



Standards:

Why we use them,
How we use them,
And conformity assessment



What is a standard?

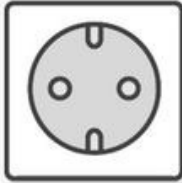
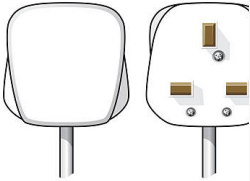
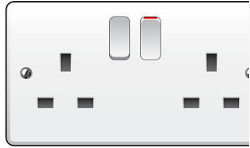


In our environment, standards provide instructions, guidelines, rules or definitions that are then used to design, manufacture, install, test & certify, maintain and repair electrical and electronic devices and systems.

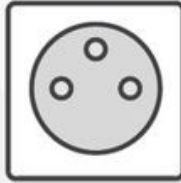
Standards reflect the consensus and distilled wisdom of many technical experts who are delegated by their companies/organisations to participate in the standards writing process.

Every developed country and many developing countries have their own standards and/or use many international standards.

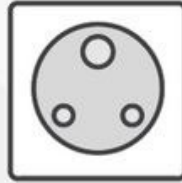
Examples are South African National Standards (SANS), British Standards, Australian Standards, American Standards, Kenyan Standards, Botswana Standards, the list is huge.



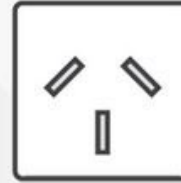
TYPE F
EUROPE, RUSSIA



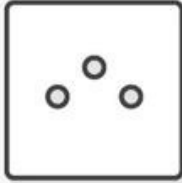
TYPE E
FRA, BEL, POL,
SVK & CZE



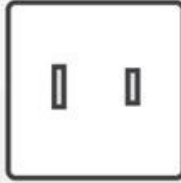
TYPE D
INDIA



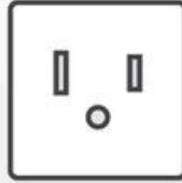
TYPE I
AUS, ARG, CHN
& NZL



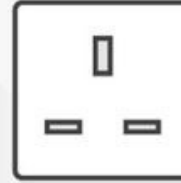
TYPE J
SUI, LIE & RWA



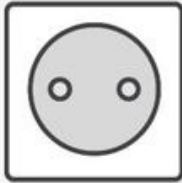
TYPE A
USA, MEX, CAN
& JPN



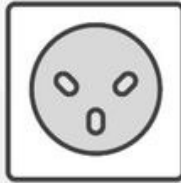
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& JPN



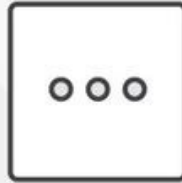
TYPE G
GBR, IRL, MLT,
MAS & SIN



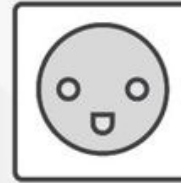
TYPE C
EUROPE, SOUTH AMERICA
& ASIA



TYPE H
ISRAEL



TYPE L
ITALY & CHILE



TYPE K
DENMARK
& GREENLAND



TYPE F
FRA, BEL, POL,
SVK & CZE



TYPE D
INDIA



TYPE I
AUS, ARG, CHN
& NZL



TYPE A
USA, MEX, CAN
& JPN



TYPE B
USA, MEX, CAN
& JPN



TYPE G
GBR, IRL, MLT,
MAS & SIN



TYPE C
ISRAEL



TYPE L
ITALY & CHILE



TYPE K
DENMARK
& GREENLAND

ERICA



South African Bureau of Standards



SABS Mandate

SABS is a statutory body that was established in terms of the Standards Act, 1945 (Act No. 24 of 1945) and continues to operate in terms of the latest edition of the Standards Act, 2008 (Act No. 8 of 2008) as the national standardisation institution in South Africa, mandated to:

- **Develop, promote and maintain South African National Standards (SANS)**
- **Promote quality in connection with commodities, products and services**
- **Render conformity assessment services and assist in matters connected therewith.**



How is a standard made? (SA)



Standards are designed for voluntary use and do not impose any regulations. (Regulations are not allowed in a standard). However, laws and regulations may refer to a standard and make compliance with it compulsory. (We also have the NRCS).

