Rotary Impingers for Adulticide Equipment Characterization:

What You See vs. What You Get

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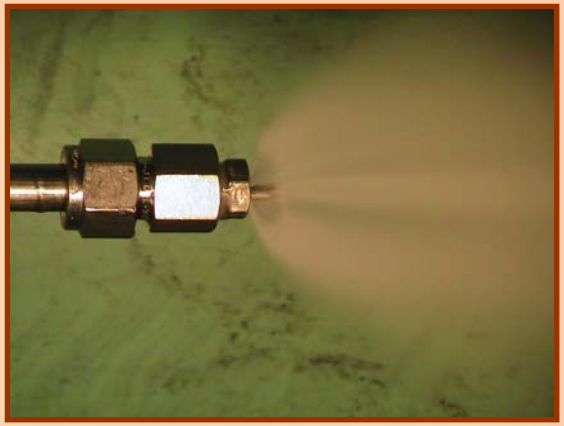
What You See

Laser Based Nozzle Plume Characterization



New ....EPA Label Requirement

Prescription for nozzle $Dv_{(.5)}$ and $Dv_{(.9)}$

Laser Based Nozzle Plume Characterization

What You Get

Field Nozzle Plume Characterization

Rotary Impinger

20th Century

500 rpm

1 inch slides

Coatings:
Silicone
Teflon

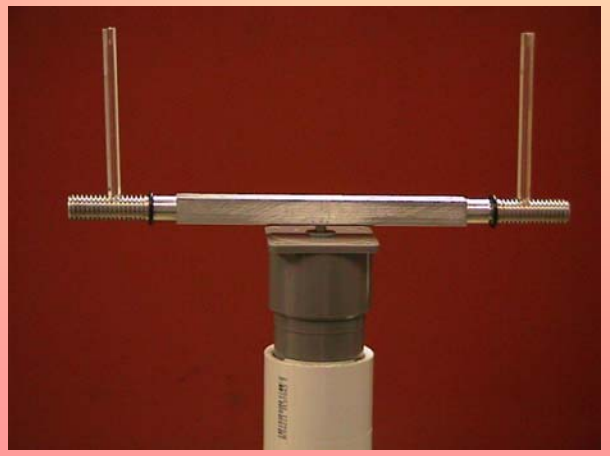
Yeoman's Correction applied

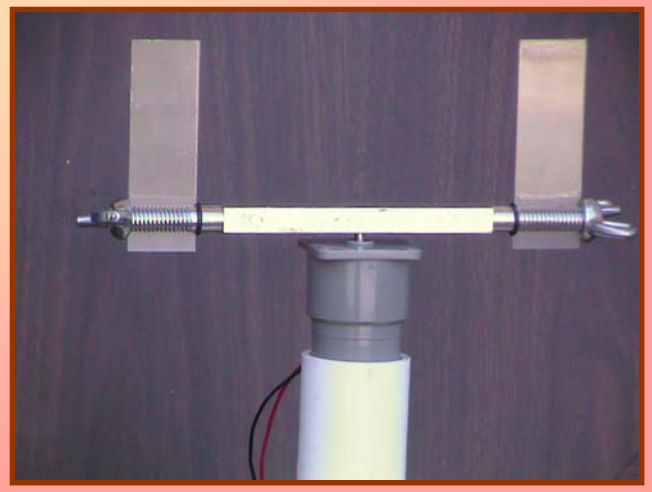
Rotary Impinger

21st Century

MIX or MATCH

500 rpm	625 rpm
1 inch slides	3mm slides
Teflon	Teflon Tape





Effects of Rotary Impinger Changes

Higher Speed……..More & Smaller Drops Collected

Narrower Slide……....More Smaller Drops
Fewer Large Drops

What You See vs. What You Get

Equipment:

Leco P1 hand held fogger 1.2 oz/min

DC3: High Pressure PJ20 (1040 psi)

Huey UH1: High Pressure PJ20 (1250 psi)

