INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) SYSTEM FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)

Title: Report & Presentation from Tim Krause, Convenor ExTAG WG 10, Proficiency Testing

Circulated to: Ex Testing and Assessment Group (ExTAG)

INTRODUCTION

Presentation by the Convenor of **ExTAG WG10, "Proficiency Testing", Tim Krause for the ExTAG Remote Meetings 2020**

The presentation **ExTAG/629/R** is a summary of the results from programs/test rounds of cycle 2019/2020 "Tests of Enclosures – Test Round 2019" (TE2019) and "Battery Testing – Test Round 2019" (BT2019) as per **ExTAG/611/R** and includes information on the planned new PT Programs for cycle 2021/2022.
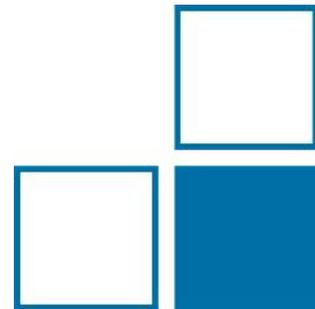
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IECEx Proficiency Testing Scheme

ExTAG WG10 Report

Tim Krause, 29th & 30th of September 2020, ExTAG Remote Meeting

News about the IECEx Ex PT Scheme

- The first phase (Phase I) of the current programs/test rounds of cycle 2019/2020 "Tests of En-closures – Test Round 2019" (TE2019) and "Battery Testing – Test Round 2019" (BT2019) is completed and the interim reports have been published

- The PT Workshops 2020 @NEPSI and @PTB had to be postponed due to COVID-19

- The second phase (Phase II; "improvement loop") is currently running and will end with the final reports in October/November 2020

- The cycle 2019/2020 ends at the end of the year 2020

PTB News about the IECEx Ex PT Scheme

- There have been ten program test rounds completed to date, with the latest test rounds ending 2020:

    - 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
    - Explosion Pressure – Test Round 2017
    - Pressurized Enclosure – Test Round 2017
    - Tests of Enclosures – Test Round 2019
    - Battery Testing – Test Round 2019

Status of the current programs 2019/2020

- **Description of program "Tests of Enclosures":**

For the program "Tests of Enclosures ("TE") - Test Round 2019" the general routine procedure is described by the standard "Explosive atmospheres - Part 0: Equipment – General requirements" - IEC 60079-0, Edition 7.0 and "Degrees of protection provided by enclosures (IP Code)" - IEC 60529, Edition 2.2.

- **Participation:**

90 Ex laboratories (78 out of 80 IECEx test laboratories; 2 IECEx test laboratories 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.

74 out of 78 registered IECEx laboratories have uploaded results in Phase I and are included in the interim report

Status of the current programs 2019/2020

- **Description of program "Battery Testing":**

In the program "Battery Testing" ("BT"), the selected quantities, which are to be compared (measurand of interest), are the maximum surface temperature and the internal resistance of batteries. The general routine procedure is described in the standard "Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"" - IEC 60079- 11 Edition 6.

- **Participation:**

81 Ex laboratories (74 out of 80 IECEx test laboratories; 6 IECEx test laboratories 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.

69 out of 74 registered IECEx laboratories have uploaded results in Phase I and are included in the interim report
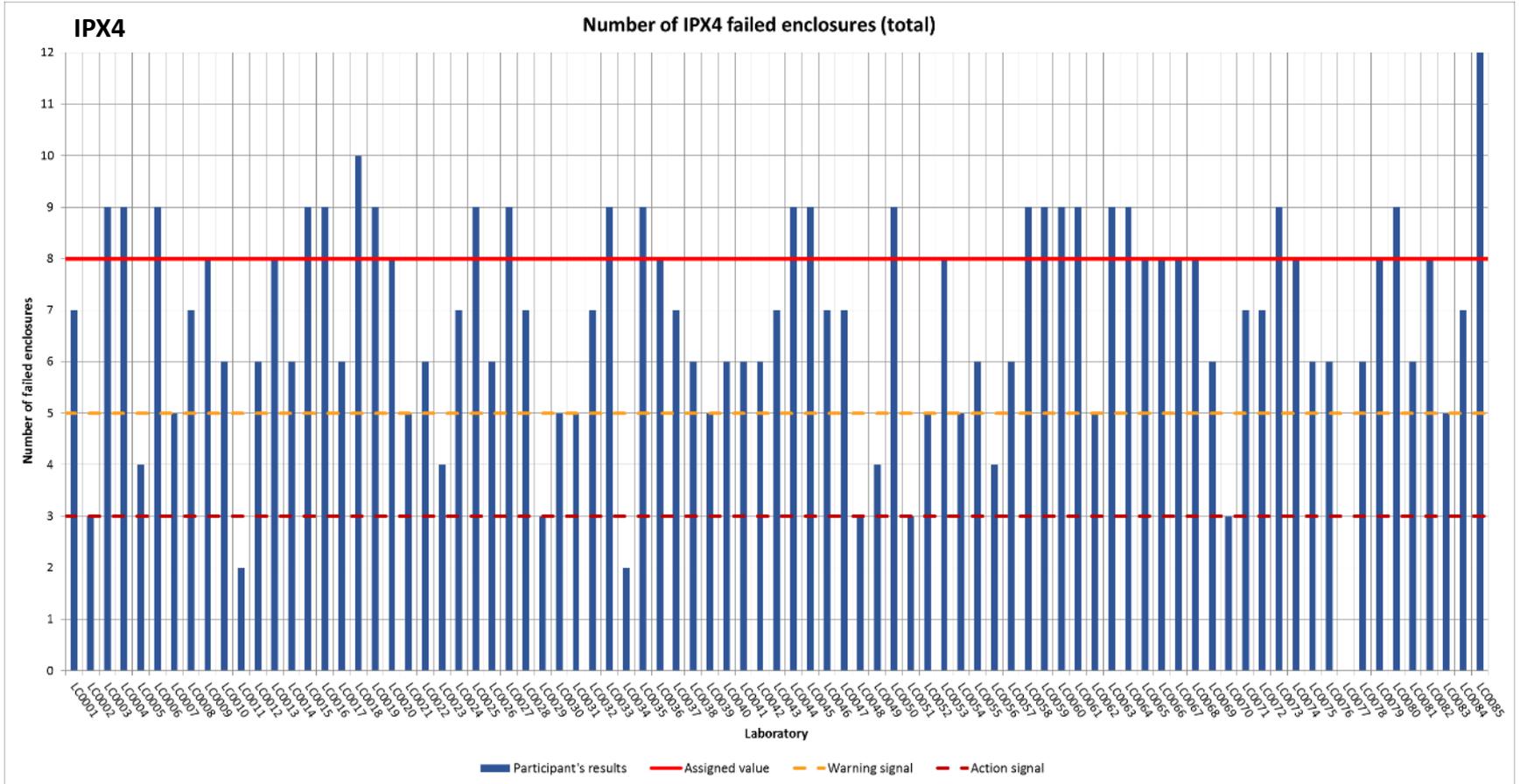
(Interim) Results of the current programs (TE2019)

