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Approval and authorisation body for construction products and types of construction

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Number:

General Technical

General

Approval /

Type Approval

Z-40.23-515

Applicant:

Klenk GmbH Eichelstraße 15 D-88285 Bodnegg-Rotheidlen

Validity period:

from: 3rd July 2021 to: 3rd July 2026

Subject of this notification:

Flexible double-walled hose line "System Klenk", Type DWSL, for transporting waterhazardous liquids in transferring and filling procedures

The above-mentioned subject matter is hereby generally approved / authorised by the building authorities. This notification consists of ten pages and two annexes with four pages. The subject was first given General Technical Approval on the 8th June 1999.



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I GENERAL PROVISIONS

- 1 This notification provides proof that the subject matter is suitable for applications and use within the meaning of the building and construction regulations enacted by the different Federal States.
- 2 This notification does not replace the permits, licences and certifications that are otherwise required by German law for construction projects.
- 3 This notification is granted without prejudice to the rights, particularly private property rights, of third parties.
- 4 The user must be provided with copies of this notification, regardless of any other regulations in the "Special Provisions". The user of the subject matter must also be informed that this notification must be present at the usage location. By request, the authorities involved must also be provided with copies.
- 5 This notification may only be duplicated in full. The publication of excerpts requires the prior consent of the German Institute for Construction Engineering (Deutsches Institut für Bautechnik). Texts and drawings of advertising material may not contradict this notification, translations must contain the note "Translation of the original German version not checked by the Deutsches Institut für Bautechnik".
- 6 This notification is revocable. The provisions can be subsequently altered and supplemented, particularly if new technical knowledge requires that this be done.
- 7 This notification relates to the information and documents submitted by the applicant. A change to these principles is not covered by this notification, and must be reported to the Deutsches Institut für Bautechnik without delay.
- 8 The general type approval included in this notification is also considered to be the general technical approval for the type of construction.



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II SPECIAL PROVISIONS

1 1 Subject matter and usage area

(1) The subject of this notification concerns and relates to flexible double-walled hose lines with the type designation DWSL, System Klenk, up to a length of 50 m, consisting of double-walled hoses with an inner hose nominal width of DN 15 to DN 75 as well as connector components and their sealants (Annex 1). The monitoring space between the inner and outer hose of the flexible double-walled hoses is suitable for serving as part of a leak detector device for monitoring according to the vacuum pressure principle. Leaks in the walls of the flexible double-walled hoses are detected by an increase in pressure in the monitoring space of the leak detector, which gives a visual and acoustic warning.

(2) If a suitable vacuum pressure leak detector is connected, the flexible double-walled hoses may be used above ground or in a pipe duct in systems for storage, filling and transferring of water-hazardous liquids at a maximum supply pressure of 10 bar to pump flammable and non-flammable water-hazardous liquids, which are listed in the DIN EN 12115¹ resistance table in the Suitability Group A as suitable for the material concerned, although these may not tend towards high viscosity² or discharge of solids. In all other cases, the selection of metal and sealing materials used in the Specific application is limited to those that have evidence of testing deposited with the DIBt for resistance to the pumped liquid.

(3) The approved operating temperatures are between -20 °C and +60 °C.

(4) This notification is issued without prejudice to the provisions and the review or approval reservations of other areas of law.

(5) This decision takes the water law requirements for the subject matter into consideration. According to § 63 Paragraph 4 No. 2 and 3 of the WHG (Water Management Act)³, the subject of the regulation is therefore considered suitable under water law.

(6) The validity period of this notification (see page 1) relates to the utilisation of the object, meaning its installation or mounting, and not to any later use.

2 Provisions concerning the construction product

2.1 General

The "System Klenk" flexible double-walled pipes with type designation DWSL must comply with sections 1 and 2 of the Special Provisions and the appendixes as defined in this decision, as well as the information deposited with the German Institute for Construction Engineering.

