



TEST RESULTS FOR OIL-SOLUBLE CORROSION INHIBITORS

A.K.Kuldoshev

F.N.Norkulov

A.T.Djalilov

Tashkent Research Institute of Chemical Technology, Uzbekistan.

alisherkuldashev999@gmail.com

<https://doi.org/10.5281/zenodo.14439431>

Abstract: Corrosion inhibitors are special chemicals used to prevent metals from oxidizing and corroding due to environmental influences. Corrosion is a serious problem in the oil and gas industry, causing damage to pipelines, tanks, and production equipment during production. Oil-soluble corrosion inhibitors are substances that, when mixed with oil, penetrate its structure and protect pipes and other metal structures. They form an inhibitory layer on the metal surface, slowing or stopping the reaction between the metal and the aggressive environment. The effectiveness of inhibitors depends on their chemical structure, concentration, and environmental conditions. Oil-soluble inhibitors are important in extending the service life of oil and gas pipelines and reducing maintenance costs. These substances are widely used in the oil and gas industry as an effective means of reducing corrosion.

Keywords: Corrosion inhibitors, oil-soluble inhibitors, metal protection, oil and gas industry, pipeline protection, corrosion prevention, service life extension, maintenance costs, inhibitory layer, aggressive environment.

Introduction: This test method is used to study the properties of nitrogen-containing oil-soluble corrosion inhibitors. Since nitrogen-containing substances are unsaturated, it should have high protective efficiency, since inhibitors with double bonds in hydrocarbon radicals form bridge structures with double attachment of molecules adsorbed on the metal to the metal, and are also resistant to corrosion. It can be used in the production of oil-soluble sulfonate-type corrosion inhibitors for ferrous metals, which are used as additives in antifreezes and preservatives.

Research methodology: Corrosion inhibitors play an important role in preventing damage to metal surfaces in the oil and gas industry. Oil pipelines, tanks, and production equipment are typically exposed to water, acids, gases, and various chemicals, causing their metals to corrode quickly. This process can damage production equipment, lead to accidents, economic losses, and even environmental disasters. Working and protective compositions developed based on used oils and developed corrosion inhibitors, their physicochemical,



environmental and operational properties were studied, and the effect of adding DOB-1 corrosion inhibitor to engine oil was studied.

Corrosion inhibitors are used to protect pipes and metal structures from the harmful effects of chemical environments. To assess the effectiveness of their use, methods for determining the corrosion rate and level of protection are usually used.

Corrosion rate is a measure of the rate at which a metal dissolves or deteriorates over a period of time. Based on the amount of metal lost by weight or volume under conditions with or without inhibitor.

Three steel plates containing nanosilicon composites were taken for each working and conservative composition study. The data obtained and the test results are presented in Table 1.

Table 1

Determination of corrosion rates and protection levels of inhibitors

Sample number	Sample surface S, m^2	Sample mass before testing M, g	Sample mass after testing M, g	Sample mass loss $M_1 - M_2, g$	$V_{n.i}$ Corrosion rate in an inhibitor-free environment, $g / m^2 \cdot s$	V_i Corrosion rate in an inhibitory environment, $g / m^2 \cdot s$	Protection level (Z)%
1	2	3	4	5	6	7	8
Inhibitor-free	0,006	0,47821	0,38385	0,09436	0,13105	-	-
1%	0,006	0,44511	0,43492	0,01019	-	0,01415	89,2
3%	0,006	0,46972	0,46566	0,00406	-	0,00563	95,7
6%	0,006	0,49718	0,49634	0,00084	-	0,00177	99,1

Results and discussion: These tests revealed that the best anti-corrosion properties were achieved with a working-preservative composition consisting of oil with the addition of 6% DOB-1 corrosion inhibitor.

Conclusion: Oil-soluble corrosion inhibitors are one of the important technological tools in the modern oil and gas industry. They not only protect metal equipment and increase its service life, but also ensure the stability and safety of production processes. The implementation of effective corrosion prevention measures is of strategic importance for industrial enterprises, as it helps to increase their economic efficiency and rational use of natural resources.



POLAND



POLAND

References:

1. C. Monticelli, Corrosion Inhibitors, Editor(s): Klaus Wandelt, Encyclopedia of Interfacial Chemistry, Elsevier, 2018, Pages 164-171, <https://doi.org/10.1016/B978-0-12-409547-2.13443-2>.
2. Гайдар Сергей Михайлович, Низамов Руслан Каримович, Голубев Михаил Иванович, Голубев Иван Григорьевич. Защитная эффективность водорастворимых ингибиторов коррозии. экст научной статьи по специальности «Технологии материалов» 2018
3. Гайдар С.М. Теория и практика создания ингибиторов коррозии для консервации сельскохозяйственной техники. /Монография. -М.: ФГНУ «Росинформагротех», 2011.
4. Семенова И.В., Флорианович Г.М., Хорошилов А.В. Коррозия и защита от коррозии / Под ред. И.В. Семеновой. – М.: ФИЗМАТЛИТ, 2002.
5. Задорожный П.А., Суховерхов С.В., "Применение высокоэффективной жидкостной хроматографии с масселективным детектированием для анализа имидазолинсодержащего ингибитора коррозии" Вестник Дальневосточного отделения Российской академии наук. Вып. 5. 2010.
6. URL: http://www.disnab.ru/prisadka_akor -1/ 9
7. URL: <http://www.vnhim.ru/price.zip>.