IPX4

1= failed   0= passed

Laboratory code	Set A (Enclosure 01-03)			Set B (Enclosure 04-06)			Set C (Enclosure 07-09)			Set D (Enclosure 10-12)			Total	Difference to assigned value	Mean ambient temperature in °C	Mean ambient humidity in % RH
	Enclosure 01	Enclosure 02	Enclosure 03	Enclosure 04	Enclosure 05	Enclosure 06	Enclosure 07	Enclosure 08	Enclosure 09	Enclosure 10	Enclosure 11	Enclosure 12				
LC0001	1	1	1	1	1	1	0	0	0	0	0	1	7	-1	26.6	68.7
LC0002	1	1	1	0	0	0	0	0	0	0	0	0	3	-5	18.6	52.1
LC0003	1	1	1	1	1	1	0	0	0	1	1	1	9	1	20.3	59.6
LC0004	1	1	1	1	1	1	0	0	0	1	1	1	9	1	23.5	46.0
LC0005	0	1	0	0	1	0	0	0	0	1	0	1	4	-4	20.5	58.3
LC0006	1	1	1	1	1	1	0	0	0	1	1	1	9	1	27.6	38.7
LC0007	1	1	0	0	0	1	0	0	0	1	0	1	5	-3	24.5	39.9
LC0008	1	1	1	1	1	1	0	0	1	0	0	0	7	-1	7.4	78.4
LC0009	1	1	1	1	1	1	0	0	0	1	0	1	8	0	21.8	53.4
LC0010	1	0	0	0	0	0	1	1	0	1	1	1	6	-2	20.1	39.5
LC0011	0	1	0	0	0	0	0	0	0	0	1	0	2	-6	22.0	61.7
LC0012	1	1	1	0	1	1	0	0	0	0	1	0	6	-2	25.8	50.3
LC0013	1	1	1	1	1	0	0	0	0	1	1	1	8	0	19.8	63.1
LC0014	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	11.3	62.2
LC0015	1	1	1	1	1	1	0	0	0	1	1	1	9	1	20.9	28.4
LC0016	1	1	1	1	1	1	0	0	0	1	1	1	9	1	16.1	38.9
LC0017	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	19.7	31.0
LC0018	1	1	1	1	1	1	0	1	0	1	1	1	10	2	15.5	71.6
LC0019	1	1	1	1	1	1	0	0	0	1	1	1	9	1	19.9	65.5
LC0020	1	1	1	1	1	1	0	0	0	1	0	1	8	0	20.7	65.3
LC0021	1	1	1	0	0	0	0	0	0	0	1	1	5	-3	16.9	58.4
LC0022	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	20.4	36.6
LC0023	0	0	1	0	0	1	0	1	0	0	0	1	4	-4	22.0	37.0
LC0024	1	1	1	1	1	1	0	0	0	0	0	1	7	-1	18.0	63.0
LC0025	1	1	1	1	1	1	0	0	0	1	1	1	9	1	21.6	37.8
LC0026	0	0	1	0	1	1	0	0	0	1	1	1	6	-2	24.8	60.7
LC0027	1	1	1	1	1	1	0	0	0	1	1	1	9	1	23.1	19.5
LC0028	1	1	1	1	1	1	0	0	0	0	1	0	7	-1	27.4	59.7
LC0029	1	0	0	1	0	0	0	0	0	0	0	1	3	-5	21.8	50.0
LC0030	1	1	0	0	1	1	0	0	0	0	1	0	5	-3	22.1	57.1
LC0031	1	1	1	0	1	1	0	0	0	0	0	0	5	-3	17.9	67.7
LC0032	1	1	1	1	1	1	0	0	0	1	0	0	7	-1	21.9	52.1
LC0033	1	1	1	1	1	1	0	0	0	1	1	1	9	1	21.0	50.0
LC0034	0	0	0	0	0	0	0	0	0	1	0	1	2	-6	21.8	54.0
LC0035	1	1	1	1	1	1	0	0	0	1	1	1	9	1	19.0	58.1
LC0036	1	1	1	1	0	1	0	0	0	1	1	1	8	0	19.3	35.7
LC0037	1	1	1	1	1	1	0	0	0	1	0	0	7	-1	22.6	96.0
LC0038	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	18.1	64.9
LC0039	0	1	1	1	1	0	0	0	0	1	0	0	5	-3	21.5	52.9
LC0040	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	23.3	49.6
LC0041	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	19.7	52.5
LC0042	1	0	1	1	0	0	0	0	0	1	1	1	6	-2	19.2	35.3
LC0043	1	1	1	1	1	1	0	0	0	0	1	0	7	-1	29.7	52.1

