

Introduction to health and safety aspects



Of working with paint products and related chemicals
in the marine and protective coatings industry

Introduction

Handling and application of paints implies that risk factors need to be recognized and controlled by taking precautions that will reduce the risk to acceptable levels. Rules and regulations regarding health, safety and environmental (HSE) aspects of working with paint products differ between countries and even job-sites. This document should not in any way be seen as a replacement of those rules and regulations but as an introduction and guidance. Expert advice should be sought when setting up HSE procedures to ensure they are in line with the latest and relevant (local) regulations.

Much has been done over the decades and there is a continuous effort to eliminate and substitute dangerous components in paint products. However, we need to recognize that controls and personal protective equipment (PPE) are a requirement when working with these products.

In this document we touch on some of the Health and Safety aspects of working with paint products.

- Safety datasheets
- Fire risk (mainly for solvent based products and thinners)
- Toxicity (inhalation, ingestions, skin contact) and other health risks (skin, eyes etc.)
- Housekeeping: Environment
- Ventilation: expert engineering support should be sought to calculate detailed ventilation values
- Precautions
- Environment

General summary on health risks related to paint products

Most paints contain or require flammable solvents in their application process or to clean the equipment. Some contain materials which can affect the users' health if swallowed or inhaled or cause irritation or more serious harm when in contact with the skin. Most countries have developed regulations to control labelling, storage and use of toxic or hazardous materials. Harmonisation of these regulations varies.

Transocean will adopt the local requirements in any country where their products are produced and/or sold and Safety Data Sheets for all products are available on request from the local Transocean producing member.

Safety Data Sheets (SDS)

SDS contain information about the physical properties of a product or material, the health risks and precautions like personal protection equipment to be used to limit exposure risks.

Prior to use, obtain and consult the (Material) Safety Data Sheet for paint and related products being used. Read and follow all precautionary notices on the SDS and container label(s).

If you do not fully understand these warnings and instructions or if you cannot strictly comply with them, do not use the product until additional explanation or training is received.

Fire/ Explosion risk

The majority of paints contain or require flammable organic solvents. As soon as a paint container is opened, solvent vapours are released. The flash point of paints and solvents is stated in the relevant product or safety data sheets. This flashpoint is the lowest temperature at which a mixture of the material with air can ignite or explode.

The lower explosive limit (LEL) is defined as the percentage of solvent vapour in the air which is the point where an explosion will occur if the air and solvent mixture is ignited with a spark.

If the temperature of the air is near, or above, the flash point it is essential that sufficient ventilation air is provided to reduce the concentration of solvent well below the lower explosive limit (LEL).

Mixtures of solvent and air can only explode when the concentration lies between the lower and upper explosive limits. These limits vary from one solvent to another but the LEL is usually about 50 g per 1 m³ of air. In brief 200 m³ ventilation air is required per kilo of solvent to maintain an atmosphere below 10% of LEL.

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If the flash point exceeds the air temperature, there is no risk of explosion but there is still a risk of fire. As such, therefore, no naked flames, cigarettes, matches or other sources of ignition should be allowed near an area where paint or thinner is being used or stored. Precautions should also be taken to avoid sparks from electrical appliances or caused by metal to metal contact.

Rags and cloths used to clean equipment or substrates using thinner should be carefully disposed off as smouldering heat is another fire risk.

If a fire involving paint does occur, do not extinguish with water, as paint solvents float on water, which accelerates the spread of the fire. The SDS will generally advise the use of a dry chemical, foam or CO₂ extinguisher. Protect yourself from the smoke and vapours. Follow site fire alarm regulations and only start fire fighting operations if properly equipped and trained.

