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TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

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MARCOGAZ position regarding the current situation about gas quality harmonisation

Context

The situation of gas in Europe is changing under the influence of three main factors:

1. Declining indigenous resources imply that Europe will be more and more dependent on imported natural gas supplies, including LNG, in a context of growing world demand.
2. The European energy agenda calls for the development of renewable energy sources, including renewable gases.
3. The building up of the internal gas market modifies the relationship between suppliers and infrastructure operators.

The result is that an increasing **diversity of supplies** is foreseen in the **mid-term**. Simultaneously market arbitration may lead to new physical gas exchanges at EU level thus bringing gases of various qualities in regions where historically gas was coming from a single supply of stable quality. These evolutions have already pushed some Member States (e.g. Denmark, Poland or UK) to study and in some cases to modify their historical gas quality specifications.

In this context, the definition of a **common gas quality specification** for the transmission, distribution and use of natural gas is an asset that would ease the **free circulation** of natural gas in EU.

It will also allow for the **development of appliances** built **for the single market** simplifying the current certification scheme.

Providing that this common specification is **wide enough** for allowing for diversified supplies, the consequences would be an improvement of the **economic position of gas** in the energy balance and an **improvement of the security of supply** at EU level.

Furthermore, as demonstrated by MARCOGAZ[1], the current Wobbe index ranges specified and distributed nationally have such a narrow common band that harmonisation made on this basis would exclude most of the gases currently distributed and used in Europe. Thus

[1] *MARCOGAZ Report "National situations regarding gas quality" (UTIL-GQ-02-19)*

a way forward that would accommodate all or at least **most of the gases currently distributed** has to be found.

History

The achievement of this common specification, identified as a necessity by the European Commission as early as 1999, is a long and complex work.

After the publication of EASEE-gas CBP "Gas Quality" in 2005 where a first proposal for a unique Wobbe index range was made with the support of MARCOGAZ[2], reservations about the ability of the appliance population to use such a range led the European Commission to give a mandate to CEN (M/400) in 2007 to standardise natural gas specifications, the target being that this specification shall be as wide as possible within reasonable costs.

During the first phase of the mandate, the GASQUAL project, under supervision of CEN/BT WG 197, studied the behaviour of GAD[3] compliant appliances submitted to variations in gas quality. In its final report, CEN/BT WG 197 identified several potential ranges in terms of Wobbe index, defined by the potentially non-nominal behaviour of some types of appliances. It concluded that **national assessment** was necessary to overcome these potential hurdles as some of them were closely related to maintenance and installation procedures that are determined at national level.

Thus, and while CEN/TC 234 WG 11 started to draft the gas quality standard (phase 2 of Mandate M/400), MARCOGAZ and EASEE-gas launched in 2012 a Pilot Study to prepare the implementation of a Wobbe index range from 46 to 54 MJ/m^3 in five Countries by:

- Assessing the results of GASQUAL in view of each national situation,
- Expanding the analysis to pre-GAD and non-GAD applications,
- Comparing potential solutions between those Countries.

However in the last months, some very strong statements have been issued against this harmonisation process. These comments are generally questioning the work being conducted, raising concerns that safety issues are overlooked and demanding that the on-going standardisation process be stopped.

With this paper MARCOGAZ intends to clarify some of the issues raised in order to avoid possible misunderstanding and allow for a positive collaboration of the entire gas value chain in this harmonisation process.

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[2] *MARCOGAZ three positions papers on gas quality specifications :*

