



# Type Approval Certificate

[ Reciprocating High Pressure Pump ]

**Initial Approval** 18 December 2023  
**Manufacturer** NIKKISO ACD LLC  
2321 S. Pullman Street Santa Ana, CA 92705 USA

**Product Description** High Pressure Cryogenic Reciprocating Pump  
Type : MSP series  
Model : MP-100, GUPD, SLS

“ See Appendix 1 ”

**Approval Condition** “ See Appendix 1 ”

**THIS IS TO CERTIFY** that the above-mentioned product has been approved in accordance with the relevant requirement of this Society's Rules and / or of the recognized standards as follows.

Pt. 7, Ch. 5, Sec. 5 & Pt. 5, Ch. 6 of the Rules for Classification of Steel Ship and Annex.1, Sec. 6 of Rules for the Classification of Ships Using Low-flashpoint Fuels.

This Certificate is valid until 17 December 2028

Issued at Busan, Korea on 8 November 2024



This certificate is signed electronically in accordance with IMO FAL.5/Circ.39/Rev.2. Validation and authentication of the certificate can be confirmed from "<http://e-cert.krs.co.kr>" by using the tracking No(ME24053637638) and certificate No.(LOX46451-PP002).



**KOREAN REGISTER**

*General Manager of  
Marine & Ocean Equipment Team*

- Note :**
1. This certificate will be valid subject to complying with the approval conditions described on the certificate and/or on the Rules of this Society.
  2. This certificate will be invalid from the expiry date aforementioned unless the extension or renewal has been granted to the applicant or the manufacturer.
  3. Any significant modifications or changes in design or construction to the above product without approval from this Society will render this certificate invalid.
  4. Should the specified rules, regulations or standards be amended during the validity of this certificate, the product is to be re-approved by this Society in accordance with the requirements as amended.

## Product Description and/or Approval Condition

Date of Issue : 8 November 2024

### A. Product Description

#### 1. Product Specification

- 1) Specification of MSP-MP-100
  - (1) Liquid : Liquefied Natural Gas, Liquid Nitrogen
  - (2) Design Temp. : -165 ~ 65 °C
  - (3) Max. Disc. Pressure : 350 bar
  - (4) Max. Speed : 1000 rpm
  - (5) Bore x Stroke : 50 mm x 57 mm
  - (6) Material of Main components
    - a) Cylinder (Cold ends) : ASTM A276 Cond. A, SS316
    - b) Discharge fitting (Cold ends) : ASTM A276, SS316/SS316L
    - c) Crankcase (Driving part) : ASTM A536, Ductile Iron 60-45-12
    - d) Crank Shaft (Driving part) : AMS-S-5000
- 2) Specification of MSP-GUPD
  - (1) Liquid : Liquefied Natural Gas, Liquid Nitrogen
  - (2) Design Temp. : -165 ~ 65 °C
  - (3) Max. Disc. Pressure : 350 bar
  - (4) Max. Speed : 1000 rpm
  - (5) Bore x Stroke : 50 mm x 33 mm
  - (6) Material of Main components
    - a) Cylinder (Cold ends) : ASTM A276 Cond. A, SS316
    - b) Discharge fitting (Cold ends) : ASTM A276, SS316/SS316L
    - c) Crankcase (Driving part) : ASTM A536, Ductile Iron 60-45-12
    - d) Crank Shaft (Driving part) : AMS-S-5000
- 3) Specification of MSP-SLS
  - (1) Liquid : Liquefied Natural Gas, Liquid Nitrogen
  - (2) Design Temp. : -165 ~ 65 °C
  - (3) Max. Disc. Pressure : 414 bar
  - (4) Max. Speed : 1000 rpm
  - (5) Bore x Stroke : 50 mm x 57 mm
  - (6) Material of Main components
    - a) Cylinder (Cold ends) : ASTM A276 Cond. A, SS316
    - b) Discharge fitting (Cold ends) : ASTM A276, SS316/SS316L
    - c) Crankcase (Driving part) : ASTM A536, Ductile Iron 60-45-12
    - d) Crank Shaft (Driving part) : AMS-S-5000

#### 2. Approved Drawings and Documents

- 1) Drawing of MSP-MP-100 ;  
- M10235, M10245, M10139, M10096, M10146, M10148, M10255, M10256, M10207
- 2) Drawing of MSP-GUPD ;  
- 68560\_rev.K, 68555\_rev.H, M10096\_rev.A, M10112\_rev.B, M10098\_rev.A, M10099\_rev.A, M10116\_rev.A, 68503\_rev.E, 68502\_rev.C, 68504\_rev.B, 68892, 45961\_rev.B, 44172\_rev.N, 45308\_rev.H, 45307\_rev.R, 65547\_rev.G, 68920\_rev.N, 68623\_rev.E, 68889\_rev.G, 14688\_rev.C, 46082\_rev.G
- 3) Drawing of MSP-SLS ;  
- R10686, 65495, 65505, 65528, 65547, 66634, 66644, 66657, 66666, 66667, 402700, 66669

#### 3. Test Reports, etc.

- 1) Approval test of MSP-MP-100 ;
  - (1) Hydrostatic test was performed on 17 ~ 18 September 2024 at Nikkiso ACD, United States.
  - (2) Capacity test was performed on 21 September 2024 at Nikkiso ACD, United States.
- 2) Approval test of MSP-GUPD ;
  - (1) Hydrostatic test was performed on 4 Dec. 2023 at Nikkiso ACD, United States.
  - (2) Capacity test was performed on 7 Dec. 2023 at Nikkiso ACD, United States.
- 3) Approval test of MSP-SLS ;
  - (1) Hydraulic test was conducted at ACD factory dated on 16 December 2019.
  - (2) Performance test was conducted at ACD factory dated on 10 February 2020.

## Product Description and/or Approval Condition

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### B. Approval Condition

#### 1. Application & Limitation

- 1) The materials used for main components are to be supplied by the approved manufacturers and is to be certified by the Society or to be satisfactory to the surveyor according to the relevant rule requirement.
- 2) The minimum average energy for Charpy V-notch impact test should be complied with the relevant requirements of the Rules, Pt. 7, Ch. 5, Sec. 6.
- 3) Pumps are to be of a non-sparking construction and prime movers for the pumps installed in Gas Hazardous Area are to be explosion-proof type approved or certified by the Society.

#### 2. Individual Product Cert. and Drawing Approval Requirement

- 1) Individual Product Certification is required.

#### 3. Marking

- 1) The product is to be marked with manufacturer's name or trademark, a date of manufacture and type designation number at least.

#### 4. Others

- Nil

< End of Certificate >



The logo of the Korean Register is a large, light gray oval containing the letters 'KR' in a bold, sans-serif font. Below 'KR', the words 'KOREAN REGISTER' are written in a smaller, all-caps, sans-serif font.

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