

Gas Interchangeability Study for Installed Residential Appliances

Description: A standardized approach to determining impacts of varying gas composition on performance of installed residential appliances.

Status: Project initiated; field tests and paper study underway.

BENEFITS

The addition of new gas supplies (imported LNG, non-conventional gas) is expected to accelerate, leading to wider ranges of natural gas compositions. While the industry is expanding supply sources, to date there has been no standardized approach for evaluating the impacts of varying gas compositions on in-service residential gas appliances. The benefits of such a study are to determine the extent to which potentially sensitive appliances exist and to identify which specific appliances are affected based on type, vintage, adjustment practices, and maintenance characteristics. With that information, better decisions can be made about whether adjustments are necessary to those appliances in order to successfully accommodate varying gas compositions. In this broad-based consortium effort, gas companies can work together to assess risks, evaluate new supply



Example of Flame Code Reference

opportunities, and determine protocols or other changes that individual companies or the industry need to consider to ensure safety and customer satisfaction as new supplies of natural gas are utilized.

BACKGROUND

NYSEARCH has had several discussions about Gas Interchangeability and what technology gaps exist as our members face increasing supply diversity and decisions associated with that diversity. Several other agencies, such as AGA, NGC+, INGAA and others have looked at the policies and debate surrounding Gas Interchangeability. While there has been extensive R & D work through the 1920s to 1950s

that looked at appliances and gas compositions changes (as a result of the changeover from manufactured gas to natural gas), the wide range of studies that have gone on before do not broadly address the combination of potentially maladjusted residential appliances and varying gas composition. There are other new or recent studies such as the Gas Appliance Manufacturer's Association (GAMA) study. But GAMA is only investigating interchangeability for NEW appliances. Other LDCs have done testing on residential units from the field but those studies have been limited as to populations and specific local gas composition issues.

TECHNICAL APPROACH

This study is being designed to serve as a nationwide approach for risk assessment. The two-phase program will combine field performance measurements, information gathered through paper surveys and laboratory tests to produce a statistically valid

database and performance assessment for in service appliances. Tasks being conducted in the first phase include documenting information and defining testing procedures that will fill information gaps, conducting field testing to determine the performance of in-place appliances, and assessing the potential sensitivity of the population to gas composition changes.

Based on information from past studies, it is hypothesized that certain combustion equipment can be sensitive to changes in natural gas composition due to a combination of factors that include: equipment design, adjustment practices, and lack of maintenance. Introducing gas that has a higher Wobbe number (the ratio of Heating Value to the square root of specific gravity) will raise appliance energy input (firing rate) and lower the excess air level. In certain sensitive appliances, these changes can result in elevated carbon monoxide (CO) emissions, increased yellow tipping (soot generation in flame), changed NOx emissions and increased heat exchanger temperatures (leading to potential furnace damage).

To determine the extent of any of these potential conditions, random appliance performance surveys will be conducted. Field visits will include assessment of flame quality, as well as measurements of firing rate,

emissions, manifold pressure and flue gas temperature. Past and present service issues will also be explored. Once the appliance types of interest are identified (if identified), a lab testing program will be defined. Phase II would then consist of a lab testing program to evaluate the impact of a wide range of gas compositions on the performance of sensitive appliances.

PROJECT STATUS

Currently, NYSEARCH and its funding members are conducting Phase I and surveys are being issued to service providers, installers, manufacturers and LDCs. Over 400 customer field visits are targeted for EACH of the four companies who have volunteered to support and oversee field tests in their customers' residences. The four companies represent different geographies and types of customers.

HIGHLIGHTS

- **Standardized, broad-based study that develops information on in-service appliances from field tests as well as from historical and current records**
- **Statistical field survey requires in-field performance measurements on about 800 appliances or about 400 customers per company.**

FOR ADDITIONAL INFORMATION

Daphne D'Zurko
Executive Director,
NYSEARCH
Vice President, RD &D
Northeast Gas Association
1515 Broadway, 43rd Floor
New York, NY 10036-5701
212-354-4790
Fax: 212-764-7014
ddzurko@northeastgas.org

Chuck Benson
Principal
Environ International Corp.
8 Hollis St.
Groton, MA 01450
978-448-8591
Fax: 978-448-8989
cbenson@environcorp.com

David Rue
R & D Manager
Gas Technology Institute
1700 S. Mount Prospect Rd.
Des Plaines, IL 60018-1804
847-768-0508
david.rue@gastechnology.org