TECHNICAL REPORT

Product	MAGDRIVE
Name and address of the applicant	Specialist Tooling Technologies Ltd Unit 2 Park 32, Park Road, Pontefract, WF8 4PS West Yorkshire United Kingdom
Rating and principal characteristics	Max. speed: 1450 RPM Max. axial load: 7 N
Trade mark (If any)	-
Model/type	MAGDRIVE
DNV certificate no.	DNV 24 ATEX 53844 U Issue 0
Ex-code for component / electrical apparatus	Ex II 1 G Ex h IIC Ga, -20°C ≤ T_{amb} ≤ +40°C
Additional information	N/A
Report issue No.	00
Tested according to	**EN IEC 60079-0:2018** — **Electrical apparatus for potentially explosive atmospheres General requirements** **EN - ISO 80079-37:2016, Edition 1.0** — **Explosive atmospheres, Part 36: Non-electrical equipment for explosive atmospheres, Basic method and requirements** **EN - ISO 80079-37:2016, Edition 1.0** — **Explosive atmospheres, Part 37: Non-electrical type of protection constructional safety "c", control of ignition source "b", liquid immersion "k"**
Name and address of the testing laboratory	**DNV Product Assurance AS** **Veritasveien 1** **1363 Høvik** **Norway** **Tel: +47 67 57 88 00** **e-mail: ex@dnv.com** **Web: www.dnv.com**
Prepared by	Nenad Stanivukovic — **Date** 2025-10-01
Reviewed by	Kaastad, Asle — **Date**
Approved by	Sandstad, Ståle — **Date**

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General remarks:
The test results presented in this Technical Report relate only to the item or product tested.
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Appendix 1; Part 0 (IECEx TEST REPORT, EN IEC 60079-0-654693/00)
Appendix 2; Part 36 (IECEx TEST REPORT, EN - ISO 80079-36-654693/00)
Appendix 3; Part 37 (IECEx TEST REPORT, EN – ISO 80079-37-654693/00)
Appendix 4; IHA (Ignition Hazzard Assessment)

Description of equipment under test:

The MAGDRIVE is magnetic coupling intended to be incorporated as in a fan for use in Zone 0.

It consists of top flange plate, flanged bearing housing which is bolted to the underside of the top flange plate and sealed, and drive shaft.
Drive shaft has a pulley mounting to it with magnets embedded around the face. These magnets interacts with the motor pulley magnets (mounted outside the flange plate) to create a magnetic lock between the 2 pulleys.
The bearing housing has upper and lower deep groove ball bearings with rotating lubricant flingers / reservoirs underneath, bearing spacer sleeves incorporating the upper flinger lock nut.
End of the tube vs drive shaft is sealed by primary and secondary radial seals (made from conductive material) sandwiched between stainless steel plates together with a gasket seal and secondary ‘O’ ring. The bottom end of drive shaft is threaded for fan impeller mounting.

Descriptive documents;

Drawing No.	Name/Title	Rev.	Date	Page/-s
41005-01	MOTOR PULLEY	C	2025-06-05	1
41005-02	MOTOR PULLEY BOTTOM	B	2025-06-04	1
41005-09	GASKET	C	2025-05-08	1
41005-10	TRANSFER PLATE SEAL	A	2025-06-04	4
41005-101	FLANGE PLATE	C	2025-06-08	4
41005-102	MOTOR MOUNTING RING	D	2025-06-08	4
41005-103	DRIVE TRANSFER PLATE	C	2025-05-08	1
41005-104	FLANGE SEAL	C	2025-05-08	1
41005-105	STOP WASHER	A	2021-07-31	1
41005-106	BEARING HOUSING	F	2025-06-08	1
41005-107	SEAL CLAMP	D	2025-05-15	3
41005-108	SEAL CLAMP PLATE	D	2025-06-03	1
41005-109	SHAFT NUT	C	2025-06-03	1
41005-110	BEARING SLEEVE	D	2025-06-03	1
41005-112	SHAFT	D	2025-06-03	1
41005-117	M6 OVERSIZED WASHER	A	2025-05-08	1
41005-118	COUPLING KEY	A	2025-07-29	2
41005-900	MAG DRIVE ASSEMBLY	F	2025-08-09	4

Copy of marking plate:

Specialist Tooling Technologies Ltd
Unit 2, Park 32, Park Road, Pontefract
WF8 4PS West Yorkshire
United Kingdom

MAGDRIVE Serial No: – 41005-900-xxx

II 1 G Ex h IIB Ga

Atex Cert No: – DNV 25 ATEX 53844U

NB Number: – 2460

Tested according to additional information:	
N/A	
Other requirements:	
N/A	
Additional information:	
Calibration:	**All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.**
Measurement uncertainty:	**Measurement uncertainties are calculated for all instruments and instrument set-ups given in this report. Calculations are based on the principles given in the standard EA-4/02 (Oct 2013). Further information about measurement uncertainties will be given on request**
Laboratory accreditation	NORWEGIAN ACCREDITATION TEST 274 — **Laboratory testing meets the requirements of NS-EN ISO/IEC 17025**

Possible test case verdicts:
- test case does not apply to the test item.....: N / A
- test item does meet the requirement..........: Pass

Report History		
Issue No.	Date of revision	Description
0	2025-10-01	Original report

Equipment tested:
See serial numbers above.

Equipment tested:

DNV Sample ID.	Date received	Description (size, colour, material, prototype modification, version no. etc)	Serial no. (if any)
1	2025-08-28	Normal sample	
2	2025-08-28	Especially prepared sample (w/o) lubricant	

Photos of component

EN IEC 60079-0:2018			
Clause	Requirement - Test	Result - Remark	Verdict
Endorsement notice: The text of the International Standard IEC 60079-0:2017 was approved by CENELEC as a European Standard without any modifications Additional information relating to the European ATEX directive 2014/34/EU (informative):			
Annex ZY.1	**Equipment groups and categories**		
Annex ZY.2	**Instructions** In clause 30.1 under: "instructions for safety addressing the following areas – installation and erection;" "Information other than the general requirements given in IEC 60079-14" Is replaced by "Information other than the general requirements given in EN 60079-14 and EN 50628"		Pass
Annex ZY.3	**Marking**	Refer to checklist for MARKING: -ADDITIONAL REQUIREMENTS ACCORDING TO ATEX DIRECTIVE	Pass
Annex ZY.4	**Fans** Clause 17.2.5 "Room ventilating fans" is to be supplemented by the requirements given in EN 14986 "Design of fans working in potentially explosive atmospheres"	Not a fan.	N/A
Annex II-1.2.3	**Enclosed structures and prevention of leaks**	No internal source of release	N/A
Annex II-1.2.5	**Additional means of protection**	No additional means of protection required for intended use.	N/A
Annex II-1.2.8	**Overloading of equipment**	Specified under Schedules of limitations.	N/A
Annex II-1.2.9	**Flameproof enclosure systems**	No flameproof enclosures	N/A
Annex II-1.3.4	**Hazards arising from overheating**	See 80079-36 report.	Pass
Annex II-1.3.5	**Hazards arising from pressure compensation operations**	No pressure compensation.	N/A
Annex II-1.5	**Requirements in respect of safety-related devices**	Not a safety System	N/A
Annex II-1.5.1		Not a safety System	N/A
Annex II-1.5.2		Not a safety System	N/A
Annex II-1.5.3		Not a safety System	N/A
Annex II-1.5.4	**Control and display units**	Not a safety System	N/A

EN IEC 60079-0:2018			
Annex II-1.5.5	**Requirements in respect of devices with a measuring function for explosion protection**	Not a safety System	N/A
Annex II-1.5.6		Not a safety System	N/A
Annex II-1.5.7		Not a safety System	N/A
Annex II-1.5.8	**Risks arising from software**	Not a safety System	N/A
Annex II-1.6.1		Not a safety protective device or system	N/A
Annex II-1.6.2		Not a safety protective device or system	N/A
Annex II-1.6.3	**Hazards arising from power failure.**	There are no hazards arising from power failure.	N/A
Annex II-1.6.5	**Placing of warning devices as parts of equipment.**	No Gas detection systems used.	
Annex II-3	Supplementary requirements in respect of protective systems	Not a protective system	N/A
Annex II-3.0	General Requirements	Not a protective system	N/A
Annex II-3.0.1	Protective systems must be dimensioned in such a way as to reduce the effects of an explosion to a sufficient level of safety	Not a protective system	N/A
Annex II-3.0.2	Protective systems must be designed and capable of being positioned in such a way that explosions are prevented from spreading through dangerous chain reactions or flashover and incipient explosions do not become detonations.	Not a protective system	N/A
Annex II-3.0.3	In the event of a power failure, protective systems must retain their capacity to function for a period sufficient to avoid a dangerous situation.	Not a protective system	N/A
Annex II-3.0.4	Protective systems must not fail due to outside interference.	Not a protective system	N/A
Annex II-3.1	Planning and design	Not a protective system	N/A
Annex II-3.1.1	**Characteristics of materials.**	Not a protective system	N/A
Annex II-3.1.2		Not a protective system	N/A
Annex II-3.1.3		Not a protective system	N/A
Annex II-3.1.4		Not a protective system	N/A
Annex II-3.1.5	**Pressure – relief systems.**	Not a protective system	N/A
Annex II-3.1.6	**Explosion suppression systems.**	Not a protective system	N/A

EN IEC 60079-0:2018			
Annex II-3.1.7	**Explosion decoupling systems.**	Not a protective system	N/A
Annex II-3.1.8		Not a protective system	N/A

MARKING: -ADDITIONAL REQUIREMENTS ACCORDING TO ATEX DIRECTIVE			
Clause	Requirement - Test	Result - Remark	Verdict
Where reference is made to Directive 2014/34/EU, the marking shall also include (Annex II, 1.0.5)			
	• **name, registered trade name or registered trade mark, and address of the manufacturer,**	Specialist Tooling Technologies Ltd Unit 2 Park 32, Park Road, Pontefract, WF8 4PS West Yorkshire United Kingdom	Pass
	• **the year in which the equipment was constructed**		Pass
	• **the specific marking of explosion protection Ex followed by the symbol of the equipment-group and the category**	Ex II 1 G	Pass
	• **CE marking without identification number to the notified body involved in the production control phase**	2460	Pass
	• **If ATEX component, no CE mark, only NB number**	No CE marking	Pass
	for equipment Group II:		
	• **the letter 'G' where explosive atmospheres caused by gases, vapours or mists are concerned and/or**	G	Pass
	• **the letter 'D' where explosive atmospheres caused by dusts are concerned**	Not evaluated.	N/A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
1	Scope		
DS 2024/002 **DS 2021/004**		Non-electrical Ex component evaluated. No monitoring/adjustment techniques to adjust internal ambient temperatures evaluated.	N/A
2	Normative references		
3	Terms and definitions		
DS 2020/002		Not applicable.	N/A
4	Equipment grouping		
4.1	General	See below.	Pass
4.2	Group I	Not evaluated for the Group I.	N/A
4.3	Group II	IIC.	Pass
4.4	Group III	Not evaluated for the Group III.	N/A
4.5	Equipment for a particular explosive gas atmosphere	The equipment has been evaluated for the Group IIC.	N/A
5	Temperatures		
DS 2016/002 **DS 2015/011A**		Not “Ex i” type of protection. No temperature measurement performed.	N/A
5.1	Environmental influences		
5.1.1	Ambient temperature	-20°C to +40°C	Pass
5.1.2 **DS 2022/002**	External source of heating or cooling	Working fluid (Ethelene Oxide) temperature is considered within the same range as ambient temperature.	N/A
5.2 **DS 2020/006**	Service temperature	There are no non-metallic parts the Ex protection is depending on. No enclosure See 6.2 in 80079-36 report. IS apparatus EPL Da not evaluated.	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
5.3	Maximum surface temperature		
5.3.1	Determination of maximum surface temperature	Not applicable for Ex components.	N/A
5.3.2	Limitation of maximum surface temperature		
5.3.2.1	Group I electrical equipment	Not applicable for Ex components.	N/A
5.3.2.2	Group II electrical equipment	Not applicable for Ex components.	N/A
5.3.2.3	Group III electrical equipment		
5.3.2.3.1 **DS 2020/006**	Maximum surface temperature for EPL Da	Not applicable for Ex components.	N/A
5.3.2.3.2	Maximum surface temperature for EPL Db	Not applicable for Ex components.	N/A
5.3.2.3.3	Maximum surface temperature determined without a layer of dust for EPL Dc	Not applicable for Ex components.	N/A
5.3.3	Small component temperature for Group I or Group II electrical equipment	Not applicable for Ex components.	N/A
5.3.4	Component temperature of smooth surfaces for Group I or Group II electrical equipment	Not applicable for Ex components.	N/A

