



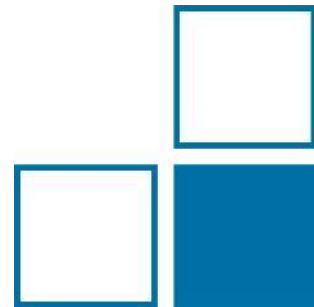
Physikalisch-Technische Bundesanstalt
Braunschweig and Berlin
National Metrology Institute

ExTAG WG 10 - Proficiency Testing

Report

Tim Krause, 6th/7th of September 2022

2022 Remote Annual Meetings of the IECEx System - ExTAG





News about the IECEx/PTB Ex PT Scheme

- The first phase (Phase I) of the current programs/test rounds of cycle 2021/2022 “Flameproof Joints – Test Round 2021” (FJ2021) and “Small Component Temperature – Test Round 2021” (SCT2021) is completed and the interim reports have been published in June 2022.
- The second phase (Phase II; “improvement loop”) is currently running and will end with the extended upload deadline of the results on 14th of September 2022.
- The final report will be published in October/November and the program cycle 2021/2022 ends at the end of the year 2022.
- The new program cycle 2023/2024 is already being planned and will start for the IECEx laboratories with the roll-out scheduled for March 2023 (program selection coming up).



News about the IECEx/PTB Ex PT Scheme

- The following programs of the previous program cycles are closed:
 - Explosion Pressure - Test Round 2010
 - Spark Ignition - Test Round 2010
 - Flame Transmission - Test Round 2013
 - Temperature Classification - Test Round 2013
 - Electrostatic Charge - Test Round 2015
 - Intrinsic Safety - Test Round 2015
 - Pressurized Enclosure - Test Round 2017
 - Explosion Pressure - Test Round 2017

News about the IECEx/PTB Ex PT Scheme

- The programs that are currently available are:
 - Tests of Enclosures - Test Round 2019
 - Battery Testing - Test Round 2019
 - Flameproof Joints - Test Round 2021
 - Small Component Temperature - Test Round 2021

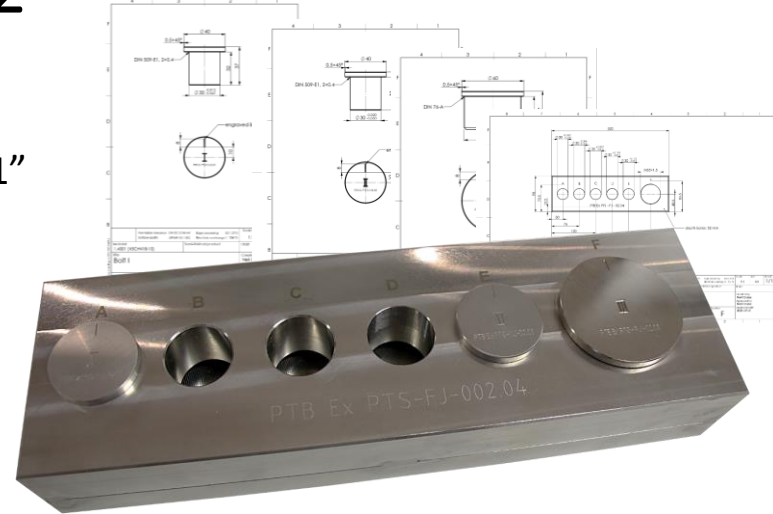
- Since November 2021 Mr. Niels Springer supports the PT Team of the provider PTB.



Review and results of the IECEx/PTB Ex PT Program “FJ2021” of cycle 2021/2022

- **Description of program “Flameproof Joints”:**

For the program “Flameproof Joints (“FJ”) - Test Round 2021” the general routine procedure is described by the standard “Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures “d” ” - IEC 60079-1, Edition 7.0



- **Participation:**

84 Ex laboratories (2 stragglers) (75 out of 86 IECEx test laboratories; 11 IECEx test laboratories have not registered*)

*The non-registration has been agreed with the IECEx secretariat (not part of the scope of the IECEx laboratory), or is currently being followed up

68 of 75 registered IECEx laboratories have uploaded results in Phase I and are included in the interim report (recently 1 additional laboratory without results in Phase I uploaded results for Phase II).

