

CERTIFICATE OF COMPLIANCE



EL Class I

Date of issue: 5 March 2024

Valid until: 31 December 2026

EHEDG hereby declares that the product

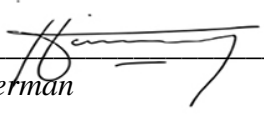
pressure transmitters, types CB55-X4/W85-EH, CS55-X4/W85-EH, CG55-X4/W85-EH and CP55-X4/W85-EH with VARINLINE (X4) or weld-on nipple (W85) with EPDM O-ring

from

Ashcroft Instruments GmbH, Max-Planck-Str. 1-9, 52477 Alsdorf, Germany

has/have been evaluated for compliance and meets/meet the current criteria for Hygienic Equipment Design of closed process applications of the EHEDG

Certificate No. EHEDG-C2600042

Signed  President EHEDG
Hein Timmerman

Signed  EHEDG Certification Officer
Karlijn Faber

EHEDG
Karspeldreef 8
1101 CJ Amsterdam
Netherlands

©EHEDG



CONTRACT TO USE THE EHEDG CERTIFICATION LOGO FOR EQUIPMENT OR COMPONENTS

A Contract entered into this 28.05.2026 between STICHTING EHEDG, an organization (foundation) existing under Dutch law, with its Head Office at Karspeldreef 8, 1101 CJ Amsterdam, Netherlands, herein after called "EHEDG" and Ashcroft Instruments GmbH, Max-Planck-Str. 1-9, 52477 Alsdorf, Germany, herein after called "Company".

1. Certified Equipment and Certified Components are any equipment, component, system, material or service for which EHEDG has specifically authorized the use of the EHEDG Certification Logo. The EHEDG Certification Logo is a registered mark. All existing rights in connection with or future rights through the use of the EHEDG Certification Logo are exclusively reserved to the EHEDG.
2. EHEDG has determined that the Equipment or Components identified in Article 11 of this Contract comply with the requirements of the applicable criteria and certification classification under Appendix 1 (EHEDG Certification Type: EL Class I) of this Contract.
3. Upon execution of this Contract and payment of any outstanding fees, EHEDG authorizes the Company to use the EHEDG Certification Logo on the Equipment or Components identified in Article 11 subject to the conditions described in Appendix 2 (Conditions for Use of the EHEDG Certification Logo) of this Contract for a period of one year. The period may be extended annually by providing documentation which shows that the Equipment or Components Certified still fully meet/s the provisions of this Contract and payment of an annual prolongation fee as published on www.ehedg.org. On each fifth year anniversary of the initial Certification, the Equipment or Component Certified will be subject to a full hygienic design evaluation and testing, as appropriate, to renew the Certification.
4. The Company undertakes the responsibility to place the EHEDG Certification Logo only on the Equipment or Components which has/have been certified as in compliance with this Contract.
5. It is understood and agreed that an EHEDG Certification Logo on any Equipment or Components and its/their Certification are invalid if the Equipment or Components has/have been significantly altered or been represented as being Certified for any purpose or end use other than that Certified by EHEDG. EHEDG assumes no liability for any claims arising from such alteration, misuse, or misrepresentation by the Company.
6. The Company assumes responsibility to inform EHEDG of any changes or modification in the design and manufacture of Certified Equipment or Components which may affect compliance with the EHEDG Criteria. The Company maintains an up-to-date database for compliance of materials in contact with food, according to national regulations. EHEDG will judge whether the changes or modifications render the current Certification void. The need for review of the modified Equipment or Components depends on the modification being carried out.
7. EHEDG assumes no liability for any claims for damages of any kind occurring to any person or entity as a result of sale, resale, use or misuse of the Company's Equipment or Components, whether or not these are certified. The Company assumes full and complete responsibility for its use of the EHEDG Certification Logo or other representation that its Equipment or Components are Certified. EHEDG assumes no liability for any claims arising from the Company's misuse of the EHEDG Certification Logo or misrepresentation of the Certification status of its Equipment or Components.
8. The Company undertakes to declare in writing before the annual expiry date on the Certificate at the latest that no modifications were made on the Certified Equipment or Components, or parts thereof. If modifications have been made on the certified Equipment or Components, the Company is to notify EHEDG thereof who determines whether the Certified Equipment or Components needs review or not.
9. Certification of the Equipment or Components is subject to a full evaluation every five years from the issuance date. If the company fails to comply with the five year evaluation or fails the evaluation, the certificate will no longer be valid. At the end of this period the Certification is no longer valid and the use of the EHEDG Certification Logo in relation to the

Equipment or Components for which the Certification was issued is, from that moment on, strictly forbidden. However, Certification of the Equipment or Components can be reviewed to determine if the Certification could be reaffirmed as written or modified to meet the current applicable EHEDG criteria and reissued, or discontinued. The Company is responsible to initiate the review process sufficiently in advance of the renewal date to prevent a delay in certification.

10. The Contract may be terminated with thirty days' notice by either party. The right to terminate the Contract for cause remains unaffected. Good cause is especially given, if the license fees were not paid or modifications have been carried out on the Certified Equipment or Components without prior notification. This Contract will be terminated when replaced by a mutually agreed new contract or contract revision provided by EHEDG or in case of abuse of the EHEDG Certification Logo as mentioned under article 14, below.
11. The EHEDG Certification Logo may be used on or in connection with the following Equipment or Components:
 - pressure transmitters, types CB55-X4/W85-EH, CS55-X4/W85-EH, CG55- X4/W85-EH and CP55-X4/W85-EH with VARINLINE (X4) or weld-on nipple (W85) with EPDM O-ring
12. EHEDG will keep all documents and other evidence of the Company's Equipment or Components on file. EHEDG will keep records of Equipment and Components that has/have been certified. EHEDG undertakes to treat all documents received from the Company as confidential.
13. A Certificate will be provided bearing the EHEDG Logo and applicable Certification type identification as shown on Appendix 1 of this Contract. The Certificate will be signed and dated.
14. Abuse of the EHEDG Certification Logo (i.e. its use under conditions conflicting with this Contract) may result in any or all of the following sanctions:
 - a. a request to immediately take corrective actions;
 - b. termination of the Contract;
 - c. indemnities and damages to the minimum amount of EUR 10,000 per case.

