# FUEL RESEARCH INSTITUTE OF SOUTH AFRICA.

## TECHNICAL MEMORANDUM NO. 7 OF 1966.

# REPORT ON DUST COLLECTOR TESTS AT KOMATI POWER STATION, 21ST DECEMBER, 1965.

BY:

T.C. ERASMUS

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## INTRODUCTION:

The tests reported herein were carried out on behalf of Messrs. Mitchell Engineering (Pty) Ltd., the suppliers of the Boiler Plant, to determine the quantity of fly-ash leaving the boiler.

A preliminary test was carried out on the 20th December, 1965. An M.C.R. test was performed.

## PART I. DESCRIPTION OF APPARATUS AND TEST METHOD.

### 1.1 Flue Dust Sampling Equipment

The dust sampling was carried out isokinetically and in accordance with B.S. 893 : 1940. The equipment comprises a sampling probe through which the flue gas is exhausted at a velocity closely corresponding to that deduced from the Pitot tube indication. The gas then passes a miniature cyclone, in which most of the dust is precipitated, and then a glasswool filter. The quantity of flue gases aspirated is determined from the pressure-drop across the cyclone.

The velocity in the duct was determined by means of a Pitot tube. In addition, the sampling head contains a thermocouple by means of which the flue gas temperature may be determined.

The equipment was designed to pass through a 6" diameter sampling port in the duct. During the test the port is closed by a heavy steel cover to which a tubular guide for the thin-walled tube is welded. A clamping device ensures that the sampling head may be rigidly fixed in any desired position.

The exhaust line, measuring tubes and thermocouple leads are extended to the measuring equipment, mounted in a case - this apparatus contains:

(a) A sliding-vane type exhauster with control valves;
(b) An inclined gauge, connected to the Pitot tube, indicating the flue gas velocity head;
(c) An inclined gauge connected across the cyclone. This gauge indicates the pressure-drop across the cyclone;
(d) A U-tube, connected to the Pitot static line and the atmosphere, indicating the static pressure in the duct;
(e) An aneroid barometer and clock;
(f) A millivoltmeter calibrated in °C, connected by copper leads to two terminals embedded in an aluminium block upon which the thermocouple leads

terminate ...../

terminate. The temperature of the block was measured by means of a mercury thermometer.

## 2. SAMPLING PROCEDURE.

In principle the test procedure is as follows: The sampling head is inserted in the duct in a suitable position, and properly aligned in one of the sampling points (situated on grids as illustrated in Figure 1). The exhaust line and all measuring tubes are temporarily closed during insertion by means of clamps (so as to avoid an untimely flow through the cyclone and damage to the pressure gauges). The measuring tubes are opened as soon as the equipment is in position. When the apparatus has - after approximately 15 minutes - attained the flue gas temperature, sampling may start. The aspiration velocity is set at the estimated speed and the quick-acting clamp on the exhaust line opened at the beginning of the sampling period. The speed is then readjusted to the correct value, corresponding to the Pitot tube indication, and sampling is continued for the required period - 10 minutes in the present case. If necessary, the suction is re-adjusted from time to time; observations are recorded at 5-minute intervals. At the end of the sampling period the exhaust is quickly closed and the sampling head transferred to another position. When all sampling points have been treated in this manner, the apparatus is finally withdrawn and opened. Any dust adhering to the interior of the apparatus is carefully transferred to the cyclone beaker (the dust collector proper) which, together with the glass-wool filter, is weighed after drying. From the data thus obtained the dust burden of the flue gas may be calculated.

The success of the operation therefore depends to a large extent on the accuracy with which the observer can adjust the exhaust velocity to the gas velocity in the duct. For correct isokinetic sampling the pressure drop $p_o$ across the cyclone has to be adjusted in a definite relation to the velocity head $p_v$, measured by means of the Pitot tube.

In practice, however, the operator usually has little time available for this calculation, especially when conditions are not quite steady. He is thus provided with a table or diagram given him the ration $p_o \div p_v$ for an anticipated average condition, and for the particular probe, based on information collected during preliminary tests. This generally adequately

covers ...../

covers the requirements of B.S. 893 : 1940, which allows the exhaust velocity to deviate by plus or minus 10% of the gas velocity.

Observations taken during the tests are presented in Tables Nos. 1 and 2.

## 3. CALIBRATION OF EQUIPMENT

The thermocouples are continuous from the hot junction to the terminals in the cold junction, which largely eliminated parasitic thermal electro-motive forces.

The thermocouples were calibrated (together with their millivoltmeters) by inserting them in small cavities in a copper block, previously heated to 200°C and left to cool. The temperature of the copper block was measured by means of a mercury thermometer, that of the cold junction by the thermometers installed on the apparatus. Readings, as set out in Table No. C1(a) - C1(b) were taken at appropriate intervals.

During sampling, the flue gas temperature is thus found as the sum of cold junction temperature and millivoltmeter reading.

### 3.1 Cyclone Calibration.

#### (a) Introductory Remarks.

The purpose of this calibration is to establish the relationship between the volume rate of flow through the cyclone and the pressure drop occurring across the cyclone. By calculation this relation can then be converted into that between pressure drop and linear velocity in the probe.

Though conditions during calibration differ from those during actual use (as the calibration is carried out using air at room temperature and pressure), these differences have usually no significant effect.

#### (b) Method of Calibration.

The experimental set-up during calibation is indicated in Figure 2. It will be noted that calibration was effected on the complete sampling head, the pressure drop during calibration does thus not differ materially from that experienced during the test.

The volume rate of flow was measured by means of a Fisher and Porter Rotameter. According to the manufacturer's

calibration ...../

calibration data, the flow rate is proportional to the instrument reading in the range from 8% to 100% of the maximum flow, where 100% corresponds to a flow rate of 3.91 $ft^3$/minute of air at 27°C and 25.8" Hg. These statements were verified and found to be substantially correct. The manufacturers further state that viscosity effects are negligible and that adjustments for other conditions are to be made on the basis of the density.*

During calibration, cyclone pressure drop, rotameter reading, pressure at rotameter intake, air pressure and temperature were recorded. (The humidity during these tests was so low that the air density was not appreciably affected.)

(c) Evaluation of Orifice Calibration Test Data.

These test data are tabulated in Table No. C3, and are evaluated as follows:

The rotameter flow rates listed in Table C2 are those for the atmospheric conditions operative during the experiment. As, however, a slight pressure drop, $p_r$, occurs at the rotameter point of entry, the air in the rotameter is a little lighter than at the probe entry. Consequently, the flow rate $Q_1$, as indicated by the rotameter, is a little higher than that at the probe entry, Q, the latter following from the former according to the equation:

$$Q = Q_1\sqrt{\frac{B - p_r}{B}}$$

where ...../

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*In principle, the rotameter is a slightly tapered vertical tube through which the fluid is passed from bottom to top. In doing so, the medium has to force its way past the float, which then assumes such a position that the pressure difference across the annular apace between float and tube wall balances the float weight W, hence

$$W = \frac{K\gamma}{2g} v_a^2$$

where $\gamma$ is the density of the fluid, K a constant and $v_a$ the velocity in the annulus. Hence it follows that if the density $\gamma_1$ at a particular test differs from that at the standard condition,

$\gamma_0$ (27°C, 25.8" Hg, air)

the actual volume flow rate $Q_1$ for a particular deflection, say 100%, has to be derived from the "standard" quantity at 100% according to the equation

$$Q_1 = Q_\bullet \sqrt{\gamma_0/\gamma_1}$$

where B equals the absolute air pressure, $p_r$ the pressure drop at the rotameter, expressed in the same units. As

$$p_r \ll B, \quad Q = Q_1(1 - \frac{p_r}{2B}).$$

Table No. C4 then shows the corrected flow rate, expressed in terms of the linear velocity $v_2$ in the probe in relation to the pressure drop across the cyclone.