• Overview of warning and action signals – Phase I

Laboratory	Signal ic calculation	Total warning signals	Total action signals	Laboratory	Signal ic calculation	Total warning signals	Total action signals
LC0001	-	0	0	LC0038	action*	1	1*
LC0002	action*	0	1*	LC0039	-	0	0
LC0003	-	0	0	LC0040	-	0	0
LC0004	action	0	2	LC0041	-	2	0
LC0005	-	0	0	LC0042	-	0	0
LC0006	action*	0	3	LC0043	action*	0	5
LC0007	action*	0	1*	LC0044	action	2	3
LC0008	-	0	0	LC0045	-	2	0
LC0009	action*	0	1*	LC0046	-	0	0
LC0010	-	0	0	LC0047	action	0	1
LC0011	action*	0	1*	LC0048	-	0	0
LC0012	-	1	0	LC0049	-	0	0
LC0013	-	0	0	LC0050	-	0	0
LC0014	action*	2	1*	LC0051	-	0	0
LC0015	-	0	0	LC0052	action*	0	1*
LC0016	-	0	0	LC0053	-	0	0
LC0017	-	0	0	LC0054	-	0	0
LC0018	action*	0	1*	LC0055	-	0	0
LC0019	action*	0	2	LC0056	-	0	0
LC0020	-	0	0	LC0057	action*	1	1*
LC0021	-	0	0	LC0058	-	0	0
LC0022	-	0	0	LC0059	action*	0	1*
LC0023	-	0	0	LC0060	-	0	0
LC0024	action*	1	1*	LC0061	-	0	0
LC0025	-	2	0	LC0062	-	0	1
LC0026	action*	0	1*	LC0063	-	0	0
LC0027	-	0	0	LC0064	-	0	0
LC0028	-	0	0	LC0065	action	0	1
LC0029	-	0	0	LC0066	action*	0	1*
LC0030	-	0	0	LC0067	-	0	1
LC0031	-	0	0	LC0068	action*	0	1*
LC0032	action*	0	1*	LC0069	-	0	0
LC0033	-	2	2	LC0070	action*	0	1*
LC0034	-	0	0	LC0071	-	0	0
LC0035	action*	2	1*	LC0072	-	0	0
LC0036	-	0	0	LC0073	-	0	0
LC0037	action	0	1	LC0074	action*	0	2



Participants with **action**
signal: 12
(10 IECEx laboratories)

Participants with **action***
signal: 17
(17 IECEx laboratories)

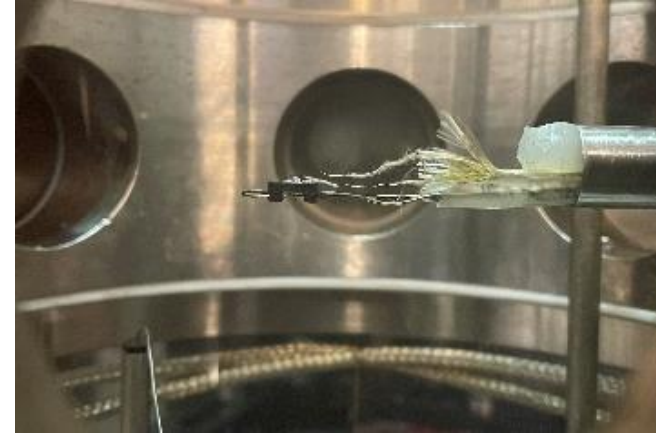


13 laboratories were able to improve
their Phase II results to the extent that
they no longer have an action signal
(13 IECEx laboratories)
(8x action* & 5x action)



Review and results of the IECEx/PTB Ex PT Program “SCT2021” of cycle 2021/2022

- **Description of program “Small Component Temperature”:**
For the program “Small Component Temperature (“SCT”) - Test Round 2021” the general routine procedure is described by the standard “Explosive atmospheres – Part 0: Equipment – General requirements” - IEC 60079-0, Edition 7



- **Participation:**
81 Ex laboratories (2 stragglers) 75 out of 86 IECEx test laboratories; 11 IECEx test laboratories not registered*)
*The non-registration has been agreed with the IECEx secretariat (not part of the scope of the IECEx laboratory, subcontracted, or similar)
58 out of 75 registered IECEx laboratories have uploaded results in Phase I and are included in the interim report of Phase I (recently 5 additional laboratory without results in Phase I uploaded results for Phase II).