Examples of Abuse:

- the Company uses the EHEDG Certification Logo on Equipment, Components, drawings, brochures or other documents which have not been Certified;
 - the Company uses the EHEDG Certification Logo as general information on documents;
 - the Company uses the EHEDG Certification Logo on modified Equipment, Components drawings, brochures or other documents without prior notification to EHEDG;
 - the Company uses the EHEDG Certification Logo on Certified Equipment or Components, drawings, brochures or other documents using another name and/or designation without prior notification to EHEDG;
 - the Company uses the EHEDG Certification Logo on Equipment, Components, drawings, brochures or other documents of Equipment or Components which passed the EHEDG in-place cleaning test but do not comply with the Hygienic Design Criteria of EHEDG.
15. Disputes between Parties in connection with or arising out of the Contract, which cannot be resolved by arrangement between parties, shall be finally settled by arbitration in accordance with the rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbiters appointed in accordance with those rules. The place of arbitration shall be Den Haag (The Hague).
 16. This Contract and referenced documents constitute the entire agreement between Parties and supersede all previous communications, representations or agreements between Parties with respect to the Certified Equipment or Components. No modification will be binding upon either party unless it is made in writing and is signed by duly authorized representatives of both Parties.
 17. This Contract will be subject to Dutch law.

For Company

Ashcroft Instruments GmbH

Christoph Weitz

Name

Manager Application Engineering

Title



Signature

May 29, 2026

Date

For EHEDG

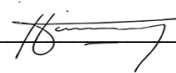
Hein Timmerman

Name

President EHEDG

Title

Signature

A handwritten signature in blue ink, appearing to read 'H. Timmerman', written over a horizontal line.

28 May 2026

Date

This Contract includes the following documents:

Appendix 1 – EHEDG Certification type and class

Appendix 2 – Conditions for Use of the EHEDG Certification Logo

Appendix 3 – EHEDG Equipment Evaluation Form

Appendix 1

EHEDG CERTIFICATION TYPE EL CLASS I

EQUIPMENT INTENDED FOR CLEANING-IN-PLACE WITH LIQUIDS WITHOUT DISMANTLING

Equipment intended for cleaning-in-place (CIP) with liquids without dismantling may be EHEDG Certified if it complies with the current Hygienic Design Criteria (HDC) of the EHEDG.

TYPE EL CLASS I Certification applies to equipment of which inspection, including documentation provided, by an EHEDG Authorized Evaluation Officer (AEO) that the equipment either fully complies with the HDC, or that for functional reasons, which are unavoidable, does not fully comply with the HDC, and additional documentation of specified measures to compensate for the lack of compliance has been provided. These specific measures shall be clearly mentioned in any technical description of the equipment as well as in any operating instructions to be provided by the equipment supplier.

Examples of certifiable equipment are:
Pipe line equipment like pumps, valves and sensors.

All documentation is recorded within the official certification file and may include reports of cleanability tests, but also include results of the measurement of surface roughness, radii of corners, etc.

Appendix 2

CONDITIONS FOR USE OF THE EHEDG CERTIFICATION LOGO

Upon obtaining evidence of compliance (see Appendix 1: EHEDG Certification Type), a contract shall be executed by the Company and EHEDG. The contract shall detail the Product for which Certification is provided. The Certification Logo will be dated (month and year) and will last for a period not to exceed 5 years unless the equipment, or any part thereof, is modified, in accordance with clauses 3 and 6 of the Contract.

1. Use of the Logo and responsibility of Applicant

1.1 The Applicant shall represent as Certified, by use of the Logo or otherwise, only Products described in the Contract.

1.2 The language allowed is either "Certified by EHEDG" or "EHEDG Certified". Correct literal translations are also allowed.

1.3 The Logo may be printed in black or in two colours. If printed in two colours, "EHEDG" must be in red and all other text in blue (see 10, below).

1.4 The Logo must be used in combination with the type of Certification, such as "TYPE EL CLASS I", and the date (month in text and year in four digits) of Certification. Both must be produced below the logo in the way shown under 10. The text, such as "TYPE EL CLASS I", must be at least 1/10 times the size of the logo and the date must be at least 1/20 times the size of the logo, but both must never be less 2 mm in height. The font must be ARIAL Bold.

1.5 If the logo is applied directly (etching) on to the Product, this may be done without using colours. If colours are used, the colours mentioned under 1.3 must be used, as indicated. It must be ascertained that the use of the Logo on Products does not adversely affect either hygiene or food safety. Dimensional requirements are as specified under 1.4.

1.6 The Logo may not be cropped in any way.

1.7 The Logo may be used in combination with other logos or marks.

If used in combination with other logos, it does not automatically mean that the EHEDG is linked to those organisations in one way or the other.

2. Written Authorization for Certification and Use of the Logo

The EHEDG Logo is a registered Mark. No Company or person shall apply or use the Logo in connection with a Product, or represent in any way that the Product is EHEDG Certified, until receipt of written authorization from EHEDG. EHEDG may pursue legal recourse if the Logo is misused.

