
# *FLOCARE*

SNF COSMETICS

# About us

SNF, a French company with headquarter in Andrézieux, is a leading producer of acrylamide based polymers with manufacturing sites in Andrézieux France, Savannah USA and Taixing China.

SNF has 40% market share, 1 B€ sales and manufactures 300 000 tons of polymers on a world wide base.

40 years of experience in polymer chemistry, aimed towards water treatment application, gives us a unique expertise in designing rheology modifiers, thickeners and film formers.

Our R&D teams have a real expertise in polymerization technologies using recent advances in the field for anionic, cationic, amphoteric and non ionic products. In addition, to serve best our customers in terms of cost, quality and supply chain, we are integrated in key monomers such as acrylamide, DiAllyl DiMethyl Ammonium Chloride (DADMAC), Quaternized DiMethylAminoEthyl (Meth)Acrylate (DMAE(M)A Quat).

This know-how in monomers, industrial processes and polymer design allows SNF to be reactive to customer needs for the cosmetic market.

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# Rheology modifier

**Amongst the Flocare range** we can offer are full range of **rheological modifiers** and **thickeners** used in a wide variety of Personnal Care Compositions. They are crosslinked pre-neutralized networks. Viscosity in aqueous systems is generated by repulsive forces between each anionic or cationic charge.

## Manufacturing stages

### Inverse Emulsion Polymerization Process and Drying Step

*OUR RANGE OF EMULSION (LDP) IS MADE-UP OF 3 MAIN INGREDIENTS:*

- *A DISPERSED POLYMER*
- *A CONTINUOUS CARRIER PHASE*
- *AN INVERTING AGENT*

### *A DISPERSED POLYMER*

Polymer manufacturing is the heart of SNF technology, with a strong back-integration on monomers. Consequently, SNF ensures a full control over the supply chain and raw materials quality.

SNF expertise in monomers allows an infinity of combination to be developped. Each monomer gives to the final formulation feeling properties (non tacky, non stringy, non greasy,...), compatibility to other raw materials or resistance to formulation conditions.

*MONOMER RANGE*

**Non ionic:**

**Acrylamide**

Efficiency due to high molecular weight, feeling properties

**Anionic:**

**Sodium acrylate**

Non toxic, strong thickening properties

**Sodium Acryloyldimethyl Taurate (ATBS)**

Stable with electrolytes, effective under acid pH

**Cationic:**

**Quaternized DiMethylAminoEthyl (Meth)Acrylate (DMAE(M)A Quat)**

Cationic monomer, keratine affinity

**DiAllyl DiMethyl Ammonium Chloride (DADMAC)**

Stable vs hydrolysis and temperature

*Figure 1: Monomers tool box*

### *A CONTINUOUS CARRIER PHASE*

This phase is made of a hydrophobic solvent called oily phase. Each oil brings a sensory profile in the final formulation. The main oil used for LDP (Liquid Dispersion Polymer) is a mineral oil, other carriers are available, on request.

### *AN INVERTING AGENT*

The inverting agent is a O/W emulsifier that allows liquid dispersions to invert in aqueous systems. This enables water molecules to enter into polymer particles by osmosis, allowing polymer chains to swell in the aqueous external phase. The standard inverting agent is Trideceth-6, other inverting agents are available, on request.

