



**METALWORKING  
AND CORROSION  
PROTECTION**  
Product guide

**sonneborn™**

AN HF SINCLAIR BRAND

# sonneborn™

**SINCE 1903**, the name Sonneborn, a Hollyfrontier business, has been synonymous with the world's highest quality refined hydrocarbons. Our goal is to provide customers with premium products, superior technical capabilities, and dependable service so they receive the very best value in the industry.

In 2010, Sonneborn acquired the sales and marketing rights for Petronate™ natural sodium sulfonates, products we pioneered decades ago. We have been manufacturing these

same sulfonates all along; now Sonneborn has acquired them for direct sale. As with all the products we make, Sonneborn is committed to providing sodium sulfonates with the highest quality and dependable service that our customers require and have come to rely upon.

The superior emulsion stability, anticorrosion characteristics and the predictable, consistent performance of our high quality Petronate natural sodium sulfonates, are now reliably available from Sonneborn, a name you know you can trust to deliver.





# PETROLEUM SULFONATES

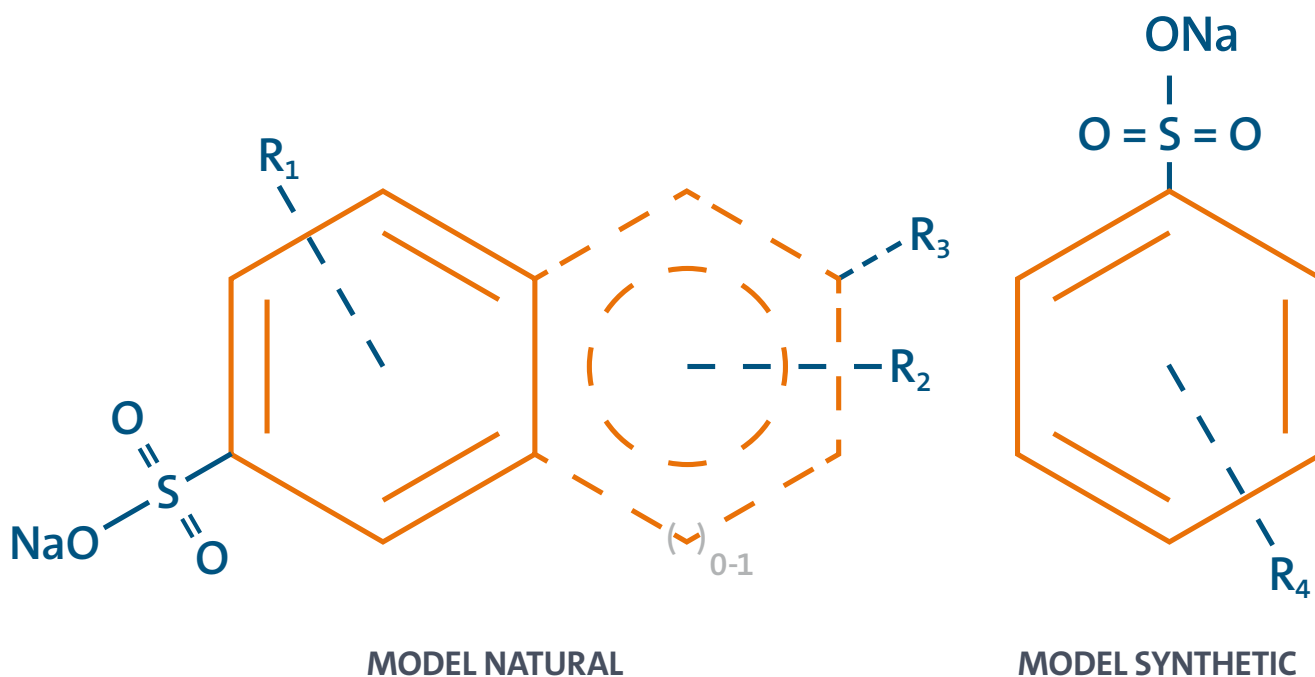
**Sonneborn's sodium sulfonates** are made from natural petroleum oil feedstocks. As a result, these sulfonates contain a very broad average equivalent weight distribution. This broad distribution enhances the ability of our sulfonates to interact with the oil and to provide excellent emulsification. In contrast, synthetic sodium sulfonates of the same average equivalent weight have a much narrower distribution and therefore, do not function as well.

