Hydrolysis of inorganic salts which runs on electric desalting plant (EDP) is accompanied by the formation of an acidic environment. It is used to conduct the neutralization of such crude oil by alkalis as well as by organic amines. Because of the difference of the density and viscosity of the oil and alkaline solutions, the neutralization occurs not equimolarly under diffusion control and is accompanied by increase consumption rates of the neutralizing agent. The excess amount of the lye supplied to neutralize is reflected on the thermal oil-processing, reducing the activity of cracking catalysts. Reducing the impact of excess alkali can be achieved by intensification of mixing alkali point of application to the flow of oil. It is known way of oil neutralization by aqueous alkaline solution, which for the dispersion of aqueous alkali proposes, in particular, carry out their partial pre-mixing with oil (1%) [1], or use a different nozzle design [2]. Experience has shown that the effectiveness of both methods is low. In addition, they are characterized by disadvantages associated with the need to service the mixers and control when the flow of oil and/or the lye is changeable. Another known on the electric desalting plants method [3] uses mixing valves, which process is working at high pressures drops across the valve, which is associated with significant energy costs to provide the required performance EDP on oil, moreover, the hydraulic losses will increase significantly during the works with heavy and viscous oils. A more effective way is to neutralize the oil on electric desalting installation with prior addition of de-emulsifier, which produces a mixture of oil with a soda-alkaline solution in static mixer type like Sulzer SMV Hemiteh [4, 5]. Disadvantage of this method is the complexity of device design, large quantity of metal usage, high pressures drops of at high flows of oil. The purpose of this study was developing a compact mixing reactor design, which can reduce the working pressure drop during the neutralization and amount of the alkaline agent required. In order to solve the problem indicated, the oil neutralization was carried out in a turbulent reactor confusor-diffuser design [6]. In this case, the oil prepared and preheated to 110-120°C enters the inlet of the first section of a turbulent tubular reactor confusor-diffuser design with a flow rate of 680-750 m3/h, where the dispersion of the two-phase system is occurring. Later, alkaline solution 1-2% by wt. is coaxially inserted in the first section of the reactor-mixer through the frontal atomizers. This allows improve the efficiency of oil neutralization due to a significant reduction of fresh and spent volumes of lye. The advantages of the device are absence of mixing devices, low pressure drop, and low quantity of metal usage. Due to possibility to increase the quality of alkali and oil mixing via fine dispersion and uniform distribution of the alkali in the entire volume of oil, the conditions for the creation of a homogeneous emulsion-phase model of system "liquid-liquid" in tubular turbulent apparatus were studied [7, 8]. Droplets distribution of the dispersed phase in size to the formation of fine homogeneous systems in the confusor-diffuser channels is narrowed by increasing speed of immiscible fluid streams. Increase in volumetric flow velocity and the number of diffuser confused sections 1 to 4 leads to reduction of the volume-surface diameter of droplets of the dispersed phase and, consequently, to increase in the specific surface of the interface, which in the case of fast chemical reactions intensify the total process. Inadvisability of using the apparatus with the number of diffuser sections confused over 5 ± 1, making these devices simple and inexpensive to manufacture and operate as well as compact, e.g. length does not exceed 8-10 caliber (L/dD). There is a range of volume velocity of two-phase flow, which corresponds to the cone-channel confused with optimal diameter of the diffuser to confuser (further indicated as dD/dC). The distance is limited from bottom by seating stratified two-phase flow, and is limited from top by energy costs arising from the increased pressure on the ends of the device (Dp~w2). In particular, the ratio dD/dC = 3 corresponds to the interval 44 80 cm3/s, and dD/dC = 1.6 corresponds to the interval 80 180 cm3/s, and further increase in the velocity of the dispersed system (w> 180 cm3/s) determines the need to further reduce the ratio dD/dC until dD/dC = 1, i.e. small units cylindrical structure are effective enough in this case. Thus, the flow, in which the dispersed particles are uniformly dispersed in the unit of confusor-diffuser design in comparison with the cylindrical channel, is formed at the lower velocities of the dispersed system, and the higher the ratio dD/dC, the lower the required value W (due to changing the value of the Reynolds number Re according to the ratio Re ~ dD/dC). Thus, the change in the rate of fluid flow in tube W devices and relation dD/dC is almost the only, but very effective way to affect the nature of the dispersion and the quality of the emulsion. These patterns of relationships allow under optimal conditions and without non-technical or technical problems create thin homogeneous dispersion systems "liquid-liquid" with a minimum residence time of the reactants in the mixing zone, and use simple apparatus to design small confusor-diffuser design. Another important quantity that characterizes the quality of the emulsion is the polydispersity coefficient k. Ratio Lc/dD almost no effects on the polydispersity of emulsions obtained. The increase in the spread of the dispersed phase in size is observed during increasing of the ratio dD/dC, and quite homogeneous emulsion is formed in the diffuser confused channels tubular device with dD/dC = 1.6. In particular, the value of k in dD/dC = 1.6 for Lc/dD = 2-3 equals 0.72-0.75, whereas the k is reduced to 0.63 and 0.41when the ratio dD/dC is 2 and 3, respectively. Creation