FORM NRC-313 I (1-79) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

1. APPLICATION FOR: *(Check and/or complete as appropriate)*

- a. NEW LICENSE
- b. AMENDMENT TO LICENSE NUMBER
- X c. RENEWAL OF LICENSE NUMBER 31-13372-01E

2. APPLICANT'S NAME *(Institution, firm, person, etc.)*
Westinghouse Electric Corporation
Industrial and Government Tube Division
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
607-796-3211

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
L. B. Vaughn
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
607-796-3278 421

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
Westinghouse Circle
Horseheads, N.Y. 14845

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*
Westinghouse Circle
Horseheads, N.Y. 14845

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	R. L. Snyder	Supv., Final Inspection and Testing
b.	R. K. Konzen	Supv., Packaging and Warehousing
c.		

7. RADIATION PROTECTION OFFICER
C. Spangenberg

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Krypton - 85	Gas	Not applicable	5000
(2)	Carbon - 14	Gas as CO_2	Not applicable	12
(3)				
(4)				

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	Fill gas for electronic tubes. See Attachments 1 and 2.
(2)	Fill gas for radiation measuring instruments. See Attachment 3.
(3)	
(4)	Release from hold

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020532

9. STORAGE OF SEALED SOURCES

LINE NO.	A. CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED.	B. NAME OF MANUFACTURER	C. MODEL NUMBER
(1)	Not applicable		
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	A. TYPE OF INSTRUMENT	B. MANUFACTURER'S NAME	C. MODEL NUMBER	D. NUMBER AVAILABLE	E. RADIATION DETECTED (alpha, beta, gamma, neutron)	F. SENSITIVITY RANGE (milliroentgens/hour or counts/minute)
(1)	Geiger Counter	Eberline	E-400	2	Beta, gamma	0-200 mR/hr
(2)	Beta Gas Monitor	Johnson	955B	1	Beta	0-2000 $\mu Ci/M^3$
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☒ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

(1) Westinghouse Electric Corporation
Chestwick, Pa.
6 month frequency

☒ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

(2) See Attachment 4

12. PERSONNEL MONITORING DEVICES

A. TYPE (Check and/or complete as appropriate.)	B. SUPPLIER (Service Company)	C. EXCHANGE FREQUENCY
☒ (1) FILM BADGE ☒ (2) THERMOLUMINESCENCE DOSIMETER (TLD) ☐ (3) OTHER (Specify): _____	R. S. Landauer, Jr. & Co. Glenwood, Ill.	☒ MONTHLY ☐ QUARTERLY ☐ OTHER (Specify): _____

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

Not applicable

14. WASTE DISPOSAL

NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

Radiac Research Corporation

IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

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INFORMATION REQUIRED FOR ITEMS 15, 16 AND

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

See Attachment 5

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.

a. Principles and practices of radiation protection.

b. Radioactivity measurement standardization and monitoring techniques and instruments.

c. Mathematics and calculations basic to the use and measurement of radioactivity.

d. Biological effects of radiation.

See Attachment 6

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

See Attachment 7

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.–18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)*	b. CERTIFYING OFFICIAL *(Signature)* D. R. Dalrymple
	c. NAME *(Type or print)* D. R. Dalrymple
(1) LICENSE FEE CATEGORY: 170.31 - 31	d. TITLE Manager of Materials
(2) LICENSE FEE ENCLOSED: $ 150.	e. DATE 6/15/79

FORM NRC-313 I (1-79)

020532

Imaging and Sensing Technology Corporation
Westinghouse Circle Horseheads, NY 14845

May 26, 1988

U. S. Nuclear Regulatory Commission
Office of Administration & Resources
Washington, DC 20555

Attn: Ms. Glenda Jackson

Dear Ms. Jackson:

Enclosed is Imaging and Sensing Technology Corporation's check for the fee of $290.00, against request for a Nuclear Materials License previously held by Westinghouse and cancelled by termination control number 020507, per telephone conversation with Ms. Sandy Kimberly on May 26, 1988.

Ref: control
No. 020532.

Sincerely,

Leslie B. Vaughn
Manager, Materials

/ck

Encl.

JUN 02 1988

Imaging and Sensing Technology Corporation
ATTN: Mr. L. B. Vaughn
Westinghouse Circle
Horseheads, NY 14845

Gentlemen:

This refers to your letter dated April 27, 1988, for a materials license.

We received your application fee of $290 as specified in §170.31 (3I) of 10 CFR 170, copy enclosed.

Your application has been sent to the Licensing staff for processing. If you have any questions please let us know.

Sincerely,

Signed by:
Glenda Jackson

Glenda Jackson
License Fee Management Branch
Division of Accounting and Finance
Office of Administration and
Resources Management

Enclosure:
10 CFR 170

c: Region I

DISTRIBUTION:
File Copy
ARM/DAF R/F
LFMB R/F (2)
DW/RI/ISTC

OFFICE:	ARM/LFMB	ARM/LFMB
SURNAME:	SKimberley:rej	GJackson
DATE:	6/ / /88	6/ / /88

Imaging and Sensing Technology Corporation
Westinghouse Circle Horseheads, NY 14845

October 25, 1988

J. Bruce Carrico
Medical, Academic and Commercial Use
Safety Branch,
Division of Industrial and Medical Nuclear Safety, NMSS
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Reference, Mail Control No. 020532

Dear Mr. Carrico:

As per your letter, please note the following information, data, and details of ISTC products are presented for which we wish to obtain a license, similar to No. 31-13372-01E provided Westinghouse. This response will be keyed to your letter referenced above.

1. Per your request, I'm enclosing a copy of our N.Y.S. license - original and latest amendment (N.Y.S. License No. 357-0058). ISTC will manufacture and distribute electron tubes containing exempt quantities of Krypton 85 as defined under part 30 of 10 CFR; in particular 30.15 8 (iv) and radiation detection tubes containing exempt quantities of Carbon 14 as defined under part 30 of 10 CFR in particular 30.71, Schedule B.

2. The request for information regarding the products we fabricate, manufacture, and distribute is attached. Please note we basically manufacture two types of devices; a EDL (Electrodeless Discharge Lamp) and a WL23761 (gamma chamber). Each device contains exempt quantities of radioactive material as defined in 10 CFR 30.15 and 30.18. The EDL's contain 0.0007 micro Ci per tube of Krypton 85 as a gas and the gamma chamber contains 100 micro Ci of Carbon 14 as Carbon 14 Dioxide Gas.

   Detailed information regarding the construction and design are attached for each product. Likewise, methods of doping each device and containment are given as well as procedures for testing to demonstrate that by product material is confined to the device.

Quality control measures for the EDL devices are generally contractual customer assurances we follow as delineated in ISTC Quality Assurance Manual, and in MIL-45208A. (A copy of the manual is being sent to you under separate cover.)

The quality control procedures for gamma chambers follow those prescribed in 10CFR 50, Appendix B, and ASME Publication NQA-1 for 1986.

As stated above, more detailed information regarding these two products, similar to that provided by Westinghouse for license renewal in 1979 is attached.

3. At ISTC we ship to our site warehouse and distribute all the manufactured products described above as EDL and WL23761 devices.

Because the amount of Krypton 85 and Carbon 14 are exempt quantities and because our experience show tubes have no measurable radiation above 1 mR/hr on contact, these types and activities are not recorded. We control the amount of radioactive material via inventory procedures.

Customer orders are filled from warehouse stock. ISTC has no other location for warehousing and subsequent delivery. Thus this ISTC site in Horseheads, New York is the primary manufacturing, storage, and distribution center for EDL and gamma chamber devices.

I trust this letter and attachments will meet your needs for NRC to act favorably upon our request for an ISTC license as early as possible. If I can help answer any questions, please call me at 607-796-3486.

Yours Truly,

Leslie B. Vaughn
Manager Materials
Imaging & Sensing Technology Corp.

Vincent J. Santilli
Radiation Safety Officer
Imaging & Sensing Technology Corp.

Enclosures

5632h/AP

RESPONSE ATTACHMENTS

FOR

N.R.C. MAIL CONTROL NO. 020532

October 28, 1988
Vincent J. Santilli
Radiation Safety Officer
Imaging & Sensing Technology Corp.

ATTACHMENT 1

COPY OF ORIGINAL N.Y.S. BY-PRODUCT LICENSE

&

LATEST AMENDMENT 16 TO IMAGING

AND SENSING TECHNOLOGY CORPORATION

STATE OF NEW YORK
DEPARTMENT OF LABOR
Division of Safety and Health
ONE MAIN ST.
BROOKLYN, N.Y. 11201

July 5, 1988

Address Reply To:
Radiological Health Unit

Refer To:
Radioactive Materials License
No. 387-0058

Reference No. 5

Amendment No. 16

DOSH Application No. DL88-140

Installation No. LRX 0058

Imaging and Sensing
Technology Corporation
Westinghouse Circle
Horseheads, New York 14845

Attention: Mr. David R. Dalrymple
Executive Vice President

Dear Mr. Dalrymple:

Enclosed herewith is an Amendment to The State of New York Radioactive Materials License authorizing your firm to possess and use Radioactive Materials licensed therein pursuant to the State of New York Industrial Code Rule 38,"Ionizing Radiation Protection" (12 NYCRR 38), as amended effective June 25, 1985.

IMPORTANT: This letter shall be retained with this License.

Your attention is directed to Section 38.7 of 12 NYCRR 38 entitled "Security". The written request submitted to the Department for a waiver from filing a Security Bond pursuant to Subdivision (c) was approved, conditioned in the License and accordingly your firm has fulfilled the requirements of this Section. Pursuant to 12 NYCRR 38, this waiver shall be in effect during the entire period of your License. Any changes which may affect the waiver approval must be brought to the Department attention immediately. Pursuant to Section 38.11 entitled "Duration of Licenses", in addition to filing a letter (application) more than 30 days prior to the expiration date of your License for a renewal of the License, your firm must either file a Security Bond or request renewal of the waiver, accompanied by latest audited annual report, pursuant to Subdivision (c) of Section 38.7.

Do not hesitate to contact the Department should you have any questions concerning this matter.

Very truly yours,

Robert Gollnick, Director

George L. Kasyk

by: George L. Kasyk
Associate Radiophysicist

Enclosure
RMP:wp

STATE OF NEW YORK - DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH

RADIOACTIVE MATERIALS LICENSE AMENDMENT

PURSUANT TO THE LABOR LAW AND INDUSTRIAL CODE RULE 38, AND IN RELIANCE ON STATEMENTS AND REPRESENTATIONS HERETOFORE MADE BY THE LICENSEE DESIGNATED BELOW, A LICENSE IS HEREBY ISSUED AUTHORIZING SUCH LICENSEE TO RECEIVE, POSSESS, USE AND TRANSFER RADIOACTIVE MATERIAL(S) DESIGNATED BELOW; AND TO USE SUCH RADIOACTIVE MATERIAL(S) FOR THE PURPOSE(S) AND AT THE PLACE(S) DESIGNATED BELOW. THIS LICENSE IS SUBJECT TO ALL APPLICABLE RULES, REGULATIONS, AND ORDERS NOW OR HEREAFTER IN EFFECT OF ALL APPROPRIATE REGULATORY AGENCIES AND TO ANY CONDITIONS SPECIFIED BELOW.

1. NAME OF LICENSEE	3. LICENSE NUMBER
Imaging and Sensing Technology Corporation	387-0058
	4. EXPIRATION DATE
2. ADDRESS OF LICENSEE	December 31, 1990
	5a. REFERENCE NO. / b. AMENDMENT NO.
Westinghouse Circle Horseheads, New York 14845	5 / 16

6. Radioactive materials (element & mass no.)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
K. Uranium 234	K. Any	K. One gram

Amendments Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13 Deleted from the License.

9. Authorized use:

Condition 6.K.
In manufacture of sensors and detectors.

Condition 18. Document added:

R. His letter dated June 29, 1988, signed by D.R. Dalrymple.

Robert Gollnick, Director
for: THE COMMISSIONER OF LABOR

George L. Kasyk

by: George L. Kasyk
Associate Radiophysicist

DATE: July 5, 1988
GLK:wp

STATE OF NEW YORK
RADIOACTIVE MATERIALS LICENSE

Pursuant to the Labor Law and Industrial Code Rule No. 38, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of all appropriate regulatory agencies and to any conditions specified below.

Licensee

1. Name: Westinghouse Electric Corporation
Power Tube Engineering Laboratory
P.O. Box 284
2. Address: Elmira, New York 14902

3. License Number, *Ref. No. 5 supersedes Ref. No. 4 in its entirety
387-0058

4. Expiration Date
December 31, 1973

5a. Reference No. *5 b. Amendment No. —

6. Radioactive materials (element and mass number)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
A. Cesium 137	A. Any	A. 100 microcuries
B. Cobalt 60	B. Any	B. 6 millicuries
C. Nickel 63	C. Any	C. 100 microcuries
D. Krypton 85	D. Gas	D. 5 curies
E. Carbon 14	E. Carbon Dioxide Gas	E. 12 millicuries
F. Hydrogen 3 (Tritium)	F. Gas	F. 15 curies
G. Hydrogen 3 (Tritium)	G. Gas	G. 2 millicuries
H. Source Materials (Uranium & Thorium)	H. Any	H. 170 pounds
I. Cesium 137	I. Sealed source (Radiation Materials Corp. Model GCD.5-X.8)	I. One (1) source not to exceed 50 millicuries

3. License Number 361-0058

5a. Rel. No. 5 b. Amend. No. —

CONDITIONS

9. Authorized use. (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)

Conditions 6.A. to 6.C.

In research and development of prototype electron tubes.

Conditions 6.D., 6.F. and 6.H.

In research, development and manufacture of electron tubes.

Condition 6.E.

In research, development and manufacture of radiation measuring instruments.

Condition 6.G.

As impurity in Helium 3 used as a filling gas for neutron counters manufactured by the licensee.

Condition 6.I.

As a production source used to excite vacuum interrupters.

Condition 6.J.

Storage of Cesium 137 source.

10. The authorized place of use includes the licensee facilities at West Junction, Horseheads, New York.

11. The licensee shall comply with the provisions of the State of New York Industrial Code Rule No. 38, "Radiation Protection" (12 NYCRR 38), as amended effective September 1, 1971.

12. The radioactive materials shall be used by, or under the supervision of, William R. Lankenau (Radiation Safety Officer), W. Gillette, L. Lupica, H. Balmer, S. Cherry, M. Yonko, R. Underwood and N. Thurlow.

13. The licensee shall not open and/or repair sealed sources or remove sealed sources from their respective source holders and devices.

14. The licensee shall have sealed sources tested for leakage of radioactive materials pursuant to Section 38.26(f) of Industrial Code Rule No. 38 and in accordance with application dated April 23, 1973, letters dated April 6, 1973 and April 26, 1973 and Radiation Procedure and Safety Manual dated May 21, 1973.

CONDITIONS

15. The licensee is not authorized to repair, modify, dismantle or affect any changes in the source holders and/or devices specified in Conditions 6.I. and 6.J. nor modify or alter labels affixed thereto except as otherwise approved by this Departm

16. The licensee shall submit revised plans and specifications of the exhaust system authorized in Condition 18.F., or any new system involving the use of radioactive materials, to the Engineering Section of the Division of Industrial Hygiene for appr prior to making alterations of or additions to the system, or the installation of a new system, as specified in the State of New York Department of Labor Notice of Pla Approval.

17. The licensee radiation protection program specified in Condition 18.G., including a copy of the Code Rule, shall be made available to each person working with or having responsibility for sources of radiation pursuant to Section 38.34(b) of Industrial Code Rule No. 38. Any change in the manual affecting the radiation protection of persons shall be submitted to this Department for license amendment prior to issuan to personnel.

18. Except as specifically provided otherwise by this license, the licensee shall recei possess, use and transfer radioactive materials in accordance with statements, representations and procedures contained in his applications to the USAEC dated April 1958, May 26, 1958, February 19, 1959, August 12, 1959, October 18, 1961, December 1961, December 22, 1961, and July 22, 1965, and applications dated October 8, 1963, April 1, 1964, August 12, 1964, November 29, 1967, April 29, 1969, and April 23, 19 with attachments, and in related documents as follows:

A. His letters to the USAEC dated March 19, 1959, December 28, 1959, October 8, 19 May 4, 1964 and September 4, 1964, signed by S.R. Baldwin, with attachments.

B. His letters dated April 13, 1967, October 13, 1967, October 23, 1967 and November 7, 1967, signed by J.J. Shields, with attachments.

C. His letters dated August 30, 1967, September 14, 1967, November 20, 1967, December 28, 1967, January 5, 1968, March 14, 1968 and February 6, 1969, signed by Philip P. Ponzi, with attachments.

D. His letters dated April 21, 1971 and June 2, 1971, signed by Edward F. Dick.

E. His letter dated September 21, 1971, signed by P.R.Hackenburg, with enclosed licensee annual financial reports for years 1969 and 1970.

F. State of New York Department of Labor, Division of Industrial Hygiene Notice of Plan Approval Nos. EP-48-68 and PA-1146-72 dated January 9, 1968 and August 9, 1 respectively, and State of New York Air Pollution Control Board Notice of Plan and/or Report Approval Nos. EAP-13-68 dated January 9, 1968 and State of New Yo Department of Environmental Conservation Permit To Construct A Source of Air Contamination, Application No. PA-1146-72 dated August 9, 1972.

3. License Number 387-0058

5a. Rel. No. 5 b. Amend. No. —

CONDITIONS

G. Licensee's "Radiation Procedure and Safety Manual" dated May 21, 1973.

H. His letters dated July 21, 1972, September 1, 1972, April 10, 1972, January 11, 197 February 13, 1973, April 6, 1973 and April 26, 1973, signed by William R. Lankenau, with attachments.

Date May 31, 1973

FOR THE NEW YORK STATE DEPARTMENT OF LABOR

by _____
John A. Miele, Associate Radiophysicist, RH
FOR J. Messite, M.D., Assistant Director, DIH

JAM:ps

ATTACHMENT 2

ELECTRODELESS DISCHARGE LAMPS

10CFR32.14(b)(1) The by-product material is krypton-85 and the maximum quantity per tube shall not exceed 0.001 microcuries. The krypton-85 gas shall be present as an impurity in an argon gas fill.

(2) See attached drawing, 2.1.

(3) The envelope structure is a 16mm long bulb fabricated from quartz tubing of 13mm O.D. (1.0mm wall). One end is round and the other a tip-off. This device is filled with a small quantity (<10 milligrams) of a non-radioactive salt of an element whose spectral line is desired and then with 2 torr of argon-krypton-85 gas before tip-off. This bulb is then permanently cemented inside a brass cylinder which is in actuality a resonant cavity. Application of RF power results in a glow discharge occurring inside the quartz bulb, the light from which is directed end-on into an electro-optical instrument.

(4) During operation, the quartz bulb will be subjected to a maximum temperature of 500°C. This temperature will be reached gradually after over 3 minutes of operation. Prototype testing performed during development shows that the quartz bulb can withstand repeated cycling from 850°C to a plunge into room temperature water without any failure from fracturing.

(4) Continued

The bulb is made of quartz and contains no electrical feed-throughs eliminating problems of potential vacuum leaks and strains associated with glass-to-metal seals. The radiation level on the outside surface of the quartz bulb is less than background (0.01 mR/hr). In addition, as the enclosed drawing indicates, the bulb is shielded by a brass and a wire-wound ceramic cylinder and approximately one inch of distance between it and the closest outside surface once the tube has been installed.

If krypton were to diffuse out through a small leak, it would diffuse rapidly through the room keeping the concentration well below the allowable limit. The worst possible case would be if the quartz tube were to be smashed, immediately releasing all the krypton-85 into the room. It would take a volume of only 0.12 cu. ft. before 0.001 microcuries would be diluted to 3×10^{-7} µc/ml, the uncontrolled area concentration limit for krypton-85 as stated in 10CFR20, Appendix B, Table II.

(5) All products are subject to operational tests before and after a hold period of one week after initial seasoning. These tests will consist of an ignition test and a spectral light output test at a specified power level. Both tests are sensitive to envelope leaks which would release krypton-85.

(5) Continued

All tests are monitored by quality control and the devices are subject to final inspection and test by Quality Control prior to shipment.

(6) Labeling is required and will be as shown in attached Drawing 2.2.

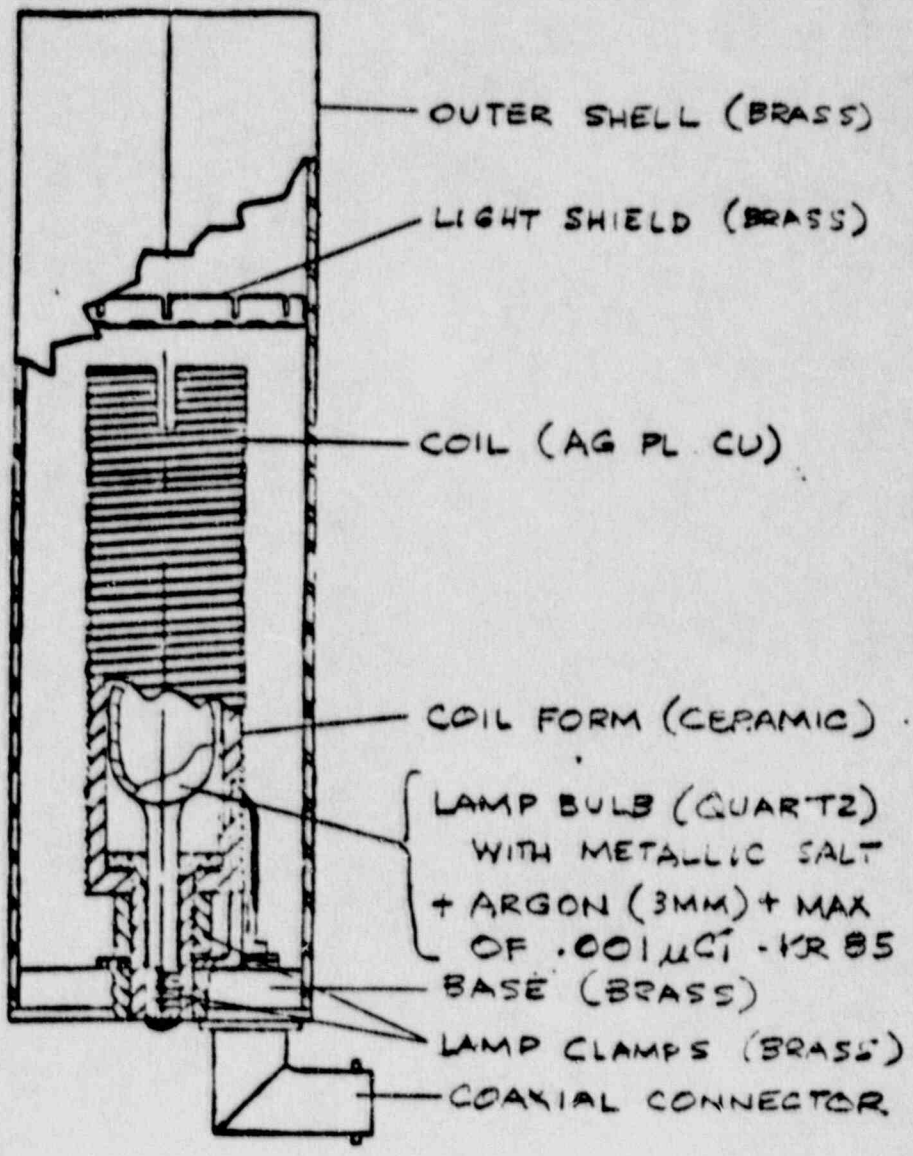
(7) The radiation level on the outside surface of the quartz tube is less than 0.01 mR/hr. The measurements are made with an Eberline Model E-400 Gamma-Beta meter.

REVISED 10/25/88
V. J. Santilli

ELECTRODELESS DISCHARGE LAMP

ALL SERIES WL40000* TYPES

Drawing 2.1



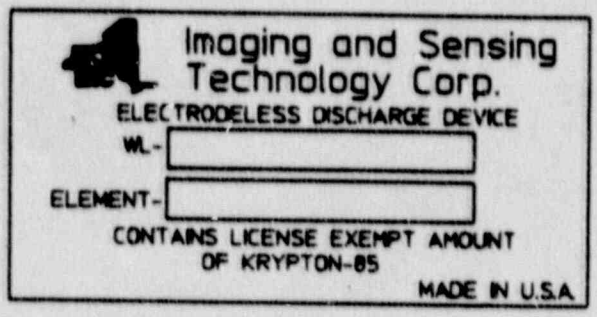
* ALL LAMPS SIMILAR IN DESIGN AND MAX. KR-85 CONTENT. DIFFERENCE IS TYPE AND AMOUNT OF METALLIC COMPOUND.

