



CERTIFICATE NUMBER 23-2445631-PDA

EFFECTIVE DATE 31-AUG-2023

EXPIRATION DATE 30-AUG-2028

ABS TECHNICAL OFFICE Yokohama Engineering Services

CERTIFICATE OF Product Design Assessment

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

GUTTELING B.V.

located at

ROTTERDAM, NETHERLANDS

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 Hose Assemblies

Model Multi-Oil Blue / Multi-Chem Black / Multi-Chem Red / Multi-Chem Green / Multi-LNG White / Multi-LPG White / Multi-Vapor Yellow

This Product Design Assessment (PDA) Certificate remains valid until 30-AUG-2028 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

Yoshio Honma
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)

GUTTELING B.V.

PELSERTSTRAAT 9

ROTTERDAM

Netherlands 3044 CH

Telephone: +31 10 208 25 50

Fax:

Email: sander.verweij@trelleborg.com

Web: www.gutteling.com

Tier: 5 - Unit Certification Required

Product: Hose Assemblies

Model: Multi-Oil Blue / Multi-Chem Black / Multi-Chem Red / Multi-Chem Green / Multi-LNG White / Multi-LPG White / Multi-Vapor Yellow

Endorsements:

Intended Service:

Maritime loading / off loading applications - Oil, Chemical, LNG and LPG systems.

Description:

Multi-Oil Blue:

Hose with polypropylene lining, inner and outer wire of galvanized steel

Dimension 1" - 12"

Fittings: Flanges fixed or floating ASA / DIN / JIS or male / female thread

Material: Carbon steel or stainless steel 316

Multi-Chem Black:

Hose with polypropylene lining, inner wire of polypropylene coated steel, outer wire of galvanized or stainless steel 316

Dimension 1" - 10"

Fittings: Flanges fixed or floating ASA / DIN / JIS or male / female thread

Material: Carbon steel or stainless steel 316

Multi-Chem Red:

Hose with PTFE, FEP or Hostaflon lining, inner wire of stainless steel 316, outer wire of galvanized steel or stainless steel 316

Dimension 1" - 12"

Fittings: Flanges fixed or floating ASA / DIN / JIS or male / female thread

Material: Carbon steel or stainless steel 316

Multi-Chem Green:

Hose with polypropylene lining, inner wire of stainless steel 316 and outer wire of galvanized steel or stainless steel 316

Dimension 1" - 12"

Fittings: Flanges fixed or floating ASA / DIN / JIS or male / female thread

Material: Carbon steel or stainless steel 316

Multi-LNG White:

Hose with lining/carcass of polyamide fabrics and polyester films, inner wire and outer wire of stainless steel 316

Dimension 1" - 12"

Fittings: Flanges fixed or floating ASA / DIN / JIS or male / female thread

Material: Stainless steel 316

Multi-LPG White:

Hose with lining/carcass of polyamide fabrics and BOPP films, inner wire and outer wire of stainless steel 316

Dimension 1" - 10"

Fittings: Flanges fixed or floating ASA / DIN / JIS or male / female thread

Material: Stainless steel 316

Multi-Vapor Yellow:

Hose with polypropylene lining, inner wire of polypropylene coated steel or stainless steel 316, outer wire of galvanized steel or stainless steel 316

Dimension 1" - 12"

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Fittings: Flanges fixed or floating ASA / DIN / JIS or male / female thread

Material: Carbon steel or stainless steel 316

Rating:

Multi-Oil Blue - Working pressure 7/10.5/14 bar, Temperature range -30 deg. C to +80 deg. C.

Multi-Chem Black - Working pressure 7/10.5/14 bar, Temperature range -30 deg. C to +80 deg. C.

Multi-Chem Red - Working pressure 7/10.5/14 bar, Temperature range -30 deg. C to +80 deg. C; Hostaflon up to +100 deg. C.

Multi-Chem Green - Working pressure 7/10.5/14 bar, Temperature range -30 deg. C to +80 deg. C.

Multi-LNG White - Working pressure 10.5 bar, Temperature range -196 deg. C to +50 deg. C.

Multi-LPG White - Working pressure 10.5/14/21/25 bar, Temperature range -50 deg. C to +50 deg. C.

Multi-Vapor Yellow - Working pressure 5 bar, Temperature range -30 deg. C to +80 deg. C.

