[redacted]

INFORMATION REPORT

CD NO. 25X1

COUNTRY East Germany

DATE DISTR. 8 November 1954

SUBJECT New Polyphase Induction Motor with Aluminum Winding

NO. OF PAGES 2

PLACE ACQUIRED [redacted]

NO. OF ENCLS. (LISTED BELOW) 25X1

DATE OF INFO.

SUPPLEMENT TO REPORT NO.

[redacted]

[redacted] THIS IS UNEVALUATED INFORMATION 25X1

[redacted]

1. Early in 1951, as a result of research carried out in the nonferrous metal rolling mill at Hettstedt, a wire lacquer (Drahtlack) with Perlon base was produced, which in contrast to the previously used oil lacquer (Oellack), clings to aluminum. With similar electric qualities, it far outstrips the oil lacquer in mechanical potentialities. The Perlon lacquer coating (Iso-Perlon Lackschicht) possesses extreme hardness and an unusually high tensile stren[redacted] 50 percent without the lacquer coating showing any si[redacted] Iso-Perlon lacquered wires can be hammered out to abou[redacted] without harming the lacquer coating. The break-down voltage of both wires is about 1,500 volts. 25X1

2. The increase in diameter of Iso-Perlon covered wires is 0.04 - 0.06 mm, whereas with ordinary covered wires it is about 0.2 - 0.3 mm. The insulation of Iso-Perlon lacquer wire permits a temperature rise of 80° C., while the permissible temperature rise of cotton- or cellulose-insulated wires is only 60° C.

3. Smaller air-cooled water-tight motors have already been wound with lacquer-covered wire. Their lamination diameter (Blechdurchmesser) is enlarged at most by three percent. By deepening the slot (Nut) it was possible to accommodate just as much active material, so that the lowered conductivity was equalized without overstepping the permissible heating limits. Motors under three kilowatts and encased motors, whose laminations are attached to the casing, are not in most cases subject to a reduction in power rating.

4. It is therefore possible today to construct housings of polyphase induction motors out of aluminum and to maintain the dimensions of the former copper-wound motors. The outstanding qualities of the Iso-Perlon-lacquer wire give a certain advantage to this aluminum-wound motor over the copper-wound motor with normal oil-lacquer insulation, or cotton and cellulose insulated winding.

5. The greatest difficulties were presented by the switch connections (Schaltverbindungen) and the connections on the terminal board (Klemmverbindungen am Klemmbrett). For switch connections, the so-called Alku-wire is now available. This is an aluminum wire with thin copper jacket. This material is also produced as insulated cabb[redacted]

[redacted] 25X1

consisting of Alku-wires about one millimeter in diameter. This Alku-wire can be tinned (verzinnen) to the terminal board side, bent into loops, and suc[redacted] fully screwed to the terminal board with the use of spring washers without [redacted] ening the contact pressure and without showing any signs of corrosion un[redacted] high humidity (bei Zutritt von feuchter Luft). On the switch side, the copper covering is dipped (abgebeizt) and the wire is welded to the coil leads (mit den Schaltenden der Wicklung). Normal cable shoes can be soldered to Alku-cable.

6. The development of aluminum-wound motors was begun at the Elektromotorenwerk Wernigerode early in 1951 and quickly completed so that current production of motors has almost one and a half years experience behind it. The trial motors, including a 200 kW motor which was subjected to great strain as a load generator (Belastungsgenerator), have stood up exceptionally well and as yet given no cause for complaint. In addition, the usual short-circuits, which in the case of oil-lacquered wires accounted sometimes for 25 percent of production, have practically ceased since the employment of Iso-Perlon lacquered wire. Moreover, tests in the tropical testing room (Tropenraum) have been made with temperatures up to 50° C. and a relative humidity of 95 percent, with motors equipped with Iso-Perlon lacquer wire winding (Lackdrahtwicklung) wit[redacted]pecial heat-protection insulation. These tests were carried out over a perio[redacted]o months. The motors were left inactive at night, so that the vapor in t[redacted]ndensed, and the next day they were again set in motion. During the entire test period not a single case of failure occurred. Since the principal sources of difficulty in aluminum motors were formerly the switch connections and the terminal connections, special attention was given to these factors during the tests. The testing of contacts was carried out over a period of one year. In no case was an increase of the contact-resistance discovered.

7. The following table gives a comparison of the technical data of a 44 kW motor with copper coil and a 44 kW motor wound with aluminum wire.

Motor	Capacity	Power	Efficiency	Increase of Temperature
Copper-wound	44 kW	0.897	89.5 percent	50±3° C.
Aluminum-wound	44 kW	0.89	88.4 percent	68.1° C.

25X1

[redacted]