

Rec'd
7/30/98



Grinnell®

FIRE PROTECTION SYSTEMS COMPANY

835 Sharon Drive
Westlake, Ohio 44145

A tyco INTERNATIONAL LTD. COMPANY

July 20, 1998

Susan Green
Mail Stop T8F5

Office of Nuclear Materials Safety and Safeguards
United States Nuclear Regulatory Commission
Washington D.C. 20555

Re: Application to amend licenses.

Dear Susan Greene,

Please find the enclosed set of documentation for amendments and changes to our registration and licenses to possess and distribute smoke detectors.

Section One: Registry No. NR-0776-D-101-E dated September 16, 1994.

Section Two: License to Possess, 34-23772-01, amendment no. 02, dated 4/15/1992

Section Three: License to Distribute, 34-23772-02E amendment 02, dated 8/26/96.

Please allow me to provide some background information that may assist you in processing the request for changes to our license.

Grinnell Corporation filed a certificate of merger on December 31, 1996 to merge with Thom Automated System Inc., Grinnell Corporation being the surviving corporation. At that time, a change of ownership application was not filed with the Nuclear Regulatory Commission as required and all associates with NRC responsibilities left the company.

A new RSO with licensing responsibilities was trained in early 1997. Due to the fact that we ceased all shipments of MF Series and Nittan Ion detectors on 7/18/96 and 10/11/96 respectively, the RSO felt that he did not have to amend our license. Upon his departure and my subsequent arrival, I have spent part of the ensuing time becoming familiar with the regulations, preparing these applications and arranging training for Radiation Safety Officers.

Section One of the application details changes to Registry No. NR-0776-D-101-E. I have included old copies of the attachments referenced in the registry. All of the attachments no longer apply to the license due to the fact that the MF Series and Nittan detectors are no longer manufactured, and the personnel who filed the documents are no longer with the company.

Section Two of the application provides details required for the change of ownership for the Materials License 34-23772-01. The information provided supersedes the enclosure listed in item 18, Application dated May 25, 1995.

Section Three of the application provides details for the safety evaluation of a new Ion detector series designed and manufactured by another Tyco International Limited subsidiary, *Tyco Electronic Products Group*. It is our hope that an in-depth evaluation of the detector is not required due to the fact that the ion chamber used in the detector is the same model used in the MF series and Nittan detectors manufactured by Amersham International plc who is registered with the NRC, number NR136S174U.

I have reviewed all the enclosures referenced on the license and feel that they no longer apply to the license. The procedures and labels referenced in the documents are outdated due to the change of ownership and the obsolescence of the detectors referenced in the license.

I have included two Lo-Pro series high performance optical detectors with this application. They are of similar construction to the Ion Chamber detectors. If this is not satisfactory, please let me know.

I have included a check for 1000.00 to cover the costs associated with this amendment application. If additional money is required, please let me know. I have provided summary data as part of this introduction. If you need further assistance or information, please do not hesitate to call me at 1-440-871-990 or fax me at 1-440-871 1870.

Thank You,



Reed Timko
Manager of Test Systems

SUMMARY DATA

Date: July 20, 1998

Applicant: Grinnell Fire Protection Systems Co.
835 Sharon Drive
Westlake, Ohio 44145

Contact: Reed Timko
Tel: 1-440-871-9900 ext 5122
Fax 1-440-871-1870

Device type: Smoke detectors

Model Lo-Pro Series 612I and 912I

Manufacturer: Tyco Electronic Products Group
160 Billet Road
Walthamstow London
E17 5DR
United Kingdom

Radioactive Source: Model DSC.A6, DSC.A3 and DSC.A2
Manufactured by:

Amersham International plc
White Lion Road
Amersham Buckinghamshire
HP9 9LL
United Kingdom

NRC Registry AMM 1001H No. NR136S174U

Radionuclides Americium 242
33.3 kBq (0.9 uCi)

Leak Test Frequency Contains less than 10 microcuries of alpha emitter, leak test not required.

Principle Use Code P (ion generators, smoke detectors)

General:	<p>The Lo-Pro series detectors are smoke detectors using an ionisation chamber sensing element and are intended for use in commercial and industrial fire detection systems.</p> <p>All detectors in the Lo-Pro seires use the same mechanical construction, and different performance characteristics are obtained by variations of the electronic circuitry.</p>
External radiation Levels	<p>Details of levels associated with the chamber assembly are provided in the technical data describing the Amersham DSC.A3</p>
Maintenance and Service	<p>The recommended maintenance for the Lo-Pro series is to remove loose dust using the suction of a vacuum cleaner. Users and maintenance Personnel are instructed not to dismantle the detectors for cleaning.</p>
Prototype Testing	<p>Prototype testing of the source performed as part of registry.</p> <p>Prototype testing of Lo-Pro detectors performed by the Loss Prevention Certification Board in the United Kingdom.</p>
Quality Assurance:	<p>The detectors are designed, manufactured and distributed by companies certified to ISO 9001: 1994 standards. Reference Certificate Numbers FM967 and A5562.</p>



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Contact: Reed Timko
Tel: 1-440-871-9900 ext 5122
Fax 1-440-871-1870

Device type: Smoke detectors

Model Lo-Pro Series 612I and 912I

Manufacturer: Tyco Electronic Products Group
160 Billet Road
Walthamstow London
E17 5DR
United Kingdom

Radioactive Source: Model DSC.A6, DSC.A3 and DSC.A2
Manufactured by:

Amersham International plc
White Lion Road
Amersham Buckinghamshire
HP9 9LL
United Kingdom

NRC Registry AMM 1001H No. NR136S174U

Radionuclides Americium 242
33.3 kBq (0.9 uCi)

Leak Test Frequency Contains less than 10 microcuries of alpha emitter, leak test not required.

Principle Use Code P (ion generators, smoke detectors)

General:	The Lo-Pro series detectors are smoke detectors using an ionisation chamber sensing element and are intended for use in commercial and industrial fire detection systems.
	All detectors in the Lo-Pro seires use the same mechanical construction, and different performance characteristics are obtained by variations of the electronic circuitry.
External radiation Levels	Details of levels associated with the chamber assembly are provided in the technical data describing the Amersham DSC.A3
Maintenance and Service	The recommended maintenance for the Lo-Pro series is to remove loose dust using the suction of a vacuum cleaner. Users and maintenance Personnel are instructed not to dismantle the detectors for cleaning.
Prototype Testing	Prototype testing of the source performed as part of registry.
	Prototype testing of Lo-Pro detectors performed by the Loss Prevention Certification Board in the United Kingdom.
Quality Assurance:	The detectors are designed, manufactured and distributed by companies certified to ISO 9001: 1994 standards. Reference Certificate Numbers FM967 and A5562.

SECTION ONE

CONTENTS:

1. Copy of current Registry
2. Details of Changes
3. Attachment A1-1 – Correspondence dated October 25, 1989
4. Attachment A1-2 – Correspondence dated May 31, 1990
5. Attachment A1-3 – Correspondence dated July 20, 1990
6. Attachment A1-4 – Correspondence dated August 26, 1993
7. Attachment A1-5 – Correspondence dated February 10, 1994
8. Attachment A2-1 – Correspondence dated March 14, 1990
9. Attachment A2-2 – Correspondence dated August 9, 1990
10. Attachment A2-3 – Correspondence dated October 10, 1991
11. Attachment A2-4 – Correspondence dated April 25, 1994
12. Attachment A2-5 – Correspondence dated August 18, 1994
13. Attachment A3 – Correspondence dated November 15, 1990
14. Attachment A4 – Correspondence dated March 13, 1992



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FIRE PROTECTION SYSTEMS COMPANY

835 Sharon Drive
Westlake, Ohio 44145

A **tyco** INTERNATIONAL LTD. COMPANY

July 20, 1998

Application to amend license 34-23772-02E Amendment No. 02

GENERAL

The purpose of this application to amend the distribution license 34-23772-02E, Amendment 02, is to add the Lo-Pro Series Ion Detectors to the license and to remove the previous detectors which are no longer manufactured.

INTRODUCTION

The Lo Pro series detectors, 612I and 912I are smoke detectors using an ionisation chamber sensing element are intended for use in commercial/ industrial fire detection systems. The ionisation chamber is comprised of a sealed source of Americium 241 with a maximum activity of 0.9 microcuries. The source is purchased complete from Amersham International plc based in the United Kingdom and is listed under NRC registry NR136S174U as model AMM 1001H configuration DSC.A2.

The design of the Lo-Pro series detectors was carried out by Thorn Security Limited, doing business as Tyco Electronic Products Group in the United Kingdom. The detectors have been listed with Underwriters Laboratories against standard UL268, file number S466 category UROX.

The Lo-Pro Series is intended to replace the MF Series detectors covered by the existing license. Both series detectors share common design traits. The Americium 241 source is the same in both detector series, the MF series ion chamber configuration was assembled during the detector manufacturing process. The Lo-Pro series detectors utilize a completed ion chamber assembly supplied by Amersham.

The housing assemblies of the MF series and Lo-Pro series detectors are designed as snap together assemblies completely enclosing the ion chamber. Both series detectors passed the BS 5445 Part 7 standard testing for vibration, corrosion, impact and shock testing in the United Kingdom by the Loss Prevention Certification Board. Test reports of the Lo-Pro series detectors are included in this application.

Requirements of 10 CFR 32.26

1. *Description of the product and its intended use.*

The 612I and 912I (Lo-Pro) series smoke detectors employ an ionization chamber sensing element and is intended for use in commercial/industrial fire detection systems. The 612I is a conventional non-addressable smoke detector, while the 912I is an addressable smoke detector. The detectors are used in ceiling or wall mount applications in plug in bases which are wired to suitable control and indication equipment. These detectors are not intended for sale to the general public for domestic applications.

2. *Type and quantity of the byproduct material in each unit.*

The Lo-Pro series detectors use an Americium 241 source of 0.9 microcuries maximum, manufactured by

Amersham International plc.
White Lion Road
Amersham
Buckinghamshire, England
United Kingdom
HP9 9LL

The mounted Model AMM 1001H sealed source is registered with the Nuclear Regulatory Commission under No. NR136S174U.

3. *Chemical and physical form of the byproduct material in the product and changes in chemical and physical form that may occur during the useful life of the product.*

The sealed source consists of americium oxide uniformly distributed and sintered in a pure gold matrix which is further contained between a backing of gold coated pure silver and a front covering of either gold or gold-palladium alloy and fabricated by hot forging methods.

Prototype testing of the source to USASI standard N5.10-1968 and respective classifications of C54545 and C44444 have shown that changes in chemical and physical form during the useful life of the product is minimal.

Further details of source construction and prototype testing are included in attachment E1, "Registry of Radioactive Sealed Sources and Devices Safety evaluation of sealed Source".

4. *Solubility in water and body fluids of the byproduct material*

During prototype testing, of the source as detailed in the Registry No. NR136S174U, the foil was immersed in water for 3 weeks at room temperature: Less than .001 microcurie per foil loaded at maximum activity was found in the water.

During prototype testing, of the source as detailed in the Registry No. NR136S174U, was immersed in 0.1 N hydrochloric acid for 24 hours at room temperature: less than 0.004 microcurie activity was leached out.

5. *Details of construction and design of product relating to containment and shielding of byproduct material, and other safety features under normal and severe conditions of handling, storage, use and disposal.*

Sealed Source

The general construction meets Underwriters Laboratories Inc. Standard UL 217 and EN54 part 7. The radioactive material ²⁴¹Am is incorporated within a gold matrix and sandwiched between a silver backing and a palladium laminate. The face layer is thick enough to retain the radioactive material. The shaped foil pieces are staked into a holder and secured between spot welded metal plates or rolling over the holder edges. The source holders are made of AISI 316 stainless steel to provide maximum corrosion resistance. (See Attachment E2, Amersham Data Sheet 11262

The Lo-Pro series detectors, the 612I and 912I use the same mechanical construction. They differ in performance characteristics based upon the variations of the electronic circuit. The ionization chamber is common to both detectors. The following attachments provide details of design and construction.

Attachment E3

Drawing no.	516-050-31	612I	Assembly
Bill of Material	CL 516-050-031		612I
Drawing no.	516-051-031	912I	Assembly
Bill of Material	CL 516-051-031		912I

6. *Maximum external radiation levels at 5 and 25 centimeters from any external surface of product, averaged over an area not to exceed 10 square centimeters, and the method of measurement.*

The following approximate dose rate calculations of the ion chamber used in the detector are based upon thermoluminescent dosimetry data are shown in the table below and are reprinted from attachment E4, Amersham data sheet 11247 p3

Direction	Distance (cm)	Dose rate MSv/year	Dose rate rem/year
Normal to surface of outer cap electrode	5	0-1	0-01
Normal to surface of outer cap electrode	25	0-005	0-0005
Normal to source electrode	5	0-6	0-06
Normal to source electrode	25	0-03	0-003

7. *Degree of access of human beings to product during normal handling and use.*

The ion chamber is completely enclosed by the detector assembly. The design of the cover, body, and baffle make it impossible to contact or see the source without dismantling the detector. Removal of the cover can be achieved by simultaneously prying three tabs. The baffle must then be removed by simultaneously prying back three notched tabs. The function of the notched tabs is not readily apparent to those unfamiliar with the construction design.

The safety performance of the Amersham source has met the requirements of ISO 2919 and has met the recommended rating of C32222.

Access to the source is limited during normal handling and use. The packaging does not have to be removed during normal handling for shipping purposes. A clear plastic cover allows visibility of the labeling on the detector body molding.

The cover and baffle, which enshrouds the ion chamber, do not have to be removed during installation. The ion chamber is soldered to the PCB assembly. The PCB assembly is mounted to the body molding with four screws torqued to 1.5 Nm. This assembly method secures the source within the detector and minimizes access.

8. *Total quantity of byproduct material expected to be distributed annually.*

Expected annual distribution of the Lo-Pro series detectors is not expected to exceed 50,000 units, resulting in a maximum total activity of 45 millicuries.