IPX4

1= failed   0= passed

Laboratory code	Set A (Enclosure 01-03)			Set B (Enclosure 04-06)			Set C (Enclosure 07-09)			Set D (Enclosure 10-12)			Total	Difference to assigned value	Ambient conditions	
	Enclosure 01	Enclosure 02	Enclosure 03	Enclosure 04	Enclosure 05	Enclosure 06	Enclosure 07	Enclosure 08	Enclosure 09	Enclosure 10	Enclosure 11	Enclosure 12			Mean ambient temperature in °C	Mean ambient humidity in % RH
LC0044	1	1	1	1	1	1	0	0	0	1	1	1	9	1	16.9	34.4
LC0045	1	1	1	1	1	1	0	0	0	1	1	1	9	1	22.1	61.7
LC0046	1	1	1	1	1	0	0	0	0	1	0	1	7	-1	13.1	56.8
LC0047	1	1	1	0	0	1	0	0	0	1	1	1	7	-1	22.1	35.5
LC0048	0	0	0	0	0	0	0	0	0	1	1	1	3	-5	22.9	29.8
LC0049	0	1	1	0	0	0	0	0	0	1	0	1	4	-4	23.8	47.8
LC0050	1	1	1	1	1	1	0	0	0	1	1	1	9	1	17.6	50.0
LC0051	1	1	1	0	0	0	0	0	0	0	0	0	3	-5	8.1	-
LC0052	1	1	1	1	0	0	0	0	0	0	0	1	5	-3	19.1	47.3
LC0053	1	1	1	0	1	1	0	0	0	1	1	1	8	0	20.9	62.1
LC0054	1	0	0	0	0	1	0	0	0	1	1	1	5	-3	19.0	63.0
LC0055	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	28.5	-
LC0056	1	1	1	0	1	0	0	0	0	0	0	0	4	-4	21.2	55.9
LC0057	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	16.8	66.3
LC0058	1	1	1	1	1	1	0	0	1	0	1	1	9	1	22.1	60.2
LC0059	1	1	1	1	1	1	0	0	0	1	1	1	9	1	22.2	34.2
LC0060	1	1	1	1	1	1	0	0	0	1	1	1	9	1	21.5	45.0
LC0061	1	1	1	1	1	1	0	0	0	1	1	1	9	1	22.7	42.7
LC0062	1	1	1	0	1	1	0	0	0	0	0	0	5	-3	15.8	-
LC0063	1	1	1	1	1	1	0	0	0	1	1	1	9	1	18.2	42.0
LC0064	1	1	1	1	1	1	0	1	0	0	1	1	9	1	19.4	47.0
LC0065	1	1	1	1	1	1	0	0	0	1	1	0	8	0	20.0	50.0
LC0066	1	1	1	1	0	1	0	0	0	1	1	1	8	0	21.0	43.6
LC0067	1	1	1	1	1	1	0	0	0	1	0	1	8	0	22.8	49.3
LC0068	1	1	1	1	1	1	0	0	0	1	1	0	8	0	14.8	51.0
LC0069	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	21.2	47.0
LC0070	1	1	1	0	0	0	0	0	0	0	0	0	3	-5	19.3	49.9
LC0071	1	1	1	1	1	1	0	1	0	0	0	0	7	-1	23.9	48.5
LC0072	1	1	1	1	1	1	0	0	0	0	1	0	7	-1	20.5	18.8
LC0073	1	1	1	1	1	1	0	0	0	1	1	1	9	1	14.7	47.0
LC0074	1	1	1	1	1	0	0	0	0	1	1	1	8	0	18.6	14.0
LC0075	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	20.7	40.2
LC0076	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	20.0	69.9
LC0077	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	21.5	50.0
LC0078	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	19.8	38.6
LC0079	1	1	1	1	1	1	0	1	0	0	0	1	8	0	19.8	30.7
LC0080	1	1	1	1	1	1	0	0	0	1	1	1	9	1	23.3	44.2
LC0081	1	1	1	1	1	1	0	0	0	0	0	0	6	-2	21.4	46.2
LC0082	0	0	1	1	1	1	0	1	1	1	1	0	8	0	18.2	36.0
LC0083	1	1	1	0	0	1	0	0	0	0	0	1	5	-3	20.5	35.2
LC0084	1	1	0	1	1	0	0	0	0	1	1	1	7	-1	23.6	62.7
LC0085	1	1	1	1	1	1	1	1	1	1	1	1	12	4	22.0	55.0

(Interim) Results of the current programs (TE2019)

Number of IPX4 failed enclosures (total)