2.2 Characteristics and structure

2.2.1 Inner and outer hoses

(1) The inner and outer hoses must correspond to Type D or Type SD (with or without spring steel wire) as specified in DIN EN 12115¹ and the Appendix B of the German Technical Regulations for Combustible Liquids (TRbF) 50⁴.

1 DIN EN 12115:2021-04

Rubber and plastic hoses and hose assemblies for liquid or gaseous chemicals - requirements

- 2 Kinematic viscosity < 5000 cSt a +4 °C
- 3 Federal Water Act of 31st July 2009 (Federal Law Gazette I pg. 2585), which was last updated by article 1 of the law of 19th June 2020 (Federal Law Gazette pg. 1408)

4 Technical Regulations for Combustible Fluids (Technische Regeln für brennbare Flüssigkeiten), TRbF 50 Pipelines ("Rohrleitungen"), BArbBI. 6/2002 p. 69



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(2) The monitored space is realised using an intermediate layer as a spacer, consisting of a thermoplastic poly(ether)ester elastomer following the specifications laid down in DIN EN 12115¹ with the type designation Hytrel. This intermediate layer consists of a plastic net pulled over the inner hose.

(3) The permitted nominal width combinations of the inner and outer hose can be found in Annex 2.

(4) The inner and outer hoses must be resistant to the fluids to be pumped (see paragraph 1 (2), table of resistance according to DIN EN 12115).

2.2.2 Connecting components and sealants

(1) The connecting components are metal hose connecting fittings, which according the connection facilities of the system can take the form of nipples and sleeves or nozzles at the hose side, clamp units, threaded hose fittings, flanges or tank truck couplings.

(2) The details of the design of the connecting components must correspond to the drawings referred to in Annex 2 in combination with the parts lists also referred to in the annex. The metallic connectors must be manufactured in accordance with the DIN EN 14420⁵ standard. The specifications of the metal materials must correspond to the information deposited with the DIBt.

(3) The sealants must be manufactured in compliance with DIN 3771-4⁶, DIN ISO 3601-1⁷ to DIN ISO 3601-3 and DIN ISO 3601-5, must meet the requirements of DIN ISO 1817⁸ and correspond to the information deposited with DIBt.

(4) Evidence must be provided of the resistance of all the metal materials used in the manufacture of the connecting elements and the sealants used for separation from the pumped liquid.

2.2.3 Double-walled hose system "System Klenk", Type DWSL

(1) The double-walled hose system "System Klenk", Type DWSL, manufactured according to the General Technical Approval, must consist of the components according to Section 2.2.1 and 2.2.2 and be produced at the factory according to the assembly instructions deposited with the German Institute for Construction Engineering.

(2) If the approved product is used for liquids with a flash point lower than 55 °C or if it is used in potentially explosive areas, proof must be provided with regard to the demands on its electric conductivity according to DIN EN 12115¹ for the specific usage case.

5	DIN EN 14420-1:2013-09	Hose fittings with clamp units - Part 1: Requirements, types of fastening and connecting, designation and testing
	DIN EN 14420-2:2013-09	Hose fittings with clamp units - Part 2: Nozzles at the hose side
	DIN EN 14420-3:2013-09	Hose fittings with clamp units - Part 3: Clamp units, bolted or pinned
	DIN EN 14420-4:2013-09	Hose fittings with clamp units - Part 4: Flange connections
	DIN EN 14420-5:2013-09	Hose fittings with clamp units - Part 5: Threaded connections
	DIN EN 14420-6:2013-09	Hose fittings with clamp units - Part 6: TW tank truck couplings
6	DIN 3771-3:1984-12	Fluid systems; O-rings; materials, areas of application
7	DIN ISO 3601-1:2013-11	Fluid systems; O-rings - Part 1: Inner diameter, cord thicknesses, tolerances and designation
	DIN ISO 3601-2:2010-08	Fluid systems; O-rings - Part 2: Installation spaces for general applications
	DIN ISO 3601-3:2010-08	Fluid systems; O-rings - Part 3: Shape and surface deviations
	DIN ISO 3601-5:2015-04	Fluid systems; O-rings - Part 5: Requirements for elastomer materials for industrial applications
8	DIN ISO 1817:2016-11	Elastomers or thermoplastic elastomers - Provisions for behaviour with liquids