Revised 10/25/88
V. J. Santilli

WG 5-31-79

EDL LABEL

Drawing 2.2



Revised 10/25/88
V. J. Santilli

ATTACHMENT 3

RADIATION MEASURING INSTRUMENTS

10CFR32.14(b) (1) Carbon-14 as carbon dioxide as mixture with inert gas, 100 microcuries maximum per device. The presence of the carbon-14 isotope will generate background ionization within the chamber which will permit verification of the calibration of the chamber and its associated system.

(2) See attached drawing 3.1.

(3) The gas is added to a leak-tight tube and sealed inside when the tube is tipped off from the exhaust and gas fill manifold.

(4) See attachment 3.2.

(5) See attachment 3.3.

(6) The manufacturer's name, tube type identification, and name of by-product material are etched and/or branded on the outside surface of the device. See Drawing 2.3.

(7) The radiation is usually at background level but in no case will it exceed 1 mR/hr per unit.

Revised 10/25/88
V. J. Santilli

ISTC PROPRIETARY

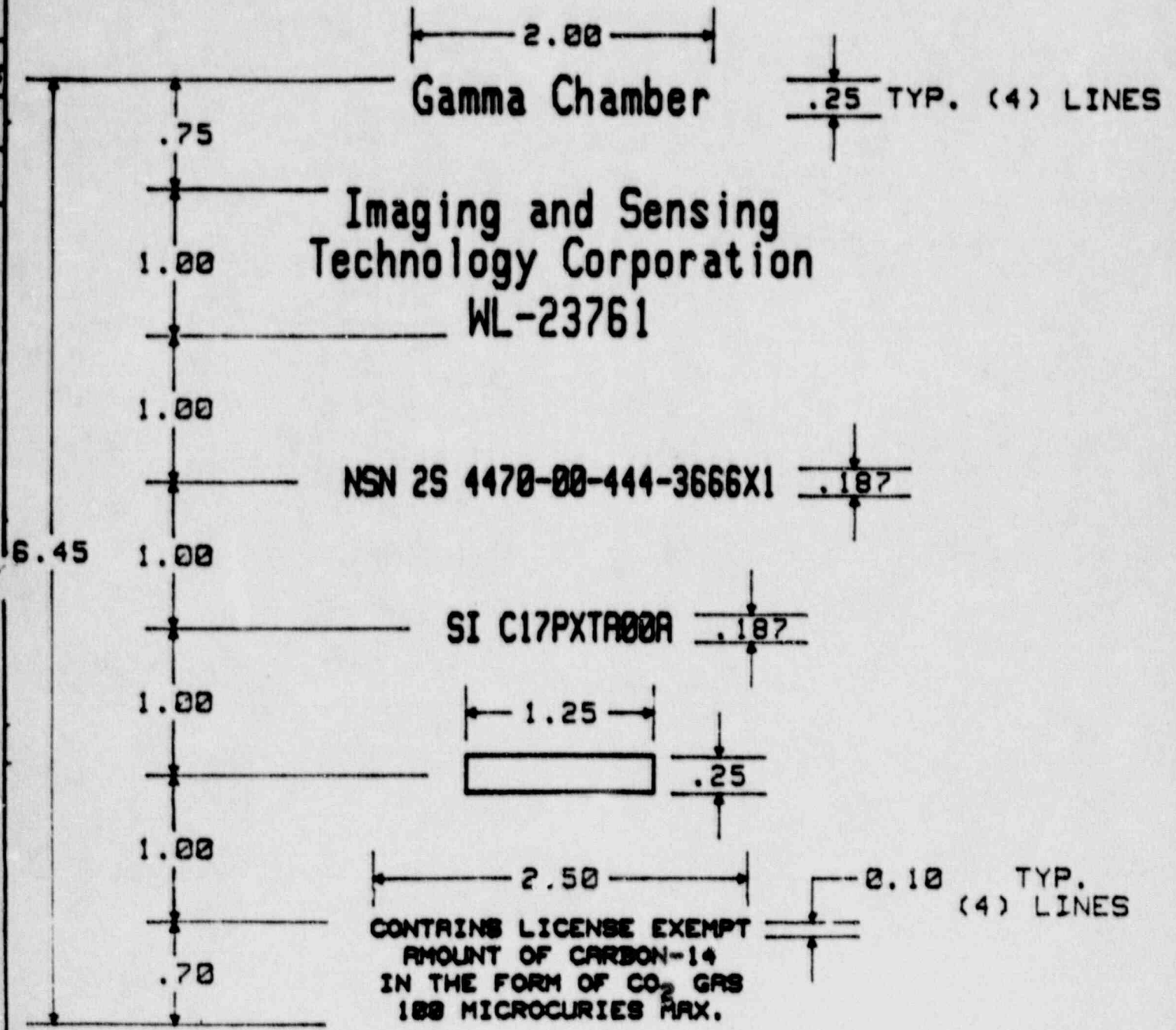
IMAGING AND SENSING TECHNOLOGY CORPORATION
HORSEHEADS NEW YORK

SPEC. NO 242-22-64

DATE	SUPS. DATE	PAGE
7-15-88		65

SUBJECT: Marking Stamp

Stamp Style #221



DRAWING 2.3

REVISED 10/25/88
V. J. Santilli

NOTES	C	P	MP	QA	QAC	QP	QQ
ALL DIM. IN INCHES * DENOTES CHANGE	REV	PC NO	DRWN	CHKD	APPR	DATE	
SCALE WTS	-	249	RM	ADS	RL	7-15-88	

IMAGING AND SENSING TECHNOLOGY CORPORATION
WESTINGHOUSE CIRCLE
HORSEHEADS, NY 14845

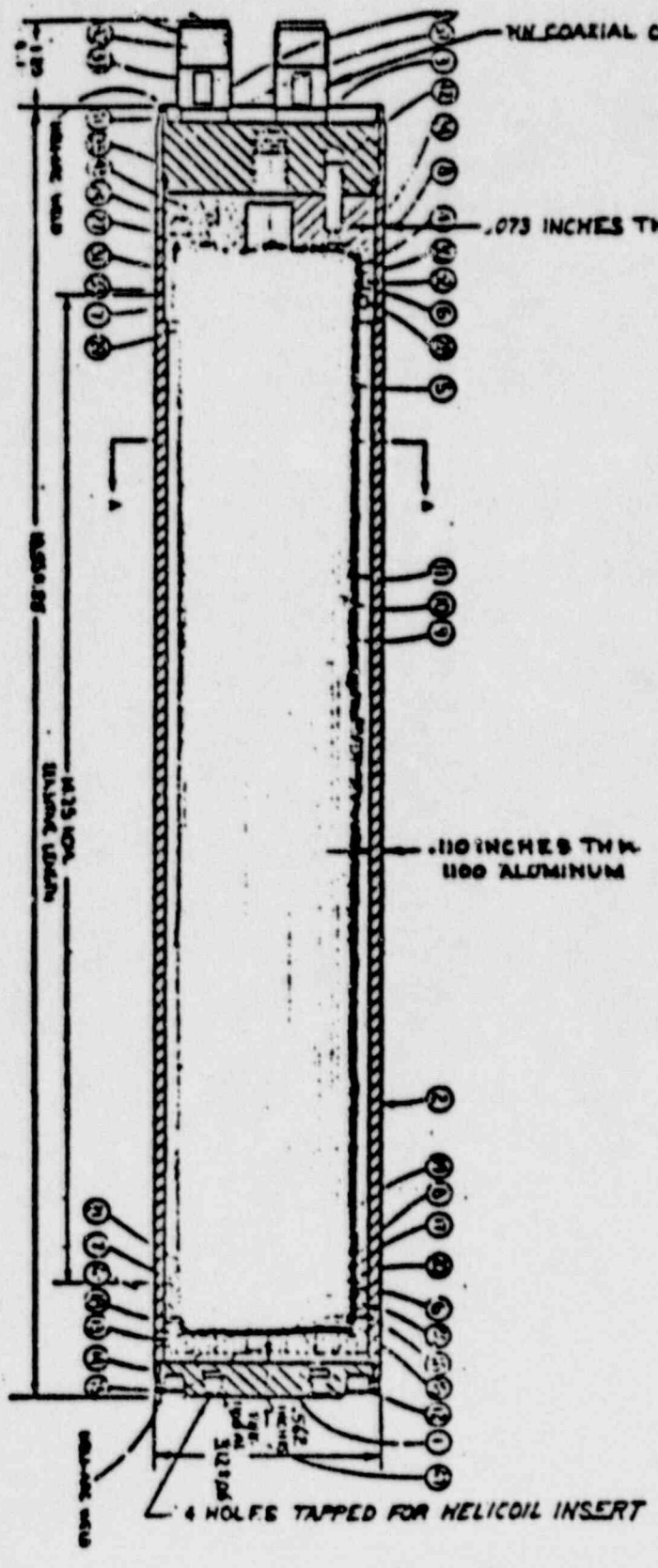
PROCESS SPEC. NO. 203-8-52

SUBJECT: QUALITY CONTROL PROCEDURE SPECIFICATION

SUPERSEDED DATE

WL-23761
GAMMA IONIZATION
CHAMBER.
CYLINDER AND END CAPS
ARE OF 1100 ALUMINUM

Drawing 3.1



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Attachment 3.2

RESULTS OF SOME PROTOTYPE TESTS

OF THE

WL-23761 GAMMA CHAMBER

NOVEMBER 29, 1972

Approved by:

W. Gillies, Engineering Manager
Special Purpose

Written by:

N. C. Thurlow
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REVIEWED AND REVISED 10/25/88
Vincent J. Santilli

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RESULTS OF PROTOTYPE TESTING

1.0 INTRODUCTION

The WL-23761 is a gamma ionization chamber designed and developed for the U. S. Navy to meet specification E-677905 of the Westinghouse Plant Apparatus Division. The E Specification, test procedures and test results are classified and not available for transmission without clearance. The test procedures and test data are contained in Chapter V of the Design Report for the WL-23761 Gamma Ionization Chamber. The following information summarizes the test data without revealing classified information.

2.0 PROTOTYPE TESTS

The following tests were conducted during the preproduction test phase of the development contract for the WL-23761 Ion Chamber. These tests were specified by the equipment specification E-677905. The results of these tests can be analyzed to demonstrate that the chamber remained hermetically sealed during all of the tests. The prototype tests are discussed in the order in which they were performed.

2.1 Initial Testing

On completion of the assembly the prototype chamber was helium leak checked by evacuating the chamber and enclosing the chamber in an atmosphere of Helium. No

leak was detected. The minimum detectable helium leak for the helium leak checking system was $3X10^{-9}$ ATM-CC/sec. Total Helium leakage into the chamber was, therefore, less than $3X10^{-9}$ ATM-CC/sec. Resistance and capacitance data was taken to insure that the chamber would meet the design limits. The chamber was evacuated and baked for at least 12 hours and then filled to a pressure above atmospheric pressure with a gas mixture of 95 percent Nitrogen and 5 percent Helium. After the exhaust tubulation was welded, the chamber was sealed in a cylinder and the cylinder was attached to a helium leak check system with a minimum detectable helium leak rate of $3X10^{-9}$ ATM-CC/sec. If the chamber was leaking, the helium in the chamber fill gas would migrate to the leak checking system. No helium leak was detected and the helium leak rate was determined to be less than $3X10^{-9}$ ATM-CC/sec. Before the chamber was submitted to the preproduction test series specified by W PAD* equipment specification E-677905, the chamber was tested in the W ETD* Cobalt-60 source and the saturated current generated by the chamber was recorded. The saturated current is directly proportional to the ionization generated in the chamber gas and the ionization is in turn directly proportional to the chamber fill pressure. Thus, if the fill pressure is reduced by

* W PAD is Westinghouse Power Apparatus Division.

* W ETD is Electronic Tube Division.

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leakage of the gas, the current produced by the chamber will be reduced. The ratio of the gamma current to the gamma flux may then be calculated and compared with the ratio produced by earlier tests. A reduction in this ratio would indicate a chamber gas leak. No significant change in the ratio was observed during the initial tests and the chamber was considered to be free of leaks when it was submitted for the preproduction test series.

2.2 Preproduction Testing

The preproduction test series consisted of fifteen tests conducted in a specified order. These tests were designed as a qualification series to verify that the chamber will function after being subjected to the limits of the environmental specification. The tests related to chamber integrity are discussed in the following paragraphs.

2.2.1 Shelf Aging

The shelf aging test was conducted by placing the chamber in a heated cabinet at a temperature of 60°C and a relative humidity of less than 50% for a period of two weeks. Upon completion of the test the chamber was inspected for damage and dimensional variances. Electrical tests were conducted and the chamber was tested for microphonics.

The elevated temperature of the shelf test will tend to increase the pressure within the sealed chamber and provide an additional potential for gas leakage if any leakage paths are present. If a leak occurred, the loss in gas pressure would result in a loss in gamma sensitivity. The shelf aging test was initiated on 2/3/72, and completed on 2/22/72.

2.2.2 Post Shelf Gamma Sensitivity

The gamma sensitivity test was conducted at three different Co^{60} flux levels. The sensitivity for each flux level was calculated and compared with the sensitivity of the chamber before the shelf aging. The preshelf sensitivity data was obtained prior to the preproduction series and is not included in the preproduction test report. There was no significant difference between the pre-shelf and post shelf gamma sensitivities.

2.2.3 Vibration

The chamber was subject to mechanical vibration testing as specified by Mil-Std-1678 Type I. (See Appendix I attached.) After completion of the test the chamber was subjected to mechanical and electrical tests and then the gamma sensitivity was again determined at three flux levels.

2.2.4 Post Vibration Gamma Sensitivity

The gamma sensitivity for each flux level was measured and compared with the sensitivity of the chamber before the preproduction test series. There was no significant difference between the preshelf gamma sensitivity and the post vibration sensitivity.

2.2.5 Shock Testing

The shock test was conducted as described by Specification MIL-S-901C (see Appendix II attached). The chamber and its associated housing and fixturing were subjected to three hammer blows in each plane or a total of nine blows. The three blows in each plane were generated by dropping the 400 lb. hammer 1 foot, 3 feet, and 5 feet. Accelerations in excess of 1000 g's were produced. Chamber current data was taken for each blow.

2.2.6 Post Shock Gamma Sensitivity

The gamma sensitivity for each of the three flux levels was determined in the same manner as for the two previous tests. The measured gamma sensitivity was compared with the gamma sensitivity of the chamber before the preproduction test series. There was no significant change in sensitivity.

To confirm that no leakage had taken place since the shock test was performed, the gamma sensitivity of the prototype chamber was recently measured and helium leak tests were conducted.

2.3 Post Preproduction Test Gamma Sensitivity

A gamma sensitivity test was conducted on October 23, 1972, to determine if the sensitivity had changed significantly from the sensitivity measured prior to the preproduction test series.

As before, no significant change in sensitivity was detected. We may then conclude that the sensitivity of the WL-23761, S/N-720401, has not changed and there has been no significant reduction in gas fill pressure.

2.4 Post Preproduction Helium Leak Test

The WL-23761, S/N-720401, was tested for helium leaks on October 24, 1972. The chamber had survived the preproduction test series and had been transported by motor freight to the Weston Archbald Division, Archbald, Penna., for test and returned in the same manner.

The leak check was conducted using a VEECO Model MS-12 with a background of $4X10^{-9}$ ATM-CC/sec. of Helium. The chamber was placed in a cylinder and the cylinder was sealed and evacuated by the leak checker.

Any helium leaking from the chamber fill gas would be transported from the cylinder to the helium leak checker. The helium leak rate was measured as less than $4X10^{-9}$ ATM-CC/sec.

3.0 CONCLUSIONS

The prototype WL-23761, Serial No. 720401, did not develop any leakage of its gas fill during or after the preproduction test series. The chamber received high energy shocks in excess of 1000 g's acceleration without damaging the chambers hermetic seals. The chamber has been accepted by the Nuclear Navy and is considered capable of surviving shipboard shock, vibration, and thermal excursions, and commercial transportation, without leakage of its fill gas.

4.0 ADDITIONAL CONSIDERATIONS

In addition to the prototype, eleven chambers have been assembled, exhausted, filled with 95% Nitrogen-5% Helium, and factory tested. No leaks were detected in the chambers. Three of the units were subjected to the shelf test described in Section 2.2.1 and there was no loss in sensitivity or any other indication of leakage.

In addition to the prototype tests the following tests will be conducted on each unit during its manufacturing process to insure chamber integrity.

1. Helium leak check of all welds and seals as they are made.
2. Helium leak check of entire chamber envelope before being placed on exhaust.

3. The vacuum attained during the high temperature chamber bake will be monitored to be certain leaks do not occur during the bake.
4. As previously discussed the chamber will be helium leak checked after it is filled with the C-14 and the background current generated by the C-14 will be monitored during the chamber shelf test.

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PROCESS SPEC. NO. 203-8-51 VG RS

SUBJECT: EXHAUST AND FILL PROCESS SPECIFICATION

SUPERSEDED DATE 3-29-73

Attachment 3.3

INTRODUCTION:

The WL-23761 requires a fill gas mixture which contains a maximum of 34 microcuries per liter of Carbon-14. The Carbon-14 is present as carbon dioxide. The Carbon-14 isotope decays by emitting beta radiation and has a half life of 5730 years.

Ingestion of the gas mixture must generally be avoided but a single brief exposure to the gas mixture will not be lethal. In an emergency where death or serious bodily injury is imminent, the ingestion of the gas mixture should not be a deterrent to rescue work.

The following instructions describe the operation of the fill system for the C-14 gas mixture. These instructions must be read and understood by the operator before the process begins.

1.0 CHAMBER PREPARATION

Each of the chambers is prepared for the exhaust and fill process as follows:

1.1 The chamber is assembled, welded, helium leak checked, and tested as specified by process specification 203-8-15 and associated specifications.

1.2 A copper tubulation is soldered to the tubulation of the H.V. seal assembly as shown in Figure 1. The solder joint is helium leak checked per process specification 203-7-218. The chambers are now ready to be attached to the manifold.

1.3 The hood is checked to be certain the stack fan is operating and that the Triton 955B C^{14} gas monitor is on and operating properly. No work is to be carried out in the hood unless the fan and monitor are operating.

1.4 After being certain all manifold valves (Valves V6, V7, V8, V9, V13, V14) are closed, the tubulation of each chamber is inserted in the vacuum coupling of the manifold and the coupling is tightened. Six chambers may be exhausted per manifold cycle.

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2. **PREPARATION OF THE EXHAUST SYSTEM**

The following items are to be checked before proceeding with the exhaust process. The position of the valves for each procedure is shown in the chart for each paragraph of the procedure that specifies valve change.

2.1 The pressure in the fill gas cylinder must be adequate to provide proper pressure for the number of chambers to be filled. The pressure indication should be approximately 25 psig per chamber to be filled.

2.2 If the fill gas cylinder requires replacement, obtain new tank, leak check it as specified by paragraph 9.2 of this specification, place in the hood and proceed as follows:

2.2.1 Be certain the hood blower is in operation. Open cylinder valve and record tank pressure in the log book. Close the cylinder shut off valve.

2.2.2 Open valves V1, V3, V5, V10 and V12 to evacuate lines back to the fill gas cylinder regulator.

2.2.3 When the vacuum gages reach the 10^{-3} Torr level, close all the valves.

2.2.4 Disconnect the gas line from the regulator but do not remove cylinder from the hood.

2.2.5 With tank and cylinder in the hood, remove the regulator from the cylinder and check the cylinder outlet with soap solution to find gas leakage.

2.2.6 When the cylinder is determined to be free of leaks, it may be set aside in the hood until the new cylinder has been installed.

2.2.7 Insert full gas cylinder into its mounting brackets and attach to gas regulator. Be certain valve V1 is closed.

2.2.8 Attach the gas line to the regulator. Open the gas cylinder valve and pressurized the gas fill line to a pressure of 45 psig. Check all joints and the regulator housing with soap solution. Record the tank pressure in the log book.

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2.2.9 Seal any leakage and then close the gas cylinder shut off valve.

2.2.10 Open valves V1, V3 and then V4 and vent the fill gas into the hood.

2.2.11 Close valves V1, V3 and V4.

2.2.12 Open the cylinder shut off valve, record cylinder pressure in the log book and then pressurize the line to 45 psig again and vent as in steps 2.2.9, 2.2.10 and 2.2.11.

2.2.13 Open valves V1, V3, V5, V10 and V12. Remove old cylinder from hood and transport directly to the radioactive materials storage shed.

2.2.14 Close valves V1 and V3.

2.3 Check the pressure in the purge tank; it must be greater than 60 psig.

2.4 If the purge tank must be changed, be certain that valve V1, V2 and V5 is closed. When tank is attached check the line for leaks with a soap solution. Line should be capable of 45 psig without leakage. Blow line free of air through valves V2 and V4.

2.5 Be certain valves V4 and V10 are closed.

2.6 When open the purge tank and valves V1, V2, V3, and V5 through V9. Pressurized system to 45 psig and check for leaks using a soap solution. Be certain all leaks are sealed before proceeding with the exhaust schedule.

2.7 Shut valve V2 and the purge tank valve and then vent system through valve V4.

2.8 Close valve V4 and V11. Ce certain the fill gas cylinder and fill gas cylinder regulator are shut off. Open valve V10 and pump entire system to a rough vacuum through valve V12.

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2.9 Close valve V12 and open valve V11 and continue to evacuate system.

3. Chamber Exhaust

The chamber exhaust procedure may be implemented while the chambers are being exhausted.

3.1 The control thermocouple is attached to one of the center chambers. The control and limit thermocouple are checked by heating them to be certain that the system is operating. The oven is then lowered and started.

3.2 The chambers are baked iat 75°C for approximately 4 hours.

3.3 The oven is shut down and valves V10 and V11 are closed. The chambers are filled to 45 psig with nitrogen from the purge tank through valves V2, V3, and V5 to speed cooling.

3.4 Valve V2 and the purge tank shut-off are closed.

3.5 After the chambers have cooled the system is vented through Valve V4.

3.6 Valve V4 is then closed and the system is evacuated through valves V10 and V12.

4. Chamber Fill

4.1 Record fill gas cylinder pressure in log book. Allow valves V10 and V12 to remain open until pressure is 10^{-3} Torr. V10 and V12 is then closed.

4.2 Valve V5 is closed.

4.3 Gas fill cylinder is opened and pressure is adjusted to the desired fill pressure. Any over pressure attained during regulator adjustment would be vented through Valve V4.

4.4 The manifold valves, V6 through V9, are closed.

4.5 Valve V5 is opened and the manifold is allowed to stabilize.

4.6 Valves V6, V7, aV8, and V9 are opened at approximately 1 minute intervals to fill the chambers individually. Change in fill gas cylinder pressure may be monitored at this time.

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4.7 Valves V1 and V6 through V9 are closed.

4.8 Test the chamber background current by connecting the H.V. tubulation to the case of the chamber by a clip lead, and applying +100 volts d.c. through a junction box to the signal electrode of the chamber with an electrometer in series with the electrode (NOTE: To accomplish this the case of the electrometer must be raised to the +100 Vdc potential). The current indicated by the meter will average $.37 \times 10^{-11}$ amperes higher than that read with the chamber connected in the guard ring mode. (H.V. applied to the H.V. electrode and the electrometer connected to the signal electrode.) If the current requires adjustment proceed as follows:

To decrease the current reduce the fill pressure by venting the chamber and manifold through Valve V4. To increase the current, increase the delivery pressure of the fill gas cylinder regulator and opening Valve V1.

4.9 When fill pressure has been determined to be correct, the fill gas cylinder and regulator are shut off and valves V6 through V9 are closed.

4.10 Valves V1, V4, and V5 are opened and manifold and lines are vented within the hood. The pressure in the fill gas cylinder is recorded in the log book.

4.11 Valve V4 is closed and valves V10 and V12 are opened to pump remaining gas from fill lines. Pump exhaust is vented within hood.

4.12 Chambers are now ready to be tipped off from the manifold. The number of chambers filled is recorded in the log book. Knowing the volume of the filled chambers, the volume of gas vented to the atmosphere can be calculated. Valves V1 and V3 are closed.

5.0 Chamber Tipoff.

Perform all chamber tip off operations in the hood except where noted.

