

AEA Annual Conference 2024

Global Standards & Certification

November 12, 2024

ISO Standards for GHG Footprint of H₂ Supply Chain

Dr. ANDREI V. TCHOUVELEV
CHAIR, ISO/TC 197/SC 1
DIRECTOR, SAFETY & REGULATORY,
VICE-CHAIR, HYDROGEN TASK FORCE



Hydrogen
Council



Scope:

Standardization of large scale hydrogen energy systems and applications including aspects of testing, certification, sustainability and placement, and coordination with other relevant standardization bodies and stakeholders

Secretariat: SCC

Committee Manager: Ms Sara Marxen

Chairperson (until end 2025): Dr Andrei Tchouvelev

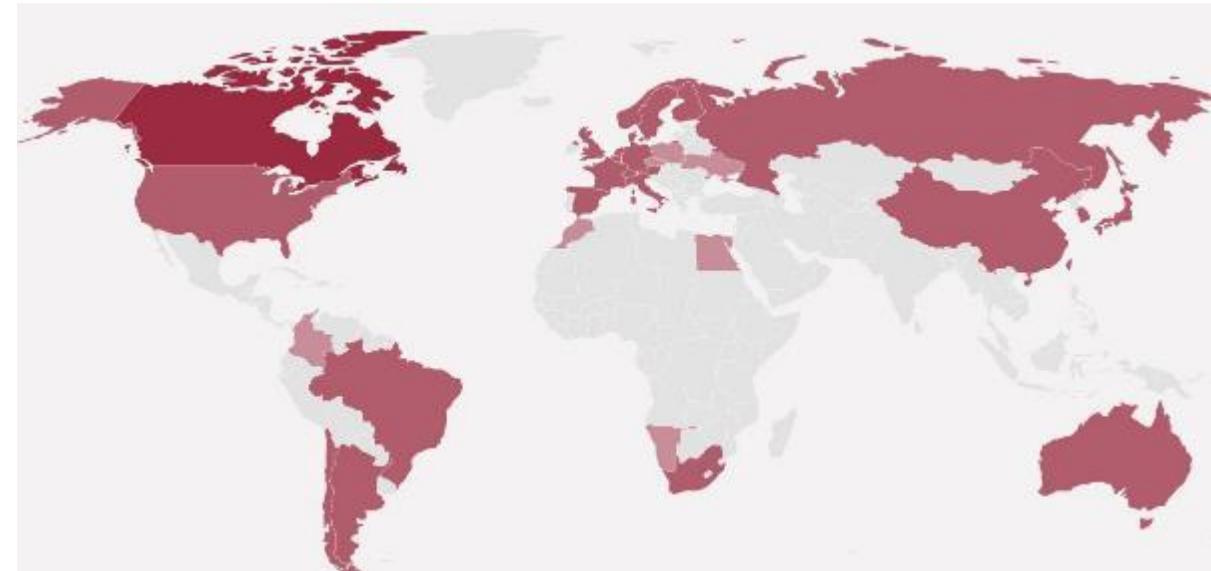
ISO Technical Programme Manager [TPM]:

Mrs Kirsi Silander-van Hunen

ISO Editorial Manager [EM]: Mr Arun ABY Paraecattil

PARTICIPATING MEMBERS (26)

COUNTRY/TERRITORY	ACRONYM
Argentina	IRAM
Australia	SA
Austria	ASI
Belgium	NBN
Brazil	ABNT
Canada	SCC
Chile	INN
China	SAC
Czech Republic	UNMZ
Denmark	DS
Finland	SFS
France	AFNOR
Germany	DIN
Italy	UNI
Japan	JISC
Korea, Republic of	KATS
Netherlands	NEN
Norway	SN
Russian Federation	GOST R
Singapore	SSC
South Africa	SABS
Spain	UNE
Sweden	SIS
Switzerland	SNV
United Kingdom	BSI
United States	ANSI



OBSERVING MEMBERS (6)

COUNTRY/TERRITORY	ACRONYM
Colombia	ICONTEC
Egypt	EOS
Morocco	IMANOR
Namibia	NSI
Poland	PKN
Ukraine	SE UkrNDNC

