RESISTANCES OF TWO TYPES OF DIVIDING FITTINGS FOR RECTANGULAR DUCTS

Thesis for the Degree of M. S.

MICHIGAN STATE COLLEGE

Robert J. Wealkes

1951

THESIS

SUPPLEMENTARY
MATERIAL
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This is to certify that the

thesis entitled

RESISTANCES OF TWO TYPES OF DIVIDING FITTINGS FOR RECTANGULAR DUCTS

presented by

Robert J. Walkes

has been accepted towards fulfillment
of the requirements for

Master of Science degree in Mechanical Engineering

C. A. Pertenfield
Major professor

Date May 16, 1951

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RESISTANCES OF TWO TYPES OF DIVIDING FITTINGS FOR RECTANGULAR DUCTS

By

ROBERT J. WAALKES

A THESIS

Submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

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He wishes also to acknowledge the work of Mr. L. A. Yerkovich and Mr. J. H. Yohn who have previously worked on this project. Material from their theses has been re-evaluated and made a part of this paper.

Mr. Donald Seble and Mr. Carl Redman are also to be thanked for their assistance and cooperation in the laboratory.

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INTRODUCTION

The objective of this research project, which is a cooperative effort of the American Society of Heating and Ventilating Engineers and Michigan State College, is to determine the resistance offered to the flow of air by dividing fittings for rectangular ducts wherein a portion of the air stream is diverted ninety degrees and the remainder is carried on straight in a branch of reduced size. At the present time there is little published data available on the frictional effect of such a fitting on the diverted branch, and practically no information as to the effect on the branch (or reduced main) which continues straight.

The original project proposed the testing of three different designs of fittings, with three combinations of branch sizes for each design. Tests of the three fittings of the first design were completed by Mr. L. A. Yerkovich and Mr. J. H. Yohn, and the three fittings of the second design have been tested by the author. This paper presents the complete data and results obtained with the second three fittings, and includes a re-evaluation of the data and results of the first three fittings. Hence, the conclusions and recommendations given herein are based on an examination of

the results from tests of six of the originally proposed nine fittings.

The results given are empirical results obtained by actual test, and it is not within the scope of this paper to present an analytical interpretation. Such an interpretation should await the completion of the testing program when all variables will have been considered, and a significant interpretation can be attempted. The empirical results can be used as an interim guide for designers of air handling systems until such time as a rigorous analysis of the mechanics of flow involved can be made to explain and verify the test results.

GENERAL APPROACH TO PROBLEM

From a study of the problem it appears that the losses in the fitting will be dependent on several factors, namely: (1) the design of the fitting; (2) the respective sizes of the "takeoff" and "straight" branches; (3) the equivalent length of the two branches; (4) the relative proportions of air flowing through the two branches; and (5) the total quantity of air flowing through the fitting. These factors therefore become the variables in the test program.

The first two variables are taken care of by the selection of the three designs of fittings and the three combinations of branch sizes previously mentioned.

To keep the duct system from becoming cumbersome and at the same time provide a means for measuring the flow through the two branches, the equivalent lengths are varied by providing a series of rectangular sharp-edged orifice plates for each branch. These are inserted in the branch duct downstream of the fitting, and simultaneously change the equivalent length of the branch and the amount of air flowing through it. The orifice is used to measure the quantity of air flowing through the branch by calibrating it against a static pressure reading taken just ahead of it.

The fifth variable is controlled by means of a damper placed in the main duct well back toward the blower. The total volume of air flowing through the system is varied by adjusting this damper in increments from the open position to the closed position.

It is desired to express the resistance offered to flow by the dividing fitting as an added equivalent length for each branch. This is accomplished by the taking of data which together with the necessary calculations leads to the determination of the total pressure drop from a point in the main duct just upstream of the fitting to a point in each of the branch ducts downstream of the fitting. These total pressure drops represent losses between the two points, and are converted to equivalent lengths by use of the friction chart and observed data on quantity of flow and duct size for each branch. The subtraction of the actual measured length between the points in each case then gives the added equivalent length of the branch due to the dividing fitting.

This procedure is repeated for each setting on each of a series of runs made with the above factors as variables. The final plot of all these added equivalent lengths, with average curves drawn, then gives a picture

of the frictional effect of the fitting over a wide range of flow conditions.

DESCRIPTION OF TESTING EQUIPMENT

A general view of the testing equipment is shown in Figure 1, and a layout is shown in Figure 1A in the pocket at the end of the paper. It consists of a centrifugal blower connected to a system of ductwork with quadrant damper, ASME long radius nozzle, test fitting, static taps, and sharp-edged orifices located as shown in the layout. The equipment is located in the Mechanical Engineering Laboratory of Michigan State College and is still set up for further testing.

The blower used to supply air to the system runs at a constant speed of about 1290 R.P.M., and the total volume of air handled is varied by means of the quadrant damper.

For purposes of description and discussion the balance of the testing equipment is divided into a volume measuring station, a static pressure measuring station, and orifice plates.

Volume Measuring Station

On the layout, Figure 1A, this station is shown simply as a nozzle in the 14" main duct preceded by an egg-crate type straightener to smooth out the flow conditions at the nozzle entrance. The nozzle is an ASME long radius type which is used when the ratio of throat

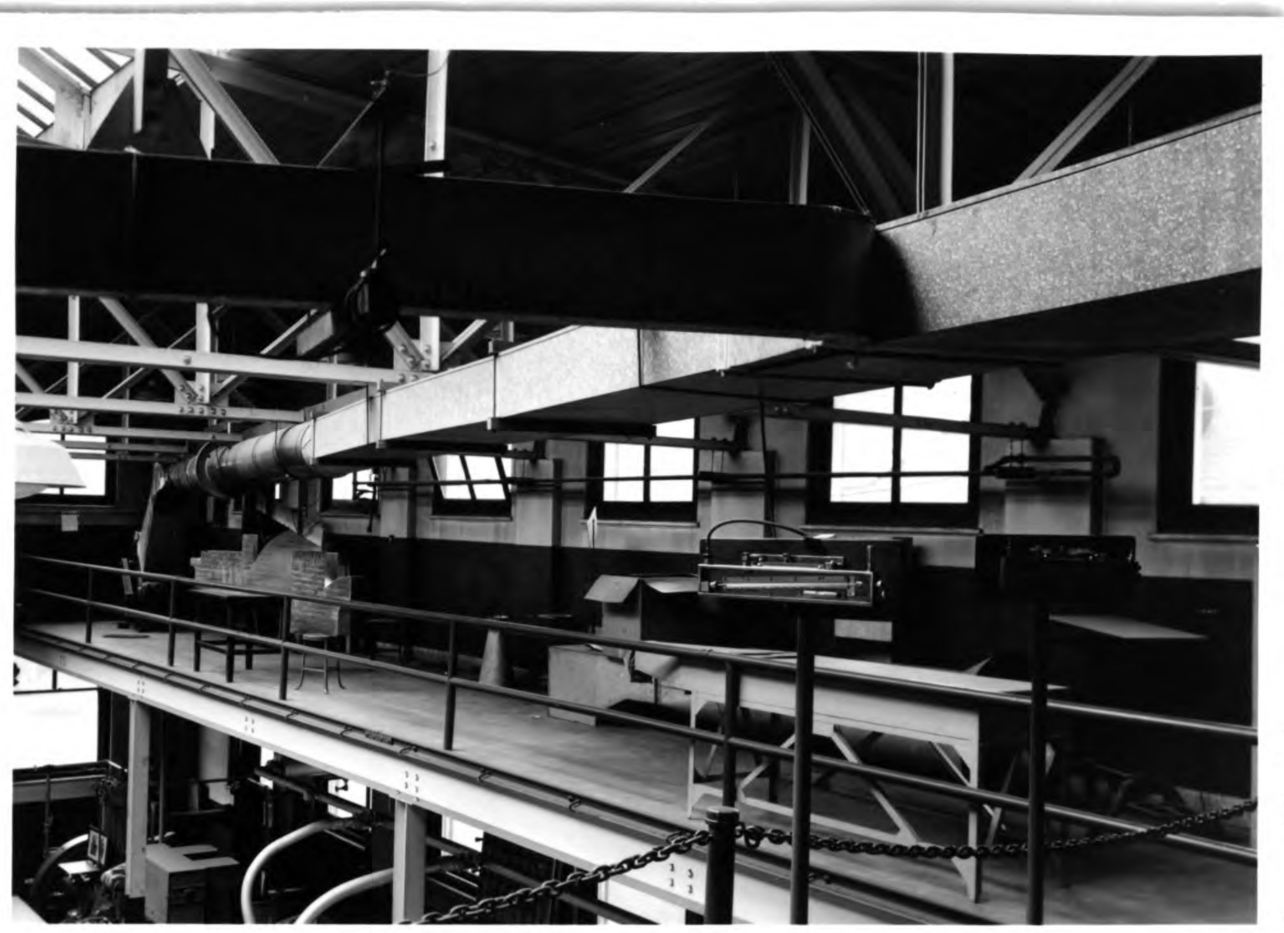


FIGURE 1. GENERAL VIEW OF TESTING EQUIPMENT

Blower is at far end of main duct, and fitting under test can be seen in foreground.

to pipe diameter is 0.53 or less. This type nozzle is shown in Figure 20, page 29 of "Power Test Codes," published in 1940 by ASME. The contour of the nozzle is a semi-ellipse with the contracting portion followed by a cylindrical section of the same diameter as the throat, which is six inches. A static tap and impact tube are used with the nozzle to measure the velocity pressure. The static tap is in the straight portion of the nozzle two inches from the end as shown in Figure 26e, page 37, of "Power Test Codes." The impact tube is located in the center of the nozzle jet with the end of the tube in the plane of the nozzle end.

Figure 2 is a view of the volume measuring station showing the large Uehling Type B inclined draft gauge and smaller Ellison inclined draft gauge, with the flange of the nozzle, the impact and static tubes visible on the main duct. The range of the Uehling instrument is 0 to 8 inches of water, and that of the Ellison gauge is 0 to 0.5 inch of water. The two gauges are connected in parallel to the static and impact tubes and thus read the velocity pressure ($P_3 - P_2$) directly. The Ellison gauge is used for more accurate reading of low velocity pressures.

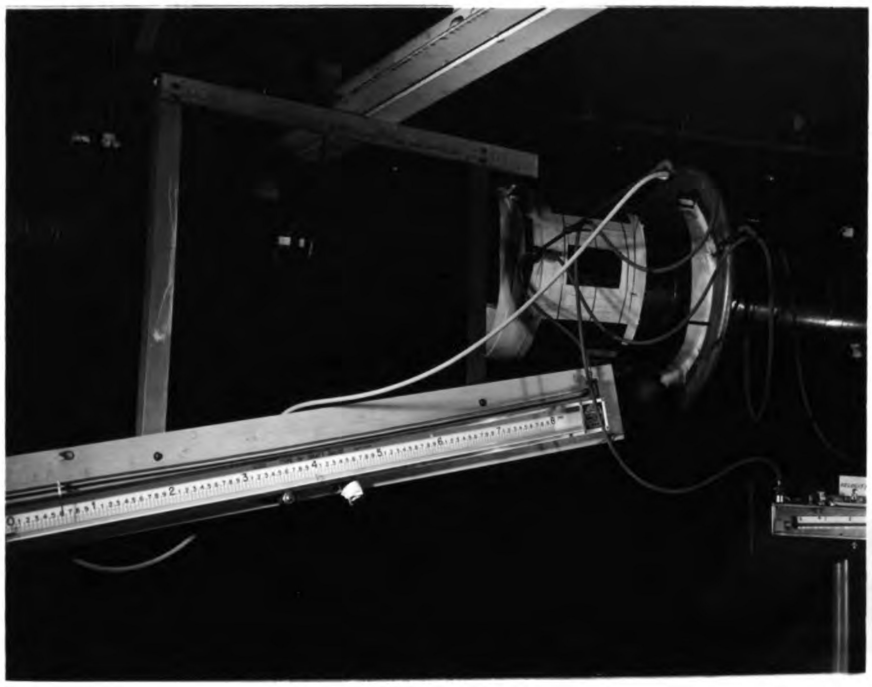


FIGURE 2

VOLUME MEASURING STATION

Static Pressure Measuring Station

The static pressure measuring station is located at the point where the fitting under test divides the main duct into two branches. The location of the static taps is shown on Figure 1A. On the data sheets, P_4 is the pressure at the static tap in the main duct upstream of the fitting, P_5 is the pressure at the static tap in the straight branch downstream of the fitting, and P_6 is the pressure at the static tap in the takeoff branch downstream of the fitting.

Figure 3 shows the static pressure measuring station with the dividing fitting and ductwork in place. The three Ellison draft gauges are used in measuring the static pressure at the three taps. The ranges of the gauges are 0-0.5, 0-1.0, and 0-3.0 inches of water. Each of the three taps are connected to a single instrument connection by means of tees in the rubber tubing. The insertion of a glass stopcock in the tubing from each tap makes it possible to connect each of them to the gauge separately. The pressures are thus read consecutively on the same instrument, eliminating the errors which may arise when a separate set of gauges is used at each tap. The three gauges are necessary to read accurately the range of pressures encountered.

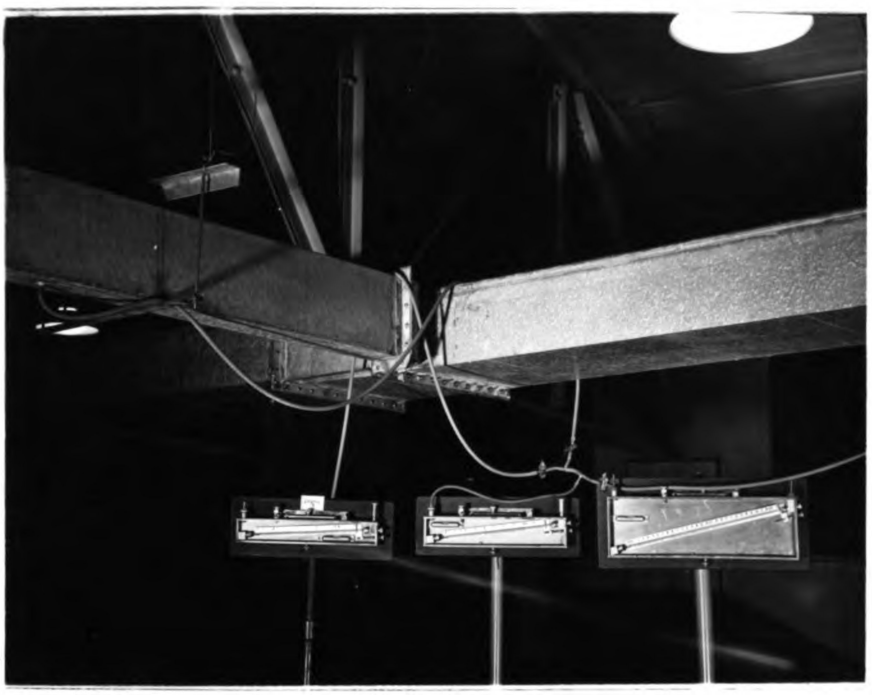


FIGURE 3

STATIC PRESSURE MEASURING STATION

Orifice Plates

All of the orifice plates used are rectangular sharp-edged orifices, and their general location is shown on Figure 1A. A set of typical orifice plates for the 3" x 8" size duct are shown in Figure 4. The sizes of orifices used in other branch ducts are shown in Table I. There are two of each of the orifice sizes listed for the 10½" x 8" branch duct since in this case the two branches are the same size.

The branch ducts are provided with special U-shaped channels about 3/8" deep soldered to the inside of the duct on three sides. The edges of the orifice plates slide in these channels, and a slot is cut in the fourth side of the duct, permitting the insertion or removal of an orifice plate from the outside without disturbing the ductwork. Masking tape is used to seal the crack between the orifice plate and the duct to eliminate leakage.

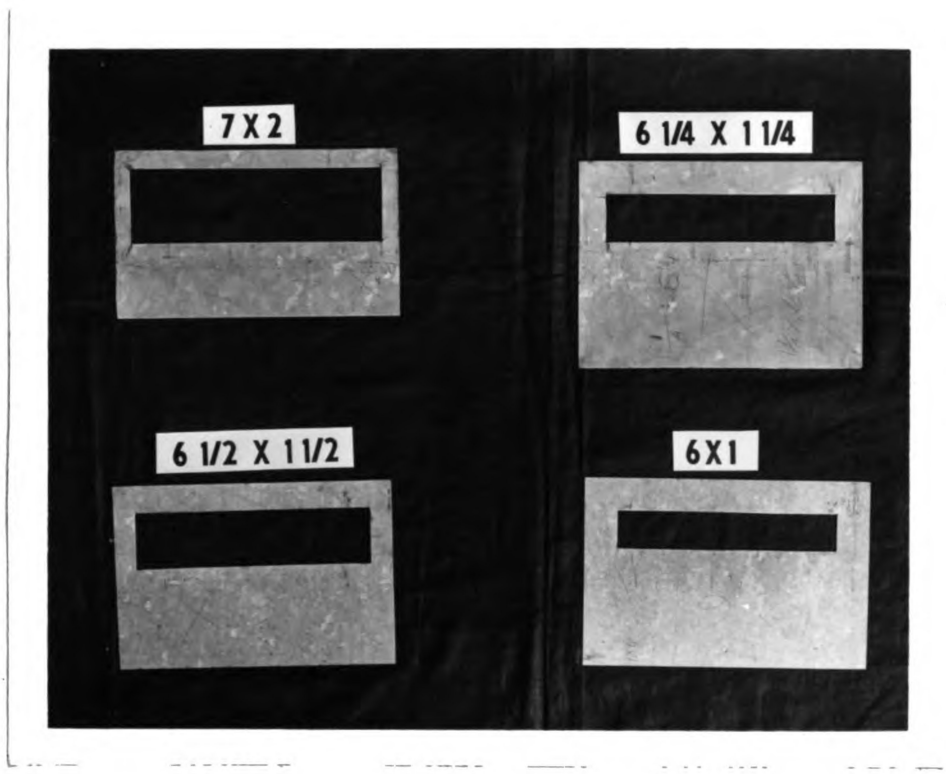


FIGURE 4

TYPICAL ORIFICE PLATES USED IN 3" x 8" BRANCH DUCT

ORIFICE CALIBRATIONS

The rectangular sharp-edged orifices used in the branch ducts to increase the equivalent lengths of the branches and vary the proportion of air flowing through them must be calibrated if they are also to be used for measuring the quantity of air flowing in each branch. This calibration is accomplished by putting a blank in place of the orifice in one branch and causing all of the air to go through the other orifice. The quantity flowing is varied by means of the quadrant damper, and measured at the main volume measuring station. The calculated quantity of flow in cubic feet per minute is then plotted against the static pressure reading at the tap near the sharp-edged orifice to establish the calibration curve of the orifice.

Curve Sheets 1 - 6 are the calibration curves for the orifices used in this investigation. It will be noted that similar sized orifices in the two branches as shown on Curve Sheets 1 and 2 have similar calibration curves within very close limits, indicating that the calibration is good whether the orifice is in the straight branch or in the takeoff branch. This is further emphasized by the fact that Curve Sheet 3 which represents the large-sized orifices in the takeoff branch agrees very closely with Curve Sheet 6 which is

for the same orifices in the straight branch. The same agreement exists between Curve Sheets 4 and 5 for the small-sized orifices.

Curve Sheets 7 - 9 are plots of the frictional resistance of different lengths of ducts of the three sizes used for branch ducts in this work. They are drawn from data taken from the friction chart in the 1950 ASHVE GUIDE. The purpose of these curves is to determine the equivalent lengths of the various sharp-edged orifices. A comparison of Curve Sheets 4 and 7, for example, shows that the 7" x 2" orifice is equivalent to about 48 feet of 5.8" round duct. Table I gives the approximate equivalent length of the various orifices in terms of feet of the size duct in which they are used. These values are approximate because it will be noted that the orifice calibration curves have a lesser slope than the duct curves, and hence at low rates of flow the equivalent length of a given orifice is less than at higher rates of flow. The equivalent lengths given in Table I are the mean value taken at the mid-length of the orifice curve.

TABLE I

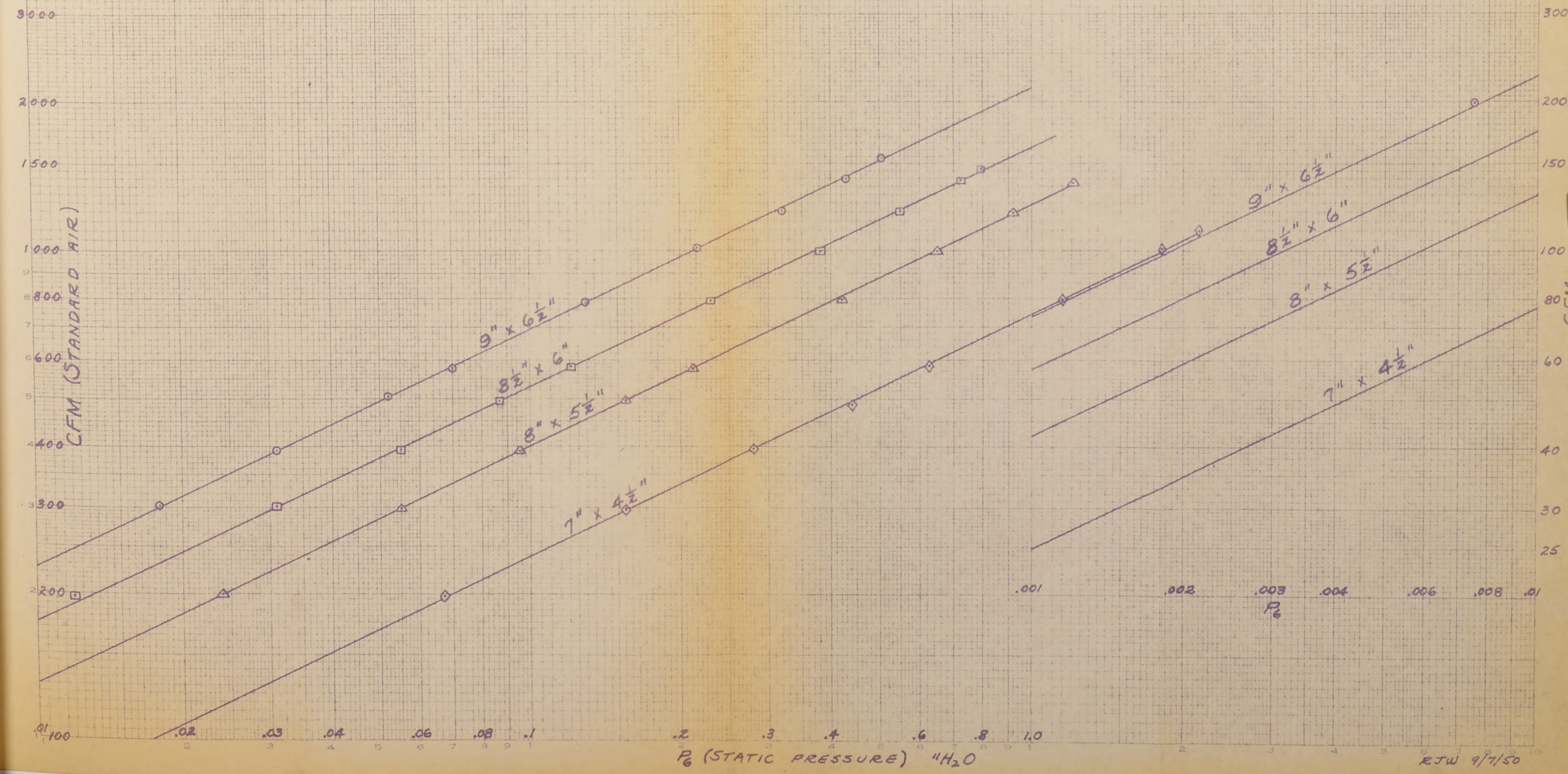
Rectangular Duct Size	Equivalent Round Size	Orifice Size	Approximate Equivalent Length
3" x 8"	5.8"	6" x 1"	480'
3" x 8"	5.8"	6 1/4" x 1 1/4"	230'
3" x 8"	5.8"	6 1/2" x 1 1/2"	135'
3" x 8"	5.8"	7" x 2"	48'
10 1/2" x 8"	10.0"	7" x 4 1/2"	305'
10 1/2" x 8"	10.0"	8" x 5 1/2"	115'
10 1/2" x 8"	10.0"	8 1/2" x 6"	69'
10 1/2" x 8"	10.0"	9" x 6 1/2"	43'
18" x 8"	12.7"	14" x 4"	275'
18" x 8"	12.7"	15" x 5"	118'
18" x 8"	12.7"	15 1/2" x 5 1/2"	70'
18" x 8"	12.7"	16" x 6"	46'
18" x 8"	12.7"	16 1/2" x 6 1/2"	31'

ORIFICE CALIBRATIONS

TAKEOFF ORIFICES (RUNS 115 - 118)

10½" x 8" STR. & 10½" x 8" T.O.

CURVE SHEET 1

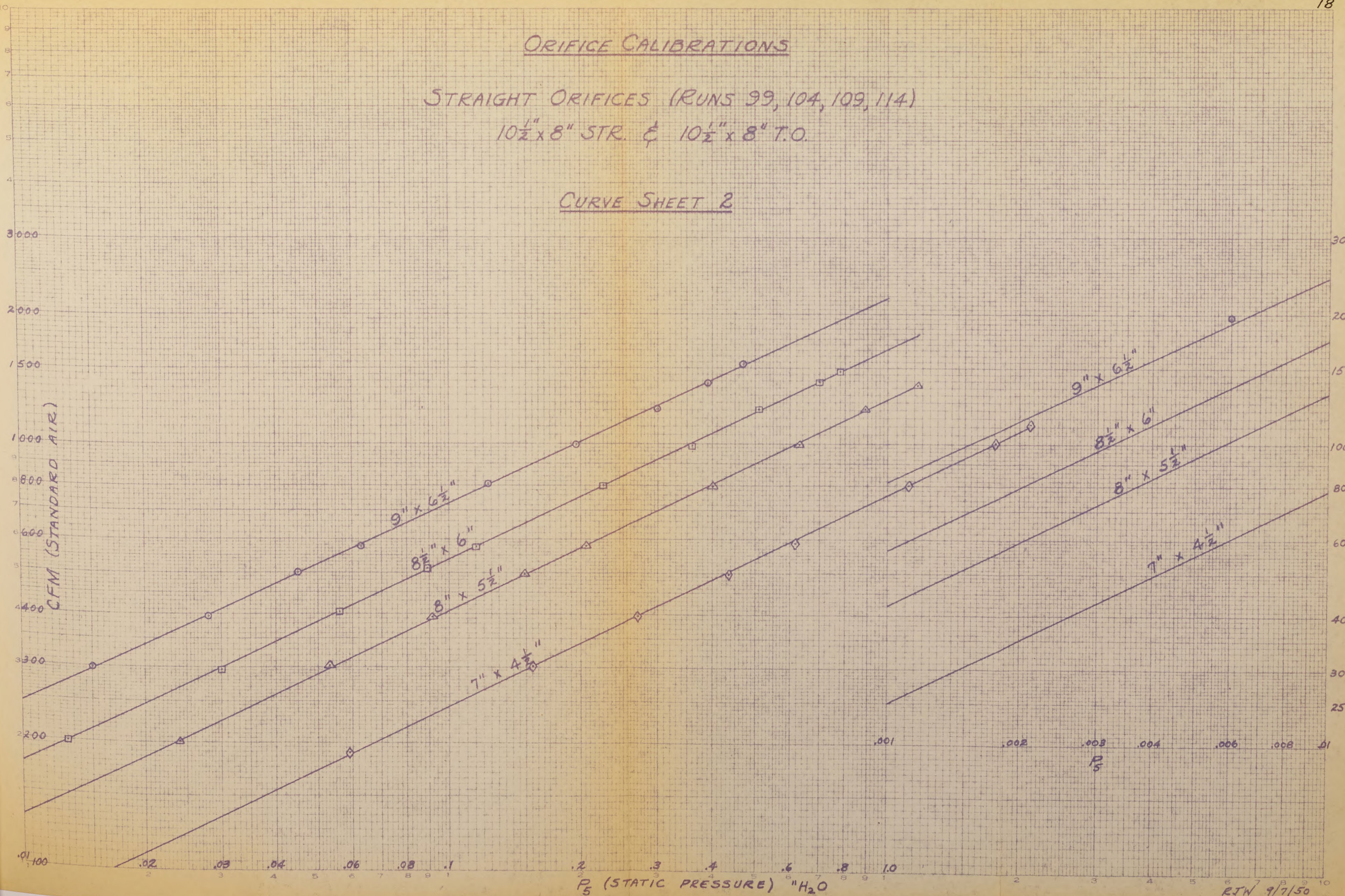


ORIFICE CALIBRATIONS

STRAIGHT ORIFICES (RUNS 99, 104, 109, 114)

$10\frac{1}{2}$" x 8" STR. & $10\frac{1}{2}$" x 8" T.O.

CURVE SHEET 2

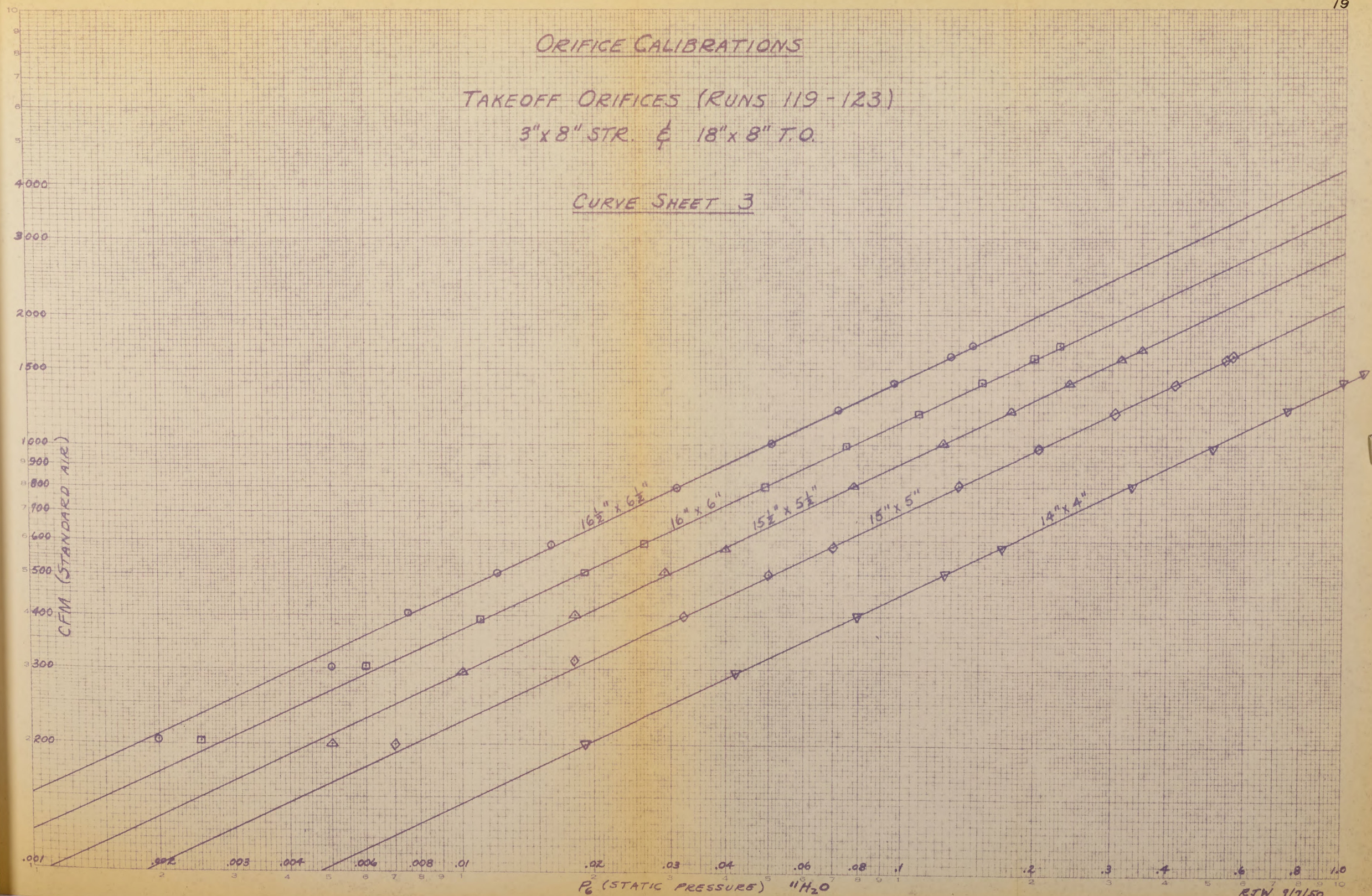


ORIFICE CALIBRATIONS

TAKEOFF ORIFICES (RUNS 119 - 123)

3"x 8" STR. & 18"x 8" T.O.

CURVE SHEET 3



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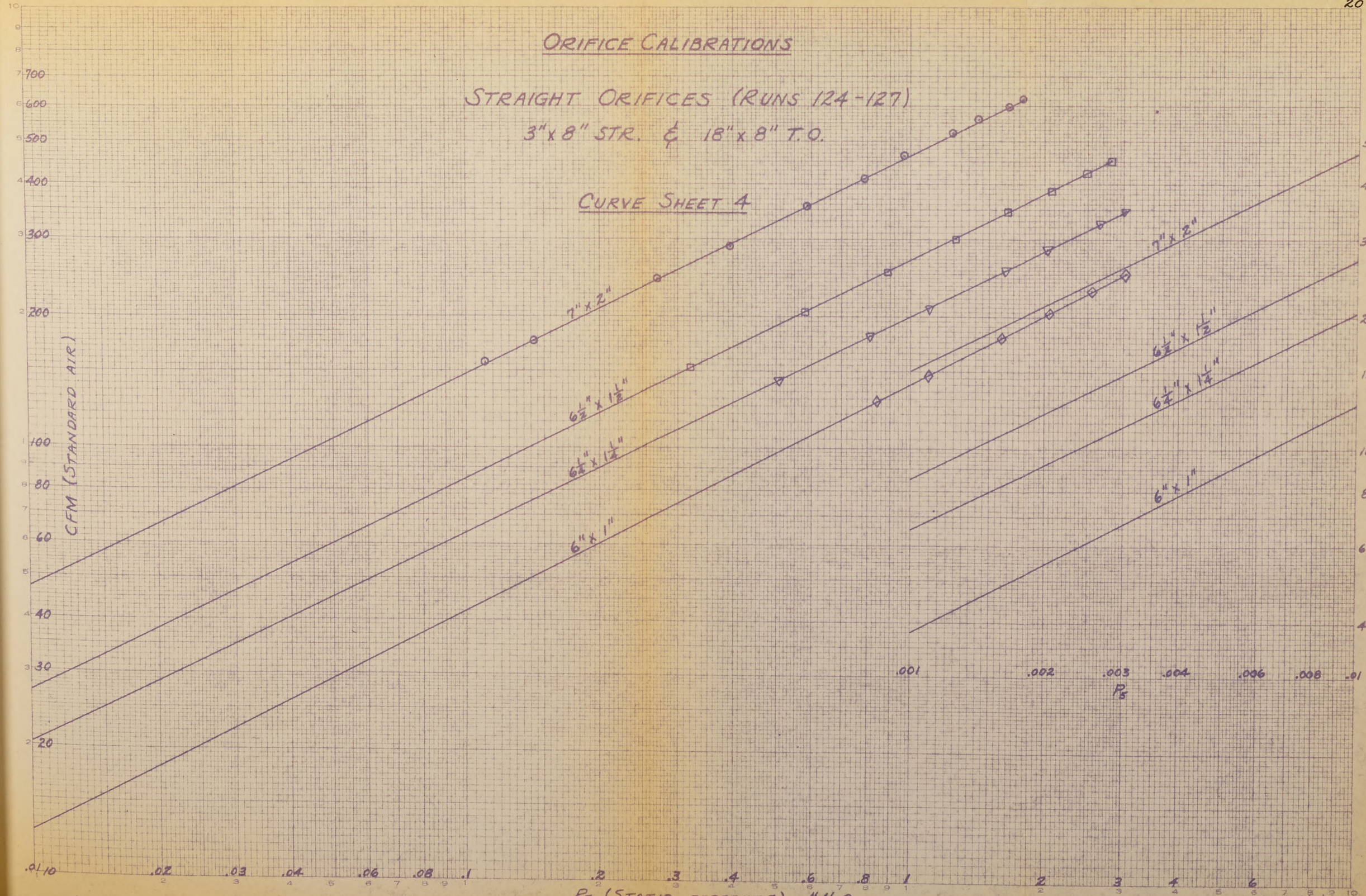
ORIFICE CALIBRATIONS

STRAIGHT ORIFICES (RUNS 124-127)

3"x8" STR. ℄ 18"x8" T.O.

CURVE SHEET 4

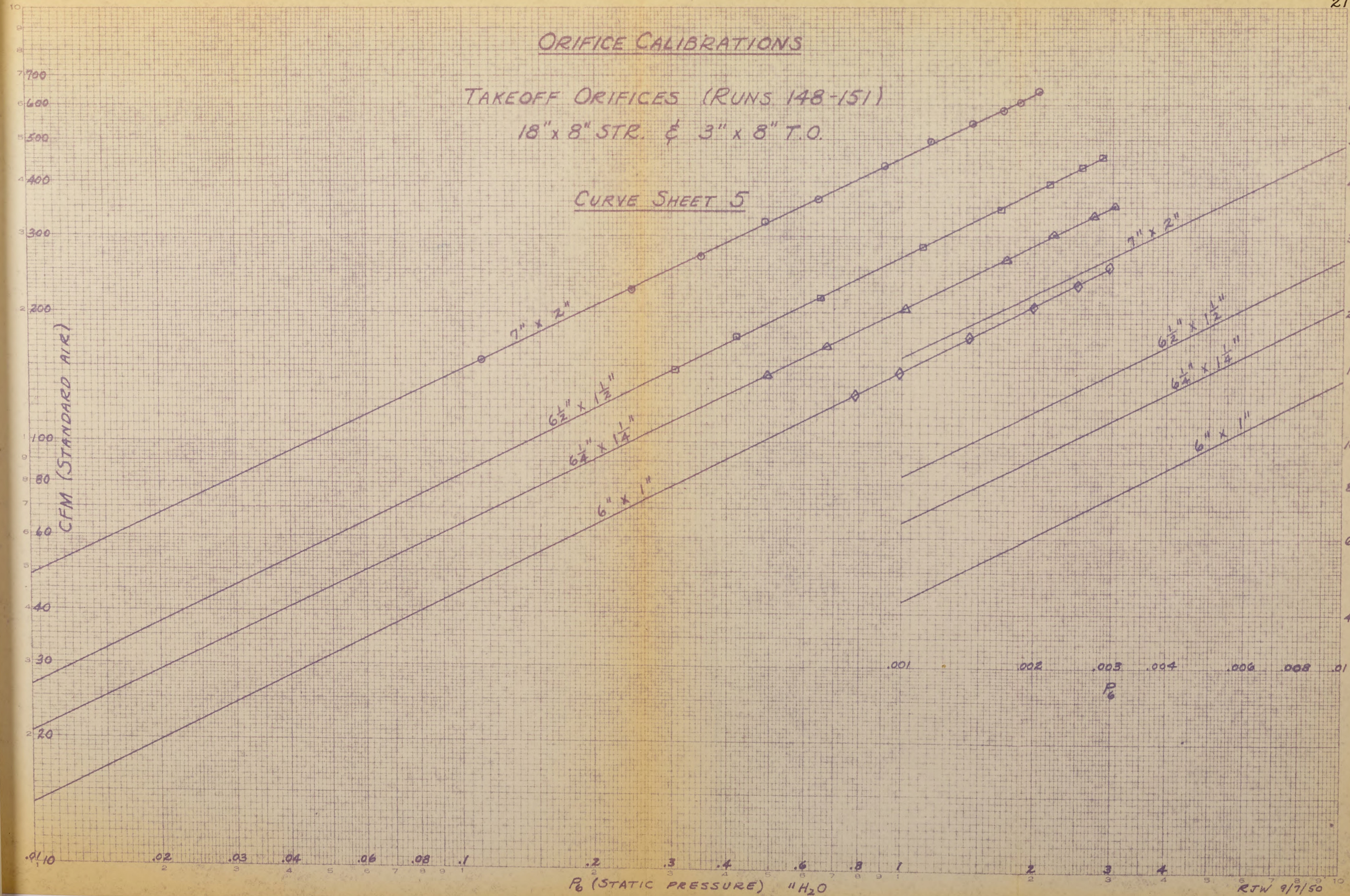


ORIFICE CALIBRATIONS

TAKEOFF ORIFICES (RUNS 148-151)

18" x 8" STR. & 3" x 8" T.O.

CURVE SHEET 5



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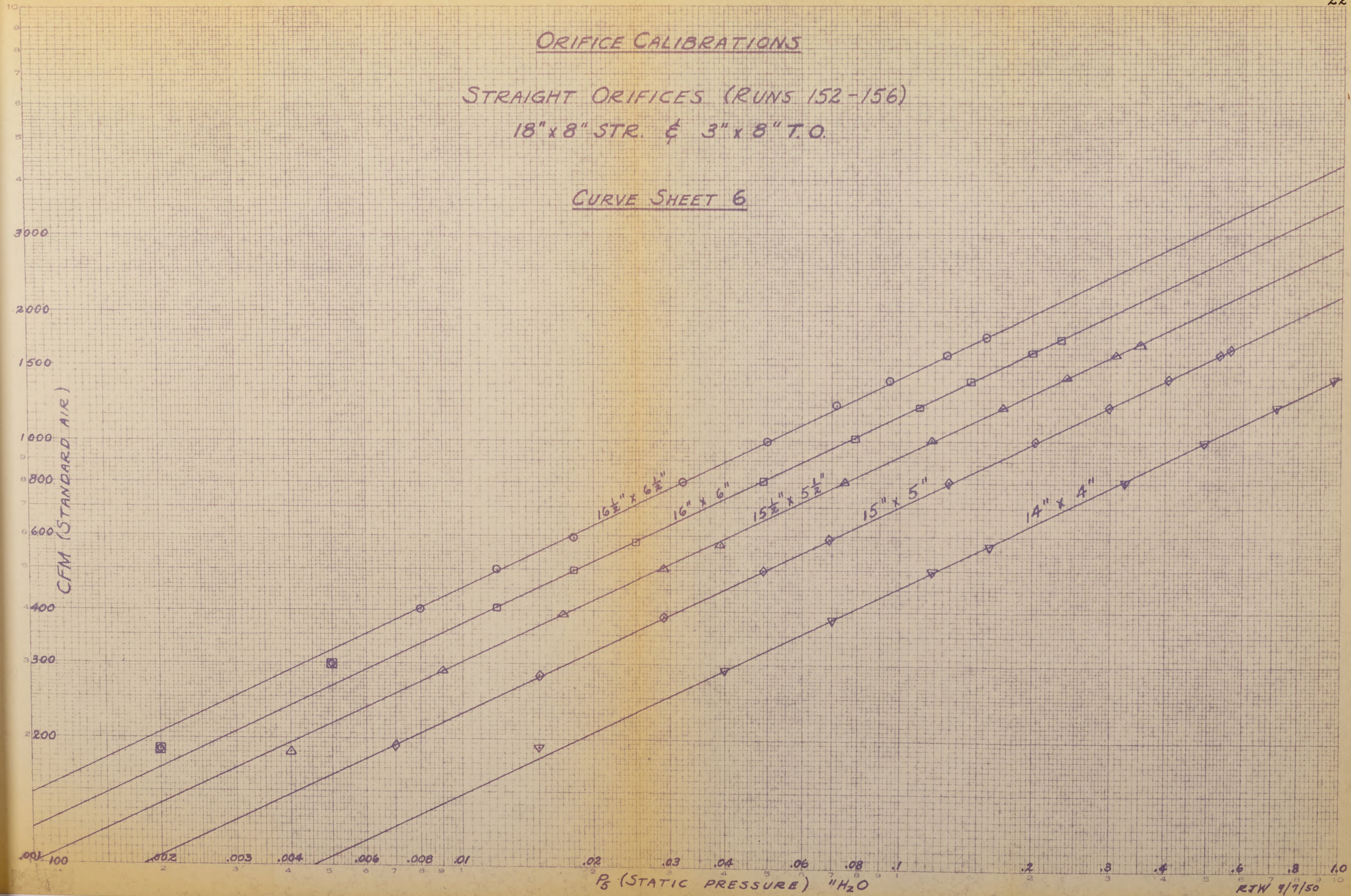
ORIFICE CALIBRATIONS

STRAIGHT ORIFICES (RUNS 152-156)

18" x 8" STR. ℄ 3" x 8" T.O.

