GENERAL ( ) SPECIFICATIONS

107 A 6042

107 A 6042

TITLE GENERAL SPECIFICATIONS FOR HEAT RETENTION MATERIAL

FIRST MADE FOR STEAM TURBINE

M.R.I. D6630

INTRODUCTION

HEAT RETENTION MATERIAL TO BE USED ON LARGE STEAM TURBINE-GENERATOR UNITS SHALL BE IN ACCORDANCE WITH THE HEAT RETENTION MATERIAL DRAWING LIST MADE FOR EACH TURBINE-GENERATOR UNIT AND WITH THE FOLLOWING GENERAL SPECIFICATIONS. USE OF MATERIAL OTHER THAN THAT SPECIFIED MUST BE REFERRED TO THE SCHENECTADY MARKETING SECTION FOR APPROVAL THRU USUAL DISTRICT OFFICE PROCEDURES.

I. HEAT RETENTION MATERIAL DRAWINGS AND VENDOR'S QUOTATIONS

1. DRAWING LIST

A HEAT RETENTION MATERIAL DRAWING LIST GIVING ALL DRAWINGS AND SPECIFICATIONS WILL BE MADE FOR EACH TURBINE-GENERATOR UNIT SHOWING ALL PARTS TO BE INSULATED. INDIVIDUAL DRAWINGS WILL BE MADE FOR SUCH PARTS AS HIGH PRESSURE SHELL, STOP VALVE, ETC. IN THE LEFT COLUMN UNDER GROUP NUMBER ON THIS LIST IS GIVEN THE TOTAL NUMBER OF VALVES, SHELLS, ETC. WHICH MAKE UP THE COMPLETE TURBINE-GENERATOR UNIT. QUOTATIONS BY INSULATION VENDORS SHOULD INCLUDE MATERIAL THICKNESS AND PROCEDURE EACH INDIVIDUAL DRAWING AS LISTED. (THE DRAWINGS ARE ISSUED TO THE G.E. DISTRICT OFFICE BY THE TURBINE REQUISITION SECTION THROUGH THE PRODUCT SERVICE SECTION.)

2. INSULATION THICKNESSES AND TEMPERATURES

THE DRAWINGS WILL GIVE THE HOT SURFACE TEMPERATURE OF ALL AREAS TO BE INSULATED. SUFFICIENT DIMENSIONS WILL BE GIVEN SO THAT THE VENDOR CAN CALCULATE THE QUANTITY OF MATERIAL REQUIRED BASED ON THE COLD SURFACE TEMPERATURES AS SPECIFIED IN APPENDIX II AND QUOTE ON THIS AMOUNT. THE K FACTOR OF MATERIALS QUOTED MUST BE LOW ENOUGH TO MEET THE SPECIFIED COLD SURFACE TEMPERATURE WITHOUT EXCEEDING THE MAXIMUM THICKNESS GIVEN IN APPENDIX II, SINCE THESE THICKNESSES ARE USED IN DESIGN TO PROVIDE SUFFICIENT CLEARANCE AROUND POWER PLANT EQUIPMENT AND TURBINE METAL LAGGING.

NYD

B. MANN Nov 12, 50

STEAM TURBINE

SCHENECTADY

107 A 6042

PLAINTIFF'S EXHIBIT 12182.00

U.E. - 1445

703508

PLAINTIFF'S EXHIBIT WV-12437

WV-12437

107 A 6042	TITLE: GENERAL SPECIFICATIONS FOR HEAT RETENTION MATERIAL
SHEET 3 OF 2	FIRST MADE FOR STEAM TURBINE

REVISE

3. MATERIALS

IN CASES WHERE MATERIALS OTHER THAN STANDARD, AS GIVEN IN SECTION III OF THESE GENERAL SPECIFICATIONS, ARE TO BE USED, THE DRAWINGS WILL SPECIFICALLY NOTE THE EXCEPTIONS. USE OF OTHER MATERIALS SHOULD BE APPROVED AS NOTED IN SECTION I.

4. HORIZONTAL & VERTICAL SHELL JOINT FLANGES

WHEN THE INSULATION IS TO BE DIFFERENT FROM THAT USED ON THE SHELL BODY, THE DRAWINGS WILL SPECIFY THE TYPE OF INSULATION TO BE SUPPLIED FOR THE SHELL JOINTS. IN GENERAL, ALL JOINT INSULATION IS TO BE FABRICATED IN SUCH A FASHION THAT IT MAY BE REUSED WITH MINIMUM LABOR. BOLTING NUTS ARE TO BE PROTECTED FROM INSULATION COMPOUNDS TO FACILITATE EASE IN DISASSEMBLY.

5. REMOVABLE COVERS FOR VALVE HEADS & PIPE FLANGES

THE DRAWINGS WILL SPECIFY WHERE REMOVABLE COVERS AS DESCRIBED IN SECTION III-2 ARE REQUIRED AND WILL SPECIFY WHEN THE COVERS ARE TO BE SUPPLIED BY THE FACTORY, OTHERWISE THE COVERS ARE TO BE SUPPLIED BY THE DISTRICT OFFICE. OTHER FLANGE AREAS WHERE REMOVABLE COVERS ARE NOT INDICATED ARE JUDGED TO REQUIRE SUCH INFREQUENT DIS-ASSEMBLY THAT THE USE OF SPECIAL REMOVABLE INSULATION IS NOT JUSTIFIED.

6. QUOTATIONS

THE VENDOR SUBMITTING A QUOTATION FOR HEAT RETENTION MATERIAL SHOULD CALCULATE THE QUANTITIES OF MATERIAL AS NOTED ABOVE AND INCLUDE AN ALLOWANCE FOR WASTE, CUTTING ETC. IN ACCORDANCE WITH STANDARD PRACTICE. USUALLY 10% ADDITIONAL IS SUPPLIED. THE QUOTATION SHOULD LIST SEPARATELY THE QUANTITY, LAGGING THICKNESS AND PRICE OF MATERIAL TO BE SUPPLIED FOR EACH OF THE DRAWINGS ON THE DRAWING LIST. ALL NECESSORY MATERIAL SUCH AS ASBESTOS CLOTH AND PAPER, TIE WIRE, FINISHING CEMENT, PASTE, ETC. TO COMPLETE THE JOB SHOULD BE LISTED FOR EACH INDIVIDUAL DRAWING. THE DRAWINGS WILL NOTE MATERIAL SUCH AS BLANKETS, METAL INSULATION COVERING, ETC. WHICH WILL BE SUPPLIED BY THE TURBINE FACTORY AND VENDORS SHOULD NOT QUOTE THIS MATERIAL. THE PURCHASE OF

ISSUED BY B. MANN, NOV. 12, '58	APPROVED	STEAM TURBINE DEPT. SCHENECTADY	107 A 6042
Filed 222 5-63			

FORM 3WA (1-62) 11 CARD TB 101

703509

INSULATING MATERIALS, EXCEPT THOSE TO BE SUPPLIED BY THE TURBINE FACTORY AS SPECIFIED ON THE DRAWINGS ARE THE RESPONSIBILITY OF THE DISTRICT OFFICE ON ALL DOMESTIC UNITS. THE VENDOR QUOTATION SHOULD BE OF SUFFICIENT DETAIL TO ALLOW THOSE RESPONSIBLE FOR INSTALLATION TO IDENTIFY THE MATERIAL FOR EACH INDIVIDUAL DRAWING AND THE THICKNESS TO BE APPLIED.

III. TYPES OF INSULATING MATERIALS TO BE USED ON VARIOUS AREAS

THE MATERIAL TYPES SPECIFIED BELOW ARE DESCRIBED IN APPENDIX I.

1. TURBINE SHELLS AND VALVE BODIES.

MATERIALS: PLASTIC TYPE A, SPRAYED ASBESTOS TYPE C, BLOCK TYPE D, OR BLOCK AND PLASTIC COMBINATION

UPPER AND LOWER SHELLS (EXCEPT FLANGES), STEAM VALVE BODIES CONTROL VALVE CHESTS AND EXHAUST CASINGS SHALL BE INSULATED WITH THE MATERIALS NOTED ABOVE. (MATERIAL FOR HORIZONTAL AND VERTICAL FLANGE JOINTS WILL BE INDICATED PER II-4). ALL PLASTIC OR SPRAYED INSULATION IS PREFERRED ON THESE IRREGULAR AREAS BECAUSE OF THE EASE OF APPLICATION AND THE RESULTING PERMANENT, TIGHT FITTING INSULATING JOB. PLASTIC OR SPRAYED WILL NOT WORK LOOSE WITH VIBRATION OR SAG AWAY FROM THE METAL SURFACE. SOMETIMES DIFFICULTY IS ENCOUNTERED IN DRYING OF LARGE AREAS OF WET PLASTIC OR SPRAYED AND THIS IS THE CHIEF OBJECTION TO ITS USE. HOWEVER, IT IS THE OPINION OF THE FACTORY THAT ITS ADVANTAGES MAKE THE EXTRA EFFORT REQUIRED IN DRYING DURING THE INSTALLATION WORTHWHILE. THE USE OF HEAT LAMPS, HEATERS AND FANS IS RECOMMENDED AS AN AID IN SPEEDING UP THE DRYING PROCESS. APPLICATION DRAWINGS INCLUDED IN APPENDIX III SHOW THE RECOMMENDED METHODS OF APPLYING SHELL INSULATION. THE APPLICATION OF BLOCK, COMBINATION INSULATION, OR SPRAYED SHOULD BE IN ACCORDANCE WITH VENDOR'S SPECIFICATIONS. WHERE SHELL JOINT BLANKETS ARE TO BE PROVIDED BY THE FACTORY, SEE BLANKET SPECIFICATION 142A3561. NUTS (1/2"-13) ARE PROVIDED ON THE TURBINE SHELL AND VALVE CASINGS TO PROVIDE FOR STUDS TO ANCHOR THE HEAT

RETENTION MATERIAL. IN NO CASE SHOULD EXTRA NUTS OR ANY OTHER HEAT RETENTION MATERIAL SECURING DEVICE BE WELDED TO THE TURBINE SHELL OR VALVE BODIES. WELDING ON THE ALLOY STEEL SHELL OR VALVE BODY MAY CAUSE THESE PARTS TO CRACK DURING OPERATION. WHEN VALVE BODIES ARE SEPARATED FROM THE TURBINE SHELLS BY LONG PIPE RUNS AND THUS WILL NOT BE COVERED BY THE METAL LAGGING, PLASTIC INSULATION WILL BE ANISHED BY THE APPLICATION OF A ½" LAYER OF FINISHING CEMENT TYPE E COVERED BY TYPE F ASBESTOS CLOTH USING TYPE G ADHESIVES. NO FINISHING MATERIALS SHOULD BE USED ON SHELLS OR VALVES COVERED BY METAL LAGGING.