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(3) Contrary to the technical description⁹, all suitable leak detectors operating according to the vacuum system and that have a building inspectorate certificate of usability may be connected to the flexible double hose assembly. The leak detector must be suitable for a maximum permissible operating negative pressure in the monitoring space of up to -550 mbar. In the event of a leak, the leak detector must be

- triggered by an alarm switch-on value of -325 mbar at the latest,
- be able to resist an overpressure of at least 10 bar or by means of self-actuating automatic shut-off valves, e. g. solenoid valves, prevent an unacceptable pressurisation of the components of the leak detector,
- prevent further evacuation by switching off the vacuum pump.

(4) Proof of the suitability of the vacuum leak detectors for connection to the monitoring space of a flexible double-walled hose system and for leak monitoring must be displayed in the usage location of the leak detector.

2.3 Manufacture, transport, storage and marking

2.3.1 Manufacture

(1) The manufacture of the inner and outer hoses according to paragraph 2.2.1 and the connecting elements and sealants according to paragraph 2.2.2 must take place in the factories whose information has been deposited with the German Institute of Construction Engineering.

(2) The manufacture of the finished "System Klenk" double-walled hose system, type DWSL, according to paragraph 2.2.3 must take place in the factory at D-88285 Bodnegg-Rotheidlen.

2.3.2 Transport and storage

Transport and storage of the flexible double-walled hose systems must be carried out in a manner that does not adversely affect their fitness for use. Components damaged by transport and storage must be excluded from further use.

2.3.3 Marking

(1) The flexible double-walled hose systems must be marked by the applicant with the conformity mark (Ü-mark) according to the conformity mark regulations of the Federal States. Marking may only be carried out if the conditions of Section 2.4 have been met.

(2) The manufacturer of the finished "System Klenk" flexible double-walled hose system, type DWSL, according to paragraph 2.2.3, must also mark the system, also with the marking required by DIN EN 12115¹, by permanently marking the fittings at the hose end with the following information:

- Type designation of the hose system (Type DWSL),
- Manufacturer or manufacturer's mark,
- Date of manufacture,
- Materials,
- Nominal widths of inner and outer hoses,
- Type designation of the hose fittings according to DIN EN 14420 Parts 1 to 6,
- Approved filling pressure 10 bar (can optionally also be marked at the filling point),
- Approved media,
- Approval number (Z-40.23-515).
- "Specification Sheet of the double-walled hose system" dated 15.06.2009, tested by the TÜV NORD Systems GmbH & Co. KG on the 18.06.2009



2.4 Proof of conformity

2.4.1 General

- (1) Confirmation of the conformity of the approved product with the provisions of this General Technical Approval recorded by this notification (sections 1 and 2) must be provided for each factory with a manufacturer's declaration of conformity based on the factory's own production control and an initial type test by a recognised inspection agency authorised to perform such tests. The manufacturer is to submit this declaration of conformity by marking the flexible, double-walled hose line "System Klenk", Type DWSL, with the conformity mark (Ü-mark), with a note of its intended use.
- (2) According to paragraph 2.2.3, the applicant is considered to be the manufacturer of the flexible double-walled hose line in this sense. If the manufacturer of the double-walled hose line is not also the manufacturer of the components used according to paragraph 2.2.1 and 2.2.2, he must give contractual assurances that these components are subject to an approval-appropriate factory production control system.

2.4.2 Factory control system

- (1) A factory control system must be set up and implemented in ever manufacturer's works. Factory production control in the above sense means continuous supervision to be carried out by the applicant of the manufacture of the approved product. With this, the applicant will ensure that the double-walled hose line produced by him according to paragraph 2.2.3 and the components used in its manufacture according to paragraphs 2.2.1 and 2.2.2 comply with the provisions of this General Technical Approval recorded by this notification (sections 1 and 2).
- (2) As part of the factory production control, the following tests must be carried out as a minimum requirement:
- a) Inner and outer hoses according to paragraph 2.2.1
 - Goods inwards control

The inner and the outer hoses must be subjected to the tests according to Appendix A and Appendix B of DIN EN 12115¹ in the minimum frequency specified therein, and also the tests according to DIN EN ISO 8031¹⁰ and DIN EN ISO 1402¹¹.