CURVE SHEET 6



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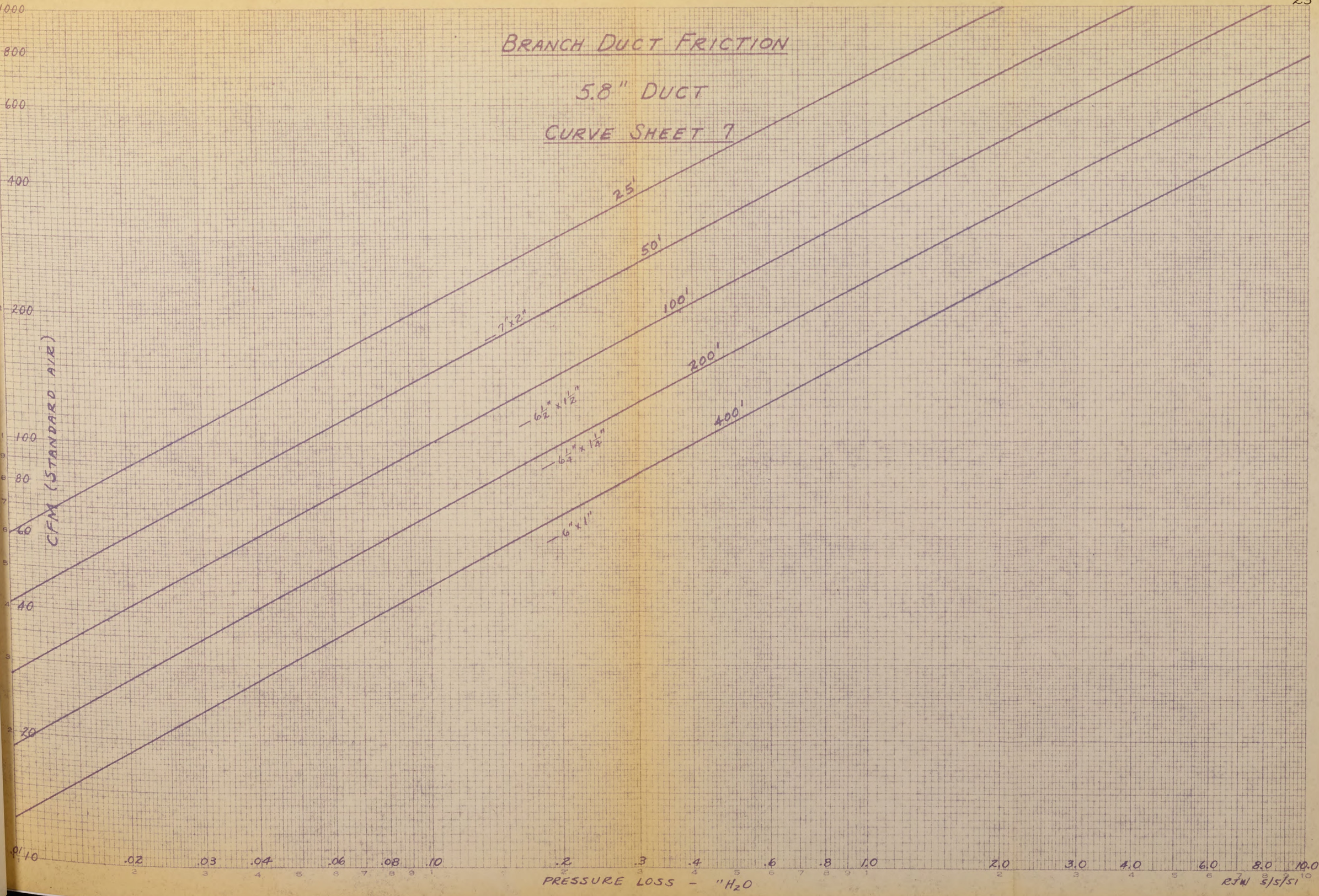
BRANCH DUCT FRICTION

5.8" DUCT

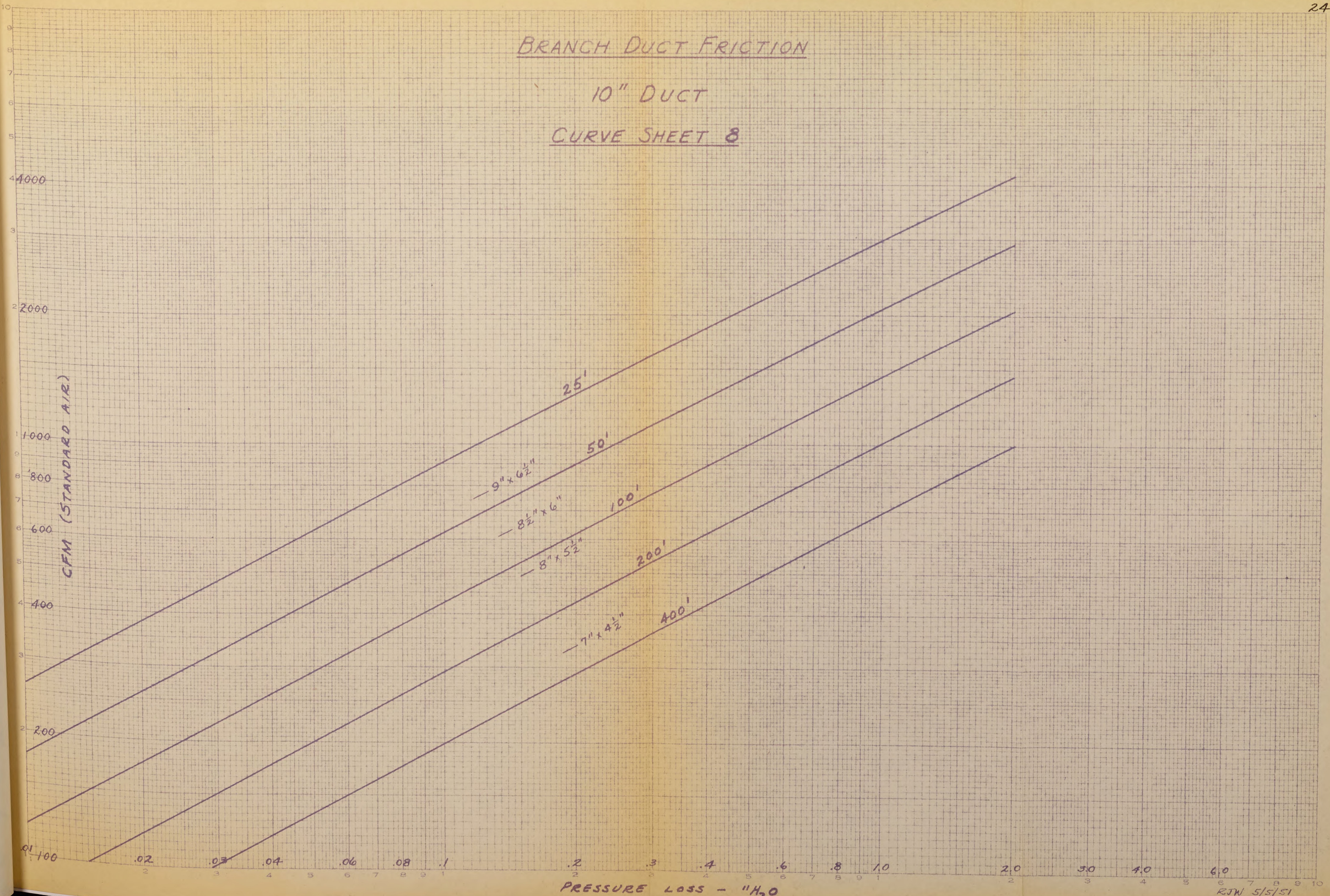
CURVE SHEET 7



BRANCH DUCT FRICTION

10" DUCT

CURVE SHEET 8



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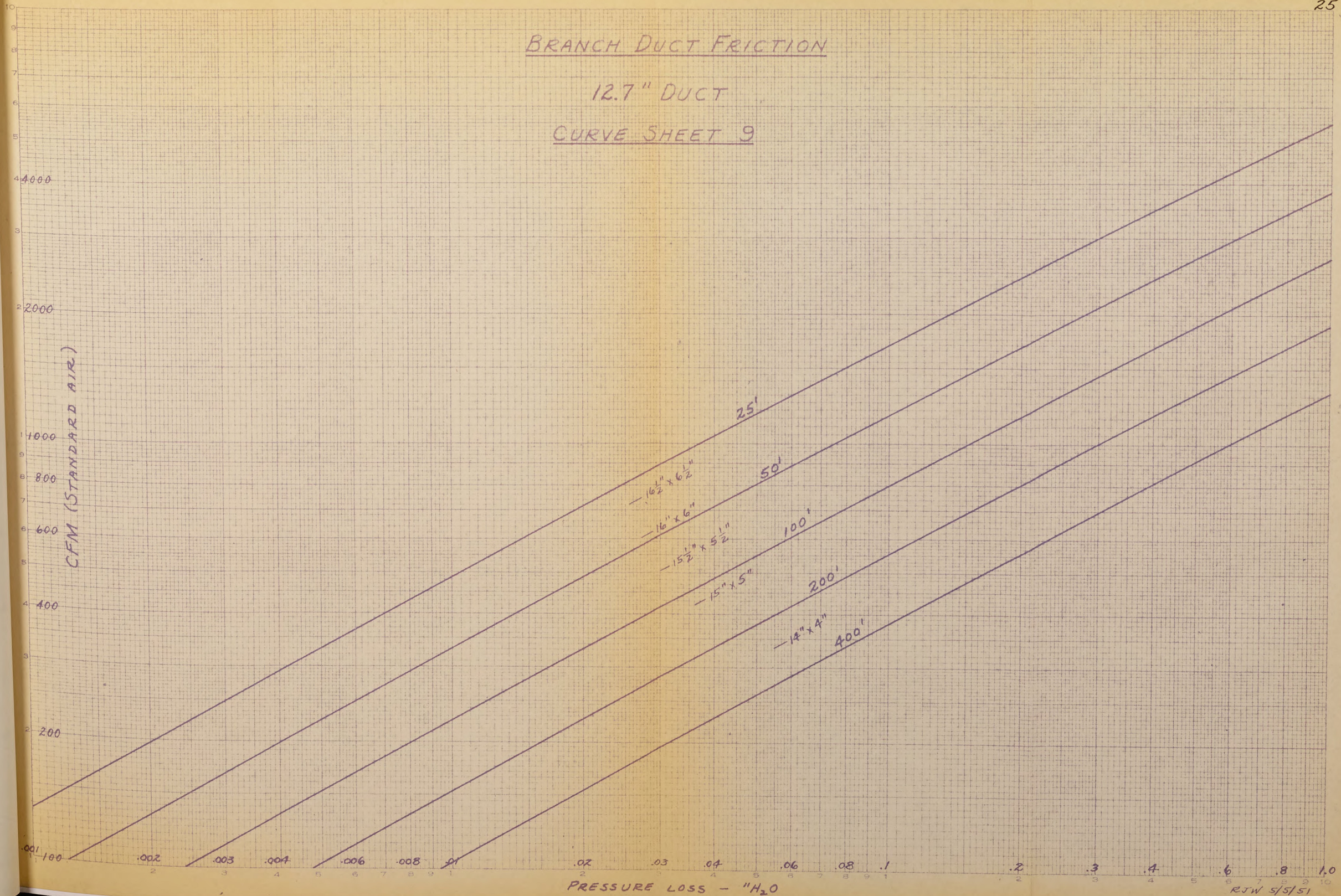
BRANCH DUCT FRICTION

12.7" DUCT

CURVE SHEET 9



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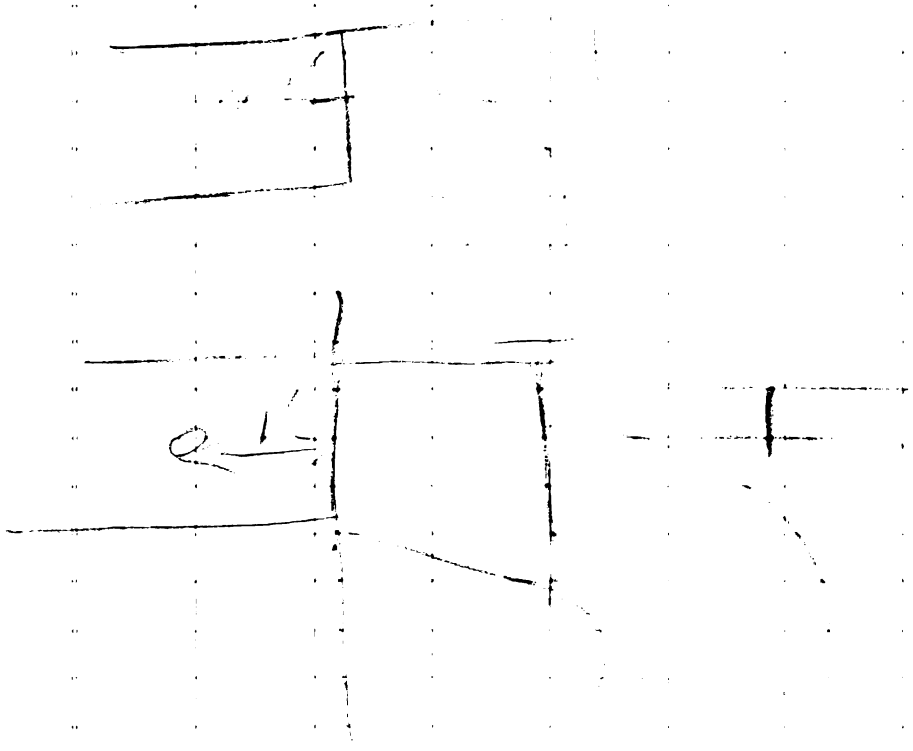

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MICHIGAN STATE COLLEGE

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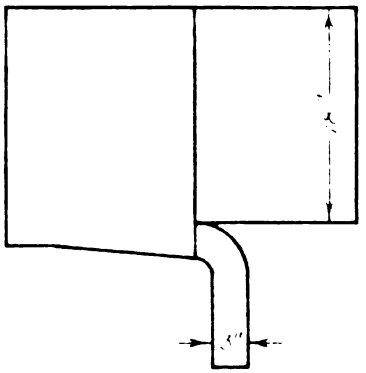
TEST PROCEDURE

The general outline of the test procedure is to select a particular style fitting in one of the three combinations of branch duct sizes; make a series of runs on this fitting with the variable between runs being the combination of orifice sizes in the branch ducts and the variable for each individual run being the total volume of air flowing through the system; and then replace the fitting with another one and repeat the process until all fittings have been tested.

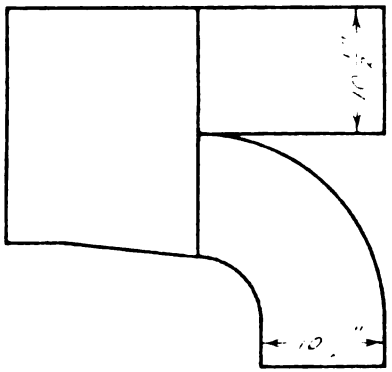
Figure 5 shows the fittings which have been tested. This paper covers the test work on the straight type fittings D, E, and F, and includes an analysis of the test results on fittings A, B, and C as previously mentioned. Figure 6 is a view of fitting B in position ready for test, and Figure 7 is a similar view of fitting E.

After the fitting and branch ducts are put in place, orifice plates are inserted in the U-channel fixtures in the branch ducts as shown in Figure 8, the damper is opened wide, and the blower is started to begin the tests. The data taken consists of the velocity pressure $P_3 - P_2$ in the volume measuring nozzle, the static pressures P_4, P_5, and P_6 as described on page 10, the wet and dry bulb temperatures of the air, and the

INCREASER TYPE



A



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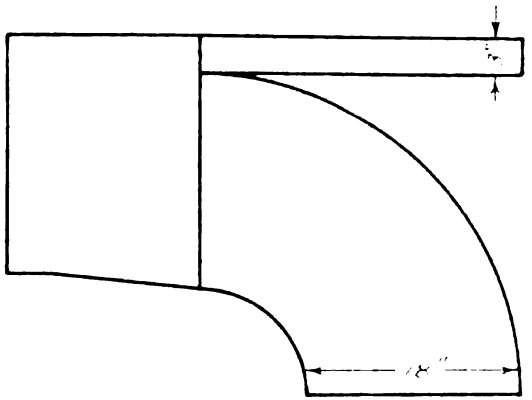
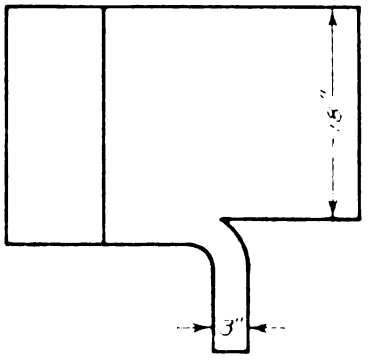


C

STRAIGHT TYPE



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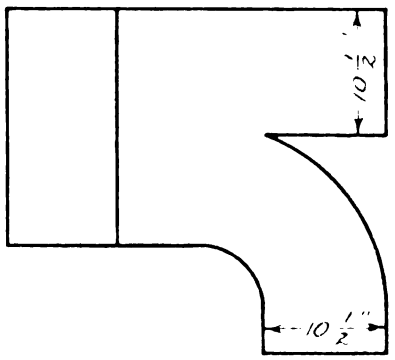
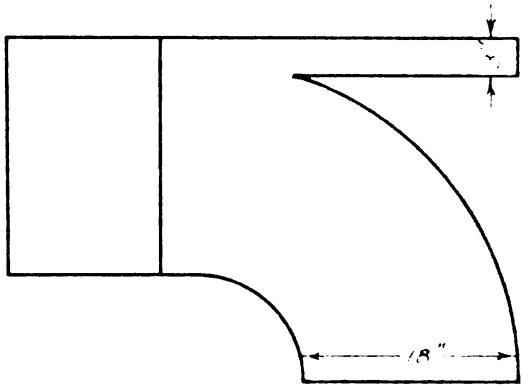


E



F

FITTINGS TESTED

FIGURE 5

ALL THROAT WIDTH HALF TAKEOFF WIDTH.

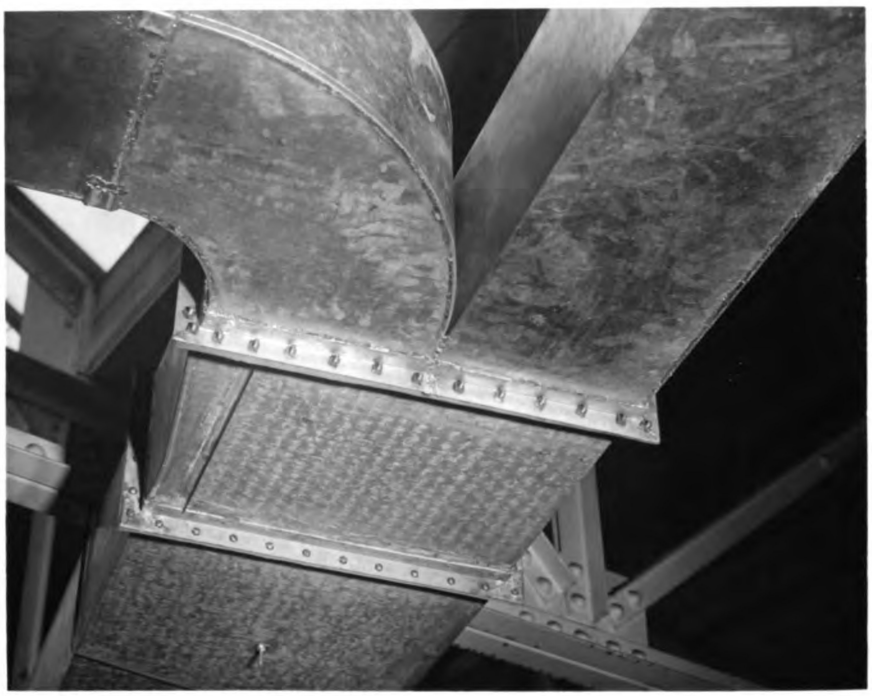


FIGURE 6

INCREASER FITTING IN PLACE



FIGURE 7

STRAIGHT FITTING IN PLACE



FIGURE 8

ORIFICE PLATE BEING PLACED IN POSITION

barometer reading. These data are taken for each of about eleven different settings of the damper controlling the volume of air flowing. The damper is adjusted in increments from the wide open position to the fully closed position which varies the quantity of air flowing from about 1750 cfm to 200 cfm. Figure 9 shows this adjustment being made. These eleven points comprise one run, and one or both of the orifice plates are then changed to set up the next run.

In the taking of the data, the velocity pressure $P_3 - P_2$ is read on the 8" inclined draft gauge (on the 0.5" gauge for low pressures) after a steady state is reached following the damper adjustment. The static pressures P_4, P_5, and P_6 are read on the 3", 1", or 0.5" gauge as required. The arrangement permitting all three pressures to be read on the same gauge eliminates the possibility of variation between instruments, but causes some loss of time since for considerable variations in pressure additional time is required for the instrument to settle out.

First Straight Type Fitting

The first straight type fitting tested was fiting E. The set-up of the fitting and orifice plates for the series of runs on this fitting is shown in



FIGURE 9

DAMPER ADJUSTMENT BEING MADE

Figure 10. There are four different sizes of orifice plates for each branch duct, making a total of sixteen possible combinations. The disposition of orifices in the individual runs is given in Table II, and the calibration curves for the orifices are on Curve Sheets 1 and 2.

Second Straight Type Fitting

Fitting F was the second straight type fitting tested. Figure 11 shows the set-up of the fitting and orifice plates for this series of runs. Five different orifices for the takeoff branch and four for the straight branch make a total of twenty runs in this case. Table III gives the disposition of orifices for the individual runs, and the calibration curves for the orifices are on Curve Sheets 3 and 4.

Third Straight Type Fitting

The third straight type fitting tested was fitting D. It is the reverse of fitting F, and the same orifice plates are used as for fitting F giving again a series of twenty runs. The set-up for this series is shown in Figure 12, and Table IV shows the combination of orifices for each run. Curve Sheets 5 and 6 are the orifice calibration curves in this case.

SET-UP FOR RUNS 87-118

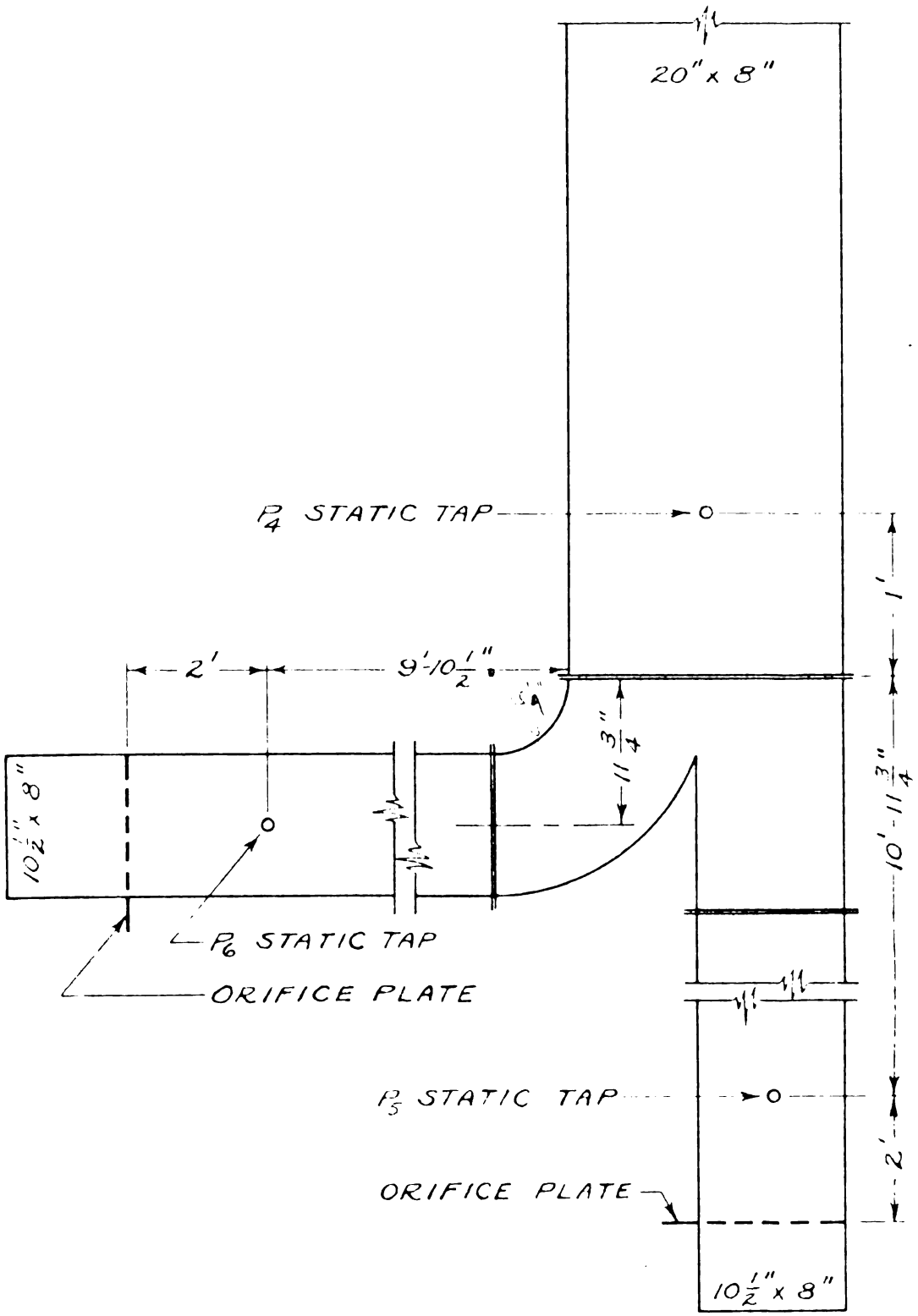


FIGURE 10

TABLE II

Run No.	Orifice Sizes	
	Straight	Take-off
95	9" x 6 1/2"	9" x 6 1/2"
96	"	8 1/2" x 6"
97	"	8" x 5 1/2"
98	"	7" x 4 1/2"
100	8 1/2" x 6"	9" x 6 1/2"
101	"	8 1/2" x 6"
102	"	8" x 5 1/2"
103	"	7" x 4 1/2"
105	8" x 5 1/2"	9" x 6 1/2"
106	"	8 1/2" x 6"
107	"	8" x 5 1/2"
108	"	7" x 4 1/2"
110	7" x 4 1/2"	9" x 6 1/2"
111	"	8 1/2" x 6"
112	"	8" x 5 1/2"
113	"	7" x 4 1/2"

SET-UP FOR RUNS 119-147

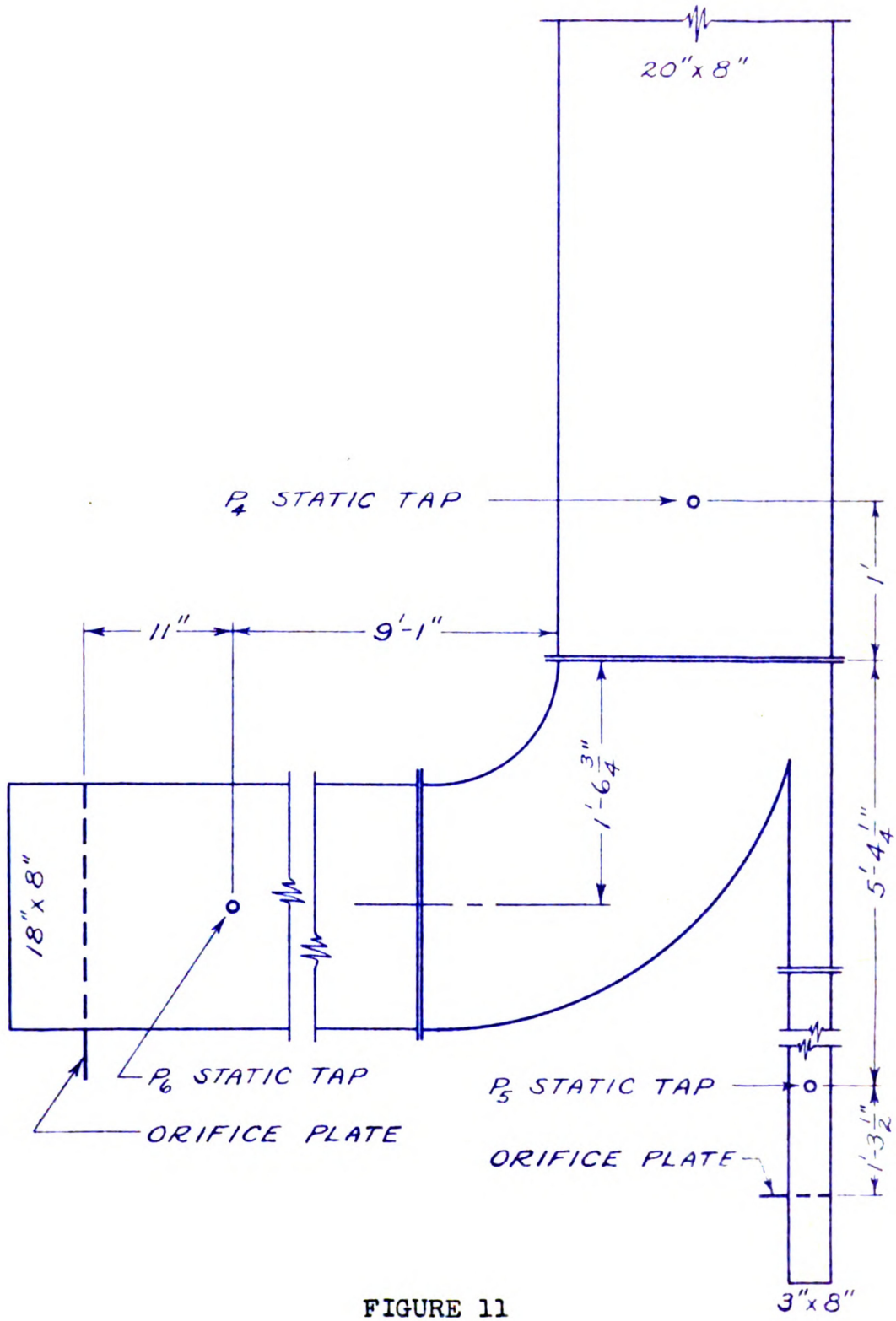


FIGURE 11

TABLE III

Run No.	Orifice Sizes	
	Straight	Take-off
128	7" x 2"	16 1/2" x 6 1/2"
129	"	16" x 6"
130	"	15 1/2" x 5 1/2"
131	"	15" x 5"
132	"	14" x 4"
133	6 1/2" x 1 1/2"	16 1/2" x 6 1/2"
134	"	16" x 6"
135	"	15 1/2" x 5 1/2"
136	"	15" x 5"
137	"	14" x 4"
138	6 1/4" x 1 1/4"	16 1/2" x 6 1/2"
139	"	16" x 6"
140	"	15 1/2" x 5 1/2"
141	"	15" x 5"
142	"	14" x 4"
143	6" x 1"	16 1/2" x 6 1/2"
144	"	16" x 6"
145	"	15 1/2" x 5 1/2"
146	"	15" x 5"
147	"	14" x 4"

SET-UP FOR RUNS 148-176

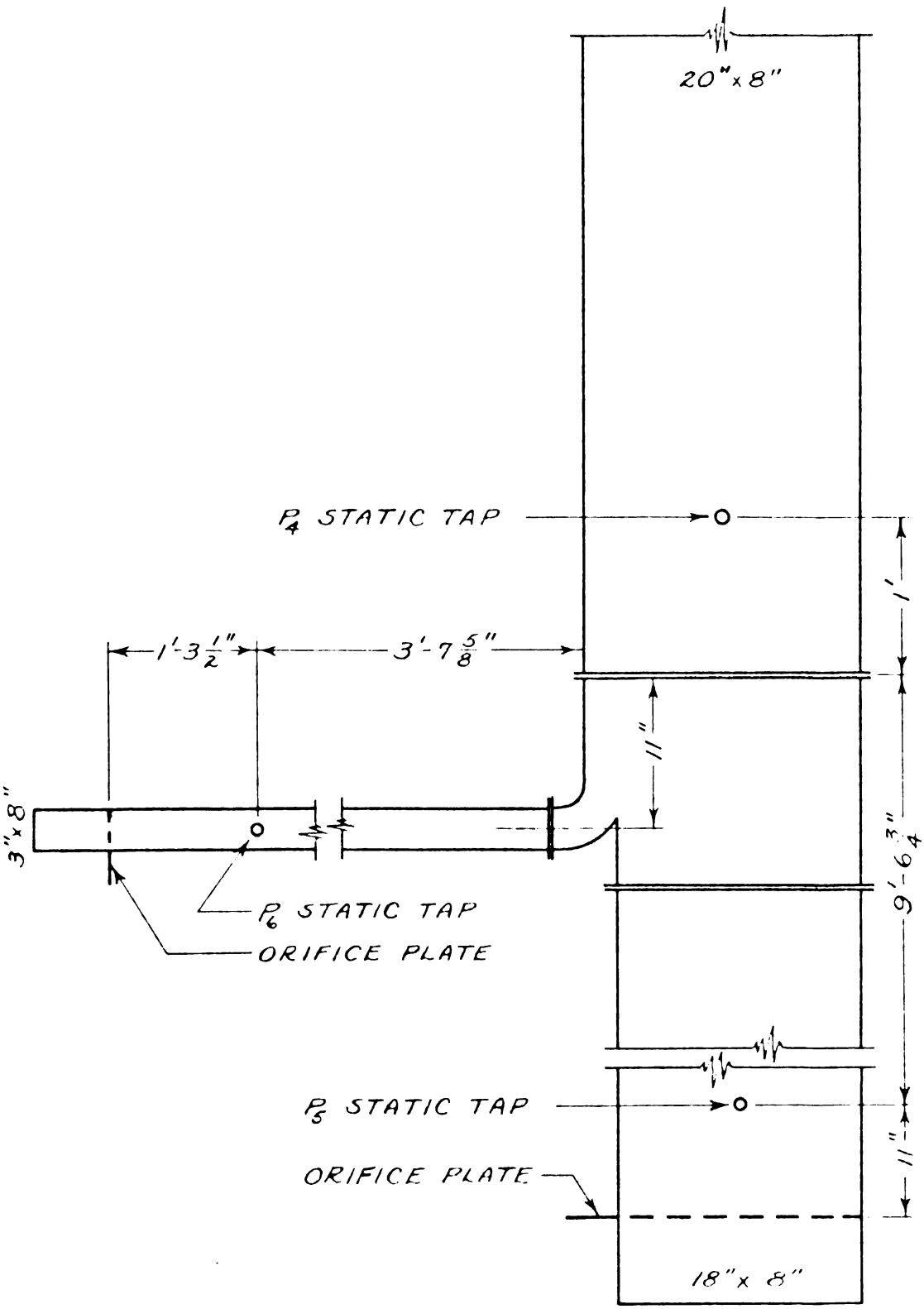


FIGURE 12

TABLE IV

Run No.	Orifice Sizes	
	Straight	Take-off
157	16 1/2" x 6 1/2"	7" x 2"
158	16" x 6"	"
159	15 1/2" x 5 1/2"	"
160	15" x 5"	"
161	14" x 4"	"
162	16 1/2" x 6 1/2"	6 1/2" x 1 1/2"
163	16" x 6"	"
164	15 1/2" x 5 1/2"	"
165	15" x 5"	"
166	14" x 4"	"
167	16 1/2" x 6 1/2"	6 1/4" x 1 1/4"
168	16" x 6"	"
169	15 1/2" x 5 1/2"	"
170	15" x 5"	"
171	14" x 4"	"
172	16 1/2" x 6 1/2"	6" x 1"
173	16" x 6"	"
174	15 1/2" x 5 1/2"	"
175	15" x 5"	"
176	14" x 4"	"

Actual Measured Lengths

The actual measured lengths from static tap P_4 to static taps P_5 and P_6 are:

First fitting:

Straight	11.98 feet
Takeoff	12.69 feet

Second fitting:

Straight	6.35 feet
Takeoff	12.48 feet

Third fitting:

Straight	10.56 feet
Takeoff	6.39 feet

CALCULATIONS

The objec tive of the calculations is to develop from the observed data the amount of the total pressure loss from a point in the main duct upstream of the dividing fitting to a point in the branch duct downstream of the fitting; to express this loss as an equivalent length of branch duct; and finally, by subtraction of the actual length between these two points, to determine the added equivalent length due to the fitting.

Briefly, the steps required to do this are:

1. From observed velocity pressure and area of main measuring nozzle calculate total quantity of air flowing (Q_4).

2. From total quantity of air flowing and area of main duct at static tap P_4 calculate velocity pressure at plane of tap (VP_4).

3. By addition of calculated velocity pressure and observed static pressure obtain total pressure at static tap P_4 (TP_4).

4. From observed static pressure P_5 and orifice calibration curve determine cfm through straight branch duct (Q_5).

5. From Q_5 and area of duct at tap P_5 calculate the velocity pressure at plane of tap (VP_5).

6. By addition of calculated velocity pressure and observed static pressure obtain total pressure at plane of tap P_5 (TP_5).

7. 8. 9. By steps similar to 4, 5, and 6 obtain total pressure at plane of tap P_6 (TP_6).

10. By subtraction obtain total pressure losses between planes of taps P_4 and P_5, and P_4 and P_6.

11. From quantity flowing in branch and equivalent branch duct diameter, determine friction loss per 100 feet from friction chart.

12. By dividing total pressure loss (times 100) between planes of static taps by friction loss per 100 feet, obtain equivalent length between planes of taps.

13. By subtraction of actual measured length between planes of static taps from equivalent length between same, obtain added equivalent length due to dividing fitting.

14. 15. 16. Repeat steps 11, 12, and 13 for second branch.

Actually, a modification of steps 5 and 8 above is necessary, since the values of Q_5 and Q_6 as obtained in steps 4 and 7 do not sum up to precisely equal Q_4 (step 1). It is felt that this is due to inability to read the inclined draft gauges accurately to three places, and that since the orifices are calibrated

against the main nozzle to begin with, it is most consistent to use the Q_4 value as being correct. Therefore, the values of Q_5 and Q_6 from the calibration curves are added, and Q_6 divided by the total to obtain the percent diverted into the takeoff branch. This percentage of the correct total cfm (Q_4) then is a corrected quantity of flow through the takeoff branch (Q_{6c}), and by subtraction ($Q_4 - Q_{6c}$) a corrected value of the quantity flowing in the straight branch (Q_{5c}) is obtained. These two values then are used in steps 5 and 8, and the calculations carried to completion.

Following the above outline, a sample calculation appears as follows (see Run 95, line 1):

Observed Data:

$P_3 - P_2$	P_4	P_5	P_6
4.91	.185	.155	.145

1. $Q_4 = A \cdot V = A \cdot 4005 \sqrt{h} = .1962(4005) \sqrt{P_3 - P_2}$
$= 785.78 \sqrt{P_3 - P_2} = 785.78(2.22)$
$= 1744$ cfm.

2. $Q_4 = A \cdot 4005 \sqrt{h} = A_4 \cdot 4005 \sqrt{VP_4}$
$\sqrt{VP_4} = Q_4/[(A_4)(4005)] = Q_4/[(1.111)(4005)]$
$= .000225Q_4$
$VP_4 = (.000225Q_4)^2 = (.392)^2 = .154"H_2O$

3. $TP_4 = VP_4 + SP_4 = .154 + .185 = .339"H_2O$

4. From Curve Sheet 2 and $P_5 = .155$:

$Q_5 = 895$ cfm

4a. From Curve Sheet 1 and $P_6 = .145$:

$Q_6 = 828$ cfm

4b. $Q_6/(Q_5 + Q_6) = 828/1723 = .481 = 48.1\%$ diverted

$Q_{6c} = \%\ \text{Div.}(Q_4) = .481(1744) = 839$ cfm

$Q_{5c} = Q_4 - Q_{6c} = 1744 - 839 = 905$ cfm

5. $\sqrt{VP_5} = Q_{5c}/[(A_5)(4005)] = Q_{5c}/[.583(4005)]$

$= .000428Q_{5c}$

$VP_5 = (.000428Q_{5c})^2 = (.387)^2 = .150"H_2O$

6. $TP_5 = VP_5 + SP_5 = .150 + .155 = .305"H_2O$

7. See 4a.

8. $\sqrt{VP_6} = Q_{6c}/[(A_6)(4005)] = Q_{6c}/[.583(4005)]$

$= .000428Q_{6c}$

$VP_6 = (.000428Q_{6c})^2 = (.359)^2 = .129"H_2O$

9. $TP_6 = VP_6 + SP_6 = .129 + .145 = .274"H_2O$

10. $TP_4 - TP_5 = .339 - .305 = .034"H_2O$

    $TP_4 - TP_6 = .339 - .274 = .065"H_2O$

11. From friction chart (ASHVE GUIDE, 1950), with $Q_{5c} = 905$ cfm and diameter = 10":

    Friction loss per 100 feet = $.410"H_2O$

12. Equivalent length (straight branch) = $(TP_4 - TP_5)/(F.L./100) \times 100$

    $= .034/.410 \times 100 = 8.29'$

13. Added equivalent length (straight branch) = $8.29 - 11.98 = -3.69'$

14. From friction chart (ASHVE GUIDE, 1950), with $Q_{6c} = 839$ cfm and diameter = 10":

    Friction loss per 100 feet = $.360"H_2O$

15. Equivalent length (takeoff branch) = $(TP_4 - TP_6)/(F.L./100) \times 100$

    $= .065/.360 \times 100 = 18.06'$

16. Added equivalent length (takeoff branch) = $18.06 - 12.69 = 5.37'$

As indicated in the sample calculation, all of the calculations so far as possible are done on a calculator.