- Overview of warning and action signals – Phase I

Participant (Lab code)	Number of ignitions- Total	Warning signal	Action signal	Participant (Lab code)	Number of ignitions- Total	Warning signal	Action signal
LC0001	0		Yes	LC0033	12		
LC0002	10			LC0034	22		
LC0003	30			LC0035	20		
LC0004	0		Yes	LC0036	15		
LC0005	0		Yes	LC0037	19		
LC0006	30			LC0038	30		
LC0007	20			LC0039	30		
LC0008	18			LC0040	10		
LC0009	30			LC0041	20		
LC0010	20			LC0042	30		
LC0011	10			LC0043	0		Yes
LC0012	30			LC0044	30		
LC0013	0		Yes	LC0045	21		
LC0014	0		Yes	LC0046	10		
LC0015	20			LC0047	30		
LC0016	10			LC0048	30		
LC0017	11			LC0049	30		
LC0018	30			LC0050	13		
LC0019	13			LC0051	1		Yes
LC0020	20			LC0052	0		Yes
LC0021	10			LC0053	0		Yes
LC0022	0		Yes	LC0054	0		Yes
LC0023	28			LC0055	20		
LC0024	11			LC0056	30		
LC0025	30			LC0057	0		Yes
LC0026	10			LC0058	30		
LC0027	0		Yes	LC0059	30		
LC0028	20			LC0060	20		
LC0029	20			LC0061	0		Yes
LC0030	20			LC0062	10		
LC0031	11			LC0063	13		
LC0032	30			LC0064	0		Yes



15 Laboratories with action signal in Phase I (14 IECEx laboratories)







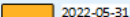






7 laboratories were able to improve their Phase II results to the extent that they no longer have an action signal (7 IECEx laboratories).



Status of the current programs 2021/2022

"FJ2021" and "SCT2021"

No.	Task	2020			2021												2022											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Development of program "Flameproof Joints - Test Round 2021" and preparation of the prototype test sample by the coordinator	 2021-09-15																										
2	Roll out of program "Flameproof Joints - Test Round 2021"													 2021-09-15														
3	Registration phase for participation													 2021-04-15														
4	Preparation and shipment of the test samples to the participants													 2021-11-30														
5	Performance of the tests of Phase I and forwarding of the results to the coordinator													 2022-03-31														
6	Deadline for uploading the test results of program "Flameproof Joints - Test Round 2021" Phase I													 2022-03-31														
7	Evaluation and publication of the test results of program "Flameproof Joints - Test Round 2021" and release of the interim report													 2022-05-31														
8	Workshop at PTB													 June 2022														
9	Performance of the tests of Phase II and forwarding of the results to the coordinator													 2022-09-14														
10	Deadline for uploading the test results of program "Flameproof Joints - Test Round 2021" Phase II													 2022-09-14														
11	Evaluation and publication of the test results of program "Flameproof Joints - Test Round 2021" and release of the final report													 Nov. 2022														

PTB Ex PT Workshops 2022

- The PTB Ex PT Workshops 2022 were organized as online workshops due to the still difficult situation regarding the corona restrictions and the related travel restrictions. The workshops consisted of pre-recorded presentations as well as videos of practical experiments. Furthermore, questions from the participants were collected and discussed during two online discussion sessions on June 15, 2022.
- Despite all the circumstances, the workshops were a success with more than 100 participants.
- Nevertheless, it is absolutely intended to hold the future PTB Ex PT Workshops again on site at PTB, because an online event cannot completely replace the exchange of experience and the practical experience in the laboratories.