Committees of manufacturers, users, research organizations, government departments and consumers work together to draw up standards that evolve to meet the demands of society and technology.

SABS Standards' staff act as secretaries and project manage the production of standards. SABS then sell the standards to anyone wishing to buy them.

Crucial to this process are 450 technical committees and subcommittees that are responsible for developing standards. At present, more than 6100 standards are maintained, and new ones created at a rate of 500 p/a.



SABS TC065 – 27 members



Role	Appointed by	Salutation	Name	E-Mail
National secretary	SABS	Ms	Maepa, Anna	anna.maepa@sabs.co.za
National chairperson	SABS	Mr	Meanwell, Paul	paul.meanwell@global.komatsu
National secretary support team	SABS	Mr	Dlamini, John	john.dlamini@sabs.co.za
National secretary support team	SABS	Ms	Mahomane, Lebogang	Lebogang.Mahomane@sabs.co.za
National secretary support team	SABS	Mr	Malatji, Winston	Winston.Malatji@sabs.co.za
National secretary support team	SABS	Mr	Marema, Johnson	johnson.marema@sabs.co.za
National secretary support team	SABS	Mr	Motaung, Mogomotsi	mogomotsi.motaung@sabs.co.za
National secretary support team	SABS	Ms	Mphele, Lulama	Lulama.Mphele@sabs.co.za
National secretary support team	SABS	Ms	Nelushi, Zvidivhevo	Zvidivhevo.Nelushi@sabs.co.za
National committee member	AFSA	Mr	Krieg, Mark	mark@afsa.org.za
National committee member	CATPILLAR	Mr	van Driel, Len	van_Driel_Len@Cat.com
National committee member	CCG	Mr	Cameron, Arthur	ccg.arthur@icon.co.za
National committee member	CMP	Mr	Vieira, Clinton	Clinton.Vieira@cmp-products.com
National committee member	DOEL	Mr	Laubscher, Pieter	pieter.laubscher@labour.gov.za
National committee member	ECA(SA)	Mr	Lancaster, Cecil	cecil@ecasa.co.za
National committee member	EXPLOLABS	Mr	Maree, David	davidm@explolabs.co.za
National committee member	FIRELAB	Mr	Strydom, Kobus	adri@firelab.co.za
National committee member	HAZLOC	Mr	Koen, Max	max@hazloc.co.za
National committee member	MASC	Mr	Du Toit, Francois	fdutoit@masc-ex.co.za
National committee member	MCSA	Mr	Biffi, Marco	mbiffi@bbe.co.za
National committee member	MTEch	Mr	Venter, Jaco	Jaco@mtexlab.co.za
National committee member	PRATLEYMNF	Mr	Kruger, Eldon	eldonk@pratley.co.za
National committee member	SABS	Mr	Segal, Joseph	joe.segal@sabs.co.za
National committee member	SACEA	Mr	Zwart, Henk	henk.zwart@vodamail.co.za
National committee member	SAFA	Mr	Nkosi, Andrew	andrew@vdv.co.za
National committee member	SAIEE	Mr	Fourie, Johannes Frederic	ffourie@safripol.com
National committee member	SAIMC	Mr	Friend, Gary	gary@extech.co.za
National committee member	SALLAB	Mr	Pillay, Gerhard	gerhard@sallab.co.za
National committee member	SASOL	Mr	Humphries, Rowan	rowan.humphries@sasol.com
National observer	CSIR	Mr	Mthombeni, Isaac	imthombe@csir.co.za
National observer	ECB	Mr	McDonald, Tony	tonymac@worldonline.co.za
National observer	EEAJA	Mr	Antonakis, Nick	nickanton@ybo.co.za
National observer	SALLAB	Mr	Ramkaran, Pratheer	pratheer@sallab.co.za
National observer	SFT	Mr	de Beer, Thys	mathysdebeer@vodamail.co.za
National observer	TECHKNOW	Mr	van Eeden, Ernest	evaneeden@techknowcon.com
National observer	theDTIC	Mr	Mbele, Veli Amos	SABS_TCs@thedti.gov.za



The IEC



International Electrotechnical Commission

[Video:](#)

173
countries

A global network that covers 99% of the world population and offers a free programme to developing countries

10 000+
standards

Develops international standards that represent a global consensus of state-of-the-art know-how

1M+
certificates

Four Conformity Assessment Systems that cover the breadth of electrical and electronic technologies

20 000
experts

Over 20 000 experts and more than 100 years expertise

With a much wider pool of experts and experience, IEC standards are generally superior to SANS



The IEC in Action!



