

Life Science Application Whitepaper

Tare Volume recommendations for HIAC™ Systems using HRLD Sensors

Best Practice for setting Tare Volumes



Introduction

Selecting the appropriate Tare Volume for your application is one of the most critical elements for producing accurate, repeatable, and reproducible results. The below Tables will provide a Best Practice guideline to use as a baseline. It is not intended to be a “one size fits all” application note, but rather a jump off point.

"Best Practice" Tare volumes (in mL) for HIAC Systems using HRLD sensors

Sensor Flow Rate	Sample Inlet Probe			Syringe Size vs. Tare Volume setting		
	O.D.	Length	Volume	1 mL	10 mL	25 mL
10 - 25 mL	0.06"	3"	0.091 mL	0.25	1	3
	0.06"	5.5"	0.172 mL	0.4	1	3
	0.25"	5.5"	1.02 mL	*	3	3
60 - 100 mL	0.06"	3"	0.091 mL	**	1	3
	0.06"	5.5"	0.172 mL	**	1	3
	0.25"	5.5"	1.02 mL	**	3	3

Table 1

* Usable configuration, but not recommended

** Not a proper configuration

Note: Each syringe has a stated maximum volume error of 5% of the total volume

Note: It is acceptable to set up a method without a tare volume value as long as the option “DISCARD FIRST RUN” is selected. This method assures that a sufficient volume of sample is pulled through the system fully displacing any residual fluid or “dead volume” within the fluid measurement path.



"Minimum" Tare volumes (in mL) for HIAC Systems using HRLD sensors

Sensor Flow Rate	Sample Inlet Probe			Syringe Size vs. Tare Volume setting		
	O.D.	Length	Volume	1 mL	10 mL	25 mL
10 - 25 mL	0.06"	3"	0.091 mL	0.15	0.5	1.5
	0.06"	5.5"	0.172 mL	0.25	0.5	1.5
	0.25"	5.5"	1.02 mL	*	1.5	1.5
60 - 100 mL	0.06"	3"	0.091 mL	**	0.5	1.5
	0.06"	5.5"	0.172 mL	**	0.5	1.5
	0.25"	5.5"	1.02 mL	**	1.5	1.5

Table 2

Conclusion:

Whenever possible it is recommended to use the Best Practice (Table 1) above, however, it is understood that some critical applications either require measuring high value samples or samples that have a minimal sample volume available which will necessitate the use of the minimum tare volumes as shown in Table 2. However, when using the minimum tare volumes you will likely experience a higher variability from sample to sample. This is due to statistical realities. Small volume sampling accuracy can be validated with the use of available traceable Count Standards.

References:

USP 1788 and the forthcoming USP 1787 Chapter (on protein sampling) will provide good general information and guidance on sample preparation, methods, and system maintenance.



Author Biography

Bill F. Bars is a Technical Support Specialist for Hach Company in Grants Pass, Oregon, USA. He has created and developed many of the liquid systems production processes and procedural tools for the Hach Particle Counting Business Units products. These products include: HIAC 9703/9703+, 8103, 8011, and HRLD Sensors. He was a primary technical resource for the Hach Particle Counting ISO 17025 accreditation project which culminated in receiving their formal ISO Accreditation Certificate from A2LA. He received his Electronics Engineering degree from DeVry Institute of Technology in 1982. He has worked for Hach Company for 16 years in a multitude of engineering capacities ranging from Metrology to Service Training and Application Support.



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