

FILE NAME: General Electric (GE)

DATE: 1990

DOC#: GE103

DOCUMENT DESCRIPTION: GE Technical Information Letter with Cover Letter



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February 13, 1990

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Attn: Dale Murdock
Plant Manager

SUBJECT: TIL 1052-4 ASBESTOS CONTAINING
MATERIALS IN TURBINE-GENERATORS
STEAM TURBINE S/N(S) 99670, 99671, 99672, ~~99673~~, 118389, 118390

Dear Mr. Murdock:

The attached TIL discusses the potential presence of asbestos containing materials associated with the Steam Turbine, Generator, and various auxiliary components. Please review and file in an appropriate location for future reference.

Regards,

Rob Huber
Service Supervisor
(415) 639-5354

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GE POW 002467

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GE POWER GENERATION
CUSTOMER SERVICE

TIL 1052-4

TECHNICAL INFORMATION LETTER

ASBESTOS CONTAINING MATERIAL IN TURBINE-GENERATORS:

Applicable to: Steam Turbine-Generators

Purpose:

The purpose of this Technical Information Letter is to inform our customers of the possible locations of asbestos containing materials in General Electric steam turbine-generators manufactured for Utility and Industrial applications. This information is being provided so that appropriate actions may be taken by each customer to comply with regulatory trends on this subject. The information provided is generic and applies to units in the "as-shipped" condition.

Discussion:

The properties of asbestos make it desirable for applications such as in heat retention and sound deadening materials, electrical insulation systems, gasketing, stem packings, and shaft seals. Non-asbestos containing materials with equivalent needed properties have not always been available for many applications. As the health hazards of asbestos were recognized, new non-asbestos materials for all turbine-generator applications became available that enabled the current turbine-generator shipments to be asbestos free.

Table 1 generically lists the potential locations of materials containing asbestos in turbine-generators, as manufactured. The table is structured by material type, general locations, specific locations and with summary comments.

Applications of the previously used asbestos and/or the presently used non-asbestos substitution are described as follows:

1. Heat retention material used for thermal insulation has been typically purchased to functional specifications from insulation vendors and field installed. In the early 1970's, non-asbestos equivalent materials became available and the GE specifications were subsequently revised to prohibit the use of asbestos. The bulk of asbestos applied in turbine generators was used for heat retention application. Several types of asbestos free material are now commercially available for this application.

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GE POW 002468

Issue Date: November 10, 1989

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2. Sprayed-on sound insulating non-asbestos materials were developed but they had poor adhesion characteristics. Current metal lagging designs do not require sound insulation. Other non-asbestos sound insulating materials are available for existing metal laggings if sound deadening is a requirement.
3. Spiral wound gaskets have a filler material captured by the metal strip. In the new unused condition, the filler is captive but after service and disassembly the metal strip may be broken and the filler material exposed. Spiral wound gaskets with non-asbestos filler materials have been developed to replace the asbestos type and are now available from many sources.
4. Flat sheet gaskets are used extensively for low pressure and low temperature sealing applications. As with the spiral wounds, asbestos containing materials have been used exclusively and the industry has only recently developed suitable non-asbestos replacements. Because of the wide range of environments (which include steam, water, oil, air, and hydrogen) where flat gaskets are used, several different asbestos containing materials have been utilized. Similarly, the industry has developed a variety of non-asbestos replacements but none are exact substitutes. Typically the non-asbestos products cannot be directly substituted for the asbestos gaskets and long term specific application must be confirmed by laboratory tests and actual usage.
5. Stem packing (soft) and shaft seals have also become available for asbestos free applications.
6. Non-asbestos insulating materials for electrical insulation applications have been developed and used for the past several years.

Recommendation:

Generic information regarding possible locations of materials containing asbestos in turbine-generators has been provided as an aid to resolve any actions that may arise as a result of this document. It is suggested that if non-asbestos material substitution is desired that the local GE Field Service Representative be contacted for specific material substitution definition and/or recommendations.

When ordering replacement material, describe and/or provide as much detail information as possible that will help determine the correct replacement. In situations where the old-type asbestos containing materials are ordered by an old drawing number or as a non-catalog item, the correct replacement non-asbestos materials will be provided. Catalog ordering numbers should be used whenever possible to assure the quickest response and delivery.

GENERAL ELECTRIC

Turbine Marketing and
Projects Operation
Customer Service Department

Technical Information Letter No. 1052-4

TABLE 1

ASBESTOS CONTAINING MATERIAL IN TURBINE-GENERATORS

ASBESTOS CONTAINING MATERIAL TYPE	POTENTIAL LOCATIONS		COMMENTS
	GENERAL	SPECIFIC	
HEAT RETENTION MATERIAL (i.e. Thermal Insulation, Lagging)	Hot Surfaces ($> 140^{\circ}\text{F}$)	-HP/IP casings -Main steam piping -Main steam valves -Auxiliary steam valves -Non return valves -Moisture separator and moisture separator reheaters -Steam packing exhauster -Steam seal evaporator -Secondary steam piping and valves -Steam driven oil pumps and regulators	Asbestos eliminated from GE specifications early 1970's. Several asbestos free types of material available commercially
SOUND INSULATING (Sprayed-on)	Metal Lagging Internal Surfaces	-Turbine enclosure -Emphasis lagging -Generator lagging -Excitation equipment lagging	Sound insulation material eliminated on current shipments. Can be removed and left off existing metal laggings. If sound deadening is still required, <u>non-asbestos, non-sprayed-on</u> material is available.
GASKETS - Spiral Wound	HP/IP Casings	-Balance hole access covers -Gib access covers -Inspection hole access covers -Borescope flange connections	Asbestos-free replacement gaskets available.
	LP Inner Casing(s)	-Hand hole access covers -Borescope flange connections -Internal piping	
	Main Steam Piping	-HP shell flanges -RHT shell flanges -Crossover flanges -Crossaround flanges -Crossaround relief valve mounting flanges -Crossaround piping manways	

