

OPERATING INSTRUCTIONS

Translation of the original instructions



Breconcherry cleaning technology

Orbital cleaners ATEX version

Breconcherry Ltd.

Document number: 430BAL011767

Language: EN-GB / Date: 24.03.2026



BRECONCHERRY

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1 General

1.1 Information about the document

The present instruction manual are part of the user information for the component.

1.1.1 Binding character of this instruction manual

This instruction manual contains the manufacturer's instructions to the operator of the component and to all persons who work on or use the component regarding the procedures to follow.

Carefully read this instruction manual before starting any work on or using the component. Your personal safety and the safety of the component can only be ensured if you act as described in the instruction manual.

Store the instruction manual in such a way that it is accessible to the operator and the operating staff during the entire service life of the component. When the location is changed or the component is sold make sure you also provide the instruction manual.

1.1.2 Validity of the Instruction manual

The instruction manual is valid exclusively for cleaners marked with an ATEX mark.

The approved cleaners are suitable for operation in potentially explosive atmospheres, taking into account the relevant regulations and the manufacturer's declaration or declaration of conformity.

Use in potentially explosive atmospheres must be specified when ordering, as the ATEX cleaners are slightly modified and marked.

Their conformity, and therefore, their suitability for the intended purpose with regard to the safety of the product in which they are installed must be assessed in the conformity assessment of the entire product.

The ATEX version of the cleaner may only be safely used in hazardous areas for the intended area. This manual contains basic instructions for the use of the cleaner in potentially explosive atmospheres. This document is a supplement to the general standard operating instructions for the cleaner and is therefore to be considered part of it. These additional operating instructions must be observed before installation and commissioning. The operating instructions must always be available at the cleaner/system site.

1.1.3 Reading obligation and storage

Every person who works on or with the cleaner must have read these Supplement to the operating instructions. They must be available to these persons at all times.

1.2 Manufacturer address

Breconcherry Ltd
Westfalia House, Old Wolverton Road
Great Britain
MK12 5PY Milton Keynes

1.3 Customer service

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<http://www.breconcherry.com>

1.4 EU Declaration of Conformity according to ATEX 2014/34/EU

 **BRECONCHERRY**

EU Declaration of Conformity according to ATEX 2014/34/EU

Manufacturer: **Breconcherry Ltd.**
Westfalia House, Old Wolverton Road
Milton Keynes, MK12 5PY, United Kingdom

We hereby declare that the devices named below

Model: **Orbital cleaner**

Planetary gear stainless steel

Type: Cyclone: Cy TSG x CPTFE y
 Twister: Tw TSG x CPTFE y
 Typhoon: Ty TSG x CPTFE y
 Tempest: Te TSG x CPTFE y
 Tornado: To TSG x CPTFE y
 Tornado 4: To4 TSG x CPTFE y x: Nozzle diameter / y: Connection

comply with the essential health and safety requirements of the following directive in view of the design and construction of the product in the form put onto the market by us:

Relevant EC directives: 2014/34/EU ATEX directive

Identification: Planetary gear stainless steel

Typhoon, Tempest, Tornado, Tornado 4:

CE 0123  II 1G Ex h IIC T6...T3 Ga 0°C ≤Ta≤140°C
 II 1D Ex h IIC T85°C...T140°C Da 0°C ≤Ta≤135°C

Cyclone, Twister:

CE 0123  II 1G Ex h IIC T6...T3 Ga 0°C ≤Ta≤140°C
 II 1D Ex h IIC T85°C...T140°C Da 0°C ≤Ta≤135°C

The notified body TÜV Süd Product Service GmbH (0123) has carried out an EC type examination and issued the following certificate: TPS 20 ATEX 101058 0001 X

Applicable harmonized standards, in particular: EN 1127-1:2019
 EN ISO 80079-36:2016
 EN ISO 80079-37:2016

Other applied standards and technical specifications: TRGS 727:2016

Remarks:

- The ATEX operating instructions including the intended use and safety instructions defined therein must be observed.
- Electrical / electronic and other devices and components in connection with the above devices must undergo a separate conformity assessment according to ATEX.
- This declaration of conformity is issued under the sole responsibility of the manufacturer

Person authorized for compilation and handover of technical documentation: **Breconcherry Ltd.**
 Westfalia House, Old Wolverton Road
 Milton Keynes, MK12 5PY, United Kingdom

Büchen, 6 February 2026



Ozgur Oz
Company Director

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Figure 1-1 - Declaration of Conformity according to ATEX 2014/34/EU, orbital cleaner

Translated copy of the EU Declaration of Conformity according to ATEX 2014/34/EU

EU Declaration of Conformity according to ATEX 2014/34/EU

Manufacturer: Breconcherry Ltd.
Westfalia House, Old Wolverton Road
Milton Keynes, MK12 5PY, Great Britain