9. *Expected useful life of the product*

The recommended working life of the sealed source is 10 years as described in Amersham data sheet 11262. Attachment E2

10. *Proposed methods of labeling or marking the detector and point of sale package to satisfy requirements of 10 CFR 32.29(b)*

The point of sale label is designed to meet the requirements of 10 CFR 29 b1. This label is clearly visible when the detector is removed.

The exterior of shipping cartons will contain a label to meet the requirements of 10 CFR 32.29 b3. This label will contain the statement; "This package contains radioactive material and has been manufactured in compliance with U.S. NRC safety criteria in 10 CFR 32.27. The purchaser is exempt from any regulatory requirements."

Copies of the labels are provided in Attachment E5.

11. *Procedures for prototype testing of product to demonstrate the effectiveness of the containment, shielding, and other safety features under both normal and severe conditions of handling, storage, use and disposal of the product.*

The source is registered with NRC under NRC Registry No: NR-0136S174-U AMM.1001H (IDNS).

The 612I and 912I series detectors have been approved by Underwriters Laboratories Inc. Listing against standard UL268, file number S466 category UROX. The Loss Prevention Certification Board prototype tested the detectors to BS EN5445 Part 7.

12. *Results of prototype testing, including any change in form of the byproduct material contained in the product, the extent to which the byproduct material may be leaked to the environment, any increase in external radiation levels, and any other changes in safety features.*

The sealed source provided by Amersham has been tested to conditions described by USASI standard N5.10-1968 and respective classifications of C54545 and C44444. Details of this testing is found in the Registry in Attachment E1.

The complete detector passed prototype testing by the Loss Prevention Certification Board. The table of contents and the test reports for the 612I and 912I detectors are included in Attachment E6. TE 86995 and TE 86927.

13. *Estimated external radiation doses and dose commitments relevant to the safety criteria in 10 CFR 32.27 and the basis for such estimates.*

In normal use, storage and disposal of the detector, the highest exposure will be experienced by the installation and service and warehouse personnel. It can be assumed that these personnel will be handling detectors singly or in packages and may be in contact with them for an estimated one hour per day maximum for two hundred and fifty hours per year. This would result in an absolute maximum dose of 0.0017 rem to the hands of the personnel concerned, this is below the maximum level in column I of the table in 10 CFR 32.28.

In normal use, handling and storage it is unlikely that there will be a significant reduction in the effectiveness of the containment or shielding. The prototype testing of the sealed source as outlined in the registry referenced in 11 above, indicate minimal dose commitment. The mechanical integrity of the complete detector was performed under abnormal conditions of use according to BS5445 Part 7 as referenced in 11 above. The testing included corrosion, shock vibration and impact.

The estimates for external radiation doses are based upon the dose rate table provided by Amersham for rem/year of the sealed source only. The addition of the body molding and cover provide additional protection.

14. *Determination that the probabilities with respect to the doses referred to in 32.27 (c) meet criteria of that paragraph.*

The probabilities expressed in determining the dose rates meet the criteria of that paragraph.

15. *Quality control procedures to be followed in the fabrication of production lots of the product and the quality control standards the product will be required to meet.*

The detectors are designed and manufactured by Thorn Security Limited, doing business as, Tyco Electronic Products Group (TEPG), an ISO 9001 registered firm, registration number FM967. See attachment E7.

The ISO 9001 quality system employed by TEPG provide procedures to address all clauses of the ISO standard, particularly, Process Control, Design Control, Document and Data Control and an Internal Audit Process. A specific procedure for handling, storage and transport has been developed to ensure that the product is dispatched according to applicable regulations. See Attachment E8 TSG 10.4

A U.S. division of the Tyco Electronic Products Group resides at Grinnell Fire Protection Systems Co. (GFPS) with responsibilities for design change approval through GFPS operations.

TEPG performs random leak test audits during the manufacturing of Ion Detectors. Records of all leak test results will be forwarded and maintained by GFPS.

The detectors will be initially transferred by Grinnell Fire Protection System Co., an ISO 9001 registered firm, registration number A5562. See attachment E7. The procedures for receipt and shipping are followed to ensure compliance to NRC regulations for labeling, packaging and record keeping. See Attachment E8. Receipt and Shipping of Ion Detectors. This procedure identifies the requirements for inspection, wipe testing and shipping. The identification and maintenance of records required in 10 CFR 32.29 4 c are addressed in this procedure.

Wipe samples performed at GFPS will be analyzed by Stan A. Huber Consultants which is licensed by the State of Illinois. License number IL-010131001.

ITEM	COMPONENT	DESCRIPTION	BIN	STOCK CODE	DRN	QTY
1	PCB ASSEMBLY	MF612		125-585-533	*	1
2						
3	PRESSING	BODY		125-049-109	*	4
4	SEAL	PCB.POLYFILM		120-046-091	*	1
5	BODY	MOULDING		121-003-176	*	1
6	BUNG	CONNECTOR HOLE.MOULDING		121-003-189	*	1
7						
8	BODY STOPPER	MOULDING		121-003-196	*	1
9	COVER	MOULDING		121-003-173	*	1
10	ION CHAMBER	AMERSHAM DSC-A2		120-258-145		1
11	BAFFLE	MOULDING		121-003-254	*	1
12	DUST CAP	VACUUM FORMED		121-003-253	*	1
13	SCREW	M3 x 12LG PAN HEAD ST/ST		115-903-062	*	4
14	TRANSISTOR	FET. ION SP T092		125-029-264	*	1
15	LABEL	LOGO		120-247-286	*	1
16	DUST CAP	BASE		121-003-199	*	1
17	LABEL	PRODUCT		120-247-826	*	1
18	ADHESIVE	EASYBOND 795		121-101-104		1g
19	FILTER PAPER	WHATMAN No.1 5.5cm DIA.		121-301-220		.001
20	SOLDER	X398 18 SWG.		121-076-038		.0003 Kg
21	PACKAGING	TRAY		123-002-621	*	0.05
22	SOLDER	CRYSTAL 400		121-076-033		.0001 Kg
23	LED	SLR-56VW RED.MILKY WHITE				
		11 max 20 mA CONTINUOUS (D3)		125-114-124	*	1
24						
25						
26						

THIS DRAWING IS SUBJECT TO U.L. APPROVAL AND MUST NOT BE CHANGED IN ANY WAY WITHOUT REFERENCE TO THE CERTIFYING AUTHORITY.

APP'D	ISSUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1 IN2216 24.10.96												
	2 008417 6.11.97												
	3 008488 15.1.98												
	4 008506 26.2.98												
	5 008560 31.3.98												
	6 008588 6.5.98												
	7 008807 8.12.98												

COMPONENT LIST FOR: **612I IONISATION SMOKE DETECTOR U.S. (UL)**

DRAWN	EG	24-10-96	USED ON
CHECKED			
APPROVED			

CL 516-050-031
SHEET 1 OF 3

THORN SECURITY

A4

ITEM	COMPONENT	DESCRIPTION	BIN	STOCK CODE	DRN	QTY
25	RESISTER	82.5K	1	125-652-828		1
25	RESISTOR	100K	2	125-652-104		1
25	RESISTOR	121K	3	125-652-128		1
25	RESISTOR	140K	4	125-652-144		1
25	RESISTOR	162K	5	125-652-168		1
25	RESISTOR	187K	6	125-652-189		1
25	RESISTOR	205K	7	125-652-209		1
25	RESISTOR	215K	8	125-652-219		1
25	RESISTOR	226K	9	125-652-229		1
25	RESISTOR	237K	10	125-652-239		1
25	RESISTOR	249K	11	125-652-249		1
25	RESISTOR	261K	12	125-652-269		1
25	RESISTOR	274K	13	125-652-279		1
25	RESISTOR	287K	14	125-652-289		1
25	RESISTOR	301K	15	125-652-309		1
25	RESISTOR	316K	16	125-652-319		1
25	RESISTOR	332K	17	125-652-339		1
25	RESISTOR	348K	18	125-652-349		1
25	RESISTOR	365K	19	125-652-369		1
25	RESISTOR	383K	20	125-652-389		1
25	RESISTOR	402K	21	125-652-409		1
25	RESISTOR	422K	22	129-652-429		1
25	RESISTOR	442K	23	125-652-449		1
25	RESISTOR	464K	24	125-652-469		1

APP'D																					
ISSUE	1	IN2216	24.10.96	2	008560	31.3.98	THIS DRAWING IS SUBJECT TO U.L. APPROVAL AND MUST NOT BE CHANGED IN ANY WAY WITHOUT REFERENCE TO THE CERTIFYING AUTHORITY.														

COMPONENT LIST FOR:				DRAWN	EG	24-10-96	USED ON
6121				CHECKED			
IONISATION SMOKE DETECTOR							CL 516-050-031

SECURITY
 1988 ©

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4	SEAL	PCB.POLYFILM		120-046-091	•	1	
5	BODY	MOULDING		121-003-176	•	1	
6	BUNG	CONNECTOR HOLE.MOULDING		121-003-189	•	1	
7							
8	BODY STOPPER	MOULDING		121-003-196	•	1	
9	COVER	MOULDING		121-003-173	•	1	
10	ION CHAMBER	AMERSHAM DSC-A2		120-258-145		1	
11	BAFFLE	MOULDING		121-003-254	•	1	
12	DUST CAP	VACUUM FORMED		121-003-253	•	1	
13	SCREW	M3 x 12LG PAN HEAD ST/ST		115-903-062	•	4	
14	TRANSISTOR	FET. ION SP T092		125-029-264	•	1	
15	LABEL	LOGO		120-247-286	•	1	
16	DUST CAP	BASE		121-003-199	•	1	
17	LABEL	PRODUCT		120-247-826	•	1	
18	ADHESIVE	EASYBOND 795		121-101-104		1g	
19	FILTER PAPER	WHATMAN No.1 5.5cm DIA.		121-301-220		.001	
20	SOLDER	X398 18 SWG.		121-076-038		.0003 kg	
21	PACKAGING	TRAY		123-002-621	•	0.05	
22	SOLDER	CRYSTAL 400		121-076-033		.0001 kg	
23	LED	SLR-56VV RED.MILKY WHITE					
		11 max 20 mA CONTINUOUS (D3)		125-114-124	•	1	
24							
25		THIS DRAWING IS SUBJECT TO U.L. APPROVAL AND MUST NOT BE CHANGED IN ANY WAY WITHOUT REFERENCE TO THE CERTIFYING AUTHORITY.					
26							
APP'D	0.0	0.0	0.0	0.0	0.0	0.0	
ISSUE	1 IN2216 24.10.96	2 008417 6.11.97	3 008488 15.1.98	4 008506 26.2.98	5 008560 31.3.98	6 008588 6.5.98	7 008807 8.12.98
COMPONENT LIST FOR:				DRAWN	EG	24-10-96	USED ON
6121				CHECKED			
IONISATION SMOKE DETECTOR				APPROVED			
U.S. (UL)				CL 516-050-031			
A4				SHEET 1 OF 3			



THORN
SECURITY

ITEM	COMPONENT	DESCRIPTION	BIN	STOCK CODE	DRN	QTY	
25	RESISTER	82.5K	1	125-652-828		1	
25	RESISTOR	100K	2	125-652-104		1	
25	RESISTOR	121K	3	125-652-128		1	
25	RESISTOR	140K	4	125-652-144		1	
25	RESISTOR	162K	5	125-652-168		1	
25	RESISTOR	187K	6	125-652-189		1	
25	RESISTOR	205K	7	125-652-209		1	
25	RESISTOR	215K	8	125-652-219		1	
25	RESISTOR	226K	9	125-652-229		1	
25	RESISTOR	237K	10	125-652-239		1	
25	RESISTOR	249K	11	125-652-249		1	
25	RESISTOR	261K	12	125-652-269		1	
25	RESISTOR	274K	13	125-652-279		1	
25	RESISTOR	287K	14	125-652-289		1	
25	RESISTOR	301K	15	125-652-309		1	
25	RESISTOR	316K	16	125-652-319		1	
25	RESISTOR	332K	17	125-652-339		1	
25	RESISTOR	348K	18	125-652-349		1	
25	RESISTOR	365K	19	125-652-369		1	
25	RESISTOR	383K	20	125-652-389		1	
25	RESISTOR	402K	21	125-652-409		1	
25	RESISTOR	422K	22	129-652-429		1	
25	RESISTOR	442K	23	125-652-449		1	
25	RESISTOR	464K	24	125-652-469		1	
APP'D	0.0						
ISSUE	1 IN2216 24.10.96	2 008560 31.3.98	THIS DRAWING IS SUBJECT TO U.L. APPROVAL AND MUST NOT BE CHANGED IN ANY WAY WITHOUT REFERENCE TO THE CERTIFYING AUTHORITY.				

