IMPA GENERAL HEALTH AND SAFETY PRECAUTIONS

Fire and explosion

The majority of paints contain flammable organic solvents. As soon as a paint container is opened, solvent vapours are released.

The flash point is the lowest temperature at which a liquid gives off sufficient vapour to form a flammable mixture in contact with air.

If the flash point of the paint is lower or close to the ambient air temperature there is a very considerable risk of fire or explosion. It only needs a spark or flame to set it off. If the flash point exceeds the ambient air temperature there is still a risk of fire. Therefore, no naked flames, cigarettes or matches should be allowed near the area where paint is being applied or stored.

Precautions should also be taken to avoid sparks caused by metal to metal contact or from electrical appliances. If a fire involving paint does occur:

- Do not extinguish with water, as paint solvents float on water, and this helps to spread fire.
- Use a dry chemical, foam, or CO_2 extinguisher.
- Protect yourself from the fumes with a breathing apparatus.

Skin and eye contact

If paint is spilled the following precautions should be taken:

- Ventilate the area to remove the fumes
- 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.

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

- Select sensible working clothes that cover as much of the body as possible
- Always wear gloves and eye protection
- Do not touch your eyes with your gloves
- Read and observe precautionary notices on paint containers
- Eyes are particularly sensitive, thus if you are splashed in the eyes by paint or thinners flood them immediately with fresh water for at least 10 minutes and SEEK IMMEDIATE MEDICAL ADVICE
- If paint should splash on your skin, remove it with soap and water or an industrial cleaner. NEVER USE SOLVENT
- 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), therefore 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.

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Inhalation

The inhalation of solvent fumes, dust, paint vapours must be avoided. Please adhere to the following precautions.

- Ensure that ventilation is available to remove solvent fumes.
- If spaces are difficult to ventilate efficiently wear an air fed hood/mask.
- Think about where the fumes are being vented. They could affect other people in adjacent spaces.

Remember solvent fumes are heavier than air, they push breathable air upwards. They can flow down drains or ventilation ducts.

- If dizziness, drunkenness or headaches are experienced this could indicate you are being affected by solvent fumes. Move into the fresh air and do not return until the ventilation has improved.
- If breathing in fumes results in the collapse of a painter they should be carefully moved into fresh air and allowed to recover gradually. Forced resuscitation? is inadvisable.
- Never enter a space where fumes have or could have accumulated with-out wearing a breathing apparatus
- The mist of paint particles created when spraying should not be inhaled

To prevent the inhalation of spray mists:

- In well ventilated spaces a dust cartridge respirator can filter out the particles of paint effectively (Replace the cartridge regularly).
- If ventilation is poor an air fed hood or mask is essential, if any doubt whatsoever exists, wear a air fed hood/mask.
- Never filter spray mist through rags wrapped over the mouth, as the rags can get soaked and allow paint to come into direct contact with the mouth. The rags are also rather inefficient filters.
- When surface preparation involves removal of old coatings, minimize the spread of dust generated to protect workers and neighbouring communities and dispose of coating residues carefully.
- When sprayed, ISOCYANATE containing products may be harmful via inhalation or through contact with skin and eyes.
- Wear suitable protective clothing, gloves, eye and face protection, suitable breathing protection such as an air supplied respirator or hood when applying isocyanate containing products by spraying.

Ingestion

Food and drink should not be consumed, stored or prepared in areas where paint is stored or being applied.
In case of accidental paint ingestion, medical attention should be obtained at once. It is the purpose of this note to establish the minimum standards of hygiene and protection for personnel applying paints in the surface coatings industry. It must be recognized that in a progressive society, improvements in the quality and application of paints are inevitable, resulting in the better protection of steel?.

Older slower methods of paint application are giving way to modern, faster techniques, and it is important to carefully study and overcome any health hazards which may result from these newer methods. It is not the purpose of this manual to spread alarm to the industry. We are well aware that vast quantities of paint have been, and are being

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applied to steel without any serious harm affecting the painters, who often have very rudimentary or no protection at all.

