Technical Advice Sheet

Guide to safe handling of Flexil Hot Melt Compounds

1. INTRODUCTION

This publication outlines the precautions which should be taken in handling hot melt compounds made from vinyl chloride polymers (PVC) and copolymers, and has been prepared in conjunction with the BRITISH PLASTICS FEDERATION.

These plastisols and hot melt compounds are made by blending PVC polymers and/or copolymers with a variety of additives such as stabilizers, plasticisers, pigments, fillers etc. Plastisols are liquids or pastes, whilst Hot Melt Compounds are solid, rubbery doughs in slab or crumb form.

Additional information on individual formulations can be obtained on request.

2. POTENTIAL HAZARDS

The release of vinyl chloride monomer (VCM) from PVC hot melt compounds into processing plant atmospheres produces only trace levels well below the limits of the EEC Directive.

Since there is accepted evidence linking inhalation of high concentrations of VCM over prolonged periods with carcinogenic effects, precautions are necessary to avoid inhalation exposure.

An EEC Directive (1) has been issued on the protection of the health of workers exposed to vinyl chloride monomer. This Directive limits VCM to a technical long term limit value (TLTLV) of 3 ppm, the reference period being the year, allowing that where ever practicable, exposures should be brought as near as possible to zero concentrations. The rigorous monitoring and control measures of the Directive do not apply to the handling of plastisols or hot melt compounds although it is recommended that the exposure requirements should be met. Analytical techniques to measure VCM levels in the atmosphere can be found in a manual published by the Chemical Industries Association (2).

Compositions based on vinyl chloride/vinyl acetate copolymers also contain trace residues of vinyl acetate monomer. This is much less volatile than VCM, but will be slowly released into the surrounding atmosphere. There is no evidence of carcinogenic effects from vinyl acetate at any concentration. It is recommended that simple ventilation is employed in areas where plastisols or hot melt compounds are stored, handled and processed.

INGESTION

Some PVC plastisols or hot melt compounds may contain certain ingredients which are toxic if ingested. This applies particularly to some of the stabilizer, pigment or fire retardancy systems used. For this reason, the ingestion of such PVC compositions may be harmful.

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The presence of a toxic ingredient in a PVC plastisol or hot melt compound will be indicated in the individual technical data sheet for that product, and cautionary labeling will be found on the containers.

DERMATOLOGY

Whilst PVC polymers and copolymers are not normally considered to be skin irritants or sensitizing agents in their own right, if sensitizing ingredients are present in the composition, dermatitic problems could arise. The presence of such an ingredient will be indicated in the individual technical data sheet and the labeling.

FIRE

PVC plastisols and hot melt compounds under normal conditions of storage and use are not flammable, but in common with other organic materials they can be consumed by fire. Some plastisols contain flammable diluents which can constitute a fire hazard. This information will be given in the individual technical data sheet.

DECOMPOSITION PRODUCTS

The major products of the combustion/thermal decomposition of PVC plastisols and hot melt compounds are carbon dioxide, carbon monoxide and hydrogen chloride. Additionally, many minor decomposition products have been identified. Carbon monoxide and hydrogen chloride are very toxic with threshold limit values of 50ppm and 5ppm respectively. Inhalation must be avoided. Hydrogen chloride is also very corrosive. (3) (4)

EXPLOSION

Some PVC plastisols contain diluents which may give rise to a concentration of vapours which are flammable and potentially explosive.

3. RECOMMENDED PRECAUTIONS FOR TRANSPORATION HANDLING AND STORAGE

HEALTH CONSIDERATIONS

PVC plastisols may contain diluents which are flammable and should be stored in well ventilated conditions as advised by the Local Fire Authority.

Where a person is handling plastisols and hot melt compounds suitable protective clothing should be worn and the working area should be well ventilated.

FIRE

Most available fire extinguishers are effective in fighting fires involving PVC, although water based systems should not be used where live electrical equipment is nearby. Small local fires could be dealt with by personnel in the vincinty, although care should be taken against inhalation of the decomposition fumes. After extinguishing the fire, increase ventilation to clear the fumes.

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Fire fighting personnel and the Fire Brigade should be informed that PVC is involved and advised to wear acid resistant protective clothing and full face masks. Suitable breathing apparatus should be used and qualified medical aid should be sought to deal with irritation to the skin, eyes, throat etc.

After the fire is extinguished, all affected areas should be washed down to remove corrosive hydrogen chloride (5)

EXPLOSION

Adequate ventilation should be provided to prevent accumulation of flammable vapours.

All likely sources of ignitions such as sparks, static discharges and hot surfaces should be minimized.

4. RECOMMENDED PRECAUTIONS FOR THE PROCESSING OF PVC PLASTISOLS AND HOT MELT COMPOUNDS

TEMPERATURE LIMITS

Plastisols and Hot Melt compounds are usually processed at temperatures between 130ºC and 210ºC. Prolonged exposure to these temperatures or a shorter exposure to higher temperatures will result in decomposition (see section 2.3.2 for decomposition products). The temperature limits of stability will vary with each formulation and the processing technique for which it has been designed. Consult material and equipment suppliers.

VENTILATION AND EXTRACTION

Good ventilation should be provided in all working areas. Adequate extraction should be provided where hot processing may lead to the formation of fumes.

PROTECTIVE CLOTHING

Good industrial hygiene procedures should be observed when handling PVC plastisols and hot melt compounds.

Gloves, eye protection and protective clothing should be provided for wear at the work place, and should be removed before leaving.

FIRE

The recommended fire precautions for processing and fabrication are as in section 3.2.

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5. PERSONAL HYGIENE

Protective clothing should be worn at all times when a risk of exposure to toxic ingredients has been identified. Washing with soap and water after work and before eating, drinking and smoking is recommended. Barrier creams may be considered a sensible precaution.

6. RECOMMENDED FIRST AID TREATMENT

INHALATION OF NOXIOUS FUMES

The patient should be quickly moved into fresh air. Artificial respiration should be applied if necessary. Expert medical attention should be obtained immediately.

EYE INJURIES

Plastisols should be flushed from eye by irrigation with water. Expert medical attention should be sought immediately.

INGESTION

Expert medical attention should be sought immediately.

GENERAL

Where expert medical attention is sought it is important to give details of the nature of the product being handled.

7. WASTE DISPOSAL

Disposal of waste is controlled by the "Control of Pollution Act 1974". Before disposing of waste plastisols or hot melt compounds , it is recommended that advice be sought from the Waste Disposal Officer of the Local Authority concerned.

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APPENDIX 1. BIBLIOGRAPHY

1. "EEC COUNCIL DIRECTIVE 78/6/10/EE6 (29 June 1978)." Available from HMSO.
2. "The determination of Vinyl Choride: A Plant Manual." Available from the Chemical Industries Association.
3. "Products of combustion of chlorinated plastics." Coleman and Thomas. Journal of Applied Chemistry Vol. 4 July 1954.
4. "The Burning Issue of PVC Disposal." Clark C.A. SPE Journal Vol. 28 No7, July 1972.
5. "Threshold Limit Values (Environmental Health Guidance Note EH15)." Available from Health and Safety Executive.
6. "Prevention and Control of Fire in the Plastics Processing Industry." Issued jointly by the British Plastics Federation and the Fire Protection Association.

APPENDIX 2. ADDRESSES OF SOURCES OF INFORMATION

British Plastics Federation
5 Belgrave Square
London
SW1X 8PH

Chemical Industries Association
Alembic House
93 Albert Embankment
London, SE1 7TU

Fire Protection Association
Fire Prevention Information and Publication Centre
Aldemary House
Queen Street
London EC4N 1TJ