IP5X

1= failed   0= passed

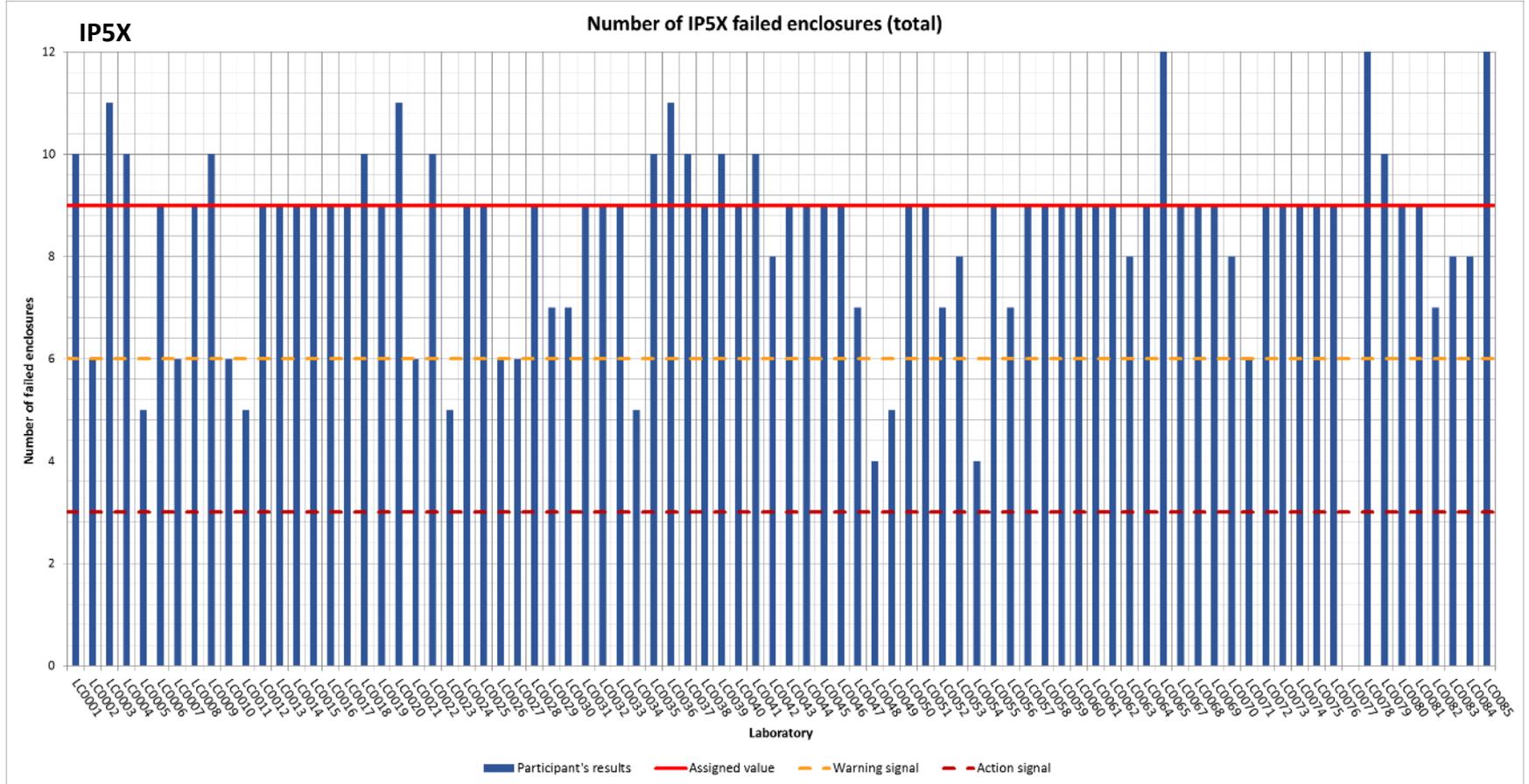| Laboratory code	Set A (Enclosure 01-03)			Set B (Enclosure 04-06)			Set C (Enclosure 07-09)			Set D (Enclosure 10-12)			Total	Difference to assigned value	Ambient conditions	
	Enclosure 01	Enclosure 02	Enclosure 03	Enclosure 04	Enclosure 05	Enclosure 06	Enclosure 07	Enclosure 08	Enclosure 09	Enclosure 10	Enclosure 11	Enclosure 12			Mean ambient temperature in °C	Mean ambient humidity in % RH
LC0001	1	1	1	1	1	1	0	1	0	1	1	1	10	1	17.7	60.1
LC0002	1	1	1	0	0	0	0	0	0	1	1	1	6	-3	18.1	43.4
LC0003	1	1	1	1	1	1	1	1	0	1	1	1	11	2	18.1	36.5
LC0004	1	1	1	1	1	1	0	0	1	1	1	1	10	1	23.7	35.4
LC0005	0	1	0	0	1	0	0	0	0	1	1	1	5	-4	22.0	39.4
LC0006	1	1	1	1	1	1	0	0	0	1	1	1	9	0	26.0	38.2
LC0007	1	1	0	0	0	1	0	0	0	1	1	1	6	-3	24.2	34.2
LC0008	1	1	1	1	1	1	0	0	0	1	1	1	9	0	8.7	71.2
LC0009	1	1	1	1	1	1	0	0	1	1	1	1	10	1	22.0	27.0
LC0010	1	0	0	0	1	0	0	1	0	1	1	1	6	-3	20.4	45.4
LC0011	0	1	0	0	1	0	0	0	0	1	1	1	5	-4	24.8	56.5
LC0012	1	1	1	1	1	1	0	0	0	1	1	1	9	0	25.1	58.3
LC0013	1	1	1	1	1	1	0	0	0	1	1	1	9	0	20.3	67.1
LC0014	1	1	1	1	1	1	0	0	0	1	1	1	9	0	11.7	74.8
LC0015	1	1	1	1	1	1	0	0	0	1	1	1	9	0	21.6	30.8
LC0016	1	1	1	1	1	1	0	0	0	1	1	1	9	0	21.0	39.4
LC0017	1	1	1	1	1	1	0	0	0	1	1	1	9	0	15.7	39.2
LC0018	1	1	1	1	1	1	0	1	0	1	1	1	10	1	16.9	51.3
LC0019	1	1	1	1	1	1	0	0	0	1	1	1	9	0	20.8	55.8
LC0020	1	1	1	1	1	1	1	1	0	1	1	1	11	2	23.7	62.9
LC0021	1	1	1	0	0	0	0	0	0	1	1	1	6	-3	10.4	59.2
LC0022	1	1	1	1	1	1	0	0	1	1	1	1	10	1	23.0	26.9
LC0023	0	0	1	0	0	1	0	0	0	1	1	1	5	-4	23.6	49.0
LC0024	1	1	1	1	1	1	0	0	0	1	1	1	9	0	20.0	30.0
LC0025	1	1	1	1	1	1	0	0	0	1	1	1	9	0	19.3	41.5
LC0026	0	0	1	0	1	1	0	0	0	1	1	1	6	-3	24.7	61.4
LC0027	1	1	1	1	1	1	0	0	0	0	0	0	6	-3	23.5	15.2
LC0028	1	1	1	1	1	1	0	0	0	1	1	1	9	0	24.0	53.9
LC0029	1	0	1	1	0	0	0	0	1	1	1	1	7	-2	-	-
LC0030	1	1	0	0	1	1	0	0	0	1	1	1	7	-2	23.2	55.5
LC0031	1	1	1	1	1	1	0	0	0	1	1	1	9	0	20.4	62.4
LC0032	1	1	1	1	1	1	0	0	0	1	1	1	9	0	22.6	47.1
LC0033	1	1	1	1	1	1	0	0	0	1	1	1	9	0	22.8	23.1
LC0034	0	1	0	0	0	1	0	0	0	1	1	1	5	-4	23.0	65.0
LC0035	1	1	1	1	1	1	1	0	0	1	1	1	10	1	19.1	42.0
LC0036	1	1	1	1	1	1	1	0	1	1	1	1	11	2	19.0	28.9
LC0037	1	1	1	1	1	1	0	0	1	1	1	1	10	1	25.2	70.0
LC0038	1	1	1	1	1	1	0	0	0	1	1	1	9	0	25.3	45.0
LC0039	1	1	1	1	1	0	1	0	1	1	1	1	10	1	21.9	41.9
LC0040	1	1	1	1	1	1	0	0	0	1	1	1	9	0	17.2	64.2
LC0041	1	1	1	1	1	1	1	0	0	1	1	1	10	1	22.1	49.8
LC0042	1	0	1	1	0	0	1	0	1	1	1	1	8	-1	17.6	46.9
LC0043	1	1	1	1	1	1	0	0	0	1	1	1	9	0	30.1	55.8

(Interim) Results of the current programs (TE2019)

