THE UNIVERSITY OF MICHIGAN
COLLEGE OF ENGINEERING
Department of Mechanical Engineering

STUDY OF DUST EXHAUST AIR PLUMES

Mill Building, Carol Project
Iron Ore Company of Canada
(Labrador City, Newfoundland)

Bechtel and Company, Engineers
Montreal, P.Q., Canada

Final Report - Part II

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ABSTRACT

This report pertains to the Carol project of the Iron Ore Company of Canada, located at Labrodor City Newfoundland, Canada. The engineers for this project are Bechtel and Company; Montreal, P.Q., Canada. The report deals with a study to determine the stack height and stack gas velocity, from the iron ore concentrating mill, necessary to maintain the height of the stack gas plume, and the ground concentration of stack effluent dust within satisfactory limits.

For simplicity of presentation, and for convenient use by the client, this report is submitted in two parts.

Part I describes the problem, the wind tunnel testing program and procedures, and the test results.

Part II presents the results assembled in such form that the designing engineers may readily choose a number of combinations of stack height and stack gas exit velocity which will give satisfactory plume behavior according to the adopted criteria. These combinations may then be examined from the standpoint of operating practicability and economic limitations. An example of the use of the curves is also given. Two appendixes are included which give more detailed information as supporting discussion of some points.

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INTRODUCTION

This part of the Final Report is a continuation of Part I and all pages, tables, and figures are numbered consecutively through the two parts. Part II contains the diagrams which summarize the test data and the computed results, in such form that the designing engineers may readily choose a number of combinations of stack height and stack gas exit velocity which will give satisfactory plume behavior according to the adopted criteria. These combinations may then be examined from the standpoint of operating practicability and economic limitations.

DUST CONCENTRATION NEAR GROUND

The dust concentration near the ground in any one of the eight designated areas (as located on the map in Fig. 4) will depend upon (1) the quantity of gas leaving the stack per unit of time; (2) the velocity of the gas as it leaves the stack; (3) the wind velocity; (4) the dust concentration and particle size gradation as the gas leaves the stack; (5) the height of the plume over the critical area; (6) the distance of the critical area from the stack; and (7) the rate of atmospheric diffusion.

GAS DISCHARGE RATE AND WIND VELOCITY

It is expected that a single stack will be used to discharge the gas from the present mill and that it will be placed according to Scheme 1 as shown in Fig. 16. If and when the capacity of the mill is doubled by future extension, it is expected that an additional stack will be placed according to Scheme 2. It is improbable that the position shown by Scheme 3 will be used, but it is shown in Fig. 16 as a possibility and graphs are shown for its behavior if used.

The present capacity of the mill is such that about 800,000 cu ft of gas is discharged per minute at a temperature of about 120°F. The diameter of the emerging gas jet will be determined by the choice of exit velocity of the gas. Curves are shown for exit velocities of 60, 85, 100, and 120 fps, between which interpolations may be made.

The graphs which follow contain curves which give the height to the bottom of the plume at a distance of 3000 ft from the stack. Other curves show the number of particles per cubic foot near the ground at distances from the stack which correspond to the critical areas shown in Fig. 4. In both sets of curves it is assumed that the plume remains at a constant height beyond 3,000 ft downwind from the stack. This means that the flotational rise of the plume is ignored as discussed in Part I under the heading of "Gas Temperature" on page 25.

DUST DISCHARGE FROM THE STACK

Table VII was prepared by Mr. I. Mozer, Senior Process Engineer, Iron Ore Company of Canada. In his covering letter (February 3, 1964) to Mr. A. Sobering, Assistant Manager, Iron Ore Company of Canada, he cautions that the calculations are based on the following assumptions:

TABLE VII

PHYSICAL PROPERTIES OF DUST

CALCULATION: (1) Surface area in one gram per single fraction $A = 6/dG$

Where: d = size of particle

G = specific gravity = 3.16

(2) According to Taggert the No. of particles $N = So/s = \frac{\text{Specific Surface}}{\text{Surface of Each Particle}}$

Size	Size Structure of Stack Exhaust, % Wt.	Average Size, MM	Area cm^2/Gram as Cubes	Area of Product, Cu^2	No. of Particles
+ 43μ	1.5	.043	442	663	5.97×10^6
-43 + 20μ	0.8	.032	593	474	7.71×10^6
-20 + 10μ	2.6	.015	1,266	3,293	243.92×10^6
-10==+ 1μ	94.8	.005	3,798	36,000	$240,000.00 \times 10^6$
- 0	0.3	.0005	37,980	11,394	$759,600.00 \times 10^6$
Total	100.0			375,824	$999,857.60 \times 10^6$

Total No. of particles per 100 grams = $999,857.6 \times 10^6$

1 gram = $9,998.576 \times 10^6$ particles

At 0.24 grains/cu ft Dust Loading or 0.0155 grams/cu ft there are: 154.978×10^6 particles.

