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CORROSION MANUAL

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

Alive Whitmore.

Ministry of Defence

Sponsored for use in the

**ROYAL NAVY by DGA(N)
ARMY SERVICE by DEME(A)
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PREFACEHAZARDS AND SAFETY PRECAUTIONS

- 1 Corrosion prevention and rectification necessitates the use of various solvents, sealants and protective materials. Many of these substances pose serious medical hazards in a variety of ways, not all of which may be immediately apparent. Combinations of normally safe procedures may give rise to excessive heat or noxious fumes.
- 2 The safety precautions detailed in this publication are to be regarded as the minimum requirements and may be increased at the discretion of the operator or by local engineering instruction, to suit specific situations. Personal protection equipment may be found in FAP1086 Sections 22G (aprons, goggles, face shields, gloves, respirators and facemasks), 22D (boots) and 33D (barrier creams).
- 3 Various terms are used to define, in general, hazards existing when using specific substances or processes:
 - 3.1 Toxic. The substance is poisonous. The level of toxicity is normally quoted as 'non-toxic', 'toxic' or 'highly toxic' and expressed as parts (of the substance) per million parts of air (PPM). The environment in which the substance is used, the method of application, use of fume extractors and other factors, will vary the toxicity in a given situation.
 - 3.2 Degreasant. A degreasant is a substance which, in contact with the skin, will remove natural body oils and possibly induce dermatitis or other skin disorders.
 - 3.3 Carcinogen. A carcinogen is a substance which, if induced into the body by any means such as inhalation, swallowing or skin contact, may produce cancer.
 - 3.4 Narcotic. Many substances, especially solvents, have a narcotic effect, which can cause drowsiness, stupor, hallucination and eventual unconsciousness. These effects may occur quickly or over a period of time. Care must be exercised when using known narcotic substances, since the onset of danger may go unnoticed. All solvents/sealants when used in confined areas, are to be regarded as narcotic, with the wearing of face masks/respirators a mandatory requirement.
 - 3.5 Flammable. The degree of flammability of a substance is based upon the temperature at which it will ignite, (flash point). A liquid possessing a flash point equal to, or lower than 32°C, is considered highly flammable; between 32°C and 60°C, flammable. These values are defined within the Highly Flammable Liquids and Liquified Petroleum Gases Regulations and are generally used by manufacturers in the labelling of products.
- 4 In all cases of eye contamination, medical attention must be sought as soon as possible. The affected eye(s) being irrigated immediately using running water or eyewash equipment if available. Where contamination by any substance is likely, eye protection must be worn.
- 5 Many chemicals are absorbed through the skin. In most cases this can be prevented by the application of barrier cream to exposed areas of skin as standard practice, and by wearing gloves of the appropriate type whenever a substance is known to be dangerous or is of an unknown nature.

6 Carcinogenic hazards are present with many substances; effects can take many years to become apparent in some cases. Chromated jointing compounds fall into this category, the poisoning taking many years to reach damaging levels.

7 Some corrosion products are themselves toxic, the most notable being cadmium carbonate, a white powder which forms on cadmium-plated items.

8 Fumes are a danger which cannot be overstressed. Their presence can go unnoticed until physical capabilities are impaired or unconsciousness occurs. If using solvents or sealants in confined areas, respirators, with an external air supply, or face masks with suitable filtration cartridges, are to be worn. The positioning of a safety man is a vital link to prevent incidents and instructions must be implemented in all cases when operations in fuel tanks or similar confined spaces are to be carried out.

9 Table 1 lists groups of materials likely to be encountered during corrosion prevention and rectification procedures. The nature of these materials refers to their flammability and toxicity under normal circumstances. It must be remembered that ordinarily safe chemicals may decompose under heat and produce dangerous fumes.

10 Reference should be made to AP 119A-0512-1 'Component Cleaning Processes', for full details of cleaning agents, their uses and authorised processes, trade names, synonyms, hazards and safety precautions.

