



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Network. Guidelines. Certification.

ICAR Measuring, Recording & Sampling Devices Subcommittee (MRSD-SC) Update

Field Services Advisory Committee

March 3, 2020

Steven Sievert

Technical Director, National DHIA/Quality Certification Services. Inc.

Chair, ICAR Subcommittee for Measuring, Recording and Sampling Devices

Recent ICAR Device Tests – Data Can be Sent to CDCB

Manufacturer	Device	Mounting	Resources Available from National DHIA
Afimilk	MPC	High Line Swing-Over	<ul style="list-style-type: none"> • New Calibration Procedure • New Operator Manual
Elcabe	ARGI	Sheep	February 2019
DeLaval	VMS 300 with DeLaval VMS Sampler	AMS	<ul style="list-style-type: none"> • Operator Manual for VMS and Sampler
Galaxy (Hokofarm)	Galaxy Astrea 20.20 Premium with Ori-Collector	AMS	<ul style="list-style-type: none"> • Calibration Instructions • Operator Manual for Ori-Collector
Lely	A5 with Ori-Collector	AMS	<ul style="list-style-type: none"> • Operator Manual for A5

Planned ICAR Testing – Data Cannot be Sent to CDCB

Manufacturer	Device	Mounting	Anticipated Timeframe * Subject to change based on manufacturer activity
Nedap	Smart Flow with SAC Manual Sampler	Low Line	Test delayed to Q3 2020
Waikato	EMM with Manual Sampler	Low Line	Test in progress
GEA	Monobox	AMS	Delayed for poor results – restart unknown
SAC	IDC 3 IDC 3b	High Line Low Line	Final review of test results
DeLaval	VMS 300 with Ori-Collector	AMS	Q2 2019 – may be delayed due to issues in mixing of milk when in combination with Ori-Collector. Also want to make sure test includes V300 with Herd Navigator
GEA	Dairy Pro Q with Turn & Mix Sampler	Rotary Robot	Unknown - Issues remain with carryover and quarter flow of milk

Planned ICAR Testing – Data Cannot be Sent to CDCB

Manufacturer	Device	Mounting	Anticipated Timeframe * Subject to change based on manufacturer activity
Boumatic	SR1 & DR1with Ori-Collector	AMS	Target is Late 2020 – which AMS version?
DeLaval	<i>New Goat & Sheep Meter – Unnamed Model</i>	High Line	Winter 2021
Fullwood	Merlin M2 with Ori-Collector	AMS	Q3/Q4 2020
Boumatic	Smart Flo with Perfection Sampler	High Line Low Line Goats/Sheep Swing-Over	Summer 2020 – concern over stability of components and changes in algorithms in software
Waikato	<i>New Mechanical Meter</i>	Low Line High Line Goats Sheep	Delayed – looks promising but zero-tests (internal) do not meet ICAR guidelines

AMS (Robotic) & Sampling Shuttles

Robot Models

- MR-S1, MR-S2
- MR-D1, MR-D2

There is no ICAR-certified shuttle with Boumatic robots including the Ori-Collector [failed test] or Lely Shuttle A [never tested]

Met with Boumatic Robotics staff in USA and Netherlands multiple times on testing – mixed signals on testing plan from Boumatic at this time

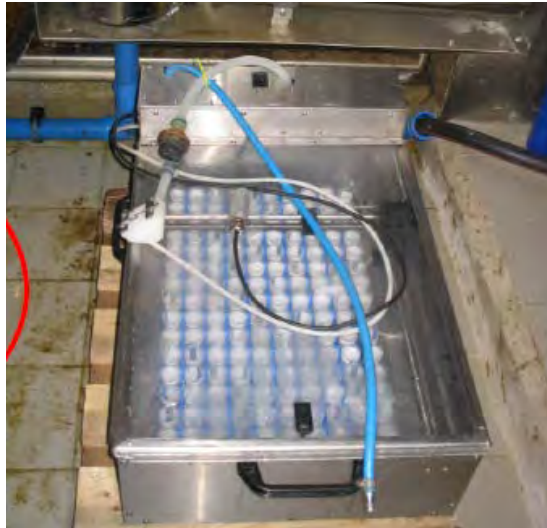




Robot Models:

- DeLaval VMS (original)
- DeLaval VMS 2007
- DeLaval VMS 2010
- DeLaval VMS 2012
- DeLaval V300

DeLaval VMS Sampler with all models



Ori-Collector is certified with models **except the V300 – test planned in 2019 but delayed due to milk mixing when connected to Ori-Collector**

