C C S 通 函

Circular

中国船级社

总工办(2003 年)通函第 010 号总第 094 号

2003 年 7 月 1 日（共 1 页）

发：本社验船师及审图人员、船东、船厂及柴油机制造厂、设计单位

关于对 SOLAS 公约（2001 综合文本）第 II-2 章第 15.2.11 条燃油管路接头保护措施解释的检验规定

由于 SOLAS 公约（2001 综合文本）第 II-2 章第 15.2.11 条（94 修正案增加条款）对燃油管路需要隔离和保护的表述含糊不清，IMO MSC77 会议于 2003 年 6 月 13 日通过了关于要求燃油管路采取屏蔽措施的统一解释（MSC/Circ.1083）。根据该统一解释，我社对有关问题具体规定如下，请各检验单位和验船师在检验中遵照执行。

一、IMO 的解释要点（解释原文见附件 1）

油压超过 0.18N/mm^2 燃油管路的法兰接头、阀帽和任何其他凸缘或螺纹接头，如位于高温装置，包括锅炉、蒸气管、排气管、消音器或其他按 SOLAS 公约第 II-2 章第 15.2.10 条*要求予以隔热的设备上方或附近，应安装防溅护罩。

二、执行中有关问题的具体要求

1. MSC/circ.1083 中的“附近”可执行为 750mm 距离以内的范围，但不包括机舱花铁板以下。

2. MSC/circ.1083 中所述“防溅护罩”可以是以下任何一种型式：

.1 按照 IMO MSC /Circ.647 设计的钢质防护罩；

.2 经本社认可的防护胶带或其它防护装置；

除上述以外的其他类型防护装置，需报经总部入级处批准。

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* **系指因燃油系统破损后，燃油可能喷射、滴落到的温度为 220° C 的表面。**

3、根据 SOLAS Reg II-2/15.3 条的规定，SOLAS 公约第 II-2 章第 15.2.11 条的规定也适用于压力润滑系统。检查中也应注意 MSC/circ.1083 对压力润滑系统中相应接头的适用性。

三、本通函适用范围:

1. SOLAS 公约第 II-2 章第 15.2.11 条具有追朔性，对 98 年 7 月 1 日以前建造国际航行公约船舶，应不迟于本通函生效后，对于客船/货船构造安全证书的第一次年检、中间检验或换证检验（取时间早者）时满足本通函要求。
2. 对于 98 年 7 月 1 日以后 2002 年 7 月 1 日以前建造国际航行公约船舶，验船师应按照本通函所述要求进行检查，凡不满足要求的，应在不迟于本通函生效后，对于客船/货船构造安全证书的第一次年检、中间检验或换证检验（取时间早者）时满足本通函要求。
3. 对于 2002 年 7 月 1 日以后建造的国际航行公约船舶，按照 SOLAS2000 修正案相应内容条款执行，本通函第二条中所述要求，同样适用。

四、本通函自 2003 年 7 月 1 日起生效，本社验船师应尽快通知所在地区船东做好相应准备。

附件：1. MSC/Circ.1083
2. MSC/Circ.647
3. Examples

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Ref. T4/4.01

MSC/Circ.1083
13 June 2003

UNIFIED INTERPRETATION OF SOLAS REGULATION II-2/15.2.11, IN FORCE BEFORE 1 JULY 2002*

1 The Maritime Safety Committee, at its seventy-seventh session (28 May to 6 June 2002), with a view to ensuring uniform application of the requirements of SOLAS chapter II-2 containing vague expressions open to diverging interpretations, approved the following interpretation of SOLAS regulation II-2/15.2.11, in force before 1 July 2002, stating that oil fuel piping shall be screened or otherwise suitably protected to avoid, as far as practicable, oil spray or oil leakages onto hot surfaces or into machinery intakes. The requirements have been in force since 1 July 1998 and ships constructed before that date shall comply with regulation II-2/15.2.11 not later than 1 July 2003.

