

A brown and white bulldog is sitting on a white surface, looking down at a bowl of dry pet food. The bowl is white with a brown and black leopard print pattern and is filled with brown kibble. The dog's tongue is slightly out, and it appears to be about to eat.

DRY PET FOOD - VPP*

*MEAT - FISH - PETFOOD

The pet food industry is one of the fastest growing food markets in recent years.

This growth is favoured by the increase in the level of quality of supply and product specialization, not by the increase in the number of pets.

THE FOUR MAIN AREAS OF DEVELOPMENT ARE BASED ON FOLLOWING SEGMENTATION:

- Health products oriented
- Specialized products by breed,
- Products adapted to the age and physiological needs of the animal
- Treats (biscuits-rewards)

IN TERMS OF PRODUCTION, THERE ARE TWO MAIN TYPES OF PROCESSES:

- the Pet food called "wet"
- the Pet food called "dry"

» APPLICATIONS:

- Dry pet food



1 ACTIVITY AND MANUFACTURING PROCESS

Dog and cat biscuits (also known as dry products containing only 8 to 10% moisture) are generally composed of :

- Meat and meat byproducts (fresh, frozen, haemoglobin, fat, fish oil ...)
- Raws material of plant origin (Cereal grains, oil...)
- Vitamins and minerals supplements,

The manufacturing process is generally that of extrusion cooking.

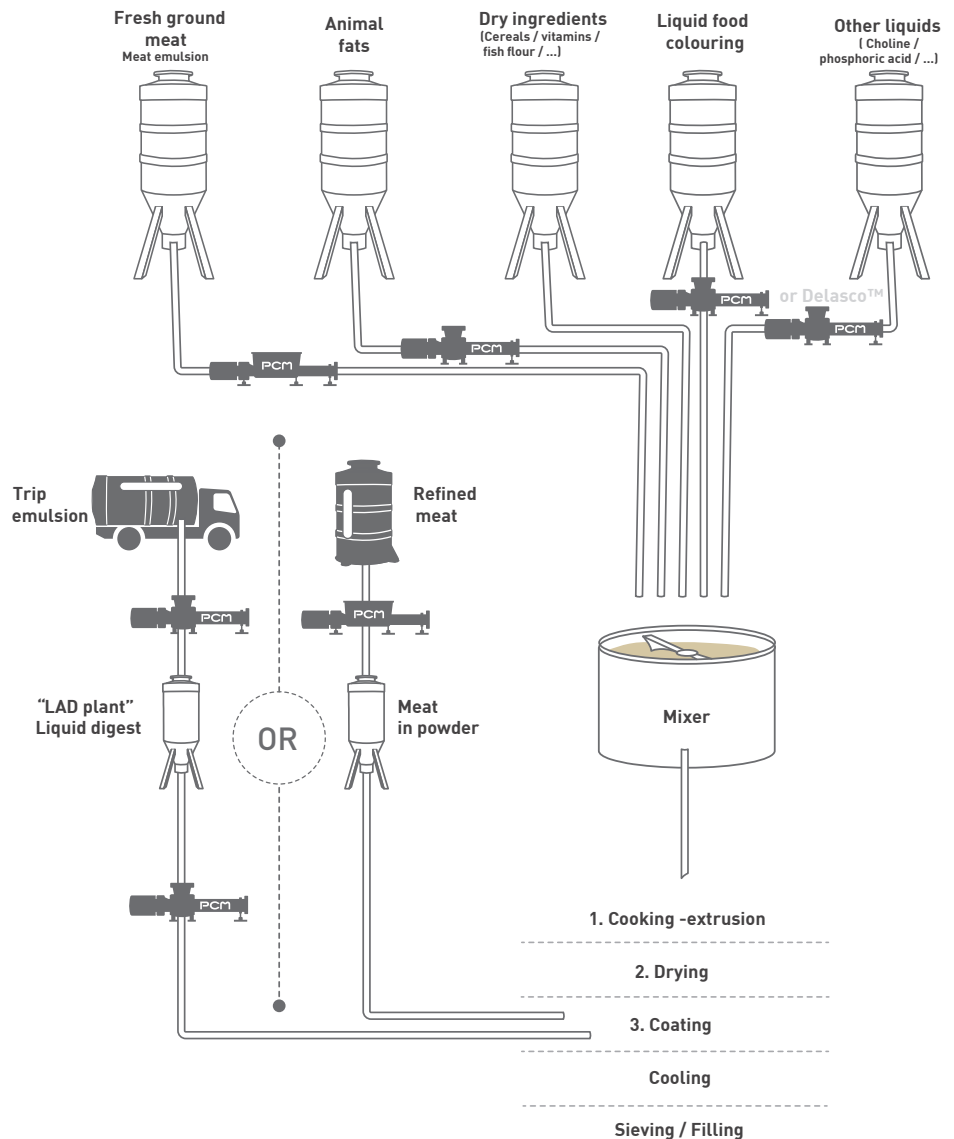
1- Extrusion cooking in two stages :

- **The mixing and cooking :** According to the recipe, the ingredients are metered, ground, mixed and sent to a cooker-extruder where they are mixed with water, fat. This mixture will be subjected to the combined action of heat, pressure and shear exerted by one or two rotating screws.

