



Certificate No:  
**TAP00002CY**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

That the **Sludge and Waste Incinerator**

with type designation(s)

**MAXI NG25SL, MAXI NG50SL WS, MAXI NG100SL WS, MAXI NG150SL WS, MAXI 1200SL WS, MAXI 1500SL WS**

Issued to

**Hyundai Marine Machinery Co., Ltd.**  
**Incheon, Republic of Korea**

is found to comply with

**IMO Resolution MEPC.244(66) – 2014 Standard Specification for Shipboard Incinerators**

## Application :

**Product(s) approved by this certificate may be accepted for installation on all vessels to demonstrate compliance with MARPOL Annex VI Reg.16. Acceptance is subject to confirmation from the Flag Administration of the vessel the product is installed on.**

**This certificate is recognized by Transport Canada.**

**Note: For vessels with EU Flag, EU Marine Equipment Directive (MED) certificates are required instead of this Type Approval certificate.**

Issued at **Høvik** on **2021-07-09**

This Certificate is valid until **2026-07-08**.

for **DNV**

DNV local station: **Seoul Office**

Approval Engineer: **Thomas Grafton**

.....  
**Dag Sæle-Nilsen**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.  
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



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## Product description

The MAXI NG Series and 1200SL WS and 1500SL WS are intended for installation onboard ships and other marine installations for the incineration of oil residue (sludge) or solid waste. The system also enables solid waste to be added to the incinerator when operating in oil residue (sludge) mode after the incinerator has warmed up. The solid waste is then burned with the assistance from the oil residue (sludge) burner when the heat from burning solid waste is insufficient. There is an additional mode where oil residue (sludge) and bilge oil can be fed into the incinerator together. In this mode incineration begins with feeding of oil residue (sludge) until the incinerator has warmed up, then bilge oil feeding begins using a separate bilge injection burner. The feeding rate of the oil residue (sludge) and bilge oil is controlled based on temperature in the primary combustion chamber so that the maximum capacity is not exceeded.

The incinerators consist of a primary combustion chamber, a secondary combustion chamber and an after-burning chamber for burning out uncombusted exhaust gases. The combustion chambers are equipped with diesel oil burners.

Solid waste is fed into the incinerator through a door system with interlocks. This enables the waste packages to be loaded through the outer door and fed into the incinerators through the inner door when the outer door is closed in cycles (i.e., continuous feeding).

Ash accumulates in the combustion chambers and may be removed from the incinerator periodically when the incinerator is cold through the ash door.

A flue gas fan is fitted in the exhaust duct or on the incinerator module to pull a negative pressure in the combustion chamber. Cooling air is pulled through a jacket around the incinerator from the compartment the incinerator is located.

## Application

| Model (*)                                               | NG25SL WS            | NG50SL WS             | NG100SL WS            |
|---------------------------------------------------------|----------------------|-----------------------|-----------------------|
| Type of solid waste loading                             | Continuous feed      | Continuous feed       | Continuous feed       |
| Calorific capacity kW(kcal/h)                           | 210 (180,000)        | 372 (320,000)         | 582 (500,000)         |
| Solid waste (kg/h), or                                  | 40                   | 80                    | 100                   |
| Oil Residue (sludge) (kg/h), or                         | 21                   | 38                    | 58                    |
| Oil Residue (sludge) (kg/h) with bilge water (l/h) (**) | 27<br>75 bilge water | 48<br>144 bilge water | 76<br>175 bilge water |

| Model (*)                                               | NG150SL WS            | 1200SL WS             | 1500SL WS             |
|---------------------------------------------------------|-----------------------|-----------------------|-----------------------|
| Type of solid waste loading                             | Continuous feed       | Continuous feed       | Continuous feed       |
| Calorific capacity kW(kcal/h)                           | 814 (700,000)         | 1163 (1,000,000)      | 1500 (1,290,000)      |
| Solid waste (kg/h), or                                  | 100                   | 230                   | 230                   |
| Oil Residue (sludge) (kg/h), or                         | 81                    | 116                   | 150                   |
| Oil Residue (sludge) (kg/h) with bilge water (l/h) (**) | 106<br>188 bilgewater | 151<br>288 bilgewater | 195<br>300 bilgewater |

(\*) Model code SL means equipped for burning Solid Waste and Oil Residue (sludge) and WS means equipped with a sluice that can be continuously loaded.

