

CHARTING THE FUTURE 

ClassNK

Guidelines for Advanced Safety Measures
(Edition 1.0)

[English]



ClassNK

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Introduction

With the rapid progress of information technology in recent years, the development of advanced safety measures that contribute to ship safety through the use of IoT and big data, including automatic navigation technology, has been actively pursued. One example of such an additional safety measure is a navigation information display system that collects and analyses real-time images from cameras installed on navigation bridges as well as data on ships and other objects obtained from AIS, radar, and other sources, and then displays said data on single-screen monitors for ship personnel to easily see and understand. These types of advanced safety measures not only improve ship safety, but also contribute to the achievement of the various Sustainable Development Goals (SDGs) recently incorporated into the management principles and business plans of various shipping companies. In other words, such measures are expected to contribute to the technological development of the maritime industry.





The primary purpose of the ClassNK Classification Rules (e.g. the *Rules for the Survey and Construction of Steel Ships*), on the other hand, is to aid in the evaluation of the minimum safety of ships, with little consideration being given to the evaluation of safety improvements achieved through the implementation of additional safety measures or their advanced features. For this reason, the ClassNK launched a new certification service called “Innovation Endorsement” in 2020 that aims to evaluate the added value of innovations, including advanced safety measures, in order to promote their spread and development, to further improve environmental protection and ship safety at sea, and to support the achieving of SDGs.

As part of its “Innovation Endorsement” service, ClassNK has also established requirements related to affixation of specialised class notation indicating the implementation of advanced features to the classification characters of ships adopting such additional safety measures. The details of this are contained within this *Guidelines for Advanced Safety Measures* (hereinafter referred to as the “Guidelines”).

This Guidelines specifies that ships adopting advanced safety measures may have class notations corresponding to such safety measures affixed to their classification characters. In addition, there are also requirements which specify ways for ships adopting advanced safety measures not yet covered within this Guidelines to have corresponding class notations affixed to their classification characters depending on the nature of such measures.

ClassNK hopes that this Guidelines will assist in the dissemination and development of innovative technologies related to the improvement of ship safety throughout the global maritime industry.

Sustainable Development Goals (SDGs) relating to this Guidelines

Related SDGs	Goals	Related Targets
	Ensure healthy lives and promote well-being for all at all ages	3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks
	Build resilient infrastructure, promote sustainable industrialization and foster innovation	9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
	Take urgent action to combat climate change and its impacts	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries 13.2 Integrate climate change measures into national policies, strategies and planning 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
	Conserve and sustainably use the oceans, seas and marine resources	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

ClassNK Innovation Endorsement Approach

As companies pursue ESG management and the SDGs to realise a sustainable society, various innovations have been vital to resolve challenges.

ClassNK has offered “Innovation Endorsement (IE) Approach” as a framework to support innovative initiatives through third-party certification. The basic concept of IE is introduced below.



Background

IE is ClassNK’s initiative as a third-party certification body to create new value based on “Third party certification/ evaluation/ rating”, and it is one of the three business pillars on which “ClassNK Digital Grand Design 2030”^{*1} (announced in February 2020) is based. It describes the future shape required to be taken by a classification society within a digital society.

(*1) Related press release: [“ClassNK develops its Digital Grand Design 2030”](#)

Policy

The principle policy of IE is as follows

- **Speed-focused:** As the innovation progresses rapidly, ClassNK focus on the speed to fully follow its pace, establish evaluation technologies as a third party, and then certify such innovation.
- **Cooperation with front runners:** Since a clear evaluation standard is unlikely to have yet been established for innovative technologies, ClassNK examines and develops evaluation standards in collaboration with pioneering front runners.
- **Certification expected by customers and society:** In response to the expansion of the scope of

innovative initiatives, the scope and target of certification will be also expanded based on customer needs and social conditions.

