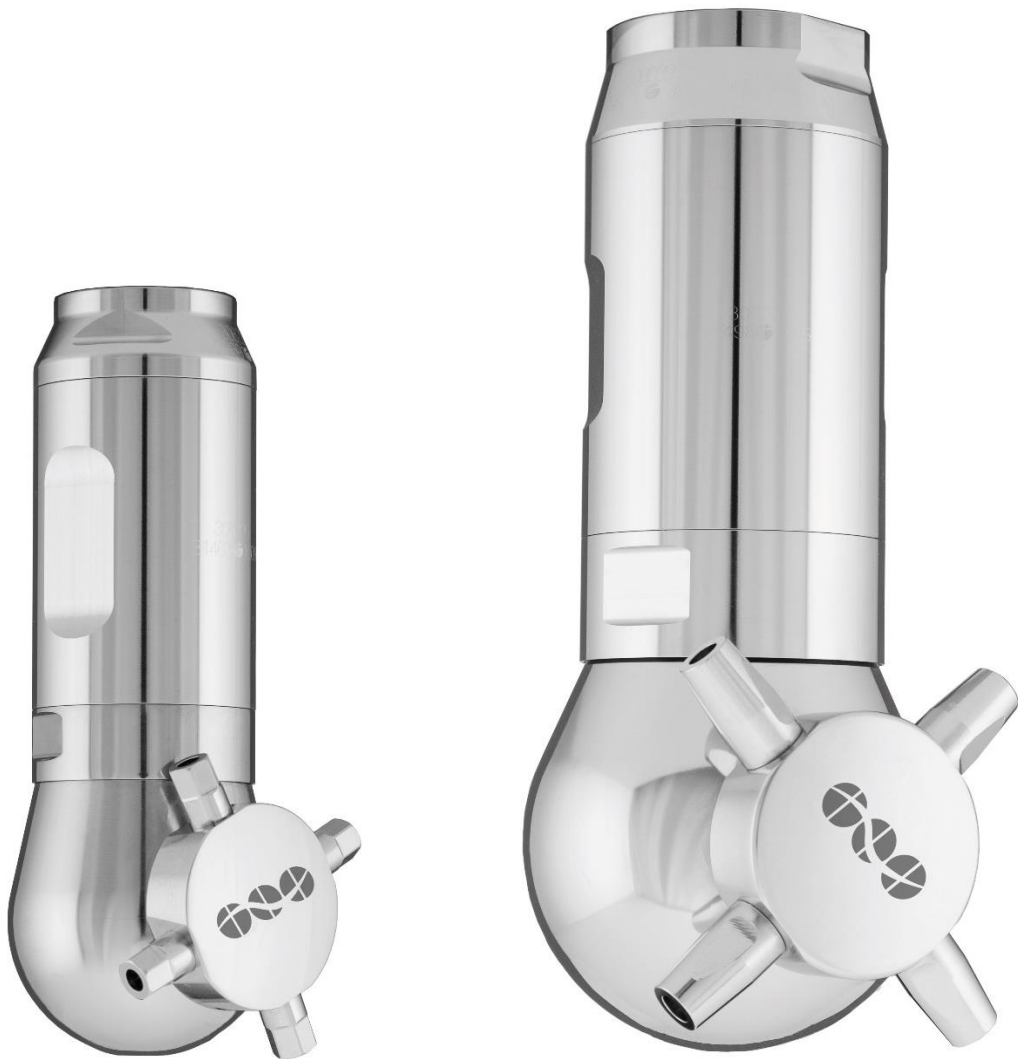


Operating Manual

(Translated from the Original German)

Dunos O50 F - Ex

Dunos O90 F - Ex



AquaDuna

FLUID PROCESS GROUP



This operating manual is an integral part of the Ex Target Jet Cleaner and must be available to the user at all times.

All safety instructions must be made sufficiently known and observed. If the Ex Target Jet Cleaner changes ownership, the operating manual must also be passed on.

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1 General information

1.1 Function

The DUNOS O50 F - Ex and O90 F - Ex Target Jet Cleaners are orbital target jet cleaners. They are driven by the cleaning medium. The machines are designed with little dead space and are produced from certified materials in Germany. The surfaces and their roughness are constantly monitored during production.

