ALOTEK
TECHNOLOGY

MANUFACTURER OF INNOVATIVE PRODUCTS
BASED ON SMART ALLOYS

PN-EN ISO 9001 :2015

INNOVATIVE SOLUTION FOR PROTECTING ELECTRICAL REMOVABLE CONTACTS WITH SMART ALLOYS

MAIN DIRECTIONS OF ALOTEK TECHNOLOGY

- Innovative CONTACT PROTECTION TECHNOLOGY
- Production of SMART alloys based on copper (Camital™)
- Development of thermal engines based on SMART alloys that operate using secondary heat energy sources
- Participation in grant programs to scale scientific innovations and bring them to market

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1. Reduction of mechanical pressure in electrical contacts
2. Oxidation of contact surfaces
3. Thermal degradation of contacts

- unregulated processes lead to major fluctuations
- progressive decrease in pressure
- increased transition resistance and rising contact temperatures

TYPICAL PROBLEMS IN ELECTRICAL CONTACT OPERATION

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TRADITIONAL METHODS TO PREVENT FAILURES:

- Monitoring contact overheating using thermal imaging inspections
- Regular maintenance (inspection, cleaning, tightening of bolted connections)

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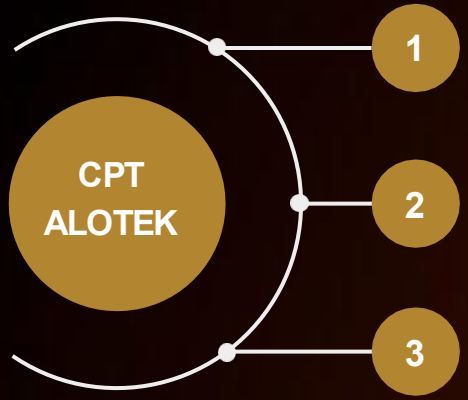
CONTACT PROTECTION TECHNOLOGY by ALOTEK TECHNOLOGY (CPT ALOTEK)



1. Overheat indicator – monitors contact temperature and detects overheating
2. Contact pressure stabilizer
3. Lubricant based on Camital alloy powder – seals contact connections and automatically removes oxide film

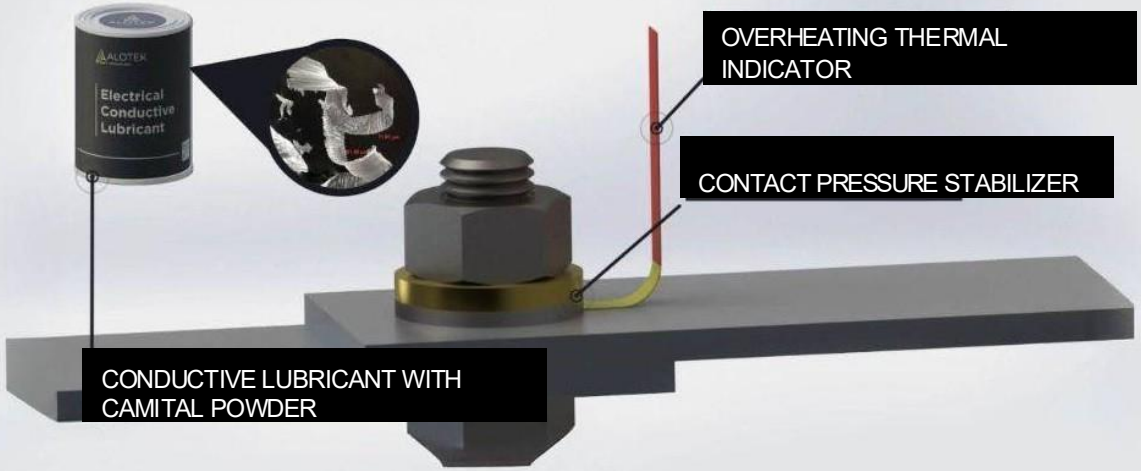
This innovative technology ensures uninterrupted, fire-safe, and efficient operation of electrical contacts by using shape memory alloys (SMA)

Our mission is to enhance energy safety worldwide!

ALOTEK's unique CPT technology provides the broadest range of protection of any known technical solution

ALOTEK TECHNOLOGY

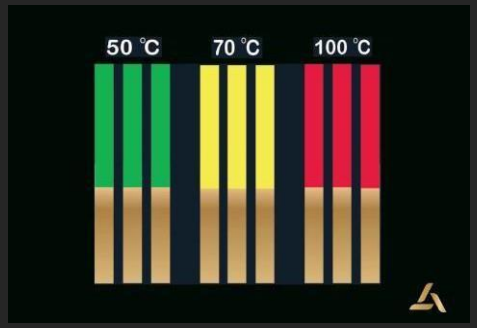
CONTACT PROTECTION TECHNOLOGY ALOTEK (CPT ALOTEK)



The unique CPT ALOTEK technology provides the most comprehensive protection among all known technical solutions.

