



KEK

High Pressure Gas Safety Regulations in Japan for SC Cavities & Cryomodules

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Legal Notice

- The English legal terms and texts in this presentation are unofficial, and they are to be used solely as reference material to aid in the understanding of Japanese laws and regulations.
- Only the original Japanese terms and texts of laws and regulations have legal effect.



Outline

- **Governing Law**

- **High Pressure Gas Safety Act**
(Act No. 204 in 1951)

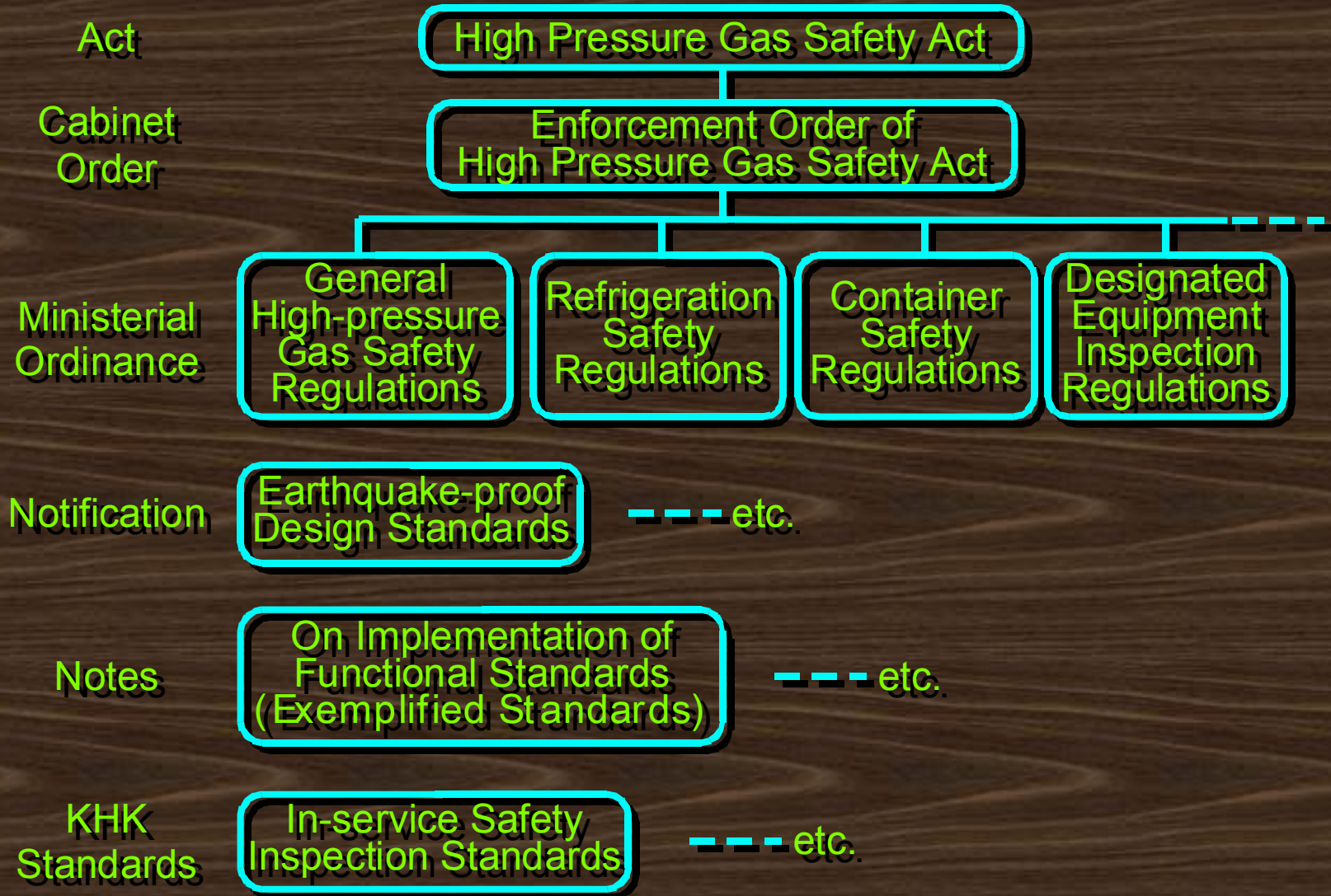
- **Competent Authorities**

- **The Ministry of Economy, Trade and Industry (METI)**
<http://www.meti.go.jp>
- **The High Pressure Gas Safety Institute of Japan (KHK)**, under METI by the act
<http://www.khk.or.jp>
- **Prefectural Government (e.g. Ibaraki-ken for KEK)**



KEK

Legal System



Relevant Laws & Technical Standards

- High Pressure Gas Safety Act (HPGSA)
- Designated Equipment Inspection Regulations (DEIR)
- Note “On Implementation of Functional Standards regarding Designated Equipment Inspection Regulations” (Exemplified Technical Standards; ETS)

SC Cavities & Cryomodules

- Categorized as “Designated Equipment” in DEIR (Art. 3 of DEIR)
 - Especially requiring inspections on either design, material quality, or the manufacturing process
 - Designated equipment inspection conducted by agencies including KHK
 - Foreign manufacturers of designated equipment for export to Japan may apply for the designated equipment inspection by KHK and others