We hereby declare that the devices named below

Model: Orbital cleaner

Planetary gear made of stainless steel

Type: Cyclone: Cy TSG x CPTFE y
Twister: Tw TSG x CPTFE y
Typhoon: Ty TSG x CPTFE y
Tempest: Te TSG x CPTFE y
Tornado: To TSG x CPTFE y
Tornado 4: To4 TSG x CPTFE y
x: nozzle diameter / y: connection

due to their design and construction as well as in the versions sold by us, meet the basic safety and health requirements of the following guideline:

Relevant EC directives: 2014/34/EU ATEX

Identification: Planetary gear made of stainless steel

Typhoon, Tempest, Tornado, Tornado 4:

 0123  II 1G Ex h IIC T6..T3 Ga 0°C ≤Ta≤140°
II 1D Ex h IIIC T85°C ...T140°C Da 0°C ≤Ta≤135°

Cyclone/Twister:

 0123  II 1G Ex h IIC T6..T3 Ga 0°C ≤Ta≤140°
II 1D Ex h IIIC T85°C ...T140°C Da 0°C ≤Ta≤135°

The notified body TÜV Süd Product Service GmbH (0123) has carried out an EC type examination and issued the following certificate: TPS 20 ATEX 022040 0001 X

Applicable harmonized standards, in particular: EN 1127-1:2019
EN ISO 80079-36:2016
EN ISO 80079-37:2016

Other applied standards and technical specifications: TRGS 727:2016

Remarks:

- The ATEX instructions including the intended use and safety instructions defined therein must be observed.
- Electrical/electronic and other devices and components in connection with the above devices must undergo a separate conformity assessment according to ATEX.
- The manufacturer bears the sole responsibility for the issuing of this declaration of conformity.

EU Declaration of Conformity according to ATEX 2014/34/EU

Authorised Person for the compilation and hand-
over of technical documents:

Breconcherry Ltd.
Westfalia House, Old Wolverton Road
Milton Keynes, MK12 5PY, Great Britain

Büchen, 6 February 2026

Ozgur Oz
Company Director

1.5 Marking

The orbital cleaners have a marking on the lower rotating body.

The following data are available depending on the materials used.

Planetary gear stainless steel

Logo



Type code	TW-TSG-0-4x4-BSP-3/4"-2-1-2 //A		
ATEX Short designation	e.g. TW TSG 4mm CPTFE 3/4"BSP Consisting of: type e.g. Tw, variant, e.g. TSG, nozzle diameter e.g. 4mm, bearing material CPTFE, connection e.g. 3/4"BSP		
Material number / Year of manufacture	e.g. 4660-4990-121 YOC2023		
Serial number	SN 1521071-0010-001		
ATEX marking	 0123 	II 1G Ex h IIC T6..T3 Ga II 1D Ex h IIIC T85°C ... 140 °C Da	
Certificate number:	TPS 20 ATEX 022040 0001 X		
Address	Breconcherry Ltd. Westfalia House, Old Wolverton Road MK12 5PY Milton Keynes Great Britain		



Table 1: Marking on the orbital cleaner

2 Safety

This chapter describes the minimum requirements for the intended use of the cleaner. It forms the basis for safe operation of the cleaner.

2.1 Intended use

The cleaner is intended for the cleaning of tanks and vessels. This cleaner was designed for the installation and operation at any angle. Using the device for any other purpose is considered contrary to its designated use.

The cleaner is only designed for operation with a supply of liquid media. Exposure to air, other gaseous media or steam is also not permitted, even for a short time.

INFO The manufacturer will not accept any liability for damage resulting from any use of the cleaner which is not in accordance with its designated use. The risk is borne solely by the operating company.

2.1.1 Requirements for the operation

The prerequisite for reliable and safe operation of the component is proper transportation and storage as well as professional installation and assembly. Operating the unit within the limits of its designated use also involves adhering to the operating, maintenance and servicing instructions.

2.1.2 Improper operating conditions

The operational reliability of the cleaner cannot be ensured under improper operating conditions. Therefore avoid improper operating conditions.

Operating the cleaner is not permitted if

- Persons or objects are in the danger zone.
- Safety devices are not working or were removed.
- Malfunctions have been detected on the cleaner.
- Damage or a leak has been detected on the cleaner.
- Maintenance intervals have been exceeded.