The cleaning medium, filtered according to the relevant regulations, is fed into the target jet cleaner. The target jet cleaner is either placed directly on the tank flange or placed in the tank via a support tube or lance. The connections are variable, standard connections are described in the chapter on "Technical data". The inflowing medium is fed to a turbine, which generates an output speed of 10 to 14 min⁻¹ with the downstream gearbox. The target jet cleaner is driven via a drive shaft. Due to the design of the orbital driven target jet cleaner, the outflowing jet of cleaning agent is applied to the container wall in the form of a horizontal eight with high impact. Depending on the type of coating to be cleaned, a user-defined amount of chemicals must be added to the cleaning medium.

Important: Only part of the cleaning medium passes through the gear unit. The main volume flow is routed via a bypass to the target jet head with the nozzles. This minimises pressure loss and ensures maximum volume flow for the nozzles.

The target jet cleaners can be operated with various nozzle diameters.

This enables the devices to be perfectly adapted to the cleaning task at hand.

1.2 Proper use



The target jet cleaners may only be operated in closed containers. Operation outside of a container can lead to severe injury from the high impact of the emerging liquid jets. The cleaning agent would additionally be widely dispersed into the environment.

1.2.1 ATEX zone

In potentially explosive areas of zone 0, 1, 2 & 20, 21, 22, only appliances may be implemented for the application purposes of the design and certified, authorised and designated by ATEX.

The DO 50 F-Ex and DO 90 F-Ex target jet cleaners are designed for use in the ATEX zones described and are therefore suitable for gas and dust environments.

The personnel for commissioning and inspection must be appropriately qualified for work in hazardous areas. Furthermore, the operator must ensure that the contents of the operating manual are fully understood by all persons involved in the installation, commissioning and operation of the target jet cleaners described.



Conversions, as well as modifications, to the target jet cleaners are forbidden and will always lead to the termination of ATEX approval.



Another or derived usage is not deemed to be approved usage and AquaDuna GmbH & Co. KG is not liable for the arising damage.



The Ex target jet cleaners have been constructed according to the state of the art and are safe to operate. From faulty operation or improper installation, hazards to life and limb of persons can arise, to the EX target jet cleaners themselves and to the operator's equipment.

1.2.2 Component marking

EX target jet cleaners are marked as equipment according to:

 II 1 G Ex h IIB T6...T4 Ga
 II 1 D Ex h IIIC T85°C...T135°C Da

the marking is engraved on the Ex target jet cleaner.

The EU type examination certificate number is: **TPS 19 ATEX 051981 0018 X**

1.2.3 Operating conditions



The following conditions must be observed in order to use the Ex target jet cleaners in accordance with their intended purpose:

- The prevention of ignition sources caused by the cleaning process is the responsibility of the operator. (TRGS 727)
- The Ex target jet cleaners must be integrated into the local equipotential bonding system. All conductive parts must be earthed or connected to other conductive parts. The leakage resistance must be lower than $10^6 \Omega$.
- After exchange of the Ex target jet cleaner or the mounting for the supporting pipe (lance), the leakage resistance must be measured and a value of $10^6 \Omega$ must not be exceeded.
- The assembly instructions (point 4) must be observed!
- When installing the Ex target jet cleaner inside a container, e.g. a tank, it should be observed that the distance of the Ex target jet cleaner to the wall of the container or fittings is sufficient, so that any contact may be excluded.
- The cleaning agent, used for operating the Ex target jet cleaner, must attain at most 80% of its ignition temperature.
- If the Ex target jet cleaner is operated in a dust explosive atmosphere, then a maximum of 2/3 of the minimum ignition temperature of the dust cloud should ever be attained.
- The minimum conductivity value of the cleaning agent must not be below 1000 pS/m.
- The Ex target jet cleaner must not be powered by gas or steam, as otherwise a hazardous electrostatic charge within the Ex target jet cleaner can potentially arise. In order to exclude operation with gas also with the start-up of the pump, the shut-off device should be situated directly before the Ex target jet cleaner. The piping volume between the shut-off device and the Ex target jet cleaner should be as small as possible. All piping should be ventilated.
- The Ex target jet cleaner should be operated with a 500 μm prefilter.
- The maximum permissible ambient temperature for the operation of the EX target jet cleaners is 135°C.
- The maximum permissible medium temperature is 97°C.

The operator is responsible for observance of the conditions.

1.2.4 Hazards



Ex target jet cleaners are operated with high pressures. We therefore expressly point out that the instructions in this operating manual must be observed. Damages resulting from non-compliance **will not be acknowledged** by the manufacturer.



