Polyether polyols

Alcupol®
Flexible slabstock & moulding; rigid foams and CASE applications
Where innovation meets excellence

Technological strength

We use our technology in the production of propylene oxide/styrene monomer (POSM) and new polyol developments.

The implementation of our technical solutions and our long experience in the polyol production since the ’70s, allows us to offer outstanding products and services.

Our Technology Centre is a recognized innovation model in Europe. This leading site together with our continuous industrial developments have enabled us to become an international reference in the POSM sector.

These infrastructures, together with our highly qualified technical and development teams, always equipped with the latest technologies, guarantee our commitment with product innovation.
Safety & Sustainability

Our numerous certificates & awards confirm Repsol as a model in safety and transparency.

In 2016 EuPC (European Plastics Converters Association) awarded us the Best Polymer Producers Award for Europe and the Global Innovation prize for our quality standards, regulation compliance, efficiency, communication and innovation values.

Through multiple projects and research we are committed to increasing the circularity and life cycle of plastics. Among the actions taken we signed the “Plastics 2030” Voluntary Commitment presented by PlasticsEurope to increase the efficient use of resources.

True partners

We work hand in hand at our customers’ sites to optimize product performance. We take into consideration the different standards and the specific requirements of each application.

Where others only see a client we see a partner to keep improving. This is how our technical service turns into a competitive advantage to help you offer better solutions.
Repsol is committed to our customers’ global strategy putting our entire organization at their disposal to achieve a common goal: to create long-term relationships which enable us to rise to the common challenges our business presents.

Repsol is one of the largest energy companies worldwide and one of the biggest private oil & gas companies. Over 8 decades of experience in the world of energy.

*Repsol Campus, Corporate Headquarters in Madrid*

LEED® Platinum certificate, awarded by the prestigious US Green Building Council (USGBC), for new buildings construction.
Chemicals

Over 95 countries where we market our products

Added value
Repsol’s Chemicals Division, with a high degree of integration, focuses its strategy in the constant generation of value through differentiated products and services.

Over 1,500 references
Repsol manufactures a wide variety of products, ranging from base petrochemicals to derivatives.

- **Base petrochemicals**: ethylene, propylene, butadiene and benzene.
- **Intermediate products**: styrene, propylene oxide, polyether polyols, and propylene glycols.
- **Polyolefins**: polypropylene (PP) and PP compounds, both high and low-density polyethylene (HDPE and LDPE), metallocene linear low density polyethylene (mLLDPE), ethylene vinyl acetate (EVA) and ethylene butyl acrylate (EBA) copolymers.

Over 100 scientists and researchers working for you
We focus all our resources to reach our most important goal: to develop innovative solutions. Our Technology Centre in sync with our steady plant improvements and our development of Industrial Sites, has steered Repsol’s leadership in POSM production. An international reference to offer you always the latest solutions.
Understanding your needs

At Repsol we are committed with the development of new products for our clients. We are in constant search of innovative solutions to meet all your needs. Our goal is to develop cutting-edge products to offer reliable and quality solutions to enhance your business. Due to this vision Repsol displays one of the widest ranges of polyether polyols in the market.

Over 45 years of experience in polyols

Over the years we have developed an integrated chemical business controlling all key factors of the value chain: research, development, manufacturing and distribution.

This unique vision enables us to understand our customers needs and requirements. A valuable experience that led us to build the first POSM plant in Europe in the early ‘70s. An insight that continues today to drive our search for excellence.

Polyether polyols for flexible slabstock & moulding

Polyether polyols for rigid foams

Polyether polyols for CASE applications
We create innovative solutions and adapt them to each specific requirement.

We believe in quality and reliable products you can trust every time.

We know every request is different, that is why we offer a wide product range for a broad variety of applications:

- Polyether polyols for rigid foams
- Polyether polyols for flexible slabstock & moulding
- Polyether polyols for CASE applications

We believe in sustainable models. Polyols for rigid foams contribute to increasing energetic efficiency in buildings and electrical appliances by reducing CO₂ emissions.

We are a customer-orientated company. Always ready to listen to our customers’ needs.

