KELTON

Hydrogen Device Trials

National Gas Transmission

Hydrogen Device Trials Comparison Summary Report

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1 Revision Control

Rev	Issue date	Description	Prep.	App.
1	06/03/2026	Draft	TB	CJ
2	12/03/2026	Updated with client comments	TB	CJ

2 Introduction

National Gas Transmission (NGT) plans to begin blending hydrogen into the UK's National Transmission System (NTS) at around 2% by volume, potentially increasing to 20% as the hydrogen economy develops. Currently, gas chromatographs on the NTS cannot measure hydrogen content, and its presence disrupts the measurement of other compounds. From 2026, during the RIIO-3 regulatory period, National Gas will need to install new chromatographs capable of measuring up to 20% hydrogen in natural gas blends. The lack of current hydrogen measurement on the NTS means there are no proven in-use devices and limited company experience to guide effective decision-making for this transition.

Existing analysers used by NGT for natural gas [redacted] are not capable of measuring hydrogen without modification. An additional column, TCD and flow control would be required for hydrogen measurement. Existing analysers currently use a single carrier gas such as helium. An additional carrier gas would be required for hydrogen. Helium is not recommended as a carrier gas for hydrogen (because the thermal conductivity of hydrogen does not differ much from that of helium), but argon or nitrogen ensures a correct linear response.

To address this, National Gas will test available blend-ready chromatographs to evaluate their performance and suitability for NTS installation. This project involves a partnership between Kelton and EffecTech in obtaining chromatographs from suppliers and rigorously examining their performance. Testing will occur at either EffecTech's test site or the instrument vendor's site, ensuring a wide selection of reliable devices for the upcoming upgrade and supporting the move towards net zero.

3 Comparison Summary

The results from EffecTech's performance evaluation testing show [redacted] would not meet NGT's present limits on absolute mean error plus uncertainty of ±0.2% when analysing natural gas blends with up to 20% hydrogen. The [redacted] would not meet the ±0.2% limit when analysing natural gas blends with up to 10% hydrogen.

In discussion with [redacted] the analysers had been configured to meet the MPE limits for calorific value measurement of ±0.5% as listed in OIML R140 Table 2[1]. The NGT ISO10723 testing criteria is more stringent than those set out in OIML R140. [redacted] not aware of the difference in criteria, and are confident that they can configure a setup on each analyser to pass this more stringent criteria. Outside of this now concluded project, the performance evaluation may be repeated using updated configurations [redacted]

As the [redacted] had previously passed a performance evaluation at Effectech they performed an investigation into the analyser and testing results. It was found the analyser had been defective at the time of the performance evaluation. It is to be decided if the performance evaluation is to be repeated with a fully working analyser.

In terms of Gross CV bias, the [redacted] and the [redacted] performed the best, with the [redacted] having a slightly higher overall uncertainty than the [redacted]. The [redacted] was shown to have the least bias in Hydrogen measurement, the [redacted] were found to have the highest hydrogen bias.

An advantage regarding the [redacted] is the compact nature and the speed of results, with an analysis time of just [redacted] seconds. The GC weighs less than [redacted] and dimensions of [redacted] within an ATEX certified enclosure. The [redacted] has the benefit of a lot of experience within the UK gas network. This means personnel are familiar with the unit setup and operation. They are widely used by NGT for standard C6+ measurement and so the existing infrastructure would not need to be altered to upgrade, other than the addition of a second carrier gas cylinder. The [redacted] has a cycle time of [redacted] seconds. The [redacted], although common in the UK, is less familiar than the [redacted]. The analyser performs well, although it is large, weighing in at [redacted] kg with dimensions of [redacted] mm. It requires a continuous air purge to maintain ATEX compliance, meaning additional infrastructure may be required if installed on site.

[1] OIML R140 – Measuring systems for gaseous fuel