Scope of certification

The scope of IE covers four categories: Digital^{*2}, Environment, Safety, and Labour. In addition, “Yours” demonstrates ClassNK’s commitment to work to meet any needs of customers and society.

(*2) IE was launched focusing on digital innovation in July 2020.

Target of certification

IE covers three categories as the target of certification: Ships, Products & Solutions, and Providers.

- Notation: For ships, notations such as “DSS”^{*3}, “a-EA”^{*4}, “a-SAFE”^{*5}, and “ELW”^{*6} indicating advanced initiatives related to the digitalisation, environment, safety, and living and working environment on board have been incorporated to the ship, are added in its class certificate and support the enhancement of ship’s value.
- P&S certification: For products and solutions (P&S), ClassNK examines and verifies their innovative functions based on our knowledge and experience as a third-party certification body and issue certificates for supporting the deployment of products and services.
- Provider certification: For organisations (providers) engaging in innovative initiatives, ClassNK provides flexible supports from the early stage with three levels of certification, (1) Conception (Class C), (2) Development (Class D), and (3) Sustainable implementation (Class S).

ClassNK is committed to contributing to the sustainable evolution of maritime and offshore business by actively supporting innovative technologies through IE, and monitoring to innovation trends, and continues its innovation ecosystem to respond quickly to customers’ advanced initiatives.

(*3) DSS: Abbreviation for Digital Smart Ship. Refer to ClassNK’s Guidelines for Digital Smart Ships.

(*4) a-EA: Abbreviation for Advanced Environmental Awareness. Refer to Chapter 5 of ClassNK’s Environmental Guidelines.

(*5) a-SAFE: Abbreviation for Advanced Safety. Refer to ClassNK’s Guidelines for Advanced Safety Measures.

(*6) ELW: Abbreviation for Excellent Living and Working Environment. Refer to ClassNK’s Guidelines for Excellent Living and Working Environment.

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Revision History

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1	April 25, 2022	First issue



Guidelines for Advanced Safety Measures

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Chapter 1 GENERAL

1.1 General

1.1.1 Purpose

1 The purpose of this *Guidelines for Advanced Safety Measures* (hereinafter referred to as the “Guidelines”) is to evaluate the advanced features of ships adopting advanced safety measures, and to stipulate requirements related to the affixation of corresponding class notation to classification characters of ships according to the type of advanced safety measures adopted.

2 This Guidelines is not intended to guarantee the safety of ships afforded by advanced safety measures. In addition, the information, etc. provided by such advanced safety measures is not a substitute for the judgment and responsibility of captain.

1.1.2 Application

1 This Guidelines applies to ships registered with the Nippon Kaiji Kyokai (hereinafter referred to as “the Society”) that adopt advanced safety measures, and for which applications for the affixation of special class notation to classification characters are submitted.

2 It is assumed that the verification of the safety aspects of the ships to which this Guidelines applies has been carried out in the process required for classification in accordance with the *Rules for the Survey and Construction of Steel Ships*, etc.

3 Notwithstanding -2 above, the Society may require additional verification of safety aspects by means of risk assessment and other means when deemed necessary.

1.1.3 Class Notations

1 For ships adopting advanced safety measures, the notation “Advanced Safety(XX)” (abbreviated as *a-SAFE(XX)*) is to be affixed to the classification characters of the ships in accordance with this Guidelines. The relevant advanced safety measure is described in “XX”, and these are listed one after another in cases where multiple measures are implemented. (e.g. “Advanced Safety(CRI, XRD)” (abbreviated as *a-SAFE(CRI, XRD)*) in cases where ships adopt the advanced safety measures specified in 3.2.2 and 3.2.3.).

2 In the following three cases, the notation “XX” defined in -1 above is to be affixed with additional numbers or letters respectively.