THE FOLLOWING IS A SUGGESTED METHOD FOR APPLYING TYPE D BLOCK INSULATION TO TURBINE SHELLS AND VALVE BODIES.

CARBON STEEL STUDS OF SUFFICIENT LENGTH (PROVIDED BY INSULATION VENDOR) ARE SCREWED INTO THE NUTS PROVIDED ON THE SHELL OR VALVE BODY. THESE STUDS ACT AS THE SECURING DEVICE TO WHICH THE TIE WIRES ARE ATTACHED.

THE BLOCKS IN EACH LAYER ARE TO BE BUTTED TIGHTLY TOGETHER AND SECURED TO THE STUDS WITH STAINLESS STEEL TIE WIRE AFTER THE BLOCKS ARE SECURED IN PLACE THEY ARE TO BE POINTED WITH TYPE A PLASTIC. EACH SUCCEEDING LAYER IS TO OVERLAP THE LAYER BELOW AND IS TO BE SECURED AND POINTED IN THE SAME MANNER

THE TOP LAYER MAY BE FINISHED WITH A ½" THICK COAT OF PLASTIC TYPE A TO ACHIEVE A FIRM OUTER SURFACE.

IT MAY BE ADVANTAGEOUS TO REINFORCE PORTIONS OF THE LOWER SHELL INSULATION BY SECURING STAINLESS STEEL WIRE MESH BETWEEN LAYERS OF BLOCK IN THE HIGH TEMPERATURE REGIONS WHERE INSULATION IS THICK.

ON VARIOUS UNITS WITH SHELL MOUNTED CONTROL VALVES, LUGS HAVE BEEN PROVIDED ON THE SHELL AND VALVE STAND AT THE CENTERLINE OF EACH LOWER CONTROL VALVE FOR THE PURPOSE OF RIGGING HOISTS BETWEEN THE TWO IN ORDER TO FACILITATE LOWERING THE INDIVIDUAL VALVES. THE HEAT RETENTION MATERIAL IN THIS AREA SHOULD BE ARRANGED WITH THE NECESSARY PARTING JOINTS TO MAKE THE LUGS ACCESSIBLE. (REFER TO APPENDIX III FOR A TYPICAL EXAMPLE OF METHOD AND TO THE APPLICABLE SHELL DRAWING FOR THE AREA INVOLVED)

REVISIONS

NY REP
273-5
273-1
273-6
273-2

703511

GENERAL ELECTRIC
107 A 6042
CONT ON SHEET 6 SH NO 5

TITLE GENERAL SPECIFICATIONS FOR HEAT RETENTION MATERIAL

FIRST MADE FOR

2. REMOVABLE COVERS FOR VALVE HEADS, MAIN AND REHEAT INLET FLANGES, AND CROSSOVER PIPE HINGE AND FLANGE COVERS

VALVE HEADS AND PIPE FLANGES SUBJECT TO FREQUENT DISASSEMBLY WILL REQUIRE PRE-FABRICATED RE-USABLE COVERS. THE OUTER METAL JACKET IS TO BE MADE OF #16, GUAGE TYPE 302, 304 OR 430 STAINLESS STEEL WITH PITTSBURGH OR WELDED SEAMS. THE HEAT RETENTION MATERIAL FILLER IS TO BE TYPE D BLOCK, THE BLOCKS TO BE CAREFULLY MITERED WITHOUT GAPS, CURVED TO DIAMETER AND CEMENTED IN PLACE WITH FIBEROUS ADHESIVE. THE INNER SURFACE IS TO BE COATED WITH SILICATE OF SODA. TYPICAL COVERS ARE SHOWN ON SHEETS 18, 20, 23 AND 24 IN APPENDIX III. THE COVERS AND CONTAINED INSULATION ARE TO BE BRACED AND SUPPORTED IN SUCH A MANNER AS TO MAKE A STURDY COVER THAT WILL WITHSTAND NORMAL HANDLING FOR LONG PERIODS OF TIME. LIFTING DEVICES ARE TO BE PROVIDED FOR EASE IN REMOVING COVERS. COVERS MAY BE SPLIT IN TWO OR MORE PARTS TO FACILITATE REMOVAL. CROSSOVER PIPE FLANGE COVERS OR VALVE HEAD COVERS, WHEN SUPPLIED BY FACTORY AS METAL LAGGING WILL BE EQUIPPED WITH 1/4 - 20 NUTS FOR THE ATTACHMENT OF PROPER LENGTH STUDS SUPPLIED BY THE INSULATION CONTRACTOR, WHICH ARE USED FOR SECURING THE INSULATION AT THE JOB SITE AS STATED ABOVE. THE DRAWINGS WILL SHOW WHERE THIS INSULATION IS TO BE APPLIED.

3. PIPING

MAIN AND REHEAT STEAM PIPING, CROSSUNDER PIPING, STEAM SEAL PIPING AND ALL OTHER STEAM PIPING FURNISHED AS A PART OF THE TURBINE-GENERATOR UNIT SHALL BE INSULATED WITH PRE-FORMED SECTIONAL PIPE INSULATION TYPE B, APPLIED PER MANUFACTURER'S RECOMMENDATIONS. LARGE DIAMETER PIPING MAY BE INSULATED WITH TYPE A PLASTIC OR WITH FLAT OR SEGMENTAL TYPE D BLOCKS, ALL GAPS TO BE FILLED WITH INSULATING CEMENT. SPRAYED ASBESTOS, TYPE C, MAY ALSO BE USED.

PIPE INSULATION WILL BE FINISHED WITH TYPE F ASBESTOS CLOTH USING TYPE G ADHESIVES. ALUMINUM JACKETING OF TYPE J MAY BE USED IN PLACE OF ASBESTOS CLOTH, IF DESIRED. ELBOWS AND BENDS

REVISIONS

NO	DESCRIPTION	DATE	APPROVED
4	ADDED 273-2	6-24-64	

REP
273-5
273-2
273-1
273-
PRINTS

MADE BY B. MARK, NOV. 12, 1958
ISSUED R.E. Gust 12-64
APPROVALS
STEAM TURBINE DIV OR DEPT.
SCHENECTADY LOCATION
107 A 6042 CONT ON SHEET 6
IP | TB

TITLE
GENERAL SPECIFICATIONS
FOR HEAT RETENTION MATERIAL

FIRST MADE FOR STEAM TURBINE MPL 06030

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	Change per ECO-6-5	Nov 5, 1958	

SHOULD NOT BE COVERED WITH ALUMINUM JACKETING. ASBESTOS CLOTH OR TYPE M MASTIC SHOULD BE USED ON BENDS INSTEAD. WHERE THE USE OF MITERED BLOCKS OR PLASTIC INSULATION IS REQUIRED IN INSULATING A LARGE DIAMETER PIPE OR ON IRREGULAR SURFACES SUCH AS ELBOWS, FLANGES, ETC., A COATING NOT TO EXCEED 1/2" THICK OF TYPE E FINISHING CEMENT SHALL BE TROWELLED ON BEFORE COVERING WITH ASBESTOS CLOTH. GLAND STEAM EXHAUSTERS SHALL BE INSULATED IN THE SAME MANNER AS PIPE.

ON OUTDOOR UNITS ALL INSULATED PARTS NOT UNDER THE METAL LAGGING OR OTHERWISE PROTECTED FROM WEATHER SHALL BE WEATHER-PROOFED. ALL SHORT RADIUS BENDS (LESS THAN 3 FEET RADIUS), FITTINGS, AND VALVE BODIES SHALL BE GIVEN A 1/2" COATING OF HARD FINISH CEMENT OF TYPE K OVER THE INSULATION. THIS WILL BE COVERED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS WITH A COATING OF MASTIC TYPE L OR M. ASBESTOS CLOTH WILL NOT BE USED IN ADDITION TO THE ABOVE WEATHERPROOFING MATERIALS.

AN EXTRA 1/2" OF INSULATION SHALL BE USED ON ALL TYPES OF INSULATION EXPOSED TO THE WEATHER TO REDUCE WIND LOSSES.

ALUMINUM PIPE JACKETING SHALL BE APPLIED TO STEAM PIPING WHERE IT PASSES UNDER OPERATING OIL CYLINDER OR OTHER DEVICES WHERE OIL DRIPPAGE MAY OCCUR.

4. EXPOSED CROSSOVER PIPES

SPECIAL CARE SHALL BE TAKEN IN INSULATING EXPOSED CROSSOVER PIPES NOT COVERED BY METAL APPEARANCE LAGGING.

APPENDIX III CONTAINS AN APPLICATION DRAWING SHOWING HOW THE LIFTING LUGS AND THE CLAMPING BOLTS ON THE EXPOSED CROSSOVER PIPES ARE TO BE COVERED. THE METHOD TO BE USED IN INSULATING THE EXPANSION JOINT AREA IS ALSO SHOWN ON AN APPLICATION DRAWING. THE METAL COLLAR WILL BE SUPPLIED BY THE FACTORY, AND IS TO BE INSULATED

NYO
R
REP
273-53
273-13
273-6
273-4
PRINTS TO

IN THE FIELD PER III-2. SECURING DEVICES MAY BE WELDED TO THE INSIDE OF THE COLLAR.

AFTER INSULATION HAS BEEN INSTALLED, LEVEL INSULATION WITH INSULATING CEMENT AND MAKE JOINTS TIGHT TO INSURE A UNIFORM SURFACE. APPLY A BEDDING COAT OF 81-42W "LAGFAS" TO THE INSULATION PRIOR TO WRAPPING WITH ASBESTOS CLOTH.

APPLY A UNIFORM BRUSH COAT OF FOSTER SEALFAS 30-36 ON ALL LONGITUDINAL AND BUTT JOINT LAPS OF ASBESTOS CLOTH. IMMEDIATELY BOND LAPS TOGETHER. PULL FABRIC TIGHT AND SMOOTH OUT TO AVOID WRINKLES AND GAPS.

IMMEDIATELY APPLY A UNIFORM COATING OF FOSTER SEALFAS 30-36 TO THE ENTIRE SURFACE AT THE RATE OF 70 SQ. FT. PER GALLON.