Contact with skin and eyes

It is recommended that the following precautions should be taken to prevent paint coming into contact with the skin and eyes:

- Read and observe precautionary notices on paint containers and SDS.
- Select sensible working clothes, that cover as much of the body as possible. Other aspects related to clothing: anti-static materials, risk of getting caught in moving equipment, etc.
- Always wear gloves and eye protection.
- Do not touch your mouth or eyes with your gloves.
- Eyes are particularly sensitive, so if you are splashed in the eyes, by paint or thinners, flood them immediately with fresh water for at least 15 minutes and seek medical advice immediately.
- If paint should splash on your skin, remove it with soap and water. Do not use solvent as solvent can penetrate and damage the skin.
- Remember to wash hands and rinse mouth after working with paint.
- Despite these precautions paint can still come into contact with the skin or eyes (e.g. spray mist, excessive splashing), so a non-greasy barrier cream is recommended for all exposed skin.

Remember the objective is to avoid skin contact. If your clothes become soaked in paint, change them immediately and thoroughly wash the affected garments with soap and water. If paint is spilled the following precautions should be taken:

- Eliminate all potential ignition sources
- Ventilate the area to remove the vapours
- Wear appropriate protective clothing and use personal protective equipment (PPE)
- Do not walk into the spill (spreading material and risk of slip/fall)
- Mop up all spilled paint with absorbent material, ensuring that all materials used to mop up the paint are disposed of in closed metal containers
- Arrange for proper disposal of all waste

Inhalation

The inhalation of solvent vapours, paint vapours and dust must be avoided. Please follow the precautions listed.

- Ensure that ventilation is available to remove solvent vapours.
- Check Safety Data Sheet for appropriate respiratory protection.
- If spaces are difficult to ventilate efficiently wear an air-fed hood /mask.
- Confined spaces may require monitoring for LEL and exposure levels.
- Think about where the vapours are being ventilated. They could affect other people in adjacent spaces.

Precautions when spraying.

Dust, smoke and spray mist can be filtered by face masks containing a dust filter cartridge. Cartridges are also available which absorb both dust and solvents.

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If the odour of solvent can be detected, the filter is unsuitable for the specific material or exhausted and should be changed. Sense of smell varies in sensitivity, is affected by exposure and is certainly not to be taken as a quantitative sensor for air quality. It is most important that the correct filter for the class of work should be used. These are described by the manufacturers of the face mask and filter.

Harmful substances in paints usually enter the body by inhalation of gases, vapours, fumes, dusts or spray mists.

As was noted by Paracelsus in 1538: the dose makes the poison. An indication of the level of hazard is the Threshold Limits Value (TLV), previously called Maximum Allowable Concentration (MAC) in some parts of the world. This can be described as the concentration which can be tolerated by a healthy worker for 8 hours a day without adverse effects. The lower the figure, the more harmful or toxic the substance.

The concentrations are given either as parts per million (ppm), i.e. cm^3 of vapour per m^3 of air, or for solid dusts as mg per m^3 .

The minimum volume for air required to achieve this safe level of concentration will be given in our data sheets. This volume may in some cases be as much as 20 times that required to reach 10% of LEL and in some classes of work it may be impractical to supply the volume of air required to allow the required rate of usage of paint in the compartment. If no preventative (engineering) solutions are available and PPE are the final option, fresh air masks or respirators fed with clean air at positive pressure could be considered. It is important that operators are trained to use the PPE and are suitable, well-fitting and in good working condition.

As solvent vapours are heavier than air, they push breathable air upwards. These vapours can flow down drains and ventilation ducts.

- If dizziness, drunkenness or headaches are experienced, this could indicate a worker being affected by solvent vapours. Move into fresh air, check PPE and possibly seek medical attention and do not return until the ventilation has improved.
- If breathing vapours results in the collapse of a painter medical attention should be sought immediately. Forced exercise is not advisable.
- Never enter a space where vapours have or could have accumulated without first checking LEL and after confirmed safe to enter, wearing the required PPE.

Ingestion

Food and drink should not be consumed, stored or prepared in areas where paint is stored or being applied. In the case of accidental ingestion, medical attention should be obtained at once.

Environment

Paint may contain substances which are poorly degradable in the environment. Therefore handle empty containers with care and avoid contamination of the environment with any paint or waste resulting from using the paint.