The intermediate layer must be subjected to the AD (dimension tests) and AR (examination of materials certificates) according to DIN 3230-3¹².

- Tests for materials, dimensions and leak tightness will be according to DIN 3230-312

Also to be carried out in the applicant's factory, or in one of the factories of his suppliers, are the following tests: AD (dimension tests) and AR (examination of certificates), BN with evidence of leakage rate 1 (leak tightness test of the hose connection using water with a maximum operating pressure of 10 bar) and BQ (leak tightness test of the hose connection using water in the inner hose with 1.5 times the maximum operating pressure).

- b) Connecting components and sealants according to paragraph 2.2.2
 - Goods inwards control

Metallic connection fittings must be tested according to the standard DIN EN 12266¹³. The sealants must be tested according to DIN 3771-3⁶ and DIN ISO 1817⁸.

10	DIN EN ISO 8031:2020-11	Rubber and plastic hoses and hose assemblies - Determination of electrical resistance and conductivity
11	DIN EN ISO 1402:2010-04	Rubber and plastic hoses and hose assemblies -
12	DIN 3230-3:1982-04	Technical delivery conditions for valves; Compilation of possible tests
13	DIN EN 12266-1:2012-06	Industrial valves - Testing of metallic valves - Part 1: Pressure tests, Test procedures and acceptance criteria - Mandatory requirements
	DIN EN 12266-2:2012-04	Industrial valves - Testing of metallic valves - Part 2: Tests, test procedures and acceptance criteria - Supplementary requirements



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- Materials and dimension tests according to DIN 3230-312

Also to be carried out in the applicant's factory, or in one of the factories of his suppliers, are the following tests: AD (dimension tests) and AR (examination of materials certificates), in combination with the parts lists given in Annex 2 and the design drawings.

The results of the above-mentioned tests must establish the compliance with requirements for the components according to paragraph 2.2.2.

c) Flexible double-walled hose line "System Klenk", Type DWSL, according to paragraph 2.2.3

Prior to its first use, each flexible double walled hose line "System Klenk", Type DWSL, needs to be subjected to a leak tightness test of the connected hose fittings according to DIN EN 12266-1¹³. The medium to be used for testing is gas. The test must be carried out by maintaining, at ambient temperature, test pressures of (6 ± 1) bar in the inner hose and of (6 ± 1) bar in the monitoring space for at least 60 seconds. There must be no bubbles rising to the surface of the water if the hose fitting is submerged in water. If, as an alternative to the above, the hose is coated with a leak detection liquid, there must be no continuous formation of bubbles.

If the test results are unsatisfactory, the necessary measures to rectify the defect must be taken immediately.

(3) The results of the factory production control must be recorded and analysed. The recorded results must as a minimum contain the following information:

- Designation of the approved product,
- Type of control or test,
- Date of manufacture and testing of the approved product,
- Results of monitoring or testing,
- Signature of the person responsible for the factory production control.

(4) The applicant must keep all recorded information on file for at least five years. The information must be submitted to the German Institute for Construction Engineering and the highest building inspection authority on request.

(5) Inner hoses, outer hoses, intermediate layers, connection fittings, nipples and sleeves plus their sealants that fail to meet the requirements must be handled in such a way that they cannot be confused with conforming components of the same kind. After elimination of the defect the corresponding test or control must, insofar as is technically feasible and required as evidence that the defect has been rectified, be repeated immediately.

2.4.3 Initial type test

As part of the initial type test, all the tests listed in paragraph 2.4.2, which also have to be carried out as part of the factory production control, must be performed at least once and their requirements met. If the evidence on which the General Technical Approval is based has been provided by samples from ongoing production, these tests will replace the initial type test.