1. Position paper on European Gas Quality Specifications (UTIL-GQ-03-06)

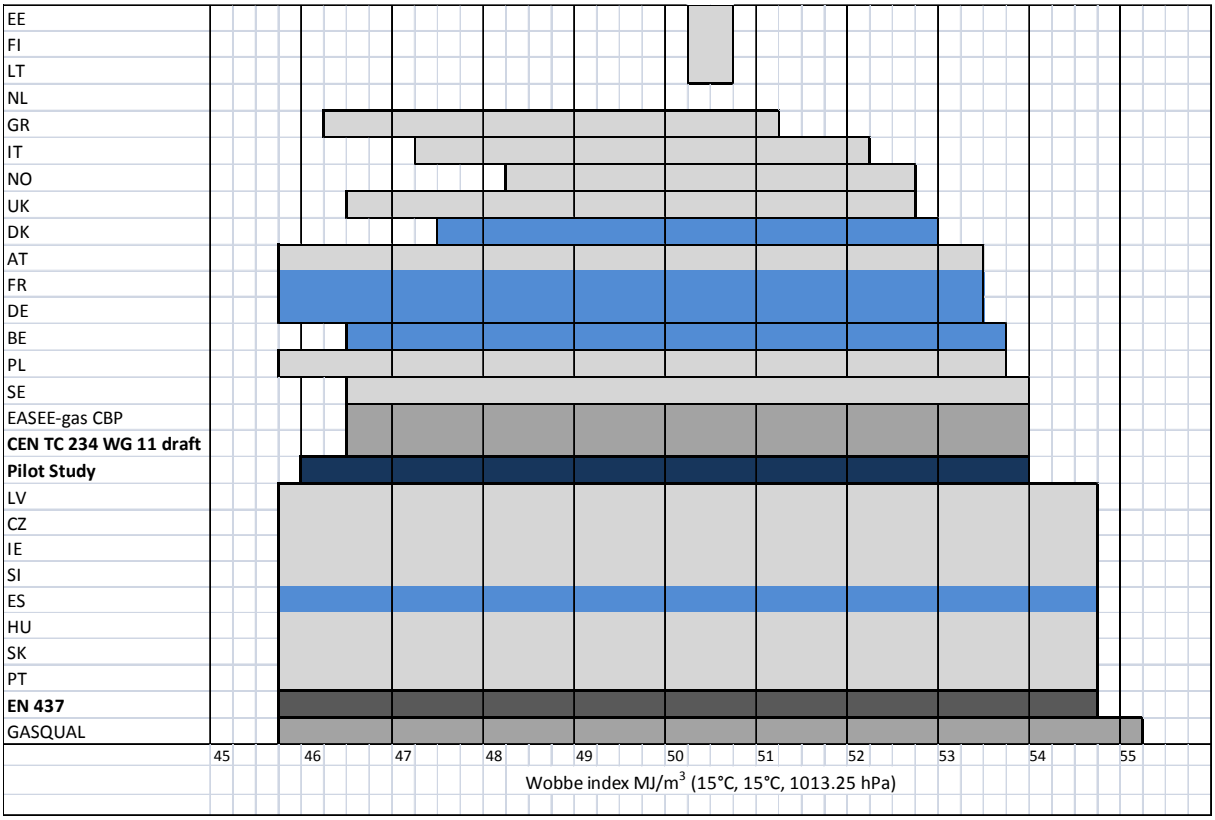
2 & 3. Position papers on European Gas Quality Specifications for natural gas interchangeability (UTIL-GQ-0309 & UTIL-GQ-06-08)

[3] *GAD: Gas Appliance Directive (2009/142/EC)*

Wobbe index range under study – Relationship with existing rules

Worries are being formulated that the current process would lead to the distribution of gases whose Wobbe index may be outside the current ranges. These concerns correctly point out that distributing gases whose qualities lies beyond the limits previously defined by the harmonised standards may lead to dangerous situations. This issue is complicated by the use of different units and reference conditions which may be the source of such misunderstanding. Figure 1 gathers in the same picture the Wobbe index ranges that are of relevance, including those that have been declared by Member States in compliance with Art 2.2 of the Gas Appliance Directive (2009/142/EC).

Figure 1: Comparison of Wobbe index ranges (national values are as declared according to Art 2.2 of GAD). In blue Countries participating in the Pilot Study (dark blue)



Although the GASQUAL project used test gases slightly above the EN 437 limit in order to have a better understanding of the potential problems when appliances are burning gases close to this higher limit, it is apparent that the current proposals for an harmonised range of Wobbe index falls **within the limits** set by **EN 437.**

It shall be also noted that eight European Countries have declared a range of Wobbe index similar to that of EN 437, thus wider than the one discussed in the harmonisation process. Should those Countries make reference to the harmonised range under investigation in the Pilot Study or proposed by CEN/TC 234 WG 11, it would mean a narrowing of their declared range, and should not have any impact on end-users when compared with the current situation.

