



MAKERS OF RESPIRATORY VALVES SINCE 1938

HANS RUDOLPH, inc.

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Data Sheet . . .

RUDOLPH VOLUME CALIBRATION SYRINGES

Series 5520, 5510, 5550, 5540, 5530, 5570, 4900

Our **Calibration Syringes**, having a known calibrated volume as a standard, provide an easy and reliable method of calibrating and measuring the accuracy of respiratory volume measuring equipment in the field on a regular basis to satisfy your **quality assurance program**.

The 3 Liter size Syringe has been recommended as a minimum standard by the "Report of 1977 Snow Bird Workshop on Standardization of Spirometry", as the minimum volume to test spirometers. Our 7 liter size is the largest size Syringe, known to us, to be commercially available. This larger size is very useful in checking your Spirometer through a full 7 liters in a single uninterrupted complete volume stroke.

SPECIFICATIONS

	(OEM)						
Model Series	5520	5510	5550	5540	5530	5570	4900
Total Volume	10ml	100ml	1/2L	1L	3L	3L	7L
Smallest Graduation (ml)	2	20	50	50	100	3000	100
Volume Stroke (inch)	3	5	6 1/4	12.38	14 3/4	14 3/4	15
(cm)	7.62	12.70	15.78	31.45	37.47	37.47	38.10
Cylinder Bore (ID)(inch)	1/2	1 1/4	2 1/2	2 1/2	4	4	6
(cm)	1.27	3.17	6.35	6.35	10.16	10.16	15.24
Weight (lbs.)	.17	.39	1.7	2	5	5.3	10
(grams)	75	175	771	907	2269	2411	4536

ADJUSTABLE POSITIVE STOP FOR SETTING VOLUME

These stops allow accurate repetitive duplication of your selected volume.

1/2, 1, 3 & 7 Liter Syringes -

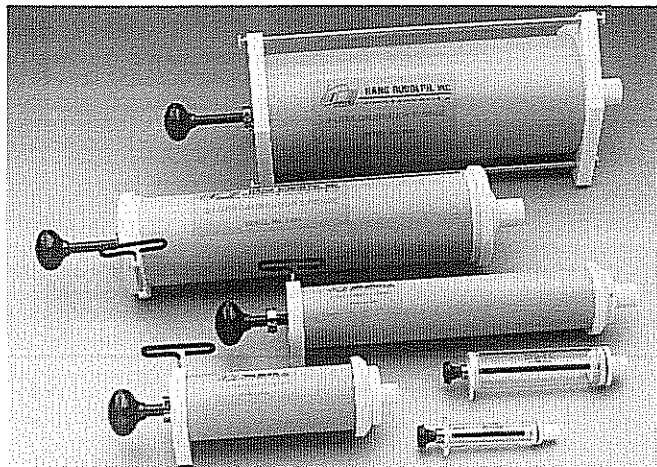
- The volume stop is easily located on the graduated piston rod for the desired volume.
- A socket-hex wrench is supplied for tightening the volume-stop
- The volume stop can be set throughout the entire 1/2, 1, 3 & 7 Liter range.
- The 5570 Series 3 Liter Syringe is factory set to 3L and is not adjustable.

100cc and 10cc Miniature Syringes -

- The method of setting the volume stop is unlike the 1/2, 1, 3 & 7 Liter Syringes.
- Each volume graduation on the piston rod has a groove which engages with a spring loaded detent, in the volume stop, for locating the desired volume. A screw, in the volume stop, is then tightened with a socket-hex wrench to securely hold the stop.
- These volume stops can only be set at the following graduations:
5510 Series - 20ml, 40ml, 60ml, 80ml & 100ml
5520 Series - 2ml, 4ml, 6ml, 8ml & 10ml.

OUTLET PORT ADAPTERS

- They thread into the end plate, making it convenient to use the various standards or custom OD / ID size connections. The 5570 Series 3L Syringe and some 5530 Series Syringes have integrally molded outlet adapters and are not removable.
- The 1/2, 1, 3 & 7 liter sizes have the same thread and are therefore interchangeable.
- The Miniature 100ml and 10ml Model end plates have different size threads for the outlet port adapters, therefore these outlet port adapters can NOT be interchanged.