3 **Provisions for planning, measuring and implementation**

3.1 Planning and measuring

(1) The conditions for laying the flexible double-walled hose line "System Klenk", Type DWSL, can be found in the water, health and safety at work and legal construction regulations.



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(2) The resistance of the materials used for the inner and outer hoses according to paragraph 2.2.1 to the pumped liquid and the conformity of the results of the above-mentioned tests with the requirements for the components according to paragraph 2.2.1 must be certified as part of goods inward control by acceptance test certificates 3.1 according to DIN EN 10204¹⁴.

(3) The resistance of the materials used for the connection fittings according to paragraph 2.2.2 to the pumped liquid and the conformity of the results of the above-mentioned tests with the requirements for the components according to paragraph 2.2.1 must be certified as part of goods inward control by acceptance test certificates 3.1 according to DIN EN 10204¹⁴. The conformity of the intended areas of application of the sealants given in the delivery note with the planned area of application must also be checked.

(4) If the flexible double-walled hose lines are used for liquids with a flashpoint below 55 °C, proof of safe use in connection with electrostatic charging of the surfaces according to DIN EN 12115¹ must be provided. If the contact between the hose line and the fitting is created by the metal inserts of the line, evidence must also be provided of problem-free contact between the metal inserts and the hose line fitting when the hose line is integrated.

(5) Metallic parts of the system must be earthed in potentially explosive areas in compliance with the definition in the Technical Rules for Hazardous Substances (Technische Regeln für Gefahrstoffe, TRGS) 727¹⁵ if they exceed a capacitance of 3 pF in Zone 0 (constantly potentially explosive atmosphere) and a capacitance of 10 pF in Zone 1 (occasionally potentially explosive atmosphere). The conditions of the manufacturer's installation and assembly instructions must be observed.

3.2 Implementation

3.2.1 Requirements for the applicant and the implementing companies

(1) The applicant is obliged to inform all persons entrusted with the design and implementation of the flexible, double-walled hose lines about the Special Provisions of this General Technical Approval and about the evidence to be provided as part of the planning and measurement (see Section 3.1).

(2) The statutory health and safety at work requirements remain unaffected.

3.2.2 Assembly of the flexible hose line DWSL, System Klenk

(1) The flexible double-walled hose lines must be laid so as to protect them from mechanical damage. The fastening screws of the flexible double-walled line, the connection fittings and the nipples must be secured against unintentional loosening. The approved bending radii corresponding to the Specification Sheet⁹ must not fall below the specifications.

(2) The regulations of the leak detector must be observed when connecting and operating the vacuum leak detector.

(3) A nozzle for connecting the leak detector must be provided at one end of the flexible double-walled hose line. The other end of the flexible double-walled hose line must be fitted with a test screw that allows for checking the free passage through the monitoring space.

(4) The connecting lines for the relevant leak detectors must be permanently marked in a clearly visible manner as follows:

- Monitoring space nozzle, depending on the leak detector system, with "Suction" or "Pressure",

 14
 DIN EN 10204:2005-01
 Metallic products - Types of i

 15
 TRGS 727:2016-01
 Avoidance of ignition dangers

Metallic products - Types of inspection documents Avoidance of ignition dangers as a result of electrostatic charging



– All other monitoring nozzles with "Test" or if required "Measure".

(5) After completing the assembly of the flexible double-walled hose line, type DWSL, System Klenk and installing the leak detector, the specialised company carrying out the above must perform a function test as set out in the regulations of the leak detector in combination with the accompanying Specification Sheet.

(6) The confirmation of conformity of the installed "System Klenk" flexible double-walled hose line, type DWSL, equipped with leak detector, with the provisions of this General Technical Approval must be provided by the implementing specialised company by means of a confirmation of conformity. Conformity can be confirmed as part of the installation and test certification procedure. This confirmation must be submitted to the operator in every individual case and placed in the construction file by the operator.

