



GSI-191
Fibrous Debris Characterization Bench-Top Test
Program

Overview

- Bench-Top Test Objective
- Methodology
- Fiber Preparation
- Parameters
- Bench-Top Testing
- Report



Bench-Top Test Objective

- Establish a fiber length distribution to represent the prototypical fiber that may bypass containment ECCS strainers.
 - Inputs to testing based on the results from a PWROG industry survey
 - Testing will be generic, but will use parameters important to bypass testing to determine appropriate length distribution(s) (reduced scale) for use in future fuel testing
 - The objective is not to determine the quantity of fiber bypass



Methodology

- Fiber-only bypass tests on a bench-top test loop
- Incremental fiber introduction – NEI Fiber Prep
- Isokinetic debris sampling
 - Not used to quantify bypass
- Debris capture downstream of the sampling ports to prevent debris re-circulation using filter bags
- Post-test microscopic analysis of bypassed fiber to determine the length distribution(s)

Fiber Preparation

- NEI Debris Preparation: “ZOI Fibrous Debris Preparation: Processing, Storage, and Handling”
 - Pressure washer
- Will use representative fiber types



Parameters – Not Important

- Strainer configuration / location within the plant
 - Debris prepared by NEI fiber prep only
- Plant specific strainer area
 - Not a head loss or bypass quantity test
- Quantity of fiber debris generated
 - Debris addition only up to an established fiber bed
- Rate of fiber arrival
 - Small incremental batches of NEI debris prepared fiber will provide the data required to meet the test objective

