VOID SHEET

TO: License Fee Management Brancn

FROM: A. Kirkwood, NMSS/IMNS/IMAB

SUBJECT: VOIDED APPLICATION

Control Number: 021891

Applicant: Hochiki America Corporation

Date Voided: 4/2/97

Reason for Void: Sealed Source Device Section voided registry review request. Licensee not responsive to deficiency questions.

A. Kirkwood 4/2/97
Signature Date

Attachment:
Official Record Copy of
Voided Action

FOR LFMB USE ONLY

Final Review of VOID Completed:

MLOD 2/1

☐ Refund Authorized and processed

☐ No Refund Due

☐ Fee Exempt or Fee Not Required

240059

Comments: After Received

Log completed ☐

Processed by:

April 3, 1997

Mr. Gyo Shinozaki
Hochiki America Corporation
15412 Electronic Lane, #210
Huntington Beach, CA 92649

Dear Mr. Shinozaki:

This letter is in reference to your application dated January 29, 1997, requesting registration of the SI Series Model smoke detector. After reviewing the application for the SI Series, it became apparent that this application contained the same deficiencies as in the application for the AI Series smoke detector that was submitted last year. Please note that the application for the AI Series contained numerous deficiencies that needed to be addressed. Therefore, we are returning the incomplete application (enclosed) for the SI Series without further action. You may submit a revised application for the SI Series addressing the same concerns raised about the AI Series. These concerns are outlined in the two NRC letters dated June 31, 1996, and September 26, 1996. Please reference mail control number 021891 when submitting the completed new application. Since your registration application is being returned without action, we are also returning your license application without action.

Sincerely,

Christopher L. Brown, General Engineer
Sealed Source Safety Section
Medical, Academic, & Commercial
Use Safety Branch
Division of Industrial and
Nuclear Safety, NMSS

Enclosed: As stated

cc w/encl: Skimberley, LFDCB
Distribution:
SSSS r/f SSD-97-04 NE01
AKirkwood, IMAB
SSD File # NR-0355-D-105-E

DOCUMENT NAME: C:\OFFICE\WPWIN\WPDOCS\HOCHKI3.DEF
To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	IMAB		IMAB					
NAME	CBrown		SBaggett					
DATE	04/ /97		04/3/97					

OFFICIAL RECORD COPY

BETWEEN:

License Fee Management Branch, ARM
and
Regional Licensing Sections

(FOR LFMS USE)
INFORMATION FROM LTS

Program Code: 03255
Status Code: 0
Fee Category: 3H
Exp. Date: 20000131
Fee Comments:
Decom Fin Assur Reqd: N

LICENSE FEE TRANSMITTAL

A. REGION 0

1. APPLICATION ATTACHED
   Applicant/Licensee: HOCHIKI AMERICA CORPORATION
   Received Date: 970203
   Docket No: 3008210
   Control No.: 021891
   License No.: 04-14886-01E
   Action Type: Amendment

2. FEE ATTACHED
   Amount:
   Check No.: /

3. COMMENTS
   Form 567 provided to SSSS. Signed CBoyle Date 2/4/99 ✓

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered / ✓)

1. Fee Category and Amount: 3H $1,000

2. Correct Fee Paid. Application may be processed for:
   Amendment ✓
   Renewal
   License

3. OTHER

Signed
Date

97 FEB -5 AM 8:33

Log: Feb. 1 HQs
Remitter:
Check: 22259 $4,400
Amount: $1,000 ($4,400 - Dallas - 97-04)
Fee Category: 3H
Type of: AMD
Date Received:
Date Completed: 3/20/97
By: SH

030-08210

HOCHIKI

HOCHIKI AMERICA CORPORATION
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

(714) 898-0795
(310) 431-0809
ADMIN. FAX (714) 895-0659
SALES FAX (714) 892-2809

January 29, 1997

Steven L. Baggett
Section Chief
U.S. Nuclear Regulatory Commission
Sealed Source Safety Section
Division of Industrial and Medical
Nuclear Safety
Washington D.C. 20555

Subject: Amendment To Materials License # 04-14886-01E

Dear Mr. Baggett:

Please find attached our submission to include our new SIJ series detector on our Materials License. The SIJ series smoke chamber is virtually identical to the SIH series detector which is on our current Materials License. The outer plastics have been changed to give the detector a new look making it compatible with our new series of photoelectric detectors. In this submission we have revised the text to read **SI_ Series** for the SIH and SIJ detectors (as we have done in the past for our **AI_ Series** detectors). Mr. Christopher Brown is familiar with the construction of our products as he has assisted Hochiki in recent submissions.

If you have any questions regarding this submission please don't hesitate to contact us.

Sincerely,

Gyo Shinozaki
Senior Operating Manager- Corporate Planning
Radiation Safety Officer
(714) 898-0795 X 265

Loren L. Leimer
Senior Operating Manager NS Project
Alternate Radiation Safety Officer
(714) 898-0796 X 785

021891

APPLICATION TO THE U.S. NUCLEAR REGULATORY COMMISSION FOR RADIATION SAFETY EVALUATION AND REGISTRATION OF DEVICES

January 22, 1997

HOCHIKI AMERICA CORPORATION
15412 ELECTRONIC LANE
HUNTINGTON BEACH, CA 92649
MANUFACTURER AND DISTRIBUTOR

CONTACT: GYO SHINOZAKI- RSO
LOREN LEIMER- ALT. RSO
TEL (714) 898-0795
FAX (714) 892-2809

IONIZATION TYPE SMOKE DETECTORS

Smoke detector models for submission:
Hochiki Model SI_ Series

These series of detectors are manufactured for both Hochiki customers as well as private labelled for specific customers. See enclosure 1.

RADIOACTIVE SOURCE Am-241 0.5 uCi MODELS

Amersham International
2636 S. Clearbrook Dr.
Arlington Hts., IL 60005
Model: AMMK-2812
USNRC Model: AMM-1001

NRD Inc.
2937 Alt Bl. North
Grand Island, NY 14072
Model: Model A001
USNRC Model: A-001

Radioactive material possessed under conditions of California License 2090-30 (agreement state). Sources will be leak tested at time of manufacture and distribution in compliance with 10 CFR Part 32.29 and as described within this document.

These detectors are Principal Use Code **"P"** devices proposed for use under a license exemption per 10 CFR Part. 30.20).

021891

Summary Description

The SI_ series smoke detector are industrial ionization type. They are intended to be used for the protection of life and property from fires by the detection of airborne particulates. These detectors will normally be mounted on the ceiling or below the floor. A complete system will generally be comprised of a number of detector heads which are connected to and operate from a central control unit. The SI_ series detectors are designed in such a way that the radioactive material is not readily accessible in its location within the assembly. The outside cover protects the chamber and prevents most objects from reaching the source. During installation there is no need to remove any mechanical or electrical parts which would also preclude anyone from inadvertently coming in contact with the radioactive source.

Description, Intended Use and Operation

The SI_ series ionization smoke detector are provided with a radioactive source of Am-241, 0.5 uCi to ionize the air. The detectors are designed to detect an abnormal decrease in ionization current due to the combustion products created by a fire. They are installed in a fixed location. The source housing does not move during operation.

The SI_ series smoke detectors have two sampling chambers, an outer and an inner ionization chamber. Smoke or invisible gasses can freely penetrate the outer chamber, but the inner chamber is virtually closed to prevent easy entry. With both chambers ionized by radioactive source Am-241, a very small amount of current flows in the circuit. The presence of smoke or gases will influence the current flow in the outer chamber and will cause a change in the voltage ratio between chambers. This difference is then amplified inside the detector and transmitted to the fire alarm control unit to which it is connected. (See Enclosure 2).

1. Details of Construction and Use

A list of mechanical parts for the SI_ series are shown on Enclosure 3 and 3A. Enclosure 4 and 4A shows the major mechanical parts used in the SI_ series assemblies. Enclosures 5, 5A through 13,13A are drawings of those parts and their respective materials. The method of attaching the foil to the inner electrode is shown in Enclosure 14, 14A and 14B. The foil is captured onto the inner electrode with a retaining disc which is staked in place by a hydraulically controlled welding machine. The inner electrode is placed into the insulation plate and the intermediate electrode is then snapped over the inner electrode and into the insulation plate. One leg of the intermediate electrode snaps into the insulation plate and the other leg protrudes through the insulation plate and is soldered onto one lead of the FET. This assembly process assures that the source is protected from damage and makes it otherwise tamper proof. The outer cover protects the unit and prevents objects from approaching the source. The closest approach is approximately 2 cm. During operation the outer cover, outer electrode and the intermediate electrode prevent someone or something from contacting the source.

The detector has been designed so that once the radioactive material has been assembled into the unit at the factory, it is inaccessible without someone removing the printed circuit board from the detector and de-soldering the two legs of the outer electrode. After the detector has been assembled by the factory there would be no need for disassembly, by either the installers or other field service technicians.

The SI_ series detectors are tested and listed to the ANSI/ UL 268-1988 standard. This standard requires that the detectors be subjected to variable ambient temperatures, humidity plunges, corrosive environments and vibration testing. After such testing, the detectors shall function normally. During normal use, detectors are not expected to be subjected to ambient conditions outside of the listed parameters.

Total Expected Annual Distribution

It is estimated that a total of up to 300,000 detectors will be distributed in the United States annually. Each detector contains 0.5 uCi, making the maximum distribution of Am-241 in the United States 150 millicuries. The useful life of the detector is assumed to be 10 years. This is the same useful life value commonly used in other similar fire protection devices already in service in the field.

2. Labeling and Marking

Each detector is manufactured with a permanent type, self adhesive backed label which is affixed to the bottom of the detector. (See Enclosure 15A through 15H). The label contains the model name, type of detector, serial number, amount and type of radioactive material used, distribution license number, installation instruction drawing number, where to send for service, where unit was produced and other pertinent information regarding its use. The labels are expected to last the useful life of the detector. The SI_ series detectors are placed in a shock absorber insert and then into a ten piece shipping carton. Each carton is printed with the name of the radio-nuclide and the quantity of activity: Americium 241, 0.5 uCi. (See Enclosure 16 through 16G).

3. Prototype Testing and Evaluation

Tests were performed on the source after it was mounted onto the inner electrode. The tests were done by the Japan Radioisotope Association. The certification of approval under the classification C 32222 of IS-Z4821 of the above mentioned part is included in Enclosure 17. Hochiki Corporation in Japan performed vibration tests on 6 completed detectors. The test consisted on 1000 cycles per minute at an amplitude of 4 mm for 60 minutes. The test results showed no leakage of the source. The results also showed there was no damage to the integrity of the operation of the detector. (See Enclosure 18, 19).

An impact test was also performed by Hochiki America Corporation. The results showed that the there was no leakage from the detector source. Two each of the SI_ series detectors were dropped from a height of 12 feet. A total of 25 drops were performed on each detector, and there were some signs of physical damage. Further investigation revealed that the inner electrode that holds the RI material was not damaged and appeared to be unaffected. The outer and inner electrodes remained very solid within the insulation plate and showed no other signs of physical damage. Even though there were signs of external physical damage the internal components remained unaffected so as to protect the radioactive source and keeping it isolated from direct contact with the outside. (See Enclosure 20 and 20A).

SOLUBILITY OF WATER AND BODY FLUIDS

The following tests were performed by Amersham International Corporation Radiochemical Center in England to determine solubility of the foils in water and body fluids:

Test - 1 Sample foils containing 100 uCi Am-241 in an area of 1 square cm were immersed in distilled water at 98 degrees Fahrenheit for four (4) hours. In all tests, less than 0.003 uCi Am-241 were transferred to the water.

Test - 2 Sample foils containing 1 uCi in an area of 9 square mm were immersed in distilled water for three (3) weeks. In all tests, less than .001 uCi Am-241 were transferred to the water.

Test - 3 Sample foils containing 1 uCi in an area of 9 square mm were immersed in distilled water for twelve (12) weeks. Wipe out tests and immersion tests carried out on the foils indicated less than .001 Am-241 were removed from the sample.

Test - 4 Sample foils containing 1 uCi in an area of 9 square mm were immersed in a 0.1n HC1 solution for four (4) hours at 98 degrees Fahrenheit. In all tests, less than .004 uCi Am-241 were removed from the sample. HC1 was chosen for this test to more closely simulate body fluids.

The following were performed by New York State University at Buffalo to determine solubility of the foils in water and body fluids for NRD Inc..

Test 1 - Sample foils containing 2 uCi Am-241 in an area of 20mm2 were immersed in city water at 98 degrees Fahrenheit for four (4) hours. In all tests, less than 0.0001 uCi Am-241 was transferred to the water.

Test 2 - Sample foils containing 2 uCi in an area of 20mm2 were immersed in city water for twelve (12) days. In all tests, less than .001 uCi were transferred to the water.

Test 3 - Sample foils containing 2 uCi in an area of 20mm2 were immersed in a solution simulating digestive juices with a ph of 1.96 for seven and one half (71/2) hours - Total activity released was less than .005 uCi.

Based on Test Report May 1976 David Dooley etal.

4. Quality Control

Incoming inspections are performed when containers of radioactive material are received. The outside of the shipping container is smear tested and the results recorded. The inside of the inner container is smear tested and the results recorded. If any contamination is detected, the foils are isolated and returned to the manufacturer for disposal. If there is no contamination detected the foils are placed in the safe and the information recorded. Before the foils are dispersed to the assembly area the inside of the container is smear tested and the results recorded and initialed. If any contamination is detected the foils are isolated and returned to the manufacturer of the foils for disposal. These tests are onducted by using a cotton tip swab wetted with alcohol. Wipes are inserted into the chamber of the Eberline SRM-100 and counted. The results are recorded on the appropriate forms. The background of the Eberline model SRM-100 will be determined by counting with the chamber empty and the results recorded in the appropriate space on the applicable form.

Any wipe showing greater than 10 cpm above background will be recounted to verify results. If results continue to show more than 10 cpm above background, item(s) will be cleaned until no activity is detectable.

There are two survey meters that can be used to make these tests. Each will be calibrated by the manufacturer against known radioactive materials including americium anually. The testers are incorporated into Hochiki's equipment calibration program.

A minimum of 1% of the daily production of ionization chambers, randomly selected, will be wiped. The results will be recorded,. Any contamination detected will result in an investigation until the cause is found. Contaminated units will be properly disposed of according to applicable regulatory procedures.

FINISHED GOODS PRIOR TO SHIPMENT

100% of all the daily quantity of units ready for final packaging will be wiped, counted, recorded and initialed. The following are the procedures routinely performed:

1. Indicate on the form provided the lot number, date, serial numbers and the sample size of the lot checked.

2. Background of the Eberline SRM--100 currently being used will be determined by counting with the chamber empty and the results recorded on the appropriate form.

3. A cotton tip swab, wetted with alcohol, will be used to wipe the detectors. The area wiped will not exceed 100 cm per wipe.

4. Wipes will be taken through the slots in the outer enclosure until the swab touches the bug screen.

5. A maximum total of 100 detectors are to be wiped before the swab is placed in the meter and the findings recorded and initialed.

6. Any wipes showing a reading greater than 10 cpm above background will be recounted to verify results. If the wipe shows more than 10 cpm above background, the detectors will be re-wiped and the data recorded. If the detectors show the presence of contamination, they will be checked and cleaned until no activity is detectable, or the contaminated detector(s) will be disposed of by a NRC approved procedure.

Radiation Profiles

BY-PRODUCT MATERIAL

The radioactive isotope used in the SI_ series detectors is Americium - 241, manufactured by Amersham International Corporation and NRD Inc.. The activity is 0.5 uCi, the physical size is 2.5 X 2.5 mm. (See Enclosure 21 and 22). The Amersham part number is AMMK-2812 the NRC listed model number is AMM-1001. The NRD model number is A001 and the NRC listed model number is A001.

Each detector contains a single foil. Each detector is defined by a unique serial number. The source is mounted onto the inner electrode and crimped into place.

BY-PRODUCT, CHEMICAL & PHYSICAL FORM

The radio nuclide, in the form of Americium oxide (AmO2), is uniformly distributed and sintered in a matrix of pure fine gold at temperatures in excess of 800 degrees C. It is contained between a backing of pure silver and a front covering of gold-palladium alloy (94% gold, 6% palladium) by hot forging. The metal layers, continuously welded, are extended by means of a power rolling mill to give required foil strips which contain 8 uCi per cm2 and from which elements of foil are cut into sections containing 0.5 uCi each. Encapsulating in this manner insures that there will be no physical or chemical changes in the radioactive material over the life of the detector.

RADIATION FROM SMOKE DETECTOR HEADS

Radiation dose from 2 SIH series detectors was measured in Tokyo, Japan by Hochiki Corporation. A hologram G-M tube attached to an Corporation TGS 111 Survey Meter was used in these measurements. The radiation dose from 2 SIJ series detectors was measured in Huntington Beach, CA. by Hochiki America. A hologram G-M tube attached to an Eberline SRM-100 Survey Meter was used in the measurements. Four positions on the detector were measured, top, bottom, left and right sides. These measurements were taken at the surface of the detector, and at 5 cm and 25 cm to the center of the tube. The tube was calibrated against a CO 60 source. The dose rates are an average of the measurements from the two detectors. (See Enclosure 23 and 23A).

SIH Series	*SIJ Series*
At 5 cm 1.6 uR/hr	At 5 cm .22 uR/hr
At 25cm 0.3 uR/hr	At 25 cm .018 uR/hr

Dose rate measurements for the SIJ series were lower than that of the SIH series detector. We will therefore use the SIH series dose rates for the theoretical calculations.

CALCULATED DOSE RATES

A theoretical dose rate may be calculated, based on a gamma emission of 60 KeV (35%) and a specific gamma ray constant of 0.036 R/h at 1 meter from 1 Ci (Radiological Health Book, HEW, 1970.)

The calculated dose rate at 5 cm from a 0.5 uCi source, for comparison:

$$\frac{(0.036)\,(0.35)\,0.5 \times 10^{-6})\,(100^2)}{(5.0)^2} = 2.5 \text{ uR/hr}$$

Similarly, the dose rate, 25 cm from a 0.5 microcurie source is calculated to be:

$$\frac{2.5\,(5.0)^2}{(25)^2} = 0.10 \text{ uR/hr}$$

ORNL Report TM-2864 reports an exposure rate of 0.01 mR/h 14 cm from a 13.5 uCi foil. This would translate into a dose rate of 2.9 uR/hr at 5.0 cm from a 0.5 uCi source.

RADIATION DOSE AND DOSE COMMITMENTS

To determine the external exposure dose rate it was assumed that the dose rate 5 cm from a 0.5 uCi of Am-241 is 1.6 uR/hr. This was based on the average value measured as previously outlined in Enclosures 22. From this dose rate, other distances were calculated. Such as, the dose rate 25 cm from the detector:

$$\frac{(1.6)(5.0)^2}{(25)^2} = .06 \text{ uR/hr}$$

The following were also calculated:

At 2cm from the source 11uR/hr.

At 5cm from the source 1.6 uR/hr

At 25cm from the source 0.06 uR/hr

At 1m from the source 0.004 uR/hr

At 2m from the source 0.001 uR/hr

At 3m from the source 0.004 uR/hr

A number of potential exposure conditions are summarized below using the values calculated previously. It was assumed in the evaluations that the detectors were mounted on the ceiling as in a normal field installation.

Example 1

A person who works in a facility protected by one or more detectors and lives in a residence with 1 detector in the bedroom and 1 or more in the hallway. The estimated dose is:

8 hrs/day work at 1m 0.004 X 8 X 5 X 50 = 8 urems/y

8 hrs/day work at 2m 0.001 X 8 X 365 = 3 urems/y

8 hrs/day transient at 1m 0.004 X 4 X 365 = urems/y

Total annual dose = 17 microrems or 0.017 mrems per year. If this same person were to be involved in cleaning or relocating 5 detectors and if this operation was performed 6 times a year and it took 1 hour per operation, the estimated dose would be: Body at 25 cm, 30 hours. X 0.06 = 1.8 urems/y or 0.002 mrems/y. Hands at surface, 30 hrs. X 4 = 120 urems/y or 0.12 mrems/y.

The total annual dose estimate for this person would be:

Body, 0.017 + 0.002 = 0.02 mrems/y

Hands 0.017 + 0.12 = 0.14 mrems/y

Example 2

A person who is working at a station 1 m from a lot of 100 detectors that are stacked in such a way that they would be in a cube approximately 60 cm on a side. The calculated dose rate at 1 m from this lot is 0.12 urads/hr. The estimated dose is: .12 X 40 X 50 = 240 urems/y or 0.24 mrems/. The same person might also handle an individual detector 1 hour per day and this additional dose would be:

Body at 25 cm 0.06 X 5 X 50 = 15 urems/y or 0.02 mrems/y

Hands at 5 cm 1.6 X 5 X 50 = 400 urems/y or 0.40 mrems/y

Assuming the same person was also exposed as the person in example 1, this dose would be: Body, .24 + 0.02 + 0.02 = 0.28 mrems/y. Hands, .24 + 0.40 + 0.14 = 0.78 mrems/y.

Example 3

A person working in a warehouse who is stationed 3 m from a lot of 1000 detectors. It is calculated that the dose rate 3m from such an array would be 0.16 urads/h. The estimated dose is: 0.16 X 50 X 40 = 320 urems/y or 0.32 mrems/y. Assuming the 1000 were in 10 cartons of 100 detectors each, the same person might handle each of the 10 cartons an additional 4 times a year, 1 hour per handling. It is calculated that the dose rate from a carton containing 100 detectors is 1.6 urads/h at the surface and 0.55 urads/h at 25 cm. The estimated handling dose would be: Body at 25 cm, 0.55 X 10 X 4 = 22 urems/y or 0.02 mrems/y. Hands at surface, 1.6 X 10 X 4 = 64 mrems/y or 0.064 mrems/y. Assuming the same person were also exposed as in example 1, the estimated dose would be: Body, 0.32 + 0.02 + 0.02 = 0.36 mrems/y. Hands, 0.32 + 0.064 + 0.14 = 0.52 mrems/y.

Example 4

A person who installs detectors 40 hours per week might have his hands at the surface of a detector 1/4 of the time, and at 5 cm 3/4 of the time. The body average would be 25 cm from a detector. The estimated dose would be: Body, 0.06 X 40 X 50 = 120 urems/y. Hands, 25%, 4 X 40 X 50 X 1/4 = 2000 urems/y. Hands, 75%, 1.6 X 40 X 50 X 3/4 = 2400 urems/y. Total estimate dose to hands = 4400 urems/y or 4.4 mrems/y. Assuming the same person were also exposed as in Example 1, his estimated dose would be: Body, 0.12 + 0.02 = 0.14 mrems/y. Hands, 4.4 + 0.14 = 4.5 mrems/y.

Example 5

A person working 40 hours per week, repairing, cleaning detectors with his hands at 2 cm from the source 1/2 of his time and -5 cm from the detectors the other 1/2 of his time, the body averages 25 cm from the detector. His estimated dose would be: Body, 0.6 X 50 X 40 = 120 urems/y or 0.12 mrems/y. Hands 50% of the time 2 cm, 11X 50 X 40 X 1/2 = 11,000 urems/y. Hands 50 % of the time 5 cm, 1.5 X 50 X 40 X 1/2 = 1,600 urems/y. Total estimated dose to hands = 12,600 urems/y or 12.6 mrems/y.

Assuming the same person was also exposed as in example 1, the estimated dose would be: Body 0.12 + 0.02 = 0.14 mrems/y. Hands, 12.6 + 0.14 = 12.7 mrems/y.

Example 6

A person who transports 10 cartons containing 100 detectors each, totaling 1000 detectors across country traveling 4000 miles. The trip took 80 hours traveling at 50 mph. The estimated dose would be: 0.16 X 80 = 12.8 urems/y or .013 mrems/y. The same person making the trip 10 more times during the year would have an estimated dose of 0.13 mrems/y. If the same person were exposed as in example 1 in addition to the 10 trips made yearly, the estimated dose would be: 1 - trip, 0.013 + 0.01 = 0.023 mrems. 10 - trips, 0.13 + 0.01 = 0.14 mrems.

EXTERNAL EXPOSURE, SUMMARY

All of the examples used are very conservative in scope, such as distances, proximity to the source, and exposure times. Examples given do not take into consideration the shielding effect provided by packaging or other materials. All the preceding estimates are far less than the limits in 10 CFR 32.28, Column 1 (5 mrems/y body and 75 mrems/y hands), so it is very unlikely that these limits will be exceeded.

DOSE COMMITMENT

In the following section on Dose Commitment, several unusual examples, such as fires, are considered. While the Dose Commitments may be higher in these cases, the external exposure to such personnel as described will be negligible because of the short exposure times.

Calculations of the annual intake of AM-241 to produce a 50 year dose commitment of 0.005 rems, based on the report of ICRP Committee II on Permissible Dose for Internal Radiation follow:

$$R = \frac{EF\ (RBE)\ n\ (q)\ (3.7 \times 10^{4} \times 3600 \times 24 \times 365 \times 1.6 \times 10^{-6})}{100\ m}$$

Where EF (RBE) n = effective absorbed energy per dis, MeV
q = uCi of Am-241 deposited in organ of reference
m = mass of organ of reference, grams
3.7×10^{4} = dis/sec per uCi
3600 X 24 X 365 = sec/year
1.6×10^{-6} = ergs per MeV
100 = ergs/grams per rad
and R is in units of rems/year

$$R = \frac{EF\ (RBE)\ n\ q}{m} = (1.867 \times 10^{4})$$

If bone is the organ of reference, EF (RBE) n = 280, and $m = 7 \times 10^{3}$, and $R = \frac{280\ q}{7000}$

$= (1.867 \times 10^{4}) = 747$ q rems/year.

The integrated dose over 50 years is:

$$D = \frac{R}{\lambda}\ (1 - e\ \lambda^{-t})$$

Where R = rems/year
λ = the elimination constant = $0.693/T$ years^{-1}
T = the effective half-life, years
t = the time of consideration, years = 50 and D is in rems

For Bone, T is 5.1×10^4 days or 140 years, and

$$D = \frac{(747\ q)(140)}{0.693}(1 - e^{-0.2475}) = 3.30 \times 10^4\ q \text{ rems}$$

For the limiting dose of 0.005 rems,

$$q = \frac{0.005}{3.3 \times 10^4} = 1.5 \times 10^7 \text{ uCi}$$

The fraction of Am-241 inhaled which reaches the bone, Fa is 0.063, so the amount of AM-241 inhaled per year to produce a 50 year dose of 0.005 rems, Qa is:

$$\frac{1.5 \times 10^7}{0.063} = 2.4 \times 10^4 \text{ uCi}$$

Similarly, the fraction reaching the bone through ingestion, f is 2.5×10 and Qw is $\frac{1.5 \times 10^{-7}}{2.5 \times 10^{-5}} = 6.1 \times 10^{-3}$ by ingestion.