New VMS calibration procedure and sampler manuals on USB drive



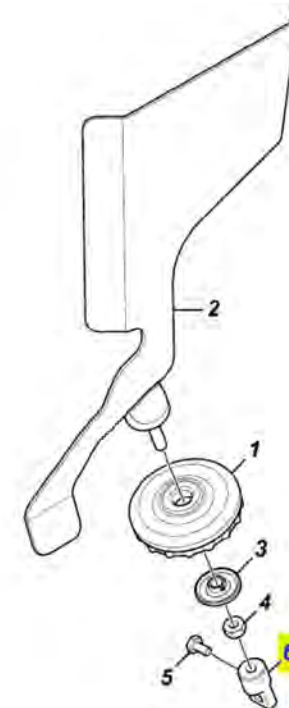
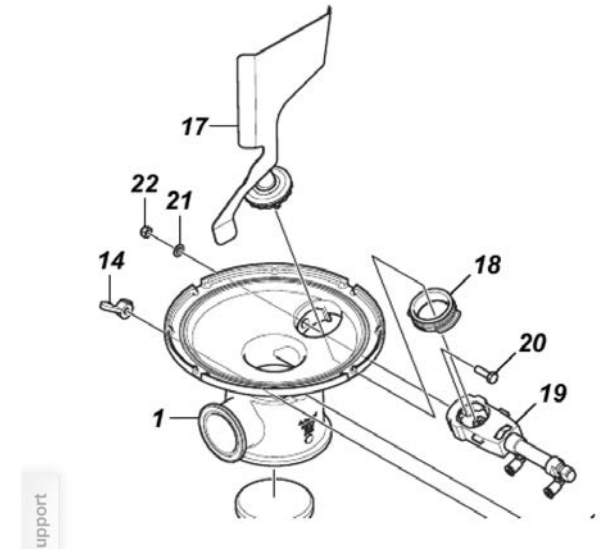
V300 Oscillating Paddle Issues

First observed in USA and Canada – pin on paddle breaks off [and remains inside receiver jar] – result was milk not mixed and DHI samples were significantly lower in fat percentage

DeLaval investigated and duplicated the problem

Technical bulletin and short video clip for DHI techs on issue issued in July 2019 – techs should listen and verify before starting herd test

DeLaval is re-engineering the connection pin and replacing at no cost





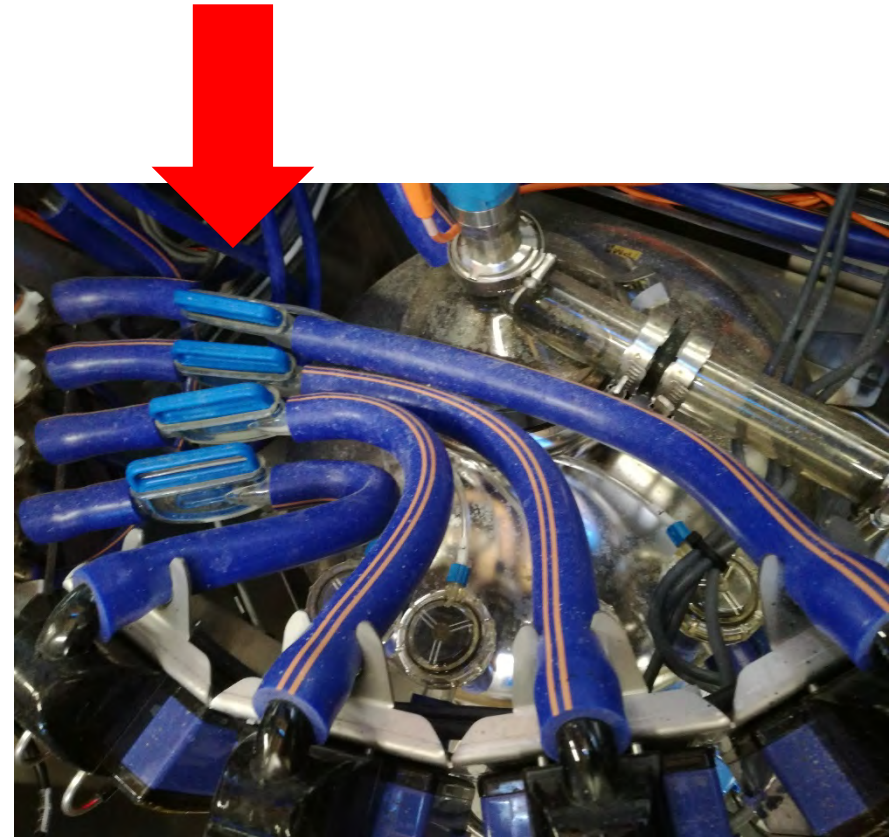
Use of Non-OEM Screens in V300

Third-party [Ambic] screens added to V300 prior to receiving jar by DeLaval dealers

Violation of the PMO in the USA, legal in Canada, France, Netherlands

Calibration of V300 may not be accurate related to higher variability during test procedure

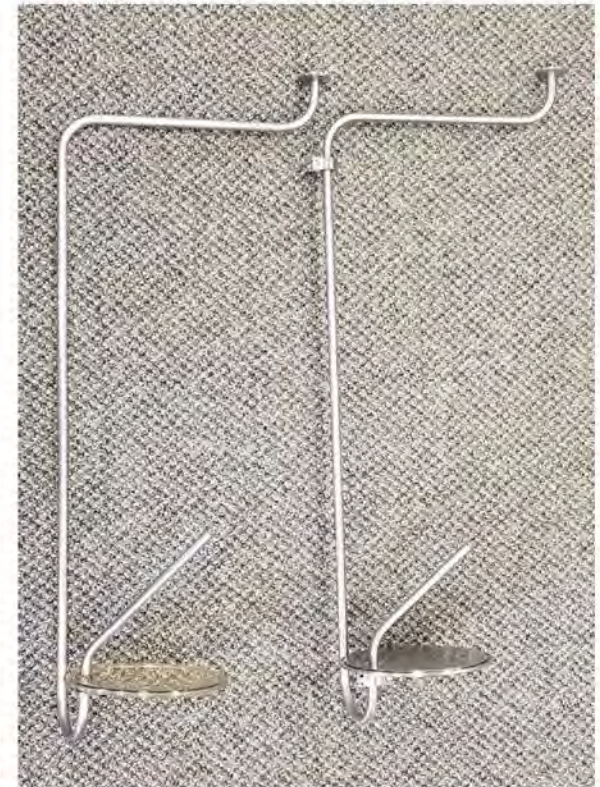
Must be removed for calibration and for testing – potential influence on accuracy of weights and sampling