WHERE THE PIPELINE IS OUTDOORS AND EXPOSED TO THE WEATHER, ALLOW 24 HRS. DRYING TIME, THEN APPLY TO THE ENTIRE SURFACE, TWO UNIFORM COATS OF FOSTER VITECT VINYL COATING (COLOR AS SELECTED) AT THE RATE OF 150 TO 200 SQ. FT. PER GALLON PER COAT. ALLOW A MINIMUM OF 4 HRS. DRYING TIME BETWEEN COATS.

FOSTER VITECT VINYL COATING IS AVAILABLE IN THREE BASIC COLORS, 50-56 MEDIUM GRAY, 57-15 WHITE, AND 57-16 ALUMINUM.

FOR INDOOR USE SEE TYPE N PAINT.

SOME CROSSOVER PIPES CONTAIN A HINGE TO RELIEVE STRESSES CAUSED BY THE DIFFERENCE IN MOVEMENT BETWEEN HIGH AND LOW PRESSURE UNITS. THE HINGE SHOULD BE KEPT FREE OF INSULATION MATERIAL. WHEN REMOVING THE CROSSOVER A STRONG-BACK HAS TO BE BOLTED ACROSS THE HINGE. IN ORDER TO ATTACH THE STRONG-BACK WITH A MINIMUM DISTURBANCE TO THE INSULATION, A REMOVABLE COVER IS TO BE APPLIED IN THIS AREA. THIS COVER WILL BE A BOX OVER THE PORTION OF THE HINGE WHERE THE STRONG-BACK IS SECURED.

5. EXPOSED STEAM PIPING

EXPOSED STEAM LEADS, NOT COVERED BY METAL LAGGING, ABOVE THE OPERATING FLOOR, SHALL BE FINISHED IN THE SAME MANNER AS DESCRIBED FOR "EXPOSED CROSSOVER PIPES", III-4, TO ACHIEVE A SATISFACTORY APPEARANCE. EXPANSION JOINTS SHALL BE INCLUDED IN THE PIPE COVERING ABOVE THE OPERATING FLOOR TO PREVENT CRACKING IN THE OUTER LAYER AND SCORCHING THE PAINTED ASBESTOS CLOTH.

APPENDIX I

DESCRIPTION OF MATERIAL TYPES

1. PLASTIC INSULATING CEMENT: (TYPE A)

THIS IS A MINERAL WOOL BASE MATERIAL LISTED BY VARIOUS MANUFACTURERS AS SUITABLE UP TO 1800°F. THE MINERAL WOOL IS COMBINED WITH CLAY OR OTHER INORGANIC BINDERS AND RUST INHIBITORS TO GIVE IT THE REQUIRED PLASTICITY WHEN MIXED WITH WATER AND GOOD ADHESIVE QUALITIES TO ITSELF AND METAL SURFACES. IT IS NOT A HYDRAULIC SETTING TYPE CEMENT AND HENCE CAN BE RE-USED BY BREAKING UP THE HARDENED MATERIAL AND MIXING WITH WATER.

THE FOLLOWING MAKES OF INSULATION ARE OF THIS TYPE:

JOHNS-MANVILLE #450 CEMENT
FORTY-EIGHT INSULATION, INC., "48" CEMENT
EAGLE-PICHER SUPER "66" CEMENT, AND
KEASBEY AND MATTISON "HY TEMP"

2. PRE-FORMED SECTIONAL PIPE INSULATION: (TYPE B)

THIS IS A PRE-FORMED CALCIUM-SILICATE BASE INSULATION COMBINED WITH A SMALL AMOUNT OF ASBESTOS OR MINERAL FIBER TO ADD MECHANICAL STRENGTH. THIS TYPE OF PIPE INSULATION IS PREFERRED TO OTHER TYPES (SUCH AS MAGNESIA) BECAUSE OF ITS HIGHER STRENGTH AND BROAD TEMPERATURE RANGE. THE FOLLOWING MAKES OF INSULATION ARE OF THIS TYPE:

KEASBEY AND MATTISON "K & M ZEBRA", "KAYTHERM"
JOHNS-MANVILLE "THERMOBESTOS"
OWENS CORNING "KAYLO"

UNION ASBESTOS "UNIBESTOS" HAS SIMILAR STRENGTH AND INSULATING QUALITIES AND ALTHOUGH NOT A CALCIUM SILICATE MATERIAL, IT IS THEREFORE, INCLUDED IN THIS TYPE.

REVISIONS

4	JUN 13 1961	PHOTO DUPLICATION
3	12-1-59	REVISED

NYD

REP
273-5
273-1
273-8
273-4

PRINTS TO

3. SPRAYED ASBESTOS (TYPE C)

SPRAYED ON BY MACHINE TO ANY DESIRED THICKNESS WITHOUT SEAMS OR JOINTS. USED PREFERABLY ON LARGE DIAMETER EQUIPMENT 16" O.D. OR GREATER, AND FLAT PLATES. THERE ARE TWO TYPES:

A). BLEND OF AMOSITE FIBERS CONSISTING OF LONG, FINE NON-FLEXIBLE FIBERS WITH A DRY INORGANIC BINDER. NOT RECOMMENDED FOR TEMPERATURES OVER 700° F. KEASBEY & MATTISON "LW 25" IS OF THIS TYPE.

B.) BLEND OF CROCIDOLITE ASBESTOS FIBERS WITH A DRY INORGANIC BINDER. USED FOR HIGH TEMPERATURE INSULATION UP TO 1300°F. KEASBEY & MATTISON "LB 8" IS OF THIS TYPE.

4. BLOCK INSULATION: (TYPE D)

THIS SHALL BE PRE-FORMED FLAT OR CURVED BLOCKS OF CALCIUM-SILICATE BASE MATERIAL SIMILAR TO PIPE INSULATION SPECIFIED ABOVE, OR A MATERIAL OF COMPARABLE OR HIGHER QUALITY. WHERE BLOCK IS USED A HIGH AND LOW TEMPERATURE BLOCK MAY BE USED PROVIDED THE QUALITY OF THE COMPLETED WORK IS AS STATED ABOVE AND SPACE LIMITATIONS ARE ADHERED TO.

5. FINISHING CEMENT: (TYPE E)

THIS MATERIAL IS COMPOSED OF ASBESTOS SHORTS AND BINDERS. IT IS A NON-HYDRAULIC SETTING CEMENT USED AS A FINISHING COAT (APPROX. 1/2" THICK) OVER INSULATING CEMENT TO ACHIEVE A RELATIVELY SMOOTH SURFACE WHICH CAN BE COVERED WITH ASBESTOS CLOTH. JOHNS-MANVILLE #352, EAGLE-PICHER #20 AND KEASBEY & MATTISON #152 ARE OF THIS TYPE.

6. ASBESTOS CLOTH: (TYPE F)

THIS CLOTH SHALL BE USED AS AN OUTER COVERING FOR INSULATED PIPING, VALVE BODIES, ETC. IT IS AN 80% COMMERCIAL GRADE AS DESCRIBED IN FEDERAL SPECIFICATIONS SS-C-466A "CLOTH, THREAD AND TAP ASBESTOS" AS TYPE I, GRADE A, CLASS I. (2.25 #/SQ.YD.)

MADE BY B. MARK, NOV. 12, '58

ISSUED

APPROVALS

STEAM TURBINE

SCHENECTADY

107 A 6042

CONT ON SHEET 10 SH NO. 9

FF-002-1VA (8-69) PRINTED IN U.S.A.

EJ TB

703516

107 A 6042 COAT ON SHEET 11 SH NO. 10

TITLE
GENERAL SPECIFICATIONS
FOR HEAT RETENTION MATERIAL
FIRST MADE FOR STEAM TURBINE NPL DE830

REVISIONS

7. ADHESIVES: (TYPE G)

THESE ARE USED TO ATTACH ASBESTOS CLOTH OR CANVAS TO INSULATION MATERIALS. ADHESIVES ARE PREFERABLE TO SEWING BECAUSE OF THE HIGH COST OF LABOR AND THEIR ABILITY TO SHRINK THE CLOTH TIGHTLY OVER THE INSULATION.

THE FOLLOWING PRODUCTS ARE SUITABLE:

BENJAMIN FOSTER CO.	NO. 30-36 SEALFAS
BENJAMIN FOSTER CO.	NO. 81-42W LAGFAS
THE ARABOL MFG. CO.	ARABOL LAGGING ADHESIVE

8. FIRE-RESISTANT WEATHERPROOF JACKET: (TYPE H)

JOHNS-MANVILLE	ASBESTOS FIRETARD JACKET

9. ALUMINUM JACKETING (TYPE J)

THIS IS A 16 MIL MAXIMUM THICK ALUMINUM SHEET METAL WITH A PROTECTIVE MOISTURE BARRIER LINER. THIS JACKETING MAY BE OBTAINED FROM:

CHILDERS MANUFACTURING CO.	CHILDERS ALUMINUM JACKETING
ALJON MANUFACTURING CO.	"ALJORJAC"

10. FINISHING CEMENT (TYPE K)

JOHNS-MANVILLE	TYPE 301

11. WEATHERPROOFING MASTIC (TYPE L)

JOHNS-MANVILLE	INSULKOTE ET
BENJAMIN FOSTER CO.	H.I. MASTIC 90-07

12. FIRE-RESISTANT MASTIC (TYPE M)

(INDOOR AND OUTDOOR USE)

VIMASCO CORP.	VIMASCO WC-1
BENJAMIN FOSTER CO.	SEALFAS MASTIC 31-49 (ALUM. COLOR)

NVO REP 273-53 273-12 273-41 273-8

PRINTED TO

DRAWN BY B. MAUK NOV. 12, 58
CHECKED E.C. Gen. 5-6-59
APPROVALS
STEAM TURBINE DIV OR DEPT.
SCHENECTADY SECTION
107 A 6042 COAT ON SHEET 11 SH NO. 10
IP TB
GE-23WA (1-62) GE-23WA (1-62) GE-23WA (1-62)

TITLE
GENERAL SPECIFICATIONS
FOR HEAT RETENTION MATERIAL
FIRST MADE FOR STEAM TURBINE MPL -06630

13. PAINT (VAPOR BARRIER) (TYPE N)

INDOOR USE ONLY

FOSTER LAGTONE — CAN BE PURCHASED IN VARIOUS COLORS
WHITE
ALUMINUM

INDOOR OR OUTDOOR USE

FOSTER VITECT — VINYL COATING
50-56 MEDIUM GRAY
57-15 WHITE (MAY BE TINTED TO SUIT STATION COLOR SCHEME)
57-16 ALUMINUM

14. RE-USABLE BLANKET INSULATION: (TYPE O)

THESE ARE TAILOR-MADE, REMOVABLE TYPE BLANKETS USED IN AREAS REQUIRING FREQUENT REMOVAL OF INSULATION FOR MAINTENANCE PURPOSES. THESE BLANKETS ARE TO BE MADE PER GENERAL SPECIFICATIONS FOR SHELL JOINT BLANKETS, DWG. 1H2A3561.

