

# HR1 Getters - Foil Hydrogen Getters for Hermetically Sealed Devices

## Overview

Although pre-baking a hermetic package may prevent some out gassing, H<sub>2</sub> 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

Rapid Absorption	455 ppm / in <sup>2</sup> / min
Capacity	20 cc / cc getter
Material	Solid metal foil
Thickness	0.004" or 0.002"
Maximum Operating Temperature	500°C
Attachment	Supply spot welded to metal substrates or direct to customer
Other	No activation required

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

## Calculating HR1 Hydrogen Getter Capacity

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

PV = Package Volume in cm<sup>3</sup>

ppm H = Parts per Million Hydrogen in Package

GP = Getter Capacity in cm<sup>3</sup> Hydrogen per cm<sup>3</sup> HR1 Getter

GV = Getter Volume in cm<sup>3</sup>

Example: A 5cm<sup>3</sup> package contains 5000 ppm Hydrogen and GP = 20

$$[ (5) \times ( 5000/ 10^6 ) ] \div ( 20 ) = 1.25 \times 10^{-3} \text{ cm}^3$$

To convert to in<sup>3</sup> 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

$$\therefore 7.6275 \times 10^{-5} \text{ in}^3 \div .004" = .01907 \text{ in}^2$$

To calculate size of a square with surface area of .01907 in<sup>2</sup> take the square root

$$\text{Square root of } .01907 \text{ in}^2 = .1381"$$

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

$$\text{ppm H} \div \text{GA} = \text{GS}$$

ppm H = Parts per Million Hydrogen in Package

GA = Getter Absorption (ppm Hydrogen) per in<sup>2</sup> per hour

GS = Getter Surface Area Required

Example: 5000 ppm Hydrogen absorbed in one hour. Getter capacity of 21000 ppm/ in<sup>2</sup>/hour  $5000 \div 21000 = .238 \text{ in}^2$

To calculate size of a square with surface area of .238 in<sup>2</sup> take the square root

$$\text{Square root of } .238 \text{ in}^2 = .488"$$

Getter size would be .488" X .488"

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