Solketal

an EHS friendly and sustainable solvent

For a long time solvents have been used rather unhesitatingly. Most important was to find an efficient and cheap product for the respective application. However the use of "classical" solvents is more and more seen as critical in relation to environmental protection and occupational health & safety. Their sustainability is another major issue.

In the course of time it has been determined that a large number of chemicals and especially solvents, not only have properties that make them attractive for different technical applications, but also potentially are harmful to human beings and the environment. As a matter of fact the usage of such substances has been restricted or banned at all.

For a long time comparatively high prices of the "green chemistry"-substitutes were somehow prohibiting their usage. Hence formulations have been switched only if regulations did no more allow the consumption of classical solvents.

In the latter years the increasingly strict conditions have led to greater environmental awareness, more and more leading to the reduction and the substitution of poisonous or hazardous substances by more environmentally sound alternatives as well as having a close eye on sustainability. Today, for vast of the applications exist appropriate and affordable solutions – also based on renewable resources.

One of the (re)sources playing an important role in the production of natural solvents is the so called sub-standard glycerin (SSG) which is produced as a by-product in biodiesel manufacturing. SSG can be used to distill high purity glycerin which then – besides the known applications – forms the basis for a number of interesting "natural" solvents that have the properties of a quasi-homologous group.

One out of those solvents is Isopropylidene glycerin also known as **SOLKETAL** (4-hydroxymethyl-2,2-dimethyl-1,3-dioxolane / CAS 100-79-8).

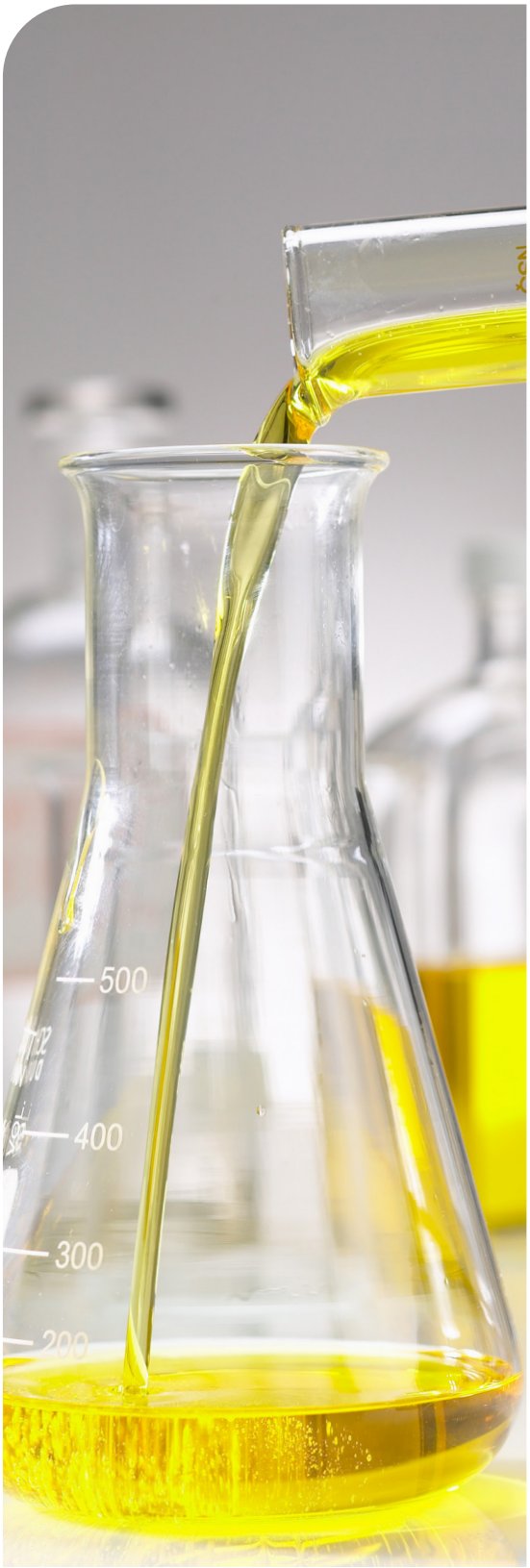
The homology of this solvent is based on the underlying ring system of the 1,3-dioxolane and the hydroxymethyl group in the fourth position. As a result of this, it is first and foremost a primary alcohol, while it is also a cyclical ether at the same time. Solketal is a cyclical ketal and has two methyl groups.

Physical properties

Solketal is a low-viscosity liquid (~11cP (@25° C) at room temperature and its freezing point is far below zero (approx. -26,5° C). Even though the vapour pressure levels of Solketal at 20° C may be 0.1 mbar, the substance can be included in the group of high boilers showing a boiling point of about 190° C.

Compatibility

Solketal is a practically universal and very compatible substance. It is completely miscible with cycloaliphatics and aromatics as well as dissolves to a large extent in vegetable oils. There is miscibility to a sufficient extent even with non-polar substances like aliphatics. Also ethers and hydrocarbons go well with Solketal. But probably the most important and outstanding characteristic is the complete miscibility with water.



Solvent capacity

To make clear statements about the solubility of certain polymer-systems in Solketal, it will definitively require tests for the specific application. However the excellent solvent capacity for resins like polyesters, polyacetates, polyacrylates, epoxides, polyurethanes, urea-formaldehyde- and melamine resins, has been known and well documented in the literature for many years. Even more complex macromolecules such as polyesterimides can be dissolved by Solketal, too. As a matter of fact this would allow to substitute "classical" solvents to a large extent.

Properties

Solketal is harmless, non-toxic, non-irritant and has – if any – only a slight but pleasant odour, hence is highly compatible in contact with human beings. It´s neither dangerous nor required to be identified. The environmental friendliness is very good, too.

Applications

The diversity described above allows a wide range of applications: resins, paints, coatings, printing inks, adhesives, paint strippers, cleaning agents and many more. Due to its positive properties Solketal is also used in many pharma and cosmetics applications.

Beyond the usage as a mere solvent, Solketal may also be functional in coatings formulations by influencing film-formation and drying time.

Specifications	
Assay	min 97.0 %
Isomers	max. 2.0 %
Glycerol	max. 0.3 %
Water	max. 0.5 %
Acid Number	max. 0.2 mgKOH/g
Color	max. 10 hazen

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