2.2 Safety precautions

Please observe the following information:

- Conformity applies only to cleaners without electrical components.
- Before putting the cleaner into operation, make sure that nobody can be endangered by the cleaner's running.
- Never operate the cleaner outside the object to be cleaned.
- Rotating parts and spilled cleaning fluid can endanger people and cause property damage.
- The cleaners may only be operated if cleaning fluid is supplied. For the safe operation of the rotating cleaners, it must be ensured that the cleaner is operated only with a supply of liquids, see 2.3 *Operating conditions*.
- The cleaner must not be exposed to gas and vapour instead of liquid, not even briefly when starting the cleaning process and emptying pipes. High speeds and increased friction could cause damage and ignition hazards.
- The cleaners must be filled with cleaning fluid without pressure and then started gently. Filling under pressure would amount to a short-term operation with gas or vapour, which can lead to ignition hazards. A sudden start can lead to damage and thus to an ignition source. Pressure surges are to be avoided.
- In the event of malfunctions, shut down the cleaner (disconnect from the power, air and fluids supplies) and secure it against further use. Defects are to be rectified immediately.
- The maximum operating conditions must be observed and monitored, see 2.3 *Operating conditions*. There is a risk of excessive charge formation, increased wear and leakages, see 4.2 *Selection of the cleaning parameters according to TRGS 727:2016*.
- Observe the safety data sheets supplied by the detergent manufacturers. The cleaner must only be operated with such cleaning detergents and used in such mediums against which all materials used are sufficiently resistant. The sealing materials must always be matched to the type and temperature of the cleaning medium.
- During cleaning, liquids must be discharged from the tank so that no electrostatic charges form in the liquid which could potentially accumulate. During cleaning, do not add any liquids in the container.
- On starting the tank or container cleaning, there must be atmospheric conditions on the inside, see *Conditions when starting the tank cleaning*.
- The cleaning medium must be removed after spraying and must not be pumped through the cleaner again.
- The cleaner must be regularly checked for damage and function, taking into account the operating conditions. Breconcherry Ltd recommends a visual inspection after every cleaning process.
- Maintenance of the ATEX cleaner is mandatory after a maximum of 150 operating hours. Maintenance-free cleaners (usually rotating cleaners) must be inspected after a maximum of 150 operating hours and after a maximum of 3 years or 2500 hours of

operation. Depending on the operating conditions, the operator must specify shorter maintenance intervals or inspection intervals.

- The performed maintenance must be logged.
- The user must ensure a loss-proof lead connection into the tank. For this, Breconcherry Ltd offers, among other things, suitable components and mounting systems.

Conditions when starting the tank cleaning

Designation	dimensioning
Absolute pressure	0.8...1.1 bar
Ambient temperature	see the instruction manual of the cleaner
Operating temperature	see the instruction manual of the cleaner
Temperature in the tank	see the instruction manual of the cleaner
Acidity content	maximum of 21% by volume
Relative ambient humidity	until saturation

Table 2: Conditions when starting the tank cleaning

Please observe the following information:

- Conformity applies only to cleaners without electrical components.
- Before putting the cleaner into operation, make sure that nobody can be endangered by the cleaner's running.
- Never operate the cleaner outside the object to be cleaned.
- Rotating parts and spilled cleaning fluid can endanger people and cause property damage.
- The cleaners may only be operated if cleaning fluid is supplied. For the safe operation of the rotating cleaners it must be ensured that the cleaner is operated only with a supply of liquids, see .
- The cleaner must not be exposed to gas and vapour instead of liquid, not even briefly when starting the cleaning process and emptying pipes. High speeds and increased friction could cause damage and ignition hazards.
- The cleaners must be filled with cleaning fluid without pressure and then started gently. Filling under pressure would amount to a short-term operation with gas or vapour, which can lead to ignition hazards. A sudden start can lead to damage and thus to an ignition source. Pressure surges are to be avoided.
- In the event of malfunctions, shut down the cleaner (disconnect from the power, air and fluids supplies) and secure it against further use. Defects are to be rectified immediately.
- The maximum operating conditions must be observed and monitored, see . There is the risk of excessive charge formation, increased wear and leakages, see.
- Observe the safety data sheets supplied by the detergent manufacturers. The cleaner must only be operated with such cleaning detergents and used in such mediums against which all materials used are sufficiently resistant. The sealing materials must always be matched to the type and temperature of the cleaning medium.
- During cleaning, liquids must be discharged from the tank so that no electrostatic charges form in the liquid which could potentially accumulate. During cleaning, do not add any liquids in the container.
- At the start of vessel or container cleaning, atmospheric conditions must be present inside, see table "Conditions for starting tank cleaning" (page 13).
- The cleaning medium must be removed after spraying and must not be pumped through the cleaner again.
- The cleaner must be regularly checked for damage and function, taking into account the operating conditions. Breconcherry Ltd recommends a visual inspection after every cleaning process.
- Maintenance of the ATEX cleaner is mandatory after a maximum of 150 operating hours. Maintenance-free cleaners (usually rotating cleaners) must be inspected after a maximum of 150 operating hours and after a maximum of 3 years or 2500 hours of operation. Depending on the operating conditions, the operator must specify shorter maintenance intervals or inspection intervals.
- The performed maintenance must be logged.