(\*\*) Oil Content in bilge water is 0%

## Electrical and control components

The units are controlled through automation systems of a type tested and accepted by a nationally recognized testing agency, according to international standards. Critical components are listed in the table below:

| Component Type:                     | Component Name and Model (***):      | Maker:                             |
|-------------------------------------|--------------------------------------|------------------------------------|
| Programmable Logic Controller (PLC) | MICROLOGIX 1400 Series               | Allen-Bradley                      |
|                                     | SIMATIC S7-1200 Series               | Siemens                            |
| Human Machine Interface (HMI)       | PV Plus 700 Series                   | Allen-Bradley                      |
|                                     | Pro-face GP4401 Series               | Schneider Electric                 |
| Flame Detection Relay               | HRE – 4X                             | Hyundai Marine Machinery Co., Ltd. |
| Flame Detector                      | Flame detection photocell QRB Series | Siemens AG                         |

(\*\*\*) The system can be configured with either a Allen-Bradley PLC and HMI or a Siemens PLC and HMI.

Changes to these components shall be approved by DNV. Documentation confirming the approval shall be kept together with the certificate, or the certificate shall be updated.

The software and firmware editions are listed in the table below:

| <i>Component:</i>                               | <i>Software/Firmware Edition:</i>                | <i>Date:</i> |
|-------------------------------------------------|--------------------------------------------------|--------------|
| Allen-Bradley MICROLOGIX 1400 Series (PLC)      | Software: RS Logix 500 V8.XX<br>Firmware: 1.X    | 2016         |
| Siemens SIMATIC S7-1200 Series (PLC)            | Software: TIA portal V13.XX<br>Firmware: 4.X     | 2016         |
| Allen-Bradley PV Plus 700 Series (HMI)          | Software: FT View Studio V7.XX<br>Firmware: 10.X | 2016         |
| Schneider Electric Pro-face GP4401 Series (HMI) | Software: GP-proEX V4.XX<br>Firmware: 4.X        | 2016         |

Changes in the software which can alter the performance of the system shall be approval by DNV. Note that testing of the system with the revised software may be required. Documentation confirming the approval (and any testing) shall be kept together with the certificate, or the certificate shall be updated.

## Basis of acceptance

Capacity and emissions testing according to IMO Res.MEPC.244(66) Annex I were carried out on the MAXI NG50SL WS, MAXI NG100SL WS, MAXI NG150SL WS, MAXI 1200SL WS and MAXI 1500SL WS models and the results are given in the Appendices to this certificate.

Electrical and mechanical control devices have been assessed according to IMO Res.MEPC.244(66) 3.14.1.7 based on certificates according to internal standards accepted by a nationally recognized testing agency. The control panels for the MAXI NG50SL WS, MAXI NG100SL WS, MAXI NG150SL WS, MAXI 1200SL WS and MAXI 1500SL WS models were each subjected to a function test between 2004 and 2006 and the final reports are listed in the "Test Reports" section of this certificate. The control system was changed from a relay type to a PLC type in 2008 and so a new function test on a MAXI NG50SL WS was conducted. The test report is listed in the "Test Reports" section of this certificate. The MAXI NG Series, MAXI 1200SL WS and MAXI 1500SL WS use the same control system and so the test can be considered applicable to all models.

Inclination requirements according to IMO Res.MEPC.244(66) Section 6.2 were assessed during the testing of the MAXI NG50SL WS, MAXI NG150SL WS, MAXI 1200SL WS and MAXI 1500SL WS models.

Prototype tests according to IMO Res.MEPC.244(66) Section 7.1 were carried out on the MAXI NG50SL WS model and the final report is listed in the "Test reports" section of this certificate. This test can be considered applicable to all models

The series of incinerators with capacities from 256 kW to 1500 kW use the same basic design. Therefore, testing on the MAXI NG50SL WS, MAXI NG100SL WS, MAXI NG150SL WS, MAXI 1200SL WS and MAXI 1500SL WS is considered sufficient to cover all models.

