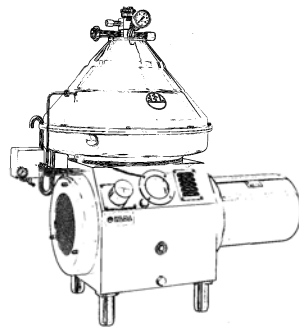


PRS - PROTEIN RECOVERY SYTEM



Protein Recovery System (PRS™)

Introduction

A new generation of REDA Separators is now coming in the market with the aim of protein recovery when milk is processed.

The milk loss caused to the discharge action can be reduced close to zero thanks to some important design modifications jointed with a new integration on existing software.

In spite of their already excellent design, REDA has upgraded its separators by introduction of the following modifications:

- **Optimized sludge chamber (OSC™):**
 - The sludge chamber must be big enough to contain sludges separated from skimmed milk outlet (discs outlet diameter); in this manner sludges can be ejected with a lower frequency.
Since each discharge means a skimmed milk (protein) loss, **more bigger is the chamber less are the discharges number and therefore the skimmed milk (protein) lost.**
 - At the same time sludge chamber should not be too big because when separator discharges it ejects the entire content of the chamber and not only the sludges (it means that most of the skimmed milk (protein) crossing through the chamber is lost): **smaller is the chamber less is the product lost at each discharge (protein loss).**

- **Stronger and faster discharge (FDS™)**
 - When the sludge is high concentrated into the sludge chamber, the ejection (discharge) is more critical: it is necessary a washing of the chamber by means of some liquid contained into the same chamber.
It means to lose skimmed milk (protein): it is as much as higher when the ejection is not perfect.
The best ejection needs to be fast and strong: only in this way the quantity of skimmed milk (protein) lost together to the sludge can be reduced.
REDA new generation separators introduces a stronger and faster discharge because the bowl opens more in a shorter time: the big effort generated over the mechanical drive can now easily supported by REDA “**Soft shaft™**” system and by “**Freq-clutch™**” system.

Besides the above optimizations REDA now can offer the **PRS™** system that cuts close to zero milk and protein losses.

How to save protein (Zero protein loss) - PRS™ system

The PRS™ system supported by a full control software provides to empty the bowl full of by milk before each discharge, but letting the pasteurizing unit working without any problem of product default.

New generation separators with a OSC™ and FDS™ systems can be supplied together to the PRS™ system to cut the milk and protein losses due to the separator working.

Compared to normal separator operating into milk skimming or standardizing the gain is the following:

Type of machine : RE200T			
Feeding capacity	20,000	liters/hour	
Operating hours/day	10	h/day	
Operating days/year	350	d/year	
Results	Standard system	PRS™	units
Discharges per hour	3	1	numbers
Volume of discharge	15	15	liters
Milk lost/each discharge	5	0	liters
Milk lost/day	150	0	liters
Milk lost/year	52500	0	liters
Difference (milk saved)	Standard system VS. PRS™	52500	liters/year
Water/each discharge	30	45	liters
Water/day	0,9	0,45	m ³
Water/years	315	157,5	m ³
Difference (water save)	Standard system VS. PRS™	157,5	m³/year
Sludge+effluents/discharge	45	60	liters
Sludge+effluents/day	1350	600	liters
Sludge+effluents/year	472,5	210	m ³
Difference	Standard system VS. PRS™	262,5	m³/year

Type of machine : RE100TE			
Feeding capacity	20'000	liters/hour	
Operating hours/day	10	h/day	
Operating days/year	350	d/year	
Results	Standard system	PRS™	units
Discharges per hour	3	1	numbers
Volume of discharge	6	6	liters
Milk lost/each discharge	2	0	liters
Milk lost/day	60	0	liters
Milk lost/year	21'000	0	liters
Difference (milk saved)	Standard system VS. PRS™	21000	liters/year
Water/each discharge	10	15	liters
Water/day	0,3	0,15	m ³
Water/years	105	52,51	m ³
Difference (water save)	Standard system VS. PRS™	52,5	m³/year
Sludge+effluents/discharge	16	21	liters
Sludge+effluents/day	480	210	liters
Sludge+effluents/year	168	73,5	m ³
Difference	Standard system VS. PRS™	94,5	m³/year

Payback time

REDA is introducing into the market the new generation of separators with OSD™ and FDS™ and in the next future all the centrifuges will be equipped with the above systems.

For above reason the only extra cost for protein recovery system will be the PRS™ system that can be payback in a very short time.

Moreover the total discharge quantity of effluents and water consumption decrease proportionally allowing an extra gain.

Competitors similar systems

On the market there are other systems to reduce the protein loss.

But the cost to introduce the system is very high with the same or worse result.

Press information done by competitors (for example "PRO+" by Westfalia) gives the gain compared to their normal system, but REDA normal system already gives advantages in the protein saving compared to the competitors.

Conclusion

Protein loss due to centrifuge working was always neglected in the past, but now the more attention given to factory efficiency focalizes the attention also in this field.

Moreover REDA always looks at environment problems; less effluents and less water consumption add a very high value to **PRS™** system.

Applications of PRS™ system:

- **Milk skimming**
- **Milk standardizing**
- **Milk clarification**
- **Milk bactofugation**



Whey process : a new PRS™ application

PRS™ system can be integrated in the whey process too even if in the past it seemed there were no big advantage due to the low value of the whey.