6	Requirements for all electrical equipment		
6.1	General	a) Comply with the requirements of this standard and, ISO 80079-36:2016 and ISO 80079-37:2016 Edition 1.0 b) Constructed in accordance with the principles of good engineering practice. Manufacturer’s responsibility. ISO 271 (for bearings).	Pass
6.2	Mechanical strength of equipment	Not applicable for Ex components.	N/A
6.3	Opening times	Not applicable for Ex components.	N/A
6.4	Circulating currents in enclosures (e.g. of large electric machines)	Not applicable for Ex components.	N/A
6.5	Gasket retention	There is no gasketed joint the degree of protection is depending on which is intended to be opened for installation or maintenance purposes.	N/A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
6.6	Electromagnetic and ultrasonic energy radiating equipment	Excluded.	N/A
7	Non-metallic enclosures and non-metallic parts of enclosures		
7.1	General		
7.1.1	Applicability	There are no non-metallic enclosures and non-metallic parts of enclosures, on which the type of protection depends. See 80079-36 report.	N/A
7.1.2	Specification of materials		
7.1.2.1	General	See clause 7.1.1 above	N/A
7.1.2.2	Plastic materials	See clause 7.1.1 above	N/A
7.1.2.3	Elastomers	See clause 7.1.1 above	N/A
7.1.2.4	Materials used for cementing	See clause 7.1.1 above	N/A
7.2	Thermal endurance		
7.2.1	Tests for thermal endurance	See clause 7.1.1 above	N/A
7.2.2	Material selection	See clause 7.1.1 above	N/A
7.2.3	Alternative qualification of elastomeric sealing O-rings	See clause 7.1.1 above	N/A
7.3 **DS 2023/001**	Resistance to ultraviolet light	See clause 7.1.1 above	N/A
7.4	Electrostatic charges on external non-metallic materials		
7.4.1	Applicability	See clause 7.1.1 above	N/A
7.4.2	Avoidance of a build-up of electrostatic charge for Group I or Group II	See clause 7.1.1 above	N/A
7.4.3	Avoidance of a build-up of electrostatic charge for Group III	Not evaluated.	N/A
7.5	Attached external conductive parts	Schedule of limitations “U”: The coupling must be connected to earth or mounted on the part which is in contact with the earth.	Pass
8	Metallic enclosures and metallic parts of enclosures		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
8.1	Material composition	See 6.2.4 of 80079-36 standard and ref. to ISO 6507-1	Pass
8.2	Group I	Not evaluated.	N/A
8.3	Group II	See 6.2.4 of 80079-36 standard and ref. to ISO 6507-1	Pass
8.4	Group III	Not evaluated.	N/A
8.5	Copper Alloys	See 6.2.4 of 80079-36 standard and ref. to ISO 6507-1	Pass
9	Fasteners	Excluded.	N/A
10	Interlocking devices	Excluded.	N/A
11	Bushings	Excluded.	N/A
12	(Reserved for future use)		
13	Ex Components		
DS 2014/001 **DS 2021/006**		Newest harmonized standards applied. No optional Function Modules.	N/A
13.1	General	Annex B applied.	Pass
13.2	Mounting	Not applicable.	N/A
13.3	Internal mounting	Not applicable.	N/A
13.4	External mounting	Not applicable.	N/A
13.5 **DS 2020/002**	Ex Component certificate	Schedule of Limitations -"U" included in Ex component certificate.	Pass
14	Connection facilities	Excluded.	N/A
15	Connection facilities for earthing or bonding conductors	Excluded.	N/A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
16	Entries into enclosures		
DS 2017/001		Excluded.	N/A
17	Supplementary requirements for electric machines	Excluded.	N/A
18	Supplementary requirements for switchgear	Excluded.	N/A
19	Reserved for future use		
20	Supplementary requirements for external plugs, socket outlets and connectors for field wiring connection	Excluded.	N/A
21	Supplementary requirements for luminaires	Excluded.	N/A
22	Supplementary requirements for caplights and handlights	Excluded.	N/A
23	Equipment incorporating cells and batteries	Excluded.	N/A
24	Documentation	See 9 of 80079-36 standard	Pass
25	Compliance of prototype or sample with documents	The samples subjected to the type verification and tests comply with the manufacturer's documents referred to in Clause 24.	Pass
26	Type tests		
DS 2017/005		OD 009 Annex A hasn't been used to justify using data provided in the form of reports prepared by another ExTL prior to the acceptance of that ExTL into the IECEx Scheme. Acceptance of Test/Assessment Data obtained prior to the application for an IECEx Test Report or IECEx Certificate of Conformity	N/A
26.1	General	See 8 of 80079-36 standard	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
26.2	Test configuration	Not applicable for Ex components.	N/A
26.3	Tests in explosive test mixtures	Not applicable.	N/A
26.4	Tests of enclosures		
26.4.1	Order of tests	Excluded.	N/A
26.4.2 **DS 2020/001**	Resistance to impact	See 8.3.1 in 80079-36 report.	Pass
26.4.3	Drop test	Not a hand-held equipment.	N/A
26.4.4	Acceptance criteria	See 8.3.3 in 80079-36 report.	Pass
26.4.5	Degree of protection (IP) by enclosures		
DS 2012/003		Not required by type of protection.	N/A
26.4.5.1	Test procedure	Not applicable.	N/A
26.4.5.2	Acceptance criteria	Not applicable.	N/A
26.5	Thermal tests		
26.5.1	Temperature measurement		
26.5.1.1	General	Refer to 8.1 in the 80079-36 report.	Pass
26.5.1.2	Service temperature	Not applicable.	N/A
26.5.1.3 **DS 2024/001**	Maximum surface temperature	Refer to 8.2 in the 80079-36 report.	Pass
26.5.2	Thermal shock test	Not applicable.	N/A
26.5.3	Small component ignition test (Group I and Group II)	Excluded.	N/A
26.6	Torque test for bushings	Excluded.	N/A
26.7	Non-metallic enclosures or non-metallic parts of enclosures		
26.7.1	General	Not applicable.	N/A
26.7.2	Test temperatures	Not applicable.	N/A
26.8 **DS 2020/003A**	Thermal endurance to heat	Not applicable.	N/A
26.9	Thermal endurance to cold	Not applicable.	N/A
26.10	Resistance to UV light		
26.10.1	General	Not applicable.	N/A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
26.10.2	Light exposure	Not applicable.	N/A
26.10.3	Acceptance criteria	Not applicable.	N/A

26.11	Resistance to chemical agents for Group I equipment	Not applicable.	N/A

26.12	Earth continuity	Not applicable.	N/A

26.13	Surface resistance test of parts of enclosures of non-metallic materials	Not applicable.	N/A

26.14	Measurement of capacitance	Excluded.	N/A

26.15	Verification of ratings of ventilating fans	Not applicable for Ex components.	N/A

26.16	Alternative qualification of elastomeric sealing O-rings	Not applicable.	N/A

26.17	Transferred charge test		
26.17.1	Test equipment	Not applicable.	N/A
26.17.2	Test sample	Not applicable.	N/A
26.17.3	Test procedure	Not applicable.	N/A

27	Routine tests	Not applicable.	N/A

28	Manufacturer's responsibility		

28.1	Conformity with the documentation	Manufacturers responsibility. See 9.1 in 80079-36 report.	N/A

28.2 **DS 2020/002** **DS 2021/005**	Certificate	Manufacturers responsibility. See 9.1 in 80079-36 report.	N/A

28.3	Responsibility for marking	Manufacturers responsibility. See 9.1 in 80079-36 report.	N/A

29	Marking		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
DS 2012/005A **DS 2017/007** **DS 2021/005** **DS 2021/006**		No inclusion of IP rating as part of the marking and certificate. No combined (electrical-non electrical) equipment. Ex equipment doesn't include Ex auxiliary equipment and Ex component. Not a field modular equipment.	N/A
29.1	Applicability	See 11 in 80079-36 report.	Pass
29.2	Location	See 11.1 in 80079-36 report.	Pass
29.3	General	Not applicable for Ex components.	N/A
29.4	Ex marking for explosive gas atmospheres	See 11.2. in 80079-36 report.	Pass
29.5	Ex marking for explosive dust atmospheres	Not evaluated.	N/A
29.6	Combined types (or levels) of protection	Not applied.	N/A
29.7	Multiple types of protection	Not applicable for Ex components.	N/A
29.8	Ga equipment using two independent Gb types (or levels) of protection	Not evaluated.	N/A
29.9	Boundary wall	Not evaluated.	N/A
29.10 **DS 2004/006A** **DS 2012/006A** **DS 2012/008** **DS 2023/002**	Ex Components	a) Specialist Tooling Technologies LDT b) MAGDRIVE c) Ex d) h e) IIC f) DNV 24 ATEX 53844U g) the symbol "U" h) N/A i) Ga Ex h IIC Ga	Pass
29.11	Small Ex Equipment and small Ex Components	Excluded.	N/A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
29.12	Extremely small Ex Equipment and extremely small Ex Components	Excluded.	N/A
29.13	Warning markings	Not applicable for Ex components.	N/A
29.14	Cells and batteries	Excluded.	N/A
29.15	Electric machines operated with a converter	Not applicable for Ex components.	N/A
29.16	Examples of marking	---	N/A
30	Instructions		
DS 2021/006		Not a field modular equipment.	N/A
30.1	General	Not applicable for Ex components. Information necessary to correctly apply the Ex Component included in the Schedule of Limitations on the Certificate. Additional information are prepared as instructions for the incorporation of the Ex Component in the final assembly of Ex Equipment.	N/A
30.2	Cells and batteries	Excluded.	N/A
30.3	Electrical machines	Excluded.	N/A
30.4	Ventilating fans	Excluded.	N/A
30.5	Cable glands	Excluded.	N/A
Annex A (Normative)	Supplementary requirements for cable glands	Excluded.	N/A
Annex B (Normative)	Requirements for Ex Components		
Table B.1	Applicability of clauses to Ex Components	Non applicable clauses excluded.	Pass
Annex C (Informative)	Example of rig for resistance to impact test		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
Annex D (Informative)	Electric machines connected to converters		

Annex E (Informative)	Temperature evaluation of electric machines

Annex F (Informative)	Guideline flowchart for tests of non-metallic enclosures or non-metallic parts of enclosures (26.4)

Annex G (Informative)	Guidance flowchart for tests of cable glands

Annex H (Informative)	Shaft voltages resulting in motor bearing or shaft brush sparking Discharge energy calculation

