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TECHNICAL REPORT

colour inside

Climatic field data including validation

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CLIMATIC FIELD DATA INCLUDING VALIDATION

FOREWORD

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IEC/TR 62130, which is a technical report, has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
104/572/DTR	104/577/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

CLIMATIC FIELD DATA INCLUDING VALIDATION

1 Scope

IEC/TR 62130, which is a technical report, provides traceable recommendations from validated field data for updating IEC 60721-2-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60721-1:1982, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

IEC 60721-2-1:1982, *Classification of environmental conditions – Part 2-1: Environmental conditions appearing in nature – Temperature and humidity*
Amendment 1:1987

3 Current IEC 60721-2-1 standard dealing with temperature and humidity

IEC 60721-2-1:1982 and its Amendment 1 (1987) give maps of climatic types with the following parameters:

– mean value of the annual extreme daily mean values of temperature, humidity and highest temperature with RH < 95 %;

– mean value of the annual extreme values of temperature, humidity and highest temperature with RH ≥ 95 %;

– absolute extreme values of temperature, humidity and highest temperature with RH ≥ 95 %.

Values of parameters and maps of statistical open-air climates in the geographical areas of the world are given in Tables 1 to 3, and in Figures 1 and 2, respectively.

Table 1 – Types of climate by extreme daily mean values from the current standard

Type of climate	Mean value of the annual extreme daily mean values of temperature and humidity			
	Low temperature °C	High temperature °C	Highest temperature with RH ≥ 95 % °C	Highest absolute humidity g × m^{-3}
Extremely cold (except Central Antarctic)	–55	+26	+18	14
Cold	–45	+25	+13	12
Cold temperate	–29	+29	+18	15
Warm temperate	–15	+30	+20	17
Warm dry	–10	+35	+23	20
Mild warm dry	0	+35	+24	22
Extremely warm dry	+8	+43	+26	24
Warm damp	+12	+35	+28	27
Warm damp, equable	+17	+33	+31	30

Table 2 – Types of climate by annual extreme values from the current standard

Type of climate	Mean value of the annual extreme values of temperature and humidity			
	Low temperature °C	High temperature °C	Highest temperature with RH ≥ 95 % °C	Highest absolute humidity g × m^{-3}
Extremely cold (except Central Antarctic)	–65	+32	+20	17
Cold	–50	+32	+20	18
Cold temperate	–33	+34	+23	20
Warm temperate	–20	+35	+25	22
Warm dry	–20	+40	+27	24
Mild warm dry	–5	+40	+27	25
Extremely warm dry	+3	+55	+28	27
Warm damp	+5	+40	+31	30
Warm damp, equable	+13	+35	+33	36

Table 3 – Types of climate by absolute extreme value from the current standard

Type of climate	Absolute extreme values of temperature and humidity			
	Low temperature °C	High temperature °C	Highest temperature with RH ≥ 95 % °C	Highest absolute humidity $g \times m^{-3}$
Extremely cold (except Central Antarctic)	–75	+40	+24	20
Cold	–60	+40	+27	22
Cold temperate	–45	+40	+28	25
Warm temperate	–30	+40	+28	25
Warm dry	–30	+45	+30	27
Mild warm dry	–15	+45	+31	30
Extremely warm dry	–10	+60	+31	30
Warm damp	0	+45	+35	36
Warm damp, equable	+4	+40	+37	40

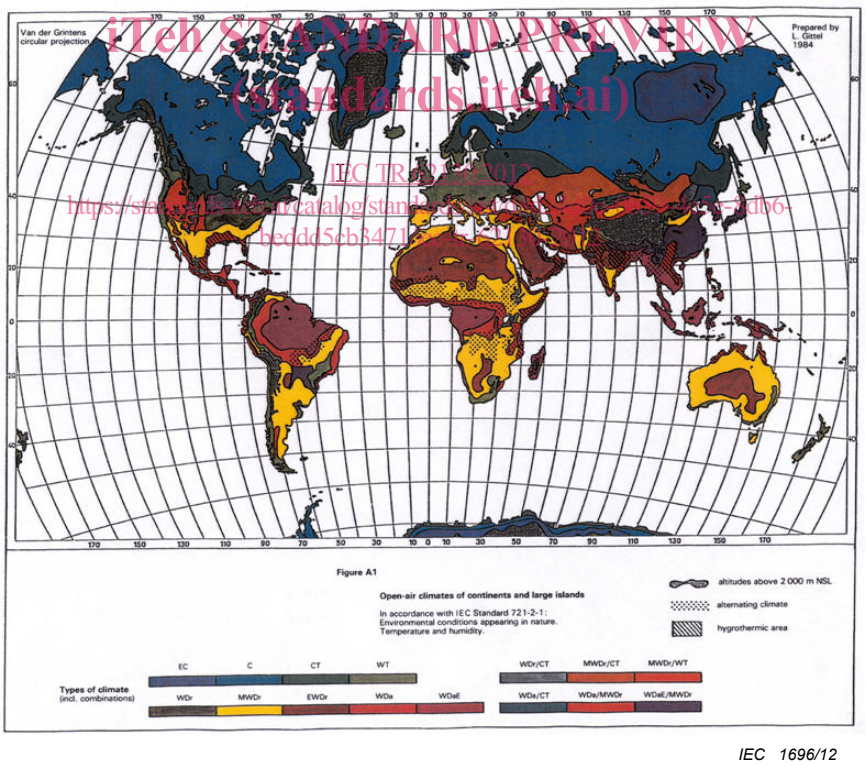

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Figure 1 – Current map showing types of climate and their combinations