The target jet cleaner may only be operated in the intended environment. Operation is only permitted in closed containers / rooms. Hazards due to rotating parts must be observed.



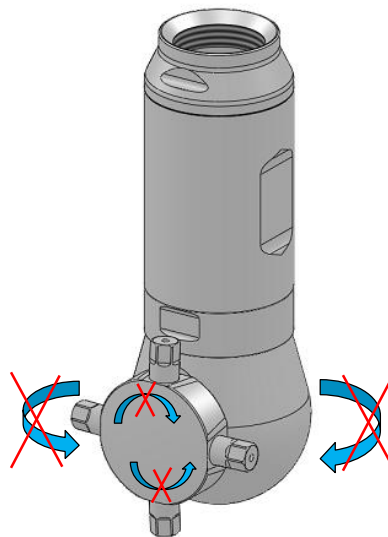
Danger of jamming between the nozzles and the unit body!



Assembly and operation of the Ex target jet cleaners may only be carried out by instructed, authorised persons.



The target jet cleaner must not be twisted by force at the machine head or the nozzle disc. This can lead to destruction of the drive. → Image below.



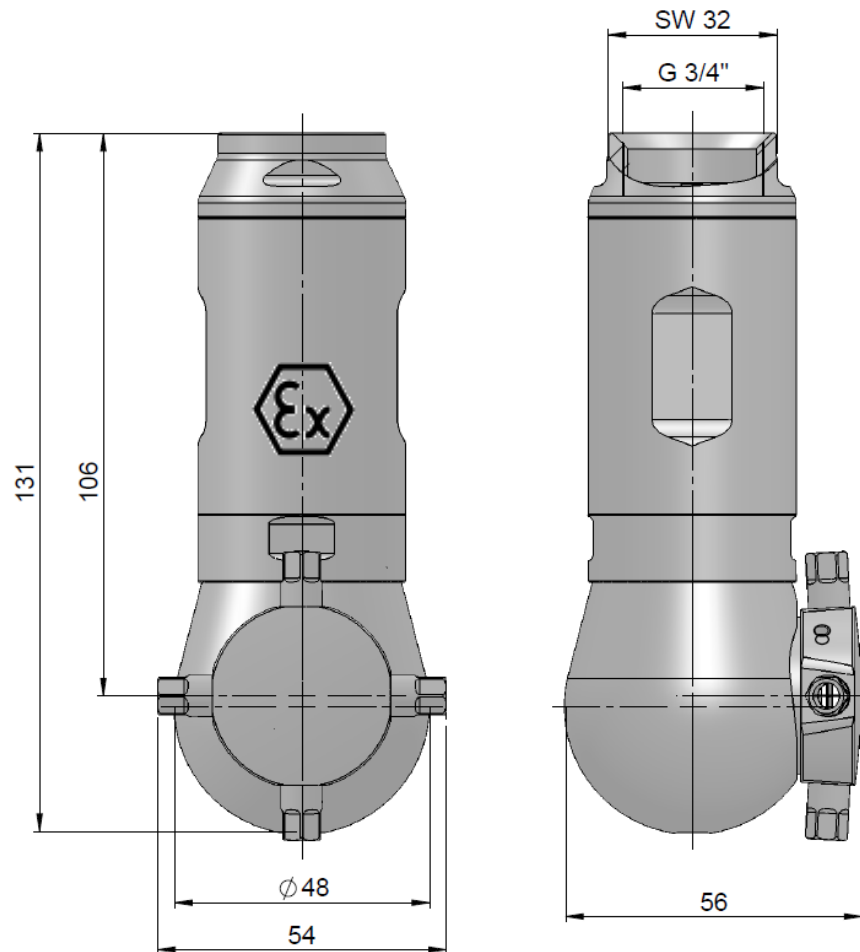
2 Technical data

Technical data for standard design		
	DUNOS O50 F-EX	DUNOS O90 F-EX
Length	131 mm	226 mm
Installation diameter	67 mm	128 mm
Agent connection	G ¾ “	G 1 ½ “
Nozzle number	2 - 4	
Nozzle diameter	2; 2.5; 3; 4; 5 mm	4; 5; 6; 7; 8 mm
Working pressure	3 – 12 bar	3 – 15 bar
Cleaning radius	2.5 - 4.5 m	4 - 9 m
Spraying radius	3.5 - 6 m	4 - 11 m
Weight	0.8 kg	4 kg
Environmental temperature	Maximum 135°C	
Agent temperature	Maximum 97°C	
Agent conductance	>1000 pS/m	
Filter size	500 µm	
Materials	Stainless steel 1.4404; PEEK; PEEK TF10; TFM 1600; EPDM; zirconium oxide: Special seals in FKM and FFKM on request.	

