

IEC TC 31 standards for Ex Equipment

standardisation

- not only for IECEx

- development of a standard

March 15th, 2024

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Head of PTB-Department „Explosion Protection in
Sensor Technology and Instrumentation“

Immediate Past Chair of ExNBG

IEC TC 31 Chair “Equipment for Explosive Atmospheres”

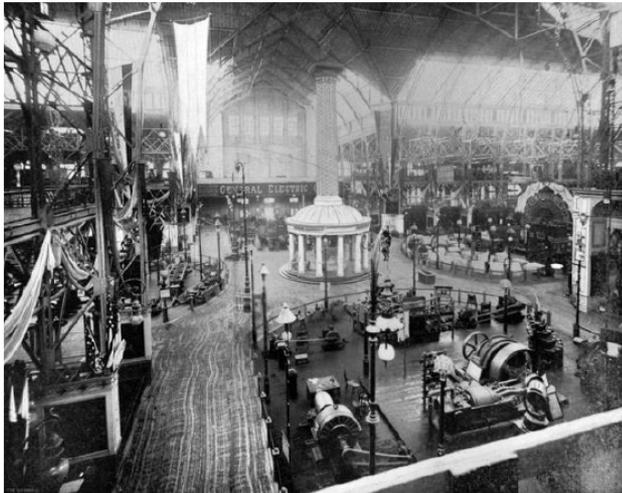


International Standardisation

IEC TC 31



IEC: the beginning..... St. Louis 1904: palace of electricity



- International Electrotechnical Commission (IEC) – Swiss incorporated Not For profit Company
- Officially formed in 1906 – Lord Kelvin the first IEC President
- Formed to serve needs of industry
- Continues to evolve to the needs of industry

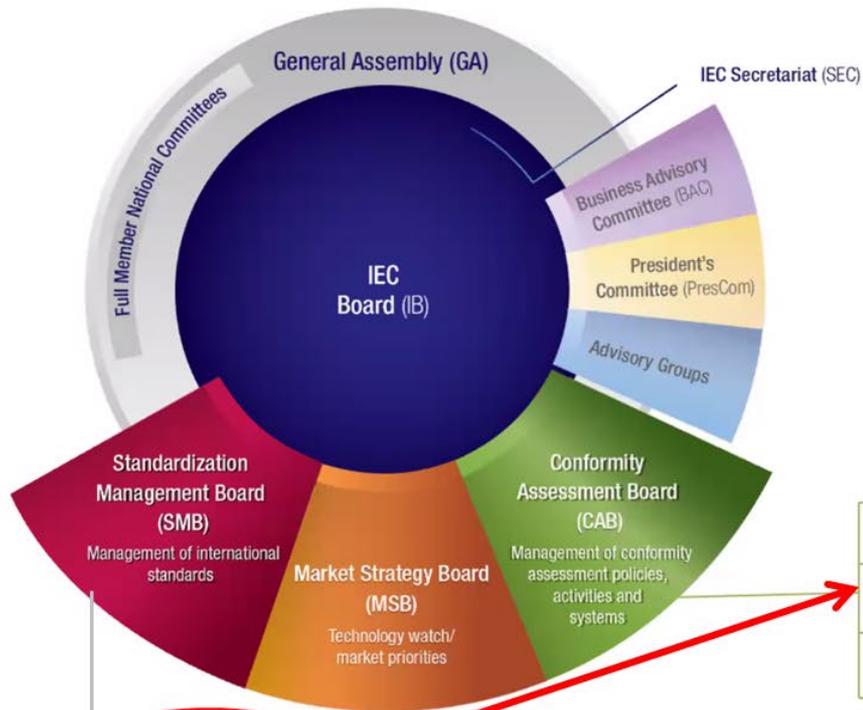
During the 1904 Convention of Scientists it was felt that a need exists to “*Standardise on Terminology*” when discussing Electrotechnology, thereby planting the seed for IEC. In 1906 IEC was formed with TC 1 “Terminology” the first Committee of IEC and still exists today.



In 1947, at the instigation of IEC General Secretary, Charles Le Maistre, ISA (International Federation of the National Standardising Associations) expanded its field of activity and changed its name to ISO.