2 **Interpretation of SOLAS regulation II-2/15.2.11**

Spray shields should be fitted around flanged joints, flanged bonnets and any other flanged or threaded connections in fuel oil piping systems under pressure exceeding 0.18 N/mm^2 which are located above or near units of high temperature, including boilers, steam pipes, exhaust manifolds, silencers or other equipment required to be insulated by SOLAS regulation II-2/15.2.10.

3 Member Governments are invited to use the above interpretation as guidance when applying relevant provisions of SOLAS chapter II-2 to fire protection construction, installation, arrangements and equipment to be installed on board ships to which SOLAS regulation II-2/15.2.11, in force before 1 July 2002, applies, in order to fulfil the requirements of the 1974 SOLAS Convention, and to bring the interpretation to the attention of all parties concerned.

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* As adopted by resolution MSC.31(63).

Circular issued by IMO following meetings of the Maritime Safety Committee.

GUIDELINES TO MINIMIZE LEAKAGES FROM FLAMMABLE LIQUID SYSTEMS

Contents

GUIDELINES TO MINIMIZE LEAKAGES FROM FLAMMABLE LIQUID SYSTEMS

1 OVERVIEW

1.1 Purpose

.1 The International Maritime Organization recognizes that oil fuel, lubricating oil and other flammable oil system failures are a major source of shipboard fires.

.2 These guidelines, including appendices, are developed to assist designers, shipyard personnel, engine-room personnel, owners, operators and maintenance personnel to be aware of measures that should be taken to reduce fires originating from machinery space flammable oil systems.

1.2 Scope

.1 The status of the guidelines is that of a recommendation. Attention is drawn to the importance of the design,

construction, testing, installation, maintenance and inspection of systems containing flammable oils in order to reduce the risk of fire.

.2 The guidelines supplement the regulation II/2-15, "Arrangements for oil fuel, lubricating oil and other flammable oils", of the International Convention for the Safety of Life at Sea (SOLAS 74), as amended, and are applicable to new and existing ships, including non-convention ships and ships covered by instruments other than SOLAS Convention.

.3 The guidelines have been developed without prejudice to the requirements of existing SOLAS regulations, MSC circulars, or other IMO safety instruments.

Appendix 1

GENERAL PIPING SYSTEM CONSIDERATIONS

1 Introduction

Based on past experience, it is known that the combination of combustible and flammable materials and sources of ignition is the main cause of machinery space fires. The combustible and flammable materials involved in the majority of cases are oils, i.e., oil fuel, lubricating oil, thermal oil, or hydraulic oil.

There are many potential ignition sources in a machinery space, the most common being hot surfaces, e.g., exhaust pipes and steam pipes. Overheating of machinery, ignition from electrical installations due to short-circuiting or arcing of switchgear and other fault conditions may result in fire. Other frequent ignition sources are those associated with human activities, e.g., smoking, welding, and grinding.

2 Human element

The role of the human element should always be considered and personnel involved should be properly trained and follow established procedures.

3 Inspection, maintenance and repairs

Inspection, maintenance and repairs should be carried out in a professional manner. Owners should ensure that this is done and that the necessary skills, equipment and spares are available.

4 Operations

4.1 Many fires have been caused by pipe connections and fittings working loose. The fuel, lubricating and hydraulic oil pipes, their fittings, connections and securing arrangements should be routinely checked. Care should be taken not to overtighten fittings during these checks.

4.2 When maintenance or repair to the main or auxiliary engines has been carried out checks should be made to ensure that the insulation covering the heated surfaces has been properly replaced. A regular check of the engines should be made to confirm that the insulation is in place.

4.3 Any fuel, lubricating or hydraulic oil leakages should be dealt with promptly. The screening arrangements and pipe securing devices should be kept in good order.

4.4 Serious fires have originated because of a failure to recognize potential hazards, such as burning oil running out of furnace fronts onto the tank top, a spray of oil from a defective gland, joint or a fractured pipe, in areas where these may not be readily noticeable but may be easily ignited. It is essential to avoid the dangerous situation in which a small fire could spread to waste oil in the bilges or on tank tops where it could rapidly spread out of control. Cleanliness is essential for safety and a high standard of cleanliness should always be maintained.