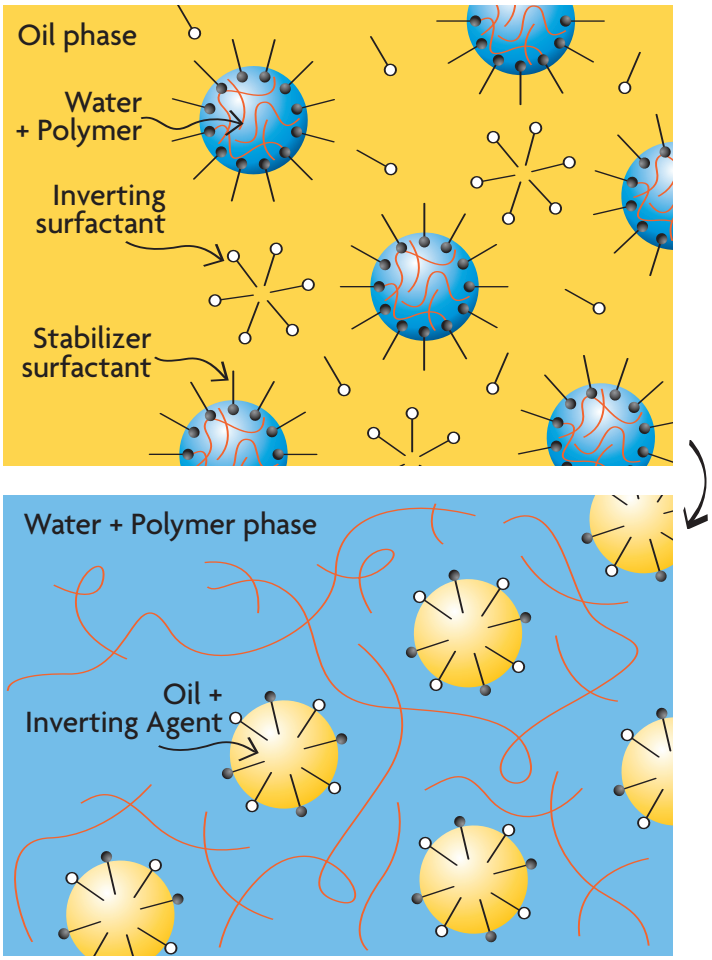



*Figure 2: Contact between emulsion and aqueous system under mixing:* ***Inversion***

**Flocare ET series** are **Liquid Dispersion Polymers (LDP)** manufactured via inverse emulsion polymerisation. With this process it is possible to achieve a very high molecular weight crosslinked polymer with an optimised rheological profile. SNF's strength is to offer a wide range of products from low concentration to highly concentrated thickener.

Rheology modifiers exist also in powder form **(PRM = Powdered Rheology Modifier)**, such as Flocare PSD100 or Flocare PSD30. The first step to produce this kind of powder consists in making a LDP, after that, with a patented process, SNF removes the oil to obtain a powder.

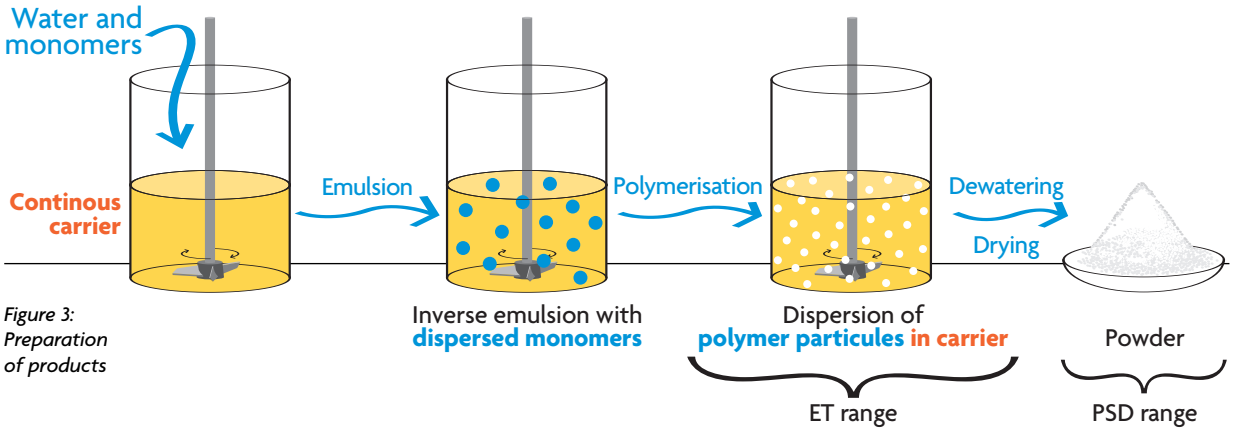



*Figure 3: Preparation of products*

# Rheology modifier

**4 major properties of LDP and PRM:**
- **Thickening** ) thanks to physical properties
- **Suspending** ) (η)
- **Stabilizing** ) thanks to chemical properties
- **Emulsifying** ) (polymer and surfactant)

When best adding a Flocare thickener during the formulation process ?

