

**Operating Instructions
for
Sight Glass Flow Indicator**

Model: DAI



We don't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.

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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.

Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:

The standard delivery includes:

- Sight Glass Flow Indicator model: DAI
- Operating Instructions

4. Regulation Use

Any use of the device, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

5. Operating Principle

The operating principle is based on the fluid passing through the instrument and its display through a transparent sight glass.

This passage can be further displayed with fixed paddle chain, rotor, ball or drips.

6. Installation

6.1 Installing the instrument

Before installation, check the line connections and the instrument connections for compatibility.

In cases when the instrument shows an arrow that indicates the direction of the flow, please comply with that indication at the assembling stage. Moreover, if the passage fluid is at high temperature or very cold, the user shall adopt insulation/protections that are able to minimize all differences in temperature from room temperature.

Burdening the unit with external loads is strictly prohibited and it is the user's duty to protect it from whatever stress; all uses as a point of support is not allowed.

To avoid all effects of galvanic corrosion, never use materials featuring a different electrochemical potential, the user shall take all actions that are aimed at preventing such condition for the unit.

The system shall be equipped with the prescribed safety valve, to remedy over pressure values that exceed the maximum value. For installation on piping exposed to strong vibration, please contact the customer service department.

7. Setting at work

Ensure that the use of the instrument does not range out of the admitted ones, with higher pressure and temperature values and lower flow rates.

The user shall absolutely avoid the occurrence of the so-called “water hammers”, taking care to always start the fluid in a gradual manner.

8. Calibration

The instrument is factory-set and does not require any calibration to be performed.

9. Maintenance

Owing to their constructional simplicity and the remarkable mechanical sturdiness, these instruments do not require any routine maintenance.

At all events, it is however advisable to check, every now and then, the service state of the seals and the integrity of glass discs or tubes. Ensure there is no fluid leaking out of the seals and that the porthole does not show marks of erosion/corrosion (a possible sign of corrosion is the dulling of the glass), scratches (≥ 0.5 mm in depth) or marks of fracture.

If necessary, immediately replace the glass and its gaskets.

These checks shall be made without dismantling the glass component from the porthole flange.

In cases when, no matter why, the user decides to dismantle the glass components, the latter and the dismantled seals, even if they do not show any deep mark of failure or wear, shall never be put back in place; they will need to be replaced with new parts.

All maintenance activities shall take place when the unit is disconnected from the system, without pressure and fluid, and at room temperature (in the vent of instruments that work at high or low temperature).

9.1 Notices

- NEVER use the unit with a pressure or temperature value that exceeds the rating data;
- NEVER make adjustments or replace parts without having first carefully read the relevant instructions; in case of doubts, please consult our customer service department;
- NEVER lubricate parts of the instrument;
- In cases when the instrument is used with high temperatures, please take all measures required to safeguard and protect the service staff at all maintenance stages.

9.2 Tightening

The edge of the glass shall not lie against the edges of the porthole flanges, whereas there must be a space of at least 1 mm between the glass and its seating (to compensate for all thermal expansion possibly occurring).

Unless specifically instructed otherwise, the bolts must be tightened following an alternate scheme, so that the gasket is compressed for 1/3 of its thickness.

The tightening shall occur in a gradual manner and in such a way as to avoid excessive local stress.

Tighten the tie rods in a sequence, in at least two subsequent stages.

10. Order Codes

Materials/Mounting position

	DAI-C	DAI-S	DAI-V	DAI-P	DAI-D
Rotor	SS316 or PTFE (optional)				
Housing	carbon steel 1.0619	st. st. 1.4401/1.4404	PVC	PP	PVDF
Cover plates	carbon steel 1.0619	stainless steel 1.4401/1.4404			
Sight glass	soda-lime glass DIN 8902 (up to 150 °C); option: borosilicate glass DIN 7080 (up to 260 °C)				
Screws	zinc plated steel	stainless steel			
Gasket	see table Order Details				
Mounting position	universal				
Operating pressure	see table Order Details				
Operating temp.	-20 ... +150 °C (+260 °C with borosilicate glass)	-196 ... +150 °C (+260 °C with borosilicate glass)	0 ... +60 °C*	-10 ... +80 °C*	-20 ... +140 °C*