Accessories, optional: Rotation monitoring, special nozzles, various connecting parts.

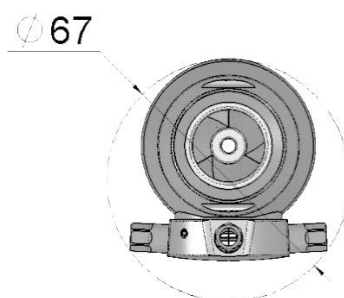
Special designs upon request.

2.1 Measurements DO50

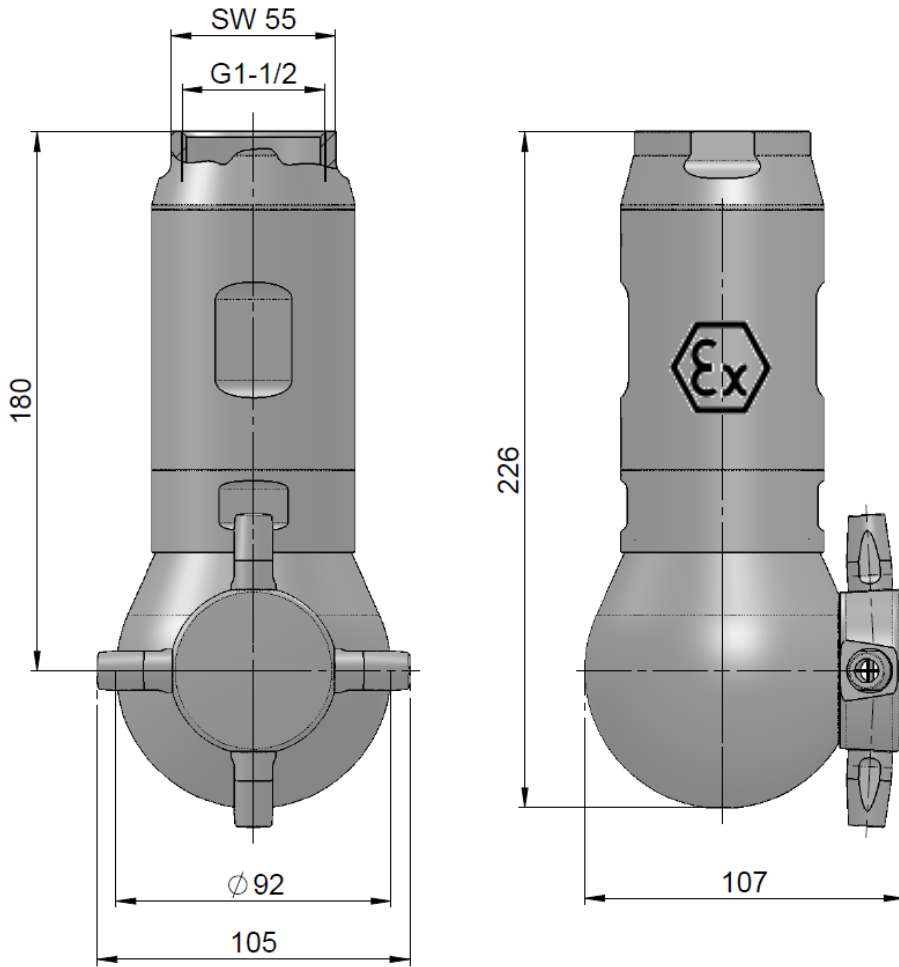


Dimensions may vary depending on medium connection and nozzle diameter.

Installation diameter:

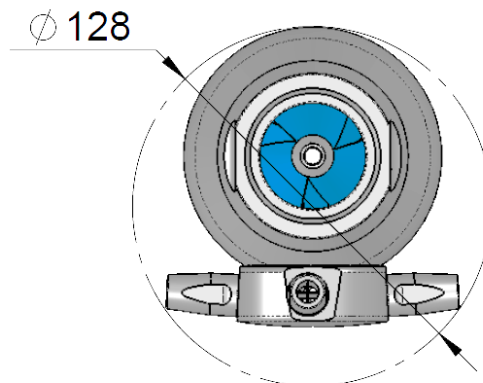


2.2 Measurements DO90



Dimensions may vary depending on medium connection and nozzle diameter.