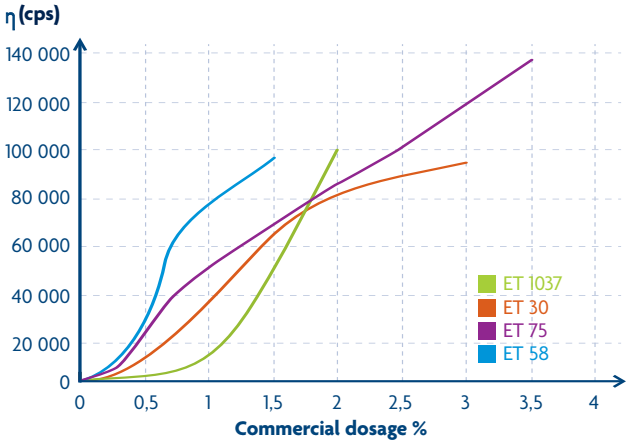
Flocare addition can happen at different time during the process. It can be a direct addition (in aqueous phase) or indirect addition (in oil phase). Flocare thickener could also be added in the cosmetic emulsion.

## Product Range

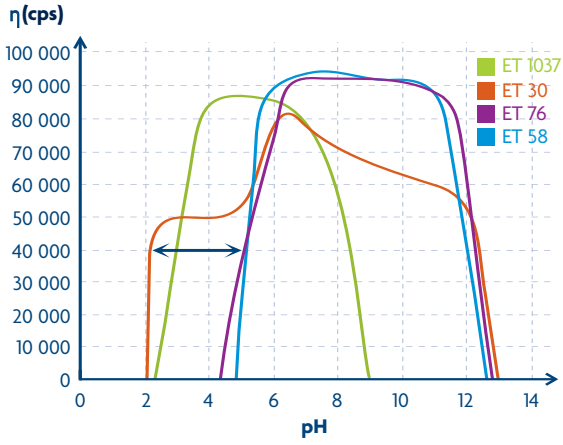
### 1 / LDP range

| Commercial Name | INCI Name | % | Remarks |
|---|---|---|---|
| **Flocare ET 75** | *Sodium Polyacrylate & Mineral Oil & Trideceth-6* | 57,5 | Concentrated |
| **Flocare ET 25** | *Sodium Polyacrylate & C13-C14 Isoparaffin & Trideceth-6* | 30 | Low concentrated |
| **Flocare ET 76** | *Sodium Polyacrylate & Hydrogenated Polydecene & Trideceth-6* | 57,5 | Mineral oil free |
| **Flocare ET 30** Patent: WO 01/97772 | *Sodium Acrylate/Sodium Acryloyldimethyl Taurate (ATBS) Copolymer & Mineral Oil & Trideceth-6* | 57,5 | Acidic pH electrolyte stable |
| **Flocare ET 58** | *Acrylamide/ Sodium Acrylate Copolymer & Mineral oil & Trideceth-6* | 57,5 | Texture |
| **Flocare ET 1037** | *Polyquaternium-37 & Mineral oil & Trideceth-6* | 53 | Cationic Keratine affinity |