Another set of calculations using "Whole Body" as the organ of reference was made: EF (RBE)n = 57; m = 7×10^4 grams

T = 1.8×10^4 days or 49.3 years; fa = 0.25; f = 10^{-4}

This resulted in annual intake of Am-241 to produce a dose of 0.0005 rems in 50 years as follows:

Qa = 3.7×10^{-5} uCi by inhalation
Qw = 9.1×10^{-2} uCi by ingestion

Comparing these values with similar ones for bone, it is obvious that bone is the more critical organ. Similar calculations for other organs (limiting dose is 0.015 rems) also showed that bone is the most critical organ. Therefore, all of the estimated dose commitments that follow are based on bone as the critical organ. There is no evidence that Am-241 becomes airborne and respirable from sources previously described. Placing an upper limit on zero is difficult but will be done in order to estimate an upper limit on dose commitment. ORNL Report TM-2684 summarizes a number of tests performed on 12 smoke detectors which had been in service at least 5 years. The detectors contained a total of 78 foils (some Ra-226, some Am-241) and contained 20 to 130 uCi per detector. Foil construction was similar to what has been previously described. Some pertinent results of these tests were:

1. Only one of the smear tests on the external surface of the 12 detectors showed detectable alpha activity, and this was 20 d/m.

2. The average removable contamination on the Am-241 foils, as measured by smear tests, was 694 d/m.

3. Following a "12-week Environmental Test" at 110 degrees F and 80% relative humidity, on 20 foils (12 Ra-226, 8 Am-241), half of which were intentionally damaged. There was no detectable contamination on the interior surfaces of the test chamber, as measured by a smear test.

4. During 1 hour "Fire Tests" (925 degrees C for 1 hour), the average loss from Am-241 foils was 31% and the loss which was deposited on filters or became airborne, was 0.002%. The ORNL Report indicates that there was no detectable contamination on the interior surfaces of the test chamber after the "12-Week Environmental Test." From the report, levels down to 6 d/m could be detected, so it would be reasonable to assume that at least 20 d/m would have been detected on a smear test of the chamber. Also, from the report, it is noted that a total of 0.12 uCi were available to become airborne, as measured by smear tests on the foils at the beginning of the test. This amount is approximately 25 times the permissible contamination (0.005 uCi) on the foils used in production of the detectors and as measured by smear tests. If it is assumed that the sample in the ORNL Tests represented at least 4% of the chamber area, and 20 d/m could be detected, the maximum that could be released form a foil in a year would be:

$$\frac{20 \times 52}{12} = 87 \text{ d/m or } 3.9 \times 10^{-5} \text{ uCi}$$

If this detector were in a room of 4 X 5 X 3 meters, and there was one air change per hour, the concentration average over a year would be:

$$\frac{3.9 \times 10^{-5}}{4 \times 5 \times 3 \times 10^{6} \times 24 \times 365} = 7.4 \times 10^{-17} \text{ uCi/cc}$$

The above represents a maximum concentration of a room in a residence. Similarly, if a work place had a volume of 8 X 10 X 6 cubic meters, the concentration average over a year would be:

9.3×10^{-18} uCi/cc

If a person were exposed as in Example 1 for 12 of the 16 hours per day at home and breathed 1×10^{7} cc in this 16 hour period, his annual intake of Am-241 would be:

$(7.4 \times 10^{-17})(1 \times 10^{7}) \times 12/16 \times 365 = 2.0 \times 10^{-17}$ uCi/y

Also, as in Example 1, if the same person were exposed at work to 9.3×10^{-18} uCi/cc in this 8 hours per day and breathed 1×10^{7} cc in this 8 hours his annual intake of Am-241 would be:

$(9.3 \times 10^{-18})(1 \times 10^{7}) \times 5 \times 50 = 2.3 \times 10^{-8}$ uCi/y

The total intakes would be 2.2×10^{-7} uCi/y. As calculated previously, inhalation of 2.4×10^{-6} uCi/y would result in a 50 year dose commitment of 0.005 rems. The dose commitment from an intake of 2.2×10^{-7} uCi/y would therefore be:

$$\frac{2.2 \times 10^{-7}}{2.4 \times 10^{-6}} (0.005) = 0.00046 \text{ rems}$$

The above is intended to be an upper limit on zero, since there is no evidence to show that Am-241 becomes airborne under normal conditions. It can also be said that in Examples 2- 6 previously described, that there is a negligible release of Am-241 to be respirable, even though quantities of 100 or 1000 detectors are involved.

Estimated Dose Commitments under abnormal conditions are calculated in the following examples:

Example 7

If a fire should occur in a 4 X 5 X 3 meter room, and 0.31% of the 0.5 uCi Am-241 source should become airborne, the average concentration might be:

$$\frac{0.0031 \text{ X } 0.5}{4 \text{ X } 5 \text{ X } 3 \text{ X } 10^{6}} = 2.6 \text{ X } 10^{-11} \text{ uCi/cc}$$

If a person were to remain in this room for 5 minutes, he might inhale:

$$2.6 \text{ X } 10^{-11} \text{ X } 2 \text{ X } 10^{7} \text{ X } \frac{5}{60 \text{ X } 24} = 1.8 \text{ X } 10^{-6} \text{ uCi}$$

If as previously calculated, inhalation of 2.4 X 10^{-6} uCi/y would result in a 50 year dose commitment of 0.005 rems, inhalation of 1.8 X 10^{-6} uCi would result in a 50 year dose commitment of approximately 0.00375 rems.

Example 8

If a fire occurred in an area having a volume of 8 X 10 X 6 cubic meters and containing 10 detectors, and 0.31% of the 50 uCi became airborne, the average concentration might be:

$$\frac{0.0032 \text{ X } 50}{8 \text{ X } 10 \text{ X } 6 \text{ X } 10^{6}} = 3.2 \text{ X } 10^{-10} \text{ uCi/cc}$$

However, it would take some period of time for the airborne contamination to become evenly distributed in a room of this size. The heat from such a fire would preclude any person from being in close proximity of the fire. There would be at least a dilution factor of 10 to where a person might be during the first few minutes of the fire. Assuming a person might take 5 minutes to evacuate, he might inhale:

$$3.2 \text{ X } 10^{-11} \text{ X } 2 \text{ X } 10^{7} \text{ X } \frac{5}{60 \text{ X } 24} = 2.2 \text{ X } 10^{-6} \text{ uCi}$$

This corresponds to a 50 year dose commitment of:

$$\frac{2.2 \text{ X } 10^{-6}}{2.4 \text{ X } 10^{-6}} (0.005) = 0.005 \text{ rems}$$

If a person fighting the fire would enter the room after the airborne contamination had been distributed throughout the volume, and the person was not wearing a respirator and he remained 1/2 an hour, he might inhale:

$$\frac{3.2 \times 10^{-10} \times 2 \times 10^{7}}{2 \times 24} = 1.3 \times 10^{-4} \text{ uCi}$$

Note: Water or other fire-fighting materials would tend to reduce the airborne contamination. This corresponds to a 50 year dose commitment of:

$$\frac{1.3 \times 10^{-4}}{2.4 \times 10^{-6}} (0.005) = 0.27 \text{ rems}$$

Example 9

If a fire should occur in an area having a volume of 30 X 50 X 6 cubic meters and there were 1000 detectors present and 0.31% of the 500 uCi became airborne, the average concentration would be:

$$\frac{0.0031 \times 500}{30 \times 50 \times 6 \times 10^{6}} = 1.7 \times 10^{-10} \text{ uCi/cc}$$

Again assuming there would be a dilution factor of at 10 where a person might be during the first few minutes of the fire, and delayed his exit for 5 minutes, the person might inhale:

$$1.7 \times 10^{-11} \times 2 \times 10^{7} \times \frac{5}{60 \times 24} = 1.2 \times 10^{-6} \text{ uCi}$$

This corresponds to a 50 year dose commitment of:

$$\frac{1.2 \times 10^{-6}}{2.4 \times 10^{-6}} 0.005) = 0.0025 \text{ rems}$$

If a fire fighter entered the area after the airborne contamination had distributed throughout the volume, and was not wearing respiratory protection, and he remained for 1/2 hour, he might inhale:

$$\frac{1.7 \times 10^{-10} \times 2 \times 10^{7}}{2 \times 24} = 7 \times 10^{-5} \text{ uCi}$$

This corresponds to a 50 year dose commitment of:

$$\frac{7.0 \times 10^{-5}}{2.4 \times 10^{-6}} (0.005) = 0.15 \text{ rems}$$

Example 10

A person who would be cleaning up after the fire described in Example 9 might be exposed to 0.0031 X 500 = 1.6 uCi of contamination which might have become airborne. Dunster Health

Physics (Vol. 8, No. 4, Aug. "62") indicates a re-suspension factor when rummaging through dusty building rubble in an enclosed and unventilated space would be:

$2 \times 10^{-6}\ m^{-1}$

Assuming the 1.6 uCi were in an area of 6 X 6 square meters, the concentration in the room would be:

$$\frac{1.6 \times 2 \times 10^{-6}}{6 \times 6} = 8. \times 10^{-8}\ uCi/m^3 \text{ or } 8.9 \times 10^{-14}\ uCi/cc$$

If a person were to work 8 hours under these conditions, he might inhale:

$$8.9 \times 10^{-14} \times 2 \times 10^{7} \times \frac{8}{24} = 6.0 \times 10^{-7}\ uCi$$

This corresponds to a 50 year dose commitment of:

$$\frac{6.0 \times 10^{-7}}{2.4 \times 10^{-6}} (0.005) = 0.001\ rems$$

Example 11

In the unlikely event that a person should swallow a foil and the total activity (0.5 uCi) were ingested as previously calculated, and the quantity ingested in a year is 6.1×10^{-3} uCi to produce a 50 year dose commitment of 0.005 rems, the dose commitment would be:

$$\frac{0.5}{6.1 \times 10^{-3}} (0.005) = 0.40\ rems$$

An actual case history (Health Physics, Vol. 33 No. 5, Dec. 1977) indicate the scenario in above assumption to be extremely conservative. The reference indicated that the foils passed in a reasonable time and that there was no detectable residual body burden.

DOSE COMMITMENT SUMMARY

All of the preceding examples are considered conservative. The "ORNL Fire Test" indicated that the average loss from the Am-241 foils was 0.31%, but most of this was deposited on the tubes containing the foils, and only 0.002% became airborne and was deposited on filters. Dose commitments may be over estimated by a factor of 150. All dose commitments are less than 10 CFR 32.28; Column I limits, under normal operating conditions. In abnormal situations, the estimates indicate that Column II may be exceeded slightly, but they are all less than the Column III limits.

Tests have shown that it is unlikely that there will be significant reduction of containment from wear and abuse likely to occur in normal handling and use during the lifetime of the SI_ series detectors.

6. Installation

SI_ detectors are intended for commercial and industrial use. They are one part of an entire fire safety system. Detectors are recommended for installation in either the ceiling or under floor applications. They must be connected properly to a fire and/ or smoke detection circuit as part of a fire safety system. There is no risk to persons responsible for installing the detectors. All installations are required to be done by qualified persons.

7. Radiological Safety Instructions

As stated above, unless detectors are subjected to extraordinary damages there is no potential for leakage of hazardous materials.

PRODUCT DISPOSAL

All SI_ series detectors that are returned to the factory for surveying will be disposed of through facilities that are authorized to handle radio-active materials. In addition, the following is an estimate dose commitment from concentrating forty thousand smoke detectors, each containing 0.5 uCi in a public landfill. The internationally recognized dose of Am-241 is 0.0129 R/hr/Ci/m. Thus the exposure rate at 1 meter from a 20 mCi Am-241 source is less than 0.26 mr/hr. However, it is unlikely due to the bulk of 40,000 detectors, anyone could get closer than approximately 5 meters from the effective center of the pile. The effective exposure rate is, therefore, 10nR/hr to anyone at the pile. This rate is without consideration of shielding by the detectors non-radioactive components. A landfill operator would reside less than an hour while burying the pile. His total dose would be less than 10nR. No significant internal dose from inhalation would be expected to result from disposal of the detectors to the workers of the landfill. Assuming an unlikely 1% airborne release of activity (Am-241), doses to critical organs would be: Lungs - 0.15 rem; Liver - 4.4 rem; Bones - 2.1 rem. These dosages are less than 10 CFR 32: 28 Column III. Long term effects to local populations would be expected to be negligible. The solubility of Am02 in a gold matrix such as the foil, is extremely low and negligible activity would be expected to reach from the burial site even under the worst conditions. Radium watch dial faces and smoke detectors over many years of burial have not been found to have contaminated public landfill operation. In addition, radium is in a far more soluble chemical physical form than AM02. In our opinion, random disposal of AM-241 containing smoke detectors from accidental or normal conditions will not contribute to a measurable cumulative environmental hazard.

8. Accompanying Documents

There are no accompanying documents provided with the products. All information pertaining to radiological safety are printed on the individual product labels as well as packaging.

9. Servicing

Any ionization detectors that are returned to Hochiki America for servicing undergo the following:

1. Indicate on form provided date, model type, serial number and operator name.

2. Perform a wipe test as indicated on steps 2-4 of the finished goods prior to shipment section above.

3. Record the results on the form.

4. Perform servicing.

5. The detector is tested to insure functionality.

6. The outer cover is removed and cleaned.

7. The cover is reassembled to the unit.

8. Repeat steps 2,3 again after re-assembling unit.

9. The unit is recalibrated.

10. If any of the above cannot be completed satisfactorily the unit is disassembled and the radioactive source is disposed of properly.

11. The service technician has been trained in the proper handling of radioactive materials.

10. Leak Test

The NRC does not require periodic testing of devices that contain less than 10 microcuries of alpha emitting material. However units are wipe tested prior to and on completion of manufacture, prior to distribution as well as before and after servicing as described above.

11. Additional Information

The SI_ series detectors are manufactured under very strict quality control procedures and distributed in accordance with the requirements of Underwriters Laboratories UL 268 specifications, the laws of the state of California and the State Fire Marshall, the Nuclear Regulatory Commission, Factory Mutual Research, and other industrial governing bodies.

12. Product Warranty

Hochiki America warrants the equipment manufactured by it to be free from defects in material and workmanship (does not apply to batteries). Hochiki America will repair or replace, at its option, any equipment which it determines to contain defective material or workmanship. Said equipment will be returned to purchaser F.O.B., Hochiki America, California. Hochiki America shall not be obligated to repair or replace equipment which has been repaired by others, abused, improperly installed, altered, or otherwise misused or damaged in any way. HOCHIKI AMERICA WILL NOT BE RESPONSIBLE FOR ANY DISMANTLING, RE-ASSEMBLY OR RE-INSTALLATION CHARGES. We warrant our devices to DIRECT PURCHASERS ONLY for one (1) year from date of shipment, with the exception of the smoke detectors, which have a three (3) year warranty. We will replace defective goods or credit them at invoice price per our

option. Merchandise that is returned for defective reasons, and found not to be defective will be returned to the sender with charges commensurate with the extent of inspection and services performed, plus freight charges. After the warranty period expires, a service charge will be made for material and labor. This warranty is in lieu of all other warranties expressed or implied. Hochiki America shall not be liable for an special, indirect, incidental or consequential damages claimed in connection with any revision of this agreement by others.

13. Safety Analysis

As noted above it is highly unlikely that materials will accumulate to a point in which it would pose a safety hazard. The table in part 32.28 was used as a guideline to insure that accumulations do not exceed these amounts. Thus exposure dosages will be held to level acceptable. Due to the low level nature of the radioactive source it would require an accumulation that would be unacceptable to the company to continue conducting day to day business activities. Such an accumulation would be bad business economics in terms of inventory levels. Due to the conditions of use it is highly unlikely that any damages would occur to the effectiveness of shielding.

Hochiki America fully intends to distribute materials to persons exempt from licensing.

Cross Reference chart for Hochiki America ionization smoke Detectors.

Hochiki Model	Simplex Model	Simplex Int'l Model	Radionics Model
SIH-24F	2098-9576	na.	D281
SIH-24FC	n.a.	2098-9576C	na.
SIH-24FI	2098-9550	n.a.	n.a.
SIH-24FAP	n.a.	n.a.	n.a.
♦♦	4098-9716	n.a.	n.a.
♦♦	n.a.	4098-9716C	n.a.
SIJ-24	n.a.	n.a.	n.a.

NOTE: ♦♦ These models are manufactured only for Simplex and Simplex international. No Hochiki Model exists.

12/9/96

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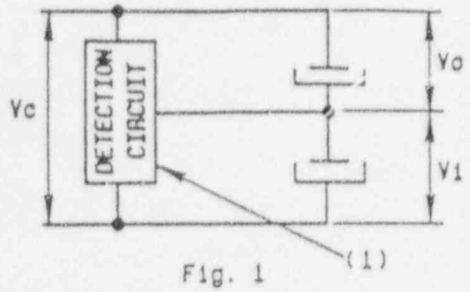

Fig. 1

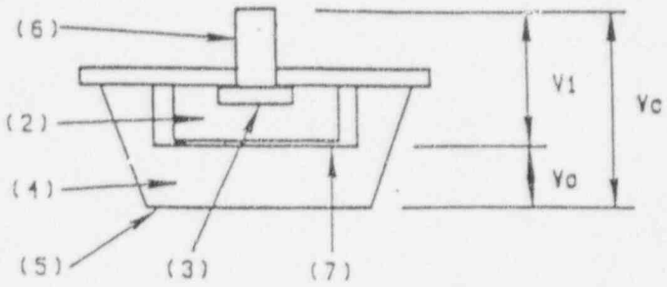

Fig. 2

(1) DETECTION CIRCUIT
(2) INNER ION CHAMBER
(3) RADIATION SOURCE (Am241)
(4) OUTER ION CHAMBER
(5) EXTERNAL ELECTRODE
(6) INTERNAL ELECTRODE
(7) INTERMEDIATE ELECTRODE

Vo: OUTER ION CHAMBER VOLTAGE

V1: INNER ION CHAMBER VOLTAGE

THE INNER ION CHAMBER COMPENSATES THE ENVIORNMENTAL CONDITIONS, SUCH AS TEMPERATURE AND ATMOSPHERIC PRESSURE. THE OUTER ION CHAMBER IS DESIGNED TO HAVE AN UNSATURATED CHARACTERISTIC WHILE THE INNER ION CHAMBER HAS A SATURATED CHARACTERISTIC

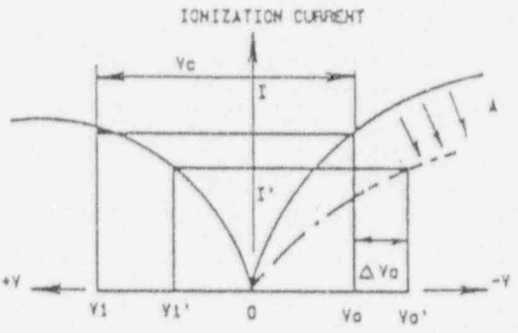

Fig. (3)

(IN NORMAL CONDITIONS: WHEN THERE IS NO SMOKE DETECTABLE)

THE OUTER ION CHAMBER AND THE INNER ION CHAMBER ARE Vo and V1 VALUE, RESPECTIVELY, WHILE SHARING Vc, THE VOLTAGE APPLIED TO BOTH ION CHAMBERS. THE OUTER ION CHAMBER IS SHOWN WITH A SOLID LINE IN Fig.(3)

(WHEN SMOKE ENTERS)

WITH THE OUTBREAK OF A FIRE, SMOKE PARTICLES ENTER IN THE OUTER ION CHAMBER AND ADSORB THE IONS, RESULTING IN A DECREASED IONIZATION CURRENT TO FLOW IN THE ION CHAMBER. THE IONIZATION CURRENT Vs, VOLTAGE CURVES IN THE OUTER ION CHAMBER AS SHOWN BY A DOTTED LINE IN FIG.(3), WITH THE CURRENT DECREASED TO I', AND THE OUTER ION CHAMBER VOLTAGE VARIATION $\triangle Vo$ WILL BE: $\triangle Vo = V'o - Vo$

THEREFORE, THE VOLTAGE SHOWS AN INCREASE BY $\triangle Vo$ AS COMPARED WITH THAT WHEN NO SMOKE EXISTS IN THE CHAMBER. A FURTHER INCREASE IN AMOUNT OF SMOKE WILL ALLOW THE CURVES TO MOVE TOWARD A, THUS REDUCING THE IONIZATION CURRENT. CONSEQUENTLY OUTER ION VOLTAGE V'o WILL BE LARGER, RESULTING IN A FURTHER INCREASE IN $\triangle Vo$.

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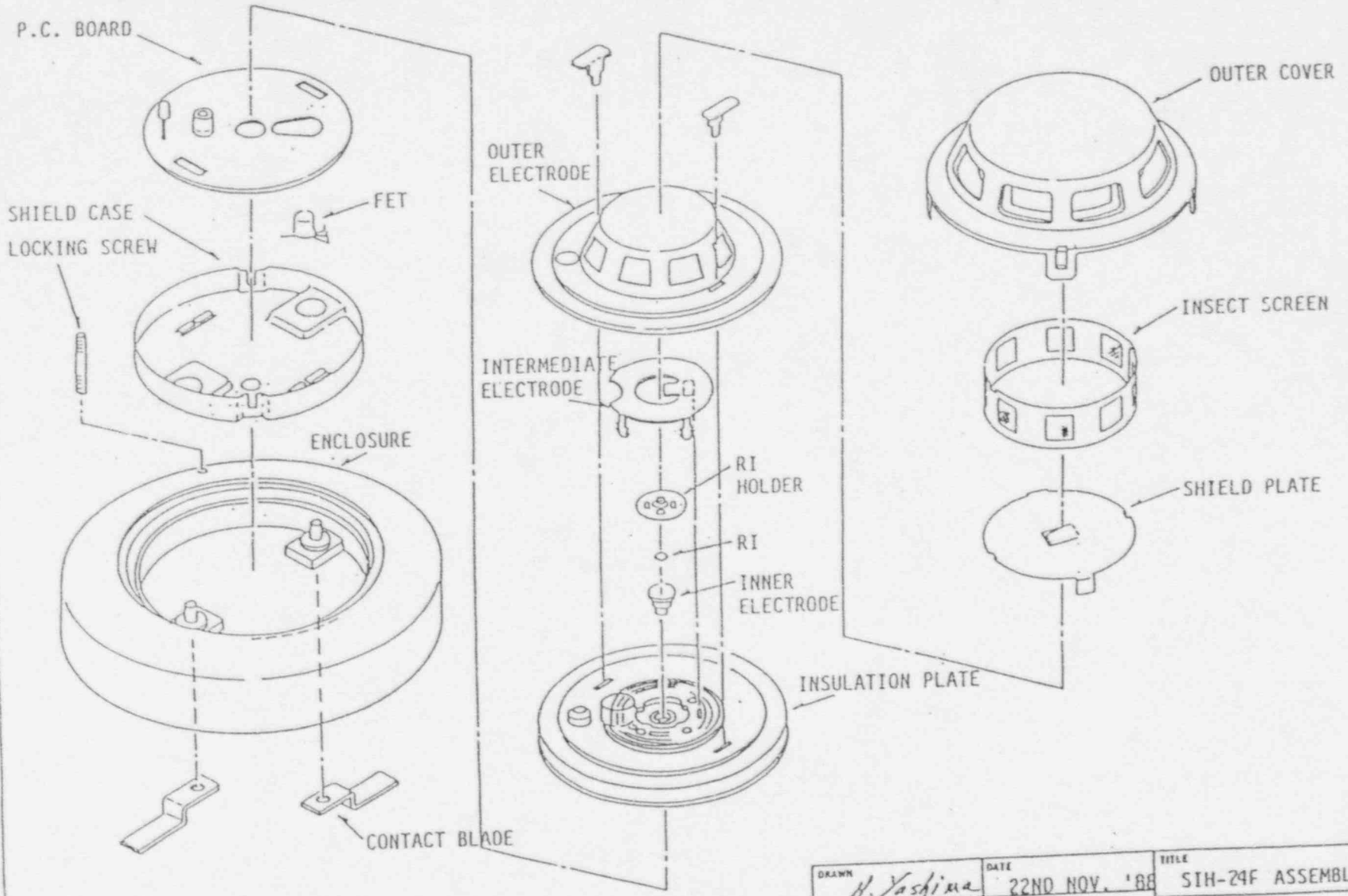
SIH PARTS LIST

ITEM	MATERIAL
ENCLOSURE	ACS
TERMINAL	COPPER
CONTACT BLADE	BRASS
INSULATION PLATE	POLYPROPYLENE
SHIELD CASE	TINPLATE
INNER ELECTRODE	STAINLESS STEEL
RI HOLDER	STAINLESS STEEL
INTERMEDIATE ELECTRODE	STAINLESS STEEL
OUTER ELECTRODE	STAINLESS STEEL
CONDUCTOR B	TINPLATE
CONDUCTOR A	PHOSPHOR BRONZE
OUTER COVER	ACS
INSECT SCREEN	STAINLESS STEEL
SHIELD PLATE	TINPLATE
LOCKING SCREW	STAINLESS STEEL

SIJ-24 PARTS LIST

ITEM	MATERIAL	DIMENSION(mm)	MOUNTING	MANUFACTURER	REMARKS
Enclosure	ABS or Equivalent	ϕ67 x 10.5		Hochiki	Yellow Card No. E47016(R)
Outer Cover	ABS or Equivalent	ϕ100 x 38	Fitting	Hochiki	Yellow Card No. E47016(R)
Inner Electrode	Stainless Steel	ϕ13x6	Fitting	Hochiki	
Intermediate Electrode	Stainless Steel	ϕ28 x 8.2	Soldering	Hochiki	
Outer Electrode	Stainless Steel	ϕ62.2 x 16.1	Soldering	Hochiki	
Radioactive Source	Am241 0.5liCi	2.5 x 2.5 t=0.2	Caulked	Amersham or NRDINC.	AMMK-2812 or A-001
RI Holder	Stainless Steel	ϕ13	Caulked	Hochiki	
Shield Case	Steel	ϕ58.6 x 6.8	Fitting	Hochiki	Solder Plating
Shield Plate	Stainless Steel	ϕ40	Fitting	Hochiki	
Insect Screen	Stainless Steel	127 x 12.5	Spot Welding	Hochiki	
Insulation Plate	Polypropylene	ϕ62 x 13	Fitting	Hochiki	
Contact Blade	Brass	8 x 30 x 5.5	Caulked	Hochiki	Solder Plating
P.C.Board	Composite	ϕ53.8 x 0.8	Screwed	Stay Electronics Co., Ltd. or Sogo Circuit Co., Ltd. or Japan Auto-tech Industries Co., Ltd. or Equivalent level of manufacturer	MC4.MC3 or SCC32, SCC32A or AUTO-6 or Equivalent
Name Label	Polyethylene Terephtalate Film	40 x 30	Adhesive	Hochiki	