IEC and ISO continue to collaborate, eg ISO/IEC Directives, Joint JTC1 + ISO/IEC 17XXX + More





Core principles:

- Transparency & Accountability
- Performance management
- Diversity

- IECEE
- IECEX
- IECQ
- IECRE

IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components
 IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres
 IEC Quality Assessment System for Electronic Components
 IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications



TC 31

- Equipment for explosive atmospheres

TC 31 Scope

To prepare and maintain international standards relating to equipment for use where there is a hazard due to the possible presence of explosive atmospheres of gases, vapours, mists or combustible dusts

ESTABLISHED
1948

1948	1957	2003	2005	2023
Conception	1 st standard 'flameproof'	IECEX 1 st certificate	SC 31M joint ISO/IEC work begins	>50 publications

IEC 60079 and ISO/IEC 80079 series
used for 1st, 2nd and 3rd party assessment



IEC TC 31 – overview



Classification and characterisation of explosion hazards and hazardous areas

Ventilation systems

Electrical installations and maintenance

Electrical Ex Equipment

Flammable properties of materials
gas/vapour/dusts

Mechanical Ex Equipment

Gas detectors –
design and use

QMS,
assemblies
and others

New projects:

Ignition systems, Portable electronic equipment, Flame arrestors, Personnel competency, Explosion venting devices, Basic Safety Publication



IEC TC 31
Equipment for explosive atmosphere



IEC SC 31G
Intrinsically-safe apparatus



IEC SC 31J
Classification of hazardous areas and installation requirements



IEC SC 31M
Non-electrical equipment and protective systems for explosive atmospheres





Info Resources - TC 31 Dashboard

International Electrotechnical Commission
International Standards and Conformity Assessment for all electrical, electronic and related technologies

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Standards development > How we work > Technical Committees & Subcommittees > **TC 31 Dashboard**

TC 31 Equipment for explosive atmospheres

Scope | Structure | Projects / Publications | Documents | Votes | Meetings | Collaboration Tools

Work programme | Publications | Stability Dates | Project files | Log in | En | Fr

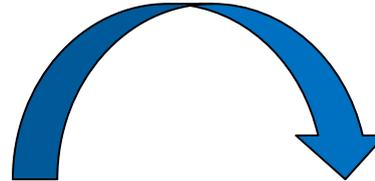
TC 31 Work programme (10)

Project Reference	Document Reference	Init. Date	Current Stage	Next Stage	Working Group	Project Leader	Fcst. Publ. Date
IEC 60079-0 Ed. 7.0 Explosive atmospheres - Part 0: Equipment - General requirements	31/1197/CD 1455 kB	2014-11	2CD 2015-05	A3CD 2015-09	WG 22	William Lawrence	2017-11
IEC 60079-13 Ed. 2.0 Explosive atmospheres - Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"	31/1129/CDV 376 kB 488 kB	2013-12	ADIS 2014-11	DEC 2015-05	MT 60079-13	Dalia El-Tawy	2015-10

- <http://www.iec.ch/tc31>
- All website lists are dynamic information

IECE_x

IEC TC 31 → ...





IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEX PTB 18.0004X	Issue No: 0	Certificate history: <small>Issue No. 0 (2018-10-09)</small>
Status:	Current	Page 1 of 3	
Date of Issue:	2018-10-09		
Applicant:	Siemens AG Werner-von-Siemens-Straße 48 92220 Amberg Germany		
Equipment:	SIRIUS Motor Management and Control Devices - SIMOCODE pro Types 3UF7011 ..., 3UF712 ...		
Optional accessory:			
Type of Protection:	control of ignition sources "b", type b1		
Marking:	I (1G/M2) [Ex h Ga/Mb]; II (1/2) G [Ex h Ga/Gb]; II (1G/2D) [Ex h Ga/Db]		
Approved for issue on behalf of the IECEx Certification Body:	Dr.-Ing. Martin Thedens		
Position:	Head of Working Group 3.73		
Signature: <small>(for printed version)</small>	_____		
Date:	_____		

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100
38116 Braunschweig
Germany





IECEX Test Report Summary

Page 1 of 1

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

EXTR Reference No.	DE/PTB/EXTR18.0035/00	Status	Current
EXTR Free Ref. No.	PTB Ex 18-58042	Date of Issue	2018-10-09
List of Standards Covered	ISO 80079-36 (Ed.1.0), ISO 80079-37 (Ed.1.0)		
Issuing ExTL	PTB - Physikalisch-Technische Bundesanstalt (PTB)		
Endorsing ExCB	PTB - Physikalisch-Technische Bundesanstalt (PTB)		
Manufacturer	Siemens AG, Werner-von-Siemens-Straße 48, 92220 Amberg		
Location of Manufacturer	Germany		
Ex Protection	control of ignition sources "b", type b1		
Product information	SIRIUS Motor Management and Control Devices - SIMOCODE pro		
Model Reference	3UF7011 ..., 3UF712 ...		
Ratings	N/A		
Related IECEx Certificates	IECEX PTB 18.0004X issue: 0		
Comments	N/A		



ExTRs are based on IEC TC 31 standards



- ExTR Cover

- ExTR 60079-0
- ExTR 60079-...
- ExTR 80079-...

