



MAKERS OF RESPIRATORY VALVES SINCE 1938

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ISO 9001, ISO 13485, EN 46001

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Hans Rudolph, inc., Volume Calibration Syringe and NIST Traceability (WI/960241)

Dear Customer,

When you purchase a Hans Rudolph, inc. (HRI) syringe, it comes with a Certificate of Calibration, which shows the actual volume of the serialized syringe at the various calibration points. The calibration of that syringe was compared to the in-house transfer standard, whose volume is traceable to NIST (National Institute of Standards and Technology) by means of the ASTM (American Society of Testing and Materials) designation E 542 Standard Practice for "Calibration of Laboratory Volumetric Apparatus". This NIST traceable volume has a 0.1% full-scale accuracy. The syringes for purchase have a 0.5% full-scale accuracy.

Hans Rudolph, inc. uses a proprietary calibration method for ensuring the accuracy of each syringe sold. The method of calibration is verified daily with the NIST in-house transfer standard, once it has been verified, we can rely on the calibration results for the other syringes. For the larger 5530, 5570, and 4900 Series Syringes, we collect the output volume and employ an encoder (which has been characterized for this purpose) for the position, or the calculated volume. We then compare it to the setting, and accuracy, and record the volume output. This is provided to you on the Certificate of Calibration. For the smaller 5520, 5510, 5550, and 5540 Series Syringes, the method we use is similar, except that, we do not collect the volume output. In order to maintain the same accuracy, we accurately measure the cross-sectional area of the bore, and measure the length of the stroke.

Once the syringe has been calibrated, we certify that calibration for a full year, under normal laboratory conditions and usage. For newly purchased syringes, the calibration of the syringe is good for one year after your date of installation; (you may have to make changes to your calibration label accordingly).

The syringe is a mechanical device and, unless any critical to function parts are worn or damaged, should provide the customer with many years of service. HRI recommends that the customers recalibrate their syringe on a yearly basis, HRI could perform this service for them and provide them with a new Certificate of Calibration. Our service technicians examine the syringe for wear, and damages (if parts are worn/damaged, these will be quoted at that time), and completely rebuild and re-lubricate the syringe. Once the syringe is serviced, it then is leak-tested, and certified for accuracy, prior to delivery to the customer. This service and the new Certificate of Calibration are under warranty for a full year.

Please refer to the HRI catalog, and/or Syringe Data Sheet (P/N 691058) for the sizes, ordering information and the instructions for obtaining service for any HRI Product.

Best Regards,

Gilbert Snedden

Quality Assurance Manager