- **Sizing:** Granules are then shaped when they are extruded through the die.

2 - Drying : They are then put through a dryer, which reduces moisture (from 25% to 10%) to ensure better conservation.

3 - Coating : Most dry-expanded pet food operations apply liquid fat, "tripe juice" and/or flavors. The aim is to enhance the acceptability and palatability of their products and the protection against oxidation.





2 TECHNICAL DATA & PROCESSING RESTRICTIONS AND RECOMMENDATIONS

» MSM (or lean finely textured meat) :

Viscosity: 40 000 to 80 000 cpo

Particles size : fine (medium when using by-products)

Abrasion : medium (when using by-products)

Discharge pressure : 13 up to 16 bars

Suction pressure : flooded (below tank)

Flowrate : 2 up to 6 m³/h

Temperature : 4° C (European regulation)

Processing restrictions :

- Important product viscosity
- Average abrasion : possibility of very small pieces of bones
- Lean manufacturing process : use of machinery 5 to 6 days/ 7 and 24/24H.



MSM (Mechanically Separated Meat)

Processing recommendations :

The high-viscosity and sticky texture of the emulsion require the installation of a pump with hopper and feed screw. The Lean process requires the installation of a continuous flow technology as the Moineau™ technology.

» TRIPE EMULSION :

Viscosity : 100 000 cpo estimated

Particles size : fine (2 up to 3 mm)

Abrasion : medium to high

Discharge pressure : -

Suction pressure : pressurized tank truck

Flowrate : 15 up to 20m³/h (25 ton truck to empty)

Temperature : 6° C

Processing restrictions :

- Important product viscosity
- Medium to high abrasion: it depends on the proportions of gizzards which contains fragments
- Dry running risk : control the pump stop when the tank is empty
- Lean manufacturing process : 2 trucks to empty (around 25tons) a day /4 days a week.

Processing recommendations:

Pressurized tank truck is essential



» **ANIMAL FAT :**

Viscosity: < 100 cpo

Particles size : 0

Abrasion : 0

Discharge pressure : < 4 bars

Suction pressure : flooded (below tank)

Flowrate : 12 m³/h

Temperature : 40 to 60° C

Processing restrictions :

- Temperature : viscosity change

Processing recommendations:

Viscosity : the moineau™ technology is able to withstand the viscosity changes.

» **OILS** (palm, soy, fish...) **AND OTHER LIQUIDS**

(food colourings, choline, phosphoric acid, tomato paste, caramel) :

Viscosity : < 3000 cpo (tomato paste)

Particles size : 0

Abrasion : 0

Discharge pressure : < 5 bars

Suction pressure : flooded (below tank)

Flowrate: small flowrates

Temperature : room temperature

Processing restrictions :

- Continuous flow is essential.

Processing recommendations:

Associate a flowmeter to control the dosing.



Visual control of dry petfood -
colourings validation

» **LIQUID DIGEST AND MEAT JUICE/GRAVY :**

Viscosity: 50 up to 1000 cpo

Particles size : 0

Abrasion : 0

Discharge pressure : 2 up to 10 bars

Suction pressure : flooded (below tank)

Flowrate : small flowrates up to 5 m³/h

Temperature : 30° C

Processing restrictions :

- Risk of bacterial growth (at the Coating stage, hygiene is sensitive)

Processing recommendations:

CIP process is recommended.

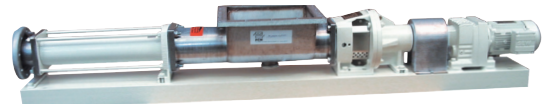


"Digest"



3 EQUIPMENT RECOMMENDATIONS

» MSM TRANSFER:



IVA pumps

IVA pumps have a suction hopper and a feed screw. The hopper allows fluid to flow freely, while the screw pushes the fluid in the rotor / stator.

Recommended speed:

- Between 100 & 150 rpm for effective feeding (avoids the phenomenon of arching or bridging on the screw).

» TRANSFER OF FOOD COLOURING, OTHER LIQUIDS & "DIGEST" INJECTION FOR COATING:

EcoMoineau™ C and HyCare™ pumps

Both models have equivalent hydraulic characteristics and guarantee the suitability of materials **food CONTACT** against the **regulatory requirements in Europe and the United States**.



For the most demanding applications in terms of cleanability (when risk of bacterial growth exists), the HYCARE™ range offers a **security certified by organizations hygienic design**.



This perfect cleanability is possible thanks to the pump conception designed to remove all retention areas likely to promote bacterial growth. This design conception focuses on:

- geometry of equipment
 - surface roughness
 - manufacturing methods such as welding ...
- a flexible rod designed in one piece (without knuckle or screws to guarantee the absence of retention area).





» TRANSFER OF COLOURINGS AND OTHER LIQUIDS:

Delasco™ DL Serie

For transfer of food colouring or phosphoric acid, DL Serie can also be used with in particular the following advantages:

- self-priming
- low life cycle costs (only one wearing part: the hose)

A food hose has been designed which complies with CE 1935/2004 and FDA 21 CFR 177.2600.



Please refer to the MSM application sheet for further information.