3. Transfer of Authorization for Certification and Use of the Logo

No company may independently transfer or authorize the use of their certification. Upon request and with documentation of continued compliance, EHEDG may transfer authorization for continued Certification of specific Products to another Company for the purpose of a name change, change of ownership, or change of a production location. An administration fee will be charged.

4. EHEDG Acknowledgement of Certified Products

Certified Products may bear the Logo or be otherwise represented as Certified.

5. Trade Designations

A Company shall not use the letter combination "EHEDG" in its trade designation (e.g. name, model number, or other identification assigned by the Company) for a Certified or non-Certified Product.

A Company shall not have a trade designation for a Certified Product that directly or indirectly states or implies an end use application for which the product is not certified.

6. Product modification

Any modification of the product, which has been Certified renders the Certification void for the modified products. If Certification of the modified product is desired, a new application must be submitted. If the modification proves to be relatively insignificant, the fee may be reduced or waived at the discretion of EHEDG.

7. Implementation of Revisions to Referenced EHEDG Guideline(s)

Upon adoption of a revision to any referenced EHEDG Guideline(s), mentioned in the Contract, the Company shall be encouraged to implement all changes in requirements in its Certified Products.

8. Certification of Distributors

A Company distributing a Certified Product with a trade designation other than that of the original manufacturer may apply for an extra EHEDG Certification and contract.

9. Private Labelling of Certified Products

If a Company has the intention to label Certified Products with another name and/or designation the Company shall prior to any changes notify the EHEDG thereof in writing. On written consent of the EHEDG, the Company may apply for an extra EHEDG Certification and contract.

10. Examples of the EHEDG Certification Logo

The applicable logo (with Month and Year) will be provided by EHEDG.

EHEDG BLUE

CMYK
100.79.4.0

RGB
22.65.148

HEX
164194

EHEDG RED

CMYK
0.87.84.0

RGB
231.59.45

HEX
E73B2D





APPENDIX 3

EHEDG Certification – Equipment Evaluation Form

Design Evaluation Date: 27.06.2023

EHEDG File Number: EHEDG-R2600044

Certification Type: EL CLASS I

Applicant: Ashcroft Instruments GmbH

Equipment: pressure transmitters, types CB55-X4/W85-EH, CS55-X4/W85-EH, CG55-X4/W85-EH and CP55-X4/W85-EH with VARINLINE (X4) or weld-on nipple (W85) with EPDM O-ring

Other essential identification:

Evaluated by:

Name: Dr. Jürgen Hofmann

Date, Signature: 13.05.2026

Approved by:

Name: Andy Timperley, Chairman on behalf of the SubCom Certification

Date, Signature: 27.05.2026,

The use of the EHEDG Certification logo is justified based on the results of the design evaluation, inspection, and testing (as applicable) of the equipment for compliance with the current EHEDG Hygienic Design Criteria (HDC):

Criteria	Certification for use in Closed Processes
☐	The equipment complies with all applicable HDC in the Guidelines.
☒	Evidence for compliance required and provided by in-place cleanability test method according to EHEDG Doc. 2.
☐	Evidence for compliance required and provided by in-place cleanability test method according to EHEDG Doc. 2, in-place sterilisability test method according to EHEDG Doc. 5, and bacteria tightness test according to EHEDG Doc. 7 for EL ASEPTIC Certification.
Criteria	Certification for use in Open Processes
☐	The equipment complies with all applicable HDC in the Guidelines.
☐	Evidence for compliance required and provided by OPC cleanability test method according to EHEDG Doc. 57.

APPENDIX 3

No.	Description
1.	EHEDG Certificate of Compliance
2.	Contract to use the EHEDG Certification Logo for equipment
3.	Appendix 1: Equipment intended for cleaning-in-place with liquids without dismantling
4.	Appendix 2: conditions for use of the EHEDG Certification Logo
5.	Appendix 3: Equipment evaluation form
6.	Evaluation report of the design of the pressure transmitters, types CB55-X4/W85-EH, CS55-X4/W85-EH, CG55-X4/W85-EH and CP55-X4/W85-EH with VARINLINE (X4) or weld-on nipple (W85) with EPDM O-ring, no. 10526TUM2026
7.	Test report of the in-place cleanability test method according to Doc. 2, Test no. V9510/02, TNO, NL .
8.	Cleaning and Installation manual (excerpt) no. P/N 095I508-01EN supplied by the manufacturer
9.	Example of EHEDG Certified Logo Type EL CLASS I

EHEDG Certification Contract Ashcroft

Final Audit Report

2026-05-29

Created:	2026-05-28
By:	EHEDG Office (office@ehedg.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAocpt89Lg5zIEzw9ZfahDNLso5v2cRrF5

"EHEDG Certification Contract Ashcroft" History

-  Document created by EHEDG Office (office@ehedg.com)
2026-05-28 - 2:56:43 PM GMT- IP address: 31.161.119.41
-  Document emailed to Christoph Weitz (christoph.weitz@ashcroft.com) for signature
2026-05-28 - 2:57:18 PM GMT
-  Email viewed by Christoph Weitz (christoph.weitz@ashcroft.com)
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-  Document e-signed by Christoph Weitz (christoph.weitz@ashcroft.com)
Signature Date: 2026-05-29 - 8:26:57 AM GMT - Time Source: server- IP address: 164.138.192.58 - Signature Appearance Selected: IMAGE
-  Agreement completed.
2026-05-29 - 8:26:57 AM GMT



Adobe Acrobat Sign

EHEDG Hygienic Design Criteria Evaluation Report no. 10526TUM2026

Items evaluated: pressure transmitters, types CB55-X4/W85-EH, CS55-X4/W85-EH, CG55-X4/W85-EH and CP55-X4/W85-EH with VARINLINE (X4) or weld-on nipple (W85) with EPDM O-ring

- Code 'EH' describes the EHEDG version.
- The pressure and level transmitters are available in two different versions of mounting:
 - VARINLINE, type N base plate version – code 'X4' – fully welded
 - Detachable connection via weld-on nipple and lockring – code 'W85' – sealed with EPDM O-ring
- The various types differ in the external area, but the design of the food contact surface is identical.