All operations on the calculator are carried to four significant figures in the intermediate steps, and then the values are rounded back to three places in most cases for recording on the data sheets. It is felt that this is sufficiently accurate for final values since the reading of the manometers at very best can be done to only three places. Values rounded off to four places are carried on the calculator to minimize distortion of the data in multiplying and dividing operations.

DISCUSSION

Early in the test work it was found that air leakage from the ductwork was sufficient to affect the accuracy of the data being taken. Therefore, all of the joints in the ducts downstream of the main measuring nozzle are soldered, including the longitudinal Pittsburgh lock seams. The fittings are provided with gasketed flange joints to eliminate leakage and permit changes to be made easily. Every time a new fitting is put in place a check is made to determine the extent of leakage by closing off both branches with blanks in place of the sharp-edged orifices, thus putting the entire duct system under high static pressure. If any appreciable quantity of air is detected flowing through the main nozzle, the leaks are located and corrected before proceeding with the tests.

Similarly, the rubber manometer tubing is checked for leakage periodically to prevent errors in readings from this source. This is easily done by forcing the liquid to the high end of the gauge and clamping off the tubing near the static tap in the duct. If the liquid does not drop, there is no leak in the tubing, stopcock, or connections.

As indicated in the Test Procedure, the wet and dry bulb temperatures of the air and the barometer read-

ing are recorded for each run. These three items have not been used in this paper since all calculations are based on standard air. They are recorded in the event that such refinement of the data appears necessary or desirable after further study.

In the section of the paper on Orifice Calibrations it is pointed out that the slope of the calibration curves of the orifices is less than that of the ducts they are used to represent. This means that the equivalent length of duct represented by an orifice is not a constant, but increases with increasing rates of flow. Since the variable from point to point in any given run is the rate of flow through the system, the equivalent length of the branches for the several points of the run will be somewhat different. However, this will not adversely affect the results obtained. The slope of all the orifice calibration curves is the same, and hence the variation of equivalent length with changing rates of flow will be proportionally the same for all orifices. Therefore, the basic function of the orifice plates (which is to vary the proportion of air flowing through the two branches by varying their equivalent lengths) is still satisfactorily performed. That this is true is borne out by the fact that the percent of air diverted remains essentially constant throughout a

run except for points of obvious experimental error.

In looking over the data sheets it will be noted that the last two or three points of a run are frequently completely out of line with the values of the other eight or nine points. This is principally due to the fact that the static pressures observed at these points are of the order of .001 - .005 inches of water, and hence cannot be read very accurately on a 0.5" inclined draft gauge. Those points which are obviously erroneous have not been used in plotting the final curves.

On Curve Sheets 10, 11, 12, and 13 in the pocket at the end of the thesis the resistance of the dividing fitting expressed as an added equivalent length in feet of branch duct is plotted against a ratio of average lower velocity to average higher velocity in the branch ducts. Thus the ratio is always less than one, and is either V_5/V_6 or V_6/V_5 depending on the respective velocities in the straight branch (V_5) and the takeoff branch (V_6). Curve Sheets 10 and 11 show the effect on the takeoff branch of the increaser and straight type fittings respectively, and Curve Sheets 12 and 13 show the effect on the straight branch of these same fittings.

An inspection of the curves for the takeoff branch shows first that there is no significant difference between the two types of fittings tested. It is further

evident that the added equivalent length of the takeoff branch due to the dividing fitting is always positive, and is a maximum when the average velocity in the takeoff branch is about one-fourth the average velocity in the straight branch. This maximum point represents a condition of a small size takeoff branch of very long equivalent length (about 480') with a very low velocity as compared to the straight branch. An important point to note here is that in actual practice a long equivalent length will naturally result in a lower quantity of flow (for a given available pressure for causing flow) and consequent lower velocity, and therefore a bad situation becomes worse. It may also be noted that the losses are not excessive when the average velocities in the two branches are within twenty percent of each other, and are a minimum when the takeoff and straight branches are of equal size and the velocities range from equal to twenty-five percent higher in the takeoff branch. Finally, the curves show that whenever the average velocity in the takeoff branch is higher than that in the straight branch the added equivalent length of the takeoff branch due to the dividing fitting is within the range of 4 to 15 feet.

Looking next at the curves for the straight branch on Curve Sheets 12 and 13, it is again evident that

there is no significant difference between the increaser and straight type fittings. In this case, however, it is seen that the added equivalent length is not always positive; in fact, for straight branch sizes of $10\frac{1}{2}$ x 8" and 18" x 8", practically all of the values taken from the curves fall within the range of 0 to -4 feet. This indicates that for these two sizes of the straight branch, the equivalent length from the plane of static tap P_4 in the main duct to the plane of static tap P_5 in the straight branch is less than the actual measured distance between the two points. In other words, some transfer of energy from the takeoff branch to the straight branch is taking place to give these negative losses.

The third curve on these sheets representing the added equivalent length for a 3" x 8" straight branch has different characteristics. The minimum value here is 8 to 10 feet at a ratio of velocities of very nearly one, and reaches a maximum when the average velocity in the straight branch is about one-fourth that in the takeoff branch. This maximum point represents a condition of a small size straight branch with a very long equivalent length (about 480') and a very low velocity as compared to the takeoff branch. The phenomena which causes this curve to shift from the region of negative added

equivalent lengths for a 10½" x 8" straight branch to the positive region with a minimum value of about 10 feet for a 3" x 8" straight branch cannot be explained with the data available at this time. Additional tests should be run using a similar dividing fitting with a straight branch (or perhaps more than one) of an intermediate size to determine what happens in this region. From the present curves it appears that there may be a family of curves obtained when the straight branch size is increased in increments from the 3" x 8" size to the 10½"x 8" size. With further increases in size the added equivalent length of the straight branch seems to become almost a constant value of from -2.5 feet to -4.0 feet, as shown by the curves for the 18" x 8" straight branch.

CONCLUSIONS

From the data and results presented in this paper the following conclusions can be drawn:

1. There is no significant difference in the resistance offered to flow by the two types of fittings tested, known as "Increaser" type and "Straight" type.

2. For all conditions of flow, the added equivalent length of a takeoff branch due to a dividing fitting is a positive value of 4 feet or more.

3. The maximum added equivalent length of a branch, due to a dividing fitting, exists when the average velocity in the branch is a minimum as compared to the average velocity in the other branch. This holds true for both the takeoff and straight branches.

4. The minimum added equivalent length of a branch, due to a dividing fitting, exists when the ratio of the average velocity in one branch to the average velocity in the other branch (taken so the ratio is less than one) is within the range 0.85 - 1.0. Within these limits, the added equivalent length of the straight branch varies from -4 to 11 feet, and that of the takeoff branch varies from 4 to 15 feet.

5. For the usual condition encountered in practice where the straight branch is actually a continuation of the main in reduced size, and hence usually is at least equal to the takeoff branch in size, the added equivalent length of the straight branch is negative, ranging from 0 to -4 feet.

6. For the usual condition mentioned in 5 above, the added equivalent length of the takeoff branch is about 10 feet if the average velocity in the takeoff branch is 80% or more of the average velocity in the straight branch.

7. A condition of a small branch of long equivalent length, with a low velocity in the branch, should be avoided. Under these conditions the added equivalent length of the branch due to the dividing fitting may become as much as 112 feet for the straight branch and 143 feet for the takeoff branch.

8. In any layout where the flow may be critical, the ratio of velocities in the branches of a dividing fitting should be checked and held as close to unity as possible.

9. This research should be continued to determine whether the third design of fitting, a "Decreaser"

type, shows different characteristics from the present two fittings. In addition, it is desirable to extend the present data on the small (3" x 8") branches by making up orifices smaller than the 14" x 4" for the large branch (18" x 8") to determine what happens to the added equivalent length of this small branch when its velocity exceeds the velocity in the large branch.

DATA SHEETS

Data sheets 10A-85A following record the recalculation of added equivalent lengths for the increaser type fittings. Data for these calculations were taken from the thesis "Friction Equivalents of Take-offs in Rectangular Ducts" by James Harold Yohn, Michigan State College, 1950.

Data sheets 87-176 and 95A-176A record the original data and all of the intermediate and final calculated values for the straight type fittings as tested by the author.

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.352	7.10	10.6'	-3.50	5.8"	.280	17.85	6.1'	11.75
2	|	.310	6.78	|	-3.82	|	.230	29.10	|	23.00
3	|	.239	6.70	|	-3.90	|	.180	29.45	|	23.35
4	|	.274	7.26	|	-3.34	|	.140	27.85	|	21.75
5	|	.130	6.15	|	-4.45	|	.093	32.25	|	26.15
6	|	.083	8.44	|	-2.16	|	.063	30.40	|	24.30
7	|	.049	8.16	|	-2.44	|	.040	27.50	|	21.40
8	|	.035	5.72	|	-4.88	|	.030	28.00	|	21.90
9	|	.024	8.34	|	-2.26	|	.020	28.00	|	21.90
10	|	.015	10.00	|	-0.60	|	.013	26.15	|	20.05
11	|	.0065	15.39	|	4.79	|	.0075	22.65	|	16.55
12	12.7"	.0049	18.36	10.6'	7.76	5.8"	—	—	6.1'	—
13										
14										
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Remarks:

MLIT-232

Sheet No. 11A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.370	6.49	10.6'	-4.11	5.8"	.150	44.65	6.1'	38.55
2	|	.330	6.51	|	-4.09	|	.130	46.15	|	40.05
3	|	.250	7.21	|	-3.39	|	.100	46.00	|	39.90
4	|	.190	6.58	|	-4.02	|	.090	31.10	|	25.00
5	|	.130	6.15	|	-4.45	|	.052	50.00	|	43.90
6	|	.086	10.45	|	-0.15	|	.036	41.20	|	41.10
7	|	.049	10.20	|	-0.40	|	.021	47.65	|	41.55
8	|	.031	10.00	|	-0.60	|	.016	43.75	|	37.65
9	|	.020	10.00	|	-0.60	|	.011	34.55	|	28.45
10	|	.013	7.69	|	-2.91	|	.0062	43.55	|	37.45
11	|	.0052	19.25	|	8.65	|	—	—	|	—
12	12.7"	—	—	10.6'	—	5.8"	—	—	6.1'	—
13										
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.400	6.25	10.6'	-4.35	5.8"	.100	67.00	6.1'	60.90
2	|	.330	6.67	|	-3.93	|	.085	65.90	|	59.80
3	|	.230	8.04	|	-2.56	|	.058	75.80	|	69.70
4	|	.180	7.78	|	-2.82	|	.045	71.10	|	65.00
5	|	.130	7.69	|	-2.91	|	.036	63.90	|	57.80
6	|	.092	8.70	|	-1.90	|	.024	72.95	|	66.85
7	|	.051	7.84	|	-2.76	|	.014	61.40	|	55.30
8	|	.037	8.11	|	-2.49	|	.011	56.37	|	50.27
9	|	.024	8.34	|	-2.26	|	.0075	50.62	|	44.52
10	|	.016	6.88	|	-3.72	|	.0047	55.30	|	49.20
11	12.7"	.007	5.72	10.6'	-4.88	5.8"	—	—	6.1'	—
12										
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.400	6.00	10.6'	-4.60	5.8"	.058	122.40	6.1'	116.30
2	|	.340	6.55	|	-4.05	|	.048	128.10	|	122.00
3	|	.260	7.70	|	-2.90	|	.038	128.90	|	122.80
4	|	.200	7.00	|	-3.60	|	.028	85.80	|	79.70
5	|	.140	7.14	|	-3.46	|	.021	114.25	|	108.15
6	|	.092	8.15	|	-2.45	|	.014	125.00	|	118.90
7	|	.052	—	|	—	|	.0085	—	|	—
8	|	.039	5.90	|	-4.70	|	.006	95.00	|	88.90
9	|	.024	8.75	|	-1.85	|	—	—	|	—
10	|	.016	5.62	|	-4.98	|	—	—	|	—
11	12.7"	.009	4.44	10.6'	-6.16	5.8"	—	—	6.1'	—
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.340	5.88	10.6'	-4.72	5.8"	.410	19.75	6.1'	13.65
2	|	.300	4.00	|	-6.60	|	.290	23.10	|	17.00
3	|	.230	4.78	|	-5.82	|	.240	21.25	|	15.15
4	|	.170	5.88	|	-4.72	|	.180	22.20	|	16.10
5	|	.130	5.38	|	-5.22	|	.130	21.52	|	15.42
6	|	.080	5.00	|	-5.60	|	.080	23.75	|	17.65
7	|	.048	6.25	|	-4.35	|	.042	30.95	|	24.85
8	|	.037	8.11	|	-2.49	|	.035	28.57	|	22.47
9	|	.021	20.90	|	10.30	|	.019	47.35	|	41.25
10	|	.013	30.75	|	20.15	|	.012	60.00	|	53.90
11	12.7"	.0065	41.70	10.6'	37.10	5.8"	.0055	89.10	6.1'	83.00
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.380	5.53	10.6'	-5.07	5.8"	.180	37.20	6.1'	31.10
2	|	.320	5.94	|	-4.66	|	.160	36.25	|	30.15
3	|	.250	6.40	|	-4.20	|	.130	34.62	|	28.52
4	|	.180	7.22	|	-3.38	|	.094	37.25	|	31.15
5	|	.130	6.92	|	-3.68	|	.070	37.15	|	31.05
6	|	.089	7.87	|	-2.73	|	.044	38.65	|	32.55
7	|	.046	6.52	|	-4.08	|	.024	37.49	|	31.39
8	|	.037	6.75	|	-3.85	|	.018	38.89	|	32.79
9	|	.022	7.28	|	-3.32	|	.012	30.82	|	24.72
10	|	.013	10.00	|	-0.60	|	.0063	46.05	|	39.95
11	12.7"	.0065	10.70	10.6'	+0.10	5.8"	—	—	6.1'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers _____ _____

Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	12.7"	.380	6.05	10.6'	-4.55	5.8"	.110	61.80	6.1'	56.70
2	|	.320	6.87	|	-3.73	|	.105	53.30	|	47.20
3	|	.260	7.69	|	-2.91	|	.082	60.99	|	54.89
4	|	.190	6.84	|	-3.76	|	.060	55.00	|	48.90
5	|	.130	6.92	|	-3.68	|	.044	52.25	|	46.15
6	|	.086	6.98	|	-3.62	|	.029	55.19	|	49.09
7	|	.048	6.25	|	-4.35	|	.017	52.90	|	46.80
8	|	.038	7.90	|	-2.70	|	.013	56.70	|	50.60
9	|	.023	5.22	|	-5.38	|	.0083	53.00	|	46.90
10	|	.014	4.28	|	-6.32	|	—	—	|	—
11	12.7"	.0062	3.22	10.6'	-7.38	5.8"	—	—	6.1'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	12.7"	.400	7.25	10.6'	-3.35	5.8"	.070	96.80	6.1'	90.70
2	|	.350	7.43	|	-3.17	|	.063	92.10	|	86.00
3	|	.260	8.08	|	-2.52	|	.048	95.90	|	89.80
4	|	.190	7.90	|	-2.70	|	.038	92.10	|	86.00
5	|	.140	10.00	|	-0.60	|	.027	92.60	|	86.50
6	|	.092	9.78	|	-0.82	|	.019	94.80	|	88.70
7	|	.054	11.10	|	0.50	|	.012	75.00	|	78.90
8	|	.041	12.19	|	1.59	|	.0085	94.10	|	88.00
9	|	.024	8.34	|	-2.26	|	.0054	74.10	|	68.00
10	|	.015	10.00	|	-0.10	|	—	—	|	—
11	12.7"	.0064	12.50	10.6'	1.90	5.8"	—	—	6.1'	—
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Remarks:

MLIT-232

Sheet No. 18A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers _____ _____

Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	12.7"	.320	6.56	10.6'	-4.04	5.8"	.460	17.38	6.1'	11.28
2		.280	5.72		-4.88		.400	17.50		11.40
3		.220	6.36		-4.24		.310	18.38		12.28
4		.160	6.88		-3.72		.230	18.69		12.59
5		.120	6.66		-3.94		.160	20.00		13.90
6		.077	6.49		-4.11		.110	19.08		12.98
7		.046	6.52		-4.08		.062	24.20		18.10
8		.032	6.25		-4.35		.042	23.80		17.70
9		.021	11.42		0.82		.027	23.70		17.60
10		.013	10.00		-0.60		.016	23.10		17.00
11	12.7"	.006	—	10.6'	—	5.8"	.0057	31.60	6.1'	25.50
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Remarks:

MLIT-232

Sheet No. 19A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.340	7.06	10.6'	-3.54	5.8"	.250	25.60	6.1'	19.50
2	"	.310	6.77	"	-3.83	"	.210	27.61	"	21.51
3	"	.220	7.73	"	-2.87	"	.170	24.70	"	18.60
4	"	.180	7.78	"	-2.82	"	.130	25.39	"	19.29
5	"	.130	6.15	"	-4.45	"	.090	26.66	"	20.56
6	"	.081	8.64	"	-1.96	"	.056	30.37	"	24.27
7	"	.048	8.34	"	-2.26	"	.034	26.45	"	20.35
8	"	.036	9.73	"	-0.87	"	.024	29.15	"	23.05
9	"	.023	10.86	"	0.26	"	.016	30.00	"	23.90
10	"	.013	10.77	"	0.17	"	.010	22.00	"	15.90
11	12.7"	.0063	14.28	10.6'	3.68	5.8"	—	—	6.1'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	12.7"	.360	6.94	10.6'	-3.66	5.8"	.160	38.10	6.1'	32.00
2	|	.320	6.56	|	-4.04	|	.140	40.00	|	33.90
3	|	.240	7.04	|	-3.56	|	.110	38.18	|	32.08
4	|	.190	7.90	|	-2.70	|	.082	40.25	|	34.15
5	|	.130	9.23	|	-1.37	|	.058	41.40	|	35.30
6	|	.085	9.42	|	-1.18	|	.039	38.50	|	32.40
7	|	.049	10.20	|	-0.40	|	.023	41.30	|	35.20
8	|	.035	10.00	|	-0.60	|	.016	40.60	|	34.50
9	|	.022	8.64	|	-1.96	|	.011	37.25	|	31.15
10	|	.013	10.00	|	-0.60	|	.0061	44.25	|	38.15
11	12.7"	.0068	10.29	10.6'	-0.31	5.8"	—	—	6.1'	—
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Remarks:

MLIT-232

Sheet No. 21A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.370	7.84	10.6'	-2.76	5.8"	.093	67.79	6.1'	61.69
2	"	.330	7.88	"	-2.72	"	.083	66.25	"	60.15
3	"	.260	8.46	"	-2.14	"	.063	71.40	"	65.30
4	"	.190	8.43	"	-2.17	"	.048	66.65	"	60.55
5	"	.140	8.57	"	-2.03	"	.039	61.55	"	56.45
6	"	.086	9.30	"	-1.30	"	.022	75.00	"	68.90
7	"	.046	10.86	"	0.26	"	.014	67.82	"	61.72
8	"	.037	10.80	"	0.20	"	.011	60.85	"	54.75
9	"	.024	11.25	"	0.65	"	.0063	68.25	"	62.15
10	"	.015	6.66	"	-3.94	"	—	—	"	—
11	12.7"	.0067	7.46	10.6'	-3.14	5.8"	—	—	6.1'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

No.	STRAIGHT					TAKE OFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.310	5.81	10.6'	-4.79	5.8"	.630	15.39	6.1'	9.29
2	"	.270	7.04	"	-3.56	"	.560	15.17	"	9.07
3	"	.220	5.91	"	-4.69	"	.440	15.45	"	9.35
4	"	.160	6.25	"	-4.35	"	.310	16.76	"	10.66
5	"	.140	5.71	"	-4.89	"	.230	16.95	"	10.85
6	"	.072	6.95	"	-3.65	"	.160	14.38	"	8.28
7	"	.042	4.76	"	-5.84	"	.081	23.45	"	17.35
8	"	.038	6.84	"	-3.76	"	.063	23.82	"	17.72
9	"	.022	6.37	"	-4.23	"	.040	20.73	"	14.63
10	"	.013	11.54	"	0.94	"	.026	18.45	"	12.35
11	12.7"	.0048	14.67	10.6'	4.07	5.8"	.012	10.00	6.1'	3.90
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Remarks:

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Sheet No. 23A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.330	6.97	10.6'	-3.63	5.8"	.320	20.61	6.1'	14.51
2		.300	6.33		-4.27		.300	19.33		13.23
3		.230	6.96		-3.64		.230	20.42		14.32
4		.180	6.11		-4.49		.170	22.35		16.25
5		.130	7.69		-2.91		.130	21.52		15.42
6		.067	8.95		-1.65		.078	23.08		16.98
7		.046	6.52		-4.08		.048	20.82		14.72
8		.035	8.86		-1.74		.033	28.18		22.08
9		.022	9.55		-1.05		.020	28.50		22.40
10		.013	8.46		-2.14		.013	38.43		32.33
11	12.7"	.0056	8.93	10.6'	-1.67	5.8"	—	—	6.1'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.330	6.96	10.6'	-3.64	5.8"	.210	29.00	6.1'	22.90
2	|	.310	6.45	|	-4.15	|	.200	27.00	|	20.90
3	|	.230	7.82	|	-2.78	|	.150	28.00	|	21.90
4	|	.180	8.33	|	-2.27	|	.120	29.10	|	23.00
5	|	.130	8.46	|	-2.14	|	.083	27.70	|	21.60
6	|	.085	8.24	|	-2.36	|	.053	30.20	|	24.10
7	|	.046	10.86	|	0.26	|	.030	33.33	|	27.23
8	|	.035	8.57	|	-2.03	|	.023	32.60	|	26.50
9	|	.023	7.82	|	-2.78	|	.015	31.30	|	25.20
10	|	.015	8.66	|	-1.94	|	.0095	36.50	|	30.40
11	12.7"	.0071	5.63	10.6'	-4.97	5.8"	—	—	6.1'	—
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Remarks:

MLIT-232

Sheet No. 25A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.350	8.00	10.6'	-2.60	5.8"	.125	46.40	6.1'	40.30
2		.320	8.75		-1.85		.120	46.60		40.50
3		.250	8.80		-1.80		.093	48.40		42.30
4		.190	8.42		-2.18		.068	50.00		43.90
5		.130	10.00		-0.60		.050	48.00		41.90
6		.088	7.95		-2.65		.032	50.00		43.90
7		.048	10.40		-0.20		.020	42.50		36.40
8		.035	8.51		-2.03		.013	43.80		37.70
9		.023	9.20		-1.40		.009	47.75		41.65
10		.014	4.28		-6.32		—	—		—
11	12.7"	.0063	14.25	10.6'	3.65	5.8"	—	—	6.1'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers _____ _____

_____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.230	6.08	10.6'	-4.52	5.8"	.950	17.70	6.1'	11.60
2		.180	6.66		-3.94		.750	18.40		12.30
3		.140	6.42		-4.08		.570	18.60		12.50
4		.098	7.15		-3.45		.380	20.21		14.11
5		.066	9.09		-1.51		.260	20.39		14.29
6		.036	8.34		-2.26		.130	23.05		16.95
7		.029	6.90		-3.70		.110	21.81		15.71
8		.017	5.88		-4.72		.061	25.21		19.11
9		.011	8.18		-2.42		.040	21.75		15.65
10		.0055	—		—		.018	21.10		15.00
11	12.7"	—	—	10.6'	—	5.8"	—	—	6.1'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.270	5.18	10.6'	-5.42	5.8"	.550	14.17	6.1'	8.07
2	|	.210	7.62	|	-2.98	|	.460	13.45	|	7.35
3	|	.160	8.12	|	-2.48	|	.330	14.85	|	8.75
4	|	.110	8.18	|	-2.42	|	.230	16.10	|	10.00
5	|	.075	9.33	|	-1.27	|	.150	17.32	|	11.22
6	|	.040	10.00	|	-0.60	|	.085	15.29	|	9.19
7	|	.030	6.67	|	-3.93	|	.065	6.15	|	0.05
8	|	.021	4.28	|	-6.32	|	.044	17.05	|	10.95
9	|	.013	11.52	|	0.92	|	.027	17.75	|	11.65
10	12.7"	—	—	10.6'	—	5.8"	.012	5.83	6.1'	-0.27
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Remarks:

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Sheet No. 28A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	12.7"	.270	4.81	10.6'	-5.79	5.8"	.410	13.90	6.1'	7.80
2		.220	6.82		-3.78		.280	21.05		14.95
3		.170	5.88		-4.72		.220	13.37		7.27
4		.120	6.66		-3.94		.150	18.65		12.55
5		.077	7.79		-2.81		.100	18.00		11.90
6		.046	8.69		-1.91		.060	21.64		15.54
7		.033	6.06		-4.54		.037	24.30		18.20
8		.023	6.52		-4.08		.030	19.32		13.22
9		.013	9.23		-1.37		.016	15.00		8.90
10	12.7"	.0053	20.75	10.6'	10.15	5.8"	.0065	23.05	6.1'	16.95
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	Eq. D.	Δp/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	Δp/100	Eq. L.	Act. L.	Added Eq. L.
1	12.7"	.280	15.70	10.6'	5.10	5.8"	.210	28.05	6.1'	21.95
2		.230	15.65		5.05		.180	25.00		18.90
3		.180	16.66		6.06		.130	27.65		21.55
4		.130	15.39		4.79		.093	26.90		20.80
5		.080	16.25		5.65		.062	25.80		19.70
6		.043	13.95		3.35		.033	26.35		20.25
7		.040	15.00		4.40		.026	26.90		20.80
8		.022	15.45		4.85		.017	21.18		15.08
9		.016	10.00		-0.60		.012	24.19		18.09
10	12.7"	.0055	14.53	10.6'	3.93	5.8"	—	—	6.1'	—
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Remarks:

MLIT-232

Sheet No. 39A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.330	20.00	5.8'	14.20	12.7"	.350	20.22	12.9'	7.32
2		.280	20.00		14.20		.300	21.00		8.10
3		.230	18.70		12.90		.230	21.30		8.40
4		.170	18.80		13.00		.170	21.80		8.90
5		.120	19.15		13.35		.110	22.75		9.85
6		.084	17.85		12.05		.080	21.21		8.31
7		.050	18.00		12.20		.043	25.60		12.70
8		.037	16.20		10.40		.034	23.50		10.60
9		.026	10.75		4.95		.028	13.20		0.30
10		.013	23.82		18.02		.013	—		—
11	5.8"	.0075	14.69	5.8'	8.89	12.7"	.0058	18.95	12.9'	6.05
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.180	30.00	5.8'	24.20	12.7"	.380	21.30	12.9'	8.40
2		.150	30.00		24.20		.310	22.20		9.30
3		.130	26.90		21.10		.240	22.50		9.60
4		.091	28.60		22.80		.180	23.30		10.40
5		.066	28.80		23.00		.130	22.30		9.40
6		.045	28.82		23.02		.086	23.25		10.35
7		.027	29.60		23.80		.050	24.00		11.10
8		.019	36.80		31.00		.035	22.81		9.91
9		.013	30.78		24.98		.024	20.80		7.90
10		.008	25.00		19.20		.015	20.00		7.10
11	5.8"	—	—	5.8'	—	12.7"	.0065	15.40	12.9'	2.50
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	5.8"	.120	46.70	5.8'	40.90	12.7"	.390	22.00	12.9'	9.10
2	|	.100	46.00	|	40.20	|	.330	22.70	|	9.80
3	|	.078	47.50	|	41.70	|	.220	26.40	|	13.50
4	|	.048	58.30	|	52.50	|	.190	22.60	|	9.70
5	|	.042	45.20	|	39.40	|	.130	23.80	|	10.90
6	|	.028	50.00	|	44.20	|	.086	25.60	|	12.70
7	|	.017	51.75	|	45.95	|	.050	26.00	|	13.10
8	|	.013	38.40	|	32.60	|	.037	21.60	|	8.70
9	|	.0085	35.30	|	29.50	|	.024	25.00	|	12.10
10	|	—	—	|	—	|	.016	25.00	|	12.10
11	5.8"	—	—	5.8'	—	12.7"	.0073	13.69	12.9'	0.79
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Remarks:

MLIT-232

Sheet No. 42A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.068	88.25	5.8'	82.45	12.7"	.390	23.50	12.9'	10.60
2	"	.056	92.75	"	86.95	"	.340	23.20	"	10.30
3	"	.044	91.00	"	85.20	"	.260	23.80	"	10.90
4	"	.035	88.60	"	82.80	"	.190	24.70	"	11.80
5	"	.025	84.00	"	78.20	"	.140	23.60	"	10.70
6	"	.017	82.50	"	76.70	"	.090	23.40	"	10.50
7	"	.011	72.70	"	66.90	"	.053	24.50	"	11.60
8	"	.0075	66.66	"	60.86	"	.037	21.60	"	8.70
9	"	—	—	"	—	"	.026	23.10	"	10.20
10	"	—	—	"	—	"	.015	20.00	"	7.10
11	5.8"	—	—	5.8'	—	12.7"	.0071	14.10	12.9'	1.20
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.400	17.75	5.8'	11.95	12.7"	.350	20.25	12.9'	7.35
2		.350	16.55		10.75		.280	21.05		8.15
3		.290	14.15		8.35		.230	21.25		8.35
4		.250	10.00		4.20		.170	21.20		8.30
5		.140	17.85		12.05		.120	20.00		7.10
6		.093	16.10		10.30		.078	20.50		7.60
7		.056	16.05		10.25		.044	22.70		9.80
8		.040	17.50		11.70		.033	21.20		8.30
9		.026	19.20		13.40		.022	18.20		5.30
10		.016	18.75		12.95		.013	15.40		2.50
11	5.8"	.0096	10.40	5.8'	4.60	12.7"	.0064	31.20	12.9'	18.30
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.230	22.60	5.8'	16.80	12.7"	.350	24.20	12.9'	11.30
2	|	.190	23.20	|	17.40	|	.320	21.80	|	8.90
3	|	.150	22.00	|	16.20	|	.230	23.90	|	11.00
4	|	.110	24.50	|	18.70	|	.180	22.80	|	9.90
5	|	.095	21.10	|	15.30	|	.130	22.30	|	9.40
6	|	.052	25.00	|	19.20	|	.085	22.40	|	9.50
7	|	.031	25.80	|	20.00	|	.046	23.90	|	11.00
8	|	.024	20.80	|	15.00	|	.037	21.60	|	8.70
9	|	.014	28.50	|	22.70	|	.023	21.70	|	8.80
10	|	.009	22.20	|	16.40	|	.013	23.10	|	10.20
11	5.8"	—	—	5.8'	—	12.7"	.0057	17.50	12.9'	4.60
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.160	31.90	5.8'	26.10	12.7"	.370	24.30	12.9'	11.40
2		.120	37.50		31.70		.330	22.70		9.80
3		.097	37.20		31.40		.250	23.20		10.30
4		.070	38.60		32.80		.180	24.50		11.60
5		.051	39.20		33.40		.130	23.80		10.90
6		.035	31.40		25.60		.086	22.10		9.20
7		.020	40.00		34.20		.051	23.50		10.60
8		.016	31.20		25.40		.036	24.90		12.00
9		.0094	31.90		26.10		.024	20.80		7.90
10		.0057	17.50		11.70		.013	23.00		10.10
11	5.8"	—	—	5.8'	—	12.7"	.0065	15.35	12.9'	2.45
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.080	73.80	5.8'	68.00	12.7"	.390	23.50	12.9'	10.60
2	"	.070	72.80	"	67.00	"	.330	24.20	"	11.30
3	"	.057	66.70	"	60.90	"	.260	24.20	"	11.30
4	"	.042	71.40	"	65.60	"	.200	23.00	"	10.10
5	"	.030	70.00	"	64.20	"	.140	24.20	"	11.30
6	"	.022	59.00	"	53.20	"	.090	24.40	"	11.50
7	"	.013	53.80	"	48.00	"	.051	23.50	"	10.60
8	"	.009	55.60	"	49.80	"	.039	23.00	"	10.10
9	"	.0061	65.50	"	59.70	"	.024	25.00	"	12.10
10	"	—	—	"	—	"	.015	33.30	"	20.40
11	5.8"	—	—	5.8'	—	12.7"	.007	28.50	12.9'	15.60
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.510	15.30	5.8'	9.50	12.7"	.330	20.60	12.9'	7.70
2		.420	16.15		10.35		.280	21.00		8.10
3		.340	15.60		9.80		.220	20.40		7.50
4		.310	13.10		7.30		.160	22.50		9.60
5		.180	15.55		9.75		.120	20.00		7.10
6		.120	15.80		10.00		.078	20.50		7.60
7		.069	17.40		11.60		.045	22.20		9.30
8		.049	18.35		12.55		.032	21.80		8.90
9		.034	14.70		8.90		.022	18.20		5.30
10		.021	14.30		8.50		.013	15.40		2.50
11	5.8"	.012	2.5	5.8'	-3.30	12.7"	.0065	15.40	12.9'	2.50
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.270	21.40	5.8'	15.60	12.7"	.350	23.90	12.9'	11.00
2	|	.240	18.75	|	12.95	|	.310	21.30	|	8.40
3	|	.180	18.90	|	13.10	|	.230	23.00	|	10.10
4	|	.140	20.00	|	14.20	|	.180	22.20	|	9.30
5	|	.100	19.00	|	13.20	|	.130	21.50	|	8.60
6	|	.066	19.70	|	13.90	|	.082	24.40	|	11.50
7	|	.038	18.40	|	12.60	|	.048	20.80	|	7.90
8	|	.028	17.85	|	12.05	|	.027	25.90	|	13.00
9	|	.019	21.05	|	15.25	|	.023	26.10	|	13.20
10	|	.012	16.65	|	10.85	|	.013	23.10	|	10.20
11	5.8"	.0057	17.50	5.8'	11.70	12.7"	.0061	16.45	12.9'	3.55
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.170	29.40	5.8'	23.60	12.7"	.360	23.00	12.9'	10.10
2	|	.150	28.60	|	22.80	|	.320	23.10	|	10.20
3	|	.120	28.30	|	22.50	|	.240	24.10	|	11.20
4	|	.090	30.00	|	24.20	|	.200	24.50	|	11.60
5	|	.064	31.30	|	25.50	|	.130	23.00	|	10.10
6	|	.042	28.50	|	22.70	|	.085	22.30	|	9.40
7	|	.026	26.90	|	21.10	|	.050	24.00	|	11.10
8	|	.019	36.80	|	31.00	|	.037	24.30	|	11.40
9	|	.013	23.10	|	17.30	|	.024	25.00	|	12.10
10	|	.0073	27.40	|	21.60	|	.014	28.50	|	15.60
11	5.8"	—	—	5.8'	—	12.7"	.0066	15.15	12.9'	2.25
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Remarks:

MLIT-232

Sheet No. 50A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.100	54.00	5.8'	48.20	12.7"	.370	23.80	12.9'	10.90
2		.091	51.70		45.90		.320	24.40		11.50
3		.072	51.30		45.50		.250	24.80		11.90
4		.054	53.70		47.90		.190	24.20		11.30
5		.039	51.25		45.45		.140	24.30		11.40
6		.027	48.10		42.30		.091	20.90		8.00
7		.015	53.30		47.50		.052	25.00		12.10
8		.012	41.60		35.80		.038	23.60		10.70
9		.0074	40.50		34.70		.025	24.00		11.10
10		—	—		—		.013	23.10		10.20
11	5.8"	—	—	5.8'	—	12.7"	.0068	29.40	12.9'	16.50
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	5.8"	.620	14.80	5.8'	9.00	12.7"	.290	21.40	12.9'	8.50
2		.580	14.50		8.70		.260	21.20		8.30
3		.440	14.30		8.50		.210	20.00		7.10
4		.330	15.75		9.95		.160	20.60		7.70
5		.280	12.50		6.70		.115	19.10		6.20
6		.150	16.00		10.20		.074	20.30		7.40
7		.087	16.10		10.30		.043	20.40		7.50
8		.065	15.40		9.60		.030	20.00		7.10
9		.042	16.65		10.85		.020	20.00		7.10
10		.026	15.40		9.60		.013	23.10		10.20
11	5.8"	.013	7.70	5.8'	1.90	12.7"	—	—	12.9'	—
12										
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Remarks:

MLIT-232

Sheet No. 52A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.400	13.00	5.8'	7.20	12.7"	.320	23.10	12.9'	10.20
2	|	.260	15.00	|	9.20	|	.230	23.00	|	10.10
3	|	.180	18.30	|	12.50	|	.170	7.05	|	-5.85
4	|	.140	14.30	|	8.50	|	.125	24.00	|	11.10
5	|	.086	16.30	|	10.50	|	.081	22.20	|	9.30
6	|	.051	17.60	|	11.80	|	.046	23.90	|	11.00
7	|	.035	20.00	|	14.20	|	.032	21.90	|	9.00
8	|	.028	14.30	|	8.50	|	.023	21.70	|	8.80
9	|	.015	13.30	|	7.50	|	.013	23.00	|	10.10
10	5.8"	.0075	13.30	5.8'	7.50	12.7"	.0058	34.40	12.9'	21.50
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.260	18.50	5.8'	12.70	12.7"	.330	22.70	12.9'	9.80
2	|	.170	20.60	|	14.80	|	.240	20.80	|	7.90
3	|	.125	20.80	|	15.00	|	.175	24.00	|	11.10
4	|	.088	23.90	|	18.10	|	.130	16.15	|	3.25
5	|	.057	22.80	|	17.00	|	.084	22.60	|	9.70
6	|	.034	23.50	|	17.70	|	.048	27.00	|	14.10
7	|	.026	19.20	|	13.40	|	.035	22.80	|	9.90
8	|	.016	25.00	|	19.20	|	.028	17.85	|	4.95
9	|	.012	16.70	|	10.90	|	.014	28.60	|	15.70
10	5.8"	—	—	5.8'	—	12.7"	.0063	15.85	12.9'	2.95
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.140	29.30	5.8'	23.50	12.7"	.350	23.10	12.9'	10.20
2	|	.100	36.00	|	30.20	|	.250	25.70	|	12.30
3	|	.074	39.20	|	33.40	|	.180	25.50	|	12.60
4	|	.054	35.20	|	29.40	|	.130	24.60	|	11.70
5	|	.035	34.20	|	28.40	|	.087	24.20	|	11.30
6	|	.021	33.30	|	27.50	|	.050	26.00	|	13.10
7	|	.015	40.00	|	34.20	|	.037	24.30	|	11.40
8	|	.011	36.40	|	30.60	|	.025	20.00	|	7.10
9	|	.0065	30.80	|	25.00	|	.016	25.00	|	12.10
10	5.8"	—	—	5.8'	—	12.7"	.006	33.30	12.9'	20.40
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Remarks:

MLIT-232

Sheet No. 55A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	Eq. D.	Δp/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	Δp/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	1.000	14.50	5.8'	8.70	12.7"	.230	22.60	12.9'	9.70
2		.770	15.30		9.50		.180	23.30		10.40
3		.580	14.60		8.80		.130	21.50		8.60
4		.400	16.50		10.70		.099	22.20		9.30
5		.270	16.30		10.50		.066	22.70		9.80
6		.150	15.30		9.50		.036	22.20		9.30
7		.120	15.00		9.20		.028	21.40		8.50
8		.075	16.00		10.20		.018	22.20		9.30
9		.042	16.65		10.85		.011	27.20		14.30
10	5.8"	.027	3.70	5.8'	-2.10	12.7"	—	—	12.9'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.550	10.50	5.8'	4.70	12.7"	.250	24.40	12.9'	11.50
2		.460	11.30		5.50		.210	23.80		10.90
3		.390	9.50		3.70		.150	24.70		11.80
4		.240	10.80		5.00		.115	20.80		7.90
5		.160	10.60		4.80		.073	23.30		10.40
6		.094	12.75		6.95		.044	22.70		9.80
7		.066	10.60		4.80		.030	20.00		7.10
8		.043	11.60		5.80		.020	25.00		12.10
9		.024	12.50		6.70		.012	25.00		12.10
10	5.8"	.011	18.20	5.8'	12.40	12.7"	.0058	17.20	12.9'	4.30
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.370	13.50	5.8'	7.70	12.7"	.260	24.20	12.9'	11.30
2		.320	10.60		4.80		.220	25.00		12.10
3		.280	9.30		3.50		.170	22.30		9.40
4		.170	11.75		5.95		.120	23.30		10.40
5		.110	12.70		6.90		.077	22.10		9.20
6		.062	14.50		8.70		.046	23.90		11.00
7		.046	13.05		7.25		.037	21.60		8.70
8		.032	15.60		9.80		.023	21.70		8.80
9		.017	17.60		11.80		.013	23.10		10.20
10	5.8"	.0082	12.20	5.8'	6.40	12.7"	.0058	34.40	12.9'	21.50
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.280	13.90	5.8'	8.10	12.7"	.280	25.40	12.9'	12.50
2		.230	15.75		9.95		.230	24.30		11.40
3		.140	17.15		11.35		.170	24.70		11.80
4		.100	19.00		13.20		.130	23.80		10.90
5		.065	21.50		15.70		.085	24.70		11.80
6		.039	17.95		12.15		.048	22.90		10.00
7		.028	25.00		19.20		.035	25.70		12.80
8		.020	20.00		14.20		.023	26.10		13.20
9		.012	25.00		19.20		.013	23.10		10.20
10	5.8"	—	—	5.8'	—	12.7"	.0067	29.90	12.9'	17.00
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.410	8.05	11.8'	-3.75	10"	.360	16.39	13.2'	3.19
2		.340	8.82		-2.98		.305	16.72		3.52
3		.268	8.58		-3.22		.241	17.84		4.64
4		.197	9.14		-2.66		.180	17.22		4.02
5		.143	7.69		-4.11		.127	17.32		4.12
6		.094	9.57		-2.23		.085	16.47		3.27
7		.056	8.93		-2.87		.049	20.41		7.21
8		.042	9.52		-2.28		.036	22.22		9.02
9		.0255	11.76		-0.04		.0226	17.70		4.50
10		.018	11.11		-0.69		.015	20.00		6.80
11	10"	.0064	15.63	11.8'	3.83	10"	.0059	16.95	13.2'	3.75
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Remarks:

MLIT-232

Sheet No. 68A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.340	9.12	11.8'	-2.68	10"	.430	15.35	13.2'	2.15
2		.290	8.62		-3.18		.360	16.39		3.19
3		.221	9.05		-2.75		.280	15.71		2.51
4		.171	8.19		-3.61		.210	18.10		4.90
5		.122	8.20		-3.60		.148	17.57		4.37
6		.081	9.88		-1.92		.100	17.00		3.80
7		.047	8.51		-3.29		.058	17.24		4.04
8		.035	8.57		-3.23		.043	16.28		3.08
9		.024	12.50		0.70		.0285	21.05		7.85
10		.013	15.38		3.58		.017	11.76		-1.44
11	10"	.005	20.00	11.8'	8.20	10"	.008	2.50	13.2'	-10.70
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.279	7.89	11.8'	-3.91	10"	.489	16.97	13.2'	3.77
2		.240	9.58		-2.22		.420	17.86		4.66
3		.189	9.52		-2.28		.330	17.27		4.07
4		.140	8.57		-3.23		.240	17.92		4.72
5		.100	9.00		-2.80		.178	16.85		3.65
6		.067	11.94		0.14		.116	18.10		4.90
7		.0385	12.99		1.19		.068	19.12		5.92
8		.028	10.71		-1.09		.046	21.74		8.54
9		.0205	9.76		-2.04		.032	15.63		2.43
10		.0118	8.47		-3.33		.0195	15.38		2.18
11	10"	.0064	7.81	11.8'	-3.99	10"	.0087	22.99	13.2'	9.79
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.158	15.82	11.8'	4.02	10"	.620	22.10	13.2'	8.90
2		.148	14.19		2.39		.580	21.90		8.70
3		.116	12.07		0.27		.440	22.50		9.30
4		.088	12.50		0.70		.330	22.73		9.53
5		.060	15.00		3.20		.234	20.94		7.74
6		.042	14.29		2.49		.151	23.84		10.64
7		.023	17.39		5.59		.084	26.19		12.99
8		.0188	15.96		4.16		.065	23.08		9.88
9		.0132	3.03		-8.77		.0425	25.88		12.68
10		.0074	8.11		-3.69		.0246	24.39		11.19
11	10"	—	—	11.8'	—	10"	.0107	18.69	13.2'	5.49
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.460	8.91	11.8'	-2.89	10"	.318	16.98	13.2'	3.78
2	|	.381	9.97	|	-1.83	|	.269	16.36	|	3.16
3	|	.300	10.00	|	-1.80	|	.210	16.19	|	2.99
4	|	.225	9.78	|	-2.02	|	.158	16.46	|	3.26
5	|	.157	11.46	|	-0.34	|	.114	16.67	|	3.47
6	|	.101	11.88	|	0.08	|	.074	16.22	|	3.02
7	|	.063	11.11	|	-0.69	|	.044	18.18	|	4.98
8	|	.044	13.64	|	1.84	|	.032	18.75	|	5.55
9	|	.028	14.29	|	2.49	|	.022	13.64	|	0.44
10	|	.0173	11.56	|	-0.24	|	.0137	14.60	|	1.40
11	10"	.0068	14.71	11.8'	2.91	10"	.006	13.33	13.2'	0.13
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Remarks:

MLIT-232

Sheet No. 73A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.390	8.21	11.8'	-3.59	10"	.365	16.44	13.2'	3.24
2		.340	8.53		-3.27		.310	17.74		4.54
3		.260	8.85		-2.95		.247	17.00		3.80
4		.198	9.09		-2.71		.185	16.76		3.56
5		.141	7.80		-4.00		.130	17.69		4.49
6		.092	8.70		-3.10		.086	17.44		4.24
7		.051	9.80		-2.00		.0495	14.14		0.94
8		.039	7.69		-4.11		.036	16.67		3.47
9		.027	7.41		-4.39		.024	20.83		7.63
10		.0153	13.07		1.27		.014	21.43		8.23
11	10"	.0066	15.15	11.8'	3.35	10"	.0059	16.95	13.2'	3.75
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Remarks:

MLIT-232

Sheet No. 74A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

Observers _____ _____

Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.315	7.30	11.8'	-4.50	10"	.430	16.51	13.2'	3.31
2		.281	7.47		-4.33		.370	17.84		4.64
3		.220	8.18		-3.62		.290	17.59		4.39
4		.165	6.67		-5.13		.211	18.01		4.81
5		.118	6.78		-5.02		.150	18.67		5.47
6		.078	7.69		-4.11		.100	19.00		5.80
7		.045	8.89		-2.91		.060	16.67		3.47
8		.0345	8.70		-3.10		.0435	22.99		9.79
9		.024	8.33		-3.47		.029	20.69		7.49
10		.0124	8.06		-3.74		.0172	11.63		-1.57
11	10"	.0057	3.51	11.8'	-8.29	10"	.007	14.29	13.2'	1.09
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	10"	.192	8.85	11.8'	-2.95	10"	.550	20.18	13.2'	6.98
2		.173	12.14		0.34		.520	19.62		6.42
3		.138	10.14		-1.66		.410	20.24		7.04
4		.103	9.71		-2.09		.297	20.88		7.68
5		.073	8.22		-3.58		.209	21.05		7.85
6		.050	10.00		-1.80		.141	21.99		8.79
7		.029	10.34		-1.46		.082	20.73		7.53
8		.0211	9.48		-2.32		.057	22.81		9.61
9		.0144	1.39		-10.41		.039	20.51		7.31
10		.009	1.11		-10.69		.024	20.83		7.63
11	10"	—	—	11.8'	—	10"	.0092	10.87	13.2'	-2.33
12										
13										
14										
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25										

Remarks:

MLIT-232

Sheet No. 77A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.520	10.19	11.8'	-1.61	10"	.258	17.44	13.2'	4.24
2		.440	11.14		-0.66		.226	16.81		3.61
3		.345	11.01		-0.79		.180	16.67		3.47
4		.253	11.07		-0.73		.130	16.92		3.72
5		.185	10.27		-1.53		.092	18.48		5.28
6		.118	11.02		-0.78		.060	20.00		6.80
7		.071	9.86		-1.94		.036	16.67		3.47
8		.0495	12.12		0.32		.026	15.38		2.18
9		.033	12.12		0.32		.018	16.67		3.47
10		.0177	11.30		-0.50		.010	20.00		6.80
11	10"	.0088	11.36	11.8'	-0.44	10"	.0047	21.28	13.2'	8.08
12										
13										
14										
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17										
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19										
20										
21										
22										
23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.440	9.55	11.8'	-2.25	10"	.300	16.67	13.2'	3.47
2		.380	10.00		-1.80		.260	16.54		3.34
3		.305	10.16		-1.64		.208	18.27		5.07
4		.225	10.22		-1.58		.158	17.09		3.89
5		.164	10.37		-1.43		.113	18.58		5.38
6		.108	11.11		-0.69		.075	18.67		5.47
7		.060	10.00		-1.80		.0415	19.28		6.08
8		.045	11.11		-0.69		.031	19.35		6.15
9		.029	10.34		-1.46		.021	14.29		1.09
10		.0184	5.43		-6.37		.0127	15.75		2.55
11	10"	.0062	16.13	11.8'	4.33	10"	.0052	3.85	13.2'	-9.35
12										
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22										
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25										

Remarks:

MLIT-232

Sheet No. 19A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.365	7.95	11.8'	-3.85	10"	.350	17.14	13.2'	3.94
2	|	.335	7.16	|	-4.64	|	.312	17.31	|	4.11
3	|	.263	7.98	|	-3.82	|	.248	17.74	|	4.54
4	|	.195	8.21	|	-3.59	|	.181	18.23	|	6.03
5	|	.140	8.57	|	-3.23	|	.132	17.42	|	4.22
6	|	.092	7.61	|	-4.19	|	.087	18.39	|	5.19
7	|	.054	9.26	|	-2.54	|	.051	17.65	|	4.45
8	|	.039	7.69	|	-4.11	|	.0367	19.07	|	5.87
9	|	.0255	7.84	|	-3.96	|	.023	26.09	|	12.89
10	|	.0148	13.51	|	1.71	|	.0145	20.69	|	7.49
11	10"	.0062	16.13	11.8'	4.33	10"	.0062	16.13	13.2'	2.93
12										
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25										

Remarks:

MLIT-232

Sheet No. 80A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	10"	.215	9.77	11.8'	-2.03	10"	.465	17.42	13.2'	4.22
2	|	.164	12.80	|	1.00	|	.357	17.37	|	4.17
3	|	.126	7.94	|	-3.86	|	.263	19.39	|	6.19
4	|	.089	11.24	|	-0.56	|	.190	18.95	|	5.75
5	|	.059	13.56	|	1.76	|	.127	18.90	|	5.70
6	|	.0355	5.63	|	-6.17	|	.072	19.44	|	6.24
7	|	.0255	11.76	|	-0.04	|	.053	20.75	|	7.55
8	|	.0185	5.41	|	-6.39	|	.0355	19.72	|	6.52
9	|	.0107	7.48	|	-4.32	|	.0205	24.39	|	11.19
10	10"	.0047	2.13	11.8'	-9.67	10"	.008	25.00	13.2'	11.80
11										
12										
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23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.633	14.53	11.8'	2.73	10"	.160	10.63	13.2'	-2.57
2		.570	14.21		2.41		.141	20.57		7.37
3		.450	14.00		2.20		.112	20.54		7.34
4		.332	13.86		2.06		.084	23.81		10.61
5		.240	12.50		0.70		.058	20.69		7.49
6		.152	15.13		3.33		.0405	19.75		6.55
7		.092	14.13		2.33		.0235	21.28		8.08
8		.064	15.63		3.83		.0195	10.26		-2.94
9		.042	16.67		4.87		.012	25.00		11.80
10		.024	16.67		4.87		.0076	13.16		-0.04
11	10"	.0092	21.74	11.8'	9.94	10"	—	—	13.2'	—
12										
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22										
23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

STRAIGHT

No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.572	12.41	11.8'	0.61
2		.530	13.77		1.97
3		.410	13.66		1.86
4		.305	12.46		0.66
5		.220	11.36		−0.44
6		.142	13.38		1.58
7		.078	12.82		1.02
8		.063	11.11		−0.69
9		.0395	12.66		0.86
10		.023	17.39		5.59
11	10"	.010	10.00	11.8'	−1.80
12					
13					
14					
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16					
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21					
22					
23					
24					
25					

TAKEOFF

EQ. D.	ΔP/100	EQ. L	ACT. L.	ADDED EQ. L.
10"	.180	21.67	13.2'	8.47
	.167	22.75		9.55
	.133	21.80		8.60
	.100	21.00		7.80
	.071	18.31		5.11
	.049	20.41		7.21
	.0275	18.18		4.98
	.0213	18.78		5.58
	.0141	14.18		0.98
	.0092	10.87		−2.33
10"	—	—	13.2'	—

Remarks:

MLIT-232

Sheet No. 84A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.490	10.61	11.8'	-1.19	10"	.210	23.33	13.2'	10.13
2	|	.372	9.41	|	-2.39	|	.157	24.84	|	11.64
3	|	.268	11.19	|	-0.61	|	.123	18.70	|	5.50
4	|	.199	10.05	|	-1.75	|	.088	18.18	|	4.98
5	|	.127	11.81	|	0.01	|	.057	19.30	|	6.10
6	|	.072	9.72	|	-2.08	|	.032	18.75	|	5.55
7	|	.052	11.54	|	-0.26	|	.024	16.67	|	3.47
8	|	.0335	11.94	|	0.14	|	.016	18.75	|	5.55
9	|	.0188	21.28	|	9.48	|	.0097	20.62	|	7.42
10	10"	.0081	12.35	11.8'	0.55	10"	—	—	13.2'	—
11										
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23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.300	10.00	11.8'	-1.80	10"	.292	18.84	13.2'	5.64
2		.255	7.84		-3.96		.248	16.53		3.33
3		.196	7.65		-4.15		.189	17.46		4.26
4		.138	7.97		-3.83		.133	18.05		4.85
5		.090	8.89		-2.91		.089	19.10		5.90
6		.055	10.91		-0.89		.053	22.64		9.44
7		.040	10.00		-1.80		.039	20.51		7.31
8		.0268	11.19		-0.61		.026	23.08		9.88
9		.017	11.76		-0.04		.0163	30.67		17.47
10	10"	.0061	16.39	11.8'	4.59	10"	.0058	17.24	13.2'	4.04
11										
12										
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25										

Remarks:

MLIT-232

Sheet No. 87-94

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE 10½" x 8" BOTH STR. & T.O.

Observers { R J Waalkes { Date JULY 6, 19 50

No.

RUNS NUMBER 87-94 REPLACED BY RUNS 99, 104, 109, 114, 115, 116, 117, 118. THESE LATTER RUNS RECORD P_4, P_5, AND P_6 RATHER THAN JUST P_5 OR P_6.

Remarks:

MLIT-232

Sheet No. 95

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: 9" x 6½" STR. & 9" x 6½" T.O.

Observers { RJ Waalkes { Date JULY 11, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	8:48	4.91	.185	.155	.145	69.0	84.0	29.30	2.22	1744	895	828
2	8:52	4.16	.157	.132	.125				2.04	1603	830	770
3	8:56	3.11	.118	.096	.092				1.764	1386	712	664
4	9:00	2.37	.091	.075	.070				1.54	1210	634	580
5	9:03	1.67	.064	.051	.049				1.29	1014	530	490
6	9:06	1.03	.040	.032	.030				1.015	798	425	388
7	9:09	.580	.022	.017	.016				.762	599	315	286
8	9:12	.395	.015	.011	.010				.629	494	256	228
9	9:15	.265	.010	.008	.007				.515	405	220	193
10	9:18	.149	.006	.005	.004				.386	303	177	147
11	9:21	.062	.003	.002	.001	70.0	85.0	29.30	.249	196	115	75
12												
13												
14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.154	.339	48.1	905	.150	.305	839	.129	.274	.034	.065	.927
2 ~~16~~	.130	.287	48.1	832	.127	.259	771	.109	.234	.028	.053	.927
3 ~~17~~	.097	.215	48.3	717	.094	.190	669	.082	.174	.025	.041	.933
4 ~~18~~	.074	.165	47.8	632	.073	.148	578	.061	.131	.017	.034	.915
5 ~~19~~	.052	.116	48.0	527	.051	.102	487	.043	.092	.014	.024	.924
6 ~~20~~	.032	.072	47.7	417	.032	.064	381	.027	.057	.008	.015	.914
7 ~~21~~	.018	.040	47.6	314	.018	.035	285	.015	.031	.005	.009	.908
8 ~~22~~	.012	.027	47.1	261	.013	.024	233	.010	.020	.003	.007	.893
9 ~~23~~	.008	.018	46.7	216	.008	.016	189	.007	.014	.002	.004	.875
10 ~~24~~	.005	.011	45.4	165	.005	.010	138	.003	.007	.001	.004	.836
11 ~~25~~	.002	.005	39.5	119	.0026	.0046	77	.001	.002	.0004	.003	.647

Remarks: CHECK FOR LEAKAGE:

.003" @ 3.70" S.P.

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.440	8.29	11.98'	-3.69	10"	.360	18.06	12.69'	5.37
2		.345	8.12		-3.86		.300	17.67		4.98
3		.260	9.61		-2.37		.235	17.45		4.76
4		.210	8.10		-3.88		.175	19.43		6.74
5		.145	9.66		-2.32		.130	18.46		5.77
6		.095	8.42		-3.56		.081	18.52		5.83
7		.056	8.93		-3.05		.048	18.75		6.06
8		.040	7.50		-4.48		.033	21.21		8.52
9		.029	6.90		-5.08		.022	18.18		5.49
10		.018	5.56		-6.42		.013	30.77		18.08
11	10"	.010	4.00	11.98'	-7.98	10"	—	—	12.69'	—
12										
13										
14										
15										
16										
17										
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19										
20										
21										
22										
23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: 9" x 6½" STR. & 8½" x 6" T.O.

Observers { RJWaalkes } { } Date JULY 11, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:00	4.81	.233	.175	.217	70.0	85.0	29.30	2.195	1725	948	770
2	10:08	4.13	.200	.150	.185				2.03	1595	880	716
3	10:12	3.21	.155	.115	.142				1.79	1407	778	630
4	10:16	2.31	.110	.083	.102				1.52	1194	666	535
5	10:19	1.62	.080	.058	.071				1.272	1000	562	450
6	10:22	1.04	.050	.037	.045				1.02	802	455	361
7	10:26	.550	.027	.020	.024				.742	583	340	267
8	10:29	.408	.020	.013	.016				.639	502	278	219
9	10:31	.249	.012	.008	.010				.499	392	220	174
10	10:34	.136	.007	.005	.006				.369	290	177	137
11	10:38	.066	.004	.002	.0025	68.0	85.0	29.30	.257	202	115	89
12												
13												

14	VP_4	TP_4	% DIV.	Q_{SC}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.151	.384	44.8	952	.165	.340	773	.110	.327	.044	.057	.812
2 ~~16~~	.129	.329	44.9	879	.141	.291	716	.094	.279	.038	.050	.815
3 ~~17~~	.100	.255	44.7	778	.111	.226	629	.072	.214	.029	.041	.808
4 ~~18~~	.072	.182	44.5	663	.080	.163	531	.052	.154	.019	.028	.801
5 ~~19~~	.051	.131	44.5	555	.056	.114	445	.036	.107	.017	.024	.802
6 ~~20~~	.032	.082	44.2	448	.037	.074	354	.023	.068	.008	.014	.790
7 ~~21~~	.017	.044	44.0	326	.019	.039	257	.012	.036	.005	.008	.788
8 ~~22~~	.013	.033	44.1	281	.014	.027	221	.009	.025	.006	.008	.786
9 ~~23~~	.008	.020	44.2	219	.009	.017	173	.005	.015	.003	.005	.790
10 ~~24~~	.004	.011	43.6	164	.005	.010	126	.003	.009	.001	.002	.768
11 ~~25~~	.002	.006	43.6	114	.002	.004	88	.001	.0035	.002	.0025	.772

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/110	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.450	9.78	11.98'	-2.20	10"	.305	18.70	12.69'	6.01
2		.380	10.00		-1.98		.260	19.22		6.53
3		.310	9.35		-2.63		.210	19.51		6.82
4		.225	8.45		-3.53		.150	18.68		5.99
5		.165	10.30		-1.68		.110	21.80		9.11
6		.110	7.27		-4.71		.072	19.44		6.75
7		.060	8.33		-3.65		.039	20.50		7.81
8		.047	12.77		0.79		.030	26.65		13.96
9		.029	10.33		-1.65		.019	26.30		13.61
10		.0175	5.71		-6.27		.011	18.20		5.51
11	10"	.0092	21.75	11.98'	9.77	10"	—	—	12.69'	—
12										
13										
14										
15										
16										
17										
18										
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Remarks:

MLIT-232

Sheet No. 97

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O. ORIFICES; 9" x 6½" STR. & 8" x 5½" T.O.

Observers { RJ Waalkes } Date JULY 11, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:47	4.71	.296	.200	.305	68.0	85.0	29.30	2.17	1705	1010	690
2	10:51	4.14	.262	.175	.269				2.035	1599	948	650
3	10:55	3.19	.200	.132	.203				1.785	1403	830	568
4	10:58	2.31	.144	.095	.145				1.52	1194	710	480
5	11:02	1.69	.105	.070	.105				1.30	1022	615	410
6	11:04	1.04	.065	.043	.065				1.02	802	488	324
7	11:07	.570	.035	.022	.035				.755	593	355	239
8	11:09	.420	.026	.016	.025				.648	509	307	203
9	11:11	.252	.015	.010	.015				.502	394	245	157
10	11:14	.150	.009	.005	.008				.387	304	177	117
11	11:17	.062	.004	.002	.003	69.0	88.0	29.30	.249	196	115	72
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.147	.443	40.6	1013	.188	.388	692	.088	.393	.055	.050	.683
2 ~~16~~	.130	.392	40.7	948	.165	.340	651	.078	.347	.052	.045	.687
3 ~~17~~	.100	.300	40.6	833	.127	.259	570	.060	.263	.041	.037	.684
4 ~~18~~	.072	.216	40.3	713	.093	.188	481	.042	.187	.028	.029	.675
5 ~~19~~	.053	.158	40.0	613	.069	.139	409	.031	.136	.019	.022	.667
6 ~~20~~	.032	.097	39.9	482	.043	.086	320	.019	.084	.011	.013	.664
7 ~~21~~	.018	.053	40.2	355	.023	.045	238	.010	.045	.008	.008	.670
8 ~~22~~	.013	.039	39.8	306	.017	.033	203	.008	.033	.006	.006	.663
9 ~~23~~	.008	.023	39.1	240	.011	.021	154	.004	.019	.002	.004	.642
10 ~~24~~	.005	.014	39.8	183	.006	.011	121	.003	.011	.003	.003	.661
11 ~~25~~	.002	.006	38.5	121	.003	.005	75	.001	.004	.001	.002	.620

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.510	10.78	11.98'	−1.20	10"	.245	20.41	12.69'	7.72
2		.440	11.82		−0.16		.224	20.09		7.40
3		.350	11.71		−0.27		.172	21.57		8.82
4		.260	10.77		−1.21		.125	23.20		10.51
5		.198	9.60		−2.38		.093	23.66		10.97
6		.128	8.59		−3.39		.058	22.41		9.72
7		.073	10.96		−1.02		.0345	23.19		10.50
8		.055	10.91		−1.07		.026	23.08		10.39
9		.035	5.71		−6.27		.016	25.00		12.31
10		.0225	13.33		1.35		.0102	29.41		16.72
11	10"	.0102	9.80	11.98'	−2.18	10"	—	—	12.69'	—
12										
13										
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½" X 8" BOTH STR. & T.O.
ORIFICES; 9" X 6½" STR. & 7" X 4½" T.O.

Observers { R.J. Wasekes } { } Date JULY 11, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:27	4.52	.457	.260	.505	69.0	88.0	29.30	2.125	1670	1148	528
2	11:30	4.12	.415	.237	.460				2.03	1595	1100	504
3	11:34	3.15	.313	.179	.345				1.776	1396	960	437
4	11:38	2.32	.228	.130	.250				1.523	1197	823	372
5	11:40	1.62	.158	.090	.172				1.272	1000	692	310
6	11:43	1.05	.100	.056	.110				1.025	805	553	248
7	11:46	.560	.055	.030	.058				.749	589	412	181
8	11:48	.410	.038	.020	.042				.640	503	340	154
9	11:51	.246	.023	.012	.025				.496	390	267	119
10	11:54	.140	.013	.006	.014				.374	294	192	90
11	11:57	.057	.005	.002	.005	68.0	87.0	29.30	.239	188	115	54
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
~~1~~15	.141	.598	31.5	1144	.240	.500	526	.051	.556	.098	.042	.460
~~2~~16	.129	.544	31.4	1094	.219	.456	501	.046	.506	.088	.038	.458
~~3~~17	.099	.412	31.3	959	.169	.348	437	.035	.380	.064	.032	.456
~~4~~18	.072	.300	31.1	825	.125	.255	372	.025	.275	.045	.025	.451
~~5~~19	.051	.209	30.9	691	.087	.177	309	.018	.190	.032	.019	.447
~~6~~20	.033	.133	31.0	555	.056	.112	250	.011	.121	.021	.012	.450
~~7~~21	.018	.073	30.5	409	.031	.061	180	.006	.064	.012	.009	.450
~~8~~22	.013	.051	31.2	346	.022	.042	157	.005	.047	.009	.004	.454
~~9~~23	.008	.031	30.8	270	.013	.025	120	.003	.028	.006	.003	.444
10~~24~~	.004	.017	31.9	200	.007	.013	94	.002	.016	.004	.001	.470
11~~25~~	.002	.007	32.0	128	.003	.005	60	.0007	.0057	.002	.0013	.469

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.630	15.56	11.98'	3.58	10"	.149	28.19	12.69'	15.50
2		.585	15.04		3.06		.137	27.74		15.05
3		.455	14.07		2.09		.106	30.19		17.50
4		.350	12.86		0.88		.079	31.65		18.96
5		.245	13.06		1.08		.055	34.55		21.86
6		.165	12.73		0.75		.0375	32.00		19.31
7		.092	13.04		1.06		.0205	43.90		21.21
8		.068	13.24		1.26		.0162	24.69		12.00
9		.044	13.64		1.66		.010	30.00		17.31
10		.025	16.00		4.02		—	—		—
11	10"	.011	18.18	11.98'	6.20	10"	—	—	12.69'	—
12										
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Remarks:

MLIT-232

Sheet No. 99

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" X 8" BOTH STR. & T.O. ORIFICES; 9" X 6½" STR. & T.O. BLOCKED

Observers { R J Waelkes } Date JULY 11, 19 50

No	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.		$\sqrt{P_3-P_2}$	V	CFM
1	12:10	3.80	.990	.470	1.05	68.0	87.0	29.30		1.95	7809.7	1532.3
2	12:14	3.14	.830	.390	.873					1.77	7088.8	1390.8
3	12:17	2.38	.630	.299	.670					1.54	6167.7	1210.1
4	12:20	1.61	.430	.195	.450					1.27	5086.4	998.0
5	12:24	1.05	.272	.123	.289					1.024	4101.1	804.6
6	12:27	.540	.139	.063	.147					.735	2943.7	577.6
7	12:30	.405	.102	.045	.110					.636	2547.2	499.8
8	12:33	.253	.065	.028	.070					.503	2014.5	395.2
9	12:36	.144	.037	.015	.040					.380	1521.9	298.6
10	12:38	.063	.016	.006	.017	68.0	87.0	29.30		.251	1005.3	197.2
11												
12												
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Remarks:

MLIT-232

Sheet No. 100

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½" x 8" BOTH STR. & T.O.
ORIFICES: 8½" x 6" STR. & 9" x 6½" T.O.

Observers { R J Waalkes } Date JULY 12, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	9:50	4.79	.235	.235	.170	71.0	86.0	29.19	2.19	1721	818	890
2	9:53	4.16	.205	.203	.145				2.04	1603	760	828
3	9:55	3.16	.158	.155	.111				1.78	1399	664	728
4	9:58	2.37	.117	.115	.084				1.54	1210	578	635
5	10:01	1.61	.080	.077	.055				1.27	998	472	519
6	10:04	1.04	.052	.050	.035				1.02	802	381	417
7	10:07	.590	.030	.028	.020				.768	603	287	319
8	10:10	.399	.020	.018	.012				.631	496	232	249
9	10:12	.245	.012	.011	.008				.495	389	182	205
10	10:15	.140	.007	.006	.005				.374	294	136	164
11	10:18	.057	.003	.002	.001	71.0	87.0	29.19	.239	188	79	75
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.150	.385	52.1	823	.124	.359	897	.147	.317	.026	.068	.918
2 ~~16~~	.130	.335	52.1	768	.108	.311	835	.128	.273	.024	.062	.920
3 ~~17~~	.099	.257	52.3	667	.082	.237	732	.098	.209	.020	.048	.911
4 ~~18~~	.074	.191	52.3	577	.061	.176	633	.073	.157	.015	.034	.912
5 ~~19~~	.051	.131	52.4	475	.041	.118	523	.050	.105	.013	.026	.908
6 ~~20~~	.032	.084	52.3	383	.027	.077	419	.032	.067	.007	.017	.914
7 ~~21~~	.018	.048	52.6	286	.015	.043	317	.018	.038	.005	.010	.902
8 ~~22~~	.013	.033	51.8	239	.010	.028	257	.012	.024	.005	.009	.930
9 ~~23~~	.008	.020	53.0	183	.006	.017	206	.008	.016	.003	.004	.888
10 ~~24~~	.004	.011	54.7	133	.003	.009	161	.005	.010	.002	.001	.826
11 ~~25~~	.002	.005	48.7	96	.002	.004	92	.002	.003	.001	.002	1.043

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.345	7.54	11.98'	−4.44	10"	.400	17.00	12.69'	4.31
2		.300	8.00		−3.98		.355	17.46		4.77
3		.231	8.66		−3.32		.274	17.52		4.83
4		.180	8.33		−3.65		.210	16.19		3.50
5		.125	10.40		−1.58		.146	17.81		5.12
6		.083	8.43		−3.55		.097	17.53		4.84
7		.048	10.42		−1.56		.058	17.24		4.55
8		.034	14.71		2.73		.039	23.08		10.39
9		.0222	13.51		1.53		.0265	15.09		2.40
10		.012	16.67		4.69		.017	5.88		−6.81
11	10"	—	—	11.98'	—	10"	—	—	12.69'	—
12										
13										
14										
15										
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19										
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22										
23										
24										
25										

Remarks:

MLIT-232

Sheet No. 101

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½" x 8" BOTH STR. & T.O.
ORIFICES: 8½" x 6" STR. & 8½" x 6" T.O.

Observers { R J Walker } { } Date JULY 12, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:25	4.68	.293	.268	.250	71.0	87.0	29.19	2.162	1699	870	828
2	10:28	4.15	.260	.236	.223				2.038	1601	819	783
3	10:32	3.21	.200	.180	.170				1.79	1407	718	685
4	10:36	2.32	.144	.130	.121				1.523	1197	610	580
5	10:40	1.65	.101	.092	.086				1.284	1009	514	494
6	10:43	1.02	.064	.055	.052				1.01	794	400	388
7	10:47	.570	.035	.031	.029				.755	593	302	293
8	10:51	.405	.025	.021	.020				.636	500	250	244
9	10:55	.261	.016	.015	.013				.511	402	212	198
10	10:59	.147	.010	.008	.007				.383	301	157	147
11	11:03	.056	.004	.003	.0025	70.0	88.0	29.19	.2365	186	97	89
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
~~15~~	.146	.439	48.8	870	.139	.407	829	.126	.376	.032	.063	.953
~~16~~	.130	.390	48.9	818	.123	.359	783	.112	.335	.031	.055	.957
~~17~~	.100	.300	48.8	720	.095	.275	687	.086	.256	.025	.044	.954
~~18~~	.072	.216	48.7	614	.069	.199	583	.062	.183	.017	.033	.950
~~19~~	.052	.153	49.0	515	.049	.141	494	.045	.131	.012	.022	.959
6 ~~20~~	.032	.096	49.2	403	.030	.085	391	.028	.080	.011	.016	.970
7 ~~21~~	.018	.053	49.2	301	.017	.048	292	.016	.045	.005	.008	.970
8 ~~22~~	.013	.038	49.4	253	.012	.033	247	.011	.031	.005	.007	.976
9 ~~23~~	.008	.024	48.3	208	.008	.023	194	.007	.020	.001	.004	.933
10 ~~24~~	.005	.015	48.4	155	.004	.012	146	.004	.011	.003	.004	.942
11 ~~25~~	.002	.006	47.8	97	.002	.005	89	.001	.0035	.001	.0025	.918

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L	ACT. L.	ADDED EQ. L.
1	10"	.376	8.51	11.98'	-3.47	10"	.345	18.26	12.69'	5.57
2		.338	9.17		-2.81		.310	17.74		5.05
3		.264	9.47		-2.51		.245	17.96		5.27
4		.200	8.50		-3.48		.182	18.13		5.44
5		.144	8.33		-3.65		.133	16.54		3.85
6		.091	12.09		0.11		.086	18.60		5.91
7		.053	9.43		-2.55		.049	16.33		3.64
8		.0388	12.89		0.91		.036	19.44		6.75
9		.0274	3.65		-8.33		.024	16.67		3.98
10		.016	18.75		6.77		.0143	27.97		15.28
11	10"	—	—	11.98'	—	10"	—	—	12.69'	—
12										
13										
14										
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24										
25										

Remarks:

MLIT-232

Sheet No. 102

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O. ORIFICES; 8½" x 6" STR. & 8" x 5½" T.O.

Observers { R J Waalkes } Date JULY 12, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:11	4.58	.375	.315	.360	70.0	88.0	29.19	2.14	1682	940	750
2	11:15	4.13	.336	.280	.325				2.03	1595	889	715
3	11:19	3.14	.251	.210	.242				1.77	1391	772	618
4	11:22	2.34	.187	.155	.180				1.53	1202	664	534
5	11:25	1.60	.126	.105	.120				1.265	994	550	438
6	11:28	1.03	.082	.068	.077				1.015	798	444	351
7	11:31	.575	.045	.036	.042				.758	596	325	262
8	11:42	.400	.032	.025	.028				.632	497	272	215
9	11:46	.264	.021	.016	.018				.514	404	219	173
10	11:49	.149	.011	.009	.010				.386	303	166	130
11	11:51	.064	.005	.003	.005	69.0	89.0	29.19	.253	199	97	92
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.143	.518	44.4	935	.160	.475	747	.102	.462	.043	.056	.799
2 ~~16~~	.129	.465	44.6	884	.143	.423	711	.093	.418	.042	.047	.804
3 ~~17~~	.098	.349	44.5	772	.109	.319	619	.070	.312	.030	.037	.802
4 ~~18~~	.073	.260	44.6	666	.081	.236	536	.053	.233	.024	.027	.805
5 ~~19~~	.050	.176	44.3	554	.056	.161	440	.035	.155	.015	.021	.794
6 ~~20~~	.032	.114	44.2	445	.036	.104	353	.023	.100	.010	.014	.793
7 ~~21~~	.018	.063	44.6	330	.020	.056	266	.013	.055	.007	.008	.806
8 ~~22~~	.013	.045	44.1	278	.014	.039	219	.009	.037	.006	.008	.788
9 ~~23~~	.008	.029	44.1	226	.009	.025	178	.006	.024	.004	.005	.788
0 ~~24~~	.005	.016	43.9	170	.005	.014	133	.003	.013	.002	.003	.782
1 ~~25~~	.002	.007	48.7	102	.002	.005	97	.002	.007	.002	.000	.951

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.417	10.31	11.98'	-1.67	10"	.288	19.44	12.69'	6.75
2		.390	10.77		-1.21		.260	18.08		5.39
3		.304	9.87		-2.11		.200	18.50		5.81
4		.230	10.43		-1.55		.150	18.00		5.31
5		.160	9.38		-2.60		.109	19.27		6.58
6		.110	9.09		-2.89		.071	19.72		7.03
7		.063	11.11		-0.87		.042	19.05		6.36
8		.046	13.04		1.06		.0296	27.03		14.34
9		.031	12.90		0.92		.0205	24.39		11.70
10		.0188	10.64		-1.34		.012	25.00		12.31
11	10"	—		11.98'	—	10"	—	—	12.69'	—
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Remarks:

MLIT-232

Sheet No. 103

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: 8½" x 6" STR. & 7" x 4½" T.O.

Observers { R J Waalkes { Date JULY 12, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:59	4.37	.565	.419	.591	69.0	89.0	29.19	2.09	1642	1085	572
2	12:02	4.09	.533	.395	.560				2.02	1587	1050	557
3	12:06	3.12	.405	.295	.420				1.767	1389	910	480
4	12:10	2.33	.292	.213	.309				1.527	1200	778	414
5	12:14	1.63	.205	.149	.214				1.278	1004	652	344
6	12:16	1.06	.130	.095	.138				1.03	809	522	278
7	12:20	.550	.068	.049	.071				.742	583	378	200
8	12:23	.418	.050	.035	.051				.646	508	320	170
9	12:25	.249	.030	.021	.031				.499	392	250	133
10	12:28	.146	.0175	.011	.018				.382	300	182	102
11	12:30	.063	.007	.005	.0075	69.0	89.0	29.19	.251	197	125	66
12												
13												
14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.136	.701	34.5	1076	.212	.631	566	.059	.650	.070	.051	.526
2 ~~16~~	.127	.660	34.7	1036	.197	.592	551	.056	.616	.068	.044	.532
3 ~~17~~	.098	.503	34.5	910	.152	.447	479	.042	.462	.056	.041	.526
4 ~~18~~	.073	.365	34.7	784	.113	.326	416	.032	.341	.039	.024	.531
5 ~~19~~	.051	.256	34.5	658	.079	.228	346	.022	.236	.028	.020	.526
6 ~~20~~	.033	.163	34.8	527	.051	.146	282	.015	.153	.017	.010	.535
7 ~~21~~	.017	.085	34.6	381	.027	.076	202	.007	.078	.009	.007	.530
8 ~~22~~	.013	.063	34.7	332	.020	.055	176	.006	.057	.008	.006	.530
9 ~~23~~	.008	.038	34.7	256	.012	.033	136	.003	.034	.005	.004	.531
10 ~~24~~	.005	.0225	35.9	192	.007	.018	108	.002	.020	.0045	.0025	.563
11 ~~25~~	.002	.009	34.6	129	.003	.008	68	.0008	.0083	.001	.0007	.527

Remarks:

MLIT-232

Sheet No. 103A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.570	12.28	11.98'	0.30	10"	.170	30.00	12.69'	17.31
2		.530	12.83		0.85		.161	27.33		14.64
3		.414	13.53		1.55		.125	32.80		20.11
4		.310	12.58		0.60		.096	25.00		12.31
5		.228	12.56		0.58		.068	29.41		16.72
6		.149	11.41		−0.57		.047	21.28		8.59
7		.082	10.98		−1.00		.026	26.92		14.23
8		.063	12.70		0.72		.0198	30.30		17.61
9		.039	12.82		0.84		.0123	32.52		19.83
10		.023	19.57		7.59		—	—		—
11	10"	.0113	8.85	11.98'	−3.13	10"	—	—	12.69'	—
12										
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14										
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O. ORIFICES: 8½" x 6" STR. & T.O. BLOCKED

Observers { R J Walker } { } Date JULY 14, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	10:20	3.55	1.26	.780	1.32	58.5	76.0	29.22	1.88	7529.4	1477.3
2	10:24	3.19	1.14	.700	1.19				1.78	7128.9	1398.7
3	10:27	2.33	.830	.510	.870				1.53	6127.7	1202.3
4	10:30	1.60	.585	.360	.610				1.265	5066.3	994.0
5	10:33	1.04	.375	.225	.398				1.02	4085.1	801.5
6	10:37	.540	.194	.115	.201				.735	2943.7	577.6
7	10:40	.426	.148	.089	.155				.653	2615.3	513.1
8	10:43	.265	.095	.056	.099				.515	2062.6	404.7
9	10:46	.141	.051	.030	.053				.376	1505.9	295.5
10	10:48	.064	.023	.013	.025	59.0	76.5	29.22	.253	1013.3	198.8
11											
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Remarks:

MLIT-232

Sheet No. 105

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: 8" x 5½" STR. & 9" x 6½" T.O.

Observers { RJ Waalkes { _____ Date JULY 14, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:03	4.81	.312	.345	.210	59.0	77.0	29.22	2.195	1725	752	986
2	11:08	4.15	.272	.299	.180				2.038	1601	701	918
3	11:11	3.17	.205	.224	.135				1.78	1399	608	800
4	11:15	2.36	.154	.165	.100				1.538	1209	522	690
5	11:18	1.60	.104	.110	.067				1.265	994	428	569
6	11:21	1.01	.066	.070	.042				1.005	790	341	455
7	11:24	.570	.037	.040	.023				.755	593	260	340
8	11:27	.414	.027	.028	.016				.643	505	217	286
9	11:30	.245	.016	.016	.010				.495	389	165	228
10	11:33	.137	.010	.010	.005				.370	291	131	164
11	11:36	.057	.004	.004	.002	59.0	77.0	29.22	.239	188	83.5	105
12												
13												
14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.151	.463	56.7	747	.102	.447	978	.175	.385	.016	.078	.764
2 ~~16~~	.130	.402	56.7	693	.088	.387	908	.151	.331	.015	.071	.763
3 ~~17~~	.099	.304	56.8	604	.067	.291	795	.116	.251	.013	.053	.760
4 ~~18~~	.074	.228	56.9	521	.050	.215	688	.087	.187	.013	.041	.757
5 ~~19~~	.050	.154	57.1	426	.033	.143	568	.059	.126	.011	.028	.750
6 ~~20~~	.032	.098	57.2	338	.021	.091	452	.037	.079	.007	.019	.748
7 ~~21~~	.018	.055	56.7	257	.012	.052	336	.021	.044	.003	.011	.765
8 ~~22~~	.013	.040	56.9	218	.009	.037	287	.015	.031	.003	.009	.760
9 ~~23~~	.008	.024	58.0	163	.005	.021	226	.009	.019	.003	.005	.722
10 ~~24~~	.004	.014	55.6	129	.003	.013	162	.005	.010	.001	.004	.797
11 ~~25~~	.002	.006	55.9	83	.001	.005	105	.002	.004	.001	.002	.791

Remarks:

MLIT-232

Sheet No. 105A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.290	5.52	11.98'	-6.46	10"	.470	16.60	12.69'	3.91
2		.246	6.10		-5.88		.445	17.11		4.42
3		.191	6.81		-5.17		.320	16.56		3.87
4		.145	8.97		-3.01		.242	16.94		4.25
5		.100	11.00		-0.98		.173	16.18		3.49
6		.065	10.77		-1.21		.111	17.12		4.43
7		.0395	7.59		-4.39		.065	16.92		4.23
8		.029	10.34		-1.64		.048	18.75		6.06
9		.0175	17.14		5.16		.031	16.13		3.44
10		.0113	8.85		-3.13		.0175	22.86		10.17
11	10"	—	—	11.98'	—	10"	—	—	12.69'	—
12										
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Remarks:

MLIT-232

Sheet No. 106

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – $10\frac{1}{2}$" x 8" BOTH STR. & T.O.
ORIFICES: 8" x $5\frac{1}{2}$" STR. & $8\frac{1}{2}$" x 6" T.O.

Observers { R J Walker } { } Date JULY 14, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:45	4.67	.391	.397	.313	59.0	77.0	29.22	2.16	1697	809	920
2	11:49	4.16	.345	.350	.276				2.04	1603	759	868
3	11:53	3.18	.262	.262	.209				1.782	1400	658	759
4	11:56	2.32	.190	.192	.152				1.523	1197	562	620
5	11:58	1.66	.135	.136	.108				1.289	1013	474	550
6	12:00	1.01	.081	.081	.065				1.005	790	367	432
7	12:04	.550	.045	.045	.035				.742	583	275	320
8	12:06	.411	.033	.033	.025				.641	504	236	272
9	12:08	.245	.020	.020	.015				.495	389	184	212
10	12:10	.143	.011	.011	.009				.378	297	137	166
11	12:13	.064	.005	.005	.004	58.0	76.0	29.22	.253	199	93	112
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.146	.537	53.2	794	.115	.512	903	.149	.462	.025	.075	.879
~~16~~ 2	.130	.475	53.3	749	.103	.453	854	.134	.410	.022	.065	.877
~~17~~ 3	.099	.361	53.6	650	.077	.339	750	.103	.312	.022	.049	.867
~~18~~ 4	.072	.262	53.6	555	.056	.248	642	.076	.228	.014	.034	.864
~~19~~ 5	.052	.187	53.7	469	.040	.176	544	.054	.162	.011	.025	.862
~~20~~ 6	.032	.113	54.1	363	.024	.105	427	.033	.098	.008	.015	.850
~~21~~ 7	.017	.062	53.8	269	.013	.058	314	.018	.051	.004	.011	.856
~~22~~ 8	.013	.046	53.5	234	.010	.043	270	.013	.038	.003	.008	.867
~~23~~ 9	.008	.028	53.5	181	.006	.026	208	.008	.023	.002	.005	.871
~~24~~ 10	.004	.015	54.8	134	.003	.014	163	.005	.014	.001	.001	.822
~~25~~ 11	.002	.007	54.6	90	.001	.006	109	.002	.006	.001	.001	.824

Remarks:

MLIT-232

Sheet No. 106A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.320	7.81	11.98'	-4.17	10"	.405	18.52	12.69'	5.83
2	|	.288	7.64	|	-4.24	|	.370	17.57	|	4.88
3	|	.224	9.82	|	-2.16	|	.288	17.01	|	4.32
4	|	.165	8.48	|	-3.50	|	.220	15.45	|	2.76
5	|	.118	9.32	|	-2.66	|	.157	15.92	|	3.23
6	|	.074	10.81	|	-1.17	|	.100	15.00	|	2.31
7	|	.043	9.30	|	-2.68	|	.057	19.30	|	6.61
8	|	.033	9.09	|	-2.89	|	.043	18.60	|	5.91
9	|	.021	9.52	|	-2.46	|	.027	18.52	|	5.83
10	|	.012	8.33	|	-3.65	|	.0175	5.71	|	-6.98
11	10"	—	—	11.98'	—	10"	—	—	12.69'	—
12										
13										
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17										
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21										
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23										
24										
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½"x 8" BOTH STR. & T.O.
ORIFICES: 8"x 5½" STR. & 8"x 5½" T.O.