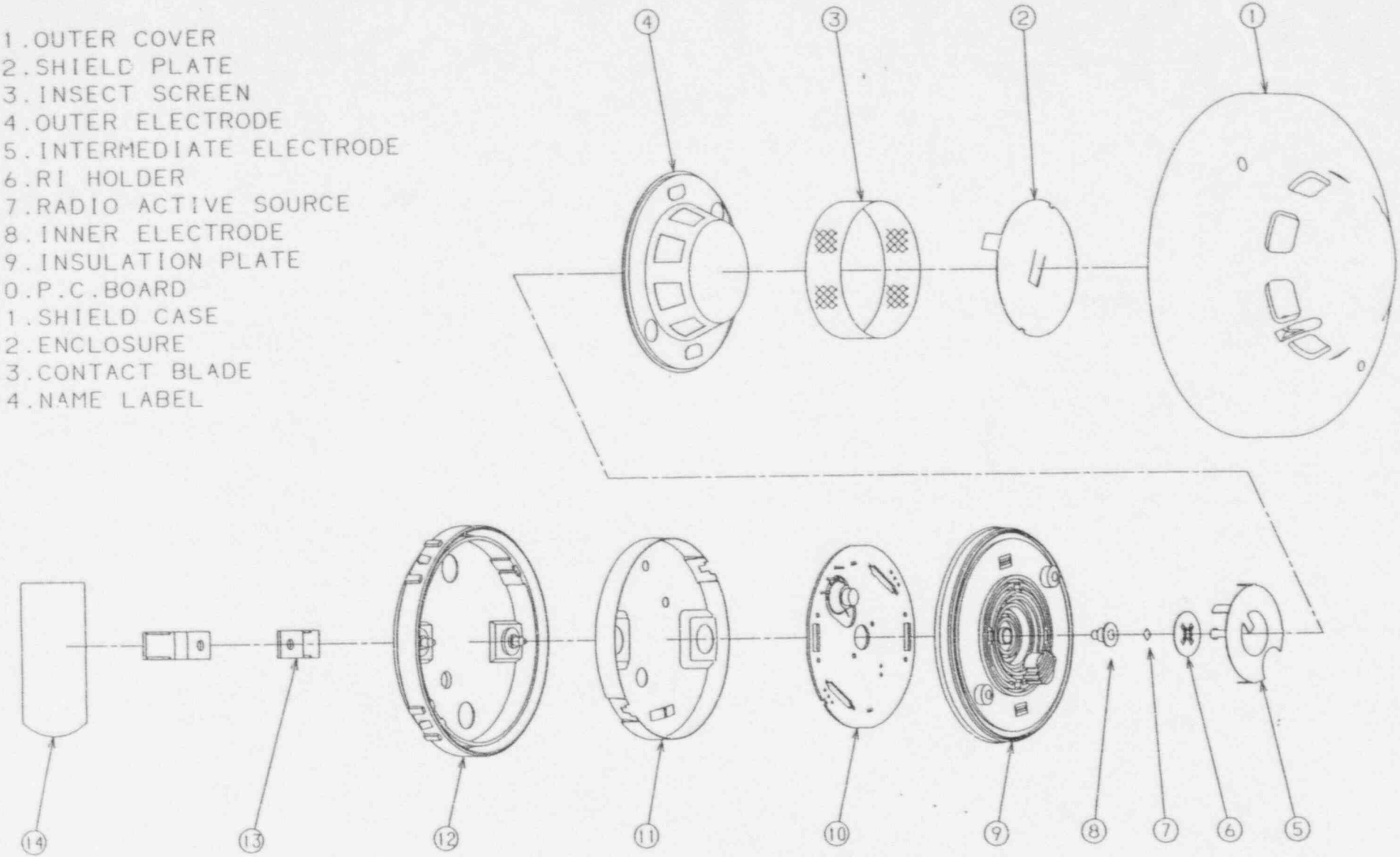
ENCLOSURE 4



DRAWN H. Yoshima	DATE 22ND NOV. '88	TITLE SIH-24F ASSEMBLY
CHECKED Y. Tominaka	UNIT	DWG NO. 2-1-000-0277
APPROVED N. Hayakawa	SCALE	HOCHIKI CORPORATION

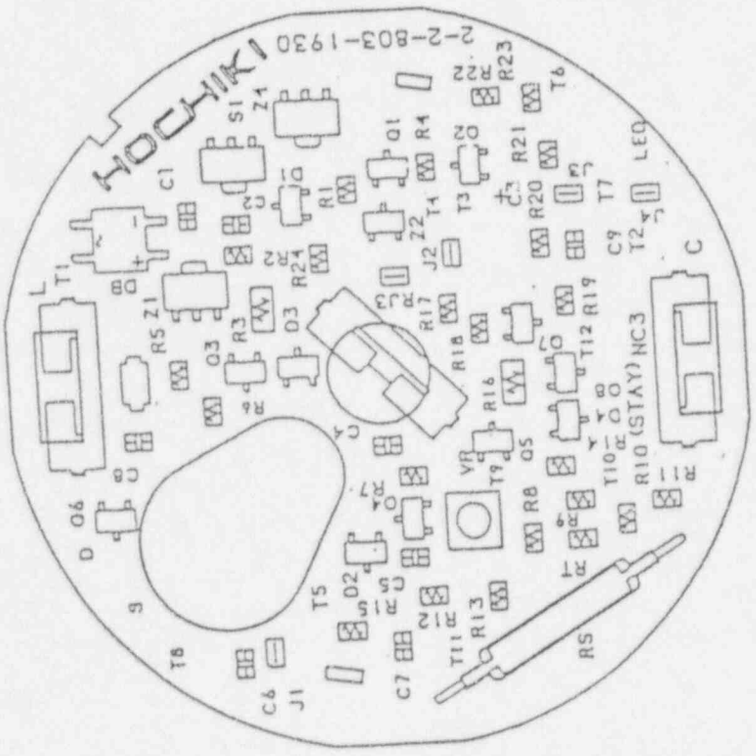
1. OUTER COVER
2. SHIELD PLATE
3. INSECT SCREEN
4. OUTER ELECTRODE
5. INTERMEDIATE ELECTRODE
6. RI HOLDER
7. RADIO ACTIVE SOURCE
8. INNER ELECTRODE
9. INSULATION PLATE
10. P.C.BOARD
11. SHIELD CASE
12. ENCLOSURE
13. CONTACT BLADE
14. NAME LABEL

ENCLOSURE 4A



HOCHIKI CORPORATION 03

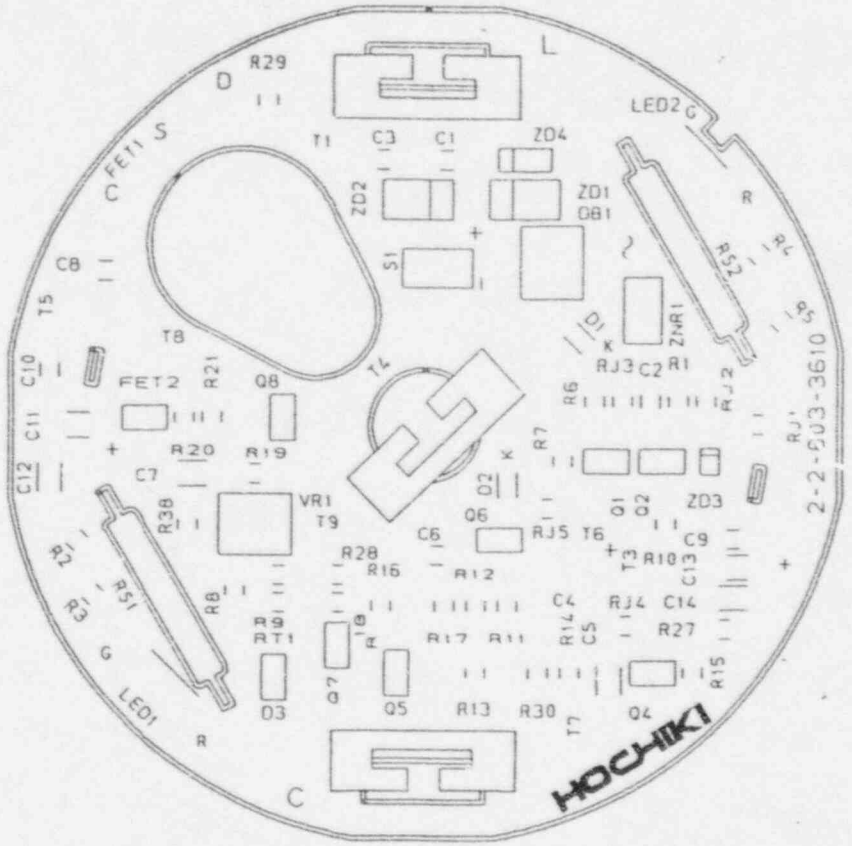
DRAWN Y. Kawabata	DATE 20. JUL. 96	TITLE	SIJ SMOKE DETECTOR ASSEMBLY DRAWING
CHECKED T. Ozawa	UNIT ---	DWG NO.	A2-96-0279
APPROVED	SCALE ---		HOCHIKI CORPORATION



DRAWN	DATE	TITLE	SIH-24F P.C.B. ASSEMELY
CHECKED	UNIT	DWG NO.	A4-88-0002
APPROVED	SCALE		HOCHIKI CORPORATION

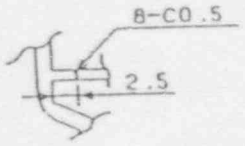
ENCLOSURE 5

ENCLOSURE 5A

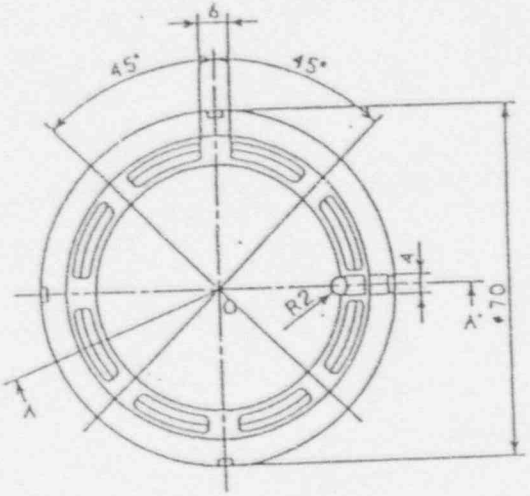


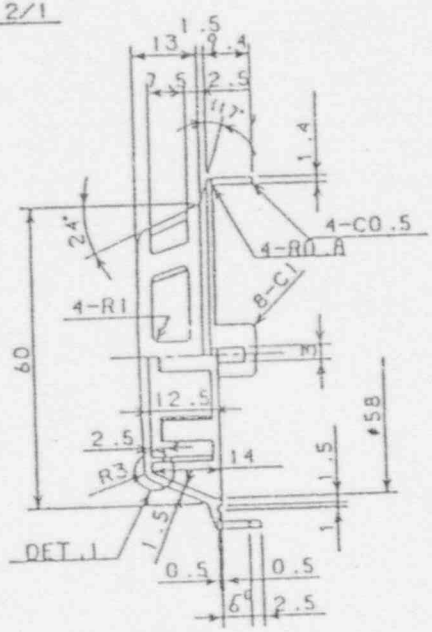
DRAWN: M. Kimura	DATE: 16.JUL.1996	TITLE: SIJ-24 PCB Assembly
CHECKED: Y. Tonikoshi	UNIT:	DWG NO.: A2-96-0338
APPROVED: M. Shibata	SCALE:	HOCHIKI CORPORATION

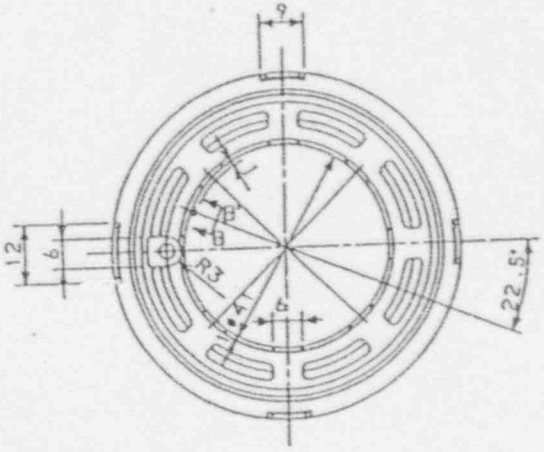
ENCLOSURE 6

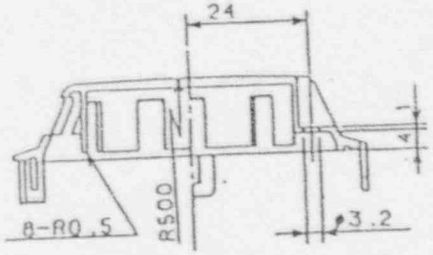


DET.1 2/1

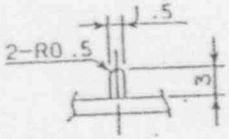








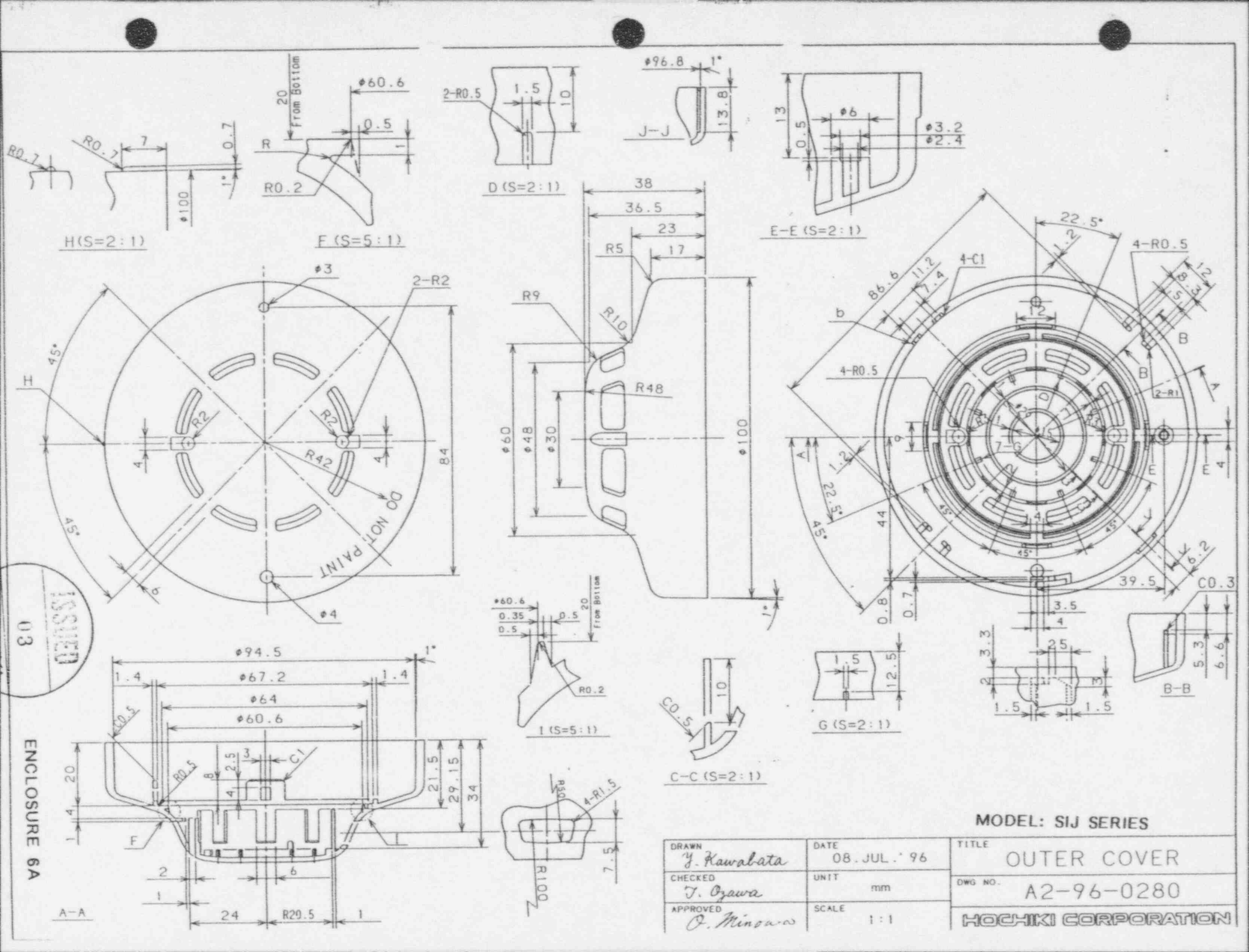
A-O-A'



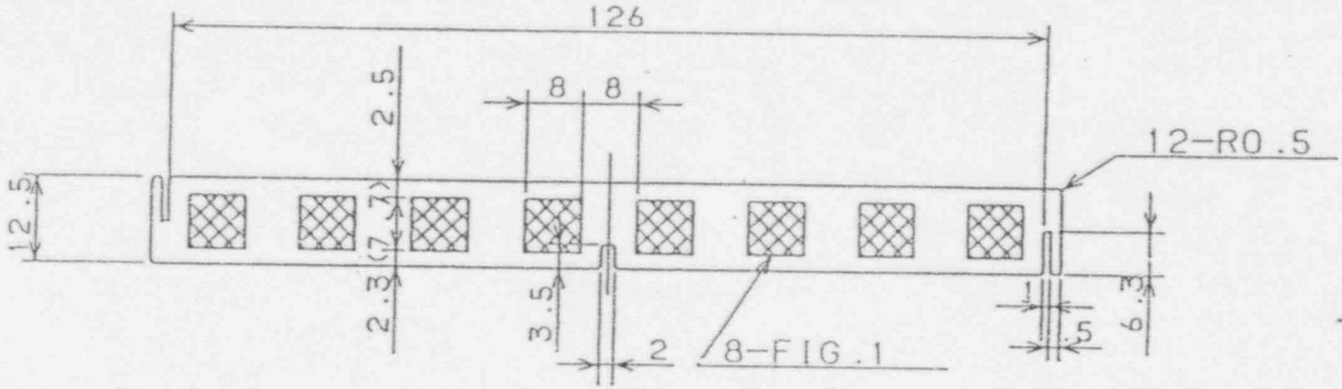
B-B' 2/1

MODEL: SIH SERIES

DRAWN H. Yashime	DATE 18.Nov.'88	TITLE OUTER COVER	
CHECKED K. Kamisaka	UNIT	DWG NO. 2-3-275-0253-E	
APPROVED N. Hayakawa	SCALE	HOCHIKI CORPORATION	

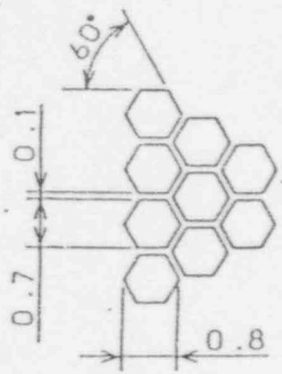

H(S=2:1)
F(S=5:1)
D(S=2:1)
J-J
E-E(S=2:1)
2-R0.5
1.5
10
13.8
13
0.5
ø6
ø3.2
ø2.4
20 From Bottom
ø60.6
0.5
R0.2
R0.7
7
0.7
ø100
1°
38
36.5
23
17
R5
R9
R10
R48
ø60
ø48
ø30
ø100
22.5°
4-R0.5
4-C1
86.6
11.2
7.4
8.3
12
5
B
2-R1
A
22.5°
45°
44
39.5
C0.3
3.5
4
2.5
3.3
5.3
6.6
B-B
G(S=2:1)
1.5
12.5
C0.5
C-C(S=2:1)
I(S=5:1)
ø60.6
0.35
0.5
20 From Bottom
R0.2
ø3
2-R2
R2
R42
84
45°
4
6
ø4
DO NOT PAINT
ø94.5
ø67.2
ø64
ø60.6
1.4
C0.5
R0.5
C1
2.5
3
8
4
20
14
21.5
29.15
34
F
2
6
1
24
R20.5
A-A
R30
4-R1.5
R100
7.5
I
MODEL: SIJ SERIES
DRAWN Y. Kawabata
DATE 08.JUL.'96
CHECKED T. Ozawa
UNIT mm
APPROVED O. Minowa
SCALE 1:1
TITLE OUTER COVER
DWG NO. A2-96-0280
HOCHIKI CORPORATION
ENCLOSURE 6A
03
ISSUED

ENCLOSURE 7



t=0.1

FIG.1



MODEL: SIH SERIES

DRAWN H. Yashima	DATE 16, Nov., '88	TITLE INSECT SCREEN
CHECKED K. Kominami	UNIT	DWG NO. 2-3-295-0294-E
APPROVED N. Hayakawa	SCALE	HOCHIKI CORPORATION

ENCLOSURE 7A

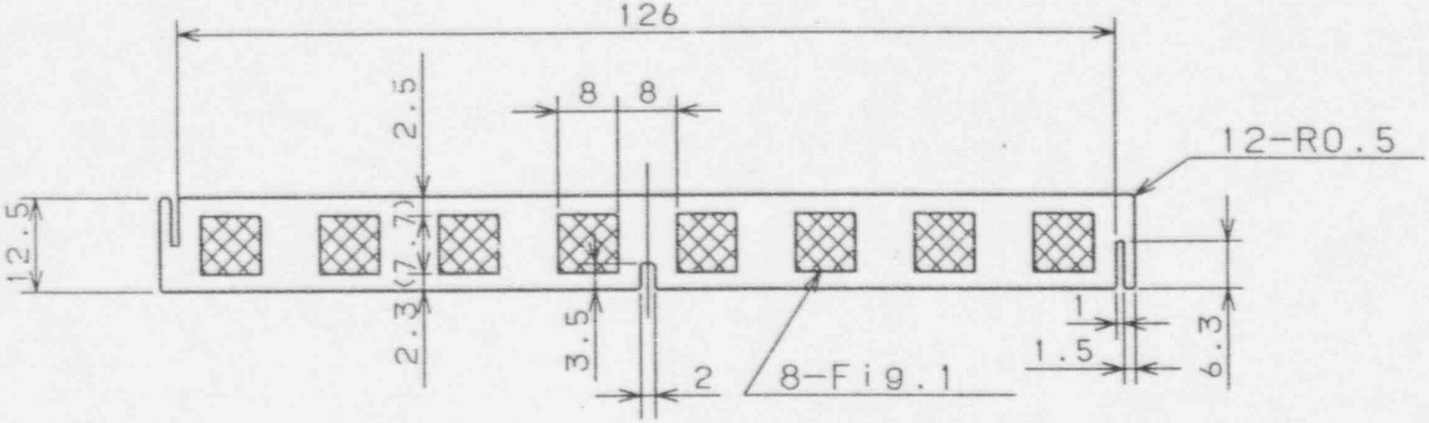
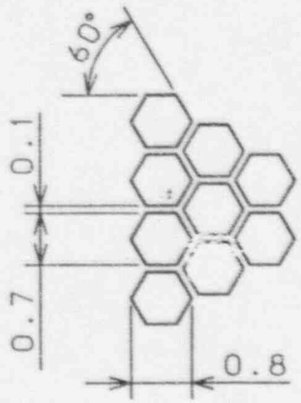


Fig.1 (S=10:1)

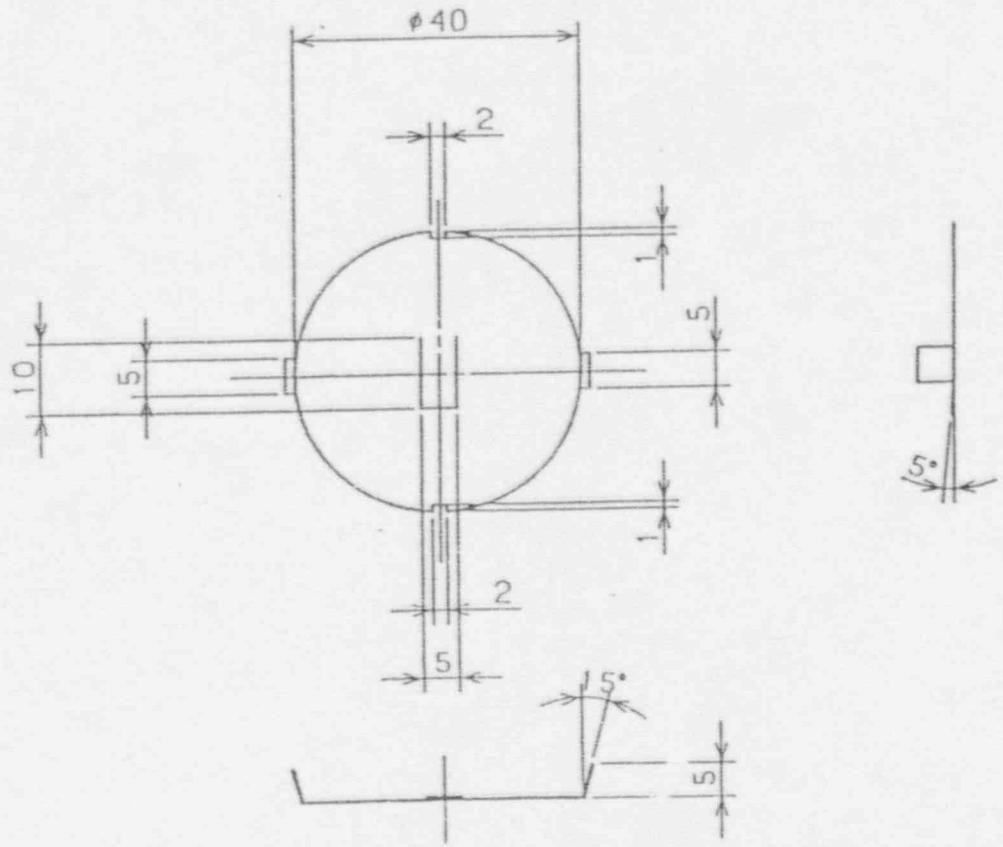


t=0.1 SUS304

MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08.JUL.96	TITLE	INSECT SCREEN
CHECKED T. Ozawa	UNIT mm	DWG NO.	A2-96-0281
APPROVED O. Hirano	SCALE 1:1		HOCHIKI CORPORATION

