



Innovation meets Standardization

Johan van Velthoven, Consultant NEN

Domestic Use of Energy
conference, March 30 – April 1, 2015 Cape Town South Africa

Me, Johan van Velthoven



- MSc degree in electronics
- University of Eindhoven, the Netherlands
- Working experience
 - Royal Philips Electronics:
 - > Innovative developments (CD)
 - > Lighting production equipment
 - NEN (Dutch standardization institute)
 - > Standardization teams on electrical installations



NEN



CENELEC

NEN

The definition of a standard

- A **standard** is a document, established by consensus and approved by a recognized body, 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.
- ISO/IEC definition

The making of standards



“Experts” & “Stakeholders”

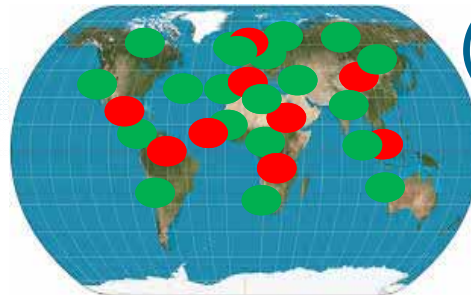


All parties concerned

Consensus in “drafting”



Acceptance by large
($>2/3$) majority



NEN

The use of standards

- Usage of general accepted “facts”



- Interconnection



- Legislation

- Safety
- Environmental issues
- (no) Barriers for trade



NEN

Risk management

- Projects
- Legislation
- Insurance
- Interconnection
- Entrance to markets



> RISC MANAGEMENT

- Proven, “state of the art”, general accepted solutions

> STANDARDS

What about innovations ??



Build upon available expertise

>> Reduce time to market



Interconnectivity

Entrance to markets



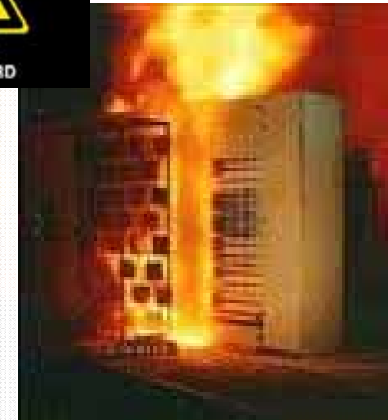
Focus on core-business/
leading edge



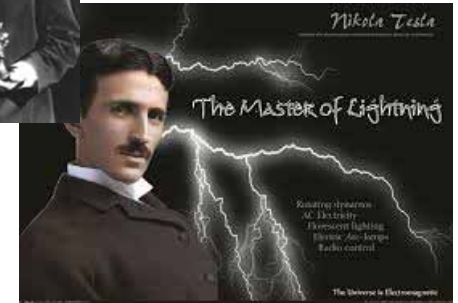
NEN

Example: electrical power

- Huge network
 - Interconnections
- Risk on injury and fire
 - Legislation
 - Insurance
- Ecological footprint
 - Use of fossile sources
 - Use of materials



War on currents



- Tesla (AC) vs. Edison (DC)

- AC due to transport of energy & available equipment

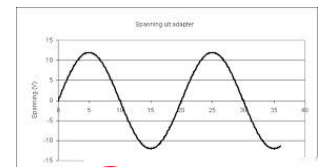


- DC due to:
 - Electronics in equipment
 - Local generation
 - Storage

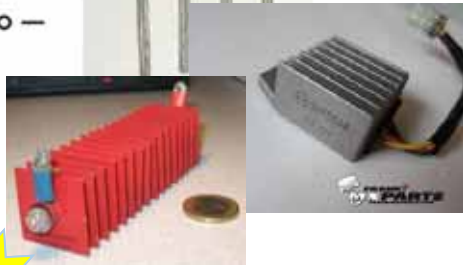
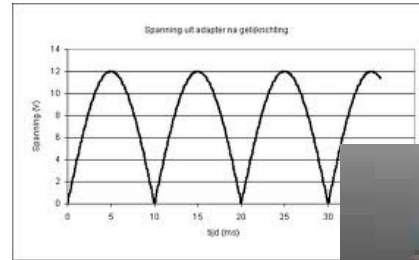
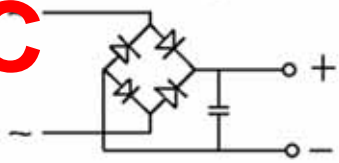


NEN

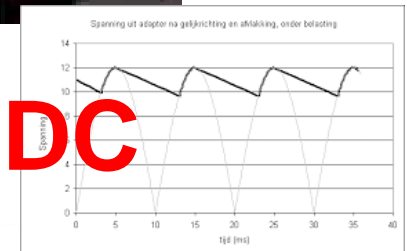
The power entry of almost every piece of equipment