* see diagram Pressure Derating Curve with Temperature

Example: DAI-C G E 50 G N 0 0

Model	Material ¹⁾	Connection ¹⁾	Connection type ¹⁾	Size ¹⁾	Gasket
DAI-	C = carbon steel S = stainless steel V ⁴⁾ = PVC P ⁴⁾ = PP D ⁴⁾ = PVDF	G = G-thread N = NPT female	6 = Thread connection, PN6 max. Z = Thread connection, PN10 max. 5 = Thread connection, PN25 max. 4 = Thread connection, PN40 max.	15 = DN 15 (1/2") 20 = DN20 (3/4") 25 = DN25 (1") 32 = DN32 (1 1/4") 40 = DN40 (1 1/2") 50 = DN50 (2") 65 = DN65 (2 1/2") 80 = DN80 (3") 1H = DN100 (4") 1Z = DN125 (5") 1F = DN150 (6") 2H = DN200 (8")	G = Graphite (Standard for Material C and S) T = PTFE (Optional for Material C and S) V = Viton (Standard for Material V/P/D)
		F = flange	D = Flange acc. EN 1092-1, PN10 B = Flange acc. 1092-1, PN25 (only up to DN80) A = Flange acc. EN 1092-1, PN40 (only up to DN50) L = Flange acc. ASME Class 150, PN10 max. (Sealing surface: RF for Material C/S, FF for Material V/P/D) M ³⁾ = Flange acc. ASME Class 300, PN40 max. (Sealing surface: RF for Material C/S, FF for Material V/P/D)		

Example: DAI-C G E 50 G N 0 0 (continued)

Sight glass	Visual internals	Option
N = Soda Lime Glass up to +150 °C (Standard) B ²⁾ = Borosilicate Glass up to +260 °C	0 = none R ²⁾ = SS316 Rotor for liquids B = PTFE ball (temperature limit: -30 °C...+200 °C) F ²⁾ = Flap SS316, fixed at 45 °C K ²⁾ = Chain SS316 hanging Only for horizontal mounting position	0 = without M = Material certificate 3.1 (to be ordered as separate line item with code DOK-FR03A) Y = special (specify in clear text)

¹⁾ = for possible Material/Size combinations, please see table on following page

²⁾ = not for Material V/P/D

³⁾ = only up to size "50"

⁴⁾ = pressure rating limited to PN6 (see diagram Pressure Derating Curve with Temperature)

10.1 Pressure Derating Curve

Pressure Derating Curve with Temperature for PVC

Temperatur	max. Druck
0...20°C	6 bar
30°C	ca. 5 bar
40°C	ca. 4 bar
50°C	ca. 2.2 bar
60°C	ca. 1.5 bar

Pressure Derating Curve with Temperature for PP

Temperatur	max. Druck
-10...+10°C	7 bar
20°C	ca. 6 bar
30°C	ca. 5 bar
40°C	ca. 4.5 bar
50°C	ca. 3.5 bar
60°C	ca. 3 bar
70°C	ca. 2.4 bar
80°C	ca. 1.4 bar

Pressure Derating Curve with Temperature for PVDF

Temperatur	max. Druck
-20...+10°C	7 bar
20°C	ca. 6.5 bar
30°C	ca. 6 bar
40°C	ca. 5.7 bar
50°C	ca. 5.2 bar
60°C	ca. 5 bar
70°C	ca. 4 bar
80°C	ca. 3.5 bar
90°C	ca. 3.2 bar
100°C	ca. 3 bar
110°C	ca. 2.5 bar
120°C	ca. 2 bar
130°C	ca. 1.5 bar
140°C	ca. 1 bar