Measurement Section, including Additional Narrative Remarks (as deemed applicable)

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict
1	Scope		
2	Normative references		
3	Terms and definitions		
4	EPL and component groups		
4.1	EPL	Ga	Pass
4.2	Group I	Not evaluated.	N/A
4.3	Group II	IIC	Pass
4.4	Group III	Not evaluated.	N/A
4.5	Component for specific explosive gas atmospheres	Not intended for specific explosive atmosphere.	N/A
5	Ignition hazard assessment		
5.1	General requirements	Conforms to this standard and EN ISO 80079-37 The Ex component is classified as Ga.	Pass
5.2	Procedure of ignition hazard assessment		
5.2.1	Formal Ignition hazard identification and assessment	Formal identification/analysis of ignition source are provided. All possible sources of ignition owned by the component have been identified. There is no effective ignition sources in normal operation. Ignition sources prevented to become effective by design and type of protection “construction safety”. Ignition sources caused by rare malfunctions are identified, but the protective measures haven’t been part of this assessment. They are properly addressed to the final certification through “U” schedule of limitations. Possible ignition source analysis is presented in Appendix 4 of this report.	Pass
5.2.2	Group I equipment assessment		
5.2.2.1	For EPL Ma equipment	Not evaluated.	N/A

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict
5.2.2.2	For EPL Mb equipment	Not evaluated.	N/A
5.2.3	Group II and III equipment assessment		
5.2.3.1	For EPL Ga or Da	Ga	Pass
5.2.3.2	For EPL Gb, Db	Not evaluated.	N/A
5.2.3.3	For EPL Gc or Dc	Not evaluated.	N/A
5.2.4	Assessment with malfunctions	Two expected malfunctions at the same time and rare malfunctions have been evaluated. See ignition hazard assessment report (Appendix 4)	Pass
5.2.5	Basic information necessary for the ignition hazard assessments	See below.	Pass
	- description of the Ex component	☒	
	- intended use	☒	
	- materials and their characteristics	☒	
	- design drawings and specifications	☒	
	- any relevant assumptions which have been made (e.g. loads strengths, safety factors)	☒	
	- results of design calculations made	☒	
	- results of examinations carried out	☒	
	- requirements for installation, operation and maintenance	☒	
5.2.6	Ignition hazard assessment report	See below.	Pass
	- basic information as described in 5.2.5	☒	
	- hazard identified and their causes	☒	
	- ignition hazard assessment	☒	
	- means implemented to eliminate or minimize identified ignition hazards (e.g. from standards or other specifications as described in Clause 6)	☒	
	- result of the final ignition hazard evaluation	☒	
	- remaining hazards that require actions from the user to minimize the likelihood of ignitions	☒	
	- reasons for evaluation results if not self-explanatory	☒	
	- resulting EPL categorisation and necessary safety limitations of the intended use.	☒	
	Ignition hazard assessment results are reported in tabular form.	☒	
	The hazard assessment report is included in the required technical documentation which demonstrate compliance with this standard (see 9.1)	☒	
	A summary of the hazards identified and the preventive and/or protective measures used are included in the instructions for use.	☒	

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict

6	Assessment of possible ignition sources and control means		

6.1	General	All possible ignition sources are considered during the assessment.	Pass

6.2	Hot surfaces		
6.2.1	General	Maximum surface temperature rise determined to ΔT=30K at the most unfavourable conditions during the rare malfunction. Component is suitable designed for use at the temperatures -40°C to +150°C on the bearing and lubrication and +260°C on the shaft sealings. See Comment 2 at the end of this report.	Pass
6.2.2	Ambient temperatures	See 6.2.1 above.	N/A
6.2.3	Establishing the maximum surface temperature	See 6.2.1 above.	N/A
6.2.4	Group I equipment	Not evaluated.	N/A
6.2.5	Group II equipment	See 6.2.1 above.	N/A
	- T-class	See 6.2.1 above.	
	- Surface temperature	See 6.2.1 above.	
	- Specific gas, vapour or mist	See 6.2.1 above.	
	- TX	See 6.2.1 above.	
6.2.6	Special cases for Group I and Group II equipment		
6.2.6.1	Small surface areas	See 6.2.1 above.	N/A
	< 20 mm^2	See 6.2.1 above.	N/A
	> 20 mm2 and < 1 000 mm^2	See 6.2.1 above.	N/A
6.2.6.2	Enclosed volumes		N/A
	Category 1	See 6.2.1 above.	N/A
	Category 2	See 6.2.1 above.	N/A
6.2.6.3	External hot surfaces	See 6.2.1 above.	N/A
6.2.7	Group III equipment		
6.2.7.1	General	Not evaluated.	N/A
6.2.7.2	Maximum surface temperature determined without a dust layer	Not evaluated.	N/A
6.2.7.3	Maximum surface temperature with respect to dust layers	Not evaluated.	N/A

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict

6.3	Flames and hot gases (including hot particles)	Ignition hazard assessment shows no overheating which can lead to smouldering or burning.	N/A

6.4	Mechanically generated sparks and hot surfaces		
6.4.1	General	Ignition Hazard assessment has been performed considering the mechanical generated sparks between the metallic parts of the component. Combination of appropriate tolerances and preventive maintenance routines makes possible only ignition sources caused by rare malfunctions. Ignition prevention system (IPS) type b1 shall be applied to prevent mechanical damage of the coupling by use of vibration sensor. Maximum allowed level of the vibration is 7 mm/s. See Comment 2 at the end of this report.	Pass
6.4.2	Assessment of sparks generated by single impacts		
6.4.2.1	Assessment of single impact sparks as Potential Ignition Sources	See 6.4.1 above	Pass
6.4.2.2	Assessment of single impact sparks as effective ignition sources	Hasn't been evaluated.	N/A
6.4.3	Assessment of sparks and hot surfaces generated by friction	Hasn't been evaluated.	N/A
6.4.4	External equipment parts containing light metals	No risk of ignition from incentive friction.	N/A

6.5	Electrical ignition sources except stray current	No electrical ignition source.	N/A

6.6	Stray electric currents, cathodic corrosion protection		
6.6.1	Internal sources	No electrical ignition source.	N/A
6.6.2	External sources	Not significant for the manufacturer.	N/A

6.7	Static electricity

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict
6.7.1	General	Component shall be connected to PE to prevent the high charging mechanism form eventual charging of the fan blades (“U” schedule of limitations assessment acc. to EN14986 hasn’t been part of this evaluation) Isolated conductive parts (magnets) are placed inside the drive pulley (made from insulator, PEEK) of the coupling. Conductive lubrication used inside the coupling to improve conductibility.	Pass
	Incentive discharges	No incentive discharges.	
	Cone discharges	No cone discharges.	
	Corona discharges	No corona discharges.	
	Spark discharges	No spark discharges.	
	Brush discharges	No brush discharges.	
	Non-conductive and charging mechanism	Non-conductive paint layers.	
6.7.2	Connection facilities for earthing conducting parts	All conducting parts are connected to earth, (no isolated metallic parts).	Pass
6.7.3	Prevention of highly efficient charge generating mechanisms (leading to propagating brush discharges on non-conductive layers and coatings)	No non-conductive layers and coatings.	N/A
6.7.4	Equipment group I	Hasn’t been evaluated.	N/A
6.7.5	Equipment Group II	The danger of ignition by electrostatic discharges is avoided by the design of the component.	Pass
6.7.6	Equipment group III	Hasn’t been evaluated.	N/A
6.8	Adiabatic compression and shock waves	No adiabatic compression and shock waves.	N/A
6.9	Exothermic reactions, including self-ignition of dusts	No possible ignition source due to exothermic reactions.	N/A
7	Additional considerations		
7.1	Dust deposits and other material in the gap of moving parts	No dust evaluated.	N/A

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict
7.2	Dust deposits and other material in the flame arresters incorporated in the equipment	No flame arresters incorporated.	N/A
7.3	Opening times of enclosures	Component doesn’t require any opening time.	N/A
7.4	Non-metallic enclosures and non-metallic parts of the equipment		
7.4.1	General	Material of the drive transfer plate.	Pass
7.4.2	Specification of the materials	Drive transfer plate made from PEEK, (not accessible, not an external part).	Pass
7.4.3	Thermal endurance	Not applicable.	N/A
7.5	Removable parts	All the parts are fixed by means of fasteners and can’t be removed without key or tool.	Pass
7.6	Materials used for cementing	No cementing.	N/A
7.7	Light transmitting parts	No light transmitting parts.	N/A
7.8	Stored energy	Not designed to be de-energized when explosive atmosphere is detected.	N/A
8	Verification and tests		
8.1	General	The component complies with relevant requirements of this standard (EN ISO 80079-36:2016) and Protection standard (EN ISO 80079-37:2016). Instruments for measurement and regularly calibrated and considered not to have significant detrimental effect.	Pass
8.2	Determination of the maximum surface temperature		
8.2.1	General	Maximum surface temperature rise determined to ΔT=30K at the most unfavourable conditions during the rare malfunction.	Pass
8.2.2	Hot Surface Ignition Test		
8.2.2.1	General	Not applicable.	N/A
8.2.2.2	Procedure	Not applicable.	N/A
8.2.2.3	Acceptance criteria	Not applicable.	N/A

8.3	Mechanical tests		
8.3.1	Test for resistance to impact	Due to strong metallic casing impact force of 7J considered as not capable to cause any significant damage so test considered as not necessary. Component is not accessible for impact (by the intended place of mounting).	Pass
8.3.2	Drop test	Not a handheld or personal equipment.	N/A
8.3.3	Required results	See 8.3.1 (above)	N/A

8.4	Additional tests of non-metallic parts of the equipment relevant for explosion protection		
8.4.1	Test temperatures	Not applicable.	N/A
8.4.2	Tests for Group I equipment	Not applicable.	N/A
8.4.3	Tests for Group II and III equipment	Not applicable.	N/A
8.4.4	Thermal endurance to heat	Not applicable.	N/A
8.4.5	Thermal endurance to cold	Not applicable.	N/A
8.4.6	Resistance to chemical substances for Group I equipment	Not applicable.	N/A
8.4.7	Mechanical resistance tests	Not applicable.	N/A
8.4.8	Surface resistance test of non-conductive parts of the equipment relevant for explosion prevention and protection	PEEK material of the drive transfer plate is (strong insulator) non-conductive material (resistance >> than 1GΩ). In the contact with the conductive lubrication grease. Not accessible. Test considered as not necessary.	Pass
8.4.9	Thermal shock test	Not applicable.	N/A

9	Documentation

9.1	Technical documentation	The manufacturer's technical documentation gives a full and correct specification of the explosion safety aspects of the component as follows:	Pass
	-ignition hazard assessment report (signed from the manufacturers' side)	☒	
	-description of the component	☒	
	-design and manufacturing drawings	☒	
	-all descriptions and explanations necessary for the understanding of drawings	☒	
	-material certificates if necessary	☐	
	-test reports of tests described in Clause 8	☐	
	-documents specified in Clause 10	☒	

