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Title	Polyester Swab Rolling			Authors	Yousif Alkandry kandiri96@gmail.com Ahmad Alsharhan alsharhan73@gmail.com

1. Purpose

To describe how to roll polyester on a 3D Printed Nasal Swab for COVID-19 Swab Testing.

2. Scope

This document applies to the 3D Printed COVID-19 Nasal Swab Tests.

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3. Equipment, Materials, and Manufacturing Aids

- Polyester Fibers
- 3D Printed Nasal Swab (PLA)
- Polyester Roller Tool



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4. Nasal Swab Test Assembly

Step	Action
1	<p>Place an appropriate amount of polyester on top of the open channel on the Swab Roller Tool. See figure 1.1.</p> <p style="text-align: center;">Figure 1.1</p> 
2	<p>Place the tip section of the nasal swab (with the 6 teeth) on top of the polyester. Push down the polyester all the way into the Swab Roller Tool with the swab. See figures 2.1 & 2.2.</p> <p style="text-align: center;">Figure 2.1</p>  <p style="text-align: center;">Figure 2.2</p>  <p>NOTE: Ensure that the swab's teeth are orientated vertically for it to be able to enter the open channel. See Figure 2.2</p>
3	<p>Roll the swab <i>clockwise</i> until the polyester is pulled through the channel and wrapped around the swab's tip. See figures 3.1 & 3.2.</p> <p style="text-align: center;">Figure 3.1</p>  <p style="text-align: center;">Figure 3.2</p>  <p>NOTE: Ensure that the amount of polyester isn't too little or too much. An indication would be too little or too much friction while rotating the nasal swab.</p>

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Lift the swab slightly to line it up with the quality check circular hole located on the side. Steadily guide the swab out of the quality check hole while feeling the amount of friction as it exits. See figures 4.1 & 4.2.

Figure 4.1

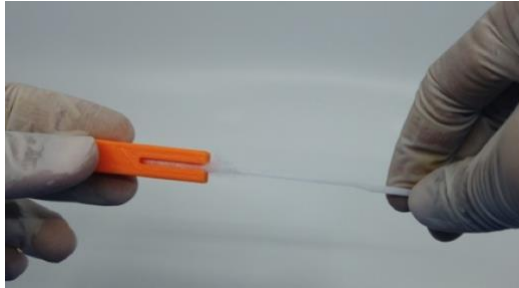
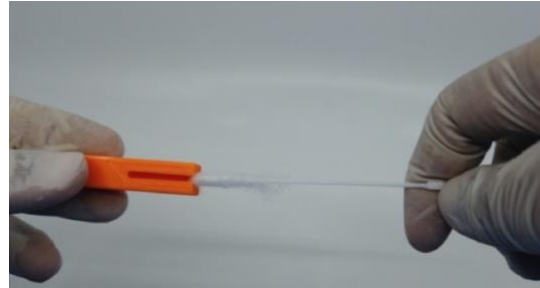


Figure 4.2



NOTE: To ensure a uniform placement of polyester, the friction should be moderate as the swab exits the quality check hole. Too little or too much friction indicates an inappropriate amount of polyester usage.

5

Manually wrap the loose fibers at the end of the polyester section flush with the swab. See figures 5.1 & 5.2.

Figure 5.1

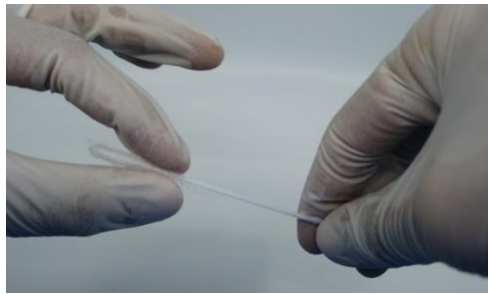




Figure 5.2





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5. Operational Method Sheet

- OMS icons shown below will provide the technician quick information and awareness during each step to ensure a proper assembly line.

