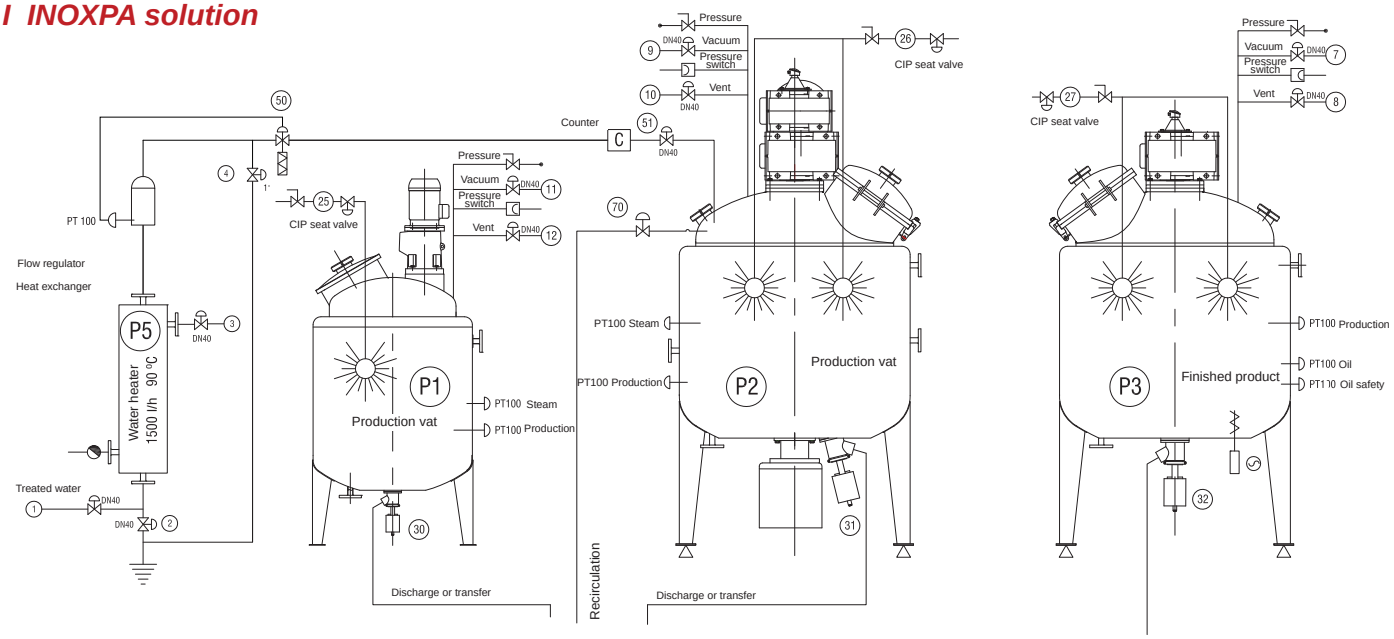
Cream Production

Creams can be divided into two main groups depending on their use — pharmaceutical and cosmetic/industrial.

The difference between these types lies in the fact that pharmaceutical creams contain an active ingredient (medicinal reagent) which is added separately, whereas the others do not.

Despite this difference, however, the flow diagram provided with these instructions can nevertheless be used to explain the production process for both types.

I INOXPA solution



I Preparation

Heat the melting vat (P1) to the desired and programmed temperature. Introduce the fats and waxes into this vat.

Once addition is complete, close the loading port and wait for 10 to 15 minutes for the fats and waxes to begin to melt. Switch the agitator on to the appropriate speed depending on the type of fat and capacity of the vat. Generally, this should be between 50 and 150 rpm.

Whilst the fats are melting, add sufficient hot water for the manufacture of the batch into the production vat (P2). This water should be taken from the heater (P5) and should be kept hot (the temperature depends on the type of cream and the mixing process) until the remaining components are added.
Steam should be passed into the heating chamber to keep it hot. The temperature is controlled using a PT100 or 4–20 mA controller.

If the cream is for pharmaceutical use, the active ingredient should be mixed in the mixing vat (P4) whilst the fats are melting so that it is ready for the transfer to the production vat (P2).

I Process of mixing and melting

The fats should be melted in hot water. Mixing can now begin.
To do so, the fats should be transferred from the melting vat (P1) to the production vat (P2). This transfer can be performed under vacuum or using a pump. In either case it should be performed slowly, with the counter-rotating agitator switched on (central shaft: 30 rpm; anchor: 10 rpm) and the emulsifier at top speed.