Our new polyol development, with very low content of volatile organic compounds, strengthens our commitment with safety and sustainability.
## Polyols for slabstock and moulding applications

### Flexible polyols

<table>
<thead>
<tr>
<th>Grade</th>
<th>Hydroxyl number</th>
<th>Viscosity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-4811</td>
<td>48</td>
<td>560</td>
<td>Non reactive triol 3,500 g/mol molecular weight used in the production of conventional foams for the comfort market</td>
</tr>
<tr>
<td>F-5511</td>
<td>55</td>
<td>490</td>
<td>Non reactive triol 3,000 g/mol molecular weight used in the production of conventional foams for the comfort market</td>
</tr>
<tr>
<td>F-5611</td>
<td>56</td>
<td>470</td>
<td>Non reactive triol 3,000 g/mol molecular weight, 100% propylene oxide designed to produce conventional CME foams for the comfort market</td>
</tr>
<tr>
<td>F-2831</td>
<td>28</td>
<td>1,100</td>
<td>Reactive triol 6,000 g/mol molecular weight used in the production of high resilience and moulded foams for the comfort market, including furniture and automotive</td>
</tr>
<tr>
<td>F-3231</td>
<td>32</td>
<td>1,350</td>
<td>Triol 5,000 g/mol molecular weight and high ethylene oxide content used as cell opener and in the production of hypersoft foams</td>
</tr>
<tr>
<td>F-1251</td>
<td>125</td>
<td>359</td>
<td>Triol 1,300 g/mol molecular weight, 100% ethylene oxide used as cell opener and in the production of hypersoft foams</td>
</tr>
<tr>
<td>F-3531</td>
<td>35</td>
<td>800</td>
<td>Reactive triol 4,800 g/mol molecular weight used in the production of high resilience and moulded foams for the comfort market, including furniture and automotive</td>
</tr>
<tr>
<td>F-3011</td>
<td>31</td>
<td>1,250</td>
<td>High functionality reactive polyol and high molecular weight used in the production of high resilience and moulded foams for the comfort market, including furniture and automotive</td>
</tr>
<tr>
<td>F-5521</td>
<td>55</td>
<td>500</td>
<td>Medium reactive triol 3,000 g/mol molecular weight used in the production of hot moulding foams for the automotive comfort market</td>
</tr>
<tr>
<td>X-1950</td>
<td>190</td>
<td>350</td>
<td>Polyether polyol specially designed for the production of MDI slabstock and moulded viscoelastic foams for the comfort market</td>
</tr>
<tr>
<td>X-1550</td>
<td>163</td>
<td>300</td>
<td>Polyether polyol designed for the production of T65 and T80 viscoelastic foams for the comfort market</td>
</tr>
<tr>
<td>X-1450</td>
<td>154</td>
<td>300</td>
<td>Polyether polyol designed for the production of T65 and T80 viscoelastic foams for the comfort market</td>
</tr>
<tr>
<td>X-7510</td>
<td>250</td>
<td>260</td>
<td>Triol 700 g/mol molecular weight specially designed for the production of T80 viscoelastic foams for the comfort market</td>
</tr>
</tbody>
</table>

Polyols make it possible to obtain foams to suit the specific needs of the different comfort and vehicle applications.

The information contained herein is based on REPSOL QUIMICA’s current knowledge and experience and is presented in good faith for guidance only. Although REPSOL QUIMICA declares to have been most diligent when including the information contained herein, taking into account that several and different factors may affect the processing, application or use of the products, the converter shall be responsible in every case for the conditions under which the products are transformed as well as for the final use given to them. REPSOL QUIMICA warns that this information may undergo variations or improvements; therefore REPSOL QUIMICA is not obliged to reflect these in this document or to communicate them to whomever may have access to it. Moreover, these readers should be aware that some or all of the products might be protected by intellectual property rights.

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# Polyols for slabstock and moulding applications

## Polymeric polyols

<table>
<thead>
<tr>
<th>Grade</th>
<th>Hydroxyl number</th>
<th>Solid content</th>
<th>Viscosity 25°C, cP</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-3091</td>
<td>32.5</td>
<td>42</td>
<td>4,500</td>
<td>Styrene and acrylonitrile graft non reactive polyether polyol 42% solid content and low free styrene content used in the production of very high hardness slabstock foams</td>
</tr>
<tr>
<td>P-3041</td>
<td>32.5</td>
<td>42</td>
<td>4,500</td>
<td>Styrene and acrylonitrile graft non reactive polyether polyol 42% solid content used in the production of very high hardness slabstock foams</td>
</tr>
<tr>
<td>P-3621</td>
<td>38.5</td>
<td>25</td>
<td>1,400</td>
<td>Styrene and acrylonitrile graft non reactive polyether polyol 25% solid content used in the production of very high hardness slabstock foams</td>
</tr>
<tr>
<td>P-3921</td>
<td>40.5</td>
<td>20</td>
<td>1,200</td>
<td>Styrene and acrylonitrile graft non reactive polyether polyol 20% solid content used in the production of medium hardness slabstock foams</td>
</tr>
<tr>
<td>P-4181</td>
<td>42.5</td>
<td>15</td>
<td>950</td>
<td>Styrene and acrylonitrile graft non reactive polyether polyol 15% solid content used in the production of medium hardness slabstock foams</td>
</tr>
<tr>
<td>P-4311</td>
<td>44.0</td>
<td>10</td>
<td>780</td>
<td>Styrene and acrylonitrile graft non reactive polyether polyol 10% solid content used in the production of medium hardness slabstock foams</td>
</tr>
<tr>
<td>P-3811</td>
<td>40.0</td>
<td>27</td>
<td>1,350</td>
<td>Styrene and acrylonitrile graft medium reactivity polyether polyol 27% solid content used in the production of hot moulded foams for the automotive comfort market</td>
</tr>
<tr>
<td>P-2621</td>
<td>26.0</td>
<td>25</td>
<td>2,800</td>
<td>Styrene and acrylonitrile graft reactive polyether polyol 25% solid content used in the production of high resilience slabstock and moulded foams for the comfort market, including furniture and automotive</td>
</tr>
<tr>
<td>P-2921</td>
<td>28.0</td>
<td>20</td>
<td>1,800</td>
<td>Styrene and acrylonitrile graft reactive polyether polyol 20% solid content used in the production of high resilience slabstock and moulded foams for the comfort market, including furniture and automotive</td>
</tr>
<tr>
<td>P-3021</td>
<td>30.0</td>
<td>15</td>
<td>1,450</td>
<td>Styrene and acrylonitrile graft reactive polyether polyol 15% solid content used in the production of high resilience slabstock foams for the comfort market</td>
</tr>
</tbody>
</table>