- Modification of Mix-Pipe by DeLaval
- Changes meet FDA and PMO
- Certified by ICAR RSD-SC in November 2018
- Waiting on DeLaval ship replacements from Europe

VMS Mix Pipe Comparison

On the left with the poly cover is the original and on the right is the redesign





Galaxy Astrea 20.20 Premium marketed by Galaxy USA

Similar to other models from Hokofarm Group

SAC Futureline Max (Scandinavia)

System Happel TIM (Germany, Austria, Poland)

ICAR-Certified with Ori-Collector in late 2018

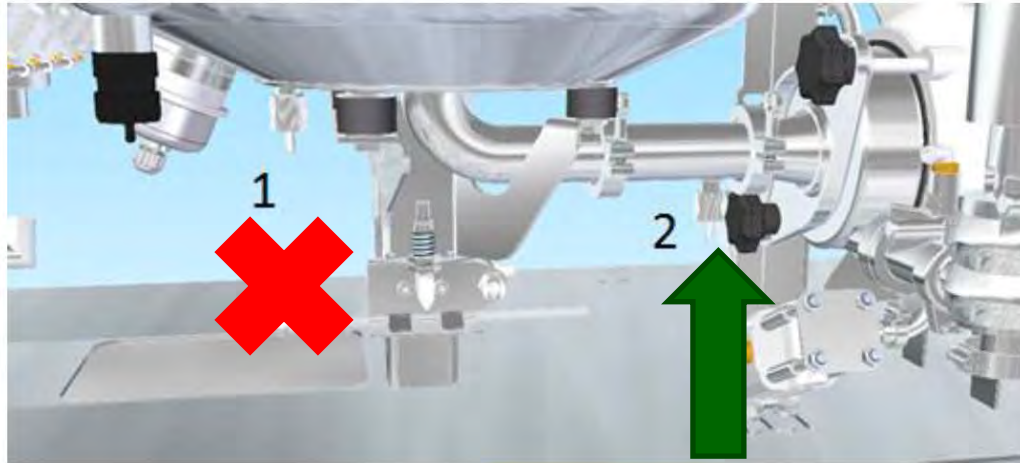


Figure 1 Detail view milk receiver and milk pump for systems build from 2013 or younger. The service pipe between both has a sample connector (2) for ICAR approved sampling. The old connector (1) needs to be trimmed to prevent usage on a later stage.

For systems manufactured from 2011 till 2013 no hardware changes are necessary . The dummy connector placed in the rubber connector can be removed and the sample connector can be placed. The rubber connector is highlighted at place 1 in Figure 2.

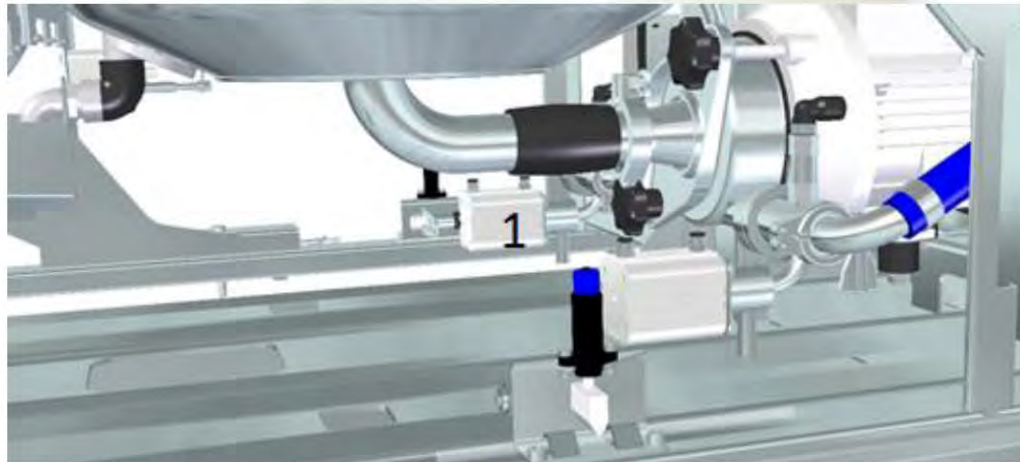


Figure 2 Detail view milk receiver and milk pump for systems build between 2011 till 2013. The sample connector can be placed in the rubber connector between milk receiver and milk pump (1).