Supplied by: Ashcroft Instruments GmbH, Max-Planck Str. 1-9, 52477 Alsdorf, Germany

Manufactured by: Klay-Instruments BV, Nijverheidsweg 5, 7991CZ Dwingeloo, The Netherlands

The evaluation is based on the applicable EHEDG hygienic design criteria (HDC) in Guidelines 8 (2018), 9 (1993), 10 (2007), 16 (1997), 32 (2005) and with reference to specific EHEDG Supplementary Certification Requirements described in Document SCR 1-1, Version 01_210505. Evidence for compliance was provided and convinced by performing the in-line cleanability test (report no. V9510/02) by the authorized EHEDG Testing Laboratory: TNO, NL.

Materials, Surface Roughness, Fabrication and Surface Geometry

- Metallic product contact surfaces are constructed from Stainless Steel Alloy AIST 316L. This material is considered non-toxic and corrosion-resistant under the intended conditions of use.
- Product contact surfaces are finished to 0.8 µm Ra or better by electro polishing. A sample of the pressure and level transmitter was measured at Quality Control inspection and documented to be in conformance with the above specifications.
stainless steel surface weld-on nipple: average value Ra = 0.3 µm
stainless steel surface around diaphragm: average value Ra = 0.3 µm
- The O-ring of the W(85) version is made of EPDM, compound EP703901 from Freudenberg or EPDM 70. The surfaces are smooth without any visible pores or damage. These materials are allowed to be used in contact with food; according to FDA § 21 CFR title 177.2600.
- The manufacturer maintains an up-to-date database for compliance of materials in contact with food, according to national regulations.
- The joint of the weld-on nipple (O-ring sealing) is according to the EHEDG HDC with centring and controlled compression.
- The weld-on nipple has a drain hole for leak detection.
- Welding of the diaphragm is done by TIG welding without any post-treatment and in conformance with the EHEDG requirements of Doc. 9. Welding seams are smooth and continuous.
- The diaphragm is flush welded without any step or recess at the product side. The convolutions have radii smaller than the 3 mm, due to technical reasons. The cleanability test assessed the easy cleaning of this design.

- The design and geometry of the product contact side of the pressure and level transmitter including the process connection comply with the applicable HDC of EHEDG.

Drainability and Installation

- Instruction manual specifies the correct installation orientation for self-draining applications.
- Instructions provided containing information regarding easy cleanable installation.
- Mounting will be done by using the weld-on nipple or VARINLINE accepted process connection following the EHEDG position paper (available on the EHEDG website at www.ehedg.org).

Cleaning

- Cleaning is done in-place together with the pipeline CIP or the tank cleaning.

Adhesives, Lubricants and Signal transfer liquids

- No adhesives or lubricants are used in the transmitter construction where they can come into contact with the product.
- As signal transfer liquid, Neobee M-20 from Stepan FDA § 21 CFR title 174.5 and FDA § 21 CFR title 172.856 compliant, is used. The liquid will not be in contact with the product under the intended conditions of use.

Result of the EHEDG in-place cleanability test method according to Doc. 2

- Test report no. V9510/02 from TNO (NL): the in-place cleanability test method has proven that the pressure and level transmitter type 2000-SAN code W-G150 (current code is G250 because of additional EHEDG requirements) with weld-on nipple W(85) and EPDM O-ring Dichtomatik 9586 (new designation EP703901 now but no changes of compound after acquisition by Freudenberg) adapted to a VARINLINE ball housing connection is easy to clean. The replicate test runs show that the tested Pressure Transmitter type 2000-SAN code W-G150 was cleanable in-place (CIP) at least as well as the reference pipe.

Conclusion

The Hygienic Design Criteria Evaluation Report concludes that these **pressure transmitters, types CB55-X4/W85-EH, CS55-X4/W85-EH, CG55-X4/W85-EH and CP55-X4/W85-EH with VARINLINE (X4) or weld-on nipple (W85) with EPDM O-ring** comply with the applicable EHEDG Hygienic Design Criteria for Hygienic Equipment Class I and the use of the EHEDG Certified logo Type EL CLASS I is justified.

Dr.-Ing. J. Hofmann
13.05.2026



2.4 Staff qualifications (target group assessment)

The device may only be installed and started up by specialist staff who are familiar with installation, start-up and operation of the product.

Specialist staff are people who are able to assess the work assigned to them on the basis of their specialist training, their knowledge and experience and their knowledge of the relevant standards, and can identify possible risks.

For devices in explosion-protected configuration, these staff must have been trained or instructed in, or be authorized for, working on explosion-protected devices in potentially explosive plants.

2.5 Signs/Safety markings

The pressure transmitter and its surrounding packaging carry markings. These markings show the article number, measurement range and manufacturer. The pressure transmitter can be provided with additional signs and safety markings advising on special conditions:

- Advice on the filling liquid
- Advice on calibration
- Safety advice for flush diaphragm

2.6 Environmental protection

This device contains a small amount of silicone oil or a foodgrade oil (Neobee M20). The provisions set out in the REACH regulation on production and use of chemicals are to be respected, and the relevant safety data sheets from the manufacturers of the chemicals are available on our website for download.