- The user must ensure a loss-proof lead connection into the tank. For this, Breconcherry Ltd offers, among other things, suitable components and mounting systems.

Conditions when starting the tank cleaning

Designation	dimensioning
Absolute pressure	0.8...1.1 bar
Ambient temperature	see the instruction manual of the cleaner
Operating temperature	see the instruction manual of the cleaner
Temperature in the tank	see the instruction manual of the cleaner
Acidity content	maximum of 21% by volume
Relative ambient humidity	until saturation

Table 3: Conditions when starting the tank cleaning

2.3 Operating conditions

The cleaner is driven by the cleaning liquid flowing through it at a suitable pressure and flow rate. It is essential that the cleaner is supplied with cleaning liquid at the correct pressure and flow rate for effective operation. The requirements are specified in the tables below.

2.3.1 Temperature

The maximum surface temperature depends mainly on the operating conditions and not on the device itself. Therefore, the device is characterized for a range of temperature classes or a temperature range.

The temperature classes define ignition ranges, according to which combustible gases and flammable liquids are classified according to their specific ignition temperature. The ignition temperature of the media can be determined from relevant tables, e.g. International Chemical Safety Cards (ICSC) <http://biade.itrust.de>.

To comply with the required temperature class, the respective maximum operating and ambient temperatures must be strictly observed and monitored:

Gases and vapours - maximum operating temperatures depending on the temperature class

Temperature class	Maximum surface temperature	Proper operating conditions
T3	$\leq 200\text{ °C}$	Operating and medium temperatures - maximum 95 °C Ambient temperature: maximum 140 °C (maximum 30 minutes)
T4	$\leq 135\text{ °C}$	Operating and medium temperatures - maximum 95 °C Ambient temperature: maximum 100 °C
T5	$\leq 100\text{ °C}$	Operating and medium temperatures - maximum 75 °C Ambient temperature: maximum 75 °C
T6	$\leq 85\text{ °C}$	Operating and medium temperatures - maximum 60 °C Ambient temperature: maximum 60 °C

Table 4: Temperature classes - gases

Dusts - maximum operating temperatures depending on the temperature class

Temperature class	Maximum surface temperature	Proper operating conditions
T140°C	$\leq 140\text{ °C}$	Operating and medium temperatures - maximum 95 °C Ambient temperature: maximum 135 °C (maximum 30 minutes)
T135°C	$\leq 130\text{ °C}$	Operating and medium temperatures - maximum 95 °C Ambient temperature: maximum 130 °C
T100°C	$\leq 100\text{ °C}$	Operating and medium temperatures - maximum 95 °C Ambient temperature: maximum 95 °C
T85°C	$\leq 85\text{ °C}$	Operating and medium temperatures - maximum 80 °C Ambient temperature: maximum 80 °C

Table 5: Temperature classes - dusts

2.3.2 Pressure

The proper operational pressures are given in the following tables. The specified operating pressures must be observed and monitored.

Cleaner	Operating pressure range
Orbital cleaner	4 - 10 bar

ATTENTION

The specified pressure is the pressure required at the cleaning head and not at the pump.

2.3.3 Flow rate

For the safe operation of the orbital cleaners, flow monitoring is required, see chapter 2.2 *Safety precautions* and chapter 5.10 *Flow and operational parameter monitoring for orbital cleaners*.

The specified flow rates must not deviate more than 10% from the specified values and must be monitored. For safer operation, the safety instructions and operating parameters of TRGS-727: 2016 (see chapter 4.2 *Selection of the cleaning parameters according to TRGS 727:2016*) must be observed.

Cyclone – 3 mm nozzles

Operating flow and pressure conditions

Required flow rate	[m ³ /h]	2.5	2.8	3.1	3.3	3.5	3.7	4.0
	[l/min]	42	47	51	55	59	62	66
	[USgpm]	11.1	12.4	13.5	14.5	15.6	16.4	17.4
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Cyclone – 4 mm nozzles

Operating flow and pressure conditions

Required flow rate	[m ³ /h]	4.0	4.5	4.9	5.2	5.6	5.9	6.2
	[l/min]	67	75	82	87	93	98	103

Cyclone – 4 mm nozzles

	[USgpm]	17.7	19.8	21.7	23.0	24.6	25.9	27.2
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Twister – 3 mm nozzles

Operating flow and pressure conditions

Required flow rate	[m ³ /h]	2.7	2.9	3.2	3.4	3.6	3.8	4.1
	[l/min]	45	49	54	57	60	64	68
	[USgpm]	11.9	12.9	14.3	15.1	15.9	16.9	18.0
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Twister – 4 mm nozzles

Operating flow and pressure conditions

Required flow rate	[m ³ /h]	3.9	4.3	4.7	5.0	5.3	5.6	5.8
	[l/min]	65	72	78	84	88	93	97
	[USgpm]	17.2	19.0	20.6	22.2	23.2	24.6	25.6
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Typhoon – 3 mm nozzles