Observers { R.J. Walker } { } Date JULY 14, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	12:21	4.57	.497	.465	.450	58.0	76.0	29.22	2.14	1682	870	838
2	12:25	4.10	.455	.430	.408				2.025	1591	840	800
3	12:28	3.17	.337	.318	.306				1.78	1399	723	692
4	12:31	2.38	.249	.237	.227				1.542	1212	625	600
5	12:33	1.65	.173	.164	.157				1.284	1009	520	500
6	12:35	1.01	.106	.099	.093				1.005	790	405	385
7	12:38	.560	.059	.054	.051				.749	589	300	287
8	12:40	.405	.041	.038	.036				.636	500	253	242
9	12:43	.248	.026	.024	.022				.498	391	202	190
10	12:46	.148	.015	.014	.013				.384	302	154	147
11	12:48	.066	.007	.006	.005	59.0	77.0	29.22	.257	202	102	92
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TR_4-TP_5	TP_4-TP_6	V_6/V_5
~~15~~ 1	.143	.640	49.1	856	.134	.599	826	.125	.575	.041	.065	.965
~~16~~ 2	.128	.583	48.8	815	.122	.552	776	.110	.518	.031	.065	.952
~~17~~ 3	.099	.436	48.9	715	.094	.412	684	.086	.392	.024	.044	.957
~~18~~ 4	.075	.324	49.0	618	.070	.307	594	.065	.292	.017	.032	.961
~~19~~ 5	.052	.225	49.0	515	.049	.213	494	.045	.202	.012	.023	.959
~~20~~ 6	.032	.138	48.7	405	.030	.129	385	.027	.120	.009	.018	.951
~~21~~ 7	.018	.077	48.9	301	.017	.071	288	.015	.066	.006	.011	.957
~~22~~ 8	.013	.054	48.9	255	.012	.050	245	.011	.047	.004	.007	.962
~~23~~ 9	.008	.034	48.5	201	.007	.031	190	.007	.029	.003	.005	.945
~~24~~ 10	.005	.020	48.8	155	.004	.018	147	.004	.017	.002	.003	.949
~~25~~ 11	.002	.009	47.4	106	.002	.008	96	.002	.007	.001	.002	.905

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.364	11.26	11.98'	−0.72	10"	.345	18.84	12.69'	6.15
2		.337	9.20		−2.78		.305	21.31		8.62
3		.260	9.23		−2.75		.241	18.26		5.57
4		.200	8.50		−3.48		.187	17.11		4.42
5		.142	8.45		−3.53		.131	17.56		4.87
6		.092	9.78		−2.20		.082	21.95		9.26
7		.053	11.32		−0.66		.049	22.45		9.76
8		.039	10.26		−1.72		.036	19.44		6.75
9		.0252	11.90		−0.08		.023	21.74		9.05
10		.016	12.50		0.52		.0146	20.55		7.86
11	10"	—	—	11.98'	—	10"	—	—	12.69'	—
12										
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24										
25										

Remarks:

MLIT-232

Sheet No. 108

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: 8" x 5½" STR. & 7" x 4½" T.O.

Observers { R.J. Waalkes } Date JULY 17, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:27	4.20	.711	.613	.720	73.0	82.0	29.05	2.05	1611	1000	630
2	11:31	3.16	.540	.470	.550				1.78	1399	878	552
3	11:35	2.33	.395	.335	.400				1.527	1200	721	470
4	11:39	1.67	.279	.238	.281				1.29	1014	628	396
5	11:42	1.01	.168	.141	.168				1.005	790	482	307
6	11:46	.570	.094	.080	.094				.755	593	365	230
7	11:49	.408	.066	.056	.066				.639	502	307	193
8	11:52	.250	.040	.034	.040				.500	393	239	151
9	11:55	.146	.024	.020	.024				.382	300	184	117
10	11:58	.066	.010	.010	.010	73.0	84.0	29.05	.257	202	131	76
11												
12												
13												

14	V_{P4}	T_{P4}	% DIV.	Q_{5C}	V_{P5}	T_{P5}	Q_{6C}	V_{P6}	T_{P6}	$T_{P4}-T_{P5}$	$T_{P4}-T_{P6}$	V_6/V_5
1 ~~15~~	.131	.842	38.7	988	.179	.792	623	.071	.791	.050	.051	.630
2 ~~16~~	.099	.639	38.6	859	.135	.605	540	.053	.603	.034	.036	.629
3 ~~17~~	.073	.468	39.5	726	.097	.432	474	.041	.441	.036	.027	.653
4 ~~18~~	.052	.331	38.7	622	.071	.309	392	.028	.309	.022	.022	.630
5 ~~19~~	.032	.200	38.9	483	.043	.184	307	.017	.185	.016	.015	.636
6 ~~20~~	.018	.112	38.7	364	.024	.104	229	.010	.104	.008	.008	.629
7 ~~21~~	.013	.079	38.6	308	.017	.073	194	.007	.073	.006	.006	.630
8 ~~22~~	.008	.048	38.7	241	.011	.045	152	.004	.044	.003	.004	.631
9 ~~23~~	.005	.029	38.9	183	.006	.026	117	.003	.027	.003	.002	.640
10 ~~24~~	.002	.012	36.7	128	.003	.013	74	.001	.011	.001	.001	.578
11 ~~25~~												

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.480	10.42	11.98'	−1.56	10"	.206	24.76	12.69'	12.07
2		.370	9.19		−2.79		.156	23.08		10.39
3		.269	13.38		1.40		.121	22.31		9.62
4		.205	10.73		−1.25		.087	25.29		12.60
5		.125	12.80		0.82		.055	27.27		14.58
6		.077	10.39		−1.59		.0312	25.64		12.95
7		.055	10.91		−1.07		.0234	25.64		12.95
8		.035	8.57		−3.41		.015	26.67		13.98
9		.0216	13.89		1.91		.0095	21.05		8.36
10	10"	.0118	—	11.98'	—	10"	—	—	12.69'	—
11										
12										
13										
14										
15										
16										
17										
18										
19										
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22										
23										
24										
25										

Remarks:



MLIT-232

Sheet No. 109

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½" x 8" BOTH STR. & T.O. ORIFICES: 8" x 5½" STR. & T.O. BLOCKED

Observers { R.J. Waelkes } { } Date JULY 17, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.		$\sqrt{P_3-P_2}$	V	CFM
1	12:06	3.05	1.58	1.17	1.61	73.0	84.0	29.05		1.75	7008.8	1375.1
2	12:10	2.33	1.20	.890	1.24					1.53	6127.7	1202.3
3	12:13	1.62	.850	.630	.873					1.27	5086.4	998.0
4	12:16	1.03	.544	.400	.560					1.015	4065.1	797.6
5	12:19	.545	.283	.205	.292					.738	2955.7	579.9
6	12:24	.403	.205	.148	.212					.635	2543.2	499.0
7	12:28	.250	.128	.091	.131					.500	2002.5	392.9
8	12:31	.149	.075	.053	.077					.386	1545.9	303.3
9	12:34	.065	.032	.024	.034	73.0	84.0	29.05		.255	1021.3	200.4
10												
11												
12												
13												
14												
15												
16												
17												
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21												
22												
23												
24												
25												

Remarks:

MLIT-232

Sheet No. 110

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½" x 8" BOTH STR. & T.O.
ORIFICES: 7" x 4½" STR. & 9" x 6½" T.O.

Observers { RJ Waalkes { Date JULY 17, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	1:25	4.49	.465	.530	.272	74.0	86.0	29.01	2.12	1666	557	1120
2	1:32	4.13	.435	.499	.252				2.03	1595	540	1075
3	1:37	3.18	.330	.377	.192				1.782	1400	470	945
4	1:41	2.35	.242	.279	.140				1.532	1204	404	812
5	1:44	1.65	.170	.195	.098				1.284	1009	339	684
6	1:48	1.01	.104	.118	.060				1.005	790	265	540
7	1:50	.550	.058	.065	.032				.742	583	197	398
8	1:53	.420	.044	.048	.025				.648	509	169	353
9	1:55	.256	.027	.030	.014				.506	398	135	268
10	1:58	.143	.015	.016	.008				.378	297	99	205
11	2:00	.062	.006	.007	.004	73.0	84.0	29.01	.249	196	66	147
12												
13												
14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.141	.606	66.8	553	.056	.586	1113	.227	.499	.020	.107	.497
2 ~~16~~	.129	.564	66.6	533	.052	.551	1062	.207	.459	.013	.105	.502
3 ~~17~~	.099	.429	66.8	465	.040	.417	935	.160	.352	.012	.077	.497
4 ~~18~~	.073	.315	66.8	400	.029	.308	804	.118	.258	.007	.057	.498
5 ~~19~~	.052	.222	66.9	334	.020	.215	675	.083	.181	.007	.041	.495
6 ~~20~~	.032	.136	67.1	260	.012	.130	530	.051	.111	.006	.025	.491
7 ~~21~~	.017	.075	66.9	193	.007	.072	390	.028	.060	.003	.015	.495
8 ~~22~~	.013	.057	67.6	165	.005	.053	344	.022	.047	.004	.010	.480
9 ~~23~~	.008	.035	66.5	133	.003	.033	265	.013	.027	.002	.008	.502
10 ~~24~~	.004	.019	67.4	97	.002	.018	200	.007	.015	.001	.004	.485
11 ~~25~~	.002	.008	69.0	61	.0007	.0077	135	.003	.007	.0003	.001	.452

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	10"	.157	12.74	11.98'	0.76	10"	.620	17.26	12.69'	4.57
2		.149	8.72		-3.26		.560	18.75		6.06
3		.119	10.08		-1.90		.440	17.50		4.81
4		.090	7.78		-4.20		.327	17.43		4.74
5		.064	10.94		-1.04		.235	17.45		4.76
6		.040	15.00		3.02		.150	16.67		3.98
7		.024	12.50		0.52		.085	17.65		4.96
8		.0177	22.60		10.62		.067	14.93		2.24
9		.012	16.67		4.69		.042	19.05		6.36
10		—	—		—		.025	16.00		3.31
11	10"	—	—	11.98'	—	10"	.0122	8.20	12.69'	-4.49
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: 7" x 4½" STR. & 8½" x 6" T.O.

Observers { R J Warlken } { } Date JULY 17, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	2:09	4.32	.570	.620	.420	73.0	84.0	29.01	2.08	1634	610	1065
2	2:14	4.14	.547	.597	.405				2.035	1599	590	1040
3	2:16	3.15	.428	.465	.305				1.776	1396	520	910
4	2:21	2.37	.310	.340	.225				1.54	1210	447	785
5	2:25	1.60	.210	.225	.150				1.265	994	364	645
6	2:27	1.04	.135	.146	.096				1.02	802	294	520
7	2:30	.580	.075	.082	.053				.762	599	222	390
8	2:33	.397	.050	.056	.035				.630	495	183	320
9	2:35	.241	.031	.034	.021				.491	386	143	250
10	2:38	.145	.019	.020	.013				.381	299	110	198
11	2:40	.065	.008	.008	.005	74.5	87.0	29.01	.255	200	70	125
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.135	.705	63.6	595	.065	.685	1039	.198	.618	.020	.087	.573
~~16~~ 2	.130	.677	63.8	579	.061	.658	1020	.191	.596	.019	.081	.568
~~17~~ 3	.099	.527	63.6	508	.047	.512	888	.144	.449	.015	.078	.572
~~18~~ 4	.074	.384	63.7	439	.035	.375	771	.109	.334	.009	.050	.569
~~19~~ 5	.050	.260	63.9	359	.024	.249	635	.074	.224	.011	.036	.565
~~20~~ 6	.032	.167	63.9	290	.015	.161	512	.048	.144	.006	.023	.566
~~21~~ 7	.018	.093	63.7	217	.009	.091	382	.027	.080	.002	.013	.568
~~22~~ 8	.012	.062	63.6	180	.006	.062	315	.018	.053	.000	.009	.571
~~23~~ 9	.008	.039	63.6	141	.004	.038	245	.011	.032	.001	.007	.575
~~24~~ 10	.004	.023	64.3	107	.002	.022	192	.007	.020	.001	.003	.557
~~25~~ 11	.002	.010	64.1	72	.001	.009	128	.003	.008	.001	.002	.562

Remarks:

[redacted]

MLIT-232

Sheet No. 111A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	10"	.188	10.64	11.98'	-1.34	10"	.535	16.26	12.69'	3.57
2		.179	10.61		-1.37		.510	15.88		3.19
3		.139	10.79		-1.19		.398	19.60		6.91
4		.105	8.57		-3.41		.300	16.67		3.98
5		.073	15.07		3.09		.210	17.14		4.45
6		.050	12.00		0.02		.141	16.31		3.62
7		.028	7.14		-4.84		.084	15.48		2.79
8		.0208	—		—		.058	15.52		2.83
9		.0134	7.46		-4.52		.036	19.44		6.75
10		—	—		—		.0231	12.99		0.30
11	10"	—	—	11.98'	—	10"	.0118	16.95	12.69'	4.26
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: 7" x 4½" STR. & 8" x 5½" T.O.

Observers { R J Walker } Date JULY 17, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	2:54	4.16	.715	.748	.610	74.5	87.0	29.01	2.04	1603	660	972
2	2:58	3.18	.552	.574	.468				1.782	1400	580	855
3	3:02	2.34	.410	.431	.344				1.53	1202	503	735
4	3:06	1.64	.283	.295	.235				1.28	1006	417	609
5	3:09	1.03	.175	.184	.145				1.015	798	330	480
6	3:12	.565	.095	.099	.078				.751	590	243	353
7	3:16	.395	.066	.069	.054				.629	494	203	295
8	3:19	.247	.041	.042	.034				.497	391	159	236
9	3:22	.138	.023	.024	.018				.372	292	121	173
10	3:24	.065	.011	.011	.008	74.5	87.0	29.01	.255	200	82	117
11												
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TR_4-TP_5	TR_4-TP_6	V_5/V_6
~~15~~ 1	.130	.845	59.6	648	.077	.825	955	.167	.777	.020	.068	.678
~~16~~ 2	.099	.651	59.6	566	.059	.633	834	.127	.595	.018	.056	.678
~~17~~ 3	.073	.483	59.4	488	.044	.475	714	.093	.437	.008	.046	.684
~~18~~ 4	.051	.334	59.4	408	.030	.325	598	.065	.300	.009	.034	.682
~~19~~ 5	.032	.207	59.3	325	.019	.203	473	.041	.186	.004	.021	.687
~~20~~ 6	.018	.113	59.2	241	.011	.110	349	.022	.100	.003	.013	.690
~~21~~ 7	.012	.078	59.2	202	.007	.076	292	.016	.070	.002	.008	.692
~~22~~ 8	.008	.049	59.7	158	.005	.047	233	.010	.044	.002	.005	.678
~~23~~ 9	.004	.027	58.8	120	.003	.027	192	.005	.023	.000	.004	.698
~~24~~ 0	.002	.013	58.8	82	.001	.012	118	.003	.011	.001	.002	.695
~~25~~ 11												

Remarks:

MLIT-232

Sheet No. 112A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.220	9.09	11.98'	-2.89	10"	.458	14.85	12.69'	2.16
2	|	.170	10.59	|	-1.39	|	.350	16.00	|	3.31
3	|	.130	6.15	|	-5.83	|	.260	17.69	|	5.00
4	|	.093	9.68	|	-2.30	|	.189	17.99	|	5.30
5	|	.060	6.67	|	-5.31	|	.120	17.50	|	4.81
6	|	.035	8.57	|	-3.41	|	.070	18.57	|	5.88
7	|	.0258	7.75	|	-4.23	|	.050	16.00	|	3.31
8	|	.0166	12.05	|	0.07	|	.0325	15.38	|	2.69
9	|	.010	—	|	—	|	.0194	20.62	|	7.93
10	10"	—	—	11.98'	—	10"	.0097	20.62	12.69'	7.93
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE — 10½" x 8" BOTH STR. & T.O.
ORIFICES: 7" x 4½" STR. & 7" x 4½" T.O.

Observers { R J Walker } { _____ } Date JULY 17, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	3:33	3.70	1.05	1.03	1.015	74.5	87.0	29.01	1.923	1511	772	748
2	3:36	3.14	.895	.890	.870				1.77	1391	720	690
3	3:39	2.36	.681	.670	.660				1.538	1209	624	605
4	3:42	1.65	.488	.480	.470				1.284	1009	530	510
5	3:46	1.02	.295	.287	.281				1.01	794	410	396
6	3:50	.560	.158	.155	.150				.749	589	303	290
7	3:52	.397	.110	.108	.105				.630	495	254	242
8	3:54	.254	.070	.069	.067				.504	396	203	195
9	3:56	.150	.041	.040	.039				.387	304	155	149
10	3:58	.065	.018	.017	.016	74.0	86.0	29.01	.255	200	102	96
11												
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
~~15~~ 1	.116	1.166	49.2	768	.108	1.138	743	.101	1.116	.028	.050	.967
~~16~~ 2	.098	.993	48.9	711	.093	.983	680	.085	.955	.010	.038	.956
~~17~~ 3	.074	.755	49.2	614	.069	.739	595	.065	.725	.016	.030	.969
~~18~~ 4	.052	.540	49.0	515	.049	.529	494	.045	.515	.011	.025	.959
~~19~~ 5	.032	.327	49.1	404	.030	.317	390	.028	.309	.010	.018	.965
~~20~~ 6	.018	.176	48.9	301	.017	.172	288	.015	.165	.004	.011	.957
~~21~~ 7	.012	.122	48.8	253	.012	.120	242	.011	.116	.002	.006	.957
~~22~~ 8	.008	.078	49.0	202	.007	.076	194	.007	.074	.002	.004	.960
~~23~~ 9	.005	.046	49.0	155	.004	.044	149	.004	.043	.002	.003	.962
~~24~~ 10	.002	.020	48.5	103	.002	.019	97	.002	.018	.001	.002	.941
25												

Remarks:

MLIT-232

Sheet No. 113A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	10"	.295	9.49	11.98'	-2.49	10"	.285	17.54	12.69'	4.85
2		.258	3.88		-8.10		.240	15.83		3.14
3		.197	8.12		-3.86		.187	16.04		3.35
4		.140	7.86		-4.12		.133	18.80		6.11
5		.092	10.87		-1.11		.086	20.93		8.24
6		.053	7.55		-4.43		.0484	22.73		10.04
7		.039	5.13		-6.85		.0355	16.90		4.21
8		.0258	7.75		-4.23		.0237	16.88		4.19
9		.016	12.50		0.52		.0148	20.27		7.58
10	10"	—	—	11.98'	—	10"	—	—	12.69'	—
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

Remarks:

MLIT-232

Sheet No. 114

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O. ORIFICES: 7" x 4½" STR. & T.O. BLOCKED

Observers { R J Walkes } { } Date JULY 18, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:11	2.01	2.38	2.12	2.41	64.0	80.0	29.19	1.42	5687.1	1115.8
2	11:14	1.645	1.965	1.755	1.99				1.28	5126.4	1005.8
3	11:18	1.05	1.255	1.12	1.27				1.024	4101.1	804.6
4	11:21	.560	.690	.615	.700				.748	2995.7	587.8
5	11:24	.403	.495	.436	.502				.635	2543.2	499.0
6	11:29	.255	.307	.270	.313				.505	2022.5	396.8
7	11:33	.149	.177	.155	.178				.386	1545.9	303.3
8	11:36	.058	.0675	.059	.070	65.0	82.0	29.19	.241	965.2	189.4
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½" x 8" BOTH STR. & T.O. ORIFICES; STR. BLOCKED & 9" x 6½" T.O.

Observers { R J Walker } { } Date JULY 18, 19 50

No	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:48	3.84	1.015	1.06	.505	65.0	82.0	29.19	1.96	7849.8	1540.1
2	11:58	3.17	.852	.896	.430				1.78	7128.9	1398.7
3	12:02	2.34	.640	.680	.320				1.53	6127.7	1202.3
4	12:04	1.66	.460	.485	.216				1.29	5166.5	1013.7
5	12:08	1.00	.277	.295	.130				1.00	4005.0	785.8
6	12:11	.540	.152	.164	.070				.735	2943.7	577.6
7	12:15	.415	.117	.124	.052				.645	2583.2	506.8
8	12:19	.250	.072	.076	.031				.500	2002.5	392.9
9	12:22	.147	.042	.045	.018				.384	1537.9	301.7
10	12:25	.064	.018	.020	.0075	65.0	82.0	29.19	.253	1013.3	198.8
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Remarks:

MLIT-232

Sheet No. 116

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8" BOTH STR. & T.O.
ORIFICES: STR. BLOCKED & 8½" x 6" T.O.

Observers { R J Waalkes {

Date JULY 18, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	12:35	3.47	1.250	1.310	.795	65.0	82.0	29.19	1.86	7449.3	1461.6
2	12:38	3.15	1.14	1.21	.725				1.775	7108.9	1394.8
3	12:41	2.34	.860	.895	.550				1.53	6127.7	1202.3
4	12:45	1.62	.606	.635	.382				1.27	5086.4	998.0
5	12:49	1.02	.386	.400	.233				1.01	4045.1	793.6
6	12:53	.550	.206	.215	.121				.741	2967.7	582.3
7	12:57	.398	.149	.155	.087				.631	2527.2	495.8
8	1:01	.250	.095	.099	.055				.500	2002.5	392.9
9	1:03	.148	.056	.060	.031				.385	1541.9	302.5
10	1:05	.065	.023	.025	.012	66.0	84.0	29.19	.251	1005.3	197.2
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 10½" x 8" BOTH STR. & T.O.
ORIFICES: STR. BLOCKED & 8" x 5½" T.O.

Observers { R J Walkes } { } Date JULY 18, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	1:12	3.05	1.60	1.66	1.21	66.0	84.0	29.19	1.75	7008.8	1375.1
2	1:15	2.30	1.22	1.26	.920				1.52	6087.6	1194.4
3	1:17	1.61	.864	.890	.651				1.27	5086.4	998.0
4	1:21	1.03	.565	.580	.420				1.015	4065.1	797.6
5	1:24	.540	.298	.305	.212				.735	2943.7	577.6
6	1:27	.398	.217	.225	.155				.631	2527.2	495.8
7	1:30	.247	.135	.139	.095				.497	1990.5	390.5
8	1:32	.145	.080	.083	.055				.381	1525.9	299.4
9	1:35	.065	.035	.036	.024	66.0	84.0	29.19	.255	1021.3	200.4
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 10½" x 8". BOTH STR. & T.O. ORIFICES: STR. BLOCKED & 7" x 4½" T.O.

Observers { R.J. Waslkes } { } Date JULY 18, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	1:40	1.95	2.39	2.42	2.15	66.0	84.0	29.19	1.40	5607.0	1100.1
2	1:43	1.64	2.025	2.05	1.81				1.28	5126.4	1005.8
3	1:46	1.03	1.29	1.30	1.15				1.015	4065.1	797.6
4	1:49	.555	.702	.710	.625				.745	2983.7	585.4
5	1:52	.386	.497	.502	.440				.621	2487.1	488.0
6	1:54	.252	.321	.325	.280				.502	2010.5	394.5
7	1:58	.143	.180	.183	.155				.378	1513.9	297.0
8	2:00	.063	.078	.080	.067	66.0	84.0	29.19	.251	1005.3	197.2
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Remarks: CHECK FOR LEAKAGE:
.001" @ 3.70" STATIC PRESSURE

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18" x 8" T.O.
ORIFICES: STR. BLOCKED & 16½" x 6½" T.O.

Observers { R J Walker } { } Date JULY 31, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.		$\sqrt{P_3-P_2}$	V	CFM
1	11:10	4.72	.265	.343	.145	75.5	86.0	28.94		2.17	8690.9	1705.2
2	11:15	4.15	.235	.304	.129					2.04	8170.2	1603.0
3	11:19	3.12	.178	.227	.096					1.77	7088.8	1390.8
4	11:22	2.35	.133	.170	.072					1.53	6127.7	1202.3
5	11:25	1.63	.093	.119	.051					1.28	5126.4	1005.8
6	11:27	1.02	.060	.075	.031					1.01	4045.1	793.6
7	11:30	.555	.033	.042	.016					.745	2983.7	585.4
8	11:33	.409	.024	.030	.012					.639	2559.2	502.1
9	11:36	.265	.015	.020	.0075					.515	2062.6	404.7
10	11:38	.148	.009	.011	.005					.385	1541.9	302.5
11	11:40	.068	.004	.005	.002	75.5	86.0	28.94		.261	1045.3	205.1
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Remarks: CHECK FOR LEAKAGE:
.0005" @ 3.66" STATIC PRESSURE.

MLIT-232

Sheet No. 120

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x8" STR. & 18"x8" T.O.
ORIFICES: STR. BLOCKED & 16"x6" T.O.

Observers { RJ Waalkes { Date AUG. 3, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	10:35	4.73	.355	.433	.228	63.0	80.0	29.14	2.175	8710.9	1709.1
2	10:38	4.14	.310	.376	.200				2.035	8150.2	1599.0
3	10:42	3.17	.238	.287	.152				1.78	7128.9	1398.7
4	10:46	2.28	.169	.205	.109				1.51	6047.6	1186.5
5	10:49	1.60	.119	.142	.075				1.265	5066.3	994.0
6	10:52	1.04	.078	.094	.049				1.02	4085.1	801.5
7	10:55	.560	.042	.050	.026				.748	2995.7	587.8
8	10:58	.413	.030	.037	.019				.643	2575.2	505.3
9	11:00	.250	.019	.022	.011				.500	2002.5	392.9
10	11:03	.150	.011	.014	.006				.387	1549.9	304.1
11	11:05	.067	.005	.006	.0025	64.0	82.0	29.14	.259	1037.3	203.5
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Remarks: CHECK FOR LEAKAGE:
.000" @ 3.74" STATIC PRESSURE.

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18"x 8" T.O. ORIFICES; STR. BLOCKED & 15½"x 5½" T.O.

Observers { R.J. Waalkes } { } Date AUG. 3, 19 50

NO.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:10	4.55	.475	.540	.349	64.0	82.0	29.14	2.135	8550.7	1677.6
2	11:14	4.11	.432	.498	.315				2.03	8130.2	1595.1
3	11:18	3.18	.327	.380	.240				1.783	7140.9	1401.1
4	11:22	2.37	.241	.278	.177				1.54	6167.7	1210.1
5	11:26	1.67	.170	.197	.124				1.29	5166.5	1013.6
6	11:29	1.06	.108	.124	.078				1.03	4125.2	809.3
7	11:32	.540	.055	.064	.040				.735	2943.7	577.6
8	11:35	.413	.041	.047	.029				.643	2575.2	505.3
9	11:37	.264	.027	.030	.018				.514	2058.6	403.9
10	11:39	.141	.014	.016	.010				.376	1505.9	295.5
11	11:42	.065	.007	.0075	.005	63.0	82.0	29.14	.255	1021.3	200.4
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Remarks:

MLIT-232

Sheet No. 122

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x8" STR. & 18"x8" T.O.
ORIFICES: STR. BLOCKED & 15"x5" T.O.

Observers { R J Waalkes { _____ Date AUG. 3, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:48	4.27	.675	.737	.562	63.0	82.0	29.14	2.07	8290.4	1626.6
2	11:54	4.12	.655	.715	.545				2.03	8130.2	1595.1
3	11:57	3.13	.510	.545	.419				1.77	7088.8	1390.8
4	12:02	2.32	.370	.408	.305				1.525	6107.6	1198.3
5	12:05	1.59	.250	.275	.205				1.26	5046.3	990.1
6	12:08	1.06	.165	.182	.135				1.03	4125.2	809.3
7	12:10	.550	.086	.094	.070				.741	2967.7	582.3
8	12:13	.410	.062	.068	.050				.640	2563.2	502.9
9	12:16	.260	.040	.044	.032				.510	2042.6	400.8
10	12:18	.160	.025	.027	.018				.400	1602.0	314.3
11	12:20	.065	.010	.010	.007	64.0	82.0	29.14	.255	1021.3	200.4
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Remarks:

MLIT-232

Sheet No. 123

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18"x 8" T.O. ORIFICES: STR. BLOCKED & 14"x 4" T.O.

Observers { R J Waalkes { _____ Date AUG. 3, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	12:25	3.56	1.205	1.250	1.110	64.0	82.0	29.14	1.89	7569.5	1485.1
2	12:29	3.18	1.080	1.120	.995				1.783	7140.9	1401.0
3	12:32	2.35	.810	.842	.745				1.53	6127.7	1202.3
4	12:34	1.58	.550	.575	.507				1.258	5038.3	988.5
5	12:36	1.06	.367	.385	.335				1.03	4125.2	809.3
6	12:44	.545	.186	.195	.169				.738	2955.7	579.9
7	12:48	.418	.139	.145	.126				.646	2587.2	507.6
8	12:50	.260	.087	.091	.079				.510	2042.6	400.8
9	12:52	.141	.047	.050	.042				.376	1505.9	295.5
10	12:55	.065	.021	.022	.019	64.0	82.0	29.14	.255	1021.3	200.4
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18"x 8" T.O.
ORIFICES: 7"x 2" STR. & T.O. BLOCKED

Observers { R.J. Waalkes } { } Date AUG. 2, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.		$\sqrt{P_3-P_2}$	V	CFM
1	12:05	.630	3.+	1.790	3.+	68.0	83.0	29.00		.794	3180.0	623.9
2	12:09	.580	3.04	1.660	3.04					.761	3047.8	598.0
3	12:12	.507	2.640	1.420	2.630					.711	2847.6	558.7
4	12:15	.442	2.310	1.240	2.305					.665	2663.3	522.5
5	12:18	.347	1.815	.965	1.815					.589	2358.9	462.8
6	12:20	.275	1.450	.784	1.450					.524	2098.6	411.7
7	12:22	.205	1.10	.585	1.10					.453	1814.3	356.0
8	12:24	.136	.740	.392	.740					.368	1473.8	289.2
9	12:29	.095	.520	.269	.520					.308	1233.5	242.0
10	12:34	.050	.280	.142	.280					.224	897.1	176.0
11	12:37	.040	.215	.110	.215	67.0	83.0	29.00		.200	801.0	157.2
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 3"x 8" STR. & 18"x 8" T.O.
ORIFICES: 6½"x 1½" STR. & T.O. BLOCKED

Observers { R J Waelkens } { _____ } Date AUG. 4, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:45	.333	3.+	2.810	3.+	62.0	77.0	29.19	.577	2310.9	453.4
2	11:47	.290	3.+	2.470	3.+				.538	2154.7	422.8
3	11:48	.242	2.610	2.065	2.610				.492	1970.5	386.6
4	11:50	.195	2.125	1.650	2.130				.441	1766.2	346.5
5	11:53	.145	1.595	1.255	1.605				.381	1525.9	299.4
6	11:55	.104	1.145	.888	1.145				.322	1289.6	253.0
7	11:58	.068	.750	.580	.750				.261	1045.3	205.1
8	12:00	.038	.420	.320	.420	62.0	77.0	29.19	.195	781.0	153.2
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18"x 8" T.O.
ORIFICES; 6¼"x 1¼" STR. & T.O. BLOCKED

Observers { R.J. Wasielewski } { _____ } Date AUG. 4, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	12:05	.205	3.+	3.+	3.+	62.0	77.0	29.19	.453	1814.3	356.0
2	12:08	.197	3.+	3.020	3.+				.444	1778.2	348.9
3	12:10	.174	3.04	2.660	3.04				.417	1670.1	327.7
4	12:12	.132	2.320	2.025	2.320				.363	1453.8	285.2
5	12:14	.105	1.880	1.630	1.880				.324	1297.6	254.6
6	12:16	.071	1.275	1.100	1.275				.266	1065.3	209.0
7	12:18	.053	.940	.810	.940				.230	921.2	180.7
8	12:20	.033	.585	.505	.585	62.0	78.0	29.19	.182	728.9	143.0
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Remarks:

MLIT-232

Sheet No. 127

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 3"x 8" STR. & 18" x 8" T.O.
ORIFICES; 6"x 1" STR. & T.O. BLOCKED

Observers { R.J. Waalkes } { } Date AUG. 4, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	12:25	.115	3.+	3.+	3.+	62.0	78.0	29.19	.339	1357.7	266.4
2	12:27	.101	3.+	3.025	3.+				.318	1273.6	249.9
3	12:29	.085	2.720	2.540	2.720				.292	1169.5	229.5
4	12:31	.068	2.200	2.050	2.200				.261	1045.3	205.1
5	12:33	.052	1.720	1.595	1.720				.228	913.1	179.2
6	12:37	.035	1.180	1.095	1.180				.187	748.9	146.9
7	12:39	.027	.910	.840	.910	62.0	78.0	29.19	.164	656.8	128.9
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Remarks:

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Sheet No. 128

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 3"x 8" STR. & 18" x 8" T.O.
ORIFICES: 7"x 2" STR. & 16½" x 6½" T.O.

Observers { R J Waalkes } Date AUG. 1, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:38	4.85	.180	.176	.120	74.5	85.0	28.94	2.20	1729	196	1550
2	10:41	4.12	.154	.151	.103				2.03	1595	182	1430
3	10:44	3.20	.121	.117	.080				1.79	1407	160	1265
4	10:46	2.32	.087	.085	.057				1.523	1197	137	1075
5	10:49	1.66	.063	.060	.041				1.288	1012	115	915
6	10:52	1.02	.040	.037	.025				1.01	794	90	718
7	10:54	.562	.022	.020	.014				.750	589	66	540
8	10:58	.405	.016	.014	.010				.636	500	56	460
9	11:00	.267	.011	.009	.006				.517	406	45	357
10	11:03	.154	.006	.005	.004				.392	308	33	294
11	11:05	.066	.003	.002	.001	75.0	86.0	28.94	.257	202	21	150
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.151	.331	88.8	193.6	.084	.260	1535.4	.147	.267	.071	.064	.756
2 ~~16~~	.129	.283	88.7	180.2	.073	.224	1414.8	.125	.228	.059	.055	.764
3 ~~17~~	.100	.221	88.8	157.6	.056	.173	1249.4	.097	.177	.048	.044	.757
4 ~~18~~	.073	.160	88.7	135.3	.041	.126	1061.7	.070	.127	.034	.033	.765
5 ~~19~~	.052	.115	88.8	113.3	.029	.089	898.7	.050	.091	.026	.024	.756
6 ~~20~~	.032	.072	88.9	88.1	.017	.054	705.9	.031	.056	.018	.016	.749
7 ~~21~~	.018	.040	89.1	64.2	.0093	.0293	524.8	.017	.031	.0107	.009	.734
8 ~~22~~	.013	.029	89.1	54.5	.0067	.0207	445.5	.012	.022	.0083	.007	.734
9 ~~23~~	.008	.019	88.8	45.5	.0047	.0137	360.5	.0081	.0141	.0053	.0049	.758
10 ~~24~~	.005	.011	89.9	31.1	.0022	.0072	276.9	.0048	.0088	.0038	.0022	.674
11 ~~25~~	.002	.005	87.7	24.8	.0014	.0034	177.2	.0020	.0030	.0016	.0020	.842

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	5.8"	.349	20.34	6.35'	13.99	12.7"	.341	18.77	12.48'	6.29
2		.305	19.34		12.99		.292	18.84		6.36
3		.238	20.17		13.82		.230	19.13		6.65
4		.180	18.89		12.54		.171	19.30		6.82
5		.130	20.00		13.65		.126	19.05		6.57
6		.080	22.50		16.15		.080	20.00		7.52
7		.045	23.78		17.43		.0455	19.78		7.30
8		.0345	24.06		17.71		.031	22.58		10.10
9		.0248	21.37		15.02		.023	21.30		8.82
10		.0126	30.16		23.81		.0142	15.49		3.01
11	5.8"	.0085	18.82	6.35'	12.47	12.7"	.0065	30.77	12.48'	18.29
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x8" STR. & 18"x8" T.O.
ORIFICES: 7"x 2" STR. & 16"x 6" T.O.

Observers { R.J. Walker } { } Date AUG. 1, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:13	4.75	.235	.208	.177	75.0	86.0	28.94	2.18	1713	213	1490
2	11:16	4.15	.205	.182	.155				2.04	1603	199	1400
3	11:20	3.16	.155	.138	.117				1.78	1399	174	1225
4	11:23	2.29	.112	.098	.085				1.513	1189	147	1045
5	11:26	1.64	.081	.070	.060				1.28	1006	124	885
6	11:29	1.02	.051	.044	.037				1.01	794	98	700
7	11:31	.570	.030	.025	.021				.755	593	74	531
8	11:34	.410	.020	.016	.014				.640	503	59.5	437
9	11:37	.255	.013	.010	.009				.505	397	47	352
10	11:40	.150	.008	.006	.005				.387	304	36.6	266
11	11:42	.065	.004	.003	.002	74.5	84.0	28.94	.255	200	26	172
12												
13												

14	VP_4	TP_4	%DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.149	.384	87.5	214.1	.103	.311	1498.9	.140	.317	.073	.067	.857
~~16~~ 2	.130	.335	87.55	199.6	.089	.271	1403.4	.123	.278	.064	.057	.853
~~17~~ 3	.099	.254	87.6	174.0	.068	.206	1225.0	.094	.211	.048	.043	.852
~~18~~ 4	.072	.884	87.7	146.2	.048	.146	1042.8	.068	.153	.038	.031	.841
~~19~~ 5	.051	.132	87.7	123.7	.034	.104	882.3	.049	.109	.028	.023	.841
~~20~~ 6	.032	.083	87.7	97.7	.021	.065	696.3	.030	.067	.018	.016	.842
~~21~~ 7	.018	.048	87.8	72.3	.012	.037	520.7	.017	.038	.011	.010	.833
~~22~~ 8	.013	.033	88.0	60.4	.0082	.0242	442.6	.012	.026	.0088	.007	.819
~~23~~ 9	.008	.021	88.2	46.8	.0049	.0149	350.2	.0076	.0166	.0061	.0044	.802
~~24~~ 10	.005	.013	87.9	36.8	.0030	.009	267.2	.0044	.0094	.0040	.0036	.826
~~25~~ 11	.002	.006	86.9	26.2	.0015	.0045	173.8	.0019	.0039	.0015	.0021	.903

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.418	17.46	6.35'	11.11	12.7"	.326	20.55	12.48'	8.07
2		.375	17.07		10.72		.289	19.72		7.24
3		.290	16.55		10.20		.224	19.20		6.72
4		.205	18.54		12.19		.166	18.67		6.19
5		.153	18.30		11.95		.120	19.17		6.69
6		.097	18.56		12.21		.077	20.78		8.30
7		.056	19.64		13.29		.045	22.22		9.74
8		.041	21.46		15.11		.0335	20.90		8.42
9		.0255	23.92		17.57		.022	20.00		7.52
10		.0168	23.81		17.46		.013	27.69		15.21
11	5.8"	.0092	16.30	6.35'	9.95	12.7"	.0063	33.33	12.48'	20.85
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 7" x 2" STR. & 15½" x 5½" T.O.

Observers { R.J. Warken } { } Date AUG. 2, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:00	4.73	.322	.259	.270	69.0	83.0	29.00	2.175	1709	237	1478
2	10:04	4.17	.285	.229	.238				2.042	1605	223	1385
3	10:07	3.12	.213	.170	.176				1.767	1388	192	1200
4	10:12	2.38	.160	.127	.134				1.543	1212	167	1045
5	10:15	1.655	.111	.088	.092				1.286	1011	139	868
6	10:17	1.04	.070	.055	.057				1.02	801	110	688
7	10:20	.575	.039	.030	.031				.758	596	81	511
8	10:23	.415	.027	.021	.022				.645	507	68	432
9	10:26	.260	.017	.013	.013				.510	401	53.6	334
10	10:28	.156	.010	.008	.008				.395	310	42	264
11	10:30	.066	.005	.003	.003	69.0	83.0	29.00	.257	202	26	164
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~	.148	.470	86.2	235.8	.125	.384	1473.2	.135	.405	.086	.065	.960
~~16~~	.130	.415	86.13	222.6	.111	.340	1382.4	.119	.357	.075	.058	.966
~~17~~	.098	.311	86.2	191.5	.082	.252	1196.5	.089	.265	.059	.046	.960
~~18~~	.074	.234	86.2	167.0	.063	.190	1045.0	.068	.202	.044	.032	.959
~~19~~	.052	.163	86.2	139.5	.044	.132	871.5	.047	.139	.031	.024	.960
~~20~~	.032	.102	86.2	110.5	.027	.082	690.5	.030	.087	.020	.015	.960
~~21~~	.018	.057	86.3	81.7	.015	.045	514.3	.016	.047	.012	.010	.953
~~22~~	.015	.042	86.4	69.0	.011	.032	438.0	.012	.034	.010	.008	.945
~~23~~	.008	.025	86.2	55.3	.0069	.0199	345.7	.0074	.0204	.0051	.0046	.959
~~24~~	.005	.015	86.3	42.5	.0041	.0121	267.5	.0045	.0125	.0029	.0025	.954
~~25~~	.002	.007	86.3	27.7	.0017	.0047	1743	.0019	.0049	.0023	.0021	.954

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.500	17.20	6.35'	10.85	12.7"	.317	20.50	12.48'	8.02
2		.445	16.85		10.50		.281	20.64		8.16
3		.340	17.35		11.00		.215	21.40		8.92
4		.272	16.18		9.83		.168	19.05		6.57
5		.192	16.15		9.80		.118	20.34		7.86
6		.123	16.26		9.91		.077	19.48		7.00
7		.072	16.67		10.32		.0448	22.32		9.84
8		.052	17.23		12.88		.033	24.24		11.76
9		.034	15.00		8.65		.0217	21.20		8.72
10		.022	13.18		6.83		.0131	19.08		6.60
11	5.8"	.0103	22.33	6.35'	15.98	12.7"	.0063	33.33	12.48'	20.85
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18" x 8" T.O.
ORIFICES: 7"x 2" STR. & 15"x 5" T.O.