- ☐ Established in 2022
- ☐ 2 Plenary meetings
- ☐ Next meeting – Seoul, Dec. 2024

ISO/TC 197 Plenary Week

Vienna, Austria, November 13-17, 2023



ISO/TC 197 & SC1 Division of Scope



ISO/TC 197 Focus

- ✓ Basic Requirements for Hydrogen Technologies
 - Production
 - Storage
 - Handling
 - Built environment
 - Protocols and components including road vehicles and their fueling infrastructure



(Toyota website)



ISO/TC 197 / SC1 Focus

- ✓ Applications' requirements of Hydrogen technologies at large scale and in horizontal energy systems with H2 as a central link
- ✓ Sustainability aspects (GHG, H2GO, Certification)
- ✓ Coordination with TCs & stakeholders on:
 - Renewables and Energy Storage/Grid Balancing
 - Multi-fuel systems
 - Testing and certification of H2 components
 - Rail, maritime, aviation applications
 - Residential applications



(Toyota website)



(Toshiba website)

IEA TCP Hydrogen and ISO/TC 197

Connecting PNR with Standards

IEA TCP Hydrogen Task 43 on Hydrogen Safety

Safety and RCS of Large-Scale Hydrogen Energy Applications

Focus on Common "Large Scale" and "Horizontal" Safety and Regulatory Aspects

Mobility Infrastructure				P2H with RES		Residential Sector	
Heavy duty road vehicles	Multifuel stations	Rail	Maritime	Aviation	Electrolysis	Energy Storage	Cooking Heating
<u>Common horizontal topics:</u>							
Social (comprehensive) risk							
Safety culture and management system							
Safety distances							
Hazardous areas							
Confined environment: Enclosures, buildings, structures							
Hydrogen system safety							
Liquid and compressed hydrogen							

Kick off meeting – June 27, 2022

1st in-person meeting – October 17-21, 2022

2nd in-person meeting – February 27-March 3, 2023

3rd in-person meeting – September 18, 2023

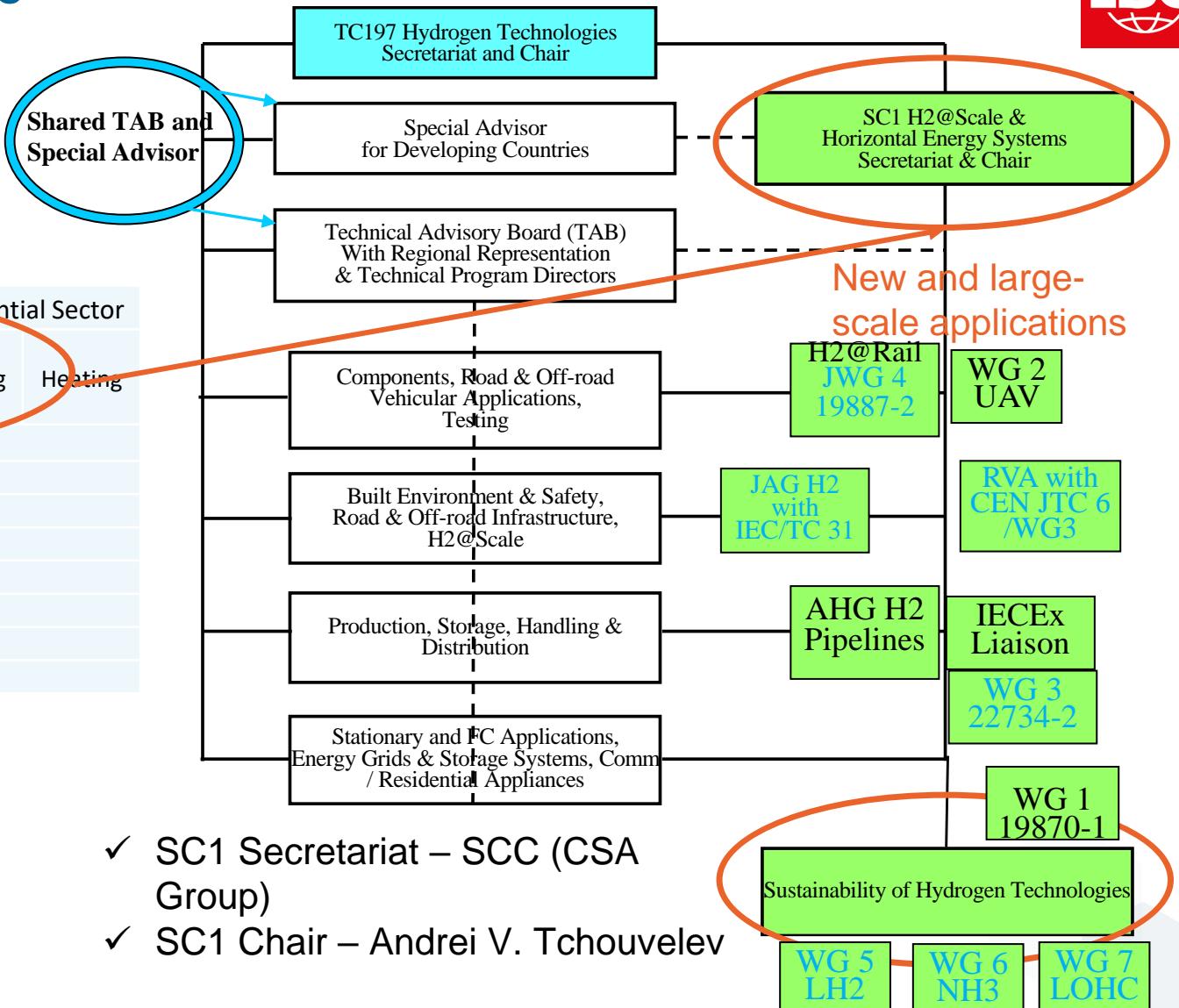
4th in-person meeting – April 8-12, 2024

