

The European solvents industry is ensuring the safe use of hydrocarbon and oxygenated solvents

## Solvents provide solutions...

From protecting crops to extracting food ingredients and flavours to producing safe and hygienic cosmetics, solvents play a vital role in providing solutions to many of the challenges of modern life.

## ...and safety can be assured for users

As well as being the best ingredients for the job, the large majority of solvents can be used safely. This is because of their generally low toxicity and the established procedures for their use. These procedures range from the simple – ensuring adequate ventilation by opening windows and doors when painting – to more complex industrial procedures.



## Using solvents safely in industry...

A variety of industrial manufacturers rely on solvents every day. Advice on safe handling and use of solvents is provided by the European solvents industry under its *Product Stewardship* programme. This is part of a wider chemical industry commitment to Responsible Care® (symbol below) which focuses on the continual improvement of safety, health and environmental performance. In fact a supplier's 'licence to operate' depends increasingly on ensuring that its products can be handled safely through the whole chain of use.

The three key areas of health and safety that the European solvents industry advises users on are:

- health risk assessment to define adequate control measures
- safe exposure limits to prevent health effects from over exposure
- safe management of flammable products



If recommendations for safe handling are not followed, there is the possibility that workers may become over exposed to solvents.

If levels of exposure are several times higher than the safe exposure limits and workers have not taken precautions, such as providing adequate ventilation, there is a risk that they could suffer from effects similar to drunkenness. These may include temporary dizziness and drowsiness. Irritation of the eyes and nose may also occur as a result of over exposure.

More recently it has been alleged that long-term, repeated high-level exposure to some solvents may have irreversible effects on the central nervous system with symptoms such as fatigue or memory loss and reduced mental performance. This condition is known as Organo-Psycho Syndrome (OPS) and has been referred to as 'painters' syndrome' since painters were involved in the initial studies. However, several carefully conducted studies have shown no evidence for the effects when safe exposure limits are observed, and other factors may well play a role.

Nevertheless, the European solvents industry takes these concerns seriously and is currently sponsoring research on this topic in the Netherlands.

## ...by protecting workers' health through safe exposure limits

Occupational exposure limits (OELs) set the airborne concentration of a substance that workers can be exposed to, day after day without any adverse effects. OELs are normally set for an 8 hour day and a 40 hour week. OELs have different names in various countries: threshold limit values (TLVs) and permissible exposure limits (PELs) in America; maximale arbeitsplatzkonzentrationen (MAKs) in Germany; and the European Union refers to them as indicative and binding limit values.

OELs for the majority of hydrocarbon and oxygenated solvents are set between 10 and 1 000 parts per million (ppm) depending on the individual substance's volatility and toxicity.

For most oxygenated solvents, OELs have been set by the European regulating body. Deriving OELs for hydrocarbon solvents has been more difficult due to their complex composition. A special solvents industry task force has published guidelines recommending a uniform methodology for calculating OELs for complex hydrocarbon solvents and blends. The ultimate aim is to develop a harmonised approach for adoption by regulators and industry.



### PRODUCT STEWARDSHIP IN ACTION

*To enable customers to assess and measure compliance with OELs, and to implement protective measures if*

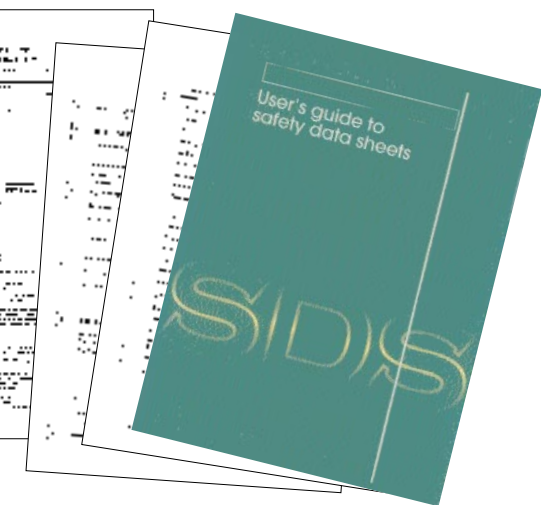
## ...and constantly researching new standards

Hydrocarbon and oxygenated solvents have been in widespread use for several decades and have been the subject of extensive health effects studies. In the past 30 years many studies have been carried out in Europe and the USA to examine the effects of exposure to solvent vapours. The large majority of products have been shown to have no significant adverse long-term health effects. A small minority of products have specific toxic effects and are subject to appropriate controls and/or restrictions on use.

## ...and making sure standards are met

Where there is potential for exposure the solvents industry helps customers maintain health and safety standards with technology that is both simple to use and affordable. For example, organic vapour analysers can be used to monitor the level of exposure on the spot. And monitoring badges, worn by individual workers, can be used to assess the level of personal exposure and help to ensure that safe exposure limits to airborne solvents are being met.





