Technical update

Title	ICAR approval
Subject	Technical update ICAR approved Shuttle XY
Date	21-Jul-14
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1   Introduction

The milk recording device Shuttle XY is tested for a period of time resulting in ICAR approval. The approval is applicable for the Shuttle XY on all Astronaut milking robots. Some modifications are required to comply to the ICAR standard. Resulting in better mixing of the milk in the milk jar, reducing cleaning water remaining and ensuring minimal carry-over during sampling.

This document will describe required modifications to comply to ICAR and will be a guideline for correct sampling.
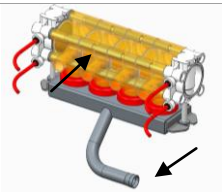
2   ICAR update matrix

Required modifications can be found in the update matrix and will be explained below.
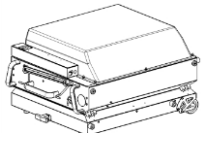**Modifications are required to comply to ICAR**

Y= needs update
N/A = Not applicable, no update is required.

#	Img.	Part / Process / Setting	Description	Robot A2-A3	Robot A3N	Robot A4
1		9.1065.0074.2 (100m) Silicone tube	Inner diameter to 4mm Max. length of sample tube 1meter.	Y	Y	**Y:** SN <3170637 (4/10/'13) **N/A:** for newer models
2		5.1004.1615.0 Connection nipple	Inner diameter to 4mm	Y	Y	**Y:** SN <3170637 (4/10/'13) **N/A:** for newer models
3		5.1004.0226.0 Milk manifold / Pre-milk manifold	bigger drain holes, 10.5mm (inside) bigger drain pipe inside to 12mm	N/A	N/A	**Y:** SN <3157694 (5/3/'13) **N/A:** For newer models
4		222158 Six-fold tube	bigger inner diameter of PRE drain 6-folded tube 14mm	N/A	N/A	**Y:** SN <3161129 (19/4/'13) **N/A:** For newer models
5		5.1001.6659.0 Nipple (2x)	Bigger connector pipe of drain tube. Inner diameter increased, 13mm	N/A	N/A	**Y:** SN <3161129 (19/4/'13) **N/A:** For newer models
6		9.1185.0013.3 (30m) Tube (2x)	Bigger inner diameter (14mm) drain tube at separator	N/A	N/A	**Y:** SN <3161129 (19/4/'13) **N/A:** For newer models
7		Robot Software 4.1 or newer	Version with improved sampling process A3N and A4 and longer addition pumping time A2 for data communication with Shuttle XY	Y Latest A2 Version	Y	Y

-		Shuttle XY	Shuttles will be updated with improved fill head and pins. Exchanged in the factory organized by CRV. List of updated Shuttles is available on request.	-	-	-

So the A2, A3 and A3N only need a sample nipple, tube and software update to comply to ICAR. The 'older' types of A4 need to be updated with multiple modifications.

3 Modifications

3.1 Sample tube improvement #1,2

The inner diameter of the sample tube and nipple is changed to 4 mm. The bigger inner diameter will result in more effective mixing end of milking and slightly improve fill time of the bottle. See #1 and 2 in the ICAR update matrix.

3.2 Water remaining improvements #3-7

A little amount of water remains during cleaning cycles. Water will remain in edges, tubes and parts. The amount of water will influence the freezing point and is found critical on the A4 robot due to new milk pump system. Additional water collected in the stainless steel tube under the milk jar before the milk pump will influence the mixing of the total.
The milk manifold, pre-milk, 6-fold tube, nipples and tubes are changed. Also the drain cycle during the Lely wash is improved in Robot software version 3.0 SR2. See #3-7 in the ICAR update matrix
How to replace the parts can be found in the A4 service manual.

3.3 Software update #7

The software is changed in different versions, each version is explained below.

Version 3.0 SR2 (09-2013): A3N and A4
Together with the hardware changes, the water remaining during the Lely Wash is negligible.
The software will use an optimized drain cycle during the Lely wash, timing and vacuum level are improved.

Version 3.0 SR4 (01-2014): A3N and A4
End mixing in milk jar is improved. Longer more effective mixing end of milking.

Version 4.1 (05-2014) : A3N and A4
To ensure the milk jar doesn't consist milk from the previous cow, the software is changed:
1. Longer pumping time during sampling process. Will ensure empty jar after milking
2. When sample process is activated on the Robot, one pump stroke will be executed.
3. When sample process is activated on the robot during milking, pump time is added to ensure empty milk jar. But sample will be taken next milking.

The A2 Robots requires an extra 7 pins connector and the latest software version to communication with Shuttle XY.

4 Guideline for correct sampling

Handling of the Shuttle
- Maximum slope of the floor where the SHUTTLE is installed: 3° If not the level is to high detection full sample bottle.
- Floor level where the SHUTTLE is installed: 36 cm-150 cm below the 5-kg level of the milk jar.
- Do not move the Shuttle during sampling. Close all caps of the vials before moving. A small drop spilled on the edge of the vail can have big influence on the fat percentage.

Operating of Shuttle / Robot
- Use operator manual the operator manual chapter
- Clean the measuring pins of the fill head before sampling with a decreaser, like Astri-TDS.
- Check correct function of fill head Shuttle XY. Milk of previous cow is flushed passing the fill head passing the loop to the antenna and must not flow back into the sample bottle. Little backflow is allowed, approx. 2 cm backflow during filling of the vial.
- Vails must not be filled untill the top, about 0.5 cm of air is required for good mixing preservative and fat content in labrotory
- Always check sharp bend in sample tubing. This can block the flow.
- During end mixing (bubbling) the vacuum level should be reaching 48 kPa for at least 10 sec.
- Check water leakage on top of the milkjar during 1 milking, some drops are allowed
- End of sampling the milk must comply pumped away. No milk remainings are alowed, this will influence next sample. The influence of milk foam is allowed.

Correct Settings
- Type of Rack = Shuttle XY, Fill time = 30 seconds
- Air pressure Shutt-off sleeves Air pressure setting at 2.0 bar. Should not leak (to be tested)
- Check CU settings for optimal performance during cleaning (lely wash):
  - Air pressure setting = min. 6.2bar
  - Air pressure Blow empty = 4 bar
  - Water pressure reducer setting = installation manual A3 A4 2 – 4 bar

Trouble shooting can be found in the operator manual chapter 8 and make use of the trouble shooting card