3 Certificates/ details

3.1 CE / EMC – Rules

All BRONZE SERIES transmitters are manufactured in accordance with the RFI / EMC directives and comply with the CE standard. All transmitters are fitted with RFI filters, which provide optimum, trouble-free operation. Our products are in conformity with EMC-Directive 2004/108/EC based on test results using harmonized standards.

3.2 Traceability year of manufacturing

The year of manufacturing of the transmitter can be traced as follows: take the first three numbers from the serial number that is engraved in the transmitter and add 1908 to it.

For example: if the serial number is 10509426. The year of manufacturing is $1908 + 105 = 2013$. For older transmitters, for example with serial number 9302123, the first two numbers must be added to 1908.

3.3 EHEDG approved connections with CB55

The cleanline BRONZE SERIES is also available with EHEDG approved connections.

Code **X4** (VARIVENT® connection baseplate from GEA) with Hygienic approval code **EH**

The design of the transmitter housings and process connections are slightly adapted to fulfill the EHEDG requirement in comparison to the non- EHEDG approved connection of X4 (*without hygienic approval code EH*). Please contact Ashcroft Instruments GmbH for the drawings of the EHEDG approved transmitters.

The $\varnothing 60 \times 3$ mm EPDM O-ring to be used with the EHEDG approved connection Code X4 Code EH, will not be supplied by Ashcroft with standard configuration (on request only). The O-ring approved for food contact shall be used by the customer. These shall be according to the most recent version of the *EHEDG Position Paper*. See the EHEDG website www.ehedg.org.

The FDA approved Neobee M-20 (*Direct food contact FDA 21 CFR 172.856; Indirect food contact FDA 21 CFR 174.5*) is used as fill fluid for the EHEDG approved connection.



If the transmitter is configured with the EHEDG approved connections, along with the general instruction for assembly and installation in Section 8, please pay attention also to the installation guidelines in Section 8.6 and the cleaning instructions in Section 8.7 for the EHEDG connections.

8.5 Mounting Position Effect

The transmitters are calibrated in horizontal position.

If the transmitter is mounted vertical (up or down), there will be a zero shift.

If the transmitter is mounted up there is a small zero shift (< 4 mA).

If the transmitter is mounted down there is a small zero shift (> 4 mA).

After installation of the transmitter the zero must be set at 4 mA with the zero potentiometer.

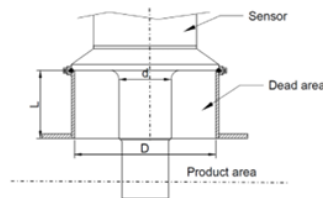
DO NOT change the span.

8.6 Installation guidelines for EHEDG approved connections

If the EHEDG approved versions of the connection X4 is used as process connections, ensure that the following guidelines are followed:

- Install the sensors according to the directions given in EHEDG documents 8, 10 and 37. See the EHEDG website www.ehedg.org.
- Mount the sensor in a self-draining orientation, the angles are to be chosen in such a way, that fluids can be drained completely by gravity alone.
- The leakage detection hole in the weld-on nipple should be on the lowest point.
- Suitable seals approved for food contact must be applied. E.g. They shall have an applicable FDA approval. These shall be according to the most recent version of the *EHEDG Position Paper* (see the EHEDG website www.ehedg.org). With the X4 connection, $\varnothing 60 \times 3$ mm EPDM O-ring approved for food contact shall be used.
- When installing hygienic process components and/or equipment in a process line it is of great importance that these components and equipment are connected in a hygienic, easy cleanable way. Preferably, do not mount on a T-piece because of dead end.

In pipe line connections, if mounting on a T-piece is unavoidable then respect the EHEDG installation directions for mounting on a T-piece; the ratio between the depth of the upstand (L) and the diameter (D) of the upstand shall be $L/(D-d) \leq 1$ (see latest EHEDG *Position Paper*. The dimension 'd' in *Position Paper* is not applicable to Ashcroft X4 connection).



Example figure from EHEDG position paper Version 5

Sensors mounted in tanks should be flush to the inside of the tank wall. If a dead leg exists for technical reasons, it must be ensured that the cleaning device is able to reach the surfaces. The above criteria for L still apply.

- In case welded adapters are used, the food contact surfaces must have a surface roughness of $R_a \leq 0.8 \mu\text{m}$. This surface roughness should be maintained after the welding. The adapters must be TIG welded (MIG welding is not admissible). Directions for welding are given in EHEDG documents 9 and 35.
- The sensors are suitable for cleaning-in-place (CIP) See Section 8.7 below for instructions.
- The device has been developed for Cleaning In Place (CIP) without dismantling (class I equipment), so during cleaning, the sensor must not be dismantled. The wetted materials shall meet the requirements of FDA and EHEDG standards.
- The max pressure and temperature limits of the transmitters (see specs in Section 4.1) shall not be exceeded.

8.7 Cleaning in Place (CIP) of EHEDG approved connections

Cleaning in Place (CIP) is an important component in guaranteeing food safety in food processing plants. Successful cleaning between production runs avoids potential contamination. Carrying out CIP correctly ensures secure barriers between food flows and cleaning chemical flows.

Whether it is a completely new installation or a replacement/ re-installation, cleaning in place of the transmitter is mandatory, before it is used in process again.

How to clean a plant that has been processing food depends on the type of food that has been produced, and under which conditions. The procedure for cleaning a plant often follows these steps:

Installation and Cleaning Manual



Pre-rinse > Alkali circulation > Rinse > Acid circulation > Final rinse

Apply a standard CIP or SIP process used with temperature pressure and the duration of the process applicable to the product/industry.