5th in-person meeting – September 26-27, 2024



Hydrogen TCP

Program Level ISO/TC197 Organization Chart



ISO/TS 19870:2023 Published!



New ISO standard on hydrogen unveiled at COP28

During COP28 in Dubai, the International Organization for Standardization (ISO) unveiled a new technical specification (ISO/TS 19870) as a foundation for harmonisation, safety, interoperability and sustainability across the hydrogen value chain.



Scope of ISO Methodology ISO/TS 19870:2023

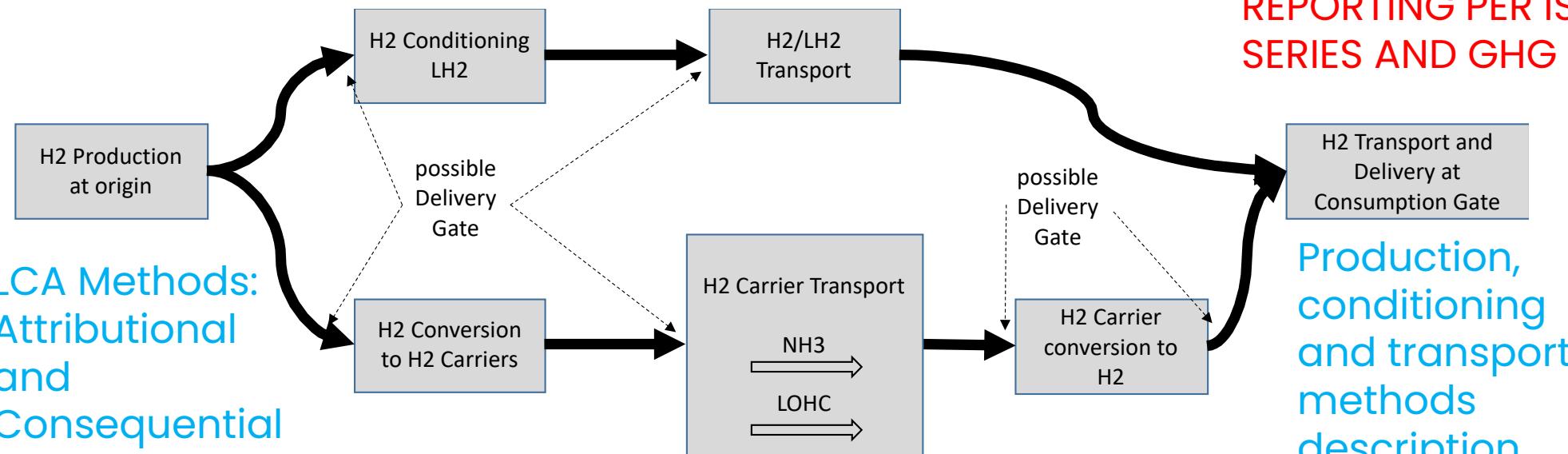


To establish CFP (Carbon Footprint of Product) of Hydrogen along its supply chain: from Well to any Delivery gate up to Consumption gate.

Key ISO standards: 14044 (on LCA) and 14067 (on CFP)

CAUTION:
NOT TO MIX WITH
CORPORATE AND PROJECT
CARBON FOOTPRINT
REPORTING PER ISO 14064
SERIES AND GHG PROTOCOL!

Considered hydrogen supply chain



ISO/TS 19870 Pub. Nov 30, 2023
ISO 19870-1, -2, -3, -4: 2024-26
Started, DIS Nov 2024

NOT in the Scope of the ISO Methodology



ISO/TS 19870:2023 is **NOT** defining what is acceptable in a given jurisdiction or for the purpose of a specific public policy!

Thresholds, Labels (Colors) are defined by public policies or by the market

Standards:
How to measure

Public authorities:
Thresholds and labels.
What is acceptable

Harmonizing labels and thresholds should only be done through **negotiations between governments**



Basic Principles of H2 GHG Footprint Classification

No	Basic Principles	Rationale Explanatory Notes
1	<u>Subject of Classification:</u> GHG footprint of the hydrogen product coming out of its full supply chain	<u>Carbon Intensity</u> of hydrogen production, conversion / conditioning and transport to consumption gate (including reporting indirect emissions) determined per ISO Methodology (currently TS 19870)
2	<u>Inclusive of all decarbonization pathways</u> (technology agnostic)	<u>One goal, multiple pathways</u> (G20 approach)
3	<u>Beyond colours</u> - colour neutral	<u>Colours are misleading</u> and can only identify the origin of energy sources and feedstock, e.g. renewable or non-renewable. However, they do not communicate carbon intensity and create an illusion of zero carbon production pathways
4	<u>No prescribed thresholds</u>	<u>Sovereign nations set their own thresholds</u> per their public policies and climate agendas
5	<u>Simple & practical</u> - easy to understand	Key information needs be presented in an <u>unambiguous</u> way precluding double interpretation

Hydrogen Product GHG Footprint Triangle

Decarbonization Attribute Beyond Colours

Classification

Generic Grade or Label to reflect GHG footprint value and / or range. For stakeholder information only.

