

## CLASSIFICATION OF SYNTHETIC DETERGENTS

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### ABSTRACT:

Questions of the results of socio-economic reforms in our republic and the influence of regional problems on the prospect of equipment and means used in the field of synthesis are highlighted. "Equipment for the production of synthetic detergents" includes the theoretical foundations and technology and equipment for the production of liquid, paste, powder and other synthetic detergents. The proposed technological processes and equipment with their theoretical basis, analysis of technological regimes and fundamentals of product quality control, methods of analysis of raw materials, waste, semi-finished products and finished products in the production of synthetic detergents are presented.

**Keywords:** *theoretical foundations and technology and equipment for the production of liquid, pasty, powder and other synthetic detergents*

Synthetic organic detergents are classified according to purpose and consistency. According to their purpose, synthetic detergents are divided into eight subgroups. Subgroups differ in the percentage of surfactants and various additives, as well as the alkalinity of the environment in which they are formed.

The following subgroups are distinguished:

- Means for daily cleaning of public buildings;
- detergents for the food industry and industrial cleaners;
- detergents for textiles;
- Means for washing dishes;
- Means for cleaning and washing vehicles;
- means for cleaning metal;
- Synthetic detergents for fabrics;
- cosmetic and hygienic detergent.

By compatibility, synthetic detergents are divided into powder, liquid and paste. At present, detergents make up the bulk of synthetic detergents produced in Russia. However, in recent years there has been a trend towards an increase in the share of liquid and gel detergents. This trend is fully consistent with the global

trend. Currently, the share of liquid and gel-like synthetic detergents in the United States is about 70% of total sales, in Western Europe from 30% to 50%, and in Russia the share of this market segment is less than 4%.

Liquid detergents have a number of important advantages over powders: they do not generate dust, they are easy to clean, they quickly and completely dissolve in water, and they are gentle on fabrics. In this regard, the main manufacturers of synthetic detergents began to introduce these products almost simultaneously. In April 2003 JSC Henkel-Era launched the production of liquid detergents, at the same time JSC Nefis Cosmetics launched a new line for the production of liquid detergents (TM BiMAX Gel). Procter & Gamble was one of the first to enter the laundry gel market and launched its production in the fall of 2002.

Cosmetic and hygiene products include shampoos, bath foams, shower detergents and toilet soaps. Most of them should be used in a slightly acidic environment (pH = 5.5). In this subgroup there are "salon" shampoos designed to quickly dry hair. They contain silicone surfactants that, when adsorbed, draw water from the surface of the hair.

Typical formulations of synthetic detergents.

Various surfactants are used in synthetic detergents, most commonly fatty oils (50%), but also linear alkylbenzene sulfonates (35%), fatty alcohol ethoxylates (14%), branched ABS (7%), quaternary ammonium salts (7% ), alkylphenol ethoxylates (7%), fatty acid esters (7%), fatty alcohol sulfates (5%), other surfactants (19%). Detergent manufacturers strive to produce synergistic (enhancing action) blends of surfactants.

In addition to the main component, i.e. Surfactants, detergents include: complexing agents, bleaches, bleaching activators, formers, pH regulators, anti-resorbents, fillers (sodium sulfate). An example recipe is shown in the table. 2018-05-01 if you like

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Non-foaming composition of "European type" washing powder for automatic washing machines from Henkel (recipe 01-11.997)

Component	Parts weight	Meeting
1	2	3
Paste MARANIL A 55 (linear dodecyl benzene sulfonate sodium)	6,0	PAV
SULFOPON 1218G (Lauryl Stearyl Alcohol Sulfate, Sodium Salt)	1,5	PAV
DEHYDOL LT 7 (fatty	2,0	PAV

alcohol ethoxylate)		
Sodium carbonate (carbonated water)	12	alkali agent
Sodium silicate (liquid glass)	3,0	Anti-rust agent
Bicarbonate of soda	2,0	pH is a buffer
Zeolite NaA	20,0	Water softener / base
	15,0	Foundation
Sodium sulfate	0,5	Complex agent
Request 2066	3,5	Water softener
Sokalan SR 5	0,2	
Optical illuminator	0,5	Anti-dispersion agent
Relatin DM 4050	22	bleach
4-aqueous sodium perborate	3,0	surfactant
<b>TAED (tetraacetythylenediamine)</b>	<b>1,7</b>	<b>Whitening activator</b>
protease	0,2	enzyme
Cellulase	0,3	enzyme
Lipase	0,2	enzyme
Amylase	0,4	enzyme
Fragrant		
760	2,0	Foam cleaner

It should be noted that the composition of auxiliary components depends on the purpose of synthetic detergent organic substances. For example, detergents intended for washing wool and silk do not contain components that change the pH value of the washing solution due to hydrolysis (sodium pentaphosphate, sodium carbonate and silicates).

#### Bleaching agents.

One mole of TAED reacts with two moles of the perhydroxyl anion (nucleophilic attack) to form two moles of the effective peracetate anion and one mole of the biodegradable byproduct diacetythylenediamine (DAED). The remaining two acetate groups in the DAED molecule are not replaced under

washing conditions. Under alkaline conditions, the perhydrolysis reaction proceeds rapidly even at temperatures below 20°C.

Thus, the combination of TAED with peroxide-containing bleaches in a laundry detergent formula changes the nature of the bleach chemically, and the peracetate anion dissociates active oxygen at a low oxygen content. synthetic detergents with the same bleaching effect can be used at much lower temperatures (20-40°C).

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