4 Provisions regarding use, maintenance and care, including recurring inspections

4.1 Use

4.1.1 Pumped liquids

The flexible double-walled hose lines "System Klenk", Type DWSL, may be used for delivering liquid corresponding to Section 1 (2).

4.1.2 Documents

The operator of the flexible double-walled hose line must also be given

the following documents by the applicant in accordance with this General Technical Approval:

- A printout of this notification,
- A printout of the Specification Sheet⁹,
- A printout of the regulations of the leak detector that was used,
- Confirmation of conformity according to paragraph 3.2 (6).

4.1.3 Operation

(1) Before operating the hose line, it must be checked whether the liquids to be led through the hose line correspond to the liquids that are permitted in accordance with section 1, and whether the permissible operating pressure and operating temperature are complied with.

(2) The statutory health and safety at work requirements remain unaffected.

(3) If the approved product is used for liquids with a flashpoint of less than 55 °C or used in potentially explosive areas, the requirements of the legal authorities responsible for such uses must be complied with.

4.2 Maintenance and care

(1) If the leak detector signals an alarm, the operator of the system must immediately inform the applicant or another specialised company according to 4.1 (1) and assign them to determine and rectify the cause of the alarm signal. If necessary, the hose line must be taken out of service.

(2) Measures for rectifying any damage must be taken in agreement with the person responsible according to water legislation.

(3) The statutory health and safety at work requirements remain unaffected.



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4.3 Tests

(1) The condition of the approved product must be tested repeatedly at suitable intervals, but at least once a year. The leak tightness and free passage through the monitoring space must be checked by opening the test screw and checking the pressure change in the monitoring space.

(2) The testing of the leak detector connected to the monitoring space must be carried out as specified in its regulations, combined with the accompanying Specification Sheet.

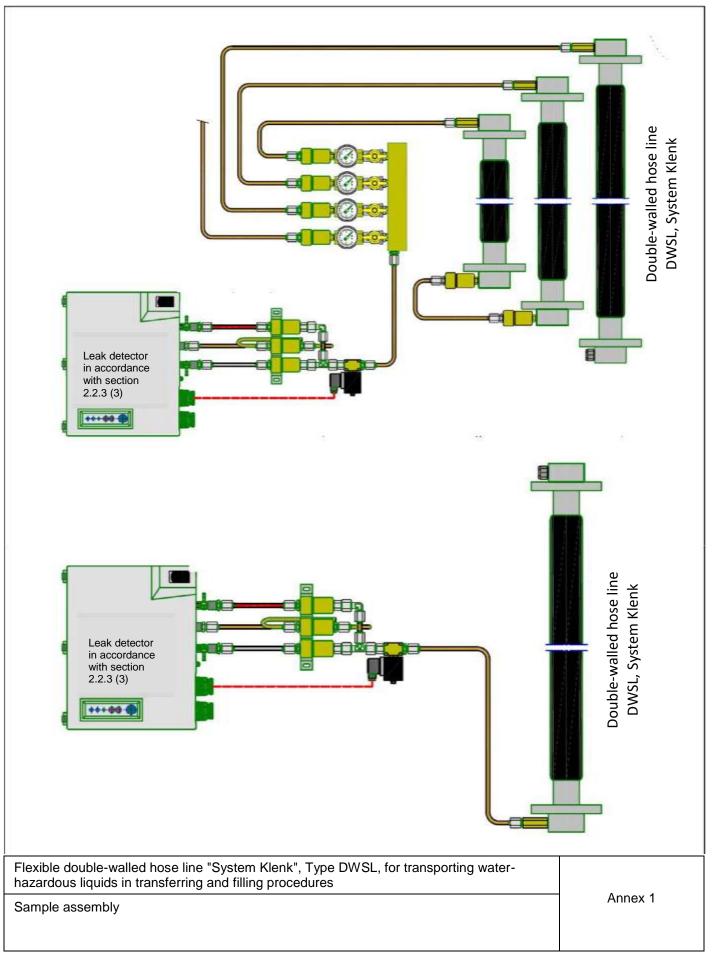
(3) All tests, checks and inspections prescribed by different laws remain unaffected.

