

AIRTURBO LAMPS



- Safe Compressed Air Power
- Reversed Air Safety Feature
- Pressurised and Purged System
- 55 Watt Long-life Halogen Bulb
- Economical 0.25m³/min Consumption
- Interchangeable Bay/ Reflector Heads

Airturbo A-0444

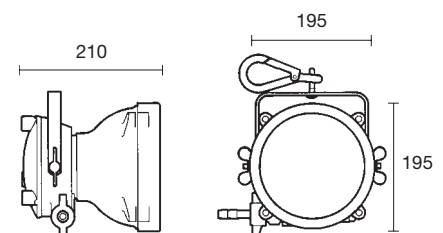
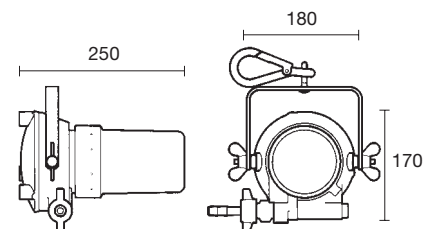
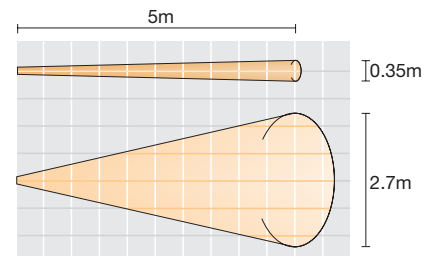
55w with ball glass for all round illumination
Peak luminous intensity at 2.5m radius **2lux**

Airturbo A-0445

55w with polished reflector spot beam (approx 4°)
Peak luminous intensity at 5m **900lux**

Airturbo A-0445

55w with matt reflector flood beam (approx 30°)
Peak luminous intensity at 5m **40lux**



The Airturbo lamp is the longest established product still in manufacture today, although it has been upgraded many times over the years. Originally used in the Coal Mining Industry to meet the rigorous requirements of underground explosion proof lighting, it is now BASEEFA certified for use in zones 1 and 2 industrial hazardous areas. Today applications are in the Oil and Petrochemicals Industries, for tank cleaning and pipeline inspections, offering a safer alternative to low voltage lighting in dangerously wet conditions or in flammable gases and vapours. Once connected to a suitable air supply, continuous output of high quality general illumination is produced, even under water.

Airturbo Lamp A-0444 is fitted with a Bay Light type Head to the generator providing all round illumination when the lamp is suspended above the work area. The moulded ball glass containing the bulb is surrounded by a protective polycarbonate dome.

Airturbo Lamp A-0445 provides a flood beam giving a well diffused 30° angle of light with the standard matt reflector, or with a polished reflector, a highly concentrated spot light. The lamp has a 15 mm toughened glass lens for high impact strength and pressure resistance.

The lamp housings are spark free cast brass with a forged brass safety hook, all nickel plated. The generator is a compressed air driven turbo-alternator of simple

design and robust construction. A gun metal impulse turbine wheel produces the energy to power the 12v 55w Tungsten Halogen bulb.

A clean dry air supply is a condition of certification and essential for the efficient running of these lamps. Deposits of dirt on the inside of the lens will adversely affect the level of illumination, but if needed, suitable air-line filters can be supplied with the lamps. Another mandatory requirement of safe use is anti-static hose, designed to avoid a dangerous build up of static electricity.

The Airturbo lamp has many inherent safety features recognised in the BASEEFA Approval; an effectively pressurised and purged system, a protective curtain of air from the exhaust ports, instant cut-off of the lamp if the lens is broken and cooling of heat generating components.

All the lamps are run in, tested and set to the necessary output prior to despatch, full maintenance instructions and lock keys are supplied with every Airturbo unit. In-house training on the maintenance and repair of air lamps is available.

Airturbo Compressed Air Powered Safety Lamps		
<i>Technical Specification</i>		
Product reference	A-0444	A-0445
Product description	Safety bay lamp, compressed air powered	Safety flood lamp, compressed air powered
Code	Ex s II T6	
Apparatus standard	SFA 3009:1972	
Type of protection	"s" special protection	
Area of classification	Zones 1 and 2, gas groups IIA, IIB and IIC	
Temp. classification	T6	
Ambient temperature	-20°C to +40°C	
Certification	BASEEFA Certificate No. Ex 78209X*	
Enclosure	Nickel plated brass and gun-metal	
Lens	Ball glass/plastic dome	Toughened glass (15mm)
Beam type	All-around 360° illumination	Flood (as standard) or spot to order
Light source:	Pt. no.	A-1130
	Type	Tungsten halogen filament bulb
	Volts	12v
	Watts	55w
	Output	1000lm (at 12v)
	Life	up to 1000hrs (at 12v)
Power source:	Type	Compressed air driven turbo-alternator
	Air pressure	4.0-8.0 bar
	Consumption	0.25m³/min
Ingress protection	Once pressurised, may be used under water	
Weight	8.2kg	12.5kg
*Special certification conditions	A clean, dry air supply must be used. Supply hose must be anti-static.	