Operating flow and pressure conditions

Required flow rate	[m ³ /h]	2.9	3.4	4.0	4.4
	[l/min]	48.0	57.0	66.0	73.0
	[USgpm]	12.7	15.1	17.4	19.3
Required pressure	[bar]	4.0	6.0	8.0	10.0
	[psi]	58.0	87.0	116.0	145.0

Typhoon – 4.5 mm nozzles

Operating flow and pressure conditions

Required flow rate	[m ³ /h]	5.6	6.2	6.7	6.9	7.1	7.3	7.6
	[l/min]	93.3	103.3	111.7	115.0	118.3	121.7	126.7

Typhoon – 4.5 mm nozzles

	[USgpm]	24.7	27.3	29.5	30.4	31.3	32.1	33.5
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Typhoon – 6 mm nozzles

Operating flow and pressure conditions								
Required flow rate	[m ³ /h]	7.4	8.2	8.9	9.6	10.0	10.3	10.5
	[l/min]	123.3	136.7	148.3	160.0	166.7	170.8	175.0
	[USgpm]	32.6	36.1	39.2	42.3	44.0	45.1	46.2
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Tempest – 7 mm nozzles

Operating flow and pressure conditions								
Required flow rate	[m ³ /h]	12.0	13.7	15.3	16.7	18.0	18.6	19.2
	[l/min]	200	227.5	255.0	277.5	300.0	310.0	320.0
	[USgpm]	52.8	60.1	67.4	73.3	79.3	81.9	84.5
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Tempest – 8 mm nozzles

Operating flow and pressure conditions								
Required flow rate	[m ³ /h]	13.5	15.8	18.0	19.5	21.0	22.2	23.4
	[l/min]	225.0	262.5	300.0	325.0	350.0	370.0	390.0
	[USgpm]	59.4	69.3	79.3	85.9	92.5	97.7	103.0
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Tornado – 11 mm nozzles

Operating flow and pressure conditions of the cleaner								
Required flow rate	[m ³ /h]	14.6	15.4	16.1	18.3	20.4	21.6	22.7
	[l/min]	243.3	255.8	268.3	304.2	340.0	359.2	378.3

Tornado – 11 mm nozzles

	[USgpm]	64.3	67.6	70.9	80.4	89.8	94.9	99.9
Required pressure	[bar]	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	[psi]	58.0	72.5	87.0	101.5	116.0	130.5	145.0

Tornado 4 – 8 mm nozzle

Operating flow and pressure conditions

Required flow rate	[m ³ /h]	14.2	16.9	19.2	21.3
	[l/min]	236.0	282.0	320.0	355.0
	[USgpm]	62.3	74.5	84.5	93.8
Required pressure	[bar]	4.0	6.0	8.0	10.0
	[psi]	58.0	87.0	116.0	145.0

3 Explosion protection information

3.1 Basics

In the European Union, directive 2014/34/EU, also known as the ATEX directive, applies. It regulates the suitability and the putting into circulation of devices for use in potentially explosive areas.

In the UK, the “Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres 2016” regulation, also known as UKEX, applies. The regulation regulates the placing on the market of equipment for use in potentially explosive atmospheres in the United Kingdom.

Whereas electrical devices have always been subject to regulation in the past, non-electrical (mechanical) devices are now also covered. The manufacturer determines the suitability of the device for use in hazardous areas. If the device falls within the scope of the directive, it is classified according to its suitability, if necessary also subjected to a type examination by an appointed body and marked.

Due to the device category, the device is assigned to the ex-zone. The ex-zone is determined by the operator. The following table shows the relationship between device group, device category, device protection level and zone. A complete overview of the structure of the Ex-marking can be found on the following page.

Required marking of the equipment to be used

Potentially explosive atmosphere	Zone classification	Potentially explosive atmosphere available	Device group	Device category	EPL (device protection level)
Gas	Zone 0	Permanently, long term, often	II	1G	Ga
	Zone 1	occasionally	II	2G (1G)	Gb (Ga)
	Zone 2	Never, rarely or short-term	II	3G (2G+1G)	Gc (Ga, Gb)
Dust	Zone 20	Permanently, long term, often	II	1D	Da
	Zone 21	occasionally	II	2D (1D)	Db (Da)
	Zone 22	Never, rarely or short-term	II	3D (2D+1D)	Dc /Da, Db)

Table 6: Required marking of the equipment to be used

Explosion groups and examples for gases and vapours

Explosion group	Gases and vapours - examples depending on explosion group and temperature class					
II A	Ammoniac Methane Ethane Propane	Ethyl alcohol Cyclohexane n-Butane	Gasoline Diesel Fuel oil n-Hexane	Acetaldehyde	--	--
II B	City gas Acrylonitrile	Ethylene Ethylene oxide	--	Ethyl ether	--	--

Explosion group	Gases and vapours - examples depending on explosion group and temperature class					
II C	Hydrogen	Acetylene	--	--	--	Carbon di-sulphide
Temperature class	T1	T2	T3	T4	T5	T6
Temperature	450°C	> 300°C < 450°C	> 200°C < 300°C	> 135°C < 200°C	> 100°C < 135°C	> 85°C < 100°C

Table 7: Explosion groups and examples for gases and vapours

3.2 Example for an ATEX marking

The marking is carried out only if the ATEX directive can be applied, i.e. if potential ignition sources are present.

