



Research on the Anti-Foaming Efficiency of DDG-Type Foam Suppressors in Gas Absorption Drying Processes

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ABSTRACT:. In this article, foam extinguishers against foam formed in absorbers and desorbers during absorption drying of gases are obtained. The article presents the results of anti-foaming efficiency of the foam extinguisher type Defoamer in drying gases(DDG) and the dependence of foaming on time and the concentration of the foam extinguisher.

KEYWORDS: Defoamer in drying gases, diethylene glycol, triethylene glycol, Glycol regeneration, Foam suppressor, Foam height, Foam decay time.

I. INTRODUCTION

To obtain highly concentrated glycol solutions, it is necessary to reduce the water vapor pressure in the vapor zones of the reboiler. There are several methods for increasing the concentration of glycols [1]:

1. driving under vacuum;
2. using evaporative gases.

Evaporative gases are non-condensable under operating conditions and are used to separate volatile components from liquids. The ability to regenerate UEG by heating it to high temperatures also creates the possibility of separating hydrocarbons dissolved in a saturated glycol solution. This allows for further enhancement of the sorption properties of glycol.

II. SIGNIFICANCE OF THE SYSTEM

In this article, foam extinguishers against foam formed in absorbers and desorbers during absorption drying of gases are obtained. 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.

III. METHODOLOGY

The evaporator temperature in the DEG and UEG regeneration unit is 160 and 190°C, respectively. While the difference between the DEG regeneration and decomposition temperatures is 4°C, in UEG this indicator is 16°C. It can be seen that the probability of DEG decomposition and the formation of decomposition products is quite high. To increase the degree of glycol regeneration, it is necessary to create a vacuum, and these indicators are given in Table 1. [2].

Table-1
The boiling point of glycols depends on pressure.

№	Pressure, mm.cm.	UEG	DEG
1	1	113,9	92,0
2	5	144,0	119,9
3	10	158,0	134,0
4	20	173,8	148,0
5	40	191,0	164,0
6	60	202,0	173,9
7	100	214,8	188,0
8	200	234,9	206,9
9	400	257,0	226,8
10	760	287,1	245,0

As can be seen from the table above, in order not to bring DEG up to the decomposition temperature, 40 millimeter of mercury, in the system. it is necessary to create the pressure in at this pressure, the boiling temperature of UEG is 191°C, which is 15°C lower than its decomposition temperature [3]

IV. EXPERIMENTAL RESULTS

At this stage of our scientific research, the anti-foaming efficiency of DDG-type foam suppressants in gas absorption drying processes was studied. In this case, a model foam-forming solution was prepared based on glycols, their decomposition products, anticorrosion inhibitors and other surfactants, and the foam height was maintained at 60 mm in all experiments. The results of the anti-foaming efficiency of DDG-1 foam suppressant are presented in Table .

Table-2
Results of the anti-foaming effectiveness of DDG foam suppressant

Foam extinguisher concentration, %	Foaming time, minutes											
	5	10	15	20	25	30	35	40	45	50	55	60
0,1	65	58	55	53	48	42	35	32	27	25	25	25
0,2	64	55	51	47	43	38	33	30	26	23	22	22
0,3	65	52	47	41	36	30	27	23	18	16	15	13
0,4	66	48	43	38	34	26	24	20	17	13	10	10
0,5	65	45	37	31	28	25	19	16	12	8	6	5
0,6	64	43	35	27	20	16	11	7	7	3	0	0
0,7	65	40	33	26	19	11	7	5	2	0	0	0
0,8	64	38	31	25	16	9	2	0	0	0	0	0
0,9	66	35	29	22	14	3	0	0	0	0	0	0
1	65	34	27	20	13	2	0	0	0	0	0	0

In order to determine the effect of the obtained anti-foaming agents, first of all, in order to determine the optimal concentrations for DEG foam suppression in absorption drying of gases at a height of 60 mm, their foam suppression efficiency was determined in the range of 0.1-1.0% for 5-60 minutes.

As can be seen from the results of Table 2, the DDG foam suppressant has a positive effect on the decomposition of glycol foams. As the concentration of the foam suppressant increases, the decomposition of the foam also accelerates. That is, with a certain increase in concentration, the longer the exposure of the foam suppressant to the foam also affects the foam extinction.

As we know, there are standards for the foam-forming ability and foam stability of glycols (Table 3) [4]

Table-4
Evaluation of the foaming ability and foam strength of glycols

Foam height, mm	Foaming ability
Under 25	Low
25-60	Average
Average	Average
Foam collapse time, m	Foam stability
Less than 15	Low
15-60	Average
More than 60	High

V. CONCLUSION AND FUTURE WORK

Conclusion: In conclusion, we can say that a 0,1-1% solution of a foam suppressant of the type DDG was used to combat the foam formed during absorption drying of gases, and data on the foaming ability and foam strength of glycols were studied.

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