International Electrotechnical Commission



The international standard for USB connectors works!



The benefits of standards



Industry Benefits

- **Standards lower installation and start-up costs.**
- **Standards inspire added trust in your business.**
- **Standards can assist business to meet mandatory regulations.**
- **Standards ensure improved quality and reliability.**
- **Standards can ensure minimum safety requirements.**
- **Standards can create a competitive advantage by improving the quality of your goods and services.**
- **Standards open new markets by assuring new customers that you meet their quality requirements.**
- **Standards attract new customers.**
- **Standards reduce cost in the way you do business.**



How are standards used?



In Industry:

- **Very often, a customer will demand compliance to one or more standards;**
- **In our Ex industry, the regulators demand compliance to Ex standards;**
- **Suppliers and manufacturers then need to purchase the relevant standards and study them to determine exactly what the customer is expecting and design/manufacture accordingly.**
- **With the majority of SANS being voluntary, manufacturers and suppliers use standards compliance as a marketing tool to give them a competitive edge**
- **This approach doesn't work with the public, who normally just want the cheapest!**



How are standards used?



By the customer:

- **Ensures minimum safety levels (Instills confidence).**
- **Demonstrates legal compliance to the regulators.**
- **Is a way of ensuring that what they ordered is what they get.**
- **Helps with price comparisons of tender documents when minimum standards compliance is claimed.**



How are standards used?



By the manufacturer:

- **Manufacturers make sure their staff know the applicable standards.**
- **Assists in design considerations.**
- **An alternative option is to use the standards to provide the required drawings and work instructions such that the staff don't need to know the standard.**
- **In advertising material to give the prospective customers confidence in the product.**



Sounds Perfect!