Note: All information has been gathered under laboratory conditions, the user must regard the values given as approximate. The Company reserves the right to alter product specifications without prior notice.

Accessories



The Airturbo and Turbolite lighting systems are very flexible and can be adapted to all sorts of confined space applications varying from huge storage tanks to small sewers.

The Lamps can be suspended from bracing or spars, sited on platforms or mounted on tripod stands to illuminate the entry and working area as effectively as possible.

As previously emphasised, there are two important conditions of Certification which must be observed in any installation:

1. The supply hose must be of an Approved Anti-Static Type such that the electrical resistance between couplings must be within the limits of 10^4 ohms (Min.) and 10^8 ohms (Max.)
2. The compressed air supply should be clean, dry and uncontaminated.

Folding Tripod Stand A-300

This very strong and convenient tripod stand is available for mounting airlamps in such a way that illumination can be angled in most directions. The lamp can be clamped to the tripod head without the need of any tools. When not in use the tripod can be folded away for easy storage.

Anti-Static Compressed Air Hose (A-179 and A-180)

This special 12mm bore single braid hose is manufactured from an anti-static compound and is available in 18.3 metre (A-179) or 36.6 metre (A-180) lengths. Stainless Steel Hose Clips are provided but air line couplings are not for reasons of possible incompatibility.

Air Line Filters

A simple automatic drain airline filter (A-184) can be supplied, but where there are major difficulties in achieving the air quality required an ultra high efficiency filter system (A-186) is recommended, and, as with the simple filter, has the throughput capacity sufficient to power either two Turbolites or six Airturbo Lamps.