Possible Material/Size combinations

Material / Connection / Connection type	Size*												Visual internals*			
	15	20	25	32	40	50	65	80	1H	1Z	1F	2H	R	B	F	K
CGZ	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CG5	✓	✓	✓	N/A	✓	✓	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CG4	✓	✓	✓	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CNZ	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CN5	✓	✓	✓	N/A	✓	✓	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CN4	✓	✓	✓	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CFD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CFB	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CFA	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
CFL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CFM	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SGZ	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SG5	✓	✓	✓	N/A	✓	✓	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SG4	✓	✓	✓	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SNZ	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SN5	✓	✓	✓	N/A	✓	✓	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SN4	✓	✓	✓	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SFD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SFB	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SFA	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
SFL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SFM	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓
VG6	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
VN6	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
VFD	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
VFL	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
PG6	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
PN6	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
PFD	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
PFL	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
DG6	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
DN6	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
DFD	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
DFL	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A

* ✓ = possible; N/A = not applicable

11. Dimensions

Dimensions / Weights (not valid for material codes C / S and threaded connections $\leq 2"$)

Model without visual internals

Free passage visual flow indicator for horizontal and vertical mounting. Made in metallic and plastic materials.

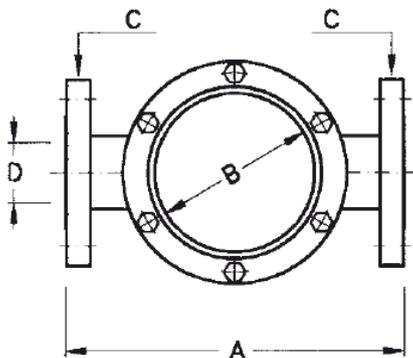
The plastic type is available up to size DN 80 (3") and for operating pressures as per the charts "Pressure Derating Curve with Temperature for PVC/PP/PVDF".

Flanged Version

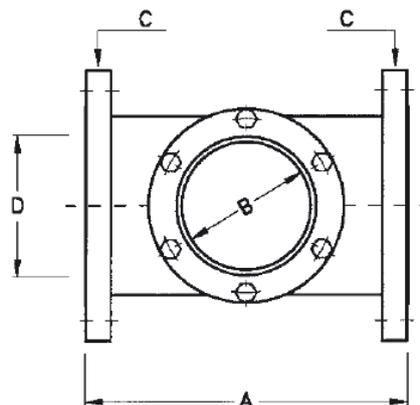
Standard "C" flange UNI PN 16 - ANSI 150 RF

On request, other types of flanges can be made.

DN 15 ... DN 80

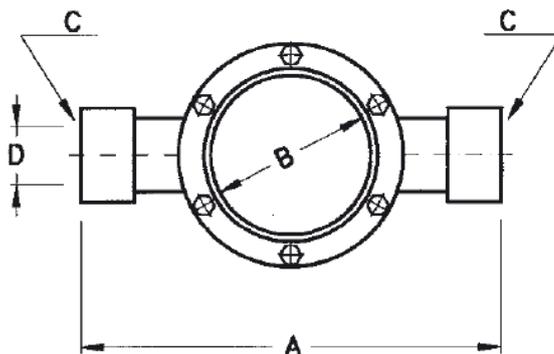


DN 100 ... DN 200



Threaded Version

Standard "C" threaded connections GAS/NPT-F and socket welding



Model with chain

Visual flow indicator with chain to further improve the visibility of flow. This model is not made in plastic materials.

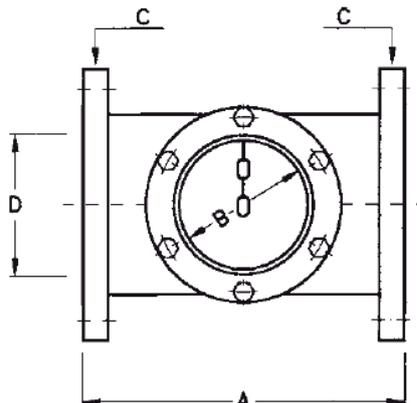
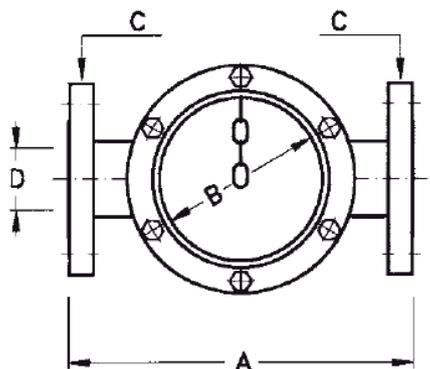
Flanged Version

Standard "C" flange UNI PN 16 - ANSI 150 RF

On request, other types of flanges can be made.

