3. MACHINE DESCRIPTION

3.1. General description

The SE 20 is a self-cleaning centrifugal separator for milk skimming, standardization, cleaning and whey skimming.
The machine is constitued by a cast-iron frame, painted or coated by stainless steel, on which are installed the following components:

- two shafts with a couple of helicoidal gears with orthogonal axes, a centrifugal clutch, ball bearings, etc.
- motor
- manual brake
- tachometer
- sight glass to check the movement of the gear (bowl) and oil gauge glass
- bowl
- anular cyclone collecting the sludge discharge and the bowl protection cover
- inlet-outlet flow unit
- device for operating water injection in the bowl.

The supply include also the electric panel, the operating water system (surge tank, filter, pressure reducer and pressure switch) and a set of special spanners for the bowl.

3.2. Operating principles

The product flows (fig. 3.1) into the bowl through feed pipe (1) and into the distributor (2) it undergoes acceleration until it reaches the bowl rotating speed. The distributor (2) conveys the product to the disks stack (3) where the separation between light and heavy phase takes place. Light clarified phase flows to the centre of the bowl and heavy phase flows to the bowl outer diameter. They rise in the disks stack and reach the two upper chambers of the bowl. Here two fixed centripetal pumps (4) and (5) convey them under pressure to the outlet pipe lines (6) and (7).
The separated solids are collected in the peripheral part of the bowl (8) and they are periodically and automatically discharged through the discharge holes (9) to maintain the required separation efficiency. The sliding piston (10) is kept in the closed position by the pressure produced by the water in the chamber (11). Injecting the water (13) into the opening valve (12) the chamber (11) is emptied, the piston goes down and the solids are immediately ejected. By interrupting the water (13) and injecting the closing water (14) into the chamber (11), the sliding piston goes back to the closed position.
The periodical solids discharge is carried out automatically by means of a cycle timing unit which controls the opening and closing water solenoid valves (12) and (13).
By setting the timers it is possible to adjust the discharge quantity and the time between each discharge. Two automatic, independent operation cycles may be selected “separation/partial discharge” and “washing/partial discharge”. The discharge of solids collected in the bowl does not involve the stopping of the separating process; actually it takes place at the rated revolving speed and without interrupting the product feeding. The ejected sediments are collected into an outer anular chamber where they are drained away by gravity through a pipe.

The cycle timing unit controls as well the automatic closing of the bowl during the starting-up phase of the separator and allows the presetting for partial discharges manually controlled.
Bowl feeding is carried out through a closed pipe line with outlets of the product under pressure, by means of two centripetal pumps and without seal gaskets between fixed parts and rotating parts. On inlet-outlet pipe lines are inserted valves and instrumentation necessary to control and regulate the separator (micrometric adjusting valves, butterfly valves, sanitary pressure gauge, sample cocks, etc.).

1 Feed
2 Distributor
3 Disks stack
4 Light phase centripetal pump
5 Heavy phase centripetal pump
6 Light phase outlet
7 Heavy phase outlet
8 Solids chamber
9 Discharge holes
10 Sliding piston
11 Closing chamber
12 Opening valve
13 Opening water
14 Closing water