CPT COMPONENTS

1 Intermetallic thermoindicators



for continuous temperature monitoring of the contact connection (24x7) with locking in case of overheating

Temperature thresholds: 50° C, 70°C, 100°C

2 Intermetallic stabilizers

for automatic control and regulation of contact pressure, connection protection against overheating and thermal failure

Available sizes: M6, M8, M10, M12, M14, M16, M20, M24, M30, M36

3 Conductive Lubricant with Camital Powder

for destruction of oxide film and slowing down the aging process of contact elements during operation of electrical installations

Capacities: 0.5 L, 50 mL

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VISUALIZATION OF CPT ALOTEK INSTALLATION

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CAMITAL ALLOY IS A REGISTERED TRADEMARK OF ALOTEK TECHNOLOGY

Camital alloy has physical and processing properties similar to Nitinol and **can be used in key industries worldwide**

Camital's production cost is nearly **20 times lower** than Nitinol, offering a cost-effective innovation for various industries

Camital copper-based alloys have excellent physical properties, making them ideal for electrical applications

Comparative characteristics of CU-Al-Mn (Camital) and Ni-Ti (Nitinol) alloys

Characteristics	Camital	Nitinol
Melting point, ℃	1000-1060	1300
Specific resistance , μOhm*cm	9..11	70…100
Thermal conductivity, W/cm ℃	45…60	8,5…18
Transformation temperature scale, ℃	-120…+200	-200…+110
max. permissible relative strain, %	4,2	8

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BENEFITS OF CPT by ALOTEK TECHNOLOGY

1. **Prevention of accidents** caused by overheated contacts
2. **Reduction of power losses** in electrical contacts by 80%
3. **Increase of** normal **operation period** of electrical equipment by **7 times**
4. **Simple, reliable** and easy **to install**
5. Operating **temperature is independent of external conditions**
6. **Possibility to modify** product parameters according to customer needs
7. **Simplified monitoring** of personnel
8. **Reduced** maintenance costs

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Calculation of power losses on the example of collapsible contact connection of electric busbars

1000

electrical contacts

1,4 € – 14,5 €

losses for 1 contact per year

18% - 40%

contact overheating statistics per year

252 € – 5800 €

total amount of electricity losses per year

EU-27 - 0,21 € /1 kWh

average cost of electricity for business

(material - aluminum alloy AD) of a typical transformer substation (TP) - 10/0,4 kV

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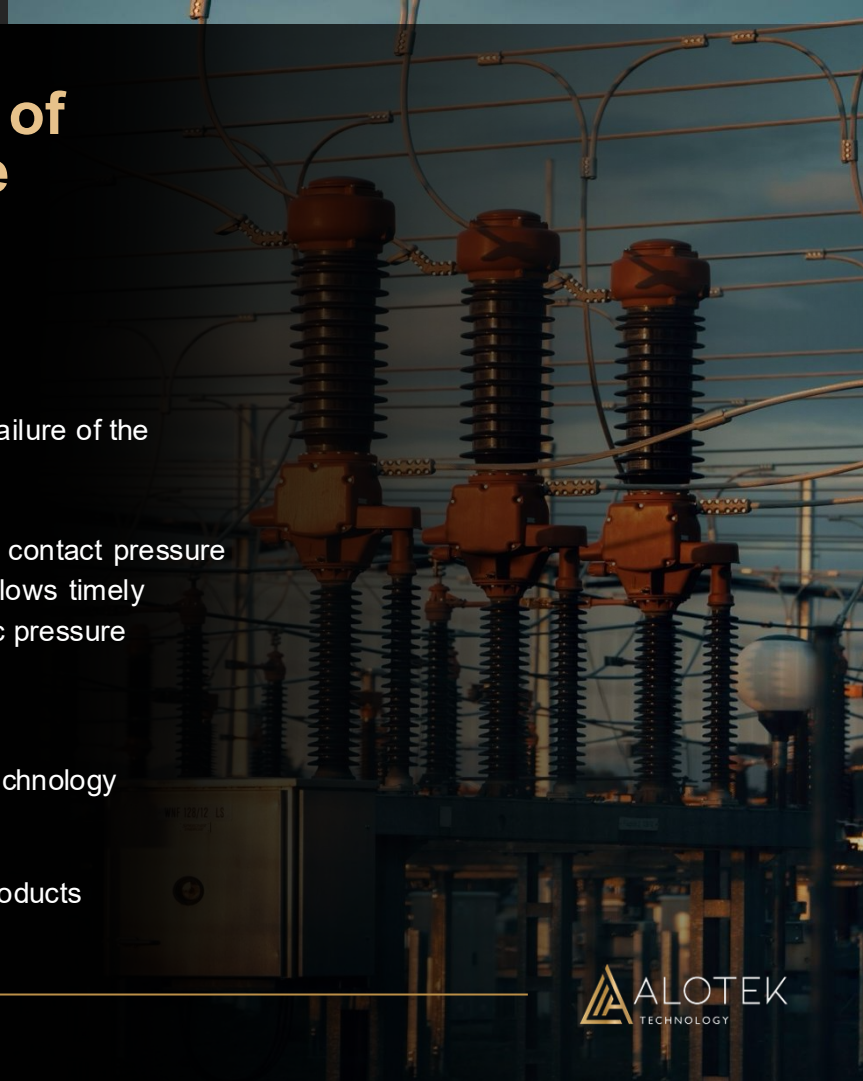
Financial impact of the application of CPT by ALOTEK Technology in the operation of contact joints