QUALITY ASSURANCE

- Traceable to the National Institute of Standards and Technology (NIST).
- The accuracy of each syringe is $\pm 1/2$ of 1% full scale.
- Quality Assurance guidelines recommend that inspection and recalibration procedures of the syringe accuracy be performed three to four times a year, once a year at a minimum.

CONSTRUCTION

- 1/2, 1, 3 & 7 Liter cylinders are aluminum with hard anodize.
- 100 & 10 ml cylinders are acrylic plastic.
- Piston seal is Teflon, a registered Trademark of Du Pont Corp.
- Piston rod is aluminum, black anodize or stainless steel.
- End plates, port adapters are acetal, PET or PBT plastic.

MAINTENANCE / SERVICE (RE-CALIBRATION)

- Lubrication of seal should only be required once a year for the typical lab.
- For lubrication, we recommend silicone grease, our P/N 660170-9020.
- For any re-conditioning, recalibration, replacing piston seals or replacing end cap o-rings, we encourage your returning syringe to us.
- The cost is nominal. We will Quote you a firm price after an evaluation of your Syringe. Contact Hans Rudolph, inc. for a Return Authorization Number (RAN).
- A **Loaner Program** is available if your system must stay up and running. Contact Hans Rudolph, inc office for information.
- **CAUTION:**

Use extreme caution when the Seal/Piston Assembly is removed from the cylinder for cleaning or repairs. This seal material is very soft and will not maintain a leak free condition if it is scratched or dented on the sealing edge.

ORDERING INFORMATION

P/N-Model No.

Contact Hans Rudolph, inc. for order information on the 5570 3L OEM Version Syringe.

Select Model by your required size of Outlet Port Adapter.

5520 Series 10ml Syringe - 1/2"(1.3cm) Diameter Cylinder. Has 2ml graduations with positive adjustable locking stop. Full volume stroke is 3"(7.6cm)

112380-5520A 10ml Syringe with 200271 Outlet 15mmOD/10.5mmID tapers

112381-5520B 10ml Syringe with 200272 Outlet 22mmOD/15mmID tapers

Replacement Outlet Port Adapters for 10 ml Syringes

200271 Outlet Adapter 15mm OD/10.5mmID tapers

200272 Outlet Adapter 22mmOD/15mmID tapers

5510 Series 100ml Syringe - 1 1/4"(3.2cm) diameter cylinder. Has 20ml graduations with positive adjustable locking stop. Full volume stroke is 5" (12.7cm).

112378-5510A 100ml Syringe with 200269 Outlet, 15mmOD/10.5mmID tapers

112379-5510B 100ml Syringe with 200270 Outlet, 22mmOD/15mmID tapers

Replacement Outlet Port Adapters For 100ml Syringes

200269 Outlet Adapter 15mmOD/10.5mmID tapers

200270 Outlet Adapter 22mmOD/15mmID tapers

5550 Series 1/2L Syringe - 2 1/2"(6.35cm) diameter cylinder. Has 50 ml graduations with adjustable locking stop. Full volume stroke is 6 1/4"(15.78cm)

112742-5550 1/2 Liter Syringe with 200264 Outlet. 1 3/8"(35mm)OD/
1 1/8"(28.6mm)ID

112743-5550A 1/2 Liter Syringe with 200265 Outlet, 1 3/4"(44.5mm)OD/
1 1/8"(28.6mm)OD (Long OD tapered outlet)

112744-5550B 1/2" Liter Syringe with 200266 Outlet, 22mmOD/15mmID tapers

112745-5550C 1/2 Liter Syringe with 200267 Outlet, Fits over 2"(50.8mm)OD with
0-Ring slip fit

112746-5550D 1/2 Liter Syringe with 200268 Outlet, 1 1/8"(28.6mm)OD/22mmID
taper

5540 Series 1L Syringe - 2 1/2"(6.35cm) diameter cylinder. Has 50ml graduations with adjustable locking stop. Full volume is 12.38" (31.45cm).