9.2	Conformity with the documentation	The tested units are in conformity with the documentation..	Pass

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict
9.3	Certificate	Manufacturer’s responsibility.	N/A
9.4	Responsibility for marking	Manufacturer’s responsibility.	N/A
10	Instructions	Accompanied Instructions for incorporation including the following particulars:	Pass
	a recapitulation of the information with which the component is marked, except for the serial number, together with any appropriate additional information to facilitate maintenance (e.g. address of the importer, repairer, etc);	☒	
	description of the intended use of the component	☒	
	a summary of the hazards identified and the preventive and/or protective measures used	☒	
	instructions for safe use:		
	i all parts of the instructions relevant for explosion protection including for example procedures to be carried out before start up and during lifetime use to ensure the safe use of the component	☒	
	ii putting into service	☒	
	iii use	☒	
	iv assembling and dismantling	☒	
	v maintenance (servicing and emergency repair)	☒	
	vi Installation	☒	
	vii adjustment	☒	
	viii where necessary training instructions	☐	
	ix details which allow a decision to be made as to whether the component can be used safely in the intended area under the expected operating conditions;	☒	
	x relevant parameters, maximum surface temperatures and other limit values	☒	
	Xi where applicable, Specific Conditions of Use including remaining hazards identified in the ignition hazard assessment report that require additional protective means by the installers or users;	☒	
	where applicable, any additional Schedule of limitations, including particulars of possible misuse, which experience has shown might occur	☒	
	where necessary, the essential characteristics of tools which may be fitted to the component;	☐	
	a list of the standards, including the issue date, with which the component is declared to comply. The certificate can be used to satisfy this requirement;	☒	
	a summary of the relevant ignition hazards identified and the protective means implemented	☒	
11	Marking		
11.1	Location	The component is legibly and indelibly marked on the top surface of the flange plate.	Pass
11.2	General	Marking includes:	Pass

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict

a)	name and the address of the manufacturer	☒	
b)	manufacturer's type identification	☒	
c)	symbol Ex	☒	
d)	letter “h”;	☒	
e)	symbol of the component Group I, II or III, including the subdivision according to 4.3 and 4.4. When the equipment is designed for use only in a particular gas, the chemical formula, or name of the gas in parentheses.		
	Group I mining		
	1 M ☐ 2 M ☐		
	Group II non-mining component		
	1 G ☒ 2 G ☒ 3 G ☐		
	IIA ☐ IIB ☐ IIC ☒		
	1 D ☐ 2 D ☐ 3 D ☐		
	IIIA ☐ IIIB ☐ IIIC ☐		
	Particular gas:		
f)	Group II component		
	T-class (not applicable for Ex Components)	☐	
	maximum surface temperature	☐	
	component designed and marked for use in a particular gas (no temperature reference)	☐	
	maximum surface temperature depends not on the component itself, but mainly on operating conditions - TX	☐	
g)	Group III (not applicable for Ex Components)		
	the maximum surface temperature in degrees Celsius and the unit of measurement °C preceded with the letter “T”	☐	
h)	EPL		
	Ma ☐ Mb ☐		
	Ga ☒ Gb ☐ Gc ☐		
	Da ☐ Db ☐ Dc ☐		
i)	Ambient temperature marking		
	normal (from - 20°C to +40°C)	☒	
	special – specified in the Ex marking code	☐	
	special – marked with the symbol “X”	☐	
j)	serial number (not required for components, but provided)	☒	

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict

k)	the name or mark of the certificate issuer and the certificate reference in the following form: the last two figures of the year of the certificate followed by a "." followed by a unique four character reference for the certificate in that year;	DNV 25 ATEX 53844U	☒	
l)	Schedules of limitations "U"		☒	
m)	any additional marking prescribed in the specific standards for the Types of Protection concerned, as listed in Clause 1;		☐	
n)	the markings c) to h) shall be placed on the same line in the order in which they are given in c) to h) and shall each be separated by a small space.		☒	
	Ex marking code: Ex h IIC Gb			

11.3	Warning markings	Acc. to 6.7.5 and 7.3		Pass
	WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS		☐	
	WARNING – AFTER DE-ENERGIZING, DELAY *Y* MINUTES BEFORE OPENING (*Y* being the value in minutes of the delay required)		☐	
	WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT		☐	

11.4	Marking on very small equipment	Not applicable.	N/A

11.5	Examples of marking	---	N/A

Annex A (informative)	Methodology for confirming the EPL

Annex B (informative)	Explanation of the ignition hazard assessment procedure

Annex C (informative)	Examples of ignition hazard assessment

Annex D (normative)	Charging tests with non-conductive materials		
D.1	General	Not applicable.	N/A
D.2	Principle of the test	Not applicable.	N/A
D.3	Samples and apparatus	Not applicable.	N/A
D.4	Procedure		
D.4.1	Conditioning	Not applicable.	N/A
D.4.2	Determination of the most efficient charging method		
D.4.2.1	Rubbing with a pure polyamide cloth (see Figure D.1)	Not applicable.	N/A
D.4.2.2	Rubbing with a cotton cloth	Not applicable.	N/A

ISO 80079-36			
Clause	Requirement – Test	Result – Remark	Verdict
D.4.2.3	Charging with a DC high voltage power supply (Figure D.3)	Not applicable.	N/A
D.4.2.4	Assessment of discharge	Not applicable.	N/A

Annex E (informative)	Consideration of misuse which can reasonably be anticipated during ignition hazard assessment procedure

Annex F (informative)	Development of different types of incendive electrostatic discharges

Annex G (normative)	Protection concepts of types of protection "d", "p" and "t" acceptable for non-electrical equipment	Not applicable.	N/A

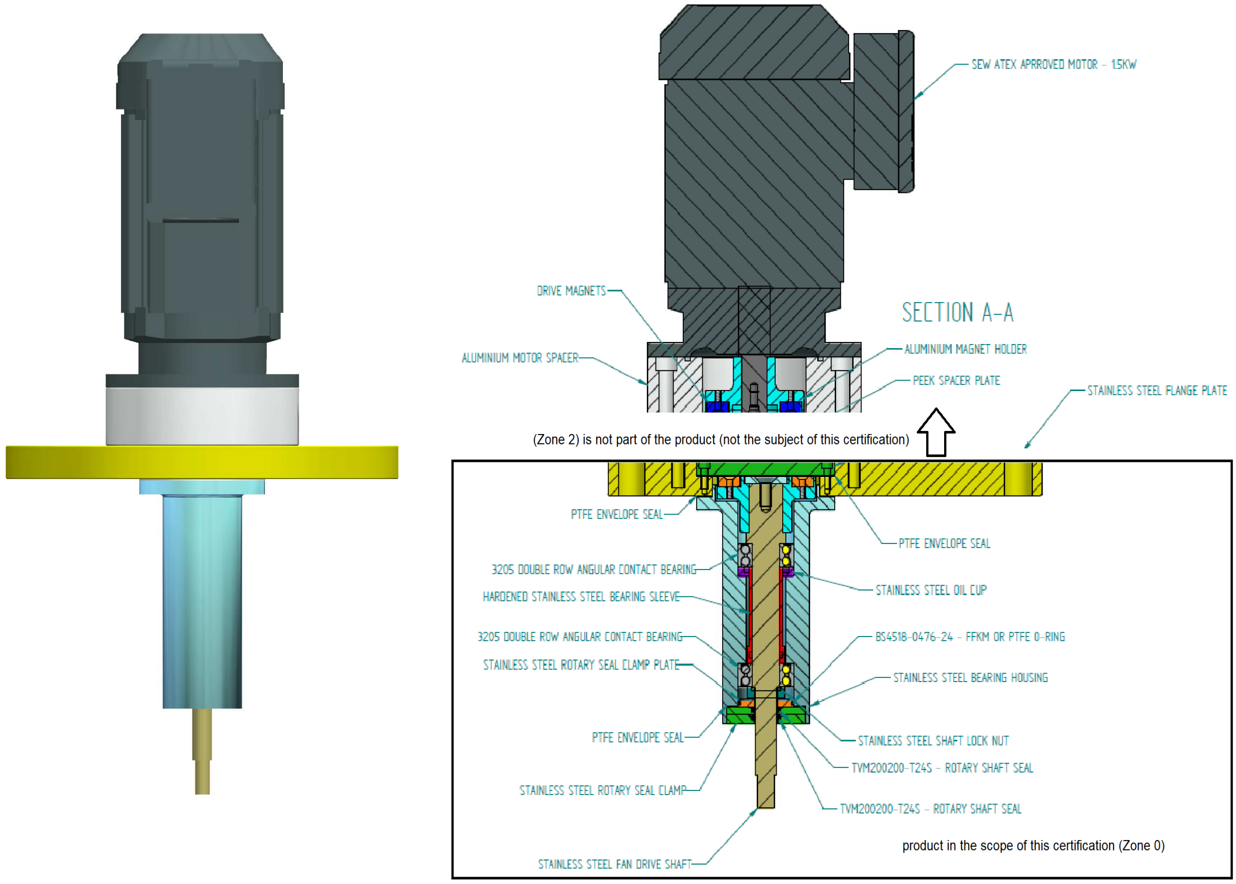
Annex H (informative)	Volume dependence of auto-ignition temperature

Annex I (informative)	Relationship between Equipment protection levels (EPLs) and zones

1. Description of the equipment and intended use.

The MAGDRIVE is magnetic coupling intended for use in Zone 0.
The MAGDRIVE has been developed as a drop in replacement to an obsolete fan drive system being used in sterilization chambers.
The chamber is a long tunnel sealed at one end and a heavy door at other. Pallets of components are wheeled into the chamber and then the door is sealed.
Ethylene Oxide is pumped into the chamber and pressurized to 50mbar.
The chamber has 2 air circulation fans (one at each end). The new drive assemblies are replacing older units that have plain carbon bushings and are no longer available.
Referring to the attached assembly Drawing 41005-900

An ATEX certified motor (rated 1.5kW) is mounted onto a Stainless Steel flange Plate via an aluminum spacer ring. On the motor shaft we have a drive coupling that has a series of North / South polarity magnets embedded i it's face. The flange plate will be bolted to the outside of the chamber with the motor side within a zone 2 (not within the scope of this certification) whilst the drive shaft is located within the zone 0.



Picture 1. MAGRDIVE magnetic coupling

The flange plate will have an inset PEEK plastic plate with a Klinger Top-Chem 2003 gasket seal under.
An Aluminum flanged bearing housing will be bolted to the underside of the main flange plate and will be sealed by a Klinger Top-Chem 2003 gasket as with the PEEK blanking plate above.
A drive shaft will have a pulley mounting to it with a series of North /South polarity magnets embedded around it's face.
These magnets will interact with the motor pulley magnets mounted outside the flange plate and create a magnetic lock between the 2 pulleys.
In the event of a bearing failure or any other high resistance the magnetic lock between the motor pulley and drive pulley will be broken and the drive shaft will stop rotating.
The bearing housing will have upper and lower Deep Groove Ball Bearing with rotating lubricant flinger / reservoirs underneath to throw any lost lubricant back into the bearings.
A bearing spacer sleeve incorporating the upper flinger will space the bearing inner races that will in turn be locked in place by a nut, incorporating a second flinger under the lower bearing.
The lock nut will also clamp the assembly axially to the top bearing location face of the shaft.
Both bearings will be a close sliding fit on the shaft and in the housing. The inner rings being locked axially as described above and the outer rings being controlled by the axial force applied by of a wave spring. This pulls the top bearing outer ring against the top bearing face of the housing by applying a force to the top of the lower bearing outer face to securely locate the bearings and apply the minimum load required for the bearings to roll correctly without reducing bearing and grease life due to skidding of rolling elements.
Both bearings will be packed with "Nyogel" 758g electrically conductive grease, to dissipate static through the bearings.
There is a sealing plate arrangement at the bottom of the bearing housing that consists of primary and secondary "Turcon Roto Variseal" rotary seals (manufactured from Trelleborg M1 electrically conductive material). These seals are sandwiched between stainless steel plates together with a Klinger Top-Chem 2003 gasket seal and secondary 'O' ring manufactured from FFKM.