The testing described above for solid waste and for oil residue (sludge) on the MAXI 1200SL WS was done under the authority of Bureau Veritas who issued EU MED Module B certificate no's 13837/C0 EC, 14517/B3 EC and 17450/B1 EC. The testing described above for oil residue (sludge) for the other models was done under the authority of Korean Register on behalf of the Republic of Korea.

## Type Approval documentation

| <i>Drawing Number:</i> | <i>Revision</i> | <i>Date</i> | <i>Name</i>                    | <i>Model</i>    |
|------------------------|-----------------|-------------|--------------------------------|-----------------|
| VHS-NG0025SL WS-1 ~ 3  | R0              | 2016.04.12  | Main specification             | MAXI NG25SL WS  |
| VHS-NG0050SL WS-1 ~ 3  | R0              | 2016.04.12  | Main specification             | MAXI NG50SL WS  |
| VHS-NG0100SL WS-1 ~ 3  | R0              | 2016.04.12  | Main specification             | MAXI NG100SL WS |
| VHS-NG0150SL WS-1 ~ 3  | R0              | 2016.04.12  | Main specification             | MAXI NG150SL WS |
| VHS-1200SL WS-1 ~ 3    | R0              | 2016.04.12  | Main specification             | MAXI 1200SL WS  |
| VHS-1500SL WS-1 ~ 3    | R0              | 2016.04.12  | Main specification             | MAXI 1500SL WS  |
| HIE-P02020022          | R2              | 2016.03.24  | Piping diagram                 | MAXI NG25SL WS  |
| HMM-NINC202-01         | R2              | 2016.03.24  | Outline dimension drawing      | MAXI NG25SL WS  |
| HID-BOD020201          | R7              | 2013.04.30  | Assembly drawing of Basis part | MAXI NG25SL WS  |