1= failed   0= passed

IP5X

Laboratory code	Set A (Enclosure 01-03)			Set B (Enclosure 04-06)			Set C (Enclosure 07-09)			Set D (Enclosure 10-12)			Total	Difference to assigned value	Ambient conditions	
	Enclosure 01	Enclosure 02	Enclosure 03	Enclosure 04	Enclosure 05	Enclosure 06	Enclosure 07	Enclosure 08	Enclosure 09	Enclosure 10	Enclosure 11	Enclosure 12			Mean ambient temperature in °C	Mean ambient humidity in % RH
LC0044	1	1	1	1	1	1	0	0	0	1	1	1	9	0	16.8	34.7
LC0045	1	1	1	1	1	1	0	0	0	1	1	1	9	0	22.0	41.1
LC0046	0	1	1	1	1	0	0	1	1	1	1	1	9	0	13.1	55.6
LC0047	1	1	1	0	0	1	0	0	0	1	1	1	7	-2	17.7	20.6
LC0048	0	0	0	1	0	0	0	0	0	1	1	1	4	-5	23.4	1.9
LC0049	0	1	1	0	1	0	0	0	0	1	0	1	5	-4	24.6	54.4
LC0050	1	1	1	1	1	1	0	0	0	1	1	1	9	0	18.3	38.5
LC0051	1	1	1	1	1	1	0	0	0	1	1	1	9	0	4.4	50.9
LC0052	1	1	1	1	0	0	0	0	0	1	1	1	7	-2	19.9	39.5
LC0053	1	1	1	0	1	1	0	0	0	1	1	1	8	-1	21.6	26.9
LC0054	1	0	0	0	0	0	0	0	0	1	1	1	4	-5	20.8	39.2
LC0055	1	1	1	1	1	1	0	0	0	1	1	1	9	0	28.6	70.3
LC0056	1	1	1	0	1	0	0	0	0	1	1	1	7	-2	20.9	61.6
LC0057	1	1	1	1	1	1	0	0	0	1	1	1	9	0	17.8	38.5
LC0058	1	1	1	1	1	1	0	0	0	1	1	1	9	0	22.1	60.1
LC0059	1	1	1	1	1	1	0	0	0	1	1	1	9	0	25.5	19.0
LC0060	1	1	1	1	1	1	0	0	0	1	1	1	9	0	21.9	40.6
LC0061	1	1	1	1	1	1	0	0	0	1	1	1	9	0	24.4	27.0
LC0062	1	1	1	1	1	1	0	0	0	1	1	1	9	0	30.0	-
LC0063	1	1	1	1	0	1	0	0	0	1	1	1	8	-1	18.1	42.1
LC0064	1	1	1	1	1	1	0	0	0	1	1	1	9	0	19.4	47.7
LC0065	1	1	1	1	1	1	1	1	1	1	1	1	12	3	20.0	50.0
LC0066	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC0067	1	1	1	1	1	1	0	0	0	1	1	1	9	0	22.6	49.9
LC0068	1	1	1	1	1	1	0	0	0	1	1	1	9	0	14.1	58.3
LC0069	1	1	1	1	1	1	0	0	0	1	1	1	9	0	22.0	17.1
LC0070	1	1	1	0	0	0	1	1	0	1	1	1	8	-1	20.4	46.0
LC0071	1	1	1	1	1	1	0	0	0	0	0	0	6	-3	21.5	43.1
LC0072	1	1	1	1	1	1	0	0	0	1	1	1	9	0	21.2	18.7
LC0073	1	1	1	1	1	1	0	0	0	1	1	1	9	0	15.9	51.3
LC0074	1	1	1	1	1	1	0	0	0	1	1	1	9	0	20.3	17.5
LC0075	1	1	1	1	1	1	0	0	0	1	1	1	9	0	-	-
LC0076	1	1	1	1	1	1	0	0	0	1	1	1	9	0	15.0	44.3
LC0077	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	22.0	45.0
LC0078	1	1	1	1	1	1	1	1	1	1	1	1	12	3	16.4	54.4
LC0079	1	1	1	1	1	1	0	1	0	1	1	1	10	1	22.8	23.2
LC0080	1	1	1	1	1	1	0	0	0	1	1	1	9	0	23.3	40.9
LC0081	1	1	1	1	1	1	0	0	0	1	1	1	9	0	22.8	34.9
LC0082	0	0	1	1	1	1	0	0	0	1	1	1	7	-2	18.8	35.7
LC0083	1	1	1	0	1	1	0	0	0	1	1	1	8	-1	20.6	36.3
LC0084	1	1	1	1	1	0	0	0	0	1	1	1	8	-1	22.8	52.4
LC0085	1	1	1	1	1	1	1	1	1	1	1	1	12	3	-	-

(Interim) Results of the current programs (TE2019)

Number of IP5X failed enclosures (total)

Comparison of IPX4 and IP5X

10 laboratories with warning signals (9 IECEx)