from 2000 €	Average repair cost of an overheated contact
over 20,000 €	Costs may be incurred in the event of thermal failure of the contact and damage to the electrical installation
100% of the time	Application of threshold thermal indicators and contact pressure stabilizers based on functional intermetallics allows timely detection of overheated contacts and automatic pressure regulation within the nominal pressure limits
1 to 4 months	Average payback period of CPT by ALOTEK Technology
3 years	Warranty period for ALOTEK TECHNOLOGY products



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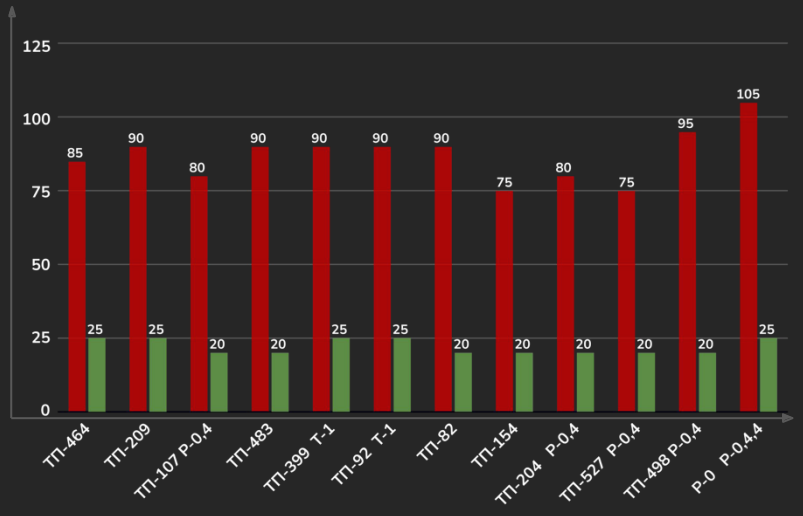
Testing of CPT ALOTEK Technology at electrical substations of PrAt Cherkasyoblenergo



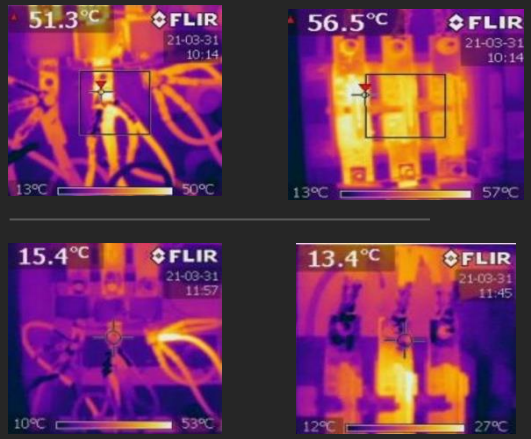
- Contact temperature before renovation, °C
- Contact temperature after renovation, °C

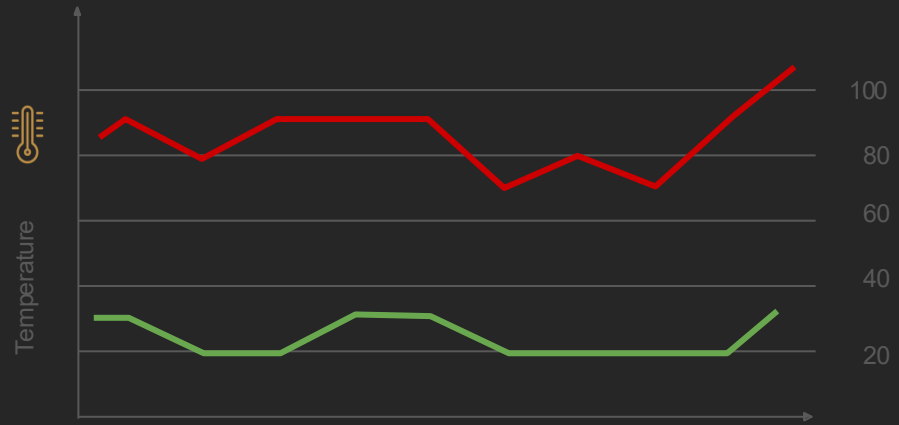
intermetallic stabilizer M12, M10, thermoindicator 70 °C were used during tests