5.1 Cold weld the copper tubulation using anhydraulic pinch-off tool per process specification 203-8-54.

5.2 Check the weld for leaks by dipping it in acetone to look for the presence of bubbles. If no bubbles are evident, proceed to 5.3.

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5.2.1 If bubbles are present, repeat 5.1. If chamber cannot be sealed by the 5.1 method, then seal the end of the tubulation by dipping the leaking end of the tubulation in molten solder. Repeat the leak test using the method of 5.2.

5.2.2 If for any reason the chamber continues to leak, place the chamber in the rear of the head. DO NOT REMOVE A LEAKING CHAMBER FROM THE HOOD. When leak has ceased to show evidence of bubbling in acetone, cut the tubulation and pump chamber to a rough vacuum. Chamber must be baked a minimum of 4 hours at 80°C while a vacuum before the chamber can be removed from the hood for reprocessing.

5.3 After the chamber tip-off has been determined to be free of leaks, the chamber is removed from the hood and hand - carried to the resistance welder.

5.4 Weld the steel portion of the tubulation using ISTC process specification 203-8-16. Return the chamber to the hood where the tubulation is removed by cutting across the weld. Leak check the cut by screwing a connector shell, part 40-22953 into the chamber so that it surrounds the tubulation to be tested. Pour alcohol or acetone into the connector shell to cover the cut end of the tubulation. If no bubbles are observed, the chamber may be removed from the hood. The procedures of 5.2, 5.3, and 5.4 are repeated until all chambers on the system have been processed. Open the tubulation stubs in the hood and then dispose of them as contaminated waste. The tubulation can contain a maximum of .3 microcuries of Carbon-14.

5.5 The chambers are then transported to the TIG welder. The cut end of the tubulation is welded.

5.6 Helium leak check the chamber per process specification 208-1-109.

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DATE 4-23-93 VDL RS 23-1-32

FILL GAS CYLINDER REPLACEMENT 203-8-51 page 8

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PROCEDURE	VALVE NUMBER												FILL GAS PURGE	
PARAGRAPH	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	Cyl.	Cyl.
INITIAL	Open	Closed	Open	Closed	Open	Closed	Closed	Closed	Closed	Open	Closed	Open	Closed	Closed
2.2.2	Open	Closed	Open	Closed	Open	Closed	Closed	Closed	Closed	Open	Closed	Open	Closed	Closed
2.2.3	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2.2.7	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2.2.8	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed
2.2.9	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2.2.10	Open	Closed	Open	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2.2.11	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2.2.12	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed
2.2.13	Open	Closed	Open	Closed	Open	Closed	Closed	Closed	Closed	Open	Closed	Open	Closed	Closed

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PROCEDURE	VALVE NUMBERS												Fill Gas Cyl.	Purge Cyl.
PARAGRAPH	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12		
INITIAL	Closed	Closed	Closed	Closed	Open	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed	Cl d
2.5	Closed	Closed	Closed	Closed	Open	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed	Closed
2.6	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Closed	Closed	Open	Closed	Open
2.7	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Closed	Closed	Open	Closed	Closed
2.8	Open	Closed	Open	Closed	Open	Open	Open	Open	Open	Open	Closed	Open	Closed	Closed
2.9	Open	Closed	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Closed	Closed	Closed
3.3	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Closed	Closed	Closed	Closed	Open
3.4	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Closed	Closed	Closed	Closed	Cl d
3.5	Open	Closed	Ope	Open	Open	Open	Open	Open	Open	Closed	Closed	Closed	Closed	Closed
3.6	Open	Closed	Open	Closed	Open	Open	Open	Open	Open	Open	Closed	Open	Closed	Closed
4.1	Open	Closed	Open	Closed	Open	Open	Open	Open	Open	Closed	Closed	Closed	Closed	Closed
4.2	Open	Closed	Open	Closed	Closed	Open	Open	Open	Open	Closed	Closed	Closed	Closed	Closed

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	V1	V2	V3	V4	V5	V6	B7	V8	V9	V10	V11	V12	Gas Fill Cyl.	Purge Tank
4.3	Open	Closed	Open	Closed	Closed	Open	Open	Open	Open	Closed	Closed	Closed	Open	Closed
4.4	Open	Closed	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed
4.5	Open	Closed	Open	Closed	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed
4.6	Open	Closed	Open	Closed	Open	Open	Open	Open	Open	Closed	Closed	Closed	Open	Closed
4.7	Closed	Closed	Open	Closed	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed
4.8	Adjust	Closed	Open	Adjust	Open	Adjust	Adjust	Adjust	Adjust	Closed	Closed	Closed	Open	Closed
4.9	Closed	Closed	Open	Closed	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
4.10	Open	Closed	Open	Open	Open	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
4.11	Closed	Closed	Closed	Closed	Open	Closed	Closed	Closed	Closed	Open	Closed	Open	Closed	Closed

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6.0 Post Fill System Maintenance

After the chambers have been leak checked, the fill system is prepared for the next chambers as follows:

6.1 The tubulation tips that are in the manifold ports are removed and placed in a bag for disposal as radioactive waste.

6.2 Check all pumps and gauges to determine that they are operating properly and that no system maintenance is required. If pump oil is to be changed, the old oil will be disposed of as contaminated waste. Any system parts which are replaced will also be disposed of as radioactive waste.

7.0 Production Tests

The following tests are performed to determine that the proper amount of C^{14} is contained in the chamber. Other tests are performed that do not relate to the C^{14} content and, therefore, are not discussed herein. All tests are conducted out of the hood unless otherwise stated.

7.1 The limits of the background current are specified by specification 212-190-45 which is classified DOD CONFIDENTIAL. If the Carbon-14 content in the chamber exceeds the specified amount, the resulting chamber background current would be too high. Similarly, too low a background current would indicate an inadequate Carbon-14 concentration. The background is measured periodically during the chamber test sequence specified by 212-190-45. The current for each chamber is compared with the value obtained at the time the chamber was filled. If a chamber develops a leak, the resulting loss of the gas mixture would reduce the background current produced by the chamber. If test indicates that the background current is decreasing, the chamber will be placed in the C-14 hood and tested for the presence of a Carbon-14 leak. If a leak is suspected, the chamber will be placed in the hood until it can be determined that it is not emitting $C^{14}O_2$ gas.

7.2 The device is given a heated shelf test of two weeks. The background current of each unit is checked just before shelf, at the end of the first week and after completion of the shelf test. A decrease in the current will be treated as in Paragraph 7.1.

8.0 Emergency Procedures

8.1 If Carbon-14 leakage is suspected from any container located in an uncontrolled area, the following action is required:

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8.1 - Continued

A. If Possible, take leaking container out of the plant or place it in the C-14 hood.

B. Clear area of all personnel within 20 feet of container and notify the Radiation Protection Officer. Post an individual to keep personnel away until R.P.O. arrives.

C. Once in the hood, or a safe area outside the plant, an attempt may be made to control the leak. An estimate of the amount of C^{14} lost to the atmosphere is to be recorded in the log book.

8.2 Figure 5 shows the valve diagram that will be mounted in clear view for emergency shut down procedure. All valve handles will be numbered and critical valves will be color coded as well.

9.0 All personnel who handle the gamma chambers containing $^{14}CO_2$ test gas or the $^{14}CO_2$ gas cylinders must be informed of its potential hazard and what procedures are to be followed in the event of an accident.

9.1 All personnel involved in the operation of the $^{14}CO_2$ fill system will be included in the periodic physical examinations under the Radioactive Materials Program (i.e., a general physical examination and a differential white blood count and red blood cell count or hematocrit determination. The frequency will be every year for persons over 50 years of age and every 2 years for persons under 50 years of age.). In addition, they shall be required to have an analysis run on their breath sample. The breath analysis sample shall be taken in the Medical Department after each of the first several detector filling operations. If the analyses are negative, this requirement shall be rescinded.

9.2 A soap bubble test will be performed on all cylinders in the storage area prior to being brought into the plant for installation in the exhaust hood.

9.3 Any vacuum pump oil, vacuum grease, or rubber gaskets used in the exhaust system shall be assumed to be contaminated and when necessary disposed of in the following manner:

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9.3.1 The vacuum pump oil shall be poured into a container (metal or Plastic) having a screw cap. The cap shall be fastened tight and sealed with electrical tape to prevent possible leakage. The container shall then be given to Special Devices, who will place the container in the Radioactive Waste Barrel.

9.3.2 Oil on the pump jet assembly shall be wiped off using a paper towel and the towel placed into the waste barrel.

9.3.3 All vacuum grease and gaskets taken from the exhaust system shall be placed into the waste barrel.

9.3.4 Personnel handling these parts shall wash their hands thoroughly at the end of the operation.

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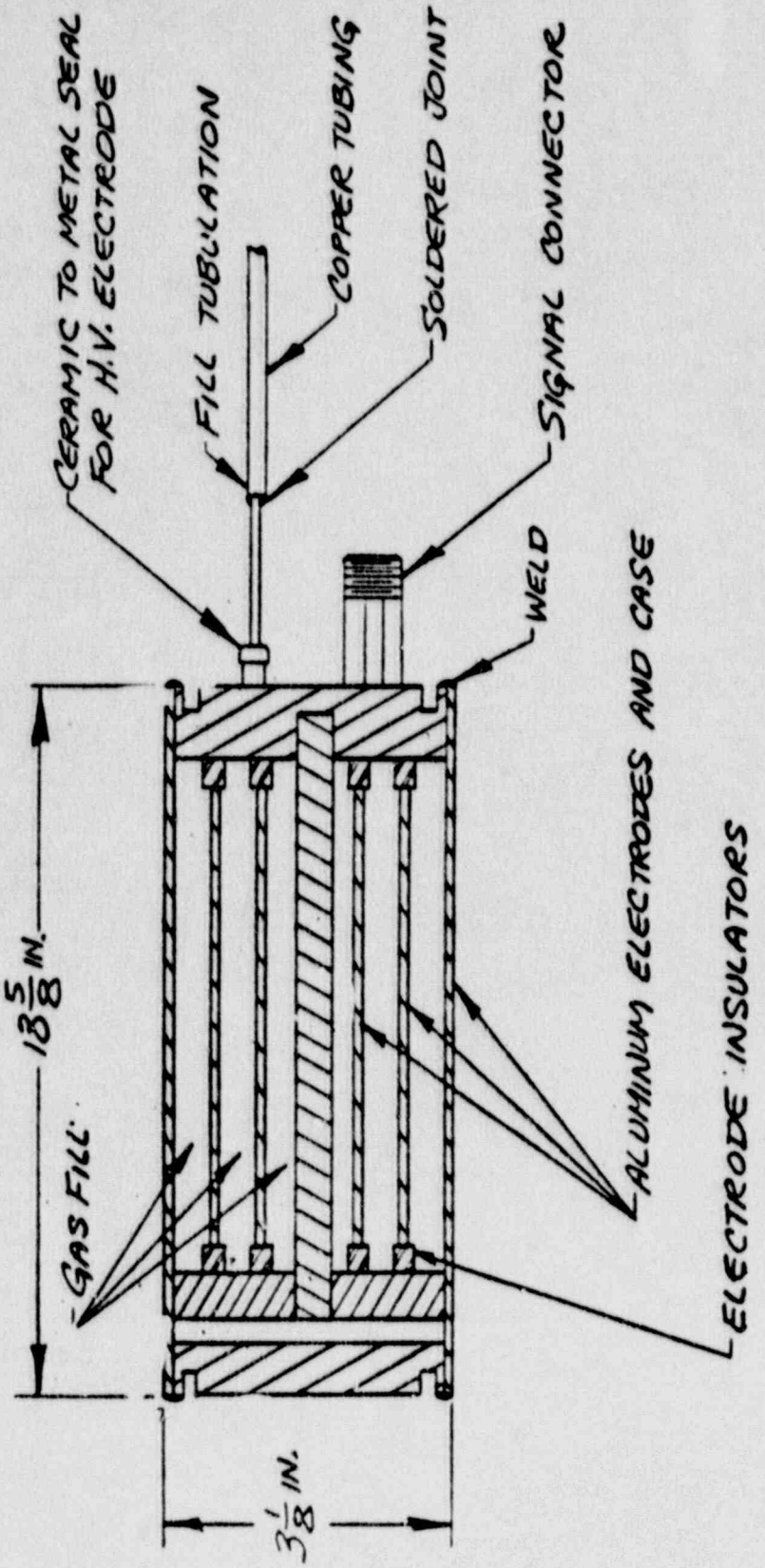
PROCESS SPEC. NO. 203-8-51

SUBJECT: EXHAUST AND FILL PROCESS SPECIFICATIONS

SUPERSEDED DATE 3-29-73

WL-23761 GAMMA CHAMBER SCHEMATIC



GAS VOLUME ~ 1 LITER

FILL PRESSURE ~ 32 PSIG

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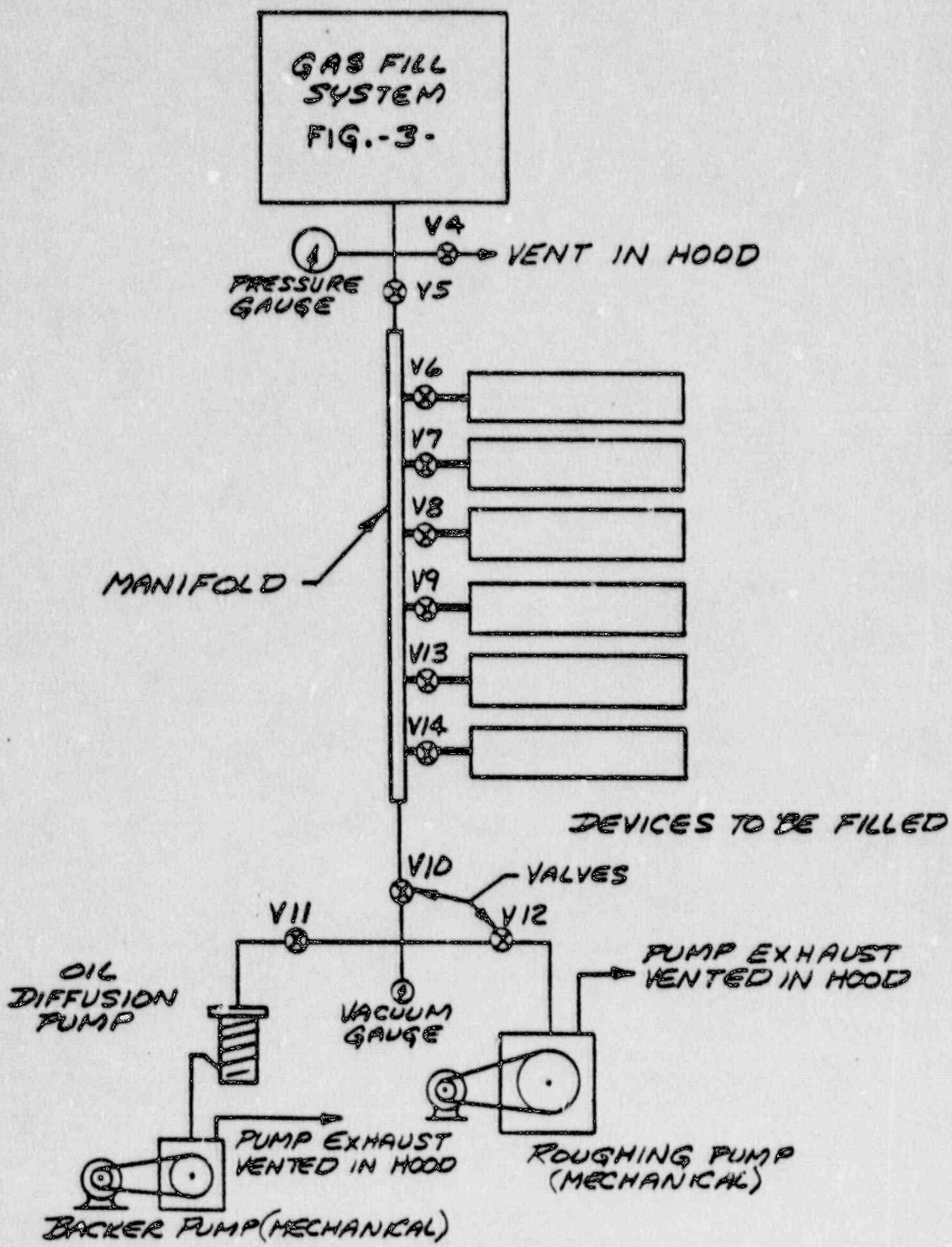
IMAGING AND SENSING TECHNOLOGY CORPORATION
WESTINGHOUSE CIRCLE
HORSEHEADS, NY 14845

PROCESS SPEC NO 203-8-51

SUBJECT: EXHAUST AND FILL PROCESS SPECIFICATIONS

SUPERSEDED DATE 3-29-73

MANIFOLD AND VACUUM SYSTEM SCHEMATIC DIAGRAM



NOTE: ENTIRE SYSTEM IS ENCLOSED IN APPROVED HOOD

FIGURE - 4 -

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V. J. Santilli

B 79823 BAMT 4-24-73

* CHANGE

EMERGENCY SHUT DOWN PROCEDURE

If any emergency develops, use the following procedure:

1. Be certain that the shut off valve of the small gas cylinder is closed. This handle will be identified by a red tag.

2. Close all valves and turn off oven.

3. Pumps may then be shut down.

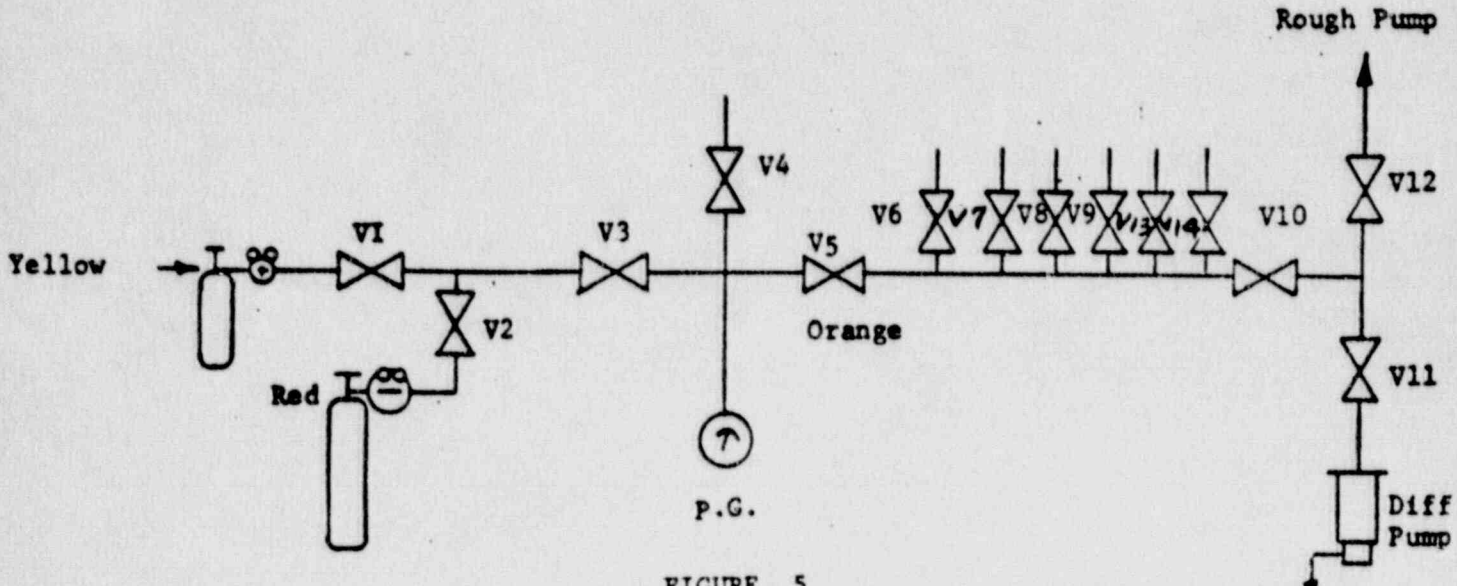

FIGURE 5

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B	77823		2-13-75

* CHANGE

The primary quality check is based upon repeated helium leak checks both before and after the fill. Leak checks before the gas fill are performed as specified by 203-7-218. Leak checks after the fill are performed by placing the chamber in a hermetic enclosure and evacuating the volume surrounding the chamber by connecting it directly to the helium leak checker. If the gas fill is leaking from the sealed chamber, it will be detected. The process specification for this check is not finalized, but a description of the engineering test which is currently being performed on the prototypes is attached.

Norman C. Thurlow

Norman C. Thurlow-Project Engineer

E L Dana

E . Dana, Quality Control Engineer

REVISED 10/25/88
V. J. Santilli

79510 BH RC1 WG 1-3-73

• CHANGE

TRITON 955B TRITIUM CALIBRATION PROCEDURE

Attachment 4

I. Start-up

1. Change filter.
2. Check condition of dessicant. Change if necessary.
3. Check meter mechanical zero.
4. Check Triton settings before turning on:
   - A. Range Selector: Zero
   - B. Alarm Switch: Off
   - C. Monitor Switch: Tritium
   - D. Time Constant: Slow
5. Turn instrument on. Allow 10 minute warmup.
6. Zero meter.
7. Set range switch to X1.
8. Check valves on CL-1 Calibrator:
   - A. Metering inlet: Closed
   - B. Metering outlet: Closed
   - C. Regulator outlet: Open
   - D. Outlet pressure adjust: Full CCW.
9. Place thermometer on Calibrator back plate and record temperature (°C) when stabilized.
10. Open and close bottle valve to put pressure on cylinder gage.
11. Adjust outlet pressure adjust to 20 psi on outlet pressure gage.
12. Open and close metering inlet valve.
13. Open and close metering outlet valve.
14. Record pressure on outlet pressure gage.
    It should be approximately at the setting in Step 11. If not, repeat steps 11-14.
15. Connect Calibrator outlet to Triton outlet.
16. Turn on Triton air pump.
17. Adjust flow to 7 lpm.
18. Open and close metering inlet valve.
19. Connect Calibrator inlet to Triton inlet.
20. Open metering outlet valve for 2-4 seconds and close.
    It is important that this time be adhered to.
21. Read meter when it has stabilized, taking an average reading over a period of several minutes.

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II. Shut-down

22. Make sure bottle valve is closed.
23. Turn outlet pressure adjust full CCW.
24. Remove Calibrator inlet connection and direct it into an operating exhaust hood.
25. Open metering inlet valve.
26. Open metering outlet valve.
27. Close regulator outlet valve when outlet pressure gage reaches zero.
28. Close metering inlet valve.
29. Close metering outlet valve.
30. Turn off Triton air pump when meter has fallen to zero.
31. Disconnect outlet hose.
32. Set range switch to zero.
33. Turn off Triton.

III. Calculation

34. Calculate theoretical scale reading as:

$$\text{Scale Reading } (\mu Ci/M^3) = \frac{0.733\ nAPd}{V}\left(\frac{273}{273 + T}\right)$$

where n = no. of aliquots used (usually 1)

A = specific activity of gas in lecture bottle when dated ($\mu Ci/l$)

P = outlet pressure gage reading from Step 14 (psi)

d = Tritium decay factor. Determine elapsed time from date on gas bottle and use table on pg. 11 of CL-1 Calibrator manual.

V = Volume of Triton plus Calibrator (10.24 l)

T = Calibrator temperature from Step 9. (°C)

35. Calculate Correction Factor as:

$$\text{Correction Factor} = \frac{\text{Scale reading (Step 34)}}{\text{Observed scale reading (Step 21)}}$$

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36. Tag Triton instrument as follows:

CALIBRATION

By:
Date:
Scale Reading:
Corr. Factor:
Due:

where Scale Reading refers to the observed reading from Step 21.