Observers { R.J. Waalkes } { } Date AUG. 2, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:37	4.52	.468	.335	.424	69.0	83.0	29.00	2.125	1670	270	1400
2	10:41	4.15	.433	.310	.392				2.04	1603	260	1350
3	10:46	3.11	.319	.228	.287				1.765	1387	223	1165
4	10:50	2.26	.230	.165	.208				1.505	1183	190	990
5	10:52	1.615	.163	.116	.147				1.27	998	160	835
6	10:55	1.05	.106	.075	.095				1.025	805	128	677
7	10:57	.550	.055	.039	.049				.741	582	92.5	490
8	11:01	.404	.040	.027	.035				.635	499	77	415
9	11:04	.258	.025	.0175	.022				.508	399	62	332
10	11:06	.156	.015	.010	.013				.395	310	47	257
11	11:08	.067	.006	.004	.005	68.0	82.0	29.00	.259	204	30	162
12												
13												

14	VP_4	TP_4	% Div.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
~~15~~ 1	.141	.609	83.8	270.0	.164	.499	1400.0	.122	.546	.110	.063	.864
~~16~~ 2	.130	.563	83.9	258.1	.149	.459	1344.9	.113	.502	.104	.058	.869
~~17~~ 3	.097	.416	83.93	228.8	.111	.339	1164.2	.085	.372	.077	.044	.871
~~18~~ 4	.071	.301	83.9	190.5	.081	.246	992.5	.061	.269	.055	.032	.868
~~19~~ 5	.050	.213	83.9	160.7	.058	.174	837.3	.044	.191	.039	.022	.869
~~20~~ 6	.033	.139	84.1	128.0	.037	.112	677.0	.029	.124	.027	.015	.882
~~21~~ 7	.017	.072	84.1	92.5	.019	.058	489.5	.015	.064	.014	.008	.882
~~22~~ 8	.013	.053	84.3	78.3	.014	.041	420.7	.011	.046	.012	.007	.895
~~23~~ 9	.008	.033	84.3	62.6	.0088	.0263	336.4	.0071	.0291	.0067	.0039	.896
~~24~~ 10	.005	.020	84.5	48.0	.0052	.0152	262.0	.0043	.0173	.0048	.0027	.910
~~25~~ 11	.002	.008	84.4	31.8	.0023	.0063	172.2	.0018	.0068	.0017	.0012	.903

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.650	16.92	6.35'	10.57	12.7"	.288	21.88	12.48'	9.40
2		.590	17.63		11.28		.263	22.05		9.57
3		.428	17.99		11.64		.200	22.00		9.52
4		.342	16.08		9.73		.150	21.33		8.85
5		.248	15.73		9.38		.111	19.82		7.34
6		.160	16.88		10.53		.072	20.83		8.35
7		.088	15.91		9.56		.040	20.00		7.52
8		.075	16.00		10.65		.030	23.33		10.85
9		.0418	16.03		9.68		.0204	19.12		6.64
10		.027	17.78		11.43		.0128	21.09		8.61
11	5.8"	.013	13.08	6.35'	6.73	12.7"	.0062	19.35	12.48'	6.87
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Remarks:

MLIT-232

Sheet No. 132

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 7" x 2" STR. & 14" x 4" T.O.

Observers { R J Waalkes { Date AUG. 2, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:22	4.06	.820	.537	.795	68.0	82.0	29.00	2.015	1583	340	1250
2	11:26	3.18	.655	.423	.630				1.782	1400	302	1120
3	11:30	2.31	.483	.303	.468				1.52	1194	257	960
4	11:35	1.67	.344	.215	.332				1.292	1015	217	812
5	11:38	1.02	.205	.129	.198				1.01	794	168	628
6	11:42	.550	.110	.069	.105				.741	582	123	460
7	11:45	.390	.077	.047	.073				.625	491	102	385
8	11:47	.255	.050	.030	.048				.505	397	81	313
9	11:49	.155	.030	.018	.028				.394	310	63	240
10	11:52	.068	.013	.0075	.012	68.0	83.0	29.00	.261	205	41	159
11												
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.127	.947	78.6	338.8	.258	.795	1244.2	.097	.892	.152	.055	.612
2 ~~16~~	.099	.754	78.8	296.8	.198	.621	1103.2	.076	.706	.133	.048	.620
3 ~~17~~	.072	.555	78.9	251.9	.142	.445	942.1	.055	.523	.110	.032	.623
4 ~~18~~	.052	.396	78.9	214.2	.103	.318	800.8	.040	.372	.078	.024	.623
5 ~~19~~	.032	.237	78.9	167.5	.063	.192	626.5	.024	.222	.045	.015	.623
6 ~~20~~	.017	.127	78.9	122.8	.034	.103	459.2	.013	.118	.024	.009	.623
7 ~~21~~	.012	.089	79.1	102.6	.024	.071	388.4	.0094	.0824	.018	.0066	.631
8 ~~22~~	.008	.058	79.4	81.8	.015	.045	315.2	.0062	.0542	.013	.0038	.642
9 ~~23~~	.005	.035	79.2	64.5	.0093	.0273	245.5	.0038	.0318	.0077	.0032	.635
10 ~~24~~	.002	.015	79.5	42.0	.0040	.0115	163.0	.0017	.0137	.0035	.0013	.647
25												

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

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Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.990	15.35	6.35'	9.00	12.7"	.230	23.91	12.48'	11.43
2		.780	17.05		10.70		.185	25.95		13.47
3		.575	19.13		12.78		.138	23.19		10.71
4		.415	18.80		12.45		.101	23.76		11.28
5		.270	16.67		10.32		.063	23.81		11.33
6		.150	16.00		9.65		.0355	25.35		12.87
7		.109	16.51		10.16		.0265	24.91		12.43
8		.072	18.06		11.71		.0181	20.99		8.51
9		.045	17.11		10.76		.0116	27.59		15.11
10	5.8"	.0214	16.36	6.35'	10.01	12.7"	.0059	22.81	12.48'	10.33
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18"x 8" T.O.
ORIFICES: 6½"x 1½" STR. & 16½"x 6½" T.O.

Observers { R.J. Walker } { } Date AUG. 7, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:11	4.89	.209	.261	.128	65.5	83.0	29.29	2.21	1737	138	1600
2	11:16	4.17	.178	.222	.110				2.042	1605	127	1480
3	11:20	3.16	.134	.167	.083				1.78	1399	110	1290
4	11:23	2.38	.102	.125	.063				1.543	1212	95	1130
5	11:26	1.62	.070	.085	.042				1.273	1000	78.5	925
6	11:29	1.00	.044	.052	.025				1.00	786	61.5	718
7	11:32	.575	.025	.030	.015				.758	596	46.7	560
8	11:35	.400	.017	.020	.010				.632	497	38.0	460
9	11:37	.250	.011	.012	.006				.500	393	29.5	357
10	11:40	.133	.006	.0065	.003				.365	287	21.7	257
11	11:43	.065	.003	.003	.001	69.0	83.0	29.29	.255	200	14.8	150
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.153	.362	92.06	137.9	.043	.304	1599.1	.159	.287	.058	.075	.517
~~16~~ 2	.130	.308	92.1	126.8	.036	.258	1478.2	.136	.244	.050	.062	.514
~~17~~ 3	.099	.233	92.14	110.0	.027	.194	1289.0	.104	.187	.039	.046	.512
~~18~~ 4	.074	.176	92.2	94.5	.020	.145	1117.5	.078	.141	.031	.035	.508
~~19~~ 5	.051	.121	92.2	78.0	.014	.099	922.0	.053	.095	.022	.026	.507
~~20~~ 6	.031	.075	92.1	62.1	.0086	.0606	723.9	.033	.058	.0144	.017	.514
~~21~~ 7	.018	.043	92.3	45.9	.0047	.0347	550.1	.019	.034	.0083	.009	.501
~~22~~ 8	.012	.029	92.4	37.8	.0032	.0232	459.2	.013	.023	.0058	.006	.493
~~23~~ 9	.008	.019	92.4	29.9	.0020	.0141	363.1	.0082	.0142	.0050	.0048	.494
~~24~~	.004	.010	92.2	22.4	.0011	.0076	264.6	.0044	.0074	.0024	.0026	.508
~~25~~	.002	.005	91.0	18.0	.0007	.0037	182.0	.0021	.0031	.0013	.0019	.595

Remarks: CHANGED PSYCHROMETERS.

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.185	31.35	6.35'	25.00	12.7"	.370	20.27	12.48'	7.79
2		.158	31.65		25.30		.320	19.58		6.90
3		.122	31.97		25.62		.245	18.78		6.30
4		.092	33.70		27.35		.186	18.82		6.34
5		.066	33.33		26.98		.131	19.85		7.37
6		.042	34.29		27.94		.082	20.73		8.25
7		.025	33.20		26.85		.0495	18.18		5.70
8		.0178	32.58		26.23		.0355	16.90		4.42
9		.0117	42.74		36.39		.023	20.87		8.39
10		.007	34.29		27.94		.0131	19.85		7.37
11	5.8"	—	—	6.35'	—	12.7"	.0068	27.94	12.48'	15.46
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Remarks:

MLIT-232

Sheet No. 134

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 6½" x 1½" STR. & 16" x 6" T.O.

Observers { R J Waalkes { Date AUG. 7, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:55	4.84	.274	.315	.195	69.0	83.0	29.29	2.20	1729	152	1570
2	12:00	4.08	.232	.266	.166				2.02	1587	139	1450
3	12:04	3.16	.177	.205	.127				1.78	1399	122	1270
4	12:07	2.31	.130	.147	.092				1.52	1194	103	1090
5	12:10	1.64	.093	.105	.065				1.28	1006	87	920
6	12:14	1.00	.056	.063	.040				1.00	786	67.5	725
7	12:16	.580	.033	.036	.022				.761	598	51	544
8	12:19	.417	.024	.025	.015				.646	508	42.5	452
9	12:21	.246	.014	.015	.009				.496	390	33	352
10	12:23	.140	.007	.008	.005				.374	294	24.1	266
11	12:25	.065	.003	.004	.002	68.5	83.0	29.29	.255	200	17.1	172
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.151	.425	91.2	152.2	.052	.367	1576.8	.155	.350	.058	.075	.579
2 ~~16~~	.128	.360	91.3	138.1	.043	.309	1448.9	.131	.297	.051	.063	.572
3 ~~17~~	.099	.276	91.2	123.1	.034	.239	1275.9	.102	.229	.037	.047	.579
4 ~~18~~	.072	.202	91.4	102.9	.024	.171	1091.1	.074	.166	.031	.036	.566
5 ~~19~~	.051	.144	91.4	86.9	.017	.122	919.1	.053	.118	.022	.026	.567
6 ~~20~~	.031	.087	91.5	66.8	.010	.073	719.2	.032	.072	.014	.015	.557
7 ~~21~~	.018	.051	91.4	51.4	.0059	.0419	546.6	.019	.041	.0091	.010	.564
8 ~~22~~	.013	.037	91.4	43.7	.0043	.0293	464.3	.013	.028	.0077	.009	.565
9 ~~23~~	.008	.022	91.4	33.5	.0025	.0175	356.5	.0079	.0169	.0045	.0051	.564
10 ~~24~~	.004	.011	91.7	24.4	.0013	.0093	269.6	.0045	.0095	.0017	.0015	.544
11 ~~25~~	.002	.005	91.0	18.0	.0007	.0047	182.0	.0021	.0041	.0003	.0009	.595

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.222	26.13	6.35'	19.78	12.7"	.361	20.78	12.48'	8.30
2		.187	27.27		20.92		.305	20.66		8.18
3		.150	24.67		18.32		.243	19.34		6.86
4		.110	28.18		21.83		.179	20.11		7.63
5		.078	28.21		21.86		.131	19.85		7.37
6		.049	28.57		22.22		.082	18.29		5.81
7		.031	29.35		23.00		.049	20.41		7.93
8		.023	33.48		27.13		.036	25.00		12.52
9		.0143	31.47		25.12		.0228	22.37		9.89
10		.0083	20.48		14.13		.0137	10.95		−1.53
11	5.8"	—	—	6.35'	—	12.7"	.0068	13.24	12.48'	0.76
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Remarks:

MLIT-232

Sheet No. 135

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 3"x 8" STR. & 18"x 8" T.O. ORIFICES; 6½"x 1½" STR. & 15½"x 5½" T.O.

Observers { R.J. Waalkes } { } Date AUG. 7, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	2:00	4.70	.368	.392	.294	69.0	84.0	29.28	2.17	1705	169	1540
2	2:03	4.12	.324	.345	.259				2.03	1595	158	1450
3	2:07	3.16	.245	.260	.195				1.78	1399	137.5	1260
4	2:10	2.36	.183	.193	.145				1.537	1208	118	1085
5	2:13	1.62	.124	.130	.098				1.272	1000	97	897
6	2:15	1.03	.079	.082	.062				1.015	798	77	718
7	2:18	.580	.044	.045	.034				.761	598	57	534
8	2:21	.385	.028	.029	.021				.621	488	46	422
9	2:23	.245	.018	.018	.013				.495	389	36.1	334
10	2:25	.145	.010	.010	.007				.381	299	27	247
11	2:27	.063	.004	.004	.003	69.0	84.0	29.28	.251	197	17.1	164
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~	.147	.515	90.1	168.8	.064	.456	1536.2	.147	.441	.059	.074	.659
~~16~~	.129	.453	90.2	156.3	.055	.400	1438.7	.129	.388	.053	.065	.652
~~17~~	.099	.344	90.16	137.7	.043	.303	1261.3	.099	.294	.041	.050	.655
~~18~~	.074	.257	90.2	118.4	.031	.224	1089.6	.074	.219	.033	.038	.652
~~19~~	.051	.175	90.2	98.0	.022	.152	902.0	.051	.149	.023	.026	.651
~~20~~	.032	.111	90.3	77.4	.013	.095	720.6	.032	.094	.016	.017	.644
~~21~~	.018	.062	90.4	57.4	.0074	.0524	540.6	.018	.052	.0096	.010	.637
~~22~~	.012	.040	90.2	47.8	.0051	.0341	440.2	.012	.033	.0059	.007	.652
~~23~~	.008	.026	90.2	38.1	.0033	.0213	350.9	.0077	.0207	.0047	.0053	.652
~~24~~	.005	.015	90.1	29.6	.0020	.0120	269.4	.0045	.0115	.0030	.0035	.658
~~25~~	.002	.006	90.6	18.5	.0008	.0048	178.5	.0020	.0050	.0012	.0010	.621

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.270	21.85	6.35'	15.50	12.7"	.343	21.57	12.48'	9.09
2		.235	22.55		16.20		.302	21.52		9.04
3		.187	21.93		15.58		.237	21.10		8.62
4		.140	23.57		17.22		.180	21.11		8.63
5		.099	23.23		16.88		.127	20.47		7.99
6		.064	25.00		18.65		.082	20.73		8.25
7		.0372	25.81		19.46		.0485	20.62		8.14
8		.0272	21.69		15.34		.0336	20.83		8.35
9		.0178	26.40		20.05		.0221	23.98		11.50
10		.0115	26.09		19.74		.0136	25.74		13.26
11	5.8"	—	—	6.35'	—	12.7"	.0065	15.38	12.48'	2.90
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O. ORIFICES: 6½" x 1½" STR. & 15" x 5" T.O.

Observers { R J Walker } { } Date AUG. 7, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	2:31	4.48	.527	.519	.465	69.0	84.0	29.28	2.116	1663	194	1470
2	2:36	4.10	.495	.489	.434				2.025	1591	188	1420
3	2:39	3.16	.375	.369	.330				1.78	1399	164	1240
4	2:42	2.34	.275	.269	.240				1.53	1202	140	1065
5	2:45	1.62	.189	.185	.165				1.272	1000	116	885
6	2:47	1.06	.123	.118	.107				1.03	809	92.5	715
7	2:49	.565	.065	.063	.056				.752	591	67.5	525
8	2:51	.443	.047	.045	.040				.643	505	57.0	444
9	2:54	.245	.028	.026	.024				.495	389	43.4	346
10	2:56	.150	.016	.015	.014				.387	304	33.0	267
11	2:58	.065	.0065	.006	.005	70.0	85.0	29.28	.255	200	21.0	162
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TR_4-TR_5	TR_4-TR_6	V_5/V_6
~~15~~ 1	.140	.667	88.34	193.9	.084	.603	1469.1	.135	.600	.064	.067	.792
~~16~~ 2	.128	.623	88.3	186.1	.078	.567	1404.9	.123	.557	.056	.066	.795
~~17~~ 3	.099	.474	88.3	163.7	.060	.429	1235.3	.095	.425	.045	.049	.795
~~18~~ 4	.073	.348	88.4	139.4	.044	.313	1062.6	.070	.310	.035	.038	.787
~~19~~ 5	.051	.240	88.4	116.0	.030	.215	884.0	.049	.214	.025	.026	.787
~~20~~ 6	.033	.156	88.5	93.0	.019	.137	716.0	.032	.139	.019	.017	.779
~~21~~ 7	.018	.083	88.6	67.4	.010	.073	523.6	.017	.073	.010	.010	.773
~~22~~ 8	.013	.060	88.6	57.6	.0074	.0524	447.4	.012	.052	.0076	.008	.773
~~23~~ 9	.008	.036	88.9	43.3	.0042	.0302	345.7	.0074	.0314	.0058	.0046	.752
~~24~~ 10	.005	.021	89.0	33.4	.0025	.0175	270.6	.0046	.0186	.0035	.0024	.740
~~25~~ 11	.002	.0085	88.5	23.0	.0012	.0072	177.0	.0020	.0070	.0013	.0015	.780

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.350	18.29	6.35'	11.94	12.7"	.310	21.61	12.48'	9.13
2		.320	17.50		11.15		.290	22.76		10.28
3		.260	17.31		10.96		.227	21.59		9.11
4		.191	18.32		11.97		.171	21.22		8.74
5		.136	18.38		12.03		.120	21.67		9.19
6		.089	21.35		15.00		.081	20.99		8.51
7		.0495	20.20		13.85		.045	22.22		9.74
8		.0375	20.27		13.92		.034	23.53		11.05
9		.0228	25.44		19.09		.022	20.91		8.43
10		.0143	24.48		18.13		.0136	17.65		5.17
11	5.8"	.0074	17.57	6.35'	11.22	12.7"	.0065	23.08	12.48'	10.60
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Remarks:

MLIT-232

Sheet No. 137

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 6½" x 1½" STR. & 14" x 4" T.O.

Observers { R J Waalkes { Date AUG. 7, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	3:03	3.92	.925	.834	.884	70.0	85.0	29.28	1.98	1556	246	1320
2	3:06	3.17	.755	.680	.720				1.78	1399	222	1190
3	3:08	2.31	.556	.499	.530				1.52	1194	190	1020
4	3:10	1.65	.398	.354	.378				1.285	1010	161	865
5	3:14	1.05	.248	.220	.235				1.025	805	127	685
6	3:17	.560	.134	.115	.125				.748	588	91	500
7	3:20	.415	.095	.085	.090				.644	506	78.5	427
8	3:23	.237	.055	.047	.050				.487	383	58.4	320
9	3:25	.140	.032	.028	.030				.374	294	45.0	249
10	3:28	.065	.014	.012	.013	71.0	87.0	29.28	.255	200	29.5	165
11												
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.123	1.048	84.3	244.3	.134	.968	1311.7	.107	.991	.080	.057	.895
2 ~~16~~	.099	.854	84.3	219.6	.108	.788	1179.4	.087	.807	.066	.047	.895
3 ~~17~~	.072	.628	84.3	187.5	.079	.578	1006.5	.063	.593	.050	.035	.895
4 ~~18~~	.052	.450	84.3	158.6	.056	.410	851.4	.045	.423	.040	.027	.895
5 ~~19~~	.033	.281	84.3	126.4	.036	.256	678.6	.029	.264	.025	.017	.895
6 ~~20~~	.018	.152	84.6	90.6	.018	.133	497.4	.015	.140	.019	.012	.915
7 ~~21~~	.013	.108	84.5	78.6	.014	.099	427.4	.011	.101	.009	.007	.907
8 ~~22~~	.007	.062	84.6	59.0	.0078	.0548	324.0	.0065	.0565	.0072	.0055	.915
9 ~~23~~	.004	.036	84.7	45.0	.0045	.0325	249.0	.0039	.0339	.0035	.0021	.923
10 ~~24~~	.002	.016	84.8	30.4	.0021	.0141	169.6	.0018	.0148	.0019	.0012	.930
25												

Remarks:

MLIT-232

Sheet No. 137A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ { _____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.535	14.95	6.35'	8.60	12.7"	.254	22.44	12.48'	9.96
2		.440	15.00		8.65		.209	22.49		10.01
3		.327	15.29		8.94		.155	22.58		10.10
4		.242	16.53		10.18		.113	23.89		11.41
5		.157	15.92		9.57		.074	22.97		10.49
6		.086	22.09		15.74		.041	29.27		16.79
7		.066	13.64		7.29		.0315	22.22		9.74
8		.039	18.46		12.11		.019	28.95		16.47
9		.0242	14.46		8.11		.012	17.50		5.02
10	5.8"	.0121	15.70	6.35'	9.35	12.7"	.006	20.00	12.48'	7.52
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Remarks:

MLIT-232

Sheet No. 138

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 6¼" x 1¼" STR. & 16½" x 6½" T.O.

Observers { R.J. Wasielkes } { } Date AUG. 9, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	8:59	4.88	.224	.293	.135	71.0	82.0	29.20	2.21	1737	109	1635
2	9:04	4.16	.190	.250	.115				2.04	1603	101	1510
3	9:08	3.14	.145	.188	.088				1.772	1392	87.5	1330
4	9:12	2.34	.107	.137	.065				1.53	1202	75.0	1150
5	9:15	1.65	.077	.097	.046				1.285	1010	63.0	965
6	9:18	1.01	.047	.060	.028				1.005	790	49.5	760
7	9:20	.510	.025	.031	.014				.714	561	35.7	540
8	9:22	.395	.019	.023	.011				.628	493	30.9	480
9	9:24	.264	.013	.015	.007				.514	404	25.0	385
10	9:27	.140	.007	.008	.004				.374	294	18.3	294
11	9:29	.056	.003	.004	.002	71.0	80.0	29.20	.2366	186	13.0	210
12												
13												

14	V_{P4}	T_{P4}	% DIV.	Q_{5C}	V_{P5}	T_{P5}	Q_{6C}	V_{P6}	T_{P6}	$T_{P4}-T_{P5}$	$T_{P4}-T_{P6}$	V_5/V_6
~~15~~ 1	.153	.377	93.8	107.7	.026	.319	1629.3	.165	.300	.058	.077	.397
~~16~~ 2	.130	.320	93.73	100.5	.023	.273	1502.5	.141	.256	.047	.064	.401
~~17~~ 3	.098	.243	93.8	86.3	.017	.205	1305.7	.106	.194	.038	.049	.397
~~18~~ 4	.073	.180	93.9	73.3	.012	.149	1128.7	.079	.144	.031	.036	.390
~~19~~ 5	.052	.129	93.9	61.6	.0085	.1055	948.4	.056	.102	.0235	.027	.390
~~20~~ 6	.032	.079	93.9	48.2	.0052	.0652	741.8	.034	.062	.0138	.017	.390
~~21~~ 7	.016	.041	93.8	34.8	.0027	.0337	526.2	.017	.031	.0073	.010	.396
~~22~~ 8	.012	.031	93.9	30.1	.0020	.0250	462.9	.013	.024	.0060	.007	.390
~~23~~ 9	.008	.021	93.9	24.6	.0014	.0164	379.4	.009	.0160	.0046	.005	.390
~~24~~ 10	.004	.011	94.1	17.3	.0007	.0087	276.7	.0048	.0088	.0023	.0022	.375
~~25~~ 11	.002	.005	94.2	10.8	.0003	.0043	175.2	.0019	.0039	.0007	.0011	.371

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	5.8"	.114	50.88	6.35'	44.53	12.7"	.381	20.21	12.48'	7.73
2		.104	45.19		38.84		.329	19.45		6.97
3		.077	49.35		43.00		.250	19.60		7.12
4		.058	53.45		47.10		.190	18.95		6.47
5		.042	55.95		49.60		.139	19.42		6.94
6		.0271	50.92		44.57		.087	19.54		7.06
7		.0155	47.10		40.75		.046	21.74		9.26
8		.0119	50.42		44.07		.0358	19.55		7.07
9		.0083	55.42		49.07		.025	20.11		7.52
10		—	—		—		.0141	15.60		3.12
11	5.8"	—	—	6.35'	—	12.7"	.0065	16.92	12.48'	4.44
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Remarks:

MLIT-232

Sheet No. 139

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18"x 8" T.O.
ORIFICES: 6¼"x 1¼" STR. & 16"x 6" T.O.

Observers { R.J. Walker } { } Date AUG. 9, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	9:35	4.75	.289	.350	.204	71.0	80.0	29.20	2.18	1713	119	1600
2	9:39	4.12	.250	.306	.177				2.03	1595	112	1490
3	9:43	3.13	.188	.228	.132				1.77	1391	96	1300
4	9:46	2.35	.141	.170	.100				1.533	1205	83	1130
5	9:50	1.61	.098	.116	.068				1.27	998	69	940
6	9:53	1.04	.064	.075	.044				1.02	801	55.5	760
7	9:56	.580	.035	.042	.024				.761	598	41.5	567
8	9:58	.411	.025	.030	.017				.641	504	35.1	479
9	10:00	.263	.017	.019	.011				.513	403	28.0	390
10	10:03	.142	.009	.010	.006				.377	296	20.4	290
11	10:05	.055	.004	.005	.0025	71.0	80.0	29.20	.2345	184	14.5	190
12												
13												

14	VP_4	TP_4	% DIV.	Q_{SC}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.149	.438	93.1	118.2	.031	.381	1594.8	.159	.363	.057	.075	.445
2 ~~16~~	.129	.379	93.0	111.6	.028	.334	1483.4	.137	.314	.045	.065	.451
3 ~~17~~	.098	.286	93.1	95.7	.021	.249	1295.3	.105	.237	.037	.049	.443
4 ~~18~~	.073	.214	93.2	81.9	.015	.185	1123.1	.079	.179	.029	.035	.438
5 ~~19~~	.050	.148	93.2	67.9	.010	.126	930.1	.054	.122	.022	.026	.438
6 ~~20~~	.032	.096	93.2	54.5	.0067	.0817	746.5	.035	.079	.0143	.017	.438
7 ~~21~~	.018	.053	93.2	40.7	.0037	.0457	557.3	.019	.043	.0073	.010	.438
8 ~~22~~	.013	.038	93.2	34.3	.0026	.0326	469.7	.014	.031	.0054	.007	.438
9 ~~23~~	.008	.025	93.3	27.0	.0016	.0206	376.0	.0088	.0198	.0044	.0052	.430
10 ~~24~~	.004	.013	93.4	19.5	.0009	.0109	276.5	.0048	.0108	.0021	.0022	.423
11 ~~25~~	.002	.006	92.9	13.1	.0004	.0054	170.9	.0018	.0043	.0006	.0017	.459

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.140	40.71	6.35'	34.36	12.7"	.369	20.33	12.48'	7.85
2		.126	35.71		29.36		.318	20.44		7.96
3		.093	39.78		33.43		.247	19.84		7.36
4		.071	40.85		34.50		.190	18.42		5.94
5		.051	43.14		36.79		.135	19.26		6.78
6		.034	42.06		35.71		.088	19.32		6.84
7		.0203	35.96		29.61		.050	20.00		7.52
8		.015	36.00		29.65		.037	18.92		6.44
9		.0097	45.36		39.01		.0247	21.05		8.57
10		.0055	38.18		31.83		.0142	15.49		3.01
11	5.8"	—	—	6.35'	—	12.7"	.0061	27.87	12.48'	15.39
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Remarks:

MLIT-232

Sheet No. 140

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 6¼" x 1¼" STR. & 15½" x 5½" T.O.

Observers { R J Waalkes { Date AUG. 9, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:11	4.66	.390	.443	.308	71.0	80.0	29.20	2.16	1697	134	1570
2	10:14	4.16	.350	.398	.276				2.04	1603	127	1500
3	10:17	3.13	.260	.293	.205				1.77	1391	109	1290
4	10:21	2.35	.195	.220	.153				1.533	1205	94.5	1120
5	10:24	1.68	.139	.155	.109				1.297	1019	79.5	945
6	10:26	1.06	.088	.098	.069				1.03	809	63.2	755
7	10:28	.530	.044	.049	.034				.728	572	44.9	535
8	10:31	.405	.033	.036	.025				.636	500	38.5	460
9	10:34	.250	.020	.023	.015				.500	393	30.9	358
10	10:37	.147	.012	.013	.009				.383	301	23.2	280
11	10:39	.065	.005	.005	.004	70.0	80.0	29.20	.255	200	14.5	188
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.146	.536	92.1	133.6	.040	.483	1563.4	.152	.460	.053	.076	.513
2 ~~16~~	.130	.480	92.2	125.0	.035	.433	1478.0	.136	.412	.047	.068	.507
3 ~~17~~	.098	.358	92.2	108.5	.026	.319	1282.5	.103	.308	.039	.050	.507
4 ~~18~~	.073	.268	92.2	94.0	.020	.240	1111.0	.077	.230	.028	.038	.507
5 ~~19~~	.053	.192	92.2	79.1	.014	.169	939.9	.055	.164	.023	.028	.505
6 ~~20~~	.033	.121	92.3	62.3	.0087	.1067	746.7	.035	.104	.0143	.017	.500
7 ~~21~~	.017	.061	92.3	44.0	.0043	.0533	528.0	.017	.051	.0077	.010	.500
8 ~~22~~	.013	.046	92.3	38.6	.0033	.0393	461.4	.013	.038	.0067	.008	.502
9 ~~23~~	.008	.028	92.1	31.3	.0022	.0252	361.7	.0082	.0232	.0028	.0048	.519
10 ~~24~~	.005	.017	92.4	23.0	.0012	.0142	278.0	.0048	.0138	.0028	.0032	.497
11 ~~25~~	.002	.007	92.8	14.3	.0005	.0055	185.7	.0022	.0062	.0015	.0008	.461

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.172	30.81	6.35'	24.46	12.7"	.351	21.65	12.48'	9.17
2		.152	30.92		24.57		.317	21.45		8.97
3		.119	32.77		26.42		.245	20.41		7.93
4		.092	30.43		24.08		.186	20.43		7.95
5		.067	34.33		27.98		.137	20.44		7.96
6		.043	33.26		26.91		.088	19.32		6.84
7		.0234	32.91		26.56		.0465	21.51		9.03
8		.0184	36.41		30.06		.0355	22.54		10.06
9		.0126	22.22		15.87		.023	20.87		8.39
10		.0075	37.33		30.98		.0143	22.38		9.90
11	5.8"	—	—	6.35'	—	12.7"	.007	11.43	12.48'	-1.05
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Remarks:

MLIT-232

Sheet No. 141

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O. ORIFICES; 6¼" x 1¼" STR. & 15" x 5" T.O.

Observers { R J Waalkes { Date AUG. 9, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:55	4.46	.560	.595	.495	70.0	80.0	29.20	2.112	1660	155	1510
2	10:59	4.08	.520	.551	.459				2.02	1587	149	1460
3	11:04	3.11	.395	.420	.349				1.763	1385	131	1270
4	11:07	2.36	.298	.314	.258				1.538	1209	113	1100
5	11:10	1.61	.201	.210	.173				1.27	998	92	905
6	11:14	1.03	.128	.134	.110				1.015	798	74	725
7	11:17	.560	.074	.075	.063				.749	589	55.5	554
8	11:23	.406	.049	.050	.042				.637	501	45.4	455
9	11:26	.247	.030	.031	.025				.497	391	35.7	352
10	11:28	.145	.0175	.018	.014				.381	299	27.3	267
11	11:30	.056	.007	.007	.005	70.0	84.0	29.20	.2365	186	17.1	162
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.140	.700	90.7	154.4	.053	.648	1505.6	.141	.636	.052	.064	.615
2 ~~16~~	.128	.648	90.7	147.6	.049	.600	1439.4	.129	.588	.048	.060	.615
3 ~~17~~	.097	.492	90.6	130.2	.038	.458	1254.8	.098	.447	.034	.045	.622
4 ~~18~~	.074	.372	90.7	112.4	.028	.342	1096.6	.075	.333	.030	.039	.615
5 ~~19~~	.050	.251	90.8	92.1	.019	.229	905.9	.051	.224	.022	.027	.610
6 ~~20~~	.032	.160	90.7	73.9	.012	.146	724.1	.033	.143	.014	.017	.612
7 ~~21~~	.018	.092	90.9	53.6	.0064	.0814	535.4	.018	.081	.0106	.011	.601
8 ~~22~~	.013	.062	90.9	45.5	.0047	.0547	455.5	.013	.055	.0073	.007	.600
9 ~~23~~	.008	.038	90.8	36.0	.0029	.0339	355.0	.0078	.0328	.0041	.0052	.608
10 ~~24~~	.005	.0225	90.7	27.8	.0017	.0197	271.2	.0046	.0186	.0028	.0039	.614
11 ~~25~~	.002	.009	90.5	17.7	.0007	.0077	168.3	.0018	.0068	.0013	.0022	.631

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.235	22.13	6.35'	15.78	12.7"	.330	19.39	12.48'	6.91
2		.207	23.19		16.84		.305	19.67		7.19
3		.166	20.48		14.13		.232	19.40		6.92
4		.128	23.44		17.09		.180	21.67		9.19
5		.088	25.00		18.65		.127	21.26		8.78
6		.059	23.73		17.38		.082	20.73		8.25
7		.033	32.12		25.77		.048	22.92		10.44
8		.0245	29.80		23.45		.035	20.00		7.52
9		.016	25.63		19.28		.0225	23.11		10.63
10		.010	28.00		21.65		.0134	29.10		16.62
11	5.8"	—	—	6.35'	—	12.7"	.006	36.67	12.48'	24.19
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Remarks:

MLIT-232

Sheet No. 142

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x 8" STR. & 18"x 8" T.O.
ORIFICES: 6¼"x 1¼" STR. & 14" x 4" T.O.

Observers { R.J. Walker } { } Date AUG. 9, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:35	3.85	.980	.960	.930	70.0	84.0	29.20	1.962	1542	196	1350
2	11:39	3.13	.810	.798	.775				1.77	1391	179	1230
3	11:43	2.38	.620	.602	.587				1.542	1212	156	1075
4	11:45	1.62	.428	.415	.403				1.272	1000	130	890
5	11:48	1.07	.278	.270	.260				1.034	812	105	720
6	11:50	.560	.142	.137	.133				.748	588	75	517
7	11:53	.406	.102	.098	.095				.637	501	63.2	438
8	11:55	.243	.061	.059	.057				.493	387	49.2	340
9	11:58	.145	.037	.035	.034				.381	299	38.0	265
10	12:00	.063	.015	.0145	.014	70.0	84.0	29.20	.251	197	245	172
11												
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.120	1.100	87.3	195.8	.086	1.046	1346.2	.113	1.043	.054	.057	.873
~~16~~ 2	.098	.908	87.3	176.7	.070	.868	1214.3	.092	.867	.040	.041	.873
~~17~~ 3	.074	.694	87.3	153.9	.053	.655	1058.1	.070	.657	.039	.037	.873
~~18~~ 4	.051	.479	87.3	127.0	.036	.451	873.0	.048	.451	.028	.028	.873
~~19~~ 5	.033	.311	87.3	103.1	.024	.294	708.9	.031	.291	.017	.020	.873
~~20~~ 6	.018	.160	87.3	74.7	.013	.150	513.3	.016	.149	.010	.011	.873
~~21~~ 7	.013	.115	87.4	63.1	.0089	.1069	437.9	.012	.107	.0081	.008	.865
~~22~~ 8	.008	.069	87.4	48.8	.0053	.0643	338.2	.0071	.064	.0047	.0049	.866
~~23~~ 9	.005	.042	87.5	37.4	.0031	.0381	261.6	.0043	.0383	.0039	.0037	.858
~~24~~ 10	.002	.017	87.5	24.6	.0014	.0159	172.4	.0018	.0158	.0011	.0012	.858
~~25~~ 11												

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKE OFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.350	15.43	6.35'	9.08	12.7"	.266	21.43	12.48'	8.95
2		.290	13.79		7.44		.220	18.64		6.16
3		.230	16.96		10.61		.168	22.02		9.54
4		.158	17.72		11.37		.117	23.93		11.45
5		.108	15.74		9.39		.080	25.00		12.52
6		.060	16.67		10.32		.044	25.00		12.52
7		.044	18.41		12.06		.033	24.24		11.76
8		.0285	16.49		10.14		.0204	24.02		11.54
9		.0175	22.29		15.94		.013	28.46		15.98
10	5.8"	.0068	16.18	6.35'	9.83	12.7"	.0062	19.35	12.48'	6.87
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Remarks:

MLIT-232

Sheet No. 143

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 6" x 1" STR. & 16½" x 6½" T.O.

Observers { R J Waalkes { Date AUG. 9, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	12:45	4.82	.234	.310	.138	71.0	84.0	29.20	2.197	1726	76	1650
2	12:50	4.15	.200	.265	.120				2.038	1601	70	1550
3	12:53	3.16	.154	.203	.091				1.78	1399	61	1350
4	12:56	2.34	.114	.148	.068				1.53	1202	51.7	1170
5	12:59	1.66	.082	.105	.047				1.289	1013	43.2	975
6	1:02	1.01	.050	.064	.029				1.005	790	33.4	770
7	1:04	.555	.028	.035	.015				.745	585	24.4	560
8	1:06	.405	.020	.025	.011				.636	500	20.4	480
9	1:09	.245	.012	.015	.007				.495	389	15.7	385
10	1:11	.152	.008	.010	.005				.390	306	12.7	328
11	1:14	.065	.004	.005	.002	71.0	84.0	29.20	.255	200	8.8	210
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.151	.385	95.6	76.0	.013	.323	1650.0	.170	.308	.062	.077	.276
2 ~~16~~	.130	.330	95.7	68.8	.011	.276	1532.2	.146	.266	.054	.064	.269
3 ~~17~~	.099	.253	95.7	60.2	.0081	.2111	1338.8	.112	.203	.0419	.050	.270
4 ~~18~~	.073	.187	95.8	50.5	.0057	.1537	1151.5	.083	.151	.0333	.036	.263
5 ~~19~~	.052	.134	95.8	42.5	.0041	.1091	970.5	.059	.106	.0249	.028	.263
6 ~~20~~	.032	.082	95.8	32.9	.0024	.0664	757.1	.036	.065	.0156	.017	.261
7 ~~21~~	.017	.045	95.8	24.6	.0014	.0364	560.4	.020	.035	.0086	.010	.264
8 ~~22~~	.013	.033	95.9	20.4	.0009	.0259	479.6	.014	.025	.0071	.008	.255
9 ~~23~~	.008	.020	96.1	15.2	.0005	.0155	373.8	.0087	.0157	.0045	.0043	.244
10 ~~24~~	.005	.013	96.3	11.3	.0003	.0103	294.7	.0054	.0104	.0027	.0026	.230
11 ~~25~~	.002	.006	96.0	8.0	.0001	.0051	192.0	.0023	.0043	.0009	.0017	.251

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.062	100.00	6.35'	93.65	12.7"	.391	19.69	12.48'	7.21
2		.052	103.85		97.50		.342	18.71		6.23
3		.041	102.20		95.85		.258	19.38		6.90
4		.0296	112.50		106.15		.197	18.27		5.79
5		.0218	114.22		107.87		.144	19.44		6.96
6		.0137	113.87		107.52		.090	18.89		6.41
7		.0083	103.61		97.26		.051	19.61		7.13
8		.006	118.33		111.98		.0383	20.89		8.41
9		—	—		—		.0243	17.70		5.22
10		—	—		—		.0159	16.35		3.87
11	5.8"	—	—	6.35'	—	12.7"	.0075	22.67	12.48'	10.19
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Remarks:

MLIT-232

Sheet No. 144

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x8" STR. & 18"x8" T.O.
ORIFICES: 6"x1" STR. & 16"x6" T.O.

Observers { R.J. Waalkes } { } Date AUG. 11, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:25	4.85	.308	.383	.215	64.0	78.0	29.26	2.201	1730	85.0	1645
2	10:29	4.14	.264	.329	.184				2.035	1599	78.2	1520
3	10:33	3.15	.199	.247	.137				1.775	1395	67.6	1325
4	10:36	2.34	.148	.182	.102				1.530	1202	57.5	1145
5	10:38	1.60	.102	.125	.070				1.265	994	47.3	950
6	10:41	1.04	.067	.080	.045				1.020	801	37.5	770
7	10:43	.530	.034	.041	.022				.728	572	26.5	544
8	10:46	.414	.026	.031	.017				.644	506	22.9	480
9	10:48	.255	.016	.019	.010				.505	397	17.7	372
10	10:50	.149	.010	.011	.006				.386	303	13.3	290
11	10:52	.066	.0045	.005	.003	64.0	78.0	29.26	.257	202	8.8	208
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.152	.460	95.1	85.0	.016	.399	1645.0	.169	.384	.061	.076	.310
~~16~~ 2	.129	.393	95.1	78.2	.014	.343	1520.8	.144	.328	.050	.065	.309
~~17~~ 3	.099	.298	95.1	67.7	.010	.257	1327.3	.110	.247	.041	.051	.306
~~18~~ 4	.073	.221	95.2	57.5	.0074	.1894	1144.5	.082	.184	.0316	.037	.301
~~19~~ 5	.050	.152	95.3	46.7	.0049	.1299	947.3	.056	.126	.0221	.026	.296
~~20~~ 6	.032	.099	95.4	36.8	.0030	.0830	764.2	.036	.081	.0160	.018	.289
~~21~~ 7	.017	.051	95.4	26.6	.0016	.0426	545.4	.019	.041	.0084	.010	.292
~~22~~ 8	.013	.039	95.4	23.3	.0012	.0322	482.7	.015	.032	.0068	.007	.290
~~23~~ 9	.008	.024	95.5	17.9	.0007	.0197	379.1	.0090	.019	.0043	.005	.283
~~24~~ 10	.005	.015	95.6	13.3	.0004	.0114	289.7	.0052	.0112	.0036	.0038	.275
~~25~~ 11	.002	.0065	95.9	8.3	.00015	.00515	193.7	.0023	.0053	.00135	.0012	.256

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ _____ _____ Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.076	80.26	6.35'	73.91	12.7"	.390	19.49	12.48'	7.01
2		.066	75.76		69.41		.332	19.58		7.10
3		.0495	82.83		76.48		.255	20.00		7.52
4		.0375	84.27		77.92		.197	18.78		6.30
5		.026	85.00		78.65		.135	19.26		6.78
6		.017	94.12		87.77		.093	19.35		6.87
7		.0095	88.42		82.07		.0485	20.62		8.14
8		.0075	90.67		84.32		.0385	18.18		5.70
9		—	—		—		.025	20.00		7.52
10		—	—		—		.0158	24.05		11.57
11	5.8"	—	—	6.35'	—	12.7"	.0077	15.58	12.48'	3.10
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Remarks:

MLIT-232

Sheet No. 145

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3" x 8" STR. & 18" x 8" T.O.
ORIFICES: 6" x 1" STR. & 15½" x 5½" T.O.

