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Obtaining Antifoaming Agents Formed During Absorption Drying Processes of Gases and Studying Their Main Physical and Chemical Properties

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ABSTRACT: This article describes the superiority of silicone foam suppressants over organic foam suppressants in terms of foam removal ability, faster operation, operation in the temperature range from minus -40 to +200^{o}C, anti-foam suppressants formed in gas absorption drying processes were obtained based on reagents such as PMS-100, 99,8% methyl alcohol, 24% hydrochloric acid, powdered Navbahor bentonite, MDEA, and the chemical composition of anti-foam suppressants formed in gas absorption drying processes.

KEYWORDS: MDEA, DDG, Silicone foam extinguishers, PMS-100, 99,8% methyl alcohol, 24% hydrochloric acid, powdered Navbahor bentonite, absorption drying.

I.INTRODUCTION

Mechanical foam extinguishers, also known as foam extinguishers, are a type of industrial foam extinguisher, also known as foam extinguishers or foam eliminators. Its function is to use centrifugal force to break up the foam generated in the production process and separate the gas and liquid.

Defoaming is to take certain measures to eliminate the foam formed or reduce the thickness of the foam layer. Bubble bursting is to destroy the film that forms the bubble. A suitable foam cleaning method must be available for the processing of foamy liquid. There are many widely used defoaming methods, which can be divided into physical defoaming method, mechanical defoaming method, chemical defoaming method and natural defoaming method according to the principle. The application of impact force by compressing the bubbles or using rapid pressure changes such as shear force, compression force and impact force can break the bubble film to achieve the purpose of defoaming.

This series of Sefluid mechanical defoamers use the mechanical force generated by the impeller to prevent foaming. It quickly defoams without the addition of chemical defoamers and other substances, which ensures the purity of the product. It is highly efficient and energy-saving, and is suitable for filtration, mixing, separation, fermentation, extraction and other process systems. Therefore, it is a good tool for preventing foaming and foam loss in industry [1].

During the working process, the high-speed rotating module provides strong shearing force and removes air bubbles. Then the liquid released by the bubble is immediately thrown to the wall by centrifugal force and is squeezed into the liquid flow to return to the liquid. At the same time, it can reduce the loss of leaked liquid.

Compared with traditional foam suppressors, the Sefluid mechanical foam suppressor solves the problems of manual timing, potential environmental pollution, and long-term purchase costs. Thus, it has a wide range of applications, suitable for cleaning, mixing, separation, fermentation, extraction, drying, and other process connections [2].

II. SIGNIFICANCE OF THE SYSTEM

This article describes the superiority of silicone foam suppressants over organic foam suppressants in terms of foam removal ability, faster operation.The study of methodology is explained in section III, section IV covers the experimental results of the study, and section V discusses the future study and conclusion.

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III. METHODOLOGY

Below, we will look at chemical, mainly silicone-based, foam suppressants that are widely used in industry today.

Silicone foam suppressants are superior to organic foam suppressants in terms of foam reduction ability, work faster and last longer. They are economical (consumption from 0.00001 to 0.1-1% by weight) - their surface tension is very low and they quickly spread into the foaming medium. They are chemically inert to most substances. They act independently of the components that cause foaming. They are used in a wide temperature range from minus -40 to +200^{o}C, they are characterized by low toxicity, volatility, ability to work in various environments, fire and explosion safety [3].

Silicone foam suppressants (antifoams, defoamers) are very soluble in aromatic hydrocarbons. They do not have a corrosive effect on metals. They are stable during storage. They have no odor, do not have cumulative properties and are environmentally friendly. There are sanitary-epidemiological conclusions [4].

IV. EXPERIMENTAL RESULTS

Anti-foaming defoamers formed during absorption drying processes of gases were obtained based on reagents such as PMS-100, 99.8% methyl alcohol, 24% hydrochloric acid, powdered Navbahor bentonite, and MDEA, and the composition of the obtained defoamers is presented in Table 1.

Table 1.
Chemical composition of antifoaming agents formed in absorption drying processes of gases

№	Foam extinguisher name	Foam extinguishing agent content, %				
		PMS-100	Methyl alcohol	24% hydrochloric acid	Navbahor bentonite	MDEA
1	DDG-1	30	50	10	5	5
2	DDG-2	33	50	8	5	4
3	DDG-3	35	50	5	7	3
4	DDG-4	38	46	5	8	3
5	DDG-5	40	45	5	7	3

During our scientific research, samples of 5 types of foam suppressants (FSS) for drying gases against foaming generated in gas absorption dryers were obtained. The main physical and chemical properties of these foam suppressants were determined (Table 2).

Main physical and chemical properties of GQKS type foam extinguishers
Table 2

№	Physical and chemical properties	DDG-1	DDG-2	DDG-3	DDG-4	DDG-5
1	Appearance and color	A highly viscous, opaque liquid with suspended particles.	A highly viscous, opaque liquid with suspended particles.	A highly viscous, opaque liquid with suspended particles.	A highly viscous, opaque liquid with suspended particles.	A highly viscous, opaque liquid with suspended particles.
2	Smell	Has aweak odor	Has a weak odor	Has a weak odor	Has a weak odor	Has a weak odor
3	Kinematic viscosity, m^2/s	90	91	93	95	96
4	Density, g/m^3	0,941	0,950	0,966	0,975	0,985
5	Refractive index	1.4144	1.4188	1.4190	1.4244	1.4265

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As can be seen from this table, the properties of foam extinguishers of the gas drying type (DDG) obtained as a result of scientific research are close to the properties of glycols, which in turn means that they are easy to disperse in glycols.

V. CONCLUSION AND FUTURE WORK

In conclusion, we can say that the chemical composition and physicochemical properties of anti-foaming agents formed during absorption drying of gases were studied.

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