C. D. Spangenberg
1/5/77

Calibration Schedule: Every 6 Months During Extended Production Runs

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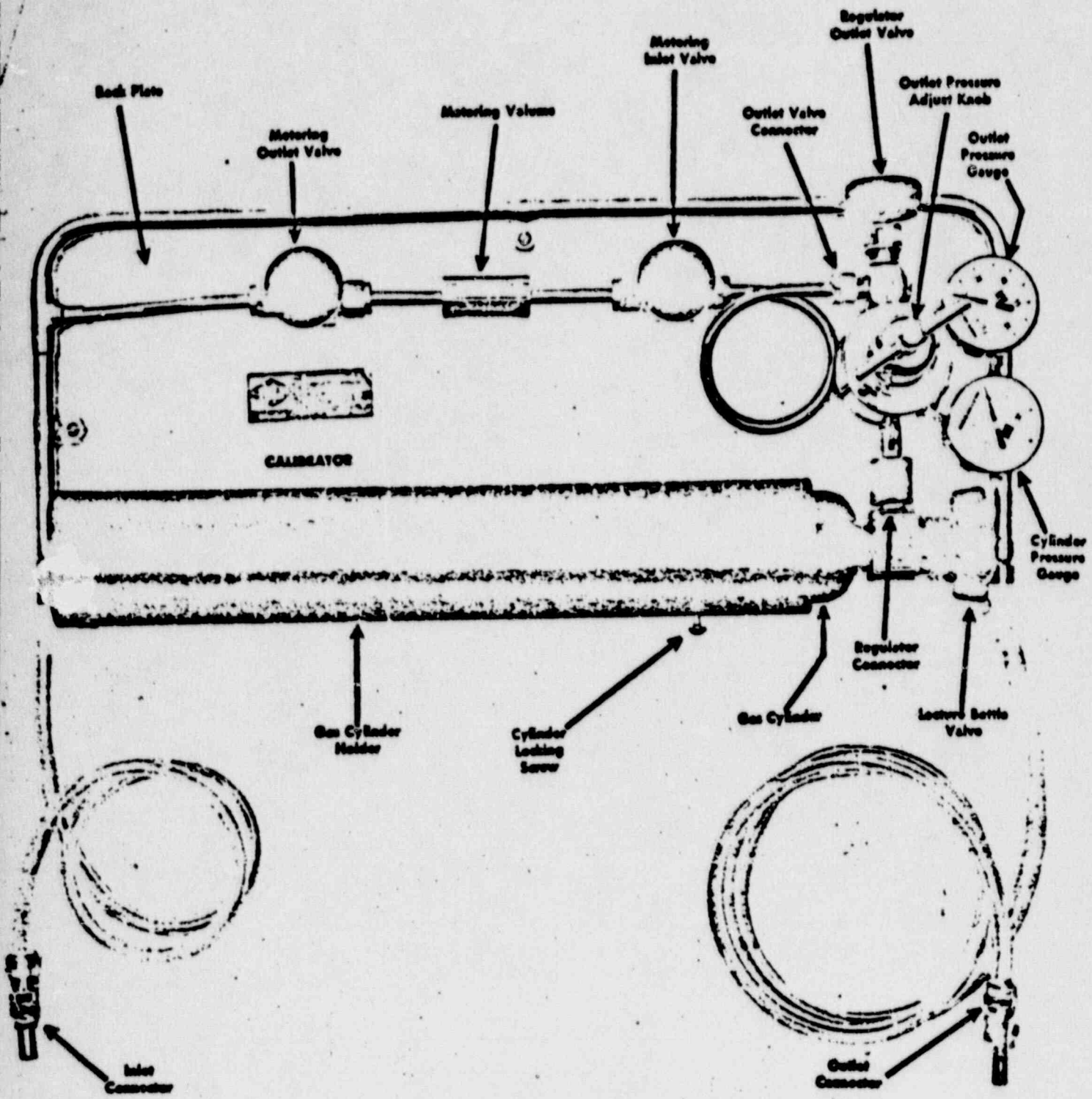
V. J. Santilli

JLI TECHNICAL DATA



CALIBRATOR

MODEL CL-1

JLI JOHNSTON LABORATORIES, INC.
8 Industry Lane • Cockeysville, Maryland 21030 • Area Code 301-666-9500
CABLE "JOHNLAB"

Imaging and Sensing Technology Corporation
Westinghouse Circle Horseheads, NY 14845

QUALITY ASSURANCE MANUAL

[ ] Controlled Copy No._____

[X] Uncontrolled Copy
(revisions not automatically provided)

Issued to	Mr. J. Bruce Carrico Medical, Academic and Commercial Use Safety Branch
Location	Division of Industrial and Medical Nuclear Safety, NMSS Nuclear Regulatory Commission Washington, D.C. 20555
Date	October 26, 1988

This Manual describes a system designed to assure that Imaging and Sensing Technology Corporation products and services meet all customer quality requirements. All activities affecting quality, from initial contract review through correction of field problems are included in the system. The Manual meets MIL Q-9858A, MIL-I-45208A, 10CFR50 Appendix B, ANSI NQA-1, and similar customer-imposed requirements. It is subject to periodic review, revision, and approval by senior Company management.

This program is a continuation of the program formerly described in the Westinghouse Industrial and Government Tube Division Quality Assurance Manual, Revision D.

STATEMENT OF POLICY AND AUTHORITY

It is Imaging and Sensing Technology Corporation policy to provide quality products and services on schedule at a competitive price for full customer satisfaction. These products and services shall meet all required standards of performance, reliability, and quality uncompromised by cost or schedule considerations. To this end, it is the Quality Assurance Manager's responsibility and authority to assure full compliance with all applicable quality requirements.

The Quality Assurance Manager and his organization have been delegated authority and freedom to:

(1) Identify quality related problems.
(2) Initiate, recommend, or provide solutions.
(3) Verify implementation of solutions.
(4) Limit or control further processing, delivery, or installation until proper dispositioning of a nonconforming item or unsatisfactory condition has occurred.

In the event that conflicts arise which cannot be resolved by the Quality Assurance Manager, these matters shall be referred to the President for resolution.

This Manual describes a quality assurance program which coordinates all activities contributing to product quality. The responsibility and authority assigned to the Quality Assurance Manager in no way relieves other departments of the basic responsibility for designing and manufacturing to the required standards of quality. This policy places major emphasis on quality teamwork among all.

Philip C. Ponzi
Philip C. Ponzi
President

June 20, 1988
Date

TABLE OF CONTENTS

Lawrence J. Bostwick, Manager
Quality Assurance and
Technical Services

6-20-88
Date

End of Section

1.0 ORGANIZATION

1.1 Organization Charts

The charts at the end of this section show the organization of Imaging and Sensing Technology Corporation (referred to below as "ISTC" or "the Company").

1.2 Responsibilities

The realization of the Statement of Policy and Authority involves every department, not just Quality Assurance. The primary responsibilities for quality and quality-related activities are allocated below. Details are given in sections 2 through 17 and cross-indexed in the Appendices. Note that function names such as "QA" are used throughout the Manual to assign specified responsibilities to the manager of a function or his designee. The terms "supervisor", "general foreman", and "foreman" are used interchangeably in the Manual to designate management personnel carrying any of those titles.

1.2.1 Quality Assurance and Technical Services

Implement the Statement of Policy and Authority in a documented program which meets all contractual requirements.

Coordinate the efforts of all functions to follow the program.

Establish a quality assurance organization designed to fulfill all QA responsibilities described in this Manual.

Provide for indoctrination, training, and formal qualification of personnel as required to keep them informed and maintain quality related skills.

Verify and certify the qualifications of processes and personnel.

Verify by inspection, auditing, document review, statistical analysis, and other appropriate techniques that all activities affecting quality are being correctly performed.

Provide technical assistance in interpreting quality requirements, implementing controls, and using statistical techniques.

Provide acceptance inspection service to Manufacturing and Engineering.

Provide instrument repair and calibration service, and maintain the calibration control system.

Provide technical service support such as Chemical and Physical (C&P) Laboratory.

Control nonconforming items found during QA inspections and audits.

Coordinate processing of field returns.

Assure that effective corrective action is taken to eliminate the causes of nonconformances.

Provide for periodic review of the QA program effectiveness and compliance with applicable requirements.

Report periodically to management on progress toward the quality policy goals.

Interface with outside quality organizations and Quality Assurance Representatives (QAR's).

1.2.2 Marketing and Sales (jointly)

Establish channels for contractual communications with customers.

Maintain the official customer order correspondence files.

Circulate contractual documents to other functions for information and review, and coordinate their responses.

1.2.3 Engineering

Provide technical interface with customer through formal transmittals documenting customer approvals of "E" drawings, Design Reports, and other documents as required.

Translate customers' design requirements into procurement specifications, manufacturing drawings, and work instructions.

Supervise the qualification of new and modified products.

Provide engineering service to Manufacturing, QA, and other functions as needed.

Administer lab facilities for the production of prototypes, engineering models, and certain new or low-volume products requiring close engineering supervision, in the Electronics and Electro-Optical Product Lines.

1.2.4 Manufacturing Engineering

Provide manufacturing engineering service to Manufacturing in the Electro-Optical Product Line. In the other product lines this function is the responsibility of Manufacturing.

1.2.5 Materials/MIS

Select vendors, based on analysis of vendor ratings supplied by QA and subject to restrictions imposed by QA Manager and the procurement specifications.

Establish channels for contractual communications with vendors.

Procure items according to schedule, bill of materials, and specifications.

Store, pack, and ship finished items.

Operate the receiving and material storeroom functions.

Operate the Manufacturing Information, material planning, inventory, and production control functions.

1.2.6 Manufacturing

Schedule and operate the factory.

Recommend dispositions for nonconforming items.

Control nonconforming items found in process until they can be brought to the attention of QA.

Perform tests to verify conformance to finished product requirements, subject to surveillance by QA and Engineering.

Provide and document specific job training of operators.

Provide manufacturing engineering for certain product lines.

Administer engineering lab facilities for the Sensor, Control, and LVS Product Line.

1.2.7 Human Resources

Maintain job descriptions containing necessary qualifications for each position. Coordinate general training of personnel. Advise QA Manager of new hires, transfers, and other personnel changes.

1.2.8 Shared

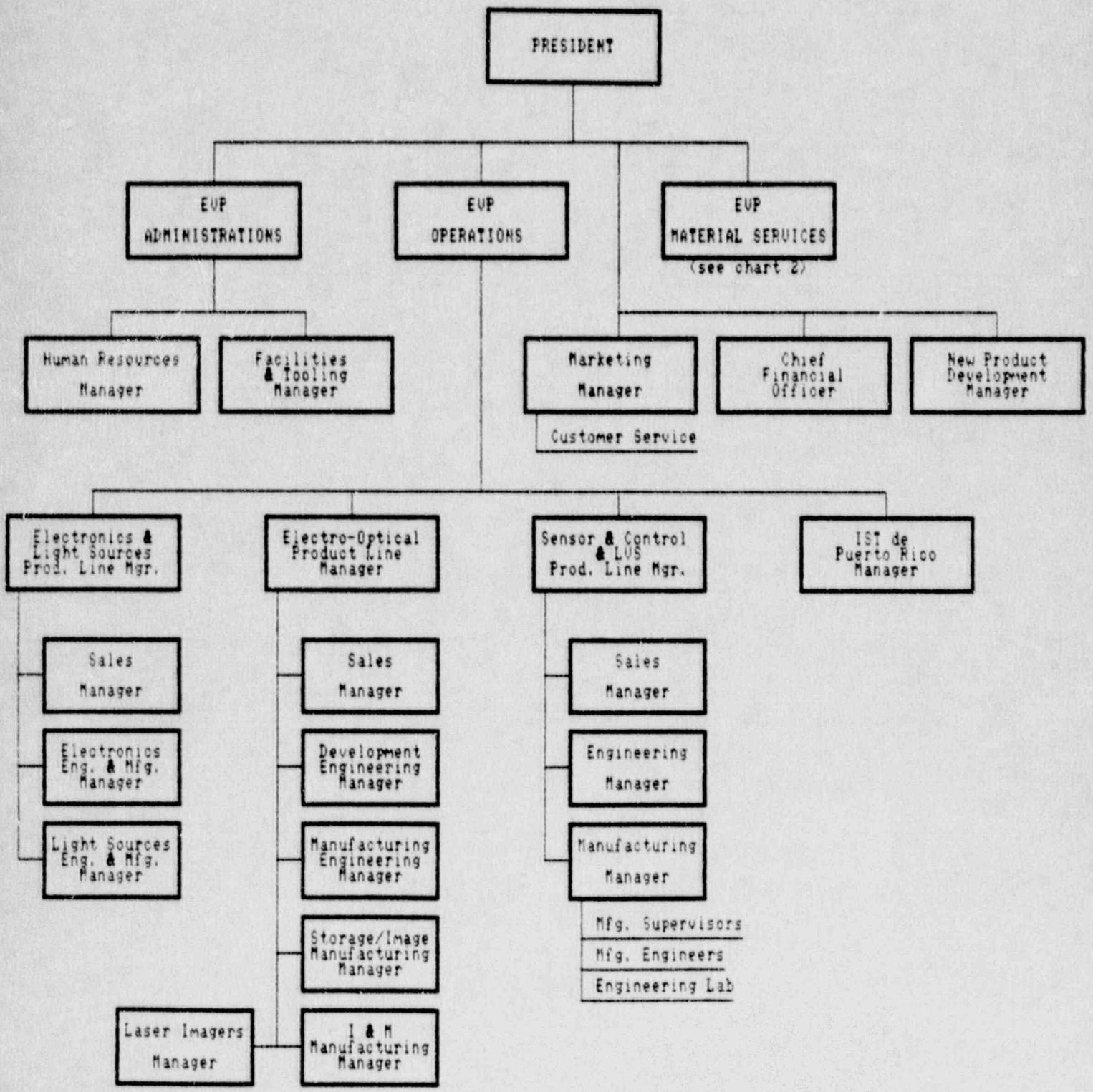
Each employee is responsible for doing his work in a manner consistent with the Statement of Policy and Authority and the requirements of this Manual.

Identification, status, and control of items is the responsibility of the supervisor to whose inventory they are assigned.

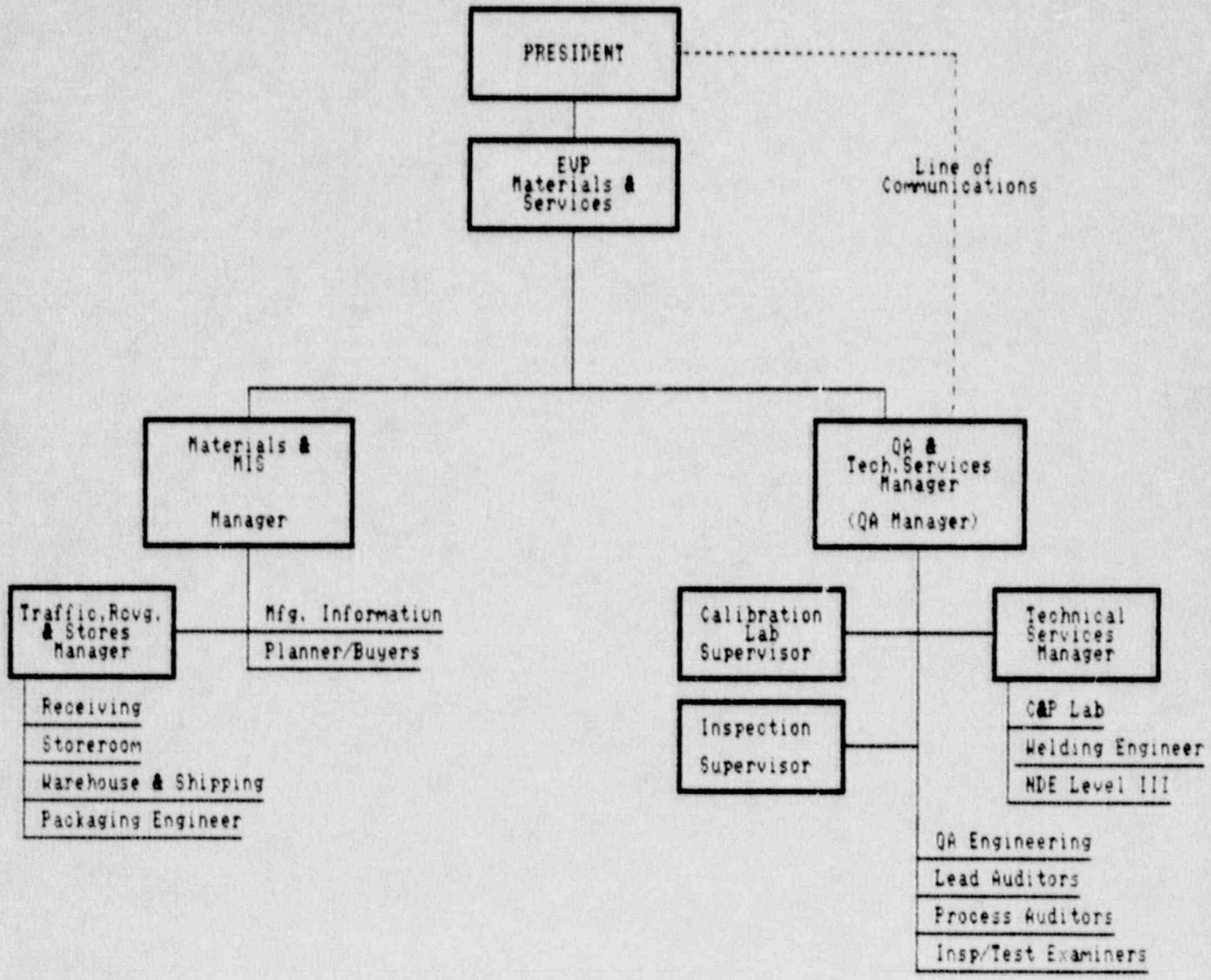
Records are the responsibility of the department generating them until they are formally transferred elsewhere.

Issues unresolved at staff level are submitted to the President for final decision.

IMAGING AND SENSING TECHNOLOGY CORPORATION
ORGANIZATION CHART 1



IMAGING AND SENSING TECHNOLOGY CORPORATION
ORGANIZATION CHART 2



End of Section

2.0 QUALITY ASSURANCE PROGRAM

2.1 Applicability and Scope

The quality assurance program described in this Manual applies to all products of the Company except nuclear penetrations and (after October 1, 1988) in-core detectors, which are covered by a separate Quality Program Manual. The program covers all activities affecting quality and reliability at the Company's facilities in Horseheads, NY, and Cayey, Puerto Rico from initial contract review through the correction of field problems. The program conforms to all applicable requirements of MIL Q-9858A, MIL I-45208A, 10CFR50 Appendix B, ANSI N45.2 and NQA-1, and other customer-imposed documents.

The program is a continuation of the program formerly described in Westinghouse Imaging and Sensing Technology Division Quality Assurance Manual, Revision D. This manual reflects changes in organization occurring when the Company was formed; there are several improvements in response to audit recommendations; a section on parts manufacturing was deleted because it no longer applied; the rest of the changes are editorial clarifications and corrections. No provision has been intentionally deleted or weakened.

2.2 The Quality Assurance Manual

2.2.1 Organization of the Manual

The Quality Assurance Manual, also referred to as "the Manual" or "the QA Manual", is composed of Sections numbered 0 through 17, and a group of informational Appendices identified by the prefix A-. Section 0 contains approval signatures, a statement of quality assurance policy, and a table of contents which also indicates the current revision of each Section. In general, each of the other sections deals with one of the major topics addressed by the documents listed in Section 2.1 For convenience, cross indexes to some of these documents are included in the Appendices.

Each page of Sections 0 through 17 carries the Section number, revision letter, and page number within the section. The last page of each section ends with the words "end of section".

Each Section may contain requirements which apply only to specific contracts, or to specific types of product such as commercial products or Engineering development products. Such requirements are covered in separate sub-sections which include a statement of applicability. The QA Manager has the authority to limit the application of each Section of the Manual for commercial products having no contractual quality system requirements. He documents such limitations in QC Procedures (See QCP 1-5) or by other suitable methods.

2.2.2 Review and Approval

The QA Manager signs the contents page of the Manual to indicate that he and the managers of all other affected functions have reviewed and approved the contents. Each revision of the Manual is similarly approved.

The Manual is reviewed during each management audit (Section 17) to assure that it accurately describes the QA program. The QA Manager also reviews customers' new and revised quality program requirements and other advisories, and revises the Manual as appropriate.

2.2.3 Revisions

Revisions are identified by a revision letter on each page. The Manual is revised by section, so that all pages of a section carry the same revision letter. A revision of any Section of the Manual causes a revision of Section 0, and all revised sections take the same revision letter as Section 0 revised at the same time. For convenience only, revised text is identified by an asterisk at the beginning of the paragraph or the words "General Revision" at the beginning of a section. Since Revision A is a general revision of the entire manual, individual changes are not marked.

2.2.4 Distribution

All issued copies of the Manual are identified on the cover page as controlled or uncontrolled. Uncontrolled copies are issued as information copies to customers and as work copies for use in preparing revisions. Acknowledgements are not required for uncontrolled copies, and revisions are not automatically provided.

Controlled copies of the Manual are numbered copies for which the QA Manager maintains a distribution list. As each revision is approved, he issues a copy of the revised sections to every holder of a controlled copy of the Manual. The transmittal letter requires the return of a signed acknowledgment. QA Engineering maintains a log of distributions and retains acknowledgments until the next revision is issued. Except for work copies, only controlled copies are issued for use within the Company.

A copy of each revision is retained by QA Engineering in accordance with Section 16.

End of Section

3.0 QUALITY PLANNING

3.1 Customer Interface

Unless otherwise agreed purchase orders, change notices, and other contractual communications with customers are routed through Sales, where the official order correspondence files are maintained. Sales advises the QA Manager, the Inspection Supervisor, and others of each purchase order and change notice, using a Transfer Sheet (Exhibit 3-1). Sales also distributes copies of the customer document as needed and transmits submittals and other information to the customer.

3.2 Initial Planning

Unless assistance is requested at earlier stages, QA planning begins when a transfer sheet for a new contract is received by the QA Manager. He assigns the order to a QA Engineer to review and follow. The reviewer determines whether the products to be supplied are fully specified and whether all customer QA requirements are fully covered by the existing QA program. To cover new requirements he works with other affected functions to initiate changes in the QA Manual, QA Plans, training schedules, and specifications as necessary. If a written QA Plan applies he notifies Sales to issue a transfer sheet identifying it. He initials his copy of the transfer sheet or attachments to indicate satisfactory completion of the review. Initialed transfer sheets need not be retained after completion of the order; for commercial products they may be discarded upon completion of the review.

Planning for changes in contracts is similarly accomplished.

The cognizant Engineering Manager also receives a copy of the transfer sheet. He reviews it and initiates any actions needed to address the applicable codes, standards, and other contract technical requirements, (See Section 5).

3.3 Quality Plans

When required by contract the QA Manager generates a QA Plan or Inspection and Test Plan. A QA Plan is a cross index which relates each of the customer's requirements to the applicable section of the Manual, with additional information as needed. An Inspection and Test Plan (ITP) shows, usually in flow chart form, the location of each contractually required inspection, test, and customer hold in the manufacturing sequence. ITP's are also referred to as IPP's, MIPP's, and IMQP's. See QC Procedure 1-3 for more information on QA Plans and ITP's.

EXHIBIT 3-1
TRANSFER SHEET

CUSTOMER ORDER TRANSFER SHEET

CUSTOMER SERVICE: C.S.
CUSTOMER: NSID (TGX)
CUSTOMER NUMBER: 346
SHIP TO: Bechtel Energy WHSA
STP Matagorda County
FM 521 Rain Nest
Wadsworth Tx 77483

P.O. Number: HU-67257
ORDER NUMBER:
ORDER DATE: 5-27-87
REQUESTED SHIP DATE: 6-1-87
PROMISED SHIP DATE: 6-15-87
PROD. CODE: 95 NON-STD CHARGE:
GOVT. PRIORITY NUMBER:
PRIME CONTRACT NO.:

TRANSPORTATION:
PREPAID: ✓
PREPAID & ADD DIFF:
PREPAID & ADD:
COLLECT:
OTHER:
SHIP VIA:

SPECIAL INSTRUCTIONS/MARKS: Marks per page 2

ITEM	QTY.	PART NO./DESCRIPTION	UNIT PRICE
1	5	Module Rats 40-3902	[redacted]
2	5	Assoc. 42-10024	[redacted]
3	1	Ebs ... -95 (HDL-95)	[redacted]
		Applicable QA plan is QCP - NONE REQ'D	

SAMPLE

REVIEWED QA 5/28/87 ... 6-1-87

TOTAL VALUE: [redacted]

DISTRIBUTION	NAME	M/S
Engineering	W. Todt ✓	154
	K. C. Playfoot	154
	V. Lankenau ✓	154
	T. Wetherill	154
Manufacturing	L. Lupica ✓	308
	R. Underwood ✓	154
	E. Bauer ✓	154
	F. Kroculick ✓	154
	J. Robbins ✓	532
Matl. Planner	T. Patterson	628
	D. Cruttenden ✓	532
Other	S. Hunt ✓	202

	M/S
(X) Quality Assurance Manager	138
(X) Quality Supervisor	634
( ) DCAS (Govt. Inspection Req.)	298
( ) NRC-A/R (Item Contains Uranium)	608
( ) Warehouse	538
(X) Packaging Engineering	538
( ) Traffic	538
( ) Govt. Acctg. (DD250/1149 Required)	218
( ) Mktg. Services (Export Orders)	202
( )	

(13) MAY 28 1987

Date & Number of copies 12 Issued by: [signature] Date: 5-27-87

End of Section

4.0 INDOCTRINATION AND TRAINING

4.1 General

Each hourly and salaried position has a written job description, maintained by Human Resources, which states the minimum acceptable levels of skills, education, and experience. These qualifications are verified by the supervisor during a probationary period of training and work on the job. Employees who are considered unsatisfactory at the end of this period are job failed by the supervisor and removed from the position.

