



Complex Modifiers for Making and Additives for Improving of Acid Stimulation Fluids

Along with the ready-to-use and concentrated acid fluids for stimulation of injection and production wells Polyex company offers the range of specialized additives: basic acid modifiers, specific acid stimulation fluid modifiers and corrosion inhibitors, which allow to prepare high quality HCl-based acid stimulation fluids at well site or in the conditions of a mud room, as well as to improve the performance of acid fluids for well stimulation.

Basic acid modifiers allow to solve the problems of making acid stimulation fluids both for production and for injection wells close to the objects to be treated. Adding of such modifiers to the acid helps to reduce the interfacial tension at the “spent acid-oil” boundary, and facilitates the penetration of the active acid into the pore space, slows down the reaction rate of the acid with the rock. When inducing feed-in the use of the modifying additives facilitates more complete removal of the neutralized acid from the formation.

Specific acid stimulation fluid modifiers may be added both at the stage of making of acid stimulation fluids and into the ready-made acid stimulation fluids with the purpose of solving the problems of acid treatment in complicated conditions.



Chemicals for preparing acidic composition with the use of modifiers:

1. Making of acid stimulation fluids of **FLUXOCORE®210** and **KSPEO** brands for the stimulation of production oil and gas wells based on pure HCl acid with the help of complex modifiers **MK-2**, **MK-3**, **MK-5**.
2. Making of acid stimulation fluids of **FLUXOCORE®110** brand designed for oil, gas, and gas-condensate well development after drilling in carbonate and terrigenous reservoirs, as well as for completion of wells after hydrofrac in terrigenous reservoirs based on pure HCl acid with the help of complex modifier system consisting of **MK-9** and **MK-10**.
3. Improving of HCl-based acid stimulation fluids for the stimulation of production wells in the condition of surplus of ferric iron with the adding of acid fluid modifiers of **MK-7** or **ACIRONIX®-IRON**.
4. Making of acid stimulation fluids of **KSPEO-N** brand for the stimulation of injection wells with the purpose to improve their intake capacity based on pure HCl acid with the help of complex modifier **MK-N**.
5. Acidizing of injection wells in cases when the injected water contains oil hydrocarbons with the use of acid stimulation fluid **KSPEO-N** with adding of acid fluid modifier **MK-R**.
6. HCl corrosion inhibiting with the help of **SOLING** brand inhibitors.



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Chemical	Description	Purpose of Application	Reservoir Type	Properties of The Modifier As A Component of Acidic Composition	Comments	
MK-2	Acid modifier	Making of KSPEO-2 g.B and g.A acid stimulation fluid for production wells	C, T	Preventing of trice high-viscose oil-acid emulsions forming during the process of acid stimulation. Preventing of precipitation of acid – rock reaction products. Reducing of «crude oil – acid» inter-phase tension	Liquid. Consumption rate up to 6 % by the volume of ready acid stimulation fluid	
MK-3	Acid modifier	Making of KSPEO-3 g.TA acid stimulation fluid based on the mixture of HCl and HF for production wells	T	Preventing of trice high-viscose oil-acid emulsions forming during the process of acid stimulation. Preventing of precipitation of acid – rock reaction products. Reducing of «crude oil – acid» inter-phase tension	Liquid. Consumption rate up to 6 % by the volume of ready acid stimulation fluid	
MK-5 grade O	Acid modifier	Making of FLUXO-CORE® 210 g.O and g.R acid stimulation fluid for production wells	C, T	Preventing of trice high-viscose oil-acid emulsions forming during the process of acid stimulation. Preventing of precipitation of acid – rock reaction products. Reducing of «crude oil – acid» inter-phase tension	Liquid. Consumption rate up to 6 % by the volume of ready acid stimulation fluid	
MK-5 grade C		Making of FLUXO-CORE® 210 g.C and g.N – the base for self-diverting acid stimulation fluid for production wells	Carbonate porous fractured reservoirs with non-uniform layer structure	Preventing of precipitation of acid – rock reaction products. Reducing of «crude oil – acid» inter-phase tension	Liquid. Consumption rate up to 4 % by the volume of ready acid stimulation fluid	
MK-9	Acid modifier	At site preparing of acid stimulation fluid FLUXOCORE® 110 . Used in combination with acid modifier MK-10	C, T	Acidic corrosion control, synergetic effect with HCl in clay and polymer dispersing	Dry composition. Consumption rate is 2.6-3.0% by the volume of ready acid stimulation fluid	
MK-10 grade NT	Acid modifier	At site preparing of acid stimulation fluid FLUXOCORE® 110 for the application at reservoir temperature <60°C. Used in combination with acidic modifier MK-9	C, T	Acidic corrosion control, reducing of the «crude oil – acid» inter-phase tension	Liquid. Consumption rate is 5.0-5.5% by the volume of ready acid stimulation fluid	
MK-10 grade VT		At site preparing of acid stimulation fluid FLUXOCORE® 110 for the application at reservoir temperature <110°C. Used in combination with acidic modifier MK-9				
MK-7 grade A grade R	Acid stimulation fluid additive – iron control agent	Specialized additive superinduced to the acid stimulation fluids of FLUXO-CORE® 210 and KSPEO brands for production wells, added into the working solutions	C, T	Preventing of emulsion forming and precipitation in the presence of surplus of ferric iron	Dry composition (grade A). Liquid (grade R). Consumption rate 0.3-1.0 % by the volume of ready acid stimulation fluid	
ACIRONIX®-IRON	Acid stimulation fluid additive – iron control agent	Specialized additive superinduced to the acid stimulation fluids for production wells added into the working solutions	C, T	Prevention of emulsion forming and precipitation in the presence of surplus of ferric Iron	Dry blend. Tentative consumption ranges from 0.5 – 1.5% of the volume of ready acidizing fluid correspondingly*	
MK-N	Acid modifier	Making of KSPEO-2 g.NA and g.NB acid stimulation fluids for injection wells	C, T	Preventing of precipitation of acid – rock reaction products.	Liquid. Consumption rate up to 6 % by the volume of ready acid stimulation fluid	
MK-R grade A grade B	Acid modifier containing alcahest	Oil hydrocarbons dissolving at the acidizing of injection wells	C, T	Dissolving of oil hydrocarbons at the acidizing of injection wells in which produced waters with high content of hydrocarbon residuals are injected	Liquid. Applied together with KSPEO-2 N acid stimulation fluid	

Chemical	Description	Purpose of Application	Area of Application	Comments
SOLING grade LU	HCl corrosion inhibitor	Anticorrosive protection in HCl solutions, hydrofluoric acid solutions and their blends	Protection of black steel equipment meant for acid storage, which is used in chemical, petrochemical and oil-producing industry	Liquid. Consumption rate 0.2 – 0.7% of the volume of acid
SOLING grade D	HCl corrosion inhibitor	Anticorrosive protection in synthetic HCl solutions	Protection of black steel equipment meant for acid storage, which is used in chemical, petrochemical and oil-producing industry. Reduces interfacial tension between crude oil and acid	Liquid. Consumption rate 0.3% of the volume of acid
SOLING grade T	High temperature HCl corrosion inhibitor	Anticorrosive protection in HCl solutions of high concentration (up to 30 % by HCl) or under high formation temperature conditions (up to 90°C / 194°F)	Protection of black steel equipment meant for acid storage in chemical, petrochemical and oil-producing industry, and oilfield equipment used in production wells	Liquid. Consumption rate is 0.2% of the volume of acid



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