112706-5540 1 Liter Syringe with 200264 Outlet, 1 3/8"(35mm)OD/
1 1/8"(28.6mm)ID

112707-5540A 1 Liter Syringe with 200265 Outlet 1 3/4"(44.5mm)OD/
1 1/8"(28.6mm)OD (Long OD tapered outlet)

112708-5540B 1 Liter Syringe with 200266 Outlet, 22mmOD/15mmID tapers

112709-5540C 1 Liter Syringe with 200267 Outlet, Fits over 2"(50.8mm)OD with
0-ring slip fit

112710-5540D 1 Liter Syringe with 200268 Outlet, 1 1/8"(28.6mm)OD/22mmID
taper

5530 Series 3L Syringe - 4"(10.2cm) diameter cylinder. Has 100 ml graduations with adjustable locking stop. Full volume stroke is 14 3/4"(37.5cm)

112028-5530 3 Liter Syringe with 200264 Outlet 1 3/8" (35mm) OD/
1 1/8"(28.6mm)ID

112231-5530A 3 Liter Syringe with 200265 Outlet 1 3/4"(44.5mm)OD/1 1/8"
(28.6mm)OD (Long OD tapered outlet)

112232-5530B 3 Liter Syringe with 200266 Outlet 22mmOD/15mmID tapers

112233-5530C 3 Liter Syringe with 200267 Outlet Fits over 2"(50.8mm)OD with
0-ring slip fit

112567-5530D 3 Liter Syringe with 200268 Outlet 1 1/8"(28.6mm)OD/22mmID
taper

4900 Series 7L Syringe - 6"(15.2cm) diameter cylinder. Has 100ml graduations with adjustable locking stop. Full volume stroke is 15"(38.1cm).

112092-4900 7 Liter Syringe with 200264 Outlet 1 3/8"(35mm)OD/1 1/8"
(28.6mm)ID

112234-4900A 7 Liter Syringe with 200265 Outlet 1 3/4"(44.5mm)OD/1 1/8"
(28.6mm)OD (Long OD tapered outlet)

112235-4900B 7 Liter Syringe with 200266 Outlet 22mmOD/15mmID tapers

112236-4900C 7 Liter Syringe with 200267 Outlet Fits over 2"(50.8mm)OD with
0-ring slip fit

112568-4900D 7 Liter Syringe with 200268 Outlet 1 1/8"(28.6mm)OD/22mmID
taper

**Replacement Outlet Port Adapters for 1/2, 1, 3, & 7 Liter
Syringes**

200264 Outlet Adapter 1 3/8"(35mm)OD/ 1 1/8"(28.6mm)ID

200265 Outlet Adapter 1 3/4"(44.5mm)OD/1 1/8"(28.6mm)OD taper (Long
OD tapered outlet)

200266 Outlet Adapter 22mmOD/15mmID tapers

200267 Outlet Adapter 2"(50.8mm)ID 0-ring slip fits over 2"(50.8mm)OD

200268 Outlet Adapter 1 1/8" (28.6mm)OD/22mmID taper

Replacement Parts for Syringes

171171 'T' Allen Wrench. For Series 5520 and 5510

171125 'T' Allen Wrench. For Series 5550, 5540, 5530, and 4900

171115 Setting Collar, stainless steel. For Series 5550, 5540, 5530 & 4900

200232 Setting Collar, ball plunger, stainless steel. For Series 5520 & 5510

171126 Knob. For Series 5550, 5540, 5530 and 4900

171168 Knob. For Series 5520 and 5510

REFERENCE

How to use a Volume Calibration Syringe for calibration checks of Volume
Spirometers. Refer to Chapter Eight, Calibration, of the book titled *Office
Spirometry, A Practical Guide to the Selection and Use of Spirometers*, by

Paul L. Enright and Robert E. Hyatt, published by Lea & Febiger, Philadelphia
PA USA 1987.

Recalibration of your Syringe, Contact Hans Rudolph, inc. for Return
Authorization Number (RAN):

955034 Recalibration of 4900 Series 7 Liter Calibration Syringe

955052 Recalibration of 5570 Series 3 Liter Calibration Syringe

955035 Recalibration of 5530 Series 3 Liter Calibration Syringe

955036 Recalibration of 5540 Series 1 Liter Calibration Syringe

955037 Recalibration of 5550 Series .5 Liter Calibration Syringe

955038 Recalibration of 5510 Series 100 ml Calibration Syringe

955039 Recalibration of 5520 Series 10 ml Calibration Syringe

955051 **Dead Space Measurement of New Syringe**, (All Series)

955050 **Recalibration and Dead Space Measurement of returned
syringe**. Order at time of obtaining a Return Authorization Number
(RAN). (All series). Certificate of calibration provided.

