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TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

Hydrogen regulation/standards survey. Summary of answers

Question	*Options for answer*	*Country: Spain*	*Country: Germany*	*Country: France*	*Country: The Netherlands*	*Country: Italy*
*Is it allowed to inject **pure hydrogen** into:*						
- *Distribution natural gas network?*	Yes/No	NO	YES	NO	YES	NO
- *Transmission natural gas network?*	Yes/No	NO	YES	NO	YES [1]	NO
If the answer is YES: Name of regulation/standard/rule/specification (including publication date) for:						
- *Distribution*		-	DVGW G262 ((technical rule on gas quality G260 refers to "renewable gas technical rule" G262)	-	Regeling van de Minister van Economische Zaken van 11 juli 2014, nr. WJZ/13196684, tot vaststelling van regels voor de gaskwaliteit (Regeling gaskwaliteit	-
- *Transmission*		-		-		-
If the answer is NO: Is it forecast to review the current regulation to consider hydrogen injection into natural gas network?	Yes/No/ Not known	-	-	-	YES In explanatory notes of the current gas quality regulation this aspect is mentioned, however without mentioning any date.	Not known.
Comments/remarks to the injection of pure hydrogen into natural gas network:		-	-	-	A maximum value of 0.1 %mol for distribution and 0.02 %mol for transmission are specified in the current regulation.	-
*Is it allowed to inject **hydrogen/natural gas mixtures** into:*						
- *Distribution natural gas network?*	Yes/No	YES	YES	YES	YES [2]	YES
- *Transmission natural gas network?*	Yes/No	YES	YES	YES	YES [3]	YES
If the answer is YES: Name of						

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Question	*Options for answer*	*Country:* *Spain*	*Country:* *Germany*	*Country:* *France*	*Country:* *The Netherlands*	*Country:* *Italy*
If the answer is YES: Maximum hydrogen concentration in the mixture for injection into the natural gas network:	%mol / %vol / other					
- *Distribution*					0.1 %mol	
- *Transmission*		5 %mol	See below	6 %mol in compliance with CV, Wobbe and density ranges	0.02 %mol	0.5 % mol
If the answer is YES: Is it compulsory/required to monitor hydrogen concentration mixture prior to injection point?	Yes/No	YES	No, but for billing purposes it is required that hydrogen is either measured or less than 0.2% (technical PTB G14)	No, it is the responsibility of the network operator to check the compliance of the gas with the legislation and its technical specifications, so each operator decides the parameter and the associated frequency of checking	Although not legally required, it will be part of the grid connection agreement between producer and TSO/DSO	-
If the answer is NO: Is it forecast to review the current regulation to consider hydrogen/natural gas mixture injection?	Yes/No/ Not known	Not known, although there could be an influence due to the current natural gas and biomethane quality harmonization process in progress.	Not known, but extensive research on hydrogen tolerance is in progress	-	In the explanatory notes of the current gas quality regulation this aspect is mentioned, however without mentioning any date.	-
Comments/remarks to the hydrogen/natural gas mixture injection into natural gas network:		Hydrogen mixtures are considered as non-conventional gases in the regulation.	There is not a clear limit value as such. An examination on a case-by-case basis is required. The technical rule G262 states that a concentration in a single digit percentage of hydrogen is uncritical in most cases if gas combustion parameters from DVGW 260 are met (Wobbe, CV). However, some restrictions are mentioned: a limit of 2 vol-% for tanks of CNG cars (DIN 51624), specified limits from gas turbines OEMs of 5 vol-% or even 1 vol%, porous	On-going French demonstration project (GRHYD) of H2 injection in distribution grid and end-users. On-going demonstration project of H2 injection in transportation network and industrial users	-	For the time being specification for th injection of a max of 0.5 %mol of H_2 Technical report fo injection of biomet the grid (UNI TR 1 July 2014)

NOTES:

The Nederlands

[1]: The TSO has legally the possibility to blend "off-spec" gases to bring them on specification (exit-specification in TSO network for hydrogen is limited to 0.0
to be paid for by the supplier. With the given value of 0.02 %mol, it is virtually impossible to accommodate pure hydrogen.

[2] Maximum allowable hydrogen concentration is limited to 0.1 %mol. With the given value of 0.1 %mol injection in the distribution grid is limited to hy
hydrogen.

[3]: The TSO has legally the possibility to blend "off-spec" gases to bring them on specification (exit-specification in TSO network for hydrogen is limited to 0.0
to be paid for by the supplier. With the given value of 0.02 %mol, it is virtually impossible to accommodate hydrogen/natural gas mixtures with a moderate to

Denmark

[4]: Gasreglementet afsnit C-12 Bestemmelser om gaskvaliteter. (14th December 2012): http://www.sik.dk/Virksomhed/Gas-kloak-vand-og-afloeb-for-fagfolk/

[5]: Requirements on H_2 for injection in the natural gas net: Same as below apart of: C_nH_m < 0,5 %vol (CH_4 equivalent); DP -50 °C at P_{atm}.

[6]: There is presently the possibility to distribute hydrogen in the net for stationary fuel cells projects that requires the authorization of the safety authorities.
"fuel cell village" in DK. In this case there are specification for the Hydrogen distributed (see Gasreglementet afsnit C-12 Bestemmelser om gaskvaliteter. (14th
vand-og-afloeb-for-fagfolk/Love-og-regler-om-gas-og-vvs/Gasreglementet.

The requirement on H2 quality when used in H_2 net are: H_2 > 98 %vol; O_2 < 0,1 %vol; CO2 < 0,1 %vol; C_nH_m < 50 ppm (CH_4 equivalent); DP -60 °C at P_{atm}.