(d) Use of Test Data

In practice, during the actual sampling procedure the velocity $v_2$ in the probe has to be made equal - as nearly as possible - to the gas velocity $v_1$ at the sampling point. However, $v_1$ is not determined directly, but by means of the dynamic pressure $p_v = \frac{\gamma}{2g} v_1^2$ generated in the Pitot tube, and thus related to $v_1$ by a square law.

Likewise, the probe velocity $v_2$ follows indirectly from the cyclone pressure drop $p_o$, which is related to $v_2$, if not exactly by a square law, by an equation closely resembling such a law.

It thus appears expedient to relate the two quantities $p_o$ and $p_v$, which are observed directly, to each other, as $p_o$ and $p_v$ may be expected to stand to each other in a nearly, though not necessarily absolutely, constant ratio.

One would thus express $p_o$ in terms of the velocity head in the probe, i.e. one would put

$$p_o = \beta \frac{\gamma}{2g} v_2^2 = \beta p_v'$$

As already mentioned, the operator is provided with a table giving him the value of $p_o$ to be maintained in relation to the velocity head $p_v$.

### 3.2 Further Calibrations.

(a) All pressure gauges used during the test were compared with an Askania micro-manometer reading to 0.01 mm. water column. It appeared that the inclined gauges, used for measuring the velocity head, were sufficiently accurate to take their indications at face value, provided they were properly levelled; theodolite type spirit levels were consequently fixed to these instruments.

(b) A brief investigation was carried out for the purpose of establishing -

(i) ...../

(i) whether the gas flow in the duct was seriously disturbed by introduction of the sampling apparatus;

(ii) whether the cyclone and filter affected the Pitot tube.

The first point was investigated by mounting a Pitot tube in a small wind tunnel (30" x 30", air speed 30 to 40 ft/sec.) and fixing the sampling head and supporting tube approximately 6" down-stream in various positions. When using technical pressure gauges (i.e. instruments reading to 0.01" or 0.2 mm. water column), no disturbance could be detected.

The second point was investigated as follows: Two Pitot tubes were mounted in the wind tunnel and their total head pressure tubes connected in opposition to a pressure detector, the Pitot tubes being so positioned that a zero pressure reading was obtained. The sampling head was then held in various positions close to one of the Pitot tubes. It appeared that no disturbance was caused as long as the static holes of the Pitot tube were not interfered with, a condition easily satisfied in practice.

## 4. PROVISIONAL ASSUMPTION OF FLUE GAS CONDITION.

It was assumed that a coal of the following composition would be used:

C - 76%
H - 5%
O - 7%
N - 1.5%
S - 0.5%
$H_2O$ - 10%

above data referring to the coal as fired, but on an ash-free basis.

Assuming 30% excess air, the composition of the wet flue gas would be:

$CO_2$ - 13% (on dry basis 14%)
$O_2$ - 4.6%
$N_2$+Ar - 74.9%
$H_2O$ - 7.5%

(with air of 30% relative humidity at 27°C).

At 0°C and 760 mm. Hg. the (fictitious) density of such a flue gas would be 1.328 kg/m³. (0.0829 lbs/ft³).

## 5. TEST RESULTS.

The actual tests were performed on the lines set

out ...../

out in the previous paragraphs. The test results are represented in Tables 1 to 13, these being derived from the data sheets completed during the tests.

## 6. GAS VOLUMES AND ASH QUANTITIES.

### 6.1 Calculation of Gas Velocity in Duct.

This velocity follows directly from the Pitot tube readings taken at the various sampling points. Denoting the velocity head by $p_v$, the velocity $v_1$ in the duct follows from the equation:

$$v_1 = \sqrt{\frac{2g}{\gamma} p_v}$$

where $\gamma$ equals the specific gravity of the flue gas under test conditions and g the acceleration due to gravity. As $p_v$ was determined in mm. $H_2O$, the velocity follows in m/sec. when g and $\gamma$ are expressed in the appropriate metric units ($m/sec^2$ and $kg/m^3$); conversion to feet per second requires multiplication by the factor 3.2808.

As the actual flue gas composition is not known at the present stage, a flue gas as indicated in paragraph 4, has been assumed to exist, with a fictitious density of 1.328 $kg/m^3$ (0.0829 $lbs/ft^3$) at $0^oC$ and a pressure of 760 mm. Hg.

The data of Tables 1 and 2 have been treated as follows:-

(a) For each sampling point, the mean value of $\sqrt{p_v}$, resulting from the three readings taken at this point, has been obtained, using the indications of the inclined gauge.

(b) The density under actual conditions, $\gamma_1$ is then calculated from the assumed figure $\gamma_0$ = 1.328 $kg/m^3$ at $0^oC$, 760 mm. Hg. by means of the conversion.

$$\gamma_1 = \gamma_0 \frac{B}{760} \frac{273}{T}$$

### 6.2 Calculation of the Aspiration Velocity.

For each sampling point the average value of the three pressure-drop readings across the cyclone has been determined, the readings as tabulated in Tables 1 and 2 being used for this purpose.

Using the diagrams, the value $p_v'$, the velocity head in the probe, may be read off for each value of $p_o$. The correction for the viscosity effect could be introduced at this point; it is, however, more convenient to do so in the final stage, i.e. when calculating the total quantity of gas aspirated.

From $\sqrt{p_v}'$ the velocity v' may be calculated in the same manner as in section (1), the results being shown in Tables 3 and 4.

### 6.3 Calculation of Flue Gas Volume and Gas Quantity Aspirated.

(a) The velocity at each of the 24 sampling points is considered to be representative for the area in the centre of which this point is situated. As it is desired to calculate only the gas volume emitted by the boiler during the actual sampling period (24 x 10 minutes), the gas volume Q follows from the equation.

$$Q = 240\Sigma \frac{A_i}{144} \times 60\ v_i = 100\Sigma\ A_i\ v_i$$

where $v_i$ equals the flue gas velocity (expressed in feet per second) in the sampling point i, and $A_i$ the area of the surface (expressed in square inches) in which point i is situated, c.f. Table 6. The calculations are summarized in Table 6.

(b) The quantity of gas aspirated, $Q_2$, follows from the consideration that sampling occurred through the area of the probe for a period of 600 seconds in each of the sampling points. Consequently, in the point i the volume $Q_i = 600\ A_p . v_i$ is aspirated, where $A_p$ denotes the probe area in $ft^2$, and $v_i$ the aspiration or probe velocity in feet per second. The total volume, exhausted during the test, thus equals $Q_2 = 600\ A_p \Sigma v_i$, where $\Sigma v_i$ is obtained from Tables 3 and 4.
The results of the calculation are shown in Table 5.
These tables also indicate the ratio $Q : Q_2 = R$ (gas volume emitted to gas volume sampled) as well as the theoretical value R', following from the ratio of duct area to probe area, and the correction factor K, by means of which the quantity of dust, collected in the sampling equipment, has to be multiplied.

