

EVA, Vienna, 31. March 2004



Safety of Hydrogen: Standards and Regulations,

Ulrich Schmidtchen German Hydrogen Association (DWV), Berlin

Missing link?



- A lot can be said about hydrogen safety
- A lot can be said about regulations and standards for hydrogen
- But why on earth does everybody want me to tell something about **both together**?
- There is definitely a link between these two topics, but it is weaker than many think

Where Safety does not come from



Safety is not

the result of numerous, comprehensive, and exhaustive standards and regulations. (You can not ordain safety.)

Safety is the result of

- sound engineering
- extensive testing
- well-trained employees
- uncomplicated procedures
- good support
- ... and also reasonable rules which can be followed

You can make products and systems as safe as you want, yet accidents and mishaps will occur.

Distinction Regulations / Standards



	Regulations	Standards	
Purpose	to protect the public, workers, the environment, values from dangers	to support the free exchange of goods and services	
Legal power	compelling	not a legal requirement, but useful	
Created by	policital bodies (parliament, government) as they are usually laws or based on them	made by the interested parties (companies, associations)	

EU regulations



Guidelines for basic requirements

- Pressure Equipment (97/23/EC)
- Transportable Pressure Equipment (99/36/EC)
- Protection from explosions (94/9/EC, 99/92/EC)
- Seveso II (emissions) (96/82/EC)
- Machinery (98/37/EC)
- ...

Guidelines must be incorporated into national law by the member states

Operational requirements (of which many are important for safety) remain in the responsibility of the member states

Other regulations

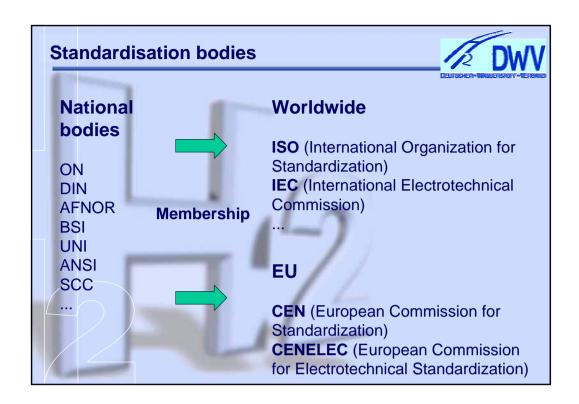


- Transport of dangerous goods:
 - ADR (road)
 - RID (rail)
 - IATA / ICAO (air)
 - IMO (sea)
 - ADNR (inland waterways)
 - ...
- Approval of road vehicles: UN ECE
 - For hydrogen cars: EIHP
- Individual national regulations

Regulations for hydrogen



- Which regulations apply to <u>hydrogen</u>?
- Wrong question there are no hydrogen specific rules
- Substance specific rules exist only
 - for particularly dangerous substances:
 - Acetylene
 - Oxygen
 - Or for economically important substances:
 - Natural gas
 - LPG
- Regulations are usually application specific
- Correct question is therefore:
- Which regulations apply to my hydrogen application?



International and European Standards							
		-		Deutscher-Wassenston	F# IE REALD		
Ш		general	electrical	other			
ı	World	ISO	IEC				
	Interface	Vienna	Agreement				
	EU	CEN	CENELEC				
		1	Siene.				

How to get into international committees



- The national standard organisation must be a member of ISO / IEC / CEN / CENELEC ...
- The work of ISO, IEC ... is done in **Technical Committees** (TCs)
- The national standard organisation must be a P member of the respective TC
- P member countries send a delegation to the plenary meetings of this TC and can propose work items
- Experts from the P member countries can participate in the working groups (WGs)

ISO TC 197 Title: "Hydrogen Technologies" Secretariat: Canada (SCC) O members P members Australia Argentina Austria Belgium China Egypt Czech Republic France Hungary Germany India Italy **Jamaica** Japan Serbia and Montenegro Korea, Republic of Spain Libyan Arab Jamahiriya Thailand Netherlands Turkey Norway Ukraine Russian Federation United Kingdom Sweden Switzerland USA

ISO TC 197 Working Groups WG Topic Secr. CAN Liquid hydrogen - Land vehicles fuel tanks 3 Airport hydrogen fuelling facility Gaseous hydrogen - Land vehicle filling connectors CAN 5 Gaseous hydrogen and hydrogen blends - Land vehicle fuel tanks CAN Basic considerations for the safety of hydrogen systems D Hydrogen generators using water electrolysis process CAN 8 Hydrogen generators using fuel processing technologies 9 NL Transportable gas storage devices - Hydrogen absorbed in 10 **USA** reversible metal hydride Gaseous hydrogen - Service stations CAN Hydrogen fuel - Product specification

Papers published by ISO TC 197 so far



- ISO 13984: Liquid hydrogen -- Land vehicle fuelling system interface
- ISO 14687: Hydrogen fuel -- Product specification
- ISO/TR 15916: Basic considerations for the safety of hydrogen systems

IEC TC 105 Title: "Fuel Cell Technologies" Secretariat: Canada (SCC) P members O members Austria Australia Belgium Canada China Norway Denmark Poland Portugal Serbia and Montenegro Finland France Egypt Germany Sweden Italy Japan Korea (Republic of) Netherlands Spain Switzerland United Kingdom USA

IEC TC 105 "Fuel Cells



WG	Topic	Secr.	
1	Terminology	USA	
2	Fuel cell modules	D	
3	Stationary fuel cell power plants – Safety	USA	
4	Performance of Fuel Cell Power Plants		
5	Stationary Fuel Cell Power Plants - Installation		
6	Fuel cell system for propulsion and auxiliary power units (APU)	D	
7	Portable fuel cell appliances - Safety and performance requirements	CAN	

Give Europe more weight!



- It is highly desirable that the point of view prevailing in Europe gets more weight in international standardization of hydrogen and fuel cell technology
- All interested parties should urge their national standard bodies to become P member of ISO TC 197 and IEC TC 105, if they are not yet
- Travel costs for the working group meetings are the price to be paid to avoid that the international standards for the field are made in America and Japan