Example for an ATEX marking

	0123		II II	1G 1D	Ex h Ex h	IIC IIIC	T6...T3 T1 140°C	Ga Da
1	2	3	4	5	6	7	8	9

Explanation of the example of the ATEX marking

No.	Explanation
1	CE Conformity of the device / autonomous protective system (not for components intended for devices)
2	Number of the notified body
3	EX marking ATEX directive is applied
4	Device group II and III (not mining)
5	Device group 1 for gases/vapours G and dusts D
6	applied ignition type Ex h
7	Explosion group IIC (not mining; sub-group B)
8	T6 ...T3 temperature range (see section 2.3.1 <i>Temperature</i>) Max. surface temperature +140°C (dust) see section 2.3.1 <i>Temperature</i>
9	Device protection level (EPL) Ga and Da

3.3 Ignition protection types

Possible ignition protection types	Device protection levels	Standard	References
Basic method and requirements	--	EN ISO 80079-36	
Safety design	Ex c*	EN ISO 80079-37	
Ignition source monitoring	Ex b*	EN ISO 80079-37	See 2.3 <i>Operating conditions</i> and 5.10 <i>Flow and operational parameter monitoring for orbital cleaners</i>
Liquid encapsulation	Ex k*	EN ISO 80079-37	
Pressurised enclosure	Ex pxb; (Ex pyb; Ex pzc)	EN ISO 60079-2	
Protection through housing	Ex ta, (Ex tb; Ex tc)	EN ISO 60079-31	
Pressure-resistant enclosure	Ex da, (Ex db; Ex dc)	EN ISO 60079-1	

*The device protection levels Ex c, Ex b and Ex k are marked consolidated as Ex h.

Table 8: Ignition protection types

For "ignition source monitoring" see 2.3 *Operating conditions* and 5.10 *Flow and operational parameter monitoring for orbital cleaners*.

4 Cleaning

4.1 The cleaning of the tanks in explosive atmospheres

4.1.1 Basics

When cleaning containers, especially when blasting and spraying liquids, high and dangerous electrostatic charges may occur, resulting in spark discharge processes.

Impacting cleaning jets form droplets or mists during dicing that may be charged and then generate electrical charges in the container. Existing turbulences distribute the charged mist throughout the container and thus can create high space charge density with high field strengths.

At the same time, the cleaning liquid itself or the medium in the tank can be combustible and thus form an explosive atmosphere.

Thus, the three basic conditions for explosions with dangerous effects are created:

- Flammable gas / flammable dust
- Effective ignition sources
- Oxygen

4.1.2 Guidelines

If there is a risk of explosion with dangerous effects, the following guidelines must be applied in all EU countries, among others: see table "Guidelines to be applied".

Applicable guidelines

Manufacturer responsibility	Operator responsibility
Directive 2014/34/EU	Directive 1999/92/EC
Explanation of ATEX conformity for a product or declaration that the product has no potential sources of ignition ATEX conformity includes: Determination of the category and additional limits of use Category 1 *) ==> Category 2 *) ==> Category 3 *) ==>	Preparation of the explosion protection document for an installation: This includes: Definition of the explosion zones and the additional plant conditions For Zone 0 *) For Zone 1 *) For Zone 2 *)

*) Particular limitations must always be considered, e.g. Temperature classes.

In addition, the regulations of the local supervisory authority apply.

Outside the EU, separate and divergent regulations apply to protect against explosions and their damaging effects, e.g. in the US, the NEC National Electric Code set of rules along with the UL standards. These regulations must be applied in these countries. Some of them require their own approval procedures.

4.2 Selection of the cleaning parameters according to TRGS 727:2016

Breconcherry Ltd assumes no responsibility for these specifications. If there is a risk of explosion due to the use of cleaners, all current ATEX-related standards and regulations must always be applied. TRGS 727:2016 is applicable in Germany. Outside Germany, the respectively valid regulations must be taken into account.

4.2.1 Cleaning with water jets with pressures of up to 12 bar

When cleaning with water jets up to 12 bar and with up to 20 nozzles, no dangerous charges are to be expected as long as the liquid flow rate does not exceed 7 l/s and the tank volume does not exceed 10 m³.