Online



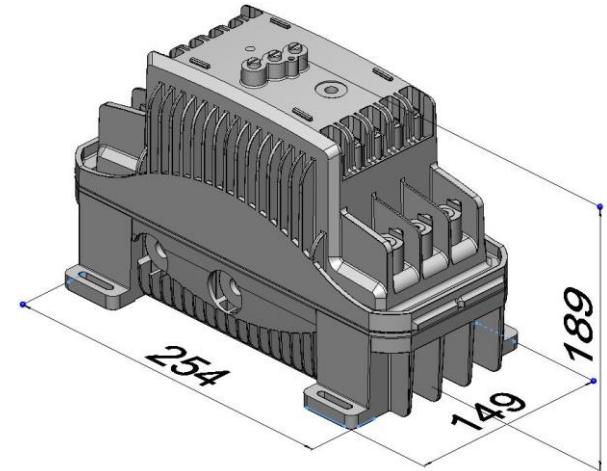
New PT programs of the IECEx/PTB Ex PTS for the cycle 2023/2024

- Suggestions for programs may be made by the IECEx PTS Provider based on questionnaires circulated under the participating laboratories, by proposals of the ExTAG WG 10 “Proficiency Testing” or by other experts. The IECEx PTS Provider will then take a decision on the programs to provide, taking those suggestions and any recommendations by ExTAG into account.

Topic	Standard
Thermal tests – devices with non-measurable paths	IEC 60079-1:2014, Cl. 15.4.3
Intrinsic safety assessment for a more complex equipment circuit, printed circuit board design provided in gerber file	IEC 60079-11:2011
Optical irradiance	IEC 60079-28:2015, Cl. 5.2.2.3
Test for ventilation of level of protection “eb” battery containing	IEC 60079-7:2017, Cl. 6.6.4
Temperature tests of general purpose “Ex e” terminal boxes	IEC 60079-0
Measurement of separation distances in “Ex I” circuits	IEC 60079-11:2011
Determination of opening times of enclosures with incorporated capacitors	IEC 60079-0:2017, Cl. 6.3a
Measurement of capacitance of electrical equipment	IEC 60079-0:2017, Cl. 26.14
Thermal shock test	IEC 60079-0, Cl. 26.5.2
Thermal test for LED luminaires	IEC 60079-7:2015, Cl. 6.3
Thermal test for general purpose connection and junction boxes	IEC 60079-7:2015, Cl. 6.8
Thermal test for “eb” rotating machine (“a small power one like 16kW so that a lot of laboratories can perform it”)	IEC 60079-7:2015, Cl. 6.2

New PT programs of the IECEx/PTB Ex PTS for the cycle 2023/2024

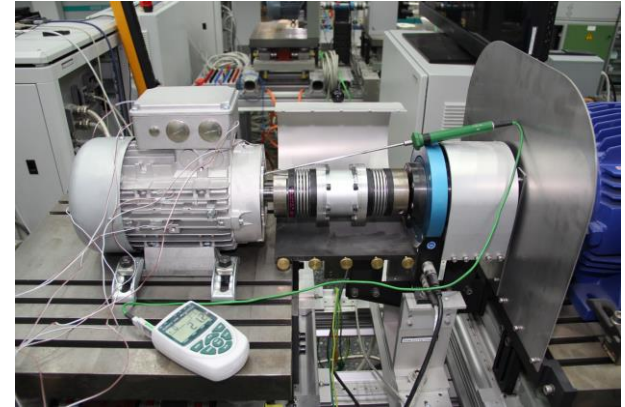
- Program Explosion Pressure – Test Round 2023 (“EP2023”)
- Normative background: IEC 60079-1, Edition 7.0; Cl. 15.2.2 Determination of explosion pressure (reference pressure).
- Test Sample: (More) real Ex equipment with built-in components.
- Task: Determination of the explosion pressure for two different gas mixtures (hydrogen and acetylene) for two different configurations (defined positions as well as own determination of the laboratory regarding the installation location for ignition source and pressure sensor).



Example flameproof enclosure made of glass fibre reinforced polyamide (PA 66). All units in mm.

