

*AU2MATE OPTIMIZED MILK STANDARDISATION*

*A TOOL FOR INCREASED EFFECTIVENESS IN THE DAIRY INDUSTRY*

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*High Performing Quality Systems*

*Your Partner in Process Automation & Industrial IT*

# AU2MATE OPTIMIZED MILK STANDARDISATION

## AGENDA

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- *Presentation*
- *Why optimize milk standardisation*
- *Milk standardisation combined with pasteurization*
- *Milk standardisation with in-line blending*
- *Tools for optimization and increased accuracy*
- *Process examples*

# AU2MATE OPTIMIZED MILK STANDARDISATION

## PRESENTATION OF AU2MATE

*Area of expertise: Process Automation & Industrial IT*

*Target industries: Food & Pharmaceutical*

*Founded: 2001*

*Location: Offices in Denmark, UK , Dubai, Norway & Sweden*

*Number of employees: 105*

*References: More than 1800 project delivered worldwide*

*Example of end users: Arla, Tine, Almarai, Lactalis, Nestle, Kraft, Novozymes, Müller*

*Design philosophy: Solutions based on open platforms & international standards*

*Au2mate Service Concept: 24/7 Hotline.*

*Au2mate Academy: Knowledge center for dairy automation*



*Main office in Silkeborg, Denmark*



## AU2MATE OPTIMIZED MILK STANDARDISATION

### WHY OPTIMIZE MILK STANDARDISATION

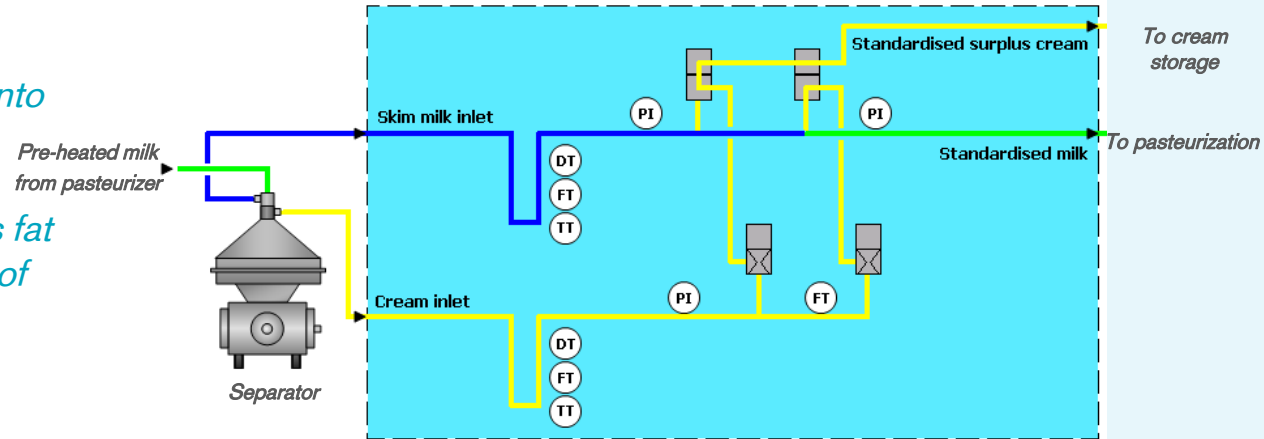
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- *To achieve an accurate composition in processed milk. (Fat, protein, solids etc.)*
- *Higher profit with lower tolerances*
- *Use of raw materials must be optimized*
- *Use of equipment must be optimized*
- *Time saving. No need for post adjustments to achieve required composition.*
- *Small batches can be produced effectively when standardisation is optimized*

# AU2MATE OPTIMIZED MILK STANDARDISATION

## MILK STANDARDISATION COMBINED WITH PASTEURIZATION

- Pasteurizer performs heat treatment of the milk
- Separator separates the milk into skim milk and cream
- Standardization unit calculates fat contents and re-blends a part of the cream into the skim milk.