The max pressure and temperature limits of the transmitters (see specs in Section 4.1) shall not be exceed.

8.8 Calibration

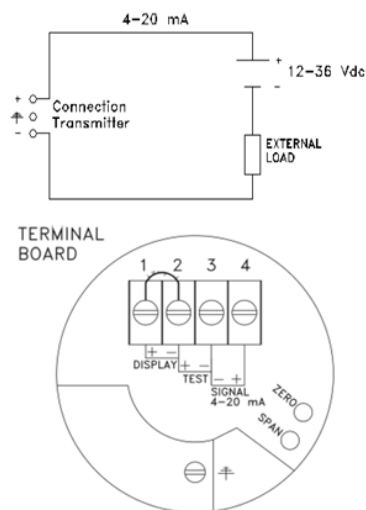
All transmitters are fully calibrated at the factory, to the conditions stipulated in users order. When the buyer has not requested calibration, the transmitter will be calibrated at the lowest span.

It may be advisable to recalibrate the transmitter after shipment.

The calibration sequence is as follows:

1. The output of the transmitter must be set at 4 mA (Zero-potentiometer).
2. Air pressure in accordance with the process pressure must be put on the test nipple.
3. The output of the transmitter must be set at 20 mA (Span-potentiometer).
4. Remove the air pressure.
5. Check if the output of the transmitter is 4 mA. (Otherwise repeat steps 1 till 4)
6. Install transmitter (See above).
7. The output must be set at 4 mA (dependable of mounting position)

8.9 Wiring



The connector, and zero / span potentiometers are under the cover. Test nipples for calibration of the BRONZE SERIES are available on request.

External loads must be placed in the negative side of the 2-wire loop.

The figure left shows the wiring connection of the transmitter. The 2-wires must be connected to connectors 3 (-) and 4 (+) of the terminal board.

The transmitter must always be connected to earth.

The transmitter must be connected with standard two-wire shielded cable. **DO NOT** run signal wiring in open trays with power wiring, or near "heavy" electrical equipment (E.g. Frequency controllers or heavy pumps).

Shielding must always be connected at the side of the power supply. In case the mounting position is already connected to ground (e.g. via the tank or pipe line) do **NOT** connect the instrument to ground. **Please ensure that the instrument is not connected to ground twice to prevent the occurrence of an 'earth loop'.**

Reversing the polarity will not damage the transmitter, but the transmitter will not function until the + and - are properly connected.

8.10 Digital local indicator(optional)

This intelligent 2-wire loop powered LCD digital display for the BRONZE SERIES transmitters, has a 16 Bit ADC MCU inside. The local indicator displays a digital value that is proportional to the pressure measured by the transmitter. The full scale point may be set to any value between 0000 and 1999. You can use the three buttons to program the zero point, span, unit, decimal point, and damping. The following are the features:

- High accuracy and stability
- 16 Bit ADC MCU inside
- The range of values which can be displayed on the LCD is -1.9.9.9.9.~ 9.9.9.9.9.
- LCD can work at 3mA. Dropout voltage=3.1V
- 34 optional units. Many kinds of values can be displayed such as pressure, temperature etc.

9.1 Safety

When undertaking servicing work on the device, the pressure lines must be depressurized, the electrical connections isolated from the mains supply, and the plant secured against being switched on again.

9.2 Check on function, and recalibration

The check on function and recalibration is carried out at regular intervals, depending on the application. The precise testing cycles should be adjusted in line with the operating conditions and ambient conditions. In the event of various device components interacting, the operating instructions for all other devices should also be taken into account.

- Check on display.
- Check on function, in conjunction with downstream components.
- Check of pressurized connection pipes for seal condition.
- Check of electrical connections.

9.3 Cleaning and maintenance

Cleaning is carried out using a non-aggressive cleaning agent, with the ventilation valve closed and respecting the protection category of the device.

10 Faults

10.1 Safety

Defective or faulty pressure transmitters put the operational safety and process safety of the plant at risk, and can lead to a risk or injury to persons, the environment or the plant.

10.2 Conduct in the event of faults

All defective or faulty devices must be taken out of service. If a repair is required, the device must be sent directly to our Repairs Department. We request that all returns of devices are agreed with our Service Department.

10.3 Fault table

Possible situations indicating a fault:

- No output signal
- Wrong output signal
- Cracked parts
- Indications that the measurement system seal is damaged (process media within the transducer)
- Damage to housing
- Humidity inside the transmitter (wrong sealing of termination)

In these instances, replacement of the pressure transmitter is always required.

10.4 Conduct following fault rectification

See Section 8 Mounting and Installation.

11 Removal, disposal

11.1 Safety



Residues of measuring media in and on removed transmitters can constitute a risk to people, the environment and equipment. Adequate precautionary measures must be adopted. If necessary, the devices must be cleaned thoroughly (see advice in safety data sheets).

11.2 Removal

- When undertaking servicing work on the device, the pressure lines must be depressurized, the electrical connections isolated from the mains supply, and the plant secured against being switched on again.
- Demount the transmitter using a suitable tool

TNO report**V9510/02****Validation of the in-place cleanability of the
Pressure Transmitter type 2000-SAN code W-
G150 from Klay Instruments B.V. according to the
EHEDG procedure**

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Summary

At the request of Klay Instruments B.V., Dwingeloo, the Netherlands the in-place cleanability of their Pressure Transmitter type 2000-SAN code W-G150 was assessed according to the test procedure of the European Hygienic Engineering & Design Group (EHEDG) [Ref. 1].