4.5 Woodwork or other readily combustible materials should not be used in boiler rooms and machinery spaces where oil fuel is used. No combustible material should be stored near any part of the oil installations. The use of bituminous or similar flammable compounds should be kept to a minimum in machinery and boiler spaces.

4.6 When repairs, however temporary, are carried out to oil lines, special attention must be paid to fire risks. All repairs, even temporary ones, should be adequate to prevent any danger of leakage and should be to a standard which would endure exposure to fire.

4.7 If there is a leakage of fuel, lubricating or hydraulic oil the

chances of preventing the outbreak of fire or quickly extinguishing one which has started will be greatly improved if all affected or adjacent machinery which may have heated surfaces, including ancillaries, can be immediately shut down. The prevention of further leakage will reduce the probability of fire or reduce the intensity of one which has already started and may help to avoid permanent disablement of the ship.

Appendix 2

FLEXIBLE HOSE AND FLEXIBLE HOSE ASSEMBLIES

1 Scope

SOLAS Regulations II-2/15.2.8, II-2/15.3, II-2/15.4 permit the limited use of flexible pipes in fuel oil, lubricating oil and other flammable oil systems. This appendix provides guidance in complying with these regulations.

2 Application

Flexible pipes or hose assemblies, which are flexible hoses with end fittings attached, should be in as short lengths as practicable and only used where necessary to accommodate relative movement between fixed piping and machinery parts.

3 Design and construction

Hoses should be constructed to a recognized standard and be approved as suitable for the intended service, taking into account pressure, temperature, fluid compatibility and mechanical loading including impulse where applicable. Each hose assembly should be provided with a certificate of hydrostatic pressure testing and conformity of production.

4 Installation

Hoses should be installed in accordance with the manufacturers instruction, having regard to: minimum bend radius, twist angle and orientation, also support where necessary. In locations where hoses are likely to suffer external damage, adequate protection should be provided. After installation, the system should be operated at maximum pressure and checked for possible malfunctions and freedom from leaks. General installation guidelines are given in figures 2.1

and 2.2.

5 Inspection and maintenance

Hose assemblies should be inspected frequently and maintained in good order or replaced when there is evidence of distress likely to lead to failure. Any of the following conditions may require replacement of the hose assembly:

.1 leaks at fitting or in flexible hose;

.2 damaged, cut, or abraded cover;

.3 kinked, crushed, flattened, or twisted flexible hose;

.4 hard, stiff, heat cracked, or charred flexible hose;

.5 blistered, soft, degraded, or loose cover;

.6 cracked, damaged, or badly corroded fittings;

.7 fitting slippage on flexible hose.

It is expected that hose assemblies may need to be replaced several times in the life of the ship. Manufacturer's recommendations should be followed in this respect. However hoses should be replaced in good time whenever there is doubt as to their suitability to continue in service.

FIGURE 2.1 METALLIC FLEXIBLE HOSE GENERAL INSTALLATION GUIDELINES
<<|IMAGE M647FA21.PCX |>>

FIGURE 2.2 NON-METALLIC FLEXIBLE HOSE GENERAL INSTALLATION GUIDELINES
<<|IMAGE M647FA22.PCX |>>

Appendix 3

SPRAY SHIELDS

1 Scope

SOLAS regulations II-2/15.2.11, II-2/15.3 and II-2/15.4, require oil fuel, lubricating oil and other flammable oil piping to be screened or otherwise suitably protected to avoid as far as practicable oil spray. This appendix provides guidance to comply with these regulations.

2 Application

Spray shields are intended for use around flanged joints, flanged bonnets and any other flanged connection in oil pressure systems which are located above the floor plates and which have no insulation in way of the joints. The purpose of spray shields is to prevent the impingement of leaked or sprayed flammable liquid onto a hot surface or other source of ignition. (Refer to appendix 7, guidance for insulation of hot surfaces.)