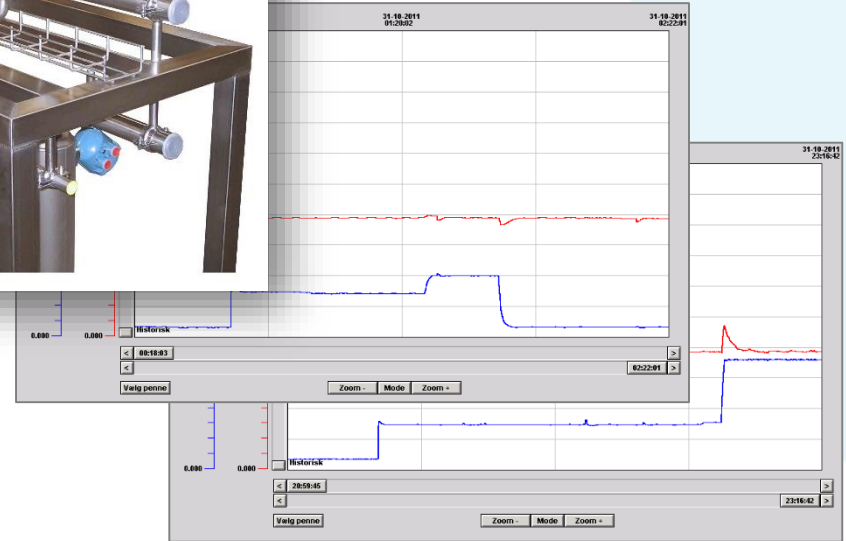


Typical standardisation unit  
for milk and cream

# AU2MATE OPTIMIZED MILK STANDARDISATION

## MILK STANDARDISATION COMBINED WITH PASTEURIZATION

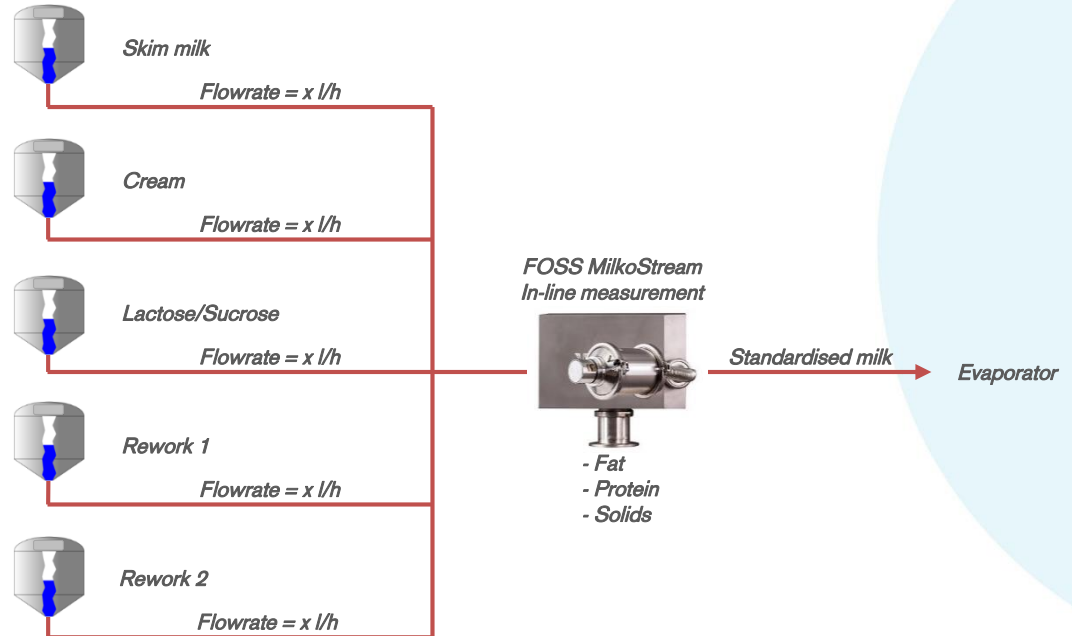
- *Automatic high accuracy control of milk and cream fat %*
- *Automatic optimization with self learning PID loop controllers*
- *Rapid response to recipe change and process conditions*



# AU2MATE OPTIMIZED MILK STANDARDISATION

## MILK STANDARDISATION WITH IN-LINE BLENDING

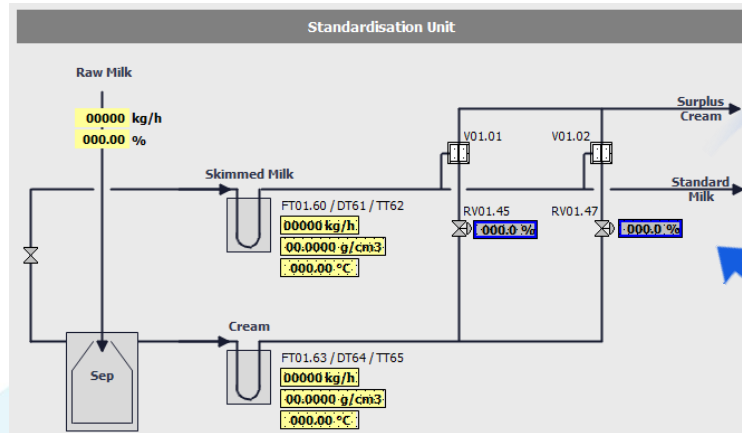
- Individual supply lines with flow control of the required ingredients
- Initial flow calculation for each ingredient.
- Accurate in-line measurements for continuous flow corrections
- Self learning PID loop controllers for optimized startup
- Batch or In-line standardization