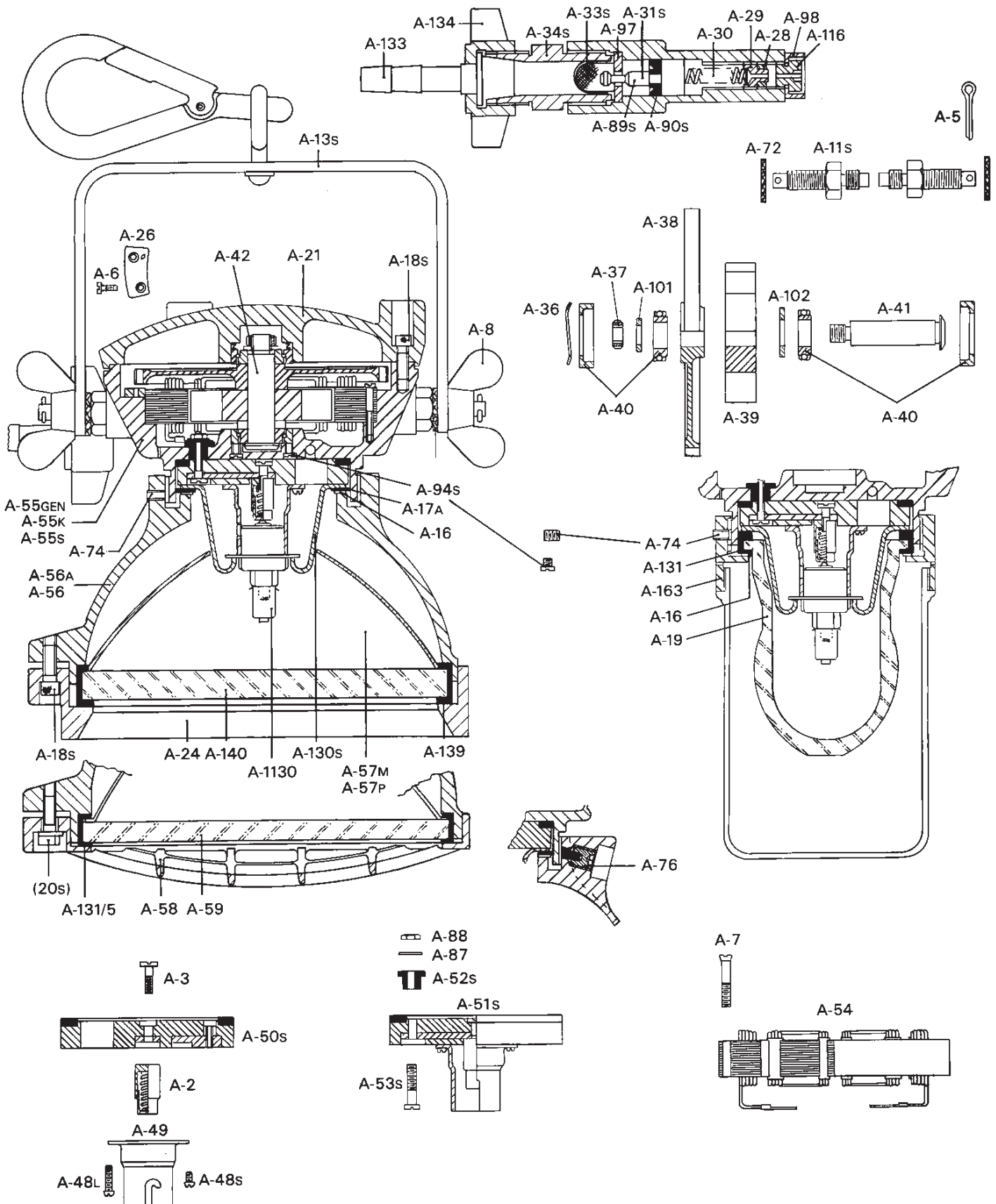
Tools and Spares

All of these items are available off the shelf and in special circumstances can be express shipped the same day in order to meet an urgent demand.

Repairs

The Company offers a repair and refurbishment service for all its compressed air safety lamp products with the aim of completing these tasks within 7 days of receiving confirmation instructions. Repair instructions and procedures are written in accordance with ISO 9000 Standards

AIRTURBO LAMPS Maintenance Nos. 0444/U/M and 0445/U/M Instructions



Introduction

The 'Airturbos' are 55 Watt Tungsten Halogen compressed air operated safety lamps. No. 0444/U/M is fitted with a 'Bay Light' head for general illumination. No. 0445/U/M has a Reflector Head with either a Matt or Polished Reflector providing wide angle or concentrated levels of lighting. They are certified by BASEEFA (Ex 78209X/005) to Special Protection — SFA 3009 for safe use in Zone 1 and Zone 2 Hazardous Areas, with a Temperature Classification — T6. This covers safe use in up to T6 range of explosive gases and vapours as listed in 'Code of Practice BS 5345 Part 1 : 1989.'

Quality Assurance Standards to BS 5750 : Part 2/ISO 9002 apply to manufacture, assembly and final inspection and testing of all lamp units.

Operating Instructions

The operating pressure of the 'Airturbo' is between 4.5 and 8 bar.

The pressure regulator of the lamp unit compensates for the above range of input pressures as well as fluctuations in airline pressures.

WARNING: DIRT OR MOISTURE FROM UNFILTERED AIR WILL DEPOSIT ON THE INSIDE OF THE GLASS DISC OR BALL GLASS REDUCING LIGHT OUTPUT. THE REFLECTOR HEAD AND BALL GLASS OF THE LAMPS ARE PRESSURISED ENCLOSURES.

Maintenance of 'Airturbos'

The maintenance and repair of 'Airturbo' lamps should only be undertaken by trained or qualified electrical fitters or engineers. Lamps should be cleaned and tested every three months if in regular use, and every six months where use is less frequent.

As a guide, reference may be made to:

The Coal Mines (Pneumatic Lighting Unit) Order 1948, No. 1918. The use of incorrect spare parts and the improper fitting of spare parts will invalidate certification and the Manufacturer's Guarantee. Full details of maintenance and repair procedures follow. If in doubt contact the Company.

Bulb Changing

The 12 Volt 55 Watt Tungsten Halogen Bulb should be handled with care, if it becomes misted or dirty it should be cleaned with a soft cloth, moistened with methylated spirit.

No. 0445/U/M

To gain access to the Bulb, the Reflector Head Assembly A-56A is unlocked by releasing Lockscrew A-74, which allows it to be unscrewed from the Generator Housing. Remove together the Metal Washer A-16, Rubber Washer A-17A and the Air Inlet Reflector A130s. Fit the Spare Bulb in the Bulbholder A-49 and replace other parts in the reverse order: these parts will be clamped in position when the reflector head is screwed back onto the Generator Housing. Ensure Lockscrew A-74 is refastened. Care should be taken when fitting the Bulb to ensure that the flange of the Air Inlet Reflector does not make contact with the Generator Housing. This could only happen with lamps made before June 1971. (The date of manufacture is on the Approval plate.) If, with the bulb in place, there is contact, a new air inlet reflector should be fitted.

