

Bureau of Standards

Certificate

FOR

STANDARD HEAT SAMPLE ³⁹

BENZOIC ACID

The total heat of combustion* at constant volume, per gram weight in air against brass weights, of standard sample No. 39 of Benzoic Acid, has been found to be

6329 calories₂₀

In order that the above figure for heat of combustion may be applicable the sample should be used under the following conditions:

1. The material should be weighed in the form of a briquet not too large for complete combustion in the bomb in which it is to be burned, usually from 1.0 to 1.5 grams. The briquet should be placed in the bomb immediately after weighing.

2. The briquet should be fired by a short length of iron wire of about No. 34 B. & S. gage (about 0.15 mm diameter) and a correction (1600 calories per gram) should be applied for the heat of combustion of the wire. A battery of 3 to 5 storage cells or 6 to 10 dry cells in series should be used for ignition.

3. The briquet should be burned in pure oxygen or in commercially pure oxygen, containing preferably not over 5% of nitrogen, and no combustible gases. To secure complete com-

bustion the total quantity of oxygen should be not less than three times that which will combine with the combustible charge. This usually requires a pressure of from 20 to 40 atmospheres in the bomb.

4. A correction of 230 calories per gram should be applied for the heat of formation of the nitric acid formed as the result of combustion.

When burning most fuels it is not necessary to briquet the material, and platinum wire may be used for ignition in place of iron wire; otherwise the conditions specified above, as well as the details of observing and of computing results, should be as nearly as possible identical in fuel combustions and in calibration observations.

Other details relating to the use of standard heat samples and some general information relating to bomb calorimeters are given in Bureau of Standards Circular No. 11, "The Standardization of Bomb Calorimeters."

S. W. STRATTON,

Director.

Test No.

Form 310

Washington, D. C.

* See definition in Bureau Circular No. 11, footnote 1, and also Scientific Paper No. 230, "Combustion Calorimetry and the Heats of Combustion of Cane Sugar, Benzoic Acid, and Naphthalene." The calorie is the 20° calorie.