Driven by Public Policies

Certification

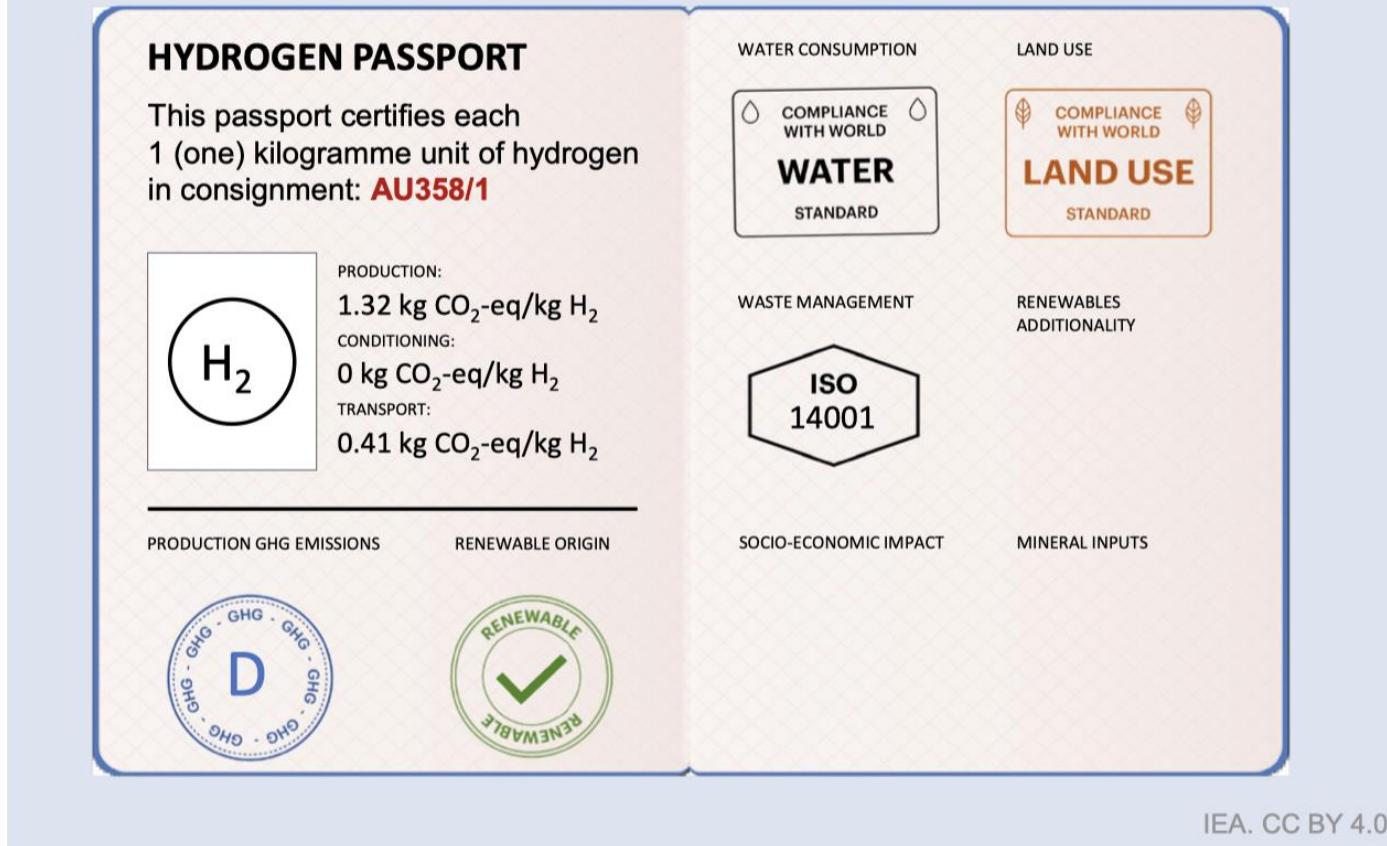
Quantified GHG footprint per Methodology of H2 or carrier product issued by a Certification Body and verified by a Verification Body. Contains GO. Part of legal conditions of a supply contract. Compliance or disclosure scheme. Subject to mutual recognition.

Driven by Science & Technology

Methodology for GHG Footprint Quantification (ISO/TS 19870)

Classification Example

Graphical representation of the possible content of a product passport for a traded hydrogen cargo



Towards hydrogen definitions based on their emissions intensity, IEA, 2023

Global Issues require International Solutions

Participation within Established partnerships –

The Effective vehicle

Global SDOs &
Regulators



- WP.6
- H2 Task Force Sustainable Energy Division



Key Strategic Partners

Hydrogen Council



H2 Hydrogen TCP



Community +
Stakeholders



International Approach ensures **Safety**,
Performance + **Sustainability** are fully
addressed ***for the Global Community***

Single International Approach instils
Regulatory + Market Confidence

Use of **Existing International Standards (and others coming) + International Certification/Verification** and working with existing International Organizations, for any additional needs, **prevents wasteful duplication**, thereby

- **Saves time**,
- **Keeps costs down**
- **Facilitates Global Trade + Innovation**

IECEx Certificates of Conformity Scheme – Well Suited for Hydrogen Technical Field