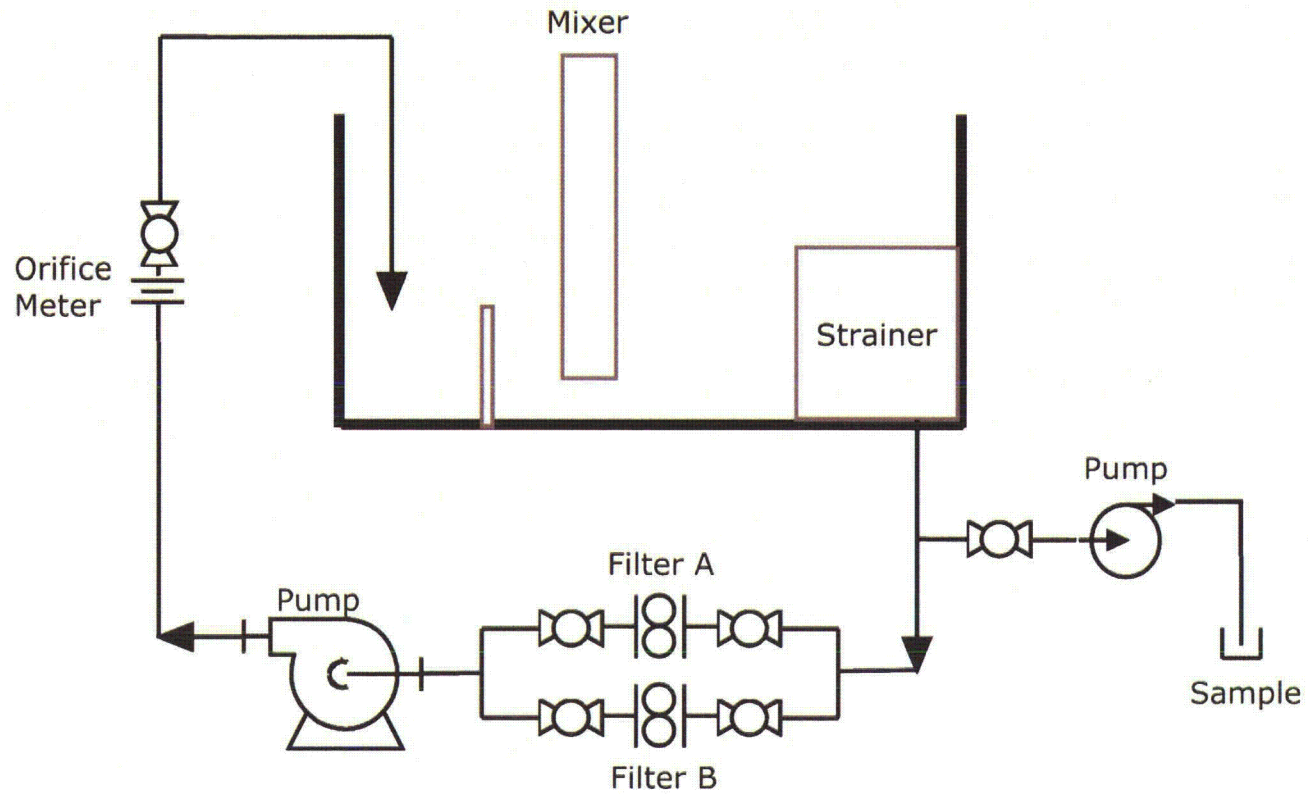


Parameters – Evaluated

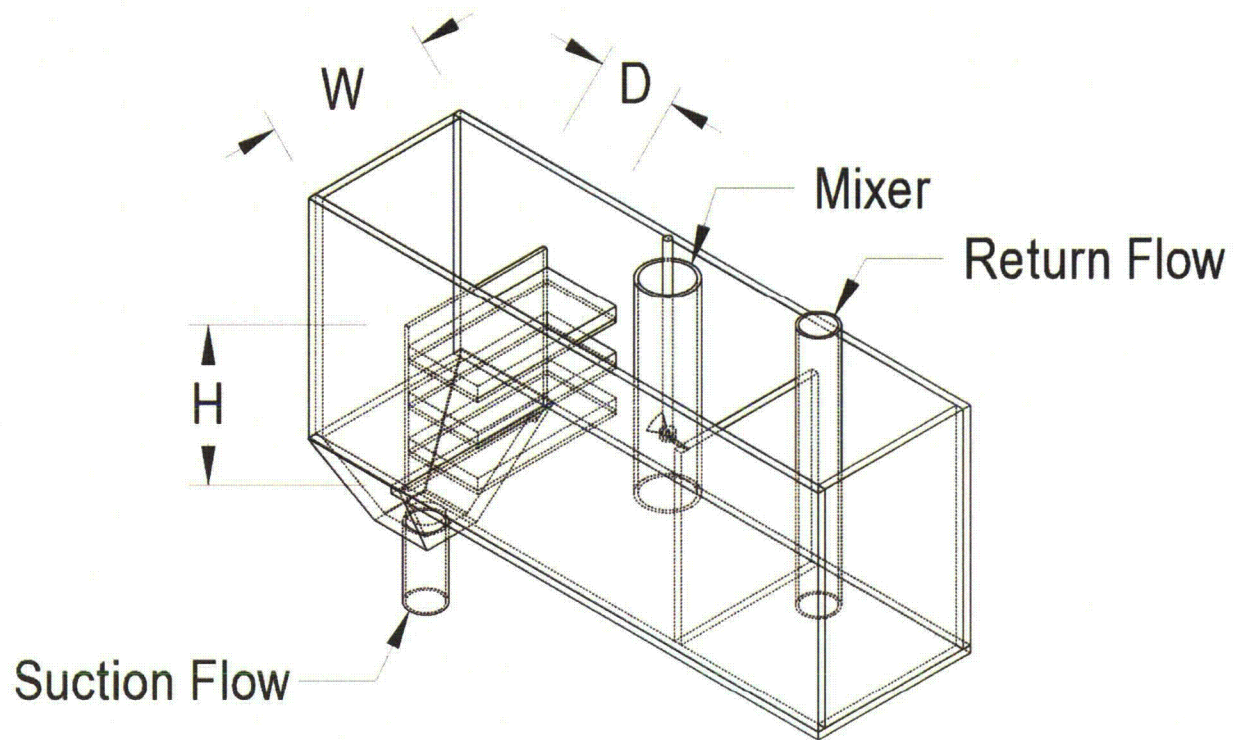
- Based on the results of the PWROG survey
- Strainer perforation hole size
- Screen surface velocity
- Water temperature
- Water chemistry - Tap, DI Buffer/Borated
- Localized Flow Conditions
 - Different shaped filter media to change the flow approach angle of attack