|                    |    |            |                                       |                 |
|--------------------|----|------------|---------------------------------------|-----------------|
| HMW-0253010 ~ 14   | R1 | 2013.04.30 | Assembly drawing of Refractory Lining | MAXI NG25SL WS  |
| HIE-P04020022      | R2 | 2016.03.24 | Piping diagram                        | MAXI NG50SL WS  |
| HMM-NINC402-01     | R2 | 2016.03.24 | Outline dimension drawing             | MAXI NG50SL WS  |
| HID-BOD040203      | R5 | 2013.04.30 | Assembly drawing of Basis part        | MAXI NG50SL WS  |
| HMW-0253010 ~ 14   | R1 | 2013.04.30 | Assembly drawing of Refractory Lining | MAXI NG50SL WS  |
| HIE-P06020022      | R2 | 2016.03.24 | Piping diagram                        | MAXI NG100SL WS |
| HMM-NINC602-01     | R2 | 2016.03.24 | Outline dimension drawing             | MAXI NG100SL WS |
| HID-BOD060203      | R5 | 2013.04.30 | Assembly drawing of Basis part        | MAXI NG100SL WS |
| HMW-1002010 ~ 14   | R1 | 2013.04.30 | Assembly drawing of Refractory Lining | MAXI NG100SL WS |
| HIE-P08020022      | R2 | 2016.03.24 | Piping diagram                        | MAXI NG150SL WS |
| HMM-NINC802-01     | R2 | 2016.03.24 | Outline dimension drawing             | MAXI NG150SL WS |
| HID-BOD080203      | R4 | 2013.04.30 | Assembly drawing of Basis part        | MAXI NG150SL WS |
| HMW-1502010 ~ 14   | R1 | 2013.04.30 | Assembly drawing of Refractory Lining | MAXI NG150SL WS |
| HIE-P12020022      | R2 | 2016.03.24 | Piping diagram                        | MAXI 1200SL WS  |
| HMM-NINC1204-01    | R2 | 2016.03.24 | Outline dimension drawing             | MAXI 1200SL WS  |
| HID-BOD120203      | R4 | 2013.04.30 | Assembly drawing of Basis part        | MAXI 1200SL WS  |
| HMW-12005010 ~ 14  | R1 | 2013.04.30 | Assembly drawing of Refractory Lining | MAXI 1200SL WS  |
| HIE-P15020022      | R2 | 2016.03.24 | Piping diagram                        | MAXI 1500SL WS  |
| HMM-NINC1502-01    | R2 | 2016.03.24 | Outline dimension drawing             | MAXI 1500SL WS  |
| HID-BOD150203      | R4 | 2013.04.30 | Assembly drawing of Basis part        | MAXI 1500SL WS  |
| HMW-1505010 ~ 14   | R1 | 2013.04.30 | Assembly drawing of Refractory Lining | MAXI 1500SL WS  |
| HID-VM202010       | R1 | 2013.04.30 | Detail drawing of Cleaning cover      | MAXI NG25SL WS  |
| HID-S15002010      | R1 | 2013.04.30 | Assembly drawing of Waste sluice      | MAXI 1500SL WS  |
| AT-ABB020010       | R0 | 2008.01.01 | Outline of primary blower             | MAXI NG25SL WS  |
| AT-ABB040010       | R1 | 2008.01.01 | Outline of primary blower             | MAXI NG50SL WS  |
| AT-ABB060010       | R1 | 2008.01.01 | Outline of primary blower             | MAXI NG100SL WS |
| AT-ABB080010       | R1 | 2008.01.01 | Outline of primary blower             | MAXI NG150SL WS |
| AT-ABB120010       | R1 | 2008.01.01 | Outline of primary blower             | MAXI 1200SL WS  |
| AT-ABB150010       | R1 | 2008.01.01 | Outline of primary blower             | MAXI 1500SL WS  |
| VHS-LOCSA-STD-1    | R0 | 2016.04.12 | List of control /Safety / Automation  | All Models      |
| VHS-PROCEDIA-STD-1 | R0 | 2016.04.12 | Process diagram incinerator           | All Models      |
| HID-VM1502210      | R0 | 2013.04.30 | Detail drawing of Cleaning cover      | All Models      |
| HID-S12002010      | R1 | 2013.04.30 | Assembly drawing of Waste sluice      | All Models      |
| HIF-NGTSTD002 ~ 4  | R2 | 2016.03.24 | ELECTRIC PANEL-LAYOUT/FRONT           | All Models      |
| HIF-NGTSTD005 ~ 7  | R2 | 2016.03.24 | ELECTRIC PANEL-LAYOUT/FRONT           | All Models      |
| HIF-NGTSTD008      | R2 | 2016.03.24 | ELECTRIC PANEL-CONTROL SOURCE         | All Models      |
| HIF-NGTSTD015 ~ 24 | R2 | 2016.03.24 | ELECTRIC PANEL-CIRCUIT DIAGRAM        | All Models      |
| HIF-NGTSTD025      | R2 | 2016.03.24 | ELECTRIC PANEL-CIRCUIT OPTION         | All Models      |
| HIF-NGTSTD030      | R2 | 2016.03.24 | ELECTRIC PANEL-EXTERNAL SIGNAL        | All Models      |

|                      |     |            |                                                                                                                      |                                                                        |
|----------------------|-----|------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| HIF-NGTSTD040 ~ 43   | R2  | 2016.03.24 | ELECTRIC PANEL-PART LIST                                                                                             | All Models                                                             |
| HIF-NGTSTD501 ~ 3    | R2  | 2016.03.24 | ELECTRIC PANEL-TERMINAL STRIP                                                                                        | All Models                                                             |
| HNP-MAXINC-EPA7      | R7  | 2011.11.26 | MAIN NAME PLATE                                                                                                      | All Models                                                             |
| NP-SIMENS-OPAPLC-NGT | R7  | 2014.09.11 | OPERATION INSTRUCTION PLATE                                                                                          | All Models                                                             |
| NP-WNPLC             | R9  | 2014.09.11 | WARNING PLATE                                                                                                        | All Models                                                             |
| V13-NGDO(PLC_SIMENS) | R13 | 2015.06.03 | Instruction Book for Installation, Operation and Maintenance of Incinerator (Type : MAXI NG25/MG50/NG100/NG150SL WS) | MAXI NG25SL WS<br>MAXI NG50SL WS<br>MAXI NG100SL WS<br>MAXI NG150SL WS |
| V13-BIG(PLC_SIMENS)  | R13 | 2015.06.03 | Instruction Book for Installation, Operation and Maintenance of Incinerator (Type : MAXI 1200SL WS, MAXI 1500SL WS)  | MAXI 1200SL WS,<br>MAXI 1500SL WS                                      |
| R0-BWB(PLC_SIMENS)   | R0  | 2017.04.17 | Instruction Book for Installation, Operation and Maintenance of Incinerator's Bilge Injection System                 | All Models                                                             |
| HINC-PGM-MAXIJAL-R0  | R0  | 2015-09-11 | PLC Ladder System Software Quality Plan                                                                              | All Models                                                             |
| MEDHF10-22           |     | 2016       | Type approval test procedure and report for incinerator (****)                                                       | All models                                                             |

