

TEMPERATURE FACTOR IMPACT ON THE CABLE SERVICE LIFE OF XLPE CABLE DURING THE INSTALLATION OF CABLE ACCESSORIES

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ABSTRACT

During the installation process of 110kV and above high-voltage cable accessories, the tail pipe of cable accessories are welded together with the cable aluminum sheath by lead solder. For a long time, people disagree with Grounding seals, lead to research and explain the process of closure is subject to overheating of insulation, sealed lead us in this article a brief introduction to the process and from the field experiment and theoretical calculations lead to the cable accessories Way of grounding closure

KEYWORDS,

Lead solde , Cable insulation, Thermocouple

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INTRODUCTION

During the installation process of 110kV and above high-voltage cable accessories, the tail pipe of cable accessories are welded together with the cable aluminum sheath by lead solder. Heating the metal sets of the tail pipe and the cable localized with the flame of the burner, when the lead solder was in the closed state of semi-solid, forming the tail pipe, cable localized and the lead solder into a complete sealing bodies by hand. In the process, however, the burner flame and molten lead material are at high temperatures, Improper operation or operating beyond the stipulated time may causing the Main insulation local deformation or aging and original electric field changed, change of the original electric field will lead to electrical stress concentration, finally, endanger the stability and security of the whole system.

In the welding process, Part of the high heat transfer by convection into the air, another part of it will transfer to the cable insulation in the form of heat conduction, convection and radiation with the aluminum sheath, and the air between the water blocking layer. This part of heat is what we care about, We designed a series of special test, to do as, measure how the temperature of symmetrical four points on cable insulation surface change with time during the welding process Record the data once every 1min, and plot charts which reflect the temperature change of every point with time.

1 SEALS CONNECTION MODE OVERVIEW

Seals way was with the help of the burner fire, locally heated the metal burner tail pipe and cable metal sleeve, after sealing tin-lead solder is half solid state, through the manual processing forming, get perfect metal seal structure. At present, seals operation commonly use touch lead method and poured lead method, the former is poured lead method burner flame heating seals site, meanwhile smelted seal tin-lead solder, then process forming using lead parts wipes. Though heating in lead cylinder with iron melt, take, pouring out scoop in sealing parts, or is the lead through the burner flame melting wipes on and then to stick to the seals by position, finally processing forming. This is the pour lead method. In order to avoid a long-time baking cable, we use the main methods, that is pouring lead method combined with touch lead method.

1.1 Seals materials

In order to damage the cable's internal insulation in the seals process, the sealing tin-lead solder melting temperature is not too high. Lead tin alloy is the ideal solders, the melting point of lead is 327°C, the melting point of tin is 232°C. According to the theory of physics and chemistry, it is concluded that lead tin balanced graphs and see figure 1, figure in A, B and C separately is lead, lead solder alloy 'tin melting point. From graphs, we can see that, the solder alloy of 65% lead and 35% tin is half solid state at 180 ~ 250°C temperature range, such as lead tin alloy have more broad operational temperature range [2]. According to engineering experience, if the content of lead is too little, then processing form of seal is difficult; If the content of tin is too many, temperature range of a semi solid state -solders may be narrowed, and shaping time too short, that is disadvantageous to seals operation.

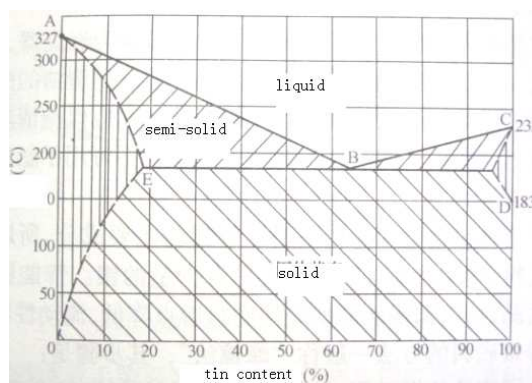


Figure 1 balanced graph between lead and tin graphs