We do, however, recommend that our advice be carefully studied as it is intended to improve the hygiene and in some cases, the safety of painters using older conventional paints as well as the more modern coatings. These recommendations are meant to be a supplement and not replace any special legal regulations in any country regarding the application of surface coatings.

Airless spray

Application of paint by airless spray is becoming increasingly popular. This rapid method of paint application produces fine paint mists which in addition to being a nuisance to workers, may in the case of some paints present a respiratory health hazard. Laboratory and field trials have shown that the mist, other than isocyanate based, is essentially a dust problem that can be satisfactorily overcome by the use of a suitable respirator with a dust cartridge as stated in the standard specifications of The Machinery and Occupational Safety Act 85 of 1993 and its Safety Regulations. Other protective equipment necessary includes eye shields, head cover, rubber gloves and overalls.

Earthing

High velocity flow rates of paint and cleaning solvents in airless spray application will cause a build-up of static electricity, particularly in dry weather, resulting in a high voltage spark discharge. To eliminate fire risk from this, earthing of the airless spray gun and unit is essential. This will also help to earth the painter's protective clothing, which can also build up electrical charge. Rubber and plastic garments are particularly susceptible to this effect.

Brush and roller

With brush or roller application, the precautions required are minimal, with there being no respiratory hazard associated with these traditional methods. Discomfort due to eye splashes is perhaps the most important mishap that can occur; this discomfort can be eliminated by the use of inexpensive eye shields. Hand protection is also desirable, plastic or rubber being suitable for this purpose.

Barrier creams

Some of these are miscible with some paint solvents and it is possible that they may assist organic poison absorption through the skin and for this reason most authorities are against their use. However, it is difficult to remove dried paint from the skin using soap and water without the prior use of barrier creams, and to leave paint on the skin is not advisable. The use of a proprietary industrial skin cleanser followed by a skin conditioner (to replace lost natural oils) is often the best way of overcoming these skin cleaning difficulties. If painters insist on pre-treating their skin before spraying then a non-greasy barrier cream should be supplied. Greasy substances such as Vaseline or petroleum jelly should not be used.

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General precautions

- Do not smoke while stirring, handling and applying compositions.
- Always wash hands before smoking and eating
- In case of splashing, wash skin immediately with soap and water
- If splashes get into eyes, flood copiously with water at once and obtain medical attention

The previous recommendations can be considered as the minimum standards consistent with hygiene and safety. However more sophisticated but costly equipment is available in the field for respiratory protection. There are other protective measures which can add to the comfort of the painter, the following are a few examples.

Air line respirators

Although expensive, the advantages of an air line respirator are obvious. Clean fresh air is supplied to personnel through an air hose, making them independent of any polluted atmosphere in which they may have to work.

Solvent fumes

In situations where solvent odour becomes intolerable a "light fume" cartridge can be added to the respirator in a duplex arrangement. This arrangement is intended for outdoor use and it must always be remembered that cartridge respirators must never be used in atmospheres deficient of oxygen.

Disposable overalls and head cowls.

These overalls are available as coats to be worn over normal overalls – the head cowls cover the whole head apart from a 15cm diameter circle for the face. Both are made of a fibre composition, which affords excellent protection against spray and splashes.

The notes listed below are designed to provide help and guidance when modern Protective Coatings are being used in different environments. These notes are not intended to be a complete discourse on the subject of safety during painting, but are designed to make one aware of some of the dangers involved. Further information may be made available if required by contacting our local representatives. The two notes presented cover: (1) The interior painting of tanks, (2) Exterior painting.