(1) In cases where the relevant requirements for advanced safety measures specified in 3.2 are amended as technology advances and it is considered appropriate by the Society that the equipment, system, facility, etc. approved according to amended requirements should be identified from those approved according to previous requirements, the notation “XX” is to be affixed with an additional number to be separately specified by the Society at some future date. (e.g. “Advanced Safety(XX2)”)

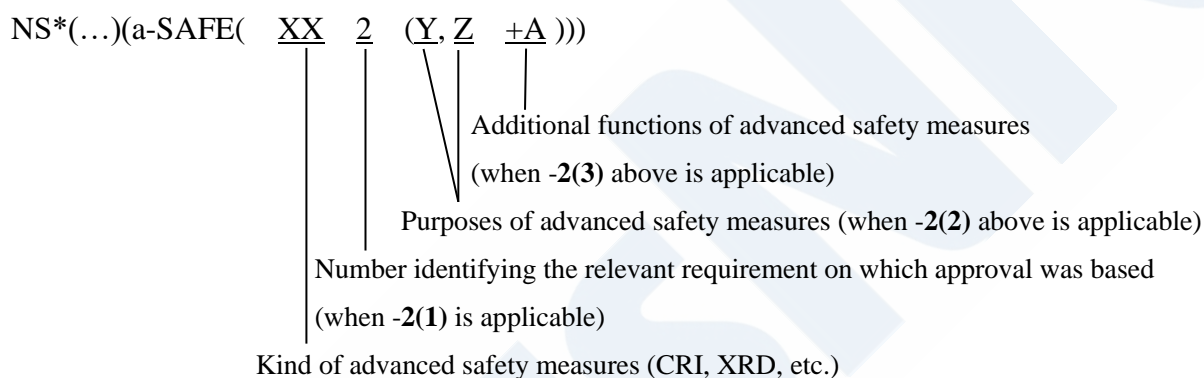
(2) In cases where an advanced safety measure specified in 3.2 can be used for multiple purposes

specified by the Society, the notation “XX” is to be affixed with additional letters in order to identify the purposes of the advanced safety measure. (e.g. “Advanced Safety(XX(Y, Z))”)

- (3) In cases where an advanced safety measure specified in 3.2 has additional functions specified by the Society, the notation “XX” is to be affixed with additional letters in order to identify the additional functions of the advanced safety measure. (e.g. “Advanced Safety(XX+A))” or “Advanced Safety(XX(Y+A))”)

3 In cases where a ship adopts an advanced safety measure that is not specified in this Guidelines, relevant class notation may be affixed to the classification characters of the ships based on the application for said notation.

e.g.



1.1.4 Termination of Class Notation

The Society will delete relevant class notation in cases where an advanced safety measure in accordance with this Guidelines is not properly maintained. Compliance with this Guidelines, however, is optional and not a condition of class maintenance.

Chapter 2 SURVEYS

2.1 General

2.1.1 Kinds of Surveys

The kinds of surveys are specified in the following (1) to (3).

- (1) Initial Surveys
- (2) Periodical Surveys
- (3) Occasional Surveys

2.1.2 Timing of Surveys

The timing of surveys is as specified in the following (1) to (3).

- (1) Initial Surveys are to be carried out at the time the application for the survey is made.
- (2) Periodical Surveys are to be carried out at the times of Annual Surveys, Intermediate Surveys and Special Surveys for Classification (i.e. those times given in **1.1.3-1(1) to (3), Part B of the Rules for the Survey and Construction of Steel Ships**).
- (3) Occasional Surveys are to be carried out on the following occasions at times other than Initial Surveys or Periodical Surveys.
 - (a) In cases where the advanced safety measures are changed or replaced.
 - (b) In cases where any conversions affecting the advanced safety measures are carried out.
 - (c) In cases where any applications for surveys are submitted by owners.
 - (d) Other occasions when Occasional Surveys are considered to be necessary.