IECEX TEST REPORT COVER	
ExTR Reference Number	
ExTR Free Reference Number	
Compiled by + signature (ExTL).....	(enter typed name here) (enter signature here)
Reviewed by + signature (ExTL).....	(enter typed name here) (enter signature here)
Endorsed by + signature (ExCB).....	(enter typed name here) (enter signature here)
Date of issue	
Ex Testing Laboratory (ExTL)	
Address	
Ex Certification Body (ExCB)	
Address	
Applicant's name.....	
Address	
Standards associated with this ExTR package	
Clauses considered	(All clauses considered / Only specific clauses considered)
Test Report Form Number	ExTR Cover_10 (released 2022-10)
Related Amendments, Corrigenda or ISHS	
Test item description	
Model/type reference.....	
Code (e.g. Ex_ II_ T_).....	
Rating	

IECEX TEST REPORT IEC 60079-0 Explosive atmospheres – Part 0: Equipment – General requirements	
ExTR Reference Number	
ExTR Free Reference Number	
Compiled by + signature (ExTL).....	(enter typed name here) (enter signature here)
Reviewed by + signature (ExTL).....	(enter typed name here) (enter signature here)

IECEX TEST REPORT IEC 60079-11 Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "I"	
Date of issue	
Ex Testing Laboratory (ExTL)	
Address	
Applicant's name.....	
Address	
Standard	
Test procedure	
Test Report Form	
Related Amendment	
ISHS	
ExTR Reference Number	

IECEX TEST REPORT IEC TS 60079-46 Explosive atmospheres – Part 46: Equipment assemblies	
ExTR Reference Number	
ExTR Free Reference Number	

IECEX TEST REPORT ISO 80079-36 Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements	
ExTR Reference Number	

IECEX TEST REPORT ISO 16852 Flame arresters — Performance requirements, test methods and limits for use	
ExTR Reference Number	
ExTR Free Reference Number	
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Reviewed by + signature (ExTL).....	(enter typed name here) (enter signature here)
Date of issue	
Ex Testing Laboratory (ExTL)	
Address	
Applicant's name	
Address	
Standard	ISO 16852:2016, Second edition
Test Report Form Number	ExTR16852_2A (released 2017-01)
Related Amendments, Corrigenda or ISHS	



IECEX ExTR ↔ IEC standard (1)



		IECEX TEST REPORT COVER	
EXTR Reference Number			
ExTR Free Reference Number			
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Reviewed by + signature (ExTL).....	(enter typed name here)	(enter signature here)	
Endorsed by + signature (ExCB)	(enter typed name here)	(enter signature here)	
Date of issue			
Ex Testing Laboratory (ExTL)			
Address			
Ex Certification Body (ExCB)			



IEC 60079-0

Edition 7.0 2017-12

INTERNATIONAL
STANDARD

NORME
INTERNATIONALE

Explosive atmospheres –
Part 0: Equipment – General requirements

		IECEX TEST REPORT	
		IEC 60079-0	
Explosive atmospheres – Part 0: Equipment – General requirements			
EXTR Reference Number			
ExTR Free Reference Number			
Compiled by + signature (ExTL)	(enter typed name here)	(enter signature here)	
Reviewed by + signature (ExTL).....	(enter typed name here)	(enter signature here)	
Date of issue			
Ex Testing Laboratory (ExTL)			
Address			
Applicant's name			
Address			
Standard	IEC 60079-0:2017, Edition 7.0		
Test procedure	IECEX System		
Test Report Form Number	ExTR60079-0-7F-DS (released 2022-10)		
Related Amendments, Corrigenda or ISHS			
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IECEx ExTR ↔ IEC standard (2)

ExTR Reference No.