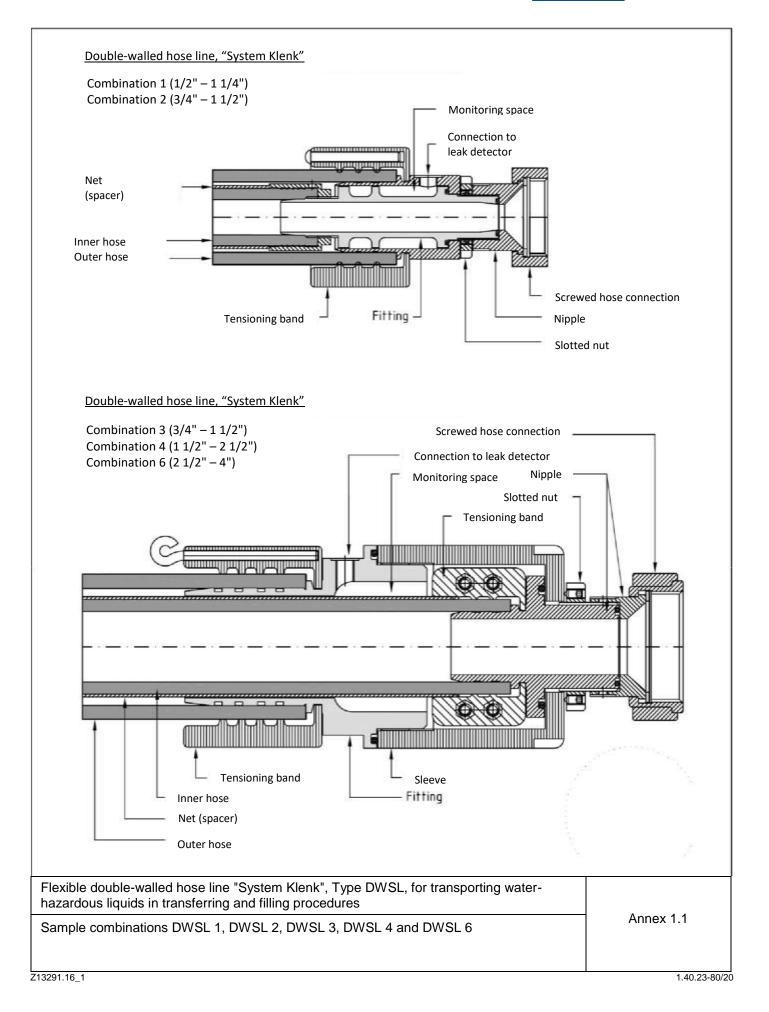
Holger Eggert Head of department

Pötzsch

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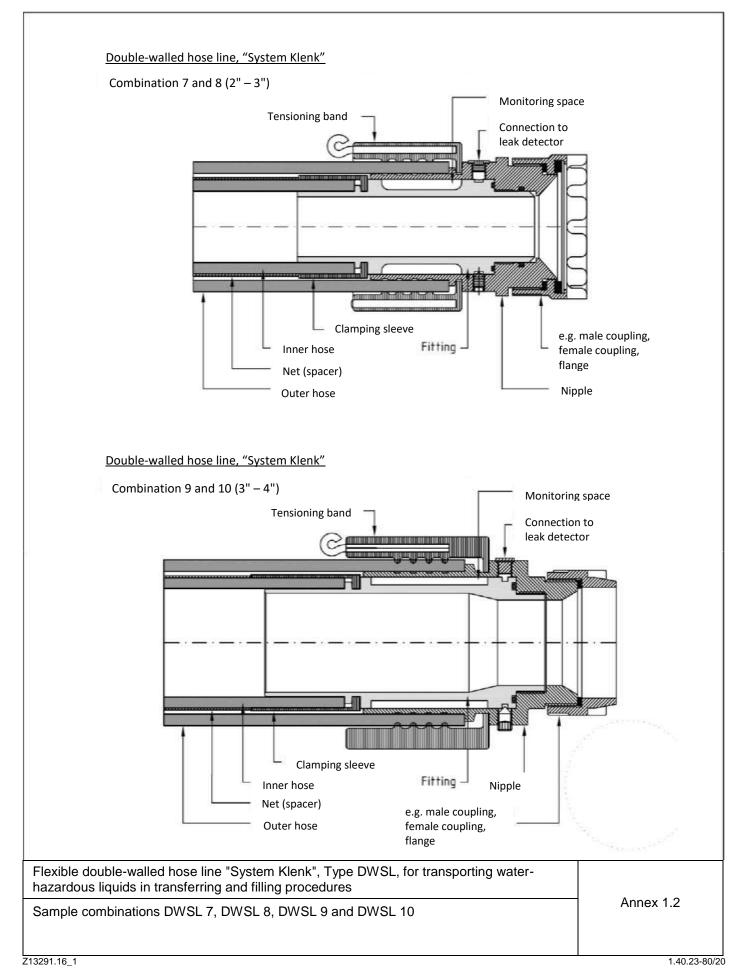