3 Design

Many types of spray shields are possible and they need not necessarily be attached to the joint, or totally enclose the joint. An example of a spray shield which provides a total enclosure is given in figure 3.1. This spray shield is designed to wrap completely around the joint and is long enough to provide an overlap equal to one-quarter of the joint's circumference. The shield is wrapped around the sides of the flange far enough to cover the heads of the bolts. The finished width is equal to or exceeds "A+B+A". The shield is laced tightly with wire and the overlap is pointed away from potential ignition sources.

FIGURE 3.1
<<|IMAGE M647F31.PCX |>>

4 Inspection and maintenance

Spray shields should be inspected regularly for their integrity and any which have been removed for maintenance purposes should be refitted on
completion of the task.

Appendix 4

JACKETED HIGH PRESSURE FUEL LINES

1 Scope

SOLAS regulation II-2/15.2.9 requires all external high pressure fuel delivery lines between the high pressure fuel pumps and fuel injectors to be protected with a jacketed piping system capable of containing fuel from a high pressure line failure. A jacketed pipe incorporates an outer pipe into which the high pressure fuel pipe is placed forming a permanent assembly. The jacketed piping system is to include a means for collection of leakages and arrangements are to be provided for an alarm to be given of a fuel line failure. Regulation II-2/15.2.12 will require existing ships to retrofit engines having an output greater than 375 kW.

2 Design

Two systems have been successfully used in meeting this requirement, namely, rigid sheathed fuel pipe and flexible sheathed fuel pipe. In either case the sheathing is to fully enclose the pipe and is to resist penetration by a fine spray or jet of oil from a failure in the pipe during service. Also the annular space and drainage arrangements should be sufficient to ensure that in the event of complete fracture of the internal pipe, an excessive build up of pressure cannot occur and cause rupture of the sheath. The suitability of such pipes should be demonstrated by prototype testing. The drainage arrangement should prevent contamination of lubricating oil by fuel oil.

3 Inspection and maintenance

Regardless of the system selected, little additional maintenance or periodic inspection is required to keep the jacketed fuel lines in proper working order. However, jacketed pipes should be inspected regularly and any drainage arrangement which may have been disconnected for maintenance purposes should be refitted on completion of the task.

Appendix 5

BELLOWS EXPANSION JOINTS

1 Scope

This appendix covers metallic bellows expansion joints. Nonmetallic expansion joints are not addressed since their use is generally limited to water systems. To ensure adequate piping system flexibility, bends, loops, offsets or bellows expansion joints are

required in most piping systems.

2 Design

Expansion joints are designed to accommodate axial and lateral movement and should not be used to compensate for pipe misalignment. Design may be based on an acceptable code or on testing of expansion joints of similar construction, type, size and use. Thermal expansion and contraction and the fatigue life due to vibration are also important points to consider. Where external mechanical damage is possible, the bellows should be suitably protected. Each bellows expansion joint should be provided with a certificate of hydrostatic pressure testing and conformity of production.

3 Installation

The bellows expansion joints should be installed in accordance with the manufacturer's instructions and examined under working conditions.

4 Inspection and maintenance

Bellows expansion joints should be inspected regularly and be replaced whenever there is doubt as to their suitability to continue in service.

Appendix 6

FILTERS AND STRAINERS

1 Scope

This appendix covers filters and strainers used in fuel oil, lubricating oil or other flammable oil systems having metallic housings and bodies with a melting point above 930 degrees C. Other housing and body materials are not addressed and their use should be specially considered on a case by case basis in relation to the risk of fire.

2 Design

All pressure retaining parts should be suitable for the maximum operating temperature and pressures. The filter or strainer design and construction should facilitate cleaning and prevent or minimize spillage during maintenance. Filters and strainers should be

designed such that they cannot be opened when under pressure.