Installation diameter:



3 Maintenance



Depending on the operating conditions, the Ex target jet cleaner must be checked visually for external damage, rotation function and spray pattern at regular intervals.

Maintenance of the EX target jet cleaner by the manufacturer is recommended after a maximum of 300 operating hours. Depending on the prevailing operating conditions, such as operating pressure, temperature, properties of the medium or influence on the operator's plant, it may be necessary to carry out maintenance at an earlier point in time.

Maintenance and installation of the Ex target jet cleaner can only be carried out at the manufacturer's works, as defined safety welding seams must be applied after assembly.

The ATEX certification expires after dismantling of the Ex target jet cleaner by the operator or third parties.

4 Installation and commissioning

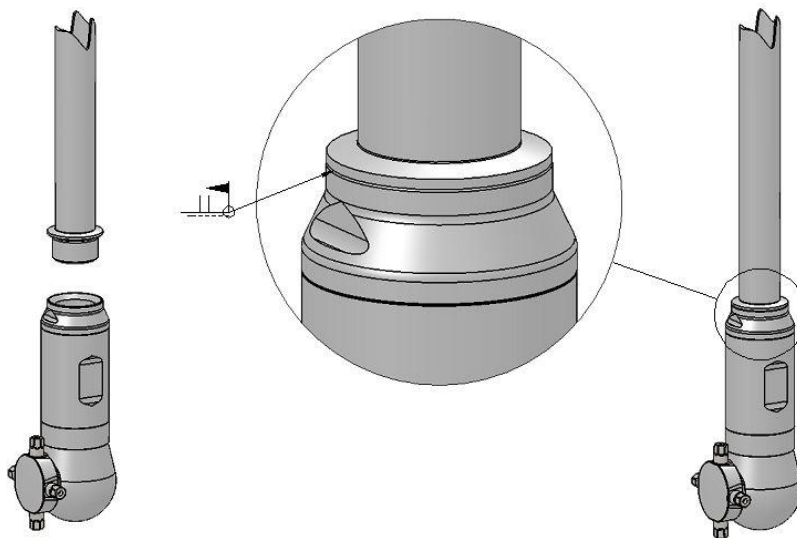
4.1 Installation of Ex target jet cleaners



Observance of operating conditions (Point 1.2.3.) is to be ensured.

If the Ex target jet cleaners are mounted by the operator on a support tube (lance), the interface between the customer support tube and the Ex target jet cleaner must be fixed with a safety weld seam.

The securing seam must be applied in such a way that an O-ring inserted for sealing is not damaged.



1. Screw on support tube

2. Weld interface

4.2 Assembly and operating personnel



The operator of the target jet cleaners is obliged to train the assembly and operating staff. All persons handling rotating and spraying machines must have been instructed on the hazards connected with these machines.

Persons who are not registered as operating staff should not linger within the operating area of the machines. The operator must assure the necessary measures.

4.3 Commissioning



Observance of operating conditions (Point 1.2.3.) is to be ensured.

If all pipelines or supply lines to the target jet cleaner are firmly connected and the shut-off valves are closed, the target jet cleaner is prepared for initial commissioning.

The prefilter in the supply piping to the target jet cleaner must be checked for proper function and the filter body must be installed.

Before commissioning, the supply piping to the target jet cleaner is to be rinsed through. Metallic impurities and welding residue may lead to damage to the target jet cleaner.

When the unit is put into operation for the first time, make sure that the supply line to the target jet cleaner has been vented, especially in the case of long supply lines. This avoids pressure shocks which could damage the target jet cleaner.

For hand-guided fittings, these are not to be opened abruptly in order to avoid pressure shocks.

5 Integration into a plant

5.1 Automatic control

If the target jet cleaners are integrated into an automatically running facility, then it is to be ensured that the target jet cleaner can be monitored during its functioning. This can be done by means of rotation monitoring or a visual check. The function check is to be documented during visual inspections.

5.2 Manual control

If the Ex target jet cleaners are to be controlled by hand-guided means, then it must be observed that pressure shocks are avoided. The servicing elements are thus to be opened and closed slowly. If steam is applied to the Ex target jet cleaner externally, it must be ensured that the temperature does not exceed the specified limits. Monitoring of the target jet cleaner must be ensured.