AC



DC



Innovation meets standardization
 Johan van Velthoven; April 1, 2015

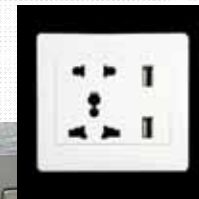
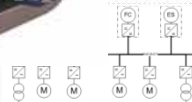
Opportunities for DC



- Small low-cost (local) grid's
- Low energy consumption, low energy losses
- Less material usage

- Typical DC-applications

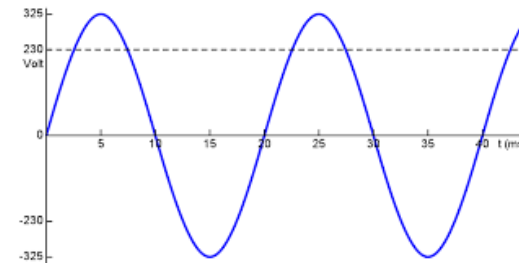
- > Data-centers
- > Lighting
- > Powergrid's on ships
- > E-mobility



- And more ... also at home

Position of standards (Electrical Power supply)

- By history: “AC-minded”
- Large, strong supply-networks
 - Ease of switching/disconnecting
 - > at 0 Volt or 0 Amp,
 - > 50 or 60 times / sec.
 - Power for fast fault-reaction
 - Alternating polarity (50 or 60 times / sec)
- Behaviour of semi-conductor electronics
 - unknown / unfamiliar ?



NEN

Example: Switching and isolation

		AC	DC
Functional	Switching Operational currents	Switching Operational currents	Switching Operational currents
Fault-reaction	Switching fault currents	Switching fault currents	Switching fault currents
Maintenance	Isolation	Disconnection	Disconnection

**High power,
High current,
High energy to operate switch**

**“Low” power,
Smart detection, fast switching
“Controlled” current**

Frequently combined in 1 device !

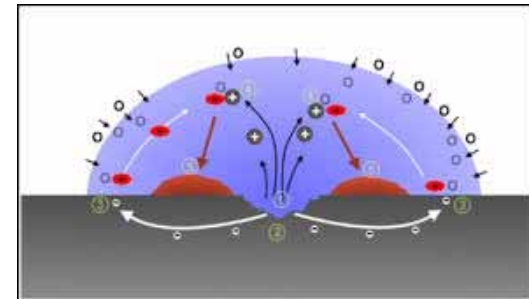
Example: earthing & bonding

Purpose: Reduction of fault-voltages to safe values within given time-limits

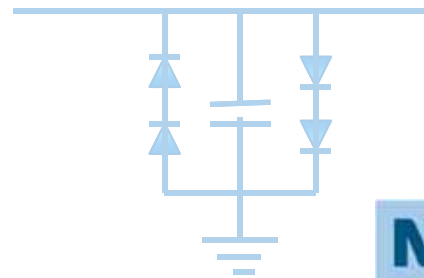
- **Classical approach:** earthing & bonding of metal objects through direct contact, aiming at a voltage-difference of 0 V

>> **DC: possible corrosion issues**

- **Possible solution:** cathodic-protection



>> Earthing and bonding through diode-networks providing threshold voltage for cathodic protection



NEN

Standards >> “unblock” your mind

- Clarifications and amendments (if required) to “unblock” formal application of standards (used in legislation, contracts)
- New standards to enable and to “guide” the new application area’s



Triggered/interested?

- Become a member of the global standardization society
- Get informed by your national standardization body