Each supervisor is responsible for providing his people with the continuing training necessary for them to develop and maintain their job skills. Much of this training occurs informally on the job. In addition, ongoing training courses are coordinated by Human Resources, using corporate and outside resources. Records of such formal training are maintained by Human Resources. Additional training for processes such as welding, NDE, and testing is discussed in Section 9.

4.2 QA Program Indoctrination and Training

Human Resources advises the QA Manager of new hires, transfers, and other personnel changes.

The QA Manager schedules training to assure that all personnel identified in Section 1 who perform functions defined in this Manual or associated procedure understand their role in meeting the applicable QA Program requirements. The program includes appropriate training

. for new hires and transfers to work affecting quality
. to introduce changes in the QA program
. when indicated as a corrective action
. to maintain awareness of QA program requirements

Records of such training are filed in the QA office. The records include the date of the training session, subject, duration, and the names of the trainer and trainees.

End of Section

5.0 DESIGN CONTROL

5.1 New Product or New Requirements

If, during negotiations or initial contract review, the cognizant Engineering Manager determines that a new or modified product is required, he sets up a suitable engineering project and assigns an engineer to be Project Engineer. The Project Engineer coordinates all technical aspects of the contract including design assistance and technical communication with the customer, and maintains files of such communications. He may reassign specific portions of his work to other Engineering personnel as appropriate. The Project Engineer reviews the design requirements received from the customer, resolves questions, and arranges for further exchanges as required. He acts as the design interface between Engineering, the customer, and other design activities, documenting their design decisions in jointly-approved drawings, test procedures, and other Specifications. He arranges as necessary for the preparation of design drawings, acceptance inspection and test criteria, calculations, reliability studies, material studies, process and process control studies, and the fabrication and evaluation of prototypes. Informal drawings and work instructions may be used during this time, and the use of Engineering PC's (see Spec. 222-9-0) is permitted. Design drawings, if generated separately from the set of manufacturing drawings for the item, take the form of E-Drawings controlled by Engineering. When the Project Engineer is satisfied with the new or changed design he formalizes it through the PC (Product Change) system (Section 6).

5.1.1 Engineering Lab Products

Designs for Engineering Lab Products need be formalized through the PC System only as required by the applicable QA Plan, if any.

5.2 Design Changes

Once a design has been formalized in accordance with Section 5.1, all changes are made using the PC System (Section 6). The PC System documents the justification for the change, the measures taken to verify its acceptability, and the review of the change by all concerned parties including, where applicable, the customer.

5.3 Design Control Options

When stated in the applicable QA Plan, the following optional features will be incorporated in the QA program.

5.3.1 Design Review

A formal, documented design review by independent engineer, QA, Manufacturing, and other affected personnel.

5.3.2 Design Report

An engineering report documenting the verification of all design requirements by design review, alternate or simplified calculation methods, or testing. The calculations are performed or reviewed by individuals other than those who performed the original design. Testing is performed or witnessed by individuals other than those who performed the original design.

5.3.3 Configuration Control

In accordance with MIL-STD-480 through -483 as required.

5.3.4 Qualification Approval

In accordance with Provisions Governing Qualification (issued by D.O.D.).

End of Section

6.0 DOCUMENT CONTROL

6.1 Types of Documents Affecting Quality

Activities affecting quality are performed in accordance with documents of the types listed below. For each type there is a procedure which assures that new documents and changes are reviewed, approved, issued to, and obsolete documents removed from work stations in a controlled manner.

6.1.1 Quality Assurance Manual

See Section 2 for a description of the Manual and the method of control.

6.1.2 Quality Program Manual

This document affects only ASME Code products not covered by the QA Manual. It is listed here for information only.

6.1.3 QC Procedures

QC Procedures (QCP's) contain detailed descriptions of procedures outlined in the QA Manual. Details are given in QCP 1-1. Note that QC Procedures are referenced throughout the Manual but distributed separately.

6.1.4 Other Supplementary QA Program Documents

Most supplementary documents are controlled as QC Procedures; however they may take other forms when contractually agreed.

6.1.5 Calibration System Manual

See Section 12 for a description of the Calibration System Manual.

6.1.6 Specifications

Documents affecting quality which are not covered elsewhere in Section 6.1 are called specifications. They are controlled by the Manufacturing Information System (Section 6.2).

6.2 Manufacturing Information System

6.2.1 Manufacturing Specifications

Production items are made in accordance with controlled manufacturing specifications which define the technical and quality system requirements for all purchased and fabricated components, and all operations from incoming inspection through packing of the finished product.

The major assembly, acceptance test, and acceptance inspection operations are controlled by a sequence of drawings identified by the tube type number prefixed by a number between 75- and 198- (for example 150-6377 is the final inspection drawing for the WL-6377 Compensated Ionization Chamber). A typical drawing contains a pictorial view of the completed item, a list of the subassemblies, parts and materials used to make the item, a set of instructions for assembly and processing, and applicable criteria for acceptance (see Exhibit 6-1). Each of the constituent items is similarly controlled, so that given a tube type all the applicable work instructions can be identified.

If there is no space to list parts and operations on the drawing they are itemized on a separate sheet carrying the drawing number with the prefix P- (Exhibit 6-2). For major assemblies requiring detailed process documentation a traveler, prefix T- (Exhibit 6-3) is used instead of a P-sheet. Processes such as welding and testing which need descriptions more detailed than P-sheet space allows are described in numbered Process Specifications which are incorporated by reference (Exhibit 6-4).

Inspection instructions are included with the assembly instructions or given on separate sheets carrying the drawing number with the prefix QA, QAC, QP, OQ, or RMIS (Exhibits 10-2 and 10-3).

6.2.2 Specification Control

Specifications are controlled by Manufacturing Information using the Product Specification System. New specifications are originated and existing ones changed or recalled through the use of a Product Change (Exhibit 6-5). The forms provide for a description of the change, disposition of affected items, a suitable engineering justification, and the signatures of the originator and reviewers. Each PC is reviewed and signed by the cognizant QA Engineer, the Planner/Buyer, and the Engineering Manager or his designee. Comments, objections, and their resolutions are attached as appropriate. Independent verification, when contractually required, is performed in accordance with QCP 3-5.

The Engineering Manager's signature indicates approval of the design or change as conforming to the customer's requirements. It also indicates that the effect of the change on any design qualifications has been properly evaluated. The QA signature affirms that design conformance (as indicated by the Engineering Manager's signature) has been verified, and that the applicable quality requirements have been included.

Approved specifications, specification changes, and drawings are distributed by Manufacturing Information to each using department according to a written distribution list. This distribution is accompanied by a Transmittal Letter (Exhibit 6-6) which describes the method of handling newly issued and superseded specifications. Unless otherwise stated revised specifications become effective upon distribution.

Details of the Product Specification System are given in Specifications 222-1-0 through 222-13-0.

6.2.2.1 Marked-up Specifications

Marked-up specifications are acceptable for use only if they carry the file number of the PC authorizing the change and the signature of the cognizant engineer or QA engineer.

Notes, comments, and explanations (for example, a note telling where to find a required gage) which do not alter any specified information are acceptable if signed and dated.

6.3 Document Control Options

When stated in the applicable QA Plan the following features will be incorporated in the QA Program.

6.3.1 Valid Document List

A VDL is a list of the specifications applicable to a tube type and the revision(s) currently approved for use. It is maintained by Manufacturing Information in accordance with Specification 222-11-0.

6.3.2 Document Control Index

A DCI is a partial or complete list of quality documents applicable to a contract, and the revision status of each. It is more general than a VDL, although it may include VDL's by reference. The form and contents of the DCI are as agreed with the customer. It is maintained by Manufacturing Information in accordance with Specification 222-11-0.

6.3.3 Break-In Point

A space on the PC form is provided to specify a break-in point when required by contract or when considered necessary by the originator.

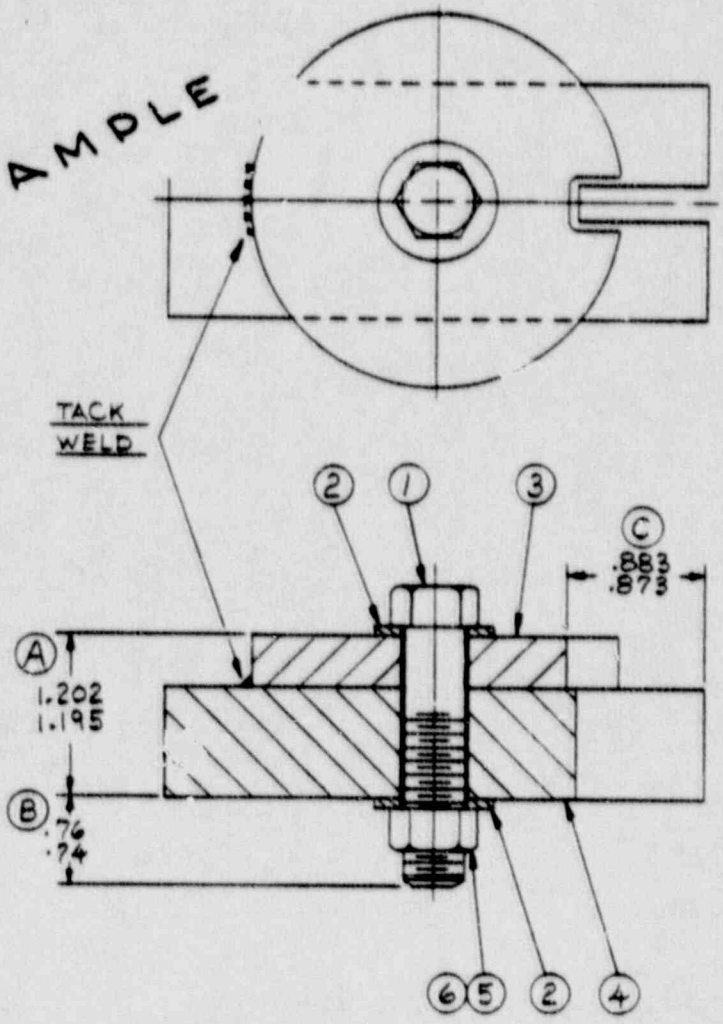
EXHIBIT 6-1
DRAWING

PROPRIETARY TO
IMAGING & SENSING TECHNOLOGY CORPORATION
HORSEHEADS, NY

SPEC. NO. 35-12345-3
DATE 4-30-79 SUPS DATE 9-18-78 PAGE

DIST SUBJECT TYPICAL ASSEM.

IT.	MATERIAL	RQ	REF. DWG.	#	OPERATION	PROD. SPEC.	SCH.
1.	BOLT, HEX HD.	1	42-11006	1.	DEGREASE IT'S. 1, 2, 3 & 5.	202-1-3C	1.5
2.	WASHER	2	42-10789	2.	CLEAN IT. 4.	202-1-2F	5.12
3.	SPACER	1	40-4409	3.	ASSEM. & INSPECT.	T35-12345	
4.	CLAMP PLATE	1	40-4393				
5.	NUT	1	42-11067				
* 6.	NEOLUBE	X	939-00000-03				



NOTES
ALL DIM IN INCHES
* DENOTES CHANGE
SCALE 1-1

REV	P.C. NO.	DRWN	CHKD	APPR	DATE
3	10917	RN			4-30-79

EXHIBIT 6-2
P-SHEET

DIST

PROPRIETARY TO
IMAGING & SENSING TECHNOLOGY CORPORATION
HORSEHEADS, NY

SPEC NO P 35-12345

DRAWN DATE	ISSUE DATE	PAGE
4.30.79	9.15.78	1

SUBJECT: TYPICAL ASSEMBLY

	ITEM	DESCRIPTION & MATERIALS	REQ	REF DWG
	1.	Hex Head Bolt	1	42-11006
	2.	Washer	2	42-10789
	3.	Spacer	1	40-4409
	4.	Clamp plate	1	40-4393
	5.	Nut	1	42-11062
*	6.	Neolube	X	939-00000-03

SAMPLE

OPER NO	OPERATION	PRO SPEC	SCHED.
1.0	Degrease items 1, 2, 3, and 5	202-1-3C	1.5
2.0	Clean item 4	202-1-2F	5.12
3.0	Assemble and Inspect	T35-12345	

* CHANGE

REV	P C NO	DRWN	CHKD	APPR	DATE
B	109-7	[illegible]	[illegible]	RFB	4 30 79

EXHIBIT 6-3
TRAVELER

DIST

PROPRIETARY TO
IMAGING & SENSING TECHNOLOGY CORPORATION
HORSEHEADS, NY

T 35-12345
SPEC. NO.

TUBE TYPE 24073 S/N

SUBJECT TYPICAL ASSEMBLY

DATE	SUPV. DATE	PAGE
4-30-79	7-12-77	

Op. No.	Operation	Operator Sign & Date
1.0	Assemble	
* 1.1	Apply Item 6 to threads of Item 3	
* 1.2	Assemble Items 1-5 per drawing and tighten finger tight.	
* 1.3	Use torque wrench to tighten to 15 to 20 inch pounds.	
2.0	Tack weld Item 3 to Item 4 213-3-8, Sch. 10	
3.0	Continuity Test	
3.1	Check resistance between Items 1 and 5 203-8-38	
	Record Value Limit 2.2×10^{12} Ohms max. X10	
4.0	QC Hold: QC procedure 10-2 and QA35-12345	
	Record Dim. & actual value	

SAMPLE

* CHANGE

REV	P.C. NO.	DRWN	CHKD	APPR	DATE
B	1097	[illegible]	[illegible]	RFB	4-30-79

EXHIBIT 6-4
PROCESS SPEC.

PROPRIETARY TO
IMAGING & SENSING TECHNOLOGY CORPORATION
HORSEHEADS, NY

DATE 3-23-81 PAGE 1
PROCESS SPEC NO RS 212-250-2
SUPERSEDED DATE 8-28-79

SUBJECT: PENETRANT TEST FOR SURFACE FLAWS

1. PURPOSE

1.1 To describe a method of nondestructive examination which provides for the detection of discontinuities open to the surface in ferrous and non-ferrous materials which are nonporous.

1.2 To establish acceptance standards for such discontinuities.

2. SCOPE

* 2.1 This specification describes only the visible dye penetrant (solvent-removable) test method and is in accordance with ASME Code Section III for Class 1, 2(3 and MC Components and SNT-TC-1A-1

3. SAFETY REQUIREMENTS

3.1 Cleaners or developer may contain ch carbons. Prolonged exposure to high concentration of e irritation to the eyes and respiratory tract. Use wi ilation. Avoid prolonged or repeated contact with ab of vapor. Do not take internally.

3.2 Penetrant or develop flammable material. Keep away from heat, sparks a es.

3.3 Refer to product labels f additional precautionary and handling information.

4. DEFINITIONS

4.1 Family of Materials - The related components of the penetrant test kit including cleaners, penetrant and developer, manufactured by one supplier and having been proven to complement one another.

4.2 Indication - The visible presence of penetrant in the dried developer.

4.3 Non-relevant Indication - An indication resulting from a condition not associated with a material discontinuity.

* CHANGE

E 1896 M RS DW 3-30-81

EXHIBIT 6-5
PRODUCT CHANGE

HF-2042A

PRODUCT CHANGE

Imaging and Sensing Technology Corporation
Westinghouse Circle Horseheads, NY 14845

DATE REC. APR 27 1979 P.C. No. 10917
DATE ISSUED _____ FILE No. QC-4321

SUBJECT 35-12345 TYPICAL ASSEMBLY PROD. CODE 75
AFFECTED TYPES 24078

This change will affect: Mat'l. yield ☐ Output per man hour ☐ Neither ☒ Unknown ☐
B.I.P., IF REQUIRED BY CONTRACT N/A

ON SPEC. NO. 35-12345-1, P35-12345
CHANGE Add item 6: Neolube 939-00000-03 (see marked-up prints attached)

☐ Stock Not Affected
☒ Existing Stock Remains Usable
☐ Dispose of Existing Stock and Cancel Orders. Give Quantity and Value
☐ _____

ON SPEC. NO. T35-12345
CHANGE Add new operation 1.1: Apply item 6 to threads of item 3. Renumber other operations accordingly. (see marked-up print attached)

☐ Stock Not Affected
☒ Existing Stock Remains Usable
☐ Dispose of Existing Stock and Cancel Orders. Give Quantity and Value
☐ _____

ON SPEC. NO. _____
CHANGE _____

SAMPLE

☐ Stock Not Affected
☐ Existing Stock Remains Usable
☐ Dispose of Existing Stock and Cancel Orders. Give Quantity and Value
☐ _____

SPECIAL INSTRUCTIONS none

ORIGINATED BY: E.L. Dana 4/1/79
VERIFIED BY: [illegible] 4/2/79
ENDORSED BY: M. Cole 4/2/79
MAT'L. CONTROL: L.J. Bohnert 4/16/79
QUAL. CONTROL: R.E. Krumbick 4/24/79
R. Underwood 4/27/79

JUSTIFICATION OF CHANGE
Increased ease of disassembly. No effect on function or reliability -- see test results in Figuring Book 54321

ROUTING	P.C. COMPLETED	BMR COMPLETED
	R. Wilkerson 4-28-79	WEm 4/30/79

If you do not approve, return to originator indicating reason.

PAGE ONE OF 1 PAGES

EXHIBIT 6-6
TRANSMITTAL LETTER

HF-3043 Page 1 of 2

80-1	83	448	6/21/88
DIST. CODE	PROD. CODE	LETTER NO.	DATE

IMAGING AND SENSING TECHNOLOGY CORPORATION
HORSEHEADS, NEW YORK
MANUFACTURING INFORMATION DEPARTMENT

Specifications attached are for the files in your department and should be filed PROMPTLY IN ORDER ON RECEIPT and the superseded pages removed and DESTROYED BY TEARING INTO FOUR PARTS and discarding. Specifications are the property of the IMAGING AND SENSING TECHNOLOGY CORPORATION and shall be treated as proprietary information.

EXAMPLE

DATE HAND CARRIED JUN 22 1988

RECEIVED BY John Smith 6/22/88

End of Section

7.0 PROCUREMENT CONTROL

7.1 Procurement Document Control

Procurement of parts and materials, except those used in Engineering Lab Products, is initiated by a Planner/Buyer, using a requisition which states the applicable specification number, quantity, and date needed. All technical and quality requirements are contained in the specification, controlled in accordance with Section 6. The purchase order itself contains no quality information other than the specification number and any applicable information from Section 7.1.2. The Planner/Buyer selects a vendor in accordance with Section 7.2 and forwards the completed purchase order along with copies of the applicable specifications (unless the vendor already has them). A sample purchase order is shown in Exhibit 7-1. Materials/MIS sends a copy of the approved purchase order to Receiving, which provides further copies as needed for item identification and incoming inspection.

Changes in purchase order technical and quality requirements are by a Purchase Order Change Notice (Exhibit 7-2). The same approvals are required and processing is the same as processing of an original Purchase Order. Copies of the approved change notice are sent to Receiving and Inspection by Materials/MIS.

Should it be necessary to use a marked-up print or sketch, QA signs the print to document approval. The Planner/Buyer sends a copy of the signed print to Incoming Inspection along with a copy of the purchase order or change notice. The use of marked-up prints for procurement is discouraged.

7.1.1 Engineering Lab Procurements

Procurement of parts and materials for Engineering Lab products is initiated by Engineering. The use of sketches and descriptions not controlled by the Product Specification System is permitted.

7.1.1.1 When stated in the applicable QA Plan, the purchase orders for a specific Engineering Lab project are routed to QA Engineering for review and signoff before placement.

7.1.2 Government Source Inspection

Materials/MIS sends an unpriced copy of each purchase order that is marked with a Government contract number to the Government QAR within one week of issue. Materials/MIS adds a requirement for Government source inspection to the order if the QAR so advises them.

7.1.3 Certificates of Compliance

When a certificate of compliance or mill test report is required for a material, the information to be supplied is described in the specification to which the material is ordered. When a certificate of compliance is required for a fabricated part, specification 212-248-1 or 212-248-2 is referenced on the drawing. Copies of 212-248-1 or 212-248-2 and forms ET-2074 and ET-2075 are sent with the order as applicable.

7.2 Vendor Selection and Control

7.2.1 Selection

As a part of customer order and specification review, Engineering and QA identify items for which greater vendor control is required than can be provided by incoming inspection alone. As a result of these reviews the QA Manager determines whether vendors of certain items or classes of items are to be formally qualified prior to acceptance of such items, using a Vendor Evaluation (Exhibit 7-3). He arranges for the qualification requirement to be stated in the applicable specifications and selects an evaluation method.

Some of the evaluation methods used are QA surveys, engineering evaluations, QA Manual reviews, reviews of vendor history for similar items, and inspection of qualification samples. The completed evaluation is approved by the QA Manager.

When the QA Manager does not request special vendor controls the selection of vendors is at the discretion of Materials/MIS, subject to review of vendor history and the advice of QA, Engineering, and other interested functions.

7.2.1.1 More extensive use is made of formal vendor qualifications when so stated in the applicable QA Plan.

7.2.2 Control

All incoming production items are inspected in accordance with Section 10. Engineering Lab items are inspected if the purchase order so requires. In addition, the QA Manager specifies source inspection, periodic vendor audits (Section 17), or other controls as appropriate.

7.2.3 Vendor Rating

To assist in evaluating supplier performance, Inspection issues monthly computerized vendor history reports to the managers of QA and Purchasing. Six-month summary reports are also provided. Each report lists the drawing number, supplier, inspection results, and disposition of each lot received during the period. Each report includes a numerical rating based on inspection results and lot dispositions for each active vendor. Low-rated vendors are flagged in the report for QA Manager review (see Section 15). The QA Manager may refuse to accept shipments from any vendor whose quality history he considers unacceptable.

EXHIBIT 7-1
PURCHASE ORDER

IMAGING AND SENSING TECHNOLOGY CORPORATION
WESTINGHOUSE CIRCLE
HORSEHEADS, NY 14845

PURCHASE ORDER

DATE: 06-15-88 | ORDER NUMBER: 04V 78058

ORDER PLACED WITH:
01555
ELMIRA ELECTRONICS INC
PO BOX 4230 S SIDE
ELMIRA NY 14904

SHIP AND BILL TO: IMAGING AND SENSING TECHNOLOGY CORPORATION
FRT. TRUCK OR UPS
MAIL OR P.P. WESTINGHOUSE CIRCLE HORSEHEADS, N.Y. 14845

QUANTITY	DESCRIPTION (NO. OF PART, STYLE, NO. DWG. & ITEM, P.O. SPEC. ETC.)	UNIT PRICE	TOTAL PRICE
15 PIECES	036-03662-04 BULB FLANGE	83.90	

SHIPMENTS WILL NOT BE ACCEPTED BY ISTC IF RECEIVED EARLIER THAN 10 DAYS PRIOR TO THE REQUIRED DATE INDICATED ON THE FACE OF THE ORDER. ISTC ORDER NUMBER MUST APPEAR ON PACKING SLIP.