ENCLOSURE 8

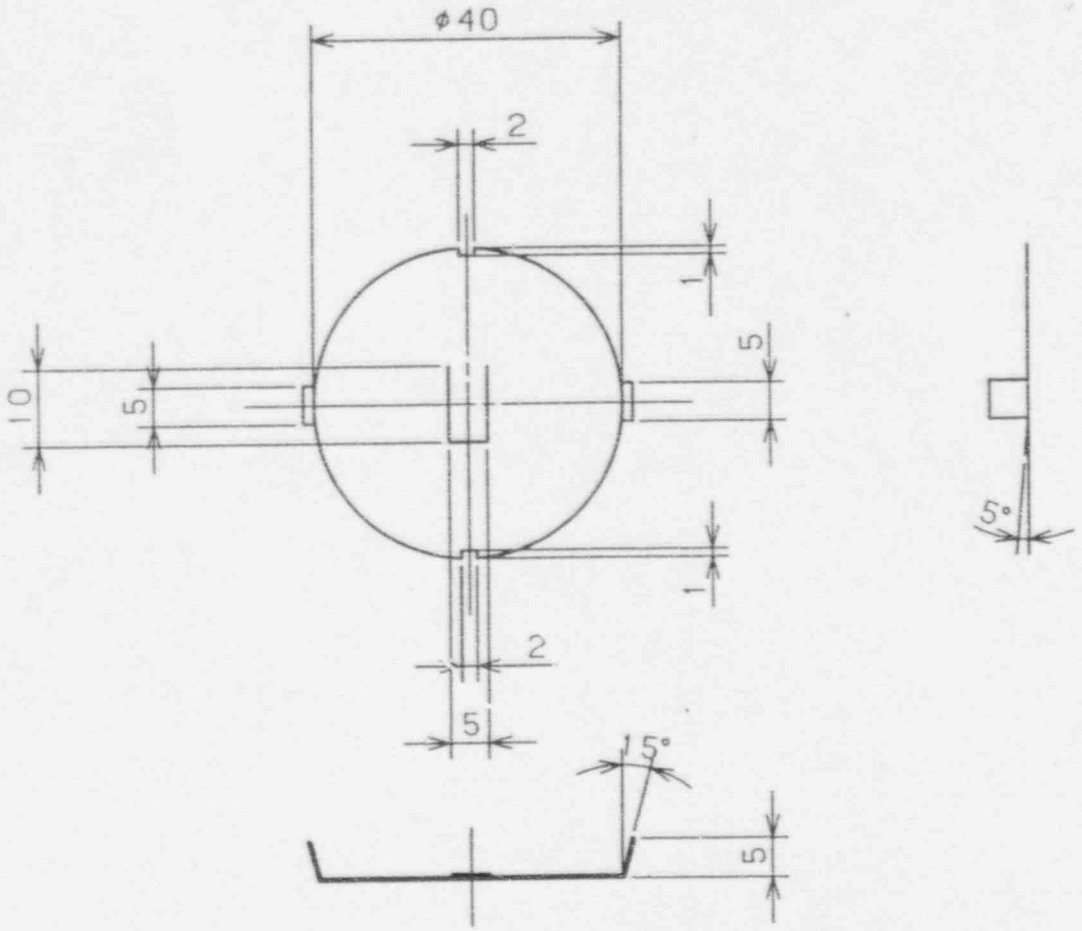


t=0.3

MODEL: SIH SERIES

DRAWN H. Yashima	DATE 18.Nov.'88	TITLE SHIELD PLATE
CHECKED K. Komiyama	UNIT	DWG NO. 2-3-295-0293-E
APPROVED N. Hoyakawa	SCALE	HOCHIKI CORPORATION

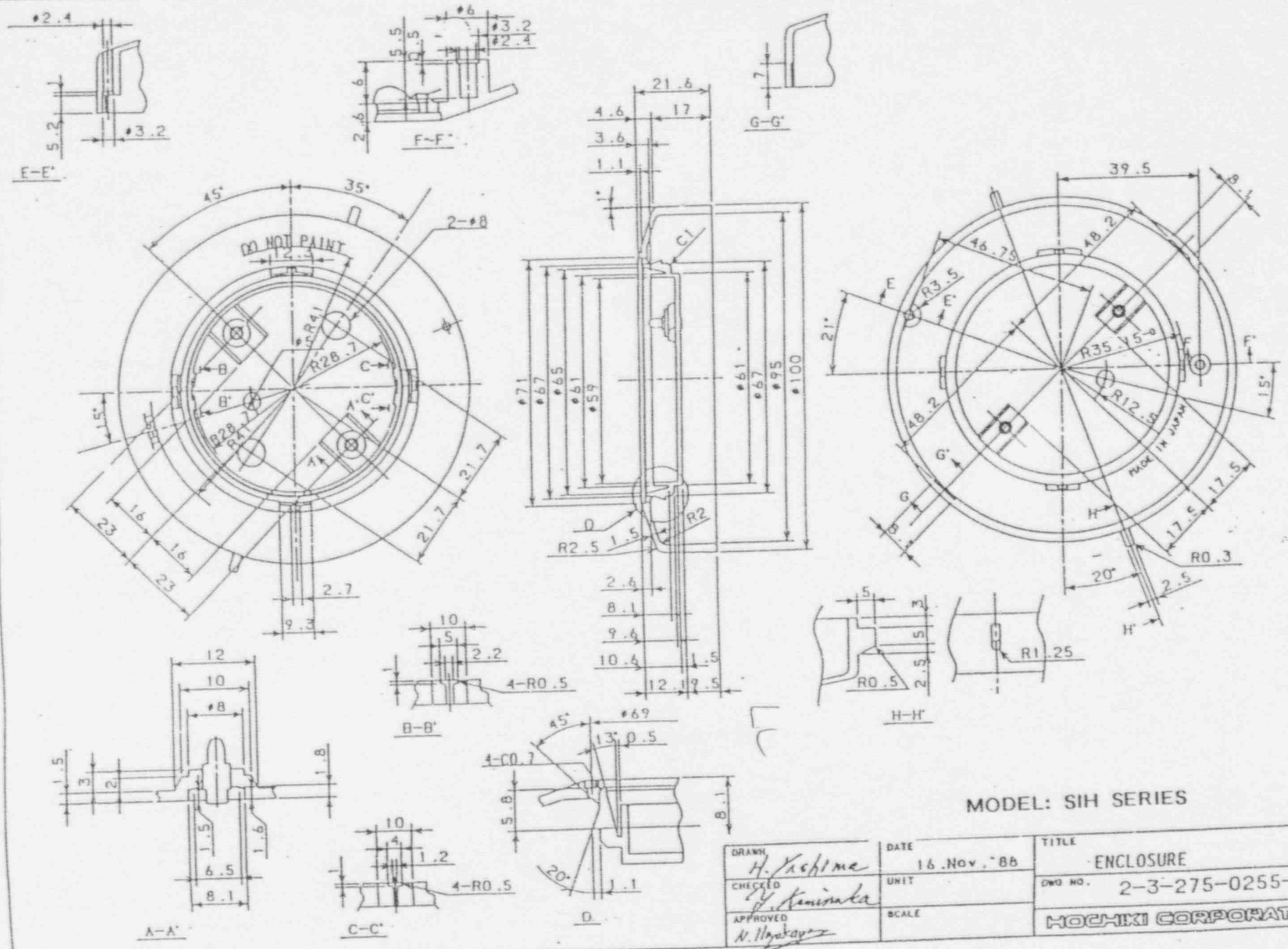
ENCLOSURE 8A



t=0.3 SUS304

MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08. JUL. 96	TITLE	SHIELD PLATE
CHECKED T. Ozawa	UNIT mm	DWG NO.	A2-96-0282
APPROVED O. Shimada	SCALE 1 : 1	HOCHIKI CORPORATION	

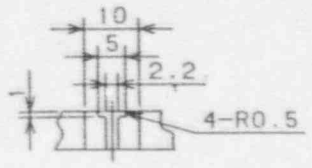


MODEL: SIH SERIES

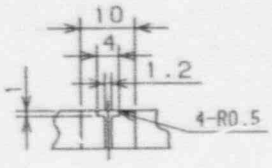
DRAWN H. Yoshime	DATE 16.Nov.'88	TITLE ENCLOSURE
CHECKED Y. Kominato	UNIT	DWG NO. 2-3-275-0255-E
APPROVED N. Nagatsuya	SCALE	HOCHIKI CORPORATION

ENCLOSURE 6

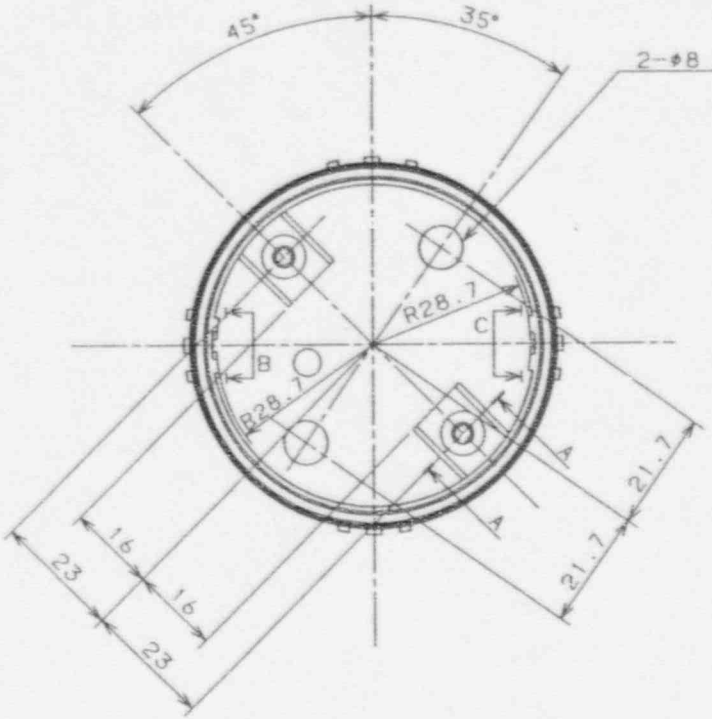
ENCLOSURE 9A

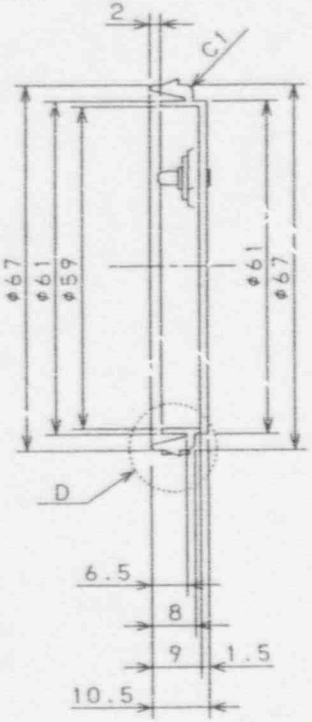


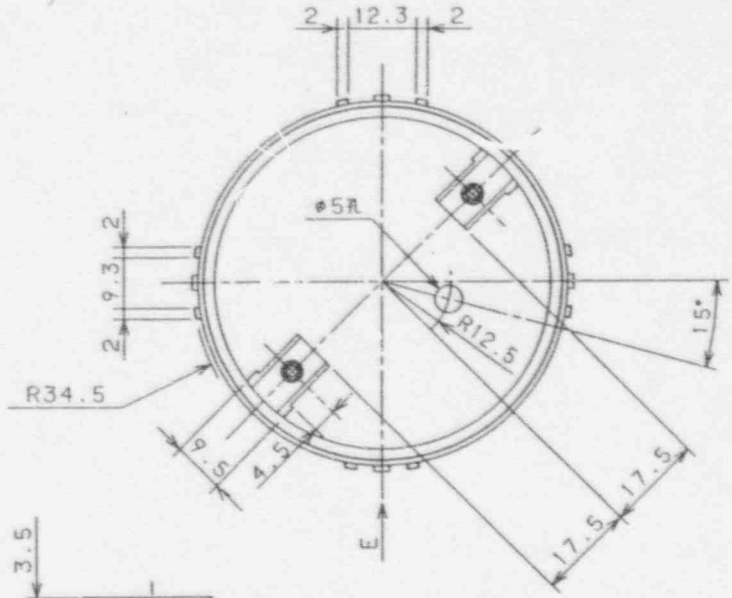
B

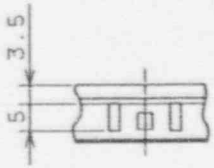


C

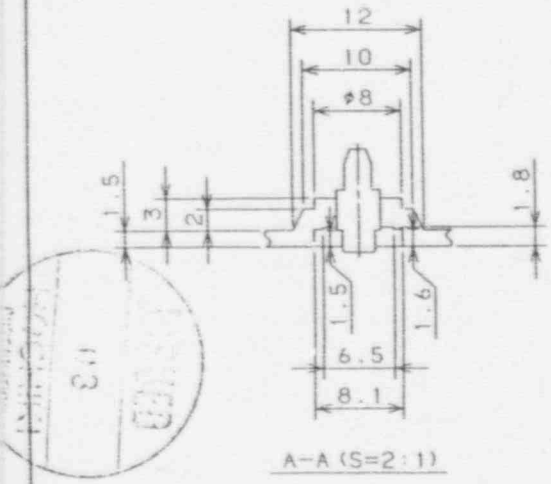




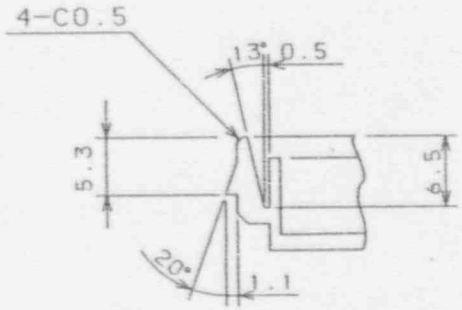




E



A–A (S=2:1)

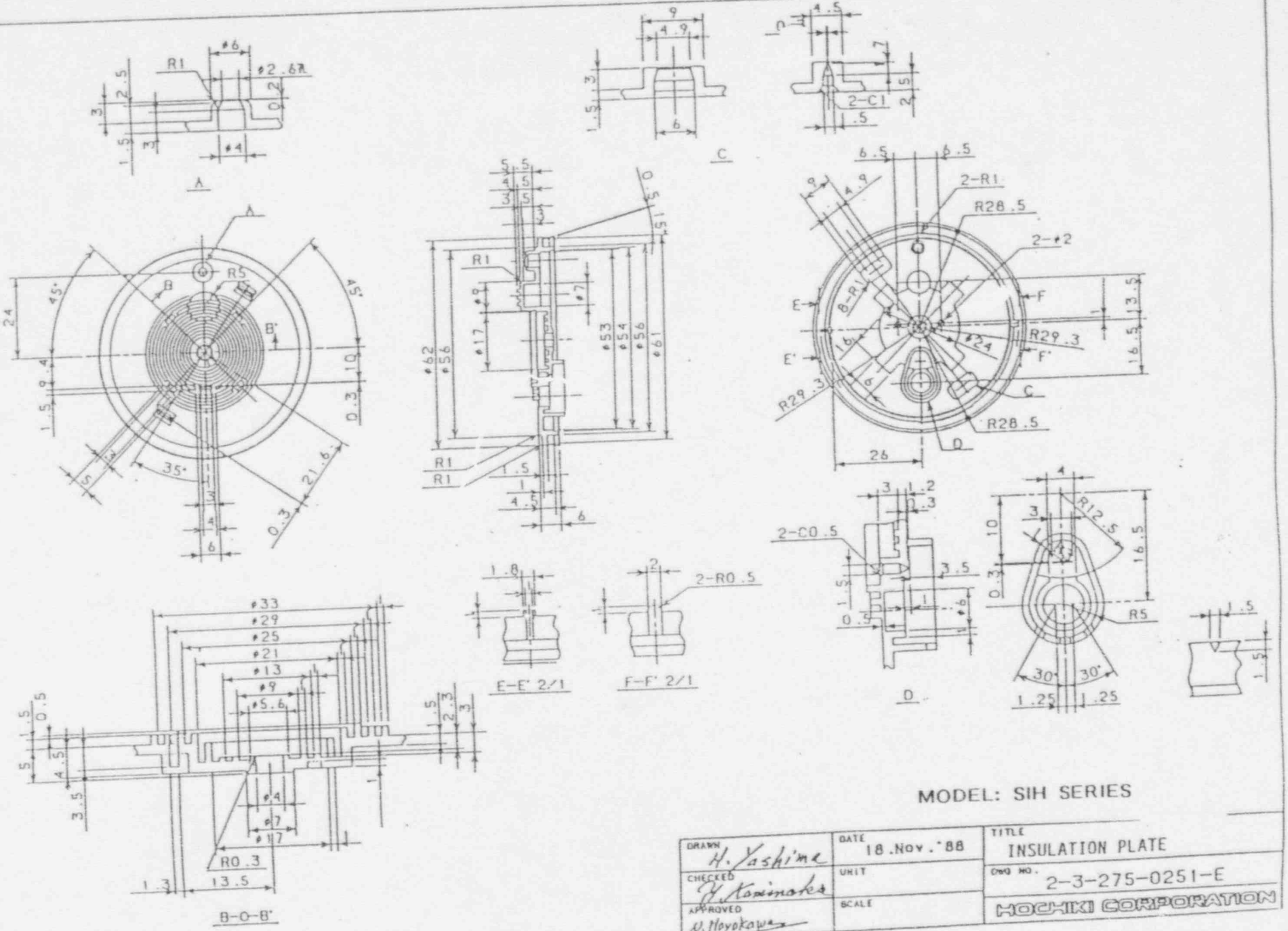


D (S=2:1)

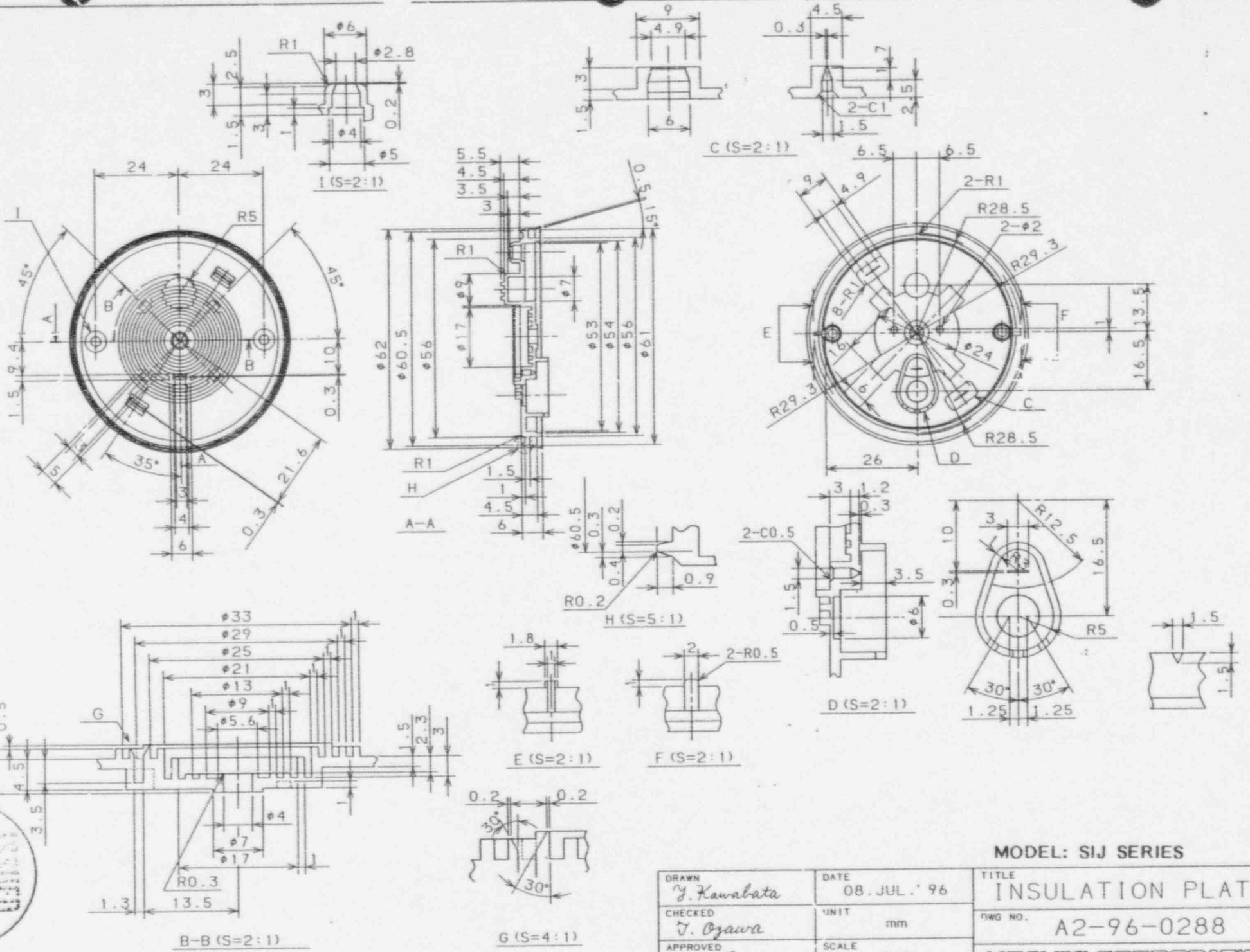
MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08. JUL. '96	TITLE	ENCLOSURE
CHECKED T. Ozawa	UNIT mm	DWG NO.	A2-96-0290
APPROVED E. Kimura	SCALE 1:1		HOCHIKI CORPORATION

ENCLOSURE 10



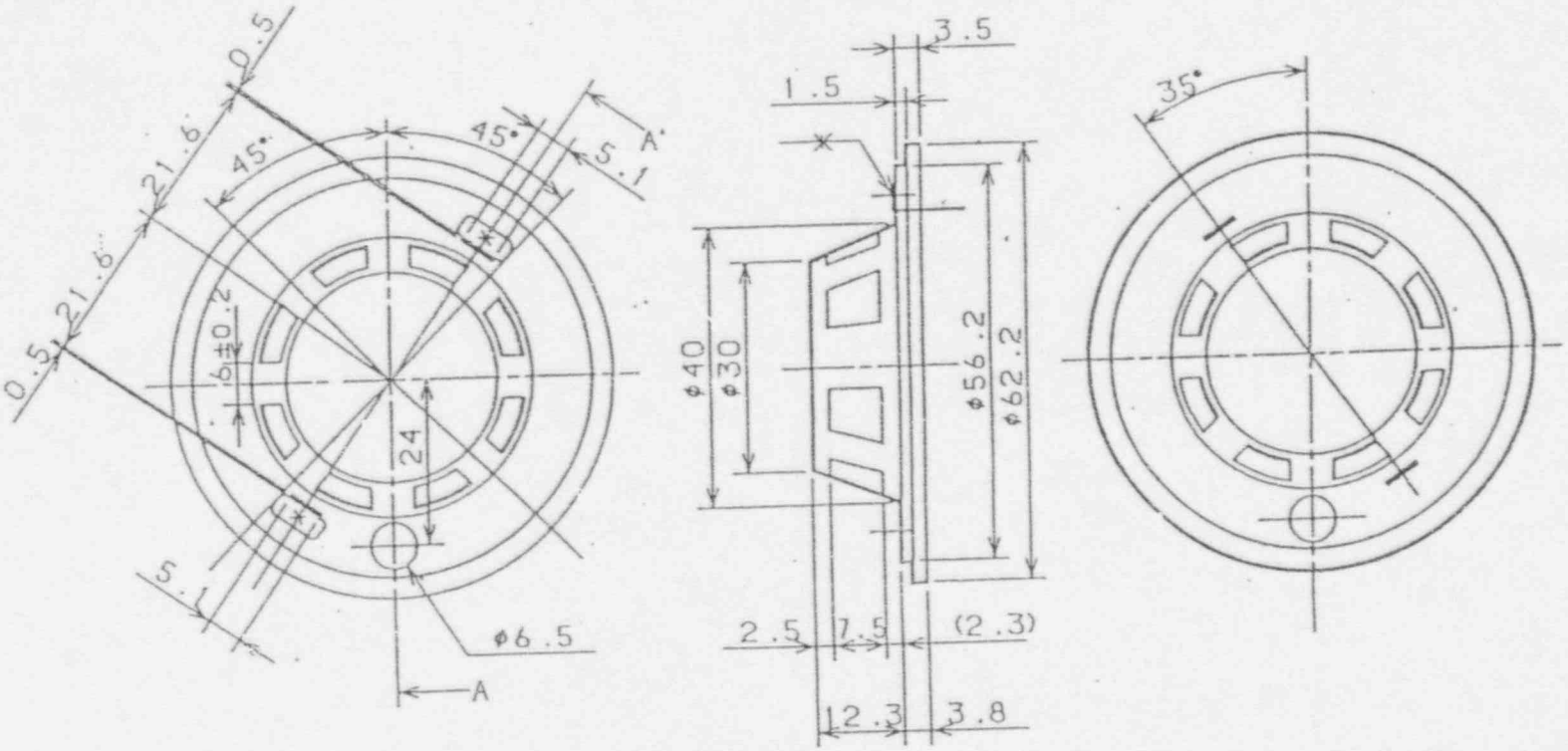
ENCLOSURE 10A



MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08. JUL. '96	TITLE INSULATION PLATE
CHECKED Y. Ozawa	UNIT mm	DWG NO. A2-96-0288
APPROVED O. Shimada	SCALE 1:1	HOCHIKI CORPORATION

