

ATEX Yönetmeliklerinde Gelecege Bakis

2nd ATEX Sempozyum on Explosion Protection of TMMOB Kocaeli Subesi and Istanbul Subesi 26th-27th-28th of September, 2013, Gebze, Turkey

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PTB

Bundesministerium für Wirtschaft und Technologie

The ATEX Regulation – a „New Approach“ Directive System

Accident in Oppau, Germany

Der Herd der Explosion und der Umfang der Zerstörung im Oppauer Werk der Badischen Anilin- und Sodafabrik (B. A. S. F.). Im Vordergrunde der durch die Sprengwirkung entstandene ungeheure Trichter von 125 m Länge, 90 m Breite und 19 m Tiefe, über dem der Silo stand.

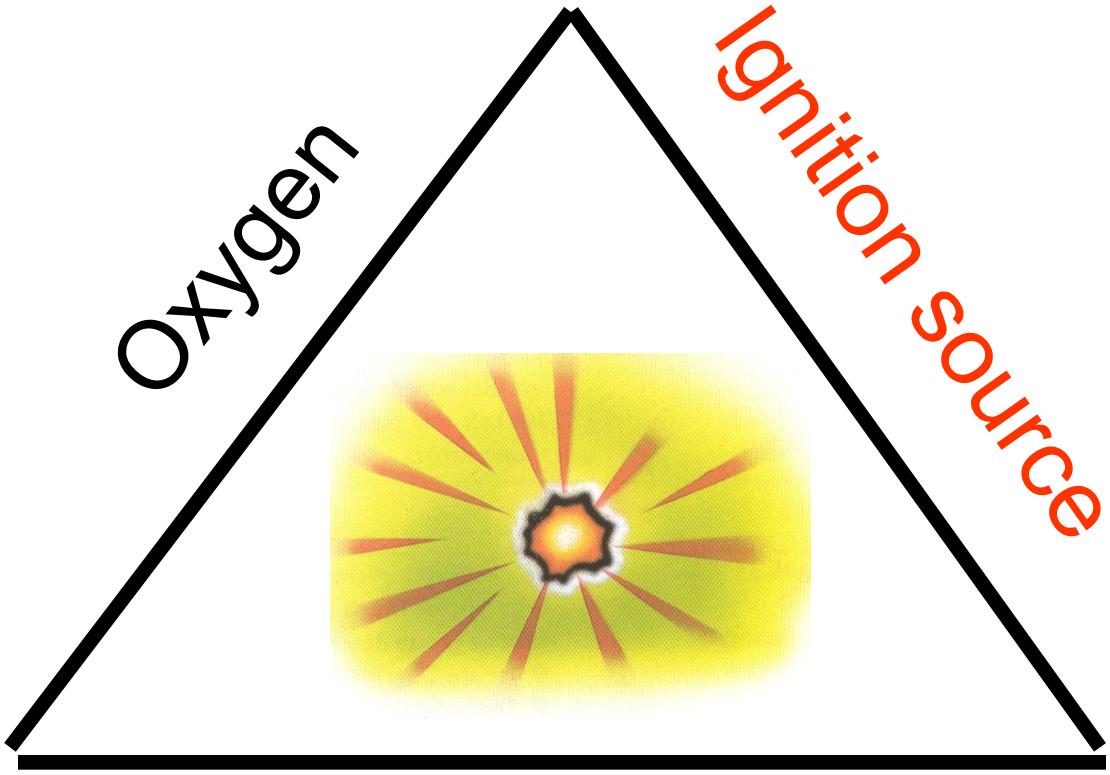
Accident in Buncefield,UK, 2005

Buncefield, 2005

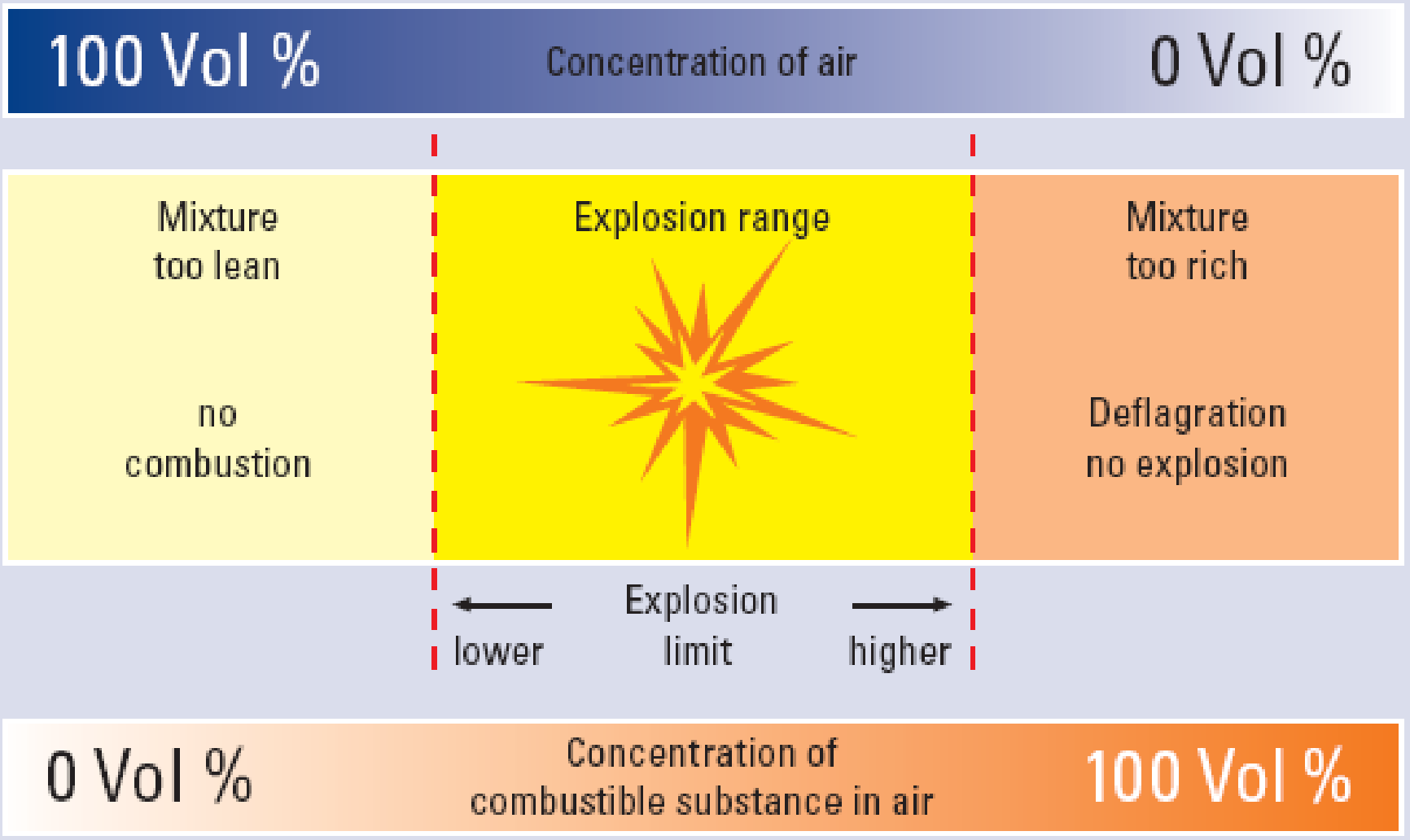
Buncefield, 2005

Accident at INEOS near Cologne, Germany
17th of March, 2008

The hazard



Influence of concentration



Critical concentration of Flammable substances

Table 2: **Explosion Limits of selected Gases and Vapours**

Substance designation	Lower explosion limit [Vol. %]	Upper explosion limit [Vol. %]
Acetylene	2,3	100 (self-decomposing!)
Ethylene	2,4	32,6
Gasoline	~ 0,6	~ 8
Benzol	1,2	8
Heating oil/diesel	~ 0,6	~6,5
Methane	4,4	17
Propane	1,7	10,8
Carbon disulphide	0,6	60,0
Hydrogen	4,0	77,0

Ignition sources – ISO/IEC [80079-xy] or EN 1127-1

Ignition of an explosive atmosphere can be caused by various sources:

- **hot surfaces**
- **flames and hot gases**
- **mechanically generated sparks**
- **electrical installations**
- **equalizing currents, cathodic corrosion protection**
- **static electricity**
- **lightning**
- **electromagnetic waves (high-frequency)**
- **optical radiation**
- **ionising radiation**
- **ultrasonics**
- **adiabatic compression and shock waves**
- **exothermal reactions**

The ATEX Regime

