



TECHNICAL SUPPORT DOCUMENT

FIA-TSD-2000-5-2

OPTICAL FIBRE

-

HANDLING OF PROCESSING CHEMICALS



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**FIA TECHNICAL SUPPORT DOCUMENTS**

This document is one a series of FIA Technical Support Documents. During the year 2000 all the existing FIA documents will be re-written or re-published in the format used throughout this document.

More importantly, the way in which these Technical Support Documents is published has also changed.

These documents are now **free** to **FIA members** via downloads from the FIA web-site ([www.fibreoptic.org.uk](http://www.fibreoptic.org.uk)). Non-members are also able to purchase these documents either by contacting the Secretariat (address shown below) or by on-line purchase.

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The FIA web-site will indicate the issue status of each document and will have links to previous issues in order that changes made will be clear to readers.

The complete list of FIA Technical Support Documents is shown in the Table below.

TOPIC	FIA-TSD-	TITLE
DESIGN	2000-1-1	OPTICAL FIBRE CABLING: LAN APPLICATION SUPPORT GUIDE
COMPONENT SELECTION	2000-2-1	OPTICAL FIBRE CABLING: CABLE SELECTION GUIDE
OPERATION	2000-3-3	OPTICAL FIBRE CABLING: POLARITY MAINTENANCE
INSTALLATION	2000-4-1-1	OPTICAL FIBRE CABLING: INSTALLATION PRACTICE: SPLICING
	2000-4-2-1	OPTICAL FIBRE CABLING: TESTING OF INSTALLED CABLING LSPM equipment
	2000-4-2-2	OPTICAL FIBRE CABLING: TESTING OF INSTALLED CABLING OTDR equipment
	2000-4-2-3	OPTICAL FIBRE CABLING: TESTING OF INSTALLED CABLING Specification, procurement and use of test cords
SAFETY	2000-5-1	OPTICAL POWER: SAFETY LEVELS
	2000-5-2	OPTICAL FIBRE: HANDLING OF PROCESSING CHEMICALS
	2000-5-3	OPTICAL FIBRE: DISPOSAL OF WASTE

1 **FOREWORD**

2 "Health and Safety" - not the most glamorous of subjects, but nonetheless a vital one.  
3

4 We all want to work in a safe environment and there is a general expectation that this will be the case. Indeed the expectation is  
5 backed by a rigorous regime of regulation that employers must observe and work in accordance with. If they do not, they  
6 expose themselves to the possibility of claims both for compensation from employees, who suffer injury during the course of  
7 their employment, and legal action from the authorities for non-compliance with their legal obligations.  
8

9 However, assembling all the information needed to implement a comprehensive set of documented workplace safety policies is  
0 not so easy, especially in the multi-discipline world of fibre optics. Whilst the required standards almost always are already in  
1 existence, the task of determining which ones are relevant and how they should be applied can be extremely time-consuming.  
2

3 Only the larger companies can afford to employ a dedicated safety officer who could be expected to become familiar with the  
4 range of subjects and documents involved.  
5

6 To assist all types of member organizations, the FIA has set out to produce a set of documents that define, for specific areas of  
7 activity, the appropriate references to existing standards. In most cases, the FIA is not seeking to create new requirements.  
8 Instead we seek to provide a comprehensive and detailed summary of the source documents. In addition to this, the FIA  
9 documents offer additional interpretation of the ways in which the standards may be implemented.  
0

1 This document identifies the chemicals that are particularly relevant to the manufacture of passive fibre optic products. These  
2 include chemicals used in the manufacture of optical fibre cable (filling compounds), in performing termination of the fibres  
3 (adhesives, polishing and cleaning compounds) and in various maintenance activities (cleaning and degreasing compounds).  
4

5 The nature of the issues involved is described, and the relevant existing Standards and legislation identified. Information on the  
6 COSHH regulations and RIDDOR is also included. Above all, recommendations are made as to the practises to be adopted,  
7 and how these may be implemented.  
8

9 We at the FIA believe that this document offers a great deal of help to companies operating in the field of optical fibre  
0 communications. I can wholeheartedly recommend it to you.  
1

2 Paul Bateson,  
3 Chairman of the FIA  
4

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## 1 INTRODUCTION

The installation of optical fibre cabling brings with it a number of health and safety issues. Specifically, these are the risks associated with optical power together with the processing chemicals used and the optical fibre waste created during the installation process.