1. Particles are cubes

2. The average size of a particle is equal to the arithmetic mean of dimensions defining the particle

3. The specific gravity is constant within each size fraction.

It is seen from Table VII that 95.1% (by weight) of the particles are less than 10 microns. It is assumed that these will behave essentially as a gas while the plume is being diffused in its travel downwind. Some of the larger particles may tend to fall out rather quickly but it will be on the side of safety to assume that all of the 155 x 10^6 particles per cu ft will be diffused the same as gaseous parcels within the gaseous plume, and that this behavior will persist even to the most distant of the critical areas shown in Fig. 4.

COMPUTATION OF DUST CONCENTRATION

Since it has been assumed that the dust particles are so small that they will behave essentially as gaseous parcels, it will be valid to adopt one of the commonly used theories of atmospheric diffusion. For this purpose the theory and equation of O. G. Sutton were used. They are discussed in detail in Appendix A. The method of adapting them to this study and to the use of IBM computation is detailed in Appendix B.

THRESHOLDS LIMITS OF DUST CONCENTRATION

The emissions from the aerofall stacks contain dusts of several different chemical compounds, but the one which is of principal interest in this study is silicon dioxide (SiO_2). Also present in considerable amounts is hematite (Fe_2O_3). The hematite is nontoxic but the silicon dioxide may cause a disease of the lungs known as silicosis if the fine dust is inhaled in sufficient quantities over a sufficiently long period of time. One reference (D. E. Cummings, "The Etiology of Silicosis") suggests that atmospheric concentrations of silica dusts should be considered in terms of two thresholds, namely, the primary threshold, a level at which a health man can be employed for his lifetime without harm, about 5,000,000 particles per cu ft (light field count); and the secondary threshold, a level at which a healthy man will inevitably develop silicosis, about 100,000,000 particles per cu ft.

The American Medical Association Archives of Industrial Health, Vol. XI, June, 1955, pages 521-524, "Threshold Limit Values for 1955," shows the following limits for different concentrations of silica in millions of particles per cubic feet (MPPCF):

High (above 50% free SiO_2)	5MPPCF
Medium (5-50% free SiO_2)	20MPPCF
Low (below 5% free SiO_2)	50MPPCF

These values are given as the maximum average atmospheric concentration to which workers may be exposed for an 8-hour working day without injury to health.

Another reference (Air Pollution, Vol. II, A. C. Sterns, page 485) suggests that where people are exposed to the dust continuously for 24 hours per day every day, the foregoing limits should be divided by 30. However, this condition could exist only in an area which is surrounded by sources of emission of SiO_2 so that the concentration would be continuously renewed regardless of wind direction. At the Carol Project this condition would not prevail. The plume is carried by the wind which changes direction with the passage of cyclones and anticyclones about twice each week on the average. These are major changes of direction. In addition there are minor changes of direction for other reasons. An inspection of Tables I and II shows that 10% would be a liberal estimate of the number of intermittent hours per year (876) when the wind would be blowing from such a direction as to cause the gas plume to pass over one of the critical areas (17 intermittent hours per week, 2.5 hours per day). Therefore, if allowance is made for the nontoxic fraction of the total 155MPPCF of dust emitted from the stack, it is permissible to place the allowable threshold limit somewhere between 5 and 20MPPCF. It will be seen in the "Discussion of Results" that any combination of stack height and gas exit velocity which satisfies the criterion of minimum plume height, will maintain the dust concentration far below the allowable threshold limits in every critical area.

CONTROLLING CRITERIA

There are two criteria which should be used in choosing the height of the stack and the exit velocity of the stack gas, namely,the dust concentration in the atmosphere near the ground, and the height of the bottom of the plume above the ground.

DUST CONCENTRATION NEAR THE GROUND

As pointed out in the foregoing discussion of "Threshold Limits of Dust Concentration," the dust concentration near the ground in the critical areas should be kept below 5MPPCF, unless a chemical analysis of the dust shows that it contains less than 50% of free silicon dioxide.

