Intoduction Investigations of molecular and super-molecular structure effects on physical and physical-chemical properties revealed in heterogeneous polymer systems show that the formation of the structure is one of the main processes in formation of electrically conducting properties of ECPC [1-6]. In its turn, the structure significantly depends on various recipe and technological factors at production of this composites [7-9]. Dependence of ECPC on the content of filler Growth of ECPC conductivity with the increase of conducting filler content is a rule without exclusions [1-4, 10]. Typical dependence of specific volume electric resistance r of composites, based on organic or inorganic binders, on content of conducting filler is shown in Fig.1. The specific feature of this dependence is a jump-like increase of conductivity γ or, which is the same, a decrease of r at definite (for a particular composite) threshold filler concentration, induced by an insulator-conductor transition. This transition conforms to the so-called threshold of proceeding, or percolation. In this case γ value jump, which may reach several decimal degrees, is stipulated by formation of a continuous chain of filler particles in the polymer matrix - the infinite cluster [11,12]. Structural insulator-conductor percolation transition may be presented by a scheme (Fig. 2). Resulting the increase of filler content the probability of occurrence of associates of these particles in the composition, or the so-called isolated clusters, grows (see Fig. 2a). Further increase of the filler content promotes the juncture of isolated clusters into greater associates up to occurrence of an infinite cluster, i.e. a continuous electrically conducting channel in ECPC macro-system. However, in this case not all associates are included into the infinite cluster (Fig. 2b). Continuous growth of the filler concentration may induce a situation, when all isolated clusters are included into an infinite cluster (Fig. 2c). In accordance with considered scheme of the infinite cluster formation, the jump-like change of r in Fig. 1 may belong to such a concentration of the filler, when necessary conditions for occurrence of the present cluster appear. Further growth of the filler concentration leads to a monotonous decrease of r, followed by coming out of its values. Fig. 1 - Typical dependence of specific volumetric electrical resistance r of composites on the concentration of conducting filler. Cp is the percolation threshold As it will be seen below, the transition of type insulator-conductor is sensitive to the filler content and many other factors effectively affecting the location of the filler particles. At present the problem of the conductivity mechanism of ECPC still to be discussed. As to the opinion of some investigators [13, 14] the charge transfer is conducted by chains, consisted of filler particles having direct electric contact. On the opinion of other authors [15, 16] conductivity of ECPC is caused by thermal emission of electrons though spaces between particles. They also speak out another opinion that current exists in ECPC with air gaps or polymer films between filler particles. In this case electrons, which obtain energy below the potential barrier value may be tunneled through it, if their own wave-length is comparable with space width of insulating film [17-19]. Fig. 2 - Scheme of infinite cluster formation from conducting particles in aniso-tropic polymer matrix Let us consider the most wide-spread models of the changecarrier transfer in ECPC, connected to the composition and structural features of composites. There were the formulas suggested for calculation of electric resistance of composite, for which the formula below is the basic one for r calculations [20-22]. These formulas were suggested basing on the ideas of two-phase composite structures as a polymeric matrix, in which chains composed by conducting filler are dislocated according to one or another rule. In this case, it is also assumed that all conducting particles participate in formation of the electrically conducting , (1) where R’ and R” are electric resistance of filler particles and the sum of contact resistances between them, respectively. As total number of chains in a sample with a specific volume is N=6Vf/pd2 where Vf and d are volumetric part and diameter of filler particles, respectively, the sum (1) could be presented as follows: R=rf/Vf + Rcn/N Here rf is the specific volumetric resistance of a filler; Rc= r/2r, where r is the specific volumetric resistance of the material; r is the radius of the contact point; n = 1/d is the number of filler particles with diameter d. Density packed system possesses r=Rcd [23]. Electric conductivity of a matrix the two-phase system of a matrix (simple cubic lattice, in points of which similar sized filler particles locate) is expressed as follows [24]: , (2) and electric conductivity of a statistic system (chaotic distribution of filler particles) as follows: , (3) where gp and gf are electric conductivities of polymer and filler, respectively; Vp and Vf are their volumetric amounts, respectively. Basing on the developed model of two-phase system conductivity the authors of suggested a formula for generalized conductivity [25]: , (4) where l is the system conductivity connected to transfer phenomenon (heat conductivity, electric conductivity, etc.); l1 and l2 are conductivities of components at l1>