Tank painting

A high proportion of tank coatings applied throughout the world contain flammable organic solvents, which can form explosive mixtures with air. Attention must be given to the following points:

a. Danger of explosion or fire
b. Provision of a suitable breathing environment
c. Prevention of skin irritation problems

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Danger of explosion or fire

The key factors in preventing explosion or fire are:

1. Adequate ventilation
2. Elimination of naked flames, sparks and any ignition sources

Any organic base coating could, merely by the normal process of drying, give off sufficient solvent vapour to produce an explosive mixture in a tank when the vapour concentration reaches or exceeds 1% by volume in air. However, at 1% these solvents produce an intolerably unpleasant odour, often with irritating skin effects and smarting of the eyes. These symptoms should be taken as a warning sign that better ventilation is needed. 0.2% solvent vapour in air is normally recommended to give a five-fold safety margin and at this concentration NO EXPLOSION CAN OCCUR.

Ventilation

Both air blowing and extraction methods of ventilation have been suggested but experienced has shown that of the two methods, blowing is more efficient. Extraction tends to produce channelling with smooth air flow and dangerous pockets of solvent vapour. Blowing causes turbulence, which disperses solvent pockets.

For individual tanks the blowing air is trunked into the coaming of the tank, to a depth of 2.5-3 metres in a 12 metre tank. This prevents the blowing air immediately returning through the coaming without sweeping the tank. The geometry and size of tanks makes each one a separate problem and it is essential to check that the ventilation arrangement, fan output, etc. is suitable before painting commences.

FORE AND AFT PEAKS AND DOUBLE BOTTOMS of ship tanks require special attention. Because of their construction, adequate ventilation is challenging and coating application could result in a rapid build-up of solvent vapours to toxic and explosive concentrations. It is necessary to have a responsible standby man at the tank opening to keep a “head count” of painters and other workers and to ensure no interruption of essential services, i.e. air supplies and electricity.

Elimination of ignition sources

1. Welding, cutting or grinding in the tank must be forbidden until paint fumes are totally dispersed. This also applies to all areas within a 15 meter radius of the tank and trunking outlet.
2. Coamings must be simply covered to prevent spark entry where welding is being carried out on superstructure.
3. Lights, including hand torches, must be certified as flash proof.
4. Smoking must be prohibited in or near tanks or extraction systems.
5. No electrical junction boxes should be allowed in tanks.
6. Airless spray equipment must be earthed (static electricity danger).

Solvent vapour and paint mists – Protection of painting personnel

No ventilation system can reduce solvent vapour levels to below the Threshold Limit Values for solvent in tank coating procedures. Painters must therefore wear air fed hoods or pressure fed masks with additional eye protection. Normal protective clothing must be worn, e.g. overalls gloves and non-spark footwear

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Skin irritation

If proper protective clothing has been worn, e.g. overalls, gloves, airline hood etc. no difficulty should be experienced from skin irritation. Any small areas not protected by clothing, such as wrists or neck can be treated with a non-greasy barrier cream. Petroleum jelly is not recommended. Areas of skin accidentally contaminated with paint should be cleaned with a proprietary industrial skin cleaner then thoroughly washed with soap and water. The use of skin conditioners designed to replace the skins natural oils is recommended.

Summary of precautions to be taken.

1. Provide adequate ventilation.
2. Ensure that the tanks and surrounding areas are flame and spark free
3. Provide painters with full respiratory protection.
4. Ensure that suitable protective clothing is worn
5. Do not smoke while stirring, handling and applying compositions.
6. Always wash hands before smoking or eating
7. In case of splashing, wash skin immediately with soap and water.
8. If splashes get into the eye, flood copiously with water at once and obtain medical attention
9. Rescue equipment with independent air supply (air cylinder) to be available for use in emergencies.
10. Operate a "head count" of men working in the tank and ensure no interruption of essential services

Appendix

It is believed that the foregoing notes will provide a practical basis for the safe painting of tanks. There are however a number of technical terms and principles, which provide the scientific basis of these notes and which are often quoted (or misquoted) in practice. The following simple definitions should help clear up any misconceptions.

Flashpoint.