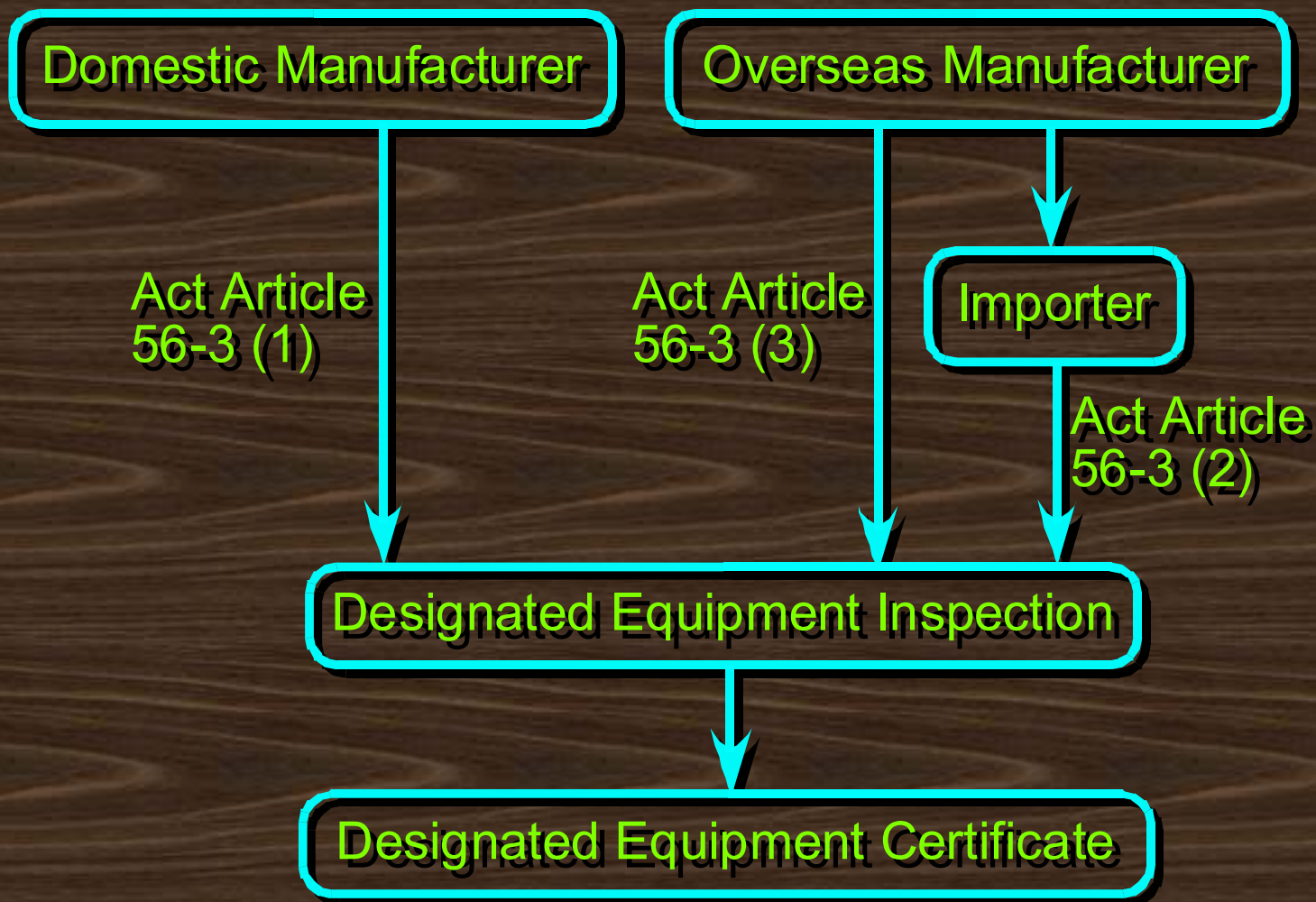
Legal Procedures

1. Application for Ministerial Special Technical Approval (**MSTA**) of METI, if necessary
2. Application for Designated Equipment Inspection (**DEI**)
3. Application for Welding Procedure Approval of KHK under ETS
4. Various inspections during manufacturing process
5. Leak Test after assembly
6. Completion Inspection by Prefectural Government after installation



Who Applies for DEI?

Designated Equipment



Notes for Overseas Manufacturer

- Measures have been taken to speed up the procedures for the designated equipment by accepting certain foreign testing data at the time of inspections
- American Society of Mechanical Engineering (ASME) Standards were added to the technical standards regarding designated equipment inspection (enforcement from March 2003)

Technical Issues Requiring MSTA

● Matters incompatible with DEIR (Case 1)

- Strength of welded parts
- Finish of joints, etc.

● Matters incompatible with ETS (Case 2)

- Niobium not approved as materials in ETS
- Strength calculations, etc.

Incompatibilities with DEIR (Case 1)

- Special exception of application of technical standards provided in DEIR to designated equipment with special design (Art. 51 of DEIR)
- Special applicable technical standards approved by the Minister of METI (MSTA)
- Evaluation of special design for high pressure gas equipment by the evaluation committee organized by KHK prior to applying for MSTA
 - e.g. welded part of niobium is less strong than original material

Form for Evaluation by KHK

Form 1

Application Form for Evaluation of Designated Matters

Number
Date