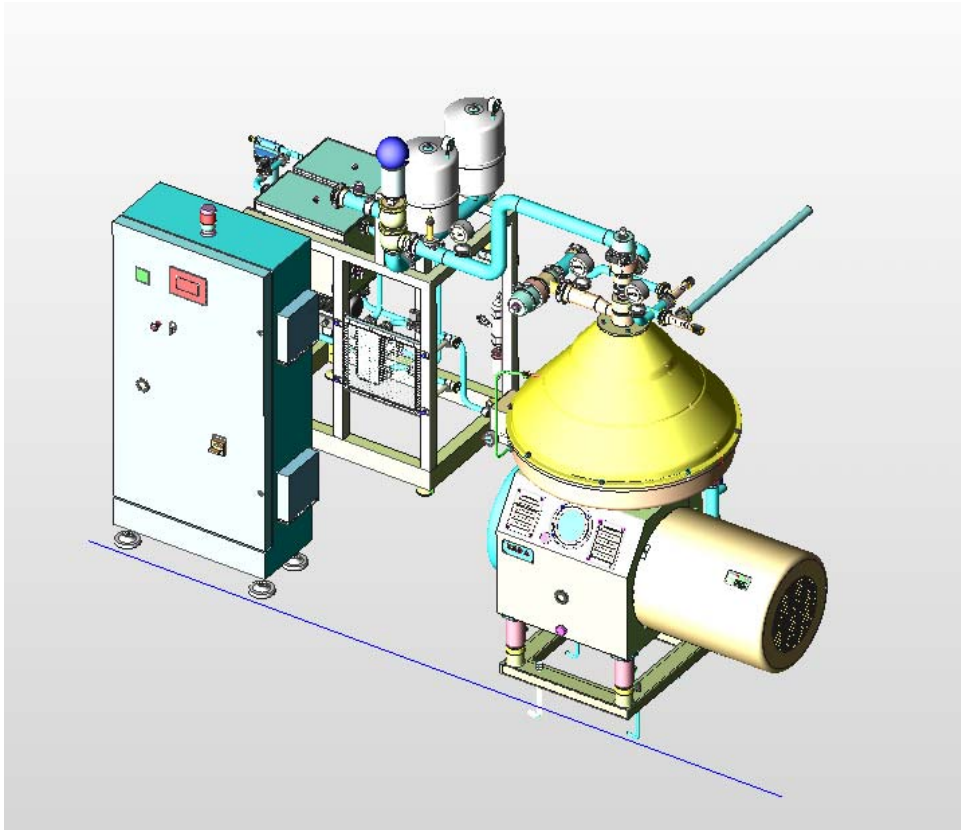
In recent years, raise of whey price has caused an earthquake in the world market.

This has changed completely the perspective because now whey recovery is becoming more and more important: the PRS™ can be setted on whey skimming separators with a short pay-back investment.

Type of machine : RE150T			
Feeding capacity	20'000	liters/hour	
Operating hours/day	10	h/day	
Operating days/year	350	d/year	
Results	Standard system	PRS™	units
Discharges per hour	6	2	numbers
Volume of discharge	15	15	liters
Whey lost/each discharge	5	0	liters
Whey lost/day	300	0	liters
Whey lost/year	105'000	0	liters
Whey powder lost/year	6'800	0	Kgs

Whey powder has an actual cost (beginning 2011) of 850÷950 Euro per tons, but to calculate the money saving for a cheese factory we have to consider the price of whey to sell: it can reach 450 Euro/ton.

Profit	6,8 Tons	450 Euro/Ton	3'060 Euro/year
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PRS installation

The PRS unit is pre-assembled on a skid and it has an extremely easy installation.

The system can be integrated on existing unit but for the best performing a separator modification should be set.

The Operator can control and adjust the system from the control board for the best product recovery.

PRS description

The PRS unit is composed of the following elements:

- Pressurizing unit with balance water tank, high pressure pump, expansion vat
- Brazed-heat exchanger for temperature control
- Pressure transmitters
- Temperature transmitters
- Inlet back-pressure valve
- Three-way pneumatic valve
- Solenoid valves for automation control
- PLC supervision to control the system

On the same skid it comes assembled the water unit system (balance-tank, pump, filter).

When to use the PRS™ system (map of the convenience)

Protein Recovery system is available for all REDA separators starting from milk skimming capacity of 12'000 L/h and whey skimming from 16'000 L/h.

The advantages of the system covers all the applications:

- Milk skimming
- Milk standardization
- Milk clarifying
- Milk bactofugation
- Whey clarifying
- Whey skimming

But the gain is much more when the quantity of milk or whey processed per day is quite huge.

What to do with small scale separators

A more simple system (called Milk Recovery System - **MRS™**) can be used on small or medium scale separator (up to 10'000 L/h): also this system, already supplied in the past, has now a new evolution with a patented pressured system that aids the Customer in the installation and regulation control.

In the past the Operator had to supply a water source with pressure and capacity equivalent to milk flow: now the pressurization unit doesn't require so huge quantity of water.

Only a small amount of water is required: it means an easy installation and better system regulation compared to the old version.



Example of Milk separator and Bactofuge of 20'000 L/h with PRS™ system