NEW YORK STATE DIRECT PAY PERMIT NO. 00000 - REGISTRATION NO. 25-0677540

F.O.B.: DESTINATION | FREIGHT CHARGE SEE NOTE 3 | CASH TERMS: VENDOR PAYS | NET 30 DAYS

ADDRESS ALL CORRESPONDENCE TO BUYER: D. CROOKER

DATE REQUIRED IN OUR PLANT: 07-01-88

SHIP VIA (DO NOT INSURE)
UPS IF AVAILABLE TO 50 LBS
IF UPS IS NOT AVAILABLE PARCEL POST UP TO 25 LBS
ALL OTHERS TRUCK

AUTHORIZED BY: T. VAUGHN
MGR. OF PURCHASING & TRAFFIC

STOREROOM USE - BIN LOCATION

PRESENT _____ TOTAL QUANTITY ___
NEW (SEE BELOW) _____ BINNED BY ___
NO. CONTAINERS _____
QUANTITY EACH _____
IF NEW - DID YOU CHA _____

SAMPLE

UNIT COST | TOTAL COST

VENDOR NUMBER 01555

DELIVER TO SPECIFIC LOCATION

WRITTEN BY AND DATE: D CROOKER DC 06-15-88
DEPT

CHARGE ACCOUNT: 380-12711
TOOL CONTRACT NO | COMM. CODE

ELMIRA ELECTRONICS INC 036-03662-04 380-12711 04V- 78058

ITEM NO	REC NO	DATE REC'D	CARRIER OR CAR NO	NO. & KIND OF CONTAINERS	LOCATION	CARRIER'S WEIGHT	P - PPD C - COLL	RECEIVED NET WT	RECEIVED QUANTITY	BALANCE DUE

RECEIVING COPY

EXHIBIT 7-2
CHANGE NOTICE

PURCHASE ORDER CHANGE NOTICE

FORM 48307 VENDOR'S COPY

FR IMAGING AND SENSING TECHNOLOGY CORPORATION
WESTINGHOUSE CIRCLE
HORSEHEADS, NY 14845 06/09/88

THIS CHANGE NOTICE APPLIES TO:

PURCHASE ORDER NO.	DATED
14C 56518	05-02-88

TO
* BIW CABLE SYSTEMS INC
20 JE WARNER BLVD
N DIGHTON , MA 02764

CHANGE NOTICE

CHANGE TO:

"QA APPROVAL" W. Ehrenberg 6/13/88

CANCEL ORDER IN FULL
VENDOR RETURNED ORDER Q.A. AUDIT NOT
ACCEPTABLE TO B.I.W.

CONFIRMING PHONE CONVERSATION 5-16-88
WITH J OBERSCHELP

PURCHASING DEPT. AUTHORIZATION BY
L. VAUGHN

Please acknowledge receipt and acceptance of this Change Notice by completely filling in and returning Acknowledgment to at the above address.

IMAGING AND SENSING TECHNOLOGY CORPORATION

MARK FOR ATTENTION OF

D. CRITTENDEN BUYER

TELEPHONE NO. (607) 796-3332

EXHIBIT 7-3
VENDOR EVALUATION FORM

IMAGING AND SENSING TECHNOLOGY CORPORATION VENDOR EVALUATION
ET23B003

VENDOR NAME: Typical Corporation
VENDOR NUMBER: 13540
STREET: 101 Main St.
CITY & STATE: Metropolis, NY 14805
ITEMS SUPPLIED: Stainless steel bar, rod, & strip

Clark Kent, QA Mgr, (607) 371-2000

APPLICABLE CODES & STANDARDS
- [X] ASME Code, Rev. winter 1980
- [ ] RDT F2-2 Rev. ______
- [ ] ______ Rev. ______
- [ ] ______ Rev. ______

STATUS
- [X] Approved
- [ ] Conditionally Approved
- [ ] Inactive
- [ ] Disapproved

BASIS OF EVALUATION (attach documentation)
- [ ] Engineering Evaluation
- [ ] Questionnaire
- [ ] Survey
- [X] Audit
- [X] Inspection History -- vendor rating .97 as of 12/31/80
- [ ] Outside Evaluation by ______
- [ ] Other ______

EVALUATION CHECKLIST
- [X] Checklist attached
- [ ] Checklist below (cross out items not applicable)

ADEQUATE	INADEQUATE	Item
		Organization
		QA Program
		Design Control
		Procurement Document Control
		Instructions, Procedures, & Dwgs.
		Document Control
		Purchases
		Identification & Control of Items
		Special Processes
		Inspection
		Test
		Test & Measuring Equipment
		Handling, Storage & Shipping
		Inspection & Test Status
		Nonconforming Items
		Corrective Action
		Records
		Audits

REASON FOR EVALUATION
annual audit

COMMENTS:
a well-organized, well-documented system which is in firm control. QA mgr. is mild-mannered but comes through when needed.

SAMPLE

QC SIGNATURE	DATE
[signature]	3-23-81

ORIGINATOR SIGNATURE	DATE	PURCHASING SIGNATURE	DATE
E L Dana	3·16·81	[signature]	3/23/81

End of Section

8.0 MATERIAL IDENTIFICATION & CONTROL

8.1 Purchased Items

Purchased items enter through the Receiving Department. Receiving identifies each package or container by marking it with the purchase order number and date received. If marking is impractical tags with the same information are used. After posting the date and quantity received to the purchase order, Receiving attaches two copies of the purchase order to the shipment. These are used as described in Section 10 to identify inspection status.

8.2 Items in the Storeroom

Purchased items are accepted by the Storeroom only if accompanied by a copy of the purchase order marked with the acceptance stamp, or other evidence of acceptance by Inspection. Such items must also be identified by specification number, purchase order number and date received as applicable. Items received from within the plant must have equivalent identification and evidence of inspection. The Storeroom shelves the item after tagging it by identification number, purchase order, date received, PDS number (where applicable) and account number. Access to the Storeroom is controlled to prevent the addition or removal of items without the proper authorization and documentation. When raw material is issued for parts making, the identification is transferred to a tag accompanying the issue, in accordance with the Production Control Manual. This tag stays with the material until it is used up. Unused raw material returned to Storeroom must have the original issue tag attached to be accepted. In cases where original tag has been lost or destroyed, the material is reinspected before restocking. Items are issued on a "First-In-First-Out" basis. Parts issued for assembly are identified by tags, labels, or containers marked with the part number and revision.

8.3 Items in Process

Items in process are kept marked or otherwise identified by part number. Items being transferred from one manufacturing department to another are identified by a Delivery Report (Exhibit 8-1).

End items are kept marked or otherwise identified by tube type number and a serial or lot number.

8.4 Traceable Items

Special identification requirements such as individual serial numbers or lot traceability are stated in the specification for the item.

8.5 Inspection Status

The inspection and test status of items is identified as described in Section 10. Nonconforming items are identified in accordance with Section 14.

8.6 Age-Sensitive Materials

Age sensitive materials are identified and controlled in accordance with QC Procedure 5-9 to preclude the use of materials whose shelf life has expired.

EXHIBIT 8-1
DELIVERY REPORT

DELIVER MATERIAL **10099**

TO SEC. / WHSE.	FROM SEC.	PART NO.
Penet.	Feeder	35-12345-3

QUANTITY	TUBE TYPE	SCHEDULE / ORDER NO.
47	24073	

NO. OF CONTAINERS	LOT NO.	DESIGNATION DESCRIPTION
1		TYPICAL ITEM

ISSUED BY & DATE	DATE	INSPECTED BY & DATE
AJH 3/2/81		ISTC 32 3-3-81

REC'D. BY & DATE	POSTED BY & DATE		TOTAL COST
CB 3/4/81			

SAMPLE

DELIVERY REPORT FORM 28743-5A

PLANNING & SCHEDULING

End of Section

9.0 PROCESS CONTROL

9.1 General

All in-house manufacturing processes are controlled by specifications, described in Section 6. The type of specification and the amount of detail used depend on the nature of the process, its potential effect on final conformance, and contractual requirements. Proper equipment, record keeping, environmental conditions, and verification that prerequisites have been satisfied are among the matters considered when a specification is generated. The Product Change system (Section 6) assures that all process control decisions receive a complete, timely review.

9.1.1 Assembly and Test Operations

Piece parts are assembled into finished, tested product in departments grouped according to product line. These departments receive parts and subassemblies from the Storeroom, have them cleaned, do the specified assembly, processing, and manufacturing check operations, and perform acceptance tests. The tested product is then delivered to QA for final inspection in accordance with Section 10. In each department process controls such as lot acceptance inspections of subassemblies, operator examinations, patrol and process inspections, travelers, and process auditing are specified where appropriate.

9.1.2 Engineering Lab Products

For Engineering Lab Products the applicable QA Plan determines the extent and formality of process controls.

9.1.3 Special Processes

Special processes which cannot be directly evaluated by inspection or test are described in detailed process specifications. Such processes used by the Company include welding, brazing, and NDE. When required by contract the qualifications of such processes and the personnel performing them are certified in writing. The qualification method, acceptance criteria, frequency of qualification, documentation and other details are described in a QC procedure or process specification. Re-examination of a certified person may be requested at any time if there is reason to question the qualification. Personnel failing an examination are not allowed to perform the operation in question until they have undergone corrective training and passed a re-examination. Certification programs are administered by the QA Manager.

When process or operator certification is required, the requirement is identified by:

- a statement in the procedure or process specification that certification is required in accordance with (procedure number). This is the preferred method.

- a statement in the traveler or inspection instruction that a certified operator is required. This method may be used when certification is required only for certain applications of a procedure.

- a statement in a quality plan or manual, when certification is required only for a specific project or product line.

- a letter to the affected supervisors, where no other method is appropriate or as a temporary measure.

End of Section

10.0 INSPECTION & TEST

10.1 Inspection--General

Inspections to verify conformance to specified requirements are performed by inspectors reporting to QA on incoming items, items being transferred between departments, in-process items, and finished items. At the convenience of the Inspector, inspections may be performed at fixed inspection stations or at the work location. Each inspection station has a controlled hold area available for items awaiting inspection. Inspections are performed using a specified instruction such as a QA sheet (Exhibit 10-3), RMIS (Exhibit 10-2), traveler, or process specification, (all controlled in accordance with Section 6) or, if none, Form ET-2961/2962 (Exhibit 10-6) signed by QA Engineering. If the instruction is marked VDL the inspector checks the Valid Document List to make sure he is working to the current approved revision.

When contractually permitted, items for which no inspection instruction yet exists may be inspected at the discretion of the Inspection Supervisor. In such cases every requirement of the drawing is inspected to 1.0% level II of MIL STD 105. The Inspection Supervisor notifies QA Engineering by a Problem Report (Exhibit 10-4) or by initiating a suitable PC that inspection instructions must be specified before any additional lots will be accepted.

For items with travelers, inspection results are documented by the inspector's sign off on the traveler or as specified therein. For other items, inspection results are documented on Inspection Record cards (Exhibit 10-1). The Inspection Record is filled out by the inspector, who signs it to indicate completion of the inspection. It includes:

- drawing number and revision, heat number, serial number, quantity, and other item identification as applicable.
- supplier.
- sampling plan.
- date received (Incoming Inspection) or date inspected (elsewhere).
- purchase order/sales ticket/mfg. lot number as applicable.
- number defective.
- MRN number, if applicable.
- disposition.
- copies of Material Test Reports and other applicable documents.

Details are given in QC Procedure 4-1.

Any item found to be nonconforming is identified and disposed of in accordance with Section 14.

The Inspection Supervisor may allow the release of items to Production prior to completion of inspection only if the requirements of QC Procedure 4-15 have been met.

10.1.1 Inspection Status Indication

The method of indicating the inspection status of items at each inspection station is given in Sections 10.2, 10.3, 10.4 and 14.

Unless otherwise stated inspection status markings and paper work look like those illustrated in Exhibit 10-7.

If inspection stamps are used the QA Manager issues them to inspectors and other QA personnel responsible for status identification, and recalls them whenever those personnel leave QA. The number of a recalled stamp is not reissued to another inspector for at least one year after recall. If a stamp is lost, use of the number is discontinued, and the QA Manager issues a letter to alert all supervisors. The QA Manager maintains a list of active, lost, and recalled stamp numbers with the unissued stamps in the QA office.

10.1.2 Sampling Plans

Sampling inspection, when used, is performed in accordance with MIL STD-105D with combined defects for each AQL. Single sampling is used except that multiple sampling may be substituted at the discretion of the Inspection Supervisor. The inspection record for a multiple sample is marked "MULTIPLE SAMPLE" or equivalent. The sampling AQL and level are specified by QA Engineering using the Classification of Defects method described in MIL STD-105D. Defect classifications have been established as follows:

Critical Defect -- a critical defect is one that could result in hazardous or unsafe conditions for individuals using or maintaining the product or prevent performance of its principal function. Inspect 100% for such defects.

Major Defects -- a major defect is a defect, other than critical, that could result in failure, or materially reduce the usability of the unit of product for its intended purpose. The normal AQL is 1.0%.

Minor Defects -- A minor defect is one that does not materially reduce the usability of the unit of product for its intended purpose, or is a departure from established standards having no significant bearing on the effective use or operation of the unit. The normal AQL is 2.5%.

Control Defects -- no significant effect on form, fit, function, or reliability of the end item; may cause minor inconvenience at assembly or "hardware" scrap. The normal AQL is 6.5% or "one piece per lot".

Other classifications and AQL's may be established by QA Engineering as appropriate. The Inspection Supervisor is permitted to increase sample size or frequency temporarily for any specified characteristic at his discretion. Vendors with excellent history may qualify for skip-lot inspection in accordance with QCP 4-13.

10.1.3 Interpretation of Limits

Unless otherwise specified, the limits specified for test and inspection characteristics are considered to be absolute; for example, decimal limits are treated as if the last digit were followed by an infinite number of zeros. A measured value which exceeds the specified limit, however slightly, signifies nonconformance with the limit.

10.2 Incoming Inspection

Items received for production use are routed to Inspection with copies of the purchase order (see Section 8). Before proceeding the inspector removes one copy of the PO and verifies that copies of any applicable change notices, attachments referred to in the purchase order, and the applicable inspection instructions are available. The inspector checks these documents for statements modifying the drawing or other specified requirements. If such statements are not covered by a QA Engineering sign off the items are held and QA Engineering notified. The items are inspected to the specification and revision listed on the purchase order and the associated inspection instruction. Tests to be performed outside Inspection are controlled by QC Procedure 4-4 (for the C&P Lab) or by use of a Factory Control (ET-1665) (for other areas of the factory).

Inspection status of items awaiting completion of inspection is by their location (size permitting) in a controlled area, and by the absence of an inspection sign off on the attached copy of the Purchase Order. When the item is accepted the inspector marks the copy in accordance with Exhibit 10-7 to indicate that the items are released. Nonconforming items are identified in accordance with Exhibit 10-7 and Section 14.

10.2.1 Engineering Items

Unless the applicable QA plan states otherwise, items procured by Engineering are delivered to the originator of the purchase order. He may request inspection of the items for information only, to a QA if it exists or else to handwritten instructions. The inspector records the inspection results in accordance with Section 10.1.

10.3 In-process Inspection

When items are ready to be forwarded from one manufacturing department to another they are delivered to a QA inspection station. The inspector inspects the items as directed by the applicable QA-sheet or other specified procedure and records the results on the inspection record card.

If the lot conforms to the requirements of the applicable specification and inspection instruction, the inspector marks the Delivery Report (Exhibit 8-1) in accordance with Exhibit 10-7 to identify the items as accepted.

Inspection status of such items is identified by the inspection sign off on the Delivery Report. In addition, each fixed inspection station has designated locations for items which are accepted, rejected, and awaiting inspection. This identification is retained until the items have been delivered to the receiving department.

Within each manufacturing department additional inspections of the following types are specified as needed for effective process control.

10.3.1 Operator Quality Examinations (OQ Specifications)

Operator Quality (OQ) examinations are carried out in a number of in-process assembly and test areas. These product quality examinations are performed to formal specifications which detail the sample size and the operations.

Operator examinations differ from QA inspections in that they are performed by manufacturing production personnel.

The format and the extent of documentation of OQ examination results is the prerogative of the assembly or test department foreman. Product acceptability is verified by subsequent QA inspections and acceptance tests (below).

10.3.2 In-process Lot/Piece Acceptance Inspections

In-process lot/piece inspections are performed like lot acceptance inspections, the primary difference being in the form and flow of inspection documentation. Contractual requirements for traceability and configuration controls vary widely; consequently in-process inspection plans also vary widely. However, the essential documentation needed to provide objective evidence of in-process quality meets the guidelines established by MIL-Q-9858A.

10.4 Final Inspection and Test

10.4.1 Acceptance Test

Each completed item is electrically tested by a manufacturing test operator in accordance with the applicable Company, MIL E-1, customer, and other requirements. The specifications controlling the testing give the prerequisites, test conditions, procedure, equipment, limits, and other requirements. The test operator initials and dates the test data, which is identified by the serial number or lot number of the finished item and stored in a location determined by Manufacturing. This data identifies the test status of the item.

10.4.2 Final Inspection

After 100% electrical testing is finished Inspection selects samples for all specified visual and mechanical inspections, life tests, environmental tests, and sampled electrical tests. The items are moved (size permitting) into an Inspection hold area until these operations have been satisfactorily completed.

End items are inspected for conformance to the current revision of the Final Inspection Outline (150- Drawing) for the tube type, and for the presence of all required documentation, using the associated QA Sheet or other applicable inspection instructions.

If the items are accepted the inspector marks as shown in Exhibit 10-7 the "Inspected by" block of the Delivery Report (Exhibit 8-1) supplied with the items by Manufacturing. The delivery report identifies the items as accepted until they have been delivered to the Warehouse for shipment or storage. The inspection status of items in Final Inspection may be further identified by copies of Form ET-1663 (Exhibit 10-5).

10.4.3 Final Inspection/Test Options

The following options apply when stated in the applicable QA plan.

10.4.3.1 Certificate of Conformance or customer release form signed by the QA Manager or his designee.

10.4.3.2 Review and sign off of final inspection and test data by Engineering and QA Engineering.

10.4.3.3 Customer Hold (see Section 11) for data review and product inspection before release to the Warehouse.

10.4.3.4 Certification of personnel performing final inspections and acceptance tests.

10.4.3.5 Witnessing of a specified proportion of the acceptance tests by QA personnel.

10.4.3.6 Inspection of packaging in accordance with Section 13.

EXHIBIT 10-1
INSPECTION RECORD

INSPECTION RECORD
ST-QAD-43

DISPOSITION CODES:
1 -- MEETS ALL SPECIFIED REQUIREMENTS
2 -- FIT FOR USE, MINOR DEVIATIONS DOCUMENTED
3 -- REQUIRES REWORK/REPAIR/SORTING BEFORE USE
4 -- NOT USABLE. RETURN TO SUPPLIER

DESCRIPTION: Bulkhead Blank Penetration ASME Code
SPEC. NO.: 40-3823
AQL: SR QA LEVEL: SR QA
SUPPLIER: Monoff Steel
USER: 100-12711

DATE	LOT IDENTITY	SPEC REV	LOT SIZE	SAMPLE SIZE	SAMPLE AC	SAMPLE RE	NO. DEF.	STAMP	NOTES	LOT DISPOSITION	INSPECTOR'S SIGNATURE AND DATE CLEARED
6-3-83	64082	01	8	N/A			0	STC	Goods used: 024-599, 024-599 Heat No. B714601, QA40-3823 Rev E	1	C. Kent 7-3-83
8-9-83	64082	01	4	N/A			4	STC	Goods used: 024-599, 024-599 Heat No. B717004, MRN 13944, QA40-3823 Rev E	4	C Kent 8-18-83

SAMPLE

EXHIBIT 10-2
RMIS

Form 49

PROPRIETARY TO
IMAGING & SENSING TECHNOLOGY CORPORATION
HORSEHEADS, NY

Raw Material Inspection Specification P.D.S. 13406CA thru CE
(Electro Static)

SAMPLE

OFHC COPPER BARS

1. INSPECTION

1.1 Dimensions

1.1.1 Permissible variations - check at least three units for dimensions.

1.2 Finish - reject for scale, roughness, slivers, seams, cracks and other surface defects.

1.3 Sampling - send 1/4" of 1 bar from each box received to C & P Laboratory.

1.3.1 On copper bar purchased from copper mills such as Anaconda, Revere, etc. cut a sample for C & P from one bar only.

1.4 For IBM Numbers 906-10890-08 and 906-10890-13 send 1/8 thick wafer to factory engineer. NOTE: For these items only factory test is required.

2. LABORATORY TEST

2.1 Physical properties and tests

2.1.1 Microscopic examination - after annealing in hydrogen atmosphere for 30 minutes at 800°C. Check at 100 X to ASTM F-68 limits.

3. FACTORY TEST

3.1 906-10890-08 and 906-10890-13 will be sent to factory engineer to determine oxygen free criterion. This to consist of subjecting the wafer to an ammogas bake at approximately 900°C and then bending the wafer.

4. STORAGE, MARKING, DATA HANDLING: -None

* CHANGE [illegible] 10/19/79 RMIS 13406CA thru CE

APPROV [illegible] CHEMICAL & PHYS. D.C.B. 10/20/79

EXHIBIT 10-3
QA-SHEET

DIST

PROPRIETARY TO
IMAGING & SENSING TECHNOLOGY CORPORATION
HORSEHEADS, NY

QA 35-12345

APPR. NO.	DATE	SUB DATE	SHEET
	9-18-78	7-4-78	1

SUBJECT
TYPICAL ASSEMBLY

ACCEPTANCE QUALITY CONTROL

OPER NO	INSPECTION OPERATION	PROCESS SPEC	INSTRUMENT	AQL	LEVEL	REMARKS
1.0	MAJOR DEFECTS			1.0	II	
1.1	Dim. A		Micrometer			
1.2	Dim. B, C		Depth Mic.			Record actual value of Dim. C on traveler
1.3	Workmanship, appearance of welds		Visual			

SAMPLE

REV	P C NO	DRWN	CHKD	APPR	DATE
2	10688	N M		[illegible]	9-18-78

* CHANGE

EXHIBIT 10-4
PROBLEM REPORT

ET-2555 QA INSPECTION PROBLEM REPORT

PART NO. 150-34411 SECTION 024

PROBLEM

No QA

SAMPLE

SIGNATURE B Elmquist DATE 4-22-82

EXHIBIT 10-5
ET-1663

ET 1663

TYPE LM 393 LOT # F2-17 DATE 4-28-92
LOT SIZE 16

	SAMPLE SIZE	RESULT	INSPECTOR	DATE
LIFE	1	OK	RP	4/10-5-92
DESIGN ELECT.	1	OK	RP	4-14-92
DESIGN VIB.	1	OK	RP	4-15-92
DESIGN SHOCK	1	OK	RP	4-16-92
DESIGN TORQUE	15/A			
DROP	2'/A			
ELECT. TEST	16	OK	[illegible]	4-25-92
FINAL INSP	8	OK	B.S.	4-28-92

SAMPLE

EXHIBIT 10-6
ET-2961

PRELIMINARY INSPECTION INSTRUCTION
FOR PARTS AND MATERIALS
IMAGING AND SENSING TECHNOLOGY CORP.
Horseheads NY ET-2961R2

USE FOR ONE PURCHASE ORDER ONLY
UNLESS EXTENDED IN WRITING.

Part/sketch Nr. N/A
Purchase Order Nr. 95C12345
Vendor MANOFF STEEL CORP.
Description KRYPTONITE BAR

1.0 DIMENSIONS AND VISUAL INSPECTION. AQL 2.5 level S3 except as noted.

	Characteristic	Method	Comments
[X] 1.1 Dimensions	OD, length	see QCP 4-8	
[ ] 1.2 One Piece per Lot (AQL not applicable)			
[X] 1.3 Workmanship & Appearance	clean & free from scratches heat no. marked on each piece	visual	
[ ] 1.4 Conformance to Description--visual			

2.0 CERTIFICATIONS AND TEST DATA
[ ] 2.1 Verify presence per purchase order require
[X] 2.2 Send with ET-1665 and PO to: L. Luther MS 13B

SAMPLE

[X] 3.0 CMP LAB OR FACTORY TESTS
Lab analysis per RMIS 56789CK.
Send 6 inch sample to L. Luther for field testing.

[ ] Send samples and ET-1665 to: _____ MS _____

4.0 RECORD RETENTION, in addition to normal retention

RECORD	KEEP	SEND TO:
Purchase Order	[X]	[ ]
This sheet	[X]	[ ]
Drawings & Sketches	[ ]	MS _____
Certifications	[X]	[ ]
_____	[ ]	[ ]

Written by E Dana date 4.1.85

EXHIBIT 10-7
INSPECTION MARKINGS

ACCEPTED

(prior to 5/1/88)

REJECTED

ACCEPT
EJG 7/4/88

REJECT
EJG 7/4/88

A
MJS 7/4/88

R
MJS 7/4/88

OK
JSD 4 July 88

End of Section

11.0 CUSTOMER INTERFACE

11.1 Customer Access

To the extent permitted under the terms of the contract and upon reasonable notice, customer QA personnel have access to Company facilities utilized in doing work for their contracts, and are permitted to examine and inspect products, witness the processes of manufacture, review records, and perform quality program and inspection system audits and shakedown inspections. The Company will repeat any inspections or tests that the purchaser may reasonably request to substantiate that the order requirements are met. The Company reserves the right to deny access to processes, specifications, and records contractually defined as proprietary. The Company may require signing of a non-disclosure agreement as a condition for a customer's representative to enter the plant.