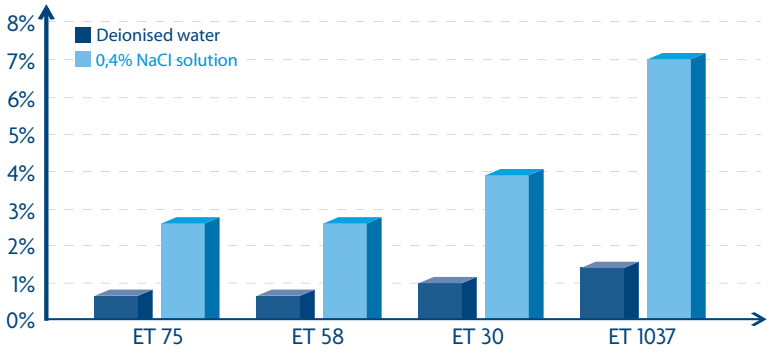
Viscosity profile*




pH profile*




Dosage for a 40 000 cps gel*

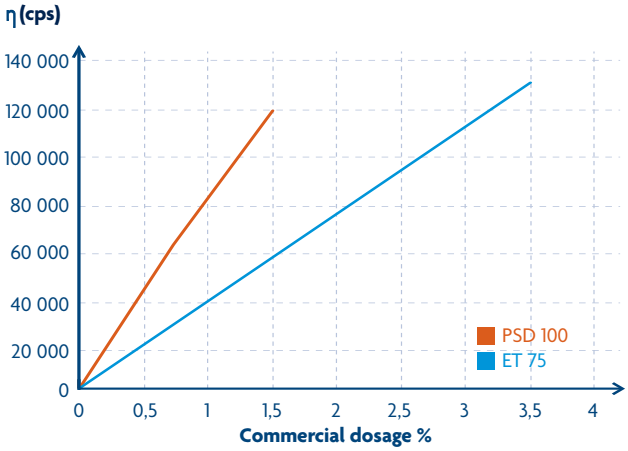



** Brookfield RVT - spindle 6-5 rpm*

## 2 / PRM range

| Commercial Name | INCI Name | Remarks |
|---|---|---|
| **Flocare PSD 100** | *Sodium Polyacrylate* | Pre-neutralized free flowing powder |
| **Flocare PSD 30** | *Sodium Acrylate & Sodium Acryloyldimethyl Taurate (ATBS) Copolymer* | Stable to electrolytes and Acidic pH because of ATBS monomer |
| **Flogel 1000** | *Carbomer* | New grade High clarity, low foam, better handling |

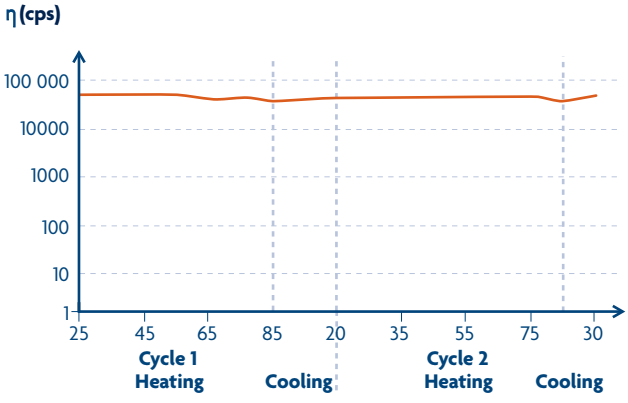
### Viscosity profile*



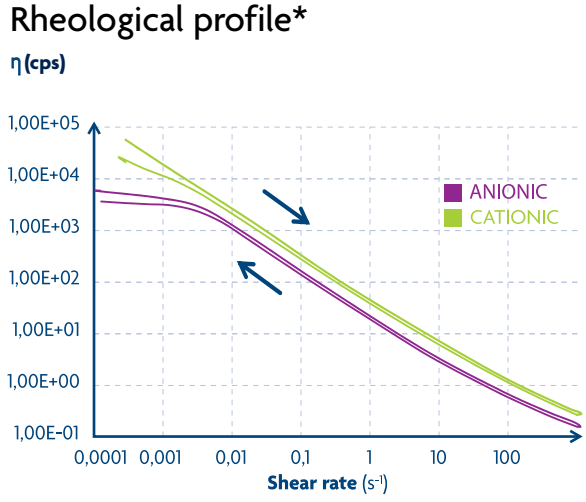

SNF's Liquid Dispersion Polymers and Powdered Rheology Modifiers are pre-neutralized and don't require the addition of a base to develop viscosity, all our products are ready to use. Emulsifying and stabilizing properties are the result of the adjusted combination of polymer and surfactants system described previously. No preservative system is required for these products.

