

SUBJECT MEASURING CATHODE-RAY EXHAUST
TEMPERATURES

SUPERSEDED DATE

1. EQUIPMENT

- A. Chromel-Alumel Thermocouple
- B. Chromel-Alumel Thermocouple Meter

Note: Leads on thermocouple should be long, but not over 4 or 5 ft, since added length will introduce an added resistance which may cause faulty calibration.

- C. Pliers

2. MATERIAL

- A. 33-C-21 Sauereisen Cement
- B. 33-C-177 Carbon Tetra chloride
- C. Asbestos String

3. PROCEDURE

- A. Determine from which section of the glass the readings are to be taken. The surface must be reasonably clean since the cement will not adhere to a dirty surface. If surface is oily or any other foreign substance is present, wash surface with carbon tetrachloride.
- B. Affix thermocouple to glass before applying the cement. This is necessary for it takes 1/2 hour or more for cement to set, and also insures the thermocouple's making direct contact with the surface of the glass sample. If the thermocouple leads are bent in a circular fashion near the point of contact it will be found that when the lead is fastened to the bulb with the tape or string it will help make good contact with the glass surface due to the spring action of the wire used in the thermocouple.
- C. The leads are fastened to the glass by means of asbestos string, which also proves helpful in holding the leads while taking readings. In some cases where surfaces are not shaped correctly and asbestos string can't be used scotch tape will serve as a temporary means of holding thermocouples in place while cement sets. Remove scotch tape after cement is dry before placing sample under heat. Apply Sauereisen cement over the thermocouple tip and to a small area (1/2" diam. or less) about the contact point.
- D. After temperatures have been taken the thermocouples may be removed by using long nose pliers to grasp the thermocouple on either side of the cement and twisting. The glass gives away about the cement so that it will render the sample useless in production, but may be used for test purposes. The remaining glass and sauereisen cement may be removed from the thermocouple lead by squeezing between a pair of pliers.

4. PRECAUTIONS

- A. While reading, certain precautions must be taken. All leads of the thermocouple must be insulated and should be carefully arranged to prevent shorts and entanglement. All junctions of the chromel and alumel wire must be a solid unit (Welding makes the best unit junction). In no case should a junction of any lead wire take place in series with the thermocouple wire if it is to operate at any point other than room temperature.
- B. Recorded data should conform to the normal cycle. It is not desirable to stop the machine in any position since such readings may not represent normal operation. Consequently it becomes necessary to keep the thermocouple mass as well as the contact cement quantity low. This will prevent "dragging" temperatures.



SUBJECT MEASURING CATHODE RAY EXHAUST
 TEMPERATURES

SUPERSEDED DATE

4. PRECAUTIONS

- C. The rotation of the cemented thermocouples with relation to the heating units must also be considered. The thermocouples should be located close to heaters if maximum temperature is desired and balanced for heat distribution if an average temperature control is being investigated. For location and description of thermocouples see below.
- D. The particular advantage of this method of obtaining temperature information is that operations reflected into machine control and tube performance can be correlated.