3 Installation

Filters and strainers should be located as far away as practicable from hot surfaces and other sources of ignition. They should not be located in positions where spillages could fall onto the flywheel or other rotating machinery parts and be sprayed around. Suitable drip trays should be provided under filters and strainers.

4 Inspection and maintenance

Filters and strainers should be inspected every time they are opened for cleaning and the cover gaskets or seals should be renewed when necessary. Satisfactory seating and tightening of the cover should be verified before the system is put back into service.

Appendix 7

INSULATION

1 Scope

SOLAS regulations II-2/15.2.10, II-2/15.3 and II-2/15.4 require that all surfaces with temperatures above 220 degrees C (430 degrees F), which may be impinged as a result of a fuel oil, lubricating oil and other flammable oil system failure be properly insulated. This appendix provides guidance to comply with these regulations.

2 Purpose

Insulation of hot surfaces is primarily to reduce the risk of fire by reducing temperatures of surfaces below the auto-ignition temperature of oil fuel, lubricating oil or other flammable oils.

3 Installation

Manufacturers' instructions should be followed if available. Permanent insulation should be used to the greatest extent possible. Insulation should be provided with readily removable sections to allow access for normal maintenance. Where the insulation used is oil absorbent or may permit the penetration of oil, the insulation should be encased in steel sheathing or equivalent material.

4 Inspection and maintenance

A regular check of equipment should be made to confirm that the insulation is in place. When maintenance or repair to equipment has been carried out, checks should be made to ensure that the insulation covering the heated surfaces has been properly replaced.

Appendix 8

PRESSURE, TEMPERATURE AND OIL LEVEL GAUGES

1 Scope

SOLAS regulation II-2/15.2.6 contains requirements for oil level gauges. This appendix gives guidance to comply with this regulation and addresses pressure and temperature gauges and similar instrumentation which have featured in many fires aboard ships.

2 Design and installation

All pressure gauges and other similar instruments in oil systems should wherever possible be fitted with an isolating valve or cock at the connection to the pressure take off point. The number of pressure take off points should be kept to a minimum and gauge piping runs should be as short as practicable. Copper pipes may be joined by brazing but soldered connections should not be used in oil systems.

Temperature gauges in oil systems should be fitted into a fixed pocket (thermowell).

Oil level gauges should be of a design which is approved for the intended service. The installation of level gauges into the lower part of oil tanks is prohibited under SOLAS for passenger ships, and is discouraged for cargo ships. Suitably protected gauges having heat resistant flat glass of substantial thickness and self-closing fittings at each tank connection may be fitted to oil tanks in cargo ships. Round gauge glasses are not permitted.

3 Inspection and maintenance

Copper gauge piping is particularly sensitive to work-hardening. All gauge pipes and fittings should be regularly inspected and

maintained in good working order.

Appendix 9

PIPE CONNECTORS, JOINTS, HANGERS AND SUPPORTS

There are many different types of pipe connectors and joints, some of which are not considered suitable for oil systems. In general, flanged joints conforming to recognized standards should be used. Compression fittings and other types of connectors should be approved for the intended service. The number of joints should be kept to a minimum in oil systems.

Pipes in oil systems should be adequately supported. Supports or hangers should not be used to force alignment of piping or system components where the alignment is incorrect. Any hangers or supports which have been removed for maintenance purposes should be refitted when the task is completed.

Guide:
See also MSC/Circ.851, GUIDELINES ON ENGINE-ROOM OIL FUEL SYSTEMS

When the Secretariat issued this Circular, the following introductory remarks were given:

MSC/Circ.647
6 June 1994

GUIDELINES TO MINIMIZE LEAKAGES FROM FLAMMABLE LIQUID SYSTEMS

1 The Maritime Safety Committee, at its sixty-third session (16 to 25 May 1994), approved Guidelines to Minimize Leakages from Flammable Liquid Systems, set out at annex to the present circular, as prepared by the Sub-Committee on Ship Design and Equipment at its thirty-seventh session.