### Temperature effect, 2% w/w Polymer, Balance Deionized Water

*Brookfield RVT - spindle 6-20rpm*




### Rheological profile*




*APPLICATION*

Anionic polymers (ET75, ET76, ET58, ET25, ET30 in liquid form or PSD30 and PSD 100 in powder form) are ideal for skin care, toiletries and decorative cosmetics. For clear cosmetic liquid shampoos or toiletries, Flogel 1000 are best suited. More details are available in product bulletin of each product.

# Film-former and

## Principle

This Flocare range of product is available in liquid form (solution) or in dry form.
A film former or a conditioner will coat hair or skin. The product forms a film on the keratine support because of its affinity with it. This deposit gives some properties to the substrate: softness, or brightness, depending on active and emollient added in formulation. The efficiency is due to film formed on skin or hair along with its ionic affinity. See figure 4 for details on film formation.

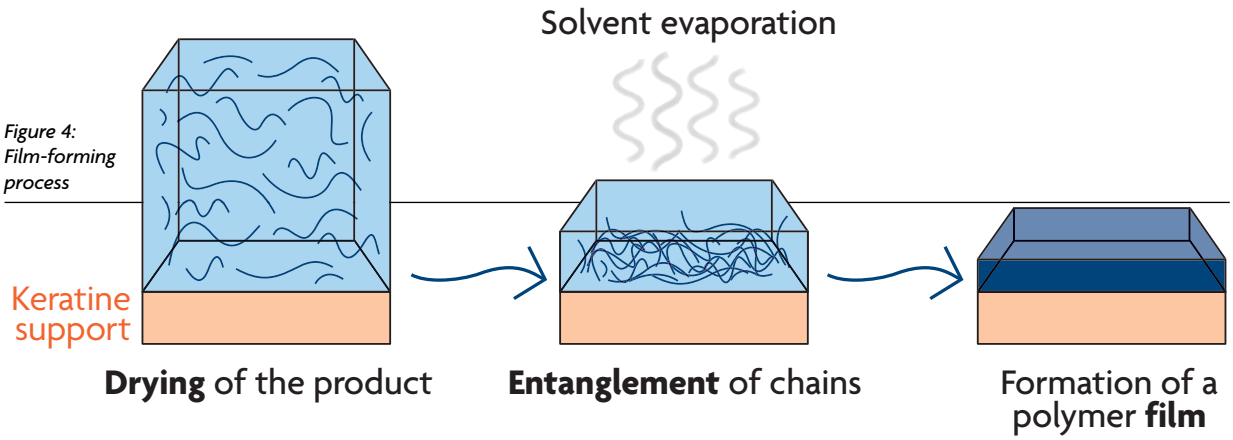
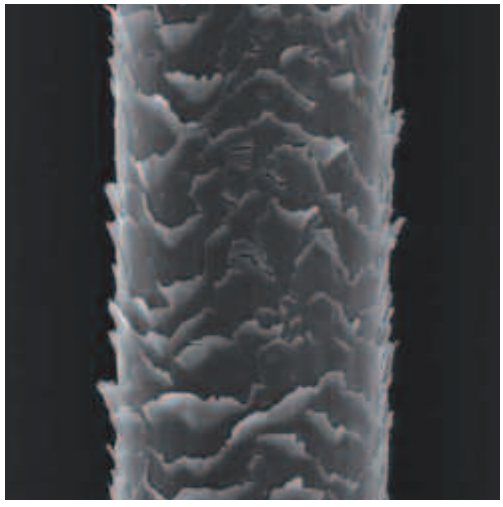


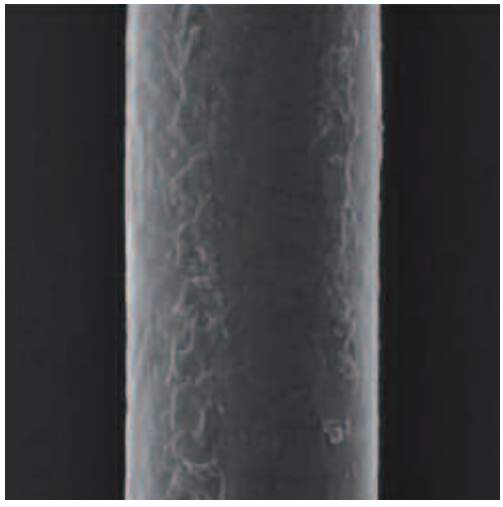

*Figure 4: Film-forming process*

With Scanning Electron Microscopy (SEM) the effect of film-former on hair can be seen (Figure 5).
This analysis has been made by a French testing external laboratory.