IN-COMING CALIBRATION REPORT - on returned calibration
syringe. This report must be requested at time of obtaining Return
Authorization Number (RAN). 5-7 Data points will be checked with
pass or fail indications.

955312 In-Coming Calibration on 4900 series 7 liter calibration Syringe

955315 In-Coming Calibration on 5570 series 3 liter calibration Syringe

955311 In-Coming Calibration on 5530 Series 3 liter Calibration Syringe

955310 In-Coming Calibration on 5540 Series 1 liter Calibration Syringe

955309 In-Coming Calibration on 5550 Series .5 liter Calibration Syringe

955308 In-Coming Calibration on 5510 Series 100 ml Calibration Syringe

955307 In-Coming Calibration on 5520 Series 10 ml Calibration Syringe

CERTIFICATE OF CALIBRATION - Provides National Institute of
Technology (NIST) traceability to Hans Rudolph, inc. syringe test
standards and actual volume calibration data (5-7 points) on your
syringe with stated accuracy.

955306 Certificate of Calibration on 4900 series 7 liter calibration Syringe

955316 Certificate of Calibration on 5570 series 3 liter calibration Syringe

955305 Certificate of Calibration on 5530 Series 3 liter Calibration Syringe

955304 Certificate of Calibration on 5540 Series 1 liter Calibration Syringe

955303 Certificate of Calibration on 5550 Series .5 liter Calibration Syringe

955302 Certificate of Calibration on 5510 Series 100 ml Calibration Syringe

955301 Certificate of Calibration on 5520 Series 10 ml Calibration Syringe

NIST TRACEABILITY of your Rudolph Volume Calibration Syringe
with 5 to 10 times greater accuracy than standard certificate of
calibration. Hans Rudolph, inc. will certify the volume displacement of
any specified reading(s) per your request. The price includes standard
certificate of recalibration/calibration. The price is per graduation mark
(contact HRI for special pricing on 5 or more points per syringe).

955046 Certificate of Traceability to NIST (Syringe Volume Setting).

CLEANING

This product requires special cleaning and care, which is described in
our **Cleaning, Disinfection, Sterilization and Maintenance Data Sheet
691203**. Request this data sheet if not already in your possession. Make
sure you fully comprehend this 691203 data sheet before proceeding
with cleaning a Rudolph product.

Caution!

• Do Not expose this product to heat at or above a temperature of
45°C(113°F).

APPLICABLE STANDARDS FOR MEDICAL TAPERED CONNECTIONS: 7.5mm, 10.5mm, 15mm, 22mm & 30mm

The 15mm, 22mm and 30mm tapered male and female diameter fitting
connections are manufactured in accordance with the applicable standards
as follows:

- American Society of Testing and Materials (ASTM). Designation: F1054-
87 standard specification for conical fittings of 15mm and 22mm sizes.
Available from ASTM, Philadelphia, Pennsylvania U.S.A.
- ISO (The International Organization for Standardization) 5356-1 1987
(E) conical connectors, cones and sockets. Available from ISO, Case
Postale 56, 1211, Geneva 20, Switzerland.

All 7.5mm and 10.5mm male and female diameters are also tapered,
but at this printing there are not any standards available. Hans Rudolph,
inc. has designed and manufactured these two sizes with parameters
similar to the 15mm and 22mm standards. Diameters other than the
above five sizes are straight unless otherwise noted.

Inspection and Usage

A visual inspection of the mating tapers should be made to verify a good
clean surface free of nicks or scratches, which would allow a wrung grip
to disconnect prematurely.

There should be no perceptible rocking in any direction when the compo-
nents are wrung together.

If accidental disconnection is a safety or critical concern, the user should
attach elastic band or other devices to prevent separations of the connecting
components.

GENERAL INFORMATION

- Packaged: Individually polyethylene bagged and shipped clean, non-
sterile.
- Designed and manufactured for multiple patient use.