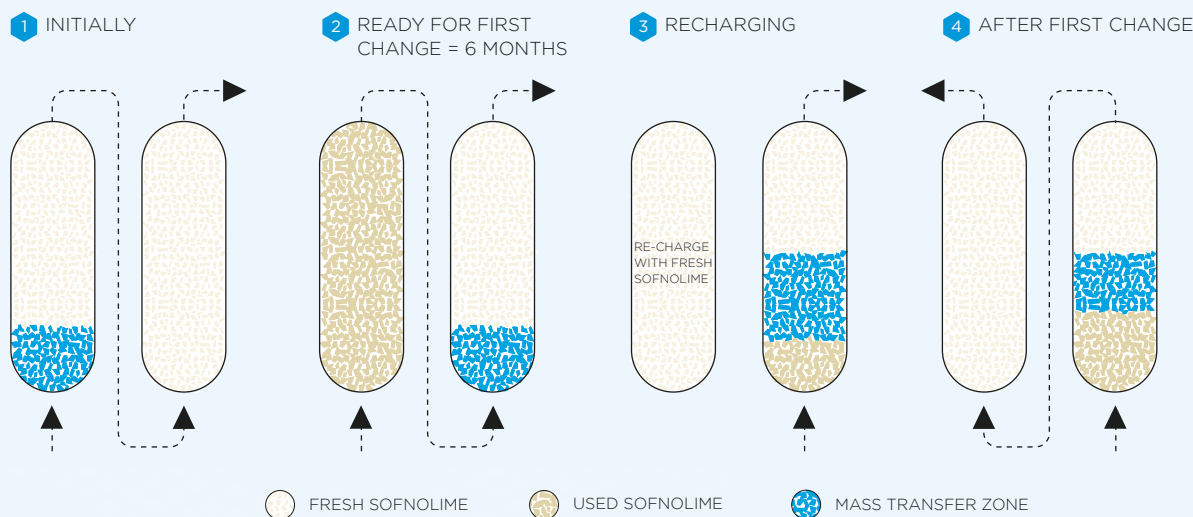


# SOFNOLIME<sup>®</sup> RG

FOR HYDROCARBON PURIFICATION



FIGURE 1 | DIAGRAM OF LIFE CYCLE



## ABSORBING CHEMISTRY

**Molecular Products is a world leader in the design and manufacture of pure air technologies for the treatment of breathable gases and the filtration of hazardous or harmful emissions.**

Through its manufacture of specialised absorbents and catalysts, Molecular Products has established a unique range of purification technologies for industrial, petrochemical, defence and healthcare applications.

Sofnolime RG was developed specifically for the removal and control of acidic components in liquid and mixed phase hydrocarbon streams such as LPG and hydrocarbon feed stocks.

Specific examples include the removal of CO<sub>2</sub> and H<sub>2</sub>S from liquefied natural gas streams, but any readily hydrolysable trace contaminant such as CO<sub>2</sub>, H<sub>2</sub>S, COS or low molecular weight mercaptans can be removed down to low or sub parts per million (ppm) levels.

## SOFNOLIME RG TECHNOLOGY

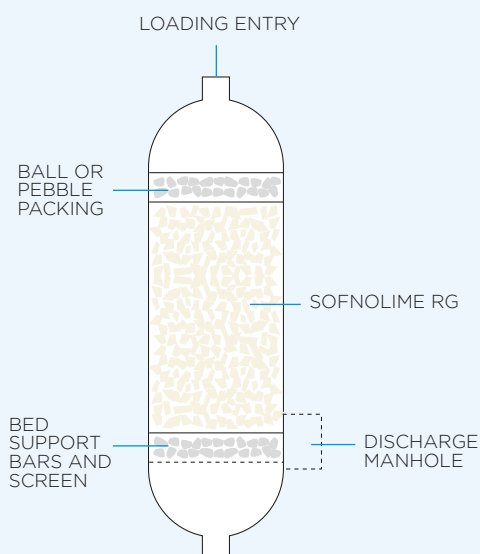
**The extraction of acidic gases from petroleum fractions with alkalis is one of the most established of processing techniques.**

While bulk removal of acid gases is achieved by washing with caustic solutions or amines, very low levels of impurities can only be attained by secondary processing through absorbent beds.

Columns of Sofnolime RG, operated in lead-trim configuration (Figure 1) reduce the level of contaminants such as hydrogen sulphide (H<sub>2</sub>S), carbonyl sulphide (COS), carbon dioxide (CO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>) from ppm to parts per billion (ppb).

This technology is applicable to the processing of the hydrocarbons over a wide range of pressures, and at temperatures as low as ambient. Sofnolime RG is a cost effective way of removing low level residual contaminants remaining after bulk washing processes to produce high purity propylene or ethylene monomers.