COMPONENT LIST FOR:

6121
IONISATION SMOKE DETECTOR

DRAWN	EG	24-10-96	USED ON
CHECKED			

CL 516-050-031

FROM TYCO ELECTRONIC PRODUCT GROUP

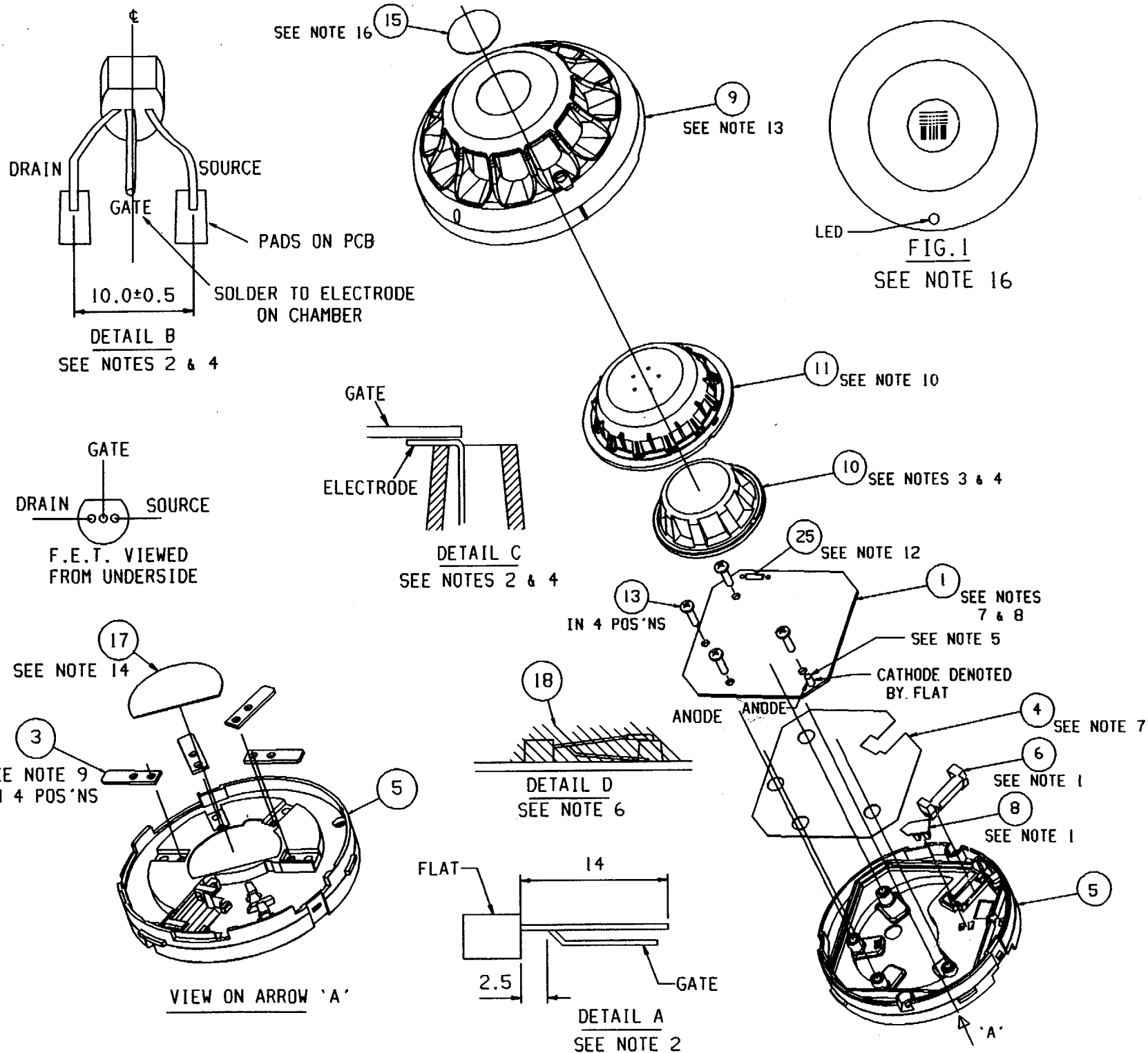
4
 SECURITY
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ITEM	COMPONENT	DESCRIPTION	BIN	STOCK CODE	DRN	QTY
25	RESISTER	487K	25	125-652-489		1
25	RESISTOR	511K	26	125-652-519		1
25	RESISTOR	536K	27	125-652-539		1
25	RESISTOR	562K	28	125-652-569		1
25	RESISTOR	590K	29	125-652-594		1
25	RESISTOR	619K	30	125-652-619		1
25	RESISTOR	649K	31	125-652-649		1
25	RESISTOR	681K	32	125-652-689		1
25	RESISTOR	715K	33	125-652-719		1
25	RESISTOR	750K	34	125-652-754		1
25	RESISTOR	787K	35	125-652-789		1
25	RESISTOR	825K	36	125-652-829		1
25	RESISTOR	866K	37	125-652-869		1
25	RESISTOR	909K	38	125-652-909		1
25	RESISTOR	953K	39	125-652-959		1
25	RESISTOR	1M	40	125-652-105		1

APP'D													
ISSUE	1 IN2216 24.10.96	2 008560 31.3.98	THIS DRAWING IS SUBJECT TO U.L. APPROVAL AND MUST NOT BE CHANGED IN ANY WAY WITHOUT REFERENCE TO THE CERTIFYING AUTHORITY.										

COMPONENT LIST FOR:			DRAWN	EG	24-10-96	USED ON
6121			CHECKED			
IONISATION SMOKE DETECTOR						CL 516-050-031

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 A4

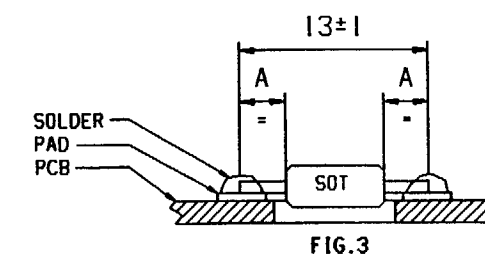


NOTES:-

1. FIT BODY BUNG (ITEM 6) AND BODY STOPPER (ITEM 8) INTO BODY (ITEM 5), AS SHOWN.
2. FORM TRANSISTOR LEADS OF ITEM 14 AS SHOWN IN DETAILS 'A' & 'B'. FORM SOURCE ELECTRODE ON CHAMBER AS SHOWN IN DETAIL 'C'.
3. FIT ION CHAMBER (ITEM 10) TO PCB ASSEMBLY (ITEM 1), THEN SOLDER USING ITEM 22.
4. AS SHOWN IN DETAIL 'B' SOLDER LEADS OF TRANSISTOR TO PADS ON PCB AND TO SOURCE ELECTRODE ON CHAMBER USING ITEM 22. SEE DETAIL 'C'. REMOVE SHORTING CLIP FROM F.E.T. LEADS.
5. FIT LED D3 (ITEM 23) INTO PCB (ITEM 1), AS SHOWN, AND SOLDER USING ITEM 22, ENSURING CROPPED LEAD LENGTH DOES NOT EXCEED 1.6 MAX.
6. COVER TRANSISTOR LEADS (ITEM 14) WITH ADHESIVE (ITEM 18) ENSURING NO GAP BETWEEN ADHESIVE AND TRANSISTOR BODY. SEE DETAIL 'D'.
7. APPLY SEAL (ITEM 4) TO UNDERSIDE OF PCB ASSEMBLY.
8. ORIENTATE AND LOCATE PCB ASSY (ITEM 1), BY HOOKING UNDER TAB ON BODY (ITEM 5).
9. SECURE PCB ASSEMBLY (ITEM 1) AND PRESSINGS (ITEM 3), 4 OFF. TO BODY (ITEM 5) USING SCREWS (ITEM 13). TIGHTEN SCREWS TO A TORQUE OF 1.5Nm.
10. CLIP BAFFLE (ITEM 11) TO PCB ASSEMBLY. ORIENTATE TO LOCATE ONTO LED.
11. TEST ASSEMBLY TO TS516-050-031.
12. SOLDER SELECTED S.O.T. RESISTOR (ITEM 25) TO PADS ON PCB ASSY USING ITEM 22.
13. FIT COVER (ITEM 9) TO BODY (ITEM 5).
14. PRINT LABEL (ITEM 17) AS ON SHEET 2 & ADHERE TO UNDERSIDE OF BODY (ITEM 5), AS SHOWN.
15. SOAK TEST UNIT IN ACCORDANCE WITH SOAK TEST SPEC TS121-200-393 & WIPE TEST UNIT IN ACCORDANCE WITH WP121-121-262.
16. ADHERE LABEL (ITEM 15) TO COVER (ITEM 9).
17. FIT DUST CAP (ITEM 12) & DUST CAP BASE (ITEM 16) ONTO DETECTOR

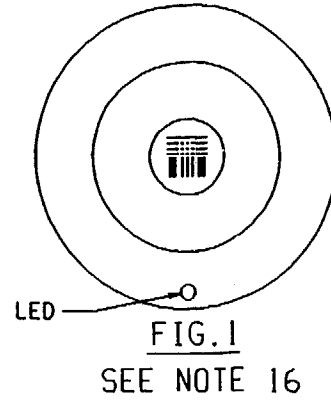
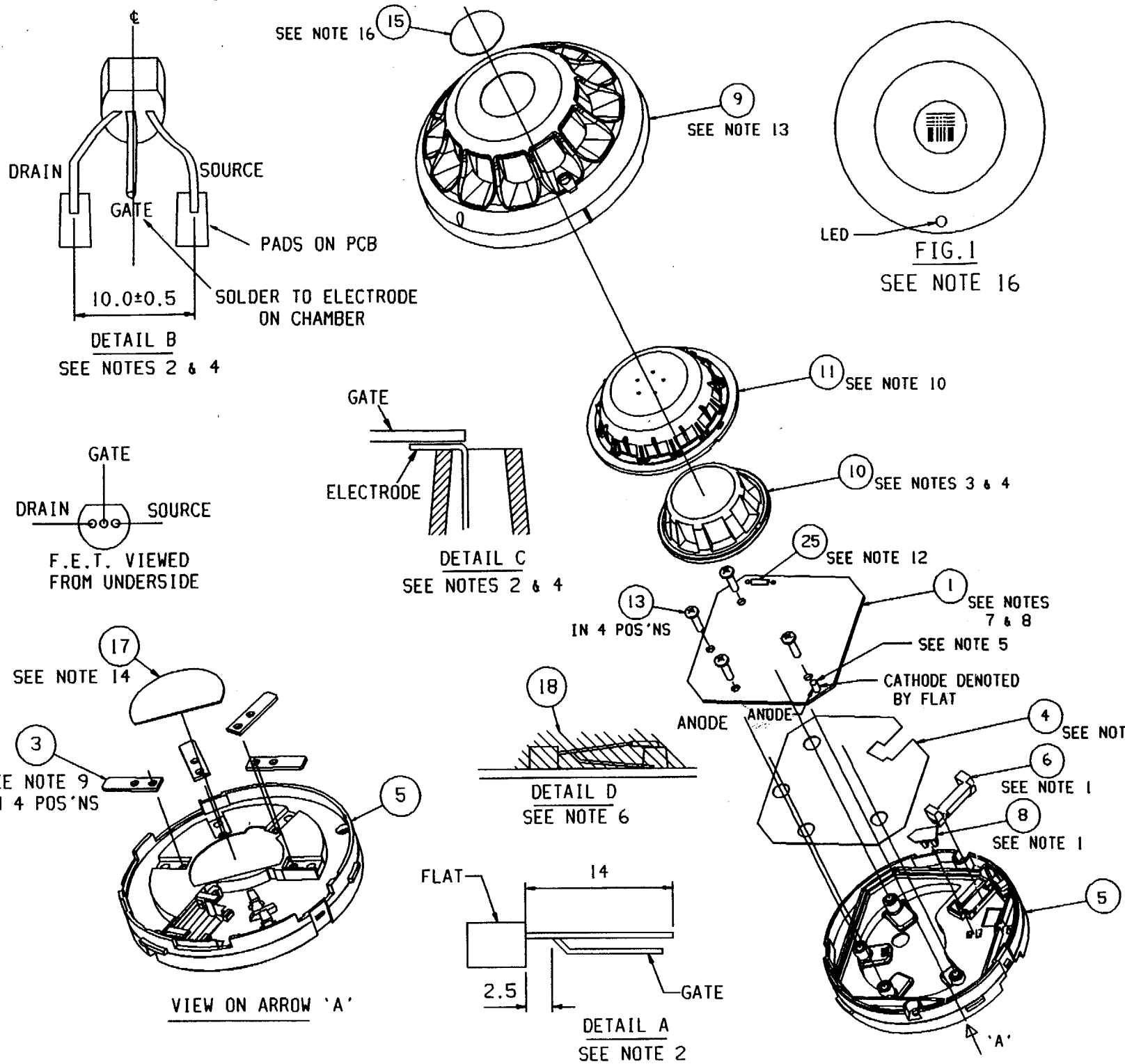
WARNING

ASSEMBLY CONTAINS A SMALL RADIOACTIVE SOURCE $A_{m241} < 0.9 \mu Ci, 3.33 kBq$ DETECTOR TO BE MANUFACTURED, STORED, TRANSPORTED, INSTALLED & DISPOSED OF IN ACCORDANCE WITH COMPANY PROCEDURES COVERING RADIOACTIVE ION CHAMBER DETECTORS/SENSORS.