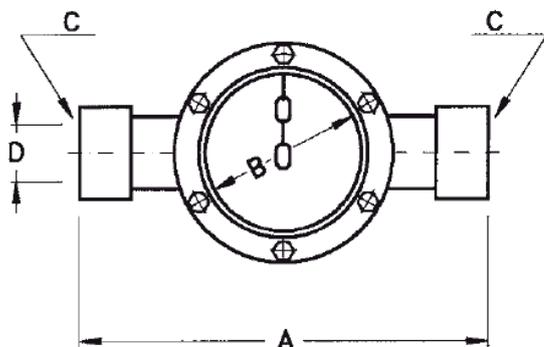
DN 15 ... DN 80

DN 100 ... DN 200



Threaded Version

Standard "C" threaded connections GAS/NPT-F and socket welding



Dimensions / Weights (not valid for material codes C / S and threaded connections $\leq 2''$) (continued)

Model with flap

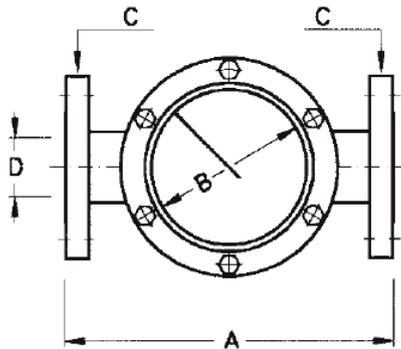
Visual flow indicator with fixed paddle to create vortex in the passage of the fluid and improve the visibility of flow. This model is not available in plastic materials.

Flanged Version

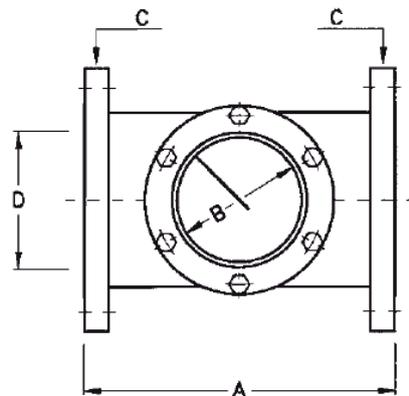
Standard "C" flange UNI PN 16 - ANSI 150 RF

On request, other types of flanges can be made.

DN 15 ... DN 80



DN 100 ... DN 200



Flanged version

Size	A [mm]	B [mm]	D		Approx. Weight ¹⁾ [kg]	Approx. Weight ²⁾ [kg]
			UNI	ANSI		
15	180	47	15	1/2"	2.5	1.5
20	180	47	20	3/4"	3	2.0
25	180	47	25	1"	3.5	2.5
32	180	47	32	1 1/4"	5	3.0
40	240	80	40	1 1/2"	8	3.5
50	240	80	50	2"	9	4.0
65	280	90	65	2 1/2"	15	6.5
80	290	90	80	3"	16.5	7.0
100	250	78	100	4"	18.5	-
125 ³⁾	300	120	125	5"	24	-
150 ³⁾	300	120	150	6"	25.5	-
200 ⁴⁾	350	140	200	8"	32	-