There are also other health and safety issues raised by the presence of metallic elements within some designs of optical fibre cables. In some cases these elements are part of the construction of the cable and, in the UK, are treated as extraneous metal within BS 7671 thereby requiring appropriate earthing to prevent electric shock – addressed in BS 6701 and the [BS] EN 50174 series of standards. In other cases, the metallic elements take the form of conductors and are used to provide either power and/or signal transmission. In such circumstances a complex array of rules apply within which safety vies with electromagnetic interference - albeit with safety always coming out on top.

In the UK there are a number of existing standards and elements of legislation which cover the issues of safety in relation to optical fibre technology.

Cabling issues are covered by:

- BS 6701;
- BS 7671;
- BS 7718 (now withdrawn but historically important);
- the [BS] EN 50174 series of standards;
- ISO/IEC 14763-2;
- the Control of Substances Hazardous to Health (COSHH) legislation.

Optical power safety issues within systems are addressed in [BS EN] IEC 60825-1 and [BS EN] IEC 60825-2.

This FIA Technical Support Document collates the available requirements and recommendations in relation to the handling of processing chemicals used during the installation and operation of optical fibre cabling infrastructures. As such the contents of the document represent the definition of good practice for FIA members.

## 1 SCOPE

This document defines appropriate references to, and provides additional interpretation of, existing standards and legislation in relation to the handling of processing chemicals used during the installation and operation of optical fibre cabling infrastructures.

1 **2 REFERENCES**

2 **2.1 Standards**

ANSI/TIA/EIA-568-C.1	Commercial building telecommunications cabling standard
BS 6701:2010	Telecommunications equipment and telecommunications cabling - Specification for installation, operation and maintenance
BS 7671:2008 + A1:2011	Requirements for electrical installations. IEE Wiring Regulations. Seventeenth edition
BS 7718	Code of Practice for the installation of fibre optic cabling (now withdrawn but historically important)
[BS] EN 50174-1:2009 +A1:2011	Information technology - Cabling installation - Part 1: Installation specification and quality assurance
[BS EN] IEC 60825-1:2007	Safety of Laser Products - Part 1: Equipment classification, requirements and users guide
[BS EN] IEC 60825-2:2004 + A2:2010	Safety of Laser Products - Part 2: Safety of optical fibre communication systems
ISO/IEC 14763-2:2012	Information technology - Implementation and operation of customer premises cabling - Part 2: Planning and installation
FIA-CCP-1/91	Code of Practice for the installation of fibre optic cabling (withdrawn when BS 7718 published)

3 **2.2 Regulations**

The Control of Substances Hazardous to Health (COSHH) legislation: 2002  
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations: 1995

<http://www.hse.gov.uk/riddor/>

7 **3 DEFINITIONS AND ABBREVIATIONS**

8 **3.1 Definitions**

9 For the purpose of this Technical Support Guide the following definitions apply:

Cladding	The dielectric material of an optical fibre surrounding the core (BS 7718).
Loose tube	A cable construction in which the optical fibres are free to move (enabling the cable to receive high tensile loads without risk of damage to the optical fibre).
Primary coating	A thin coating applied directly to the cladding to preserve the integrity of the cladding surface (BS7718)

1

1 **3.2 Abbreviations**

2 For the purpose of this Technical Support Guide the following definitions apply:

3

COSHH	Control of Substances Hazardous to Health
HSE	Health and Safety Executive
MEL	Maximum Exposure Level
OES	Occupation Exposure Standard
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
TSD	Technical Support Document (FIA Publication)