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APP'D	0.0	0.0	0.0	0.0	0.0	0.0																IF IN DOUBT - ASK						
ISSUE	1 IN2216 29-10-95	2 008417 31-10-97	3 008506 4-2-98	4 008560 31-3-98	5 008593 13-5-98	6 008786 30-11-98																DO NOT SCALE - REMOVE ALL BURRS AND SHARP EDGES - ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED. TO BE READ IN CONJUNCTION WITH BS 308.						
TITLE	ATTACHMENT 3 6121 IONISATION SMOKE DETECTOR U.S. (UL)													DRAWN	EG	29-10-96	ENG'R	NAS	18-5-95	MATERIAL	SEE COMPONENTS LIST				SCALE	NTS	THIRD ANGLE PROJECTION	RELEVANT DRAWINGS
														DEV. No.	142/001/3			FINISH					TOLERANCES (UNLESS STATED)	USED ON				
														DRAWING No.	516-050-031							GENERAL	±0.4mm					
																		HOLE CENTRES	±0.12mm									
																		HOLE DIAMETERS	+0.1mm -0									

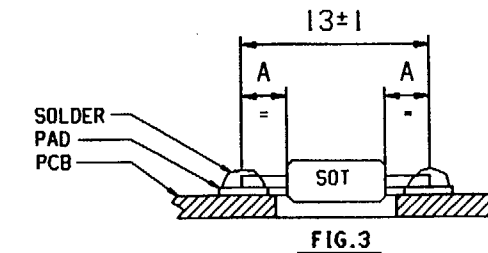


NOTES:-

1. FIT BODY BUNG (ITEM 6) AND BODY STOPPER (ITEM 8) INTO BODY (ITEM 5),AS SHOWN.
2. FORM TRANSISTOR LEADS OF ITEM 14 AS SHOWN IN DETAILS 'A' & 'B'. FORM SOURCE ELECTRODE ON CHAMBER AS SHOWN IN DETAIL 'C'.
3. FIT ION CHAMBER (ITEM 10) TO PCB ASSEMBLY (ITEM 1),THEN SOLDER USING ITEM 22.
4. AS SHOWN IN DETAIL 'B' SOLDER LEADS OF TRANSISTOR TO PADS ON PCB AND TO SOURCE ELECTRODE ON CHAMBER USING ITEM 22. SEE DETAIL 'C'. REMOVE SHORTING CLIP FROM F.E.T. LEADS.
5. FIT LED.D3 (ITEM 23) INTO PCB (ITEM 1),AS SHOWN,AND SOLDER USING ITEM 22.ENSURING CROPPED LEAD LENGTH DOES NOT EXCEED 1.6 MAX.
6. COVER TRANSISTOR LEADS (ITEM 14) WITH ADHESIVE (ITEM 18) ENSURING NO GAP BETWEEN ADHESIVE AND TRANSISTOR BODY. SEE DETAIL 'D'.
7. APPLY SEAL (ITEM 4) TO UNDERSIDE OF PCB ASSEMBLY.
8. ORIENTATE AND LOCATE PCB ASSY (ITEM 1),BY HOOKING UNDER TAB ON BODY (ITEM 5).
9. SECURE PCB ASSEMBLY (ITEM 1) AND PRESSINGS (ITEM 3). 4 OFF. TO BODY (ITEM 5) USING SCREWS (ITEM 13). TIGHTEN SCREWS TO A TORQUE OF 1.5Nm.
10. CLIP BAFFLE (ITEM 11) TO PCB ASSEMBLY. ORIENTATE TO LOCATE ONTO LED.
11. TEST ASSEMBLY TO TS516-050-031.
12. SOLDER SELECTED S.O.T. RESISTOR (ITEM 25) TO PADS ON PCB ASSY USING ITEM 22.
13. FIT COVER (ITEM 9) TO BODY (ITEM 5).
14. PRINT LABEL (ITEM 17) AS ON SHEET 2 & ADHERE TO UNDERSIDE OF BODY (ITEM 5). AS SHOWN.
15. SOAK TEST UNIT IN ACCORDANCE WITH SOAK TEST SPEC TS121-200-393 & WIPE TEST UNIT IN ACCORDANCE WITH WP121-121-262.
16. ADHERE LABEL (ITEM 15) TO COVER (ITEM 9).
17. FIT DUST CAP (ITEM 12) & DUST CAP BASE (ITEM 16) ONTO DETECTOR

WARNING

ASSEMBLY CONTAINS A SMALL RADIOACTIVE SOURCE $Am^{241}(0.9\mu Ci, 3.33kBq)$ DETECTOR TO BE MANUFACTURED,STORED,TRANSPORTED,INSTALLED & DISPOSED OF IN ACCORDANCE WITH COMPANY PROCEDURES COVERING RADIOACTIVE ION CHAMBER DETECTORS/SENSORS.



APP'D							IF IN DOUBT - ASK																
ISSUE							DO NOT SCALE - REMOVE ALL BURRS AND SHARP EDGES - ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.TO BE READ IN CONJUNCTION WITH BS 308.																
1		2		3		4		5		6													
IN2216		008417		008506		008560		008593		008786													
29-10-95		31-10-97		4-2-98		31-3-98		13-5-98		30-11-98													
TITLE											RELEVANT DRAWINGS												
ATTACHMENT E3 6121 IONISATION SMOKE DETECTOR U.S. (UL)											DRAWN EG 29-10-96 ENG'R NAS 18-5-95 DEV.No. 142/001/3 DRAWING No. 516-050-031 MATERIAL SEE COMPONENTS LIST FINISH												
SCALE											NTS THIRD ANGLE PROJECTION												
TOLERANCES (UNLESS STATED)											USED ON												
GENERAL ±0.4mm											HOLE CENTRES ±0.12mm												
HOLE DIAMETERS +0.1mm											-0												

ITEM No.	COMPONENT	DESCRIPTION	QTY	STOCK CODE	UNIT	QTY
1	PCB ASSEMBLY	MF901		125-585-256	♦	1
2						
3	PRESSING	BODY		125-049-109	♦	4
4	SEAL	PCB. POLYFILM		120-046-085	♦	1
5	BODY	METALLISED		120-037-161	♦	1
6	CONNECTOR ASSY	5-WAY		121-004-003	♦	1
7						
8						
9	COVER	MOULDING		121-003-173	♦	1
10	ION CHAMBER	AMERSHAM DSC A2		120-258-145		1
11	BAFFLE	MOULDING		121-003-254	♦	1
12	DUST CAP	VACUUM FORMED		121-003-253	♦	1
13	SCREW	M3 X 12LG PAN HEAD ST/STL		115-903-062	*	4
14	TRANSISTOR	FET. ION SP 7092		125-029-264		1
15	LABEL	LOGO		120-247-284	♦	1
16	DUST CAP	BASE		121-003-199	♦	1
17	LABEL	BLANK		120-247-826	♦	1
18	ADHESIVE	EASY BOND 795		121-101-104		1g
19	FILTER PAPER	WHATMAN No.1 5.5 CM DIA.		121-301-220		.001
20	SOLDER	X398 18 SWG.		121-076-038		.003 Kg
21	PACKAGING	TRAY		123-002-621		.05
22	SOLDER	CRYSTAL 400		121-076-033		.001 Kg
23	LED	SLR-56V W RED MILKY WHITE (D3) IF MAX. 20mA CONTINUOUS		125-114-124		1
24	CRYSTAL	32.768kHz (X1)		125-003-005		1

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APP'D			
ISSUE	6 008538 7.5.98	7 008593 14.5.98	8 008807 8.12.98

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COMPONENTS LIST FOR
912I IONISATION ANALOGUE SMOKE DETECTOR
 USED ON DR. 516-051-031

DRAWN: PAB 06/05/95
 REV. NO.: CL142/002/4
CL516-051-031
 SHEET 1 OF 3

A4

(ORIGINAL DRG)

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ITEM No.	COMPONENT	DESCRIPTION	BIN No.	STOCK CODE	QTY PER	
25	RESISTOR	82.5K	1	125-652-828	1	
25	RESISTOR	100K	2	125-652-104	1	
25	RESISTOR	121K	3	125-652-128	1	
25	RESISTOR	140K	4	125-652-144	1	
25	RESISTOR	162K	5	125-652-168	1	
25	RESISTOR	187K	6	125-652-189	1	
25						
25	RESISTOR	205K	7	125-652-209	1	
25	RESISTOR	215K	0.6W +/-1% S.O.T.	8	125-652-219	1
25	RESISTOR	226K	ONLY 1 OFF OF THE	9	125-652-229	1
25	RESISTOR	237K	LISTED RESISTORS	10	125-652-239	1
25	RESISTOR	249K	(SHTS 2 & 3) TO BE	11	125-652-249	1
25	RESISTOR	261K	SELECTED AT FINAL	12	125-652-269	1
25	RESISTOR	274K	ASSEMBLY STAGE	13	125-652-279	1
25	RESISTOR	287K		14	125-652-289	1
25	RESISTOR	301K		15	125-652-309	1
25	RESISTOR	316K		16	125-652-319	1
25	RESISTOR	332K		17	125-652-339	1
25	RESISTOR	348K		18	125-652-349	1
25	RESISTOR	365K		19	125-652-369	1
25	RESISTOR	383K		20	125-652-389	1
25	RESISTOR	402K		21	125-652-409	1
25	RESISTOR	422K		22	125-652-429	1
25	RESISTOR	442K		23	125-652-449	1

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ISSUE
1
2
A4

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2
008560
2.4.98

LIST FOR
912I IONISATION ANALOGUE SMOKE DETECTOR
516-051-031

DRAWN
REV. No. CL142/002/4
CL516-051-031
SHEET 2 OF 3

ITEM No.	COMPONENT	DESCRIPTION	QTY	STOCK CODE	QTY PER
25	RESISTOR	464K } 0.6W +/-1% S.O.T.	24	125-652-469	1
25	RESISTOR	487K } ONLY 1 OFF OF THE	25	125-652-489	1
25	RESISTOR	511K } LISTED RESISTORS	26	125-652-519	1
25	RESISTOR	536K } (SHTS 2 & 3) TO BE	27	125-652-539	1
25		562K } SELECTED AT FINAL	28	125-652-569	1
25		590K } ASSEMBLY STAGE	29	125-652-594	1
25		619K	30	125-652-619	1
25		649K	31	125-652-649	1
25		681K }	32	125-652-689	1
25		715K	33	125-652-719	1
25		750K	34	125-652-754	1
25		787K	35	125-652-789	1
25		825K	36	125-652-829	1
25		866K	37	125-652-869	1
25		909K	38	125-652-909	1
25		953K	39	125-652-959	1
25		1M /	40	125-652-105	1
25					
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ISSUE
 1 IN2199
 5.9.96
 2 008560
 2.4.98

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COMPONENTS LIST FOR
912I IONISATION ANALOGUE SMOKE DETECTOR
 VPCD 01 516-051-031

DRAWN PAB 05/06/95
 DEV. No. CL142/002/4
CL516-051-031
 SHEET 3 OF 3

A4

ITEM NO.	COMPONENT	DESCRIPTION	QTY	STOCK CODE	UNIT	QTY
1	PCB ASSEMBLY	MF901		125-585-256	♦	1
2						
3	PRESSING	BODY		125-049-109	♦	4
4	SEAL	PCB.POLYFILM		120-046-085	♦	1
5	BODY	METALLISED		120-037-161	♦	1
6	CONNECTOR ASSY	S-WAY		121-004-003	♦	1
7						
8						
9	COVER	MOULDING		121-003-173	♦	1
10	ION CHAMBER	AMERSHAM DSC A2		120-258-145		1
11	BAFFLE	MOULDING		121-003-254	♦	1
12	DUST CAP	VACUUM FORMED		121-003-253	♦	1
13	SCREW	M3 X 12LG PAN HEAD ST/STL		115-903-062	*	4
14	TRANSISTOR	FET. ION SP 7092		125-029-264		1
15	LABEL	LOGO		120-247-284	♦	1
16	DUST CAP	BASE		121-003-199	♦	1
17	LABEL	BLANK		120-247-826	♦	1
18	ADHESIVE	EASY BOND 795		121-101-104		1g
19	FILTER PAPER	WHATMAN No.1 5.5 cm DIA.		121-301-220		.001
20	SOLDER	X39B 18 SWG.		121-076-038		.002 Kg
21	PACKAGING	TRAY		123-002-621		.05
22	SOLDER	CRYSTAL 400		121-076-033		.0001 Kg
23	LED	SLR-56V W RED.MILKY WHITE (D3) IF MAX.20mA CONTINUOUS		125-114-124		1
24	CRYSTAL	32.768kHz (X1)		125-003-005		1

THORN SECURITY

APPROV'D				
ISSUE	6	7	8	
	008588	008593	008807	
	7.5.98	14.5.98	8.12.98	

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COMPONENTS LIST FOR
912I IONISATION ANALOGUE SMOKE DETECTOR
 USED OR CL 516-051-031

DRAWN: PDB 02/05/95
 DEV. NO. CL142/002/4
CL516-051-031
 SHEET 1 OF 3

A4

(ORIGINAL DRG)

ITEM No.	COMPONENT	DESCRIPTION	BIN No.	STOCK CODE	QTY	PER
25	RESISTOR	82.5K	1	125-652-828	1	
25	RESISTOR	100K	2	125-652-104	1	
25	RESISTOR	121K	3	125-652-128	1	
25	RESISTOR	140K	4	125-652-144	1	
25	RESISTOR	162K	5	125-652-168	1	
25	RESISTOR	187K	6	125-652-189	1	
25						
25	RESISTOR	205K	7	125-652-209	1	
25	RESISTOR	215K	8	125-652-219	1	
25	RESISTOR	226K	9	125-652-229	1	
25	RESISTOR	237K	10	125-652-239	1	
25	RESISTOR	249K	11	125-652-249	1	
25	RESISTOR	261K	12	125-652-269	1	
25	RESISTOR	274K	13	125-652-279	1	
25	RESISTOR	287K	14	125-652-289	1	
25	RESISTOR	301K	15	125-652-309	1	
25	RESISTOR	316K	16	125-652-319	1	
25	RESISTOR	332K	17	125-652-339	1	
25	RESISTOR	348K	18	125-652-349	1	
25	RESISTOR	365K	19	125-652-369	1	
25	RESISTOR	383K	20	125-652-389	1	
25	RESISTOR	402K	21	125-652-409	1	
25	RESISTOR	422K	22	125-652-429	1	
25	RESISTOR	442K	23	125-652-449	1	

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COMPONENTS

A4

ISSUE

1 IN2199

2 5-9-96

008560

2.4.98

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LIST FOR

912I IONISATION

ANALOGUE SMOKE DETECTOR

USED ON DL 516-051-031

DRAWN *ARB* 05/06/95

REV. No. CL142/002/4

CL516-051-031

SHEET 2 OF 3

ITEM No.	COMPONENT	DESCRIPTION	QTY PER	STOCK CODE	QTY PER
25	RESISTOR	464K } 0.6W +/-1% S.O.T.	24	125-652-469	1
25	RESISTOR	487K } ONLY 1 OFF OF THE	25	125-652-489	1
25	RESISTOR	511K } LISTED RESISTORS	26	125-652-519	1
25	RESISTOR	536K } (SHTS 2 & 3) TO BE	27	125-652-539	1
25		562K } SELECTED AT FINAL	28	125-652-569	1
25		590K } ASSEMBLY STAGE	29	125-652-594	1
25		619K	30	125-652-619	1
25		649K	31	125-652-649	1
25		681K }	32	125-652-689	1
25		715K	33	125-652-719	1
25		750K	34	125-652-754	1
25		787K	35	125-652-789	1
25		825K	36	125-652-829	1
25		866K	37	125-652-869	1
25		909K	38	125-652-909	1
25		953K	39	125-652-959	1
25		1M /	40	125-652-105	1
25					
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ISSUE
 1 1N2199
 5.9.96
 2 008560
 2.4.98