# AU2MATE OPTIMIZED MILK STANDARDISATION

## TOOLS FOR OPTIMIZATION AND INCREASED ACCURACY

- *Self learning regulation loops*
  - *Contoller outputs are learned during production, and used in next startup*
  - *Values are saved according to target setpoint, recipes or a combination*
  - *The system gives shorter settling time and less product out-of-spec.*



Standardization unit overview

*PID outputs are stored during normal operation*

*Saved data are searched to find the best PID output to be used during startup and recipe change*

STANDARD_HMI				
	Name	Data type	Start value	Comment
14	PID_MEM	'udt_Memory'		PID memory data
15	STORAGE	Array[1..50, 1..4] o...		
16	STORAGE[1,1]	Real	22.45394	Cream PID output
17	STORAGE[1,2]	Real	54.89001	Milk PID output
18	STORAGE[1,3]	Real	39.0	Cream setpoint
19	STORAGE[1,4]	Real	1.5	Milk setpoint
20	STORAGE[2,1]	Real	25.06221	
21	STORAGE[2,2]	Real	55.79557	
22	STORAGE[2,3]	Real	39.0	
23	STORAGE[2,4]	Real	1.57	
24	STORAGE[3,1]	Real	69.68231	
25	STORAGE[3,2]	Real	31.60773	
26	STORAGE[3,3]	Real	39.0	
27	STORAGE[3,4]	Real	3.5	
28	STORAGE[4,1]	Real	23.63064	
29	STORAGE[4,2]	Real	55.83379	
30	STORAGE[4,3]	Real	39.0	
31	STORAGE[4,4]	Real	1.55	
32	STORAGE[5,1]	Real	25.5097	
33	STORAGE[5,2]	Real	55.05103	
34	STORAGE[5,3]	Real	39.0	

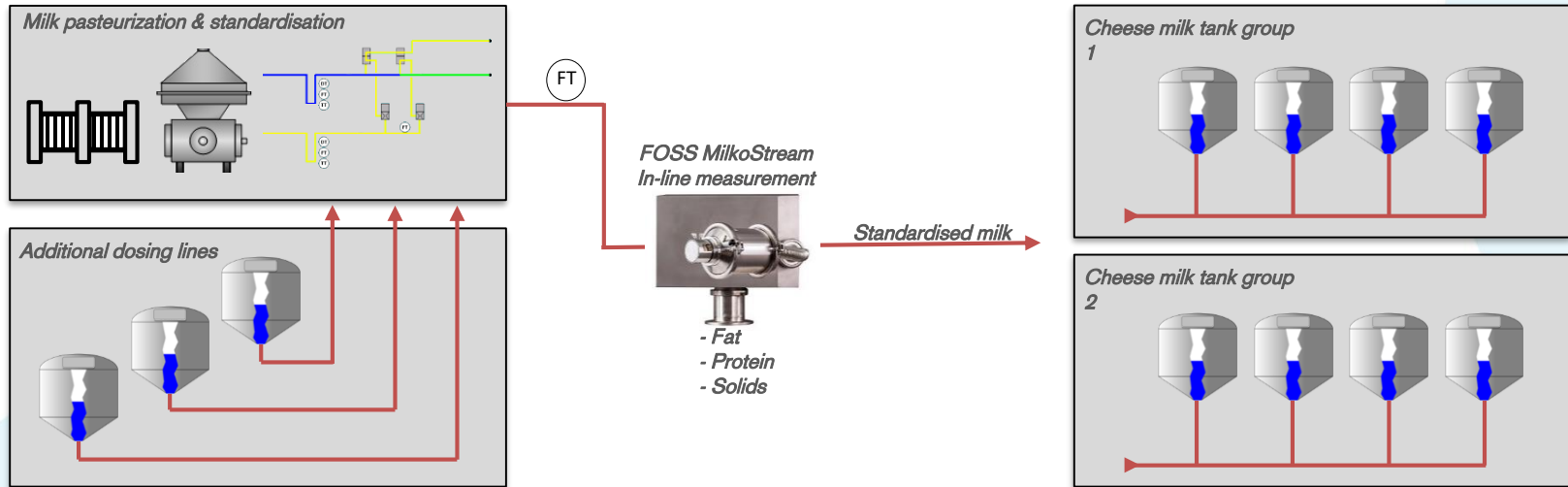
PLC data for storing controller outputs



# AU2MATE OPTIMIZED MILK STANDARDISATION

## TOOLS FOR OPTIMIZATION AND INCREASED ACCURACY

- *Batch standardization with continuous correction*
  - *Uses accurate in-line measurements to calculate pipe and tank contents*
  - *A complex system keeps track of composition in already produced product.*
  - *Continuous compensation for any product out-of-spec. in the beginning of a batch.*



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*THANKS FOR LISTENING😊*

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