For other Countries the use of such harmonised ranges, although it may mean a widening of their national specification, would still mean that appliances are used within the range for which they are certified, unless specific Country adjustment are made.

However, these Countries may have populations of appliances not certified under the current EN 437 scheme or non-GAD applications in the industry, which were designed only for their current national ranges. Obviously **an analysis** has to be conducted in order to verify if and how gases outside the current national range may be distributed prior to any change of the national declaration toward a harmonised one that could be larger. This analysis is at the **core** of the **Pilot Study approach**.

Relationship with currently distributed Wobbe range

Gases that are currently distributed in various Countries are usually covering a range of Wobbe index **narrower** than the ones declared by the Member States.

As presented in the context of this paper, current gas quality variations are the result of the diversity of supply and the functioning of the gas markets. As in most Member States **no further rule limit the fluctuation of gas quality** within the declared range, the impact of a harmonised range will have **no impact** on the actual gas distributed further than changing the potential limits as discussed in the previous paragraph.

GASQUAL results interpretation and way forward

Some concerns were expressed that GASQUAL results are insufficient to allow any evolution due to a number of limitations. These concerns correctly underlined elements that have been identified during the GASQUAL project as being obstacles for change (for instance national efficiency labels or regulations…) or as having not been examined by the GASQUAL project (pre-GAD appliances, industrial processes…). MARCOGAZ, as one promoter of the Implementation Pilot Study, believe that this study is a way to address these concerns and to act on the recommendations of CEN/BT WG 197 as developed in § 6.4 of its final report[4].

MARCOGAZ considers that, albeit all its limitations, the GASQUAL project has been **the most comprehensive gas interchangeability study** since the works of people such as Delbourg (1950's) or Dutton (1970's). As all sample based study it cannot deliver definitive answers enabling a complete knowledge of all the aspects of the real world.

The Pilot Study is conducted in order to complete the knowledge given by GASQUAL with field observations, data and experiences. It is our conviction that this needs the sharing of factual information by all stakeholders.

[4] *CEN/BT/WG 197 N 310, "Standardization in the field of gas qualities Mandate CE M400 Phase I Final report", 2012-03-12*

Importance of national approaches

As illustrated in Figure 1 the current ranges as declared by Member States are dissimilar, which means that the **gap** between the national range and a future harmonised range is **country dependant**.

Furthermore some national practices or regulation may have an impact on **appliance installation and maintenance practices** as those are **not harmonised** in EU. For instance in Countries where gas quality is stable or where the Wobbe index changes only in a narrow band, appliances adjustment may be common which may raise an issue when gas quality changes (see Danish case) whereas Countries with usually wide Wobbe index variations may have developed solutions to prevent the adverse effect of those variations on sensitive equipment.

For these reasons MARCOGAZ recommends that each Country analyses its own situation as regards the implementation of a harmonised Wobbe index range and develops its own implementation roadmap as proposed in the Pilot Study. The use of a common methodology and frequent exchange between all actors is a way to transfer experience and knowledge between Countries.

MARCOGAZ concerns about positions expressed in some product standards

Recently, at least one standard and two draft standards to be harmonised under the Gas Appliance Directives (EN 15502-1[5], prEN 676[6] and prEN 15502-2-1[7]) recommend that local variation of the Wobbe index be kept minimum for distributed gases. This is confusing as the range of variations that are suggested is much narrower than the current ranges declared by Member States and **narrower than existing variations** that are observed on some networks.

Compliance with these harmonised standards is evaluated using the test gases and pressures defined in EN 437 and is a presumption of conformity with the Gas Appliance Directive essential safety requirements, one of which is that the compliant product is safe when *"...used with a normal variation in the gas quality…"*. This normal variation corresponds to the range declared by the Member State according to Art 2.2 of the same Directive. Thus it is unclear how a product can be compliant with the Directive while demanding such restrictions in gas quality variations as those expressed in EN 15502-1, Annex Q of prEN 676 or Annex DD of prEN 15502-2-1.