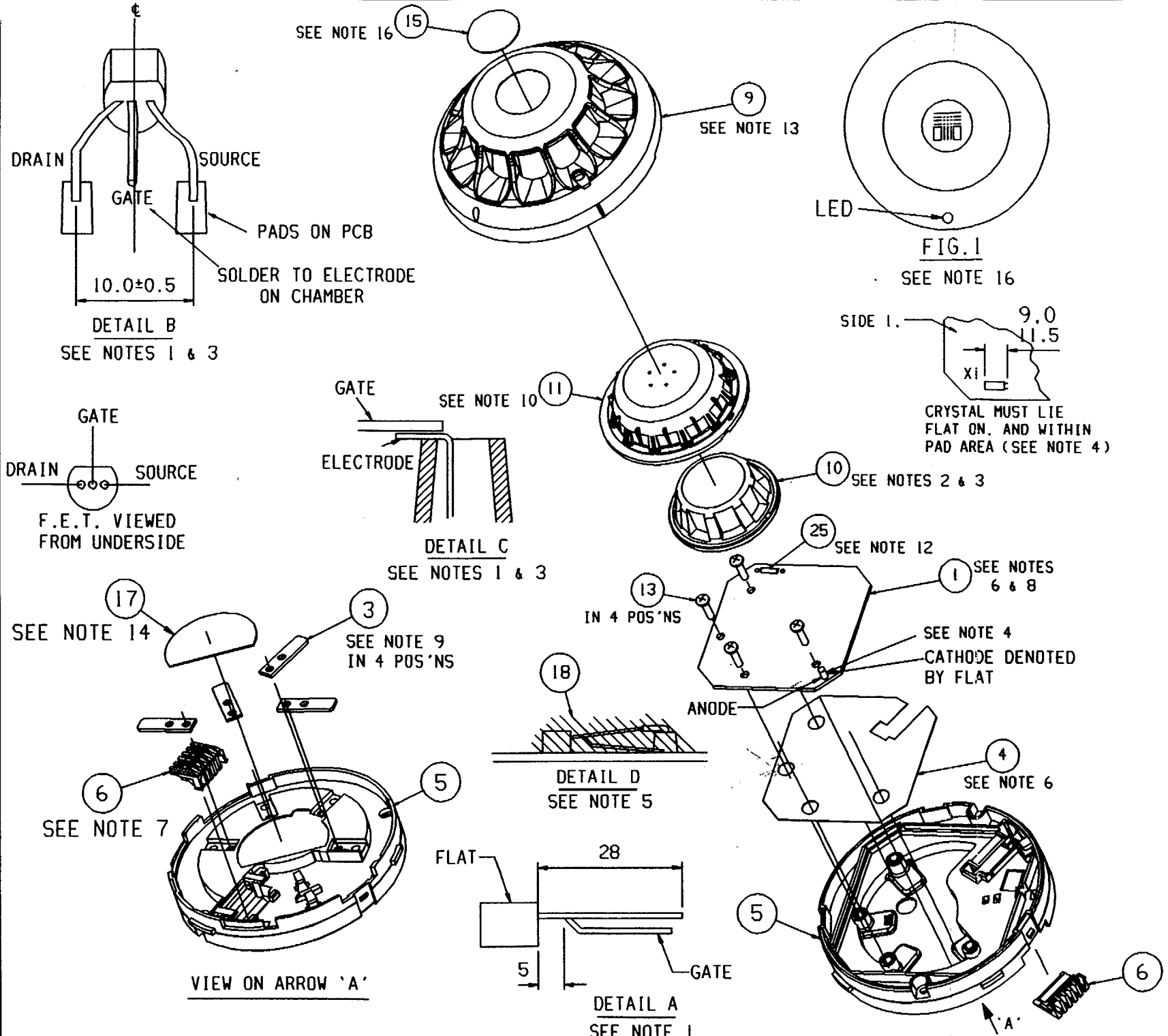
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COMPONENTS LIST FOR
912I IONISATION ANALOGUE SMOKE DETECTOR
 USED ON IT 516-051-031

DRAWN PAB 05/06/95
 DEV. No. CL142/002/4
CL516-051-031
 SHEET 3 OF 3

A4

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NOTES:-

1. FORM TRANSISTOR LEADS OF ITEM 14 AS SHOWN IN DETAILS 'A' & 'B'. FORM SOURCE ELECTRODE ON CHAMBER AS SHOWN IN DETAIL 'C'.
2. FIT ION CHAMBER (ITEM 10) TO PCB ASSEMBLY (ITEM 1), THEN SOLDER USING ITEM 22.
3. AS SHOWN IN DETAIL 'B', SOLDER LEADS OF TRANSISTOR TO PADS ON PCB AND TO SOURCE ELECTRODE ON CHAMBER USING ITEM 22. SEE DETAIL 'C'. REMOVE SHORTING CLIP FROM F.E.T. LEADS.
4. FIT LED, D3 (ITEM 23) FROM SIDE 2 AND CRYSTAL (ITEM 24) FROM SIDE 1 INTO PCB (ITEM 1), AS SHOWN, AND SOLDER USING ITEM 22. ENSURING CROPPED LEAD LENGTH DOES NOT EXCEED 1.6 MAX.
5. COVER TRANSISTOR LEADS (ITEM 14) WITH ADHESIVE (ITEM 18) ENSURING NO GAP BETWEEN ADHESIVE AND TRANSISTOR BODY. SEE DETAIL 'D'.
6. APPLY SEAL (ITEM 4) TO UNDERSIDE OF PCB ASSEMBLY.
7. FIT CONNECTOR ASSY (ITEM 6) INTO BODY (ITEM 5), AS SHOWN.
8. ORIENTATE AND LOCATE PCB ASSY (ITEM 1), BY HOOKING UNDER TAB ON BODY (ITEM 5).
9. SECURE PCB ASSEMBLY (ITEM 1) AND PRESSINGS (ITEM 3), 4 OFF, TO BODY (ITEM 5) USING SCREWS (ITEM 13). TIGHTEN SCREWS TO A TORQUE OF 1.5Nm.
10. CLIP BAFFLE (ITEM 11) TO PCB ASSEMBLY. ORIENTATE TO LOCATE ONTO LED.
11. TEST ASSEMBLY TO TS516-051-031.
12. SOLDER SELECTED S.O.T. RESISTOR (ITEM 25) TO PADS ON PCB ASSY USING ITEM 22. SEE FIG 3.
13. FIT COVER (ITEM 9) TO BODY (ITEM 5).
14. PRINT LABEL AS ON SHEET 2 & ADHERE TO UNDERSIDE OF BODY (ITEM 5), AS SHOWN.
15. SOAK TEST UNIT IN ACCORDANCE WITH SOAK TEST SPEC TS121-200-393 & WIPE TEST UNIT IN ACCORDANCE WITH WPI21-121-262.
16. ADHERE LABEL (ITEM 15) TO COVER (ITEM 9).
17. FIT DUST CAP (ITEM 12) & DUST CAP BASE (ITEM 16) ONTO DETECTOR

WARNING

ASSEMBLY CONTAINS A SMALL RADIOACTIVE SOURCE $Am^{241} < 0.9 \mu Ci, 3.33 kBq$ DETECTOR TO BE MANUFACTURED, STORED, TRANSPORTED, INSTALLED & DISPOSED OF IN ACCORDANCE WITH COMPANY PROCEDURES COVERING RADIOACTIVE ION CHAMBER DETECTORS/SENSORS.

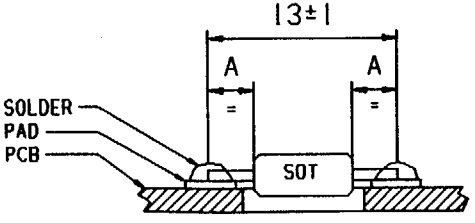
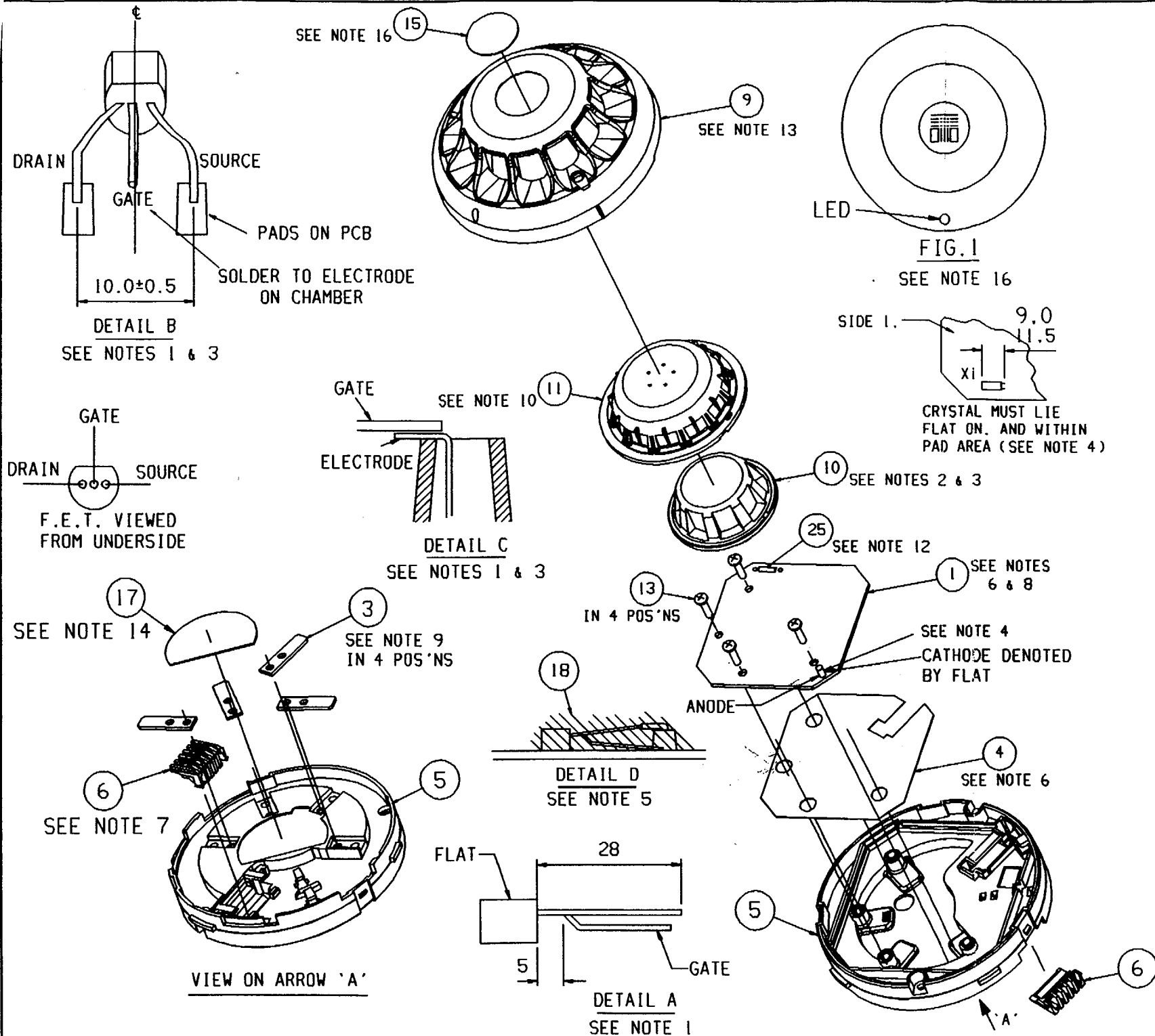


FIG.3

THORN SECURITY	ISSUE	APP'D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	DO NOT SCALE - REMOVE ALL BURRS AND SHARP EDGES - ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED. TO BE READ IN CONJUNCTION WITH BS 308.								
	1	0.0	IN2199 5-9-96	0.0	008417 31-10-97	0.0	008506 4-2-98	0.0	008560 31-3-98	0.0	008593 14-5-98	0.0	008786 30-11-98																
	TITLE: 912I ATTACHMENT E3 ANALOGUE SMOKE DETECTOR																												
A3	DRAWN	EG	5-6-97	ENG'R	MATERIAL SEE COMPONENTS LIST							SCALE	NTS				RELEVANT DRAWINGS												
DRAWING No. 516-051-031																		FINISH				TOLERANCES (UNLESS STATED) GENERAL ±0.2mm HOLE CENTRES ±0.12mm HOLE DIAMETERS ±0.1mm -0 ANGULAR ±30°				USED ON			
SHEET 1 OF 2																													



NOTES:-

1. FORM TRANSISTOR LEADS OF ITEM 14 AS SHOWN IN DETAILS 'A' & 'B'. FORM SOURCE ELECTRODE ON CHAMBER AS SHOWN IN DETAIL 'C'.
2. FIT ION CHAMBER (ITEM 10) TO PCB ASSEMBLY (ITEM 1), THEN SOLDER USING ITEM 22.
3. AS SHOWN IN DETAIL 'B', SOLDER LEADS OF TRANSISTOR TO PADS ON PCB AND TO SOURCE ELECTRODE ON CHAMBER USING ITEM 22. SEE DETAIL 'C'. REMOVE SHORTING CLIP FROM F.E.T. LEADS.
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8. ORIENTATE AND LOCATE PCB ASSY (ITEM 1), BY HOOKING UNDER TAB ON BODY (ITEM 5).
9. SECURE PCB ASSEMBLY (ITEM 1) AND PRESSINGS (ITEM 3), 4 OFF, TO BODY (ITEM 5) USING SCREWS (ITEM 13), TIGHTEN SCREWS TO A TORQUE OF 1.5Nm.
10. CLIP BAFFLE (ITEM 11) TO PCB ASSEMBLY, ORIENTATE TO LOCATE ONTO LED.
11. TEST ASSEMBLY TO TS516-051-031.
12. SOLDER SELECTED S.O.T. RESISTOR (ITEM 25) TO PADS ON PCB ASSY USING ITEM 22. SEE FIG 3.
13. FIT COVER (ITEM 9) TO BODY (ITEM 5).
14. PRINT LABEL AS ON SHEET 2 & ADHERE TO UNDERSIDE OF BODY (ITEM 5), AS SHOWN.
15. SOAK TEST UNIT IN ACCORDANCE WITH SOAK TEST SPEC TS121-200-393 & WIPE TEST UNIT IN ACCORDANCE WITH WPI21-121-262.
16. ADHERE LABEL (ITEM 15) TO COVER (ITEM 9).
17. FIT DUST CAP (ITEM 12) & DUST CAP BASE (ITEM 16) ONTO DETECTOR

WARNING

ASSEMBLY CONTAINS A SMALL RADIOACTIVE SOURCE $Am^{241} < 0.9 \mu Ci, 3.33 kBq$ DETECTOR TO BE MANUFACTURED, STORED, TRANSPORTED, INSTALLED & DISPOSED OF IN ACCORDANCE WITH COMPANY PROCEDURES COVERING RADIOACTIVE ION CHAMBER DETECTORS/SENSORS.