4.2.2 Clean with solvents of low and medium conductivity from pressures up to 12 bar

(1) When cleaning liquids of low and medium conductivity, e.g. organic solvents, are used, the proportion of a second phase, e.g. water or solid, may not exceed 1%.

(2) Cleaning agents may only be run in a closed circuit if the impurities are kept below 1%.

INFO The accumulation of liquid in the container during cleaning should be avoided.

INFO Low-conductivity liquids such as hydrocarbons become less charged during spraying than water as they contain only a low concentration of dissociated ions.

5 Preventing further ignition sources

5.1 Putting cleaner in the tank - mechanically generated sparks

If the cleaner is not permanently installed in the tank, but is retracted or retracted automatically or manually, there is a risk of mechanically generated sparks during collisions.

To avoid sparks,

- the lowering and lifting speed must not exceed 1 m/s,
- the impact energy must not exceed 500 J,
- contact between the cleaner and aluminium and other light metals must be avoided.

If this can not be avoided, further requirements from the standards must be met, see EN ISO 80079-36:2016. The risk originating from sparks caused by individual impact must always be taken into account in the ignition hazard analysis of the cleaning line.

For cleaning, the cleaner must be firmly connected to the tank via a mounting flange or via a manhole cover plate.

Additional safety measures must be taken so that the cleaner starts only in the container.

Proper condition and safe handling of the device must be ensured by the operator.

5.2 Manhole cover

If a cleaner in a potentially explosive area is placed in a tank with a manhole cover plate, it must rest flat. Open ventilation holes must not be installed.

It must be taken into account that the cleaner has no flame arrester and the connection of the cleaner housing ==> Cleaner lance and container interior is not flame-proof.

5.3 Electrical sparks

If the cleaner is equipped with electrical components, e.g. sensors and motors, they must have their own ATEX approval. The operator must ensure the correct connection and secure cable routing.

In particular, cable entry points must comply with the valid technical regulations and must not show any kinks or sharp edges.

5.4 Grounding – electrical charge

Tanks must be grounded. Tankers must be grounded via copper cable and connectors.

The cleaner (orbital cleaner, rotating and static cleaners) must be introduced into the system via the grounded piping.

The operator is obliged to ensure equipotential bonding with the tank for the cleaner. All conductive parts of the system must be grounded.

5.5 Filling the tanks

The container outlet must be open during the cleaning process. Thus, it is not a filling process.

5.6 Inerting

In the case of an explosive atmosphere in the tank and tank dimensions that exceed the container diameter of 3 m, an inert gas, for example, may only be introduced so that a formation of mist or sublimate is avoided.

Wet steam and CO₂ are not suitable. Nitrogen and noble gases, for example, are suitable. The inert gas must be introduced solids-free and slowly through the largest possible openings.

5.7 Foreign objects in the fluid

There is a risk of foreign objects shooting out of nozzle if the mesh size of the sieve is too small or the sieve is defective (torn). The foreign objects are embedded in the liquid, since the operation of the device is only allowed when liquid is present.

The following applies: The operator must ensure that only permissible media are used that contain no solids.

Before putting the system into operation, all foreign objects such as screws, nuts and welding beads must be removed.

The cleaning medium must be removed after spraying and must not be pumped through the cleaner again. Corresponding preparation is acceptable, the quality of the medium must be guaranteed and is the duty of care of the operator.

5.8 Petroleum vehicles

The hazardous area for petroleum vehicles is defined in the Ordinance on Flammable Liquids (TRbF).

5.9 Maintenance / servicing

5.9.1 Authorized personnel / OEM replacement parts

The cleaners may only be serviced and repaired by authorized personnel. Only OEM replacement parts intended for use in potentially explosive atmospheres may be used, which must be requested from Breconcherry Ltd.

Changes to the cleaners are not permitted without the consent of the ATEX officer of Breconcherry Ltd.

If changes are made or if OEM replacement parts are not used for applications in potentially explosive atmospheres, the enclosed ATEX declarations lose their validity and their use in potentially explosive atmospheres is no longer permitted.

5.9.2 Maintenance

The cleaner must be regularly checked for damage and function, taking into account the operating conditions. Breconcherry recommends a visual inspection after every cleaning process.

Maintenance of the ATEX cleaner is mandatory after a maximum of 150 operating hours. Depending on the operating conditions, the operator must specify shorter maintenance intervals.

The performed maintenance must be logged.

Only original Breconcherry maintenance and wear kits intended for ATEX may be used.

If the maintenance instructions are not followed, the cleaner loses its ATEX conformity and must not be used in explosive areas.

5.10 Flow and operational parameter monitoring for orbital cleaners

In order to ensure that the orbital cleaners are operated with fluid, the operator must use a suitable monitoring system.