- **Free Trade Directive 94/9/EC in the Internal EU Market (Essential Health and Safety Requirements – EHSR, obligations of the manufacturer)**
- **Worker protection (Social) Directive 1999/92/EC (obligations of the end user)**
- **ATEX Working Group**
- **ATEX Notified Bodies**
- **ATEX Consultant, CENELEC, CEN**

to be continued under “New Legislative Framework” (NLF) – no substantial change

Explosion protection – safety in plants

- **The situation in Turkey :**
  - ATEX regulation is implemented in the national legislation of Turkey since 2003
  - Product trade: EU internal market open for Turkish manufacturers (if EC Type Examination Certificate and QA Notification is available)
  - Workplace safety: explosion protection document is legally required (Zone plan, selected equipment, installation, inspection, maintenance, repair)

The daily practice in plants

- **Potential difficulties to manage under ATEX in practice:**

  - Zone plan vs. NA Division classification
  - re-classification vs. Liability increase
  - few CE declared equipment installed
  - few domestic CE products available
  - training for ATEX requirements necessary, how to get trainers

Risk assessment acc. ATEX Directive 1999/92

The employer has to assess:

- likelihood and duration of a significant amount of explosive atmosphere (Zone classification in acc. to IEC 60079-10)
- likelihood and effectiveness of ignition sources
- scale of damages which might occur

EU-Directive 1999/92/EG and IEC 60079-10

Zone 0

A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is present continuously or for long periods or frequently.

Zone 1

A place in which an explosive atmosphere consisting of a mixture with air or flammable substances in the form of gas, vapour or mist is likely to occur in normal operation occasionally.