703518

APPENDIX II

THICKNESSES OF MATERIALS

TYPE A
PLASTIC INSULATING CEMENT

STEAM TEMP. °F	MAX. COLD SURFACE TEMP. WITH 80° AMBIENT	MAX. INSULATION THICKNESS
BELOW 250	100	2
250 - 349	110	2 1/2
350 - 449	115	3 1/2
450 - 549	120	4
550 - 649	125	5
650 - 749	125	6
750 - 849	130	6
850 - 949	135	6 1/2
950 - 1049	135	7
1050 - 1149	140	8
1150 - 1250	145	9

NOTE 1: APPLIED IN LAYERS APPROXIMATELY 2" THICK.

NOTE 2: ADDITIONAL THICKNESS OF PLASTIC INSULATING CEMENT, 1/2", TO BE USED ON AREAS EXPOSED TO THE WEATHER ON OUTDOOR INSTALLATIONS.

NOTE 3: EQUIPMENT NOT COVERED BY METAL LAGGING SUCH AS STOP VALVE CASINGS WILL HAVE ADDITIONAL 1/2" OF FINISHING CEMENT TYPE E OVER THE PLASTIC.

NOTE 4: MAXIMUM INSULATION THICKNESS IS USED FOR DESIGN PURPOSES. THE THICKNESS CAN BE LESS THAN STATED HERE PROVIDED THAT THE MAXIMUM COLD SURFACE TEMPERATURE AS STATED IS MAINTAINED.

703519

GENERAL ELECTRIC

107 A 6042

107 A 6042

TITLE GENERAL SPECIFICATIONS FOR HEAT RETENTION MATERIAL

FIRST MADE FOR STEAM TURBINE M.P.L. D6G20

TYPE B
PIPE INSULATION
(CALCIUM SILICATE)

Steam Temp. °F	Max. Cold Surface Temp. with 80° Ambient	Max. Insulation Thickness — Pipe Size (in inches): $1\frac{1}{2}$ or less	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5
Below 250	100	1	1	1	1	1	$1\frac{1}{2}$	$1\frac{1}{2}$
250 - 349	110	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
350 - 449	115	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	2	2
450 - 549	120	2	2	2	2	2	2	$2\frac{1}{2}$
550 - 649	125	2	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
650 - 749	125	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3
750 - 849	130	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	3	3
850 - 949	130	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$
950 - 1049	135	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$
1050 - 1149	140	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$
1150 - 1200	140	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	4	4

Large Gen. Th.

Schenectady

703520

TITLE

GENERAL SPECIFICATIONS FOR HEAT INSULATION MATERIAL

FIRST MADE FOR STEAM TURBINE NO. 0230

TYPE B

PIPE INSULATION (CALCIUM SILICATE)

STEAM TEMP. °F	MAX. COLD SURFACE TEMP. WITH 80° AMBIENT	MAX. INSULATION THICKNESS PIPE SIZE (IN INCHES) 6	8	10	12	14
BELOW 250	100	1½	1½	1½	1½	1½
250-349	110	1½	1½	1½	2	2
350-449	115	2	2	2	2	2½
450-549	120	2½	2½	2½	2½	3
550-649	125	2½	2½	3	3	3
650-749	125	3	3	3½	3½	3½
750-849	130	3½	3½	3½	3½	4
850-949	130	3½	4	4	4	4½
950-1049	135	4	4	4	4½	4½
1050-1149	140	4	4	4½	4½	5
1150-1200	140	4½	4½	5	5	5½

NOTE: SINGLE LAYER INSULATION MAY BE USED ON ALL PIPES WHERE STEAM TEMPERATURE IS LESS THAN 550°F. SINGLE LAYER INSULATION MAY BE USED ON ALL PIPES SIZES 2 1/2" AND SMALLER REGARDLESS OF STEAM TEMPERATURE. DOUBLE LAYER INSULATION WITH STAGGERED JOINTS ON ALL OTHER PIPING. ADDITIONAL THICKNESS OF 1/2" TO BE USED ON PIPING EXPOSED TO THE WEATHER ON OUTDOOR INSTALLATIONS. MAXIMUM INSULATION THICKNESS IS USED FOR DESIGN PURPOSES. THE THICKNESS CAN BE LESS THAN STATED HERE PROVIDED THAT THE MAXIMUM COLD SURFACE TEMPERATURE AS STATED IS MAINTAINED. IN THE CASE OF PIPE COVERING, THE VENDOR SHOULD NOT INCLUDE ADDITIONAL MATERIAL FOR WASTE ALLOWANCE AS SPECIFIED IN II - 6, SHEET 2. THIS IS BECAUSE THE TABULATED PIPE LENGTHS ARE COMPUTED AS, "ACTUAL LENGTH PLUS 10% IN MULTIPLES OF 3 FEET".

703521

107A6042

107A6042

TITLE GENERAL SPECIFICATIONS FOR HEAT RETENTION MATERIAL.

FIRST MADE FOR STEAM TURBINE M.R.L. 06080

REVISIONS

TYPE D

INSULATING BLOCK (CALCIUM SILICATE)

(EQUIPMENT WITH DIAMETER OF 16" OR GREATER)

Steam Temp. °F	Max. Cold Surface Temp. with 80° Ambient	Max. Insulation Thickness
Below 250°	100	1 1/2
250 - 349	110	2
350 - 449	115	2 1/2
450 - 549	120	3
550 - 649	125	3 1/2
650 - 749	125	3 1/2
750 - 849	130	4
850 - 949	130	4 1/2
950 - 1049	135	4 1/2
1050 - 1149	140	5
1150 - 1200	140	5 1/2

NOTES:

1. Single layer below 550° steam temp. For 550° and above use double layer with staggered joints. Layers to be of approx. equal thickness.
2. Additional thickness of 1/2" to be used on areas exposed to the weather on outdoor installations.

NYO

273-21

273-12

273-11

273-41

REP

B

PRINTED

S. SHERRY 3/11/60 | 4/12/60 | LARGE STM. TURBINE | SCHENECTADY | 107A6042

703522

GENERAL ELECTRIC

107A 6042

COST ON SHEET 17 ENGR. 16

TITLE GENERAL SPECIFICATIONS FOR HEAT RETENTION MATERIAL

107A 6042

COST ON SHEET 17 ENGR. 16

FIRST MADE FOR

REVISIONS

NOTE 3: Equipment not covered by metal lagging such as stop valves, will have an additional layer 1/2" thick of finishing cement type E over the insulation.

NOTE 4: MAXIMUM INSULATION THICKNESS IS USED FOR DESIGN PURPOSES. THE THICKNESS CAN BE LESS THAN STATED HERE PROVIDED THAT THE MAXIMUM COLD SURFACE TEMPERATURE AS STATED IS MAINTAINED.