No. 0444/U/M

Lockscrew Ring/Guard A-163 for Ball Glass is removed from the Generator Housing and the Bulb replaced in much the same manner except that Rubber Washer A-17A is not fitted or required in this instance.

When replacing the Reflector Head/Bay Light Head, screw down with only sufficient torque to seal the pressurised enclosure. The seals are internal by way of A-131 Grooved Rubber Washer for Ball Glass or Rubber Washer A-17A for Reflector Head. Ensure Metal Washer A-16 is uppermost on the Rubber Washer before re-fitting either type of Head. In both cases refasten Lockscrew A-74.

Replacing/Cleaning Glass Disc — No. 0445/U/M

THE REFLECTOR HEAD OF THE 'AIRTURBO' LAMP IS A PRESSURISED ENCLOSURE

The Lens Ring A-24 which retains the 15 mm Glass Disc A-140, is removed by unfastening the four high tensile Stainless Steel Fastening Screws A-18s. The Reflector and Glass Disc are mounted together within the Grooved Rubber Washer A-139, and these three items should be separated for cleaning/replacement as necessary.

The Grooved Rubber Washer in particular, should be inspected for any damage, as this provides a pressurised seal on both faces of the Reflector Head enclosure.

When re-assembling ensure that this Washer is evenly fitted on both faces of the Glass Disc and Reflector.

Refastening of this assembly into the Reflector Head must follow normal good practice in fastening down a flanged joint; the 4 Screws A-18s should be fastened down opposite and evenly, only sufficiently to make an air-tight seal.

INCORRECT FASTENING OF THESE SCREWS CAN CAUSE:

- The toughened Glass Disc to shatter.
- The Grooved Rubber seal to become damaged.
- Weakening of the Fastening Screws.
- Stripping of the threads in the Reflector Head.

NOTE: Lockwashers are no longer fitted with Fastening Screws A-18s.

Replacing/Cleaning Ball Glass No. 0444/U/M

After cleaning/replacement as necessary, the Ball glass A-19 together with Grooved Rubber Washer for Ball Glass A-131 is fitted in the Generator Housing recess first, followed by Metal Washer A-16 then the Lockscrew Ring/Guard A-163 is screwed firmly down and locked as previously described.

Lubrication

The magneto type Bearings require a medium grade non-emulsifying grease, which should be applied after every 1000 hours running time. Grease nipples are no longer fitted to the Generator Housing and Cover as this encouraged over greasing. Access to the Bearings requires removing just the three Fastening screws A-18s in the Housing Cover A-21. Should the Housing Cover resist removal, then the edge of the rim should be tapped with a mallet at several points to free the joint.

The Rotor Complete A-42 can then be lifted out of the open Generator Housing. This may require either a pair of pliers or the aid of Key A-146 on Nut for Rotor Shaft.

A smear of grease can then be applied to the caged Bearings on each end of the Rotor Shaft and in the races situated in the Generator Housing and Housing Cover respectively. Before replacing the Rotor Assembly make sure that no small ferrous objects have been attracted to the Magnet. Care must be taken when replacing the Assembly to avoid fingers becoming trapped between the Turbine Wheel and the Generator Housing as the Magnet is attracted to the Stator.

Replacing Bearings

Remove Nut for Rotor Shaft A-37 on the Rotor Assembly, Washer A-101, first Bearing A-40, Turbine Wheel A-38, Magnet A-39, Rotor Spacer A-102 and finally second Bearing A-40 from the Rotor Shaft A-41. These parts should be cleaned and replaced in reverse order together with new bearings.

Underneath the outer race of the Bearing in Housing Cover A-21 is fitted a Waved Spring Washer A-36. This ensures the correct loading of the bearings. It is important to check that the Waved Spring Washer is in good condition before fitting a new outer Bearing race. The other outer Bearing race is a tight fit in the Generator Housing:

To replace this Bearing race, first remove the Lamp Head and then the Rotor Complete A-42 from the Generator Housing. Unscrew the two Nuts for Stator Terminal A-88 and push through the two Connecting Screws A-53s. These screws are insulated and sealed by Insulating Bushes A-52s, and carry the power from the Stator Winding A-54. If removed, it is essential to ensure that the Insulating Bushes are in good condition, because as well as providing electrical insulation, they also provide a pressure seal between the Reflector Head and the Generator Housing.