*Figure 5: Picture non-treated and treated hair in SEM*



Non-treated hair (x700)



Hair treated with film-former (x700)

# Product Range

| | Commercial Name | INCI Name | Chemistry | Form | Remarks |
|---|---|---|---|---|---|
| Cationic polymer | **Flocare C106** | *Polyquaternium 6* | DADMAC homopolymer | Liquid | High cationic level<br>Hair compatibility |
| | **Flocare C106B** | | | Dry | |
| | **Flocare C107** | *Polyquaternium 7* | DADMAC/Acrylamide copolymer | Liquid | Cationic<br>Surfactants affinity |
| | **Flocare C7000** | | | Dry | |
| | **Flocare C111** | *Polyquaternium 11* | NVP/DMAEMA (Q) Diethyl Sulfate copolymer | Liquid | Cationic<br>NVP based |
| | **Flocare C600** | *Acrylamidopropyltrimonium Chloride and Acrylamide Copolymer* | APTAC/Acrylamide copolymer | Dry | Cationic<br>Hair compatibility<br>Surfactants compatibility |
| Amphoteric | **Flocare C122** | *Polyquaternium 22* | Acrylic Acid/DADMAC copolymer | Liquid | Amphoteric<br>Basic pH formulation<br>Non acrylamide based |

**Flocare C106 and C107, *polyquaternium 6 and 7,*** are available in liquid form and powder form. These two products are largely used in cosmetic for their conditioning properties.
The powder forms (C106B and C7000) are free of preservative systems (ie: paraben free).
**Flocare C106** is highly cationic and may have compatibility issues when formulated with anionic surfactants.

**Flocare C600,** is a cationic product, with an ionic charge density between C106 and C107. This product is recommended for ethnic hair treatment. Being in powder form, it is free of any preservative system.

**Flocare C111, *polyquaternium 11,*** is a conditioner based on NVP (vinyl pyrrolidone) and DMAEMA DiMethylAminoEthyl (Meth)Acrylate diethyl sulfate. NVP provides the polymer with a very high film-forming power, and DMAEMA diethyl sulfate gives substantivity for hair and skin.

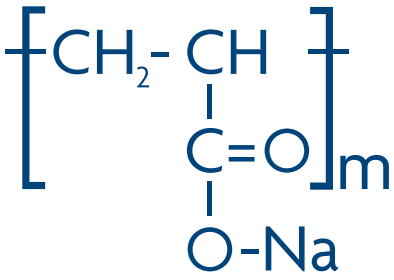
**Flocare C122, *polyquaternium 22,*** is an Acrylic Acid/DiAllyl DiMethyl Ammonium Chloride (DADMAC) copolymer. This polymer is amphoteric. Flocare C122 is not sensitive to hydrolysis, making it perfect for high pH formulations. This product is acrylamide free.

Regarding preservative system, Flocare range is also available in **"Paraben Free"** versions.

# Specialties application

## Principle of "Superabsorbent" Technology Flocare GB300

Superabsorbent products have the property of absorbing up to 400 times their weight in distilled water and they become gels.




The polymers consists of a set of polymeric chains regularly linked to each other by cross-linking agents, thus forming a network. When water comes into contact with one of these chains, it is drawn into the molecule by osmosis. Water rapidly migrates inside of the polymer network where it is stored.

Swollen polymer are 1 mm spherical gel beads (Figure 6).

