

TRADE SECRET CONFIDENTIAL GUIDELINE RESPONSE VERSION

SELECT CHEMISTRY LLC

FR-1000

1. **To your knowledge, has the identity of the ingredient, its concentration, or both as appropriate, been publicly disclosed:**
 - a. **Pursuant to any federal or state law or regulation**
 - b. **In professional trade publications?**
 - c. **Through any other media or publications available to the public or your competing oil and gas operators, or service companies.**

FR-1000 is an anionic friction reducer product, the disclosure of which would cause competitive harm to Select Chemistry LLC. Specifically, such disclosure would permit competitors to determine the precise chemical identity and composition of this product. The product has been reviewed carefully to ensure that only the components that represent trade secret components are protected. To Select Chemistry's and Select Chemistry's knowledge, the confidential information (including the chemical name and CAS number) do not appear in any public source. In addition, this information has not been previously disclosed on the FracFocus database by Select Chemistry LLC or, to Select Chemistry's knowledge, any other third party.

Specifically, the identity of the confidential information and its use in FR-1000 has not been publicly disclosed to our knowledge: (i) pursuant to any federal, state, or local law or regulation; (ii) in any professional trade publication; or (iii) through any other media or publications available to the public or Select Chemistry's competitors.

In responding to these questions, you must take steps that are reasonable and appropriate under the circumstances to determine the knowledge of relevant individuals within the company. You must provide a description of the investigation you undertook to respond to these questions.

Steps have been taken that are reasonable and appropriate under the circumstances to determine the knowledge of relevant individuals within the company. These steps include consultation with relevant individuals in the product team that are involved in the development of these types of additives.

2. **To what extent is the identity of the ingredient, concentrations, or both, as appropriate, are known within the company. Please describe in detail how this information is housed in your company and what steps your employees, officers, agents, and directors, take to prevent disclosure of the information to parties outside your company.**

The exact chemical identity of the product FR-1000 are treated as a trade secret, and care has taken (and continues to take) appropriate and required steps designed to ensure that no unauthorized disclosure of such information is made. Internally, Select Chemistry, LLC employees have been trained on the importance of protecting the company's confidential information and trade secrets. Further, information about the chemical composition of all products are maintained in a limited-access, secure database by the manufacturer Select Chemistry. Only employees who need to know such information are permitted access to this information. In the event that such information must be disclosed externally, for example to satisfy applicable regulatory requirements, it is disclosed pursuant to an executed Non-Disclosure Agreement. We understand that our customers similarly treat such information with the highest degree of confidentiality.

- 3. Has any other federal or state entity determined that the ingredient, concentrations, or both, as appropriate, is not entitled to protections from public disclosure? If so provide a copy of the agency's determination, along with any explanation as to why the Board should not make a similar determination. Provide any other information concerning prior requests for confidentiality and/or regulatory body determinations you believe are relevant to the Board's determination:**

No other federal, state, tribal or local regulatory body has determined that the confidential information (including its use in the product FR-1000) is not entitled to protection from public disclosure or trade secret or confidential commercial information. To our knowledge, the trade secret components do not require full disclosure under any applicable Federal laws. The OSHA Hazard Communication Standard (29 CFR 1910.1200) requires manufacturers to disclose on the SDS any hazardous components present at greater than 1.0% and for carcinogenic components at levels above 0.1%. *[Components which meet these criteria are identified on the SDS, as applicable, and SDS forms comply with the trade secret provisions as outlined in the OSHA Hazard Communication Standard (29 CFR 1910.1200, Appendix D).]*

- 4. How is the identity of the ingredient, concentrations, or both, as appropriate, commercially valuable to the owner, operator, or service company? In answering this question, please describe why the ingredient, concentrations, or both, as appropriate, is not common knowledge in the industry, including any novel or unusual aspects of the ingredient in this application.**

Select Chemistry LLC is able to maintain its position and share of the market via the unique specialized products and services not offered by competitors.

Select Chemistry LLC via years of research and development into the selection of raw materials, specific blend ratios, subsequent lab and field testing prior to commercialization. These efforts have allowed Select Chemistry to generate, proprietary chemistries that provide superior, cost-effective results for our clients. These novel chemistries provide a competitive edge for our group and helps to support further development to meet client and regulatory requirements.

FR-1000 is an anionic emulsion polymer consisting of the monomers acrylic acid and acrylamide, combined with various surfactants, oils, and water. **[Although the use of acrylic acid-acrylamide copolymers is not unique, the specific components of the emulsifying and inversion surfactants are unique and provide superior performance to other friction reducer products in the market.**

[The proper preparation of an oil and water emulsion like FR-1000 is advantageous to oil and gas well fracture operations as it allows a large amount of high molecular weight polymer chemical to be applied to high water flow rates. The manufacturing process and chemical formula of an oil and water emulsion require significant expertise and knowledge to create a stable mixture of immiscible oil and water phases which on their own and without the proper surfactant/surfactants and inversion package would separate into the constituent oil and water phases and be useless as a friction reduction additive.