New PT programs of the IECEx/PTB Ex PTS for the cycle 2023/2024

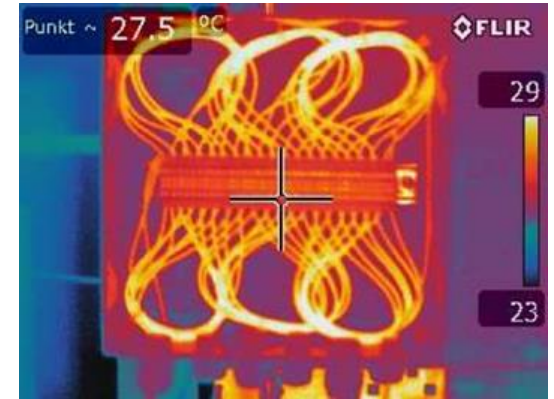
- Program Rotating Electrical Machines – Test Round 2023 (“REM2023”)
- Normative background: IEC 60079-7, Edition 5.0; Cl. 6.2.1
Determination of starting current ratio I_A / I_N and the time t_E
- Test Sample: Three-phase motors with squirrel cage rotor
(small easy-to-handle motor with shaft/frame size 80 mm and rated power < 1 kW)
- Task: Tests to determine the starting current ratio I_A / I_N and the time t_E using test or calculation methods according to Annex A.



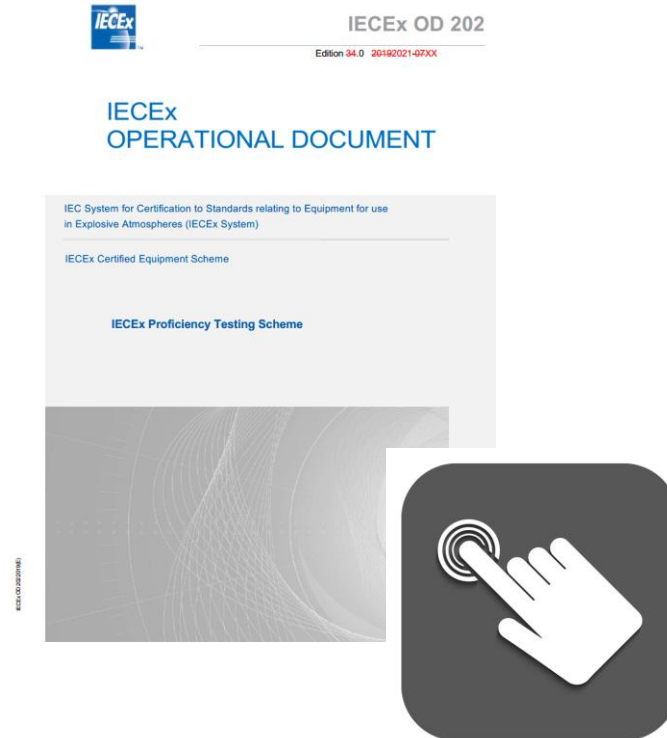
Determination of the temperature at the rotor for an example motor.

New PT programs of the IECEx/PTB Ex PTS for the cycle 2023/2024

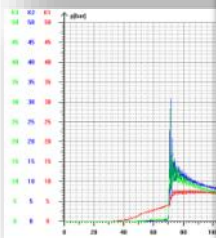
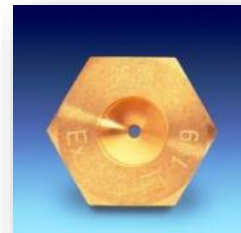
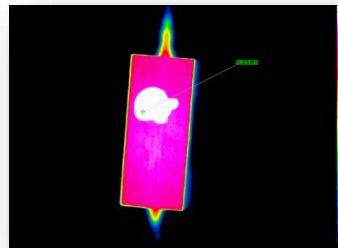
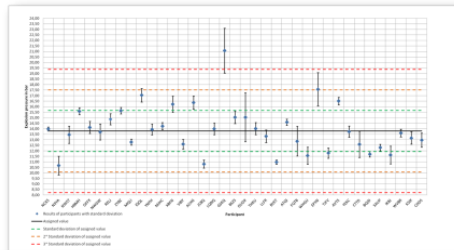
- Program Connection and Junction Boxes (“CJB”)
- Normative background: IEC 60079-7, Edition 5.0; Cl. 6.8
General purpose connection and junction boxes
- Test Sample: Connection/junction box prepared with terminals and cables/cable bundles
- Task: Determination of max. temperature and evaluation regarding max. fitting of terminals



Temperature profile determination using a thermography camera for the example sample of a junction box.



Would you like to know more?



<https://www.ex-proficiency-testing.ptb.de/>