Zone 2

A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

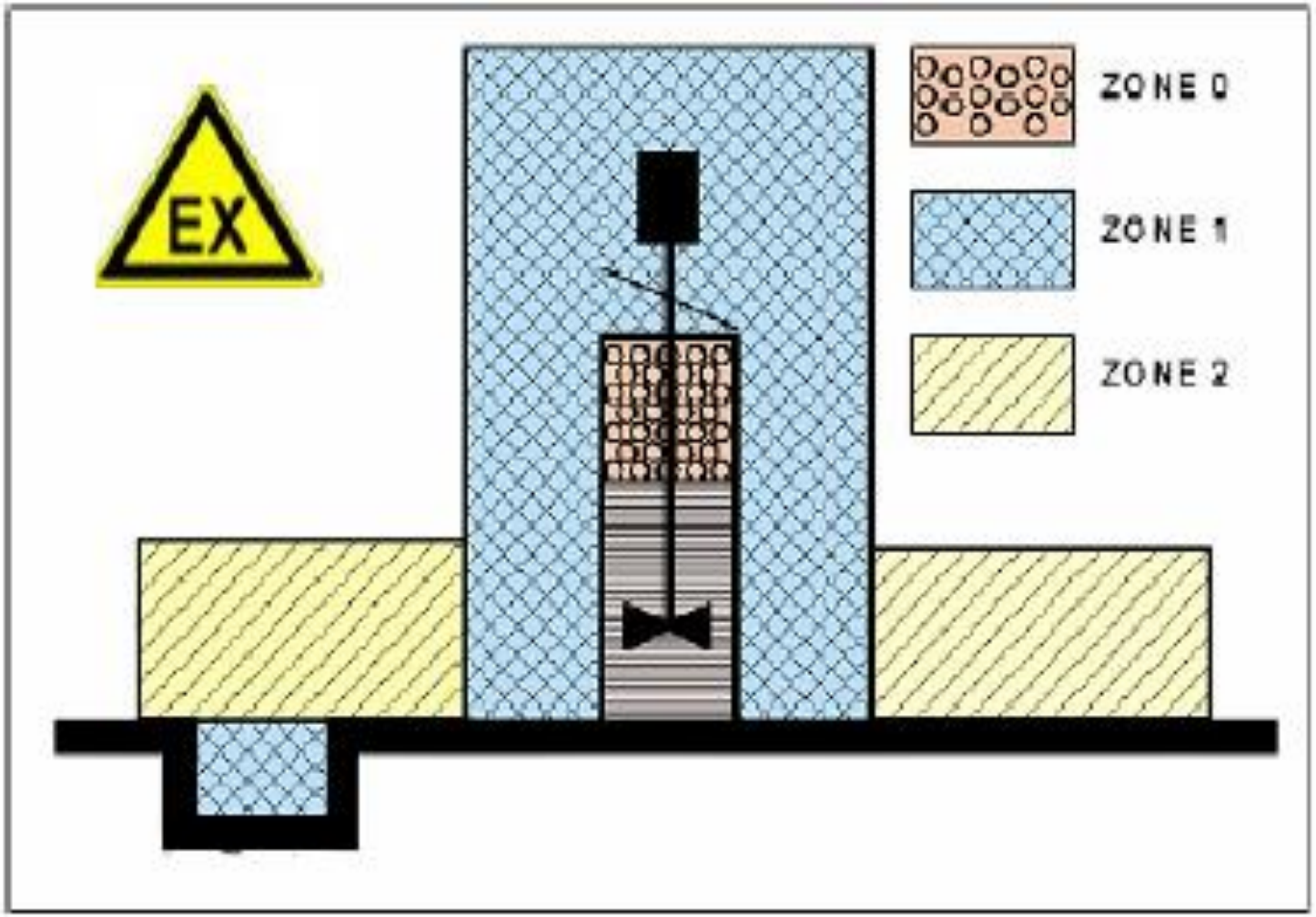
Directive 1999/92/EG and IEC 61241-10

Zone 20
A place in which an explosive atmosphere in the form of a cloud of combustable dust in air is present continously, or for long periods or frequently.

Zone 21
A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally.

Zone 22
A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Examples for a Zone plan of hazardous areas – example of IEC 60079-10



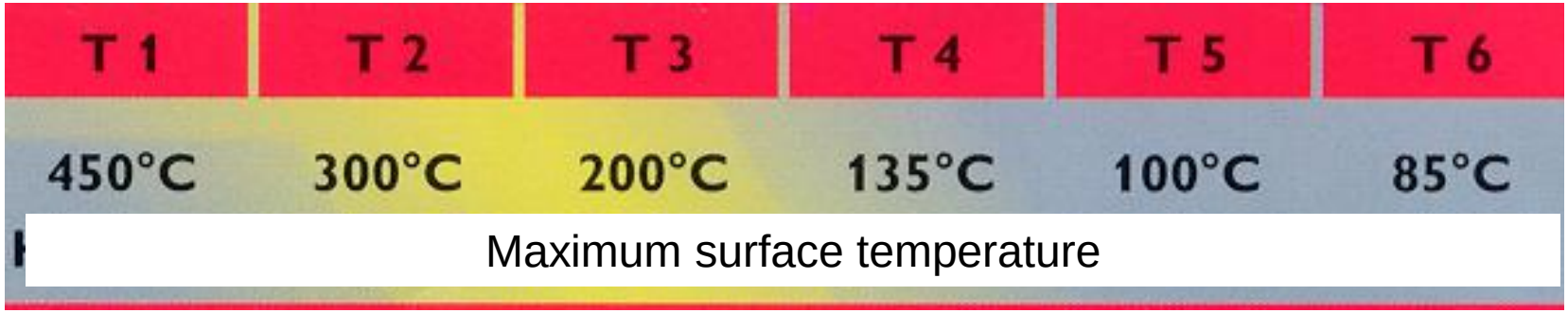
Stirrer

Selection of Equipment, Categories

Zone	Equipment category (Directive 94/9/EG)	Safety level
0 /20	II 1 G/D	Even in the event of infrequent malfunctions
1/21	II 1 G/D oder II 2 G/D	In the event of expected malfunctions
2/22	II 1 G/D oder II 2 G/D oder II 3 G/D	Normal operation

Selection of equipment EN/IEC 60079-14

- **Temperatur Class:**



- **Explosion Group**

II A	Methan, Benzine, Methanol
II B	Schwefelwasserstoff
II C	Wasserstoff, Acetylen

Examples for selection of equipment

Explosion characteristics	Methane	Biogas 70 % CH_4 30 % CO_2	Petrol	Propan
Explosion limits /air [Vol.- %]	4,4 - 17	4,4 - 14	0,6 - 8	1,7- 10,9
Ingition Temperature [^{0}C]	595		220 - 260	450
Relative density (air = 1)	0,55	0,85	ca. 3,2 (gas)	1,55
Flashpoint [^{0}C]			< - 20	- 104
Temperaturclass	T 1	T 1	T 3	T 3
Explosion group	II A	II A	II A	II A
Max. Ex.- pressure [bar]	8,1		8,5	9,4

Directive 1999/92/EG
(1) Documentation

Explosion protection document:

- **description of the plant, the process, the activities and flammable material quantities**
- **material data**
- **results of the explosion risk assessment**
- **Explosion protection measures**
- **Organizational measures (training staff, …)**

Get assistance by NAMUR

NAMUR.de and
NAMUR recommendation xyz

Directive 1999/92/EG
(2) Inspection, Maintenance, Repair

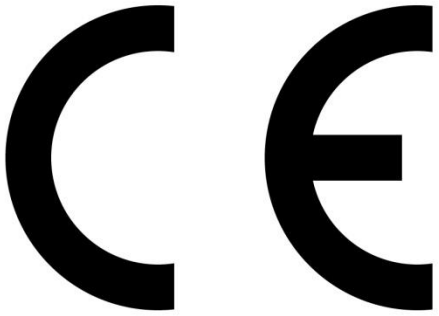
- Ensure expertise of the personell
- Training and experience must be ensured
- Prevent occurence of hazardous atmophere
- install a fire monitor if necessary
- Making sure before restarting that the explosion protection measures required for normal operation have been reactived
- remove dust deposits from installed products (good housekeeping)