2 Member Governments are invited to bring the Guidelines and the measures that should be taken to reduce fires originating from machinery space flammable oil systems to the attention of designers, shipyard personnel, engine-room personnel, owners, operators and maintenance personnel.

ANNEX

Responsible:MTP880

1. CONSTRUCTION: The spray shields should be made of metallized fiberglass cloth (2-3 layers, minimum) underneath a protective jacket of fiberglass cloth and fastened by either wire drawstrings or using lacing hooks or rings.

For shields secured by drawstrings, the sides of the shield shall be folded over to form a tunnel to enclose the drawstring, and stitched with fiberglass thread. There shall be ample overlap in the seam to allow wire to be run through the entire length of the shield. The seam on both sides of the shield shall be intact.

For shields secured using lacing hooks or rings, lacing hooks or rings made of stainless steel shall be attached to the metallized cloth using a wire stitch machine, backup washers and 18 gauge (or stronger) stainless steel wire.

2. INSTALLATION: A properly shielded joint will not permit a flammable fluid spray to be produced or an atomized mist to be released. Leaks will be evidenced by oil dripping from the bottom of the shield.

The shield shall be centered on the joint, wrapped snugly around the sides of the joint, and laced tightly with wire. For shields secured using lacing hooks or rings, the shield should be secured about the joint using the same wire to lace the ends together.

The overlap shall be pointed away from potential ignition sources, and personnel, and to the extent possible, with the overlap oriented downward to prevent dirt accumulation, as shown in Fig. 1 below.

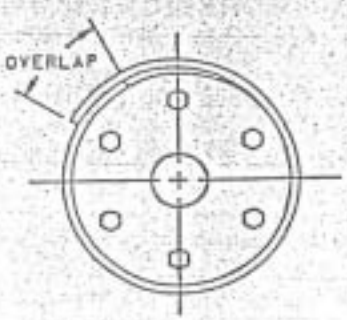
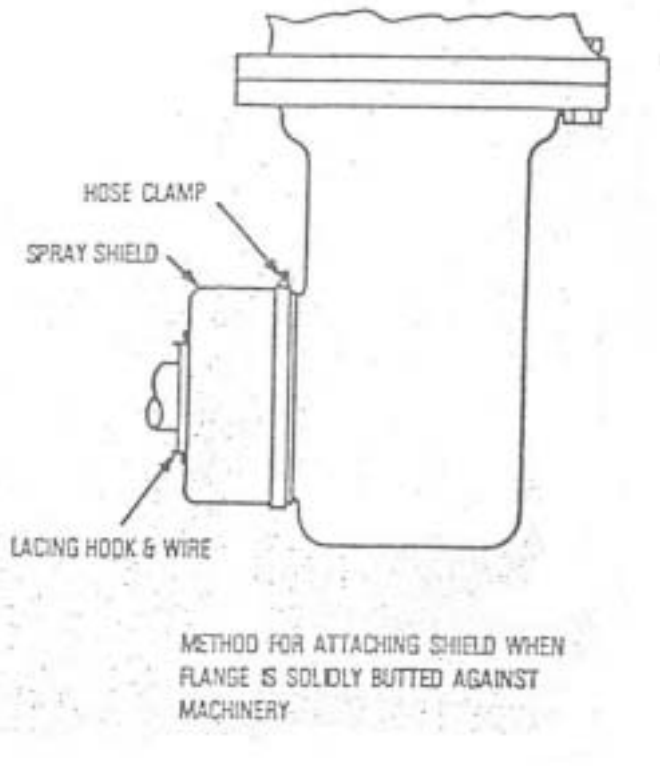
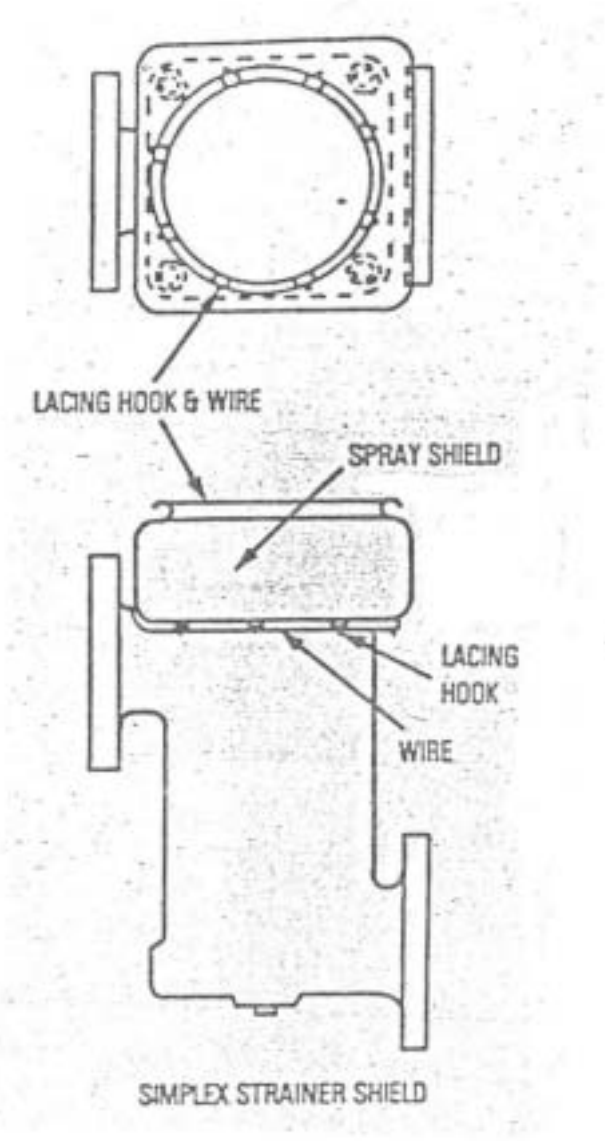