Bench-Top Testing

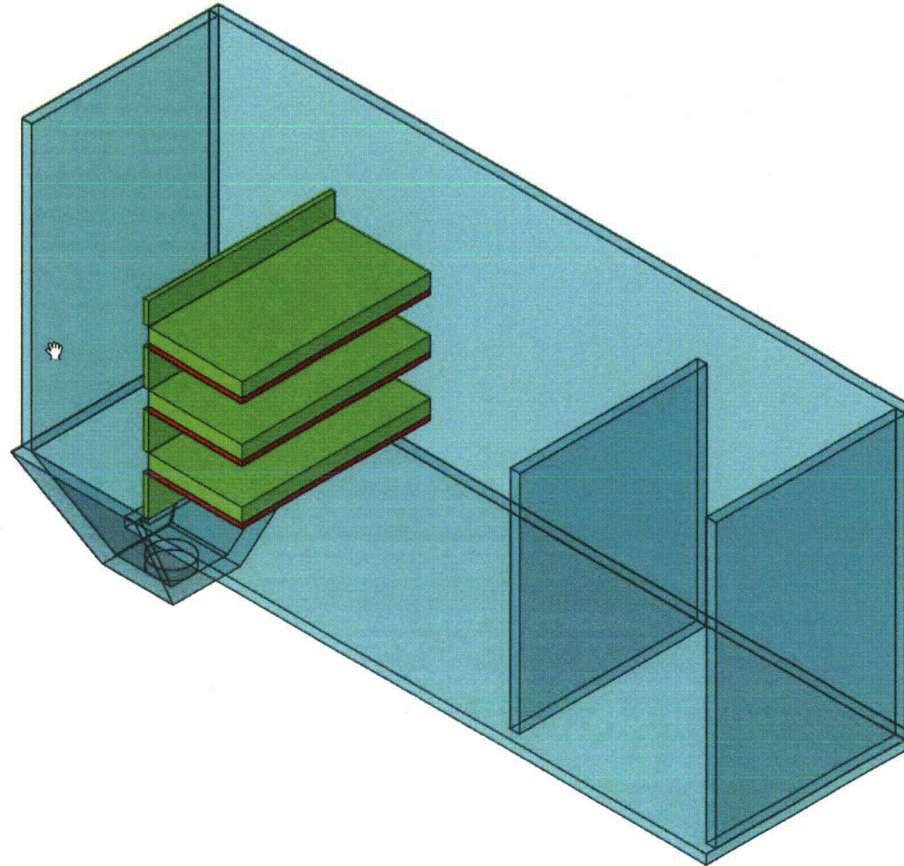


Bench-Top Testing



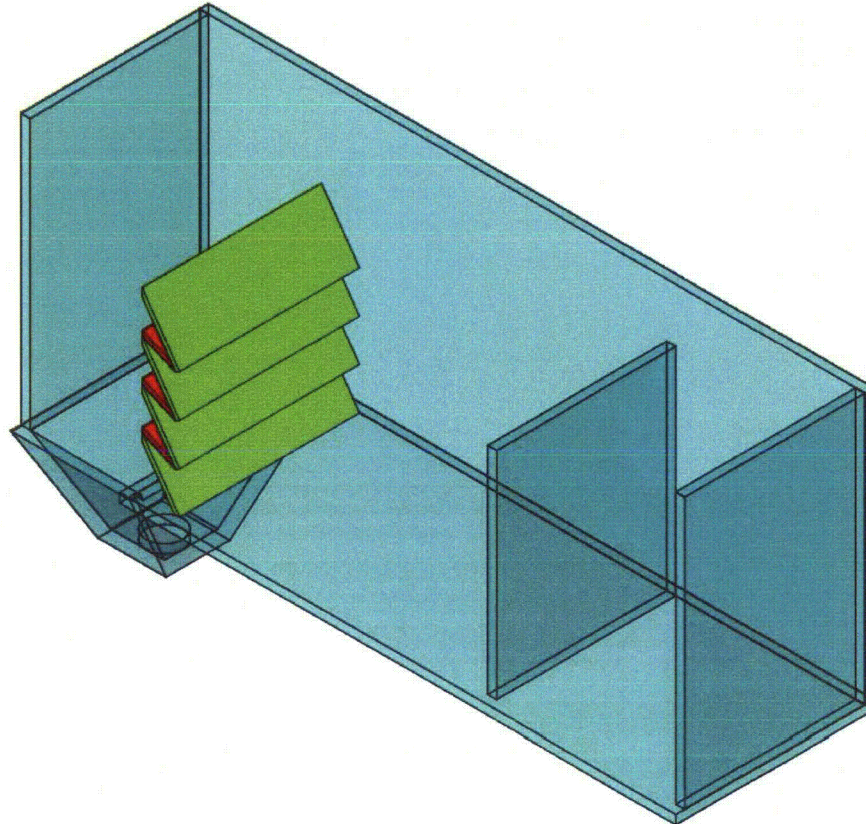
Test Tank: $\approx 10''W \times 12''D \times 36''L$