ENCLOSURE 11



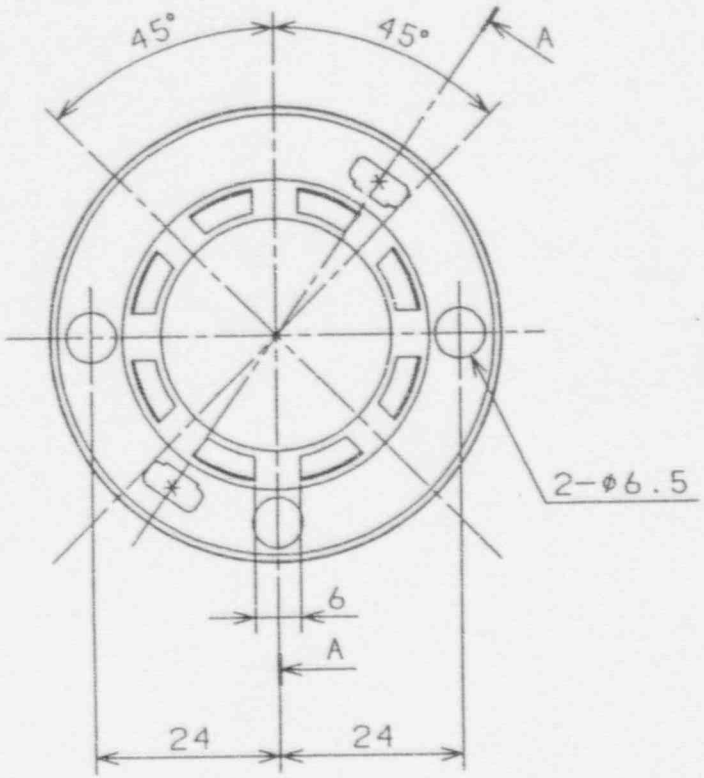
A~A'

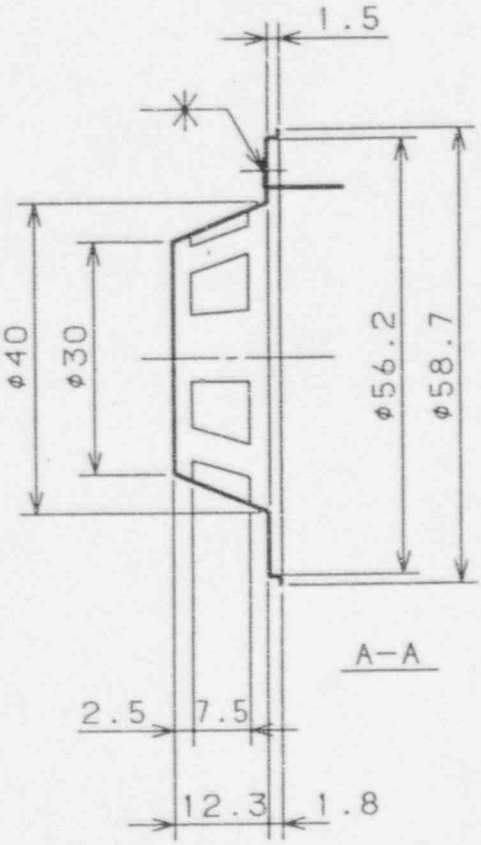
t=0.3

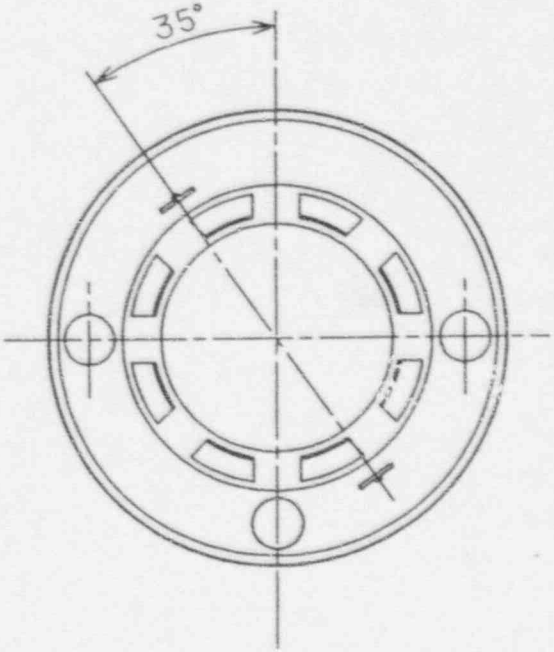
MODEL: SIH SERIES

DRAWN H. Yashima	DATE 18. Nov. '88	TITLE OUTER CHAMBER
CHECKED H. Kawanaka	UNIT	DWG NO. 2-3-295-0302-E
APPROVED M. Hayakawa	SCALE	HOCHIKI CORPORATION

ENCLOSURE 11A







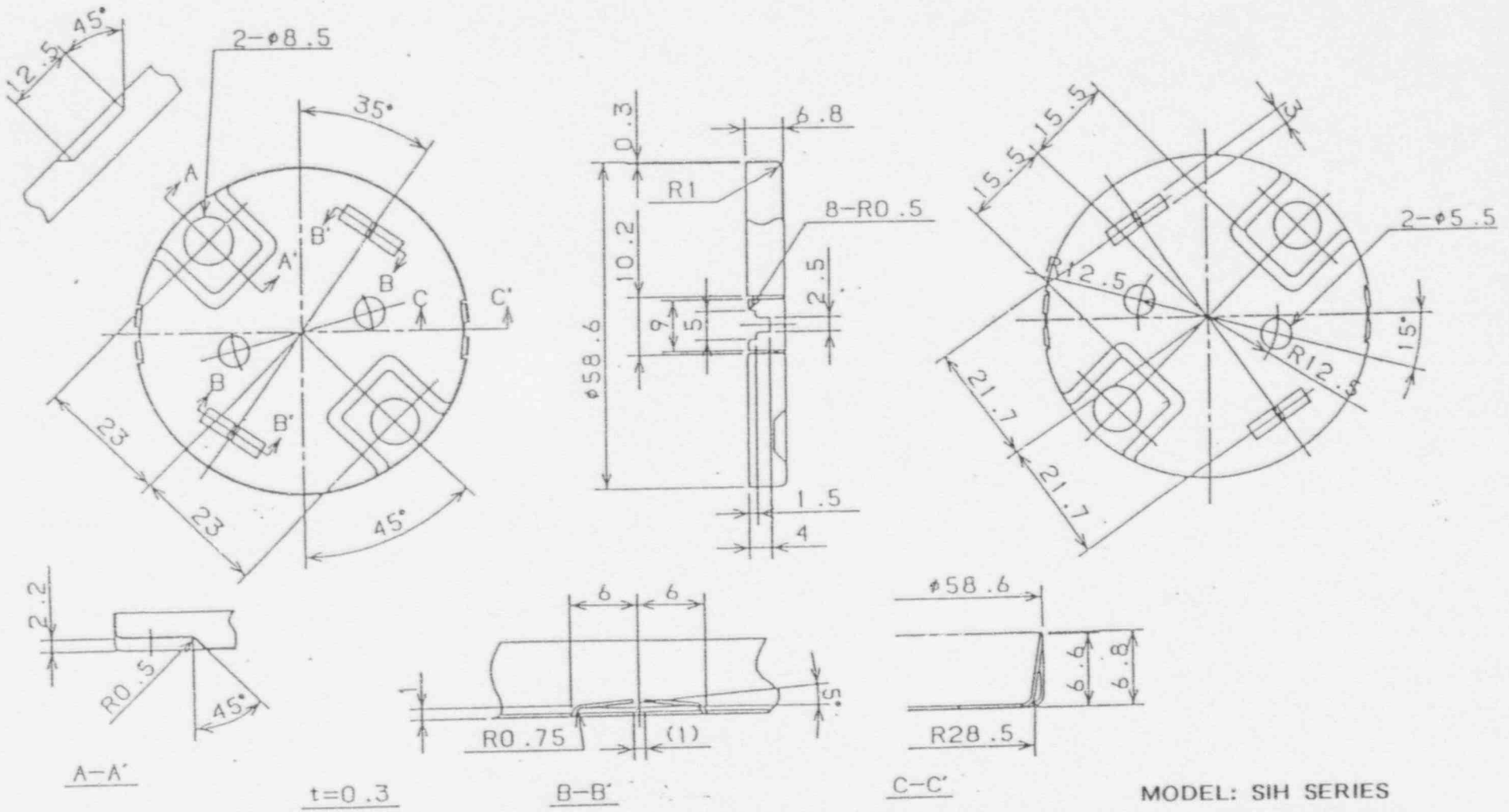
t=0.3 SUS304

MODEL: SIJ SERIES

DRAWN J. Kawabata	DATE 08. JUL. 96	TITLE OUTER ELECTRODE
CHECKED J. Ozawa	UNIT mm	DWG NO. A2-96-0283
APPROVED K. Mimura	SCALE 1 : 1	HOCHIKI CORPORATION

ISSUED 03 HOCHIKI CORPORATION

ENCLOSURE 12



A-A'

t=0.3

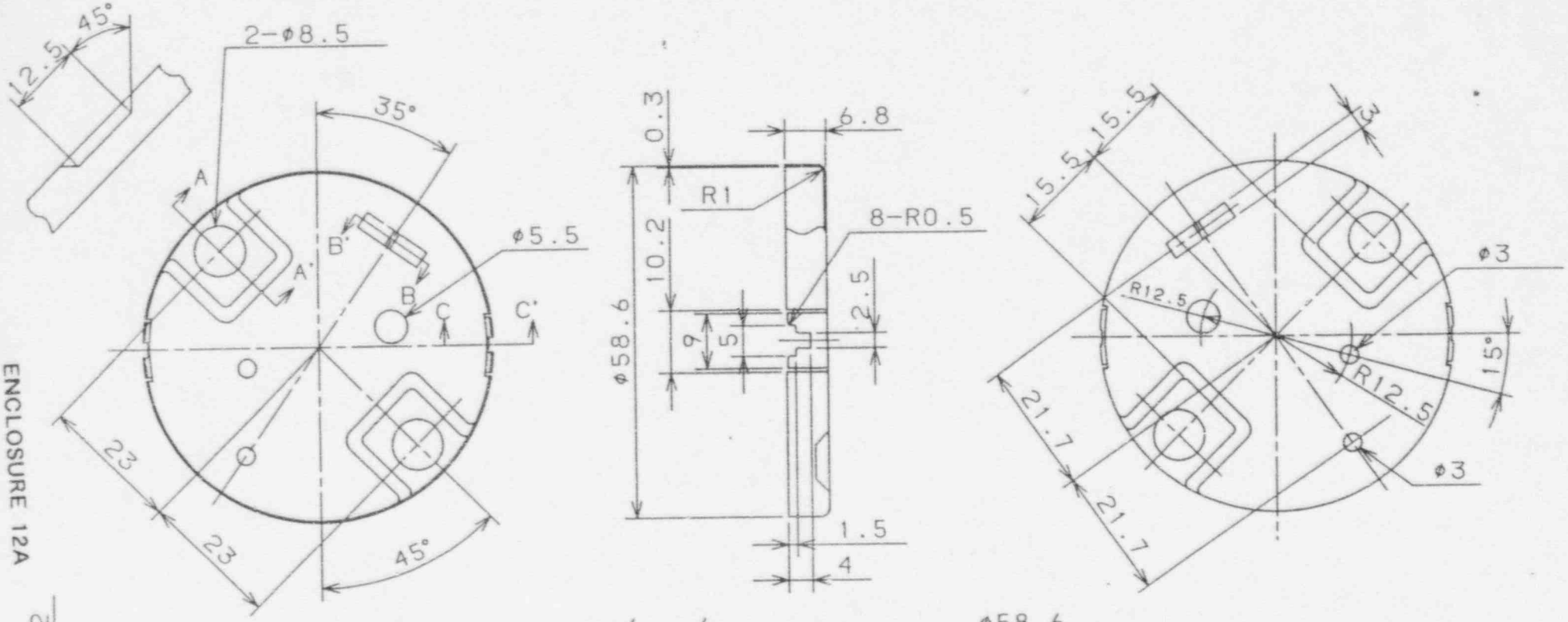
B-B'

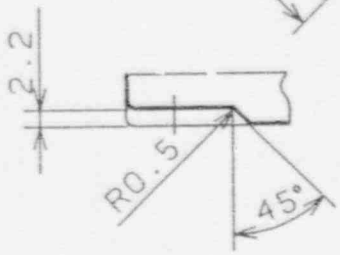
C-C'

MODEL: SIH SERIES

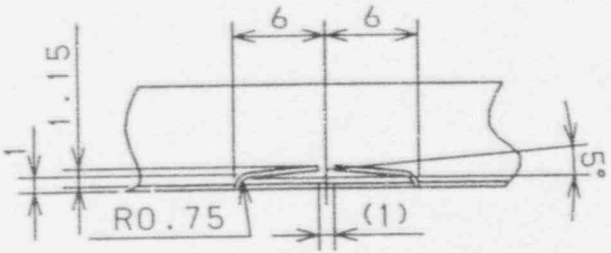
DRAWN H. Yashima	DATE 18 Nov. '88	TITLE SHIELD CASE	
CHECKED T. Kojima	UNIT	DWG NO. 2-3-295-0292-E	
APPROVED N. Hayakawa	SCALE	HOCHIKI CORPORATION	

ENCLOSURE 12A

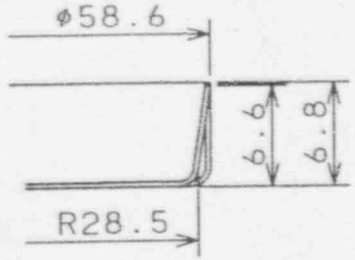




A–A



B–B (S=2:1)



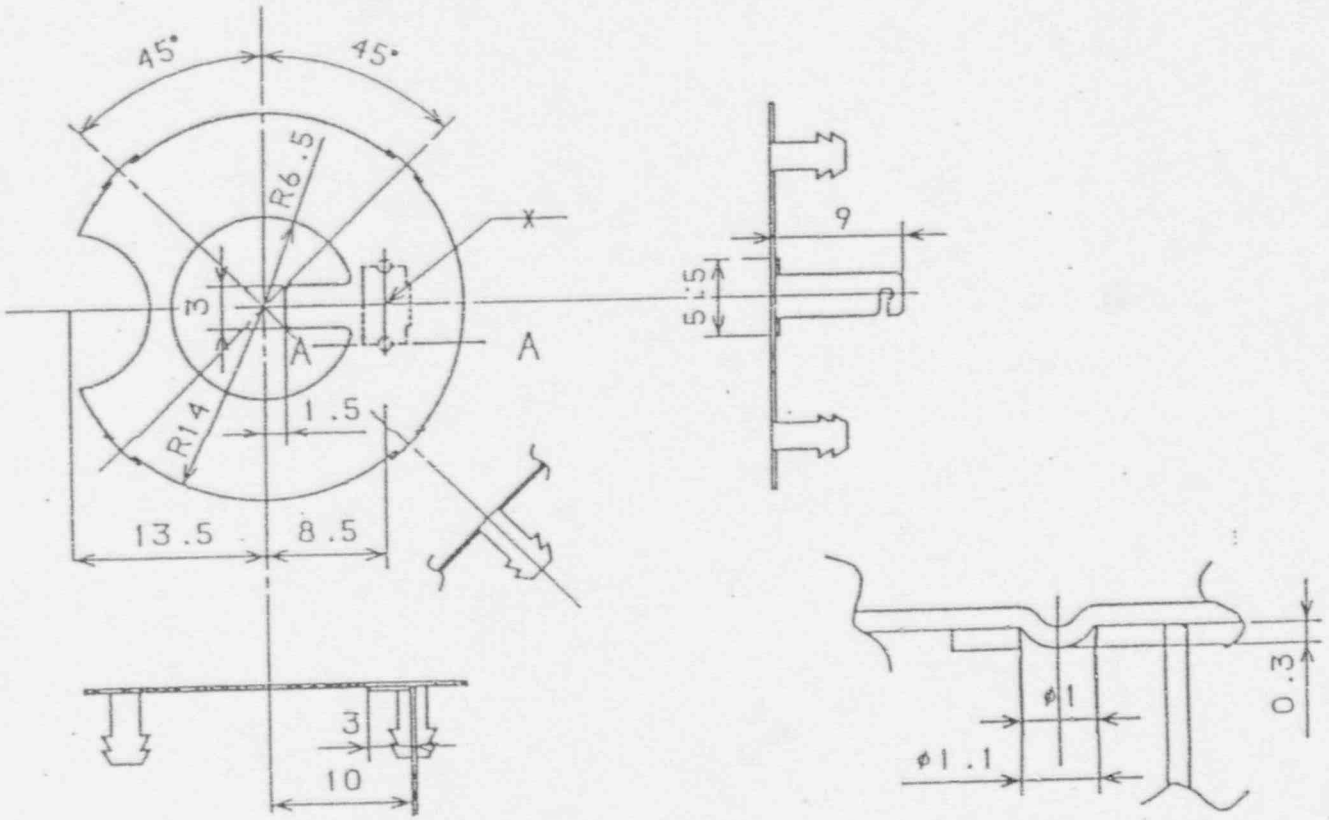
C–C (S=2:1)

t=0.3

MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08. JUL. 96	TITLE	SHIELD CASE
CHECKED T. Ozawa	UNIT mm	DWG NO.	A2-96-0289
APPROVED O. Yamamoto	SCALE 1 : 1	HOSHIKI CORPORATION	

ENCLOSURE 13



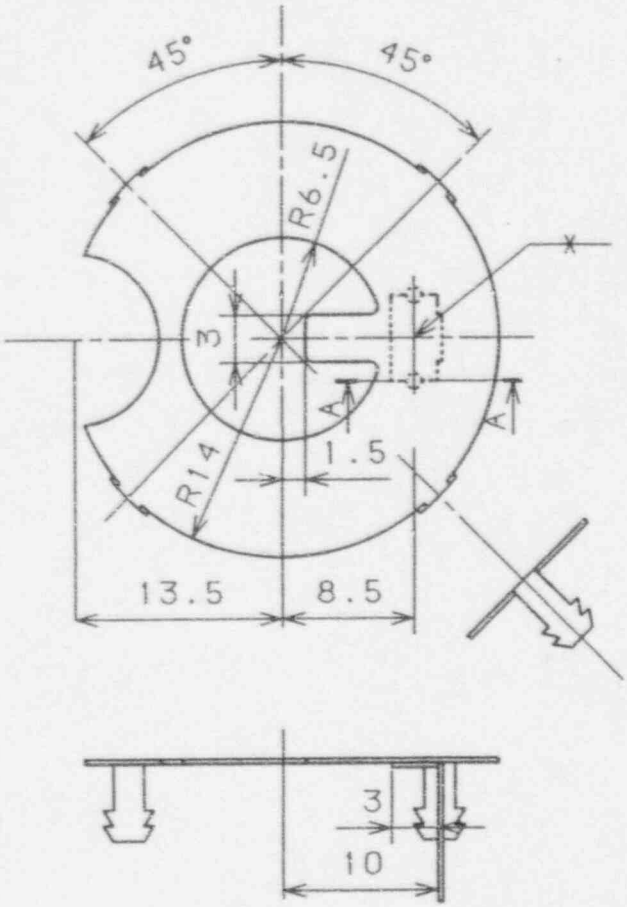
t=0.3

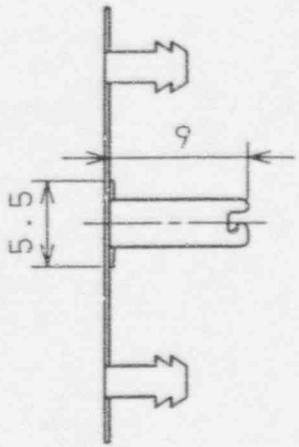
A~A' S:5/1

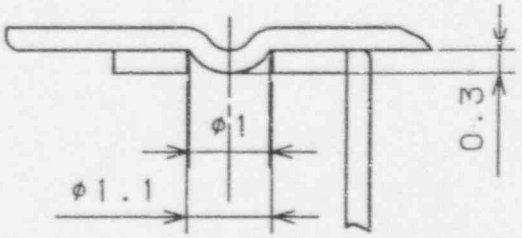
MODEL: SIH SERIES

DRAWN H. Yachima	DATE 18.Nov.'88	TITLE INTERMEDIATE ELECTRODE
CHECKED H. Kamimaba	UNIT	DWG NO. 2-3-295-0301-E
APPROVED N. Hayakawa	SCALE	HOCHIKI CORPORATION

ENCLOSURE 13A







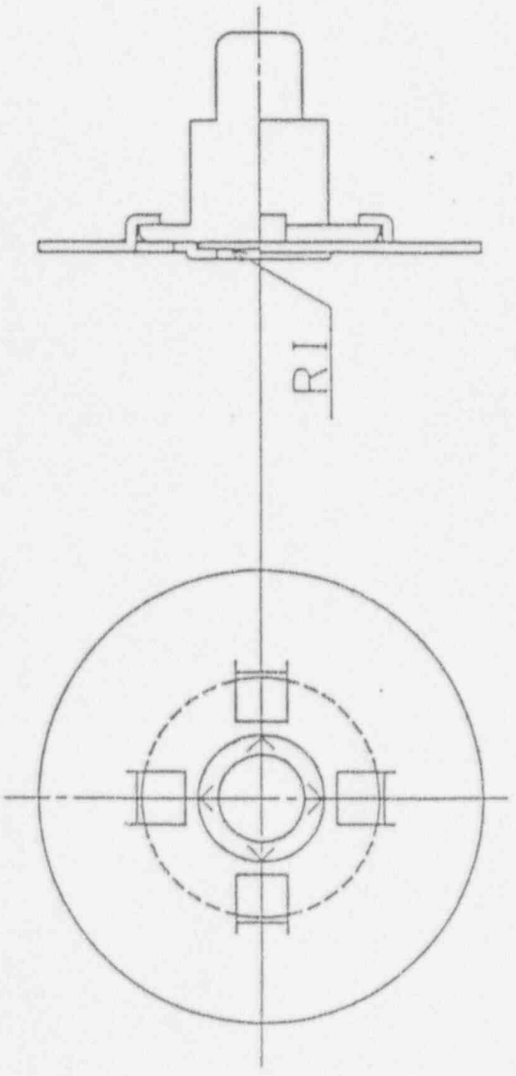
A–A S=5:1

t=0.3 SUS304

MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08. JUL. '96	TITLE INTERMEDIATE ELECTRODE
CHECKED T. Ozawa	UNIT mm	DWG NO. A2-96-0284
APPROVED O. Hirose	SCALE 2:1	HOCHIKI CORPORATION

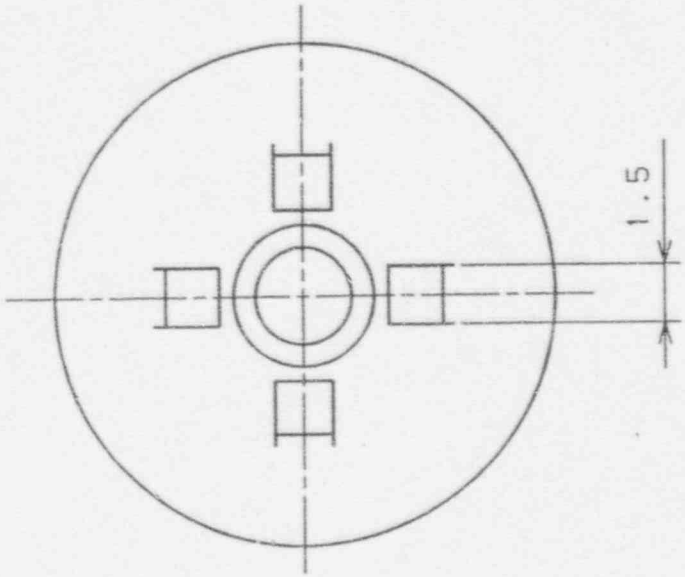
HOCHIKI CORPORATION
CONFIGURATION
03

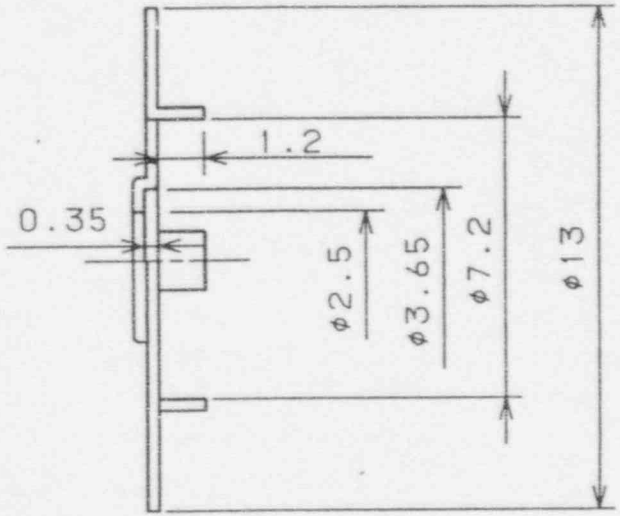


MODEL: SIJ SERIES

DRAWN H. Kishiwa	DATE 21. Nov. '88	TITLE INNER ELECTRODE	
CHECKED H. Kawanabe	UNIT	DWG NO. 2-1-490-0217-F	
APPROVED M. Hayakawa	SCALE	HOSHIKI CORPORATION	

ENCLOSURE 14A



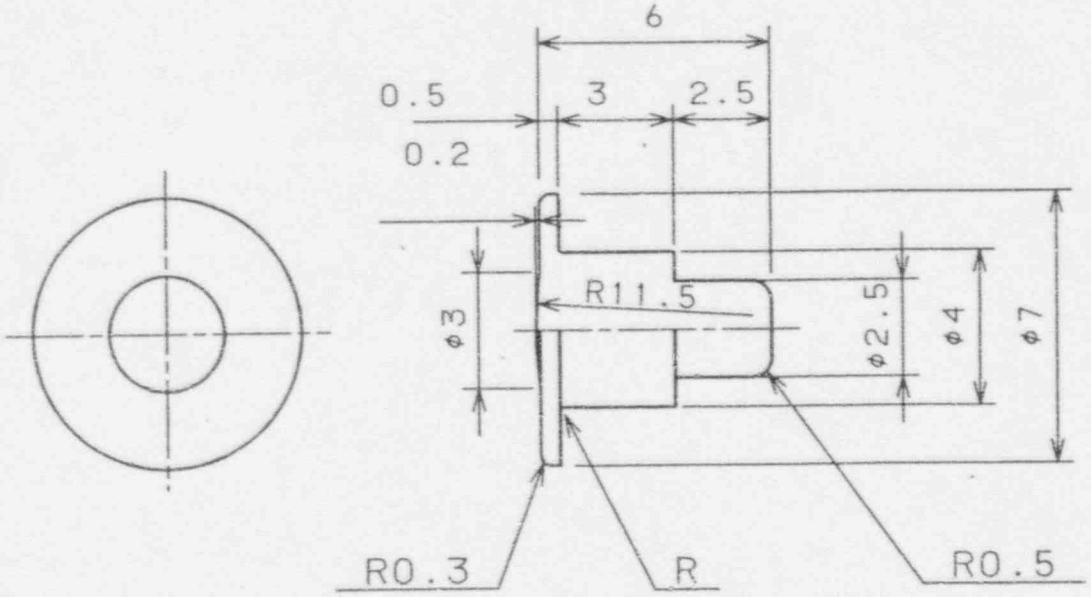


t=0.3 SUS304

MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08. JUL. '96	TITLE	RI HOLDER
CHECKED T. Ozawa	UNIT mm	DWG NO.	A2-96-0285
APPROVED O. Shimonaka	SCALE 5:1	HOCHIKI CORPORATION	

ENCLOSURE 14B



SUS304

MODEL: SIJ SERIES

DRAWN Y. Kawabata	DATE 08. JUL. '96	TITLE INNER ELECTRODE	
CHECKED T. Ozawa	UNIT mm	DWG NO. A2-96-0286	
APPROVED A. Shimomura	SCALE 5 : 1	HOCHIKI CORPORATION	

HOCHIKI CORPORATION

ENCLOSURE 15A

IONIZATION
SMOKE DETECTOR
MODEL 2098-9576
CONTACTS 0.15A @ 24V DC

SENSITIVITY RANGE 1.35 %/FT. $^{+0.43}_{-0.55}$ %/FT.