The lowest temperature at which a liquid gives off vapour sufficient to form an flammable mixture in contact with air. It is a rather rough yet quick way of measuring the relative combustibility of volatile liquids and, in turn, determines the appropriate temperature below which combustibles may be stored and used without creating explosive atmospheres. The flashpoint is always determined in a standard apparatus.

Explosion limits

- Lower – The lowest concentration of vapour in air, which can be ignited (exploded)
- Upper – the highest concentration of vapour in air, which can be ignited (exploded)

Flashpoint and lower explosive limit are interconnected. The flashpoint is the temperature at which a liquid gives off sufficient vapour into a fixed volume of air so that when a naked flame is applied the mixture will ignite. The quantity (%) of vapour in the mixture when ignition occurs is the lower explosive limit for that particular solvent. This means that at all temperatures below the flashpoint of a solvent the quantity of vapour it can give off into the atmosphere must be less than the lower explosive limit. This simple guide to the volatility of solvent is, however, complicated by the presence of paint spray and solvent mist (liquid

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particles) in tank atmospheres. If particulate spray is present it will also have a lower explosive limit, which is not dependent on the flashpoint of any solvent mixture present.

IMPA GENERAL SAFE HANDLING OF PAINTS

INTRODUCTION:

Few paints today are strongly toxic. Paints based on lead, mercury, arsenic etc. are rarely used today and if these toxic materials are used warning labels are attached. However, most paints present some form of hazard and must be treated accordingly.

FLAMMABILITY:

Water based emulsion, epoxy paints and paints based on chlorinated solvents are not flammable. All other paints are, to some degree, flammable.

The degree of flammability depends on the volatility of the solvent employed. Consequently, the paint with the strongest smell is likely to be the most flammable and, in order of flammability, the least dangerous are household paints based on mineral turpentine, followed by industrial spraying enamels based on aromatic hydrocarbons, followed by certain high performance paints such as solvent based epoxies and polyurethanes, and the most flammable are cellulose lacquers. The following precautions must be taken:

- Do not smoke whilst painting.
- Ensure good ventilation to carry away flammable fumes
- Avoid, where possible, the use of tools such as chisels etc. that are liable to cause sparks
- Do not apply paint anywhere near welding operations
- Do not apply paint near any source of heat such as hotplates, gas burners, etc.
- Do not apply paint near machinery that will produce sparks, such as grinding wheels, etc.
- Do not apply paint where there could be sparks from power tools, electric drills, etc.
- Appropriate warning signs should always be erected as necessary.

VAPOUR TOXICITY:

Most paints give off vapour of some kind. In the case of emulsion paints it may be ammonia. In the case of solvent based paints solvent vapours escape as soon as he tin is opened and evaporate during the drying process. Even solvent-less paints often contain materials that are volatile and give off vapours. These vapours or fumes may be toxic.

It is important, therefore, to avoid breathing in fumes from paint. In particularly bad conditions a separate air line should be supplied to a face mask. In well ventilated conditions there may be sufficient air movement to render the inhalation of harmful concentrations unlikely. A face mask filled with suitable filters could make a considerable difference to the quantity of fumes inhaled.

The effects of vapour inhalation could vary depending upon the individual and the quantity of fumes inhaled. Symptoms could include slight dizziness to quite serious spasms, choking sensations etc. Should any discomfort be

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experienced the operator should leave the area at once and move to a fresh air area, before returning to work any ventilation problems should be resolved.

CLEAN UP:

It is essential that all paint spills be cleaned up as soon as possible. Apart from being a fire hazard, there is also the danger of the paint attacking all surfaces and the floor becoming slippery thus having the potential to cause an accident. Spilled paint must be cleaned up using an absorbent material such as sand which must then be disposed of in such a way that it will not be a hazard. Solvent spills must be dealt with in a similar manner.

Empty containers should be disposed of in such a manner that they will not cause a hazard. Paint containers should preferably be punctured so they will not be used as containers for water. In some cases it may even be advisable to burn the containers under carefully controlled conditions.