4

5

**4 CONFORMANCE**

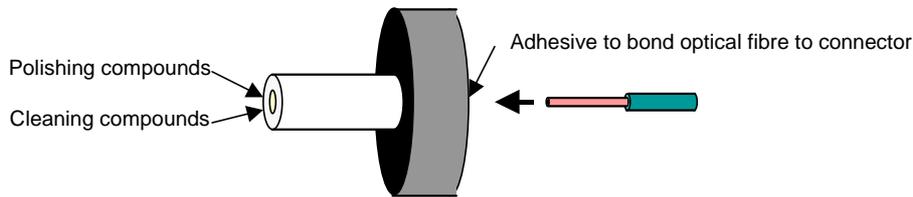
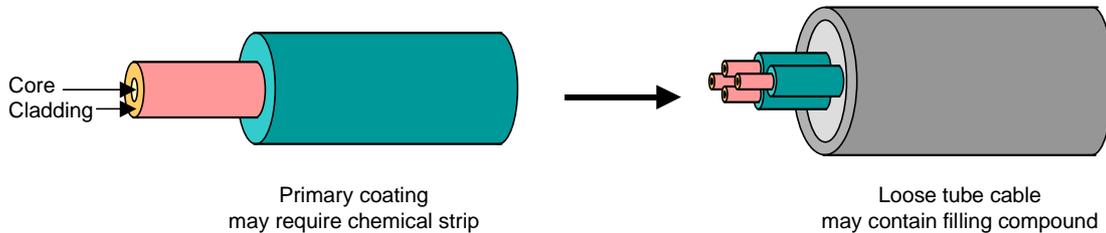
This document provides guidance and does not seek to modify or replace the requirements of any of standards referred to in clause 2 above. There are no specific conformance requirements.

**5 THE HAZARD**

**5.1 Processing chemicals: their use**

The jointing and termination of optical fibre cables generally involves some degree of chemical processing. Chemicals may be required to undertake one or more of the following:

- removal of the primary coating;
- cleaning of the cladding surface;
- removal of filling compounds in loose tube construction cables;
- bonding of optical fibres within connections;
- polishing of optical fibre end-faces;
- cleaning of connecting hardware.



**5.2 Processing chemicals: the problems**

Few processing chemicals are completely safe when ingested or when they come in contact with skin or eyes. Some of the chemicals used may be flammable.

The processing chemicals used may be pre-manufactured or may be prepared on site (as in the case of two part adhesives or certain polishing compounds). In the case of on-site preparation, the constituent parts may be in liquid or powder form. If in powder form their uncontrolled use may present an increased risk of explosion.

It is also important to recognise that chemicals affect some personnel more than others. Certain individuals may have particularly violent reactions to some types of processing chemicals whereas others are left unaffected. Experience has shown that individual suffering from asthma and allergies of all types may be more prone to reaction than others.

## 6 EXISTING STANDARDS

### 6.1 British Standards

The first standard to contain recommendations for the handling of processing chemicals was BS 7718.

Section 4.2 of BS 7718: 1996 states

*"It is essential that the installer should have documented procedures for substances that are hazardous to health. In particular attention is drawn to the Control of Substances Hazardous to Health Regulations: 1988."*

Section 4.2.1 of BS 7718: 1996 states

*"Certain chemicals used to prepare and clean optical fibres may be considered hazardous when inhaled or ingested by mouth. Others such as the epoxide resins used in the production of joints may cause allergic reactions."*

Section 4.2.2 of BS 7718: 1996 states

*"Work should be carried out in well ventilated areas or forced ventilation should be provided. Prolonged and repeated breathing of vapour or fumes should be avoided."*

Section 4.2.3 of BS 7718: 1996 states

*"Precautions should be taken to avoid contact with eyes or skin or clothing."*

Section 4.2.4 of BS 7718: 1996 states

*"Eating and smoking should not be permitted in the vicinity of processing chemicals used since this may represent an enhanced hazard due to potential ingestion or explosion."*

Section 4.2.5 of BS 7718: 1996 states

*"In case of contamination a basic First Aid Kit should be available together with a ready supply of water."*

Section 4.2.6 of BS 7718: 1996 states

*"All chemicals should be stored in clearly and correctly marked containers and should be securely stoppered when not in use. All chemicals should be safely disposed of following use. All chemicals should be safely disposed of upon reaching relevant expiry dates."*

### 6.2 European Standards

[BS] EN 50174-1 was written in CENELEC but large parts of the text were based upon BS 7718. During the development of EN 50174-1 it was felt that the safety issues surrounding the handling of processing chemical should be considered as part of overall safety concerns and did not, therefore, need to be provisioned separately. There is text within BS EN 50174-1 that covers the chemical behavior of the cabling components and installation processes applied to them.