ATEX approved flow monitoring systems recommended by Breconcherry:

- Flow switch type SF311A; Manufacturer ifm electronic GmbH
- Evaluation unit type SR2301; Manufacturer ifm electronic GmbH
- Evaluation unit type SN2301; Manufacturer ifm electronic GmbH

The instructions and manufacturer's instructions for maintenance and calibration of the flow monitoring system must be taken into account. The ignition protection system should have ignition protection level b1, (see EN ISO 80079-37:2016).

The monitoring of the temperature, the pressure and the flow rate must be guaranteed, (see chapter 2.3 *Operating conditions*).

6 Additional information on cleaner selection

6.1 Possibilities of ATEX classification

6.1.1 Cleaner with its own potential ignition source

Ignition protection measures are required so that the cleaner is grouped into a category depending on the likelihood of a potential ignition hazard and other limiting factors.

This restricts the application to certain zones (Directive 1999/92/EC) and places additional restrictions on operation.

INFO The declaration of conformity according to 2014/34/EU must be available in any case and belongs in the explosion protection document.

The orbital cleaners from Breconcherry Ltd are EC type approved and can be safely used under the following classification.

Planetary gear stainless steel

Cyclone, Twister, Typhoon, Tempest, Tornado, Tornado 4



0123



II 1G Ex h IIC T6..T3 Ga
0°C ≤Ta≤140°
II 1D Ex h IIC T85°C ...T140°C Da
0°C ≤Ta≤135°

INFO The maximum surface temperature depends mainly on the operating conditions. The allowable temperatures can be found in the chapter Operating Conditions.

6.1.2 Additional restrictions on usable substances

Depending on the type of detergent, there may be additional restrictions on the substances to be used. Please observe the manufacturer's or conformity declarations.

6.2 Instructions for the operation of the cleaner

On the operating side, a temperature limiter (temperature sensor) must be available for switching off of the system. The settings must be adjusted so that the maximum permissible temperatures are never reached.

See EN ISO 80079-36:2016 and other regulations that must be applied for cleaning with explosive mediums.

6.3 Explosion groups

The classification of gases is based on their specific ignitability, which is determined by standardized figures.

Explosion groups	Typical gas
IIA	Propane
IIB	Ethylene
IIC	Hydrogen

The danger increases for the explosion groups from IIA to IIC.

6.4 Substance classification

The substance classification depends on the temperature classes and explosion groups. Once all substance data has been recorded, a cleaner can be selected according to the specified temperature class and explosion group.

7 Further information sources

The table lists further information sources for explosion protection when cleaning containers.

Document	Contents
ATEX Directive 2014/34/EU	Devices and protective systems intended for use in potentially explosive atmospheres
Directive 1999/92/EC	Improvement of the health and safety of workers potentially at risk from explosive atmospheres
TRGS 727:2016	Technical regulations for hazardous substances Publisher: Federal Institute for Occupational Safety and Health
EN 1127-1:2011	Explosive Atmospheres - Explosion Protection, Part 1: Basic principles and methods
EN ISO 80079-36:2016	Non-electrical equipment for operation in explosive atmospheres - Basic principles and requirements
EN IEC 60079-0:2018	Potentially explosive areas - Part 0: Operating equipment - General requirements
EN ISO 80079-37:2016	Non-electrical equipment for explosive atmospheres - Protection through constructional safety "c", control of ignition sources "b", liquid immersion "k"

8 Annex

8.1 List of abbreviations

Abbreviation	Explanation
ATEX	ATEX is a widely used synonym for the European Union ATEX directives. The designation ATEX is derived from the abbreviation of the French ATmosphère EXplosive.
BS	British Standard
bar	Unit of measurement of pressure [bar] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
BSP	British Standard Pipe Thread
BSPT	British Standard Pipe Tapered Tread
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
DN	DIN nominal width
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardization)
EN	European standard
h	Unit of measurement of time [hour]
ISO	International standard issued by the International Organisation for Standardisation
kg	Unit of measurement of weight [kilogram]
l	Unit of measurement of volume [litre]
min.	minimum
max.	maximum
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]
M	metric
NPT	National Pipe Thread
Nm	Unit of measurement of work [newton metre] SPECIFICATION FOR THE TORQUE: 1 Nm = 0.737 lbft Pound-Force (lb) + Feet (ft)
PA	Polyamide
PTFE	Polytetrafluoroethylene
C-PTFE	Carbonated polytetrafluoroethylene

Abbreviation	Explanation
SW	Indicates the size of spanners [width across flats]
TPB	Orbital cleaner with PEEK planetary gears
TSG	Orbital cleaner with stainless steel planetary gears
Inch OD	Tube measurement according to British Standard (BS), outside diameter
Inch IPS	American pipe measurement, iron pipe size

Table 9: Abbreviations and terms

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