Particular care must be taken when disposing of aerosol containers – they must NEVER be punctured or burnt.

STORAGE:

Paints should always be stored under the correct conditions. All the precautions listed under FLAMMABILITY must be observed.

The Machinery and Occupational Safety Act 85 of 1993 and its Safety Regulations determine the volumes and conditions under which paints and solvents may be stored, the firefighting equipment required, etc. These legal requirements should be observed at all times. The temperature of the paint store should be kept between 10-30ºC wherever possible. Lower temperatures can cause damage to emulsions and higher temperatures can cause the solvent inside the tins to expand to an excessive degree causing the tins to explode. If only a portion of the contents is to be used, the container should be very carefully closed after cleaning the rim. It is better to pour the material into smaller tins to reduce the size of the airspace if it is to be kept for some time. Ensure that all items such as catalysts, driers and acids are kept separate. All paints, with the exception of water-based coatings, should never be stored with other chemicals.

HANDLING:

Keep skin contact to a minimum as the solvents in paint tend to remove natural oils from the skin. Skin contact with paint could lead to dermatitis or other allergies in certain people. This may happen rapidly or develop over a long period. If any form of dermatitis occurs seek medical advice.

To reduce the risk of these problems use barrier cream, wear overalls and gloves. Wear goggles or a face shield. Liquid components splash easily. If material splashes into the eye wash well with running water and seek medical advice immediately.

Personal clean-up should consist of thorough washing with soap and water. If there are stubborn spots of paint on the skin, remove with a cloth dampened with suitable solvent followed by washing with more soap and water immediately thereafter. Immersion of the hands in solvent must be discouraged. The use of creams is recommended to restore the oil balance of the skin.

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Multi-component materials must be handled with great care. Two-pack materials often contain chemicals which are more hazardous than those in normal paints and as materials of widely differing viscosities often have to be mixed together, splashes and spillages are much more likely to occur.

The directions given by the manufacturer must always be carefully read and followed.

Some paints have hazards which may not be mentioned under the general points above but these are dealt with in the manufacturer's directions to which close attention must be paid.

Paints are normally quite safe to handle if used with due regard to the above safe handling procedures, but could be hazardous if handled incorrectly.

IMPA LEAD IN PAINT

Impa has never made a paint product that contained lead pigment. However, for many years, other paint manufacturers did produce paint that contained lead pigments. Why should that concern you? Because paint containing lead pigments can be very hazardous to your health, especially for small children and pregnant women. This is particularly true when old paint containing lead pigment is sanded or scraped off a wall or other surface. The dust from sanding can contain lead particles that might be breathed in or swallowed. Cracking or peeling is also a concern. If a young child eats peeling paint containing lead pigments, this can significantly raise the level of lead in their bodies which could cause brain damage and lead to other health risks.

We are concerned about your health and want to make sure you are aware of the risks associated with sanding or scraping old paint. That is why we began putting lead warning statements on our products several years ago despite the fact that our products have never contained lead pigments. It is also why South Africa has issued lead warnings with the Paint Manufacturing Association as lead was a common ingredient in paint for over a hundred years.

Controlling exposure to lead or other hazardous substances requires the use of proper equipment, such as a properly fitted respirator (National Institute of Occupational Health and Safety (NIOSH) approved), proper containment with plastic sheets or other containment devices, and cleanup with a HEPA (High Efficiency Particulate Arresting) vacuum and a wet mop. Before you start your project, find out how to protect yourself and your family by contacting Impa Information Hotline. We have also provided brochures to our retailers that you can pick up free of charge wherever Impa paint is sold.

DISCLAIMER

The information contained in this document is given in good faith and is meant to be used as a guideline by the specified user. Whilst we are confident about the quality of our products, we cannot accept any liability for the incorrect use or application of said products.

Please note: all of our latest Product Data Sheets and Material Safety Data Sheets are available for viewing on our website at www.impa.co.za .

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