ITEM No. 1
FILE No. XXVII–46

DESIGN OF RADAR TEST EQUIPMENT SIEMENS HALSKE PLANT MUNICH

COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE

LONDON—H.M. STATIONERY OFFICE

REPORT ON
DISCUSSION OF DESIGN OF RADAR TEST EQUIPMENT
AT SIEMENS HALSKE PLANT
51 HOFMANN STREET
MUNICH, GERMANY

Reported by:

FRED E. HENDERSON, U.S.

On behalf of the

U.S. Technical Industrial Intelligence Committee

July 16, 1945

CIOS Target No. 1/469
Radar

COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE
G-2 Division, SHAEF (Rear) APO 413

TABLE OF CONTENTS

PERSONNEL OF INVESTIGATING TEAM

Fred E. Henderson, U.S.

TARGET

Siemens Halske
51 Hofmann Street
Munich, Germany

Personnel of Siemens Halske plant were originally at Asche, Czechoslovaks were responsible for the design of Radar Test Equipment.

PHYSICAL CONDITION OF TARGET

Undamaged.

PLANT PERSONNEL

The following personnel were interrogated:

Dr. Schniedermann
Chief Engineer Thilo
I also learned that Dr. Katti who headed this group would be located in Munich after August 1.

RESUME OF INTELLIGENCE GAINED BY INVESTIGATION

Dr. Schniedermann informed me that they had designed Radar Test equipment in the 30, 10 and 3 cm. range. They had also manufactured up to 1000 test sets per month at Asche. These test sets included Frequency Meters, Power Meters, Range Calibrators, and Phantom Targets.

I discussed general design questions with regard to Frequency Meters, Power Meters, and Range Calibrators and found that they had followed the same fundamental theory in the design of their equipment as we had in America. They had no design features in their test sets that we do not have in our sets for similar applications.

They designed and built five different types of Phantom Targets. These sets differ from ours in one principle. They all had a rectangular section for their tuned cavity instead of the round tubular cavity used in all of our designes. They claimed that their targets had uniform efficiency over the entire range for which they were designed. They also had no unwanted modes, however, it is possible that their "Q" was so poor that the unwanted modes could not be detected.

The five types manufactured by Siemens Halske covered the following frequency ranges:

Type	Frequency Range in Centimeter wave length
A	2.5 to 4.9
B	3.2 to 7.0
C	6.5 to 9.0
D	8.8 to 11.0
	10.5 to 13.0

One of the most important developments completed by this group of engineers was a new type of thermister that was produced in large quantities and which had the important characteristic of being extremely stable in its performance, and at the same time reacted much faster than our glass bead type of thermister. The method used in the manufacture of the thermister is given below.

Mix 100 grams of Uranium Oxide (U_3O_8), 30 grams of Traganth (Dried fruit or Legume Powder) with distilled water until the mixture has a consistency of chewing gum. This mixture is then extruded into rod form .04 millimeter in diameter. The extruded rod is allowed to dry at room temperature for twenty-four hours and is then cut into short lengths to form the body of the thermister unit. The thermister unit is then cintered in a hydrogen atmosphere following the process outlined below.

The units are placed in a furnace having a hydrogen atmosphere, and the furnace is brought up to a temperature of 800°C and maintained at this temperature for 10 minutes. It is then taken to 1000°C for an additional 10 minutes, then to 1200°C for 10 minutes, and finally to 1450°C for 20 minutes. The units are then allowed to cool down with the furnace to room temperature. This operation completes the thermister body, and .01 millimeter constantin wire leads are then attached to each end of the thermister body by wrapping a few turns of the wire around the thermister adjacent to each end. These turns are covered with silver paste which after being fired in the conventional manner causes the lead wires to be securely soldered.

The thermister unit is now mounted in a glass fork as shown in the attached drawing and then is enclosed in a glass envelope. The thermister assembly is now evacuated to a pressure of 10^{-5}. It is heated externally by radiation and internally by an electric current during the evacuating process. The envelope is outgassed by breaking the vacuum with about one-half atmosphere of pure hydrogen, and this pressure is maintained for 10 minutes. The envelope is then evacuated again to a pressure of 10^{-5} and sealed off in the usual manner. The attached drawing also shows additional information required to manufacture this type of thermister.

RECOMMENDATION

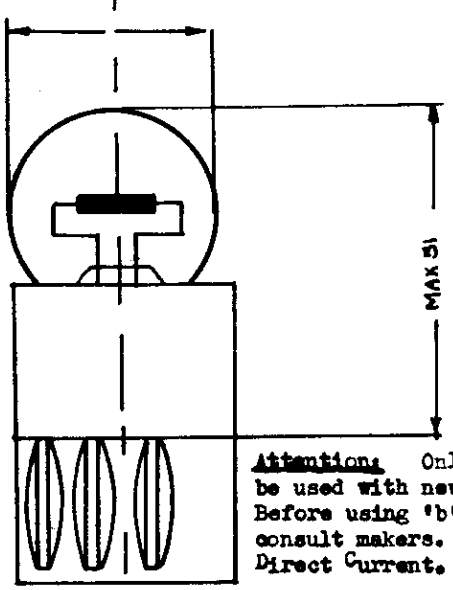
I recommend that an engineer who has had a wide experience in the design of Radar Test Equipment arrange an additional meeting with this group of German engineers.

Normal Partial map of leak conductance for repeater.	HEAT CONDUCTANCE	A13-511/1.

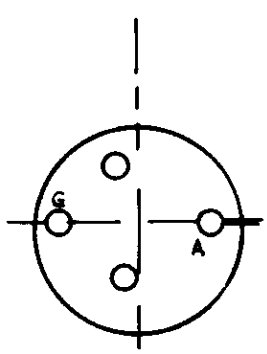
General remarks.
In the heat conductance the negative temperature coefficient of a semiconductor is used to maintain the terminal tension of the former within a definite range of voltage at a constant figure. There are 3 types, divided into three classes.

1.) Type 2) designation of elec. data i.e.g. Rel wd 96a H1 6/2a.

Type.			R_{el} wd 96A							
Carried out according to			Illustration 1.							
Designation of electric data.			LC 6/2 a-c			LC 2/2 a-c			LC 2/9.5 a-c	
'Soll' tension. Us			6 Volt			2 volt			2 volt	
Denominational current			2 mA			2 mA			05 mA	
Maximum variation.			By classificat'			By classific			By classification.	
	a		b	c		a	b		a	b	a
Denom. current	0.4-6		0.5-5	1-3		0.4-8	05-5	1-3	01-2	02-1	030-8
Soll tension U	1.2 V		0.6 V	0.18 V		0.4 V	0.2V	0.6V	0.4V	02V	006V
Denom voltage Su	0.6V		0.18V	0.6V		0.02 V	06V	02V	02 V	006V	002V
Term. voltage of Soll voltage u Su	1.8 V		0.78V	0.24V		0.6 V	0.26	0.08	0.6V	0.26V	0.08V
			Can be used in the tropics							
Socket.			4-pin Europa socket (compressed mat. Black.)							
Make-up			Example - R_{el} 1-g 1b							
Weight in kilograms.			Approx. 0.020							
Remarks:			Customary temperature regulates regulation volt. (normally 20° C. Before using, inspect state of packing.							



View of socket from below
The leak conductance lies at pins G. & A.



Attention: Only semi-conductors 'a' to be used with new types of apparatus. Before using 'b' or 'c', types please consult makers. This applies also for Direct Current.

Siemens & Halske Co. Ltd. Issued
Wernerwerk. by
Name:-

Replaced by:-

Wt. 44046. 1/46. 950 O.U.P.