The Contact Plate A-51s can then be extracted and the two Screws for Bearing Race A-94s can be removed so that Forked Tool A-147 can be inserted through the holes and used for tapping out the Bearing Race. Clean the bearing recess before fitting a new Bearing Race in position.

The Bearings and races should be lubricated with a smear of grease. When replacing the Housing Cover A-21, spring lift will indicate that the Bearings are properly loaded.

Magnet

The six pole magnets A-39 are ground and balanced before being magnetised. They have a long life but should be kept clean and free from iron filings and ferrous objects. The magnet should be a light sliding fit onto the rotor shaft and should never be tapped or hit with a hammer as this can affect the magnetism and may cause sharp pieces to break off. Avoid close proximity of any large ferrous objects.

Air Regulator Assembly

All the Air Regulator parts are fastened in position by Connecting Piece A-34s with Air Filter Sieve A-33s and should not be disturbed unless the Regulator ceases to function correctly. While ever fastened, the Connecting Piece also maintains the alignment of the Air Regulating Plate A-97. Removal of these parts gives access to Pressure Regulating Piston complete A-31s and the Spring for Piston A-30.

These parts are withdrawn from the front of the piston chamber and should be cleaned and examined for wear and damage and replaced as necessary. In particular the lip of Rubber Seal for Piston A-90s should be checked for damage or wear.

Before re-assembly of the Piston parts, the Regulating Screw A-29 and Lock Nut A-28 must be removed from the other end of the piston chamber. Hexagon Lock Key A-171 will be needed to remove Lockscrew A-116 and Pair of Pressure Regulating Keys A-68 to remove Regulating Screw and Lock Nut.

The Regulating Screw A-29 and Lock-Nut A-28 should then be loosely fitted just inside the end of the piston chamber, ready for resetting the pressure regulator and hence the generator electrical output.

Setting Generator Voltage Output

Airturbo Setting and Testing Device A-200 will be required for correct setting of the Generator output, adjusted by re-setting the Air Regulator. The Setting and Testing Device is fitted on the Generator in place of the Head and all other associated parts, including the Bulb, fastened and sealed with Screwed Handle A-189. The Bulb is fitted and fastened by means of a clip in the Bulbholder on top of the Setting and Testing Device and Voltmeter connections are made to the two terminals.

Couple up and turn on a CLEAN and DRY supply of compressed air to the Lamp, checking first that no air is escaping past the Pressure Regulating Piston by sealing the exposed hole with the thumb, an escape will be indicated by an increase in Turbine speed and Voltage reading. In such circumstances the Rubber Seal for Piston A-90s should be replaced as above, with a smear of grease to assist assembly.

Using the Pair of Pressure Regulating Keys A-68, screw in Regulating Screw A-29 to increase voltage output or screw out to decrease Voltage output. When the Voltage output is steady at between 11.5 and 12.0 Volts, turn the air supply off and on several times, allowing the Turbine to achieve maximum speed each time and make any minor adjustments if necessary. Leave the Lamp running for 15 minutes before making any final adjustments to the regulating screw. The setting can now be locked with Lock Nut A-28 using the outer sleeve of the Keys and finally, replace Lockscrew for Piston Chamber A-116 together with Collar A-98 to secure the setting.

Use of 'Airturbo' in Hazardous Areas

The Introduction details the Hazardous Area Zones of Use and the Temperature Classification of the 'Airturbo' but users are advised to consult BS 5345 Part 1 — 1989 'Code of Practice for the Selection, Installation and Maintenance of Electrical Apparatus for use in Potentially Explosive Atmospheres', before operating in a Hazardous Area.

Conditions of Certification are that clean, dry compressed air must be used to power the lamps through anti-static air hose of resistances between connections, 10^9 ohms maximum and 10^4 ohms minimum, to NCB Specification PT82 or BS 2050.

These lamps are not solidly earthed and when used in Tankers the precautions against the hazards of static electricity in cargo tanks, as set out in the International Chamber of Shipping 'Tanker Safety Act (Petroleum)' as amended or 'The Oil Tanker and Terminal Safety Guide', 1977 edition, should be observed.

Replacement of Bulbs or any other spare parts must be done in a Non-Hazardous Area.

Major changes in design are permitted as Variations of Approvals but may otherwise be made without prior notice.