The fan drive shaft will have a keyed fan boss location diameter with a threaded bottom end to locate and secure the aluminum fan wheel as per the original unit with a self-locking nut.

Routine tests
N/A

2. Ignition Hazard Assessment Report

See Appendix 4.

3. Temperature measurement

Standards clause	ISO 80079-36, Clause 8.2.1 Annex B.1 EN IEC 60079-0:2018, Clause 26.5.1.
Date	2025-09-04 to 2024-09-10
Samples	1 and 2
Equipment	No
Data logger	P0043 (cal. till 2026-05)
IR thermometer	P0050 (cal. till 2025-11-28)
Scale	P0055 (cal. till 2026-07-31)

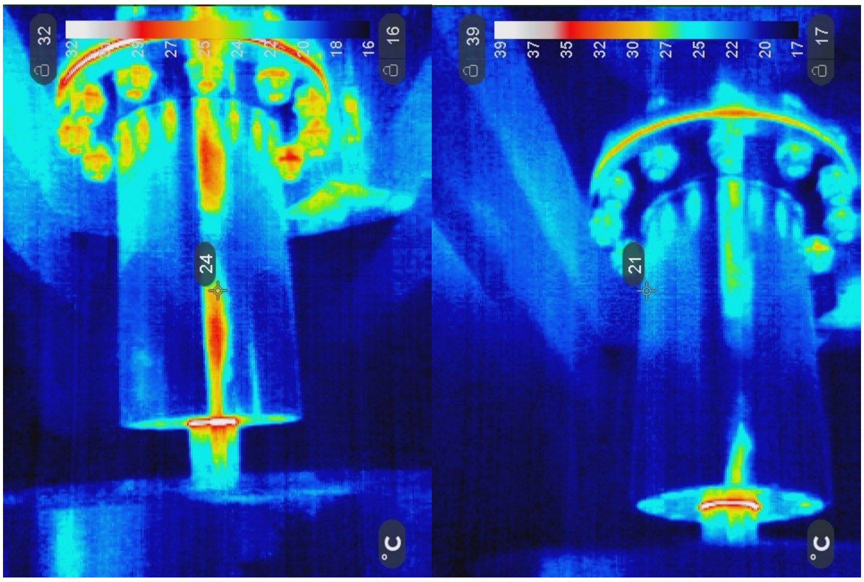
Test conditions:

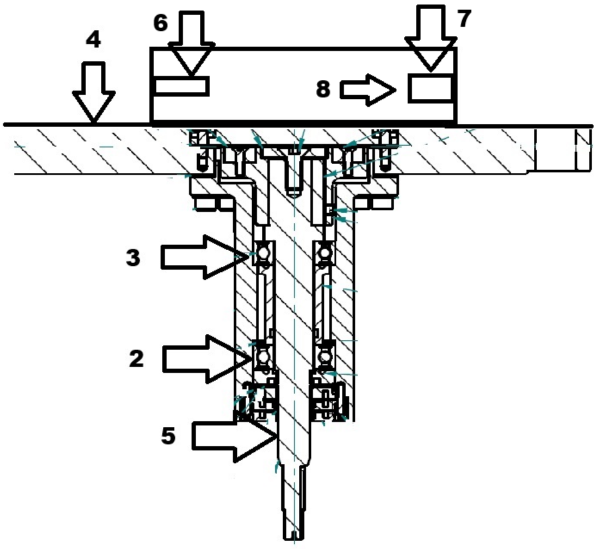
Maximum rotational speed of the axle (1461 RPM) provided by el. motor SEW (1.5 kW, 3 phase 400VAC 50 Hz). Axle loaded with maximum load simulated by mounted fan impeller dimensions (weight 0.66 kg) which is intended for this coupling.

Measurement points of the temperature on the fixed parts are as near as possible to the place where the seal makes contact with the moving parts.

Test arrangement and points of measure are shown below.

Hottest point were determined by digital thermal imaging.





Picture 2. Test arrangement

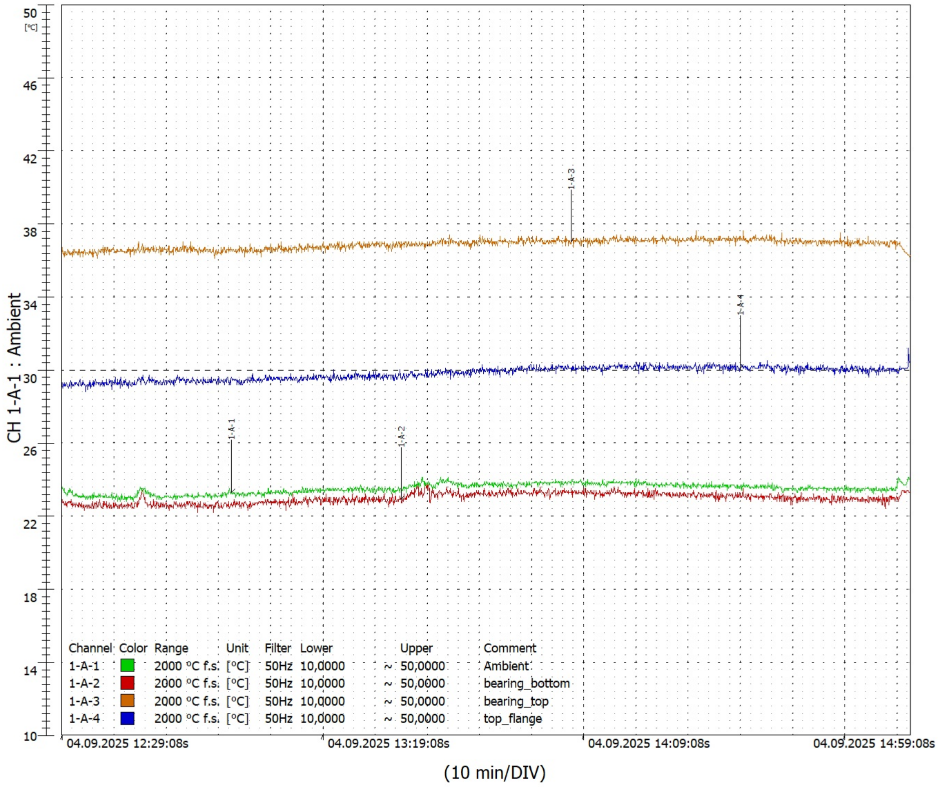
Test result:

Maximum surface temperature rise was measured to +ΔT=30K on the axle bearing at the malfunction w/o (dry run). No protective measures (IPS system) required. Ex component is fail-safe regarding the hot surfaces. Test performed on normal ambient temperature +22°C.

3.1 Determination of maximum surface temperature at normal operation.

Testing at normal use includes unlimited duty at the maximum speed with the (intended) fan impeller attached. Test was running till the stable temperatures were developed.

Ch	Point of measure and method for attachment of thermocouple.	Temperature [°C]			
		Start	End	Temp rise measured K	Comment
1	Ambient	22	23	-	-
2	axle bearing bottom	22	24	2K	-40° to +150°C lubrication temp range.
3	axle bearing top	22	37	15K	-40° to +150°C lubrication temp range
4	Top flange	22	30	8K	-
5	Axle (bottom)	22	27	5K	-100°C to +260°C rotational seal temp range



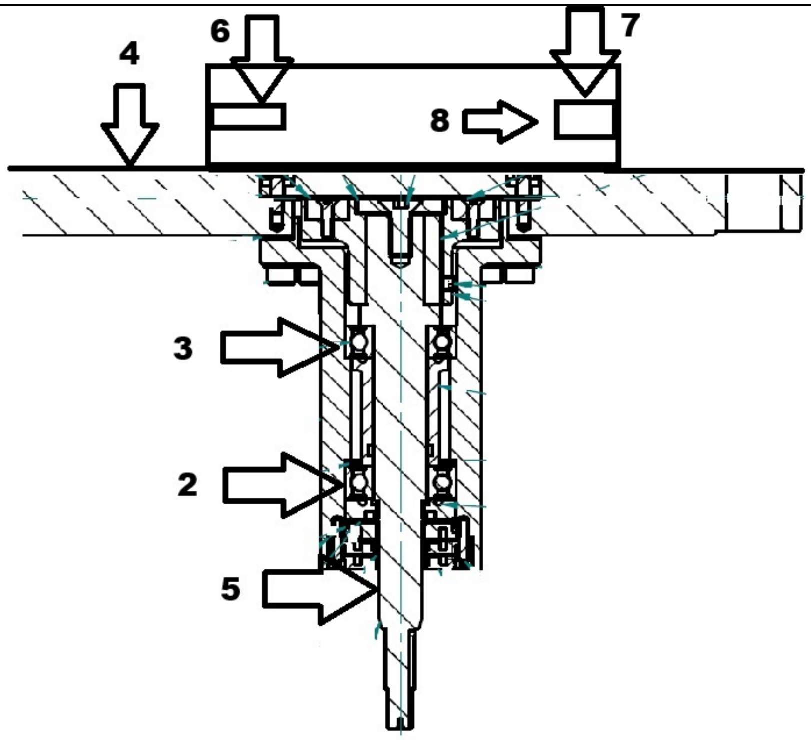
Graph 1. Normal operation

3.2 Determination of maximum surface temperature at rare malfunction (dry run)

.2 Testing at rare malfunction (dry run)

Testing at continuous operation (dry run) is simulated by especially prepared test object by the Manufacturer (w/o lubrication applied). Lubricant is removed before the test without cleaning. The subject the sealing arrangement to a "dry run" type test with the moving part operating at its maximum normal operating speed.

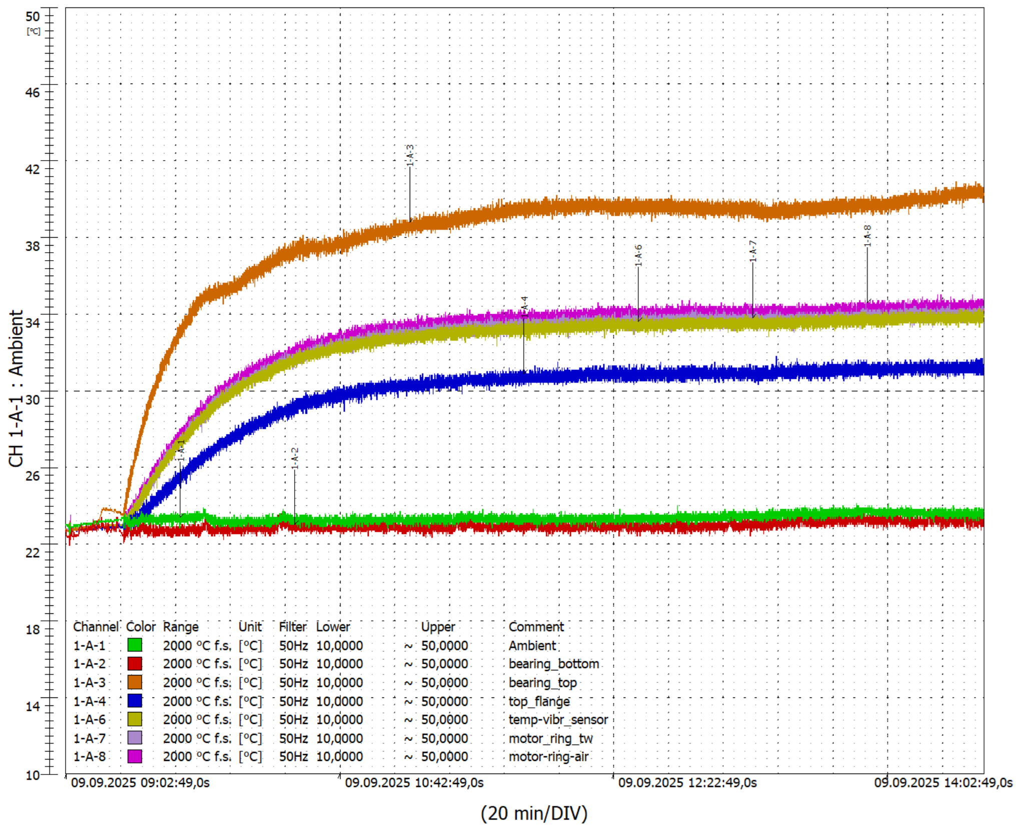
The maximum time for dry running cannot be assessed, the maximum surface temperature requirements of ISO 80079-36 apply under dry run conditions (until final temperature is reached).