2.1.3 Periodical Surveys Carried Out in Advance and Postponement

The requirements for the carrying out in advance or postponement of Periodical Surveys are to be in accordance with the requirements for Periodical Surveys for Classification (i.e. **1.1.4** or **1.1.5, Part B of the Rules for the Survey and Construction of Steel Ships**).

2.1.4 Ships Laid-up

Ships laid-up are not subject to the Periodical Surveys specified in **2.1.1(2)**.

2.1.5 Preparation for Surveys and Other Related Issues

1 In cases where ships are to be surveyed in accordance with this Guidelines, it is the responsibility of the Owners to notify Surveyors of the locations where they wish to undergo such surveys. Surveyors are to be advised of surveys a reasonable time in advance so that such surveys can be carried out at proper times.

2 All such preparations as required for registration, periodical and other surveys specified in this Guidelines as well as those which may be required by Surveyors in accordance with this Guidelines are the responsibility of Owners or their representatives.

3 Applicants for surveys are to arrange supervisors who are well conversant with all of the survey

items required for the preparation of such surveys and who are able to provide all necessary assistance to the Surveyor according to their requests during such surveys.

4 Surveys may be suspended in cases where necessary preparations have not been made, any appropriate supervisor is not present, or the Surveyor considers that the safety needed for the execution of the survey is not ensured.

5 In cases where repairs are considered to be necessary as a result of surveys, Surveyors notify survey applicants of their findings. Applicants, upon receiving such notification, are to obtain Surveyor verification after carrying out any necessary repairs.

2.2 Initial Surveys

2.2.1 General

During Initial Surveys, the advanced safety measures are to be examined and surveyed in order to ascertain whether this Guidelines is satisfied.

2.2.2 Submission of Plans and Document

1 For ships intending to undergo Initial Surveys, the relevant plans and documents specified in **Chapter 3** are to be submitted to the Society.

2 Notwithstanding **-1** above, it is not necessary to submit a separate set of such documents for Initial Surveys at Classification Surveys During Construction.

3 Submission of additional plans and documents may be required in cases where deemed necessary by the Society.

2.2.3 Survey Items

During Initial Surveys, the following items are to be confirmed:

- (1) The appropriate installation of all relevant equipment, systems, facilities, etc.
- (2) The proper provision on board of all relevant documents, procedure manuals and record books.
- (3) In cases where Initial Surveys are carried out at times other than at Classification Surveys During Construction, proper maintaining on board of all relevant equipment, systems, facilities, documents, procedure manuals, and record books, etc. In addition, required record keeping is being carried out for record books, etc.

2.3 Periodical Surveys

2.3.1 General

During Periodical Surveys, the advanced safety measures are to be surveyed in order to ascertain whether this Guidelines is satisfied.

2.3.2 Survey Items

During Periodical Surveys, the following items are to be confirmed.

- (1) The condition of relevant equipment, systems, facilities, etc. is in good order.
- (2) Relevant documents, procedure manuals, etc. are being appropriately maintained.
- (3) Relevant record books, etc. are being appropriately maintained, and required record keeping is being carried out.

2.4 Occasional Surveys

2.4.1 General

In cases where equipment, systems, facilities, etc. for advanced safety measures are changed or replaced, Occasional Surveys are to be carried out and such equipment, systems, facilities, etc. are to be confirmed as complying with this Guidelines.

Chapter 3 **ADVANCED SAFETY MEASURES**

3.1 **General**

3.1.1 **Submission of Plans and Documents**

During Initial Surveys, the plans and documents specified in **Table 3.1** are to be submitted to the Society in order to examine those items specified in **3.2**.

3.2 **Advanced Safety Measures**

The advanced safety measures and corresponding class notation are to be in accordance with this **3.2**.