The replicate test runs show that the tested Pressure Transmitter type 2000-SAN code W-G150 including the O-ring seal was cleanable in-place (CIP) at least as well as the reference pipe.

The design of the Pressure Transmitter type 2000-SAN code W-G150 complies with the hygienic equipment design criteria of the EHEDG, Doc.8, Second Edition, April 2004 [Ref. 2].

The results obtained are representative for the Pressure Transmitter type 2000-SAN code W-G150.

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**Appendix A: Detailed information on the Pressure Transmitter type 2000-SAN
code W-G150.**

1 Introduction

At the request of Klay Instruments B.V., Dwingeloo, the Netherlands the in-place cleanability of their Pressure Transmitter type 2000-SAN code W-G150 was assessed according to the test procedure of the European Hygienic Engineering & Design Group (EHEDG) [Ref. 1].

The tests were performed on two test objects assembled in a Varivent process connection.

2 Description of the test object

Name of test object	: Pressure Transmitter
Type	: 2000-SAN code W-G150
Material of construction diaphragm	: Stainless steel 316L
Surface finish (internal)	: $R_a \leq 0.8\mu\text{m}$
Type of applied seal	: O-ring
Material of seal	: EPDM; Dichtomatik 9586
TNO numbers	: 3119-12-0055 / 0057

A schematic drawing and detailed technical information is given in Appendix A. Figure 1 shows a photo of Pressure Transmitter type 2000-SAN code W-G150.

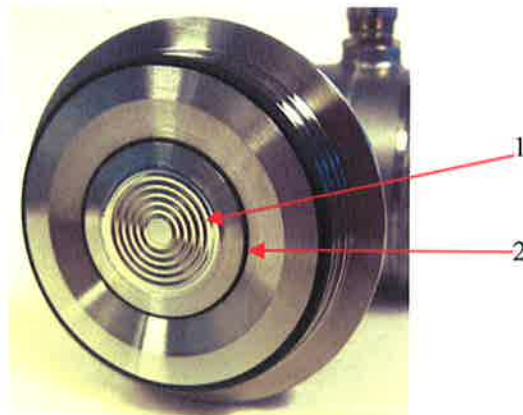


Figure 1.

Specific parts to be mentioned that could be critical in relation to the in-place-cleanability are:

1. stainless steel membrane
2. O-ring seal

3 Time schedule

The test objects arrived at TNO in February 2012 and were registered under TNO numbers 3119-12-0055 / 0057. The investigation was carried out from February to April 2012.

4 Material and method

Before conducting the test programme the elastomeric component (EPDM) has been checked against the test strain for antimicrobial properties. Prior to testing, the test object and the reference pipe (having a $0.5 \mu\text{m}$ R_a internal roughness) were dismantled, thoroughly cleaned and degreased by hand and steam-sterilized in-line or autoclaved at 121°C for 30 minutes.

The test object and reference pipe were reassembled with an auxiliary pipe at each end and soiled under 5 bar g (gauge) pressure with a soured milk solution with spores of the test strain *Geobacillus stearothermophilus* var. *calidolactis*, mixed to give a final concentration of approx. 10^5 spores per cm^3 in the milk. The air pressure of 5 bar g was applied 3 times to the closed assembly and held at pressure for 2 minutes on each occasion.

After draining the test object was dried by flushing with dry filtered air at a velocity of 1.0 m/s (for about 2 to 4 hours) until an exhaust relative humidity of $\leq 5 \pm 0.3\%$ was achieved.

The test object was cleaned in-place in an in-place cleaning test rig by three stages:

1. Rinsing with cold water for 1 minute;
2. Cleaning with a 1% (w/v) detergent solution at $63^\circ\text{C} \pm 2^\circ\text{C}$ for 10 minutes;
3. Rinsing with cold water for 1 minute.

For stages 1, 2 and 3 the mean velocity of flow in CIP system was 1.5 m/s. A back pressure of 1 bar g was set during all stages of the CIP cleaning runs.

At the end of both rinsing procedures samples of the out flowing water were taken and two 5 ml portions of each were pour-plated with modified Shapton and Hinds agar (MSHA).

After cleaning, the inner surfaces of the test object and reference pipe were covered with molten MSHA. After the agar had fully solidified the test object and reference pipe were placed in an incubator at 58°C for 16 hours.

After incubation, the test object and reference pipe were examined for the presence of yellow discolouration in the agar. The degree of discolouration in the agar taken from the test object was compared to the degree of discolouration in the agar taken from the reference pipe.

5 Results

The applied EPDM seals used for the sensor have been checked against the test strain on antimicrobial properties. The results indicated no growth inhibiting activity of the EPDM material.

The tests were conducted up to three times on the available object. The back pressure during CIP cleaning was 1.0 bar g.

The yellow discolouration in the MSHA from the specific parts of the test object studied and reference pipe for the test runs performed are summarized in table 1 and in table 2.

The individual results of the tests are comparable with each other.

Table 1. Survey of the test results for the Level Switch type Pressure Transmitter type 2000-SAN code W-G150 (1).

Test object Pressure Transmitter type 2000-SAN code W-G150, sensor 1	Average surface finish (µm Ra)	Average discolouration (%)		
		Test 1	Test 2	Test 3
Stainless steel diaphragm	<0.8	<5	<5	<5
EPDM seals	n.a.	<5	<5	<5
Varivent process connection	<0.8	<5	<5	<5
Reference pipe	0.5	20	30	30

Table 2. Survey of the test results for the Level Switch type Pressure Transmitter type 2000-SAN code W-G150 (2).