Testing of CPT ALOTEK by DTEK Group of Companies

Inspection and reconstruction of contact connections at:

- ZTP-186 10/0.4 kV
- KPT-855 0.4 kV





- Contact temperature before renovation, °C
- Contact temperature after renovation, °C

The image shows the thermogram of the joints before and after renovation

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Conclusion of specialists of PrJSC “Ukrzaliznytsia” on the results of CPT ALOTEK tests

- prevents **26%** of accidents and failures due to overheating of contacts
- reduces energy losses due to overheating, oxidation and partial destruction of contacts up to **80%**
- annual savings of **1,4-14,5 euros** per contact at currents of 200-500 A
- annual savings of **140-1450 euros** for 10(6)/04 kV substation, up to **5800 euros** for 35/10(6) kV substation
- extends the service life of electrical components **6-7 times**
- significantly **reduces maintenance costs** by extending the time between routine maintenance
- **optimizes schedules** and maintenance technology of electrical equipment and networks thanks to maximum reliability, better predictability and control systems
- the results of the pilot projects are recorded in official reports and can be made available on request

The highest efficiency is achieved in traction substations, electric switchgears, contact networks, electric locomotives

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Recognition of ALOTEK TECHNOLOGY

CPT by ALOTEK Technology has been successfully tested in a number of power generation and distribution facilities, receiving positive conclusions

The practical value of CPT by ALOTEK Technology has been confirmed by a number of scientific institutes

ALOTEK TECHNOLOGY is a member of the Polish Chamber of Commerce of High Technology


IZTECH

DYPLOM
CZŁONKOSTWA

ALOTEK TECHNOLOGY SP. Z O.O.

ALOTEK TECHNOLOGY LTD.

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ACHIEVEMENTS OF ALOTEK TECHNOLOGY

1

Own trademark CAMITAL

2

Hamelton Certification

3

Positive opinion of the I. Lukashevich Polytechnic Institute

4

CERTIFICATE PN-EN ISO 9001 :2015

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CPT ALOTEK TECHNOLOGY APPLICATIONS

- Electrical networks of all voltage levels – Transformer substations, distribution points, automatic backup power systems
- Urban and railway electric transport equipment
- Oil, mining, aviation, shipbuilding, and military industries – Transformer substations, distribution devices, control panels, electric motors, compressors, and pumps
- Enterprise internal power networks
- Industrial and household electrical equipment

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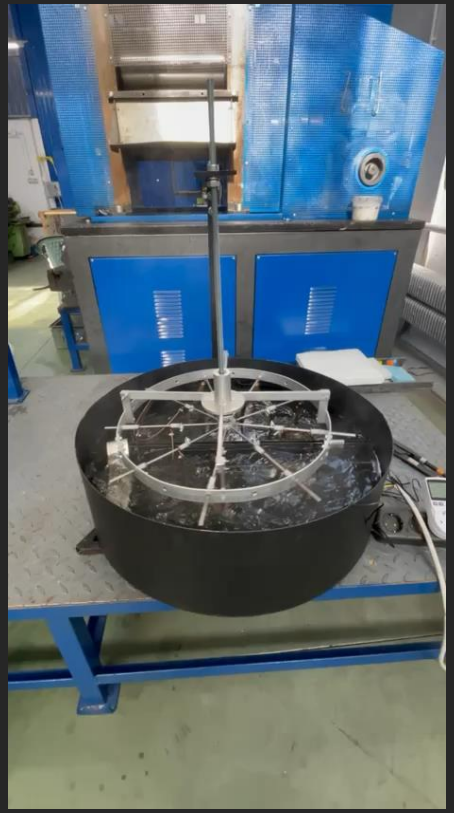
HEAT ENGINES BASED ON SHAPE MEMORY ALLOYS

Water temperature
+20...+100 °C



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CONTACTS

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BASED ON SMART ALLOYS

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**INNOVATIVE SOLUTION
FOR PROTECTING ELECTRICAL REMOVABLE CONTACTS WITH
SMART ALLOYS**

We take responsibility for our products and contribute to the world of energy!

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