SER. NO.

SIMPLEX TIME RECORDER CO.

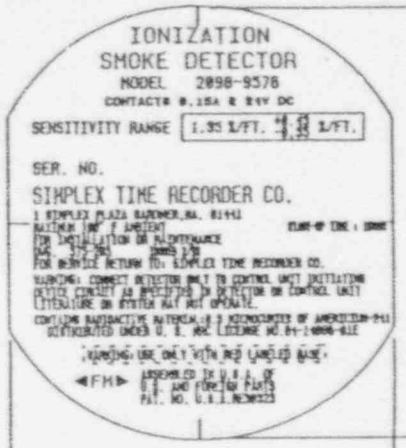
1 SIMPLEX PLAZA GARDNER,MA. 01441
MAXIMUM 100° F AMBIENT START-UP TIME: 18sec
FOR INSTALLATION OR MAINTENANCE
DWG. 575-285 ISSUED 2/93
FOR SERVICE RETURN TO: SIMPLEX TIME RECORDER CO.
WARNING: CONNECT DETECTOR ONLY TO CONTROL UNIT INITIATING DEVICE CIRCUIT AS SPECIFIED IN DETECTOR OR CONTROL UNIT LITERATURE OR SYSTEM MAY NOT OPERATE.
CONTAINS RADIOACTIVE MATERIAL:0.5 MICROCURIES OF AMERICIUM-241 DISTRIBUTED UNDER U. S. NRC LICENSE NO.04-14886-01E

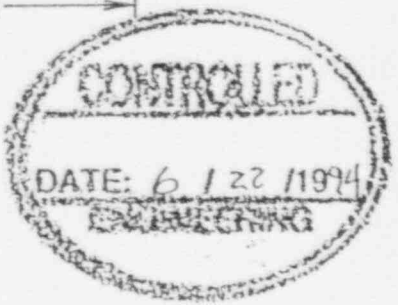
WARNING: USE ONLY WITH RED LABELED BASE.

◄FM► ASSEMBLED IN U.S.A. OF U.S. AND FOREIGN PARTS PAT. NO. U.S.A.RE30323

2:1

THIS AREA WILL BE PRE-PRINTED
ON THE WHITE WEBER STOCK IN RED
(REFER TO DRAWING NUMBER HA-01-052
COMPUTER # 1700-01455)





REV.	DATE	BY	CHANGE
E	5/14/94	DJH	CHANGED LABEL SHAPE AND MATERIAL
D	1/24/94	DJH	CHANGED LABEL FORMAT FOR LEGI80 PRINTING
C	7/16/93	AJG	CHANGED INSTALLATION INSTRUCTION DATE
B	2/3/92	LLL	CHANGED FROM MADE IN U.S.A. TO PRESENT FORM
A	11/28/90	LLL	ADD FM MARKING TO NAMEPLATE LABEL.

NOTES:

1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

3) MINIMUM TEXT SIZE IS .050 IN.

COMPUTER # 9000-01390

TOLERANCE
UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.XX ±.015
.XXX ±.005

MATERIAL: SEE NOTES 1
PCB/ASSY

DRAWN BY: DAVID HALL
DATE: 8/24/90
CHECKED BY:
UNITS: IN.
APPROVED BY:
SCALE: 2:1
DRAWING NO. HA-01-006

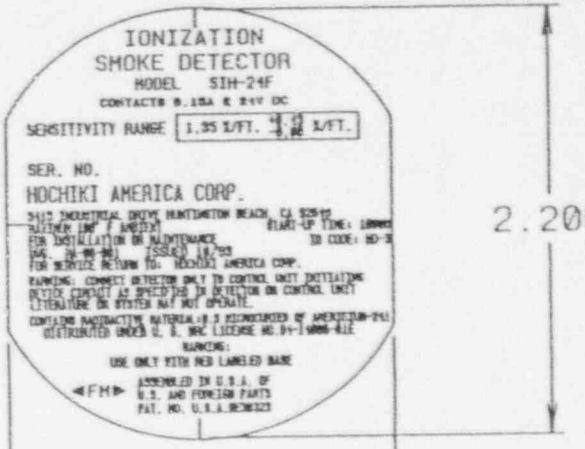
HOCHIKI
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

TITLE
SIH-24F DETECTOR LABEL
SIMPLEX VERSION(2098-9576

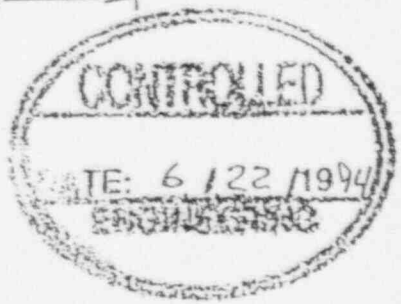
ENCLOSURE 15B

IONIZATION
SMOKE DETECTOR
MODEL SIH-24F
CONTACTS 0.15A @ 24V DC
SENSITIVITY RANGE 1.35 %/FT. +0.43 -0.80 %/FT.
SER. NO.
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE HUNTINGTON BEACH, CA 92649
MAXIMUM 100° F AMBIENT START-UP TIME: 18sec
FOR INSTALLATION OR MAINTENANCE ID CODE: HD-3
DWG. HA-06-001 ISSUED 10/93
FOR SERVICE RETURN TO: HOCHIKI AMERICA CORP.
WARNING: CONNECT DETECTOR ONLY TO CONTROL UNIT INITIATING DEVICE CIRCUIT AS SPECIFIED IN DETECTOR OR CONTROL UNIT LITERATURE OR SYSTEM MAY NOT OPERATE.
CONTAINS RADIOACTIVE MATERIAL:0.5 MICROCURIES OF AMERICIUM-241 DISTRIBUTED UNDER U. S. NRC LICENSE NO.04-14886-01E
WARNING:
USE ONLY WITH RED LABELED BASE
◄FM► ASSEMBLED IN U.S.A. OF U.S. AND FOREIGN PARTS PAT. NO. U.S.A.RE30323

2:1



1:1



REV.	DATE	BY	CHANGE
E	5/14/94	DJH	CHANGED LABEL SHAPE AND MATERIAL
D	1/24/94	DJH	CHANGED LABEL FORMAT FOR LEGI80 PRINTING
C	5/ 4/92	DJH	THE WORD JAPANESE WAS CHANGED TO FOREIGN
B	10/31/91	DJH	CHANGED FROM MADE IN U.S.A. TO PRESENT FORM
A	11/26/90	LLL	ADD FM MARKING TO NAMEPLATE LABEL.

NOTES:

1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

3) MINIMUM TEXT SIZE IS .050 IN.

COMPUTER # 9000-01380

TOLERANCE
UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.XX ±.015
.XXX ±.005

MATERIAL: SEE NOTES 1
PCS/ASSY

DRAWN BY: LOREN LEIMER
DATE: 8/24/90
CHECKED BY:
UNITS: IN.
APPROVED BY:
SCALE: 2:1
DRAWING NO. HA-01-008

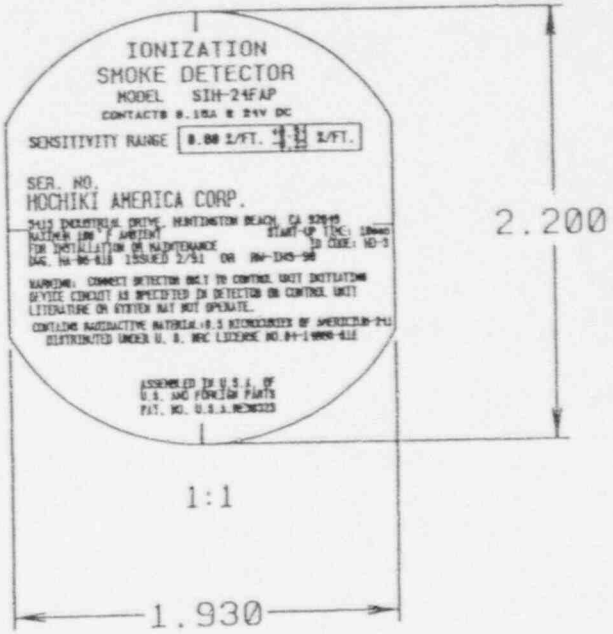
HOCHIKI
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

TITLE
SIH-24F DETECTOR LABEL
FOR HOCHIKI AMERICA

ENCLOSURE 15C

IONIZATION
SMOKE DETECTOR
MODEL SIH-24FAP
CONTACTS 0.15A @ 24V DC
SENSITIVITY RANGE 0.80 %/FT. +0.34 -0.25 %/FT.
SER. NO.
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE, HUNTINGTON BEACH, CA 92649
MAXIMUM 100° F AMBIENT START-UP TIME: 18sec
FOR INSTALLATION OR MAINTENANCE ID CODE: HD-3
DWG. HA-06-018 ISSUED 2/91 OR RW-INS-90
WARNING: CONNECT DETECTOR ONLY TO CONTROL UNIT INITIATING DEVICE CIRCUIT AS SPECIFIED IN DETECTOR OR CONTROL UNIT LITERATURE OR SYSTEM MAY NOT OPERATE.
CONTAINS RADIOACTIVE MATERIAL:0.5 MICROCURIES OF AMERICIUM-241 DISTRIBUTED UNDER U. S. NRC LICENSE NO.04-14886-01E
ASSEMBLED IN U.S.A. OF U.S. AND FOREIGN PARTS
PAT. NO. U.S.A.RE30323

2:1



1:1

CONTROLLED
DATE: 6/22/1994
ENGINEERING

REV.	DATE	BY	CHANGE
D	5/14/94	DJH	CHANGED LABEL SHAPE AND MATERIAL
C	1/24/94	DJH	CHANGED LABEL FORMAT FOR LEGI80 PRINTING
B	5/4/92	DJH	CHANGED JAPANESE TO READ FOREIGN
A	11/ 1/91	DJH	CHANGED FROM MADE IN U.S.A. TO PRESENT FORM

NOTES:

1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

3) MINIMUM TEXT SIZE IS .050 IN.

COMPUTER # 1700-06150

TOLERANCE UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.XX ±.015
.XXX ±.005

MATERIAL: SEE NOTES 1 PCS/ASSY

DRAWN BY: LOREN L. LEIMER
DATE: 2/19/91
CHECKED BY:
APPROVED BY:
UNITS: IN.
SCALE: 2:1
DRAWING NO. HA-01-010

HOCHIKI
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

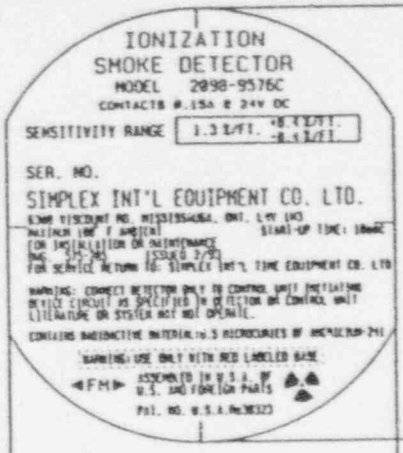
TITLE
SIH-24FAP DETECTOR LABEL
FOR USE IN THE AIR PRODUCTS
DUCT HOUSING

ENCLOSURE 15D

IONIZATION
SMOKE DETECTOR
MODEL 2098-9576C
CONTACTS 0.15A @ 24V DC
SENSITIVITY RANGE 1.3 %/FT. +0.4 %/FT. -0.4 %/FT.
SER. NO.
SIMPLEX INT'L EQUIPMENT CO. LTD.
6300 VISCOUNT RD. MISSISSAUGA, ONT. L4V 1H3
MAXIMUM 100° F AMBIENT START-UP TIME: 18sec
FOR INSTALLATION OR MAINTENANCE
DWG. 575-285 ISSUED 2/93
FOR SERVICE RETURN TO: SIMPLEX INT'L TIME EQUIPMENT CO. LTD
WARNING: CONNECT DETECTOR ONLY TO CONTROL UNIT INITIATING DEVICE CIRCUIT AS SPECIFIED IN DETECTOR OR CONTROL UNIT LITERATURE OR SYSTEM MAY NOT OPERATE.
CONTAINS RADIOACTIVE MATERIAL:0.5 MICROCURIES OF AMERICIUM-241
WARNING: USE ONLY WITH RED LABELED BASE
◄FM► ASSEMBLED IN U.S.A. OF U.S. AND FOREIGN PARTS
PAT. NO. U.S.A.Re30323

2:1

CONTROLLED
DATE: 6/22/1994
ENGINEERING



1:1

THIS AREA WILL BE PRE-PRINTED
ON THE SILVER WEBER STOCK IN RED
(REFER TO DRAWING NUMBER HA-01-052
COMPUTER # 1700-01455)

REV.	DATE	BY	CHANGE
G	5/14/94	DJH	CHANGED LABEL SHAPE AND MATERIAL
F	1/24/94	DJH	CHANGED LABEL FORMAT FOR LEGIBO PRINTING
E	7/19/93	AJG	CHANGED INSTALLATION INSTRUCTION DATE
D	1/27/93	LLL	CHANGED DRAWING NUMBER AND ISSUE DATE
C	11/9/92	DJH	CHANGED STR NO. FROM 2098-9130 TO 2098-9576C
B	1/9/92	LLL	CHANGED FROM MADE IN U.S.A. TO PRESENT FORM
A	12/6/91	DJH	ADD FM SYMBOL TO LABEL

NOTES:

1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

3) MINIMUM TEXT SIZE IS .050 IN.

COMPUTER # 1700-04040

TOLERANCE UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.xx ±.015
.xxx ±.005

MATERIAL: SEE NOTES 1
PCS/ASSY

DRAWN BY: TONY GARCIA
DATE: 2/22/91
CHECKED BY:
APPROVED BY:
UNITS: IN.
SCALE: 2:1
DRAWING NO. HA-01-011

HOCHIKI
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

TITLE
SIH-24FC (2098-9576C)
NAME PLATE LABEL

ENCLOSURE 15E

IONIZATION
SMOKE DETECTOR
MODEL D281
CONTACTS 0.15A @ 24V DC

SENSITIVITY RANGE 1.35 %/FT. $^{+0.43}_{-0.80}$ %/FT.

SER. NO.

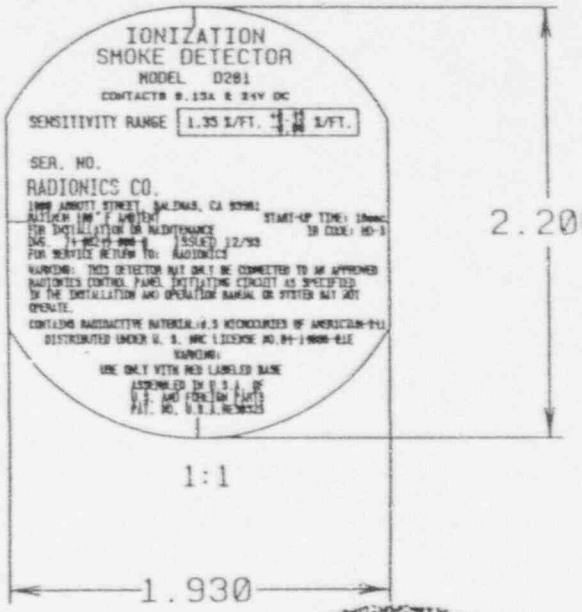
RADIONICS CO.

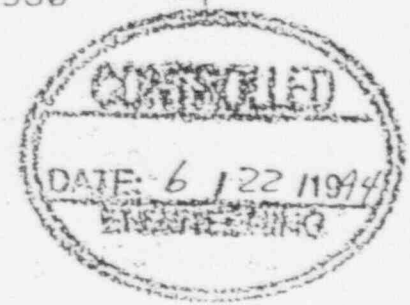
1800 ABBOTT STREET, SALINAS, CA 93901
MAXIMUM 100° F AMBIENT START-UP TIME: 10sec.
FOR INSTALLATION OR MAINTENANCE ID CODE: HD-3
DWG. 74-06249-000-B ISSUED 12/93
FOR SERVICE RETURN TO: RADIONICS

WARNING: THIS DETECTOR MAY ONLY BE CONNECTED TO AN APPROVED RADIONICS CONTROL PANEL INITIATING CIRCUIT AS SPECIFIED IN THE INSTALLATION AND OPERATION MANUAL OR SYSTEM MAY NOT OPERATE.

CONTAINS RADIOACTIVE MATERIAL:0.5 MICROCURIES OF AMERICIUM-241
DISTRIBUTED UNDER U. S. NRC LICENSE NO.04-14886-01E
WARNING:
USE ONLY WITH RED LABELED BASE
ASSEMBLED IN U.S.A. OF
U.S. AND FOREIGN PARTS
PAT. NO. U.S.A.RE30323

2:1





REV.	DATE	BY	CHANGE
E	5/14/94	DJH	CHANGED LABEL SHAPE AND MATERIAL
D	4/21/94	DJH	REMOVED "THE" FROM WARNING STATEMENT
C	1/24/94	DJH	CHANGED LABEL FORMAT FOR LEGI80 PRINTING
B	5/7/92	DJH	CHANGED JAPANESE TO FOREIGN
A	11/1/91	DJH	CHANGED FROM MADE IN U.S.A. TO PRESENT FORM

NOTES:

1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

3) MINIMUM TEXT SIZE IS .050 IN.

COMPUTER # 1700-05017

TOLERANCE
UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.XX ±.015
.XXX ±.005

MATERIAL: SEE NOTES 1
PCS/ASSY

DRAWN BY: TONY GARCIA
DATE: 4/9/91
CHECKED BY:
UNITS: IN.
APPROVED BY:
SCALE: 2:1
DRAWING NO. HA-01-015

HOCHIKI
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

TITLE
SIH-24F RADIONICS
NAME PLATE LABEL

ENCLOSURE 15F

IONIZATION
SMOKE DETECTOR
MODEL 2098-9550
CONTACTS 0.15A @ 24V DC
SENSITIVITY RANGE 1.35 %/FT. +0.43 -0.55 %/FT.

SER. NO.
SIMPLEX TIME RECORDER CO.
1 SIMPLEX PLAZA GARDNER,MA. 01441
MAXIMUM 100 °F AMBIENT START-UP TIME : 18 sec
FOR SERVICE RETURN TO: SIMPLEX TIME RECORDER CO.

WARNING: CONNECT DETECTOR ONLY TO CONTROL UNIT INITIATING DEVICE CIRCUIT AS SPECIFIED IN DETECTOR OR CONTROL UNIT LITERATURE OR SYSTEM MAY NOT OPERATE.

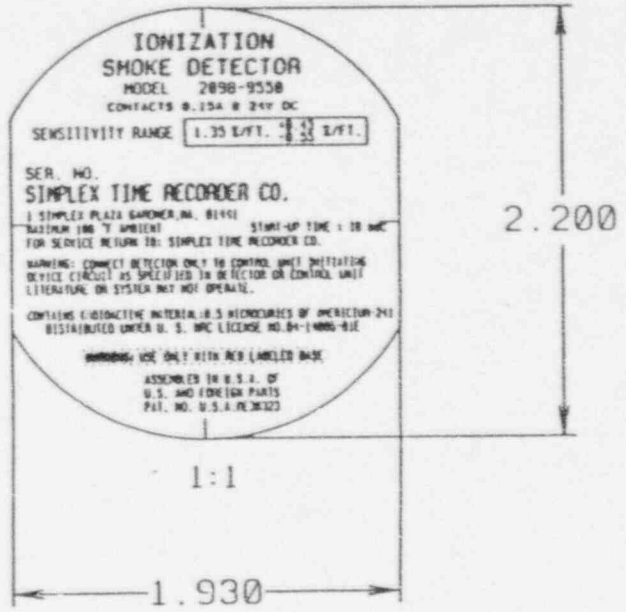
CONTAINS RADIOACTIVE MATERIAL:0.5 MICROCURIES OF AMERICIUM-241 DISTRIBUTED UNDER U. S. NRC LICENSE NO.04-14886-01E

WARNING: USE ONLY WITH RED LABELED BASE

ASSEMBLED IN U.S.A. OF
U.S. AND FOREIGN PARTS
PAT. NO. U.S.A.RE30323

2:1

THIS AREA WILL BE PRE-PRINTED
ON THE SILVER WEBER STOCK IN RED
(REFER TO DRAWING NUMBER HA-01-052
COMPUTER # 1700-01455)



CONTROLLED
DATE: 6/22/1994
ENGINEERING

NOTES:

1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

3) MINIMUM TEXT SIZE IS .050 IN.

COMPUTER # 1700-01041

REV.	DATE	BY	CHANGE
C	5/14/94	DJH	CHANGED LABEL SHAPE AND MATERIAL
B	1/24/94	DJH	CHANGED LABEL FORMAT FOR LEGI80 PRINTING
A	2/25/92	LLL	CHANGED "JAPANESE" TO "FOREIGN"

TOLERANCE
UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.xx ±.015
.xxx ±.005

MATERIAL:
SEE NOTES 1

PCS/ASSY

DRAWN BY: LOREN LEIMER
DATE: 11/21/91
CHECKED BY:
UNITS: IN.
APPROVED BY:
SCALE: 2:1
DRAWING NO. HA-01-028

HOCHIKI
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

TITLE
SIH-24FI DETECTOR LABEL
SIMPLEX VERSION(2098-9550)

ENCLOSURE 15G

IONIZATION
SMOKE DETECTOR
MODEL SIH-24FI
CONTACTS 0.15A @ 24V DC
SENSITIVITY RANGE 1.35 %/FT. +0.43 -0.55 %/FT.

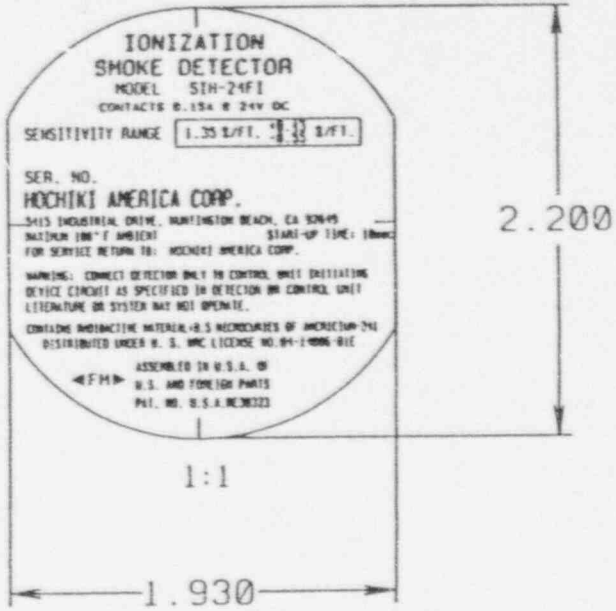
SER. NO.
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE, HUNTINGTON BEACH, CA 92649
MAXIMUM 100° F AMBIENT START-UP TIME: 10sec
FOR SERVICE RETURN TO: HOCHIKI AMERICA CORP.

WARNING: CONNECT DETECTOR ONLY TO CONTROL UNIT INITIATING DEVICE CIRCUIT AS SPECIFIED IN DETECTOR OR CONTROL UNIT LITERATURE OR SYSTEM MAY NOT OPERATE.

CONTAINS RADIOACTIVE MATERIAL:0.5 MICROCURIES OF AMERICIUM-241 DISTRIBUTED UNDER U. S. NRC LICENSE NO.04-14886-01E

◄FM► ASSEMBLED IN U.S.A. OF U.S. AND FOREIGN PARTS
PAT. NO. U.S.A.RE30323

2:1



1:1

CONTROLLED
DATE: 6/22/1994
ENGINEERING

NOTES:
1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

3) MINIMUM TEXT SIZE IS .050 IN.

