

Optimization of natural gas filtration process based on technical inspection evaluation

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Extended Abstract

Natural gas (methane or CH₄) as a driver of development, raw material and one of the most significant fossil fuels, is playing a crucial role in different countries. This green energy demands due to population growth and urbanization expansion, drive to develop new standards for improving modern life. In this point of view, filtration systems in gas transmission and distribution network have direct and vital influence on all aspects of gas industry. This article proposes IGS M PM 111(1) [1] that is a new inspection and test plan according to revised technical specification for cartridge of dry gas filters in metering and regulating gas stations to reach several main goals; Improving filtration mechanism for better dust spot with optimum efficiency, consideration the human and environment safety points, reducing odour fade and finally reduction of machinery risks which may causes gas flow interruption to keep continuous safe flow of gas in transmission and distribution network are the results of this technical optimisation. This specification in a filtration management system, covers minimum requirements for material, design, testing, inspection, marking and packaging cartridge of dry gas filters as central heart of filtration systems for natural gas network. Several international standards GIS/E 13.1, EN 779, ASHRAE 52.2, ISO 21220 and finally ISO 16890 [2,3,4,5], were considered to access the right test method and acceptance criteria. Filtration is any of mechanical, physical or even biological operation that separate particles from fluids and filtration of natural gas in city gate stations differ from sieving; In gas station units, by coalescing and merging small droplets in to large ones, gravity and inertia will cause it to be separated from the fluid stream. The final filtration step to remove smaller particles will happen in dry gas filters. Inertia, interception, diffusion, straining, bridge, electrostatic charge and gravity mechanisms based on flow rate, pressure drop and velocity through filter media in flow where considered to simulate it in laboratory condition to evaluate cartridge's performance. Selected test particles were based on appropriate liquid and solid particles such as ¹DEHS and KCL that are supposed in above mentioned standards in compare with gas station black powder in real and practical conditions. Although natural gas is considered as one of the cleanest fuels, however it contains water humidity, glycol, amines, methanol, compressor oils and valve greases, salts, liquid hydrocarbons, and other pollutions that categorised to solid and liquid parts that are its specific containment, specially suspended particles and other pollution. The results of these unwanted guests are missing raw material quality and energy sources, machinery damages, instrument disruption, risk problems, gas flow interruption and creating a flooding contaminant flow. The Final proposed point for assessment of operational function of filter cartridge is defined in two concepts; 1st one is arresstance that is based on weight percentage of trapped contaminants and the other concept is efficiency which assess filtration function by optic instrument.

References

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¹ Di Ethyl Hexyl Sebacate

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