Inspection, Maintenance, Repair
EN/IEC 60079-17/-19

Examples of 94/9-equipment with EC Declaration of Conformity

CE – EU Dir. 94/9 marked equipment is required by the user‘s directive 1999/92

What‘s about this mark????
““““Confusion everywhere ;-))))“““““



1. **Conformité Européenne (FR)**
2. **Legal mark, NOT a quality mark like TSE, VDE, UL… IECEx**
3. **Affixed by a manufacturer on his own responsibilty**
4. **may be based on an EC Type Examination Certificate by an independent ATEX Notified body, in the ATEX field only for Zone 0 and Zone 1 classified areas**
5. ***installation and instruction manual!!!!!***
6. ***Product liability under the condition of intended use***

Important directives of the New Approach

(Low Voltage Directive	73/23/EEC)
Machinery Directive	98/37/EC
ATEX (Explosion-proof equipment)	94/9/EC
EMC Directive	89/336/EEC
Pressure Equipment Directive	97/23/EC
R&TTE-Directive	1999/5/EC
Toys Directive	88/378/EEC
Personal Protective Equipment Directive	89/686/EEC
Construction Products Directive	89/106/EEC
Medical Devices Directive	93/42/EEC
(CE-Kennzeichnungs-Richtlinie	93/68/EEC)

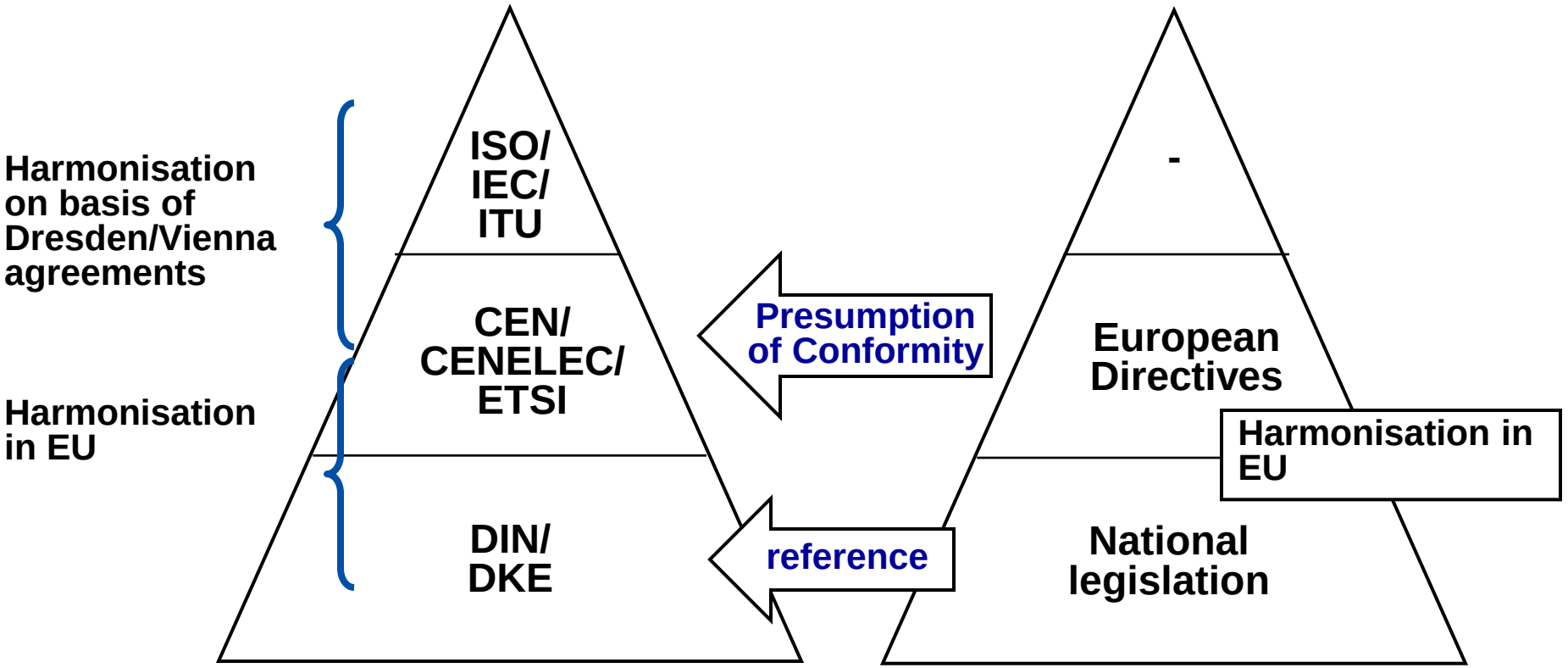
Requirements for Equipment, to be installed and used in a Zone classified area

- EC Declaration of Conformity, issued by the manufacturer of the equipment (CE marked)
  - CE: compliance with all applicable EU-Directives (Ex: Dir. **94/9/EC hexagon Ex**)
  - since 01. July 2003 **only EC-Type Examination Certificates** compulsory for placing in the EU market
  - This means especially: production audit is now compulsory (ATEX audit, QA-Notification)

???? Why so much IEC standards – ATEX is based on CENELEC and CEN standards

- We are in an internationally dominated field of technology: see activities of companies like Shell, BP, Total …- think global – act local ;-)
- We are working on the applicable standards only in IEC and ISO
- We have the Dresden and Vienna agreement for CENELEC and CEN, means: stop standardization on national level
- CENELEC and CEN standards are identical with IEC and ISO standards