| FEATURES                                      | BENEFITS                  |
|---|---------------------------|
| Natural Petroleum Sulfonate Product           | Performance               |
| Range of Average Equivalent Weights Available | Formulator Flexibility    |
| Consistent Quality                            | Quality Control           |
| Reliable Supply                               | Production Plan Assurance |
| High Compatibility with Basestocks            | Raw Material Flexibility  |
| High Storage Stability                        | Plant Handling            |
| Global Supplier                               | Supply Chain Management   |
| Global Registration                           | EH&S Management           |
| Proven Track Record                           | Industry Wide Acceptance  |

# PETROLEUM SULFONATES COMPOSITION

**Sonneborn's sodium sulfonates** are composed of a poly-alkylated aromatic ring system, where the alkylates are primarily branched and short-chained. Conversely, typical synthetic sodium sulfonates are composed of an alkylated aromatic ring system where the alkylates are

linear and longchained. The short-chained, branched alkyl aromatic groups found in Sonneborn's sodium sulfonates provide benefits in both emulsion and rust prevention by improving the compatibility with the base oil.



Where both the generic structure and chain length of  $R_1$ ,  $R_2$  and  $R_3$  are variable.

# PETROLEUM SULFONATES APPLICATION

**Sonneborn's sodium sulfonates** provide excellent emulsion quality and corrosion resistance in customer formulations. While the lower average equivalent weight sulfonates provide excellent emulsion performance, the higher average equivalent weight sulfonates provide unsurpassed rust prevention. Depending on the application, the balance of these two properties is critical for maximum performance.

In oilfield and mining applications which are less concerned with rust prevention, the preference is the strong

emulsification properties of Petronate™ L. However, in the industrial oils market, where rust prevention is key, the preference is for the corrosion prevention properties of Petronate H and Petronate HH. In the metalworking industry, a balance of both the emulsion and corrosion performance is critical to a successful formulation and Petronate HL is preferred for its balanced emulsion and corrosion resistant properties. Sonneborn also has the capability to make special blends of our products in the desired ratios upon request. Please contact us for more information.



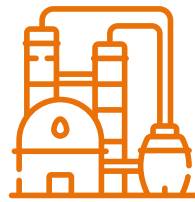
## METALWORKING

- Emulsifiers
- Demulsifiers
- Dispersing Agents
- Rust Preventatives



## OILFIELD

- Flooding Compounds
- Flocculants
- Crude Oil Emulsifiers
- Bitumen Frothing
- Oilsand Flotation



## INDUSTRIAL OILS

- Emulsifiers
- Demulsifiers
- Dispersing Agents
- Moisture Absorbants
- Wetting Agents
- Rust Preventatives
- Degreasing Agents
- Detergents



## MINING

- Ore Flotation
- Phosphate Sand Flotation
- Quartz Sand Flotation



# PETRONATE PRODUCTS

Our line of Petronate™ sodium petroleum sulfonates vary in average equivalent weight from 425 to 530. They are natural products which are transparent, dark brown liquids that are readily soluble in mineral oil.