The diagram shows that the exit valve (30) on the melting vat (P1) is connected to the valve on the transfer panel (M30). An intermediate filter is fitted to avoid the presence of unwanted lumps and particles.

On the transfer panel, valve M30 is connected to M31, which in turn is connected to the valve (31) on the production vat.

Once transfer is complete and the mixture is beginning to become homogeneous, agitation should be maintained for 15 to 20 minutes. Cooling with running water can then start until the temperature of the cream reaches 50 ºC. The active ingredients (if applicable), flavourings and colourings are then added rapidly, depending on whether the cream is for pharmaceutical, cosmetic or industrial use.

As with the fats, they can be added using a pump or under vacuum. This is performed by connecting the outlet from the mixing vat (P4) or the flavouring agents container to the valve (M31) connected to that on the production vat (31).

The bottom emulsifier should be switched on for the required time, depending on the cream being produced and its volume.

If required, an in-line emulsifier connected to the production vat can be included. The inlet to the emulsifier is connected to valve M31 and the outlet to valve M22, both of which can be found on the transfer panel.

Once all additives have been added, cooling should be continued until the cream reaches approximately 30 ºC, with the central shaft rotating at 15 rpm and the anchor at rpm. Any volatile products should be added at this point and agitation continued for 10 to 12 minutes. The process is then complete.

I Finished product

The same process used to transfer fats (under vacuum or using a pump) should be followed to transfer the cream from the production vat (P2) to the finished product vat (P3). However, in this case, valve M31 on the transfer panel should be connected to M32, which is connected to valve 32 on the finished product vat; the temperature should be maintained at 30 ºC.
If necessary, due to the viscosity of the product, the production vat (P2) can be pressurised with nitrogen to improve the emptying process. This pressure should never exceed 2 bar.

The difference between this vat and the others is that the anchor and central shaft are moved by a single gearbox. The speed should be set so as to maintain the homogeneity of the cream. The heating chamber should be heated with hot water (not steam) or heating oil heated with a submerged electrical resistance. It is necessary to control the temperature of the product to ensure that it does not overheat and burn.

I Finished product

A transfer system with product recovery consisting of the following elements is provided for cream filling: A transfer pump (32) which is connected to valve M32 on the transfer panel. The other end is connected to the filling machine. The SIL PIG product-recovery system, which is used to recover the product present in the line once the operation is complete, is installed between the two ends of this line.

I Cream production process

ALL EQUIPMENT

- *Ensure that all equipment is clean and ready for use*
- *Check that all connections are correct*

MELTING VAT ((P1)

- *Load the fats and waxes into the melting vat*
- *Close the loading port*
- *Heat to 90 ºC for 10–15 minutes*
- *Start agitation at the programmed rpm. Depending on the agitator and the type of material to be melted and mixed, between 50 and 150 rpm*
- *Once the materials have been melted and mixed, reduce the agitation speed by approx. 30% and the temperature to between 70 and 80 ºC until transfer*

PRODUCTION VAT (P2)

- *Add treated water pre-heated to 80ºC using a weighing system or a meter*
- *Maintain this temperature using the heating system*
- *Connect the vacuum system (if applicable)*
- *Start the counter-rotation agitator at the programmed rpm (approx. 10 rpm for the anchor and 80 rpm for the central shaft)*
- *Start the emulsifier at maximum speed*
- *Transfer the material melted in the melting vat (P1) in a controlled manner, ensuring that the flow is appropriate for the type of mixture. The transfer can be performed under vacuum or using a transfer pump*
- *Once the transfer is complete, keep stirring the mixture for at least 10 minutes. Then, the emulsifier can be stopped*
- *Start cooling the production vat to 50 ºC using running water*
- *Once this temperature has been reached, add the additives: active pharmaceutical ingredients, flavourings, colourings etc.These elements can be added under vacuum, using a transfer pump or manually via the designated port*
- *Continue cooling to 30 ºC and lower the rpm of the counter-rotation agitator to 6 rpm for the anchor and 40 rpm for the central shaft*
- *Any volatile components should be added to the mixture at this point*
- *Keep agitating the product at this temperature until transfer to the finished product vat (P3)*