PHOTO RESTORATION JAN. 23, 1971

1

NYO

273-21

273-12

273-6

273-21

REP

R

703523

DRAWN C. SNOBBY 2/11/60

APPR. 12, 60

4/11/60

LARGE STEAM TURBINE

SCHENECTADY

107A 6042

COST ON SHEET 17 ENGR. 16

REP

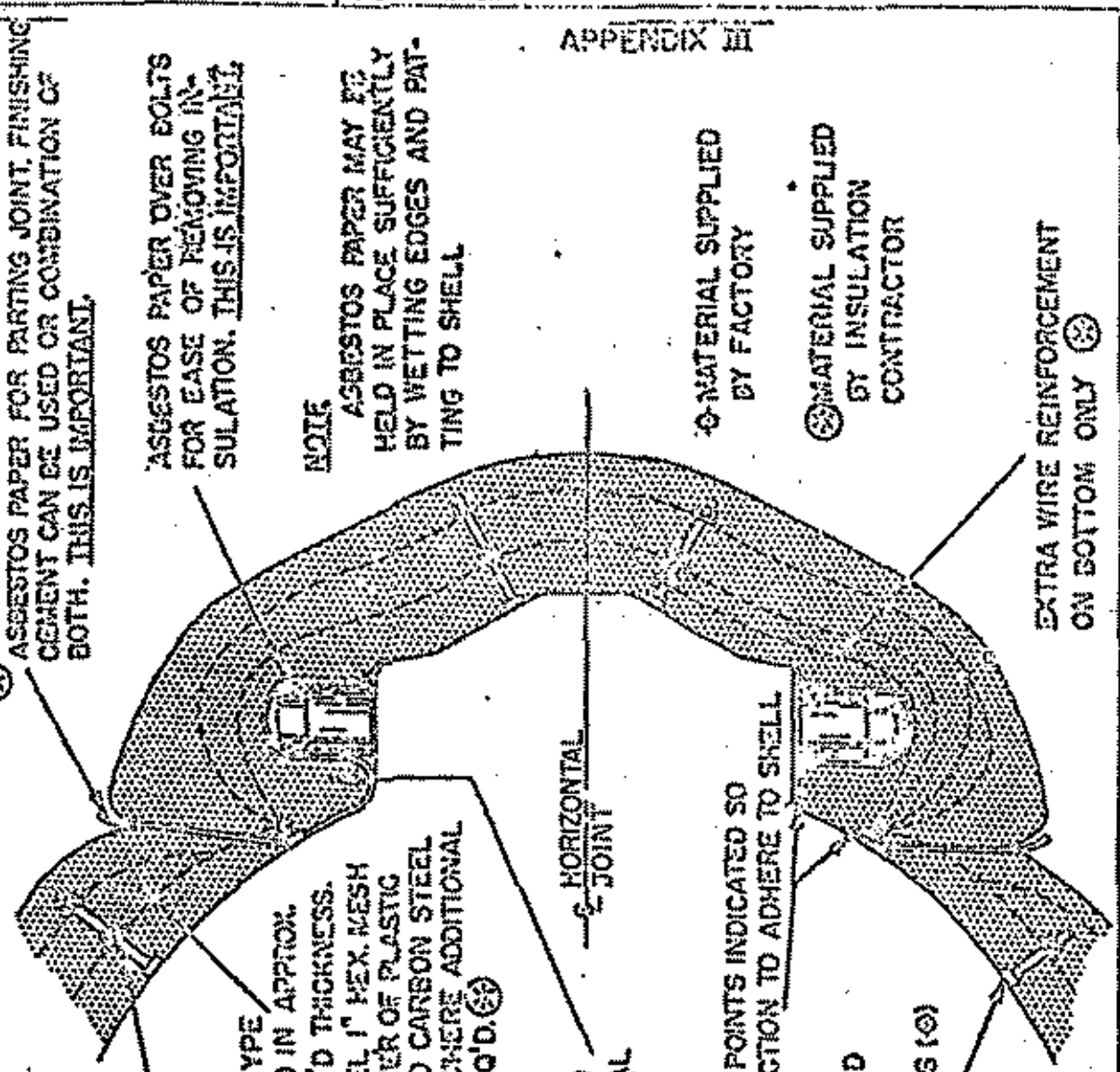
107A6042

107A6042

APPLICATION OF ALL PLASTIC OR SPRAYED ON TURBINE SHELL AND HORIZONTAL FLANGES

FIRST MADE FOR HEAT RETENTION REFERENCE NOTES

APPENDIX III



2 PHOTO RESTORATION JAN. 20, 1971

NYO

C. SHOREY 3/11/60

APRIL 19, 1960

STEAM TURBINE

SCHENECTADY

107A6042

703524

GENERAL ELECTRIC

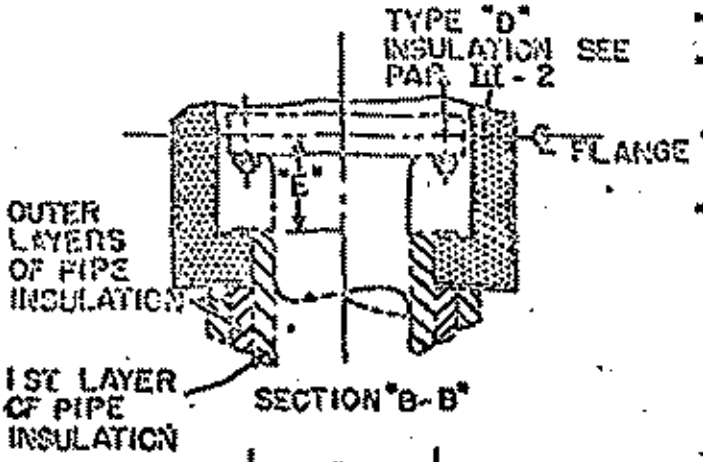
107A6042

TITLE: TYPICAL REMOVABLE & REUSABLE FLANGE COVER

FIRST MADE FOR HEAT RETENTION REFERENCE NOTES

107A6042

APPENDIX III

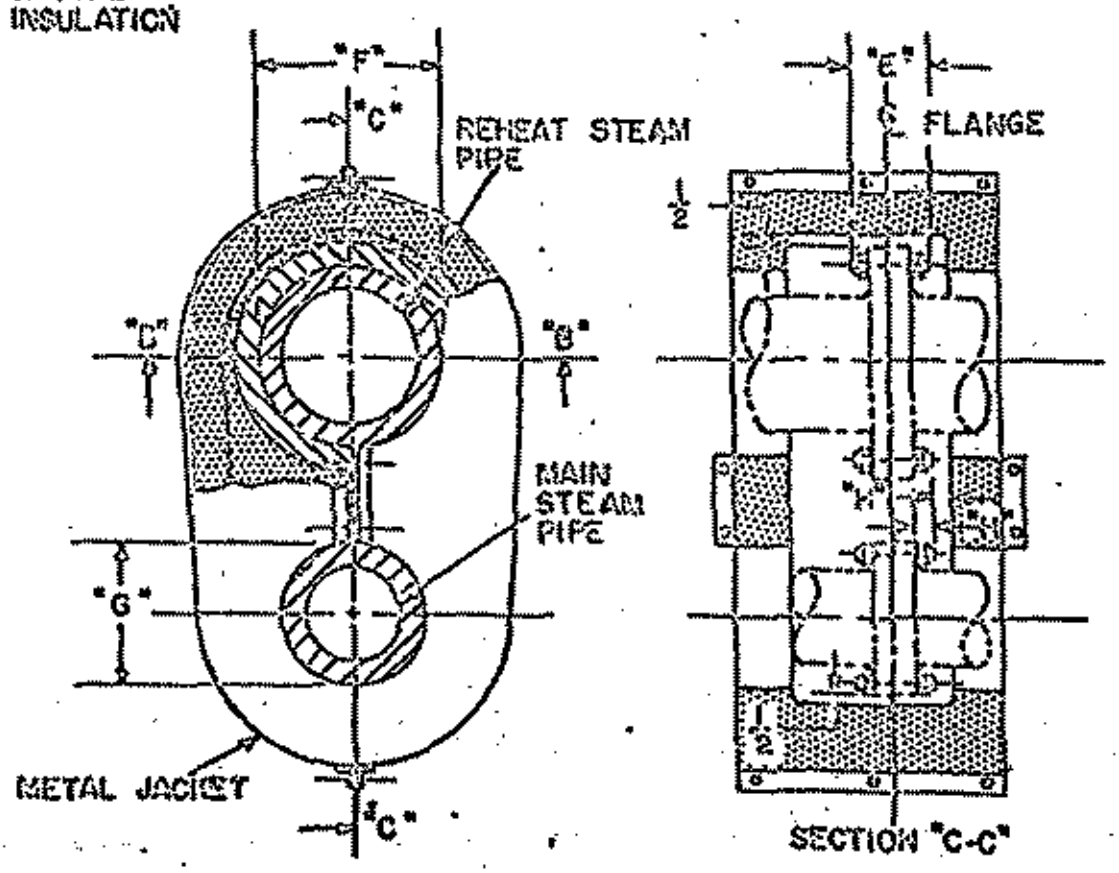


"E" BOLT LENGTH

"F" DIA. = O.D. OF PIPE + 1ST. LAYER OF PIPE INSULATION

"G" DIA. = O.D. OF PIPE + 1ST. LAYER OF PIPE INSULATION

"H" DISTANCE FROM FLANGE TO END OF NUT OR BOLT.



ALL BLOCKS ARE TO BE CAREFULLY MITERED WITHOUT GAPS, CURVED TO DIAMETER & CEMENTED IN PLACE WITH FIBEROUS ADHESIVE. FIRST LAYER TO BE FIRMLY EMBEDDED IN CEMENT, TYPE A.

NYO

273-41

R

273-21

273-05

273-12

REF

C. DEMOSNICK MAR. 13, 50

APRIL 19, 60

STEAM TURBINE

SCHENECTADY

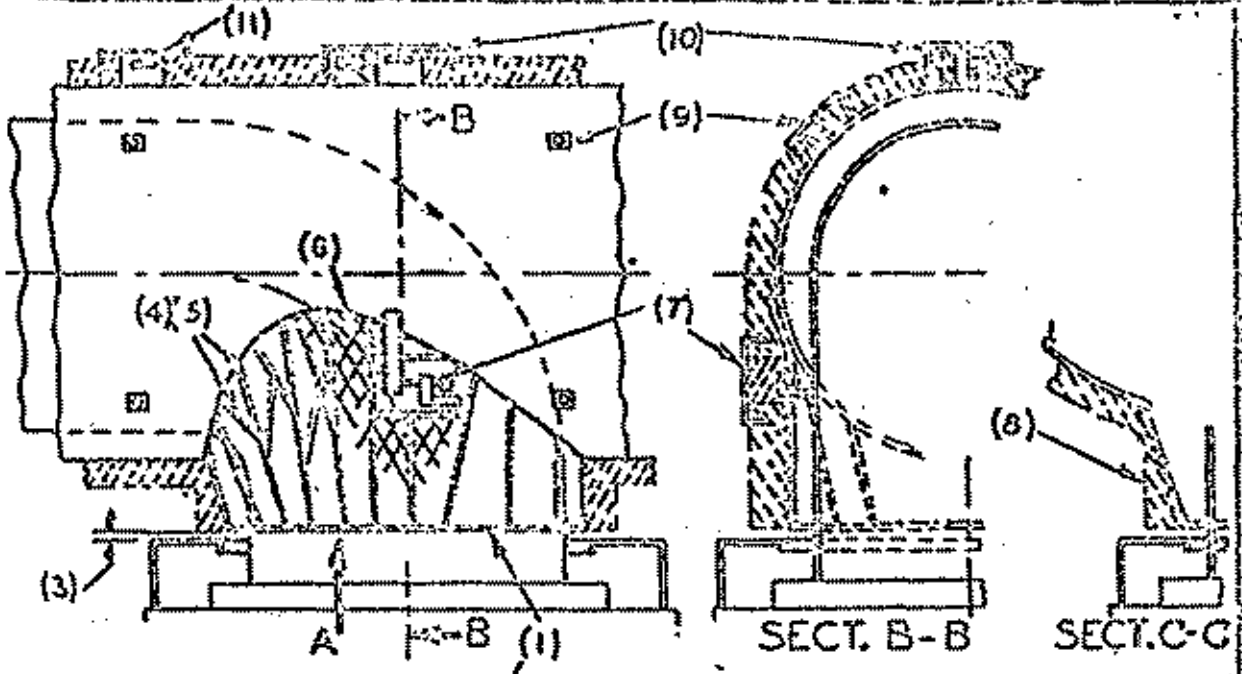
107 A 6042

703525

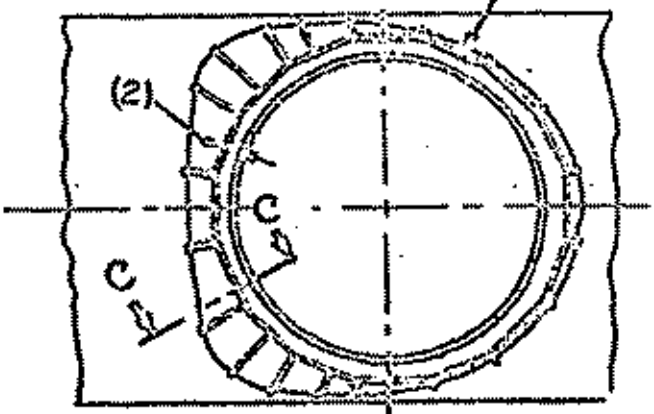
107A6042

107A6042

EXPOSED CROSSOVER PIPES: METHOD OF INSULATING JACKING, LIFTING, CLAMPING DEVICES & EXPANSION JOINT AREA FURNISHED FOR HEAT RETENTION MATERIAL



X-O ELBOW DIA.	QTY. OF FRAME BASE PCS.	CHORD LENGTH	DIM. ACROSS FLATS
30	12	9 3/8	35
36	12	11	41
42	16	9 3/8	47
46	15	10 1/8	53
54	20	10 3/8	59
60	20	11 1/2	65