### 6.4 Dust Burden.

The quantities of dust leaving the boiler are summarized in Table No. 9. This information, together with the analysis of the fly-ash (see Tables 10 - 12) yields the quantity of combustible matter leaving the boiler. The final results are summarized in Table 13.

(Signed) T.C. ERASMUS
SENIOR RESEARCH
OFFICER.

PRETORIA.
1st March, 1966.

## TABLE NO. C1(a).

## THERMOCOUPLE CALIBRATION - APPARATUS NO. 3.

| AMBIENT TEMPERATURE | METER READING | TEMPERATURE AS INDICATED BY: | |
|---|---|---|---|
| | | METER | THERMOMETER |
| °C | °C | °C | °C |
| 23 | 160 | 183 | 178 |
| 23 | 145 | 168 | 164 |
| 23 | 132 | 155 | 152 |
| 23 | 122 | 145 | 141 |
| 23 | 67 | 90 | 86 |
| 23 | 49 | 72 | 68 |
| 23 | 114 | 137 | 134 |
| 23 | 103 | 126 | 124 |
| 23 | 91 | 114 | 111 |
| 23 | 78 | 101 | 99 |
| 23 | 61 | 84 | 80 |

## TABLE NO. C1(b).

## THERMOCOUPLE CALIBRATION - APPARATUS NO. 4.

| AMBIENT TEMPERATURE | METER READING | TEMPERATURE AS INDICATED BY: | |
|---|---|---|---|
| | | METER | THERMOMETER |
| °C | °C | °C | °C |
| 18 | 165 | 183 | 177 |
| 19 | 153 | 172 | 168 |
| 19 | 140 | 159 | 155 |
| 19 | 128 | 147 | 144 |
| 21 | 69 | 90 | 85 |
| 21 | 52 | 73 | 69 |
| 21 | 122 | 143 | 137 |
| 21 | 110 | 131 | 125 |
| 21 | 97 | 118 | 113 |
| 21 | 86 | 107 | 101 |
| 21 | 66 | 87 | 81 |

## TABLE NO. C2(a).

## CYCLONE CALIBRATION - APPARATUS NO. 3.

Atmospheric pressure : 26.13" Hg.

Ambient temperature : 15°C.

| Rotameter reading % of maximum | Cyclone pressure drop mm $H_2O$ | Pressure drop at rotameter inlet mm $H_2O$ |
|---|---|---|
| 11.8 | 1.8 | 6 |
| 16.9 | 3.8 | 12 |
| 20.5 | 6.0 | 17 |
| 24.0 | 8.2 | 23 |
| 27.8 | 11.4 | 31 |
| 31.5 | 15.0 | 39 |
| 34.8 | 18.4 | 48 |
| 38.0 | 22.4 | 57 |
| 42.0 | 27.6 | 69 |
| 45.3 | 32.2 | 81 |
| 48.8 | 37.4 | 96 |
| 53.0 | 44.2 | 113 |
| 56.4 | 50.2 | 128 |
| 49.9 | 39.0 | 99 |
| 44.4 | 30.8 | 79 |
| 37.2 | 21.6 | 57 |
| 31.1 | 14.6 | 39 |
| 20.4 | 5.8 | 17 |
| 13.9 | 2.4 | 8 |

## TABLE NO. C2(b).

## CYCLONE CALIBRATION - APPARATUS NO. 4.

Atmospheric pressure : 26.07" Hg.

Ambient temperature : 19°C.

| Rotameter reading % of maximum | Cyclone pressure drop mm $H_2O$ | Pressure drop at Rotameter inlet mm $H_2O$ |
|---|---|---|
| 12.7 | 2.2 | 3 |
| 16.8 | 4.0 | 5 |
| 20.6 | 6.4 | 9 |
| 24.6 | 9.4 | 11 |
| 27.9 | 12.2 | 15 |
| 30.2 | 15.0 | 17 |
| 33.1 | 18.2 | 23 |
| 35.1 | 20.6 | 25 |
| 37.1 | 23.2 | 27 |
| 39.7 | 26.6 | 31 |
| 42.8 | 31.2 | 37 |
| 45.2 | 35.2 | 41 |
| 48.7 | 40.6 | 49 |
| 52.3 | 47.2 | 57 |
| 53.6 | 49.8 | 59 |
| 50.0 | 43.0 | 65 |
| 45.0 | 34.6 | 43 |
| 40.0 | 27.2 | 35 |
| 35.1 | 20.8 | 27 |
| 29.1 | 13.6 | 19 |
| 21.5 | 7.0 | 11 |
| 14.9 | 3.0 | 5 |

## TABLE NO. C3.

Standard Data and Conversion Factors:

| AIR DENSITY: | | |
|---|---|---|
| | At 14.7 psia, 70°F | 0.0749 $lbs/ft^3$ |
| | or 760 mm. Hg, 21.1°C | 1.200 $kg/m^3$ |
| | At 760 mm, Hg, 0°C | 0.0807 $lbs/ft^3$ |
| | | 1.293 $kg/m^3$ |

Air density conversion:

$$\gamma_1 = \gamma_0 \frac{P_1}{P_0} \frac{T_0}{T_1} = 11.795 \frac{B}{T}$$

where B = air pressure in inches Hg.
T = absolute temperature in °K.

ROTAMETER:

Flow rate at maximum (100%) indication

$$Q_0 = 3.91 \text{ ft}^3\text{/min of air at } 25.8\text{" Hg. and } 27^\circ\text{C}$$

Under other concitions

$$Q_1 = Q_0 \sqrt{\gamma_0/\gamma_1}$$

PROBES:

| Apparatus No. | Probe area |
|---|---|
| | ft |
| 3 | $0.4991 \times 10^{-3}$ |
| 4 | $0.5107 \times 10^{-3}$ |

CONVERSION FACTORS:

1 $ft^3$ = 28.317 litres

1 kg = 2.20462 lbs.

1 mm. $H_2O$ = 1 $kg/m^2$

1 m. = 3.2808 ft

## TABLE NO. C4(a).

## CYCLONE CALIBRATION - APPARATUS NO. 3.

| Rotameter Reading % | Velocity in probe m/sec | Velocity head mm $H_2O$ | Cyclone pressure drop mm $H_2O$ |
|---|---|---|---|
| 11.8 | 4.57 | 1.1 | 0.7 |
| 16.9 | 6.54 | 2.3 | 1.5 |
| 20.5 | 7.92 | 3.4 | 2.6 |
| 24.0 | 9.28 | 4.7 | 3.5 |
| 27.8 | 10.75 | 6.3 | 5.1 |
| 31.5 | 12.18 | 8.1 | 6.9 |
| 34.8 | 13.45 | 9.9 | 8.5 |
| 38.0 | 14.67 | 11.7 | 10.7 |
| 42.0 | 16.21 | 14.3 | 13.3 |
| 45.3 | 17.47 | 16.6 | 15.6 |
| 48.8 | 18.81 | 19.3 | 18.1 |
| 53.0 | 20.39 | 22.6 | 21.6 |
| 56.4 | 21.69 | 25.6 | 24.6 |
| 49.9 | 19.22 | 20.1 | 18.9 |
| 44.4 | 17.13 | 15.9 | 14.9 |
| 37.2 | 14.36 | 11.2 | 10.4 |
| 31.1 | 12.02 | 7.9 | 6.7 |
| 20.4 | 7.89 | 3.4 | 2.4 |
| 13.9 | 5.38 | 1.6 | 0.8 |