Bench-Top Testing



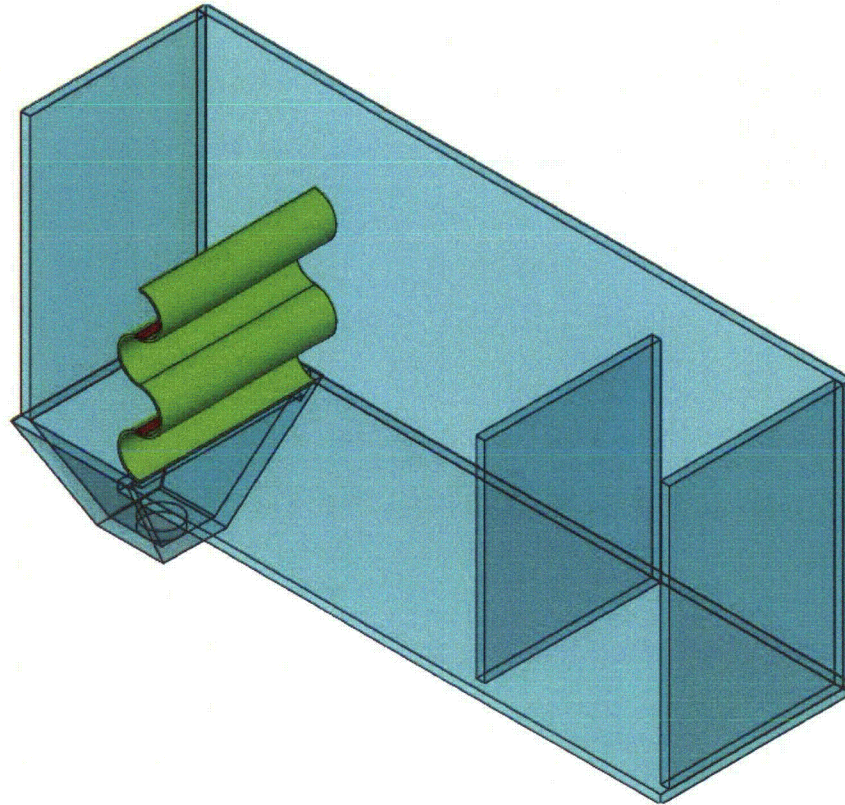
Iso of Filter Media in Tank

Bench-Top Testing



Iso of Filter Media in Tank

Bench-Top Testing



Iso of Filter Media in Tank

Bench-Top Testing

- Debris addition sequence
- All fiber tested will be assume to be Low Density Fiber Glass (LDFG)

Batch #	Fiber Addition (bed thickness in inches)	Total Bed Thickness (inches)
1	1/16	1/16
2	1/16	2/16
3	1/16	3/16
4	1/16	2/8
5	1/8	3/8
6	1/8	1/2

Bench-Top Testing

- Introduce debris
- Wait 10 turnovers and take downstream samples
- Sample timing
- Repeat the process until a ½ inch thick bed has been introduced
- After last batch, visually confirm a fiber bed, wait 10 turnovers and terminate

Report

- Microscopic characterization of fiber length
- Categorization into “bins”
 - 20 microns and less
 - 20-40 microns
 - 40-1000 microns (best fit categorization)



Questions



COVER SHEET FOR CORRESPONDENCE
USE THIS COVER SHEET TO PROTECT ORIGINALS OF
MULTI-PAGE CORRESPONDENCE