Picture 2. Test arrangement

Testing with the fan attached.

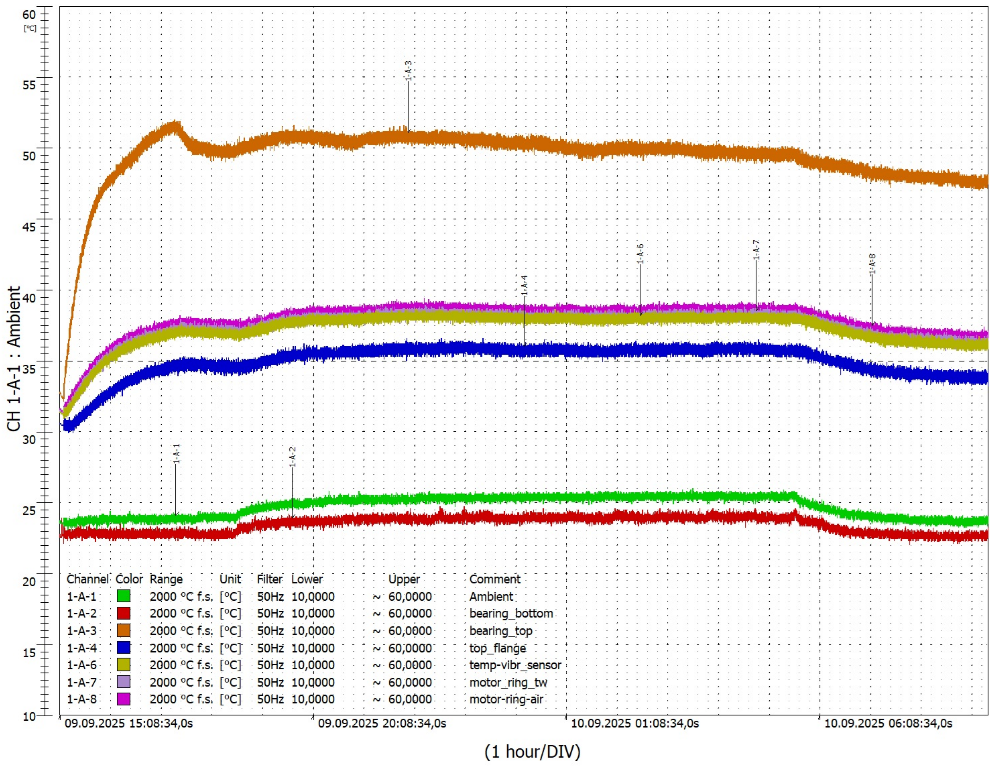
Ch	Point of measure and method for attachment of thermocouple.	Temperature [°C]			
		Start	End	Temp rise measured K	Comment
1	Ambient	23	-		-
2	axle bearing bottom	23	23		-40° to +150°C lubrication temp range.
3	axle bearing top	23	40	17	-40° to +150°C lubrication temp range
4	Top flange (sensor port)	23	31		-
5	Axle (bottom)	23	29		-100°C to +260°C rotational seal temp range
6	Motor mounting ring - contact point at vibration and temp sensor (outside of Zone 0)	23	34	11	
7	Motor mounting ring - contact point thermowell (outside of Zone 0)	23	34	11	
8	Air inside motor mounting ring (for thermowell) (outside of Zone 0)	23	34	11	



Graph 2. Dry run operation with fan impeller mounted

Testing w/o the fan impeller attached.

Ch	Point of measure and method for attachment of thermocouple.	Temperature [°C]			
		Start	End	Temp rise measured K	Comment
1	Ambient	22	22	-	-
2	axle bearing bottom	22	22	-	-40° to +150°C lubrication temp range.
3	axle bearing top	22	52	30	-40° to +150°C lubrication temp range
4	Top flange (sensor port)	22	36	14	-
5	Axle (bottom)	22	30	8	-100°C to +260°C rotational seal temp range
6	Motor mounting ring - contact point at vibration and temp sensor (outside of Zone 0)	22	38	16	
7	Motor mounting ring - contact point thermowell (outside of Zone 0)	22	38	16	
8	Air inside motor mounting ring (for thermowell) (outside of Zone 0)	22	38	16	



Graph 3. Dry run operation without fan impeller

ISO 80079-37			
Clause	Requirement – Test	Result – Remark	Verdict
1	Scope		
2	Normative references		
3	Terms and definitions		
4	Determination of suitability	See ignition source analysis presented in Appendix 4 of this report.	Pass
5	Requirements for equipment with Type of Protection constructional safety "c"		
5.1	General requirements	Equipment designed and constructed according to the applicable safety requirements and good engineering practice and relevant industrial standard ISO 281	Pass
5.2	Ingress protection		
5.2.1	General	Ex protection doesn't rely on ingress protection.	N/A
5.2.2	Ingress protection in special cases	Not applicable.	N/A
5.3	Seals for moving parts		
5.3.1	Unlubricated gaskets, seals, sleeves, bellows and diaphragms	Double lip-seals of the coupling evaluated as potential ignition source. Roto Variseal®: Turcon® T40 Rotating speed: up to 2 m/s Operating temperature range: -100°C to +260°C Dry run temperature determined Ex protection doesn't depend on seals.	Pass
5.3.2	Stuffing box seals (packed glands)	See 5.3.1 above.	Pass
5.3.3	Lubricated seals	Design of the equipment completed the 'dry run' type test, as described in Annex B, w/o significant temperature rise which can compromise the service temperature of the bearing lubrication and seals or reduce the effectiveness of its ignition protection.	Pass
5.4	Equipment lubricants, coolants and fluids	Lubrication grease used inside bearing housing: NYOGEL 758G A stiff, lithium soap thickened, light viscosity, synthetic ester grease intended for demanding bearing applications. Specially developed for electrical conductivity. Recommended service temperature range: -40°C to +150°C Flash point temperature: +257°C	Pass

ISO 80079-37			
Clause	Requirement – Test	Result – Remark	Verdict

5.5	Vibration	The manufacturer specified the vibrations level as base for critical values determination. An IPS system is required (see 8.2 below). See Comment 2 at the end of this report.	Pass

5.6	Requirements for moving parts		
5.6.1	General	The ignition hazard assessment identified all moving parts which could lead to the occurrence of unsafe vibration, impact or friction.	Pass
5.6.2	Clearance	Clearances between moving parts and fixed parts are designed and specified in descriptive documentation. Likelihood of undesired frictional contact, able to produce an effective ignition source in the form of hot surfaces or mechanically generated sparks, is considered as rare fail (appropriate to the intended EPL: Ga	Pass
5.6.3	Lubrication	Bearing house is an grease reservoir. Lubricated for service life, maintenance free.	Pass

5.7	Requirements for bearings			
5.7.1	General		Stainless steel single row deep groove ball bearings 6205 (from SKF) provide greater chemical and corrosion resistance. As with deep groove ball bearings generally, they are particularly versatile, have low friction and are optimized for low noise and low vibration, which enables high rotational speeds. They accommodate radial and axial loads in both directions, are easy to mount, and require less maintenance than many other bearing types. • Greater chemical and corrosion resistance • Simple, versatile and robust design • Low friction and high-speed capability • Accommodate radial and axial loads in both directions • Require little maintenance The ignition hazard assessment took into account the conditions a-m) and found applicable as follows: See Comment 1 at the end of this report.	Pass
	a)	the bearing’s suitability for the equipment’s intended duty e.g. speed, temperature, loading and variations of speed and loading: 1460 1/min, -40°C to +150°C		☒
	b)	the bearing’s basic rated life as described in ISO 281 for rolling element bearings (see also Note 1);		☒
	c)	the proper fit of the bearings in their housing and on the shaft (tolerances, roundness and surface quality), taking into consideration the vertical and axial loads on the bearing with respect to shaft and housing;		☒
	d)	the correct alignment of the bearings		☒

ISO 80079-37			
Clause	Requirement – Test	Result – Remark	Verdict

	e)	the axial and radial loading of the bearings caused by thermal expansion of the shaft and the housing under the most severe operating conditions	☒
	f)	protection of the bearing from ingress of water and solids, if necessary to avoid premature failure	☐
	g)	protection of the bearing from electrical currents, including stray circulating currents (which can cause, for example, incentive sparking, or spark erosion leading to premature failure, at the point of contact between the ball and ball race of a ball bearing);	☐
	h)	the provision of adequate lubrication, according to the lubricating regime necessary for the type of bearing (e.g. for sliding bearings, boundary lubrication, mixed film, or full film hydrodynamic lubrication are the most commonly used regimes	☐
	i)	maintenance checks at recommended intervals (e.g. vibration, temperature)	☒
	j)	replacement after unacceptable wear or at the end of its recommended life, whichever comes first	☒
	k)	protection of the bearing from vibration, especially at standstill	☐
	l)	the use of low reliability non-metallic bearing cages in industrial applications	☐
	m)	Where a special initial running in period is necessary that could lead to an effective ignition source, information shall be given in the instructions	☐

5.7.2	Lubrication	The bearing housing is sealed for life. Schedule of limitations -“U” Bearings, Grease, Seals and wave spring should be replaced after 5500 h running or after two years, whichever occurs first. According to specification in 5.7.1 dry run considered as both expected and rare malfunction. No significant temperature rise determined during the dry run (Ex component is fail-safe regarding the loss of the lubrication).	Pass
	Bearings depend on the presence of a lubricating medium whose presence is ensured by:		

	a)	bearings that are sealed for life	☒
	b)	an oil splash lubricator	☐
	c)	an automatic greasing system	☐
	d)	manual system of monitoring the oil level together with suitable instructions about regular servicing and the recommended frequency of inspection	☐
	e)	Equipment is designed to process liquids and the presence of the process liquid is essential for the purpose of lubrication, cooling, quenching, or ignition protection, or when the safe operation of the equipment (e.g. of a pump) requires special priming considerations, this shall be stated in the instructions	☐

5.7.3	Chemical compatibility	Lubrication grease is appropriate for metallic surfaces and non-metallic seals.	Pass

5.8	Requirements for power transmission systems		
5.8.1	Gear drives	Not applicable.	N/A
5.8.2	Belt drives		
5.8.2.1	Belt drive categories	Not applicable.	N/A
5.8.2.2	Electrostatic charging	Not applicable.	N/A
5.8.2.3	Belt tension	Not applicable.	N/A
5.8.2.4	Belt alignment	Not applicable.	N/A

