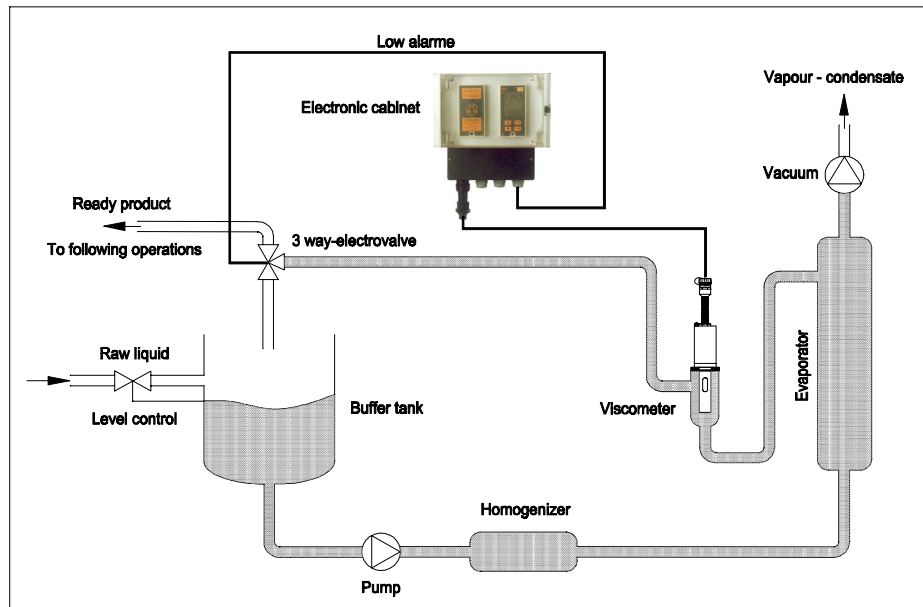




3.10 CONCENTRATION CONTROL

3.10.1 BY EVAPORATION



The product circulates in a closed loop as long as the right concentration is not reached. This closed loop includes a buffer tank, a circulating pump, an homogenizer, the evaporator, a viscosity controller and a three ways valve.

As soon as the product is at the right concentration, the low viscosity alarm activates this valve and the product is derived to the following operations as long as the high viscosity alarm is not reached. At this time the loop is closed and the cycle starts again.

This simplest kind of control is not available for all the applications. It can be eventually replaced by a more accurate system (the valve becomes progressive in this case).

Applications :

- Gelatine broothes.
- Powder – liquid mixtures and slurries.
- Abrasive – liquid mixtures.
- Milk concentration.
- Sugar crystallisers.
- Water-ash mixtures.

The problem is less critical than before, as the processing temperature is quite constant and as the fluid velocity at the concentration loop is also constant.



The MIVI sensor (without temperature probe) is directly installed in line and the viscosity information is delivered to the controller by a simple low cost electronics.

More than 50 units are presently in operation and we regularly receive orders (about 10 a year).

Users : ROUSSELOT, SANOFI, CECA (proteins from old meats).

Competitors : the same (same problems).

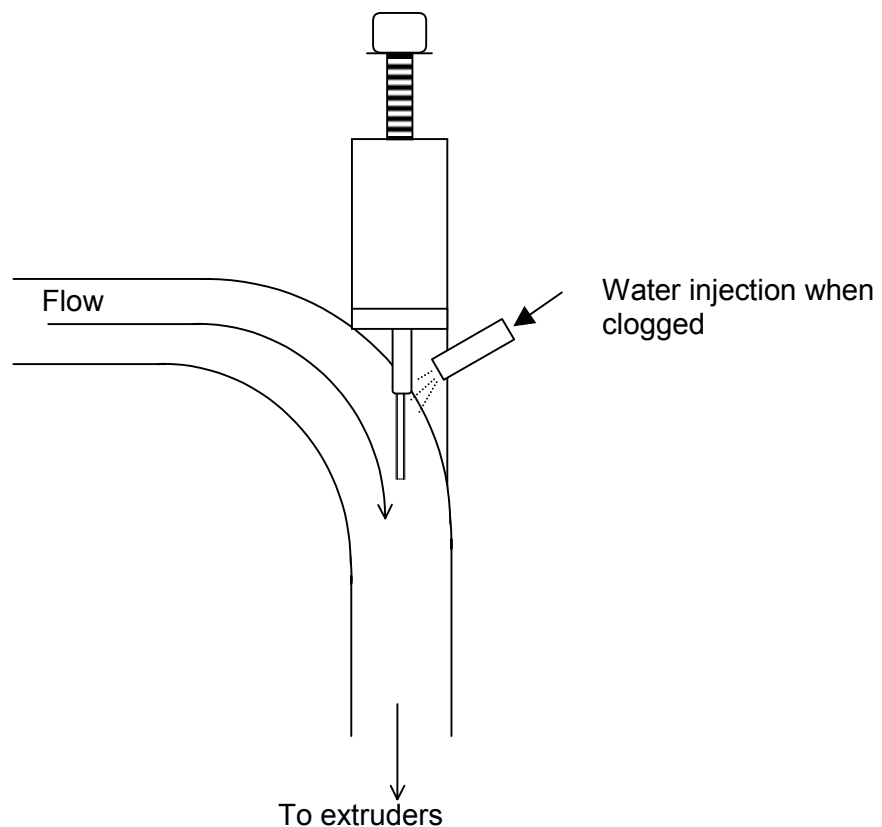
Similar applications : Sugar juices and crystallization.