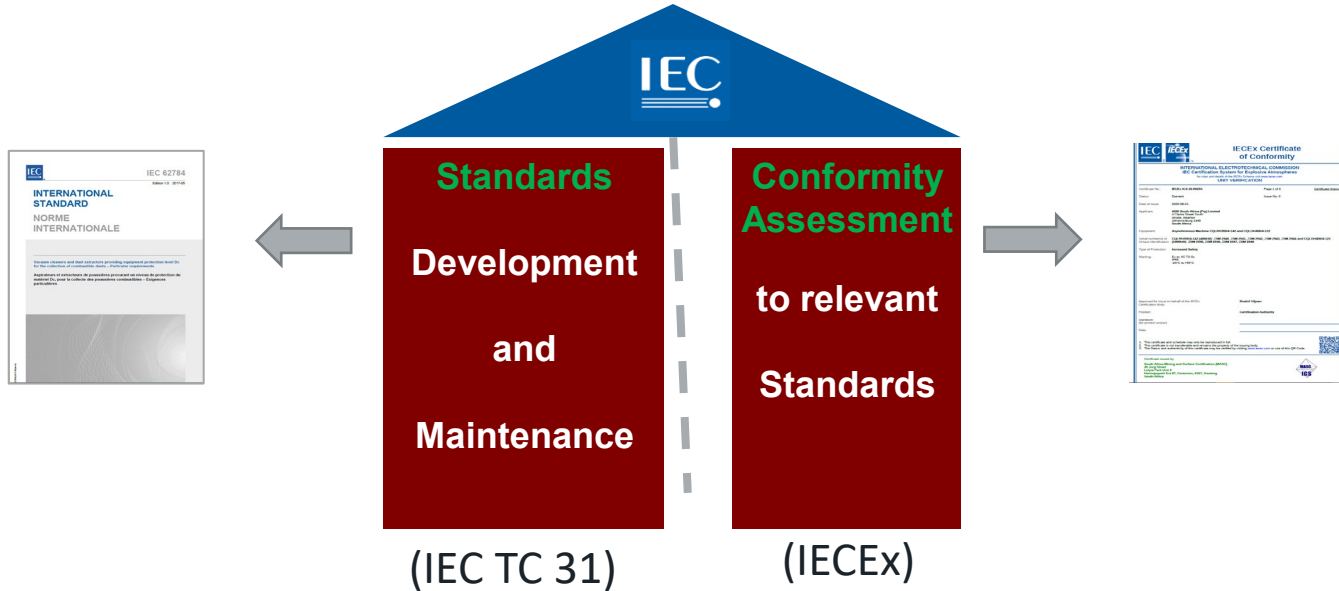


But it's not so simple 😞

- **Unscrupulous suppliers claim compliance with standard when it's not true**
- **Some suppliers misinterpret the true intention of standards clauses**
- **IEC standards are only published in English and French. More interpretation problems**
- **The best way of confirming compliance is to have the product tested!**
- **(sometimes product testing is made mandatory by legislation)**
- **Test certificates give an extra level of comfort**



Conformity Assessment



The 2 Sides to the House of IEC:
Standards Development + Conformity Assessment



What is Conformity Assessment?



Conformity assessment is the name given to the processes that are used to demonstrate that a product, service or management system or body meets specified requirements. When applied to product, it involves testing to an established performance standard, as well as inspection, quality management, surveillance, accreditation and declaration of conformity.

The IEC states that “officially, Conformity Assessment is the demonstration that specified requirements relating to a product, process, system, person or body are fulfilled”.



The ideal Conformity Assessment



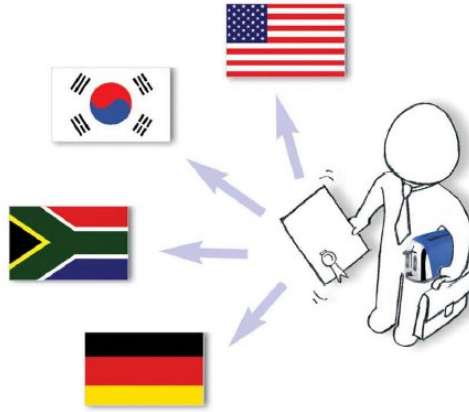
ONE PRODUCT



ONE TEST



ONE CERTIFICATE



ACCEPTED EVERYWHERE!



Types of Conformity Assessment



First Party

The manufacturer or supplier declares that tests and other conformity assessment activities required to show the product conforms have been successfully completed. In many cases manufacturers will self-perform testing and evaluation and provide a Supplier's Declaration of Conformity (SDoC).

This type of conformity assessment is used where the product does not represent great danger, a critical reliability risk, or large economic impact. It is furnished information by the supplier. Some national regulations will accept SDoC for low risk products. This is the easiest and cheapest form of conformity assessment.



Types of Conformity Assessment



Second Party

This type of conformity assessment is typically performed by a person or organization that has a purchaser or user interest in the product or service. A very large, important, or demanding customer (e.g. government or major manufacturer) will put in place its own conformity assessment for the products and services it purchases.

This may include test facilities and special assessment procedures that are conducted to guarantee the quality of the purchased goods, and fitness for purpose. The aim is typically to obtain better assurance that the supplier has carried out their first-party conformity assessment. This is sometimes performed by an independent engineer or an owner's rep. In many cases this is being replaced by third party conformity assessment.



