Nasr Ghoniem <nghoniem@gmail.com>

FCI - High PPI Foam Properties

1 message

Brian Williams <brian.williams@ultramet.com> **Thu, Dec 14, 2006 at 2:59 PM**
To: Shahram Sharafat <sharams@gmail.com>
Cc: Nasr Ghoniem <nghoniem@gmail.com>

Shahram,

The ligament diameter of 10 ppi RVC foam is 0.0133".
Adding 10vol% W will increase the ligament diameter to about 0.0199"
Adding 20vol% W will increase the ligament diameter to about 0.025"

The ligament diameter of 20 ppi RVC foam is 0.011".
Adding 10vol% W will increase the ligament diameter to about 0.0164"
Adding 20vol% W will increase the ligament diameter to about 0.0207

Brian

From: Shahram Sharafat [mailto:sharams@gmail.com]
Sent: Tuesday, December 12, 2006 11:10 AM
To: Brian Williams
Cc: Nasr Ghoniem; Neil B. Morley; Matt Wright
Subject: Re: FCI - High PPI Foam Properties

Brian,

Can you give an estimate of the average ligament thickness for
10 PPI; 10% and 20% dense W foam
20 PPI, 10% and 20% dense W foam

Thanks,
Shahram

On 12/12/06, **Brian Williams** <brian.williams@ultramet.com> wrote:

> Shahram,
>
> The paper was primarily written by David Barland at the AF, with some sections written by me.
>
> We have made very little W foam and no mechanical tests have been performed. However, all foams (ceramic and metal) follow the same relationship relative to the solid material. For example, if 10% dense SiC foam has 2% of the strength of solid SiC, then 10% W foam will have 2% of the strength of solid W. We can perform specific tests to confirm the properties but this is generally true.
>
> The ligament diameter is dependent on ppi, % dense, and the coating material density so we have made foams with literally hundreds of different ligament diameters.
> However, if you define a specific ppi, % dense, and coating material I can estimate the ligament diameter

and show you how we do it so you could estimate the ligament diameter for other combinations.

Brian

From: Shahram Sharafat [mailto:sharams@gmail.com]
Sent: Tuesday, December 12, 2006 8:03 AM
To: Brian Williams
Cc: Nasr Ghoniem; Neil B. Morley; Matt Wright
Subject: Re: FCI - High PPI Foam Properties

Brian,

Thank you for the report. It is comprehensive and very useful.

Three questions:

1. Who was the author(s)?
2. Figure 7 compares crush strengths and shows "ULTRAMET's Proprietary Foam" to have much higher crush strengths due to smaller flaw size. Is there any similar data for W-foam?
3. Would you have a figure similar to Fig. 8, which shows the ligament thicknesses for foams with SiC or W coatings?

As for the smallest size foam sample for permeation studies by Neil, I will let him respond. However, it seems to me that as long as the sample can be handled readily there should not be any size limitation.

Shahram

On 12/12/06, **Brian Williams** <brian.williams@ultramet.com > wrote:

> Shahram, Nasr, Neil,
>
> Attached is a paper that Ultramet and the AF wrote on the properties of high ppi SiC foam and high ppi RVC foam. The work was performed in support of a foam propellant injector program but much of the data should be useful to you.
>
> I will send two, high ppi SiC foam pieces (different ppi) to Neil this week for liquid metal permeability testing.
>
> I will also send a sample of alumina aerogel for the same purpose.
>
> **What is the minimum size part that Neil can use to perform the permeability tests?**
>
> Brian

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Dr. Shahram Sharafat
Adjunct Professor of Engineering
Mechanical and Aerospace Engr. Dept.
University of California Los Angeles
Los Angeles, CA 90095-1597

Tel: 310-794-5990
Fax: 310-206-4830
email: shahrams@ucla.edu

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Dr. Shahram Sharafat
Adjunct Professor of Engineering
Mechanical and Aerospace Engr. Dept.
University of California Los Angeles
Los Angeles, CA 90095-1597

Tel: 310-794-5990
Fax: 310-206-4830
email: shahrams@ucla.edu