

Gas Distribution Networks – Standardisation of siloxane limit in gas distribution network systems

Gas distribution networks are legally bound by the Gas Safety (Management) Regulations 1996 (GS(M)R) to ensure the content and characteristics of the gas distributed to end consumers is safe and fit for use within consumer appliances. Within Schedule 3 Part 1 of the regulations (Content and other characteristics of gas – requirements under normal operating conditions) are set out various contents and characteristics of gas to be maintained at set values including a generalised statement on impurities in the gas. This statement requires that the gas transported shall not contain solid or liquid material which 'may interfere with the integrity or operation of pipes or any gas appliance which a consumer could reasonably be expected to operate'.

The presence of siloxanes within the gas transported in the gas network including organosilicon compounds and other silica containing compounds, will once combusted, be converted into silica which can deposit on consumer appliances and impact on the performance and safety level of these appliances. Consumer appliance operating efficiency and safety performance should not be impacted by the quality level of the natural gas consumed over the normal lifetime of the appliance. To ensure continuing compliance with GS(M)R Cadent GDN instigated a piece of research work undertaken by DNV GL Oil and Gas to establish a recommended limit on siloxanes in the gas transported within the gas network. This piece of work was conducted under the Network Innovation Allowance framework established and administered by Ofgem and as a result the output of this piece of work including the report¹ is available for use by all GDNs. The content of this report is available for interested parties to view alongside this statement. The conclusion of the report focused on implementing a siloxane limit of 0.23mg per cubic metre of biomethane gas injected into the gas network following extensive analysis and impact studies on different types of domestic gas appliances. The study focused on the impact silica build up has on the efficient operation of gas appliances over time including the impact on the safe operation of the appliances and the production of carbon monoxide as a result.

With the development of biomethane gases in the gas distribution network over the last ten years there has been a growth in the sources of this gas ranging from the traditional agri-crop feedstocks through to more recent food waste and industrial food and farm waste sources including biomethane gases generated from waste water plants, all of which can contain trace components of siloxanes within the gas produced. Recent government energy subsidy schemes, including the Renewable Heat Incentive and the current Green Gas Support Scheme both cover

¹ IL 318 – Siloxanes impact study – domestic appliances – Toward well founded standards for silicon content in biomethane for domestic appliances.

the production of biomethane gases and include a requirement to source feedstocks from waste products on an increasing scale.

Gas Distribution Networks are required under Licence and under the industry framework code (the Uniform Network Code) to enter in to arrangements with gas producers (including biomethane gas producers) which govern the characteristics and requirements of the gas entered in to the gas network. These arrangements are encompassed within the Network Entry Agreement which is a legal contract between the two entities and covers the enduring arrangements for gas entered into the network. Historically GDNs have set varying limits on the content of siloxanes in the gas injected into the gas network which have featured as requirements in Network Entry Agreements entered into with gas producers. These limits have ranged from 0.5mg to 1mg per cubic metre of gas entered and were considered at the time to be suitable limits for specific feedstocks producing gas. The GDNs now intend to adopt a new limit of 0.23mg per cubic metre of gas entered into the network as a standard approach across the industry which will feature in all new Network Entry Agreements going forward and also the adoption of this limit into existing entry arrangements, the latter of which may require a formal legal variation of the Network Entry Agreement. Following the finalisation of the DNV-GL report GDNs requested a view on the report conclusions and the adoption of the new limit on siloxanes from the Health and Safety Executive (HSE) who provided additional questions on the type of appliances included in the study and the nature of the analysis conducted by DNV-GL. These questions were referred to DNV-GL who provided a response to the HSE who were subsequently satisfied that the response addressed their questions. The HSE were clear that their response did not constitute an endorsement of the prescribed limit and that GDNs should work towards eliminating all impurities in the gas conveyed.

The GDNs now intend to adopt the new limit on siloxanes of 0.23mg per cubic metre of gas entered into the network from 1st May 2021 for all new Network Entry Agreements entered into and will approach individual gas producers relating to the variation of existing agreements. The GDNs intend that the new limit will be included within the existing management procedure generic measurement / risk assessment of biomethane injected into the gas distribution network which is conducted for all new biomethane gas injection projects.