	<p>Yellow circles represent the successive manufacturing steps required to complete the job. (e.g. assembly steps, quality check, cutting, etc.)</p> <p>These instructions will ensure that the technicians manufacture the part to a consistent quality.</p>
	<p>Blue circles indicate key features that must be checked after performing a certain step.</p>

NOTE: Examples that represent acceptable or undesirable outcomes of steps will be provided and denoted by the following symbols:	
	Green check indicates examples of desired outcome.
	Red X indicates examples of undesirable outcome.

**NOTE: These visual aids are a supplement to process step descriptions, not a replacement.*


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OMS ID: 00001	Process ID: Polyester Swab Rolling	 : JOB CONTENT  : GOOD  : CHECK  : BAD
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1

Place an appropriate amount of polyester on the channel opening of the Swab Roller Tool.



 Good amount of Polyester.




 Excess amount of Polyester.


2

Place the tip section of the nasal swab on top of the polyester. Push down the polyester all the way into the Swab Roller Tool with the swab.




 Swab's teeth must be orientated vertically to be able to enter.






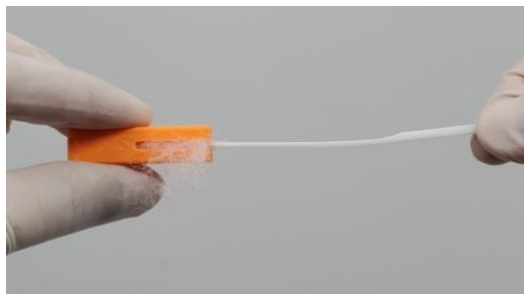





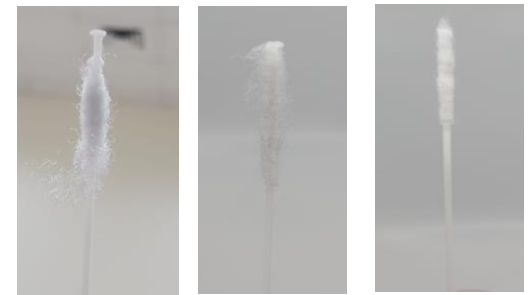



 Teeth are oriented vertically, swab enters easily the channel.



 Teeth are oriented horizontally, swab won't be able to enter.

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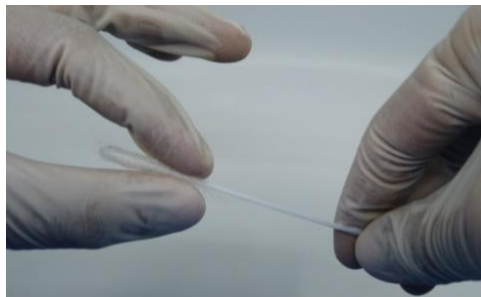
OMS ID: 00001	Process ID: <p style="text-align: center;">Polyester Swab Rolling</p>	
<p>3</p> <p>4</p>	<p>Roll the swab <i>clockwise</i> until the polyester is pulled through the channel and wrapped around the swab's tip.</p> <p>Lift the swab slightly to line it up with the quality check circular hole located on the side.</p>	<div style="display: flex; justify-content: space-around;"> <div data-bbox="273 519 798 812">  <p> Too much or too little friction while rotating indicates inappropriate amount of polyester used.</p> </div> <div data-bbox="871 519 1396 812">  <p> Swab rotating with moderate amount of friction, indicates good amount of polyester used.</p> </div> <div data-bbox="1470 519 1995 812">  <p> Swab experiencing great amount of friction causing it to twist, indicates over use of polyester.</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div data-bbox="273 998 798 1291">  <p> Steadily guide the swab out of the quality check hole while feeling the amount of friction as it exits.</p> </div> <div data-bbox="871 998 1396 1291">  <p> Good sample exiting from the quality check hole.</p> </div> <div data-bbox="1470 998 1995 1291">  <p> Low polyester usage results in exposed tip / non-uniform distribution.</p> </div> </div>


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OMS ID: 00001	Process ID: Polyester Swab Rolling	 : JOB CONTENT  : GOOD  : CHECK  : BAD
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5

Manually wrap the loose fibers at the end of the polyester section flush with the swab.



 Final Result – Good Sample