European Approach to Standardisation



Safety concepts for equipment

Table 7: **Electrical Apparatus for Explosive Gas Atmospheres**

	EN (old)	EN (new)	IEC
General requirements	EN 50 014	EN 60079-0	IEC 60079-0
Flameproof enclosures "d"	EN 50 018	EN 60079-1	IEC 60079-1
Pressurized enclosures "p"	EN 50 016	EN 60079-2	IEC 60079-2
Powder filling "q"	EN 50 017	EN 60079-5	IEC 60079-5
Oil immersion "o"	EN 50 015	EN 60079-6	IEC 60079-6
Increased safety "e"	EN 50 019	EN 60079-7	IEC 60079-7
Intrinsic safety "i"	EN 50 020	EN 60079-11	IEC 60079-11
Type of protection "n"	EN 50 021	EN 60079-15	IEC 60079-15
Encapsulation "m"	EN 50 028	EN 60079-18	IEC 60079-18
Intrinsically safe systems		EN 60079-25	IEC 60079-25
Electrical equipment for Zone 0	EN 50 284	EN 60079-26	IEC 60079-26
Intrinsically safe field bus systems		EN 60079-27	IEC 60079-27
Optical radiation "op"		EN 60079-28	IEC 60079-28

Ignition hazards of a complex apparatus: a fork lift (electrical motor or combustion engine)

1 Electrical apparatus

- Motor „d“, „e“
- control device „d“, „e“, „i“
- accumulator „e“
- plug and socket „d“
- lighting fixture and control lights „d“, „e“

2 Electrical installation

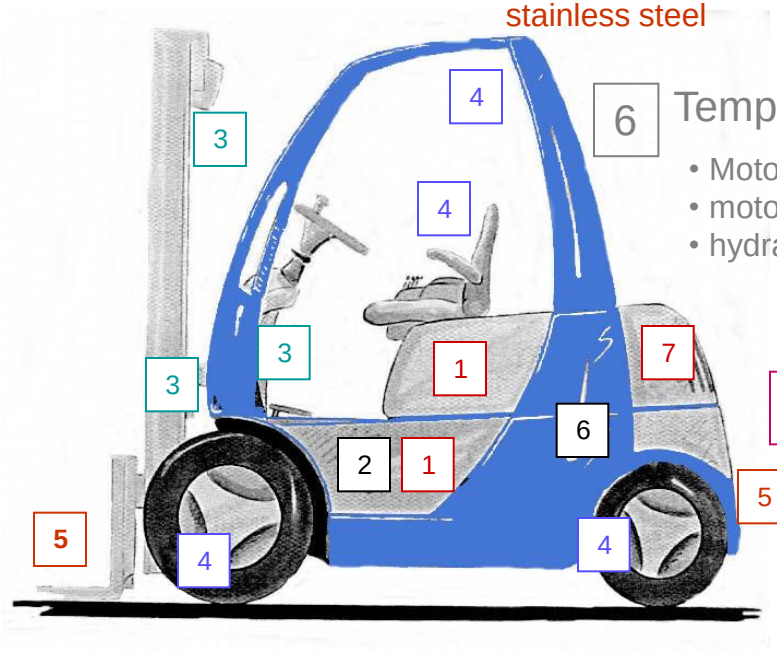
- IEC/EN 60079-14

3 Mechanical apparatus

- Brakes and oil hydraulic system/components

5 Sparks caused by metallic parts

- Coating with brass, bronze and stainless steel



6 Temperature control

- Motor control device
- motor
- hydraulic oil/system

7 Engine

4 Electrostatic charge

- Conductable wheels
- conductable seat material
- conductable housing
- grounding against electrostatic charge

The ATEX Working Group

- Representatives coming from Ministries of the EU Member States, Industry Associations, ExNB Group, Standardization Bodies CENELEC and CEN, ATEX Consultant, …. the Stakeholders
- Interpretation of the Directives 94/9 and 1999/92
- Interface to other Directives, e.g. to the Machinery Directive
- Meeting once a year in Brussels

ATEX Notified Body Group

IEP (Nurettin Terzioglu), SCA, TSE (Ebru Bali), TTK/ALSz soon

- The Notified Bodies
  - around 60 Notified Bodies under ATEX with similar scopes
  - but it is a national ***notification***, not an accreditation in acc. with ISO/IEC standards, but under NLF 2014: ACCREDITATION
  - requirements for notification see annex XI of the 94/9
  - PTB experience: no chance outside EU with such a notification, ISO/IEC 17025 and 17065 are to be applied by internationally recognized accreditation bodies (ILAC)

CE-marked products – on going production surveillance for category 1 and 2 (electrical)

- Manufacturers need for the production a certified QM system
  - ISO 9000
  - ATEX-Audit by a ATEX Notified Body (QA-Notification, EN 80079-34)
  - then the manufacturer is authorized to declare CE (Conformité Européenne) - but only if the product complies with applicable other directives as well (LVD, EMC, ...)

Market resonance of ATEX

- Users are very convinced by the ATEX system because of production surveillance
- Manufacturers gain more flexibility by the New Approach Directive: just ESRs - no specific requirements and specific standards
- *but:* global harmonization is required by manufacturers and users: **one standard - one product - one installation concept**

The future

The IECEx Mark is granted for a manufacturer, in compliance with IECEx 04 – to be affixed on his products

Relation of ATEX, CEN/CENELEC, ISO and IEC/IECEx – the EU and UNECE

National/ regional

international

New Practice of many ATEX Notified Bodies (which are also IECEx ExCB) is to use the elements of IECEx (ExTRs, QAR) to issue a EC Type Examination Certificate , the QA Notification and the IECEx Certificate of Conformity

IECEx certificates – to answer the market need for global solutions

To eliminate or significantly reduce:

- **Multiple/Re-Testing/Assessments**
- **Delays in accessing markets (time to market!!)**
- **Obstacles that prevent access to new products and technology by smaller markets.**
- **Un-Safe Practices + Lost Production (Down time)**

IECEx Mission:

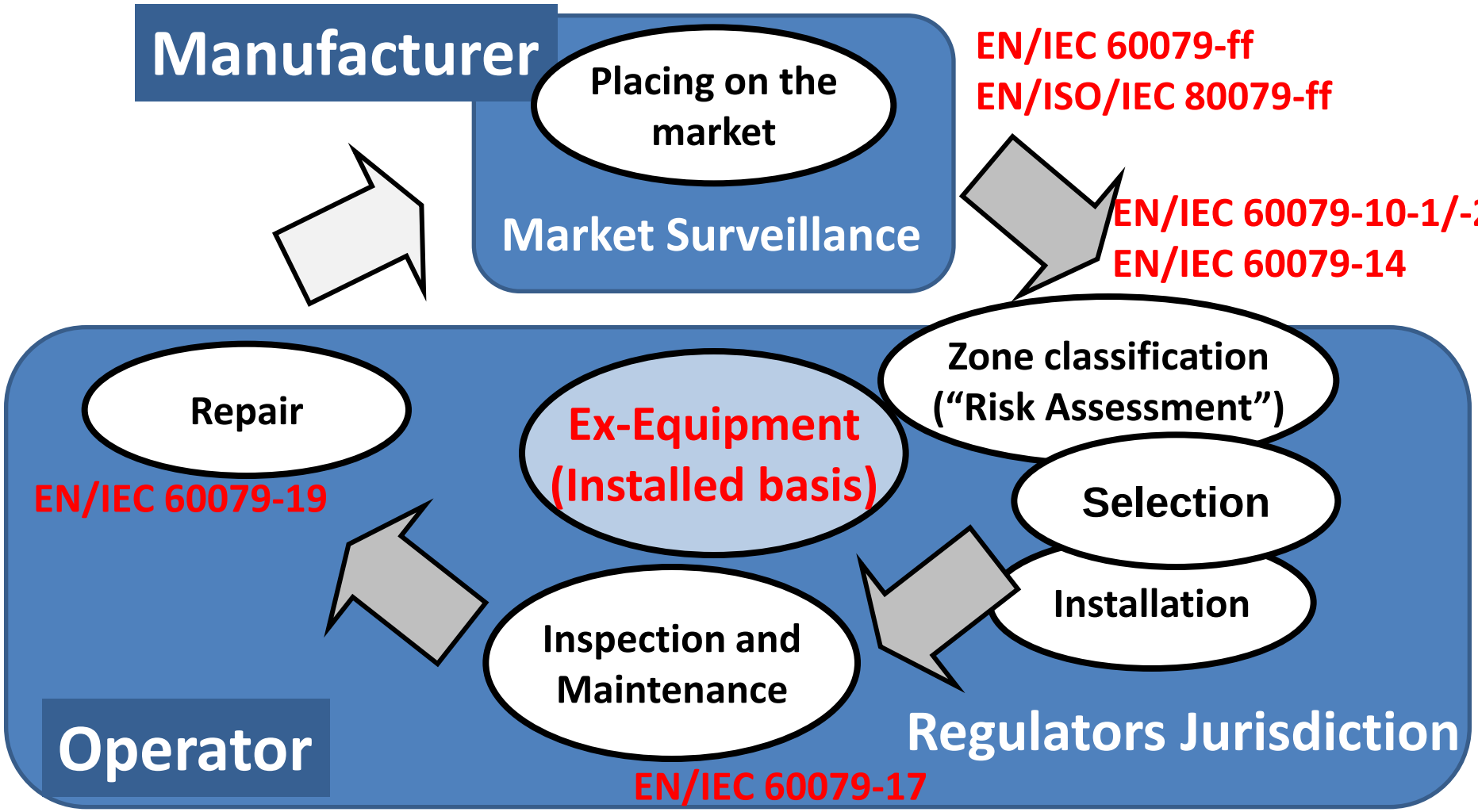
"To serve the Global Community of Experts in Explosion Protection"

UNECE Working Program WP.6

- New sector project:
  Equipment for explosive atmospheres
- Overall target is to achieve consensus for a so-called **“Recommendation Model L“** addressed to national governments to harmonize regulations
- First **workshop** on „Regulatory cooperation“ to exchange experience in regulations **was held in Geneva 5th of November, 2007**
  - John Waudby, Mine Safety, **Australia**
  - **China**… and more presentations from **EU, Russia…**

Goal: ***full recognition of IECEx by regulators***

Intention of the Common Regulatory Objectives (CRO)



Life cycle approach

CROs (comparable EHSR) structure, to be detailed by ISO/IEC standards and IECEx

- **Part 1: Safety of the product – addressed to manufacturers**
  (ignition source elimination, types of protection “d” etc., Self Declaration of Conformity, standards to be published in an Annex)
- **Part 2: Safe use of the equipment – addressed to users**
  (Zone classification, product selection, inspection, maintenance, repair, standards to be published by an Annex)
- **Part 3: Standard Acceptance Group – addressed to standardization body**
  (ISO/IEC standards to be assessed by regulators)
- **Part 4: Recognition of Conformity Assessment Bodies – addressed to IECEx**
  (recognition procedure and competence assessment according to ISO/IEC CASCO standards – ISO/IEC 17025, 17065 etc.)
- **Part 5: UNECE Explosion Protection Steering Committee**
  (to maintain the regulation and monitor the daily application)
- **Part 6: Market surveillance**
  (to execute governmental procedures to get protected against unsafe products and poor implementation in the various countries)