To President of the High Pressure Gas Safety Institute of Japan

Applicant:
Address
Name
Representative

Seal

This is the application for Evaluation of Designated Matters⁽²⁾ on (1)

Manufacturer of High Pressure Gas Equipments	Name (including name of establishment)	
	Location (street address)	
Establishment where High Pressure Gas Equipments are to be located	Name	
	Location (street address)	
Outline of High Pressure Gas Equipments	Kind	
	Normal pressure ⁽³⁾	
	Normal temperature ⁽⁴⁾	
	Working fluid	
Description of Special Technical Approval		As described on the attached form

Notes:

1. The size of this form shall be A4 defined in Japanese Industrial Standards.
2. A letter of delegation written by the representative person shall be attached, if the applicant does not have a representation right.
3. Blank (1) shall be filled with the appropriate name on the attached table 1 with dropping the term of "special technical approve regarding."
4. Term (2) shall be written as "Comprehensive Evaluation of Designated Matters," if the case of application for comprehensive evaluation of designated matters.
5. Term (3) shall be written as "Design pressure," if the application is regarding Art. 64 (2) based on Art. 69 of Designated Equipment Inspection Regulations and Refrigeration Safety Regulations, or as "Allowable pressure," if regarding Art. 7 (1) (vi), Art. 7 (2), Art. 8 (2), Art. 12 and Art. 13 based on Art. 69 of Refrigeration Safety Regulations, respectively.
6. Term (4) shall be written as "Design temperature," if the application is regarding Designated Equipment Inspection Regulations and Refrigeration Safety Regulations.