## TABLE NO. C4(b).

## CYCLONE CALIBRATION - APPARATUS NO. 4.

| Rotameter Reading % | Velocity in probe m/sec | Velocity head mm $H_2O$ | Cyclone pressure drop mm $H_2O$ |
|---|---|---|---|
| 12.7 | 4.84 | 1.3 | 0.9 |
| 16.8 | 6.42 | 2.2 | 1.8 |
| 20.6 | 7.86 | 3.3 | 3.1 |
| 24.6 | 9.38 | 4.7 | 4.7 |
| 27.9 | 10.64 | 6.1 | 6.1 |
| 30.2 | 11.52 | 7.1 | 7.9 |
| 33.1 | 12.61 | 8.5 | 9.7 |
| 35.1 | 13.36 | 9.6 | 11.0 |
| 37.1 | 14.13 | 10.7 | 12.5 |
| 39.7 | 15.13 | 12.3 | 14.3 |
| 42.8 | 16.30 | 14.2 | 17.0 |
| 45.2 | 17.21 | 15.9 | 19.3 |
| 48.7 | 18.54 | 18.4 | 22.2 |
| 52.3 | 19.89 | 21.2 | 26.0 |
| 53.6 | 20.37 | 22.2 | 27.6 |
| 50.0 | 19.02 | 19.4 | 23.6 |
| 45.0 | 17.13 | 15.7 | 18.9 |
| 40.0 | 15.24 | 12.4 | 14.8 |
| 35.1 | 13.37 | 9.6 | 11.2 |
| 29.1 | 11.10 | 6.6 | 7.0 |
| 21.5 | 8.21 | 3.6 | 3.4 |
| 14.9 | 5.68 | 1.7 | 1.3 |

## TABLE NO. 1.

## LEFT HAND INLET DUCT.

DUST COLLECTOR TEST AT KOMATI POWER STATION

DATE : 21.12.65
OBSERVER : OBERHOLZER

LOAD : M.C.R.
APPARATUS NO. 4

| SAMPLING POINT | TIME | VELOC. HEAD | CYCLONE P. DROP | STATIC PR. | FLUE GAS TEMP. | AMB TEMP. |
|---|---|---|---|---|---|---|
| | hr.min. | mm $H_2O$ | mm $H_2O$ | mm $H_2O$ | $^oC$ | $^oC$ |
| | CYCLONE BEAKER NO. 11. | | | FILTER NO. 48. | | |
| 1a | 9:00 | 7.3 | 8.0 | 18 | 101 | 33.2 |
| | 9:05 | 7.2 | 7.4 | 18 | 101 | 33.7 |
| | 9:10 | 7.2 | 8.2 | 18 | 101 | 34.0 |
| 1b | 9:11 | 10.2 | 12.4 | 18 | 106 | 34.0 |
| | 9:16 | 10.0 | 11.6 | 18 | 106 | 34.1 |
| | 9:21 | 10.2 | 12.0 | 18 | 107 | 34.2 |
| 1c | 9:21½ | 10.4 | 12.4 | 18 | 106 | 34.4 |
| | 9:26½ | 10.8 | 12.4 | 19 | 108 | 34.6 |
| | 9:31½ | 10.5 | 12.0 | 19 | 108 | 34.8 |
| 1d | 9:32 | 11.2 | 12.8 | 19 | 106 | 35.0 |
| | 9:37 | 11.0 | 12.8 | 19 | 103 | 35.2 |
| | 9:42 | 11.4 | 13.5 | 19 | 104 | 35.4 |
| | CYCLONE BEAKER NO. 15. | | | FILTER NO. 49. | | |
| 2a | 9:56 | 9.2 | 11.0 | 19 | 101 | 36.2 |
| | 10:01 | 9.4 | 10.6 | 19 | 103 | 36.2 |
| | 10:06 | 9.0 | 10.4 | 19 | 102 | 36.2 |
| 2b | 10:06½ | 10.4 | 12.2 | 19 | 103 | 36.3 |
| | 10:11½ | 11.0 | 12.6 | 19 | 104 | 36.4 |
| | 10:16½ | 10.2 | 11.5 | 18 | 103 | 36.5 |
| 2c | 10:17 | 11.5 | 13.5 | 18 | 103 | 36.5 |
| | 10:22 | 11.2 | 13.0 | 18 | 103 | 36.7 |
| | 10:27 | 11.0 | 12.8 | 18 | 103 | 36.9 |
| 2d | 10:28 | 11.4 | 13.2 | 19 | 102 | 37.0 |
| | 10:33 | 12.0 | 14.0 | 19 | 100 | 37.1 |
| | 10:38 | 12.0 | 13.6 | 19 | 101 | 37.2 |
| OBSERVER : KREFT. | | CYCLONE BEAKER NO. 10. | | | FILTER NO. 47 | |
| 3a | 11:04 | 9.0 | 10.2 | 18 | 101 | 38.0 |
| | 11:09 | 9.0 | 10.0 | 18 | 102 | 38.1 |
| | 11:14 | 9.2 | 10.2 | 18 | 101 | 38.1 |
| 3b | 11:15 | 9.8 | 11.5 | 18 | 103 | 38.1 |
| | 11:20 | 9.8 | 11.2 | 18 | 103 | 38.2 |
| | 11:25 | 9.6 | 11.0 | 18 | 103 | 38.3 |
| 3c | 11:25½ | 10.8 | 12.6 | 18 | 102 | 38.3 |
| | 11:30½ | 11.0 | 12.6 | 18 | 103 | 38.3 |
| | 11:35½ | 10.8 | 12.4 | 18 | 103 | 38.4 |
| 3d | 11:37 | 11.6 | 13.6 | 18 | 100 | 38.4 |
| | 11:42 | 11.8 | 13.8 | 18 | 101 | 38.5 |
| | 11:47 | 11.4 | 13.4 | 18 | 101 | 38.7 |