AMS Galaxy USA Volume 3 Astrea 20.20 Maintenance Procedures

Milk Meter Calibration	03.19 Revision 0 October 2014 Page 1 of 1
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Denotes Revision

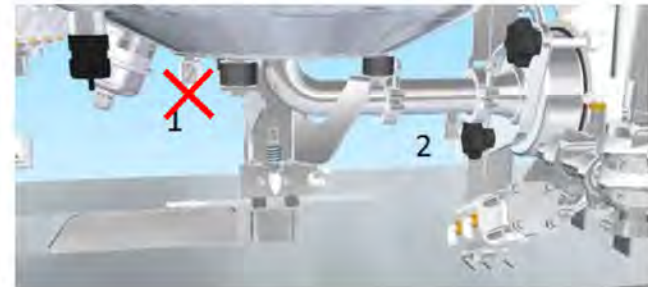
1. **PURPOSE**
The purpose of this document is to provide instructions.
2. **SCOPE**
This procedure applies and shall be used by all technicians.
3. **SUMMARY**
This can be used as a guide for the service agencies. Under normal circumstances, this can be used as a guide for the service agencies. Under normal circumstances, this can be used as a guide for the service agencies.
4. **PROCEDURE**
 - 4.1. To calibrate the milk meter you need to be sure so it is possible to measure the amount of milk which is shown in the SCU.
 - 4.2. Gather the following tools.
 - 4.2.1. Calibrated digital scale that measures necessary.
 - 4.2.2. Temporary Hoses
 - 4.2.3. Milker Bucket
 - 4.3. Put the MCU in "Service" mode.
 - 4.4. Remove the hose between the milk meter and milker bucket as shown in the diagram and

AMS Galaxy USA Volume 2 Astrea 20.20 Operating Procedures

Ori Sampling Rack Setup and Milk Testing	02.12a Revision 0 July, 2018 Page 1 of 15
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Denotes Revision

1. **PURPOSE**
The purpose of this document is to provide guidelines for getting milk samples with an Ori Collector. The Ori Collector is the only device approved by ICAR for use with the Astrea 20.20 for official milk sampling. The Lely Shuttles can still be used for unofficial sampling (Procedure 02.12). This collector is found to be faster than the sample shuttle and will only cost a small amount of box time. The rack can also hold 90 bottles each and so in the case where cows visit the robot more on Box 1 vs. Box 2, there is ample capacity to accommodate for non-uniform visits.
2. **SCOPE**
This procedure applies and shall be used by farm owners, AMS Galaxy USA support staff and DHI Testers. ICAR approved sampling is only on systems running RDS software 4.1 or greater, and which have a sampling nipple located in the milk pipe leading to the milk pump (2). Sampling Nipple in the receiver jar (1) are NOT ICAR approved. For more information regarding upgrading to ICAR approved sampling, see appendix.



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Bradley Biehl	
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Resources Available

- Calibration Manual
- Ori-Collector Manual
- Technical Bulletins



MIOne

Must use the GEA sampler with MIOne systems

The Ori-Collector is not certified [failed ICAR test] with the MIOne



R9500 [Monobox]

The R9500 is not ICAR-certified with any sampler – currently working with GEA on testing and approval – test began in October 2018 and aborted due to poor results. ICAR test centres are still waiting for GEA to address issues and resume testing.

The Ori-Collector has not been tested with the R9500 – GEA has no plans for any test at this time.



Challenges with R9500

The R9500 uses 4 Lactoflow sensors for quarter milk flows and 1 Metatron meter for official DHI milk weight.

Treated or fresh cows are diverted before the Metatron master meter and do not receive an official DHI milk weight or sample for that milking.

Quarters identified [by conductivity] with potential milk quality issues are diverted as well and not part of the milk yield for that milking session.



Important Factors Affecting Milk Sampling with the Monobox

Sampling Vessel

- The rigid hose should end at the deepest level of the sampling vessel



- The rigid hose has a diagonal cut at the end so that it can't attach itself to the sampling vessel
- The flexible hose for taking the sample ends at the deepest level of the sampling vessel
- The flexible hose is attached aside from the rigid hose, so that it can't attach itself to the sampling vessel



- The ball holder under the top of the sampling vessel is mounted absolutely in the middle so that the balls are free to move

GEA Monobox - Factors for Good Milk Sampling

30 May 2018

- The sampling vessel can only be turned under the top when overcoming the friction between the top seal and the vessel. It will become air tight when under vacuum



- The arrow on the top shows the upright position



- The milk collecting hose from sampler to vessel has a downward slope

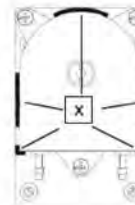
GEA Monobox - Factors for Good Milk Sampling

Sampling Device

- The hose of the pump isn't damaged (service part 7801-9905-090)



- The cover of the pump is put on the pump correctly, so that the hose won't be damaged when the pump turns



Freeze valve isn't damaged (service part 7801-9905-

is proper setting for the desired sample size. For 10 will have a delivery rate of 45ml)

Switch position		
4	5	6
1	23-25	27-29
Sample quantity		
	31-33	

ored) hose from vessel
gh should be about 220
res out of the sampling

ilk Sampling

- The flexible (red colored) hose is not damaged, has no sharp bends or kinks, and is not blocked
- The flexible (red colored) hose is secured on the connection part of the sampling vessel



- The plug of the sampling device is connected to the socket of the Monobox and the lamp "L" is shining



- Reset-button "T1" is pressed right before starting of sampling process



GEA Monobox - Factors for Good Milk Sampling

30 May 2018



Dairy ProQ

System is more conventional but concerns exist – no cluster, use of sensors like Monobox, and carry-over in milk sampling [approximately 5-8 ml from previous cow].