ISO 80079-37			
Clause	Requirement – Test	Result – Remark	Verdict
5.8.2.5	Earthing and bonding	Not applicable.	N/A
5.8.2.6	Detection of mechanical faults	Not applicable.	N/A
5.8.3	Chain drives	Not applicable.	N/A
5.8.4	Other drives	See 5.1 above.	Pass
5.8.5	Hydrostatic, hydrokinetic and pneumatic equipment		
5.8.5.1	Hot surfaces	Not applicable.	N/A
5.8.5.2	Hydrostatic and hydrokinetic equipment	Not applicable.	N/A
5.8.5.3	Pneumatic equipment	Not applicable.	N/A
5.9	Requirements for clutches and variable speed couplings		
5.9.1	General	Not applicable.	N/A
5.9.2	Slipping	Not applicable.	N/A
5.9.3	Friction	Not applicable.	N/A
5.10	Flexible couplings	Not applicable.	N/A
5.11	Requirements for brakes and braking systems		
5.11.1	Brakes used only for stopping in emergency	Not applicable.	N/A
5.11.2	Service brakes (including friction brakes and fluid based retarders)	Not applicable.	N/A
5.11.3	Parking brakes	Not applicable.	N/A
5.12	Requirements for springs and absorbing elements	Not applicable.	N/A
5.13	Requirements for conveyor belts		
5.13.1	Electrostatic requirements	Not applicable.	N/A
5.13.2	Materials	Not applicable.	N/A
5.13.3	Belt tension	Not applicable.	N/A
5.13.4	Alignment	Not applicable.	N/A
5.13.5	Earthing and bonding	Not applicable.	N/A
6	Requirements for equipment with Type of Protection control of ignition source “b”	“U”-Schedules of limitations Ignition prevention system (IPS) type b1 shall be applied to prevent the unsatisfactory vibration level (normal value: <2.5 mm/s, critical value: 7 mm/s). Clauses 6.1, 6.3, 6.4, 6.5.1 and 8.2.2 of EN ISO 80079-37:2016 must be evaluated.	Pass

7	Requirements for equipment with Type of Protection liquid immersion “k”	Not applicable.	N/A
8	Type tests		
8.1	Type tests for equipment with Type of Protection constructional safety “c”	Surface temperature – dry run. See 80079-36 report.	Pass
8.2	Type tests for equipment with Type of Protection control of ignition source “b”	“U”-Schedules of limitations Ignition prevention system (IPS) type b1 shall be applied to prevent the unsatisfactory vibration level (normal value: <2.5 mm/s, critical value: 7 mm/s). Clauses 6.1, 6.3, 6.4, 6.5.1, 8.2.2 and 9.2 of EN ISO 80079-37:2016 must be evaluated.	Pass
8.3	Type tests for equipment with Type of Protection liquid immersion “k”	Not applicable.	N/A
9	Documentation		
9.1	Documentation for equipment with Type of Protection constructional safety “c”	Technical documentation includes the following information as applicable:	Pass

a)	details of the maximum and minimum level of the protective liquid, or if more appropriate, the maximum and minimum pressure and flow rate of protective liquid	☐
b)	details of the maximum normal working pressure Specified under “rating” of equipment in Manufacturer’s instructions	☐
c)	details of the maximum allowable working angle to the horizontal of the equipment Only one position (vertical) working angle	☒
d)	details of the type of the liquid to be used, or its minimum viscosity specified in Manufacturer’s instructions	☒
e)	if necessary, any specific mounting instruction for the equipment specified in Manufacturer’s instructions	☒
f)	instructions relating to maintenance, recommended duty life, replacement, replenishment and disposal of the protective liquid	☒
g)	where applicable instructions regarding the periodic internal cleaning to remove deposits that could self-heat. Hydraulic oil filter control and maintenance procedures specified in Manufacturer’s instructions.	☐

ISO 80079-37			
Clause	Requirement – Test	Result – Remark	Verdict

	h) Instructions about the commissioning, initial filling, and putting into service of the equipment specified in Manufacturer's instructions		☐

9.2	Documentation for equipment with Type of Protection control of ignition sources "b"	See 6 above.	Pass

9.3	Documentation for equipment with Type of Protection liquid immersion "k"	Not applicable.	N/A

10	Marking		

10.1	General	No additional requirements. See part 80079-36.	Pass

10.2	Safety devices	Not applicable.	N/A

Annex A (informative)	Approach and application: equipment with Type of Protection "c"		

Annex B (normative)	Test requirements		
B.1	"Dry run" type test for lubricated sealing arrangements	"Dry run" type test determined the max. temperature rise w/o lubrication. See 80097-36 report.	Pass
B.2	Type test for determining the maximum engaging time of clutch assembly		
B.2.1	Apparatus		
B.2.1.1	Clutch assembly	Not applicable.	N/A
B.2.1.2	Temperature sensor	Not applicable.	N/A
B.2.1.3	Drive motor	Not applicable.	N/A
B.2.1.4	Locking mechanism	Not applicable.	N/A
B.2.1.5	Recording devices	Not applicable.	N/A
B.2.1.6	Conditioning chamber	Not applicable.	N/A
B.2.2	Procedure		
B.2.2.1	Sample preparation	Not applicable.	N/A
B.2.2.2	Timing	Not applicable.	N/A
B.2.2.3	Temperature recording	Not applicable.	N/A
B.2.2.4	Results	Not applicable.	N/A
B.2.2.5	Reporting	Not applicable.	N/A

Annex C (informative)	Methodology: equipment with Type of Protection “b”

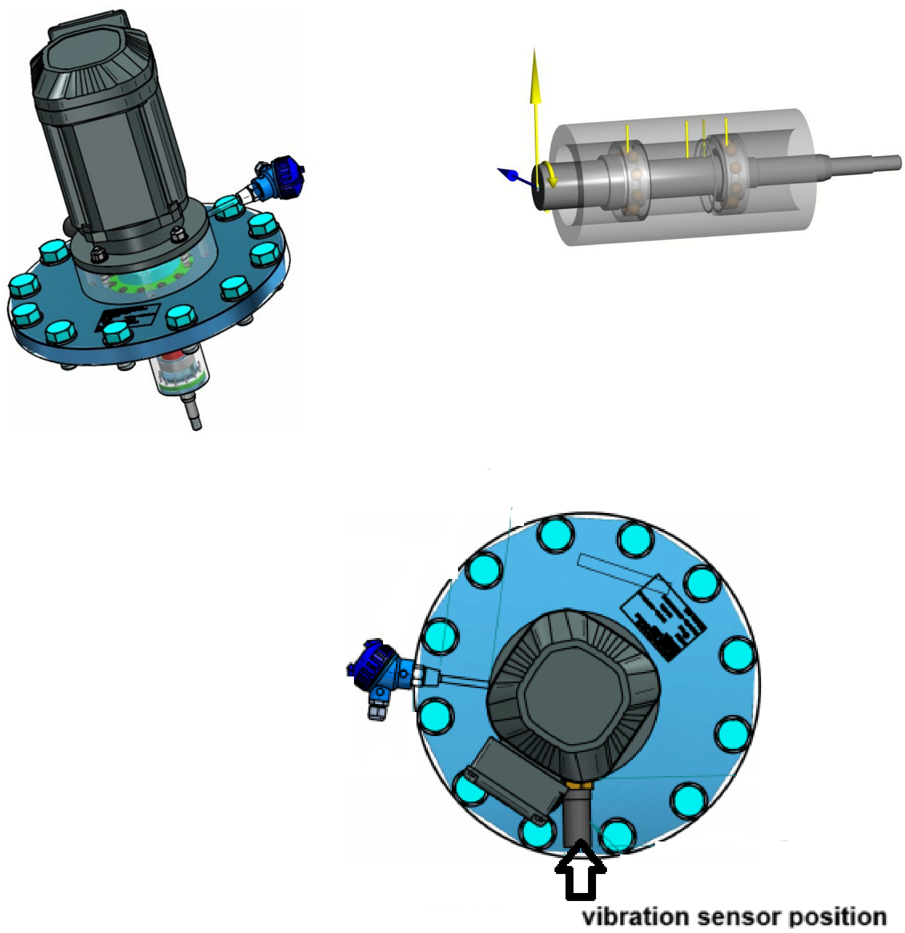
Annex D (informative)	Approach to assign the required ignition protection type used for equipment to achieve different EPL

Annex E (informative)	Information on functional safety concept

1. Fan Bearing Housing

Axle, two bearings and appropriate amount of grease are located in the bearing housing which is sealed for life (see picture 1 below).

Axial Load is Mass of moving parts plus force applied by spring on 6205-2 loose fit outer ring. Radial load is that created by axial displacement of bearings due to axial load. As there is very little load applied, the limiting factor is that minimum load required to prevent bearing skid is met.

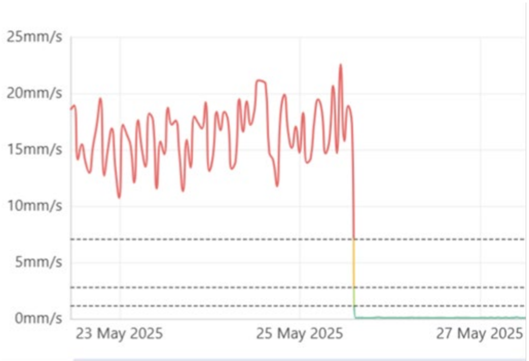


Picture 1. Coupling and bearing housing.

2. Bearing Vibration levels

The component shall be equipped with appropriate vibration sensor mounted on the position shown on the picture 1. above. Sensor and IPS function evaluation is not in the scope of this certification. Vibration criteria below specifies the magnitude of change before the IPS shall be activated. The red trace shown appears to be an example of what we would expect from a failed unit. The velocity list (see table below) shows the value levels (based on picture 2 below)

Velocity:	Value mm/s	Verdict	Comment
	0-1mm/s	Good	
	2-2.5mm/s	Satisfactory	< 2.5 is normal value
	2.5-7mm/s	Unsatisfactory	7 is critical value
	>7mm/s	Unacceptable	fail



Picture 2. Vibration levels criteria

For example, an accurate determination can usually be made by inserting a thermocouple into a small hole drilled at an angle near the seal so that it extends underneath the sealing element. Towards the end of the test several temperature readings may need to be taken to ensure that a final 'steady state' temperature has been attained. Note the temperature readings together with the ambient temperature and the speed of moving part during the test.

