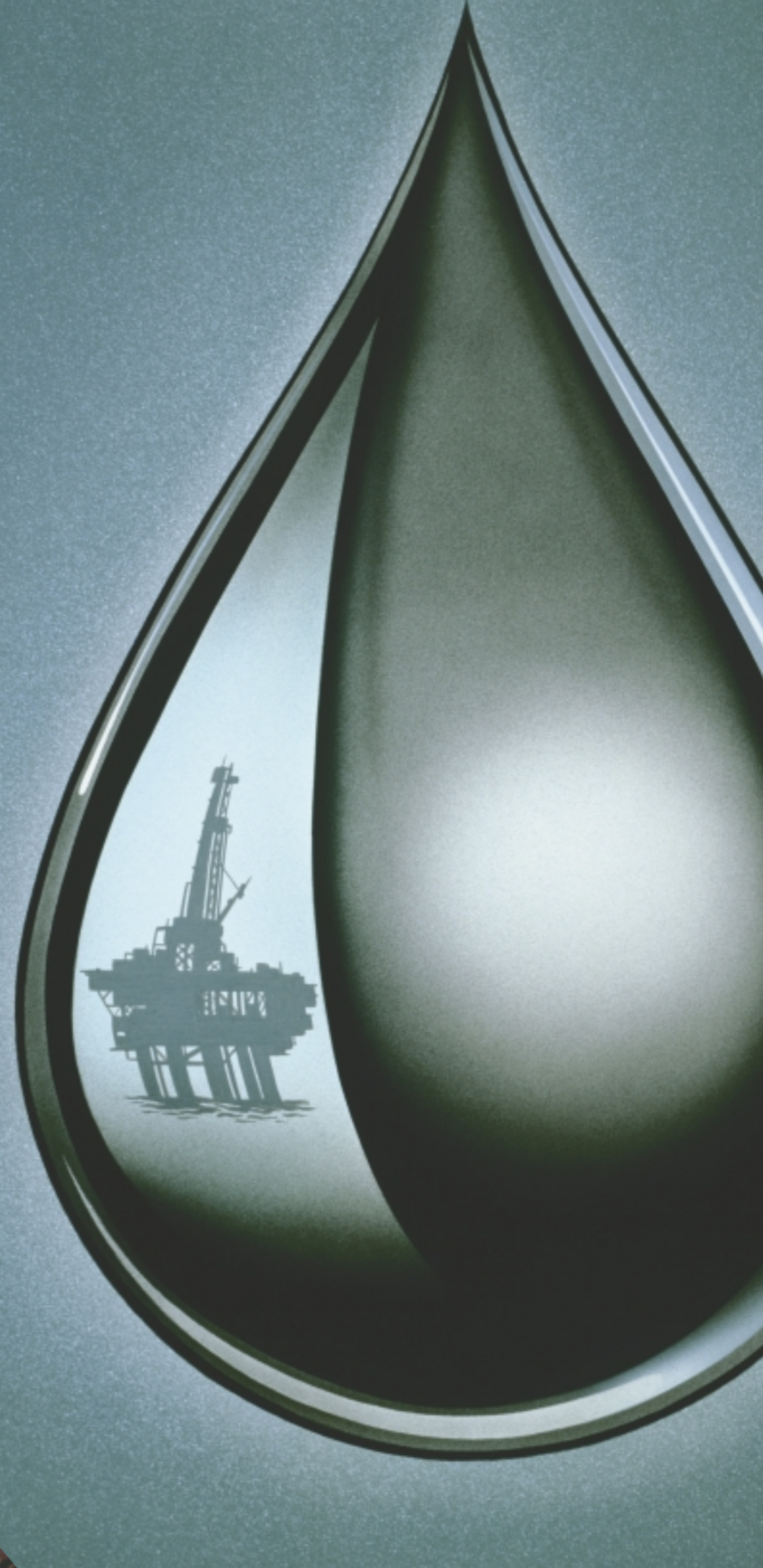


**FLODRILL™**

*For the  
drilling industry*



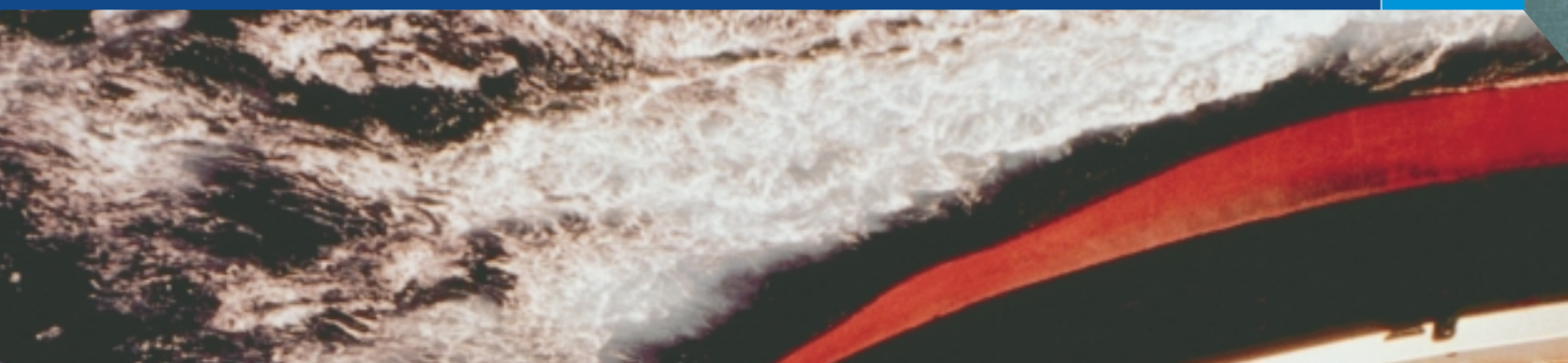
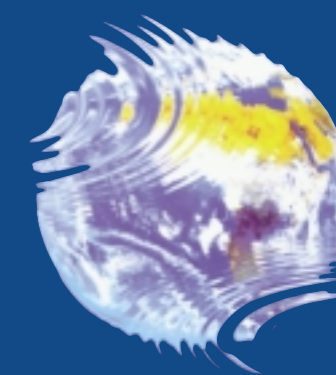
**SNF FLOERGER**  
ZAC de Milieux  
42163 Andrézieux Cedex - FRANCE  
Tel: + 33 (0)4 77 36 86 00  
Fax: + 33 (0)4 77 36 86 96  
floerger@snf.fr