3.2.1 **Advanced Safety (Radar Based System Displaying xx Information) (a-SAFE(Rxx))**

For ships provided with a system that displays additional information such as waves, floating ice, oil, etc. which is different from the conventional object marker information displayed on screen by analysing the radar signals received by the radar, the class notation “Advanced Safety (Radar Based System Displaying xx Information)” (abbreviated as *a-SAFE(Rxx)*) may be affixed to the classification characters of the ships. The following symbols are used for xx, depending on the information to be covered. Useful information other than those listed below, which the Society deems appropriate, may be affixed by selecting the appropriate characters.

- (1) Sea Wave: SW
- (2) Floating Ice: FI
- (3) Spilled Oil: SP

3.2.2 **Advanced Safety (Collision Risk Indication System) (a-SAFE(CRI))**

For ships provided with a Collision Risk Indication System for predicting, indicating and warning about areas where collisions with other ships are likely to occur in the future (i.e. Predicted Areas of Danger (PAD) and Dangerous Areas of Collision (DAC)) or areas where navigation is impeded by other ships (i.e. Obstacle Zone by Target (OZT)) from data for other ships obtained from AIS in order to prevent collisions with such ships navigating in the same area, the class notation “Advanced Safety (Collision Risk Indication System)” (abbreviated as *a-SAFE(CRI)*) may be affixed to the classification characters of such ships.

3.2.3 **Advanced Safety (Extended Reality Display System) (a-SAFE(XRD))**

For ships provided with a display system for superimposing the navigation information necessary for safe navigation (such as information about other ships, obstacles, etc. and geographical information) obtained from existing navigation equipment and radio equipment (AIS, radar, ECDIS, etc.) onto real-time images from cameras installed on the bridge or virtual three-dimensional images, the class notation “Advanced Safety (Extended Reality Display System)” (abbreviated as *a-*

SAFE(XRD)) may be affixed to the classification characters of such ships.

**3.2.4 Advanced Safety (Forward Underwater Obstacle Detection System)
(a-SAFE(FUOD))**

For ships provided with a highly accurate detection system for underwater obstacles in front of the ship, the class notation “Advanced Safety (Forward Underwater Obstacle Detection System)” (abbreviated as *a-SAFE(FUOD)*) may be affixed to the classification characters of such ships.