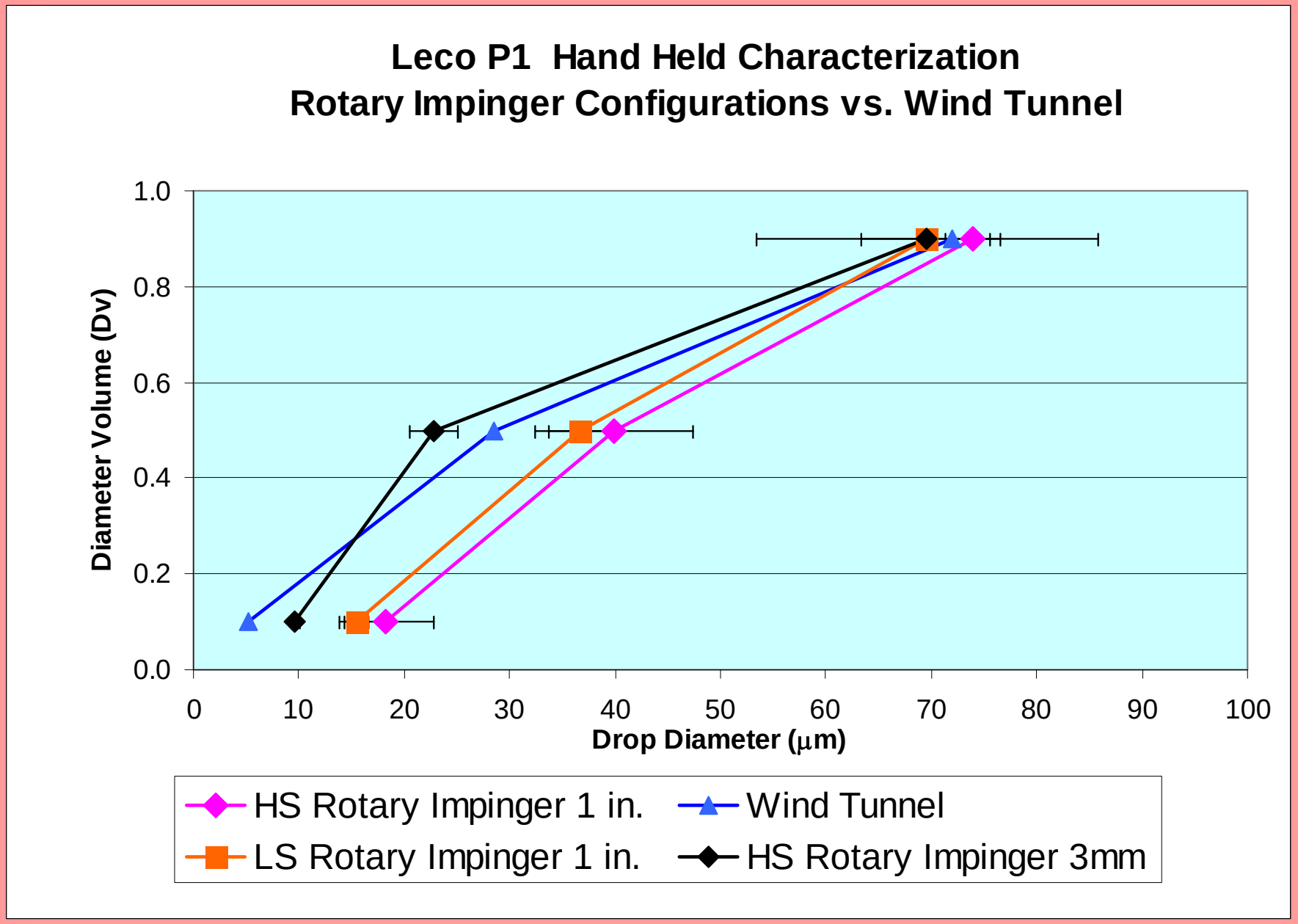
Design:

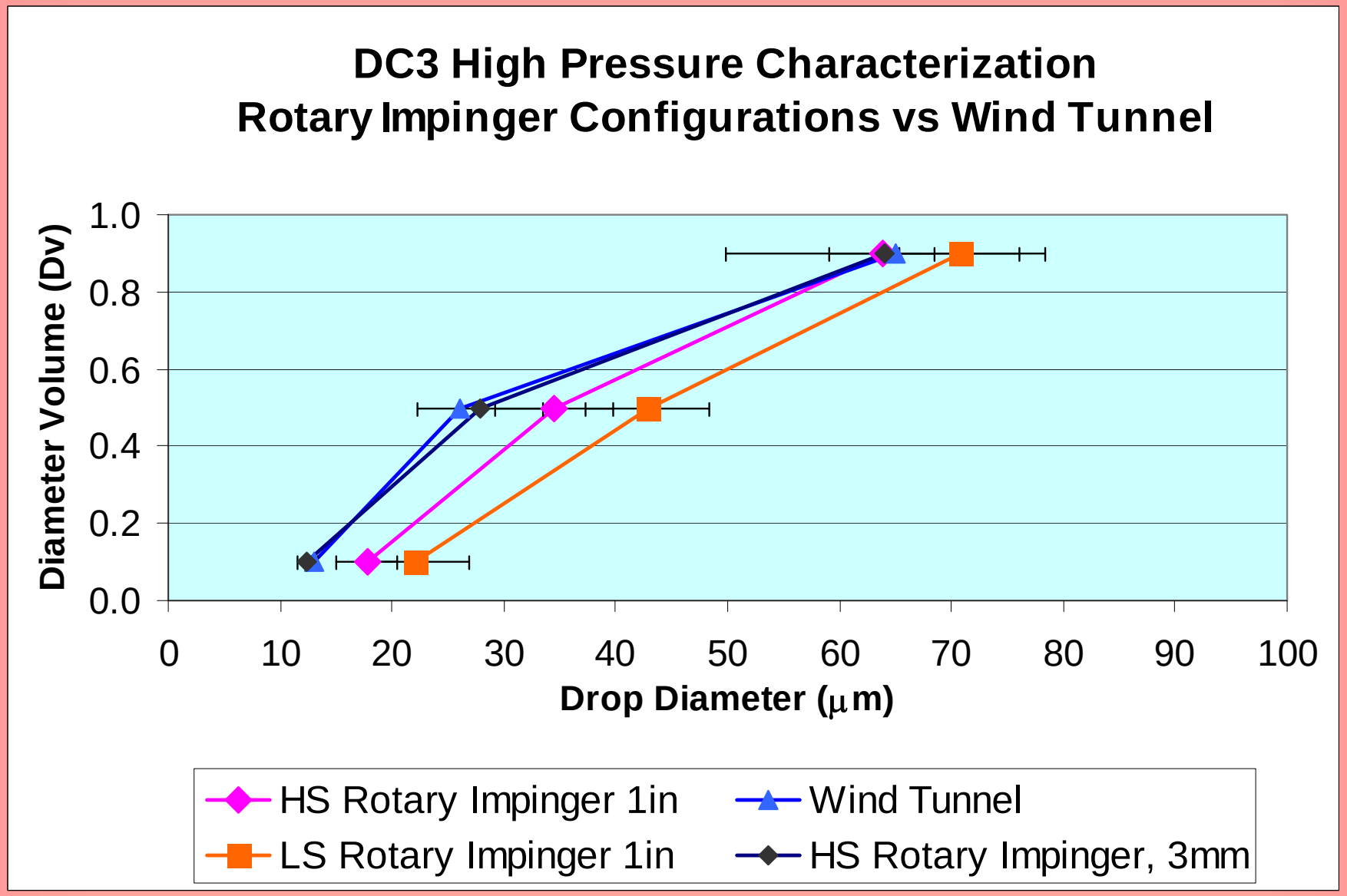
Leco P1: 6 feet from spinners

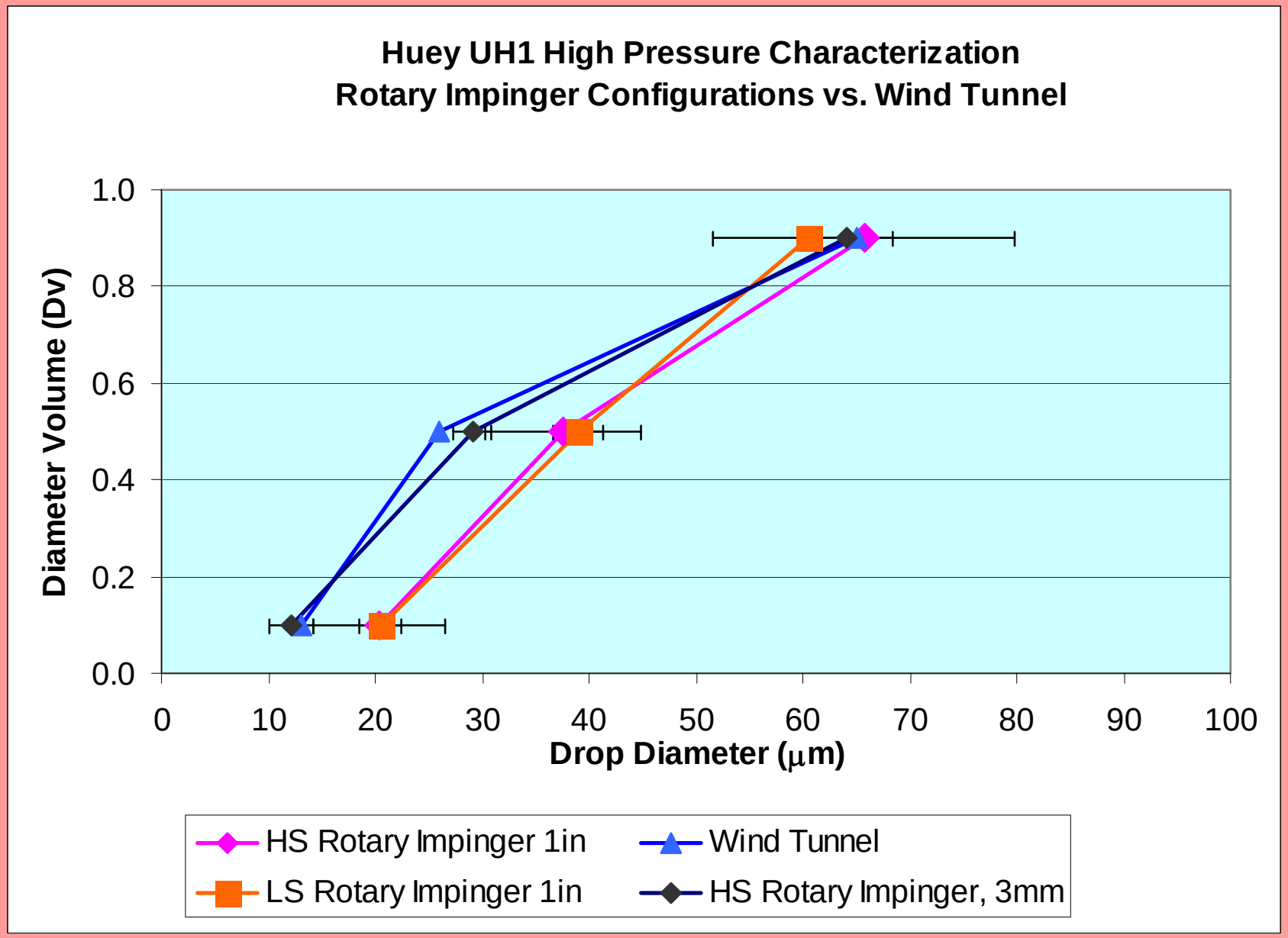
DC3, Huey UH1: 50 ft above ground, Into the wind.

3 Replicate Runs on Different Days

Mean $Dv_{(.1)}$ $Dv_{(.5)}$ $Dv_{(.9)}$ with 95% Confidence Interval
Yeoman's correction applied


Leco P1 Hand Held Characterization
Rotary Impinger Configurations vs. Wind Tunnel
Diameter Volume (Dv)
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
90
100
Drop Diameter (µm)
HS Rotary Impinger 1 in.
Wind Tunnel
LS Rotary Impinger 1 in.
HS Rotary Impinger 3mm


DC3 High Pressure Characterization
Rotary Impinger Configurations vs Wind Tunnel
Diameter Volume (Dv)
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
90
100
Drop Diameter (μm)
HS Rotary Impinger 1in
Wind Tunnel
LS Rotary Impinger 1in
HS Rotary Impinger, 3mm


Huey UH1 High Pressure Characterization
Rotary Impinger Configurations vs. Wind Tunnel
Diameter Volume (Dv)
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
90
100
Drop Diameter (μm)
HS Rotary Impinger 1in
Wind Tunnel
LS Rotary Impinger 1in
HS Rotary Impinger, 3mm

Summary

<u>What You See</u> is <u>What You Get</u>

The 3 mm high speed spinner most closely characterized the aerosol plume to match data of the wind tunnel when Dv(.9) < 100 μ.

The 1 inch high speed spinner produced data statistically the same as the 3 mm high speed and the 1 in. low speed spinner for aerosol plumes with Dv(.9) of < 100 μ.

Rotary impingers with 1 inch slides tend to over estimate the Dv() values for aerosol plumes with Dv(.9) of <100 μ.

Rotary impingers are an acceptable means of characterizing aerosol plumes with Dv(.9) of <100 μ when evaluating for Label compliance.

"When Yeoman's correction is applied"