## TABLE NO. 1 (Continued).

| SAMPLING POINT | TIME | VELOC. HEAD | CYCLONE P. DROP | STATIC PR. | FLUE GAS TEMP. | AMB TEMP. |
|---|---|---|---|---|---|---|
| | hr.min. | mm $H_2O$ | mm $H_2O$ | mm $H_2O$ | °C | °C |
| | CYCLONE BEAKER NO. 14. | | | FILTER NO. 46. | | |
| 4a | 12:03 | 10.6 | 12.2 | 18 | 100 | 39.3 |
| | 12:08 | 10.2 | 11.6 | 18 | 100 | 39.5 |
| | 12:13 | 10.0 | 11.8 | 18 | 100 | 39.6 |
| 4b | 12:14 | 10.6 | 12.4 | 18 | 104 | 39.6 |
| | 12:19 | 10.2 | 11.6 | 18 | 103 | 39.7 |
| | 12:24 | 10.6 | 12.2 | 18 | 102 | 39.8 |
| 4c | 12:25 | 11.2 | 12.8 | 18 | 102 | 39.9 |
| | 12:30 | 11.4 | 13.2 | 18 | 102 | 40.0 |
| | 12:35 | 11.8 | 13.6 | 18 | 102 | 40.0 |
| 4d | 12:35½ | 10.8 | 12.4 | 18 | 97 | 40.1 |
| | 12:40½ | 11.0 | 13.0 | 18 | 97 | 40.2 |
| | 12:45½ | 11.2 | 13.2 | 18 | 96 | 40.2 |
| | CYCLONE BEAKER NO. 12. | | | FILTER NO. 40. | | |
| 5a | 1:03 | 11.2 | 12.8 | 18 | 99 | 40.8 |
| | 1:08 | 11.2 | 12.4 | 18 | 100 | 40.9 |
| | 1:13 | 11.6 | 12.8 | 18 | 100 | 41.0 |
| 5b | 1:14 | 13.0 | 15.0 | 18 | 103 | 41.0 |
| | 1:19 | 13.2 | 15.6 | 18 | 103 | 41.0 |
| | 1:24 | 13.2 | 15.6 | 18 | 102 | 41.2 |
| 5c | 1:25 | 13.8 | 16.6 | 19 | 102 | 41.2 |
| | 1:30 | 13.8 | 16.6 | 19 | 102 | 41.3 |
| | 1:35 | 13.6 | 16.0 | 18 | 102 | 41.5 |
| 5d | 1:35½ | 13.5 | 16.0 | 18 | 97.5 | 41.6 |
| | 1:40½ | 14.0 | 16.6 | 19 | 98.0 | 41.6 |
| | 1:45½ | 14.5 | 17.3 | 19 | 99.0 | 41.8 |
| | CYCLONE BEAKER NO. 13. | | | FILTER NO. 37. | | |
| 6a | 2:01 | 10.8 | 12.8 | 18 | 97.5 | 42.0 |
| | 2:06 | 10.8 | 12.8 | 18 | 97.5 | 42.0 |
| | 2:11 | 10.5 | 12.2 | 18 | 97.0 | 42.0 |
| 6b | 2:11½ | 12.4 | 14.7 | 18 | 98.0 | 42.0 |
| | 2:16½ | 12.5 | 14.7 | 18 | 97.5 | 42.0 |
| | 2:21½ | 12.4 | 14.7 | 18 | 98.0 | 41.9 |
| 6c | 2:22 | 13.4 | 16.0 | 18 | 97.5 | 41.9 |
| | 2:27 | 13.5 | 16.0 | 18 | 97.5 | 41.8 |
| | 2:32 | 13.8 | 16.3 | 18 | 98.0 | 41.7 |
| 6d | 2:32½ | 14.5 | 17.3 | 18 | 99.0 | 41.7 |
| | 2:37½ | 17.0 | 20.0 | 18 | 97.5 | 41.6 |
| | 2:42½ | 19.0 | 20.0 | 18 | 97.5 | 41.5 |

## TABLE NO. 2.

## RIGHT HAND INLET DUCT.

| | |
|---|---|
| DUST COLLECTOR TEST AT KOMATI POWER STATION | |
| DATE : 21.12.65 | LOAD : M.C.R. |
| OBSERVER : VILJOEN | APPARATUS NO. 3 |

| SAMPLING POINT | TIME | VELOC. HEAD | CYCLONE P. DROP | STATIC PR. | FLUE GAS TEMP. | AMB TEMP. |
|---|---|---|---|---|---|---|
| | hr.min. | mm $H_2O$ | mm $H_2O$ | mm $H_2O$ | °C | °C |
| | CYCLONE BEAKER NO. 7. | | | FILTER NO. 28. | | |
| 1a | 9:08 | 10.5 | 9.4 | 17.0 | 98 | 32.8 |
| | 9:13 | 10.5 | 9.3 | 17.0 | 98 | 33.1 |
| | 9:18 | 10.4 | 9.0 | 17.0 | 98 | 33.2 |
| 1b | 9:19 | 10.0 | 8.8 | 17.0 | 98 | 33.2 |
| | 9:24 | 10.5 | 9.3 | 17.0 | 98 | 33.5 |
| | 9:29 | 10.5 | 9.3 | 17.0 | 98 | 33.8 |
| 1c | 9:31 | 12.0 | 11.0 | 17.0 | 98 | 33.9 |
| | 9:36 | 12.0 | 11.0 | 17.0 | 100 | 34.1 |
| | 9:41 | 12.0 | 11.0 | 18.0 | 97 | 34.5 |
| 1d | 9:42 | 10.0 | 8.8 | 17.0 | 97 | 34.5 |
| | 9:47 | 10.2 | 8.9 | 17.0 | 98 | 35.0 |
| | 9:52 | 10.2 | 8.8 | 17.0 | 98 | 35.2 |
| | CYCLONE BEAKER NO. 8. | | | FILTER NO. 34. | | |
| 2a | 10:09 | 11.0 | 9.9 | 17.0 | 95 | 36.5 |
| | 10:14 | 11.0 | 9.8 | 17.0 | 96 | 36.6 |
| | 10:19 | 10.8 | 10.2 | 17.0 | 96 | 37.0 |
| 2b | 10:20 | 11.0 | 9.8 | 17.0 | 96 | 37.0 |
| | 10:25 | 11.2 | 10.0 | 17.0 | 96 | 37.1 |
| | 10:30 | 10.5 | 9.2 | 17.0 | 96 | 37.0 |
| 2c | 10:31 | 11.5 | 10.4 | 17.0 | 96 | 37.0 |
| | 10:36 | 11.6 | 10.5 | 17.0 | 96 | 37.0 |
| | 10:41 | 11.8 | 10.5 | 17.0 | 96 | 37.1 |
| 2d | 10:42 | 12.5 | 11.6 | 17.0 | 96 | 37.1 |
| | 10:47 | 12.5 | 11.5 | 18.0 | 95 | 37.2 |
| | 10:52 | 12.5 | 11.5 | 18.0 | 95 | 37.2 |
| | CYCLONE BEAKER NO. 18. | | | FILTER NO. 29. | | |
| 3a | 11:15 | 9.5 | 8.4 | 17.0 | 96 | 37.5 |
| | 11:20 | 9.0 | 7.6 | 17.0 | 96 | 37.7 |
| | 11:25 | 9.4 | 8.0 | 17.0 | 96 | 37.7 |
| 3b | 11:26 | 8.5 | 7.4 | 17.0 | 96 | 37.6 |
| | 11:31 | 8.0 | 7.0 | 17.0 | 96 | 37.6 |
| | 11:36 | 8.6 | 7.4 | 17.0 | 96 | 37.8 |
| 3c | 11:37 | 10.0 | 8.8 | 17.0 | 96 | 37.8 |
| | 11:42 | 9.6 | 8.3 | 17.0 | 96 | 37.9 |
| | 11:47 | 10.0 | 8.7 | 17.0 | 97 | 38.0 |
| 3d | 11:48 | 9.5 | 8.2 | 17.0 | 96 | 38.0 |
| | 11:53 | 9.2 | 8.0 | 17.0 | 96 | 38.0 |
| | 11:58 | 9.0 | 7.8 | 17.0 | 96 | 38.0 |