The information in this brochure is provided in good faith. To our knowledge it reflects the truth.

credit photos GETTY images

GUTENBERG ON LINE REGIONS - Tél. 04 77 42 38 00 / 02 - 2002 - N°1312-01



# Water based mud additives

Drilling fluids are necessary for the following applications:

- 1 Removal of cuttings from the wellbore, due to the viscosity and the flow rate in the annulus.
- 2 Control of down-hole pressure, by the density of the mud.
- 3 Cooling and lubrication of the drill bit.
- 4 Formation of filter cake on the wellbore walls, by filtrate loss properties.
- 5 Suspension of cuttings and weighting materials during downtime due to the thixotropic behaviour of the mud system.

SNF S.A has developed a wide array of polymers for water based drilling mud systems. Each range of SNF polymers covers one or more of the following applications in drilling fluids: Viscosity, fluid loss control, shale inhibition.

Both natural (xanthan gum) and synthetic (polyacrylamide) polymers are produced in a variety of grades for specific applications. Polyacrylamide provides viscosity, thixotropic behaviour and fluid loss properties and xanthan gum provides viscosity in harsh brines and mud systems.

## ■ Viscosity

Three main products are used to enhance viscosity: bentonite, partially hydrolysed polyacrylamide (PHPA) and xanthan gum.

Bentonite is a montmorillonite clay. The viscosity results from the hydration and dispersion of clay particles composed of thin platelet crystals bearing positive and negative charges which interact electrostatically. Bentonite is mainly used in fresh water.

PHPA is a water soluble polymer. Interactions between the polymer molecules increase drilling mud viscosity in proportion to the molecular weight (MW). PHPA polymers can be used in fresh water, sea water, NaCl and KCl system.

Flodril PAM 1040  
Flodril EM533, EM533A40, DW533

Xanthan gum is a polysaccharide, manufactured in a fermentation process. These products are used for viscosity in fresh water, lignosulfonate, saturated NaCl brine or heavy mud systems.

Flodril S and SD



## ■ Bentonite extender

Low solids systems typically use polymer additive as a viscosifier or as a bentonite extender.

**Low MW and very high anionic polymers are used as BENTONITE EXTENDERS.**

Flodril PAM 1100  
Flodril AB 995 BPM

These products are used to increase viscosity in non-dispersed, fresh water mud systems. They can be added to the mud system on site or they can be added directly to the bentonite at the mill.

The polymer adsorbs onto the bentonite clay particles due to the ionic character and the molecular weight, which links them together and consequently increases the viscosity yield. SNF produces a complete range of polyacrylamides for this application.

## ■ Anti clay swelling agent (Shale inhibition)

Polymer is absorbed on the surfaces of drill cuttings and the borehole wall. The encapsulation of drilled solids promotes flocculation and minimizes disintegration and dispersion. These larger cuttings are carried to the surface and more effectively removed by solids control equipment. The adsorption of polymer on the borehole wall enhances the stability of sensitive formations (salt, clay, ...).

**High MW PHPA with KCl salt are used as ANTI CLAY SWELLING AGENT.**

Flodril PAM 1040  
Flodril PAM 1040 QW4 (dispersible powder)  
Flodril EM533, EM533A40, DW533

## ■ Fluid loss control agent

Drilling mud must be treated to keep cake permeability as low as possible in order to maintain a stable borehole and to minimize filtrate invasion, and damage to the pay zone.

Polyelectrolytes added to low solids water based mud systems and bentonitic water based mud systems to improve fluid loss control and consequently avoid formation damage and increase drilling rates.

**Very low Molecular Weight and anionic polymers are used for FLUID LOSS CONTROL AGENT.**

Flodril PAM 1090  
Flodril AB705BPM



## ■ *High temperature, high pressure fluid loss control agent*

High filtration performance is required when drilling under high temperature and high pressure conditions in harsh brine.

Depending of downhole conditions, various compositions of polymer can be used to yield good filtration control.

**Sulfonated polymers are used for HIGH TEMPERATURE FLUID LOSS CONTROL.**

Flodril DP/AS 2089L  
Flodril AN125VLM

## ■ *Dispersant*

Dispersants are used to reduce viscosity and gel strength. Besides lignosulfonates and polyphosphates, polyacrylates of low molecular weight are used. Modified dispersants based on sulfonated polymers are also available for high temperature, high salinity water based mud systems.

**For low to medium temperature:**

Flodril D110B  
Dispersant n° 8

**For high temperature or harsh environment:**

Flodril D210B  
Flodril D210L