Appendix 4

Ignition hazardous assessment (IHA)

DNV

Manufacturer: Specialist Tooling Technologies Ltd

Location: Zone 0

Type of equipment: MAGDRIVE magnetic coupling

Instruction: Sequence of protection measures: 1 prevent ignition / 2 separate ignition source from hazardous area / 3 screen hazardous area

Starting date: 05.04.2024

Location: Høvik, NO

Assessment team members:

George Hutsby	Specialist Tooling Technologies LT Director	
Nenad Stanivukovic	DNV Product Assurance AS	Senior Engineer

	1: Ignition hazard analysis		2: Assessment of the frequency of occurence without application of an additional measure					3: Measures applied to prevent the ignition source becoming effective			3b: Second protection measure applied to prevent ignition (req. by foreseeable malfunctions)			4: Assessment of the frequency incl. protection measures					
Ignition source #	Potential ignition source	Description of basic couse *(Which conditions originate which ignition hazard?)*	Normal operation	Foreseeable malfunctions	Rare malfunctions	Not relevant	Reasons for assessment	Protective measure	Basis *(citation of standards, technical rules, experimental results)*	Technical documentation *(evidence including relevant features listed in column 1)*	Second protection measure *(required by foreseeable malfunctions)*	Basis	Technical documentation (evidence)	Normal operation	Foreseeable malfunctions	Rare malfunctions	Not relevant	Resulting equipment category	Necessary restriction (Temperature class, gas group)
1	Hot surface	hot surface of a ball bearing	x				moderate heating caused by friction between lubricated moving and static parts	The bearing is calculated according to ISO 281 for a specified lifetime A malfunction is generally agreed as a rare incident under these conditions. Frictional heat of W 6205 SS deep groove ball bearings. Dry run is prevented by regular maintenance intervals and use of two independent rotary shaft seals. Instruction for installation and maintenance must be followed. Maximum temperature (rise) determined at the constant speed of 1461 RPM to (15) K by type testing Maximum allowed axial and radial load must not be exceeded. (7N in axial direction at the stand still). LUBRICANT grease NYOGEL 758G A stiff, lithium soap thickened, light viscosity, synthetic ester grease intended for demanding bearing applications. Specially developed for electrical conductivity suitable for service temp range (°C) -40 to 150	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7	Dwg. 41005-900 rev F bearings technical specificaton records of type test lubricant datasheet Instructions for installation	no						x	1G	Schedule of limitation "U" Maximum allowed axial and radial load of the bearings must not be exceeded. "U" Component must be mounted in vertical position with the shaft on the bottom.
2	Hot surface	hot surface of a ball bearing due to loss of lubrication		x			excessve heating caused by friction between moving and static parts w/o proper lubrication	Frictional heat of W 6205 SS deep groove ball bearings. Dry run is prevented by regular maintenance intervals and use of two independent rotary shaft seals. Instruction for installation and maintenance must be followed.	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7	Dwg. 41005-900 rev F bearings technical specificaton records of type test lubricant datasheet Instructions for installation	no						x	1G	Schedule of limitation "U" Maximum allowed axial and radial load of the bearings must not be exceeded.
3	Hot surface	hot surface of a ball bearing due to loss of lubrication			x		excessve heating caused by friction between moving and static parts w/o proper lubrication	The bearing is calculated according to ISO 281 for a specified lifetime A malfunction is generally agreed as a rare incident under these conditions. Dry run tested with and w/o impeller attached. Maximum temperature (rise) determined at the constant speed of 1461 RPM to 30K by type testing Maximum allowed axial and radial load must not be exceeded. (7N in axial direction to the shaft at the stand still). Component must be mounted in vertical position.	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7	Dwg. 41005-900 rev F bearings technical specificaton records of type test	no						x	1G	Schedule of limitation "U" Instruction for installation and maintenance must be followed.
4	Hot surface	grinding inside the bearing house	x	x			grinding can cause excesive heating	design according to the state of the art, tolerances specified in the dwg.	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7	Dwg. 41005-900 rev F bearings technical specificaton lubricant datasheet)	no						x	1G	
5	Hot surface	breakdown of the W6205 bearings			x		A breakdown of the bearing shall be considered as a rare malfunction (for category 1 equipment)	The malfunction of the bearing will cause the revolving of the shaft to stop either due to rupture of the magnetic coupling or by: "U" - Ignition prevention system (IPS) type b1 shall be applied to prevent this state through vibration sensor.	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7 EN-ISO 80079-37:2017, Clause 6.2, 8.2.1	Dwg. 41005-900 rev F bearings technical specificaton lubricant datasheet	no						x	1G	"U" - Ignition prevention system (IPS) type b1 shall be applied to prevent the unsatisfactory vibration level (>2.5 mm/s)
6	Hot surface	Frictional heat of ball bearings caused by excess load			x		excessve load as result of miscalculation of the impeller vs. Max. allowed load of the bearings (human factor)	"U" - Ignition prevention system (IPS) type b1 shall be applied to prevent this stater through appropriate vibration sensor.	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7 EN-ISO 80079-37:2017, Clause 6.2, 8.2.1	Dwg. 41005-900 rev F bearings technical specificaton lubricant datasheet	no						x		"U" - Ignition prevention system (IPS) type b1 shall be applied to prevent the unsatisfactory vibration level (>2.5 mm/s)
7	Hot surface	friction between the shaft and radial sealing	x				frictional heating in normal operation	A single-acting sealing element comprised of a U-shaped Turcon® ring and metallic energizing finger spring. It offers low friction with no stick-slip, minimized breakout force and high wear resistance. Its constrained flange eliminates potential seal rotation and it is resistant to most liquids and chemicals. Unlimited shelf life. No significant temperature rise determined (5K).		Dwg. 41005-900 rev F records of type test lubricant and lipseal datasheet datasheet (Turcon® Roto Variseal Instructions for installationdatasheet (Turcon® Roto Variseal®)	no						x	1G	
8	Hot surface	friction between the shaft (14) and radial sealing (28)		x			the seal may run dry or a failure of mounting may occur	No significant temperature rise determined (8K) as the result of the temperature measuremend under conditions specified in 2.(above)	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7 EN-ISO 80079-37:2017, Clause 6.2, 8.2.1	Dwg. 41005-900 rev F records of type test lipseal datasheet (Turcon® Roto Variseal Instructions for installation	no						x	1G	
9	Hot surface	friction between the shaft (14) and radial sealing (28)			x		a seizure of the seal can not be excluded	Ignition prevention system (IPS) type b1 shall be applied to prevent this state in the early phase by the monitoring magnitude of the vibration.	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7 EN-ISO 80079-37:2017, Clause 6.2, 8.2.1	Dwg. 41005-900 rev F records of type test lubricant and lipseal datasheet datasheet (Turcon® Roto Variseal Instructions for installation	no						x	1G	"U" - Ignition prevention system (IPS) type b1 shall be applied to prevent the unsatisfactory vibration level (>2.5 mm/s)
10	Mechanically generated sparks	breakdown of the bearing (29) (zone 0);			x		A breakdown of the bearing shall be considered as a rare malfunction (for category 1 equipment),	The malfunction of the bearing will cause the revolving of the shaft to stop due to rupture of the magnetic coupling. the impact velocity greater than 1 m/s and the maximum potential Lubricants and coolant required for the protection against incendive hot surfaces or mechanically generated sparks have an auto-ignition temperature at least 50 K above the maximum allowed temperature the liquid is being used 758G flash point +257C "U" -Ignition prevention system (IPS) type b1 shall be applied to prevent this state in the early phase by the monitoring magnitude of the vibration.	EN 1127-1:2011, Clause 5.1 EN-ISO 80079-36:2016 Clause 6.2 EN-ISO 80079-36:2017, Clause 5.7 EN-ISO 80079-37:2017, Clause 6.2, 8.2.1	Dwg. 41005-900 rev F bearings technical specificaton	no						x	1G	"U" - Ignition prevention system (IPS) type b1 shall be applied to prevent the unsatisfactory vibration level (>2.5 mm/s)
11	Mechanically generated sparks	mechanical generated sparks due to a breaking shaft due to unacceptable vibration of the fan			x		A breakdown of the shaft shall be considered as a rare malfunction (for category 1 equipment),	Fan isn't subject of this evaluation. See Schedules of limitations.	EN 1127-1:2011, Clause 5.3 EN-ISO 80079-36:2016 Clause 6.4	Dwg. 41005-900 rev F	no						x	1G	Schedule of limitation "U"1.Fan impeller must be assessed together with the MAGDRIVE acc. to EN 14986:2017
12	Mechanically generated sparks	grinding on the shaft due to bearing failure			x		acc. to relative contact speed of 1.9 m/s speed grinding is to be considered.	The grinding will raise the rotational resistance and will create wibration The revolving of the shaft will stop either due to rupture of the magnetic coupling or by: "U" - Ignition prevention system (IPS) type b1 shall be applied to prevent this state through vibration sensor.	EN 1127-1:2011, Clause 5.3 EN-ISO 80079-36:2016 Clause 6.4	Dwg. 41005-900 rev F bearings technical specificaton							x	1G	"U" - Ignition prevention system (IPS) type b1 shall be applied to prevent the unsatisfactory vibration level (>2.5 mm/s)
13	Mechanically generated sparks	loosening of the bearing housing			x		can cause the whole house crash down	force looked joints secured with sufficient number of the fasteners (10) to prevent the loosening	EN 1127-1:2011, Clause 5.3 EN-ISO 80079-36:2016 Clause 6.4	descriptive documentation Maintenace routines							x	1G	
14	Mechanically generated sparks	loosening of the shaft's radial seal clamp (10)			x		can cause the seal clamp fall down and hit some other parts (as fan impeller)	force looked joints secured with sufficient number of the fasteners (10) to prevent the loosening	EN 1127-1:2011, Clause 5.3 EN-ISO 80079-36:2016 Clause 6.4	descriptive documentation Maintenace routines	no						x	1G	
15	Mechanically generated sparks	unacceptable durability of parts e.g. The shaft, bearings and bearing housing)		x			possible corrosion	adequate material selection	EN-ISO 80079-37:2017, Clause 5.7.3.	Dwg. 41005-900 rev F	no						x	1G	
16	electrostatic discharge	isolated electrical conductive parts	x				isolated conductive parts creates a capacitor, which e.g. can be charged by electrostatic induction to a hazardous static	equipotential bonding between the parts, earthing of the housing, information for installation Lubrication is conductive	EN 1127-1:2011, Clause 5.6 EN-ISO 80079-36:2016 Clause 6.7	descriptive drawing manufacturer's instructions	no						x	1G	"U"-the whole compoenent must be conntected to part which is in contact with the earth
17	electrostatic discharge	parts of non metallic material with a surface resistance not exceeding 1 GΩ				x	parts not accessible, surrounded with the conuductive parts										x	1G	

Ignition hazardous assessment (IHA)

	1: Ignition hazard analysis		2: Assessment of the frequency of occurence without application of an additional measure					3: Measures applied to prevent the ignition source becoming effective			3b: Second protection measure applied to prevent ignition (req. by foreseeable malfunctions)			4: Assessment of the frequency incl. protection measures					
Ignition source #	Potential ignition source	Description of basic couse *(Which conditions originate which ignition hazard?)*	Normal operation	Foreseeable malfunctions	Rare malfunctions	Not relevant	Reasons for assessment	Protective measure	Basis *(citation of standards, technical rules, experimental results)*	Technical documentation *(evidence including relevant features listed in column 1)*	Second protection measure *(required by foreseeable malfunctions)*	Basis	Technical documentation (evidence)	Normal operation	Foreseeable malfunctions	Rare malfunctions	Not relevant	Resulting equipment category	Necessary restriction (Temperature class, gas group)
18	electrostatic discharge	fluid moision against metallic parts				x	fluid is conductive										x	1G	
19	Stray electric currents, cathodic corrosion protection	Converged sunlight.				x	won't be exposed, magneitc coupling, no direct contact with the motor shaft										x	1G	
20	Exothermic reactions	Not to be considered.				x	Not present										x	1G	
21	Flames and hot gases (including hot particles)	Not to be considered.				x	Not present										x	1G	
22	Electrical apparatus	electric motor is a possible ignition source.				x	el. Motor is not within the scope it is located in Zone 2 and it is not part of the product										x	1G	
23	Electrical apparatus	electrical equipment (category 2) in contact with zone 0				x	overspeed of the motor (over 1461 RPM) shall be prevented by limitation of the inverter to max. 50Hz.										x	1G	
24	Radio frequency waves 104 Hz to 3x1012 Hz	Not to be considered.				x	Not present										x	1G	
25	Electromagnetic waves 3x1011 Hz to 3x1015 Hz	Not to be considered.				x	Not present										x	1G	
26	Ionising radiation	Not to be considered.				x	Not present										x	1G	
27	Ultrasonics	Not to be considered.				x	Not present										x	1G	
28	Adiabatic compression and shock waves	Not to be considered.				x	Not present										x	1G	
29	Lightning	Lightning strike				x	Not to be considered. User responsibility.										x	1G	
30	Hot surface	Excessive transfer flow temperature of Ethylene oxyde				x	max +40°C the same as ambient										x	1G	

Resulting equipment category including all existing ignition hazards: **1G**