Working with GEA on testing and certification – access to installations, sampler certification, PCB changes all have impact on process.

GEA





Certified AMS Models

- Astronaut/Astronaut A2
- A3/A3 Next
- A4
- A5

Certified Shuttles

- Not all shuttles are certified with all Lely AMS Models
- Lely Shuttle A
- Lely Shuttle XY
- Ori-Collector

- Shuttle XY is being decommissioned world wide in 2022
- Lely is looking to launch a Lely-branded Ori-Collector – no change other than color of sampling shuttle



— innovators in agriculture —

ICAR-Certified AMS-Sampler Combinations

Updated
2/15/2019

Available on
QCS Website

	Lely Shuttle A	Lely Shuttle XY [Not Available in US/Canada]	Ori-Collector 90	GEA Sampler	DeLaval Milk Sampler
					
Boumatic MR-D1	Not Certified	Not Certified	Not Certified		
Boumatic MR-D2	Not Certified	Not Certified	Not Certified		
Boumatic MR-S1	Not Certified	Not Certified	Not Certified		
Boumatic MR-S2	Not Certified	Not Certified	Not Certified		
Fullwood Merlin	Not Certified	Not Certified	Not Certified		
Fullwood M²erlin	Not Certified	Not Certified	Not Certified		
GEA MI-One			Not Certified	Certified	
GEA Monobox			Not Certified	Not Certified	
Lely Astronaut	Certified	Not Certified	Not Certified		
Lely A2	Certified	Not Certified	Not Certified		
Lely A3	Not Certified	Certified	Certified		
Lely A3 Next	Not Certified	Certified	Certified		
Lely A4	Not Certified	Certified	Certified		
Lely A5	Not Certified	Certified	Certified		
Galaxy Starline 2007/2009	Not Certified	Not Certified	Not Certified		
Galaxy Astrea 20.20 2011	Not Certified	Certified	Certified		
Galaxy Astrea 20.20 2013	Not Certified	Certified	Certified		
Galaxy Astrea 20.20 Premium	Not Certified	Certified	Certified		
Galaxy Astrea 20.20 Premium FDA	Not Certified	Certified	Certified		
DeLaval VMS			Certified		Certified
DeLaval VMS 2008			Certified		Certified
DeLaval VMS 2010			Certified		Certified
DeLaval VMS 2012			Certified		Certified
DeLaval VMS 300			Not Certified		Certified
Milkomax Roboleo	Not Certified	Not Certified	Not Certified		

Fixed In-Place Electronic Meters & Samplers

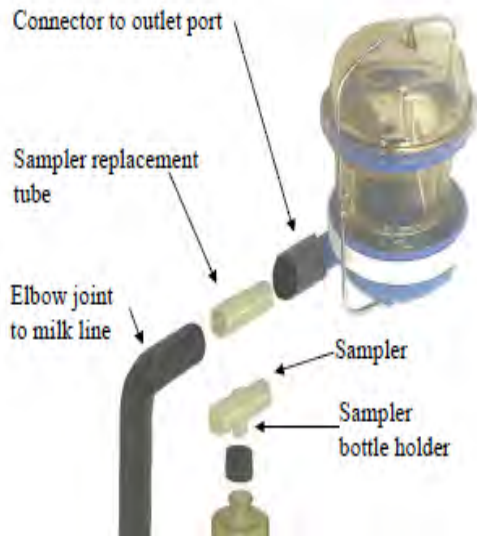
afimilk®

The Heart of the Dairy Farm



Approved Models

- Afiflo 2000
 - Afiflo 9000
 - Full Flow (MM 85/MM95)
 - Afilite (Germania's Essential)
 - Afilite MPC
 - Afi 155 & 155i (Sheep & Goat)
-
- Low-line installation for all models
 - High-line certification now for Afilite, Afilite MPC, Afi 155/155i (sheep/goats)
 - Must Use Afikim 2x Sampler
 - There is no meter performance report available – must interface with DC305 or PCDART for EMMR
 - Possible report available at dealer level – meeting with Afimilk on 3/23/2020



afimilk®

The Heart of the Dairy Farm

The Afi 2x Sampler is only certified for use with Afikim meters.

Cannot be used with GEA Metatron, Boumatic Perfection, or DeLaval meters – this includes owner-sampler herds.

Issues

- Biased results
- Sampler flooding with other meters
- Foaming and flooding with vented inflations (impulseAir, Conewango)

Change in plastic compound causes has resulted in new sampler bottles collapsing under vacuum – working with Afimilk on issue





- The Ambic sampler is not certified for DHI programs under any conditions including owner-sampler herds.
- Has never been ICAR tested.
- Appears to be a negative bias for fat in limited testing.
- The challenge is the local milking equipment dealers are selling this sampler with on-farm meters instead of the higher-priced ICAR-certified sampler for the respective meter model.





The Beco Scan Nexus is not approved for recording of milk weights in DHI programs.

Is not ICAR-certified.

It cannot be ICAR tested as they do not have a sampler of their own.

Staff has had three meetings with Beco about testing – waiting for action from manufacturer



Reports Include:
Lot Summary
Stall Summary
Milking Shift
Milking Summary
All Cows
Stall Diagnostic

Can Also Download Data
into SmartDairy



AMI 5450/5550

Automatic Milk Indicator

Not ICAR tested/certified.