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
1 DS 2021/004	Scope		
2	Normative references		
3 DS 2020/002	Terms and definitions		
4	Equipment grouping		
4.1	General		
4.2	Group I		
4.3	Group II		
4.4	Group III		
4.5	Equipment for a particular explosive gas atmosphere		
5 DS 2016/002 DS 2015/011A	Temperatures		
5.1	Environmental influences		
5.1.1	Ambient temperature		
5.1.2 DS 2022/002	External source of heating or cooling		
5.2 DS 2020/006	Service temperature		
5.3	Maximum surface temperature		
5.3.1	Determination of maximum surface temperature		

– 2 –

IEC 60079-0:2017 © IEC 2017

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IECEX ExTAG Decision Sheets

- IECEx DS are used only for clarification of the use / understanding of a standard.
- The interpretation of a standard is the task of IEC TC 31.



DS 2022/002
May 2022

COLLECTION OF IECEx / ExTAG DECISIONS

Standard: IEC 60079-1:2014 IEC 60079-1:2007 IEC 60079-0:2017 IEC 60079-0:2011 IEC 60079-0:2007	Clauses: 15.2.2 15.1.2 5.1.2 5.1.2 5.1.2	Draft Decision Sheet: ExTAG/670/CD
Subject: Influence of a separate external source of cooling on reference pressure testing Status of document: Approved	Key words: <ul style="list-style-type: none"> • External source of cooling • Reference pressure testing • Process temperature • Ambient temperature 	Date: May 2022 Originator of proposal: UL LLC TC/SC involved: IEC/TC 31 MT 60079-1, WG 22

BACKGROUND:

Consider flameproof "Ex d" equipment that is intended to be physically connected to a separate external source of cooling, such as a process temperature of -197 °C.

QUESTION:

Should reference pressure testing at low ambient, as required by IEC 60079-1, be solely determined based on the minimum ambient of the rated Ta range, or should the effect of the process temperature on the equipment be considered when determining reference pressure?

ANSWER:

IEC 60079-0 requires consideration of external sources of heat and cooling. Since IEC 60079-1 does not take exception to this requirement from IEC 60079-0, and since low temperatures can affect the reference pressure, therefore the effect of the process temperature on the equipment is to be considered when determining reference pressure in accordance with IEC 60079-1. This position is



DS 2021/004
May 2021

COLLECTION OF IECEx / ExTAG DECISION

Standard: IEC 60079-0:2017 (Ed. 7.0) IEC 60079-0:2011 (Ed. 6.0)	Clause: 1 1	Draft Decision Sheet: ExTAG/622C/CD
Subject: Certification of equipment/assemblies using temperature monitoring/adjustment techniques to adjust internal ambient temperatures Status of document: Approved	Key words: - Ambient temperature	Date: 2021 05 21 Originator of proposal: UL LLC TC/SC involved: WG22

Background:

Equipment assemblers and manufacturers have made requests to certify equipment with a rated ambient temperature range beyond that of some incorporated internal devices. An example of this is a control panel containing a power supply, an intrinsic safety barrier, and other switchgear. The power supply and IS barrier are rated (-20C to +40C), but the panel manufacturer wants the complete control panel to be rated for (-40C to +50C).

To mitigate this issue when the equipment is energized, manufacturers have proposed to install heaters or refrigerators with interlocked sensors, or other methods of ensuring that the internal devices (for example, power supply or IS barrier) cannot be energized unless the internal surrounding air is within the rated ambient range for those internal devices within the assembly.

However, this ambient temperature concern can also be an issue when the equipment is not



CEN & CENELEC / regional standardisation

IEC TC 31 → ...