Section 4.3.1 (Products and processes) of [BS] EN 50174-1: 2009 (including A1:2011) states

*"Consideration shall also be given to the potential risks associated with fire and explosion and appropriate steps taken to minimize such risk."*

### 6.3 International Standards

[BS EN] IEC 60825-2:2004 covers more than is suggested by its title "Safety of Laser Products - Part 2: Safety of optical fibre communication systems".

Section D.6.3 of BS EN 60825-2: 2004 states that good practice requires operators to "use only approved methods for cleaning and preparing optical fibres and optical connectors".

## 7 EXISTING LEGISLATION (UNITED KINGDOM)

The United Kingdom legislation covering the handling of processing chemicals is as follows:

- Control of Substances Hazardous to Health: 2002 - COSHH (see clause 9);
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations: 1995 – RIDDOR (see 11.2).

## 8 FIA REQUIREMENTS

For the purposes of this document the Fibreoptic Industry Association has selected the recommendation and requirements of the BS 7718 and BS EN 50174 standards to be the foundation of any further recommendations.

Therefore the following practices **shall** be adopted:

- a) the installer **shall** have documented procedures for substances that are hazardous to health in accordance with the current COSHH Regulations;
- b) processing chemicals used should be in accordance with the relevant manufacturers instructions and if alternatives are used they **shall** have been proven not to release dangerous substances;
- c) all processing chemicals **shall** be stored in clearly and correctly marked containers;
- d) all processing chemicals **shall** be securely stoppered when not in use;
- e) all processing chemicals **shall** be safely disposed of following use;
- f) all processing chemicals **shall** be safely disposed of upon reaching relevant expiry dates;
- g) eating and smoking **shall** not be permitted in the vicinity of processing chemicals;
- h) a basic First Aid Kit **shall** be readily available together with a ready supply of water.

Safe disposal **shall** be achieved by means of a waste disposal organization competent to handle the relevant chemicals. Local authorities are often able to either provide the service or recommend alternative service providers.

In addition:

- i) work should be carried out in well ventilated areas or forced ventilation should be provided;
- j) prolonged and repeated breathing of vapour or fumes should be avoided;
- k) precautions should be taken to avoid contact with eyes or skin or clothing.

## 9 COSHH REGULATIONS

The Control of Substances Hazardous to Health (COSHH) Regulations: 1988 came in to force in October 1989. They were re-enacted with some modifications in the COSHH Regulations 1994. They were been amended in 1996, 1997, 1998 and 1999.

However, the current COSHH Regulations were revised in 2002 (Statutory Instrument 2002/2677). The 2002 revision revokes all previous editions and amendments. Details of the Regulations can be found at [www.opsi.gov.uk/si/si2002/20022677.htm](http://www.opsi.gov.uk/si/si2002/20022677.htm). The information can also be accessed from the FIA web-site ([www.fia-online.co.uk](http://www.fia-online.co.uk)) on the page containing all the TSD downloads.

The Regulations require employers to:

- assess risks to health arising from exposure to hazardous substances;
- prevent or adequately control exposure;
- ensure control measures are used, maintained, examined and tested;
- in some instances monitor exposure and carry out appropriate health surveillance;
- inform, instruct and train employees.

The regulations do not apply to lead, asbestos or where the substance is only hazardous to health due to its radioactive, explosive or flammable properties or because it is at high or low temperature, but they do now cover carcinogens.

As such the regulations serve to encompass most but not all of the FIA requirements and recommendations of clause 0.

1 The COSHH Regulations are supported by the document EH40, published by the Health and Safety Executive, and entitled  
2 "Occupational Exposure Limits".

3  
4 NOTE: EH40 is one of hundreds of documents produced by the HSE. A typical list is to be found on the FIA web-site (www.fia-  
5 online.co.uk) on the page containing all the TSD downloads.