(\*\*\*\*) Protocol for prototype tests according to IMO Res.MEPC.244(66) Section 7.1.

## Tests reports

Capacity and Emissions tests, and safety and control tests:

- Type approval test procedure & report for waste oil incinerator, MAXI NG50SL WS, Hyundai Marine Machinery Co., Ltd., report HTTR-HM2404787 dated 31 March 2004. (Witnessed by Bureau Veritas.)
- Type approval test procedure & report for waste oil incinerator, MAXI NG150SL WS, Hyundai Marine Machinery Co., Ltd., report HTTR-HM2401750 dated 5 March 2004. (Witnessed by Bureau Veritas.)
- MAXI type W.O. incinerator test report, MAXI NG100SL WS, Hyundai Marine Machinery Co., Ltd., report HFTR-IMONG100 dated 13 February 2004. (Witnessed by Korean Register on behalf of the Republic of Korea.)
- MAXI type W.O. incinerator test report, MAXI NG150SL WS, Hyundai Marine Machinery Co., Ltd., report HFTR-IMONG150 dated 13 February 2004. (Witnessed by Korean Register on behalf of the Republic of Korea.)
- Type approval test procedure & report for waste oil incinerator, 1200S WS, Hyundai Marine Machinery Co., Ltd., report HTTR-HM2401748 dated 5 March 2004. (Witnessed by Bureau Veritas.)
- Type approval sampling test report for waste oil incinerator, MAXI 1200SL WS, Hyundai Marine Machinery Co., Ltd., report HFT-MEDM1200SLWS dated 14 June 2006. (Witnessed by Bureau Veritas.)
- Type approval test procedure & report for waste oil incinerator, MAXI 1500SL WS, Hyundai Marine Machinery Co., Ltd., report HTTR-2411896 dated 23 March 2005. (Witnessed by Bureau Veritas.)

Safety and control tests (prototype tests according to IMO Res.MEPC.244(66) Section 7.1):

- Modification type approval test report for shipboard incinerator, MAXI NG50SL WS, , Hyundai Marine Machinery Co., Ltd., report HTTR-SK111 dated 27 May 2008. (Witnessed by Bureau Veritas.)

## Marking of product

For traceability to this type approval, each incinerator is to be marked with:

- Manufacturer's name or trade mark
- Style, type, model or other manufacturer's designation for the incinerator (i.e., model name with serial number)
- Capacity (net design heat release)

## Copy of the DNV Type Approval certificate

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.

### Periodical assessment

For retention of the Type Approval, a DNV surveyor shall perform periodical assessments (refer to Type Approval program DNVGL-CP-0338). The main scope of the periodic assessment will normally include:

- Verification of the Type Approval applicant's production and quality system with relation to ensuring continued consistent production of the type approved products at the applicant's own premises and at other companies that are given the responsibility for manufacturing of the products.
- Review of the documentation and checking that this is still used as basis for the production.
- Review of possible changes to the design, material and performance of the product.
- Verification of the product marking.

This certificate is valid for five years and periodical assessments will be required after 2 years (+/- 90 days) and 3.5 years (+/- 90 days). The date defining the beginning of the validity period is 2021-07-09.

### Places of manufacture

- Hyundai Marine Machinery Co., Ltd., 22, Wondang-daero 117beon-gil, Seo-gu, Incheon, Republic of Korea.