#### PRODUCT STEWARDSHIP IN ACTION

*All suppliers ensure that customers always have up to date Safety data sheets. Some have linked the Safety data sheet database to the computerised ordering system, guaranteeing that customers automatically receive the appropriate sheet. In one company, the equivalent of four people are dedicated to providing this service, which involves translating the documents into 12 languages. A supplier has also produced a guide to Safety data sheets and sent 10 000 copies to customers all over Europe, covering their entire customer base as well as other interested parties.*

*needed, some suppliers have issued a series of Industrial hygiene bulletins. These cover areas such as: measuring vapours; assessing personal exposure to vapours; and methods to control vapours. Specific information is provided on the use of organic vapour analysers, monitoring badges, Draeger tubes, installation of local exhaust ventilation and the use of personal protection equipment.*

#### ...by regularly providing guidelines for safe handling

All solvents suppliers have been providing safe handling guidelines for many years. For the last 20 years – and well before it became a legal requirement at European level in 1992 – solvent producers have distributed *Safety data sheets* for all their products. These sheets provide comprehensive safety and health information including both safe exposure limits and techniques for managing flammability.

In particular they provide:

- information on the main hazards, how to protect against them and the steps to take in an emergency
- OELs
- handling, storage, transport, spills and disposal advice
- regulatory information such as classification and labelling
- toxicity and environmental information

#### ...by explaining how to manage flammable substances sensibly

Some hydrocarbon and oxygenated solvents are very volatile which makes them suitable for particular applications. They are generally flammable and need to be managed sensibly – particularly during loading and unloading, storing and when using in bulk.

The solvents industry works closely with hauliers, distributors and customers to ensure that adequate precautions and procedures are in place at all stages of solvent handling and that all legislative requirements concerning flammability are met.

#### PRODUCT STEWARDSHIP IN ACTION

*Some users decided to switch from using a non-flammable group of solvents to a different group of solvents that are highly flammable. To help these customers understand how to use these new products safely a solvent supplier produced a comprehensive manual providing handling guidelines. In addition, on-site advice and training is provided when appropriate.*



#### ...by communicating clearly through labels

Like all chemicals, solvents are subject to the European Union's classification and labelling requirements which identify the main hazards of a product through symbols and risk/safety phrases on container labels. Where appropriate, certain hydrocarbon and oxygenated solvents display information on:

- flammable products
- irritation to skin and eyes (minority of hydrocarbon and oxygenated solvents)
- lung aspiration hazard if accidentally swallowed (low viscosity hydrocarbon solvents)

A small number of products have particular health effects and these are dealt with by appropriate labels.

#### ...by improving products

Product innovation has led to the development of new ranges of less volatile, less odorous and safer solvents. For example, one supplier of resin for architectural paints used one of these solvents in a new formulation, resulting in a safer product with the same performance and less odour.

## Using solvents safely in paints and coatings

Studies carried out by the Building Research Establishment in the UK have shown that for certain interior applications, OELs can be readily met under actual working conditions typical of indoor professional painting situations. This is providing relatively simple steps are taken to ensure adequate ventilation, for example opening doors and windows. The overall conclusion supports a continuing role for solvent based paints in painting interior woodwork. The responsible use of solvent based paints enables both high performance and high safety standards to be met.

## Using solvents safely in agriculture

Hydrocarbon and oxygenated solvents play an important role in crop protection by dissolving the active chemicals in pesticide formulations. The solvents help crop protection agents work efficiently by drying at a slow enough rate to allow adequate absorption, but fast enough to ensure efficient action. Once the solvents have done their job they degrade quickly through biological and physical processes which means that they do not accumulate in the food chain.



## Using solvents safely in cosmetics and toiletries

The low toxicity and low skin irritancy of hydrocarbon and oxygenated solvents enables them to be used safely in the production of cosmetic and toiletry formulations. Several are listed in a European Commission inventory for cosmetic products and in the International Nomenclature Cosmetic Ingredient (INCI) list of products.



## Using solvents safely for extracting food ingredients

An EU Directive allows solvents to be used to extract fats and oils for making margarine. Solvents are also used to extract: flavours from naturally flavoured materials; caffeine from coffee; and sugar from molasses. In all cases maximum levels of residues are regulated carefully.

In addition, some solvents are used in the process to make the plastics used for food packaging and other applications.

## The future

Hydrocarbon and oxygenated solvents are being used safely in a wide variety of everyday applications.

In order to ensure the continuing safe use of solvents, the European solvents industry is committed to: **Product stewardship**; compliance with health, safety and environmental legislation; improving understanding through scientific research; improving products; and providing health, safety and environmental information to customers on an ongoing basis.

In this way, the performance and cost advantages of hydrocarbon and oxygenated solvents can be realised whilst ensuring the safety and health of all those handling and using them.

## European Solvents Industry

### Hydrocarbon & Oxygenated Solvents

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For further information please contact:  
Terry Badcock, European Solvents Industry Group,  
CEFIC, Avenue E. Van Nieuwenhuyse 4, bte 2,  
B-1160 Brussels  
Tel: 32 (0) 2 676 72 64 Fax: 32 (0) 2 676 73 01