## TABLE NO. 2 (Continued).

| SAMPLING POINT | TIME | VELOC. HEAD | CYCLONE P. DROP | STATIC PR. | FLUE GAS TEMP. | AMB TEMP. |
|---|---|---|---|---|---|---|
| | hr.min. | mm $H_2O$ | mm $H_2O$ | mm $H_2O$ | °C | °C |
| | CYCLONE BEAKER NO. 16. | | | FILTER NO. 30. | | |
| 4a | 12:07 | 8.5 | 7.3 | 17.0 | 93 | 38.5 |
| | 12:12 | 8.0 | 6.8 | 17.0 | 94 | 38.6 |
| | 12:17 | 8.0 | 7.0 | 17.0 | 94 | 38.8 |
| 4b | 12:18 | 8.0 | 6.8 | 17.0 | 95 | 38.9 |
| | 12:23 | 8.0 | 6.9 | 17.0 | 96 | 39.0 |
| | 12:28 | 8.4 | 7.2 | 17.0 | 96 | 39.1 |
| 4c | 12:29 | 9.0 | 7.8 | 17.0 | 96 | 39.1 |
| | 12:34 | 9.5 | 8.3 | 17.0 | 96 | 39.1 |
| | 12:39 | 9.5 | 8.2 | 17.0 | 96 | 39.2 |
| 4d | 12:40 | 11.0 | 9.8 | 17.0 | 96 | 39.2 |
| | 12:45 | 14.0 | 12.4 | 17.0 | 96 | 39.4 |
| | 12:50 | 15.0 | 14.0 | 17.0 | 96 | 39.8 |
| | CYCLONE BEAKER NO. 9. | | | FILTER NO. 35. | | |
| 5a | 12:59 | 7.8 | 6.5 | 17.0 | 93 | 40.0 |
| | 13:04 | 8.0 | 7.0 | 17.0 | 93 | 40.1 |
| | 13:09 | 8.0 | 6.8 | 17.0 | 94 | 40.2 |
| 5b | 13:10 | 8.5 | 7.3 | 17.0 | 95 | 40.3 |
| | 13:15 | 8.5 | 7.4 | 17.0 | 95 | 40.4 |
| | 13:20 | 8.6 | 7.4 | 17.0 | 95 | 40.8 |
| 5c | 13:21 | 9.0 | 7.7 | 17.0 | 95 | 41.0 |
| | 13:26 | 12.0 | 10.9 | 17.0 | 95 | 41.0 |
| | 13:31 | 11.5 | 10.4 | 17.0 | 95 | 41.0 |
| 5d | 13:32 | 11.5 | 10.3 | 17.0 | 95 | 41.0 |
| | 13:37 | 13.5 | 12.5 | 17.0 | 94 | 41.2 |
| | 13:42 | 18.0 | 17.0 | 17.0 | 94 | 41.2 |
| | CYCLONE BEAKER NO. 17. | | | FILTER NO. 36. | | |
| 6a | 13:59 | 6.2 | 5.0 | 17.0 | 92 | 41.8 |
| | 14:04 | 6.5 | 5.2 | 17.0 | 93 | 41.9 |
| | 14:09 | 6.4 | 5.0 | 17.0 | 92 | 41.9 |
| 6b | 14:10 | 9.0 | 7.8 | 17.0 | 93 | 42.0 |
| | 14:15 | 8.5 | 7.2 | 17.0 | 93 | 41.8 |
| | 14:20 | 8.7 | 7.4 | 17.0 | 93 | 41.7 |
| 6c | 14:21 | 9.5 | 8.3 | 17.0 | 94 | 41.6 |
| | 14:26 | 9.4 | 8.2 | 17.0 | 94 | 41.5 |
| | 14:31 | 9.0 | 7.7 | 17.0 | 93 | 41.4 |
| 6d | 14:32 | 9.5 | 8.4 | 17.0 | 93 | 41.3 |
| | 14:37 | 9.6 | 8.0 | 17.0 | 93 | 41.2 |
| | 14:42 | 9.4 | 8.2 | 17.0 | 93 | 41.1 |

## TABLE NO. 3.

## LEFT HAND INLET DUCT.

LOAD : M.C.R.     DATE : 21.12.65.

| SAMPLING POINT | MEAN TEMP. | MEAN VELOCITY HEAD | MEAN VELOCITY IN SAMPLING POINT | MEAN CYCLONE PRESSURE DROP | MEAN VELOCITY IN PROBE |
|---|---|---|---|---|---|
| No. | $^oC$ | mm $H_2O$ | $V_1$ m/sec | mm $H_2O$ | $V_1'$ m/sec |
| 1a | 128.8 | 7.2 | 14.04 | 7.9 | 13.94 |
| b | 134.9 | 10.1 | 16.63 | 12.0 | 16.79 |
| c | 136.4 | 10.6 | 17.04 | 12.3 | 17.04 |
| d | 133.7 | 11.2 | 17.51 | 13.0 | 17.43 |
| 2a | 132.5 | 9.2 | 15.87 | 10.7 | 15.96 |
| b | 133.9 | 10.5 | 16.95 | 12.1 | 16.87 |
| c | 133.9 | 11.2 | 17.51 | 13.1 | 17.51 |
| d | 132.3 | 11.8 | 17.97 | 13.6 | 17.82 |
| 3a | 133.6 | 9.1 | 15.78 | 10.1 | 15.52 |
| b | 135.7 | 9.7 | 16.29 | 11.2 | 16.29 |
| c | 135.4 | 10.9 | 17.28 | 12.5 | 17.11 |
| d | 133.3 | 11.6 | 17.82 | 13.6 | 17.82 |
| 4a | 133.7 | 10.3 | 16.79 | 11.9 | 16.71 |
| b | 133.2 | 10.5 | 16.95 | 12.1 | 16.87 |
| c | 136.5 | 11.5 | 17.74 | 13.2 | 17.59 |
| d | 131.0 | 11.0 | 17.35 | 12.9 | 17.35 |
| 5a | 135.0 | 11.3 | 17.59 | 12.7 | 17.28 |
| b | 138.2 | 13.1 | 18.93 | 15.4 | 18.86 |
| c | 137.8 | 13.7 | 19.36 | 16.4 | 19.36 |
| d | 134.5 | 14.0 | 19.58 | 16.6 | 19.50 |
| 6a | 133.5 | 10.7 | 17.11 | 12.6 | 17.19 |
| b | 134.0 | 12.4 | 18.42 | 14.7 | 18.42 |
| c | 133.6 | 13.6 | 19.30 | 16.1 | 19.22 |
| d | 133.8 | 16.8 | 21.44 | 19.1 | 20.80 |
| TOTAL | | | 421.27 | | 419.28 |

## TABLE NO. 4.

## RIGHT HAND INLET DUCT.

LOAD : M.C.R.    DATE : 21.12.65.