¹⁾ refers to metallic type

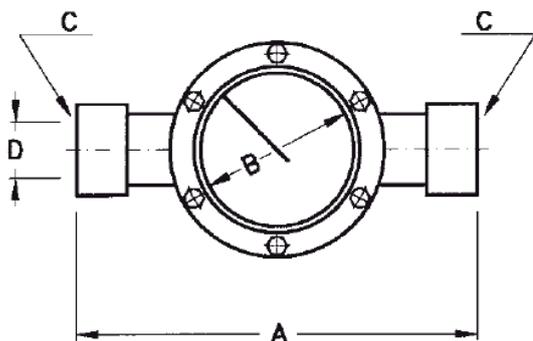
²⁾ refers to plastic type

³⁾ max. operating pressure 10 bar

⁴⁾ max. operating pressure 9 bar

Threaded Version

Standard "C" threaded connections GAS/NPT-F and socket welding



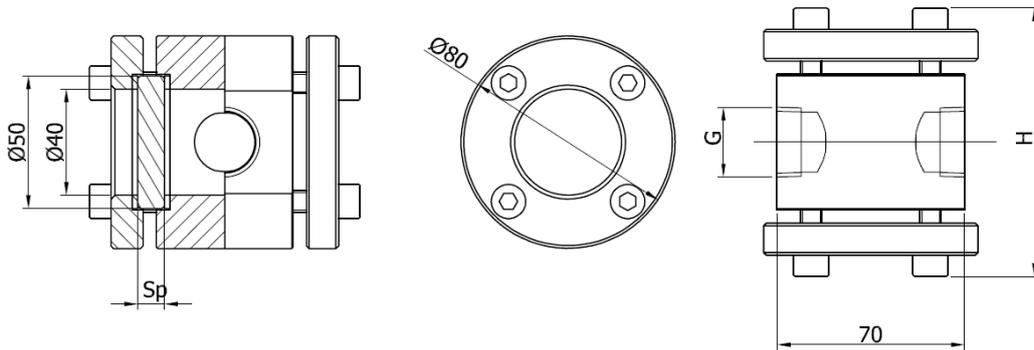
Threaded version

Size	A [mm]	B [mm]	D	Approx. Weight ¹⁾ [kg]	Approx. Weight ²⁾ [kg]
65	350	90	2 1/2"	15	11.0
80	360	90	3"	16.5	12.5

¹⁾ refers to metallic type

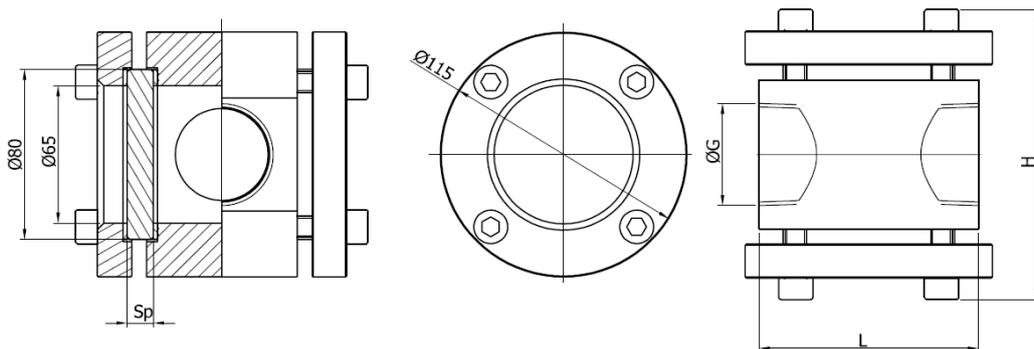
²⁾ refers to plastic type

Dimensions / Weights (valid for material codes C / S and threaded connections ≤2")



Rating	DN	G*	Sp [mm]	H [mm]	Approx. weight [kg]
PN25	DN 15	1/2" NPT-F	10	100	3.0
	DN 20	3/4" NPT-F			3.0
	DN 25	1" NPT-F			3.0
PN40	DN 15	1/2" NPT-F	12	110	3.0
	DN 20	3/4" NPT-F			3.0
	DN 25	1" NPT-F			3.0

* GAS connection as option



Rating	DN	G*	Sp [mm]	L [mm]	H [mm]	Approx. weight [kg]
PN25	DN 40	1 1/2" NPT-F	15	102	150	5.5
	DN 50	2" NPT-F		94	150	6.5
PN40	DN 40	1 1/2" NPT-F	20	102	160	6.0
	DN 50	2" NPT-F		94	160	7.0

* GAS connection as option



12. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Model Description **Model: DAI-...**

to which this declaration relates is in conformity with the EC guidelines noted below:

2011/65/EU	RoHS (category 9)
2015/863/EU	Delegated Directive (RoHS III)
2014/68/EU	PED

Hofheim, 04 May 2021



H. Volz
General Manager



M. Wenzel
Proxy Holder