Types of Conformity Assessment



Third Party

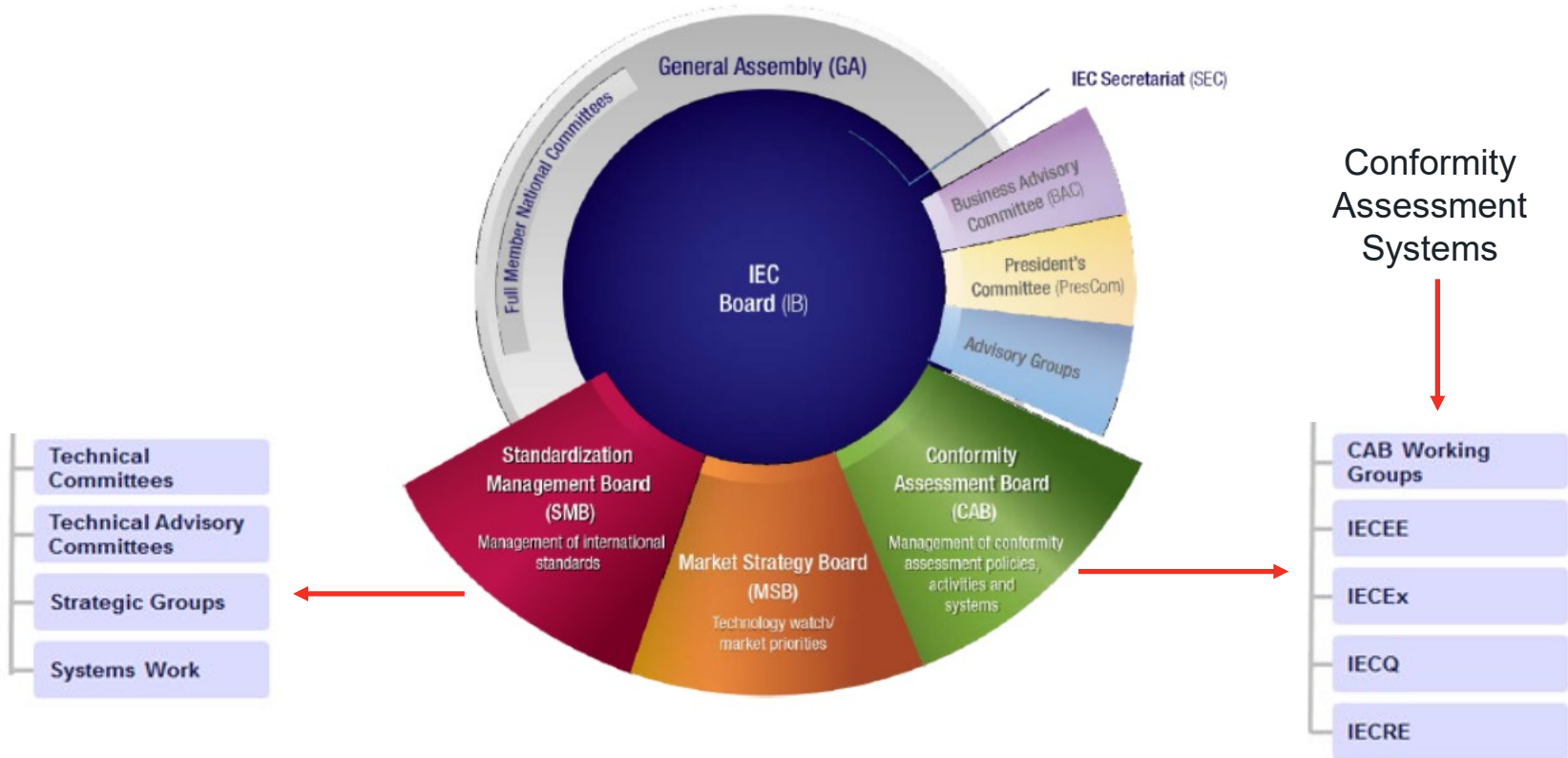
This is a conformity assessment activity that is performed by a person, organization, or body, that is independent from the manufacturer, and the buyer.

In most cases the organization or body's prime focus of work is testing and conformity assessment. It is sometimes called certification and provides the highest level of confidence. Certification is an independently unbiased assurance of the safety of the product or service. It is applied where a major market makes it cost effective or where it is mandated by legislation.

These activities are performed by certification bodies (CBs), which are usually for-profit companies, so this type of conformity assessment is normally more expensive than first party conformity assessment.