The Company provides customer QA personnel with office facilities and clerical assistance appropriate to the type and duration of their surveillance. A copy of this Manual will be issued to the customer on request. Copies of other non-proprietary documents are furnished as provided by contract.

11.2 Customer Holds and Witness Points

Contractually specified customer holds and witness points are identified in the applicable QA Plans, Inspection and Test plans, and specifications. QA, Engineering and Manufacturing work jointly to provide timely notification to the customer.

11.3 Government Source Inspection

11.3.1 A controlled copy of the QA Manual is issued to the DCASO-QAR, and all revisions are coordinated with him.

11.3.2 The DCASO-QAR is not required to sign a non-disclosure agreement.

11.3.3 When finished products requiring Government Source Inspection (GSI) have been accepted by Inspection, the Inspection Supervisor fills out an Electronic Tube Shipment Release (Exhibit 11-1). He sends it to the DCASO-QAR as notification that the items are ready for GSI. The release is submitted to the QAR at least one day prior to submission of any lots of tubes for Government acceptance against Government contracts and purchase orders. The items are released to the warehouse only after the DCASO-QAR has signed the release.

11.3.4 When source inspection or verification of measurements by the Government or a prime contractor for the Government at the Company is contractually required, the necessary inspection gages, test equipment and personnel are made available for joint Company and Government or prime contractor use.

11.3.5 Preparation and distribution of Form DD-250 in accordance with applicable requirements is the responsibility of Customer Service.

11.3.6 The QA Manager advises the Contracting Officer in a timely manner of any contractually required measurement which cannot be made within the known state of the art.

11.4 Customer-furnished Items

Customer-furnished items are infrequently required by the Company. For such items procedures are generated as appropriate for

- incoming inspection for customer certification, completeness, proper type, and transit damage.
- controls on storage and use
- protection against damage during storage and handling
- notification of damage, loss or nonconformity

11.4.1 Government-furnished Material

Government-furnished property is controlled in accordance with Contractor's System of Accounting for Government Property, maintained by the Government Accounting Department.

EXHIBIT 11-1
SHIPMENT RELEASE

ELECTRONIC TUBE SHIPMENT RELEASE

TUBE TYPE: 31381 BPA

REWORK _____ ORIGINAL ✓ LOT SIZE 20 LOT #: 88-26

TEST	REFERENCE #	SIGNED BY:
Product Test		L Brown
Design Test		
Life Test		
Drop Test		

WRAMA PO # 88-C-0709

See reverse side for ser. Nos.

SAMPLE

RELEASED FOR SHIPMENT: [signature] 6-10-88
Quality Control

[signature] 6-13-88
Govt. Inspector

ET 1382

End of Section

12.0 MEASURING & TEST EQUIPMENT

12.1 General

Gages, instruments, production tooling used as media of inspection,and other Measuring and Test Equipment (M&TE) used in the manufacture, inspection, NDE, and testing of the Company's products are calibrated by the Calibration Laboratory in accordance with the Calibration Systems Manual. New and revised sections of the manual are generated and controlled by the Calibration Lab Supervisor.

Upon satisfactory initial calibration, M&TE is issued to the owning department for use. Items due for calibration are either recalled to the Calibration Laboratory or calibrated in the using department by Calibration Laboratory personnel.

Calibration intervals are chosen in accordance with rules stated in the Calibration System Manual. The manual assures that proper environmental controls are applied during calibration and that all calibrations are traceable to the National Standards, natural constants, or ratio methods of self-calibration. The manual contains calibration procedures for each type of M&TE used. Each procedure contains a general description, accuracy limits, equipment (including standards) required, and a detailed procedure. The calibration status of all M&TE is indicated by standard labels or tags. Typical labels are shown in Exhibit 12-1. A written calibration history is maintained by the Lab for each item of M&TE (Exhibit 12-2). Each calibration history identifies the M&TE by serial number, and description and owning department, and gives the calibration procedure number and scheduled frequency of calibration in weeks. For each calibration the person performing it enters the date calibrated, the calibration data as required by the procedure and initials as shown on Exhibit 12-2. If the M&TE is found to be nonconforming, he enters a brief description of the problem and its resolution if known. The M&TE control system conforms to the requirements of MIL STD-45662.

12.2 Discrepant M&TE

The Calibration System Manual includes a system for identifying discrepant M&TE by a special label (Exhibit 12-1) until corrected. Calibration Lab personnel generate a DA tag (Exhibit 12-3) on which they record the serial number, a brief description of the problem, the date, the department where used, and the initials of the issuer. They send a copy of the tag to the responsible supervisor, who recommends a disposition. If the Lab Supervisor concurs, he causes the disposition to be executed. He then notes the disposition on the tag and signs the tag to indicate it is closed.

When the DA tag is generated, and again when it is closed, a copy is sent by the Lab to QA Engineering to evaluate the effect on finished product quality. If the quality of items shipped was affected or incorrect data were supplied to customer because of defective equipment, the customer is notified. Corrective action on tubes shipped, data given, or tubes in inventory is taken as required to insure that quality is maintained. Details are given in QC Procedure 7-1.

QA Engineering also follows up on DA's open more than 30 days to assure that action is being taken.

EXHIBIT 12-1
CALIBRATION LABELS

CALIBRATION
SER 6853
BY K.C.
DATE 7-14-78
DUE 1-14-79
3% F.S.

CALIBRATION

9837 SERIAL	ST D.	READING	ST D.	READING
DATE 7-14-78	.195	.2	99.782	100
BY K.C.	1.000	1.0	250.0	250
DUE 1-14-79	4.956	5.0	.2 in 2	3%
	10.032	10	1 in 2	3%
	29.842	30	REMAINING	1%

SAMPLES

CALIBRATION
NOT REQUIRED
NOT CALIBRATED
NOT TO BE USED
FOR OBTAINING DATA

NOT CALIBRATED
NOTIFY CAL LAB
BEFORE USING
☑ DEFECTIVE
☐ PAST CAL DATE
SER 9698
BY R. MILLER DATE 7/6/78

CALIBRATION
NOT REQUIRED

LIMITED
CALIBRATION

48012 SERIAL	ST D.	READING	ST D.	READING
DATE 7/14/78	CALIBRATED CHANNELS			
BY R CLARK	1 THRU	4 ONLY		
DUE 1/14/79				

EXHIBIT 12-2
CALIBRATION HISTORY CARDS

(Form 677896 is used for mechanical gages, ET-2136 for all others)

ET-2136 R1

INSTRUMENT CALIBRATION HISTORY CARD — Card 3 of 3

SERIAL NO.	C.P.M.	LABEL	CAL. FREQ.
2076	331	222	26 WEEKS

INSTRUMENT 42	TYPE-MODEL	MFG.	ACCURACY	RANGE	DEPT.
Itm VCExhaust	EIES	W	See CPM	See CPM	223

DATE	BY	STANDARD	CPM REV.	Grid Current	STD	COMP	STD	COMP	STD	COMP	STD	COMP		REPAIR HISTORY
					2.95	2.97	2.97	2.98	2.974	2.97	2.964	2.96		
9-6-82	CM	256RKM	0		2.972	2.98	2.973	2.96	2.963	2.97	2.961	2.97		
					2.903	2.90	2.961	2.95						
					2.808	2.81	282.6	2.822	2.83	2.834	2.805	2.807		
3-14-83	CM	448222	0		2.820	2.824	2.851	2.846	2.824	2.874	2.809	2.819		
					2.736	2.744	2.829	2.827						

SAMPLE

GAGE INSPECTION RECORD

DEPT	SER #	LC	DRAWING NUMBER	TUBE TYPE	FREQUENCY
024	060	A		C.P.M. 61	26

SG12 RING NO. .432 X
.432 +.00004 -0

DESCRIPTION: GAGE BLOCKS
(1) 30B-229 GAGE BLOCKS
(2) 30B-1 "

DATE INSPECTED	INSP BY	ACTUAL SIZE	COMMENTS
REV.O 3/10/80	T.W	(1) .4320	ok
REV.O 9/12/80	T.W	(2) .4320	ok
REV.O 3/16/81	T.W	(1) .4320	ok

DATE INSPECTED	INSP BY	ACTUAL SIZE	COMMENTS

CC | DEPT | SER # | LC | DRAWING NUMBER | TUBE TYPE | FQ | DESCRIPTION

EXHIBIT 12-3
M&TE DA TAG

REJECT ☐ REPAIR ☐ SALVAGE ☐ RETURN TO SUPPLIER STOREROOM ☐

DA 793749

DATE 3-2-81 | S. O. | ASSD. ITEM | DELIVERY TO SEC. 355

QUANTITY 1 | APPARATUS ELECTROMETER 610 CR

DWG. OR PAT. NO. | ITEM | REPAIR IN SEC.

SIZE, STYLE, SER. NO. OR P.O. SPEC. 52020

SUPPLIER | MOVE TO SEC.

P. O. I. W. R. | M. R. R.

CHG. ACCT. | SEC. | FROM SECTION 308

CHG. ACCT. | SEC.

DEFECT
10^{-3} CURRENT RANGE OPEN.
REPAIRED AND CALIBRATED.

NU -- not used during the period in question; MRN not required.

T Dana 3.23.81

ISSUING INSPECTOR K.C. 3-2-81 DATE | ISSUING FOREMAN DATE 3/2/81

MFG. SEC. INSPECTOR DATE | MFG. SEC. FOREMAN DATE

PRODUCTION CLERK DATE | ACCTG. | COST CENTER

OPERATIONS PERFORMED NOS. | OPERATIONS EFFECTIVE NO.

PENALTY YES ☐ NO. | GR. NO.

GROSS WEIGHT | TARE WEIGHT

OR. VA. | LAB | UNIT COST | TOTAL

SA. VA. | CLASS | NET WGT. | PRICE | TOTAL

H. BALMER | NET LOSS

3.2.81

SAMPLE

End of Section

13.0 HANDLING, STORAGE, SHIPPING, & PRESERVATION

13.1 General

Engineering is responsible for the inclusion of suitable handling, storage, cleaning, packaging, packing, shipping, and preservation instructions in the applicable specifications. These instructions address special coverings, special equipment, and special protective environments as necessary. Storage of items at the Company is in enclosed, heated areas suitable for general manufacturing, unless otherwise specified.

For items to be shipped, the Packaging Engineer generates a packaging specification in accordance with contract requirements, using QC Procedure 6-1 as a checklist. The packaging specification includes descriptions of the packing materials, packaging and/or packing procedures, and special environments as required. For low-volume products with no contractual requirement for a formal packaging specification, packaging in accordance with informal instructions from the Packaging Engineer is permitted.

As a part of their review of PC's (section 6), QA Engineering adds inspection instructions to the packaging specification and other specifications when required to verify that special documentation, coverings, equipment, and protective environments such as inert gas atmosphere, specific moisture content levels, and temperature levels have been provided. The verification is documented in inspection records in accordance with Section 10. Inspectors are trained to check during each inspection for signs of damage, deterioration, or loss.

Warehouse or other designated personnel package the item in accordance with the packaging specification after notifying Inspection of any specified inspection. The item is then shipped in accordance with shipping instructions provided by Customer Service.

End of Section

14. NONCONFORMING ITEMS

14.1 Material Review Procedure

14.1.1 Initiation of MRN

If an item is found by Inspection to be nonconforming, the inspector generates a Material Review Notice (MRN Exhibit 14-1). Details are given in QC Procedure 8-2. The information entered on the MRN includes:

. identification of the nonconforming items
. supplier or department where the nonconformance was detected
. description of the nonconformance
. inspector's signature
. inspection date.

Inspection then routes the MRN for disposition, and, for items to be repaired or used as is, a written engineering justification.

Each completed MRN is signed by the Inspection Supervisor or the cognizant QA engineer to indicate that the disposition, cause, and corrective action meet all requirements described in QCP 8-2. A copy of each completed MRN is distributed to the cognizant QA engineer for review and additional follow-up, if necessary, to assure completion. Except in product lines where there is no military end use, a copy is also sent to the DCASO-QAR for information. Each MRN is referenced in the associated inspection or manufacturing record. A master copy of each completed MRN is filed in a location designated by the Inspection Supervisor. All other copies are for information only. It is the responsibility of anyone who finds an MRN incomplete or inadequate to have the master copy amended.

A statement of cause and corrective action is requested unless the Inspection Supervisor determines that the costs of determining the cause would outweigh the benefits, or that a cause is not assignable. In such cases he makes a suitable note in the Corrective Action box.

The Inspection Supervisor reviews all open MRN's at least monthly and follows up as necessary to assure timely close-out. The Inspection Supervisor maintains a logbook or tickler file of open MRN's for this purpose.

14.1.2 Purchased Material

The cognizant engineer recommends disposition of the nonconforming items and signs the MRN. The MRN is also reviewed by the cognizant Planner/Buyer, who is responsible for assessing production needs and impacts, order status, and for recommending whether rejected lots should be screened or returned complete to the vendor. Then the MRN is returned to Inspection for review and assignment of final disposition.

When the vendor is responsible for the nonconformance, the Inspection Supervisor sends a copy of the MRN to Materials/MIS, which transmits it to the vendor with a suitable cover letter. The letter includes a response date unless the Corrective Action box indicates that no response is required. If the date is missed, or the response is unacceptable, Materials/MIS follows up until a response is received and accepted by QA, or until Materials/MIS and QA agree that follow-up should be ended.

For materials which are to be returned to the supplier, Form 31364 is completed and forwarded to Materials/MIS along with the vendor's copy of the MRN.

Items resubmitted by the vendor are inspected as if being received for the first time unless clearly identified as resubmitted; in that case only the affected characteristics need be reinspected.

14.1.3 Internal Nonconformances

The MRN is routed to the responsible supervisor for a statement of cause and corrective action. If the decision is to scrap, screen or rework the lot, the MRN may be returned directly to Inspection with that recommended disposition for QA concurrence. Any other disposition is provided by the cognizant engineer, along with procedures for repair and rework as required.

Rejected lots which are screened other than by QA, reworked, repaired or salvaged are submitted to QA for reinspection of the characteristics in question, and any others which may have been affected by additional operations. The Inspection Supervisor may forego reinspection if he determines that product quality is adequately assured without it. In such cases he marks the MRN "Reinspection Not Required".

14.1.4 Nonconforming End Items

Nonconforming end items are processed in accordance with 14.1.3. In addition, end items which do not conform to contract requirements require the concurrence of the contracting officer or other authorized customer representative prior to release for shipment. If Engineering recommends accepting product containing such a nonconforming condition, the customer or his representative is notified by the contractually specified procedure. The items are held by Inspection until a disposition has been agreed on.

Material Review Boards have been established as appropriate. MRB activity is described in QC Procedure 8-1.

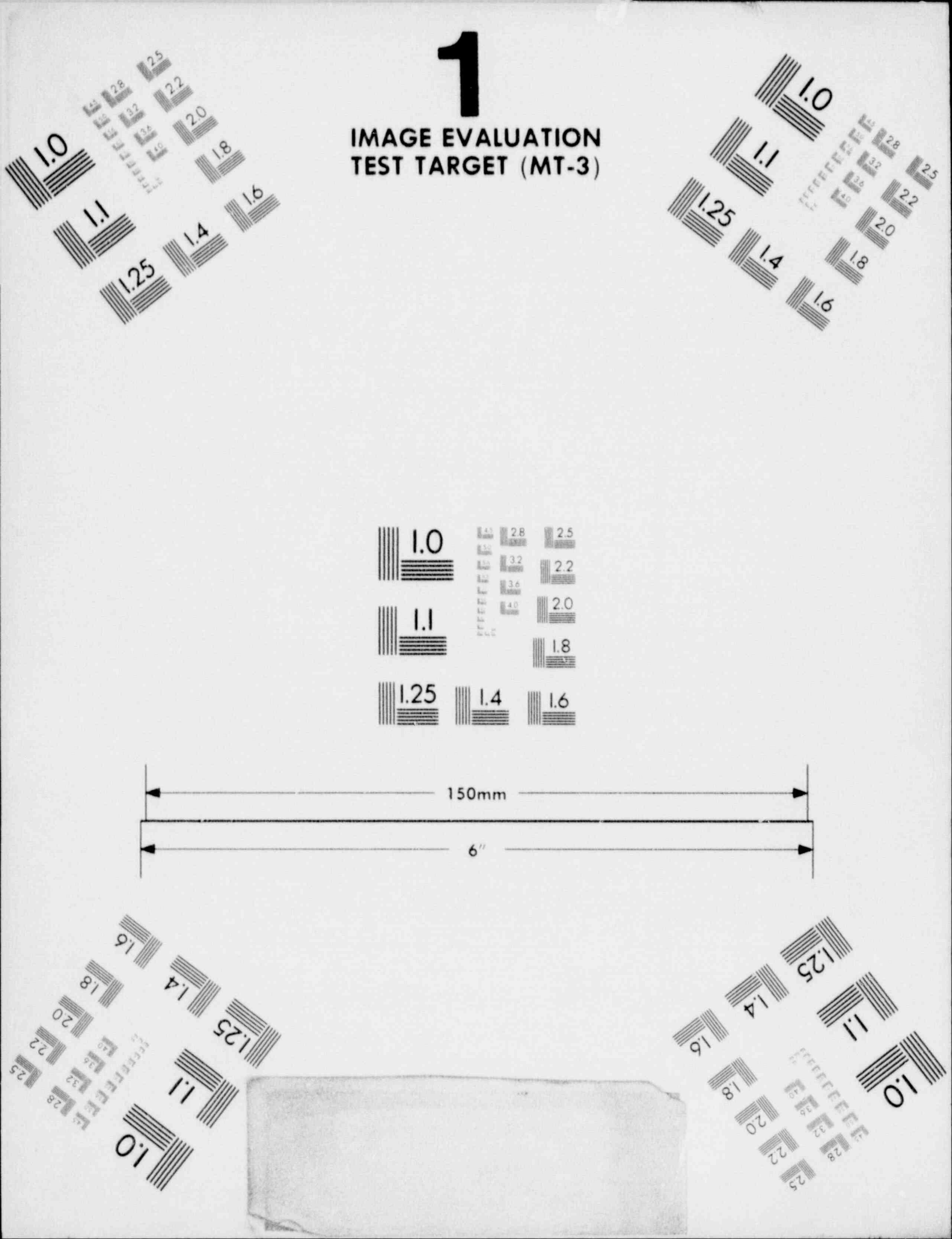
14.1.5 Third Rejection Procedure

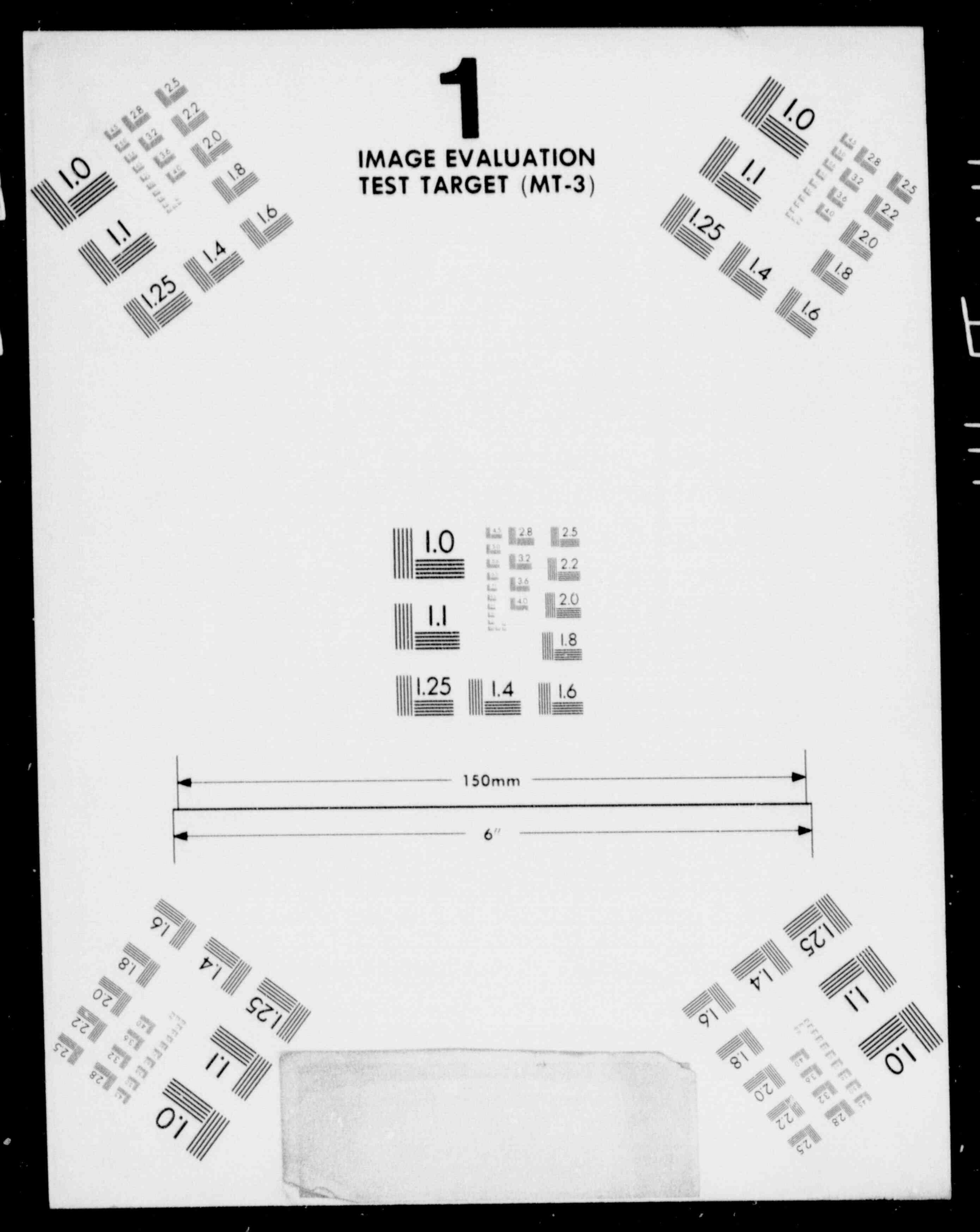
When three or more of the last five lots are rejected for the same reason(s) the MRN is marked "Third Rejection" and Form ET-2554 (Exhibit 14-2) is attached. To accept such purchased material for use ET-2554 must be signed by the cognizant Manufacturing, Materials/MIS, Engineering, and QA managers. For in-house items ET-2554 must be signed by the cognizant Manufacturing, Engineering, and QA managers regardless of disposition. The completed ET-2554 is filed with the MRN.