VIEW A

FOR APPLICABLE NOTES & REFERENCE POINTS SHOWN IN PARANTHESIS (-) REFER TO SHEET 19A

NYO

R
272-53
273-41
273-21
273-6
273-12
REP

STEAM TURBINE

SCHENECTADY

107A6042

703526

GENERAL ELECTRIC

107A6042 20

107A6042 20 SH. 19A	TITLE EXPOSED CROSSOVER PIPES METHOD OF INSULATING, JACKING, LIFTING, CLAMPING DEVICES & EXPANSION JOINT AREA FIRST ISSUE FOR HEAT RETENTION MATERIAL

THE FOLLOWING NOTES REFER TO SHEET 19

MATERIAL REFERRED TO BELOW TO BE FURNISHED BY VENDOR
(1) INSUL. SUPPORT FRAME, BASE RING OF SUFFICIENT CHORD LENGTH, PIECES (SEE TABLE) (APPROX. $\frac{1}{4}$ X $\frac{1}{2}$ BAR OR $\frac{1}{2}$ DIA. CONCRETE REINFORCING ROD) TO ALLOW $2\frac{1}{2}$ MIN.
(2) CLEARANCE FROM ELBOW AND A $\frac{1}{4}$ MIN. (3) CLEARANCE FROM X-O FLANGE COVER.
(4) UPRIGHT AND CROSS MEMBERS OF SUFFICIENT QUANTITY TO ADEQUATELY SUPPORT WIRE FABRIC AND INSULATION.
(5) TACK WELDED TO EDGE OF X-OVER WRAPPER OPENING.
(6) WIRE FABRIC 19 AWG SS 1" HEX MESH SECURED TO FRAME HOLDING A $2\frac{1}{2}$ MIN. CLEARANCE FROM ELBOW AT ANY POINT.
(7) 6 X 6 ACCESS CENTERED AROUND ADJUSTING BOLT HEAD ON JACKING DEVICE (IF SO EQUIPPED) WITH REMOVABLE PLUG OF INSL. AND METAL COVER.
(8) THICKNESS OF INSL. MAY VARY TO RESULT IN ROUND AND VERTICAL COLUMN AROUND SUPPORTING FRAME.
(9) (10) (11) LOCKING BOLT PADS, JACKING DEVICE & LIFTING LUGS TO BE PROVIDED WITH REMOVABLE PLUG OF INSL. AND METAL COVER.

REVISIONS	
1	PHOTO REVISION June 26 '71

MVD
R
273-55
273-41
273-21
273-6
273-12
REP

DRAWN W. Lipson July 0 '63	APPROVED	STEAM TURBINE MFG. DEPT.	107A6042
TRACED July 10-63		SCHENECTADY, N.Y.	SCALE OF SIZE 20 SH. 19A

ITG 0-5

107

703527

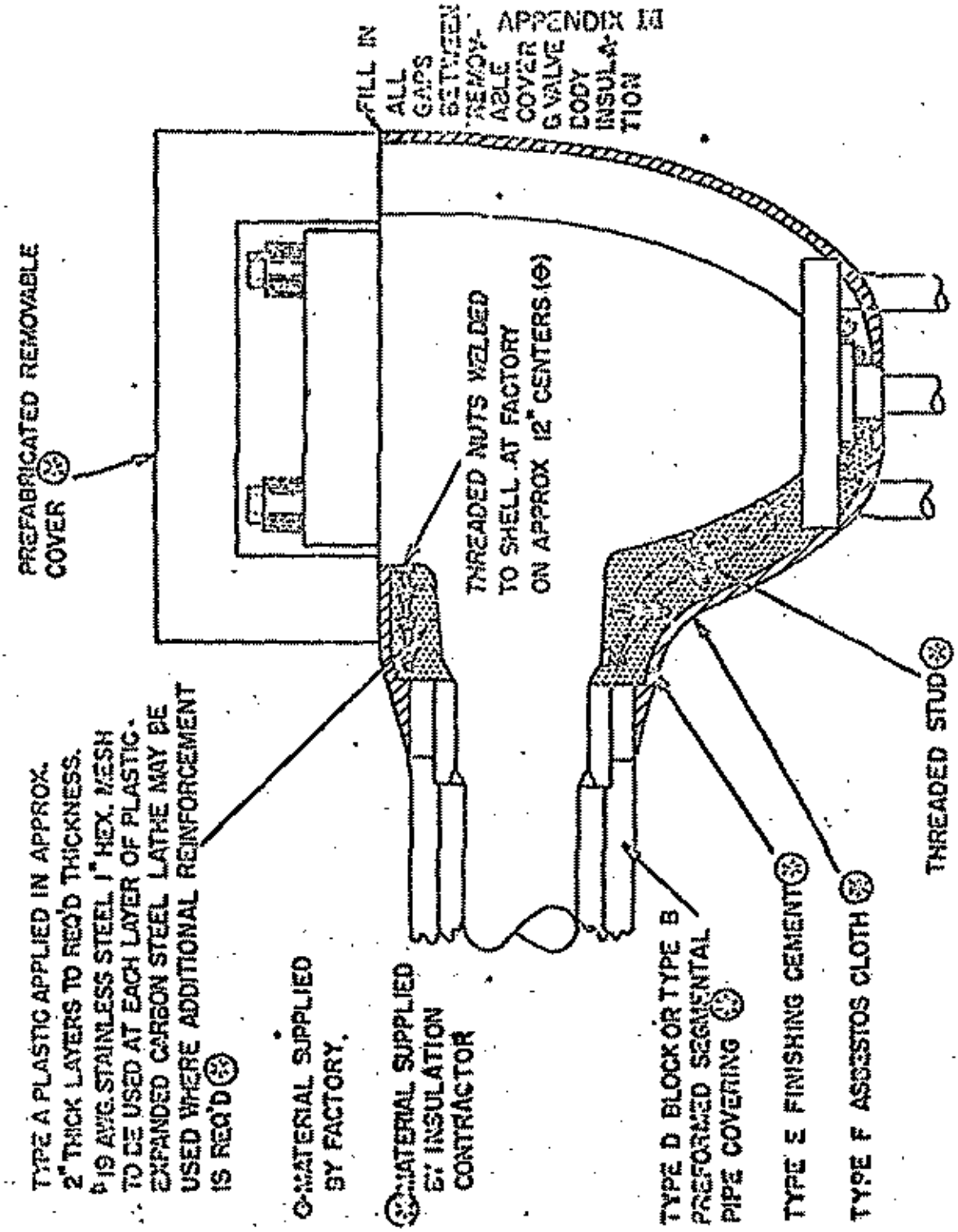
107A6042

107A6042

TITLE APPLICATION OF TYPE A PLASTIC INSULATION TYPICAL TURBINE VALVE

FIRST MADE FOR HEAT RETENTION REFERENCE NOTES

APPENDIX III



REVISIONS

1	PROTO RESTORATION JAN. 22, 71

NYO

273-72

273-41

R

273-21

273-84

273-12

REP

C. SHOREY 5/11/60

APRIL 19, 60

STEAM TURBINE

SCHENECTADY

107A6042

ATB | 85

703528

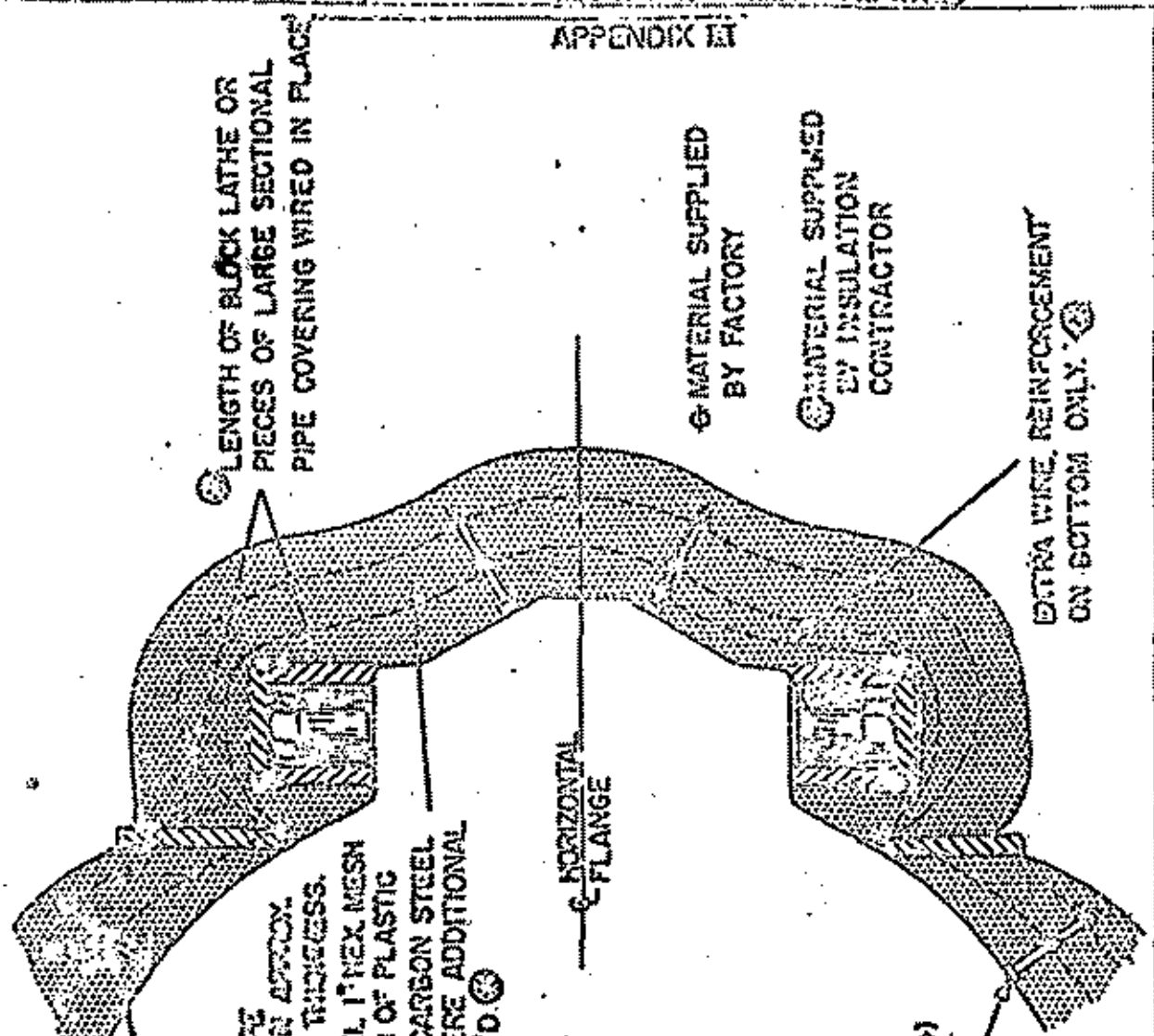
GENERAL ELECTRIC

107A6042

CONT ON SHEET 22 SH NO. 21

TITLE
APPLICATION OF ALL PLASTIC SPRAYED ON TURBINE SHELL AND HORIZONTAL FLANGE EXCEPT BLOCK LATH COVERING FLANGE BOLTS AND USED AS PARTING
FIRST PART FOR UNIT REDUCTION REFERENCE PLATES