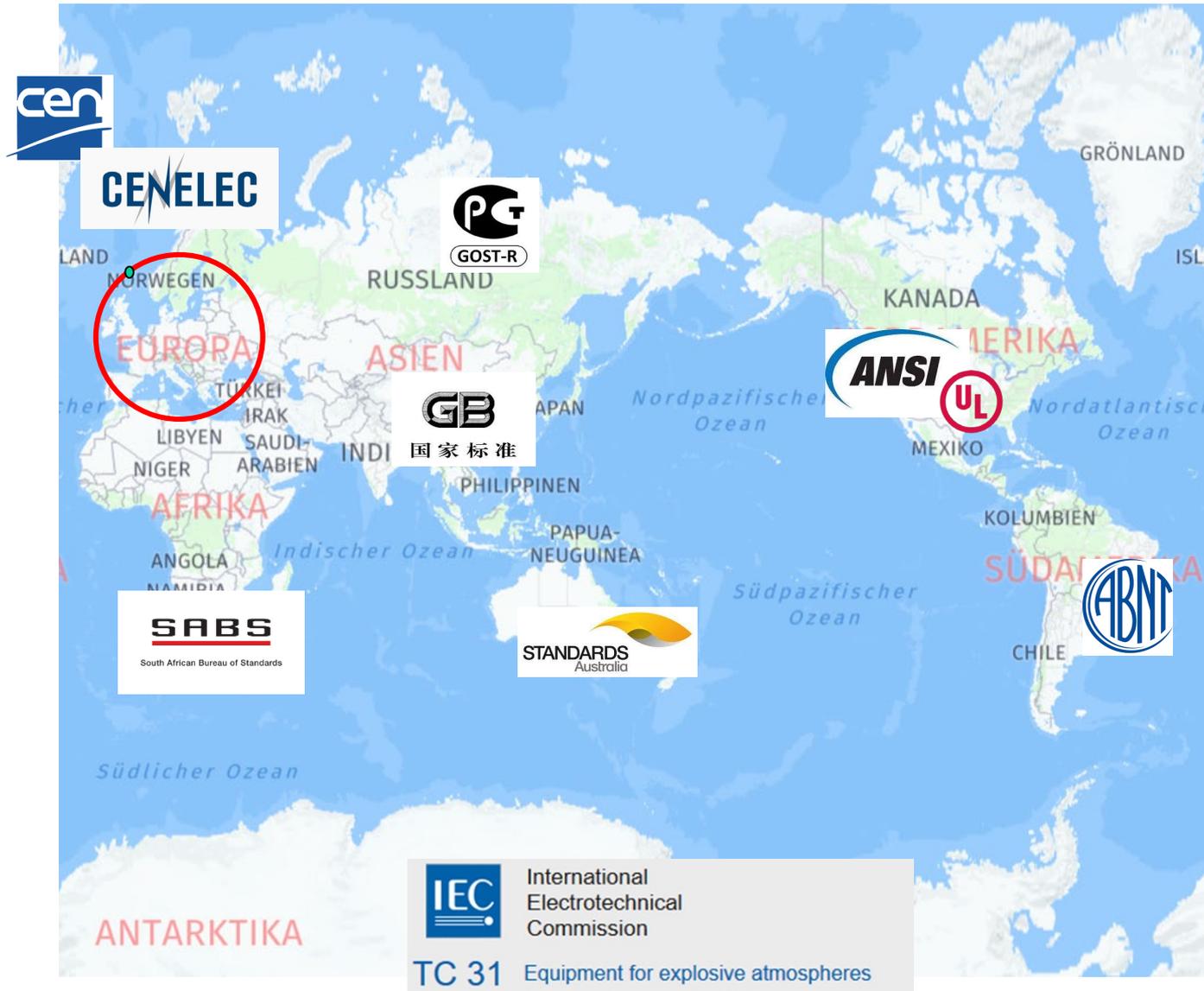
Conformity Assessment - worldwide



IEC International Electrotechnical Commission
TC 31 Equipment for explosive atmospheres



Standardisation - worldwide



IEC TC 31 standards are used...



some examples:

- by **IECEX**
→ for international conformity assessment
- in **Europe**
by CEN and CENELEC as EN standards
(without **technical** modifications)
→ for conformity assessment according ATEX Directive 2014/34/EU
- in **China** as GB standards
(mainly with modifications; partly older IEC-Editions)
- in **North America** e.g. adopted by UL
(partly with national deviations)

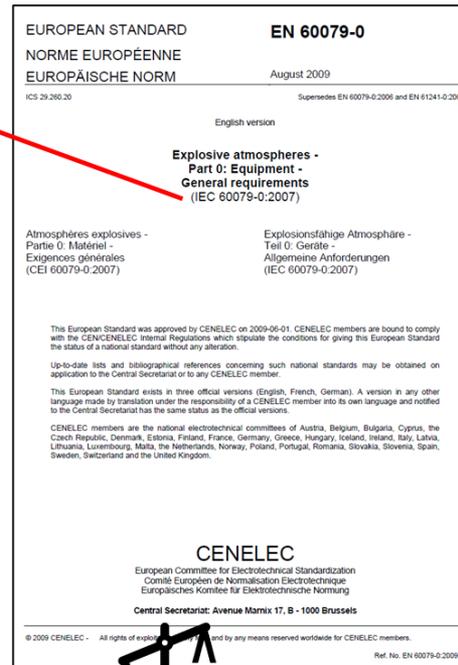


EN version of an IEC standard

- **EN IEC 60079-0**
 - no technical modification
- **EN 60079-30-1**
 - European modification or European version