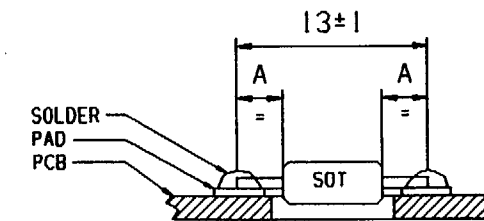


FIG. 3

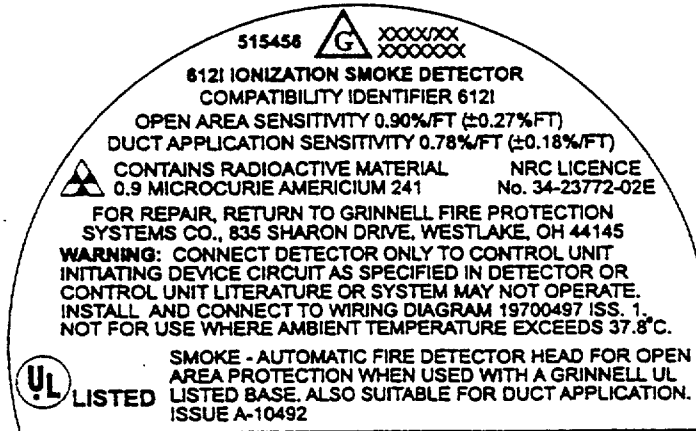
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THORN SECURITY

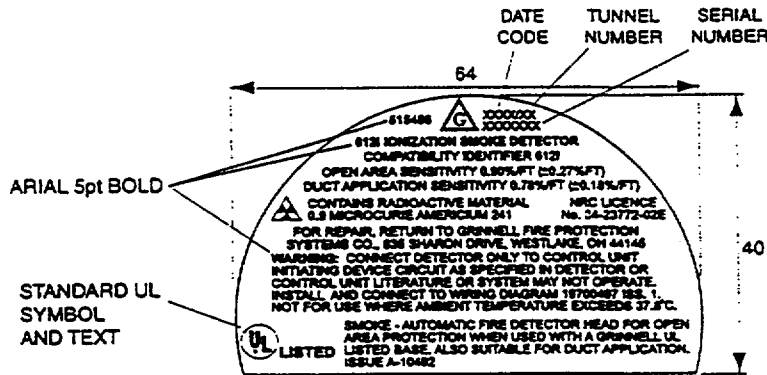
A3	APP'D	0.0	0.0	0.0	0.0	0.0	DRAWN EG 5-6-97 ENG'R DEV. No. DRAWING No. 516-051-031 SHEET 1 OF 2	MATERIAL SEE COMPONENTS LIST	SCALE NTS	TOLERANCES (UNLESS STATED) GENERAL ±0.2mm HOLE CENTRES ±0.12mm HOLE DIAMETERS ±0.1mm -0 ANGULAR ±30°	RELEVANT DRAWINGS USED ON
	ISSUE	1	2	3	4	5					
	IN2199	008417	008506	008560	008593	008786					
	5-9-96	31-10-97	4-2-98	31-3-98	14-5-98	30-11-98					
TITLE 9121 ATTACHMENT 3 ANALOGUE SMOKE DETECTOR											

DO NOT SCALE - REMOVE ALL BURRS AND SHARP EDGES - ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED. TO BE READ IN CONJUNCTION WITH BS 308.

REMOVE ALL BURRS SHARP EDGES - DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED
DO NOT SCALE - TO BE READ IN CONJUNCTION WITH BS 308 - IF IN DOUBT - ASK!



1.5 : 1



1:1

NOTES:

1. FILE HELD IN ADOBE ILLUSTRATOR 7.0 FORMAT
2. LABEL CAN BE SUPPLIED IN THE FOLLOWING FORMATS:
.AI, .PDF, .PCX, .TIF, .GIF, .JPG, .WPG.
3. ANY PART OF THE LABEL CAN BE SUPPLIED IN THE ABOVE FORMATS.
4. ALL TEXT 5pt ARIAL EXCEPT WHERE CHANGES SHOWN.
5. BLACK CHARACTERS ON WHITE BACKGROUND.

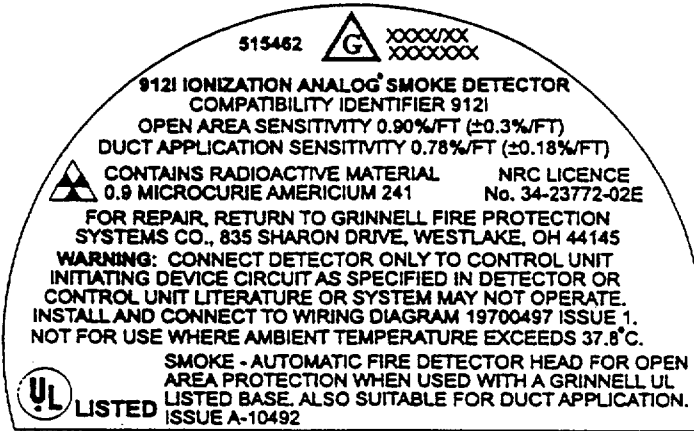
INK TDR2000 RIBBON. (UL RECOGNISED ARMOR RIBBON AXR7+)

APP'D								RELEVANT DRAWINGS
ISSUE	A 21/4/98	B 24/4/98	1 .2/6/98					USED ON 515456
MATERIAL	120-247-826		FINISH		SEE ABOVE			TOLERANCES (UNLESS STATED) GENERAL $\pm 0.2mm$ HOLE CENTRES $\pm 0.12mm$ HOLE DIAMETERS $-0.1mm$ ANGULAR ± 30
TITLE	LABEL - 612I IONIZATION SMOKE DETECTOR (GRINNELL)		DRAWN	2.6.98	DEV.No.	142/315		
			ENG'R	TA 6 02/06/98	DRAWING No.	515456		
			SCALE		SHEET	2 of 2		
			THIRD ANGLE PROJECTION					
A4								

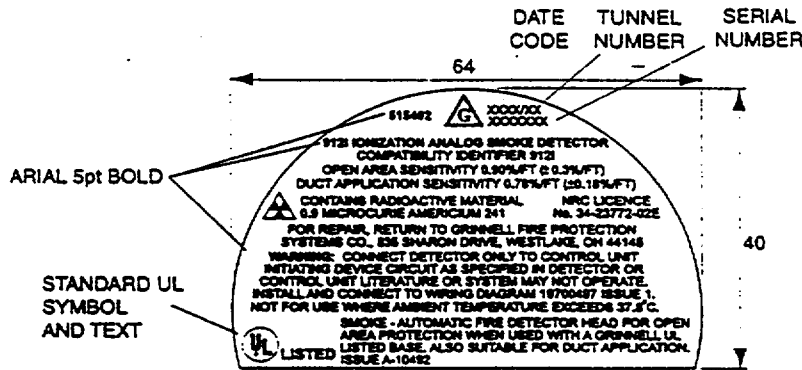
© 1998



REMOVE ALL BURR SHARP EDGES - DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED
DO NOT SCALE - TO BE READ IN CONJUNCTION WITH BS JOB - IF IN DOUBT - ASK!



1.5 : 1



1:1

NOTES:

1. FILE HELD IN ADOBE ILLUSTRATOR 7.0 FORMAT
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4. ALL TEXT 5pt ARIAL EXCEPT WHERE CHANGES SHOWN.
5. BLACK CHARACTERS ON WHITE BACKGROUND

INK TDR2000 RIBBON. (UL RECOGNISED ARMOR RIBBON AXR7+)

APP'D								RELEVANT DRAWINGS	
ISSUE	A 21/4/98	B 24/4/98	1 1/6/98					USED ON 515462	
MATERIAL	120-247-826			FINISH SEE ABOVE				TOLERANCES (UNLESS STATED) GENERAL ±0.2mm HOLE CENTRES ±0.12mm HOLE DIAMETERS -0.1mm -0 ANGULAR ±30	
TITLE	LABEL - 912I IONIZATION ANALOG SMOKE DETECTOR (GRINNELL)			DRAWN	<i>Z.L.F.B.</i>	DEV. No.	142/316		
				ENG'R	<i>TAG</i>	02/06/98	DRAWING No.	515462	
				SCALE			SHEET	2 OF 2	
				THIRD ANGLE PROJECTION					

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A4

SECTION TWO

CONTENTS:

1. Copy of current license 34-23772-01 Amendment No. 02
2. Application
3. Attachment B1 - Certificates of Recognition for RSO and Assistant RSO
4. Attachment B2 - Legal transfer documents
5. Attachment B3 - Site Map of 835 Sharon Drive



Grinnell®

FIRE PROTECTION SYSTEMS COMPANY

835 Sharon Drive
Westlake, Ohio 44145

A **tyco** INTERNATIONAL LTD. COMPANY

July 20, 1998

Application to amend license 34-23772-02E Amendment No. 02

GENERAL

The purpose of this application to amend the distribution license 34-23772-02E, Amendment 02, is to add the Lo-Pro Series Ion Detectors to the license and to remove the previous detectors which are no longer manufactured.

INTRODUCTION

The Lo Pro series detectors, 612I and 912I are smoke detectors using an ionisation chamber sensing element are intended for use in commercial/ industrial fire detection systems. The ionisation chamber is comprised of a sealed source of Americium 241 with a maximum activity of 0.9 microcuries. The source is purchased complete from Amersham International plc based in the United Kingdom and is listed under NRC registry NR136S174U as model AMM 1001H configuration DSC.A2.

The design of the Lo-Pro series detectors was carried out by Thorn Security Limited, doing business as Tyco Electronic Products Group in the United Kingdom. The detectors have been listed with Underwriters Laboratories against standard UL268, file number S466 category UROX.

The Lo-Pro Series is intended to replace the MF Series detectors covered by the existing license. Both series detectors share common design traits. The Americium 241 source is the same in both detector series, the MF series ion chamber configuration was assembled during the detector manufacturing process. The Lo-Pro series detectors utilize a completed ion chamber assembly supplied by Amersham.

The housing assemblies of the MF series and Lo-Pro series detectors are designed as snap together assemblies completely enclosing the ion chamber. Both series detectors passed the BS 5445 Part 7 standard testing for vibration, corrosion, impact and shock testing in the United Kingdom by the Loss Prevention Certification Board. Test reports of the Lo-Pro series detectors are included in this application.

Requirements of 10 CFR 32.26

1. *Description of the product and its intended use.*

The 612I and 912I (Lo-Pro) series smoke detectors employ an ionization chamber sensing element and is intended for use in commercial/industrial fire detection systems. The 612I is a conventional non-addressable smoke detector, while the 912I is an addressable smoke detector. The detectors are used in ceiling or wall mount applications in plug in bases which are wired to suitable control and indication equipment. These detectors are not intended for sale to the general public for domestic applications.

2. *Type and quantity of the byproduct material in each unit.*

The Lo-Pro series detectors use an Americium 241 source of 0.9 microcuries maximum, manufactured by

Amersham International plc.
White Lion Road
Amersham
Buckinghamshire, England
United Kingdom
HP9 9LL

The mounted Model AMM 1001H sealed source is registered with the Nuclear Regulatory Commission under No. NR136S174U.

3. *Chemical and physical form of the byproduct material in the product and changes in chemical and physical form that may occur during the useful life of the product.*

The sealed source consists of americium oxide uniformly distributed and sintered in a pure gold matrix which is further contained between a backing of gold coated pure silver and a front covering of either gold or gold-palladium alloy and fabricated by hot forging methods.

Prototype testing of the source to USASI standard N5.10-1968 and respective classifications of C54545 and C44444 have shown that changes in chemical and physical form during the useful life of the product is minimal.

Further details of source construction and prototype testing are included in attachment E1, "Registry of Radioactive Sealed Sources and Devices Safety evaluation of sealed Source".

4. *Solubility in water and body fluids of the byproduct material*

During prototype testing, of the source as detailed in the Registry No. NR136S174U, the foil was immersed in water for 3 weeks at room temperature: Less than .001 microcurie per foil loaded at maximum activity was found in the water.

During prototype testing, of the source as detailed in the Registry No. NR136S174U, was immersed in 0.1 N hydrochloric acid for 24 hours at room temperature: less than 0.004 microcurie activity was leached out.

5. *Details of construction and design of product relating to containment and shielding of byproduct material, and other safety features under normal and severe conditions of handling, storage, use and disposal.*

Sealed Source

The general construction meets Underwriters Laboratories Inc. Standard UL 217 and EN54 part 7. The radioactive material ²⁴¹Am is incorporated within a gold matrix and sandwiched between a silver backing and a palladium laminate. The face layer is thick enough to retain the radioactive material. The shaped foil pieces are staked into a holder and secured between spot welded metal plates or rolling over the holder edges. The source holders are made of AISI 316 stainless steel to provide maximum corrosion resistance. (See Attachment E2, Amersham Data Sheet 11262

The Lo-Pro series detectors, the 612I and 912I use the same mechanical construction. They differ in performance characteristics based upon the variations of the electronic circuit. The ionization chamber is common to both detectors. The following attachments provide details of design and construction.