APPENDIX III



REVISIONS

2	PHOTO RESTORATION JAN. 23, 71

NYO

273-41

R

273-21

273-84

273-12

RSP

C. SHOCKY 3/11/60

APRIL 19, 60

STEAM TURBINE

SCHENECTADY

107A6042

CONT ON SHEET 22 SH NO. 21

703529

GENERAL ELECTRIC

107A6042

CONT ON SHEET 23 SH NO. 22

NO. 2

107A6042

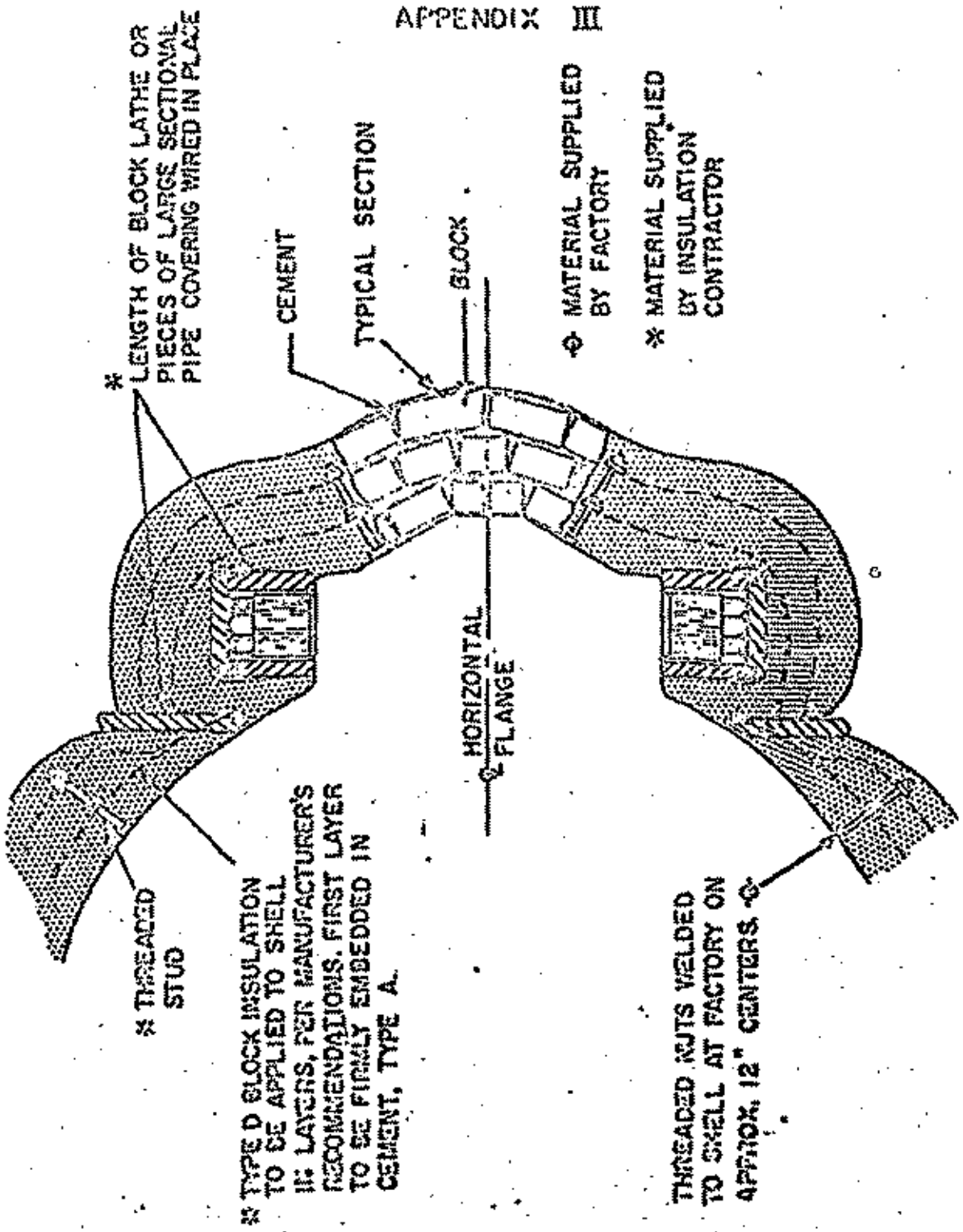
CONT ON SHEET 23 SH NO. 22

TITLE APPLICATION OF ALL BLOCK TYPE INSULATION ON TURBINE SHELL

FIRST MADE FOR HEAT RETENTION [illegible]

REVISIONS

APPENDIX III



2 PHOTO RESTORATION JAN. 25, 71

NYO

273-41

R

273-21

273-13

273-12

R.E.

PRINTS TO

DRAWN BY C. DRIBOUNCE MAR. 13, 60

CHECKED APR. 19, 60

STEAM TURBINE

SCHENECTADY

107A6042

CONT ON SHEET 23 SH NO. 22

A

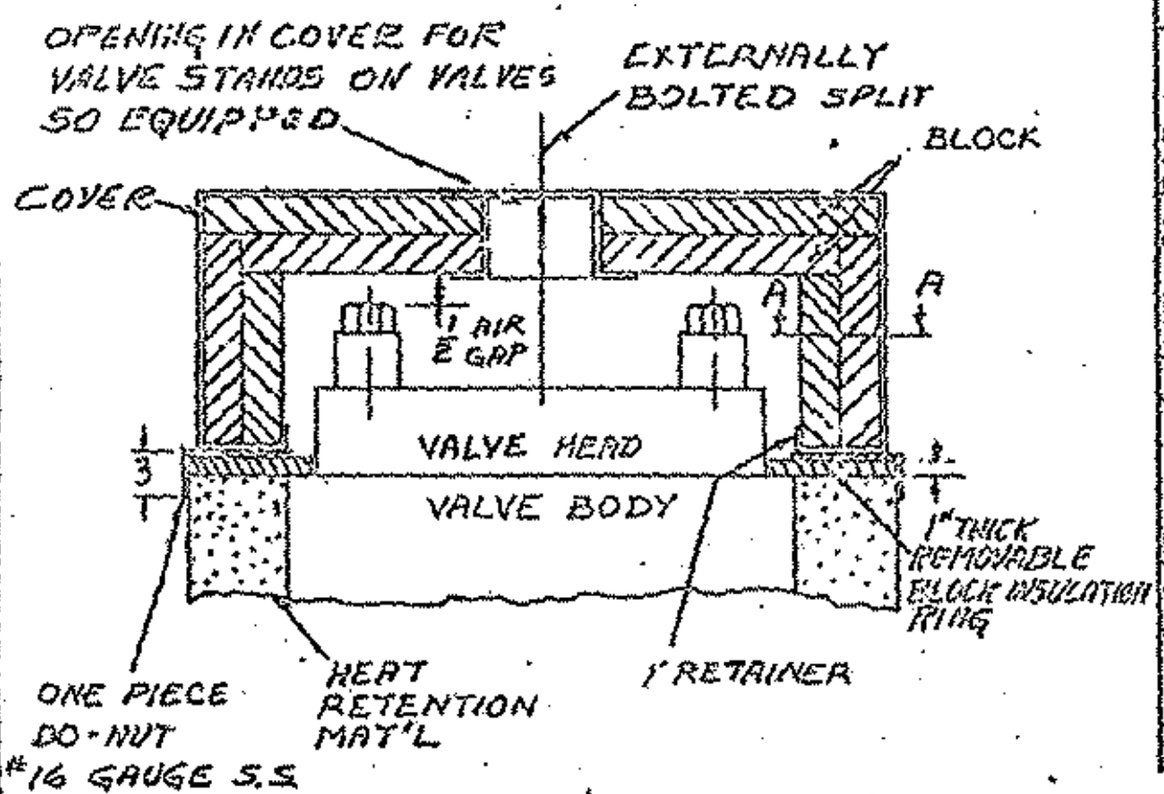
T B

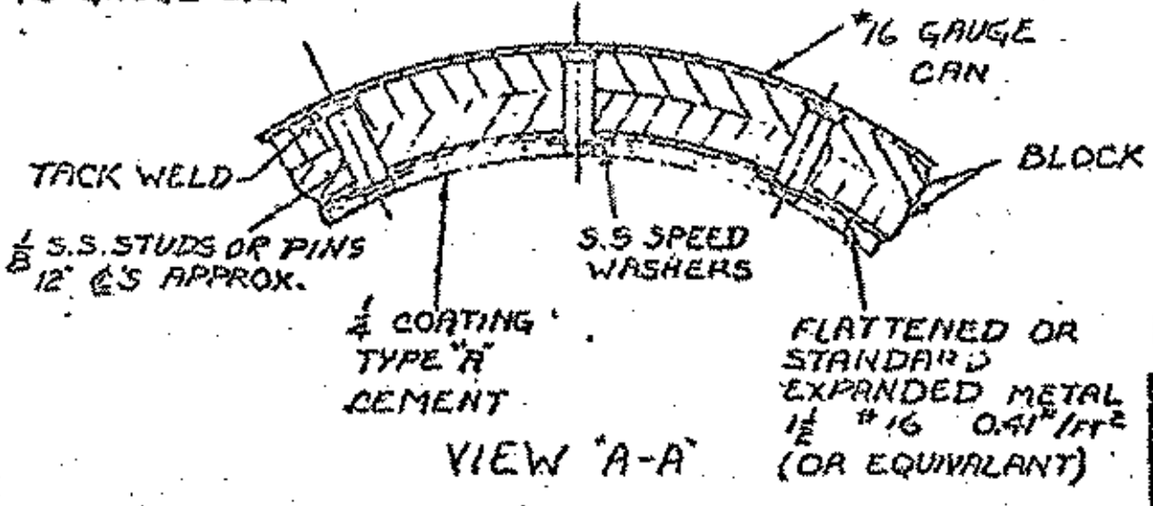
703530

107AG042

107AG042

HEAT RETENTION MATERIAL REV
GENERAL SPECIFICATIONS





VIEW "A-A"

TYPICAL REMOVABLE & REUSABLE COVER

		ST. TURBINE	107A6042
		SCHENECTADY	

THE FOLLOWING COPY WAS MADE FROM A POOR QUALITY ORIGINAL.