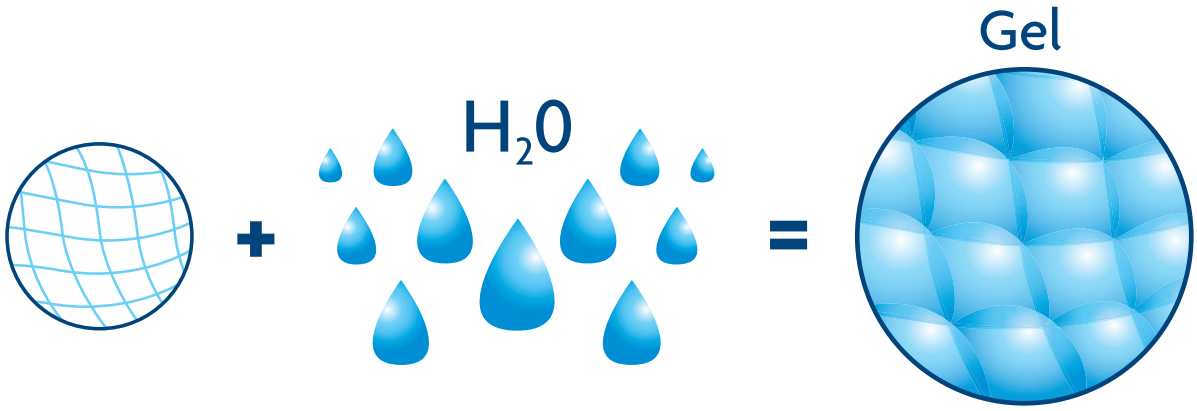


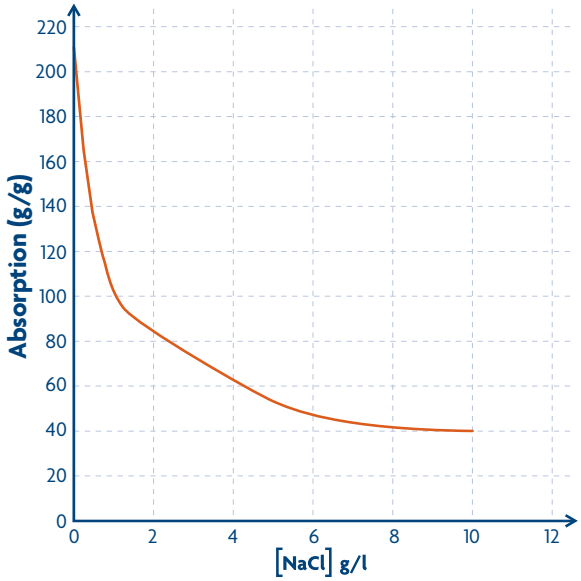

*Figure 6: GB300 beads swelling*

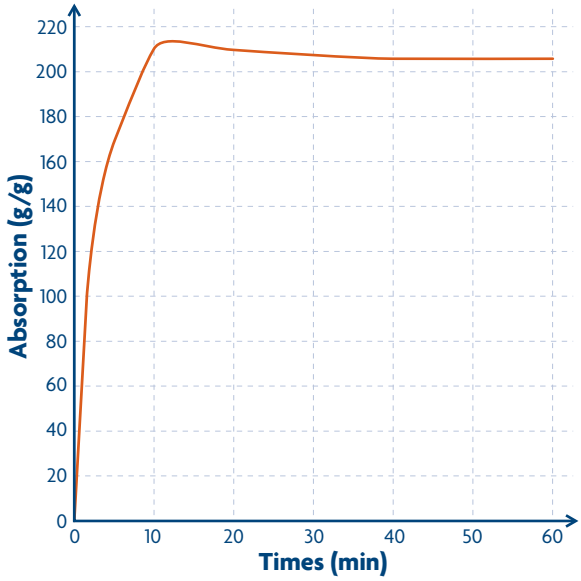
## Product Range

| Commercial Name | INCI Name | Form | Remarks |
|---|---|---|---|
| **Flocare T920GC** | *Polyacrylamide* | Powder | A non-ionic polymer that provides spreadability and lubricant properties to the final formulation. |
| **Flocare GB 300**<br>Patent: WO01/64179 | *Sodium Polyacrylate* | Bead | Mild skin-polishing agent in bead form, providing superabsorbent properties. Ideal for soft scrubbing effect. |

*Picture of Flocare GB 300 before (right) and after (left) water absorption*

*GB300 absorption: 1 g GB300 + 200 mL water = 500 mL swelled beads*



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