

AND ROLE OF ELECTRICAL CONTROL METHODS IN PRODUCING QUALITY PRODUCTS

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Abstract: In the article electric methods using indestructible of control essence and types illuminated. Electric control — supervision object with mutual under the influence harvest to be electricity field parameters based on defects determination method. Electric potentials, thermoelectric, electric capacity, electricity disruption and electrostatic powder methods work principles, application sectors and their advantage and disadvantages analysis Research to the results according to, electric control methods metal and dielectric in materials defects of determination efficient, fast and reliable method is considered.

Key words: Electricity control, indestructible control, electricity potential method, thermoelectric method, electricity capacitance, electrostatic powder, insulation coating, defect, dielectric, metal, quality control.

Modern working in the release products quality provide and their internal and external defects determination working release safety, reliability and economic efficiency important from factors is one. This for the purpose **indestructible control (BN)** methods wide is applied. Such control of the types one is **electric control (EN)** is, it is material or of goods electricity to the characteristics based without their quality, structure and defects determination opportunity gives.

Electricity control methods **GOST 25315-82** standard with order is inserted and metal, alloy, polymer and composite from materials prepared in products wide is applied.

Electricity control methods essence

Electricity control (EN) — this indestructible control of the types one control object with mutual under the influence harvest to be or external forces under the influence appearance to be **electricity fields parameters** record to grow and analysis to do is based on.

This methods using:

- metal and in alloys cracks, gaps, delaminations is determined;
- insulating in coatings holes, bubbles, thinning places record is being done;
- metal, plastic, composite of materials thickness and structure one diversity is evaluated;
- indirectly in a way density, humidity, polymerization level and other physical-mechanical features is determined.

Electricity control methods main types



1. Electricity potentials method

This method through a conductive material electricity till when transferred harvest to be **electricity potentials distribution to measure** is based on .

- Control being done to the surface electrodes is installed and they among electricity till is held .
- Potential difference ΔU 's change through surface one kind or defective that is determined .
- If the surface flawless If , ΔU is constant will be ; crack or defect there is if , potential difference increases .

This method cracks , pores and other in conductivity changes fast determination opportunity gives .

2. Thermoelectric method

Thermoelectric control heat temperature difference as a result electricity in the chain harvest to be **thermo -EMC (electrode engine power)** what to measure is based on .

- Under study “ hot ” and “ cold ” electrodes applied to the object will be placed .
- Contact at the point thermoelectric potential harvest will be and measurement tool through record is being done .
- Method metal varieties detection , semiconductor of materials conductivity type in determining is applied .

Thermoelectric in a way differential measurement is also performed is increased — in this control being done of the object thermo-EMF of the reference sample with is compared .

3. Electricity capacity method

this way control being done object condenser element one part as works .

- If the object dielectric If it is a capacitor , plates between will be placed .
- If metal if , itself of the capacitor one plate as service does .
- Capacitor capacitance (C) and dielectric loss angle ($\text{tg } \delta$) is measured .

This method dielectric of materials density , humidity , internal structure and one sexuality in evaluation is applied .

4. Electricity distortion (discretization) method

This method dielectric or insulating in coatings **electricity disruption voltage** record to reach based on .

- Test voltage coating on top of special electrode through is given .
- If the coating crack , hole or If there is a thin spot , electricity will pass and disruption happened will be .
- Disruption point location and number according to coating to the quality grade is given .

This method insulation layers integrity in inspection wide is applied .

5. Electrostatic powder method

This method surface defects **electrostatic fields** using to determine based on .

- Calcium carbonate (CaCO_3) or to that similar small powder product to the surface sprayed .
- Friction as a result powder particles electricity is charging and surface with mutual to the effect enters .
- Surface defective places electrostatic the field breaks , as a result charged particles exactly that's it in places accumulated , defective places visible to form is coming .

This method visual accuracy giving , cheap and simple control of the types is one .

Electricity control advantages



- Metal , alloy , polymer and composite materials for suitable ;
- Indestructible , fast and relatively cheap method ;
- High accuracy and sensitivity ;
- Physical-mechanical features about indirectly information gives .

Disadvantages

- Object surface cleanliness and readiness high to be necessary ;
- Control in the process object with communication to do demand will be done ;
- Results automation difficult ;
- Wet or uneven on surfaces accuracy decreases .

Conclusion. Electric control methods working release in the process metal and dielectric materials quality in evaluation important place They are using of the product internal defects determine the thickness measurement , insulation of coatings integrity check and of materials physicist features determination These methods are possible . high sensitivity , wide application and thriftiness with separated It will be . In the future them automation and digital technologies with combine through quality control efficiency further increase possible .

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