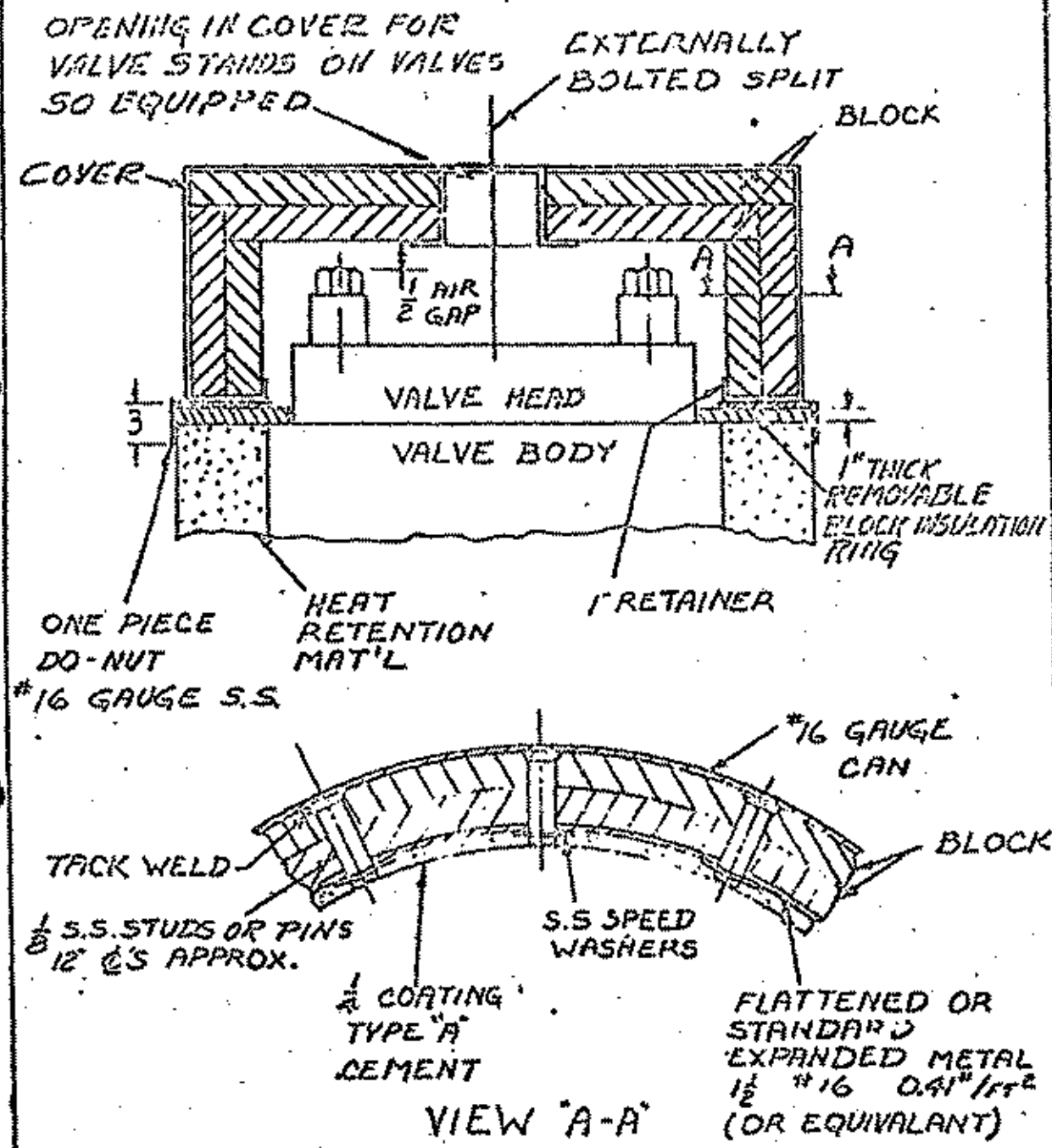
703532

107A6042

TITLE

HEAT RETENTION MATERIAL GENERAL SPECIFICATIONS

FIRST MADE FOR ST. TURBINE APL. 24 G50



TYPICAL REMOVABLE & REUSABLE COVER

3	PROTO RESTORATION JAN. 23, 71		
2			
1			

WYU REP A

273-6 2

273-12

273-8 6

273-4

		ST. TURBINE	107A6042
		SCHENECTADY	

TB

703533

042
SHEET 24

TITLE GENERAL SPECIFICATIONS FOR HEAT RETENTION MATERIAL

FIRST MADE FOR STEAM TURBINE M.R.L. 06650

REVISION

WING NOTES REFER TO SHEETS 18, 20, 23 AND SECTION III-2.

EAMS OF COVERS MAY BE INTERMITTENTLY WELDED PROVIDED ELDS ARE NOT EXPOSED WHEN VIEWED FROM OUTSIDE.

HEN COVERS ARE SPLIT TO ACCOMMODATE REMOVAL, PIPES OR VALVE LINKAGE, THE SPLIT MUST BE FACED ON BOTH VALVES WITH THE SAME MATERIAL AS THE COVER.

ALL BLOCKS ARE TO BE CAREFULLY MITERED WITHOUT CAPS, CURVED TO DIAMETER AND PAINTED WITH TYPE "A" CEMENT.

FOR EACH VALVE COVER, THE VENDOR SHOULD ALSO PROVIDE A SEPARATE ONE PIECE "DO-NUT" THAT WILL FIT ON THE VALVE-BODY HEAT RETENTION MATERIAL AND SO PROTECT IT WHEN THE COVER IS REMOVED.

WHEN THE COVERS ARE INTEGRAL WITH THE METAL LAGGING AND PROVIDED BY G.E. CO., THE VENDOR WILL PROVIDE ALL INTERNAL MATERIAL INCLUDING THE STUDS.

PHOTO RESTORATION JAN. 23, 71

2

NYC

RE

R

273-

273-

273-

273-

PRINT

D. BLAKE JULY 31, 62	APPROVALS	STEAM TURBINE	107A6042
APRIL 20-64		SCHENECTADY	CONT ON SHEET 25

DRAFTSMAN 1 4 IP TB

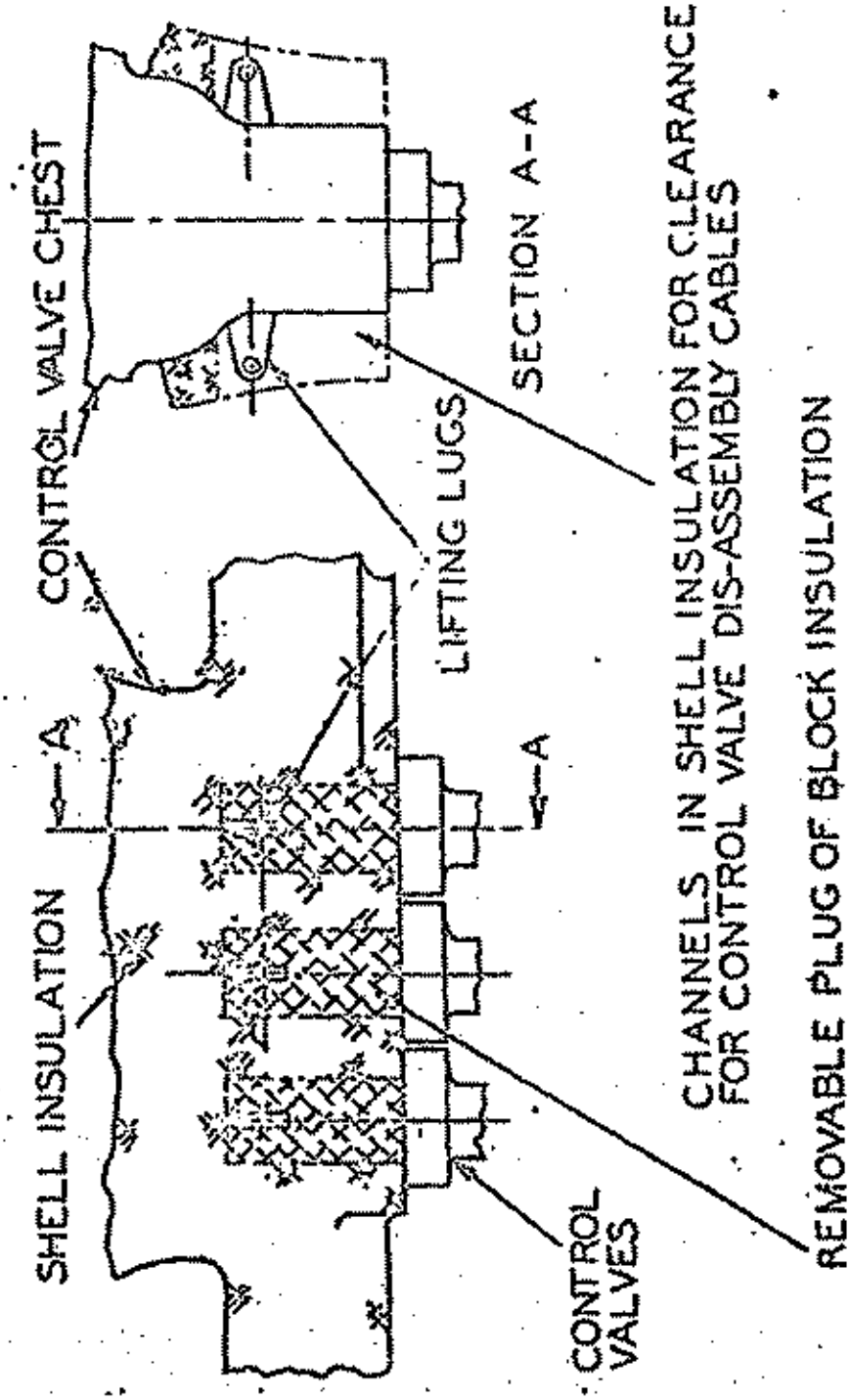
703534

107A6042

107A6042

TITLE: APPLICATION OF INSULATION AT AREA OF LOWER CONTROL VALVE CHEST LIFT LUGS

APPENDIX III



STEAM TURBINE

SCHENECTADY

107A6042

703535