### Revision history

| Revision | Issue Date | Reason for revision                                                                                            |
|----------|------------|----------------------------------------------------------------------------------------------------------------|
| 0        | 2021-07-09 | Initial certificate, based EU Marine Equipment Directive (MED) certificate MEDB00001J7 Rev.1 issued by DNV AS. |

## APPENDIX: Tests on MAXI NG50SL WS

### Form of IMO Type Approval Certificate for Shipboard Incinerators with Capacities of up to 4,000 kW

This is to certify that the shipboard incinerator listed has been examined and tested in accordance with the Standard for Shipboard Incinerators for disposing of ship-generated waste, as amended by resolution MEPC.244(66), and as required by regulation 16.6.1 of MARPOL Annex VI.

#### Test Data:

|                                       |  |
|---------------------------------------|--|
| Incinerator manufactured by:          |  |
| Incinerator type and model            |  |
| Place and date of tests:              |  |
| Max. capacity:                        |  |
| Solid Waste:                          |  |
| Pilot Fuel Consumption (Solid Waste): |  |

#### Combustion chamber and flue gas records:

| Parameters / Type of Waste:                            | Solid Waste: |
|--------------------------------------------------------|--------------|
| O <sub>2</sub> average in combustion chamber/zone      |              |
| CO average in flue gas                                 |              |
| Soot number average                                    |              |
| Combustion chamber flue gas outlet temperature average |              |
| Amount of unburned components in ashes                 |              |

#### Shock-cooling of Flue Gas:

Temperature of the flue gas should be shock-cooled to a maximum 350°C within 2.5 m from the combustion chamber flue gas outlet:

| Parameter:  | Solid Waste: |
|-------------|--------------|
| Temperature |              |
| Distance    |              |

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.

## APPENDIX: Tests on MAXI NG100SL WS

### Form of IMO Type Approval Certificate for Shipboard Incinerators with Capacities of up to 4,000 kW

This is to certify that the shipboard incinerator listed has been examined and tested in accordance with the Standard for Shipboard Incinerators for disposing of ship-generated waste, as amended by resolution MEPC.244(66), and as required by regulation 16.6.1 of MARPOL Annex VI.

#### Test Data:

|                                                |                                    |
|------------------------------------------------|------------------------------------|
| Incinerator manufactured by:                   | Hyundai Marine Machinery Co., Ltd. |
| Incinerator type and model                     |                                    |
| Place and date of tests:                       |                                    |
| Max. capacity:                                 |                                    |
| Oil Residue (sludge):                          |                                    |
| Pilot Fuel Consumption (Oil Residue (sludge)): |                                    |

#### Combustion chamber and flue gas records:

| Parameters / Type of Waste:                            | Oil Residue (sludge): |
|--------------------------------------------------------|-----------------------|
| O <sub>2</sub> average in combustion chamber/zone      |                       |
| CO average in flue gas                                 |                       |
| Soot number average                                    |                       |
| Combustion chamber flue gas outlet temperature average |                       |
| Amount of unburned components in ashes                 |                       |

#### Shock-cooling of Flue Gas:

Temperature of the flue gas should be shock-cooled to a maximum 350°C within 2.5 m from the combustion chamber flue gas outlet:

| Parameter:  | Oil Residue (sludge): |
|-------------|-----------------------|
| Temperature |                       |
| Distance    |                       |

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.

## APPENDIX: Tests on MAXI NG150SL WS

### Form of IMO Type Approval Certificate for Shipboard Incinerators with Capacities of up to 4,000 kW

This is to certify that the shipboard incinerator listed has been examined and tested in accordance with the Standard for Shipboard Incinerators for disposing of ship-generated waste, as amended by resolution MEPC.244(66), and as required by regulation 16.6.1 of MARPOL Annex VI.