General Technical Approval / General Type Approval No. Z-40.23-515 dated 7th May 2021







Flexible double-walled hose line "System Klenk", Annex 2 Type DWSL: for transporting water-hazardous liquids during transfer and filling procedures

Technical data and materials for the nominal width combination

Combination Nominal width combination	Inner/outer hose	Volume [*] in I/m	Connection design, drawing number	Metallic fittings materials
DWSL 1	DN 15 (1/2") DN 32 (11/4")	0.424	With union screw, parts list dated 29.10.2008, No. 1-2-5/1_0	Brass (Ms58) or stainless steel threaded fittings, <u>pinned</u> clamp unit made from aluminium, stainless steel socket (nozzle on the hose side)
DWSL 2	DN 20 (3/4") DN 40 (11/2")	0.380	With union screw, parts list dated 29.10.2008, 1-2-5/1_0	
DWSL 3	DN 20 (3/4") DN 40 (11/2")	0.380	With union screw, parts list dated 29.10.2008, 3-4-6/1_0	Brass (Ms58) or stainless steel threaded fittings, <u>threaded</u> clamp unit made from aluminium, stainless steel socket (nozzle on the hose side)
DWSL 4	DN 40 (1 ¹ /2") DN 65 (21/2")	1.080	With union screw, parts list dated 29.10.2008, 3-4-6/1_0	
DWSL 5	DN 40 (1 ¹ /2") DN 65 (21/2")	1.080	With union screw, parts list dated 29.10.2008, 1-2-5/1_0	Brass (Ms58) or stainless steel threaded fittings, <u>pinned</u> clamp unit made from aluminium, stainless steel socket (nozzle on the hose side)
DWSL 6	DN 65 (2 ¹ /2") DN 100 (4")	3.075	With union screw, parts list dated 29.10.2008, 3-4-6/1_0	Brass (Ms58) or stainless steel threaded fittings, threaded clamp unit made from aluminium, stainless steel socket (nozzle on the hose side)
DWSL 7	DN 50 (2") DN 75 (3")	บ.ชษ	with tank truck coupling, parts list of 18.3.2009, 7-8/VM_0, 7-8/3_0, 7-8/2_0	Brass (Ms58) or stainless steel clamp unit, pinned, made from stainless steel or aluminium, socket stainless steel (nozzle on the hose side)
DWSL 8			with flange connection, parts list of 28.10.2008, 7-8/F_0, 7-8/1_0, 7-8/2_0	
DWSL 9	DN 75 (3") DN 100 (4")	1.075	with tank truck coupling, parts list of 28.10.2008, 9-10/VM_0, 9-10/3_0, 9-10/2_0	Brass (Ms58) or stainless steel clamp unit, pinned, made from stainless steel or aluminium
DWSL 10			with threaded flange connection parts list of 28.10.2008 9-10/F_0, 7-8/1_0, 7-8/2_0	stainless steel socket (nozzle on the hose side)

* Volume of the monitoring space