6  
7 EH40 contains two types of exposure limit:

8 Maximum Exposure Limit (MEL)

- 9 • an MEL is assigned to substances which may cause the most serious health effects, such as cancer and  
0 occupational asthma and for which "safe" levels of exposure cannot be determined, or for substances for which  
1 safe levels may exist, but control to those levels is not reasonably practicable.

2 Occupation Exposure Standard (OES)

- 3 • an OES is set at a level that (based on current scientific knowledge) will not damage the health of workers  
4 exposed to it by inhalation day after day.

5  
6 The substances that are hazardous to health include:

- 7 • those listed in the Classification, Packaging and Labelling of Dangerous Substances Regulations as being very  
8 toxic, harmful, corrosive or irritant;
- 9 • a substance that has a MEL;
- 10 • certain micro-organisms;
- 11 • dust, in substantial concentration in air.

12  
13 It is strongly recommended that FIA members that have not yet analysed or implemented their own COSHH programme should  
14 do so as soon as possible. Information and training courses can be readily found using any web search engine and typing in  
15 the keyword "COSHH".

## 16 10 UK HSE INFORMATION

### 17 HSG140 Safe use and 18 handling of flammable 19 liquids (1996)

Provides guidance on the safe use of flammable liquids in general work activities, including batch  
or small scale chemical processing. It is mainly concerned with fire and explosion hazards,  
although some general advice is given on health risks where this may be helpful.

ISBN: 0 7176 0967 7

This is available at <http://www.hse.gov.uk/pubns/books/hsg140.htm>

Contents: Hazards; Precautions; Sources of ignition; Ventilation; Health precautions;  
Maintenance; Housekeeping; Disposal of flammable liquids; Information and training; General  
fire precautions; Emergency procedures; Legal requirements; Hazardous area classification; Fire  
resisting structures.

## 20 11 MECHANISMS OF COMPLIANCE

### 21 11.1 FIA

22 The FIA requirements define the "whats" rather than the "hows". This section provides information on how to meet the  
23 requirements.

- 24 • have in place a review system for new installation operatives to check for excessive reaction to processing chemicals;
- 25 • always follow the manufacturer's instructions when using chemicals, substances or resins;
- 26 • always follow the information given in the COSHH assessments for the products;
- 27 • do not proceed until you have all the information necessary including the COSHH assessments, and you are satisfied that  
28 you understand them;
- 29 • make use of protective plastic gloves or finger cots to protect the skin if required by the manufacturer's instructions or the  
30 COSHH assessment.

1 **11.2 RIDDOR**

2 If you are an employer, self-employed or in control of work premises, you are required under RIDDOR (Reporting of Injuries,  
3 Diseases and Dangerous Occurrences Regulations 1995) to report some work-related accidents, diseases and dangerous  
4 occurrences.

5  
6 Reporting accidents and ill health at work is a legal requirement. The information enables the Health and Safety Executive  
7 (HSE) and local authorities to identify where and how risks arise and to investigate serious accidents.

8  
9 All the following shall be reported:

- 0
- 1 • a death or major injury;
  - 2 • an over-three-day injury (that is when an employee or self-employed person has an accident at work and is unable to  
3 work for over three days, but does not have a major injury);
  - 4 • a work-related disease; and
  - 5 • a dangerous occurrence (this is when something happens that does not result in a reportable injury, but which clearly  
6 could have done).

7 More information can be found at [www.RIDDOR.gov.uk](http://www.RIDDOR.gov.uk).

8  
9 **12 TRAINING**

10 Training of operators in the curricula surrounding City & Guilds 3666 series qualifications will assist in practical implementation  
11 of processing chemical safety in the course of installation tasks.

12  
13 A list of FIA members providing training is available in the Members e-Guide which can be downloaded from  
14 [www.fia-online.co.uk](http://www.fia-online.co.uk).

15  
16 A list of companies meeting the requirements for FIA Approved Training Providers can be accessed at [www.fia-  
17 online.co.uk/eatps02.htm](http://www.fia-online.co.uk/eatps02.htm).