The IEC Structure



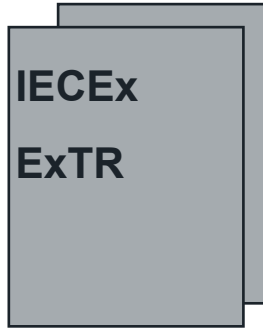


The IECEx Model



**Product
Assess/Testing**

**IECEx Unit
Verification
Certificate**



IECEx CoC



- Only Applies to the specific items tested/assessed
- Certificate must identify **serial number or other unique identifier**

In South Africa this is normally referred to as “Batch Testing”
SANS 96 contains the requirements for batch testing

Table 1

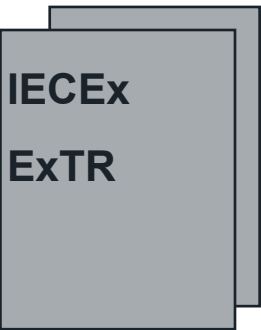
Batch Size	Sample Size
2 – 8	2
9 – 15	3
16 – 25	5
26 – 40	6
41 – 65	7
66 – 110	8
111 – 180	10
181 – 300	15



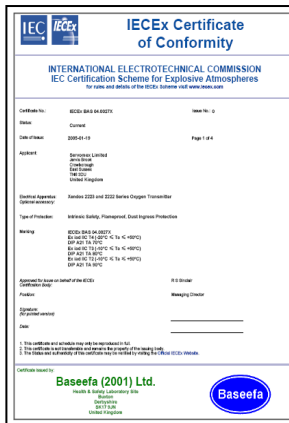
The IECEx Model

Production
IECEX
Certificate of
Conformity

*Product
Assess/Testing*



*Factory Audit
+ surveillance*



- Allows for on-going production without need for constant re-testing
- IECEx Certification Body conducts on-going factory inspections/audits
- Cert. Displayed on the Public “On-Line” System

With this model, as with the South African model, a certificate will not contain product serial numbers. The certificate will cover all identical manufactured product as long as the ExTR and QAR remain valid



The IECEx Model



How is confidence assured in the system?

- The IECEx has a pool of “expert” assessors
- Each Certification Body (ExCB) has to be assessed and approved by a team of assessors. *Facilities and competencies* are audited against set criteria (IEC 17000) Specific Ex techniques are individually addressed
- The report from the team is then assessed by a panel of well experienced experts at the IECEx Secretariat
- The assessment report is sent out to the entire IECEx membership for consideration and approval
- Exactly the same process is used to assess the Test Laboratories (ExTL's)



The IECEx Model



How is confidence assured in the system?

- ISO/IEC **17011** Requirements for accreditation bodies accrediting conformity assessment bodies
- ISO/IEC **17020** Requirements for the operation of various types of bodies performing inspection
- ISO/IEC **17021** Requirements for bodies providing audit and certification of management systems
- ISO/IEC **17024** General requirements for bodies operating certification of persons
- ISO/IEC **17025** General requirements for the competence of testing and calibration laboratories
- ISO/IEC **17029** General requirements for validation and verification bodies



IECEX Certificates



All certificates are online

- **Any printed copies are just copies. The original valid certificate is the online one**
- **Anyone can check for an online certificate. Simply input the product certification number (found on the product) into the IECEx online database.
The secretariat carries out annual audits of the certificates in the system**
- **<https://www.iecex-certs.com/#/home>**
- **If the certificate is not in the online database, it does not exist.**
- **South Africa does not have such a system. Some of our certification bodies objected to this being set up**



Is the IECEx System bulletproof?