Discontinuous operations : directly in vat (caution tot the operation end : very viscous, agitated product).

Continuous operation : directly in line.

Other similar applications : Synthetic sponges manufacturing, from cellulose (SPONTEX).

Very viscous and clogging product, with fibers, sensor directly mounted in line, flow direction inverted. No protector. When clogged (fast viscosity rise → alarm), automatic washing with a small water injection to the rod.



3.10.2 BY SEPARATION

Bacteria's solutions (fermentations).

Yeast.

Fresh cheese.

Concentrated milk.

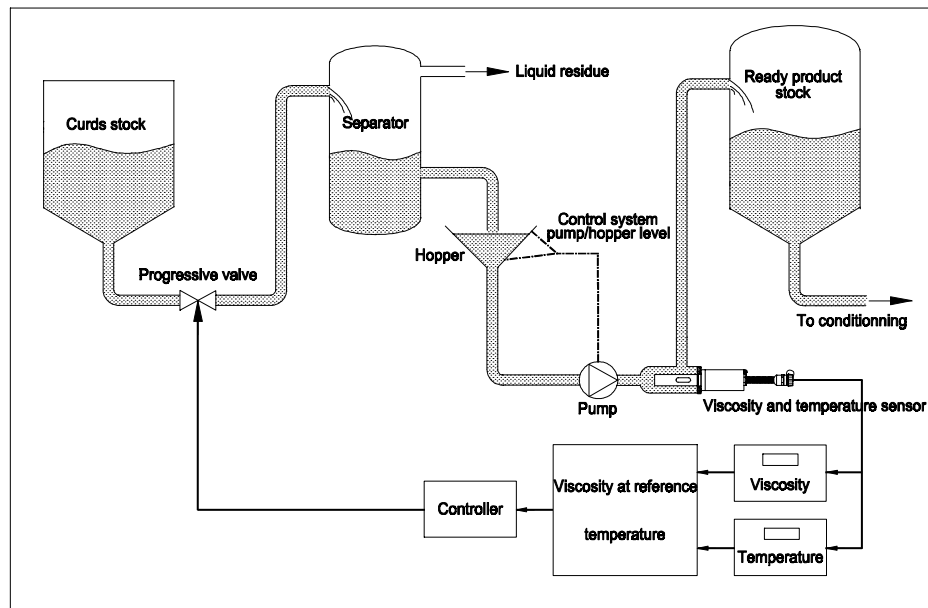
Problems:

No newtonian – Temperature variations – easy separation – Pulsed flow.

Solutions: constant velocity loop (>4/5 cm/s) circulation pot with a ½ " holes.

Direct calibration on % dry extract + temp; compensation.

Material: MIVI 6002 equiped with temp. compensation software. External temperature probe to avoid clogging.



Why to use a separation control: for the most separator efficiency, without nozzles clogging (time savings).

WHY to use MIVI 6002: for very good accuracy (less than .1% variation) → material savings.

Caution! The accuracy of a control loop is this of its worst element. Be sure that the controller quality is perfect.

Customers: BEL, CECA, ELF BIORECHERCHE, SANOFI, ORSAN (bacterias soups), GOAVEC (ice creams machines manufacturers).

Other applications: sauces (tomatoes), jams, fish solubles. Note: for the moment, the separators manufacturers are not very interested, as they say that this is not their problem.

Our main customers are:

The concentration makers (see above).

The engineering companies assembling the whole installation (BURDOSA for example).



Competitors we know in France:

Brabender (viscometers). Important maintenance and not too reliable in information. We replaced some of them at existent installations. GOAVEC CO replaced their Brabender purchases by SOFRASER ones.

Density meters. Mechanical, not available : clogging problems. Optical (refracto) not available : cleaning operations, gamma rays not available : not accepted in food industry.