Will not pass ICAR test – 5-7% bias on milk yield.

There is no sampler for the system – cannot use another sampler like the Afi 2X sampler.

Cannot be used for DHI programs at the present time.



Perfection 3000

- Must use Boumatic Perfection Sampler with the meter
- Some components are no longer available – will have to be retested in near future
- New calibration module in software (AQUA) is causing concerns about meters reading low – ICAR is reviewing
- Service manual, troubleshooting guides, and calibration instructions are available from QCS.



SmartControl Meter

- ICAR-certified
- Must use the Boumatic Perfection Sampler
- Must retrofit deflector/upgrade software – still not completed in some areas (CA, CO, New England)
- Fat is underestimated with old deflector





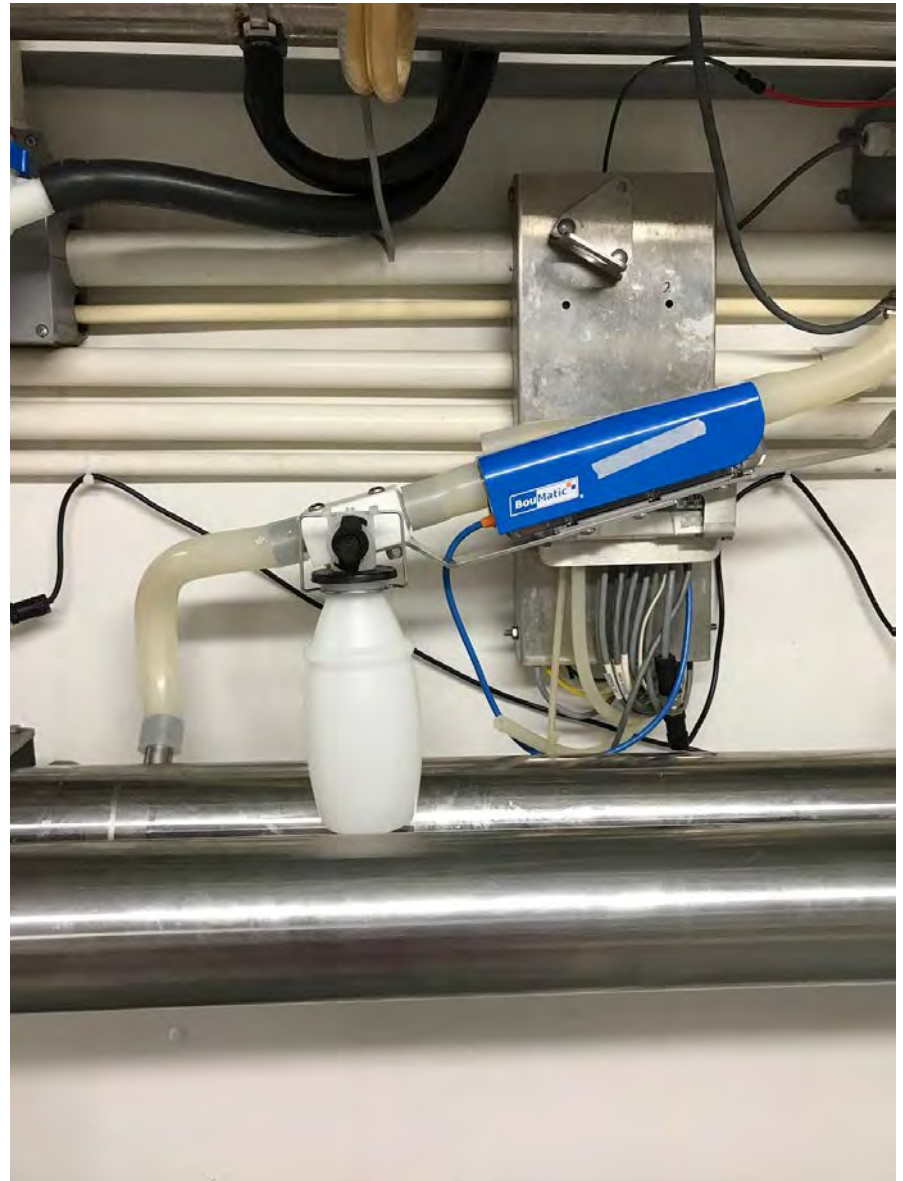
New SmartFlo Meter

New (free flow) meter being tested on DHI dairy

Appears to use Perfection sampler with modified sampling port

Planned testing but delayed by Boumatic Europe

Cannot use yield or component data from this device





CURRENT WEIGHALL MILK METER & MILK METER CONTROLLER WITH ICAR APPROVAL.



Weighall Milk Meter

- Both high line and low-line installations are certified at this time.
- Working on new meter performance report with Dairymaster.
- It appears that Dairymaster changed valve materials and dump cycle but denies any changes.
- Met with Dairymaster in February 2019 on routine procedures, reported changes and next steps to retain certification.