**Polymeric polyols make it possible to obtain foams that meet the most demanding market requirements.**

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Polyols for rigid foams

<table>
<thead>
<tr>
<th>Grade</th>
<th>Hydroxyl number</th>
<th>Functionality</th>
<th>Viscosity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-1610</td>
<td>160</td>
<td>3.0</td>
<td>250</td>
<td>Non reactive triol, 1000 g/mol molecular weight, 100% propylene oxide, used in the production of OCF foams, rigid foams and non cellular polyurethanes</td>
</tr>
<tr>
<td>R-2510</td>
<td>250</td>
<td>3.0</td>
<td>260</td>
<td>Non reactive triol, 700 g/mol molecular weight, 100% propylene oxide, used in the production of OCF foams, rigid foams and non cellular polyurethanes</td>
</tr>
<tr>
<td>R-3810</td>
<td>380</td>
<td>3.0</td>
<td>350</td>
<td>Non reactive triol, 450 g/mol molecular weight, used in the production of rigid foams and non cellular polyurethanes</td>
</tr>
<tr>
<td>R-3600</td>
<td>360</td>
<td>4.5</td>
<td>2,750</td>
<td>High functionality sucrose-glycerol based polyol with low viscosity recommended for the production of rigid foams for the construction and isolation markets</td>
</tr>
<tr>
<td>R-4110</td>
<td>410</td>
<td>4.5</td>
<td>5,250</td>
<td>High functionality sucrose-glycerol based polyol used in the production of rigid foams for the construction and isolation markets</td>
</tr>
<tr>
<td>R-4920</td>
<td>490</td>
<td>4.5</td>
<td>9,500</td>
<td>High functionality sucrose-glycerol based polyol used in the production of rigid foams for the construction and isolation markets</td>
</tr>
<tr>
<td>R-4520</td>
<td>455</td>
<td>4.5</td>
<td>5,250</td>
<td>High functionality sorbitol-glycerol based polyol used in the production of rigid foams for the construction and isolation markets</td>
</tr>
<tr>
<td>R-4720</td>
<td>475</td>
<td>5.5</td>
<td>19,000</td>
<td>Very high functionality sorbitol-glycerol based polyol used in the production of rigid foams for the construction and isolation markets</td>
</tr>
</tbody>
</table>

Its insulating properties help to increase the energy efficiency of buildings and appliances, by reducing emissions of CO₂ into the atmosphere.

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Polyols for CASE applications