3 laboratory with action signals (3 IECEx)
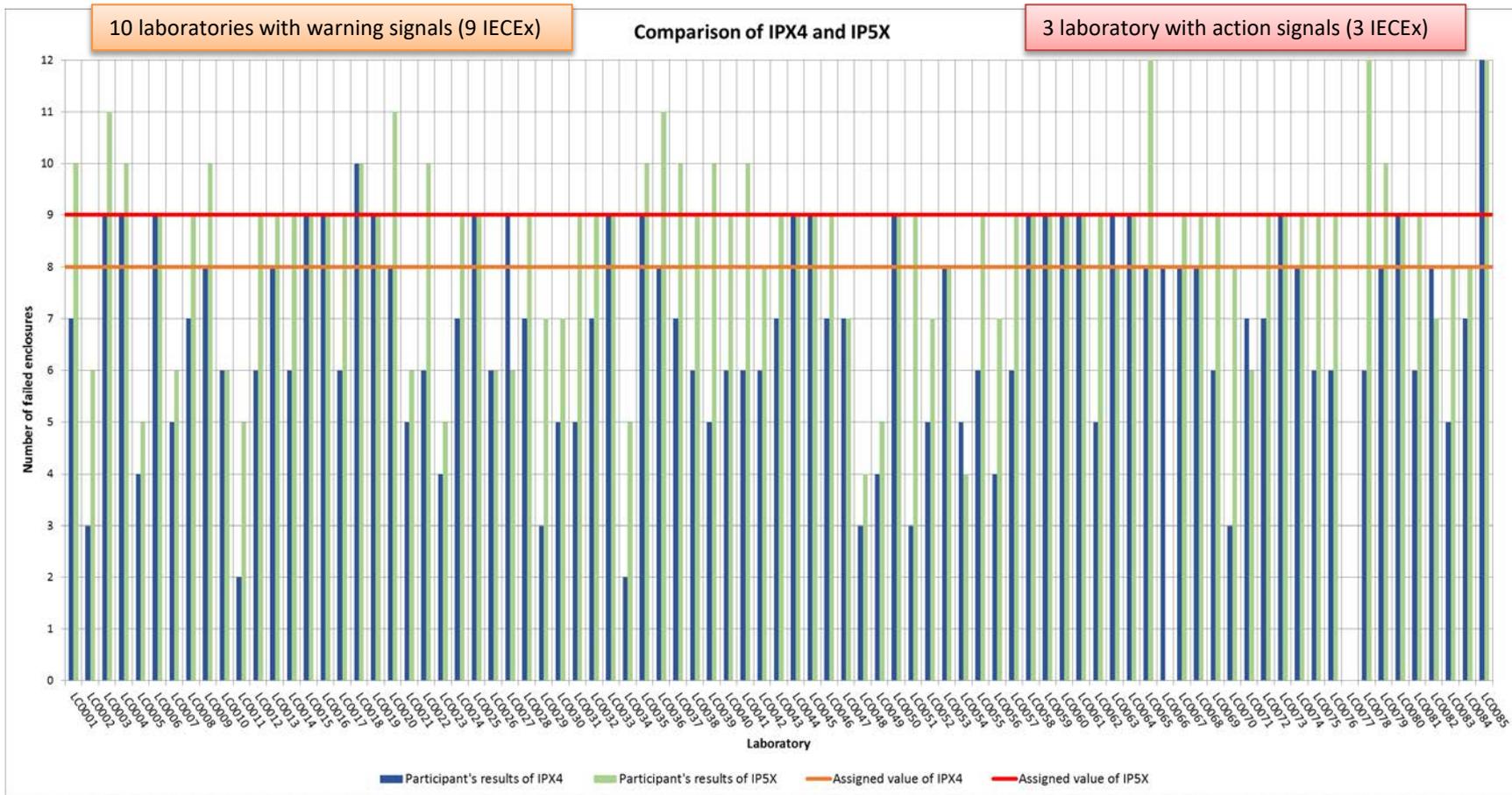
(Interim) Results of the current programs (TE2019)
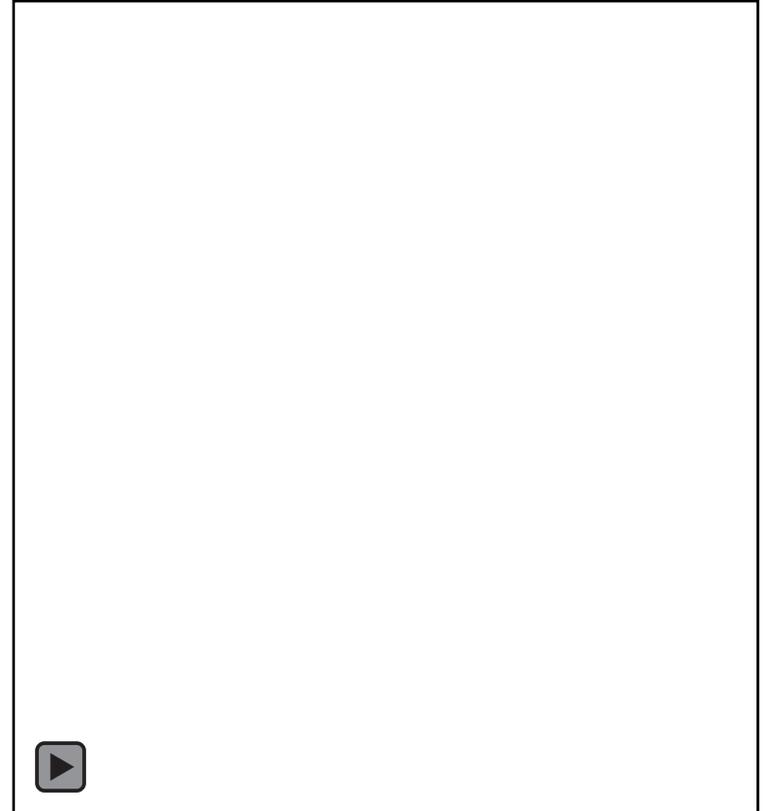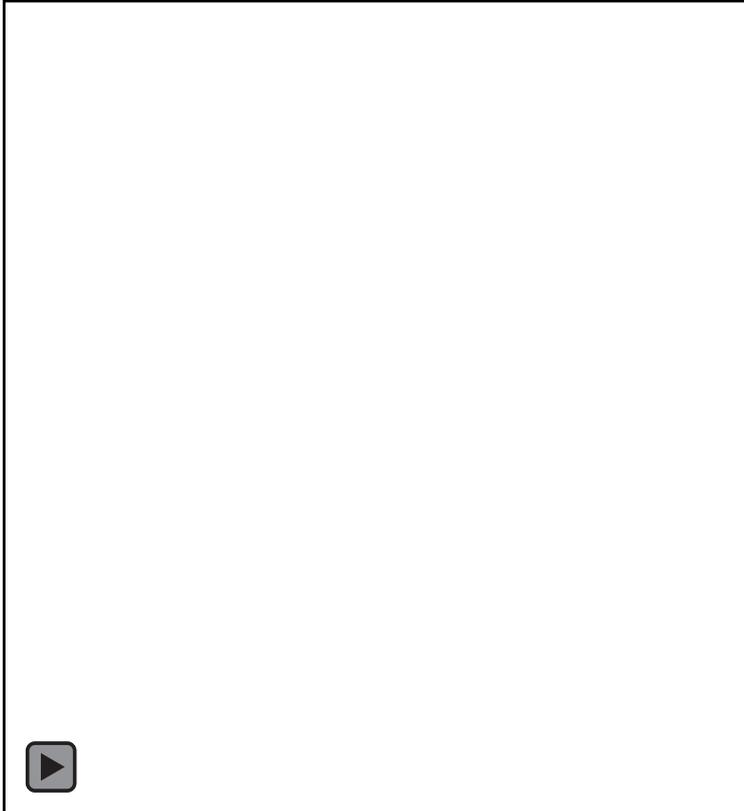
Results/Findings/Discussion – Location of impact