The workshop idea: Regulators Dialogue Group

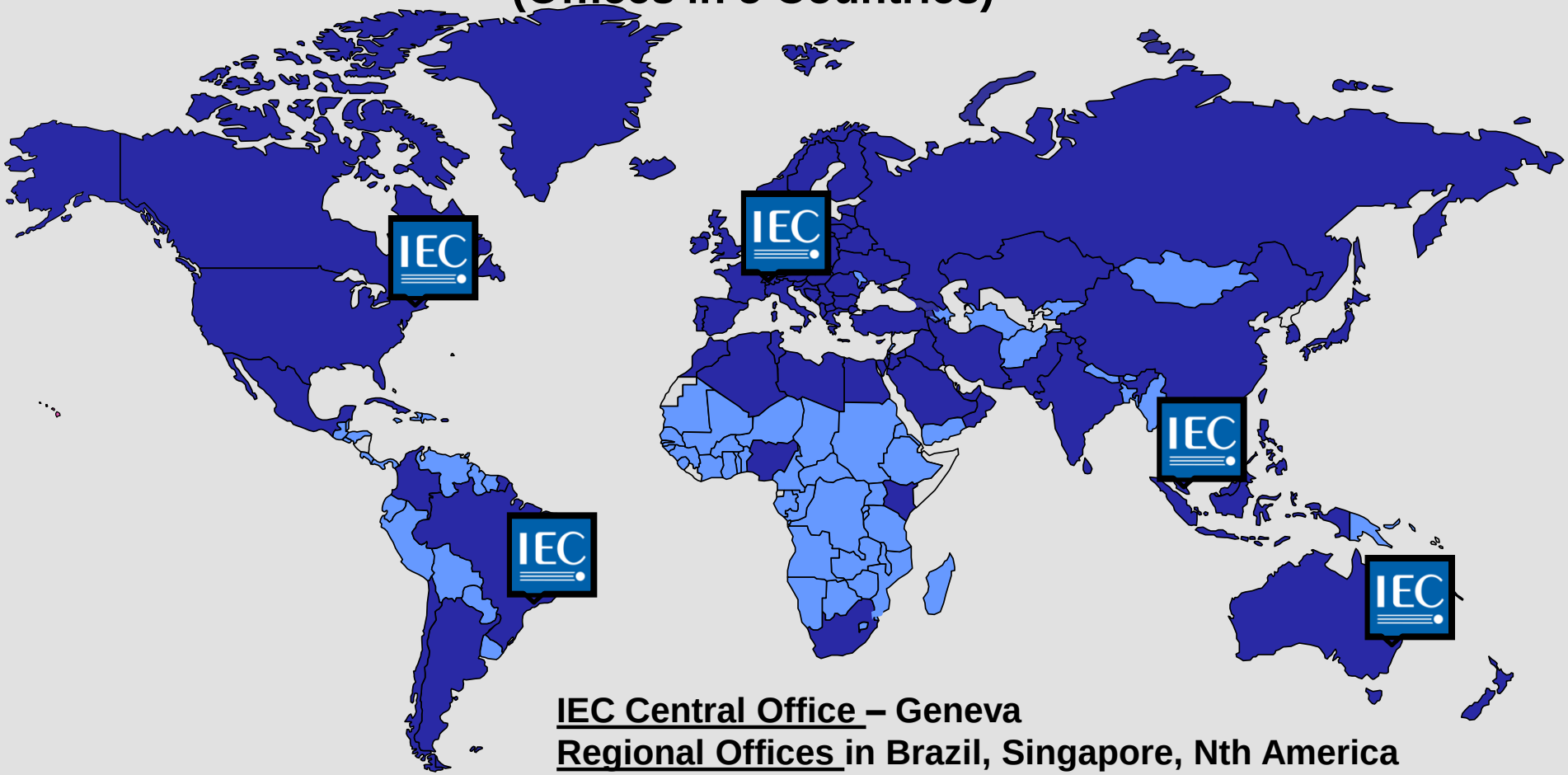
Outputs:

- Comprehensive description of the methodology of the system
- Guidance documents for the various stakeholders (Regulators, Market Surveillance, Manufacturer, Operator, Inspection bodies)

IEC Family: 163 countries – Global Reach

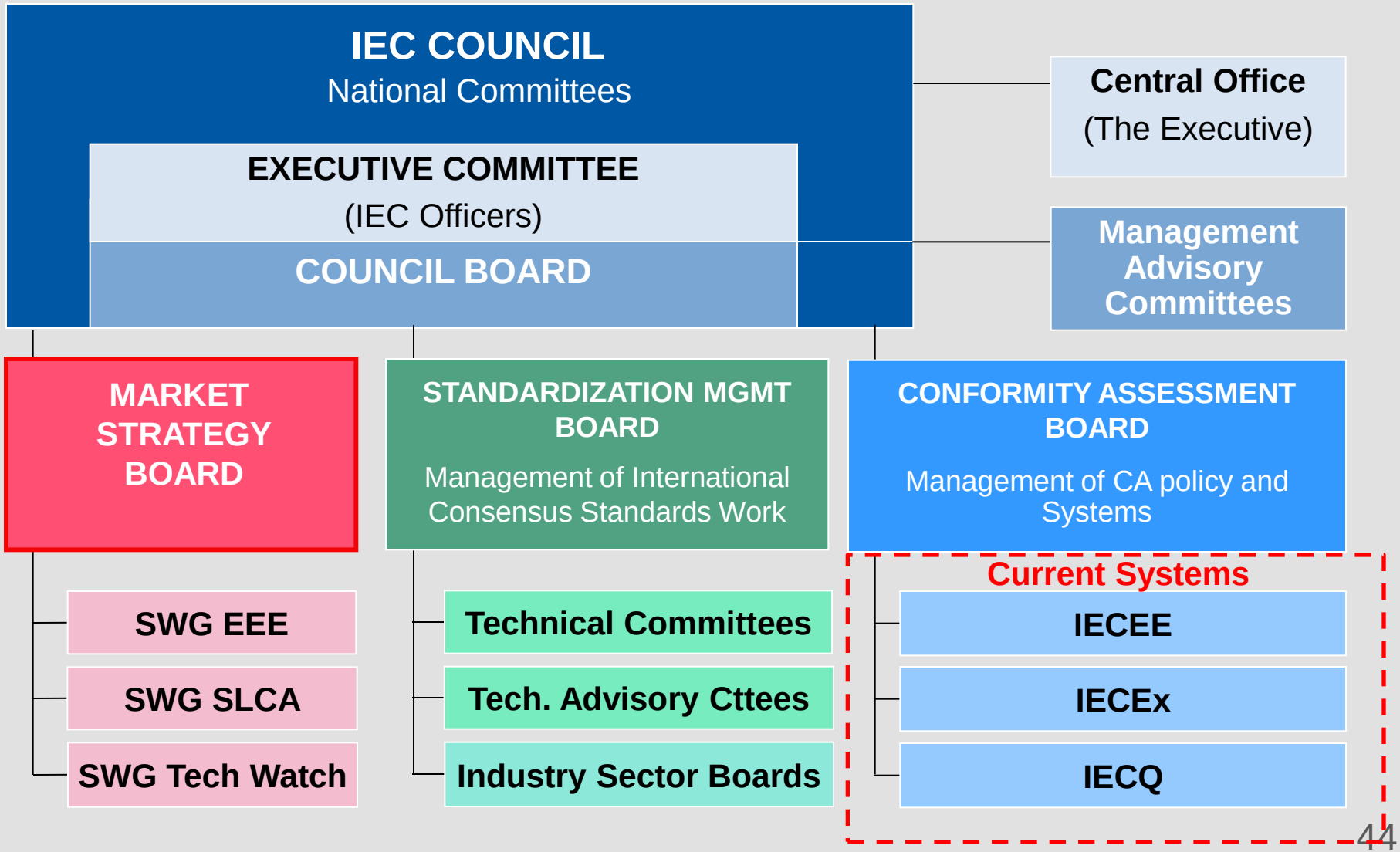
82 Members **81 Affiliates**

(Offices in 5 Countries)