<table>
<thead>
<tr>
<th>Grade</th>
<th>Hydroxyl number</th>
<th>Viscosity 25ºC, cP</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-4811*</td>
<td>48</td>
<td>560</td>
<td>Non reactive triol 3,500 g/mol molecular weight</td>
</tr>
<tr>
<td>C-4814</td>
<td>48</td>
<td>560</td>
<td>Non reactive triol 3,500 g/mol molecular weight</td>
</tr>
<tr>
<td>C-5611</td>
<td>56</td>
<td>495</td>
<td>Non reactive triol 3,000 g/mol molecular weight, 100% propylene oxide</td>
</tr>
<tr>
<td>C-5710*</td>
<td>570</td>
<td>700</td>
<td>Non reactive triol 300 g/mol molecular weight</td>
</tr>
<tr>
<td>C-5521*</td>
<td>55</td>
<td>500</td>
<td>Medium reactivity triol 3,000 g/mol molecular weight</td>
</tr>
<tr>
<td>C-3531*</td>
<td>35</td>
<td>800</td>
<td>Reactive triol 4,800 g/mol molecular weight</td>
</tr>
<tr>
<td>C-2831</td>
<td>28</td>
<td>1,100</td>
<td>Reactive triol 6,000 g/mol molecular weight</td>
</tr>
<tr>
<td>D-0411*</td>
<td>280</td>
<td>65</td>
<td>Non reactive diol 400 g/mol molecular weight, 100% propylene oxide</td>
</tr>
<tr>
<td>D-1011*</td>
<td>110</td>
<td>150</td>
<td>Non reactive diol 1,000 g/mol molecular weight, 100% propylene oxide</td>
</tr>
<tr>
<td>D-2021*</td>
<td>56</td>
<td>300</td>
<td>Non reactive diol 2,000 g/mol molecular weight, 100% propylene oxide</td>
</tr>
<tr>
<td>D-2000*</td>
<td>59</td>
<td>300</td>
<td>Reactive diol 2,000 g/mol molecular weight</td>
</tr>
<tr>
<td>D-4011*</td>
<td>28</td>
<td>850</td>
<td>Reactive diol 4,000 g/mol molecular weight</td>
</tr>
</tbody>
</table>

* Contains an antioxidant that has been cleared by the FDA for use in food packaging and/or other applications as an indirect food additive

Present in modern coating materials, in vehicles, cables, floors, walls, bridges, roads... they insulate safely and effectively, improving their durability and appearance.
Building trust through safety and transparency

Excellence is intrinsic to Repsol's values. It infuses our daily work and helps guide our decisions and actions, contributing to achieve the commitment made to our customers, stakeholders, employees, suppliers / partners and society to build a better future.

Safety is our priority

Petrochemical complexes, packaging facilities and logistics centres all have OHSAS 18001.2007 [Occupational Health and Safety Assessment Series] certification for their rigorous safety measures.

Technical Data Sheets and MSDS are available on: www.repsol.com

A global company that seeks the welfare of people and is a step ahead in building a better future through the development of smart energy

Quality

All petrochemical plants are compliant with the current ISO 9001:2015 standards, for the quality of processes from manufacture to distribution, transport management and end product warehousing.
Environment

We set up and deploy ambitious energy efficiency programmes to reduce energy consumption and GHG emissions as one of the key elements of our strategy. These programmes pursue long term targets which have been made public in order to facilitate their progress by the stakeholders. In this sense, Repsol Química has attained a final reduction of 0.56 million tonnes of GHG emissions at the end of the 2006-2013 period. Repsol is currently working on a new target covering the period 2014-2020, that involves an additional reduction of 0.42 million tonnes of CO₂.

All petrochemical complexes, have ISO 14001 certification for their environmental management and the reduction of the impact of their facilities; and ISO 14064 for the annual verification of greenhouse gas (GHG) emissions.

The Chemical area of our complexes in Tarragona (2015), Puertollano (2013) and Sines (2016), has implemented an Energy Management system according to the requirements indicated in the International Standard ISO 50001. This system is dedicated to developing and implementing our organization’s energy policy, as well as manage the energy aspects of our activities, products or services. The objective is to increase and improve our energy efficiency, based on systems’ implementation aimed at continuous energy performances improvement and thus contribute to a more efficient and sustainable use of energy.

Repsol reinforced its commitment with sustainability by signing the “Paris Pledge for Action” document. An historical agreement in which both developed countries and less developed countries and companies engaged to contribute towards a low CO₂ emission economy.
Chemicals Customer Care

SPAIN
Tel.: 900 10 32 39
Tel.: +34 91 753 18 01

PORTUGAL
Tel.: 800 60 501 111
Tel.: +34 91 753 18 05

FRANCE
Tel.: 800 60 503 333
Tel.: +34 91 753 18 02

ITALY
Tel.: 800 60 509 999
Tel.: +34 91 753 18 04

GERMANY
Tel.: 800 60 504 444
Tel.: +34 91 753 18 00

UNITED KINGDOM
Tel.: 800 60 502 222
Tel.: +34 91 753 18 03

sacrq@repsol.com
www.repsol.com

Efficiency  Vision  Responsibility  Globalization
Safety  Differentiation
Corporate Headquarters

Méndez Álvaro, 44
28045 Madrid, Spain
Tel.: +34 91 753 81 00
www.repsol.com

Technical Service & Development
Repsol Technology Centre

Ctra. de Extremadura A5, km 18
28931 Móstoles, Madrid, Spain
Tel.: +34 91 753 86 00
atdintermedios@repsol.com