ASBESTOS CONTAINING MATERIAL TYPE	POTENTIAL LOCATIONS		COMMENTS
	GENERAL	SPECIFIC	
GASKETS - Spiral Wound (cont'd)	Main Steam Valve Assemblies (Main Stop, Control, Reheat and Intercept Valves) Non Return Valves	-Valve heads -Bolted-in seats -Bolted inlet flanges -Bolted outlet flanges -CY stand -Bolted stem bushing guides -Leakoff flanges -Yoke to casing -CY head -Equalizer valve flanges -SV bypass seat	Asbestos-free replacement gaskets available.
	Auxiliary Steam Valves (Equalizer, Blowdown, Ventilator, Bypass, CY Starting, Speed Matching, Cross- over Admission, Extraction, Steam Seal Regulator)	-Valve heads -Bolted-in seats -Bolted inlet flanges -Bolted outlet flanges -Bolted stem bushing guides -Leakoff flanges -Yoke/stand to casing	
	Moisture Separator (MS) and Moisture Separator Reheaters(MSR)	-MS/MSR manways -MS/MSR drain tank manways -Leak detection orifice flanges	
	Heat Exchangers (Steam Packing Exhauster, Steam Seal Evaporator)	-SPE shell drain -SSE drain tank inlet -SSE drain tank pipe connections	
	Secondary Steam Piping and Valves (Steam Seal), External Drain, Heating & Cooling Steam, Bypass	-Flanged piping connections -Valve inlet flanges -Valve outlet flanges -Valve bonnet to body -Relief valve test lever	

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ASBESTOS CONTAINING MATERIAL TYPE	POTENTIAL LOCATIONS		COMMENTS
	GENERAL	SPECIFIC	
GASKETS - Flat Sheet (*or Woven Cloth)	LP Casings	-Inner casing access* -Exhaust hood manways -Last stage orifice assembly -Bearing cap access openings -Exhaust flange -Sight flow opening	Woven cloth gaskets can be replaced with non- asbestos materials or suitable non-asbestos spiral wound gaskets. Non-asbestos flat sheet gasket materials available.
	Packing Casings	-Bolting flanges -Pipe flanges	
	Valve Chest	-Valve chest cover	
	Heat Exchangers (Steam Packing Exhausters, Steam Seal Evaporators, Oil Coolers, EHC Coolers, Stator Bag Coolers, Air Coolers, Hydrogen Coolers)	-Shell to tubesheet -Shell outlet flange -Header to cover -Manway cover -Waterheader to cover -Waterheader to tubesheet -Waterbox to cover -Shell flange to seal ring -Seal ring to waterbox	
	Hydraulic Applications (Hydraulic Mechanisms (MHC) at Front Standard, Hydraulic Enclosures, Separate Hydr. Cylinder Assemblies, Lube Oil Tank, Lift Pump Assemblies, Front/Mid Standards, Turning Gear Housings, Thrust Bearing Near Detector, Oil Conditioners, Filters)	-Hydraulic mechanisms bolted joints -Housing access covers -Lube and hydraulic pipe flanges -Oil pumps mounting flanges -Booster pump cover -Lube oil transfer valve mounting flange -Gage mountings -Switchbox cover	
	Air Applications	-Air cylinders -Air valves -Air filter regulators	
	Generator	-Access covers	

ASBESTOS CONTAINING MATERIAL TYPE	- POTENTIAL LOCATIONS		COMMENTS
	GENERAL	SPECIFIC	
STEM PACKING	Valve Stems	-Nuclear main steam valves -Secondary steam systems valves -Special fossil main steam valves	Non-asbestos material available. ↓
	MHC Hydraulic Cylinders for Main Steam Valves	-Rod seal for exposed cylinders	
SHAFT SEAL	Lube Oil System	-Vapor extractor -Butterfly valve -Transfer valve bearing seal (Andale only)	Non-asbestos materials available from vendors. ↓
	Valve Motor Operators	-Shaft seals at several locations	
	Non Return Valves	-Shaft seals	
VALVE SEAL	Butterfly Valves	-Internal seal material on disc	Contact vendor for substitutions
ELECTRICAL	Motors	-DC motor insulation	Asbestos eliminated in 1980.
	Thermocouples	-Extension wire insulation	Asbestos eliminated about 1970. ↓
	Heaters (Generator)	-Wire insulation	
	Generator Electrical Insulation Systems (Moven materials, papers, resin fiber combinations, putty)	-Stator bar armor tape -Tape on ducts of gas cooled armature bars -Vertical separators in armature bars -Rotor slot insulation -Rotor slot armor voltage grading -Rotor blocking -Rotor end turns tape -Packing under series loop insulation -Retaining ring insulation -Stator bar strand insulation	Non-asbestos materials for all types of generator electrical insulation systems available since 1983.
	Exciters	-4 pole rotor	Asbestos eliminated

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