Attachment E3

Drawing no.	516-050-31	612I	Assembly
Bill of Material	CL 516-050-031		612I
Drawing no.	516-051-031	912I	Assembly
Bill of Material	CL 516-051-031		912I

6. *Maximum external radiation levels at 5 and 25 centimeters from any external surface of product, averaged over an area not to exceed 10 square centimeters, and the method of measurement.*

The following approximate dose rate calculations of the ion chamber used in the detector are based upon thermoluminescent dosimetry data are shown in the table below and are reprinted from attachment E4, Amersham data sheet 11247 p3

Direction	Distance (cm)	Dose rate MSv/year	Dose rate rem/year
Normal to surface of outer cap electrode	5	0-1	0-01
Normal to surface of outer cap electrode	25	0-005	0-0005
Normal to source electrode	5	0-6	0-06
Normal to source electrode	25	0-03	0-003

7. *Degree of access of human beings to product during normal handling and use.*

The ion chamber is completely enclosed by the detector assembly. The design of the cover, body, and baffle make it impossible to contact or see the source without dismantling the detector. Removal of the cover can be achieved by simultaneously prying three tabs. The baffle must then be removed by simultaneously prying back three notched tabs. The function of the notched tabs is not readily apparent to those unfamiliar with the construction design.

The safety performance of the Amersham source has met the requirements of ISO 2919 and has met the recommended rating of C32222.

Access to the source is limited during normal handling and use. The packaging does not have to be removed during normal handling for shipping purposes. A clear plastic cover allows visibility of the labeling on the detector body molding.

The cover and baffle, which enshrouds the ion chamber, do not have to be removed during installation. The ion chamber is soldered to the PCB assembly. The PCB assembly is mounted to the body molding with four screws torqued to 1.5 Nm. This assembly method secures the source within the detector and minimizes access.

8. *Total quantity of byproduct material expected to be distributed annually.*

Expected annual distribution of the Lo-Pro series detectors is not expected to exceed 50,000 units, resulting in a maximum total activity of 45 millicuries.

9. *Expected useful life of the product*

The recommended working life of the sealed source is 10 years as described in Amersham data sheet 11262. Attachment E2

10. *Proposed methods of labeling or marking the detector and point of sale package to satisfy requirements of 10 CFR 32.29(b)*

The point of sale label is designed to meet the requirements of 10 CFR 29 b1. This label is clearly visible when the detector is removed.

The exterior of shipping cartons will contain a label to meet the requirements of 10 CFR 32.29 b3. This label will contain the statement; "This package contains radioactive material and has been manufactured in compliance with U.S. NRC safety criteria in 10 CFR 32.27. The purchaser is exempt from any regulatory requirements."

Copies of the labels are provided in Attachment E5.

11. *Procedures for prototype testing of product to demonstrate the effectiveness of the containment, shielding, and other safety features under both normal and severe conditions of handling, storage, use and disposal of the product.*

The source is registered with NRC under NRC Registry No: NR-0136S174-U AMM.1001H (IDNS).

The 612I and 912I series detectors have been approved by Underwriters Laboratories Inc. Listing against standard UL268, file number S466 category UROX. The Loss Prevention Certification Board prototype tested the detectors to BS EN5445 Part 7.

12. *Results of prototype testing, including any change in form of the byproduct material contained in the product, the extent to which the byproduct material may be leaked to the environment, any increase in external radiation levels, and any other changes in safety features.*

The sealed source provided by Amersham has been tested to conditions described by USASI standard N5.10-1968 and respective classifications of C54545 and C44444. Details of this testing is found in the Registry in Attachment E1.

The complete detector passed prototype testing by the Loss Prevention Certification Board. The table of contents and the test reports for the 612I and 912I detectors are included in Attachment E6. TE 86995 and TE 86927.

13. *Estimated external radiation doses and dose commitments relevant to the safety criteria in 10 CFR 32.27 and the basis for such estimates.*

In normal use, storage and disposal of the detector, the highest exposure will be experienced by the installation and service and warehouse personnel. It can be assumed that these personnel will be handling detectors singly or in packages and may be in contact with them for an estimated one hour per day maximum for two hundred and fifty hours per year. This would result in an absolute maximum dose of 0.0017 rem to the hands of the personnel concerned, this is below the maximum level in column I of the table in 10 CFR 32.28.

In normal use, handling and storage it is unlikely that there will be a significant reduction in the effectiveness of the containment or shielding. The prototype testing of the sealed source as outlined in the registry referenced in 11 above, indicate minimal dose commitment. The mechanical integrity of the complete detector was performed under abnormal conditions of use according to BS5445 Part 7 as referenced in 11 above. The testing included corrosion, shock vibration and impact.

The estimates for external radiation doses are based upon the dose rate table provided by Amersham for rem/year of the sealed source only. The addition of the body molding and cover provide additional protection.

14. *Determination that the probabilities with respect to the doses referred to in 32.27 (c) meet criteria of that paragraph.*

The probabilities expressed in determining the dose rates meet the criteria of that paragraph.

15. *Quality control procedures to be followed in the fabrication of production lots of the product and the quality control standards the product will be required to meet.*

The detectors are designed and manufactured by Thorn Security Limited, doing business as, Tyco Electronic Products Group (TEPG), an ISO 9001 registered firm, registration number FM967. See attachment E7.

The ISO 9001 quality system employed by TEPG provide procedures to address all clauses of the ISO standard, particularly, Process Control, Design Control, Document and Data Control and an Internal Audit Process. A specific procedure for handling, storage and transport has been developed to ensure that the product is dispatched according to applicable regulations. See Attachment E8 TSG 10.4

A U.S. division of the Tyco Electronic Products Group resides at Grinnell Fire Protection Systems Co. (GFPS) with responsibilities for design change approval through GFPS operations.

TEPG performs random leak test audits during the manufacturing of Ion Detectors. Records of all leak test results will be forwarded and maintained by GFPS.

The detectors will be initially transferred by Grinnell Fire Protection System Co., an ISO 9001 registered firm, registration number A5562. See attachment E7. The procedures for receipt and shipping are followed to ensure compliance to NRC regulations for labeling, packaging and record keeping. See Attachment E8. Receipt and Shipping of Ion Detectors. This procedure identifies the requirements for inspection, wipe testing and shipping. The identification and maintenance of records required in 10 CFR 32.29 4 c are addressed in this procedure.

Wipe samples performed at GFPS will be analyzed by Stan A. Huber Consultants which is licensed by the State of Illinois. License number IL-010131001.



Grinnell®

FIRE PROTECTION SYSTEMS COMPANY

835 Sharon Drive
Westlake, Ohio 44145

A **tyco** INTERNATIONAL LTD. COMPANY

July 20, 1998

Application to amend license 34-23772-02E Amendment No. 02

GENERAL

The purpose of this application to amend the distribution license 34-23772-02E, Amendment 02, is to add the Lo-Pro Series Ion Detectors to the license and to remove the previous detectors which are no longer manufactured.

INTRODUCTION

The Lo Pro series detectors, 612I and 912I are smoke detectors using an ionisation chamber sensing element are intended for use in commercial/ industrial fire detection systems. The ionisation chamber is comprised of a sealed source of Americium 241 with a maximum activity of 0.9 microcuries. The source is purchased complete from Amersham International plc based in the United Kingdom and is listed under NRC registry NR136S174U as model AMM 1001H configuration DSC.A3.

The design of the Lo-Pro series detectors was carried out by Thorn Security Limited, doing business as Tyco Electronic Products Group in the United Kingdom. The detectors have been listed with Underwriters Laboratories against standard UL268, file number S466 category UROX.

The Lo-Pro Series is intended to replace the MF Series detectors covered by the existing license. Both series detectors share common design traits. The Americium 241 source is the same in both detector series, the MF series ion chamber configuration was assembled by Thorn Security during the detector manufacturing process. The Lo-Pro series detectors utilize a completed ion chamber assembly supplied by Amersham.

The housing assemblies of the MF series and Lo-Pro series detectors are designed as snap together assemblies completely enclosing the ion chamber. Both series detectors passed the BS 5445 Part 7 standard testing for vibration, corrosion, impact and shock testing in the United Kingdom by the Loss Prevention Certification Board. Test reports of the Lo-Pro series detectors are included in this application.

Requirements of 10 CFR 32.26

1. *Description of the product and its intended use.*

The 612I and 912I (Lo-Pro) series smoke detectors employ an ionization chamber sensing element and is intended for use in commercial/industrial fire detection systems. The 612I is a conventional non-addressable smoke detector, while the 912I is an addressable smoke detector. The detectors are used in ceiling or wall mount applications in plug in bases which are wired to suitable control and indication equipment. These detectors are not intended for sale to the general public for domestic applications.

2. *Type and quantity of the byproduct material in each unit.*

The Lo-Pro series detectors use an Americium 241 source of 0.9 microcuries maximum, manufactured by

Amersham International plc.
White Lion Road
Amersham
Buckinghamshire, England
United Kingdom
HP9 9LL

The mounted Model AMM 1001H sealed source is registered with the Nuclear Regulatory Commission under No. NR136S174U.

3. *Chemical and physical form of the byproduct material in the product and changes in chemical and physical form that may occur during the useful life of the product.*

The sealed source consists of americium oxide uniformly distributed and sintered in a pure gold matrix which is further contained between a backing of gold coated pure silver and a front covering of either gold or gold-palladium alloy and fabricated by hot forging methods.

Prototype testing of the source to USASI standard N5.10-1968 and respective classifications of C54545 and C44444 have shown that changes in chemical and physical form during the useful life of the product is minimal.

Further details of source construction and prototype testing are included in attachment E1, "Registry of Radioactive Sealed Sources and Devices Safety evaluation of sealed Source".

4. *Solubility in water and body fluids of the byproduct material*

During prototype testing, of the source as detailed in the Registry No. NR136S174U, the foil was immersed in water for 3 weeks at room temperature: Less than .001 microcurie per foil loaded at maximum activity was found in the water.

7. *Degree of access of human beings to product during normal handling and use.*

The ion chamber is completely enclosed by the detector assembly. The design of the cover and housing makes it impossible to contact or see the source without dismantling the detector. Removal of the cover can be achieved by simultaneously lifting three tabs. The baffle must then be removed by simultaneously prying back three notched tabs. The function of the notched tabs is not readily apparent to those unfamiliar with the construction design.

The safety performance of the Amersham source has met the requirements of ISO 2919 and has met the recommended rating of C32222.

Access to the source is limited during normal handling and use. The packaging does not have to be removed during normal handling for shipping purposes. A clear plastic cover allows visibility of the labeling on the detector body molding.

The cover and baffle, which enshrouds the ion chamber, do not have to be removed during installation. The ion chamber is soldered to the PCB assembly. The PCB assembly is mounted to the body molding with four screws torqued to 1.5 Nm. This assembly method secures the source within the detector and minimizes access.

8. *Total quantity of byproduct material expected to be distributed annually.*

Expected annual distribution of the Lo-Pro series detectors is not expected to exceed 50,000 units, resulting in a maximum total activity of 45 millicuries.

9. *Expected useful life of the product*

The recommended working life of the sealed source is 10 years as described in Amersham data sheet 11262. Attachment E2

10. *Proposed methods of labeling or marking the detector and point of sale package to satisfy requirements of 10 CFR 32.29(b)*

The point of sale label is designed to meet the requirements of 10 CFR 29 b1. This label is clearly visible when the detector is removed.

The exterior of shipping cartons will contain a label to meet the requirements of 10 CFR 32.29 b3. This label will contain the statement; "This package contains radioactive material and has been manufactured in compliance with U.S. NRC safety criteria in 10 CFR 32.27. The purchaser is exempt from any regulatory requirements."

Copies of the labels are provided in Attachment E5.

7. *Degree of access of human beings to product during normal handling and use.*

The ion chamber is completely enclosed by the detector assembly. The design of the cover and housing makes it impossible to contact or see the source without dismantling the detector. Removal of the cover can be achieved by simultaneously lifting three tabs. The baffle must then be removed by simultaneously prying back three notched tabs. The retaining ring keeps the notched tabs secure during normal operation and must be removed prior to removing the baffle. The function of the notched tabs is not readily apparent to those unfamiliar with the construction design.

The safety performance of the Amersham source has met the requirements of ISO 2919 and has met the recommended rating of C32222.

Access to the source is limited during normal handling and use. The packaging does not have to be removed during normal handling for shipping purposes. A clear plastic cover allows visibility of the labeling on the detector body molding.

The cover and baffle, which enshrouds the ion chamber, do not have to be removed during installation. The ion chamber is soldered to the PCB assembly. The PCB assembly is mounted to the body molding with four screws torqued to 1.5 Nm. This assembly method secures the source within the detector and minimizes access.

8. *Total quantity of byproduct material expected to be distributed annually.*

Expected annual distribution of the Lo-Pro series detectors is not expected to exceed 50,000 units, resulting in a maximum total activity of 45 millicuries.

9. *Expected useful life of the product*

The recommended working life of the sealed source is 10 years as described in Amersham data sheet 11262. Attachment E2

10. *Proposed methods of labeling or marking the detector and point of sale package to satisfy requirements of 10 CFR 32.29(b)*

The point of sale label is designed to meet the requirements of 10 CFR 29 b1. This label is clearly visible when the detector is removed.

The exterior of shipping cartons will contain a label to meet the requirements of 10 CFR 32.29 b3. This label will contain the statement; "This package contains radioactive material and has been manufactured in compliance with U.S. NRC safety criteria in 10 CFR 32.27. The purchaser is exempt from any regulatory requirements."

Copies of the labels are provided in Attachment E5.

11. *Procedures for prototype testing of product to demonstrate the effectiveness of the containment, shielding, and other safety features under both normal and severe conditions of handling, storage, use and disposal of the product.*

The source is registered with NRC under NRC Registry No: NR-0136S174-U AMM.1001H (IDNS).