Figure 1

There shall be no holes or openings of any kind in the shield other than those made by sewing or the attachment of lacing hooks or rings.

In cases where flanges are solidly butted against machinery, such as lube oil piping flanges mounted on reduction gear casings, tightly secure the shield to the flange by fitting a metal band or hose clamp arrangement around the shield, over the perimeter of the flanged joint. Recommended installation configurations are depicted in figure 2 .





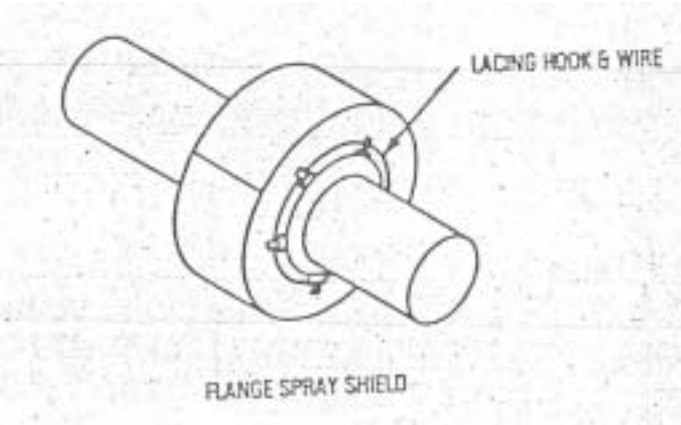


Figure 2-1 Approved Spray Shield Installations (Sheet 1 of 2)