11 Any queries on the safety of materials should be directed in the first instance to the Station Medical Centre.

TABLE 1 GROUPS OF MATERIALS LIKELY TO BE ENCOUNTERED DURING CORROSION PROCEDURES

Material	Nature	Hazardous to
1 Acids	Toxic Skin irritant	Skin Lungs Internal Clothing Eyes
2 Compound cleaning (DTD 5507B)	Combustable when concentrated	Skin Eyes
3 Compound cleaning heavy duty (DTD 5600)	Flammable Skin irritant	Skin Internal Clothing Eyes
4 Jointing Compounds	Flammable Toxic	Skin Internal Eyes

(continued)

TABLE 1 GROUPS OF MATERIALS LIKELY TO BE ENCOUNTERED DURING CORROSION
PROCEDURES (continued)

Material	Nature	Hazardous to
5 Paint removers	Flammable Toxic Skin irritant	Skin Lungs Internal Clothing Eyes
6 Water dispersants and temporary protectives (PX-10, 24, 29, 32)	Flammable Skin irritant	Skin Lungs Internal
7 Chemical spillages	May be flammable Toxic Skin irritant	Skin Lungs Internal Clothing Eyes

LIST OF RELATED PUBLICATIONS

AP 100E-20	Aircraft Storage.
AP 101A-0206-1	Flexible Cables in Aircraft Control Systems.
AP 101B-0002-1	Maintaining Aircraft and Associated Equipment in Low Temperatures.
AP 119A-0202-1	Corrosion in Naval Aircraft.
AP 119A-0203-1	Electroplating and Corrosion Resisting Processes.
AP 119A-0504-1	General Adhesives and Glazing and Sealing Compounds, Glazing and Sealing of Aircraft Components.
AP 119A-0511-1	Rust Removing Solutions.
AP 119A-0512-1	Component Cleaning Processes.
AP 119A-0601-0	Aircraft Painting and Marking.
AP 119A-1201-1	Welding, Brazing and Soldering.
AP 119A-20001-1	NDT General Information.
AP 119A-20002-1	NDT Safety Precautions.
AP 119A-20003-1	NDT Penetrant Flaw Detection.
AP 119F-1902 Series	Aircraft Washing Plant, Electrically Driven (4K 4455305) and ICE Driven (4K 4455306).
AP 119F-1903 Series	Foam Dispenser Small Aircraft Washing.
AP 119F-1912 Series	Cleaning Machines Multi-Purpose Warwick 12000S, 12000SA, 11000SA, 22000SA.
AP 119G-0002-1	Heat Treatment of Aluminium Alloy.
AP 119G-0129-1	Vacu-Blast Impact Finishing Equipment.
AP 830	Supply Regulations Vol 2. Storage, Materials, Handling and Packaging.
AP 1086	Stores (27D - Covers for Individual Aircraft).
AP 1441C	Servicing of Aircraft and Associated Equipment in Tropical and Semi-Tropical Conditions.
AP 4471A	Preservation of Aero Engines and Associated Equipment.
Def Stan 00-970	Design Requirements for Service Aircraft.
Chapter 400	Use of Magnesium Alloys.
Chapter 405	Exfoliation Corrosion of Aluminium Alloys.
Chapter 406	Stress Corrosion Cracking.
Chapter 801	Precautions Against Corrosion and Deterioration.
Def Stan 01-5/ -HMSO	Fuels, Lubricants and Associated Products.

LIST OF MATERIALSDTD SPECIFICATIONSMATERIAL USAGE

DTD 756	Cleaning materials for metals.
DTD 911	Protection of magnesium-rich alloys against corrosion.
DTD 5507	Cleaning compound for aircraft exterior surfaces.
DTD 5580	Exterior glossy finishing schemes (Polyurethane).
DTD 5599	Acrylic paint finish.
DTD 5600	Heavy duty cleaner for aircraft exterior surfaces.
DTD 5604	Pigmented jointing compounds, non-hardening type.
DEF 1402	Paint scheme anti-acid, anti-alkali.
DEF 1443	Paint remover, acrylic finishes.
Def Stan 03-2/1	Cleaning and preparation of metal surfaces.
Def Stan 03-7/1	Application of paint materials to metal surfaces.
Def Stan 68-10/2	PX-24, water displacing compound.
Def Stan 80-16/1	Universal paint-remover.

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