## TYPICAL PROPERTIES OF SONNEBORN PETRONATE PRODUCTS

| PROPERTY*                        | Method     | Petronate L | Petronate HL/L | Petronate HL | Petronate 480 | Petronate H | Petronate HH |
|----------------------------------|------------|-------------|----------------|--------------|---------------|-------------|--------------|
| Sodium Sulfonate, wt %           | ASTM D3712 | 62          | 62             | 62           | 62            | 62          | 62           |
| oil, wt %                        | ASTM D3712 | 33          | 33             | 33           | 33            | 33          | 33           |
| Average Equivalent Weight        | ASTM D3712 | 425         | 440            | 455          | 470           | 500         | 530          |
| Inorganic Salt, wt %             | ASTM D3712 | max 1.0     | max 1.0        | max 1.0      | max 1.0       | max 1.0     | max 1.0      |
| Free Alkalinity, mgKOH/g         | SAM 150    | 1.0         | 1.0            | 1.0          | 1.0           | 1.0         | 1.0          |
| Water, wt %                      | ASTM D95   | 4.5         | 4.5            | 4.5          | 4.5           | 4.5         | 4.5          |
| Color (dilute)                   | ASTM D1500 | max 5.0     | max 5.0        | max 5.0      | max 5.0       | max 5.0     | max 5.0      |
| Flash Point, COC, °C             | ASTM D92   | 190         | 190            | 190          | 205           | 210         | 230          |
| Density @ 20°C kg/m <sup>3</sup> | ASTM D4052 | 1020        | 1020           | 1015         | 1010          | 1010        | 1010         |



# CORROSION PROTECTION

Sonneborn produces a range of oxidized petrolatums (Oxpets) that are used primarily for rust prevention and anti-corrosion. These chemically oxidized petrolatums are mixtures of long-chained, branched and cyclic hydrocarbons, plus their derivatives such as organic acids, oxi-acids and esters. The acids present in our Oxpets can be neutralized with bivalent metal oxides, yielding end-products with a high average equivalent weight and wax-like nature, which have excellent water-resistant properties and corrosion protection.

## APPLICATION INFORMATION

Neutralization is best achieved with calcium hydroxide or zinc oxide in a white spirit dilution. This white spirit solution of neutralized products provides improved anti-corrosion properties through the addition of a high average equivalent weight petroleum sulfonate. To obtain special characteristics in the end-product it is also possible to add Petrolatum 640/20 or Tech Pet F. The end-product may be sprayed or brushed on to the metal surface to be protected.


## TYPICAL PROPERTIES OF SONNEBORN OXPET PRODUCTS

| PROPERTY*                           | Method      | WH-1    | WH-6    | LA 1531/20 |
|-------------------------------------|-------------|---------|---------|------------|
| Acid number, mg KOH/G               | ASTM D 664  | 48-53   | 42-47   | 17-22      |
| Saponification number, mg KOH/g     | DIN 51559   | 100     | 110     | 47         |
| Congealing Point, °C                | ASTM D 938  | 56      | 54      | 38         |
| Ash, % by weight                    | ASTM D 482  | max 0.5 | max 0.5 | max 0.5    |
| Flash Point, COC, °C                | ASTM D 92   | min 150 | min 150 | min 150    |
| Colour, diluted                     | ASTM D 1500 | 8       | 8       | 8          |
| Density at 100°C, kg/m <sup>3</sup> | ISO 3838    | 850-950 | 850-950 | 800-900    |

\*Typical Values

## PETROLATUM-TECHNICAL PRODUCTS

| PRODUCT           | Drop Melting Point, °C<br>ASTM D 127 | Congealing Point, °C<br>ASTM D 938 | Cone Penetration at<br>25°C, | Colour |
|-------------------|--------------------------------------|------------------------------------|------------------------------|--------|
| Petrolatum 640/20 | 35-45                                | 35-43                              | 175-195                      | brown  |
| Tech Pet F        | 57-66                                |                                    | 160-190                      | brown  |



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Sonneborn makes highly refined products for hundreds of customers and thousands of applications worldwide – from personal care and pharmaceuticals to food and industrial applications.

Everything we make and every action we take is based on the knowledge that nothing is more valuable to the scientists and the customers who use our products than absolute confidence in our products, our experts and our services.

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