



CERTIFICATE NUMBER	20-2029001-PDA
EFFECTIVE DATE	19-Aug-2020
EXPIRY DATE	18-Aug-2025
ABS TECHNICAL OFFICE	Houston ESD - Piping

CERTIFICATE OF Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

ACD LLC

located at

2321 S. PULLMAN ST., SANTA ANA, CA, United States, 92705

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product Pump, Centrifugal

Model TC 3.24 Centrifugal Pump

This Product Design Assessment (PDA) Certificate remains valid until 18/Aug/2025 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping
Yongjin Lee, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

ACD LLC

2321 S. PULLMAN ST.

SANTA ANA CA

United States 92705

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Email: rdegler@acdcom.com

Web: acdcom.com

Tier: 5 - Unit Certification Required

Product: Pump, Centrifugal

Model: TC 3.24 Centrifugal Pump

Intended Service:

Transfer of liquefied Liquid Nitrogen, Liquid Natural Gas, Ethylene, Ethane for marine or offshore applications

Description:

Submerged centrifugal pump and VFD motor assembly for broad range operation without a mechanical seal. Gastight design. Vertical pump installation.

Rating:

Materials:

Pump Casing: Aluminum Alloy (6061-T6)

Impeller: Aluminum Alloy (6061-T6)

Inducer: Aluminum Alloy (6061-T6)

Motor Housing: Aluminum Alloy (6061-T6)

Shaft: Stainless steel (17-4PH, Condition H1150)

Bearing: 440C stainless steel races and ceramic balls

Ratings:

Flow Range: 1 to 1600 GPM (4 to 6056 LPM)

NPSHR: 0.5 to 5 Feet (0.15 to 1.5 Meters)

Differential Head: 50 to 4000 Feet (15 to 1220 Meters)

Pump Design Range: 3.35 to 335 HP (2.5 to 250 KW)

RPM Range: 2000 to 10000 RPM

Temperature: -128.2F (-89C) ± 20C to -320.8F (-196C) ± 20C

Please consult with the manufacturer for Pump Performance Curves and Technical Data for more detail

Service Restriction:

1. Unit Certification is required for all cargo pumps at the plant of manufacturer in the presence of the Surveyor by carrying out tests including hydrostatic test and capacity test as specified in section 5C-8-5/13.1.3(b) of the ABS Marine Vessels Rules and also for the materials of construction due to the cryogenic design temperature of this product as per section 5C-8-6/2.2 of the ABS Marine Vessels Rules.
2. Surveyor is to witness the material testing unless the plant and product are approved under ABS's Quality Assurance Program.
3. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

Comments:

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

Notes/Drawing/Documentation:

Supporting Documents:

Drawings Package of Pump Assemblies, TC-34.2, Pages: 590;

Pump Product Line, Materials, Specifications and Testing, Sheet: 1;

Risk Assessment compliant to Machinery Directive 2006/42/EC, Date: 3/31/2017, Pages: 69;

Test Reports:

Electrical Test Reports by e+a Elektromaschinen und Antriebe AG, Pages: 5;

Prototype Test Report for D 90 by ABS Surveyor at ACD LLC, Date: 4/23/2019, Pages: 2;

Prototype Test Report for D 125 by ABS Surveyor at ACD LLC, Date: 2/22/2019, Pages: 2;

Prototype Test Report for E 145 by ABS Surveyor at ACD LLC, Date: 12/18/2019, Page: 1;

Prototype Test Report for H 170 by ABS Surveyor at ACD LLC, WO#: 4054816, Page: 1;

Prototype Test Report for H 210 by ABS Surveyor at ACD LLC, Date: 7/17/2020, Page: 1;

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Tier: 5 - Unit Certification Required

Terms of Validity:

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STANDARDS

ABS Rules:

The Rules for Conditions of Classification, 2020 Marine Vessels Rules:1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the followings;
2020 Rules for Building and Classing Marine Vessels: 4-6-1/7.3.1, 4-6-1/7.3.2, 5C-8-5/13.1.3, 5C-8-6/2.2;

National:

NA

International:

IGC Code 2016 Edition;
ISO 24490:2016 Cryogenic Vessels – Pumps for Cryogenic Service;
ISO 12100:2010 Safety of Machinery - General principles for design - Risk assessment and risk reduction;

Government:

NA

EUMED:

NA

OTHERS:

NA