>
<tr>
<td>Attachment</td>
<td>Supply spot welded to metal substrates or direct to customer</td>
</tr>
<tr>
<td>Other</td>
<td>No activation required</td>
</tr>
</tbody>
</table>

Note: Data via RGA in 99% Nitrogen 1% Hydrogen environment after 60 minutes (Test Site: Oneida Research Services Inc.)
Calculating HR1 Hydrogen Getter Capacity

\[ \frac{PV \times (\text{ppm H/10}^6)}{GP} \]

PV = Package Volume in cm\(^3\)
ppm H = Parts per Million Hydrogen in Package
GP = Getter Capacity in cm\(^3\) Hydrogen per cm\(^3\) HR1 Getter
GV = Getter Volume in cm\(^3\)

Example: A 5cm\(^3\) package contains 5000 ppm Hydrogen and GP = 20
\[ \frac{(5) \times (5000/10^6)}{20} = 1.25 \times 10^{-3} \text{ cm}^3 \]

To convert to in\(^3\) multiply by .06102
\[ \therefore 1.25 \times 10^{-3} \text{ cm}^3 \times .06102 = 7.6275 \times 10^{-5} \text{ in}^3 \]

To calculate surface area divide by thickness
\[ \therefore 7.6275 \times 10^{-5} \text{ in}^3 + .004" = .01907 \text{ in}^2 \]

To calculate size of a square with surface area of .01907 in\(^2\) take the square root
Square root of .01907 in\(^2\) = .1381"

Calculating Getter Size Required to Absorb a Given Amount of Hydrogen in an Hour

ppm H \div GA = GS
ppm H = Parts per Million Hydrogen in Package
GA = Getter Absorption (ppm Hydrogen) per in\(^2\) per hour
GS = Getter Surface Area Required

Example: 5000 ppm Hydrogen absorbed in one hour. Getter capacity of 21000 ppm/ in\(^2\)/hour 5000 ÷ 21000 = .238 in\(^2\)
To calculate size of a square with surface area of .238 in\(^2\) take the square root
Square root of .238 in\(^2\) = .488"
Getter size would be .488" X .488"