

Formula F Concentrate



A DIVISION OF CHEVRON PHILLIPS
CHEMICAL COMPANY LP

Formula F Concentrate employs patented technology to provide a base fluid that is useful for suspending solids. Formula F Concentrate is a thickened, paraffinic oil. As shown in Figure 1, it has sufficient viscosity to suspend a spatula. It is packaged in 55 gallon, open top drums.

The Formula F Concentrate is typically used in the production of solids suspensions. In the oil industry, such solids usually include: guar gum, guar derivatives, xanthan gum (Flowzan[®] Biopolymer), hydroxyethyl cellulose, polyanionic cellulose (Drispac[®] Polymer), various synthetic polymers (HE[®] Polymers).

The Formula F Concentrate is too thick to be used alone as a suspension medium. In practice, it is combined with other oils in proportions sufficient to produce a base fluid that has viscous properties which allows for stable particle suspension, yet easy handling. A variety of oils have been evaluated and found to be compatible with the Formula F Concentrate, including:

1. Petroleum Distillates (mineral oils)
 - a. Soltrol[®] 170 Isoparaffin Solvent
 - b. Soltrol[®] 220 Isoparaffin Solvent
2. Process Oils
 - a. ParaLux[®] Process Oil 701
 - b. Orfom[®] SX-12 Solvent Extraction Diluent
 - c. Orfom[®] SX-80 Solvent Extraction Diluent
3. Naphthenic Oils
4. Synthetic Oils
 - a. Synfluid[®] PAO



Figure 1 Formula F Concentrate

^aProducts of Chevron Phillips Chemical, LP

^bProducts of Chevron U.S.A. Inc

This is not a complete listing of diluents that have been evaluated, but is meant to provide a basis for other investigations. The compatibility of the diluent should be judged according to the viscous properties of the resulting blend. Furthermore, the proportion of diluent to Formula F Concentrate must be determined experimentally. Generally, however, one part of the Formula F Concentrate is combined with three parts of diluent to produce a useable base fluid. Table 1 shows typical values of fluid viscosity for a 1:3 dilution of the Formula F Concentrate, using a petroleum distillate.

Mixing Requirements

Formula F Concentrate is typically mixed in a ratio of 1 part concentrate to 3 parts diluent. Several possible diluents are listed in this TDS. See details in the text. Target bulk viscosities are shown in Table 1. Active material loading is determined by targeting the bulk viscosity levels shown in table 2.

Handling

For specific instructions refer to MSDS information or as illustrated on product containers.

Packaging

55 gallon open top steel drums
350 lbs net weight
1650 lb totes

Before using this product, the user is advised and cautioned to make its own determination and assessment of the safety and suitability of the product for the specific use in question and is further advised against relying on the information contained herein as it may relate to any specific use or application. It is the ultimate responsibility of the user to ensure that the product is suited and the information is applicable to the user's specific application. Drilling Specialties Company does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained herein or the product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or the product itself. Further, information contained herein is given without reference to any intellectual property issues, as well as federal, state or local laws which may be encountered in the use thereof. Such questions should be investigated by the user.

Formula F Concentrate



Table 1

Typical Diluted Base Fluid Bulk Viscosities

	Brookfield Viscosity (cP)
0.6 rpm	30,000
6.0 rpm	5,000

Once a suitable diluent has been identified, and the proper ratio of diluent to Formula F Concentrate is determined, the fluids are combined and mixed until a homogeneous blend is achieved. Solids are then added to the mixture. The amount of solids used normally ranges from 20% to 50% by weight. The solids content (activity) is limited by the bulk viscosity of the finished product. Table 2 shows a typical viscosity profile for a 40% suspension of guar gum in a base fluid made using Formula F Concentrate. Experimentally, the amount of diluent and the total solids content are adjusted in order to optimize the suspension stability and also the ease of handling.

Table 2

Typical 40% Guar Gum Suspension Bulk Viscosities

	Brookfield Viscosity (cP)
0.6 rpm	60,000
6.0 rpm	12,000

This patented technology has been employed by Drilling Specialties to produce stable liquid suspensions using mineral oil as the diluent fluid. Drilling Specialties' 50% active Liquid Flowzan® Biopolymer will not experience the separation, evident in other suspension products. It is not subject to Particle settling or fluid separation under normal storage or transport conditions. Starting with an environmentally friendly fluid and utilizing our unique suspension technology, we eliminate settling of the Flowzan® Biopolymer particles while the product remains fully pourable. The long-term stability of the suspension provides for consistent, reliable product properties at your field locations any place in the world. Liquid Flowzan® Biopolymer has seen successful application in both warm climates, like the Gulf of Mexico and the Middle East, and in cold climates, like the North Sea and Alaska.

Packaging any product as a liquid suspension allows for accurate metering, and provides complete dispersion of the particles in your treating fluids before hydration begins. This quality eliminates problems of polymer lumping and incomplete viscosity development, even when facing adverse field mixing conditions.

Information about Liquid Flowzan® Biopolymer and other liquid suspensions is available in the following Technical Data Sheets: Liquid Drispac® Polymer, Liquid Flowzan® Biopolymer, Liquid HE® Polymer 150 and Liquid HEC Polymer at www.drillingspecialties.com/products .

Before using this product, the user is advised and cautioned to make its own determination and assessment of the safety and suitability of the product for the specific use in question and is further advised against relying on the information contained herein as it may relate to any specific use or application. It is the ultimate responsibility of the user to ensure that the product is suited and the information is applicable to the user's specific application. Drilling Specialties Company does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained herein or the product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or the product itself. Further, information contained herein is given without reference to any intellectual property issues, as well as federal, state or local laws which may be encountered in the use thereof. Such questions should be investigated by the user.