



## DEAD SPACE

### SOL-CARE™ Safety Needles SOL-M™ Standard Hypodermic Needles

#### Test method for determination of dead space using distilled water

##### Principle

The needle is weighed dry and after having been filled with, and emptied of, water. The dead space is inferred from the mass of the residual water.

##### Reference

Test method in accordance with ISO 7886-1:2017 Annex C applied for the needle.

##### Apparatus

- Analytical balance.
- Distilled water at a temperature of 18°C to 28°C.

##### Sampling

Test 10 pieces for each REF.

##### Products tested

The needles tested are listed below:

SN2310	SOL-CARE Safety Needle 23G*1"
SN23125	SOL-CARE Safety Needle 23G*1 1/4"
SN2315	SOL-CARE Safety Needle 23G*1 1/2"
SN2558	SOL-CARE Safety Needle 25G*5/8"
SN2510	SOL-CARE Safety Needle 25G*1"
SN2515	SOL-CARE Safety Needle 25G*1 1/2"
112115	SOL-M Hypodermic Needle 21G*1 1/2"
112310	SOL-M Hypodermic Needle 23G*1"
1123125	SOL-M Hypodermic Needle 23G*1 1/4"
112315	SOL-M Hypodermic Needle 23G*1 1/2"
112506	SOL-M Hypodermic Needle 25G*5/8"
112510	SOL-M Hypodermic Needle 25G*1"
112515	SOL-M Hypodermic Needle 25G*1 1/2"



132115	SOL-M Hypodermic Needle 21G*1 1/2"
132310	SOL-M Hypodermic Needle 23G*1"
1323125	SOL-M Hypodermic Needle 23G*1 1/4"
132315	SOL-M Hypodermic Needle 23G*1 1/2"
132506	SOL-M Hypodermic Needle 25G*5/8"
132510	SOL-M Hypodermic Needle 25G*1"
132515	SOL-M Hypodermic Needle 25G*1 1/2"

### Procedure

Remove the needle cap and weigh the empty needle.



Firmly attach the needle to the 1ml syringe Luer Slip Tip, fill to the nominal capacity graduation line with distilled water, taking care to expel all air.



Expel the water by fully depressing the plunger, and wipe dry the outer surfaces of the needle in case of water drops presence externally of cannula needle.

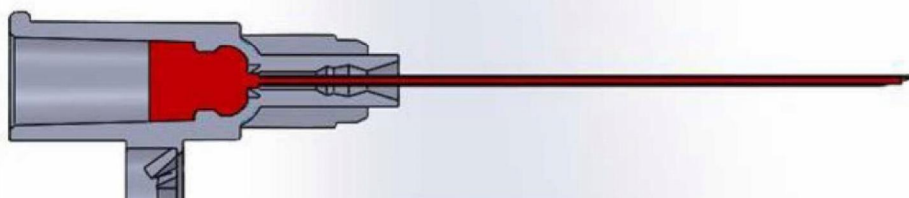


Detach the needle from the syringe and reweight the needle.



Determine the mass, in grams, of water remaining in the needle by subtracting the mass of the empty needle from the mass of the needle after expulsion of the water.  
 Record this value as the dead space in millilitres, taking the density of water as 1.000 kg/m<sup>3</sup>.

Below a CAD drawing simulation which is showing the dead space measured (in red).



## Results

In the following tables the results found:

REF	Description	DEAD SPACE				
		Average		Min	Max	Dev. St.
		( $\mu$ l)	(ml)	(ml)	(ml)	(ml)
SN2310	SOL-CARE Safety Needle 23G*1"	<b>46</b>	0.0459	0.0432	0.0493	0.00203
SN23125	SOL-CARE Safety Needle 23G*1 1/4"	<b>52</b>	0.0515	0.0492	0.0565	0.00222
SN2315	SOL-CARE Safety Needle 23G*1 1/2"	<b>50</b>	0.0499	0.0466	0.0573	0.00390
SN2558	SOL-CARE Safety Needle 25G*5/8"	<b>42</b>	0.0416	0.0406	0.0422	0.00060
SN2510	SOL-CARE Safety Needle 25G*1"	<b>43</b>	0.0426	0.0412	0.0452	0.00116
SN2515	SOL-CARE Safety Needle 25G*1 1/2"	<b>49</b>	0.0485	0.0475	0.0494	0.00070
112115	SOL-M Hypodermic Needle 21G*1 1/2"	<b>48*</b>	Estimated data			
112310	SOL-M Hypodermic Needle 23G*1"	<b>47</b>	0.0468	0.0408	0.0511	0.00302
1123125	SOL-M Hypodermic Needle 23G*1 1/4"	<b>46</b>	0.0455	0.0365	0.0524	0.00447
112315	SOL-M Hypodermic Needle 23G*1 1/2"	<b>39</b>	0.0391	0.0329	0.0428	0.0037
112506	SOL-M Hypodermic Needle 25G*5/8"	<b>36</b>	0.0358	0.0255	0.0434	0.00602
112510	SOL-M Hypodermic Needle 25G*1"	<b>43</b>	0.0426	0.0376	0.0458	0.00221
112515	SOL-M Hypodermic Needle 25G*1 1/2"	<b>38</b>	0.0378	0.0336	0.0412	0.00231
132115	SOL-M Hypodermic Needle 21G*1 1/2"	<b>48*</b>	Estimated data			
132310	SOL-M Hypodermic Needle 23G*1"	<b>47*</b>	Estimated data			
1323125	SOL-M Hypodermic Needle 23G*1 1/4"	<b>46*</b>	Estimated data			
132315	SOL-M Hypodermic Needle 23G*1 1/2"	<b>39*</b>	Estimated data			
132506	SOL-M Hypodermic Needle 25G*5/8"	<b>36*</b>	Estimated data			
132510	SOL-M Hypodermic Needle 25G*1"	<b>43*</b>	Estimated data			
132515	SOL-M Hypodermic Needle 25G*1 1/2"	<b>38*</b>	Estimated data			

Lugano, 24<sup>th</sup> February 2021

Author:

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