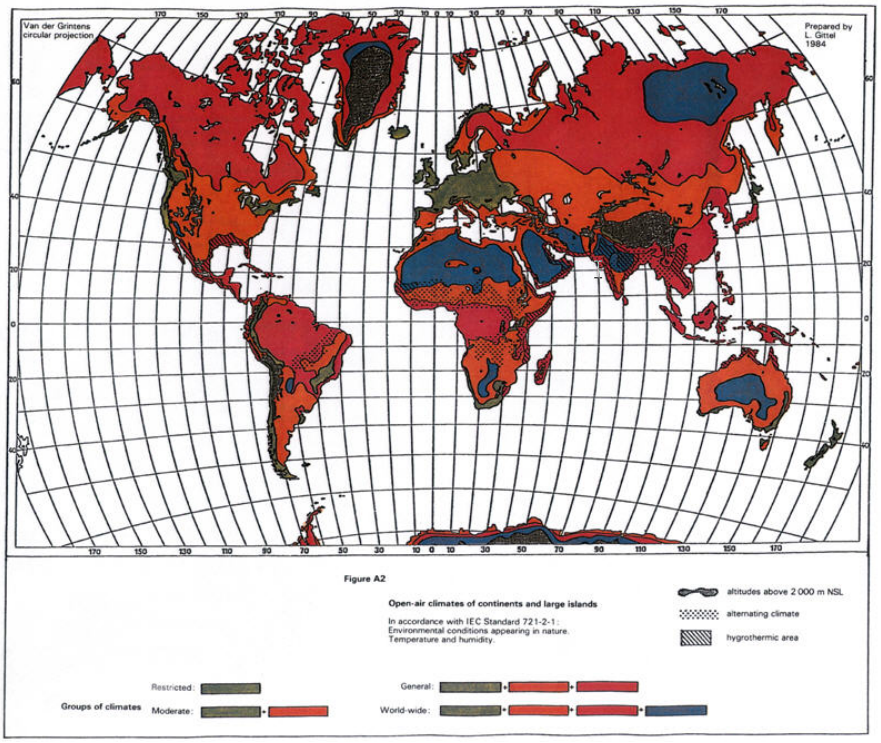

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Figure 2 – Current map showing the groups of climates

4 Task 1

The purpose of task 1 is to collect field data and to collate the validated data into a form suitable for comparison with IEC 60721-2-1.

The field data was collected from two independent main sources. The data was organized, arranged and analysed using a spreadsheet (Figure 3 and attachment). Annex A shows the graphical data based on the data in Annex B. The validation process is described in details in Clauses 5 and 6.