See attachment for more details.

Service Restriction:

Unit Certification is required for hoses used for transfer of gas in liquid and vapour form.

Comments:

1. Hoses used for the transfer of gas in liquid and vapour form are to be stencilled or otherwise marked with the date of testing, its specified maximum working pressure, and its maximum and minimum service temperature.
2. The hoses are to be selected and installed in accordance with the manufacturer's recommendations and ABS approved drawings. For each geographical area of use, the hose is to be verified for suitability regarding environmental conditions, including but not limited to wave characteristics and ambient thermal conditions affecting heat transfer across the flanges.
3. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

Notes/Drawing/Documentation:

COMPOSITE HOSES DRAWING

- Multi-Oil Blue: GUT/HOSE/05-22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, and 44
- Multi-Chem Black: GUT/HOSE/05-00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, and 21
- Multi-Chem Red: GUT/HOSE/05-68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 126, and 127
- Multi-Chem Green: GUT/HOSE/05-45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, and 67
- Multi-LNG White: GUT/HOSE/05-97, 98, 99, 100, 101, 102, 103, and 104, GUT/HOSE/06-105 and 106
- Multi-LPG White: GUT/HOSE/05-89, 90, 91, 92, 93, 94, 95, 96, and 96b
- Multi-Vapor Yellow: GUT/HOSE/05-105, 106, 107, 108, 109, 110, 111, 112, and 113
- Type Test Reports issued on 19 May 2008 by Gutteling BV
- Proof Pressure Test by Gutteling BV on 24 September 2003, 6 August 2006 and 10 August 2006 witnessed by DNV
- Vacuum Test by Gutteling BV on 24 September 2003 and 3 August 2006 witnessed by DNV
- Pressure Cycle Test by Gutteling BV on 11 April 2007 witnessed by NK
- Impulse Test by Gutteling BV on 25 September 2003 witnessed by DNV
- Bend Test by Gutteling BV on 11 April 2007 witnessed by NK and on 25 September 2003 and 3 August 2006 witnessed by DNV
- Burst Test by Gutteling BV on 11 April 2007 witnessed by NK and on 14 September 2003 and 3 August 2006 witnessed by DNV
- Proof pressure Test / IBC Code Test / Burst Test by Gutteling BV on 13 February 2007 witnessed by GL
- IBC Code Test by Gutteling BV on 29 September 2003 and 3 August 2006 witnessed by DNV
- IGC Code Test by Gutteling BV on 3 August 2006 witnessed by DNV
- Cold Flexible Test by Gutteling BV on 24 September 2003, 24 October 2003 and 3 August 2006 witnessed by DNV
- Cold Shock Test by Gutteling BV on 24 October 2003 witnessed by DNV

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Tier: 5 - Unit Certification Required

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 30/Aug/2028 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.

STANDARDS

ABS Rules:

2023 Rules for Conditions of Classification 1-1-4/7.7, 1-1-Appendix 3 and 1-1-Appendix 4, which covers the following:

2023 Marine Vessel Rules 4-1-1/Table 6, 5C-1-7/21.9.4, 5C-8-5/11.7, 5C-9-5/7.3

National:

NA

International:

IGC Code (International Code for The Construction And Equipment Of Ships Carrying Liquefied Gases In Bulk) 2016 Edition; Chapter 5.11.7

IBC Code (International Code for the Construction and Equipment of Ships Carrying Dangerous Chemical in Bulk) Chapter 5.7.3

BS EN 13765:2018 Thermoplastic multi-layer (non-vulcanized) hoses and hose assemblies for the transfer of hydrocarbons, solvents and chemicals. Specification

BS EN 13766:2018+A1:2020 Thermoplastic multi-layer (non-vulcanized) hoses and hose assemblies for the transfer of liquid petroleum gas and liquefied natural gas. Specification

Government:

NA

EUMED:

NA

OTHERS:

NA

Product Design Assessment (PDA) Certificate Attachment for Component Details

PDA Certificate No: 23-2445631-PDA

Entry Date: 31 August 2023

Expire Date: 30 August 2028

Company: GUTTELING B.V.