Test object Pressure Transmitter type 2000-SAN code W-G150, sensor 2	Average surface finish (µm Ra)	Average discolouration (%)		
		Test 1	Test 2	Test 3
Stainless steel diaphragm	<0.8	<5	<5	<5
EPDM seals	n.a.	<5	<5	<5
Varivent process connection	<0.8	<5	<5	<5
Reference pipe	0.5	20	30	30

n.a. = not applicable

% = randomly yellow colouration present in comparison with the colour disk

6 Conclusions

The replicate test runs show that the tested Pressure Transmitter type 2000-SAN code W-G150 was cleanable in-place (CIP) at least as well as the reference pipe.

The design of the Pressure Transmitter type 2000-SAN code W-G150 complies with the hygienic equipment design criteria of the EHEDG, Doc.8, Second Edition, April 2004 [Ref. 2].

The results obtained are representative for the Pressure Transmitter type 2000-SAN code W-G150.

7 Records

Original data sheets, protocols and the final report will be filed in the archives of TNO for 5 years after completion of the study.

8 References

1. EHEDG Guideline
Hygienic equipment design criteria, European Hygienic Engineering and Design Group, Doc. 8, Second Edition, April 2004.
2. EHEDG Guideline
A method for the assessment of in-place cleanability of food processing equipment. European Hygienic Engineering and Design Group, Doc. 2, Third Edition 2004.

9 Authentication

We, the undersigned, herewith declare that the tests reported here were carried out according to the agreed protocols, that this report contains an accurate description of the results obtained and that the results relate only to the tested object.

Date: April 2012



Dr. J.M.B.M. van der Vossen
Project Manager



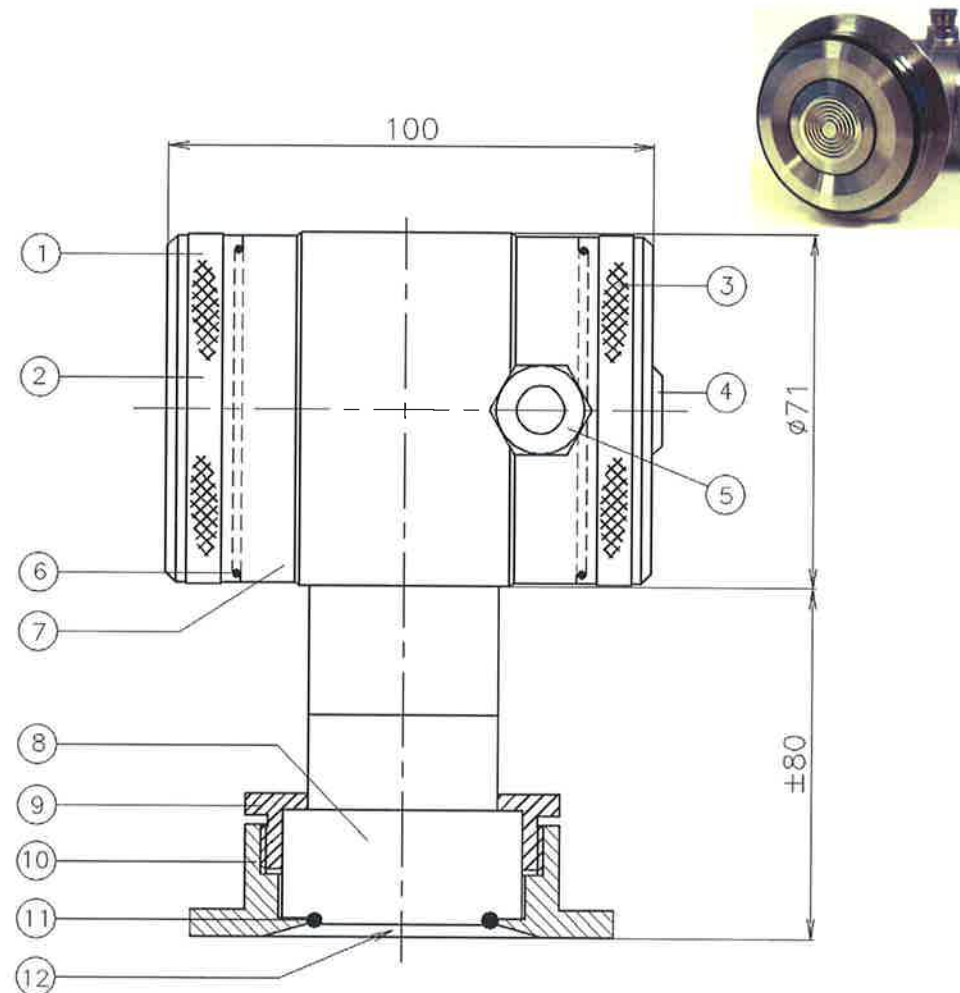
Ing. J. Kastelein
Scientist



Dr. R.C. Montijn
Head Research Group
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Appendix A.

Detailed information on the Pressure Transmitter type 2000-SAN code W-G150.



ITEM	QUANTITY	DESCRIPTION	MATERIAL
1	1	Cover	AISI 304
2	1	Push buttons + display (Behind cover)	
3	1	Cover with venting	AISI 304
4	1	Venting	PA
5	1	PG9 Cable gland	
6	2	O-ring	EPDM
7	1	Electronics housing	AISI 304
8	1	Foot with Sensor	AISI 316
9	1	Lockring	AISI 304
10	1	Weld on Nipple, ø48mm, 62mm or 85 mm	AISI 316L
11	1	O-Ring	EPDM
12	1	Diaphragm	AISI 316L



TYPE EL
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