94 pages



10 pages

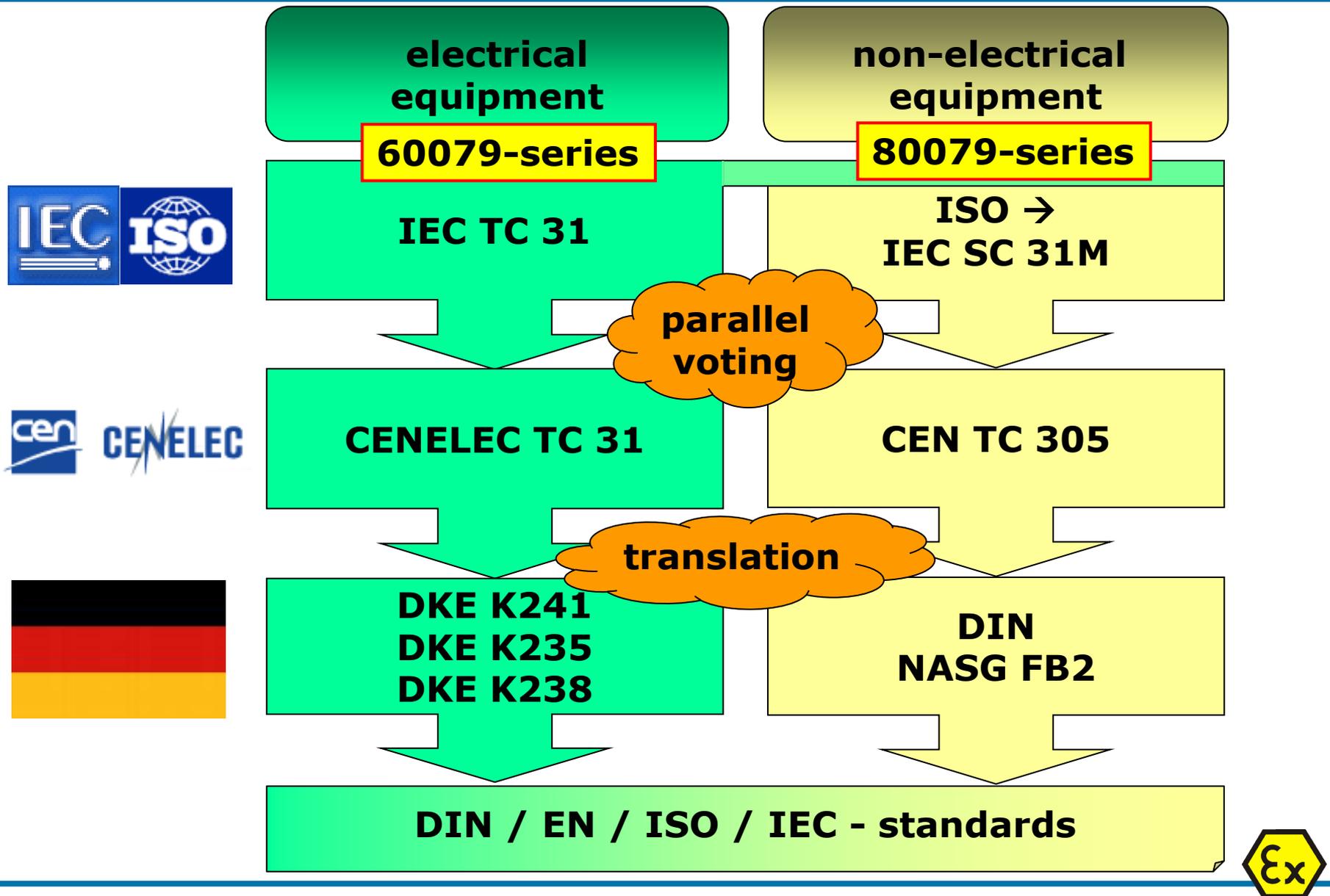


Annex ZA (normative)
Normative references
int. pub. → European pub.