| SAMPLING POINT | MEAN TEMP. | MEAN VELOCITY HEAD | MEAN VELOCITY IN SAMPLING POINT | MEAN CYCLONE PRESSURE DROP | MEAN VELOCITY IN PROBE |
|---|---|---|---|---|---|
| No. | $^oC$ | mm $H_2O$ | $V_1$ m/sec | mm $H_2O$ | $V_1$' m/sec |
| 1a | 128.0 | 10.5 | 16.86 | 9.2 | 16.70 |
| b | 128.3 | 10.3 | 16.70 | 9.1 | 16.62 |
| c | 129.5 | 12.0 | 18.02 | 11.0 | 18.10 |
| d | 129.3 | 10.1 | 16.54 | 8.8 | 16.37 |
| 2a | 130.0 | 10.9 | 17.17 | 10.0 | 17.34 |
| b | 130.0 | 10.9 | 17.17 | 9.7 | 17.10 |
| c | 130.0 | 11.6 | 17.72 | 10.5 | 17.64 |
| d | 129.5 | 12.5 | 18.40 | 11.5 | 18.40 |
| 3a | 130.6 | 9.3 | 15.86 | 8.0 | 15.78 |
| b | 130.7 | 8.4 | 15.08 | 7.3 | 15.17 |
| c | 131.2 | 9.9 | 16.37 | 8.6 | 16.20 |
| d | 131.0 | 9.2 | 15.78 | 8.0 | 15.78 |
| 4a | 129.2 | 8.2 | 14.90 | 7.0 | 14.90 |
| b | 131.6 | 8.1 | 14.81 | 7.0 | 14.90 |
| c | 132.0 | 9.3 | 15.86 | 8.1 | 15.86 |
| d | 132.4 | 13.3 | 18.97 | 12.1 | 18.83 |
| 5a | 130.4 | 7.9 | 14.63 | 6.8 | 14.71 |
| b | 132.4 | 8.5 | 15.17 | 7.4 | 15.26 |
| c | 132.8 | 10.8 | 17.10 | 9.7 | 17.10 |
| d | 132.3 | 14.3 | 19.67 | 13.3 | 19.67 |
| 6a | 131.2 | 6.4 | 13.16 | 5.1 | 13.06 |
| b | 131.8 | 8.7 | 15.35 | 7.5 | 15.35 |
| c | 132.0 | 9.3 | 15.86 | 8.1 | 15.86 |
| d | 131.2 | 9.5 | 16.04 | 8.2 | 15.95 |
| TOTAL | | | 393.19 | | 392.65 |

## TABLE NO. 5.

## VOLUME ASPIRATED.

| DUCT | PROBE AREA $ft^2 x10^{-3}$ | $\Sigma V_1$' | VOLUME $ft^3$ |
|---|---|---|---|
| L.H. Inlet | 0.5107 | 419.28 m/sec<br>1375.574 ft/sec | 421.503 |
| R.H. Inlet | 0.4991 | 392.65 m/sec<br>1288.206 ft/sec | 385.766 |

## TABLE NO. 6.

| DUCT | SAMPLING POSITIONS | AREA (EACH) INCHES$^2$ | $\Sigma V_1$ | VOLUME Q x $10^4$ ft$^3$ /4 HOURS | RATIO VOLUME EMITTED TO VOLUME SAMPLED | | CORRECTION FACTOR K K = ACTUAL/THEORETICAL |
|---|---|---|---|---|---|---|---|
| | | | | | THEORETICAL | ACTUAL | |
| L.H. Inlet | la - 6d | 494.083 | 421.27 m/sec<br>1382.103 ft/sec | 6828.736 | 161244 | 162010 | 1.0047 |
| R.H. Inlet | la - 6d | 494.083 | 393.19 m/sec<br>1289.978 ft/sec | 6373.562 | 164991 | 165218 | 1.0014 |

## TABLE NO. 7.

## WEIGHTS OF SAMPLES COLLECTED FROM LEFT HAND INLET DUCT.

Container + filter 49 + dust = 232.5321 gm
Container = 102.8356 gm
Filter 49 = 120.3184 gm
Dust = 9.3781 gm

Container + filter 47 + dust = 240.9694 gm
Container = 98.2966 gm
Filter 47 = 135.2214 gm
Dust = 7.4514 gm

Container + filter 46 + dust = 236.4323 gm
Container = 103.0557 gm
Filter 46 = 127.2202 gm
Dust = 6.1564 gm

Container + filter 40 + dust = 254.5405 gm
Container = 98.5291 gm
Filter 40 = 147.1177 gm
Dust = 8.8937 gm

Container + filter 48 + dust = 250.2407 gm
Container = 100.3786 gm
Filter 48 = 145.6302 gm
Dust = 4.2319 gm

Container + filter 37 + dust = 253.2573 gm
Container = 101.2321 gm
Filter 37 = 133.4321 gm
Dust = 18.5931 gm

Beaker 11 + dust = 119.8917 gm
Beaker 11 = 112.5610 gm
Dust = 7.3307 gm

Beaker 12 + dust = 125.4990 gm
Beaker 12 = 112.7555 gm
Dust = 12.7435 gm

Beaker 14 + dust = 131.7424 gm
Beaker 14 = 114.3826 gm
Dust = 17.3598 gm

Beaker 15 + dust = 124.0417 gm
Beaker 15 = 114.8776 gm
Dust = 9.1641 gm

Beaker 10 + dust = 123.8587 gm
Beaker 10 = 107.4564 gm
Dust = 16.4023 gm

Beaker 13 + dust = 137.2193 gm
Beaker 13 = 113.5320 gm
Dust = 23.6873 gm

## TABLE NO. 7 (Continued).

Cyclone + dust = 545.2057 gm
Cyclone = 545.1759 gm
Dust = 0.0298 gm

Filter housing cover + dust = 617.7080 gm
Filter housing cover = 617.4322 gm
Dust = 0.2758 gm

Filter housing + dust = 931.0855 gm
Filter housing = 931.0514 gm
Dust = 0.0341 gm

Connector + dust = 422.9598 gm
Connector = 422.9225 gm
Dust = 0.0373 gm

Total = 141.7693 gm

## TABLE NO. 8

## WEIGHTS OF SAMPLES COLLECTED FROM RIGHT HAND INLET DUCT.

Container + filter 36 + dust = 259.3197 gm
Container = 109.0486 gm
Filter 36 = 145.2242 gm
Dust = 5.0469 gm

Container + filter 28 + dust = 258.4303 gm
Container = 122.5772 gm
Filter 28 = 136.9680 gm
Dust = 8.8851 gm

Container + filter 29 + dust = 256.4021 gm
Container = 109.3676 gm
Filter 29 = 140.9436 gm
Dust = 6.0909 gm

Container + filter 30 + dust = 246.7282 gm
Container = 101.6707 gm
Filter 30 = 139.2240 gm
Dust = 5.8335 gm

Container + filter 34 + dust = 257.7831 gm
Container = 106.5643 gm
Filter 34 = 144.2145 gm
Dust = 7.0043 gm

Container + filter 35 + dust = 263.0989 gm
Container = 107.2491 gm
Filter 35 = 149.7557 gm
Dust = 6.0941 gm