For MARCOGAZ, it shall not be the purpose of product standards to define gas quality specifications.

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[5] *Gas-fired heating boilers – Part 1 : general requirements and tests*

[6] *Forced draught burners for gaseous fuels*

[7] *Gas-fired heating boilers – Part 2-1 ; specific standard for type C appliances and type B2, B3 and B5 appliances of a nominal heat input not exceeding 1000kW*

MARCOGAZ recommendations about the key issues identified

The knowledge gained through the first phase of the Mandate and the on-going Pilot Study has allowed for the identification of several key issues that need to be solved by a joint effort of all the gas value chain.

The main ones are:

- On site adjustment of appliances or burners,
- Performance requirements complementing the safety requirement of the GAD,
- Implementation of safety margins for appliances,
- Mitigation of gas quality variations on sensitive industrial applications.

As observed during the GASQUAL project and illustrated by the Danish experience, **adjustment** of the air-gas ratio of an appliance in the field without taking provision of possible gas quality variations may lead to operational or safety issues when gas quality changes. Thus it seems necessary that **national rules for the installation and maintenance of gas appliances** are defined in order to allow for adjustment without compromising the flexibility of the appliances as regard the range of gases that they can use. The experience of Denmark shows that such procedures can be implemented providing sufficient collaboration between all stakeholders.

MARCOGAZ recommends that a collaboration between infrastructure operators, appliance manufacturers and installers is organised to develop procedures for re-adjusting gas appliances, when needed, taking into account potential gas quality variations.

Performance requirements about NO_x emissions or efficiency are sometimes expressed in national regulation that put an extra burden on appliances. It is well known[8] and illustrated by GASQUAL results, that a change of Wobbe index will trigger efficiency or NO_x emissions changes.

MARCOGAZ recommends that the measurement of appliances performances in the field shall be corrected taking into account the impact of gas quality and ambiant conditions variations from reference conditions.

Some national requirements on CO emissions as measured in the field are more demanding than the admissible limits as defined in various product standards. These extra restrictions may be seen as a way to establish a **safety margin**. EN 15502-2-1 recommends that the actual range of Wobbe index for distributed gases is narrower than the range defined by the EN 437 test gases as a measure to establish a safety margin to address for instance the aging of the appliances. Although the general ideas for these restrictions as aging or non nominal maintenance are understandable, the way limits are established or proposed is not clear and leads to assertions in contradiction with already observed situations.

[8] *MARCOGAZ report " Main effects of gas quality variations on applications" (UTIL-GQ-05-04)*

Furthermore, it shall be underlined that a product standard cannot be harmonised under the GAD if it puts restriction on gas quality variations in contradiction with the declaration of Member States under Art 2.2 of the GAD.

MARCOGAZ recommends that the discussion about safety margins is carried out horizontally and not at product level taking into account the field experience established through Europe.

Considering the well-known **sensitivity of some industrial processes** to gas quality variations, MARCOGAZ wants to point out that on site mitigation solutions have been developed in some Countries since decades allowing a wide range of gases to be distributed locally while satisfying the stringent requirements of the most sensitive gas users. Thus these stringent requirements are addressed where and when necessary and don't put extra constraint, and costs, on the gas distributed to less demanding customers.

MARCOGAZ recommends that, taking opportunity of the current Pilot Study, solutions for industrial installations shall be shared and implemented whenever needed.

Conclusion

The current evolution of the gas market has and will lead to **evolution in gas quality**.

The current harmonisation process has given the opportunity to identify the **key issues** that can compromise a safe and efficient use of gas. To solve these issues through a **common effort of all stakeholders** within the National and European frameworks would allow for a **flexible use of gas**. This is necessary to improve the **competitiveness** of the gas sector.

As identified by the work of CEN/BT WG 197 and confirmed by the current activities led within the Pilot Study, National situations may be contrasted. Thus in order to ensure that the harmonised standard meets its target of being *as* ***wide as possible within reasonable costs*** a flexible implementation of the harmonised specifications benefiting from a **common effort of the whole gas value chain** will be necessary.