Annex ZY (informative)
Add. requirements acc.
ATEX-Directive

Annex ZZ (informative)
EHSRs ↔ standard

e.g. Standardisation in Germany



How to draft a standard

IEC TC 31 → ...



IEC Publications – International Standard (IS)

A document, established by consensus and approved by IEC, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context



**$\geq 2/3$ vote in favour by TC/SC P-members
 $\leq 1/4$ negative vote from all IEC members voting**

Published when:

- The subject is still under technical development
- Insufficient consensus for approval of an IS is available
- There is doubt that consensus has been achieved
- Other reason precluding immediate publication of an IS



≥ 2/3 vote in favour by TC/SC P-members voting



IEC Publications – Technical Report (TR)

- Informative document
- Data of a different kind, e.g.
 - Scientific supporting material
 - Data collection
 - Results of surveys
 - State of the art
 - Supplementary information or explanation



**Approved by simple majority vote
of TC/SC P-members voting**



Standards process - New / Maintenance

Project stage	Associated document	Acronym
Preliminary	Preliminary work item	PWI
Proposal	New work item proposal ^a	NP
Preparatory	Working draft(s) ^a	WD
Preparatory	Questionnaire or Doc. For Comment Review Report	Q or DC RR
Committee	Committee draft(s) ^a	CD
Enquiry	Enquiry draft ^b	CDV
Approval	Final Draft International Standard ^a	FDIS
Publication	International Standard	

a) These stages may be omitted

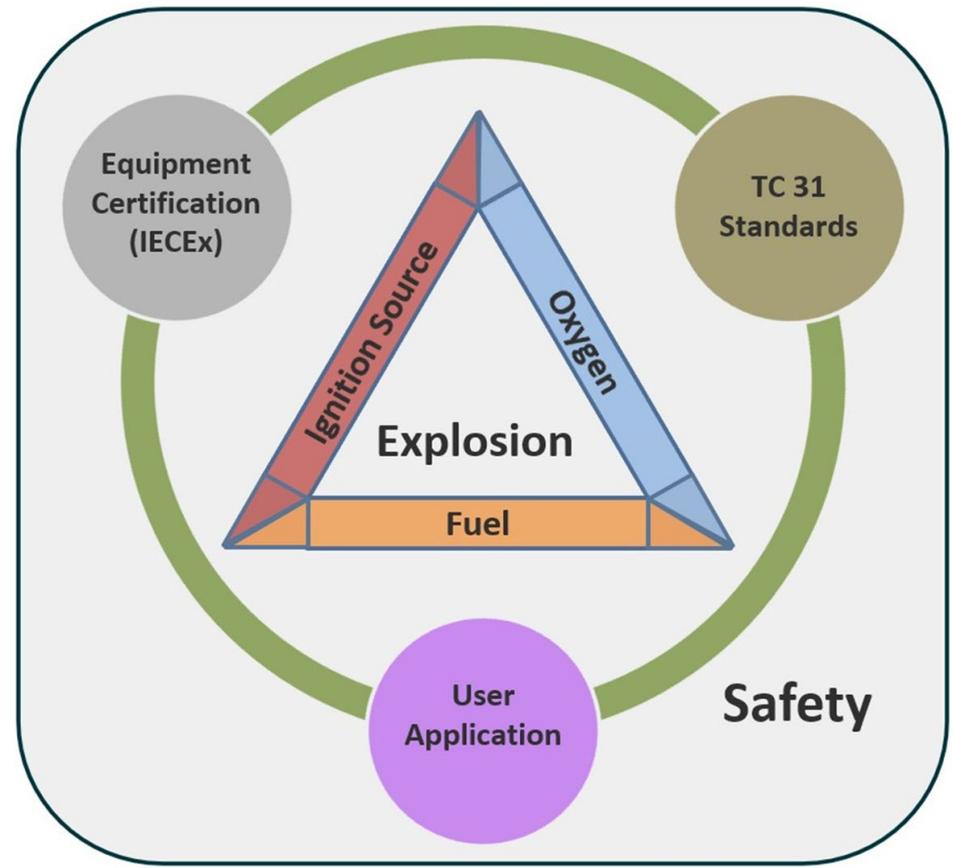
b) Draft International Standard in ISO, committee draft for vote in IEC

Share your experience...

...to improve the standards!



WE WANT YOU!



Source: Neil Dennis (AECOM)

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