COMPUTER # NOT ASSIGNED YET

REV.	DATE	BY	CHANGE
B	5/14/94	DJH	CHANGED LBEL SHAPE AND MATERIAL
A	1/24/94	DJH	CHANGED LABEL FORMAT FOR LEGI80 PRINTING

TOLERANCE
UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.XX ±.015
.XXX ±.005

MATERIAL: SEE NOTES 1

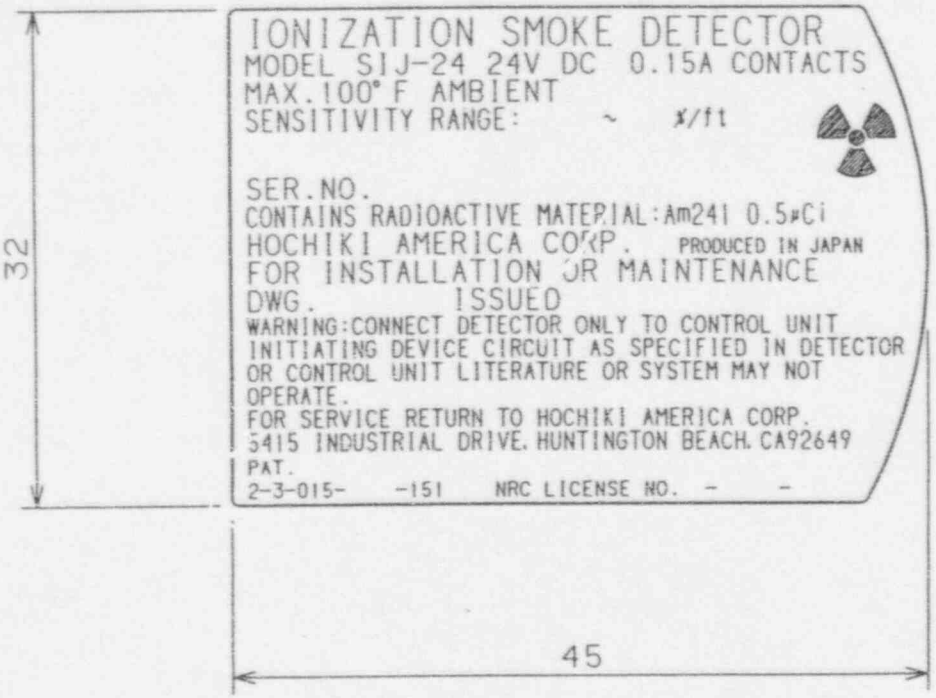
PCS/ASSY

DRAWN BY: DAVID HALL
DATE: 2/19/91
CHECKED BY:
UNITS: IN.
APPROVED BY:
SCALE: 2:1
DRAWING NO. HA-01-034

HOCHIKI
HOCHIKI AMERICA CORP.
5415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

TITLE
SIH-24FI NAMEPLATE LABEL

ENCLOSURE 15H



POLYETHYLENE TEREPHTALATE FILM
t=0.05

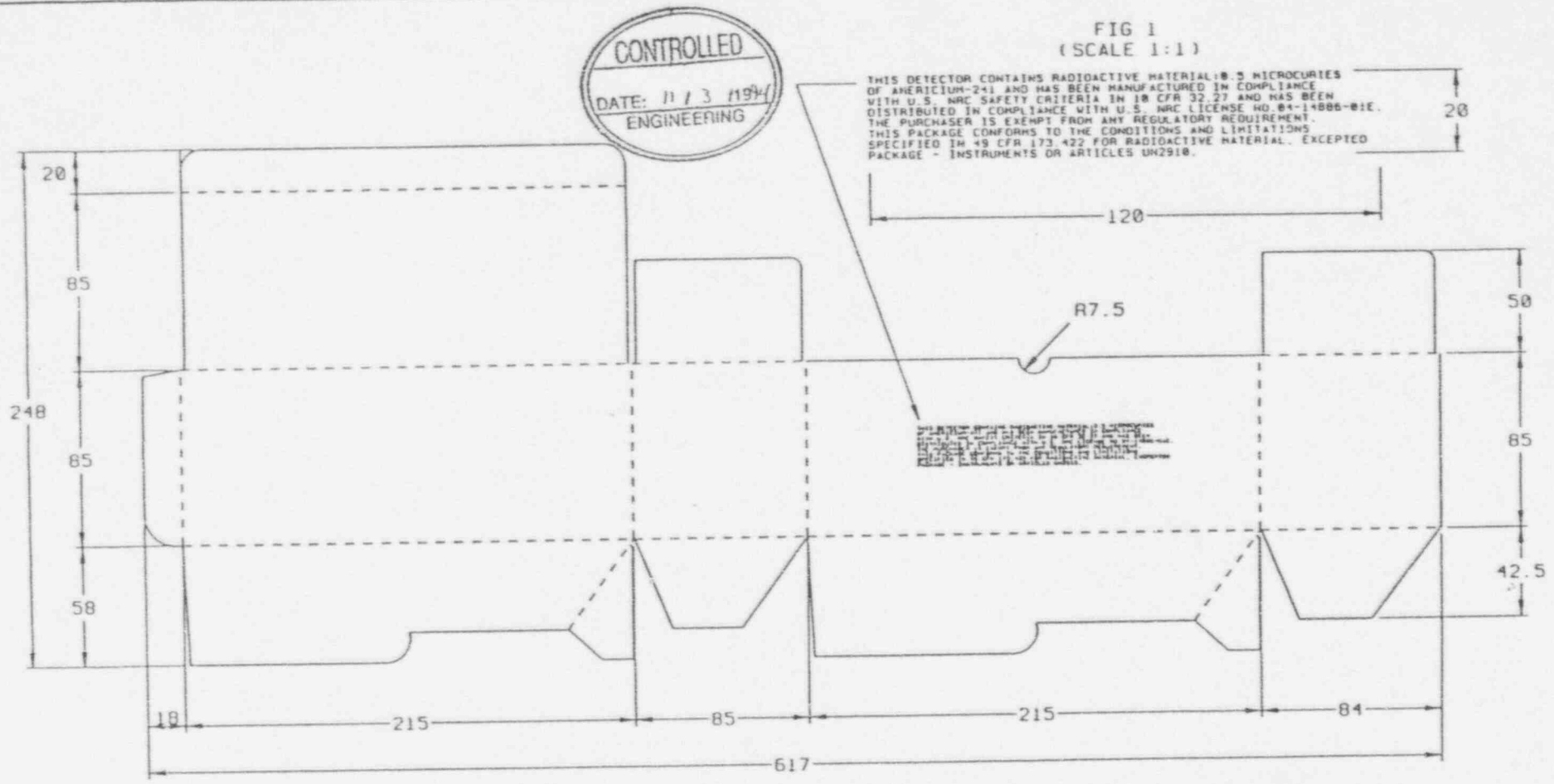
DRAWN Y. Kawabata	DATE 16.JUL.96	TITLE NAME LABEL SIJ-24
CHECKED Y. Torikoshi	UNIT mm	DWG NO. A2-96-0292
APPROVED M. Shibata	SCALE 2:1	HOCHIKI CORPORATION

HOCHIKI CORPORATION 03 ISSUED

ENCLOSURE 16A

CONTROLLED
DATE: 11/3/1994
ENGINEERING

FIG 1
(SCALE 1:1)



NOTES:

1. TEXT TO BE CENTERED HORIZONTALLY AND VERTICALLY.

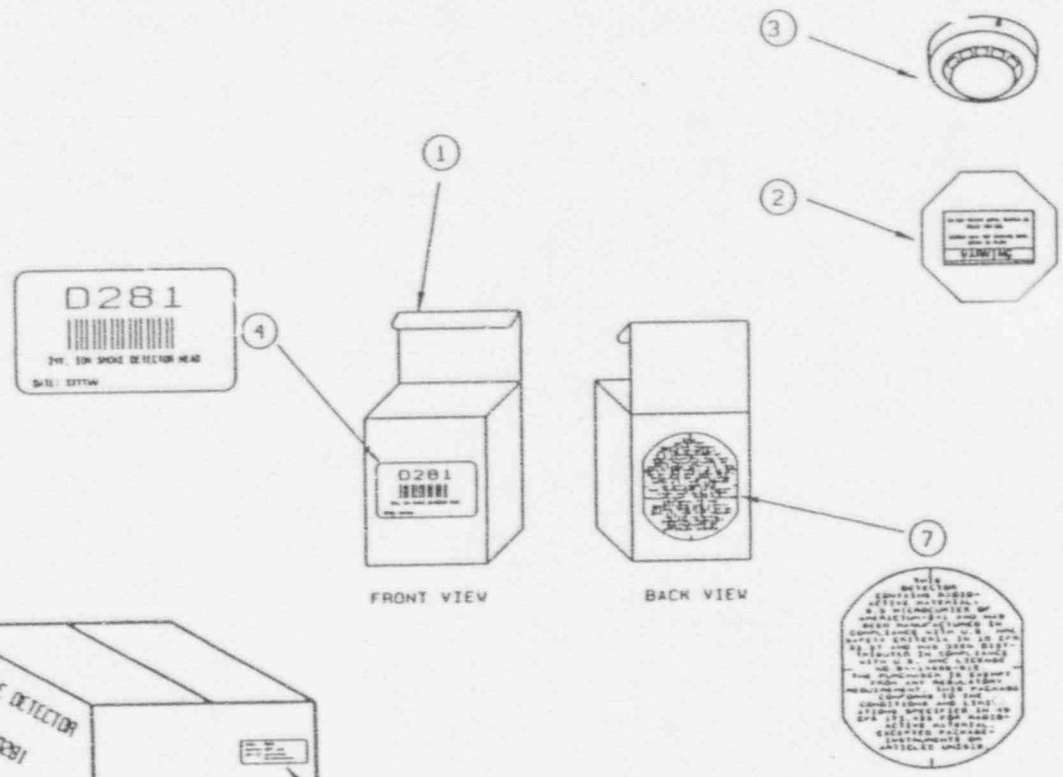
COMPUTER # 3800-09550

REV.	DATE	BY	CHANGE
B	11-3-94	AJG	CHANGED TITLE TO SHOW SIMPLEX MODELS
A	9-3-94	AJG	ADDED RADIOACTIVE STATEMENT
-	6-24-94	AJG	INITIAL RELEASE

TOLERANCE UNLESS OTHERWISE SPECIFIED ANGLE ± 03° ±1 MM	DRAWN BY: ANTHONY J GARCIA JR	DATE 6-24-94	HOCHIKI AMERICA CORP. 5413 INDUSTRIAL DRIVE HUNTINGTON BEACH, CA 92649
	CHECKED BY:	UNITS MM	
	APPROVED BY:	SCALE 1:2	TITLE BOX 5 PC 4098-9716 & 4098-9716C
MATERIAL: PCS/ASSY	DRAWING NO. HA-10-104		

ENCLOSURE 16B

ITEM	DESCRIPTION	PART #
1	INDIVIDUAL BOX	3000-00327
2	DUST COVER	5006-01368
3	DETECTOR	0250-00715
4	INDIVIDUAL BOX BAR CODE LABEL	1700-00414
5	LABEL - SERIAL NUMBER (100 PC)	1700-01102
6	BOX 100 PC	3000-00320
7	INDIVIVIDUAL BOX WARNING LABEL	1700-05010



CONTROLLED
DATE: 11/2/1994
ENGINEERING

NOTES:

A. MASTER CARTON TEXT "SMOKE DETECTOR" AND "D281" TO BE STAMPED OR STENCILED IN BLACK. MINIMUM TEXT HEIGHT 1".

REV.	DATE	BY	CHANGE
-	11-2-94	AJG	INITIAL RELEASE

TOLERANCE
UNLESS OTHERWISE SPECIFIED
ANGLE ± 03'
.XX ± .015
.XXX ± .005

MATERIAL:

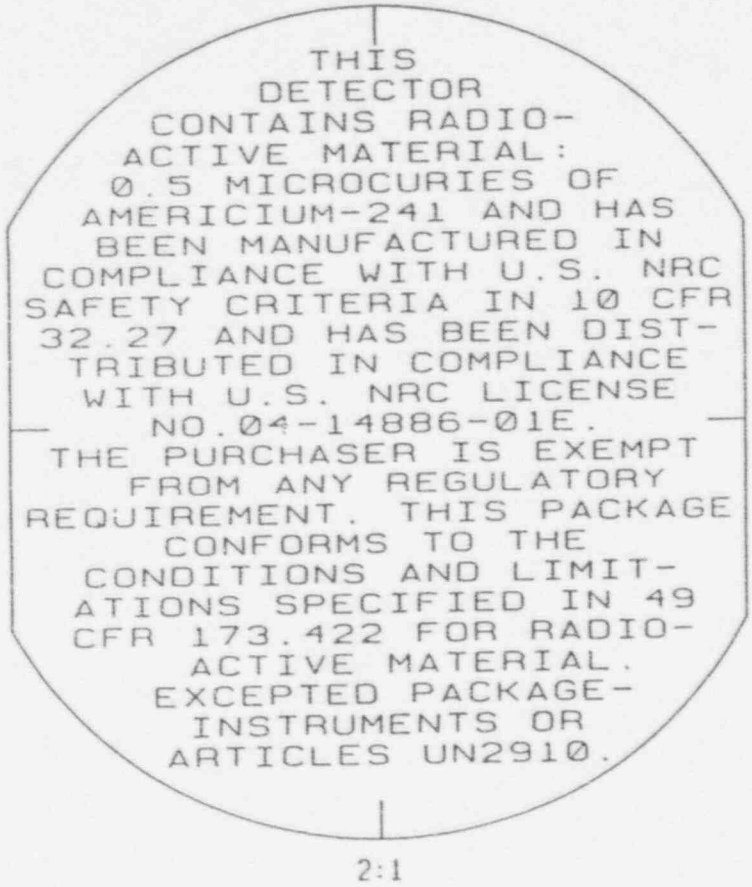
PCS/ASSY

DRAWN BY: ANTHONY J GARCIA JR
DATE: 11-2-94
CHECKED BY:
UNITS: MM
APPROVED BY:
SCALE: NA
DRAWING NO. MA-10-141

HOCHIKI AMERICA CORP.
3415 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

TITLE
ASSEMBLY
PACKAGING
D281
SIH-24F (RADIONICS)

ENCLOSURE 16C



2:1

NOTES:

1) LABEL MATERIAL:
WHITE ULTRAPLATE LABEL
STOCK MADE BY WEBER MARKING SYSTEMS INC.

2) THE PRINT WILL BE PRODUCED BY THE WEBER MARKING SYSTEMS ULTRAPLATE, ULTRAPLATE B OR ULTRAPLATE C THERMAL TRANSFER INK FOR PRODUCING FINISHED PRINTED LABELS WITH UL LISTED WEBER THERMAL TRANSFER PRINTERS.

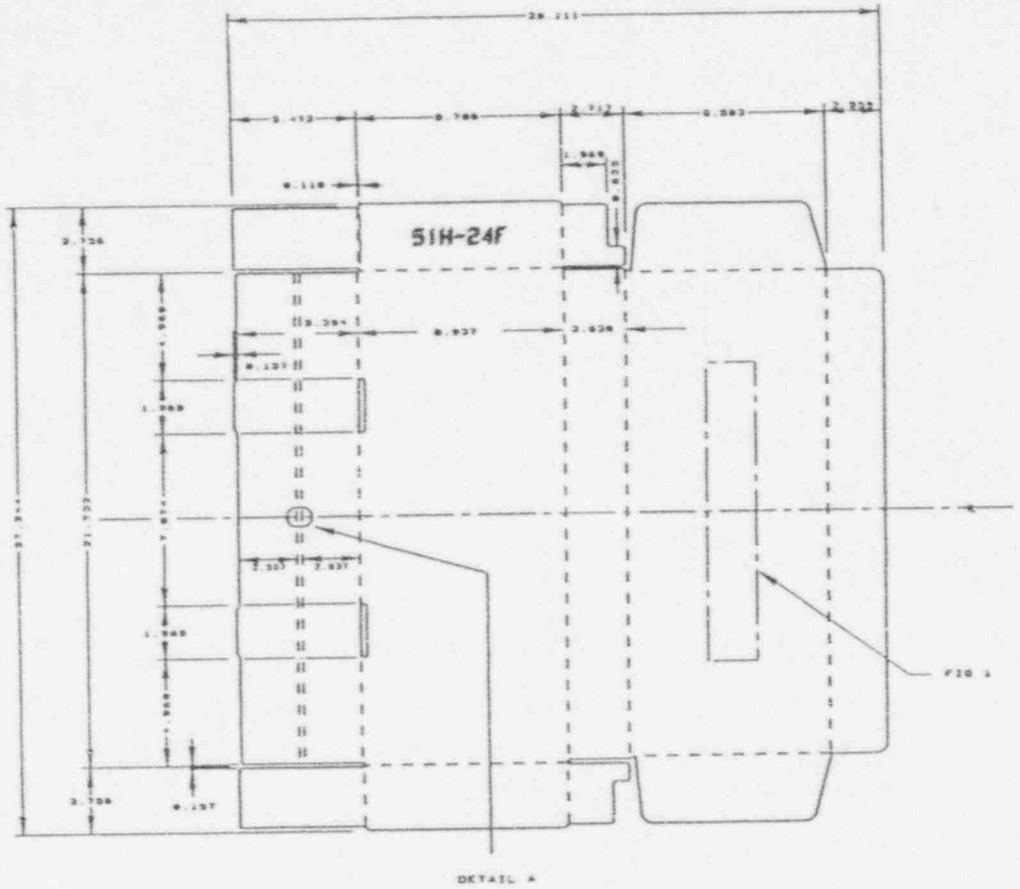
3) MINIMUM TEXT SIZE IS .050 IN.

Comp.# 1700-05040

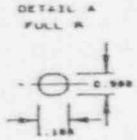
REV.	DATE	BY	CHANGE
-	11/2/94	DJH	INITIAL

TOLERANCE UNLESS OTHERWISE SPECIFIED: ANGLE ± 03° .XX ±.015 .XXX ±.005	DRAWN BY: DAVID HALL	DATE: 11/2/94	HOCHIKI HOCHIKI AMERICA CORP. 3413 INDUSTRIAL DRIVE HUNTINGTON BEACH, CA 92649
	CHECKED BY:	UNITS: IN.	
	APPROVED BY:	SCALE: 2:1	TITLE: LABEL NRC WARNING FOR INDIVIDUALLY PACKAGED DETECTORS
MATERIAL: SEE NOTES 1 PCS/ASSY	DRAWING NO. HA-10-139		

ENCLOSURE 16D



DETAIL A



CONTROLLED
DATE: 11 / 2 /1994
ENGINEERING

THIS DETECTOR CONTAINS RADIOACTIVE MATERIAL: 0.5 MICROCURIES OF AMERICIUM-241 AND HAS BEEN MANUFACTURED IN COMPLIANCE WITH U.S. NRC SAFETY CRITERIA IN 10 CFR 32.27 AND HAS BEEN DISTRIBUTED IN COMPLIANCE WITH U.S. NRC LICENSE NO.04-14886-01E. THE PURCHASER IS EXEMPT FROM ANY REGULATORY REQUIREMENT. THIS PACKAGE CONFORMS TO THE CONDITIONS AND LIMITATIONS SPECIFIED IN 49 CFR 173.422 FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS OR ARTICLES UN2910.

3.822

11.889

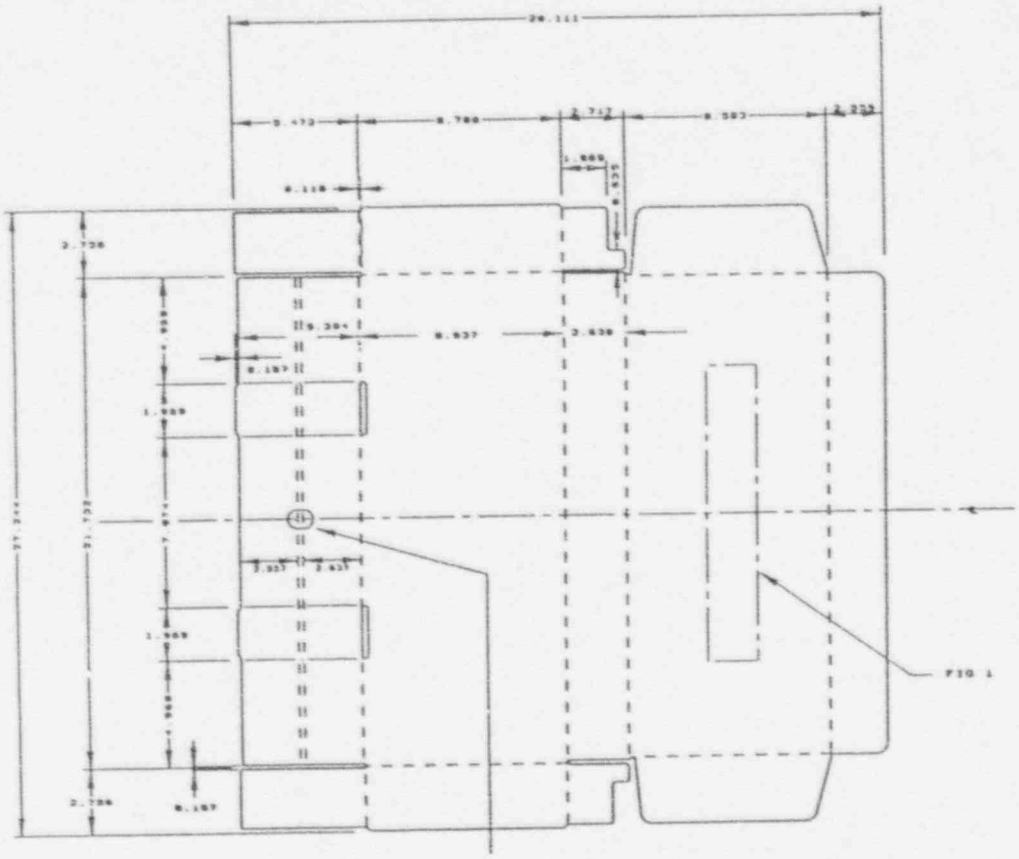
NOTES:

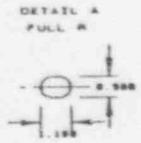
PART # 9000-01400

REV.	DATE	BY	CHANGE
-	11-2-94	AJG	INITIAL RELEASE

TOLERANCE UNLESS OTHERWISE SPECIFIED: ANGLE ± 03° .XX ±.015 .XXX ±.005	DRAWN BY: ANTHONY J GARCIA	DATE: 11-2-94	HOCHIKI AMERICA CORP. 5415 INDUSTRIAL DRIVE HUNTINGTON BEACH, CA 92649
	CHECKED BY:	UNITS: INCH	
	APPROVED BY:	SCALE: NTS	TITLE: BOX 10 PC SIH-24F, SIH-24FAP
MATERIAL: NO 3 WHITE 200 # CORREGATED CARDBOARD PCS/ASSY	DRAWING NO. HA-10-138		

ENCLOSURE 16E





CONTROLLED
DATE: 11/2/1994
ENGINEERING

FIG 1

THIS DETECTOR CONTAINS RADIOACTIVE MATERIAL: 0.5 MICROCURIES OF AMERICIUM-241 AND HAS BEEN MANUFACTURED IN COMPLIANCE WITH U.S. NRC SAFETY CRITERIA IN 10 CFR 32.27 AND HAS BEEN DISTRIBUTED IN COMPLIANCE WITH U.S. NRC LICENSE NO. 04-14886-01E. THE PURCHASER IS EXEMPT FROM ANY REGULATORY REQUIREMENT. THIS PACKAGE CONFORMS TO THE CONDITIONS AND LIMITATIONS SPECIFIED IN 49 CFR 173.422 FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS OR ARTICLES UN2910.

3.822

11.889

REV.	DATE	BY	CHANGE
C	11-2-94	AJG	CHANGED RADIOACTIVE STATEMENT/DRAWING TITLE
B	8-25-92	AJG	CORRECT DIMENSIONS
A	7-29-92	AJG	DELETE FIG 2/AMEND TITLE BLOCK
-	2-2-91	JT	INITIAL RELEASE

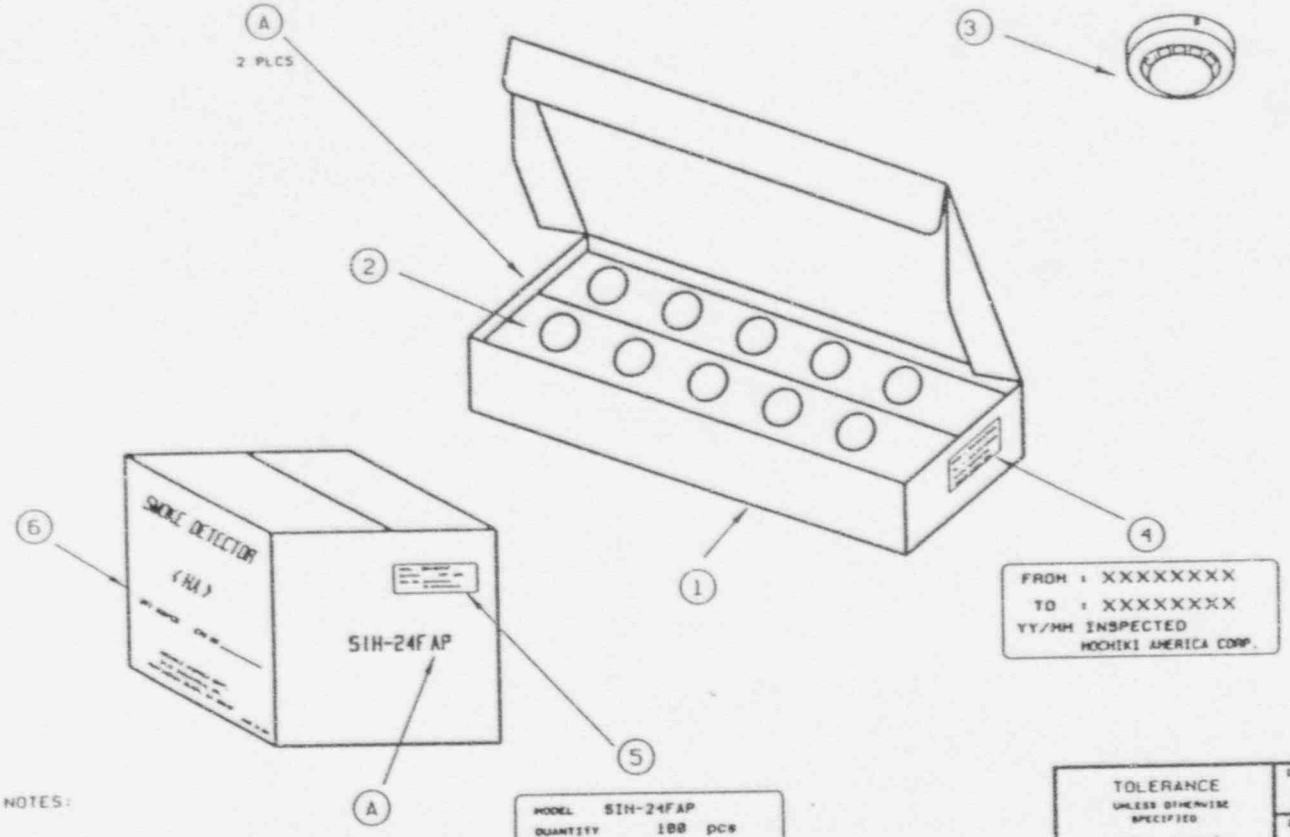
NOTES:

TOLERANCE UNLESS OTHERWISE SPECIFIED: ANGLE ± 03° .XX ±.015 .XXX ±.005	DRAWN BY: JOHN YARAGI	DATE: 2-2-91	HOCHIKI AMERICA CORP. 5413 INDUSTRIAL DRIVE HUNTINGTON BEACH, CA 92649
	CHECKED BY:	UNITS: INCH	
	APPROVED BY:	SCALE: NTS	TITLE: BOX (10 PC) FOR 2098-9576, 2098-9576C, 2098-9550
MATERIAL: NO 3 WHITE 200 # CORREGATED CARDBOARD	PCS/ASSY:	DRAWING NO.: HA-10-002	

PART # 9000-01410

ENCLOSURE 16F

ITEM	DESCRIPTION	PART #
1	BOX (10 PC)	9000-01150
2	SHOCK ABSORBER (5 PC)	9000-01370
3	DETECTOR	8200-00703
4	LABEL - SERIAL NUMBER (10 PC)	1700-04830
5	LABEL - SERIAL NUMBER (100 PC)	1700-01101
6	BOX (100 PC)	9000-01420



FROM : XXXXXXXX
TO : XXXXXXXX
YY/MM INSPECTED
HOCHIKI AMERICA CORP.