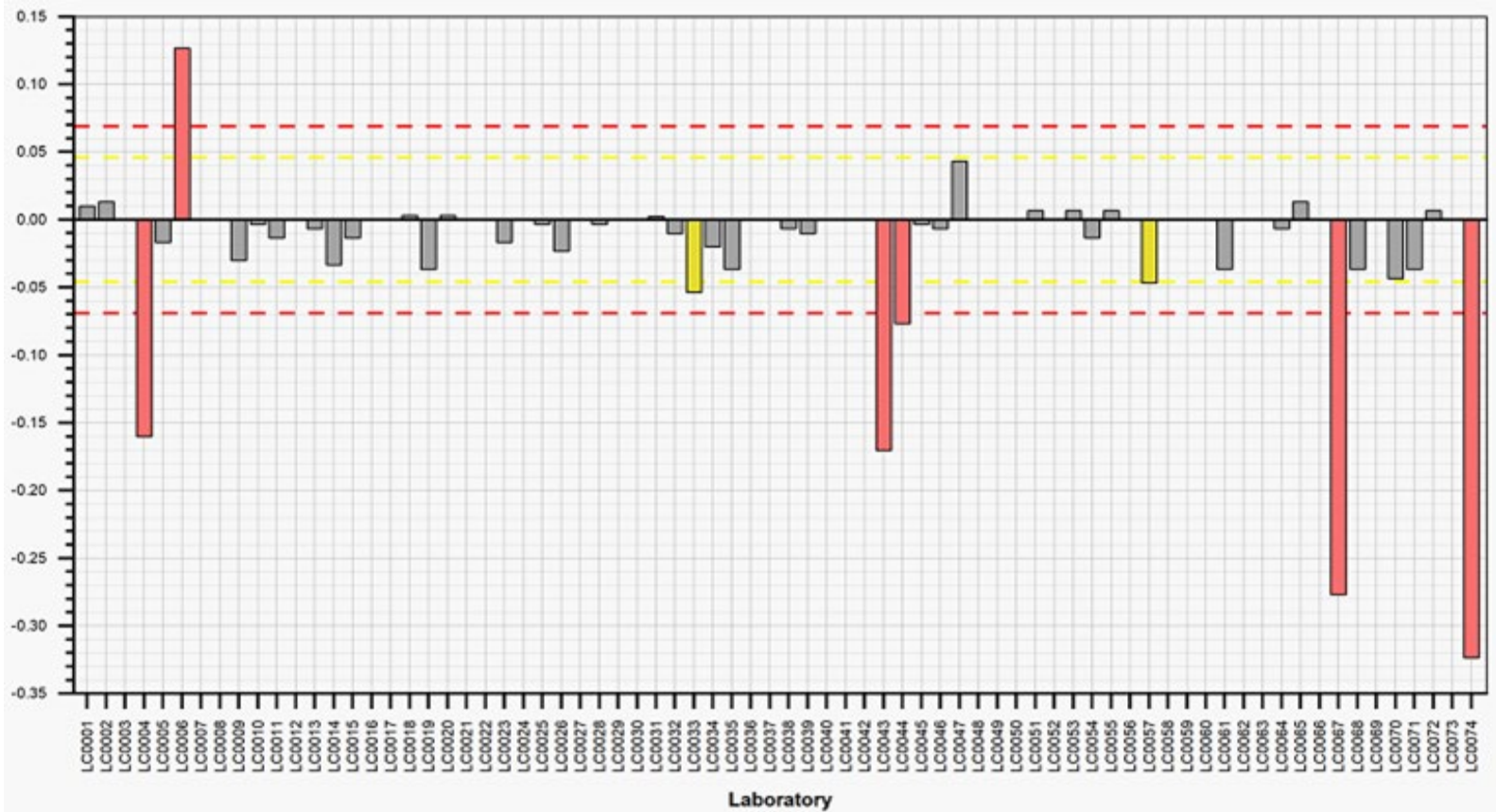


No, but there is nothing superior

- **IECEX and IEC TC31 work hand in hand with good cross pollination**
- **Interpretation sheets are regularly drafted and issued after distribution for comment**
- **Proficiency testing takes place to check on the labs ability to interpret the standards and test correctly**



Example of Proficiency Testing





Going the extra mile



The IECEx System operates separate Schemes for:

- IECEx Certified Equipment Scheme
- IECEx Certified Service Facility Scheme (onsite and offsite)
- IECEx Certification of Personnel Competencies (CoPC) Scheme
- IECEx also operates a “Recommended Training Provider” programme
- IECEx is issuing certificates for non-electrical Ex equipment, and is now branching out into hydrogen dispensers and hydrogen fuel cells using IEC 60079-46 for equipment assemblies.
- There are three explanatory animated videos available at www.iecex.com



Conclusions



- **The world of standards is not as black and white as it may appear**
- **Expert volunteers are required in order for standards to develop**
- **Overcoming commercial issues is a continuous barrier to trade worldwide**
- **Most African countries remain way behind the rest of the world**
- **Enforcing compliance with mandatory standards is almost impossible in South Africa**
- **When it all goes wrong, the cost of compliance seems almost trivial**
- **Get on board! You can learn more than you think!**



And that's it! Questions?