(Interim) Results of the current programs (TE2019)

Results/Findings/Discussion - Shape of impact weight
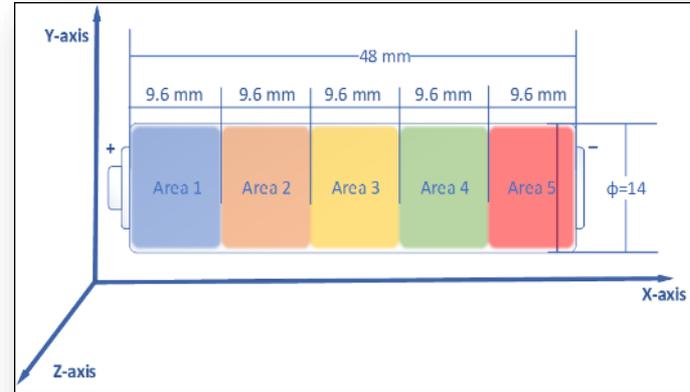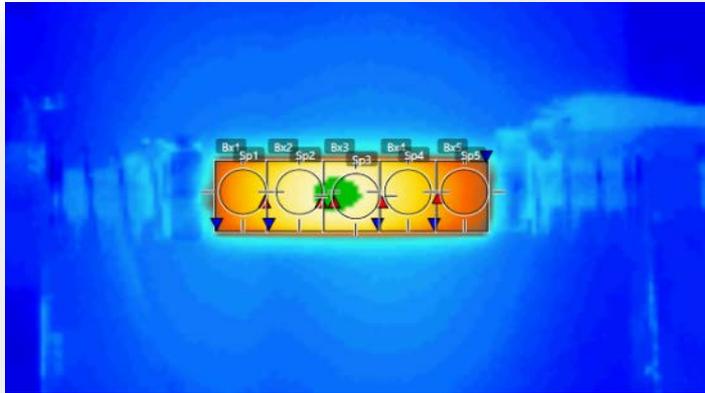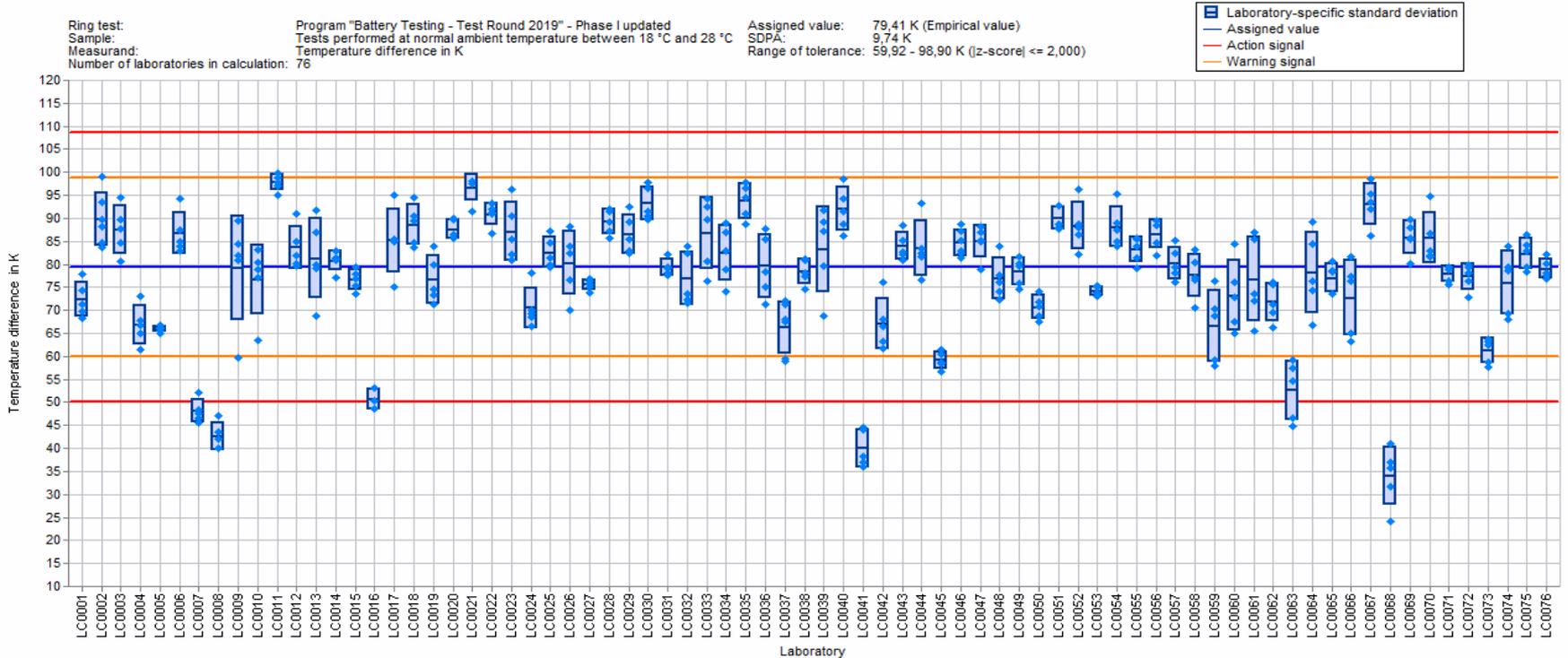
Results/Findings/Discussion - Shape of impact weight

(Interim) Results of the current programs (TE2019)

Results/Findings/Discussion – Performance of test (IPX4)

Hotspot

Green area: maximal temperature field with temperature difference of 1 K

(Interim) Results of the current programs (BT2019)