The 612I and 912I series detectors have been approved by Underwriters Laboratories Inc. Listing against standard UL268, file number S466 category UROX. The Loss Prevention Certification Board prototype tested the detectors to BS EN5445 Part 7.

12. *Results of prototype testing, including any change in form of the byproduct material contained in the product, the extent to which the byproduct material may be leaked to the environment, any increase in external radiation levels, and any other changes in safety features.*

The sealed source provided by Amersham has been tested to conditions described by USASI standard N5.10-1968 and respective classifications of C54545 and C44444. Details of this testing is found in the Registry in Attachment E1.

The complete detector passed prototype testing by the Loss Prevention Certification Board. The table of contents and the test reports for the 612I and 912I detectors are included in Attachment E6. TE 86995 and TE86927.

13. *Estimated external radiation doses and dose commitments relevant to the safety criteria in 10 CFR 32.27 and the basis for such estimates.*

In normal use, storage and disposal of the detector, the highest exposure will be experienced by the installation and service and warehouse personnel. It can be assumed that these personnel will be handling detectors singly or in packages and may be in contact with them for an estimated one hour per day maximum for two hundred and fifty hours per year. This would result in an absolute maximum dose of 0.0017 rem to the hands of the personnel concerned, this is below the maximum level in column I of the table in 10 CFR 32.28.

In normal use, handling and storage it is unlikely that there will be a significant reduction in the effectiveness of the containment or shielding. The prototype testing of the sealed source as outlined in the registry referenced in 11 above, indicate minimal dose commitment. The mechanical integrity of the complete detector was performed under abnormal conditions of use according to BS5445 Part 7 as referenced in 11 above. The testing included corrosion, shock vibration and impact.

The estimates for external radiation doses are based upon the dose rate table provided by Amersham for rem/year of the sealed source only. The addition of the body molding and cover provide additional protection.

14. *Determination that the probabilities with respect to the doses referred to in 32.27 (c) meet criteria of that paragraph.*

The probabilities expressed in determining the dose rates meet the criteria of that paragraph.

15. *Quality control procedures to be followed in the fabrication of production lots of the product and the quality control standards the product will be required to meet.*

The detectors are designed and manufactured by Thorn Security Limited, doing business as, Tyco Electronic Products Group (TEPG), an ISO 9001 registered firm, registration number FM967. See attachment E7.

The ISO 9001 quality system employed by TEPG provide procedures to address all clauses of the ISO standard, particularly, Process Control, Design Control, Document and Data Control and an Internal Audit Process. A specific procedure for handling, storage and transport has been developed to ensure that the product is dispatched according to applicable regulations. See Attachment E8 TSG 10.4

A U.S. division of the Tyco Electronic Products Group resides at Grinnell Fire Protection Systems Co. (GFPS) with responsibilities for design change approval through GFPS operations.

TEPG performs random leak test audits during the manufacturing of Ion Detectors. Records of all leak test results will be forwarded and maintained by GFPS.

The detectors will be initially transferred by Grinnell Fire Protection System Co., an ISO 9001 registered firm, registration number A5562. See attachment E7. The procedures for receipt and shipping are followed to ensure compliance to NRC regulations for labeling, packaging and record keeping. See Attachment E8. Receipt and Shipping of Ion Detectors. This procedure identifies the requirements for inspection, wipe testing and shipping. The identification and maintenance of records required in 10 CFR 32.29 4 c are addressed in this procedure.

Wipe samples performed at GFPS will be analyzed by Stan A. Huber Consultants which is licensed by the State of Illinois. License number IL-010131001.



Grinnell®

FIRE PROTECTION SYSTEMS COMPANY

835 Sharon Drive
Westlake, Ohio 44145

A **tyco** INTERNATIONAL LTD. COMPANY

July 20, 1998

Changes to license 34-23772-01 Amendment 02

1. The new name of the licensed organization.

Grinnell Fire Protection Systems Co.
835 Sharon Drive
Westlake, Ohio 44145

Grinnell Fire Protection Systems Co. is a division of Grinnell Corporation, a Delaware Corporation.

The license was originally issued in the name of Thorn Automated Systems, Inc. at the same address.

2. The new licensee contact and telephone number.

Reed Timko, Manager of Test Systems
Phone: 1-440-871-9900- ext 5122
Fax: 1-440-871-1870

3. Changes in personnel having control over licensed activities or named in licenses.

The Director of Operations, responsible for all activities related to the manufacturing process, is Al Hilt, who replaced H. T. Swanson. Mr. Hilt is a Professional Engineer and holds a Masters of Business Administration.

The Materials Manager, responsible for warehouse operations, including the area where the licensed materials will be stored for shipment, is Tim Woodworth, who replaced Danial Speese. Mr. Woodworth has 14 years of experience in warehousing and materials control.

The Radiation Safety Officer (RSO), who is also the Return Material Manager, is George E. Fertal, who replace H.T. Swanson. The Assistant RSO is Andy Schefft, Stockroom Clerk. On October 7, 1997, Mr. Fertal and Mr. Schefft successfully completed a two-day Radiation Safety and Management training course at Stan A. Huber Consultants, Inc. which is licensed by the State of Illinois (IL-010131001) Copies of Certificates of Recognition are submitted as Attachment B1.

4. Transferor status.

The transferor, Thorn Automated Systems, Inc., ceased to exist upon its merger with and into Grinnell Corporation as of December 31, 1996.

5. Description of the transfer transaction.

Pursuant to an agreement and Plan of Merger approved and adopted by each corporation in accordance with the General Corporation Law of the State of Delaware, Thorn Automated Systems, Inc. a Delaware corporation, on December 31, 1996, merged with and into Grinnell Corporation, also a Delaware corporation, with Grinnell Corporation the surviving corporation. See attachment B2 for pertinent correspondence relating to the transfer.

6. Planned changes in organization, location, facility, equipment or procedures.

Relevant changes in organization are as described above. There have been no changes in equipment. Changes to procedures have been made to accommodate the name change from Thorn to Grinnell. The following operating procedures have been updated.

The Rec. Insp. Procedure for Ionization Chamber Smoke Detectors dated 09/28/90 rev A and the Wipe Test Specifications procedure dated 10/20/? has been replaced by Grinnell procedure: Receipt and Shipping of Ion Detectors.

The Radiological Protection Procedure not dated is no longer applicable.

The Quality Plan for MF312 Ion Chamber Detectors Reference 710 dated August 8th 1989 and QP-15 Quality Plan – Manufacturing – Standard Product is no longer applicable.

New procedures have been included in Appendix E8 of Section II of this application.

7. Changes in use, possession, location or storage of licensed materials.

No changes to the location have been made. The area identified for storage of detectors on the site map submitted for Amendment 01, dated August 18, 1994, has been changed due to the expansion of the facility. A new site map is included as attachment B3.

8. Changes in organization, location, facilities, equipment, procedures or personnel that would require a license amendment even without the change of ownership.

Section III of this submission include documentation required to amend Section 10 of Materials License 34-23772-02E to include Tyco Electronic Product Group Lo-Pro series detectors.

9. Surveillance items and records

All surveillance items and records were current at the time of transfer, and remain current as applicable. Physical inventory records and wipe test records of MF Series ion detectors covered by the two referenced licenses have been maintained.

10. Records concerning decommissioning.

There have been no spills or unusual occurrences involving the spread of contamination in or around the facility, equipment or site. In addition, the sealed sources have not leaked. Drawings and information concerning structures and equipment in restricted areas where radioactive materials are used and/or stored are in attachment B3.

11. Contamination status of the facility

The facility at 835 Sharon Drive is free of contamination. All wipe test records of materials transferred from the facility indicate no source leakage. The facilities listed as 835 Sharon Drive indicate no source leakage. There has been no transfer of product since February 22, 1996.

12. Decontamination Plans

See responses 10 and 11.

13. Transfer Commitment

Grinnell Corporation agrees to abide by all commitments and representations previously made to the NRC by Thorn Automated Systems including those relating to maintaining decommissioning record, implementing decontamination activities, and addressing inspection items if any arise in the future. There are no open inspection items or enforcement actions. Grinnell accepts full responsibility for the site.

14. Agreement to the change in ownership or control of the licensed material.

See responses number 4, 5 and 13.

15. Commitment to Abide by Licenses

Grinnell Corporation hereby commits to abide by all constraints, conditions, requirements, representations, and commitments identified in the licenses.



CERTIFICATE

This is to certify that

George E. Fertal

has participated in
and successfully completed the

**Radiation Safety &
Management Course**

and is awarded this

CERTIFICATE OF RECOGNITION

on this date of October 2, 1997

Stan Huber

**Stan A. Huber, President
Stan A. Huber Consultants, Inc.**

Attachment B1



CERTIFICATE

This is to certify that

Andrew R. Schefft

has participated in
and successfully completed the

**Radiation Safety &
Management Course**

and is awarded this

CERTIFICATE OF RECOGNITION

on this date of October 2, 1997

Stan Huber

**Stan A. Huber, President
Stan A. Huber Consultants, Inc.**

ATTACHMENT B-1



Grinnell[®]

CORPORATION

10R
3 Tyco Park
Exeter, NH 03833-1114
603-778-9200

TO WHOM IT MAY CONCERN:

Grinnell Corporation is a wholly owned subsidiary of Tyco International Ltd. of Exeter, New Hampshire. Tyco is a New York Stock Exchange Company, a component of the S&P 500, and carries a 5A2 rating in Dun & Bradstreet.

TRADE REFERENCES

Sawhill Tubular
P.O. Box 11
Sharon, PA 16146
(412) 346-7107

NIBCO, Inc.
500 Simpson
Elkhart, IN 46515
(219) 295-3000

BANK REFERENCE

Global Corp. Attn: Marlene Bushee FAX #(412) 234-8390
Banking Credit Inquiry
Mellon Bank
One Mellon Bank Center
Room 4550
Pittsburgh, PA 15258-0001

BONDING COMPANY

Federal Insurance Company
15 Mountain View Road
Warren, NJ 07061

AGENT OF BONDING COMPANY

Willis Corroon
1 Exeter Plaza
Boston, MA 02116

GRINNELL CORPORATION IS THE SUCCESSOR IN INTEREST
TO THORN AUTOMATED SYSTEMS, INC.

FP/pws
143PWS

Attachment B2

FILED

MAR 6 1998
9AM
General Services

CERTIFICATE OF AMENDMENT
OF
CERTIFICATE OF INCORPORATION
OF

GRINNELL FIRE PROTECTION SYSTEMS COMPANY, INC.

Adopted in accordance with the provisions
of Section 242 of the General Corporation
Law of the State of Delaware

We, L. Dennis Kozlowski, President and Bernard J. Doherty, Secretary of Grinnell Fire Protection Systems Company, Inc., a corporation existing under the laws of the State of Delaware, do hereby certify as follows:

FIRST: That the Certificate of Incorporation of said corporation has been amended as follows:

By striking out the whole of Article 1 thereof as it now exists and inserting in lieu and instead thereof a new Article 1, reading as follows:

ARTICLE 1. The name of the corporation is
GRINNELL CORPORATION.

SECOND: That such amendment has been duly adopted in accordance with the provisions of the General Corporation Law of the State of Delaware by the unanimous written consent of all of the stockholders entitled to vote in accordance with the provisions of Section 228 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, we have signed this certificate this 14th day of February, 1986.

L. Dennis Kozlowski

President

00002

ATTEST:

B. J. Doherty

Secretary



12-31-96
09:00

CERTIFICATE OF MERGER
OF
THORN AUTOMATED SYSTEMS, INC.
 (Subsidiary)
INTO
GRINNELL CORPORATION
 (Parent)

The undersigned corporation, organized and existing under and by virtue of the General Corporation Law of the State of Delaware,

DOES HEREBY CERTIFY:

FIRST: That the name and state of incorporation of each of the constituent corporations of the merger is as follows:

<u>Name</u>	<u>State of Incorporation</u>
Grinnell Corporation	Delaware
Thorn Automated Systems, Inc.	Delaware

SECOND: That an agreement and plan of merger ("Agreement and Plan of Merger") between the parties to the merger has been approved, adopted, certified, executed and acknowledged by each of the constituent corporations in accordance with the requirements of Section 251 of the General Corporation Law of the State of Delaware.

THIRD: That the name of the surviving corporation of the merger is Grinnell Corporation.

FOURTH: That the Certificate of Incorporation of Grinnell Corporation, a Delaware corporation, the surviving corporation, shall be the Certificate of Incorporation of the surviving corporation.

FIFTH: That the executed Agreement and Plan of Merger is on file at the principal place of business of the surviving corporation. The address of the principal place of business of the surviving corporation is Three Tyco Park, Exeter, New Hampshire 03833.

State of Delaware

Office of the Secretary of State

I, EDWARD J. FREEL, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF MERGER, WHICH MERGES:

"THORN AUTOMATED SYSTEMS, INC.", A DELAWARE CORPORATION, WITH AND INTO "GRINNELL CORPORATION" UNDER THE NAME OF "GRINNELL CORPORATION", A CORPORATION ORGANIZED AND EXISTING UNDER THE LAWS OF THE STATE OF DELAWARE, AS RECEIVED AND FILED IN THIS OFFICE THE THIRTY-FIRST DAY OF DECEMBER, A.D. 1996, AT 9 O'CLOCK A.M.



Edward J. Freel

Edward J. Freel, Secretary of State

0776275 8100M

AUTHENTICATION:

8285880

971014340


DATE:

01-15-97


SIXTH: That a copy of the Agreement and Plan of Merger will be furnished by the surviving corporation on request and without cost to any stockholder of any constituent corporation.

IN WITNESS WHEREOF, the undersigned, the surviving corporation, has caused this Certificate of Merger to be signed by a duly authorized officer and attested thereto this 31st day of December, 1996.

GRINNELL CORPORATION

By: 
John J. Guarnieri
Vice President

ATTEST:

By: 
M. Brian Moroze
Assistant Secretary

Site Map

Grinnell Fire Protection Systems Co.
835 Sharon Drive
Westlake, Ohio 44145