Challenges with the Dairymaster Subsampler

Mixing of milk is crucial before sampling due to shape of sampler

10 seconds mixing time
Complete drainage of sampler

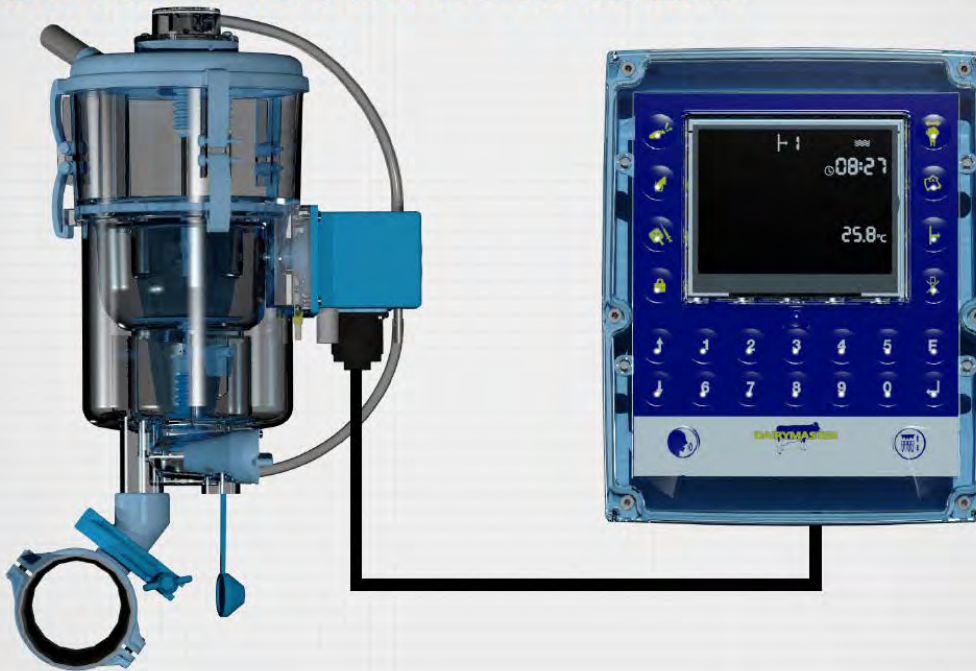
Failure to properly mix subsample can result in overestimating milk fat and SCC values

High carryover potential if sampler is not emptied



Swiftflo Commander

WEIGHALL MILK METER & NEW SWIFFLO COMMANDER TOUCH CONTROLLER



Uses old Weighall meter with a new controller called Swiftflo Commander.

Not ICAR-certified.

Met with Dairymaster and with indication that they will apply for ICAR test in 2019.



Milk Flow Sensor and Swiftflo Commander

MILK FLOW SENSOR & NEW SWIFFLO COMMANDER TOUCH CONTROLLER



- The combination of the new flow sensor and Swiftflo Commander panel is not ICAR-certified.
- Will not pass ICAR testing with current technology.



Approved Models

- Flomaster
- SG (Sheep & Goat)
- MM15 (Flomaster Pro)
- MM25/MM25W/MM27BC
- Delpro MU480/MU486

Must use proper DeLaval sampler for each model

All meters are low-line except for Delpro MU480/MU486

New meter calibration functionality in Delpro software for MM25/MM27BC





- Unapproved models – these are flow indicators (FI) that are only in the 5-8% accuracy range



FI 2



FI 5



MM15 (Flomaster Meter)

- Must use the correct sampler
- Fill and dump meter
- Calibration instructions and troubleshooting guides available from QCS



MM25/MM27BC

Must use the correct sampler

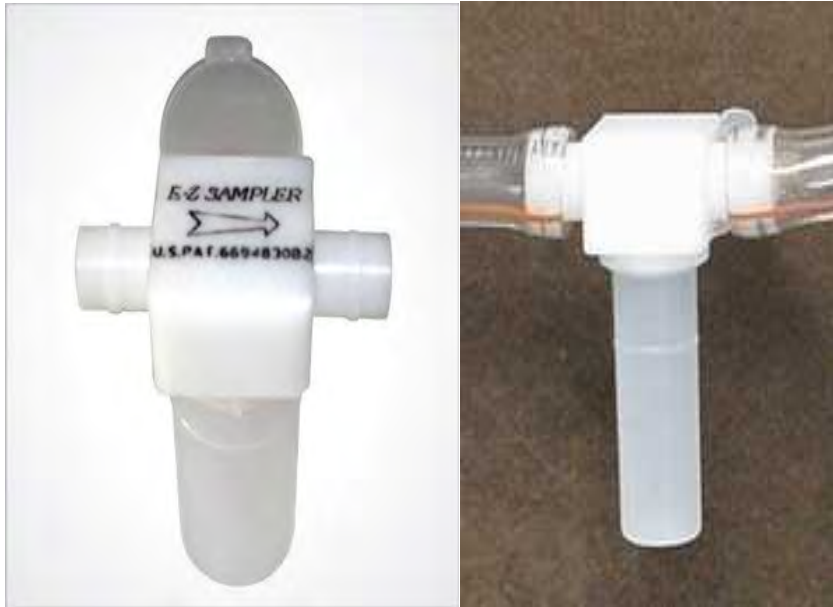
- **Blue sampler with MM25W**
- **Black sampler with MM27BC**

Continuous flow sensor meter from SCR that uses combination of infrared and white light

Reported issues with vented inflations

Calibration instructions and troubleshooting guides available from QCS





- The E-Z Sampler is not approved for DHI programs under any conditions.
- Is not ICAR-certified with any meter.
- The challenge is the local milking equipment dealers are selling this sampler with on-farm meters instead of higher-priced ICAR approved sampler for the respective meter model.