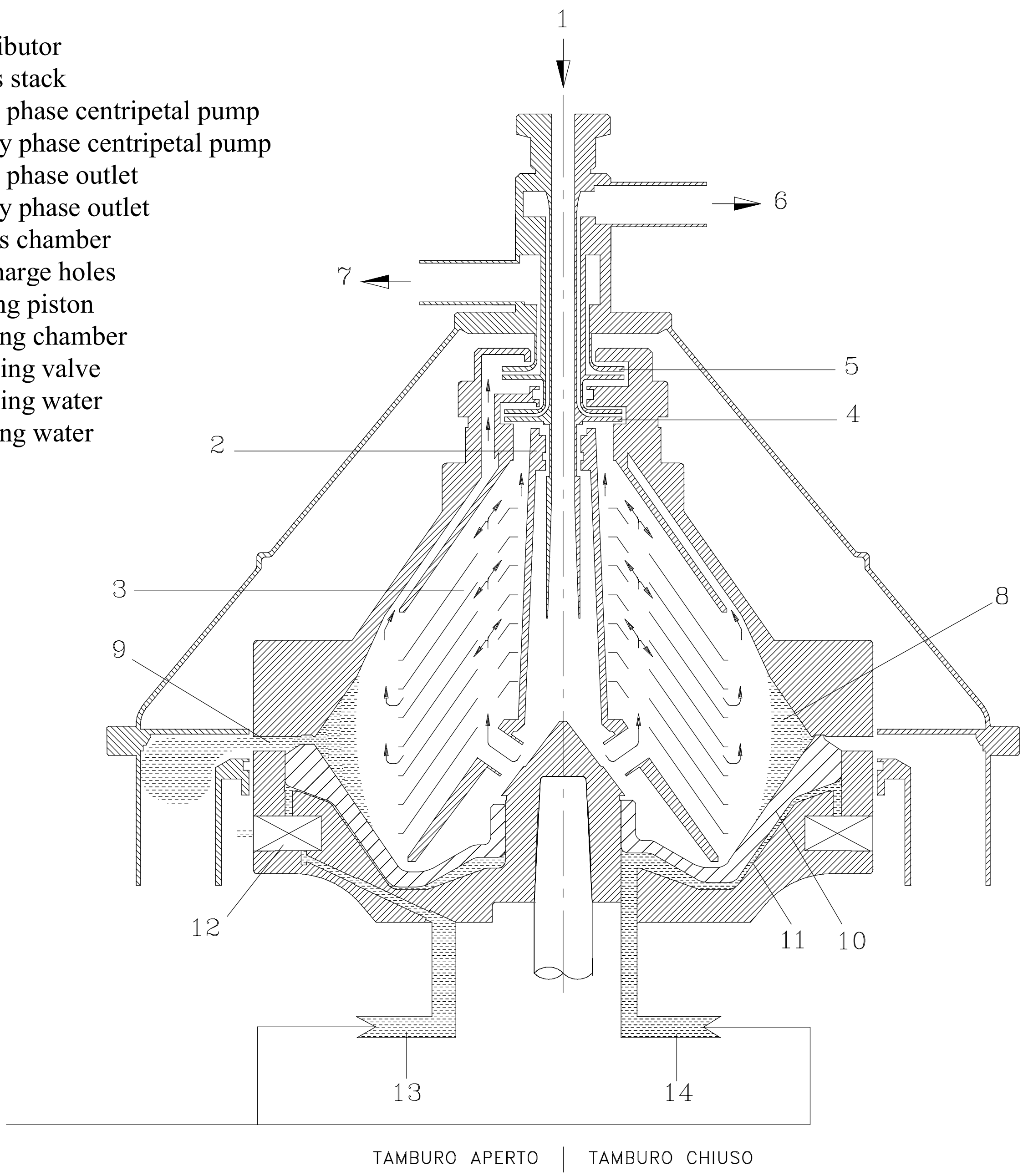

Figure 3.1

3.3. Technical card

Overall dimensions (ref. Tab. 20):		
Width:	780	mm.
Length:	1.200	mm.
Height:	1.250	mm.
Weights:		
Bowl weight:	200	kg.
Separator net weight:	590	kg.
Operating features:		
* Milk skimming capacity:	4.500	l/h
* Whey skimming, standardization, milk cleaning capacities:	7.000	l/h
Bowl capacity:	9,5	l
Solids chamber capacity:	4,8	l
Bowl speed:	7.500	r.p.m.
Motor speed:	1.450	r.p.m.
Product and process features:		
Maximum product density:	1,1	kg/dm^3
Maximum sludge density:	1,35	kg/dm^3
Maximum product temperature:	95	°C
Minimum product temperature:	3	°C
* Process temperature:	20 ÷ 60	°C
Electrical system features:		
Motor power:	7,5	kW
Voltage:	3 x 400/690	V
Auxiliary components voltage:	24	Ac
Frequency:	50	Hz
System:	three-phase+earth	
Motor protection level:	IP 55	
Electric panel protection level:	IP 55	
Operation:	electro-mechanical	
Hydraulic system features:		
* Required feeding pressure necessary for a machine working at maximum capacity:	0,5	bar
* Maximum outlet pressure (cream and skim):	4,5	bar
Minimum feeding pressure for operating water:	2	bar
Operating water consumption for each discharge:	approx. 10	l

Spacers of inlet-outlet flow unit (§ 6.3):

- n° ______ x thickness ________mm.
- n° ______ x thickness ________mm.
- n° ______ x thickness ________mm.

Total thickness ________mm.

(*) These data depend on the specific application (milk skimming, standardization, cleaning and whey skimming). The skimming capacities given above has been obtained with normal milk and whey at a temperature of 30÷50 °C with 0,03% maximum residual fat content (Gerber system).