Observers { RJWaalkes { Date AUG. 11, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:56	4.71	.415	.487	.323	64.0	78.0	29.26	2.17	1705	96.2	1615
2	11:00	4.12	.366	.429	.284				2.03	1595	90.0	1510
3	11:04	3.19	.281	.326	.217				1.786	1403	78.0	1330
4	11:08	2.35	.205	.238	.158				1.533	1205	66.4	1135
5	11:10	1.62	.140	.162	.109				1.272	1000	54.2	945
6	11:22	1.06	.092	.105	.070				1.030	809	43.2	760
7	11:25	.555	.048	.065	.036				.745	585	30.9	550
8	11:28	.394	.034	.038	.025				.627	493	25.5	460
9	11:31	.240	.021	.024	.015				.490	385	20.0	358
10	11:35	.150	.012	.014	.009				.387	304	15.1	280
11	11:37	.065	.005	.006	.004	64.0	78.0	29.26	.255	200	9.7	188
12												
13												
14	VP_4	TP_4	%DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.147	.562	94.40	95.8	.021	.508	1609.2	.161	.484	.054	.078	.357
2 ~~16~~	.129	.495	94.40	89.6	.018	.447	1505.4	.141	.425	.048	.070	.357
3 ~~17~~	.100	.381	94.46	77.7	.014	.340	1325.3	.109	.326	.041	.055	.352
4 ~~18~~	.073	.278	94.47	66.6	.010	.248	1138.4	.081	.239	.030	.039	.351
5 ~~19~~	.051	.191	94.58	54.2	.0066	.1686	945.8	.056	.165	.0224	.026	.344
6 ~~20~~	.033	.125	94.62	43.5	.0043	.1093	765.5	.037	.107	.0157	.018	.341
7 ~~21~~	.017	.065	94.68	31.1	.0022	.0572	553.9	.019	.055	.0078	.010	.337
8 ~~22~~	.012	.046	94.75	25.9	.0015	.0395	467.1	.014	.039	.0065	.0070	.333
9 ~~23~~	.007	.028	94.71	20.4	.0009	.0249	364.6	.0083	.0233	.0031	.0047	.336
10 ~~24~~	.005	.017	94.88	15.6	.0005	.0145	288.4	.0052	.0142	.0025	.0028	.325
11 ~~25~~	.002	.007	95.09	9.8	.0002	.0062	190.2	.0023	.0063	.0008	.0007	.309

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.093	58.06	6.35'	51.71	12.7"	.379	20.58	12.48'	8.10
2		.084	57.14		50.79		.326	21.47		8.99
3		.064	64.06		57.71		.255	21.57		9.09
4		.048	62.50		56.15		.194	20.10		7.62
5		.034	65.88		59.53		.139	18.71		6.23
6		.0231	67.97		61.62		.092	19.57		7.09
7		.0126	61.90		55.55		.051	19.61		7.13
8		.0091	71.43		65.08		.036	19.44		6.96
9		.006	51.67		45.32		.024	19.58		7.10
10		—	—		—		.0154	18.18		5.70
11	5.8"	—	—	6.35'	—	12.7"	.0074	9.46	12.48'	-3.02
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"X8" STR. & 18"X8" T.O.
ORIFICES: 6"X1" STR. & 15"X5" T.O.

Observers { R.J. Wadkes } { } Date AUG. 11, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:41	4.43	.590	.645	.510	64.0	78.0	29.26	2.104	1653	112	1540
2	11:45	4.13	.556	.607	.480				2.032	1597	108	1490
3	11:47	3.08	.421	.453	.360				1.755	1379	93.0	1295
4	11:51	2.32	.308	.338	.265				1.525	1198	79.8	1120
5	11:55	1.61	.214	.234	.183				1.270	998	65.8	930
6	11:59	1.04	.136	.148	.115				1.020	801	51.7	740
7	12:01	.580	.075	.082	.063				.761	598	38.0	554
8	12:03	.405	.052	.056	.044				.636	500	31.1	465
9	12:06	.264	.034	.036	.028				.514	404	24.8	373
10	12:08	.145	.018	.020	.015				.381	299	18.2	275
11	12:10	.068	.008	.009	.007	64.0	78.0	29.26	.261	205	12.0	190
12												
13												

14	VP_4	TP_4	% Div.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.138	.728	93.22	112.1	.028	.673	1540.9	.148	.658	.055	.070	.436
~~16~~ 2	.129	.685	93.24	108.0	.026	.633	1489.0	.138	.618	.052	.067	.435
~~17~~ 3	.096	.517	93.30	92.4	.019	.472	1286.6	.103	.463	.045	.054	.431
~~18~~ 4	.073	.381	93.35	79.7	.014	.352	1118.3	.078	.343	.029	.038	.428
~~19~~ 5	.050	.264	93.39	66.0	.0098	.2438	932.0	.054	.237	.0202	.027	.425
~~20~~ 6	.032	.168	93.47	52.3	.0061	.1541	748.7	.035	.150	.0139	.018	.419
~~21~~ 7	.018	.093	93.58	38.4	.0033	.0853	559.6	.020	.083	.0077	.010	.412
~~22~~ 8	.013	.065	93.73	31.3	.0022	.0582	468.7	.014	.058	.0068	.007	.401
~~23~~ 9	.008	.042	93.77	25.2	.0014	.0374	378.8	.0089	.0369	.0046	.0051	.399
~~24~~ 10	.005	.023	93.79	18.6	.0008	.0208	280.4	.0049	.0199	.0022	.0031	.399
~~25~~ 11	.002	.010	94.06	12.2	.0003	.0093	192.8	.0023	.0093	.0007	.0007	.380

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.	Eq. D.	ΔP/100	Eq. L.	Act. L.	Added Eq. L.
1	5.8"	.123	44.72	6.35'	38.37	12.7"	.345	20.29	12.48'	7.81
2		.118	44.07		37.72		.317	21.14		8.66
3		.088	51.14		44.79		.243	22.22		9.74
4		.068	42.65		36.30		.189	20.11		7.63
5		.047	42.98		36.63		.135	20.00		7.52
6		.0315	44.13		37.78		.089	20.22		7.74
7		.018	42.78		36.43		.052	19.23		6.75
8		.0127	53.54		47.19		.037	18.92		6.44
9		.0086	53.49		47.14		.025	20.40		7.92
10		—	—		—		.0147	21.09		8.61
11	5.8"	—	—	6.35'	—	12.7"	.0076	9.21	12.48'	-3.27
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 3"x8" STR. & 18"x8" T.O.
ORIFICES: 6"x1" STR. & 14"x4" T.O.

Observers { R.J. Walker } { } Date AUG. 11, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	12:14	3.83	1.060	1.075	.995	64.0	78.0	29.26	1.957	1538	146	1400
2	12:16	3.14	.870	.900	.820				1.772	1392	133	1270
3	12:18	2.35	.655	.665	.615				1.533	1205	114	1100
4	12:19	1.64	.470	.474	.439				1.280	1006	95.0	930
5	12:22	1.08	.301	.309	.284				1.040	817	76.0	750
6	12:25	.545	.150	.154	.140				.738	580	52.8	530
7	12:28	.406	.109	.111	.101				.637	501	44.4	450
8	12:29	.270	.072	.073	.067				.520	409	35.7	370
9	12:31	.150	.040	.040	.037				.387	304	26.2	275
10	12:33	.066	.017	.017	.015	64.0	78.0	29.26	.257	202	16.7	177
11												
12												
13												

14	V_{P4}	T_{P4}	% DIV.	Q_{5c}	V_{P5}	T_{P5}	Q_{6c}	V_{P6}	T_{P6}	$T_{P4}-T_{P5}$	$T_{P4}-T_{P6}$	V_5/V_6
~~15~~ 1	.120	1.180	90.56	145.2	.047	1.122	1392.8	.121	1.116	.058	.064	.625
~~16~~ 2	.098	.968	90.52	132.0	.039	.939	1260.0	.099	.919	.029	.049	.628
~~17~~ 3	.073	.728	90.61	113.1	.029	.694	1091.9	.074	.689	.034	.039	.621
~~18~~ 4	.051	.521	90.73	93.3	.020	.494	912.7	.052	.491	.027	.030	.613
~~19~~ 5	.034	.335	90.80	75.2	.013	.322	741.8	.034	.318	.013	.017	.608
6 20	.017	.167	90.94	52.5	.0062	.1602	527.5	.017	.157	.0068	.010	.597
7 ~~21~~	.013	.122	91.02	45.0	.0045	.1155	456.0	.013	.114	.0065	.0080	.592
8 ~~22~~	.008	.080	91.20	36.0	.0029	.0759	373.0	.0087	.0757	.0041	.0043	.579
9 ~~23~~	.005	.045	91.30	26.4	.0016	.0416	277.6	.0048	.0418	.0034	.0032	.570
10 ~~24~~	.002	.019	91.38	17.4	.0007	.0177	184.6	.0021	.0171	.0013	.0019	.566
25												

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	5.8"	.207	28.02	6.35'	21.67	12.7"	.286	22.38	12.48'	9.90
2		.170	17.06		10.71		.237	20.68		8.20
3		.130	26.15		19.80		.182	21.43		8.95
4		.090	30.00		23.65		.128	23.44		10.96
5		.060	21.67		15.32		.0875	19.43		6.95
6		.032	21.25		14.90		.046	21.74		9.26
7		.024	27.08		20.73		.035	22.86		10.38
8		.0161	25.47		19.12		.0244	17.62		5.14
9		.0094	36.17		29.82		.0144	22.22		9.74
10	5.8"	—	—	6.35'	—	12.7"	.007	27.14	12.48'	14.66
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Remarks:

MLIT-232

Sheet No. 148

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O. ORIFICES: STR. BLOCKED & 7" x 2" T.O.

Observers { R J Wasilkea } Date AUG. 18, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:06	.670	3.+	3.+	2.045	72.0	82.0	29.18	.819	3280.1	643.6
2	11:08	.605	3.00	3.020	1.855				.778	3115.9	611.3
3	11:10	.555	2.760	2.765	1.700				.745	2983.7	585.4
4	11:13	.485	2.400	2.400	1.445				.696	2787.5	546.9
5	11:18	.395	1.955	1.955	1.160				.629	2519.1	494.2
6	11:20	.310	1.560	1.560	.915				.556	2226.8	436.9
7	11:23	.217	1.110	1.110	.645				.466	1866.3	366.2
8	11:25	.169	.860	.860	.490				.411	1646.1	323.0
9	11:27	.118	.610	.610	.350				.344	1377.7	270.3
10	11:30	.082	.441	.442	.242				.286	1145.4	224.7
11	11:34	.039	.205	.205	.110	72.0	81.0	29.18	.1975	791.0	155.2
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Remarks: CHECK FOR LEAKAGE:

.003" @ 3.74" STATIC PRESSURE

MLIT-232

Sheet No. 149

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: STR. BLOCKED & 6½" x 1½" T.O.

Observers { RJ Waalkes { Date AUG. 18, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:42	.340	3.+	3.+	2.850	72.0	81.0	29.18	.583	2334.9	458.1
2	11:44	.301	3.+	3.+	2.570				.549	2198.7	431.4
3	11:46	.255	2.660	2.660	2.165				.505	2022.5	396.8
4	11:48	.195	2.050	2.050	1,670				.441	1766.2	346.5
5	11:50	.130	1.380	1.380	1.110				.360	1441.8	282.9
6	11:52	.076	.820	.820	.655				.276	1105.4	216.9
7	11:55	.050	.535	.535	.420				.224	897.1	176.0
8	11:57	.035	.390	.390	.305	72.0	81.0	29.18	.187	748.9	146.9
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Remarks:

MLIT-232

Sheet No. 150

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" X 8" STR. & 3" X 8" T.O.
ORIFICES: STR. BLOCKED & 6¼" X 1¼" T.O.

Observers { R J Walker } { } Date AUG. 18, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	12:04	.213	3.+	3.+	3.+	72.0	81.0	29.18	.461	1846.3	367.2
2	12:06	.201	3.+	3.+	8.020				.449	1798.2	352.8
3	12:08	.181	3.+	3.+	2.715				.425	1702.1	334.0
4	12:10	.148	2.510	2.510	2.220				.385	1541.9	302.5
5	12:12	.114	1.945	1.945	1.765				.338	1353.7	265.6
6	12:14	.067	1.155	1.155	1.015				.259	1037.3	203.5
7	12:16	.045	.765	.765	.675				.212	849.1	166.6
8	12:18	.033	.565	.565	.495	72.0	81.0	29.18	.182	728.9	143.0
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Remarks:

MLIT-232

Sheet No. 151

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O. ORIFICES: STR. BLOCKED & 6" x 1" T.O.

Observers { R J Walker } { } Date AUG. 18, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	12:34	.121	3.+	3.+	3.+	72.0	81.0	29.18	.348	1393.7	273.4
2	12:40	.105	3.+	3.+	2.960				.324	1297.6	254.6
3	12:41	.087	2.670	2.670	2.505				.295	1181.5	231.8
4	12:43	.069	2.120	2.120	1.990				.263	1053.3	206.7
5	12:44	.050	1.525	1.525	1.425				.224	897.1	176.0
6	12:46	.034	1.050	1.050	.990				.1845	738.9	145.0
7	12:48	.027	.840	.840	.785	72.0	81.0	29.18	.164	656.8	128.9
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Remarks:

MLIT-232

Sheet No. 152

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O. ORIFICES; 16½" x 6½" STR. & T.O. BLOCKED

Observers { R J Waalkes { Date AUG. 21, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:08	4.93	.235	.157	.290	59.0	70.0	29.05	2.220	8891.1	1744.4
2	11:16	4.08	.196	.128	.243				2.020	8090.1	1587.3
3	11:20	3.12	.148	.095	.182				1.767	7076.8	1388.5
4	11:24	2.37	.113	.072	.137				1.540	6167.7	1210.1
5	11:26	1.62	.077	.050	.094				1.272	5094.4	999.5
6	11:30	1.04	.050	.032	.060				1.020	4085.1	801.5
7	11:33	.570	.028	.018	.033				.755	3023.8	593.3
8	11:35	.403	.020	.012	.024				.635	2543.2	499.0
9	11:37	.263	.013	.008	.015				.513	2054.6	403.1
10	11:39	.144	.007	.005	.008				.380	1521.9	298.6
11	11:42	.057	.003	.002	.004	60.0	72.0	29.05	.239	957.2	187.8
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Remarks:

MLIT-232

Sheet No. 153

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 18"x 8" STR. & 3" x 8" T.O.
ORIFICES: 16" x 6" STR. & T.O. BLOCKED

Observers { R J Waalkes } { } Date AUG. 21, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	11:53	4.83	.312	.232	.363	60.0	72.0	29.05	2.20	8811.0	1728.7
2	11:58	4.17	.271	.200	.318				2.04	8170.2	1603.0
3	12:01	3.09	.200	.145	.235				1.76	7048.8	1383.0
4	12:05	2.35	.150	.111	.175				1.53	6127.7	1202.3
5	12:09	1.67	.107	.079	.123				1.29	5166.5	1013.6
6	12:11	1.06	.067	.049	.078				1.03	4125.2	809.3
7	12:15	.545	.035	.025	.040				.738	2955.7	579.9
8	12:19	.405	.025	.018	.029				.636	2547.2	499.8
9	12:21	.267	.017	.012	.018				.517	2070.6	406.3
10	12:24	.145	.009	.005	.010				.381	1525.9	299.4
11	12:26	.057	.004	.002	.005	60.0	72.0	29.05	.239	957.2	187.8
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15½" x 5½" STR. & T.O. BLOCKED

Observers { R J Walker } { } Date AUG. 21, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	12:42	4.65	.431	.351	.484	60.0	72.0	29.05	2.16	8650.8	1697.3
2	12:46	4.11	.382	.310	.429				2.03	8130.2	1595.1
3	1:03	3.23	.292	.240	.332				1.80	7209.0	1414.4
4	1:06	2.33	.210	.172	.235				1.53	6127.7	1202.3
5	1:09	1.63	.146	.118	.165				1.28	5126.4	1005.8
6	1:12	1.05	.094	.075	.105				1.024	4101.1	804.6
7	1:14	.535	.048	.039	.053				.731	2927.7	574.4
8	1:17	.413	.036	.029	.040				.643	2575.2	505.3
9	1:20	.248	.022	.017	.025				.498	1994.5	391.3
10	1:22	.135	.011	.009	.014				.368	1473.8	289.2
11	1:25	.056	.005	.004	.005	60.0	72.0	29.05	.2365	947.2	185.8
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O. ORIFICES: 15" x 5" STR. & T.O. BLOCKED

Observers { R J Walker } { } Date AUG. 21, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	1:30	4.36	.632	.562	.675	60.0	72.0	29.05	2.090	8370.5	1642.3
2	1:34	4.14	.600	.533	.645				2.035	8150.2	1599.0
3	1:37	3.17	.470	.409	.500				1.780	7128.9	1398.7
4	1:41	2.35	.340	.298	.364				1.530	6127.7	1202.3
5	1:44	1.62	.231	.203	.249				1.272	5094.4	999.5
6	1:48	1.05	.146	.129	.158				1.024	4101.1	804.6
7	1:50	.565	.080	.069	.087				.752	3011.8	590.9
8	1:56	.406	.057	.049	.060				.637	2551.2	500.5
9	1:59	.245	.034	.029	.037				.495	1982.5	389.0
10	2:02	.129	.018	.015	.018				.359	1437.8	282.1
11	2:05	.060	.008	.007	.009	62.0	74.0	29.05	.245	981.2	192.5
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Remarks:

MLIT-232

Sheet No. 156

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 14" x 4" STR. & T.O. BLOCKED

Observers { R J Walker } { _____ } Date AUG. 21, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	V	CFM
1	2:10	3.68	1.180	1.115	1.215	62.0	74.0	29.05	1.92	7689.6	1508.7
2	2:14	8.17	1.020	.965	1.060				1.78	7128.9	1398.7
3	2:16	2.34	.755	.715	.780				1.53	6127.7	1202.3
4	2:18	1.61	.520	.490	.535				1.27	5086.4	998.0
5	2:21	1.06	.345	.325	.355				1.03	4125.2	809.3
6	2:24	.530	.170	.160	.177				.728	2915.6	572.0
7	2:27	.403	.125	.118	.130				.635	2543.2	499.0
8	2:30	.240	.076	.070	.080				.490	1962.5	385.0
9	2:32	.139	.043	.040	.044				.373	1493.9	293.1
10	2:34	.059	.017	.015	.018	62.0	74.0	29.05	.243	973.2	190.9
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 16½" x 6½" STR. & 7" x 2" T.O.

Observers { R.J. Walker } { } Date AUG. 23, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:08	4.98	.164	.128	.152	66.0	74.0	29.10	2.232	1754	1587	180
2	10:11	4.15	.129	.108	.125				2.037	1601	1455	164
3	10:14	3.18	.099	.082	.095				1.783	1401	1270	144
4	10:17	2.39	.074	.061	.070				1.546	1215	1100	124
5	10:20	1.60	.050	.041	.046				1.265	994.0	900	101
6	10:23	1.00	.032	.025	.029				1.000	785.8	705	81.0
7	10:26	.515	.017	.014	.015				.7177	564.0	532	59.0
8	10:29	.405	.013	.009	.011				.6364	500.1	429	50.5
9	10:31	.245	.008	.006	.007				.4950	389.0	351	40.5
10	10:33	.145	.005	.003	.004				.3808	299.2	251	31.0
11	10:35	.062	.0025	.0015	.002	66.0	74.0	29.10	.2490	195.7	179	22.0
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.156	.310	10.19	1575.3	.155	.283	178.7	.072	.224	.027	.086	.681
2 ~~16~~	.130	.259	10.13	1438.8	.129	.237	162.2	.059	.184	.022	.075	.676
3 ~~17~~	.099	.198	10.18	1258.4	.099	.181	142.6	.046	.141	.017	.057	.680
4 ~~18~~	.075	.149	10.13	1091.9	.074	.135	123.1	.034	.104	.014	.045	.676
5 ~~19~~	.050	.100	10.09	893.7	.050	.091	100.3	.023	.069	.009	.031	.673
6 ~~20~~	.031	.063	10.31	704.8	.031	.056	81.0	.015	.044	.007	.019	.689
7 ~~21~~	.016	.033	9.98	507.7	.016	.030	56.3	.007	.022	.003	.011	.665
8 ~~22~~	.013	.026	10.53	447.4	.012	.021	52.7	.006	.017	.005	.009	.706
9 ~~23~~	.008	.016	10.34	348.8	.008	.014	40.2	.004	.011	.002	.005	.691
10 ~~24~~	.005	.010	10.99	266.3	.004	.007	32.9	.002	.006	.003	.004	.741
11 ~~25~~	.0019	.0044	10.95	174.3	.0019	.0034	21.4	.001	.003	.001	.0014	.738

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.360	7.50	10.56'	-3.06	5.8"	.300	28.67	6.39'	22.28
2		.306	7.19		-3.37		.255	29.41		23.02
3		.232	7.33		-3.23		.204	27.94		21.55
4		.180	7.78		-2.78		.152	29.61		23.22
5		.124	7.26		-3.30		.104	29.81		23.42
6		.079	8.86		-1.70		.070	27.14		20.75
7		.0435	6.90		-3.66		.036	30.56		24.17
8		.034	14.71		4.15		.032	28.13		21.74
9		.022	9.09		-1.47		.020	25.00		18.61
10		.0134	22.39		11.83		.0141	28.37		21.98
11	12.7"	.0064	15.63	10.56'	5.07	5.8"	.0066	21.21	6.39'	14.82
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Remarks:

MLIT-232

Sheet No. 158

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 16" x 6" STR. & 7" x 2" T.O.

Observers { R J Waalkes } Date AUG. 23, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:39	4.90	.208	.188	.187	66.0	74.0	29.10	2.214	1740	1590	200
2	10:43	4.09	.175	.156	.155				2.023	1590	1425	182
3	10:45	3.14	.132	.120	.118				1.772	1392	1251	160
4	10:48	2.31	.097	.087	.085				1.520	1194	1070	137
5	10:51	1.63	.069	.061	.060				1.277	1003	900	115
6	10:54	1.07	.045	.040	.039				1.034	812.5	730	93.5
7	10:56	.590	.025	.022	.020				.7681	603.6	547	67.5
8	10:59	.407	.017	.015	.014				.6380	501.3	452	57.0
9	11:01	.250	.010	.009	.008				.5000	392.9	353	43.3
10	11:04	.145	.006	.005	.005				.3808	299.2	265	34.4
11	11:06	.063	.003	.0025	.002	69.0	77.0	29.10	.2510	197.2	189	22.0
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.153	.361	11.30	1543.4	.149	.337	196.6	.087	.274	.024	.087	.764
2 ~~16~~	.128	.303	11.33	1409.9	.124	.280	180.1	.073	.228	.023	.075	.766
3 ~~17~~	.098	.230	11.34	1234.1	.095	.215	157.9	.056	.174	.015	.056	.768
4 ~~18~~	.072	.169	11.35	1058.5	.070	.157	135.5	.041	.126	.012	.043	.768
5 ~~19~~	.051	.120	11.33	889.4	.049	.110	113.6	.029	.089	.010	.031	.766
6 ~~20~~	.033	.078	11.35	720.3	.032	.072	92.2	.019	.058	.006	.020	.768
7 ~~21~~	.018	.043	10.98	537.3	.018	.040	66.3	.010	.030	.003	.013	.740
8 ~~22~~	.013	.030	11.20	445.2	.012	.027	56.1	.007	.021	.003	.009	.755
9 ~~23~~	.008	.018	10.93	350.0	.008	.017	42.9	.004	.012	.001	.006	.736
10 ~~24~~	.005	.011	11.49	264.8	.004	.009	34.4	.003	.008	.002	.003	.779
11 ~~25~~	.002	.005	10.43	176.6	.0019	.0044	20.6	.001	.003	.0006	.002	.701

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.346	6.94	10.56'	-3.62	5.8"	.360	24.17	6.39'	17.78
2		.292	7.88		-2.68		.305	24.59		18.20
3		.227	6.61		-3.95		.242	23.14		16.75
4		.171	7.02		-3.54		.180	23.89		17.50
5		.123	8.13		-2.43		.131	23.66		17.27
6		.082	7.32		-3.24		.088	22.73		16.34
7		.048	6.25		-4.31		.048	27.08		20.69
8		.034	8.82		-1.74		.036	25.00		18.61
9		.022	4.55		-6.01		.0225	26.67		20.28
10		.0135	14.81		4.25		.0152	19.74		13.35
11	12.7"	.0065	9.23	10.56'	-1.33	5.8"	.0061	32.79	6.39'	26.40
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Remarks:

MLIT-232

Sheet No. 159

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15½" x 5½" STR. & 7" x 2" T.O.

Observers { RJ Waalkes { _____ Date AUG. 23, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:10	4.82	.290	.277	.240	69.0	77.0	29.10	2.196	1726	1510	225
2	11:14	4.11	.251	.239	.205				2.028	1594	1408	209
3	11:18	3.18	.190	.181	.155				1.783	1401	1230	182
4	11:22	2.32	.138	.130	.112				1.523	1197	1040	156
5	11:26	1.66	.099	.093	.080				1.289	1013	888	132.5
6	11:29	1.00	.060	.055	.046				1.000	785.8	688	101
7	11:32	.525	.031	.029	.024				.7246	569.4	505	74
8	11:35	.405	.023	.021	.018				.6364	500.1	432	64
9	11:37	.258	.015	.013	.010				.5080	399.2	344	48
10	11:39	.145	.009	.007	.005				.3808	299.2	255	34
11	11:41	.061	.004	.003	.002	67.0	76.0	29.10	.2470	194.1	170	22
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.151	.441	12.97	1502.1	.141	.418	223.9	.112	.352	.023	.089	.894
2 ~~16~~	.129	.380	12.93	1387.9	.120	.359	206.1	.095	.300	.021	.080	.891
3 ~~17~~	.099	.289	12.89	1220.4	.093	.274	180.6	.073	.228	.015	.061	.888
4 ~~18~~	.073	.211	13.04	1040.9	.068	.198	156.1	.055	.167	.013	.044	.900
5 ~~19~~	.052	.151	12.98	881.5	.048	.141	131.5	.039	.119	.010	.032	.895
6 ~~20~~	.031	.091	12.80	685.2	.029	.084	100.6	.023	.069	.007	.022	.881
7 ~~21~~	.016	.047	12.78	496.6	.015	.044	72.8	.012	.036	.003	.011	.880
8 ~~22~~	.013	.036	12.90	435.6	.012	.033	64.5	.009	.027	.003	.009	.888
9 ~~23~~	.008	.023	12.24	350.3	.008	.021	48.9	.005	.015	.002	.008	.838
10 ~~24~~	.005	.014	11.89	263.6	.004	.011	35.6	.003	.008	.003	.006	.810
11 ~~25~~	.0019	.0059	11.46	171.9	.0018	.0048	22.2	.0011	.0031	.0011	.0028	.776

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.325	7.08	10.56'	-3.48	5.8"	.460	19.35	6.39'	12.96
2		.282	7.45		-3.11		.390	20.51		14.12
3		.223	6.73		-3.83		.307	19.87		13.48
4		.163	7.98		-2.58		.235	18.72		12.33
5		.119	8.40		-2.16		.169	18.93		12.54
6		.075	9.33		-1.23		.105	20.95		14.56
7		.041	7.32		-3.24		.0565	19.47		13.08
8		.033	9.09		-1.47		.045	20.00		13.61
9		.022	9.09		-1.47		.028	28.57		22.18
10		.013	23.08		12.52		.016	37.50		31.11
11	12.7"	.0062	17.74	10.56'	7.18	5.8"	.0069	40.58	6.39'	34.19
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Remarks:

MLIT-232

Sheet No. 160

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15" x 5" STR. & 7" x 2" T.O.

Observers { RJ Waalkes { Date AUG. 24, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:53	4.61	.438	.434	.331	70.0	83.0	29.20	2.147	1687	1443	264
2	11:57	4.14	.396	.392	.297				2.035	1599	1375	250
3	12:00	3.14	.296	.294	.222				1.772	1392	1195	217
4	12:04	2.28	.213	.210	.158				1.510	1187	1010	184
5	12:07	1.60	.149	.145	.110				1.265	994.0	844	155
6	12:10	1.07	.098	.095	.071				1.034	812.5	688	125
7	12:14	.570	.052	.050	.037				.7550	593.3	502	91
8	12:18	.398	.036	.035	.025				.6309	495.7	422	75
9	12:20	.237	.022	.020	.015				.4869	382.6	322	59
10	12:23	.140	.0125	.011	.008				.3742	294.0	240	43
11	12:25	.061	.005	.005	.003	70.0	83.0	29.20	.2470	194.1	164	27
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.144	.582	15.47	1426.0	.127	.561	261.0	.153	.484	.021	.098	.911
2 ~~16~~	.129	.525	15.38	1353.1	.114	.506	245.9	.136	.433	.019	.092	.917
3 ~~17~~	.098	.394	15.37	1178.0	.086	.380	214.0	.103	.325	.014	.069	.917
4 ~~18~~	.071	.284	15.41	1004.1	.063	.273	182.9	.075	.233	.011	.051	.915
5 ~~19~~	.050	.199	15.52	839.7	.044	.189	154.3	.053	.163	.010	.036	.907
6 ~~20~~	.033	.131	15.38	687.5	.029	.124	125.0	.035	.106	.007	.025	.917
7 ~~21~~	.018	.070	15.35	502.2	.016	.066	91.1	.019	.056	.004	.014	.919
8 ~~22~~	.012	.048	15.09	420.9	.011	.046	74.8	.013	.038	.002	.010	.938
9 ~~23~~	.007	.029	15.49	323.3	.007	.027	59.3	.008	.023	.002	.006	.909
10 ~~24~~	.004	.0165	15.28	249.1	.004	.015	44.9	.005	.013	.0015	.0035	.924
11 ~~25~~	.0019	.0069	14.14	166.7	.0017	.0067	27.4	.0017	.0047	.0002	.0022	1.015

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7'	.297	7.07	10.56'	-3.49	5.8"	.615	15.93	6.39'	9.54
2		.269	7.06		-3.50		.535	17.20		10.81
3		.209	6.70		-3.86		.420	16.43		10.04
4		.153	7.19		-3.37		.310	16.45		10.06
5		.110	9.09		-1.47		.230	15.65		9.26
6		.076	9.21		-1.35		.153	16.34		9.95
7		.043	9.30		-1.26		.086	16.28		9.89
8		.030	6.67		-3.89		.060	16.67		10.28
9		.0185	10.81		0.25		.039	15.38		8.99
10		.012	12.50		1.94		.024	14.58		8.19
11	12.7"	.0058	3.45	10.56'	-7.11	5.8"	.010	22.00	6.39'	15.61
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18"x 8" STR. & 3"x 8" T.O.
ORIFICES: 14"x 4" STR. & 7"x 2" T.O.

Observers { R.J. Waelkes } Date AUG. 24, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	12:31	4.10	.793	.800	.570	70.0	83.0	29.20	2.025	1591	1268	344
2	12:34	3.17	.615	.625	.445				1.780	1399	1120	305
3	12:38	2.29	.451	.457	.310				1.513	1189	960	255
4	12:45	1.59	.310	.311	.210				1.261	990.9	798	211
5	12:49	1.07	.206	.208	.138				1.034	812.5	654	173
6	12:52	.560	.105	.107	.070				.7483	588.0	472	124
7	12:54	.411	.077	.078	.050				.6411	503.8	404	106
8	12:57	.237	.045	.045	.029				.4869	382.6	309	81
9	1:00	.128	.024	.024	.015				.3578	281.2	227	59
10	1:02	.064	.011	.011	.007	70.0	83.0	29.20	.2530	198.8	154	40
11												
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
~~15~~ 1	.128	.921	21.34	1251.5	.098	.898	399.5	.259	.829	.023	.092	.614
~~16~~ 2	.099	.714	21.40	1099.5	.075	.700	299.5	.201	.646	.014	.068	.612
~~17~~ 3	.072	.523	20.99	939.4	.055	.512	249.6	.140	.450	.011	.073	.627
~~18~~ 4	.050	.360	20.91	783.7	.038	.349	207.2	.096	.306	.011	.054	.630
~~19~~ 5	.033	.239	20.92	642.5	.026	.234	170.0	.065	.203	.005	.036	.630
~~20~~ 6	.018	.123	20.81	465.6	.014	.121	122.4	.034	.104	.002	.019	.634
~~21~~ 7	.013	.090	20.78	399.1	.010	.088	104.7	.025	.075	.002	.015	.636
~~22~~ 8	.007	.052	20.77	303.1	.006	.051	79.5	.014	.043	.001	.009	.636
~~23~~ 9	.004	.028	20.63	223.2	.003	.027	58.0	.008	.023	.001	.005	.641
~~24~~ 10	.002	.013	20.82	157.4	.0015	.0125	41.4	.0038	.0108	.0005	.0022	.634
25												

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ } { _____ _____ } Date _____, 19 ____

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.235	9.79	10.56'	-0.77	5.8"	1.000	9.20	6.39'	2.81
2		.182	7.69		-2.87		.800	8.50		2.11
3		.137	8.03		-2.53		.565	12.92		6.53
4		.098	11.22		0.66		.390	13.85		7.46
5		.0665	7.52		-3.04		.272	13.24		6.85
6		.0362	5.52		-5.04		.149	12.75		6.36
7		.0279	7.17		-3.39		.112	13.39		7.00
8		.017	5.88		-4.68		.067	13.43		7.04
9		.0096	10.42		-0.14		.038	13.16		6.77
10	12.7"	.0053	9.43	10.56'	-1.13	5.8"	.021	10.48	6.39'	4.09
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 16½" x 6½" STR. & 6½" x 1½" T.O.

Observers { R J Walker } { } Date AUG. 25, 19 50

No	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:19	4.94	.174	.137	.213	70.0	79.0	29.15	2.223	1747	1630	123
2	10:22	4.11	.145	.115	.177				2.028	1594	1500	112
3	10:27	3.13	.111	.087	.133				1.769	1390	1310	97
4	10:31	2.30	.081	.064	.097				1.517	1192	1125	83
5	10:35	1.57	.056	.044	.066				1.253	984.6	933	68
6	10:37	1.075	.038	.030	.045				1.037	814.9	772	56
7	10:40	.530	.019	.015	.022				.7280	572.0	550	39.3
8	10:43	.403	.014	.011	.016				.6348	498.8	472	33.5
9	10:45	.240	.009	.007	.010				.4899	385.0	379	26.5
10	10:47	.143	.005	.004	.006				.3782	297.2	289	20.5
11	10:50	.065	.003	.002	.003	70.0	79.0	29.15	.2550	200.4	206	14.5
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TR_4-TR_5	TR_4-TP_6	V_6/V_5
1 ~~15~~	.155	.329	7.02	1624.4	.165	.302	122.6	.034	.247	.027	.082	.453
~~2 16~~	.129	.274	6.95	1483.2	.137	.252	110.8	.028	.205	.022	.069	.448
~~3 17~~	.098	.209	6.89	1294.2	.104	.191	95.8	.021	.154	.018	.055	.444
~~4 18~~	.072	.153	6.87	1110.1	.077	.141	81.9	.015	.112	.012	.041	.443
~~5 19~~	.049	.105	6.79	917.7	.052	.096	66.9	.010	.076	.009	.029	.437
6 ~~20~~	.034	.072	6.76	759.8	.036	.066	55.1	.007	.052	.006	.020	.435
7 ~~21~~	.017	.036	6.67	533.8	.018	.033	38.2	.003	.025	.003	.011	.429
8 ~~22~~	.013	.027	6.63	465.7	.014	.025	33.1	.002	.018	.002	.009	.426
9 ~~23~~	.007	.016	6.54	359.8	.008	.015	25.2	.001	.011	.001	.005	.420
0 ~~24~~	.004	.009	6.62	277.5	.005	.009	19.7	.0009	.0069	.000	.0021	.426
1 ~~25~~	.002	.005	6.58	187.2	.0022	.0042	13.2	.0004	.0034	.0008	.0016	.424

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.380	7.11	10.56'	-3.45	5.8"	.148	55.41	6.39'	49.02
2		.320	6.88		-3.68		.123	56.10		49.71
3		.247	7.29		-3.27		.092	59.78		53.39
4		.187	6.42		-4.14		.072	56.94		50.55
5		.130	6.92		-3.64		.049	59.18		52.79
6		.091	6.59		-3.91		.0345	57.97		51.58
7		.047	6.38		-4.18		.0181	61.11		54.72
8		.036	5.56		-5.00		.0141	63.83		57.44
9		.023	4.35		-6.21		.0087	57.47		51.08
10		.0145	—		—		.0056	37.50		31.11
11	12.7"	.0072	11.11	10.56'	0.55	5.8"	—	—	6.39'	—
12										
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O. ORIFICES; 16" x 6" STR. & 6½" x 1½" T.O.

Observers { R J Walker } { } Date AUG. 25, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:55	4.83	.233	.200	.261	70.0	79.0	29.15	2.198	1727	1603	136
2	10:59	4.13	.200	.171	.225				2.032	1597	1493	127
3	11:02	3.15	.150	.129	.168				1.775	1395	1300	109
4	11:06	2.34	.113	.095	.124				1.530	1202	1120	94
5	11:10	1.59	.077	.065	.084				1.261	990.9	930	77
6	11:13	1.065	.051	.043	.055				1.032	810.9	757	62
7	11:16	.540	.026	.021	.028				.7349	577.5	533	44.3
8	11:19	.405	.019	.016	.020				.6364	500.1	467	37.4
9	11:22	.247	.012	.010	.012				.4970	390.5	371	29.0
10	11:24	.147	.007	.006	.007				.3834	301.3	289	22.2
11	11:26	.062	.003	.0025	.003	70.0	79.0	29.15	.2490	195.7	189	14.5
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_6-TP_5	V_6/V_5
1 ~~15~~	.151	.384	7.82	1591.9	.158	.358	135.1	.041	.302	.026	.082	.509
2 ~~16~~	.129	.329	7.84	1471.8	.135	.306	125.2	.035	.260	.023	.069	.510
3 ~~17~~	.099	.249	7.74	1287.0	.103	.232	108.0	.026	.194	.017	.055	.503
4 ~~18~~	.073	.186	7.74	1109.0	.077	.172	93.0	.019	.143	.014	.043	.503
5 ~~19~~	.050	.127	7.65	915.1	.052	.117	75.8	.013	.097	.010	.030	.497
6 ~~20~~	.033	.084	7.57	749.5	.035	.078	61.4	.008	.063	.006	.021	.492
7 ~~21~~	.017	.043	7.67	533.2	.018	.039	44.3	.004	.032	.004	.011	.499
8 ~~22~~	.013	.032	7.41	463.0	.013	.029	37.1	.003	.023	.003	.009	.481
9 ~~23~~	.008	.020	7.25	362.2	.008	.018	28.3	.0018	.0138	.002	.0062	.469
10 ~~24~~	.005	.012	7.13	279.8	.005	.011	21.5	.0010	.0080	.001	.0040	.461
11 ~~25~~	.0019	.0049	7.13	181.7	.0021	.0046	14.0	.0004	.0034	.0003	.0015	.463

Remarks:

MLIT-232

Sheet No. 163A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

Observers { _____ { _____ Date _____, 19 ___

No.	STRAIGHT EQ.D.	STRAIGHT ΔP/100	STRAIGHT EQ.L.	STRAIGHT ACT.L.	STRAIGHT ADDED EQ.L.	TAKEOFF EQ.D.	TAKEOFF ΔP/100	TAKEOFF EQ.L.	TAKEOFF ACT.L.	TAKEOFF ADDED EQ.L.
1	12.7"	.370	7.03	10.56'	-3.53	5.8"	.180	45.56	6.39'	39.17
2		.316	7.28		-3.28		.153	45.10		38.71
3		.245	6.94		-3.62		.117	47.01		40.62
4		.183	7.65		-2.91		.090	47.78		41.39
5		.129	7.75		-2.81		.061	49.18		42.79
6		.088	6.82		-3.74		.042	50.00		43.61
7		.047	8.51		-2.05		.0237	46.41		40.02
8		.036	8.33		-2.23		.0172	52.33		45.94
9		.0232	8.62		-1.94		.0107	57.94		51.55
10		.0144	6.94		-3.62		.0065	61.54		55.15
11	12.7"	.0068	4.41	10.56'	-6.15	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 164

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15½" x 5½" STR. & 6½" x 1½" T.O.

Observers { R J Waalkes { _____ Date AUG. 25, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:31	4.70	.325	.295	.338	70.0	79.0	29.15	2.168	1704	1560	155
2	11:35	4.12	.285	.258	.298				2.030	1595	1462	146
3	11:39	3.16	.217	.195	.223				1.778	1397	1275	126
4	11:43	2.41	.163	.148	.168				1.552	1220	1115	109
5	11:47	1.60	.109	.098	.111				1.265	994.0	910.0	89.0
6	11:51	1.07	.072	.065	.073				1.034	812.5	748	71.5
7	11:54	.550	.037	.033	.037				.7416	582.7	538	51.0
8	11:56	.417	.028	.025	.028				.6458	507.5	470	44.3
9	11:59	.250	.017	.015	.016				.5000	392.9	367	33.5
10	12:01	.139	.010	.008	.009				.3728	292.9	272	25.2
11	12:03	.060	.004	.004	.004	70.0	79.0	29.15	.2450	192.5	195	16.7
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.147	.472	9.04	1550.0	.150	.445	154.0	.053	.391	.027	.081	.596
2 ~~16~~	.129	.414	9.08	1450.2	.131	.389	144.8	.047	.345	.025	.069	.599
3 ~~17~~	.099	.316	8.99	1271.4	.101	.296	125.6	.035	.258	.020	.058	.592
4 ~~18~~	.075	.238	8.91	1111.3	.077	.225	108.7	.027	.195	.013	.043	.587
5 ~~19~~	.050	.159	8.91	905.4	.051	.149	88.6	.018	.129	.010	.030	.587
6 ~~20~~	.033	.105	8.72	741.6	.034	.099	70.9	.011	.084	.006	.021	.573
7 ~~21~~	.017	.054	8.66	532.2	.018	.051	50.5	.006	.043	.003	.011	.569
8 ~~22~~	.013	.041	8.61	463.8	.013	.038	43.7	.004	.032	.003	.009	.566
9 ~~23~~	.008	.025	8.36	360.1	.008	.023	32.8	.002	.018	.002	.007	.546
10 ~~24~~	.004	.014	8.48	268.1	.004	.012	24.8	.0014	.0104	.002	.0036	.556
11 ~~25~~	.0019	.0059	7.89	177.3	.002	.006	15.2	.0005	[illegible]	[illegible]	[illegible]	[illegible]

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ____

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.350	7.71	10.56'	-2.85	5.8"	.229	35.37	6.39'	28.98
2		.306	8.17		-2.39		.202	34.16		27.77
3		.242	8.26		-2.30		.153	37.91		31.52
4		.187	6.95		-3.61		.118	36.44		30.05
5		.127	7.87		-2.69		.081	37.04		30.65
6		.087	6.90		-3.66		.055	38.18		31.79
7		.047	6.38		-4.18		.0296	37.16		30.77
8		.036	8.33		-2.23		.023	39.13		32.74
9		.0231	8.66		-1.90		.0138	50.72		44.33
10		.0136	14.71		4.15		.0085	42.35		35.96
11	12.7"	—	—	10.56'	—	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 165

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15" x 5" STR. & 6½" x 1½" T.O.