				Mean value of the annual extreme daily mean values of temperature and humidity			Mean value of the annual extreme values of temperature and humidity			Absolute extreme value of temperature and humidity				
	City or Locaton	Proposal	Type according the map by M.Kottek et al	Low temperature (°C)	High temperature (°C)	Highest absolute humid	Low temperature (°C)	High temperature (°C)	Highest absolute humidi	Low temperature (°C)	High temperature (°C)	Highest absolute humid	Years on record	
4	Akureyri, IL	very low	polar	-11	19	13	-17	23	14	-19	27	21	1973-1992	Expert CD, 1997
5	Jan Mayen, No	very low	polar	-14	11	8	-19	12	8	-26	18	11	1973-1992	Expert CD, 1997
6	Godthab, GL	very low	polar	-14	14	9	-21	18	10	-28	21	13	1973-1992	Expert CD, 1997
7	Eureka, CN	very low	polar	-35	1	5	-50	15	7	-53	19	9	1973-1992	Expert CD, 1997
8	Mould Bay, airport, CN	very low	polar	-34	2	5	-47	13	8	-53	19	11	1973-1992	Expert CD, 1997
9	Resolute airport, CN	very low	polar	-32	2	7	-45	13	9	-51	16	25	1973-1992	Expert CD, 1997
10	Sondre Stromfjord	very low	polar	-26	15	8	-40	21	9	-46	22	11	1973-1992	Expert CD, 1997
11	Forbisher, CN	very low	polar	-26	10	8	-42	23	10	-45	25	32	1973-1992	Expert CD, 1997
12	Thule, CN	very low	polar	-26	8	6	-39	15	7	-44	20	9	1973-1992	Expert CD, 1997
13	Fort Reliance, CN	very low	polar	-27	16	10	-45	28	14	-52	33	21	1973-1992	Expert CD, 1997
14		very low	Polar	-40	25	15	-50	30	20	-60	35	25		
15	Harbin,China	Low	snow	-14	24	14	-33	33	23	-37	37	29	1973-1992	Expert CD, 1997
16	Nome, AK, US	very low	snow	-24	16	9	-37	25	12	-47	28	16	1973-1992	Expert CD, 1997
17	Chibougamau-Chapais, CN	very low	snow	-21	21	13	-40	31	17	-44	35	20	1973-1992	Expert CD, 1997
18	Mountain Home, ID, US	Intermediate	Snow	-13	31	13	-20	40	14	-30	43	23	1973-1992	Expert CD, 1997
19	Renner, KS, US	Intermediate	Snow	-12	33	14	-24	37	18	-32	40	21	1973-1992	Expert CD, 1997
20	Jinzhou,China	Intermediate	snow	-6	29	15	-19	34	27	-23	37	37	1973-1992	Expert CD, 1997
21	Yulin,China	Intermediate	snow	-10	27	13	-23	35	19	-29	39	26	1973-1992	Expert CD, 1997
22	Pyongynag,N.Korea	Intermediate	snow	-5	25	17	-20	33	24	-25	35	29	1973-1992	Expert CD, 1997
23	Beijing,China	Intermediate	snow	-1	28	16	-14	37	26	-17	39	29	1973-1992	Expert CD, 1997
24	Griffiss AFB/Rome, NY, US	Low	snow	-13	28	17	-27	34	22	-34	36	24	1973-1992	Expert CD, 1997
25	Winnipeg Intl Airport, CN	Low	snow	-18	25	13	-35	35	20	-38	38	24	1973-1992	Expert CD, 1997
26	Huron Regional, SD, US	Low	snow	-16	31	16	-31	39	22	-38	42	25	1973-1992	Expert CD, 1997
27	Andoya NORWAY	Intermediate	snow	-11	16	10	-16	23	12	-20	26	16	1973-1992	Expert CD, 1997
28	Oslo NORWAY	Intermediate	snow	-10	22	12	-19	30	15	-26	35	17	1973-1992	Expert CD, 1997
29	Shengyang,China	Low	snow	-8	26	15	-25	34	24	-28	38	27	1973-1992	Expert CD, 1997
30	Jyvaskyla FINLAND	Low	snow	-18	19	12	-31	28	16	-38	34	23	1973-1992	Expert CD, 1997
31	Kajaani FINLAND	Low	snow	-21	18	11	-34	27	15	-41	30	19	1973-1992	Expert CD, 1997
32		Low	Snow	-25	35	25	-45	45	25	-50	45	30		
33	Gibraltor	High	WT	9	31	17	5	36	18	-1	39	20	1973-1992	Expert CD, 1997
34	Palma Mallorca SPAIN	High	WT	2	30	19	-3	36	24	-6	40	29	1973-1992	Expert CD, 1997
35	Rabat, Morocco	High	WT	13	23		5	38		0	48		1973-1992	Expert CD, 1997
36	Naples ITALY	High	WT	3	30	19	-2	36	25	-5	40	32	1973-1992	Expert CD, 1997
37	Posadas airport, AG	High	WT	6	37	25	1	39	27	-2	41	36	1973-1992	Expert CD, 1997
38	Buenos Aires, AG	High	WT	1	33	21	-3	37	24	-4	40	29	1973-1992	Expert CD, 1997
39	Shanghai,China	High	WT	3	31	22	-6	37	28	-9	39	30	1973-1992	Expert CD, 1997
40	Fukuoka,Japan	High	WT	4	29	20	-4	35	25	-7	38	29	1973-1992	Expert CD, 1997
41	Palermo ITALY	High	WT	10	33	21	5	37	26	2	43	34	1973-1992	Expert CD, 1997
42	Athens GREECE	High	WT	6	30	17	0	37	21	-3	41	26	1973-1992	Expert CD, 1997
43	Osaka(Itami),Japan	High	WT	4	28	19	-4	36	24	-7	38	27	1973-1992	Expert CD, 1997
44	Tokyo,Japan	High	WT	5	28	19	-3	34	25	-5	37	27	1973-1992	Expert CD, 1997

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Figure 3 – Screenshot from data analysis spreadsheet

5 Task 2

5.1 General

The purpose of task 2 is to ensure traceability of the comparison process.

5.2 Description of the comparison process

The high level process for updating IEC 60721-2 standards [1][1] is given in Figure 4. The process has four main phases. The traceability between measured field data and values given in the standard can be achieved by following this process. Detailed actions that were carried out in each phase are given in Table 4. To ensure full traceability, it is crucial that all process phases are documented and that the sources used can be found in the future.

In Phase 1, it is decided what standards will be reviewed and possibly updated. In Phase 2, data sources are identified and data is collected with certain attributes. Analysis of data and comparison to current values in the particular standard takes place in Phase 3. The data comparison process is a key phase to ensure traceability of data and it can vary depending on which parameters are in question. This phase is described in detail in Clause 6. The output of the process (Phase 4) helps the maintenance team decide how a standard should be updated and/or modified. The decision can also be a proposal to leave the parameters in the standard as they are.

1 References in square brackets refer to the Bibliography.