Set-Up	# Cows	BF MD	BF SD	Protein MD	Protein SD	SCC MD	SCC SD
EZ Sampler before Boumatic Meter	167	+0.06	0.152	-0.04	0.082	+58	69
EZ Sampler behind Boumatic Meter (proper setup)	86	+0.18	0.368	-0.06	0.047	+121	127



Metatron Meter

Certified Controller Combinations

- Metatron 12
- S21/P21
- Dematron 70
- Dematron 75



Low-Line Installation

High-Line Installation is now ICAR-certified.

Must Use GEA/Westfalia Turn & Mix Sampler

Reports of Sampler Flooding with Higher Milk Flow Rates or Vented Inflations – ICAR investigating.

milkrite | InterPuls



MMV Meter

- Certified Controller Combinations
 - iMilk 600+
 - ACR Smart
- Must use sampler from Interpuls
- Low-Line Installation is ICAR-certified
- High-Line will be tested in 2020
- Software designed with multiple algorithms to compensate for vented inflations





Figure 1. Nedap Smart Flow milk meter and sampling device

Milk meter device	Sampler
	



PRECISE DAIRY FARMING



Uncertified Sensor from SCR

- FFS 30 Sensor
- ED 200 Display
- MC 200 Controller

FFS 30 is same as DeLaval FI 5

SCR has not tested or applied for ICAR testing/certified

Cannot be used for DHI programs

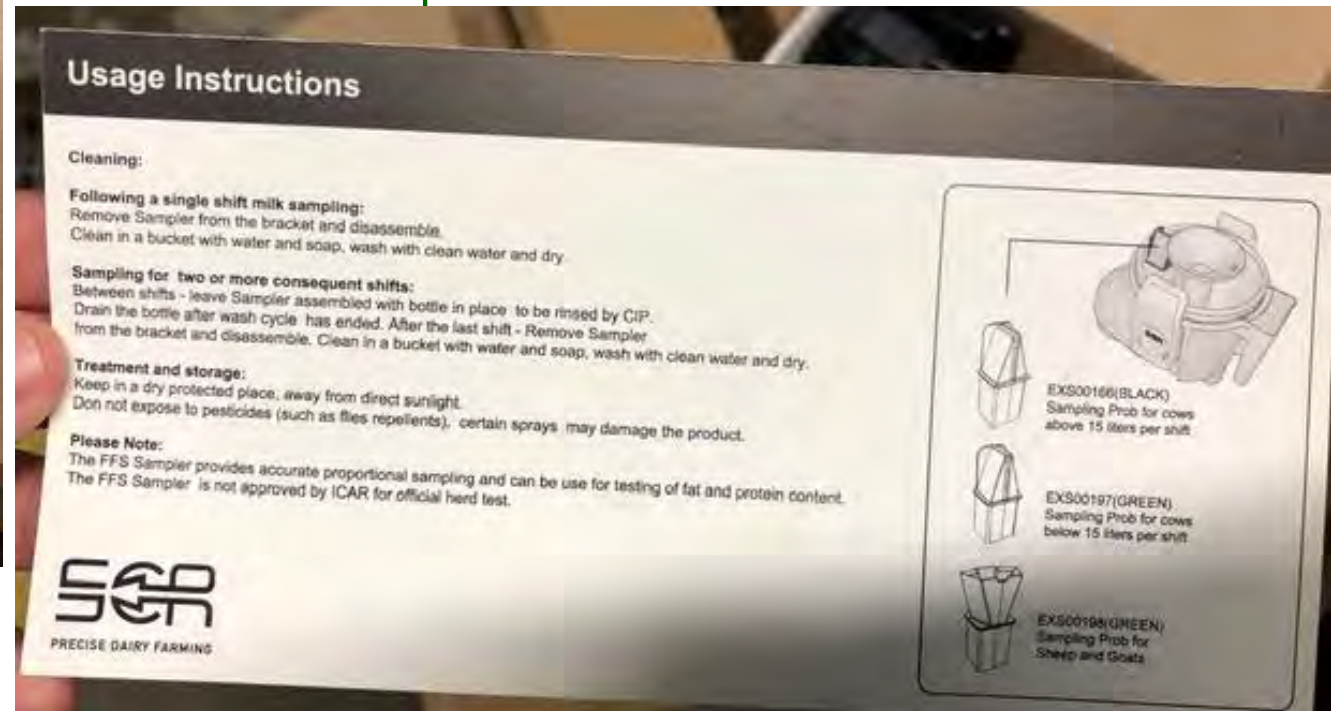


Sampler for SCR Sensor is being sold in US

SCR has not tested or applied for ICAR testing

Materials non-compliant with PMO

Cannot be used for DHI programs



DATAMARS



Lactocorder T-T



Lactocorder is manufactured by WMB from Switzerland

ICAR-certified for cattle, goats and sheep as Lactocorder from WMB – **modifications will have to be reviewed by ICAR and possibly tested based on outcome of that review**

Marketing agreement between Datamars/Tru-Test and WMB

Meter works on the expected milk yield principle – need to have cow ID and previous milk in the system



Waikato Electronic Milk Meter



Waikato applied for ICAR test late in 2017 – delayed five times by Waikato but in progress at present time

Includes EMM, new sampler and software

Cannot use this meter for DHI programs currently