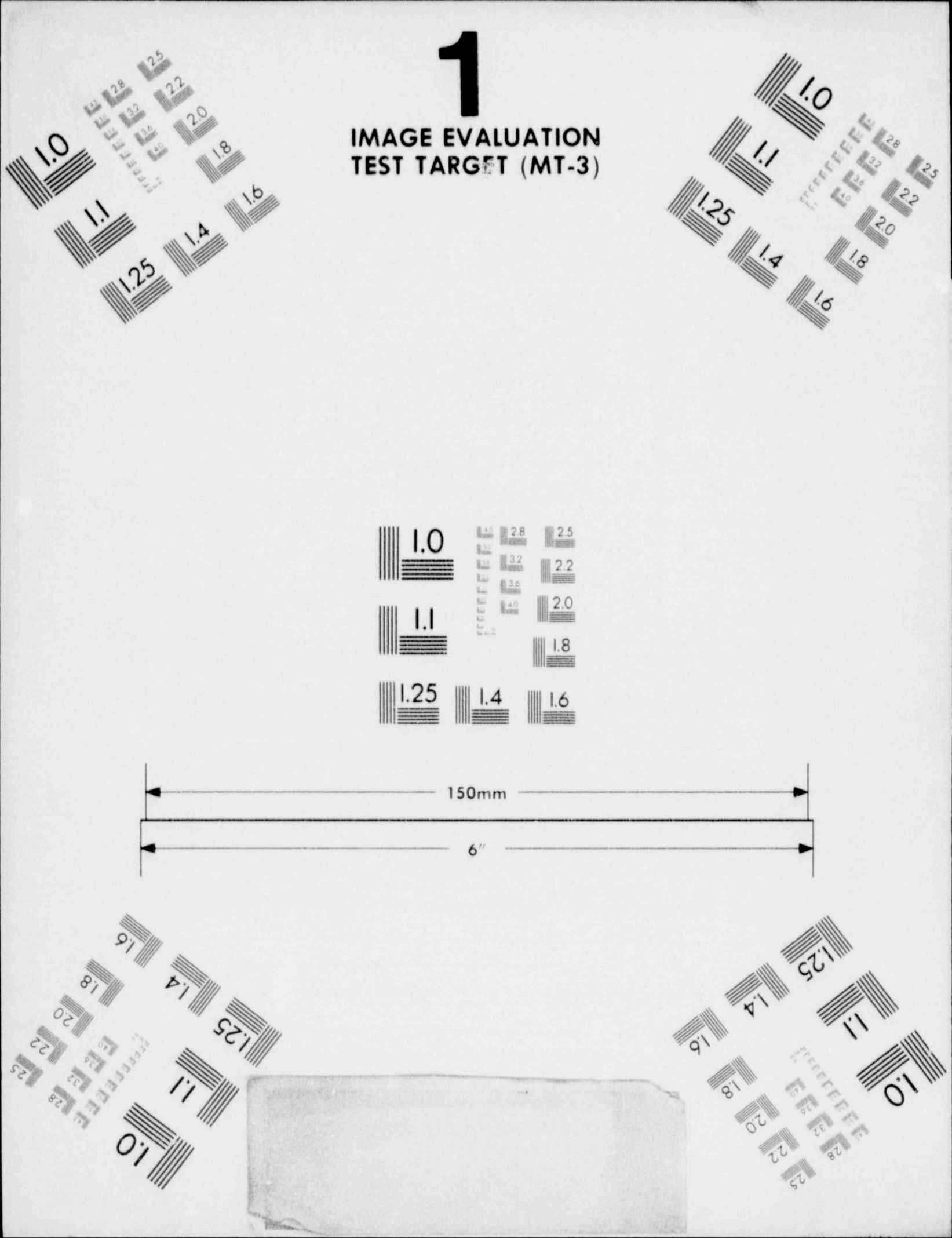
The third rejection system assures that ineffective corrective actions receive management attention.

14.2 Identification of Nonconforming Items

In addition to the hold area for items awaiting inspection, each QA inspection station has a separate marked hold area where unacceptable (disposition code 3 or 4) items are moved (size permitting) until ready to be disposed of. In addition the MRN number or, if none, a note of explanation is marked on the item or the accompanying paper work. Nonconforming items detected in process are identified as described in Section 14.3. Age sensitive material which has passed its expiration date is identified as described in Section 8.6.

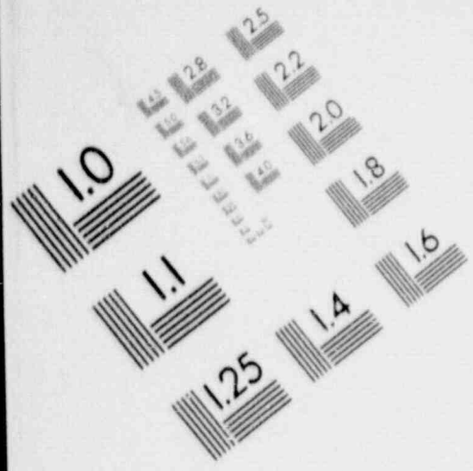

1
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

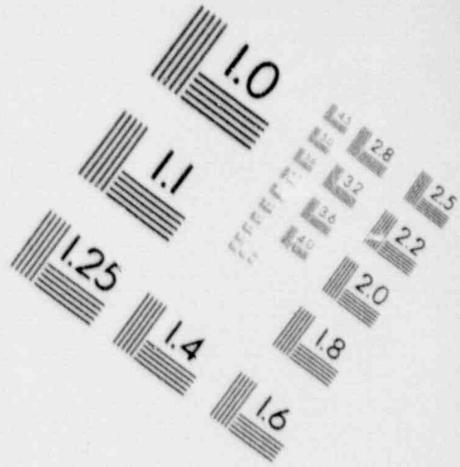

1
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

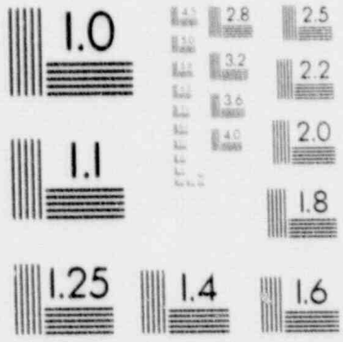

1
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

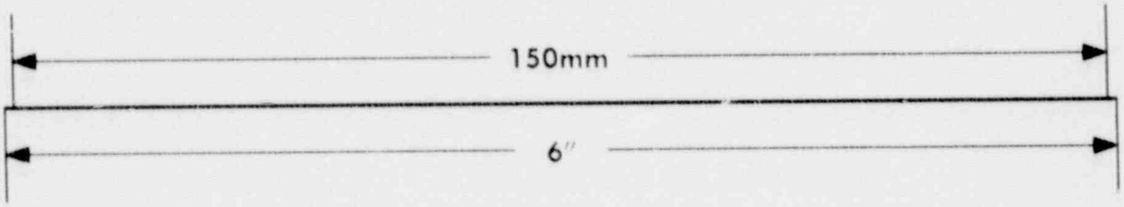
1

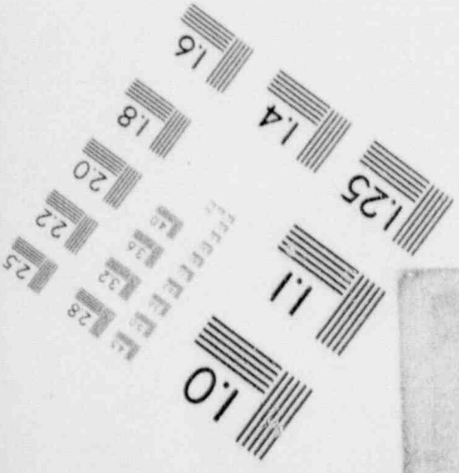
IMAGE EVALUATION TEST TARGET (MT-3)

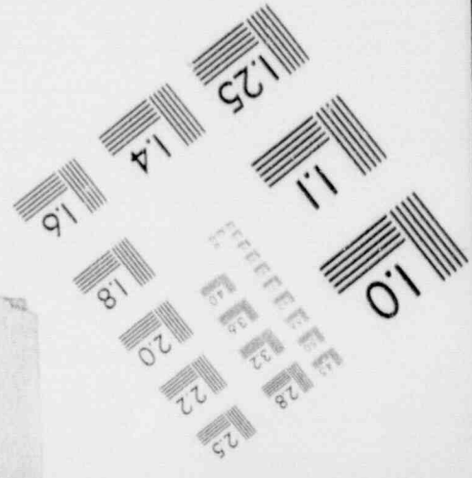












14.3 Nonconformances Discovered by Operators

Production operators who discover nonconforming items identify them as nonconforming by one or more of the following methods:

- Placing the item in a designated area or container marked "Nonconforming Items" or equivalent.
- Marking or tagging the item or its container to indicate what is wrong or with a notation such as "nonconforming" or "scrap".
- For items with serial numbers a suitable notation signed by the operator on the traveler or other process document.
- Notification of the Supervisor if none of the above methods is suitable.

The cognizant Manufacturing Engineer reviews all such items (except those covered in Section 14.5) to determine cause (if assignable), initiates appropriate corrective action as needed and assigns disposition. Before making a scrap disposition he determines that repair or rework of the item is impractical. He marks the item with disposition instructions, using physical marking, tagging, etc., as described above. The Manufacturing Supervisor is responsible for seeing that the disposition is executed in accordance with the engineer's instructions.

For items with travelers the cognizant Manufacturing Engineer provides signed instructions on the traveler or an attached rework traveler. The instructions address, as applicable:

- Analysis
- Rework
- Retest
- Repair
- Where to rejoin the normal sequence of operations.
- How to keep rework from causing additional damage

QA approval of the instructions is indicated by signoff of the next QA hold.

14.4 Miscellaneous Defects

Defective items may be found during lot sampling inspection without a lot rejection resulting, if the acceptance number is 1 or more or the defective item is not in the sample. Such defective items are removed from the lot and their disposition is recorded on the inspection record card. An MRN may be generated for the items at the discretion of the Inspection Supervisor.

14.5 Process Scrap Control

14.5.1 Disposal of Scrap

Process scrap, such as turnings, chips, bar ends, damaged or nonconforming parts of low value, and other waste products of normal operations may be disposed of by the operator without formal engineering review. Specially marked containers are provided for disposal of scrap having salvage value or special handling requirements.

14.5.2 Records

Scrap and recoveries are tallied by the Manufacturing Supervisor on Form ET-1685 by part number and tube type. The completed forms are forwarded to Accounting, where they are used to prepare monthly scrap reports issued to the Manufacturing Supervisors and QA.

14.5.3 Disposition of Scrap Generated on Government Contracts

When required by Government contract, scrap is disposed of in accordance with Contractor's System of Accounting for Government Property, maintained by the Government Accounting Department.

14.6 Field Returns

Items returned by customers (commonly called RMR's) are processed in accordance with Specification 212-249-3. Inspection verifies their condition upon receipt and before reshipment to the customer.

Each returned item is evaluated to determine responsibility and disposition. For items that are Company responsibility, Engineering determines the cause and initiates corrective action as appropriate for the circumstances.

The recipient of a customer request for a corrective action statement notifies Marketing. With Marketing concurrence he next notifies the Inspection Supervisor, who obtains the analysis as above and gives him a copy. The recipient then transmits a suitable response to the customer via Marketing with a copy to the Inspection Supervisor.

14.6.1 Material Deficiency Reports (Government Products)

Upon receipt of an Unsatisfactory Report (MDR) from the field, the DCASO-QAR reviews with the QA Manager the need to request an exhibit. Copies of the UR and exhibit request are forwarded by the QAR to the QA Manager, who informs the cognizant Manufacturing Manager, contractor Government Property Administrator, concerned government administrators or monitors, and the consignee.

Any exhibit received is processed in accordance with Specification 212-249-3. Following engineering analysis of the exhibit, the QA Manager provides the QAR with a reply to the MDR.

14.6.2 Navy Nuclear Detector RMR's

The cognizant engineer provides signed instructions of evaluation, repair, and retest as applicable, using the MIL DETECTOR RMR form or equivalent.

EXHIBIT 14-1
MATERIAL REVIEW NOTICE

2 IMAGING & SENSING TECHNOLOGY CORPORATION RKA

MATERIAL REVIEW NOTICE MRN 9361

4.95029 Seabrook

40.40252-1	Slip-on Flange		Typical Corporation	95C25485	2.5.81
6	6	100%	99039	--	J Smith 2.27.81

18.18 min ID is undersize to 18.152

Heat No. A44603
Traveler No. N/A, Rev. N/A, Op. No N/A

Error in transcribing requirements was not caught by QA review of shop documents.

☐ ☒

ID OF FLANGE WILL FIT PROPERLY OVER O.D. OF MATING PIPE, WHICH IS 18.093 MAX.

Production control clerks advised of error and given additional training by QA Manager. All QA personnel who review shop documents were also retrained in review procedure and common errors.

SAMPLE

3.4.81

☐ ☐

C Kent

QA Mgr. Typical Corp. 4/1/81

3.10.81

JFP ANI 3/23/81

Closed 3.10.81

This example is for an Incoming Inspection nonconformance.
Not all of the information shown appears on every copy of the MRN.

EXHIBIT 14-2
THIRD REJECTION

THIRD REJECTION

MRN no._____

This material has been rejected three or more times for the same condition. A stronger corrective action is needed for this persistent problem. Before signing below please make sure that effective corrective action with completion dates has been entered on the attached MRN.

[ ] Internal item. All signatures except Purchasing Manager required regardless of disposition.

[ ] Purchased item. All signatures including Purchasing Manager required to accept item for use.

Mfg Mgr_____ _____/___/___

Eng Mgr_____ _____/___/___

QA Mgr_____ _____/___/___

Purch Mgr_____ _____/___/___

SAMPLE

ET-2554 R1

End of Section

15. CORRECTIVE ACTION

15.1 General

The QA program provides for timely detection and correction of conditions adverse to quality. The program involves many types of actions by individuals throughout the organization, all subject to review and coordination by the QA Manager.

The foundation of the corrective action program is corrective action of individual problems as discussed in other sections of the Manual. Corrective action for problems associated with scrapped and reworked items is described in Section 14. Corrective action for defective M&TE is described in Section 12. Corrective action for problems discovered during audits is described in Section 17. Corrective action for field problems and Government unsatisfactory reports is described in Section 14.6.

In-process corrective action work is the responsibility of the cognizant engineer, as described in Section 14.3. He is responsible for the timely detection and correction of in-process conditions adverse to quality. He monitors the process to verify the effectiveness of actions taken and detect adverse trends. His activities are documented in the Engineering Managers' monthly reports.

15.2 Management Review

The QA Manager monitors the corrective action program continuously to verify its effectiveness and detect trends and problems needing management attention. Among his sources of information are

- Engineering Managers' monthly reports
- Audit reports (internal and customer)
- Corrective action requests (internal and customer)
- MRN copies and monthly summaries
- Monthly scrap and rework summaries
- Returned material summaries
- Vendor history summaries
- Third rejections (see Sec. 14.1.5)
- Military detector field returns report
- Incoming inspection report
- In-process and final inspection summary

He analyzes this information for trends and repetitive problems to determine the extent to which the total corrective action program is effective. He looks for problems which are common to two or more areas or sources of data. Where additional actions are needed he assigns additional QA effort or coordinates a more general management approach as appropriate. He summarizes these conditions in his monthly report to the President and staff, along with the corrective actions being taken. He continues to monitor such conditions until he determines that they have been corrected or brought under control.

Twice a year the QA Manager issues a report on actions to correct significant vendor quality problems. The report is based on the vendor history described in Section 7.2.

15.3 Significant Conditions Adverse to Quality

For nuclear products to which 10CFR50 App. B applies, the QA Supervisors and QA engineers report to the QA Manager any Significant Conditions Adverse to Quality which come to their attention. The QA Manager reports in turn to the appropriate level of management, and when contractually required, to the customer. The reporting of such conditions, as well as their causes and corrective actions, is documented in the QA Manager's monthly report. For nuclear products to which 10CFR21 applies, defects in delivered products are reported in accordance with specification 252-1-38.

15.4 Cost Related to Quality

Records relating to cost of quality (labor, scrap, rework departmental charges) are maintained. This data is collected daily and reported weekly and monthly. Such reports are used for cost improvement and are available for on-site review by the DCASO-QAR.

End of Section

16.0 QUALITY ASSURANCE RECORDS

16.1 General

Each activity affecting quality is documented as described in the applicable section of the QA Manual. Active records are stored in the department which generated them. When no longer needed there they may be transferred to inactive storage, although control remains with the generating activity. Records are stored in metal file cabinets or equivalent facilities to prevent loss due to damage or deterioration.

Unless otherwise required, QA records are retained for seven years after the date of the latest entry. Raw Material inspection records are retained for seven years after the last of the affected material has been issued from the storeroom. Travelers are retained until the acceptance test records for the item are disposed of. Personnel, procedure, and equipment certifications are retained for ten years after generation. Qualification reports and specifications are retained for at least ten years after manufacture of the product has been discontinued, except as otherwise noted in Specification 222-7. QA Manual and QC Procedure revisions are retained for at least ten years after they are superseded. At the end of the required retention period the records may be destroyed at the discretion of the supervisor of the department that generated them.

Records subject to special or extended retention requirements are prominently identified by the following words or their equivalent:

"DO NOT DESTROY THIS FILE WITHOUT APPROVAL FROM

_____. See
Purchase Order_____ or
Specification_____.
First review date is_____."

QA verifies that such records have been properly identified and stored by the originating department, which retains responsibility for their proper disposition at the end of the retention period.

End of Section

17.0 AUDITS AND SURVEYS

17.1 General

The implementation of all QA requirements of the contract and the Manual is evaluated by a program of periodic audits. Care is taken to plan and execute audits thoroughly, to provide constructive recommendations when a need for improvement is indicated, and to document results for later follow-up activity.

Audits are intended to evaluate: first, whether QA requirements are adequately covered by the Manual or other documents; second, whether those responsible for complying with the requirements are aware of and understand them; third, whether the requirements are in fact being complied with; and fourth, whether compliance is producing the intended results.

Audit techniques used include questioning, discussion, observation, re-inspection, review of objective evidence, and others at the discretion of the auditor. Written checklists such as ET-2040 (Exhibit 17-1) are used for all audits and surveys. Lead auditors and auditors are trained and certified in accordance with ANSI/ASME NQA-1. Details are given in QC Procedure 10-5. Process auditors are trained and certified in accordance with QC Procedure 2-1-10. Nonconforming conditions are reported on Corrective Action Forms (Exhibit 17-2). A file of audit checklists reports, replies, and follow-up reports is retained in the QA office, where it is available for review.

17.2 Audit Types

17.2.1 Customer Audits

Customer audits are audits of the QA system performed by customers in accordance with a contractual agreement. The QA Manager makes all necessary arrangements for a customer audit team upon reasonable notice from the customer.

17.2.2 Management Audits

Management Audits are audits of the overall quality assurance program by personnel who are independent of the QA organization.

The QA Manager schedules management audits and requests the President to appoint the audit team. At least one management audit is performed each year. The audit team is composed of personnel from the Company or elsewhere who do not report to and who are qualified in accordance with Section 17.1. The audit report is submitted to the President, the QA Manager, and other affected Managers. The QA Manager furnishes written responses to the audit report as requested by the team.

17.2.3 Vendor Surveys

Vendor surveys are performed as required by Section 7.2 before approval is given to a prospective vendor, to evaluate his ability to meet all applicable requirements. The QA Manager assigns a Lead Auditor to contact the vendor and arrange a survey.

Before the survey the Lead Auditor

- requests a QA Manual from the vendor for review, time permitting.
- arranges for additional survey team members as appropriate, and briefs them.
- reviews the latest vendor history report, previous survey and audit reports, and other sources of information about the vendor.
- prepares a suitable checklist by modifying a standard checklist such as ET-2326 or ET-2327.

The survey results are summarized on ET-2326 (Exhibit 7-3), signed by the Lead Auditor and the Manager or his designee. The Materials/MIS Manager receives a copy for information. The Lead Auditor advises the vendor of the results by letter, stating any corrective actions required before approval, with a response date. The letter and the completed ET-2326 together constitute the survey report. The lead auditor follows up, verifying corrective action by resurvey or other suitable means. Follow-up is documented in additional reports or signed, dated notations on the initial report.

17.2.4 Vendor Audits

Vendor audits are audits of vendor QA systems by Company personnel to evaluate the extent to which they comply with the Company's QA requirements. For most items this is accomplished by the product auditing performed by Inspection. When required by contract, the nature of a particular purchased item, by a quality problem, or for other good reason, the QA Manager arranges for audits of a designated vendor. The procedure for such audits is the same as for vendor surveys, above, except that all applicable requirements need not be covered during each audit.

17.2.5 Department and Function Audits

Department and function audits are audits of the departments of the Company for conformance to the Manual and other QA requirements. They are scheduled and carried out under the direction of the QA Manager. Each activity covered by this Manual is audited at least once each year. Additional audits may be scheduled by the QA Manager to evaluate specific functions.

Each audit is conducted by a Lead Auditor assigned by the QA Manager. Before the audit the Lead Auditor

- notifies the supervisor of the affected area and arranges a time for the audit.
- reviews previous audit reports and other sources of pertinent information.
- prepares a suitable checklist, by selection from and modification of ET-2040.
- arranges for additional audit team members as appropriate, and briefs them. No one on the audit team may have direct responsibilities in the area being audited.

Following the audit the Lead Auditor prepares and signs an audit Report. Copies of the audit report are sent to the supervisor of the department or function audited, the President, the QA Manager and others designated by the QA Manager. Audit nonconformances are documented by the Lead Auditor on a Corrective Action (CA) Form (Exhibit 17-2), processed in accordance with QCP 10-4. The lead auditor follows up on nonconformances until they are satisfactorily closed out.

SEP 0 2 1988

Imaging & Sensing Technology Corp.
ATTN: Leslie B. Vaughn
Manager, Materials
Westinghouse Circle
Horseheads, New York 14845

Gentlemen:

This refers to your letter dated April 27, 1988, notifying NRC of your intent to purchase and operate, on or about May 1, 1988, product lines owned by Westinghouse Electric Corporation, Imaging and Sensing Technology Division. As such, you requested authorization similar to that provided to Westinghouse, pursuant to Section 32.14 of 10 CFR Part 32 and under License No. 31-13372-01E, to distribute electron tubes to persons exempt from licensing pursuant to Section 30.15 of 10 CFR Part 30.

In support of your request, you provided information similar to that submitted in Westinghouse's 1984 renewal application. However, in reviewing the Westinghouse file we note that the license references 1979 documents; that the license is due to expire in 1991; and that the 1984 renewal simply referenced product information and production procedures that were submitted in 1979. In view of the above, and considering that a new license would not expire until 1993, we have determined that a complete, up-to-date application must be submitted at this time.

We will need the following additional information in order to complete our review of your request:

1. Paragraph 32.14(a) specifies that you must satisfy the general requirements in Section 30.33 for a license to possess licensed materials. Please provide a copy of your State of New York license.

2. Section 30.15(b), 10 CFR Part 30 states, in part, that persons who desire to initially transfer for sale or distribution such products shall apply for a specific license pursuant to Section 32.14 of 10 CFR Part 32. Paragraph 32.14(b) specifies that for an application to be approved, the applicant must submit sufficient information regarding the product.

   To meet this requirement you must submit complete information concerning your device for each appropriate item in Sections 32.14 and 32.15 of 10 CFR Part 32. Note the criteria for maximum radiation levels from electron tubes listed in Section 30.15. The information you submit should be similar to that provided in Westinghouse's 1979 application.

3. Your NRC license will identify all locations in the United States from which you are authorized to distribute the products. As long as your corporation possesses the devices, each location at which it possesses must be authorized by a license. Do you intend to possess and/or warehouse and distribute the products from other locations? If you do, and some of these locations are in the Agreement States, then you should contact the appropriate authorities concerning licensing requirements and provide us with information concerning the status of your license request. Possession at NRC locations can be included with this license request.

Our review of your application will continue upon receipt of the above information. Please reply within 30 days, in duplicate, and reference Mail Control No. 020532. If you have questions, please feel free to call me at (301) 492-0634.

Sincerely,
Original Signed By
J. Bruce Carrico

J. Bruce Carrico
Medical, Academic and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Enclosures:
10 CFR Part 30
10 CFR Part 32
Agreement State List

DISTRIBUTION:
IMNS Central File
NMSS r/f
IMAB r/f
BCarrico
MLamastra

OFC: IMAB	:	:	:	:	:
NAME:BCarrico/bc:	:	:	:	:	:
DATE:9/ / /88	:	:	:	:	:

Imaging and Sensing Technology Corporation
Westinghouse Circle Horseheads, NY 14845

September 21, 1988

Mr. J. Bruce Carrico
Medical, Academic, and Commercial Use Safety Branch
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Material Safety and Safeguards
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Carrico:

Subject: Mail Control No. 020532
Renewal License Application

As discussed with you on 9/20/88, I believe the response time for the letter to Mr. L. Vaughn, Mail Control No. 020532, will fall beyond the reply due date.

In order for me to act on Mr. Vaughn's behalf and collate the requested/required information, I request a one month extension on the due date from October 2 to November 2. This will give me time to properly respond to N.R.C. Thank you for your patience.

Yours truly,

Vincent J. Santilli

Vincent J. Santilli
Radiation Safety Officer
Imaging & Sensing Technology Corporation

SEP 0 2 1988

Imaging & Sensing Technology Corp.
ATTN: Leslie B. Vaughn
Manager, Materials
Westinghouse Circle
Horseheads, New York 14845

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SEP 0 2 1988

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Sincerely,
Original Signed By
J. Bruce Carrico

J. Bruce Carrico
Medical, Academic and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Enclosures:
10 CFR Part 30
10 CFR Part 32
Agreement State List

DISTRIBUTION:
IMNS Central File
NMSS r/f
IMAB r/f
BCarrico
MLamastra

OFC: IMAB	:	:	:	:	:
NAME:BCarrico/bc:	:	:	:	:	:
DATE:9/ / /88	:	:	:	:	:

OFFICIAL RECORD COPY