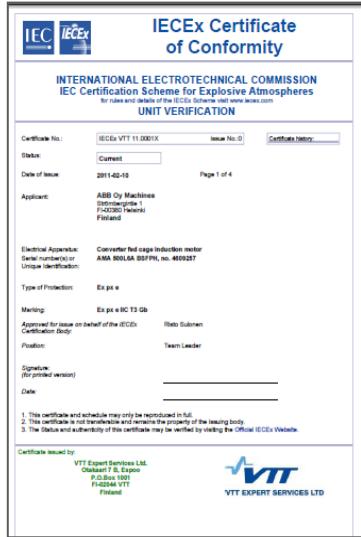
Equipment



**Ex Equipment,
Components +
Systems +
Mechanical
Equipment**

Product testing + initial factory
inspection + surveillance

Assemblies



**Ex Equipment Unit
Verification e.g.
“Assemblies”**

Services



**Ex Services, e.g.
Repair + Overhaul
Installation
Inspection**

Personnel

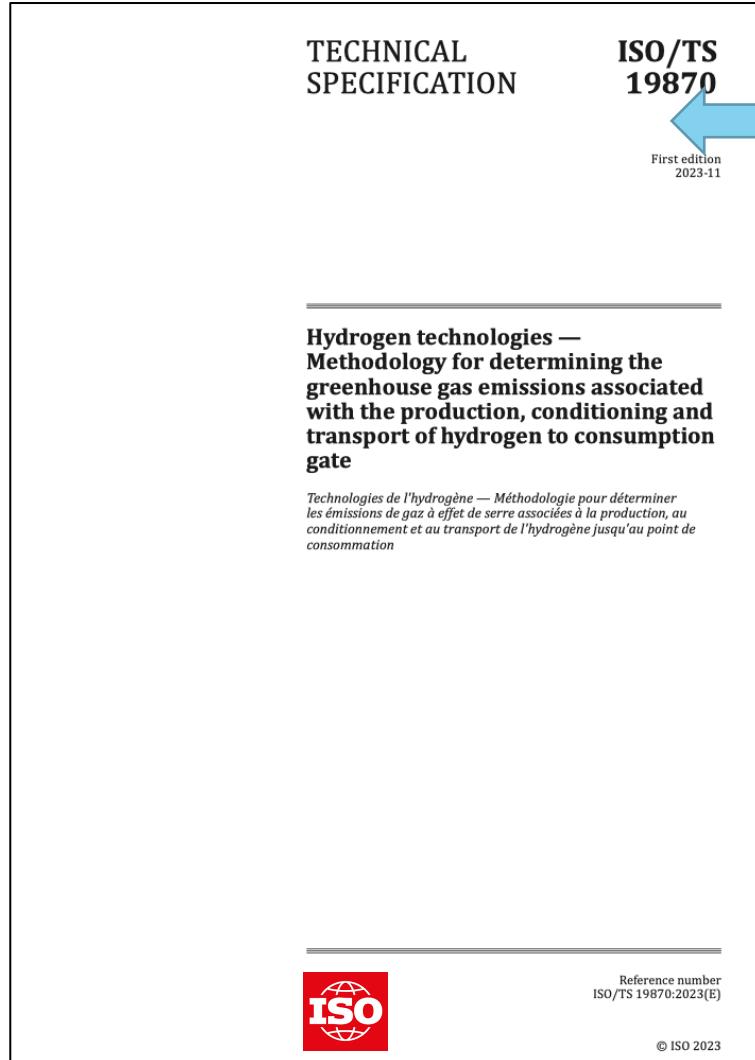


**Ex Competent
Person, with Photo
ID Card**

Started 1996

**Currently over 100 IECEx
Certification Bodies offer
IECEx Certification
>140,000 Certificates +
Reports issued including
over 30,000 Certificates
covering H2:
- Equipment
- Services
- Personnel Cert.**

Similar Approach Fits into H2 Product Certification Scheme (via IECQ CFP claims verification scheme)



❑ ISO/TS 19870:2023 is based on ISO 14067 for CFP and ISO 14040 and 14044 for LCA.

❑ Based on ISO 14067, IECQ has launched a new service under its approved process (AP) scheme: the issuing of an IECQ carbon footprint of product claims verification.



Carbon footprint of product claims verification



Hydrogen
Council |