In addition to the requirement of being a stable oil and water emulsion, chemistries like FR-1000 must also be able to exhibit the required characteristics of specific viscoelasticity and sand carrying capability under a wide range of shear stresses when inverted. The required viscoelasticity properties include the ability to be effective as a friction reducer by being able to elongate or contract (like a spring), depending on the shear stress experienced over a range of water flow rates and not degrade over time due to the experienced stress.

During the manufacturing of a stable oil and water emulsion, the polymer is dispersed in an oil phase. When mixed with water, the oil phase partitions out of the emulsion and allows the polymer to “unwind” into the bulk water phase. The characteristics and chemistry of the bulk water phase, the frac water, varies depending on the geographical area and whether the water is from a surface location such as a lake or river or underground subterranean source. Different waters requires a specific optimum surfactant and breaker package for maximum friction reduction and resulting more economical fracture operations.]

[In the process of developing FR-1000, the surfactant inversion package consisting of alcohols C9-C11 ethoxylated, phenolic resin, alkylbenzene sulfonic acid, and polyethylene glycol monooleate in their specific ratios and quantities in FR-1000 works synergistically with the primary surfactant [sorbitan monooleate used to emulsify the oil and water phases prior to manufacturing of poly acrylamide-sodium acrylate copolymer) emulsion, in order to help the emulsion product invert efficiently when injected into large amounts of water in oilfield applications. The specific ratio and quantity of products in the surfactant package is critical for product performance and product stability. The determination of the surfactant package concentration in the final blend requires a considerable time investment via the preparation of laboratory samples before moving on to trial batches of product, to review the following aspects of the final product:

- **Product performance: The combination of emulsion and inversions surfactants in FR-1000 are chosen to provide a specific hydrophilic-lipophilic balance (HLB) value and solubility characteristics in waters that help our product invert in water very efficiently, better than the industry competing products.**

- **Product Stability: the specific phenolic resin was chosen as it is stable over a wide range of temperatures. This reduces the likelihood of emulsion separation over time as well as limiting the formation of solids or gelling of the product.]**

When applied to various water conditions, the product will work as intended **[to reduce the friction and associated back pressure produced in the pipe created by high water flow rates moving through a restricted flow path by altering the flow regime to laminar flow instead of turbulent flow in confined flow paths such as that experienced in an oil well fracture operations]**. Since every water condition has unique characteristics, a universal friction reducer is not possible and more niche friction reducers result. FR-1000 would be considered a niche friction reducer based on its unique specialized characteristics and performance in specific water chemistry and conditions.

Disclosure of the trade secret components of Product FR-1000 would negatively impact Select Chemistry's competitive advantage in the marketplace, and would allow competitors to unfairly benefit from the substantial investment of money, corporate resources, ingenuity, and product development.

5. **Describe the ease or difficulty with which the complete composition of the fracturing fluid, including the identity, concentrations, or both, as appropriate could be determined from public disclosure. Specifically, explain why use of the "systems approach" format would not adequately protect your proprietary interest.**

Appropriate measures have been taken to protect its confidential identity of FR-1000 from public disclosure. The use of a "systems approach" would not adequately protect the confidentiality of the product formula in this instance. A trained person skilled in the art of product development for these types of chemical technologies could easily decipher which components are associated with the product FR-1000. A "systems approach" to disclosure would also give a trained person an acceptable concentration range to achieve the key performance requirements. A review of such public information would permit Select Chemistry's competitors to replicate this product and to commercialize them.

Confidential: Product Composition FR-1000

[As indicated by highlighting Select Chemistry claims the following 3 chemicals found in FR-1000 as Trade Secrets.

- **Phenolic Resin: formaldehyde, 4-nonylphenol; oxirane**
- **Alkyl Benzene Sulfonic Acid**
- **Sulfuric Acid]**

Chemical Identity	CAS Number	Trade Secret	Trade Secret Name
Water	7732-18-5	No	
Distillates (Petroleum), Hydrotreated Light	64742-47-8	No	
Poly(acrylamide-co-sodium acrylate)	25085-02-3	No	
Sodium Chloride	7647-14-5	No	
Sorbitan Monooleate	1338-43-8	No	
Polyethylene Glycol Monooleate	9004-96-0	No	
Alcohol C9-C11, Ethoxylated	68439-46-3	No	
Phenolic Resin: formaldehyde, 4-nonylphenol; oxirane	30846-35-6	Yes	SC-0001
Petroleum naphtha, heavy aromatic	64742-94-5	No	
Napthalene	91-20-3	No	
Potassium hydroxide	1310-58-3	No	
Alkyl Benzene Sulfonic Acid	68584-22-5	Yes	SC-0002
Sulfuric Acid	7664-93-9	Yes	SC-0003