



Initial pH (i-pH) determination of in-service gas engines



A change in the Initial pH (i-pH) value can reflect the strength of acidic constituents that have formed in used natural gas engine oils that can contribute to corrosive pitting on metal surfaces due to strong acids.

Acid number provides an indication of lubricant acid concentration due to initial additive compounding, degradation and aging, but not necessarily acid strength. As an oil oxidizes, weak acids form that have a significant influence on the acid number increase. Strong acids that are highly corrosive in small amounts may not be significantly reflected in acid number test results. A change in the Initial pH (i-pH) value can reflect the strength of acidic constituents that have formed in used natural gas engine oils, which can contribute to corrosive pitting on metal surfaces due to strong acids. The i-pH value is another measurement of lubricant degradation while in service.

Some testing on in-service natural gas engine oils may show the acid number at a slight increase compared to previous trended test results. This may support assessment that the oil itself has not started to oxidize, especially if supported by other test data; however, the

change in the i-pH results may indicate the presence of strong acids that have accumulated, which can be highly corrosive in nature. This is especially relevant to biogas or wet gas applications.

Test method ASTM D7946 (Standard Test Method for Initial pH (i-pH)-Value of Petroleum Products) is a test method developed to standardize this test and provide consistent results between laboratories. The method is designed to work in conjunction with test method ASTM D664 for acid number. The reason this test is termed initial pH (i-pH) is because the pH determination is done prior to the acid number determination. In the past, determining pH readings or the i-pH would vary depending on the procedure used. Therefore, this test parameter, though it had possible benefits, did not always provide consistent or trendable data industry wide.

New oils typically start out with a pH in the range of 6.5 to 8.0, though this can vary with oil formulation. While in service, the pH of a lubricating oil, especially in natural gas or industrial applications, decreases steadily over time. This test is a useful addition to other tests that

monitor a lubricant's service life and degradation in natural gas applications by indicating the corrosion potential due to strong acids. An i-pH of 4.0 has generally become a flagging limit for this test, though this may vary due to application requirements. As with most tests, it is meant to compliment a matrix of other parameters, such as increase in acid number, oxidation, nitration, viscosity and metals content in the oil.

ALS provides i-pH test results as part of our test package for natural gas applications. For further assistance please feel free to contact one of our global laboratory locations. We can optimize testing of in-service lubricants and coolants to compliment your maintenance practices to help optimize equipment reliability and asset care.

For further information about having viscosity testing performed on your oil, please contact: reliability@alsglobal.com.