IEC Central Office – Geneva
Regional Offices in Brazil, Singapore, Nth America and Australia

IEC Structure



IECEx Structure

IEC CONFORMITY ASSESSMENT BOARD, CAB

Oversees IEC Conformity Assessment policy and Systems, eg IECEx

IECEx Management Committee, ExMC

National Members (31 Countries)

Overall management of the IECEx System

- **Officers + Executive, TC 31 Chair, IEC Gen. Sec**
- **ExMC Expert Working Groups (WGs)**
- **IECEx Expert Assessors**

IECEx Secretariat

- **Technical Support**
- **Administration**

Ex Officio Members

- **IEC General Secretary**
- **IEC TC 31 Chairman**

IECEx Technical Assessment Group

Members: ExCBs + ExTLs

- **ExTAG Expert WGs**
- **TC 31 + SC Liaison**

IECEx Marks Committee

Operation of IECEx Mark

- **Appointed Members**
- **IECEx Executive**

IECEx CoPC Committee

Operation of Personnel Cert

- **Appointed Members**
- **IECEx Executive**

Schemes within the IECEx System

IECEx System
www.iecex.com

IECEx Equipment Scheme
Certification of Ex Equipment + Systems

Choice between:

- IECEx "Certificate of Conformity"
- IECEx "Component Certificate"
- IECEx "Unit Verification" Cert.

IECEx Conformity Mark License Scheme

IECEx Services Scheme
Certification of Ex Service Providers, eg Repair and overhaul workshops

IECEx Certified Persons Scheme (CoPC)
Competency to work in Ex field (New)

IECEx On-Line Certificate System

Certificate of Conformity: IECEx ITS 07.0008X - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://iecex.iec.ch/iecex/iecexweb.nsf/ae7eea0d12561594c1256d0200448859/607c74650e91a0e2c1257928002f3a9c?OpenDocument

important information !

IECEx CoC Home > Certified Equipment Scheme > Certificate of Conformity

CoC ONLINE

- iecex.iec.ch:
  - Home / Search
  - Certified Service Facilities
  - Conformity Mark Licenses
  - Certified Persons
- View by:
  - "All ExCBs" Certificates
  - Certificate ref. number
  - IECEx Cert. Body (ExCB)
  - Applicant
  - Applicant Location
  - Manufacturer location
  - Country/Standards/ExCBs
  - Standard used
  - ExTRs
  - QARs
- Services:
  - Export to MS Excel
  - Operational Manual

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 ITS 07.0008X issue No.:2

Status: **Current**

Date of Issue: **2011-12-21** Page 1 of 5

Certificate history:
Issue No. 2 (2011-12-21)
Issue No. 1 (2010-6-9)
Issue No. 0 (2007-3-26)

Applicant: **Joy Mining Machinery**
Thorn Hill Industrial Park
177 Thorn Hill Road
Warrendale
PA 15086
United States of America

Electrical Apparatus: **Controller Enclosure 7LS1A / Type 5000033161**
Optional accessory:




IECEx Certification – Equipment Scheme Production and Unit Covered

IECEx Certificate of Conformity according to OD 009

Product Assess/Testing

IECEx ExTR

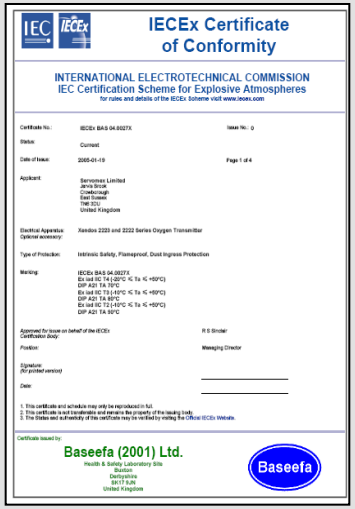
+

Factory Audit + surveillance

IECEx QAR

=

IECEx CoC



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

Baseefa (2001) Ltd.

IECEx Unit Verification Certificate according to OD 033

Product Assess/Testing

IECEx ExTR

=

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
UNIT VERIFICATION

Certificate No.: IECEx TUN 12.0012X Issue No.:0 Certificate history:
Status: Current
Date of Issue: 2012-06-29 Page 1 of 3

Applicant: ABB S.P.A
Viale Dell'Industria 18
20010 Vittuone (MI)
Italy
Italy

Electrical Apparatus: 3Phase Induction Electrical Motor AMI 1000 S18 ABSFTPYM
Serial number(s) or Unique Identification: 8110003027.03

Type of Protection: Pressurized enclosure pz, intrinsic safety ic

Marking: Ex ic pz IIB T3 Gc

Approved for Issue on behalf of the IECEx Karl-Heinz Schwedt

Future IECEx Main Annual Meetings

Future Annual Meetings

- 2013: Brazil
- 2014: Netherlands
- 2015: Australia/New Zealand
- 2016: South Africa
- 2017: USA
- 2018: France
- 2019: UAE

The great chance for Turkey

- Keep relation to ATEX regime and EU
- Join now the international community!
- Become P member of IEC/TC 31
- Make use of the membership within IECEx
- Start to become IECEx ExCB and ExTL
- Find opportunities to export Turkish products worldwide
- End users can enjoy the standardization work in IEC/SC 31J
- Ministries may join the UNECE project