Factory or Works: Rotterdam

Product/Equipment: Hose Assemblies

Model: Multi-Oil Blue / Multi-Chem Black / Multi-Chem Red / Multi-Chem Green / Multi-LNG / White / Multi-LPG White / Multi-Vapor Yellow

Equipm.name	Description	Material/fluid	Liquid / Gas (L/G)	Max.work.press Pw(design)	Bursting.press Pw	Inch	Diameter (DN)	Design Temperature	Test according to	Maximum production length (mtr)
Flexible Composite Hose	Multi-Chem Red	Chemical	L	10,5	52,0	12"	300	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	10"	250	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	8"	200	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	6"	150	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	4"	100	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	3"	80	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	2,5"	65	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	2"	50	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	1,5"	40	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Red	Chemical	L	14	70	1"	28	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	10"	250	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	8"	200	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	6"	150	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	4"	100	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	3"	80	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	2,5"	65	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	2"	50	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	1,5"	40	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Black	Chemical	L	14	70	1"	28	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	10,5	52	12"	300	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	10"	250	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	8"	200	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	6"	150	80°C / -30°C	IMO IBC CODE	30 mtr

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Factory or Works: Rotterdam

Product/Equipment: Hose Assemblies

Model: Multi-Oil Blue / Multi-Chem Black / Multi-Chem Red / Multi-Chem Green / Multi-LNG / White / Multi-LPG White / Multi-Vapor Yellow

Equipm.name	Description	Material/fluid	Liquid / Gas (L/G)	Max.work.press Pw(design)	Bursting.press Pw	Inch	Diameter (DN)	Design Temperature	Test according to	Maximum production length (mtr)
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	4"	100	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	3"	80	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	2,5"	65	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	2"	50	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	1,5"	40	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Chem Green	Chemical	L	14	70	1"	28	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	14	70	10"	250	50°C / -50°C	IMO IGC CODE	20 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	21	105	8"	200	50°C / -50°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	21	105	6"	150	50°C / -50°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	21	105	4"	100	50°C / -50°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	25	125	3"	80	50°C / -50°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	25	125	2,5"	65	50°C / -50°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	25	125	2"	50	50°C / -50°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	25	125	1,5"	40	50°C / -50°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.P.G.White	LIQUID GAS	L	25	125	1"	28	50°C / -50°C	IMO IGC CODE	20 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	12"	300	50°C / -196°C	IMO IGC CODE	20 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	10"	250	50°C / -196°C	IMO IGC CODE	20 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	8"	200	50°C / -196°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	6"	150	50°C / -196°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	4"	100	50°C / -196°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	3"	80	50°C / -196°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	2,5"	65	50°C / -196°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	2"	50	50°C / -196°C	IMO IGC CODE	30 mtr

Product Design Assessment (PDA) Certificate Attachment for Component Details

PDA Certificate No: 23-2445631-PDA

Entry Date: 31 August 2023

Expire Date: 30 August 2028

Company: GUTTELING B.V.

Factory or Works: Rotterdam

Product/Equipment: Hose Assemblies

Model: Multi-Oil Blue / Multi-Chem Black / Multi-Chem Red / Multi-Chem Green / Multi-LNG / White / Multi-LPG White / Multi-Vapor Yellow

Equipm.name	Description	Material/fluid	Liquid / Gas (L/G)	Max.work.press Pw(design)	Bursting.press Pw	Inch	Diameter (DN)	Design Temperature	Test according to	Maximum production length (mtr)
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	1,5"	40	50°C / -196°C	IMO IGC CODE	30 mtr
Flexible Composite Hose	Multi-L.N.G.White	LIQUID GAS	L	10,5	52	1"	28	50°C / -196°C	IMO IGC CODE	20 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	12"	300	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	10"	250	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	8"	200	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	6"	150	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	4"	100	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	3"	80	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	2,5"	65	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	2"	50	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	1,5"	40	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Vapor Yellow	VAPOR	G	7	35	1"	28	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	10,5	52,0	12"	300	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	10"	250	80°C / -30°C	IMO IBC CODE	20 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	8"	200	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	6"	150	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	4"	100	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	3"	80	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	2,5"	65	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	2"	50	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	1,5"	40	80°C / -30°C	IMO IBC CODE	30 mtr
Flexible Composite Hose	Multi-Oil Blue	OIL	L	14	70	1"	28	80°C / -30°C	IMO IBC CODE	20 mtr