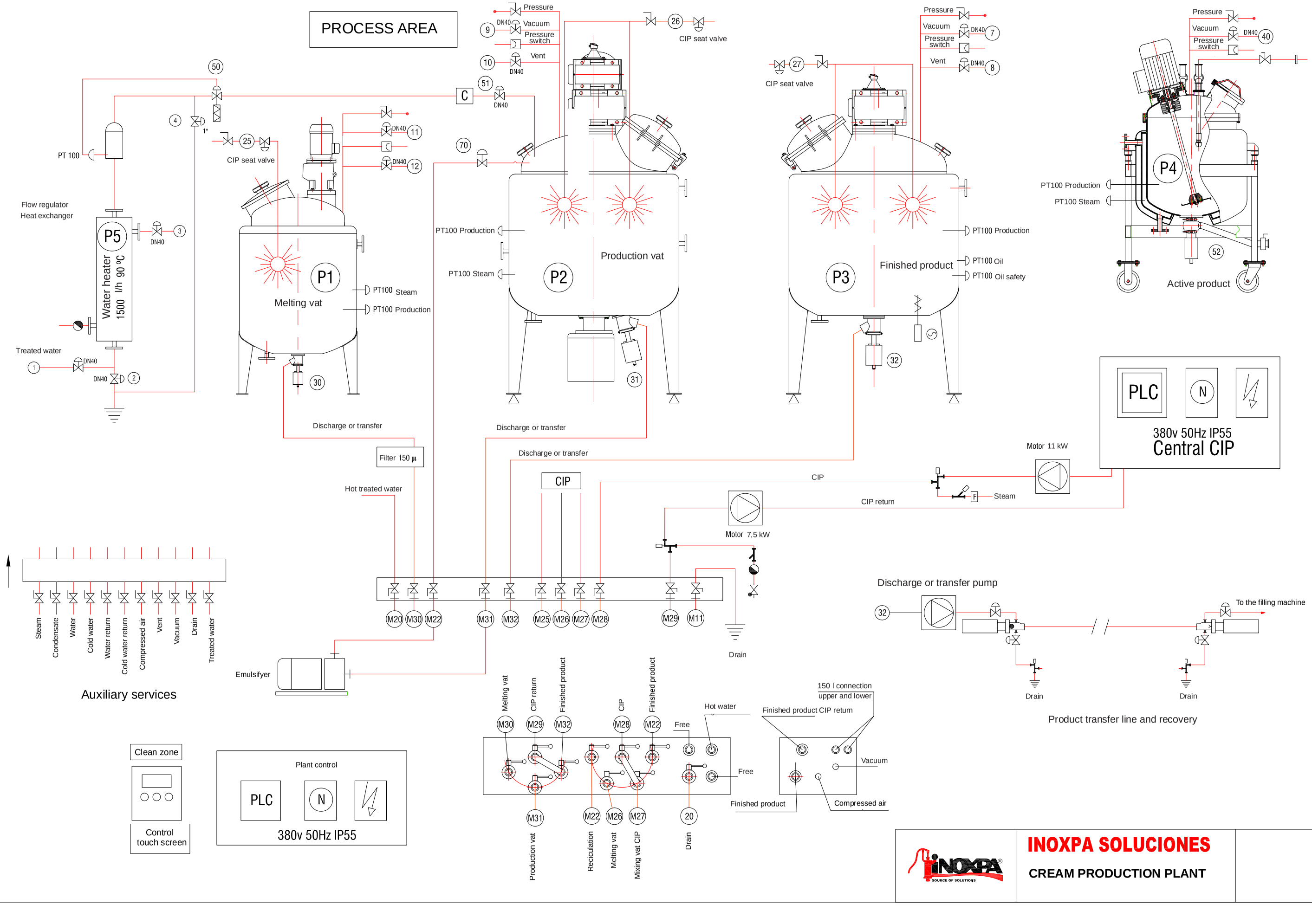
FINISHED PRODUCT

- *Heat the vat to 30 ºC using the heating system*
- *Switch the agitator on at approximately 10 rpm*
- *Transfer the product from the production vat (P2) to the finished product vat (P3). This transfer can be performed under vacuum or using a transfer pump*
- *If necessary due to the viscosity or other properties of the product, the production vat (P2) can be pressurised with nitrogen to a maximum of 2 bar.*

FILLING

- *Filling should be performed from the finished product vat using a transfer pump.*
- *It is recommended to install a SIL PIG system in the line. This allows any product remaining in the pipeline which lead from the transfer pump to the entry to the filling system to be recovered, thereby helping to clean the line.*

PROCESS AREA



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CREAM PRODUCTION PLANT