**FIGURE 2 | COLUMN DESIGN**



**SOFNOLIME RG | EXTRUDATES**

## WHAT IS SOFNOLIME RG

Sofnolime RG is a synergistic mixture of alkali and alkaline earth metal hydroxides. The non-hygroscopic nature and extrudate catalyst form ensure high mechanical strength and superior handling properties.

### SOFNOLIME RG TYPICAL ANALYSIS

<b>Appearance</b>	Off white cylindrical extrudates
<b>Particle diameter</b>	3mm*
<b>Weight loss at 200°C</b>	5%
<b>Surface area</b>	12m <sup>2</sup> g <sup>-1</sup>
<b>Pore volume</b>	0.3cm <sup>3</sup> g <sup>-1</sup>
<b>Packing density</b>	750-850 kg m <sup>-3</sup>

\*Other sizes available on request

Sofnolime RG, essentially an activated caustic media, offers the proven reactions of caustic soda without the traditional handling and effluent problems associated with solid or liquid sodium hydroxide.

The removal of acidic contaminants takes place in a sharp absorption front that travels through the catalyst bed.

### SOFNOLIME RG PRINCIPAL REACTIONS

$\text{COS} + \text{H}_2\text{O}$	$\text{CO}_2 + \text{H}_2\text{S}$
$\text{H}_2\text{S} + \text{NaOH}$	$\text{NaSH} + \text{H}_2\text{O}$
$\text{NaSH} + \text{NaOH}$	$\text{Na}_2\text{S} + \text{H}_2\text{O}$
$\text{CO}_2 + \text{Ca}(\text{OH})_2$	$\text{CaCO}_3 + \text{H}_2\text{O}$

## DESIGN INFORMATION

**Suggested design parameters for reaction vessels housing fixed beds of Sofnolime RG (Figure 2) are as follows:**

### BED SUPPORT

Stainless steel mesh supported on grid with retaining ceramic ball or pebble layers top and bottom.

### MAXIMUM BED DEPTH

Max height 6m (20ft). Size calculation appropriate to application can be provided.

### BED DIMENSIONS

Height to diameter ratio 2-4.

### PRESSURE DROP

Standard engineering for particles in a fluid apply.

### ACID GAS LOADING

Dependent on bed design and process conditions, from 2 – 10%wt can be achieved.

### EFFLUENT DISPOSAL

No liquid effluent associated with process. Reacted Sofnolime RG will contain some residual alkalinity and may be disposed of by a licensed contractor in line with local legislation.

## APPLICATIONS

### PROPYLENE AND ETHYLENE PURIFICATION

The demand for high purity olefins has increased due to expansion and improvements in downstream petrochemical operations, notably polypropylene manufacture using the latest generation of catalysts. Pure monomer is a pre-requisite for efficient operation of these sensitive catalysts.

Due to its relatively unreactive nature, carbonyl sulphide (COS) is one of the most difficult impurities to separate from propylene, normally requiring treatment at elevated temperature.

Sofnolime RG technology has proven to be a simple, cost effective way of reducing acidic contaminants such as H<sub>2</sub>S, COS and CO<sub>2</sub> down to the lowest levels of analytical detection, thereby ensuring high purity olefins and optimum process efficiency.

### LPG SWEETENING

Contacting LPG with fixed beds of Sofnolime RG removes hydrogen sulphide and low molecular weight mercaptans, leaving a clean product with acceptable copper strip test characteristics.

### GAS CONDENSATE PROCESSING

The processing of gas condensate fractions through Sofnolime RG, improves odour and stability by removing traces of unwanted acidic materials.

### CFC MANUFACTURE

In the manufacture of chlorofluorocarbons (CFCs), undesirable by-products such as hydrogen chloride (HCl) and phosgene (COCl<sub>2</sub>) are extracted using Sofnolime RG technology.



## PRODUCT RANGE

### SOFNOLIME

Soda lime carbon dioxide absorbent.

### SOFNOCAT

Precious metal catalyst for oxidation of carbon monoxide and hydrogen.

### CHEMSORB

High activity carbon for a wide range of absorption applications.

### IONEX

Synthetic silver-exchanged molecular sieves for hydrogen gettingter, radioactive iodine removal and acetic acid purification.

### OXYGEN GENERATORS

Chemically generated oxygen.

### SOFNOFIL

Indicating absorbent for removal of ethylene, odours and noxious fumes.

#### Molecular Products Ltd (UK)

Parkway, Harlow Business Park,  
Harlow, Essex, CM19 5FR, UK

**T** +44 (0) 1279 445111

**E** sales@molprod.com

[WWW.MOLECULARPRODUCTS.COM](http://WWW.MOLECULARPRODUCTS.COM)

#### Molecular Products Inc (US)

633 CTC Boulevard,  
Louisville, CO 80027, USA

**T** +1 (303) 666 4400 or (local) 1-888-665-7763 toll free

**E** salesusa@molprod.com