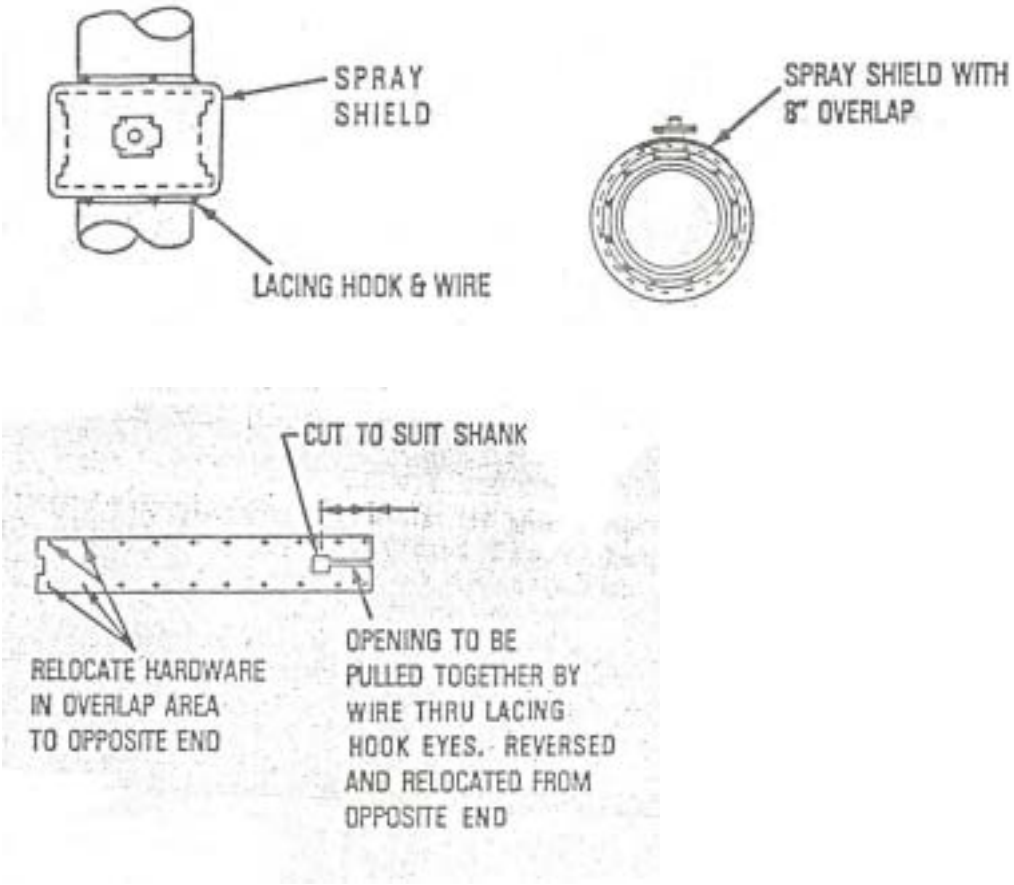


Figure 2-2 Approved Spray Shield Installations (Sheet 2 of 2).

2.1 Drawstring Installation:

(a) Cut two lengths of lacing wire 150 mm longer than the length of the shield.

(a) Cut away seam material on each side of overlap and insert lengths of wire into seams on both sides of shield until the wire emerges at the other end.

(b) Wrap shield around flange with aluminized cloth on the inside.

(c) Fold shield edges down over flange bolts.

(d) Twist ends of wire together sufficiently to maintain tightness, cut excessive wire and fold down to be flat on shield.

2.2 Lacing Hooks or Rings:

(a) Cut away seam material on each side of overlap. There shall be a 16 mm space between the end of shield overlap and the first pair of lacing hooks/rings.

(b) Remove lacing hooks that would be under the overlap.

(c) Wrap shield around flange with metallized glass cloth on the inside.

(d) String wire through hooks on both sides and pull tight to secure shield in place.

(e) Twist ends of wire together sufficiently to maintain tightness, cut excessive wire and fold down to be flat on shield.

6. INSPECTION: Spray shields should be examined frequently for general condition and evidence of leaking joints. Loose wires or frayed areas on the shield indicate the need for adjustment or replacement. While preparing to adjust or replace a spray shield, the cause of the condition should be determined and corrected or eliminated. Any evidence of leaking necessitates immediate removal repair of the leaking piping joint, and installation or a new spray shield. CAUTION: Ensure that spray shields soaked with flammable fluids are disposed of appropriately.