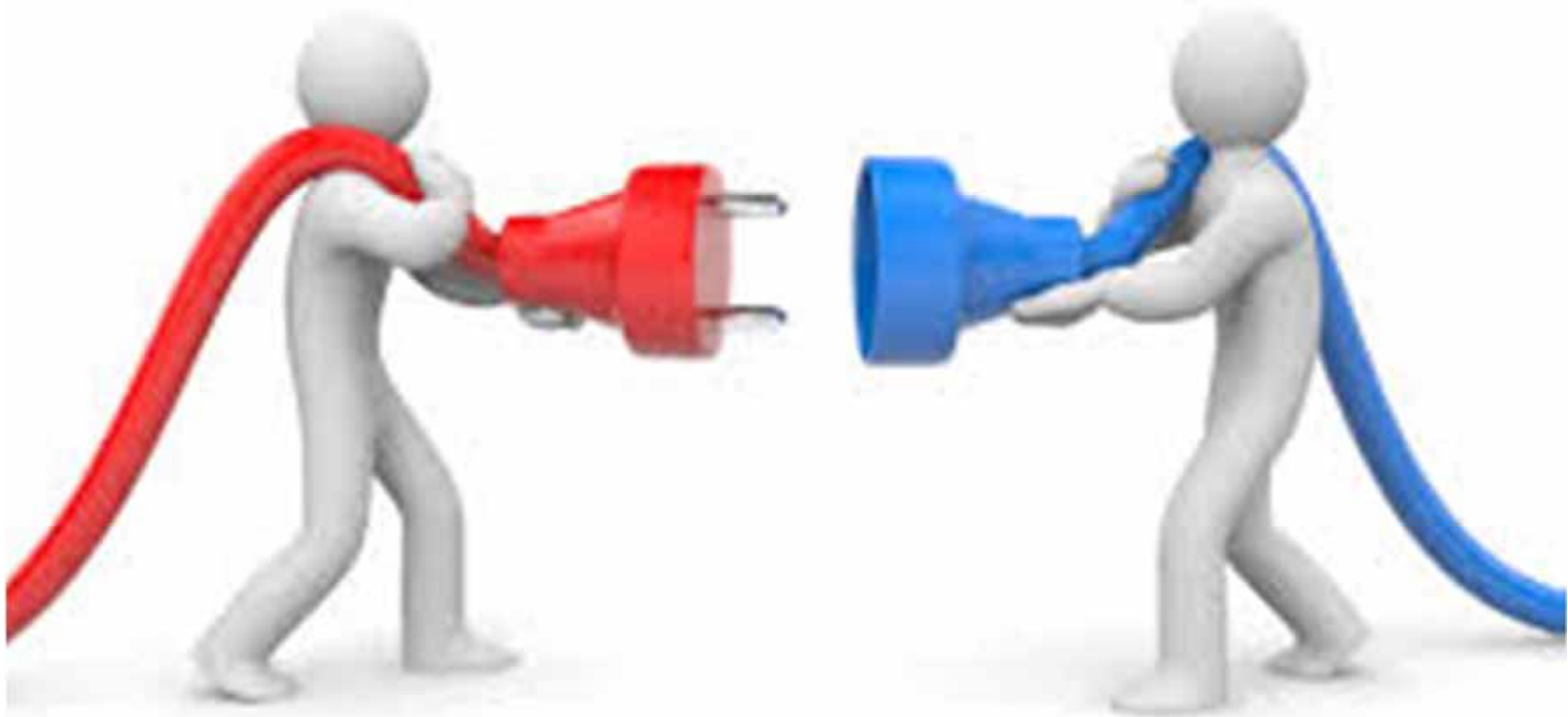
www.sabs.co.za

www.iso.org

www.iec.ch



Don't forget



The value of standards ...

<http://www.iec.ch/worldplugs>

The screenshot shows the IEC World Plugs website interface. At the top left is the IEC logo and the text 'International Electrotechnical Commission'. Below this is a navigation menu with links for 'You & the IEC', 'About the IEC', 'News & views', 'Standards development', 'Conformity assessment', 'Members & experts', 'Developing countries', and 'Webstore'. A search bar is located on the right. The main content area is titled 'World Plugs Plugs & Sockets' and includes a breadcrumb trail: 'About the IEC > What we do > Technology sectors > World Plugs > Map view'. Below the title are tabs for 'Map', 'List', 'IEC Standards', 'Why so many?', and 'Brief history'. A 'Types:' section shows buttons for plug types A through N. A paragraph of instructions reads: 'Select a location to discover what plug type(s), voltage and frequency are used there. Click on a plug type to see where it's being used. Choose electric potential, or frequency to view all corresponding locations.' The main feature is a world map with red markers indicating plug locations. Below the map, a panel for 'South Africa' shows '230 V', '50 Hz', and 'C,D,M,N'. At the bottom, a grid displays 14 different plug and socket types, with 'Type C' and 'Type N' highlighted. The footer contains 'Privacy | Contact | IEC offices' and 'Copyright © IEC 2015. All rights reserved.'

**14 different
incompatible
plugs & sockets**

NEN

Questions?



MSc. Johan van Velthoven

Consultant sector Elektrical Installations

Tel: +31 (0)15 2690 337

Mob: +31 (0)6 33333 882

Email: Johan.vanvelthoven@nen.nl

P.O. box 5059, 2600 GB Delft

Vlinderweg 6, 2623 AX Delft

The Netherlands

www.nen.nl

NEN