Temperature difference at the normal ambient temperature

Internal resistance at normal ambient temperature

Results/Findings/Discussion – Hotspot
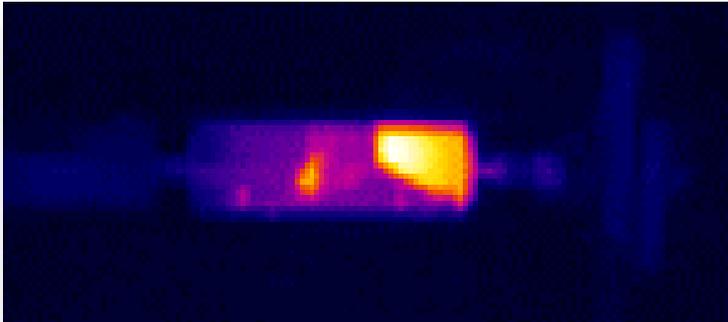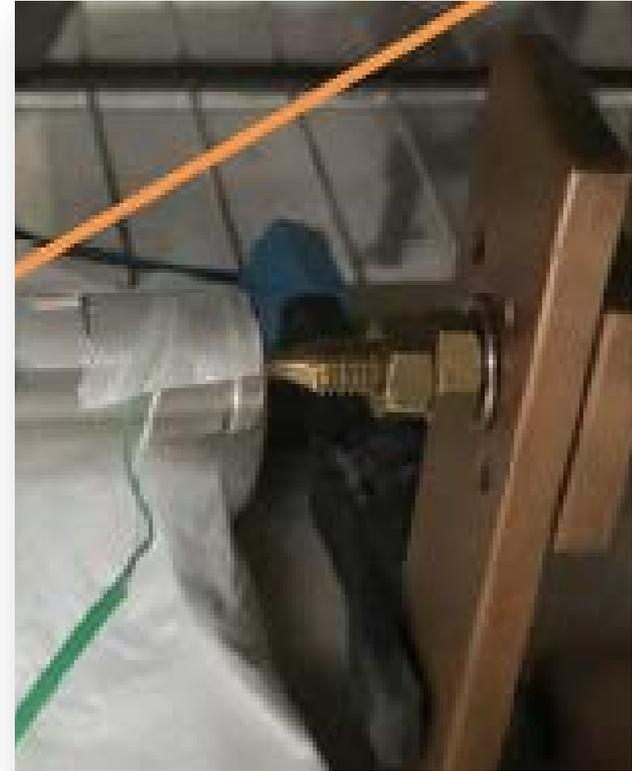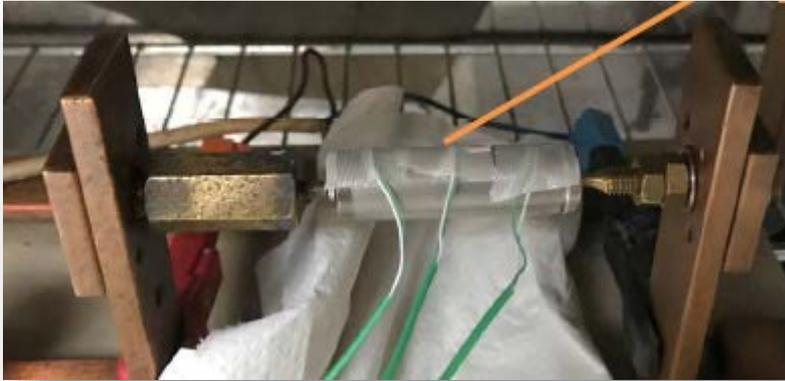
Results/Findings/Discussion – Diameter of thermocouple

1.2 mm

0.5 mm

0.2 mm

0.08 mm

(Interim) Results of the current programs (BT2019)
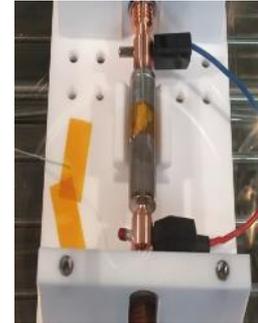
Results/Findings/Discussion – Sampling rate of data acquisition system

Sampling rate of data acquisition	Number of results	Mean of the maximum short-circuit current in A	Standard uncertainty of mean in A	Standard deviation of mean in A
Test results measured with a sampling rate of the data acquisition lower than 1KHz	10	21.40	1.86	5.87
Test results measured with a sampling rate of the data acquisition higher than 1KHz	66	27.00	0.74	6.00
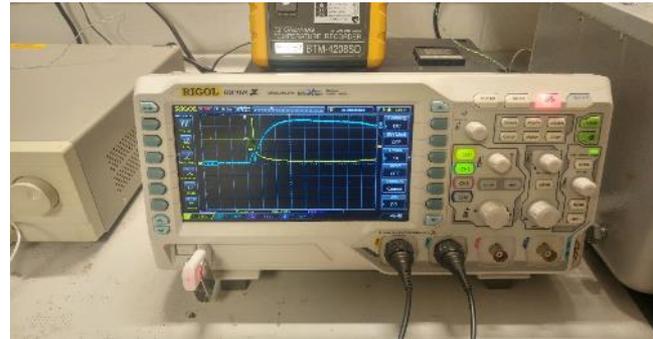
PTB Ex PT Workshops 2020

The two planned PTB Ex PT Workshops in China at NEPSI (from May 13 to May 14, 2020) and in Germany at PTB (from May 25 to May 28, 2020) had to be postponed due to the situation around COVID-19. The postponement dates are as follows:
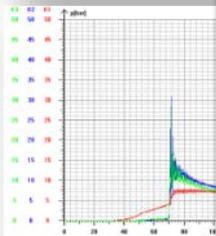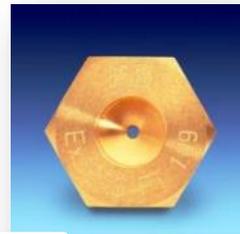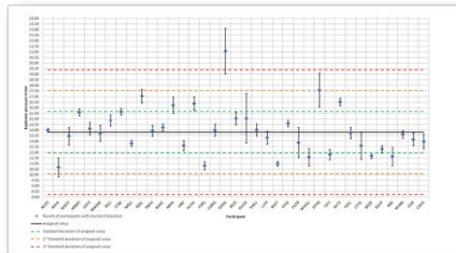
- Shortened PTB Ex PT Workshops 2020 in China at NEPSI: Wednesday, 11th of November 2020 to Thursday, 12th of November 2020

- PTB Ex PT Workshops 2020/2021 in Germany at PTB: Monday, 25th of January 2021 to Thursday, 28th of January 2021

A possible cancellation, further postponement or reorganization of the workshops to a web conference due to the ongoing difficulties around COVID-19 are discussed and will be communicated as soon as possible.

New PT programs for cycle 2021/2022

- Small Component Temperature (according to IEC 60079-0, clause 5.3.3/26.5.3)

- Flameproof Joints (according to IEC 60079-1)

PTB Would you like to know more?

http://www.ex-proficiency-testing.ptb.de/