3.2.5 Advanced Safety (Berthing Support System) (a-SAFE(BSS))

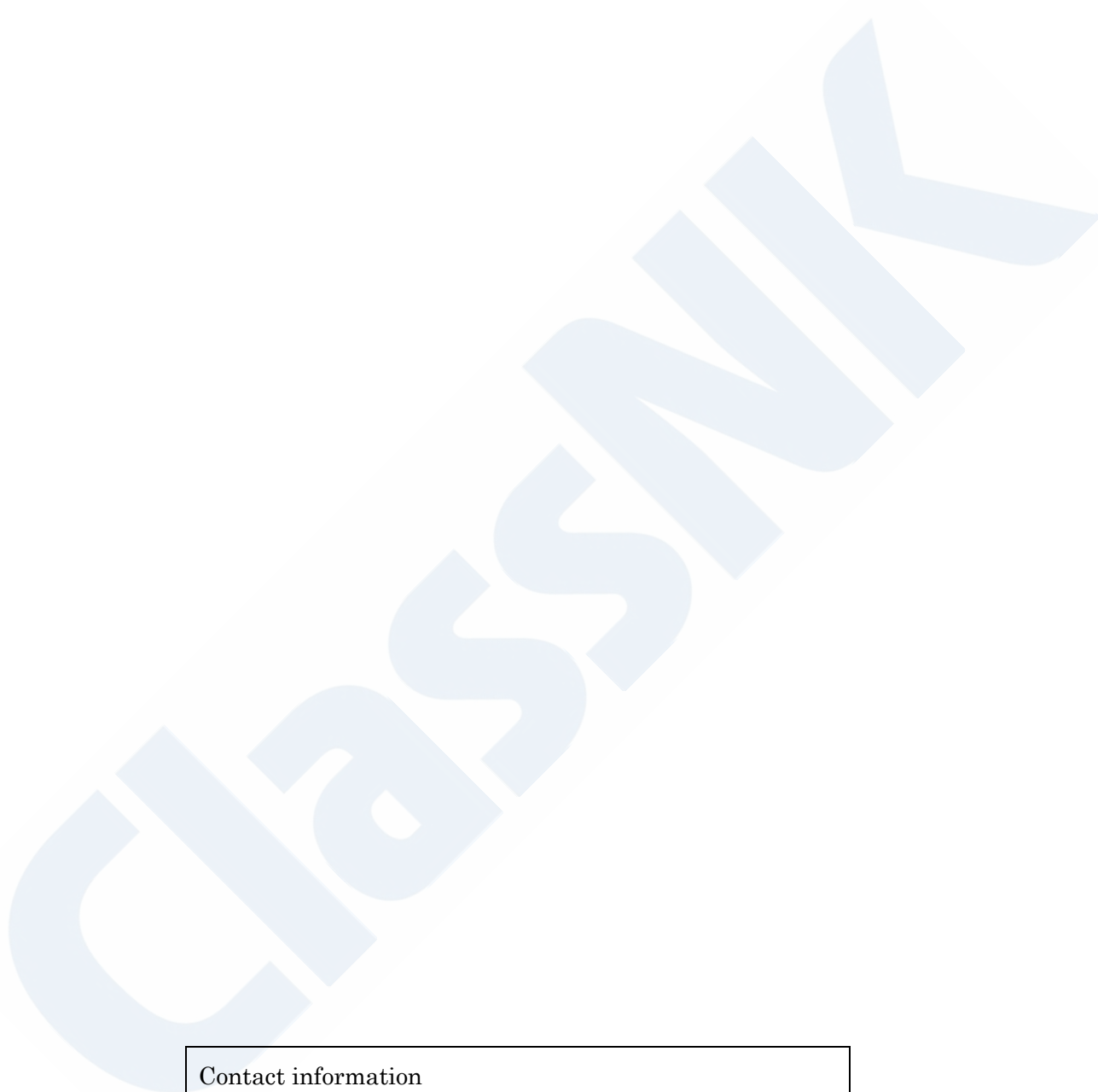
For ships provided with a system which integrates and displays the information necessary for maneuvering during berthing and departing by real time measuring and analysing the distance to the wharf, vessel speed, wind speed and other meteorological information, the class notation “Advanced Safety (Berthing Support System)” (abbreviated as *a-SAFE(BSS)*) may be affixed to the classification characters of such ships.

3.2.6 Other

In cases where ships are provided with other advanced safety measures deemed appropriate by the Society, relevant class notation may be affixed to the classification characters of such ships.

Table 3.1 Plans and Documents to Be Submitted

Reference	Class notation	Plans and documents to be submitted	Note
3.2.1	<i>a-SAFE(Rxx)</i>	(1) System outlines (2) Operation manuals (3) Wiring diagrams (4) Equipment performance test reports (e.g. In-house test reports)	-
3.2.2	<i>a-SAFE(CRI)</i>	(1) System outlines (2) Operation manuals (3) Wiring diagrams (4) Equipment performance test reports (e.g. In-house test reports)	-
3.2.3	<i>a-SAFE(XRD)</i>	(1) System outlines (2) Operation manuals (3) Wiring diagrams (4) Equipment performance test reports (e.g. In-house test reports)	-
3.2.4	<i>a-SAFE(FUOD)</i>	(1) System outlines (2) Operation manuals (3) Arrangement drawings (including fitting details for detectors fitted to hull structures) (4) Wiring diagrams (5) Equipment performance test reports (e.g. In-house test reports) (6) Non-destructive or watertight test records of fitting section of detectors (if applicable)	-
3.2.5	<i>a-SAFE(BSS)</i>	(1) System outlines (2) Operation manuals (3) Wiring diagrams (4) Equipment performance test reports (e.g. In-house test reports)	-



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