Attached Form for Evaluation

Attached Form 1

Description of Special Technical Approval

- Name of Applicant
- Division of Contact Persons
- Names of Contact Persons (2 or more)
- Telephone no. & Facsimile no.

Kind of High Pressure Gas Equipment	Governing Provisions	Provisions to be specially approved	Descriptions		Remarks
			Reasons provided standards are not applicable	Countermeasures	
Summary					

Notes:

1. The size of this form shall be A3 defined in Japanese Industrial Standards.
2. In the place (1) shall be summarized concretely the outlines of equipments and containers to be approved specially, or how the applicable standards will be employed. Specify clearly if the same or similar matters have already specially approved before. If the description of special technical approval requires more than one sheet of form, this summary shall be written only on the first sheet.



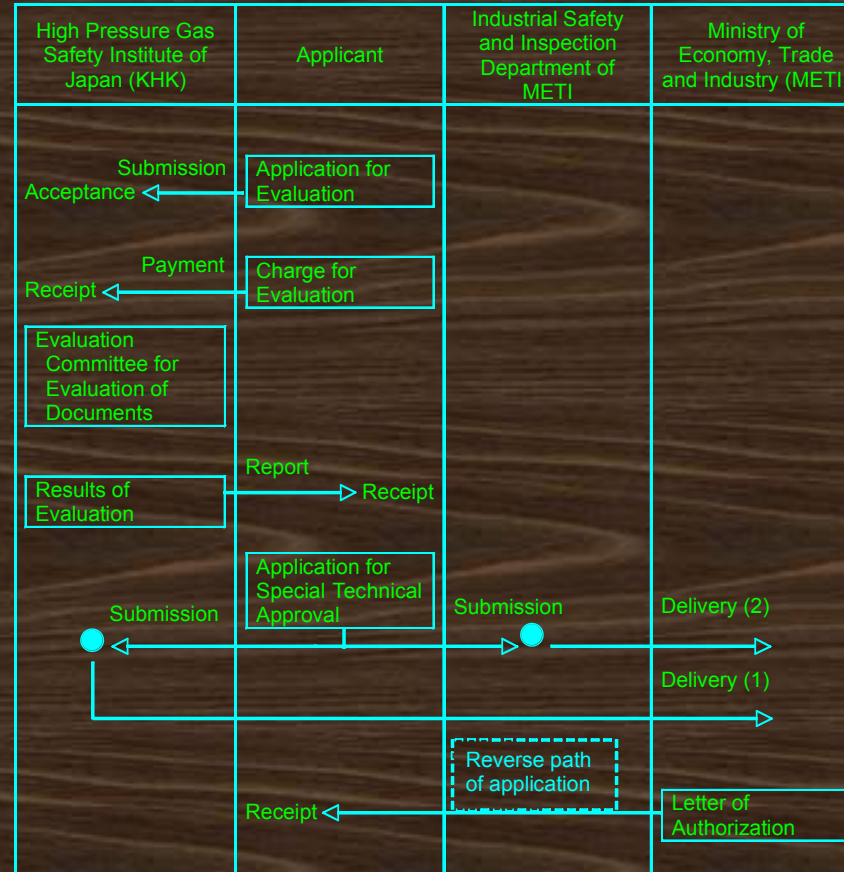
Attached Documents

1. Outline of equipment; including inner volume, storage capacity, etc.
2. Design drawings of equipment; general assembly drawing, parts drawing
3. Materials used
4. Process flow sheet
5. Location of equipment and drawing of surrounding circumstances
6. Detailed description of MSTA; thickness calculation, materials, procedure of machining, welding and inspections, etc.
7. Other additional documents

Procedure Flow of MSTA

[Reference]

Procedure Flow of MSTA (Summary)



Notes:

(1) For cases concerning with Designated Equipment Inspection Regulations (except application on Art. 7 (2)), and for cases concerning with Npressurization, gas-tightness and strength On General High-pressure Safety Regulations, Liquefied Petroleum Gas Safety Regulations and Industrial Complexes Safety Regulations.