Observers { R J Waalkes } Date AUG. 25, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	12:07	4.48	.493	.470	.479	70.0	79.0	29.15	2.117	1663	1500	185
2	12:10	4.11	.455	.430	.441				2.028	1594	1435	178
3	12:13	3.15	.341	.323	.331				1.775	1395	1250	154
4	12:17	2.31	.248	.235	.239				1.520	1194	1070	130
5	12:20	1.55	.164	.155	.157				1.245	978.3	870	106
6	12:23	1.04	.109	.102	.103				1.020	801.5	710	85
7	12:26	.520	.055	.051	.051				.7211	566.6	507	60
8	12:28	.390	.041	.038	.038				.6245	490.7	439	52
9	12:31	.242	.025	.023	.023				.4919	386.5	343	40
10	12:33	.140	.014	.013	.013				.3742	294.0	260	30.2
11	12:35	.064	.007	.006	.006	73.0	82.0	29.15	.2530	198.8	178	20.5
12												
13												
14	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.140	.633	10.98	1480.5	.137	.607	182.5	.075	.554	.026	.079	.740
2 ~~16~~	.129	.584	11.04	1418.0	.125	.555	176.0	.069	.510	.029	.074	.744
3 ~~17~~	.099	.440	10.97	1242.0	.096	.419	153.0	.053	.384	.021	.056	.739
4 18	.072	.320	10.83	1064.7	.071	.306	129.3	.038	.277	.014	.043	.729
5 ~~19~~	.048	.212	10.86	872.1	.047	.202	106.2	.025	.182	.010	.030	.730
6 ~~20~~	.033	.142	10.69	715.8	.032	.134	85.7	.016	.119	.008	.023	.719
7 ~~21~~	.016	.071	10.58	506.7	.016	.067	59.9	.008	.059	.004	.012	.709
8 ~~22~~	.012	.053	10.59	438.7	.012	.050	52.0	.006	.044	.003	.009	.711
9 ~~23~~	.008	.033	10.44	346.1	.007	.030	40.4	.004	.027	.003	.006	.700
10 ~~24~~	.004	.018	10.41	263.4	.004	.017	30.6	.002	.015	.001	.003	.696
11 ~~25~~	.002	.009	10.33	178.3	.002	.008	20.5	.0009	.0069	.001	.002	[illegible]

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.318	8.18	10.56'	-2.38	5.8"	.310	25.48	6.39'	19.09
2		.297	9.76		-0.80		.290	25.52		19.13
3		.230	9.13		-1.43		.227	24.67		18.28
4		.170	8.24		-2.32		.166	25.90		19.51
5		.119	8.40		-2.16		.111	27.03		20.64
6		.081	9.88		-0.68		.077	29.87		23.48
7		.0435	9.20		-1.36		.0405	29.63		23.24
8		.0332	9.04		-1.52		.031	29.03		22.64
9		.0216	13.89		3.33		.020	30.00		23.61
10		.013	7.69		-2.87		.0122	24.59		18.20
11	12.7"	.0066	15.15	10.56'	4.59	5.8"	.0059	35.59	6.39'	29.20
12										
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23										
24										
25										

Remarks:

MLIT-232

Sheet No. 166

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 14" x 4" STR. & 6½" x 1½" T.O.

Observers { R J Waalkes { Date AUG. 28, 1950

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:20	3.96	.899	.887	.815	73.0	79.0	29.05	1.990	1564	1330	242
2	10:23	3.17	.725	.715	.655				1.780	1399	1200	217
3	10:26	2.30	.529	.520	.475				1.517	1192	1025	185
4	10:29	1.58	.365	.360	.325				1.257	987.7	854	152
5	10:33	1.03	.231	.229	.205				1.015	797.6	686	121
6	10:37	.540	.120	.118	.105				.7349	577.5	495	86
7	10:41	.410	.089	.088	.079				.6403	503.1	429	75
8	10:44	.260	.057	.055	.049				.5099	400.7	340	59
9	10:46	.143	.031	.030	.026				.3782	297.2	253	43
10	10:49	.065	.013	.0125	.011	73.0	79.0	29.05	.2550	200.4	164	28
11												
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_5/V_6
1 ~~15~~	.124	1.023	15.39	1323.3	.109	.996	240.7	.130	.945	.027	.078	.916
2 ~~16~~	.099	.824	15.31	1184.8	.087	.802	214.2	.103	.758	.022	.066	.922
3 ~~17~~	.072	.601	15.29	1009.7	.064	.584	182.3	.075	.550	.017	.051	.923
4 ~~18~~	.049	.414	15.11	838.5	.044	.404	149.2	.050	.375	.010	.039	.937
5 ~~19~~	.032	.263	14.99	678.0	.029	.258	119.6	.032	.237	.005	.026	.945
6 ~~20~~	.017	.137	14.80	492.0	.015	.133	85.5	.016	.121	.004	.016	.959
7 ~~21~~	.013	.102	14.88	428.2	.011	.099	74.9	.013	.092	.003	.010	.953
8 ~~22~~	.008	.065	14.79	341.4	.007	.062	59.3	.008	.057	.003	.008	.959
9 ~~23~~	.004	.035	14.53	254.0	.004	.035	43.2	.004	.030	.001	.005	.980
10 ~~24~~	.002	.015	14.58	171.2	.0018	.0143	29.2	.002	.013	.0007	.002	.977
25												

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ____

No	STRAIGHT					TAKEOFF				
	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.260	10.38	10.56'	-0.18	5.8"	.525	14.86	6.39'	8.47
2		.210	10.48		-0.08		.418	15.79		9.40
3		.158	10.76		0.20		.310	16.45		10.06
4		.110	9.09		-1.47		.220	17.73		11.34
5		.074	6.76		-3.80		.143	18.18		11.79
6		.0405	9.88		-0.68		.077	20.78		14.39
7		.031	9.68		-0.88		.060	16.67		10.28
8		.021	14.29		3.73		.039	20.51		14.12
9		.0124	8.06		-2.50		.0226	22.12		15.73
10	12.7"	.0061	11.48	10.56'	0.92	5.8"	.0113	17.70	6.39'	11.31
11										
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Remarks:

MLIT-232

Sheet No. 167

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3"x8" T.O.
ORIFICES: 16½" x 6½" STR. & 6¼" x 1¼" T.O.

Observers { R.J. Walker } { } Date AUG. 30, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	9:55	4.99	.188	.144	.241	65.0	70.0	29.08	2.234	1755	1675	100
2	9:59	4.11	.155	.119	.199				2.028	1594	1525	91
3	10:03	3.12	.115	.089	.147				1.766	1388	1325	78
4	10:07	2.36	.086	.067	.111				1.536	1207	1150	68
5	10:10	1.66	.060	.047	.078				1.289	1013	965	57
6	10:14	1.02	.038	.029	.047				1.010	793.6	760	44
7	10:18	.590	.021	.016	.027				.7681	603.6	568	33.6
8	10:22	.410	.015	.011	.018				.6403	503.1	472	27.5
9	10:24	.247	.009	.007	.011				.4970	390.5	379	21.5
10	10:26	.149	.005	.004	.006				.3860	303.3	289	15.9
11	10:28	.060	.002	.0015	.0025	67.0	72.0	29.08	.2450	192.5	179	10.3
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TR_4-TP_5	TA_4-T	V_6/V_5
~~15~~ 1	.156	.344	5.63	1656.2	.171	.315	98.8	.022	.263	.029	.08	.358
~~16~~ 2	.129	.284	5.63	1504.3	.141	.260	89.7	.018	.217	.024	.06	.358
~~17~~ 3	.098	.213	5.56	1310.8	.107	.196	77.2	.013	.160	.017	.05	.353
~~18~~ 4	.074	.160	5.58	1139.6	.081	.148	67.4	.010	.121	.012	.039	.355
~~19~~ 5	.052	.112	5.58	956.5	.057	.104	56.5	.007	.085	.008	.02	.354
~~20~~ 6	.032	.070	5.47	750.2	.035	.064	43.4	.004	.051	.006	.019	.347
~~21~~ 7	.018	.039	5.59	569.9	.020	.036	33.7	.003	.030	.003	.00	.355
~~22~~ 8	.013	.028	5.51	475.4	.014	.025	27.7	.0017	.0197	.003	.008	.350
~~23~~ 9	.008	.017	5.37	369.5	.009	.016	21.0	.0010	.0120	.001	.0050	.341
~~24~~ 10	.005	.010	5.21	287.5	.005	.009	15.8	.0006	.0066	.001	.0034	.330
~~25~~ 11	.0019	.0039	5.44	182.0	.0021	.0036	10.5	.0002	.0027	.0003	.0012	.476

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.390	7.44	10.56'	-3.12	5.8"	.100	81.00	6.39'	74.61
2		.330	7.27		-3.29		.084	79.76		73.37
3		.255	6.67		-3.89		.064	82.81		76.42
4		.193	6.22		-4.34		.050	78.00		71.61
5		.140	5.71		-4.85		.036	75.00		68.61
6		.088	6.82		-3.74		.0227	83.70		77.31
7		.053	5.66		-4.90		.0146	61.64		55.25
8		.038	7.89		-2.67		.0102	81.37		74.98
9		.0242	4.13		-6.43		.0062	80.65		74.26
10		.0152	6.58		-3.98		—	—		—
11	12.7"	.0068	4.41	10.56'	-6.15	5.8"	—	—	6.39'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 16" x 6" STR. & 6¼" x 1¼" T.O.

Observers { R. J. Walker } { } Date AUG. 30, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	10:50	4.91	.254	.212	.300	67.0	72.0	29.08	2.216	1741	1660	112
2	10:56	4.17	.215	.180	.255				2.042	1605	1530	103
3	11:00	3.21	.165	.136	.195				1.792	1408	1330	90
4	11:03	2.35	.120	.100	.140				1.533	1205	1145	76
5	11:06	1.62	.080	.067	.095				1.273	1000	940	63
6	11:09	1.03	.050	.043	.060				1.015	797.6	757	50
7	11:12	.540	.026	.022	.030				.7349	577.5	546	35.4
8	11:16	.402	.020	.015	.022				.6340	498.2	453	30.2
9	11:18	.247	.011	.009	.013				.4970	390.5	353	23.4
10	11:21	.141	.006	.005	.007				.3755	295.1	265	17.2
11	11:24	.060	.0025	.002	.003	68.0	73.0	29.08	.2450	192.5	170	11.3
12												
13												

No.	VP_4	TP_4	% DIV.	Q_{SC}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_5-TP_6	TP_4-TP_6	V_6/V_5
~~15~~ 1	.153	.407	6.32	1631.0	.166	.378	110.0	.027	.327	.029	.080	.405
~~16~~ 2	.130	.345	6.31	1503.7	.141	.321	101.3	.023	.278	.024	.067	.404
~~17~~ 3	.100	.265	6.34	1318.7	.108	.244	89.3	.018	.213	.021	.052	.406
~~18~~ 4	.073	.193	6.22	1130.0	.080	.180	75.0	.013	.153	.013	.040	.398
~~19~~ 5	.051	.131	6.28	937.2	.055	.122	62.8	.009	.104	.009	.027	.402
~~20~~ 6	.032	.082	6.20	748.1	.035	.078	49.5	.006	.066	.004	.016	.397
~~21~~ 7	.017	.043	6.09	542.3	.018	.040	35.2	.003	.033	.003	.010	.389
~~22~~ 8	.013	.033	6.25	467.1	.014	.029	31.1	.002	.024	.004	.009	.400
~~23~~ 9	.008	.019	6.22	366.2	.008	.017	24.3	.0013	.0143	.002	.0047	.398
~~24~~ 10	.004	.010	6.09	277.1	.005	.010	18.0	.0007	.0077	.000	.0023	.390
~~25~~ 11	.0019	.0044	6.23	180.5	.002	.004	12.0	.0003	.0033	.0004	.0011	.399

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.383	7.57	10.56'	-2.99	5.8"	.123	65.04	6.39'	58.65
2	|	.325	7.38	|	-3.18	|	.105	63.81	|	57.42
3	|	.257	8.17	|	-2.39	|	.082	63.41	|	57.02
4	|	.192	6.77	|	-3.79	|	.060	66.67	|	60.28
5	|	.137	6.57	|	-3.99	|	.044	61.36	|	54.97
6	|	.088	4.55	|	-6.01	|	.0284	56.34	|	49.95
7	|	.0485	6.19	|	-4.37	|	.0158	63.29	|	56.90
8	|	.0365	10.96	|	0.40	|	.0125	72.00	|	65.61
9	|	.0237	8.44	|	-2.12	|	.0081	58.02	|	51.63
10	|	.0143	—	|	—	|	—	—	|	—
11	12.7"	.0074	5.41	10.56'	-5.15	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 169

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE – 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15 1/2" x 5 1/2" STR. & 6 1/4" x 1 1/4" T.O.

Observers { R.J. Walker } { } Date AUG. 30, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	11:29	4.77	.353	.314	.391	68.0	73.0	29.08	2.184	1716	1605	127
2	11:34	4.13	.305	.271	.338				2.032	1597	1495	118
3	11:38	3.22	.235	.209	.259				1.794	1410	1320	104
4	11:42	2.32	.166	.148	.184				1.523	1197	1115	87
5	11:46	1.64	.115	.104	.129				1.281	1007	935	73
6	11:49	1.06	.075	.066	.082				1.030	809.4	750	58.4
7	11:53	.550	.038	.034	.042				.7416	582.7	545	42.0
8	11:56	.401	.027	.024	.030				.6332	497.6	462	35.4
9	12:00	.242	.016	.014	.0175				.4919	386.5	355	27.0
10	12:02	.150	.010	.009	.010				.3873	3043	288	20.5
11	12:05	.061	.004	.003	.004	68.5	74.0	29.08	.2470	194.1	170	13.0
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
~~15~~	.149	.502	7.33	1590.2	.158	.472	125.8	.035	.426	.030	.076	.474
~~16~~	.129	.434	7.32	1480.1	.137	.408	116.9	.031	.369	.026	.065	.474
~~17~~	.101	.336	7.30	1307.1	.107	.316	102.9	.024	.283	.020	.053	.472
~~18~~	.073	.239	7.24	1110.3	.077	.225	86.7	.017	.201	.014	.038	.469
~~19~~	.051	.166	7.24	934.1	.054	.158	72.9	.012	.141	.008	.025	.468
~~20~~	.033	.108	7.22	751.0	.035	.101	58.4	.008	.090	.007	.018	.467
~~21~~	.017	.055	7.16	541.0	.018	.052	41.7	.004	.046	.003	.009	.463
~~22~~	.013	.040	7.12	462.2	.013	.037	35.4	.003	.033	.003	.007	.459
~~23~~	.008	.024	7.07	359.2	.008	.022	27.3	.0017	.0192	.002	.0048	.456
~~24~~	.005	.015	6.65	284.1	.005	.014	20.2	.0009	.0109	.001	.0041	.427
~~25~~	.0019	.0059	7.10	180.3	.002	.005	13.8	.0004	.0044	.0009	.0015	.460

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.368	8.15	10.56'	-2.41	5.8"	.153	49.67	6.39'	43.28
2	|	.312	8.33	|	-2.23	|	.137	47.45	|	41.06
3	|	.253	7.91	|	-2.65	|	.111	47.75	|	41.36
4	|	.187	7.49	|	-3.07	|	.078	48.72	|	42.33
5	|	.135	5.93	|	-4.63	|	.0575	43.48	|	37.09
6	|	.089	7.87	|	-2.69	|	.0386	46.63	|	40.24
7	|	.049	6.12	|	-4.44	|	.0213	42.25	|	35.86
8	|	.0357	8.40	|	-2.16	|	.016	43.75	|	37.36
9	|	.023	8.70	|	-1.86	|	.0098	48.98	|	42.59
10	|	.015	6.67	|	-3.89	|	.0058	70.69	|	64.30
11	12.7"	.0074	12.16	10.56'	1.60	5.8"	—	—	6.39'	—
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Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18"x 8" STR. & 3"x 8" T.O.
ORIFICES: 15"x 5" STR. & 6¼"x 1¼" T.O.

Observers { A J Waalkes } Date AUG. 30, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	12:10	4.54	.521	.496	.540	68.5	74.0	29.08	2.131	1674	1540	149
2	12:13	4.11	.490	.460	.507				2.028	1594	1480	145
3	12:17	3.14	.369	.345	.381				1.772	1392	1285	126
4	12:23	2.34	.269	.251	.276				1.530	1202	1105	107
5	12:26	1.60	.182	.170	.187				1.265	994.0	910	88
6	12:31	1.02	.115	.107	.117				1.010	793.6	728	70
7	12:36	.535	.060	.056	.061				.7314	574.7	530	50.5
8	12:39	.415	.045	.043	.045				.6442	506.2	467	43.2
9	12:42	.267	.030	.027	.030				.5167	406.0	372	35.4
10	12:44	.145	.015	.014	.015				.3808	299.2	270	25.1
11	12:46	.053	.0055	.005	.0055	68.5	74.0	29.08	.2302	180.9	163	15.3
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.142	.663	8.82	1526.4	.145	.641	147.6	.049	.589	.022	.074	.580
~~2 16~~	.129	.619	8.92	1451.8	.131	.591	142.2	.045	.552	.028	.067	.588
~~3 17~~	.098	.467	8.93	1267.7	.100	.445	124.3	.035	.416	.022	.051	.588
~~4 18~~	.073	.342	8.83	1095.9	.075	.326	106.1	.025	.301	.016	.041	.581
~~5 19~~	.050	.232	8.82	906.3	.051	.221	87.7	.017	.204	.011	.028	.581
6 ~~20~~	.032	.147	8.77	724.0	.033	.140	69.6	.011	.128	.007	.019	.577
7 ~~21~~	.017	.077	8.70	524.7	.017	.073	50.0	.006	.067	.004	.010	.572
8 ~~22~~	.013	.058	8.47	463.3	.013	.056	42.9	.004	.049	.002	.009	.556
9 ~~23~~	.008	.038	8.69	370.7	.009	.036	35.3	.003	.033	.002	.005	.571
~~24~~	.005	.020	8.51	273.7	.005	.019	25.5	.0015	.0165	.001	.0035	.559
~~25~~	.0017	.0072	8.58	165.4	.0017	.0067	15.5	.0005	.006	.0005	.0017	.562

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.335	6.57	10.56'	-3.99	5.8"	.213	34.74	6.39'	28.35
2		.307	9.12		-1.44		.197	34.01		27.62
3		.236	9.32		-1.24		.153	33.33		26.94
4		.180	8.89		-1.67		.114	35.96		29.57
5		.127	8.66		-1.90		.081	34.57		28.18
6		.0815	8.59		-1.97		.053	35.85		29.46
7		.045	8.89		-1.67		.029	34.48		28.09
8		.036	5.56		-5.00		.0224	40.18		33.79
9		.024	8.33		-2.23		.0158	31.65		25.26
10		.0141	7.09		-3.47		.0088	39.77		33.38
11	12.7"	.0057	8.77	10.56'	-1.79	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 171

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O. ORIFICES: 14" x 4" STR. & 6¼" x 1¼" T.O.

Observers { R. J. Walker } { }

Date SEPT. 1, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	1:52	3.92	.943	.935	.922	74.5	79.0	29.05	1.980	1556	1370	195
2	1:54	3.14	.769	.760	.745				1.772	1392	1235	175
3	1:58	2.39	.593	.580	.571				1.546	1215	1080	154
4	2:00	1.60	.400	.392	.384				1.265	994.0	890	126
5	2:04	1.03	.251	.245	.240				1.015	797.6	708	100
6	2:08	.540	.130	.127	.124				.7349	577.5	514	72
7	2:12	.405	.095	.093	.090				.6364	500.1	440	61.0
8	2:15	.247	.058	.057	.055				.4970	390.5	347	48.0
9	2:18	.130	.030	.029	.028				.3606	283.4	249	34.2
10	2:20	.056	.012	.012	.011	74.5	79.0	29.05	.2367	186.0	161	21.5
11												
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
~~15~~ 1	.123	1.066	12.46	1362.1	.116	1.051	193.9	.084	1.006	.015	.060	.854
~~16~~ 2	.098	.867	12.41	1219.3	.093	.853	172.7	.067	.812	.014	.055	.850
~~17~~ 3	.075	.668	12.48	10634	.070	.650	151.6	.052	.623	.018	.045	.855
~~18~~ 4	.050	.450	12.40	870.7	.047	.439	123.3	.034	.448	.011	.032	.850
~~19~~ 5	.032	.283	12.38	698.9	.030	.275	98.7	.022	.262	.008	.021	.848
~~20~~ 6	.017	.147	12.29	506.5	.016	.143	71.0	.011	.135	.004	.012	.841
~~21~~ 7	.013	.108	12.18	439.2	.012	.105	60.9	.008	.098	.003	.010	.831
~~22~~ 8	.008	.066	12.15	343.1	.007	.064	41.4	.005	.060	.002	.006	.828
~~23~~ 9	.004	.034	12.08	249.2	.004	.033	34.2	.003	.031	.001	.003	.823
~~24~~ 10	.0018	.0138	11.78	164.1	.0017	.0137	21.9	.0011	.0121	.0001	.0017	.800
25												

Remarks:

MLIT-232

Sheet No. 171A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers { _____ _____ { _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.269	5.58	10.56'	-4.98	5.8"	.350	17.14	6.39'	10.75
2		.224	6.25		-4.31		.285	19.30		12.91
3		.169	10.65		0.09		.221	20.36		13.97
4		.119	9.24		-1.32		.150	21.33		14.94
5		.078	10.26		-0.30		.100	21.00		14.61
6		.043	9.30		-1.26		.055	21.82		15.43
7		.033	9.09		-1.47		.041	24.39		18.00
8		.0212	9.43		-1.13		.027	22.22		15.83
9		.012	8.33		-2.23		.015	20.00		13.61
10	12.7"	.0057	1.75	10.56'	-8.81	5.8"	.0068	25.00	6.39'	18.61
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Remarks=

MLIT-232

Sheet No. 172

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3"x8" T.O.
ORIFICES: 16½" x 6½" STR. & 6" x 1" T.O.

Observers { R J Walker } { }

Date SEPT. 1, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	2:28	4.86	.195	.145	.252	74.5	79.0	29.05	2.205	1733	1680	72.0
2	2:32	4.13	.165	.123	.215				2.032	1597	1555	66.5
3	2:37	3.12	.121	.092	.160				1.766	1388	1345	57.0
4	2:40	2.35	.090	.070	.120				1.533	1205	1175	49.0
5	2:42	1.66	.064	.048	.084				1.289	1013	975	41.0
6	2:45	1.06	.041	.031	.053				1.030	809.4	785	32.5
7	2:48	.595	.024	.017	.030				.7714	606.2	584	24.4
8	2:52	.386	.015	.011	.019				.6213	488.2	472	19.2
9	2:54	.255	.010	.007	.013				.5050	396.8	379	15.8
10	2:56	.145	.0055	.004	.007				.3808	299.2	289	11.6
11	2:58	.056	.002	.001	.003	77.0	82.0	29.05	.2367	186.0	147	7.5
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5c}	VP_5	TP_5	Q_{6c}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
~~15~~ 1	.152	.347	4.11	1661.8	.172	.317	71.2	.011	.263	.030	.084	.257
~~16~~ 2	.129	.294	4.10	1531.5	.146	.269	65.5	.010	.225	.025	.069	.257
~~17~~ 3	.098	.219	4.07	1331.5	.111	.203	56.5	.007	.167	.016	.052	.254
~~18~~ 4	.073	.163	4.00	1156.8	.083	.153	48.2	.005	.125	.010	.038	.250
~~19~~ 5	.052	.116	4.04	972.1	.059	.107	40.9	.004	.088	.009	.028	.253
~~20~~ 6	.033	.074	3.98	777.2	.038	.069	32.2	.002	.055	.005	.019	.248
~~21~~ 7	.019	.043	4.01	581.9	.021	.038	24.3	.0013	.0313	.005	.0117	.251
~~22~~ 8	.012	.027	3.91	469.1	.014	.025	19.1	.0008	.0198	.002	.0072	.244
~~23~~ 9	.008	.018	4.00	380.9	.009	.016	15.9	.0006	.0136	.002	.0044	.250
~~24~~ 10	.005	.0105	3.86	287.7	.005	.009	11.5	.0003	.0073	.0015	.0032	.240
~~25~~ 11	.0018	.0038	4.85	177.0	.002	.003	9.0	.0002	.0032	.0008	.0006	.305

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

_____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.393	7.63	10.56'	-2.93	5.8"	.056	150.00	6.39'	143.61
2	|	.337	7.42	|	-3.14	|	.0465	148.39	|	142.00
3	|	.262	6.11	|	-4.45	|	.036	144.44	|	138.05
4	|	.199	5.03	|	-5.53	|	.0275	138.18	|	131.79
5	|	.145	6.21	|	-4.35	|	.0203	137.93	|	131.54
6	|	.096	5.21	|	-5.35	|	.0133	142.86	|	136.47
7	|	.056	8.93	|	-1.63	|	.0081	144.44	|	138.05
8	|	.037	5.41	|	-5.15	|	.0053	135.85	|	129.46
9	|	.0256	7.81	|	-2.75	|	—	—	|	—
10	|	.0153	9.80	|	-0.76	|	—	—	|	—
11	12.7"	.0065	12.31	10.56'	1.75	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 173

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18"x 8" STR. & 3"x8" T.O.
ORIFICES: 16"x 6" STR. & 6"x 1" T.O.

Observers { R.J. Wasielkes } { } Date SEPT. 1, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	3:04	4.76	.260	.213	.315	77.0	82.0	29.05	2.182	1715	1665	81.0
2	3:08	4.11	.225	.185	.272				2.028	1594	1550	75.0
3	3:12	3.13	.170	.138	.206				1.769	1390	1345	65.0
4	3:16	2.34	.123	.102	.150				1.530	1202	1190	55.5
5	3:19	1.64	.086	.071	.105				1.281	1007	970	46.0
6	3:22	1.08	.056	.046	.067				1.039	816.4	782	36.6
7	3:36	.530	.028	.022	.033				.7280	572.0	541	25.5
8	3:39	.390	.020	.016	.024				.6245	490.7	467	21.7
9	3:41	.245	.013	.010	.015				.4950	389.0	371	17.0
10	3:43	.130	.007	.005	.008				.3606	283.4	265	12.4
11	3:45	.056	.003	.002	.004	77.0	82.0	29.05	.2367	186.0	170	8.7
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TR_4-TP_5	TR_4-TR_6	V_6/V_5
~~15~~	.149	.409	4.64	1635.4	.167	.380	79.6	.014	.329	.029	.080	.292
~~16~~	.129	.354	4.62	1520.4	.144	.329	73.6	.012	.284	.025	.070	.291
~~17~~	.098	.268	4.61	1325.9	.110	.248	64.1	.009	.215	.020	.053	.290
~~18~~	.073	.196	4.57	1147.1	.082	.184	54.9	.007	.157	.012	.039	.287
~~19~~	.051	.137	4.53	961.4	.058	.129	45.6	.005	.110	.008	.027	.284
6 ~~20~~	.034	.090	4.47	779.9	.038	.084	36.5	.003	.070	.006	.020	.281
7 ~~21~~	.017	.045	4.45	546.5	.019	.041	25.5	.0015	.0345	.004	.0105	.280
8 ~~22~~	.012	.032	4.44	468.9	.014	.030	21.8	.0011	.0251	.002	.0069	.279
9 ~~23~~	.008	.021	4.38	372.0	.009	.019	17.0	.0007	.0157	.002	.0053	.274
10 ~~24~~	.004	.011	4.47	270.7	.005	.010	12.7	.0004	.0084	.001	.0026	.281
11 ~~25~~	.0018	.0048	4.87	176.9	.002	.004	9.1	.0002	.0042	.0008	.0006	.308

Remarks:

MLIT-232

Sheet No. 173A

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.387	7.49	10.56'	-3.07	5.8"	.0675	118.52	6.39'	112.13
2		.337	7.42		-3.14		.058	120.69		114.30
3		.258	7.72		-2.81		.046	115.22		108.83
4		.196	6.12		-4.44		.0345	113.04		106.65
5		.140	5.71		-4.85		.0247	109.31		102.92
6		.097	6.19		-4.37		.017	117.65		111.26
7		.049	8.16		-2.40		.0088	119.32		112.93
8		.037	5.41		-5.15		.0067	102.99		96.60
9		.0245	8.16		-2.40		—	—		—
10		.0138	7.25		-3.31		—	—		—
11	12.7"	.0065	12.31	10.56'	1.75	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 174

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15½" x 5½" STR. & 6" x 1" T.O.

Observers { R J Waalkes } Date SEPT. 1, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	3:50	4.64	.364	.319	.412	77.0	82.0	29.05	2.154	1693	1620	93.0
2	3:55	4.12	.324	.282	.367				2.030	1595	1525	87.0
3	4:00	3.23	.252	.220	.285				1.797	1412	1350	77.0
4	4:03	2.37	.182	.159	.205				1.540	1210	1150	65.0
5	4:06	1.65	.124	.110	.141				1.285	1010	960	53.5
6	4:09	1.07	.080	.070	.090				1.034	812.5	772	42.6
7	4:12	.580	.042	.037	.048				.7616	598.5	568	31.0
8	4:14	.405	.030	.025	.033				.6364	500.1	470	25.5
9	4:17	.235	.017	.014	.019				.4848	380.9	355	19.3
10	4:20	.122	.008	.007	.009				.3493	274.5	255	13.2
11	4:22	.057	.004	.003	.005	77.0	82.0	29.05	.2388	187.6	170	9.7
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_4-TP_5	TP_4-TP_6	V_6/V_5
1 ~~15~~	.145	.509	5.43	1601.1	.160	.479	91.9	.019	.431	.030	.078	.344
2 ~~16~~	.129	.453	5.40	1508.9	.142	.424	86.1	.017	.384	.029	.069	.342
3 ~~17~~	.101	.353	5.40	1335.8	.111	.331	76.2	.013	.298	.022	.055	.342
4 ~~18~~	.074	.256	5.35	1145.3	.082	.241	64.7	.009	.214	.015	.042	.339
5 ~~19~~	.052	.176	5.28	956.7	.057	.167	53.3	.006	.147	.009	.029	.334
6 ~~20~~	.033	.113	5.23	770.0	.037	.107	42.5	.004	.094	.006	.019	.331
7 ~~21~~	.018	.060	5.18	567.5	.020	.057	31.0	.002	.050	.003	.010	.327
8 ~~22~~	.013	.043	5.15	474.3	.014	.039	25.8	.0015	.0345	.004	.0085	.326
9 ~~23~~	.007	.024	5.16	361.2	.008	.022	19.7	.0009	.0199	.002	.0041	.327
10 ~~24~~	.004	.012	4.92	261.0	.004	.011	13.5	.0004	.0094	.001	.0026	.310
11 ~~25~~	.0018	.0058	5.40	177.5	.002	.005	10.1	.0002	.0052	.0008	.0006	.341

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____ Date _____, 19 ___

	STRAIGHT					TAKEOFF				
No.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.	EQ.D.	ΔP/100	EQ.L.	ACT.L.	ADDED EQ.L.
1	12.7"	.370	8.11	10.56'	-2.45	5.8"	.0865	90.17	6.39'	83.78
2		.327	8.87		-1.69		.076	90.79		84.40
3		.265	8.30		-2.26		.062	88.71		82.32
4		.195	7.69		-2.87		.046	91.30		84.91
5		.140	6.43		-4.13		.033	87.88		81.49
6		.093	6.45		-4.11		.022	86.36		79.97
7		.053	5.66		-4.90		.0124	80.65		74.26
8		.0375	10.67		0.11		.009	9444		88.05
9		.0231	8.66		-1.90		.0056	73.21		66.82
10		.0129	7.75		-2.81		—	—		—
11	12.7"	.0066	12.12	10.56'	1.56	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 175

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 15" x 5" STR. & 6" x 1" T.O.

Observers { A.J. Waalkes } Date SEPT. 1, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	4:28	4.42	.540	.500	.578	77.0	82.0	29.05	2.102	1652	1548	110
2	4:30	4.09	.508	.469	.540				2.023	1590	1500	106
3	4:33	3.17	.394	.360	.421				1.780	1399	1320	94.0
4	4:38	2.29	.280	.258	.298				1.513	1189	1120	79.0
5	4:41	1.67	.202	.186	.215				1.292	1015	952	66.5
6	4:45	1.02	.122	.111	.130				1.010	793.6	740	51.4
7	4:48	.545	.064	.059	.070				.7382	580.1	544	37.5
8	4:52	.395	.045	.041	.048				.6285	493.9	457	31.0
9	4:54	.224	.025	.023	.027				.4733	371.9	343	23.0
10	4:57	.126	.014	.013	.015				.3550	279.0	260	17.0
11	4:59	.055	.005	.005	.006	77.0	82.0	29.05	.2345	184.3	163	10.7
12												
13												

14	VP_4	TP_4	% DIV.	Q_{5C}	VP_5	TP_5	Q_{6C}	VP_6	TP_6	TP_2-TP_5	TP_4-TP_6	V_6/V_5
~~15~~ 1	.138	.678	6.63	1542.5	.148	.648	109.5	.027	.605	.030	.073	.426
~~16~~ 2	.128	.636	6.60	1485.1	.137	.606	104.9	.025	.565	.030	.071	.424
~~17~~ 3	.099	.493	6.65	1306.0	.106	.466	93.0	.019	.440	.027	.053	.427
~~18~~ 4	.072	.352	6.59	1110.6	.077	.335	78.4	.014	.312	.017	.040	.423
~~19~~ 5	.052	.254	6.53	948.7	.056	.242	66.3	.010	.225	.012	.029	.419
6 ~~20~~	.032	.154	6.49	742.1	.034	.145	51.5	.006	.136	.009	.018	.416
7 ~~21~~	.017	.081	6.45	542.7	.018	.077	37.4	.003	.073	.004	.008	.413
8 ~~22~~	.012	.057	6.35	462.5	.013	.054	31.4	.002	.050	.003	.007	.407
9 ~~23~~	.007	.032	6.28	348.5	.008	.031	23.4	.0012	.0282	.001	.0038	.403
10 ~~24~~	.004	.018	6.14	261.9	.004	.017	17.1	.0007	.0157	.001	.0023	.391
11 ~~25~~	.0017	.0067	6.16	172.9	.0019	.0069	11.4	.0003	.0063	.0002	.0004	.396

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

_____

Observers _____ _____

Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.346	8.67	10.56'	-1.89	5.8"	.121	60.33	6.39'	53.94
2		.323	9.29		-1.27		.110	64.55		58.16
3		.250	10.80		0.24		.090	58.89		52.50
4		.188	9.04		-1.52		.066	60.61		54.22
5		.138	8.70		-1.86		.048	60.42		54.03
6		.0875	10.29		-0.27		.031	58.06		51.67
7		.0488	8.20		-2.36		.0172	46.51		40.12
8		.036	8.33		-2.23		.0127	55.12		48.73
9		.0218	4.59		-5.97		.0077	49.35		42.96
10		.013	7.69		-2.87		—	—		—
11	12.7"	.0062	—	10.56'	—	5.8"	—	—	6.39'	—
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Remarks:

MLIT-232

Sheet No. 176

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of STRAIGHT TYPE - 18" x 8" STR. & 3" x 8" T.O.
ORIFICES: 14" x 4" STR. & 6" x 1" T.O.

Observers { R J Walker } { } Date SEPT. 1, 19 50

No.	TIME	P_3-P_2	P_4	P_5	P_6	TEMPS. W.B.	TEMPS. D.B.	BAR.	$\sqrt{P_3-P_2}$	Q_4	Q_5	Q_6
1	5:03	3.80	.994	.966	1.000	77.0	82.0	29.05	1.949	1531	1398	145
2	5:06	3.11	.815	.795	.820				1.764	1386	1265	132
3	5:09	2.35	.627	.609	.630				1.533	1205	1110	115
4	5:12	1.66	.450	.437	.451				1.289	1013	940	97.0
5	5:17	1.06	.282	.273	.283				1.030	809.4	746	76.5
6	5:20	.565	.145	.140	.145				.7517	590.7	540	54.4
7	5:23	.406	.104	.100	.104				.6372	500.7	457	46.0
8	5:26	.247	.063	.060	.063				.4970	390.5	354	35.5
9	5:28	.124	.031	.030	.031				.3521	276.7	253	24.8
10	5:30	.058	.014	.014	.014	77.0	82.0	29.05	.2408	189.2	174	16.5
11												
12												
13												

14	V_{P4}	T_{P4}	% DIV.	Q_{5C}	V_{P5}	T_{P5}	Q_{6C}	V_{P6}	T_{P6}	$T_{R4}-T_{P5}$	$T_{R4}-T_{P6}$	V_6/V_5
~~15~~ 1	.119	1.113	9.40	1387.1	.120	1.086	143.9	.046	1.046	.027	.067	.623
~~16~~ 2	.097	.912	9.45	1255.0	.098	.893	131.0	.038	.858	.019	.054	.626
~~17~~ 3	.073	.700	9.39	1091.9	.074	.683	113.1	.029	.659	.017	.041	.621
~~18~~ 4	.052	.502	9.35	918.3	.053	.490	94.7	.020	.471	.012	.031	.619
~~19~~ 5	.033	.315	9.30	734.1	.034	.307	75.3	.013	.296	.008	.019	.615
~~20~~ 6	.018	.163	9.15	536.7	.018	.158	54.0	.007	.152	.005	.011	.604
~~21~~ 7	.013	.117	9.15	454.9	.013	.113	45.8	.005	.109	.004	.008	.604
~~22~~ 8	.008	.071	9.11	354.9	.008	.068	35.6	.003	.066	.003	.005	.602
~~23~~ 9	.004	.035	8.93	252.0	.004	.034	24.7	.0014	.0324	.001	.0026	.588
~~24~~ 10	.0018	.0158	8.66	172.8	.0019	.0159	16.4	.0006	.0146	.0001	.0012	.571
25												

Remarks:

MECHANICAL ENGINEERING LABORATORY
MICHIGAN STATE COLLEGE

Running Log of _____

Observers _____ _____

Date _____, 19 ___

No.	STRAIGHT					TAKEOFF				
	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.	EQ. D.	ΔP/100	EQ. L.	ACT. L.	ADDED EQ. L.
1	12.7"	.282	9.57	10.56'	-0.99	5.8"	.200	33.50	6.39'	27.11
2	|	.232	8.19	|	-2.37	|	.169	31.95	|	25.56
3	|	.180	9.44	|	-1.12	|	.131	31.30	|	24.91
4	|	.130	9.23	|	-1.33	|	.093	33.33	|	26.94
5	|	.086	9.30	|	-1.26	|	.060	31.67	|	25.28
6	|	.048	10.42	|	-0.14	|	.033	33.33	|	26.94
7	|	.035	11.43	|	0.87	|	.025	32.00	|	25.61
8	|	.0226	13.27	|	2.71	|	.016	31.25	|	24.86
9	|	.0123	8.13	|	-2.43	|	.0084	30.95	|	24.56
10	12.7"	—	—	10.56'	—	5.8"	—	—	6.39'	—
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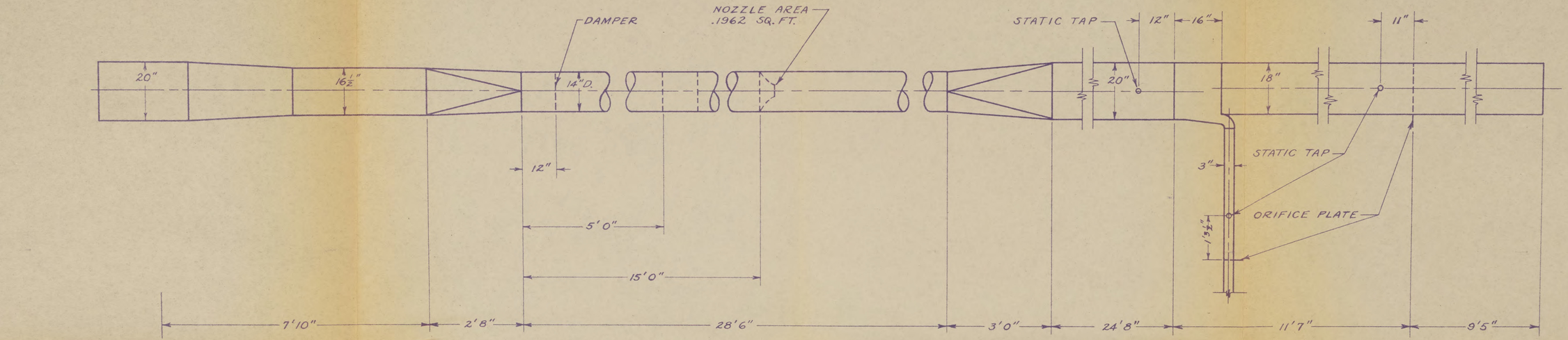
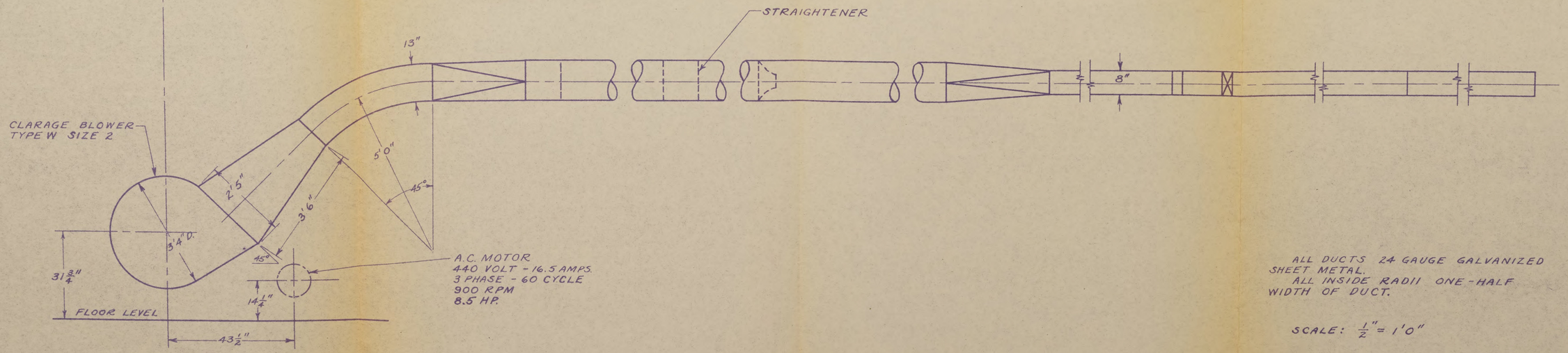
Remarks:

[redacted]

Ja 23
FE2 '53 pd
FE18'53
MR13'53
Ap 6 '53 pd
MY 5'54
Je 10 '54
Je 21 '54





ALL DUCTS 24 GAUGE GALVANIZED SHEET METAL.
ALL INSIDE RADII ONE-HALF WIDTH OF DUCT.

SCALE: $\frac{1}{2}$" = 1'0"

FIGURE 1A. LAYOUT OF TEST EQUIPMENT

RJW 5/11/51

Pocket has
Curve sheet

CURVE SHEET 10

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