5.3 Emergency shutdown of the plant



To be able to bring about an emergency shutdown of the target jet cleaner, it is essential that the operators of the facility are familiar with the facility's design.

It is vital, that training in emergency shutdown be given and the necessary elements for emergency shutdown be known. The training of those entrusted with cleaning is to be documented.

The manufacturer's liability for the consequences of incorrect plant operation is excluded.

6 Transportation

6.1 Scope of delivery

Included within the scope of delivery are the Ex target jet cleaner and this operating manual. The design option for the Ex target jet cleaner supplied can be found in the delivery documents.

6.2 Transportation and packaging

Our products are manufactured, assembled and checked with the greatest diligence. However, should there be any grounds for complaint, we will of course rectify these in the context of our warranty. Even after the warranty period, we will be glad to assist you.



For all deliveries, it is fundamental that the delivery note be compared with the scope of delivery. After establishing that everything is present, the goods are to be checked for damage.

Should damage be evident, then a note made on the delivery papers is vital. The damage must be counter-signed by the carrier.

For returns, either the packaging is to be retained or such packaging is to be chosen, so that the equipment does not become damaged.

7 Quality assurance

Quality of construction, manufacture, assembly, final inspection and checking are second nature to us. It represents an absolute precondition for the enduring, efficient and high-value production of our sophisticated products. To ensure our high quality standards, we use an IT-supported quality assurance system that is ISO 9001:2015 certified. In addition, all our products undergo a final functional test (100% check). We thereby ensure that only 100%-reliable products are allowed to leave our premises.

8 Disposal

All materials used for the production of the target jet cleaner are not harmful to the environment. These are mainly stainless steel, EPDM, ZrO₂ and PEEK. These materials are able to be disposed of in the manner intended for them.



WARNING! It is to be ensured that no contamination from substances during operation is still present. In this regard, corresponding substances are to be used in rinsing those parts to be disposed of.

9 Annex

9.1 Symbols used



This symbol indicates an imminent danger, which can lead to severe injuries or death.



This symbol indicates a potential danger, which can lead to severe injuries or death.



This symbol indicates a potential danger, which can lead to mild to severe injuries.



This symbol indicates a potential danger, which can lead to damage to property.



Information on explosion protection



Important note

9.2 Dunos O – Ex performance values

TYPE	Nozzle diameter in mm	Flow rate in l / min at the following pressures		
		2 bar	5 bar	10 bar
DO50	2	12	20	27
	2.5	16	25	35
	3	24	39	55
	4	35	56	79
	5	50	79	111
DO90	4	56	87	122
	5	82	128	179
	6	107	169	239
	7	132	209	296
	8	150	238	336

10 EU Declaration of conformity

We hereby declare that the

equipment: DUNOS

Series: O50 F / O90F / RB / RN / F50 / F90

of the DIRECTIVE 2014/34/EU OF THE EUROPEAN PARLIAMENT AND COUNCIL of 26th February 2014 for the harmonisation of the laws of the member states relating to equipment and protective systems intended for use in potentially explosive atmospheres.



II 1 G Ex h IIB T6...T4 Ga



II 1 D Ex h IIIC T85°C...T135°C Da

EU type examination was carried out by the stated body, TÜV SÜD Product Service 0123, under certificate number **TPS 19 ATEX 051981 0018 X**. The above-described subject of the declaration fulfils the relevant harmonisation of laws of the Union, where the following harmonised standards are used:

DIN EN 1127-1, Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

EN ISO 80079-36, Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements.

EN ISO 80079-37, Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"

The associated operating manual contains important safety-related notices and instructions for commissioning of the said equipment, according to Directive 2014/34/EU (ATEX).

Modifications and repairs to the said equipment are not permissible, without the express, written consent of the manufacturer.

Should the said equipment be installed within superior machinery, then the new risks arising from the installation must be assessed by the manufacturer of the new machinery.

The sole responsibility of the production of this declaration of conformity remains with the manufacturer.

AquaDuna GmbH & Co. KG, Sternenfels, October 2019.



Frank Zeitler
Managing Director

11 Masthead

Original operating manual

Dunos O50 F – Ex / Dunos O90 F - Ex

Date: October 2019

Revision 03

AquaDuna GmbH & Co.KG

Ferdinand-von-Steinbeis-Ring 31

D-75447 Sternefels

Telephone: +49 (0)7045 / 204980

Fax: +49 (0)7045 / 2049890

www.aquaduna.com