MODEL SIH-24FAP
QUANTITY 100 pcs
BCA. NO. xxxxxxxxxx
TO xxxxxxxxxx

NOTES:

A. LETTERS "AP" TO BE ADDED TO EXISTING BOX LETTERING "SIH-24F" USING BLACK MARKER.

CONTROLLED
DATE: 11/2/94
ENGINEERING

REV.	DATE	BY	CHANGE
-	11-2-94	AJG	INITIAL RELEASE

TOLERANCE
UNLESS OTHERWISE SPECIFIED
ANGLE ± 03°
.XX ±.015
.XXX ±.005

MATERIAL:

PCS/ASSY

DRAWN BY: ANTHONY J GARCIA JR
DATE: 11-2-94
CHECKED BY:
UNITS: INCH
APPROVED BY:
SCALE: NA
DRAWING NO. HA-10-140

HOCHIKI AMERICA CORP.
5613 INDUSTRIAL DRIVE
HUNTINGTON BEACH, CA 92649

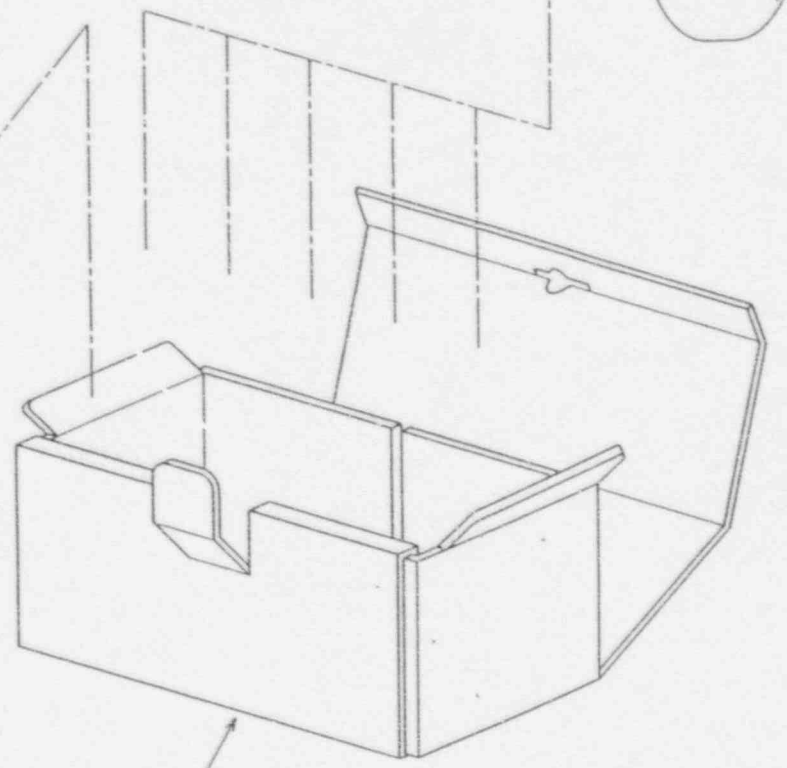
TITLE
ASSEMBLY
PACKAGING
SIH-24FAP (HA)

年月日	旧図番
. .	△
. .	△
. .	△

5-表示銘板 1587
2-3-015-1587

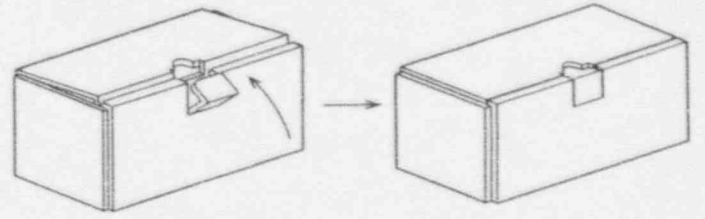
5- ME SIJ-24
2-1-603-0938

5- 防塵カバー SIJ
2-3-275-0463



梱包箱(5ヶ用) ASA 無地
2-3-210-1037

ENCLOSURE 16G



※蓋を少し持ち上げた状態で差し込んでください。

梱包図

記事	---	. . △2			
		. . △1			
		年月日	訂正事項	設計	承認
材質	---	仕上	---		
承認	調査	設計	製図	図名	梱包セット SIJ-24
縮尺		設計年月日		図番	2-1-980-1389-161
---		96.10.22			
単位	mm	第3角法			
				原図保管	

TO:NOCHIKI CORPORATION

FROM:JAPAN RADIOISOTOPE ASSOSIATION

CERTIFICATE OF UNDERMENTIONED FOIL SOURCE

APPROVEED THE CLASSIFICATION C32222 OF JIS-Z4821

NUCLIDE : AM-241
(Manufacturer : Amersham International plc, Amersham UK)

CODE NUMVER : AMMK-2812 pd face
2.5mm x 2.5mm

RADIOACTIVITY : 18.5kbq (0.5uci)

TEST REQUIREMENT
: The test was performed after the source was mounted in stainless steel holder.
(Holder No. SIH-type XM-11781 and XM-11782)

ENCLOSURE 17

TEST REPORT

TO: HOCHIKI CORPORATION

FROM: JAPAN RADIOISOTOPE ASSOSIATION

REPORT IS AS FOLLOWS:

1	MATTER OF REQUEST	CLASSIFICATION TEST OF UNDERMENTIONED FOIL SOURCE ACCORDING TO THE JIS Z-4821 1981.		
2	TEST MATERIAL	ALPHA FOIL SOURCE FOR SMOKE DETECTOR WITH HOLDER (XM-11781, 11782)		
3	TEST METHOD	ACCORDING TO THE JIS Z-4821 1981		
4	TEST PLACE	JAPAN RADIOISOTOPE ASSOCIATION & HOCHIKI CORPORATION		
5	TEST DATE	JAN. 18. 1988- FEB. 2. 1988		
6	TEST RESULT	TEST ITEM	CLASSIFICATION	JUDGMENT
		TEMPERATURE	3	GOOD
		PRESSURE	2	GOOD
		SHOCK	2	GOOD
		VIBRATION	2	GOOD
		BANG	2	GOOD

ENCLOSURE 18

RELIABILITY TEST REPORT

TEST	Vibration Test (Sine Wave)		
SAMPLE	Ionization Smoke Detector	Model	SIH-24F
Test Method	1. Under supplying the power to the detector, it will be forced to the vibration of 1000 cycles per minutes and amplitude of 4mm for 60 minutes. 2. Mounting Each 3 detectors shall be mounted in up side and down side (which means total 6 pcs. of detectors are mounted and tested). The detectors shall be tested for both of vertical and horizontal vibration.		
Test apparatus	1. Matsudaira type vibration machine model:UBC-4A, Manufactured by Ito seiki Co., 2. Fire Alarm Control Panel		
Test Result	1. There was no false alarm during the test. 2. There was no trouble on the function and the structure of the detector.		
Standard for judgement	1. The detector should not generate a false alarm. 2. The detector should not have a trouble on the structure and the function.		
Judgement	OK		
Comment	In consideration of this test, under normal environmental vibration (possibly the detectors may be faced the vibration in normal environment), there are no influence on the detectors of the structure and the function.		

HOCHIKI CORPORATION

SIH SERIES SHOCK TEST

TEST DATED 9/8/89

TEST SAMPLE	**IMPACT TEST (VERTICAL DROP)**		
	2 IONIZATION SMOKE DETECTORS	**MODEL**	**SIH SERIES**
TEST METHOD	1. HAND HELD VERTICAL DROP FROM 6 1/2' 2. TWO DETECTORS CYCLED 25 TIMES EACH 3. DETECTORS WERE DROPPED FACE DOWN AS THEY WOULD BE WHEN INSTALLED IN THE FIELD (TEST PARAMETERS) AFTER 8 DROPS OF EACH DETECTOR THEY WERE INSPECTED FOR DAMAGE AND MEASUREMENTS TAKEN		
TEST RESULTS	MEASUREMENTS TAKEN WERE AS FOLLOWS		
	(PRIOR TO DROP)	DETECTOR (A)	DETECTOR (B)
	BACKGROUND	27	20
	GROSS COUNTS	31	26
	NET COUNTS	4	6
	AFTER 8 DROPS NO VISIBLE DAMAGE WAS EVIDENT		
	(AFTER 8 CYCLES)	DETECTOR (A)	DETECTOR (B)
	BACKGROUND	25	29
	GROSS COUNTS	31	25
	NET COUNTS	4	4
	AFTER 16 DROPS NO VISIBLE DAMAGE WAS EVIDENT		
	(AFTER 16 CYCLES)	DETECTOR (A)	DETECTOR (B)
	BACKGROUND	37	37
	GROSS COUNTS	29	38
	NET COUNTS	8	1
	AFTER 25 DROPS THERE WAS NO VISIBLE DAMAGE		
	(AFTER 25 CYCLES)	DETECTOR (A)	DETECTOR (B)
	BACKGROUND	25	22
	GROSS COUNTS	26	26
	NET COUNTS	1	4
JUDGMENT STANDARD	AFTER TEST, DETECTORS SHOULD NOT SHOW ANY SIGNS OF MAJOR DAMAGE TO THE SMOKE DETECTOR CHAMBER AND SPECIFICALLY TO THE RADIOACTIVE SOURCE.		
JUDGMENT	MEETS ALL CRITERIA		
COMMENTS	WE FEEL THIS TEST IS MUCH MORE SEVERE THAN WOULD EVER ARISE IN THE FIELD, AND UNDER NORMAL CONDITIONS THE AIB SERIES DETECTOR WOULD IN NO ADVERSE WAY EFFECT THE HEALTH AND SAFETY OF THE PUBLIC DOMAIN FROM A LEAK DUE TO THE DETECTOR INADVERTENTLY BEING DROPPED OR OTHERWISE BEING ABUSED SUCH AS DAMAGED IN TRANSIT.		

BILL MCKINNEY

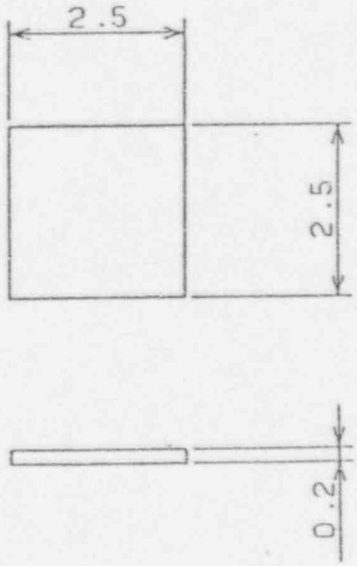
NRC 89

Date: 12/9/96 CK

SIJ SERIES SHOCK TEST

# OF SAMPLE	2 SIJ IONIZATION SMOKE DETECTORS
TEST METHOD	1. HAND HELD VERTICLE DROP FROM 12' 2. 2 DETECTORS CYCLED 25 TIMES EACH 3. DETECTORS WERE DROPPED FACE DOWN AS THEY WOULD BE INSTALLED IN THE FIELD. AFTER 8 DROPS OF EACH DETECTOR THEY WERE INSPECTED FOR DAMAGE AND MEASUREMENTS TAKEN.
TEST RESULTS	MEASUREMENTS TAKEN WERE AS FOLLOWS: PRIOR TO DROP — DETECTOR (A): BACKGROUND 32, GROSS COUNT 31, NET COUNTS -1 — DETECTOR (B): BACKGROUND 32, GROSS COUNT 35, NET COUNTS 3 AFTER 8 DROPS THERE WAS THERE WAS SLIGHT PHYSICAL DAMAGE AFTER 8 CYCLES — DETECTOR (A): BACKGROUND 39, GROSS COUNT 29, NET COUNTS -10 — DETECTOR (B): BACKGROUND 47, GROSS COUNT 42, NET COUNTS -5 AFTER 16 DROPS THERE WAS THERE WAS SLIGHT PHYSICAL DAMAGE AFTER 16 CYCLES — DETECTOR (A): BACKGROUND 38, GROSS COUNT 40, NET COUNTS 2 — DETECTOR (B): BACKGROUND 37, GROSS COUNT 34, NET COUNTS -4 AFTER 25 DROPS THERE WAS MODERATE DAMAGE TO THE COVER AFTER 25 CYCLES — DETECTOR (A): BACKGROUND 37, GROSS COUNT 29, NET COUNTS -8 — DETECTOR (B): BACKGROUND 33, GROSS COUNT 29, NET COUNTS -4
JUDGEMENT STANDARD	AFTER TEST, DETECTOR SHOULD NOT SHOW ANY SIGNS OF MAJOR DAMAGE TO THE SMOKE DETECTOR CHAMBER AND SPECIFICALLY TO THE RADIOACTIVE SOURCE
JUDGEMENT	MEET ALL CRITERIA
COMMENTS	ALTHOUGH THE DETECTOR OUTER COVER SHOWED MODERATE DAMAGE THE SMOKE CHAMBER AND RADIOACTIVE SOURCE SHOWED NO SIGNS OF MAJOR DAMAGE. WE FEEL THIS TEST IS MUCH MORE SEVERE THAN WOULD EVER ARISE IN THE FIELD, AND UNDER NORMAL CONDITIONS THE SIJ SERIES DETECTOR WOULD IN NO ADVERS WAY AFFECT THE HEALTH AND SAFETY OF PUBLIC DOMAIN FROM A LEAK DUE TO THE DETECTOR INADVERTENTLY BEING DROPPED OR OTHERWISE BEING ABUSED SUCH AS DAMAGED IN TRANSIT

ENCLOSURE 21



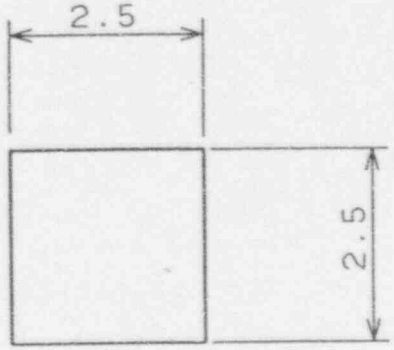
18.5KBq (0.5μCi)

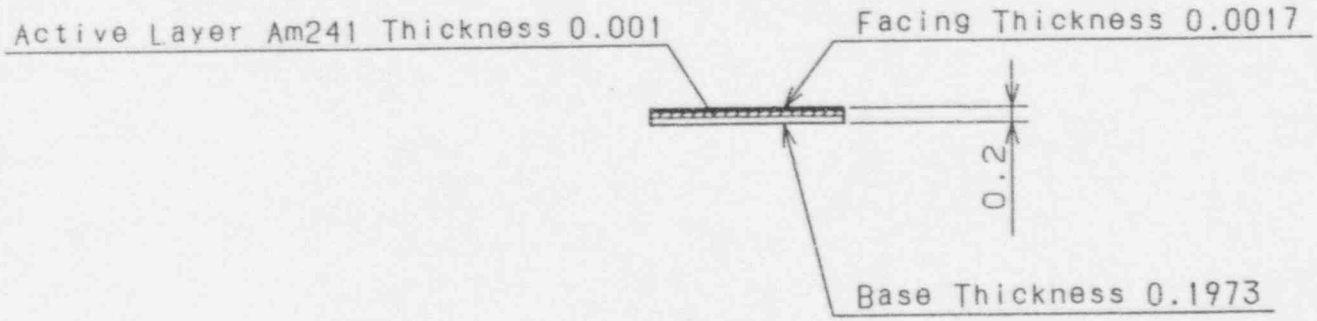
DRAWN H. Yoshina	DATE 18. Nov. '88	TITLE RADIO ACTIVE SOURCE
CHECKED H. Kominato	UNIT	DWG NO. 2-3-295-0303-E
APPROVED N. Hayakawa	SCALE	HOCHIKI CORPORATION

ENCLOSURE 21A

Specifications

1. Nuclide : Am 241
2. Radio Activity : 0.5μCi
3. Face Covering : Palladium
4. Base : Silver Alloy
5. Thickness : 0.2





HOCHIKI CORPORATION 03

MODEL: SIJ SERIES

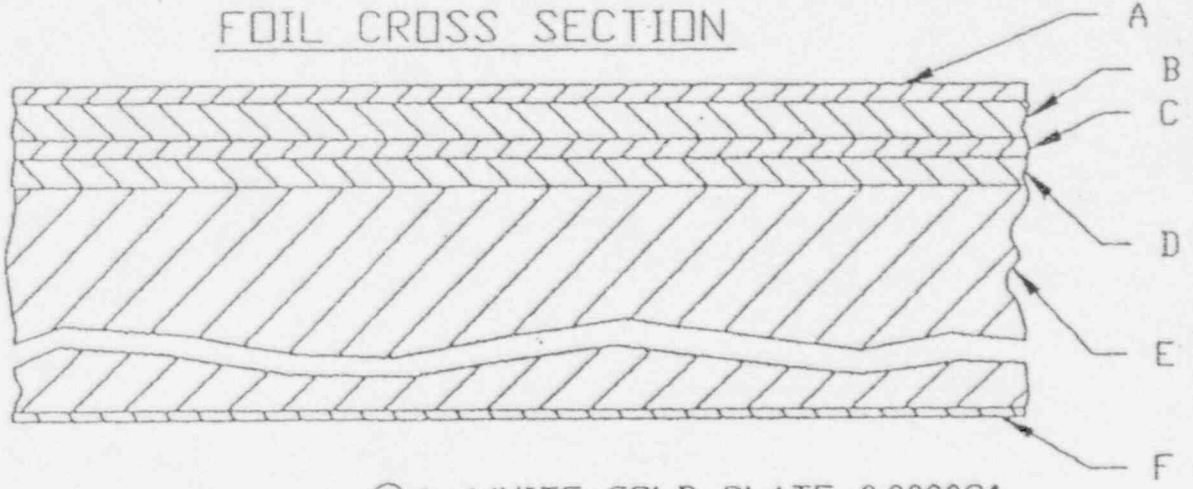
DRAWN Y. Kawabata	DATE 08. JUL. '96	TITLE RADIO ACTIVE SOURCE
CHECKED T. Ozawa	UNIT mm	DWG NO. A2-96-0287
APPROVED	SCALE 10:1	HOCHIKI CORPORATION

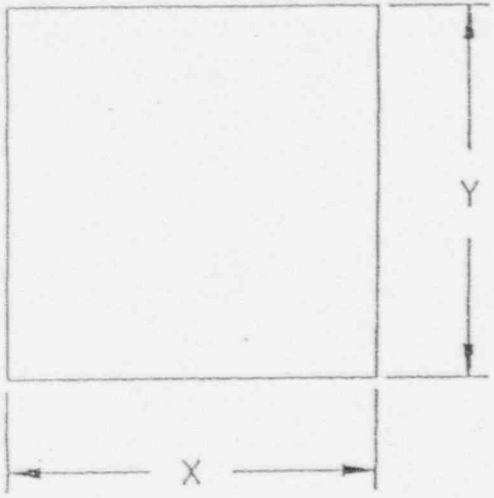
NOTES:

1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. ELECTROLYTIC DISSOCIATION CURRENT 1.04 TO 1.26 X E-10 AMPS.

DATE	SYM	REVISION RECORD	A	DR.	CK.
30OC90	A	0.006" TO 0.009" WAS 0.004" TO 0.007"	LK	CDD	
13AU91	C	NOTE #3 ADDED	LK	CDD	
18OC91	B	LAYER "F" ADDED; LAYER "A" REVISED; NOTE REMOVED	LK	CDD	

FOIL CROSS SECTION





(B) A. WHITE GOLD PLATE 0.00002"
B. GOLD 0.00004"
C. AMERICIUM 241 & GOLD 0.00002"
D. GOLD 0.00003"
(A) E. SILVER 0.006" TO 0.009"
(B) F. YELLOW GOLD FLASH PLATE FOR IDENTIFICATION

FOIL DIMENSIONS		DECIMAL EQUIVALENT		AMERICIUM CONTENT
X	Y	X	Y	
2.5mm	2.5mm	0.098"	0.098"	0.5 μCi

NRD INC.
A SUBSIDIARY OF MARK IV INDUSTRIES, INC.
2937 ALT BOULEVARD GRAND ISLAND, NEW YORK 14072

TOLERANCE (EXCEPT AS NOTED) DECIMAL ± 0.03mm ± 0.001" FRACTIONAL ± ANGULAR ±	TITLE A-001 SINGLE FACE FOIL			
	MATERIAL & FINISH AMERICIUM 241 GOLD, SILVER	SCALE NA	DRAWN BY C. DUNN APPROVED BY	
	DATE 23AU90	DWG. NUMBER HA-01-026 (90A007)		REVISION 3

ENCLOSURE 22

Radiation data sheet

測定日	自H1. 9.6 至 . .
決裁	調査 / 測定
	H(RA)Z

試験内容

distance

DPM

	0(cm)		5		25	
	[cpm]	[mR/h]	[cpm]	[mR/h]	[cpm]	[mR/h]
A ①	120	4.14×10^{-3}	80	1.38×10^{-3}	75	1.04×10^{-3}
②	120	4.14×10^{-3}	80	1.38×10^{-3}	75	1.04×10^{-3}
B ①	75	1.04×10^{-3}	90	2.07 "	60	0
②	100	2.76 "	100	2.76 "	70	0.69×10^{-3}
C ①	120	4.14 "	80	1.38 "	50	0
②	100	2.76 "	90	2.07 "	60	0
D ①	70	0.69 "	65	0.35 "	50	0
②	80	1.38 "	80	1.38 "	60	0
	→ 60.					

備考

① : Sample No.1

② : Sample No.2

測定条件	室温	湿度	気圧	風速	坑内温度			
	℃	%	mmHg	m/s	℃			

ENCLOSURE 23

Radiation Measurement Sheet
SIJ-24

CK 12/9/1996

	0 cm		5 cm		25 cm	
	CPM	uR/hr.	CPM	uR/hr.	CPM	uR/hr.
Top						
1	67	2.14	50	0.97	38	0.14
2	65	2.00	45	0.62	35	0.00
Bottom						
1	43	0.48	34	0.00	33	0.00
2	44	0.55	33	0.00	33	0.00
Right						
1	37	0.35	27	0.00	36	0.00
2	26	0.00	38	0.14	29	0.00
Left						
1	37	0.07	27	0.00	28	0.00
2	42	0.41	31	0.00	31	0.00

1= Sample #1
2= Sample #2

Background Count = 36 CPM

Conditions:

21.0°C 53% R.H.

Eberline Survey Meter
Model SRM-100
Ser. No. 289

NRC FORM 577 (1-95)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSE FEE REQUIREMENTS

LICENSE FEE AND DEBT COLLECTION BRANCH
DIVISION OF ACCOUNTING AND FINANCE
OFFICE OF THE CONTROLLER
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

HOCHIKI AMERICA CORPORATION
ATTN: Gyo Shinozaki, Senior Operating
Manager-Corporate Planning, RSO
5415 Industrial Drive
Huntington Beach, CA 92649

TYPE OF ACTION

- [ ] NEW LICENSE
- [ ] RENEWAL OF LICENSE
- [X] AMENDMENT TO LICENSE

REQUESTED DATE: 1-29-97

LICENSE NUMBER: 04-14886-01E & New SS&D Registration

CONTROL NUMBER: 021891 & 97-04

I. APPLICATION FEE DUE

Your request for a licensing action is subject to the fee(s) in the category(ies) noted below in accordance with Section 170.31 of the enclosed Federal Register notice. Payment of the fee is required prior to the issuance of the license, renewal, or amendment.

FEE CATEGORY	APPLICATION	RENEWAL	AMENDMENT
3H	$	$	$ 1,000.00
9A	$ 3,400.00	$	$
	$	$	$
	$	$	$
	$	$	$
	$	$	$
	$	$	$
	$	$	$
	$	$	$
	$	$	$

FEE(s) DUE	$ 4,400.00
PAYMENT RECEIVED	$ 0.00
AMOUNT DUE	$ 4,400.00

[X] Your request was received without the prescribed application fee.

[ ] We received your Check No. in the amount of $. Payment of the additional fee noted above is required.

[ ] Your request will increase the scope of your license program. Therefore, your request is subject to the application fee(s) noted above. Refer to Section 170.31 and Footnote 1(d)(2).

[ ] Your license expired prior to the receipt of your application for renewal. Therefore, your request is subject to the application fee(s) noted above. Refer to Section 170.31 and Footnote 1(a).

MAKE PAYMENT OF THE FEE(S) TO THE U.S. NUCLEAR REGULATORY COMMISSION AND MAIL THE PAYMENT TO THE ADDRESS LISTED AT THE TOP OF THIS FORM. IF WE DO NOT RECEIVE A REPLY FROM YOU WITHIN 30 CALENDAR DAYS FROM THE DATE LISTED BELOW, WE SHALL ASSUME THAT YOU DO NOT WISH TO PURSUE YOUR APPLICATION AND WILL VOID THIS ACTION.

II. FEE NOT REQUIRED

[ ] Enclosed is Check No. which accompanied your request. The fee is not required because:

[ ] We received your Check No. in payment of the fee.

[ ] The Licensing staff has informed us that your request is to be considered as a continuation of your request dated , Control No.

[ ] Your request was combined, prior to review, with your request, Control No.

III. CHECK RETURNED

[ ] Enclosed is Check No. which was returned to us by the bank for:

- [ ] INSUFFICIENT FUNDS
- [ ] ACCOUNT CLOSED
- [ ] OTHER

MAIL THE REPLACEMENT CHECK TO THE ADDRESS LISTED AT THE TOP OF THIS FORM AND REFERENCE THE ABOVE CONTROL NUMBER.

IV. LICENSE ISSUED WITHOUT THE REQUIRED FEE

[ ] License No. , Amendment No. , issued on was issued without the required fee being collected. The fee required is noted in Section I of this form.

[ ] The scope of your licensed program was increased. Therefore, your request is subject to the application fee(s) noted in Section 1 of this form. Refer to Section 170.31 and Footnote 1(d)(2).

[ ] Because of the urgency of your request, the license was issued without remittance of the prescribed fee noted in Section 1 of this form.

SIGNATURE -- LICENSE FEE ANALYST	LFDCB	LFDCB	Distribution:	DATE
Sandra Kimberley	sk	2/19/97	O:OAP/LFARB S/F (LP3.2.7) cc: SBaggett SGreenman OC/OMF/LFARB R/F	2-19-97

NRC FORM 577 (1-95)

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