#### Test Data:

|                                                |  |
|------------------------------------------------|--|
| Incinerator manufactured by:                   |  |
| Incinerator type and model                     |  |
| Place and date of tests:                       |  |
| Max. capacity:                                 |  |
| Oil Residue (sludge):                          |  |
| Solid Waste:                                   |  |
| Pilot Fuel Consumption (Oil Residue (sludge)): |  |
| Pilot Fuel Consumption (Solid Waste):          |  |

#### Combustion chamber and flue gas records:

| Parameters / Type of Waste:                            | Solid Waste: | Oil Residue (sludge): |
|--------------------------------------------------------|--------------|-----------------------|
| O <sub>2</sub> average in combustion chamber/zone      |              |                       |
| CO average in flue gas                                 |              |                       |
| Soot number average                                    |              |                       |
| Combustion chamber flue gas outlet temperature average |              |                       |
| Amount of unburned components in ashes                 |              |                       |

#### Shock-cooling of Flue Gas:

Temperature of the flue gas should be shock-cooled to a maximum 350°C within 2.5 m from the combustion chamber flue gas outlet:

| Parameter:  | Solid Waste: | Oil Residue (sludge): |
|-------------|--------------|-----------------------|
| Temperature |              |                       |
| Distance    |              |                       |

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.

## APPENDIX: Tests on MAXI 1200SL WS

### Form of IMO Type Approval Certificate for Shipboard Incinerators with Capacities of up to 4,000 kW

This is to certify that the shipboard incinerator listed has been examined and tested in accordance with the Standard for Shipboard Incinerators for disposing of ship-generated waste, as amended by resolution MEPC.244(66), and as required by regulation 16.6.1 of MARPOL Annex VI.

#### Test Data:

|                                                |                                    |
|------------------------------------------------|------------------------------------|
| Incinerator manufactured by:                   | Hyundai Marine Machinery Co., Ltd. |
| Incinerator type and model                     |                                    |
| Place and date of tests:                       |                                    |
| Max. capacity:                                 |                                    |
| Oil Residue (sludge):                          |                                    |
| Solid Waste:                                   |                                    |
| Pilot Fuel Consumption (Oil Residue (sludge)): |                                    |
| Pilot Fuel Consumption (Solid Waste):          |                                    |

#### Combustion chamber and flue gas records:

| Parameters / Type of Waste:                            | Solid Waste: | Oil Residue (sludge): |
|--------------------------------------------------------|--------------|-----------------------|
| O <sub>2</sub> average in combustion chamber/zone      |              |                       |
| CO average in flue gas                                 |              |                       |
| Soot number average                                    |              |                       |
| Combustion chamber flue gas outlet temperature average |              |                       |
| Amount of unburned components in ashes                 |              |                       |

#### Shock-cooling of Flue Gas:

Temperature of the flue gas should be shock-cooled to a maximum 350°C within 2.5 m from the combustion chamber flue gas outlet:

| Parameter:  | Solid Waste: | Oil Residue (sludge): |
|-------------|--------------|-----------------------|
| Temperature |              |                       |
| Distance    |              |                       |

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.

## APPENDIX: Tests on MAXI 1500SL WS

### Form of IMO Type Approval Certificate for Shipboard Incinerators with Capacities of up to 4,000 kW

This is to certify that the shipboard incinerator listed has been examined and tested in accordance with the Standard for Shipboard Incinerators for disposing of ship-generated waste, as amended by resolution MEPC.244(66), and as required by regulation 16.6.1 of MARPOL Annex VI.

#### Test Data:

|                                       |  |
|---------------------------------------|--|
| Incinerator manufactured by:          |  |
| Incinerator type and model            |  |
| Place and date of tests:              |  |
| Max. capacity:                        |  |
| Solid Waste:                          |  |
| Pilot Fuel Consumption (Solid Waste): |  |

#### Combustion chamber and flue gas records:

| Parameters / Type of Waste:                            | Solid Waste: |
|--------------------------------------------------------|--------------|
| O <sub>2</sub> average in combustion chamber/zone      |              |
| CO average in flue gas                                 |              |
| Soot number average                                    |              |
| Combustion chamber flue gas outlet temperature average |              |
| Amount of unburned components in ashes                 |              |

#### Shock-cooling of Flue Gas:

Temperature of the flue gas should be shock-cooled to a maximum 350°C within 2.5 m from the combustion chamber flue gas outlet:

| Parameter:  | Solid Waste: |
|-------------|--------------|
| Temperature |              |
| Distance    |              |

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.