of intensive longitudinal mixing in a two-phase system in tubular turbulent apparatus with the ability to increase the surface of contact between the phases allows intensify the flow of fast chemical reactions at the interface. The dependences obtained allow predict the dispersion of droplets of alkali in oil, which makes it possible to design a mixer for use in a wide range of flow rates of mixed liquids. The process at low differential pressure is necessary to carry out for effective mixing of oil-base, which is directly related to the energy needed to provide the performance ELOU required. However, the hydraulic losses increase significantly when working with heavy and viscous oil. The pressure drop is expressed by the relationship , where ζ is a coefficient of local resistance, l is a friction coefficient, L is a length, d is diameter, r is a density, w is a speed. The coefficient of local resistance to the unit area with sudden expansion is calculated (in the calculation of the velocity head speed in a smaller cross section) by the formula (fig. 1a), and cylindrical portion of the apparatus for ζ = 1, while coefficient of local resistance to the plot device of a sudden contraction (in the calculation of the velocity head speed in a smaller section) ζ=0.38. The values of friction coefficient for turbulent flow can be calculated by the Blasius formula: a b Fig. 1 - Scheme for calculation of: a) coefficient of local resistance, b) pressure drop in tube The pressure drop in the section is the sum of the pressure drop in a smooth tube, expansion (diffuser) and narrowing (confuser) (fig. 1b) DP= (P1-P2) + (P2 - P3) + (P3 - P4). The total pressure drop is the sum of pressure drops in each section. Calculation by these formulas was done according to experimental data of measuring the pressure at the ends of tubular turbulent apparatus consisting of 20 sections with a water flow. Comparison of calculated data obtained with respect to the model system shows correlations with the experimental data for the pressure in the apparatus: D P practical = 0.955 atm, D P theoretical = 1.062 atm. Calculation of diameter of the narrow section (confuser) section on the proposed formulas, based on the requirements for the pressure drop in the apparatus D P ≤ 0.6 atm, was done (Table 1). The pressure drop at the ends of the device with a diameter of confuser dC = 0.2 m is DP5unit ≈ 0,52 atm, which is optimal for steel neutralization of oil. Sharp rise in temperature is observing while using of concentrated solutions of the reagents during the neutralization of acidic environments. In this case, the small tubular turbulent reactors confusor diffuser designs define the ability to effectively regulate the temperature field in the reaction zone in several variants: the radius of the apparatus and the speed of the flow of the reactants, the use of the band model of a rapid chemical process and the use of shell and tube apparatus with a bundle of small-radius intensification of convective heat transfer at profiling apparatus. The process of neutralizing the oil in accordance with the proposed method is following (fig. 2). The main flow of commercial oil from the pipeline (I) is mixed with the de-emulsifier (II), the pump (1) is directed to the heat exchanger (2), where it is heated to 110-120 oC. Table 1 - Calculation of the diameter of the diffuser at dc for oil in the apparatus of confusor-diffuser design DP5section 0.6 atm DPsection 0.118 atm DP3-4 6643 kgF/m2 DP2-3 51.1 KgF/m2 DP1-2 7875 KgF/m2 zC 0.38 z 0 zD 0,46 r 762 Kg/m3 L 0.875 m lC 0.0087 lD 0.0115 dD 0.35 m Re 177•104 ReD 577•103 wC 6.62 m/s W 2.163 m/s SD 0.096 m2 SC 0.031 m2 dC 0.198 m Fig. 2 - Scheme of the site electric desalting oil. 1, 5, 8, 12, 13 - pumps; 2 heat exchanger; 3, 6 - electric dehydrators, 4 - turbulent tubular reactor, 7 - diaphragm mixer, 9, 10 - valve automatically reset the salt water, 11 - the sump The oil with de-emulsifier comes to the first stage of separation in electric dehydrators E1 (3). The oil from electric dehydrators (3) from top comes with the flow rate 680- 750 m3/h at the inlet of the first section of a turbulent tubular reactor (4). Dispersion occurs in the five sections of the tubular turbulent reactor (fig. 3), which is less than 4 meters with a pressure drop at the ends of the device to 0.52 atm. Aqueous alkaline solution (III) by pump (5) is sent to the coaxial connector of the first section of a turbulent tubular reactor (4) confusor-diffuser design with end nozzles (fig. 4). Pipe is perforated by twenty-one hole with a diameter d1 = 5 mm, where twenty holes are in the walls for the radial outlet to the flow of oil supply bases, and closed front end of the pipe is perforated by hole coaxial with the direction of oil entering the solution of a neutralizing agent. Alkali solution Petroleum Fig. 3 - General view of the tubular turbulent apparatus for neutralization of the petroleum with alkali Fig. 4 - Scheme for input socket bases Perforations are arranged symmetrically on the cross section (four holes on one section A-A). Partially dehydrated and desalted oil comes under pressure in the second stage of electric dehydrators E2 (6). Before this, electric dehydrators oil mixed in the diaphragm mixer (7) with pre-heated to 65-70 oC pumped (8) fresh water (IV). Electric dehydrators E1 and E2 (3 and 6) by automatic reset valve saltwater (9) and (10) disperse the water to the sump (11). The extracted water streams containing oil are received for recycling by pumps (12) and (13). Desalted and dehydrated oil from the top V electric dehydrators E2 (6) - play with the installation. Conclusions Tubular turbulent apparatus confusor-diffuser design allows for effective neutralization of aqueous alkali oil and organic amines in equimolar ratio 2. The proposed low metal device confusor-diffuser design determines the differential pressure at the ends of the device of the five sections of no more than 0.52 atmospheres and is installed as part of the pipeline flow of oil on the node CDU.