

Marcogaz WG “Gas Quality”

1st Position Paper on European Gas Quality Specifications

Domestic appliances are not able to tolerate wide variation in natural gas quality without endangering the public; gas quality has to be maintained within defined limits. These limits are currently set nationally and reflect the type, age and condition of the appliance population present within each country. Since 1993 all European appliances are required to comply with the 1990 Gas Appliance Directive 90/396/CEE (“GAD”) and are able to tolerate the same range in gas quality, wider than those generally set nationally. The performance of modern, GAD-compliant, appliances should therefore provide the basis for a common European gas quality specification. However, there are two main issues that will need to be addressed in order for Europe to safely adopt such a specification. Addressing these issues will require co-operative work to establish the details of the new specification and individual national programmes of work in order to ensure that each country’s appliance population is capable of accepting gas to the new specification.

Background

Marcogaz working group “Gas Quality” is addressing in this paper the impact of gas quality on domestic appliances and in particular how gas quality should be specified in order to ensure gases are “interchangeable” – i.e., that they can be freely mixed, commingled and traded without risk of unsafe combustion. Domestic appliances are not able to tolerate variations in gas quality outside predefined limits without endangering end users. Whilst industrial and commercial appliances are also affected, combustion control strategies can be devised to combat such variations.

European countries employ differing means of specifying acceptable limits of gas composition, and this reflects the type, age and condition of the worst performing appliances within each country. The current national limits are specified through a mixture of national legislation and commercial contracts. Changes in both will need to be made before a single European gas quality specification can be adopted.

Interchangeability parameters

Most European countries employ limits in the Wobbe number of gases as the principal means of ensuring safe combustion. At high Wobbe numbers, incomplete combustion occurs and appliances tend to emit high levels of carbon monoxide and consequently present increased risk of deaths by poisoning. At low Wobbe numbers, flame lift occurs and flames can become unstable and may detach and even extinguish, leading to emission of unburnt flammable gas. These faulty behaviours are specifically mentioned in Directive 90/396/CE.

However there are two other types of appliance malfunction that can occur, which are not solely governed by Wobbe number. The first is flashback and is mainly associated with the presence of hydrogen or other high flame speed gases. The second is sooting and is mainly associated with the presence of higher hydrocarbons (those other than methane). Any European gas quality specification will need to cover these forms of malfunction because, whilst they have not been a major issue in the past, future gas operations may lead to use of gases containing either hydrogen or significant levels of higher hydrocarbons. Requirements regarding flashback and sooting are currently treated differently in different European countries. The possibility of harmonizing these requirements is being addressed within this MARCOGAZ working group. It is likely that Wobbe number and one or two other parameters will need to be defined and specified.

Transition to a new European Gas Quality Specification

Since 1993 all European appliances are required to comply with the 1990 Gas Appliance Directive 90/396/CEE (“GAD”) and are able to tolerate a wider range in gas quality than any limits set nationally. The performance of modern, GAD-compliant, appliances should therefore provide the basis for a common European gas quality specification. Upper and lower Wobbe limits should reflect those of the test gases specified in EN437, with some provision for a safety margin that addresses appliance ageing and maintenance. In addition, formal parameters addressing flashback and sooting should be specified within the framework set down by EN 437. This may lead to a revision of some of the test gases in EN 437.

20 February 2003

Few countries would be able to adopt immediately a new European gas quality specification. Changes in contracts and legislation would be required and to do so will require national programmes of work to either ensure that "pre-GAD" appliances present an insignificant additional risk to the public, or to remove at-risk appliances from use. In addition, rational safety margins must be set before the specifications can be harmonized. Transitional arrangements and a timetable will need to be agreed for each country.

Other gas quality parameters

As for the other parameters that have been suggested by GTE in its position paper, the Marcogaz working group generally agrees with them. One issue that should be more closely addressed is the possible presence of compounds in the gas that may lead to harmful combustion products. The main concern is the presence of halogenated compounds coming from landfill gas injected in the natural gas stream that would lead to fluoride and chloride acid and possibly dioxin in combustion products. However these products may not be the sole trace components leading to harmful combustion products and we suggest that the general impurity clause be expanded to specifically address this issue.