(2) For cases other than (1).

Incompatibilities with ETS (Case 2)

- Evaluation by the evaluation committee organized by KHK prior to applying for special technical standards other than those included in ETS
 - e.g. materials not approved in ETS (niobium etc.)
 - e.g. usage of the strength calculation formula not specified in ETS

Attached Documents

1. Outline of designated equipment
2. Reason why ETS not applicable
3. Applicable detailed standards
4. Reason why applicable detailed standards are appropriate, and evidence they are safe
5. Other document as drawing, calculation sheets, reference books, etc.

Precautions to Procedure Steps

- Processing time and kinds of inspections described in the following procedure steps may vary according to the circumstances at the time of each step.

Procedure Step 1

- **Brief Explanation of MSTA Application**
 - Introduction of the outline of MSTA application to KHK, and also to Prefectural Government
 - Earlier than 1 month prior to the application for MSTA

Procedure Step 2

- **Application for MSTA**
 - **Submission of application forms of evaluations of “designated equipment inspection” and of “designated matters” to KHK**
 - **Check by KHK**
 - **Corrections of application forms, if any, after the check by KHK**
 - **Earlier than 1 month prior to the evaluation committee deliberation (correction acceptable 2 weeks before the committee deliberation)**

Procedure Step 3

- **Deliberation by Evaluation Committee**
 - Held once a month
 - Report of the evaluation results about one week later of the committee deliberation
 - If any comments from the committee, submission of solutions and/or corrections of application forms
 - Approval of KHK to “evaluation of designated equipment inspection”

Procedure Step 4

- **MSTA Application**
 - **Submission of application forms of MSTA with evaluation report**
 - **Issue of certificate of MSTA from the Minister of METI about 1 month later of the application**

Procedure Step 5

- **Application for DEI**
 - **Submission of application forms to KHK after reception of the certificate of MSTA**
 - **Issue of permission for manufacture of designated equipment from KHK about 1 week later of application**

Procedure Step 6

- Approval of Welding Procedures by KHK
 - Applications regarding welding methods, materials and thickness of the materials
 - Approval needed before actual welding of materials
 - Application for approval can be executed simultaneously with applications of special technical approval and designated equipment inspection
 - About 2 months to be approved

Procedure Step 7

- **Inspections During Manufacturing Process**
 - Confirmation of materials with presence of KHK staff
 - Check of parts dimensions
 - Inspection of welding bevels
 - Mechanical test (tensile test) of welded parts with presence of KHK staff
 - Appearance inspection after welding with presence of KHK staff

Procedure Step 7 (Cont'd)

- Confirmation of thickness with presence of KHK staff
- Radiograph test (RT)
- Penetrant test (PT)
- Pressure test at pressure of 1.5 times (test with liquid) or 1.25 times (test with gas) of design pressure with presence of KHK staff
- Gas-tight test at normal pressure with presence of KHK staff



Procedure Step 8

- **After Completion of Cryomodule Assembly**
 - **Leak test with presence of KHK staff**
 - **Issue of certificate of DEI**

Procedure Step 9

- **After Cryomodule Installation**
 - **Completion inspection with presence of Prefectural Government officer**
 - Screening of application documents
 - Gas-tight test at normal pressure
 - **Issue of permission of operation**



Acknowledgment

- The information on the legal procedure regarding the high pressure gas safety act and relevant laws from staffs of Mitsubishi Heavy Industries Ltd., Kobe Shipyard & Machinery Works is appreciated.