Beaker 18 + dust = 128.1116 gm
Beaker 18 = 110.4958 gm
Dust = 17.6158 gm

Beaker 7 + dust = 131.4862 gm
Beaker 7 = 112.8157 gm
Dust = 18.6705 gm

Beaker 8 + dust = 134.5216 gm
Beaker 8 = 116.7075 gm
Dust = 17.8141 gm

Beaker 9 + dust = 128.8511 gm
Beaker 9 = 112.6458 gm
Dust = 16.2053 gm

Beaker 16 + dust = 123.8165 gm
Beaker 16 = 106.7842 gm
Dust = 17.0323 gm

Beaker 17 + dust = 124.3514 gm
Beaker 17 = 109.8815 gm
Dust = 14.4699 gm

## TABLE NO. 8 (Continued).

Cyclone + dust = 543.7768 gm
Cyclone = 543.0157 gm
Dust = 0.7611 gm

Filter housing cover + dust = 638.4128 gm
Filter housing cover = 638.0553 gm
Dust = 0.3575 gm

Filter housing + dust = 870.0873 gm
Filter housing = 870.0515 gm
Dust = 0.0358 gm

Connector + dust = 414.2072 gm
Connector = 414.1911 gm
Dust = 0.0161 gm

Total = 141.9332

## TABLE NO. 9.

## WEIGHTS OF ASH LEAVING BOILER IN 4 HOURS.

| | L.H. INLET | R.H. INLET | TOTAL |
|---|---|---|---|
| Weight of ash sampled | 141.7693 gm | 141.9332 gm | |
| Weight of ash leaving boiler in 4 hours | 50636 lbs | 51698 lbs | 102334 lbs |

## TABLE NO. 10.

## WEIGHTS OF SAMPLES RECOVERED FOR ANALYSIS.

| | L.H. INLET | R.H. INLET |
|---|---|---|
| Probe sample | 95.8572 gm | 103.1753 gm |
| Intact filter | 27.6691 gm | 26.5557 gm |
| Dismantled filter | 11.9990 gm | 7.5447 gm |
| Total | 135.5253 | 137.2757 |

## TABLE NO. 11.

## ANALYSIS OF SAMPLES.

| | L.H. INLET DUCT | | | R.H. INLET DUCT | | |
|---|---|---|---|---|---|---|
| | % Ash | % $H_2O$ | % C.M. | % Ash | % $H_2O$ | % C.M. |
| Probe sample | 87.1 | 0.5 | 12.4 | 87.7 | 0.4 | 11.9 |
| Intact filter | 94.0 | 0.2 | 5.8 | 92.8 | 0.3 | 6.9 |
| Dismantled filter | 94.9 | 0.3 | 4.8 | 95.0 | 0.2 | 4.8 |

## TABLE NO. 12.

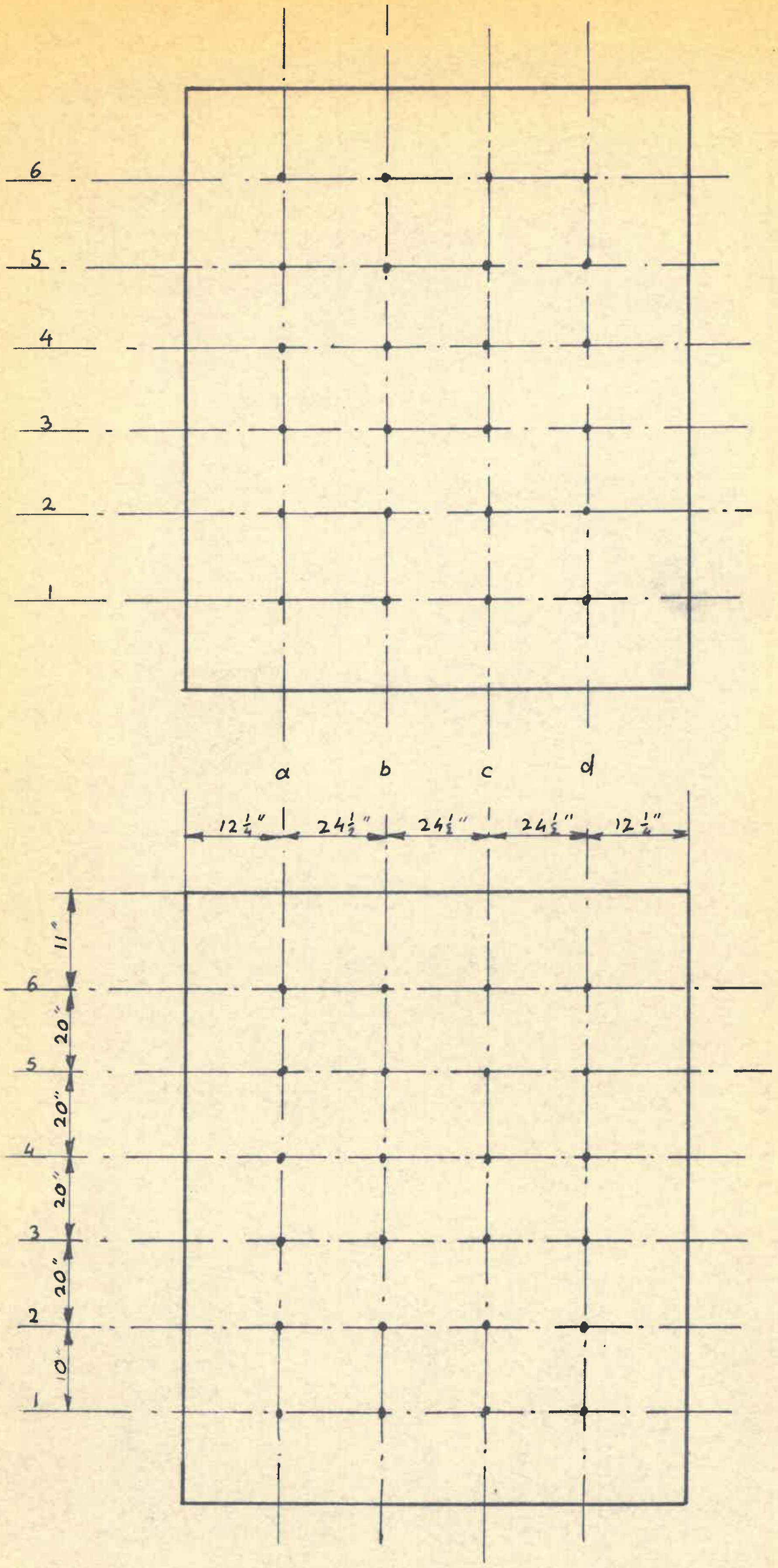
## ANALYSIS OF RECONSTRUCTED SAMPLE.

| | % ASH | % $H_2O$ | % COMBUSTIBLE MATTER |
|---|---|---|---|
| L.H. Inlet Duct | 89.2 | 0.4 | 10.4 |
| R.H. Inlet Duct | 89.1 | 0.4 | 10.5 |

## TABLE NO. 13.

## WEIGHT OF COMBUSTIBLE MATTER IN FLY-ASH LEAVING THE BOILER IN 4 HOURS

| | TOTAL WEIGHT OF ASH IN 4 HOURS | % COMBUSTIBLE MATTER | TOTAL WEIGHT OF COMBUSTIBLE MATTER IN ASH/4 HOURS |
|---|---|---|---|
| L.H. Inlet Duct | 50636 lbs | 10.4 | 5266.1 lbs |
| R.H. Inlet Duct | 51698 lbs | 10.5 | 5428.3 lbs |
| Total | | | 10694.4 lbs |



INLET DUCTS

FIG. 1