PLUME HEIGHT ABOVE THE GROUND

As shown in Figs. 11, 12, and 13 (Part I), a plume which has escaped the aerodynamic downwash in the lee of the stack and buildings will follow the streamlines in the atmosphere. For some distance downwind the upper streamlines may tend to slope downward because of the disturbance in the flow conditions as the air passes the obstructions, after which the streamlines will tend to level off or they may level off without sloping downward. This occurs in the tunnel where there is no flotational effects due to hot gas. The levelling off occurs at a distance of about 3000 ft downwind and it is assumed that the height to the bottom of the plume is the same over the critical areas as it is at 3000 ft from the stack.

This procedure ignores the rise of the plume due to flotation of the hot gas in the field. However, due to the low exit temperature of the gas the rise is small in all except slow winds and it is on the safe side to ignore it when computing the ground concentration of dust.

However, the plume in the fheld is subject to fluctuations in height due to the presence of gusts, and to looping caused by thermal cells in the atmosphere. Therefore, it is desirable to establish minimum plume heights when using the wind tunnel results in order to minimize the nuisance of these transient occurrences of short duration.

Based on observations on previous projects in the field, it has been decided to adopt a minimum height to the bottom of the plume of 200 ft when using the hourly average value of 10.25 mph and of 150 ft when using the higher hourly value of 15 mph.

DISCUSSION OF RESULTS

The results of this study have been presented in graphic form (Figs. 19 through 128, inclusive) so that they may be readily interpreted without further calculation. Two major considerations should be kept in mind when reviewing them for stack design purposes: (a) The minimum allowable height of the bottom of the plume above ground level (1792 ft), and (b) the maximum allowable dust concentration at critical areas.

The graphical results have been arranged in subordinating steps in the following order, with plume height followed by concentration of dust at ground level (1792 ft).

(1) Wind direction
Wind velocity
Stack location
Plant configuration
Distance from stack to point where concentration is in question

(2) Wind direction
Wind velocity
Stack location
Plant configuration
Distance from stack to point where concentration is in question
Etc.

A review of the plume height graphs, which are at the beginning of each group, reveals that the lowest plume heights occur when the wind is from the N.W. and the stack is at location 1 without plant extensions. To satisfy the criterion that the bottom of the plume should not drop below 150 ft with a 15 mph wind, it is apparent from this graph that a 450 ft stack with a stack gas velocity of 90 fps would serve the purpose.

A review of the dust concentration curves indicates that the highest concentration at any critical area resulting from a 450 ft stack and a 90 fps stack gas velocity is about 96,000 particles per cu ft. This occurs when the wind is from the west at 15 mph and the stack is at location 1 with plant extensions in place. The critical area affected is 2200 ft downwind from the stack. Other combinations of stack height and stack gas velocity may be similarly investigated.

APPENDIX A. ATMOSPHERIC DIFFUSION, GAS

Figure A1 is a perspective view of a single stack with the basic plume emerging from the stack, rising, and flowing downwind. The basic plume is the visible portion of the plume. In this discussion of the theory the plume is assumed to be a mixture of air which has entered the plume as the result of diffusion in the ambient atmosphere, together with the original stack gas with the entrained pollutant. The concentration (Chi) of the pollutant at a point downwind (x,y,z) is the unknown which is to be determined.

SUTTON'S THEORY

It is necessary to superimpose upon the basic plume the effect of diffusion caused by eddies in the atmosphere. For this purpose, the equation of O. G. Sutton [Micrometeorology, McGraw-Hill, 1953, p. 293, Eq. 8.35)] was used. Figure A2 shows graphically the assumptions on which the equation is based. A point source is assumed from which the gaseous pollutant continuously emerges at a constant rate, flows horizontally downwind, and diffuses to boundaries which are arbitrarily fixed at a concentration equal to one tenth the concentration at the height of the point source. It is further assumed that, beyond the distance at which the bottom of the diffused plume reaches the ground, the gas is reflected back into the atmosphere by the impervious ground and the additional concentrations thus created are determined by the method of images.

The foregoing assumptions may be stated mathematically in functional form as follows:

$$\chi = \phi[Q,h,V_w,x,y,z,n,C_y,C_z] \quad .$$

where

χ = the mass concentration of pollutant per unit volume of stack gas;

Q = the rate at which the pollutant is leaving the point source expressed as mass per unit time;

h = the height from the ground to the point source;

V_w = the average wind velocity;

x,y,z = the coordinates along the wind, horizontally across the wind, and vertically upward, respectively, of the point for which the concentration is being determined, the origin being at ground level at the base of the stack;

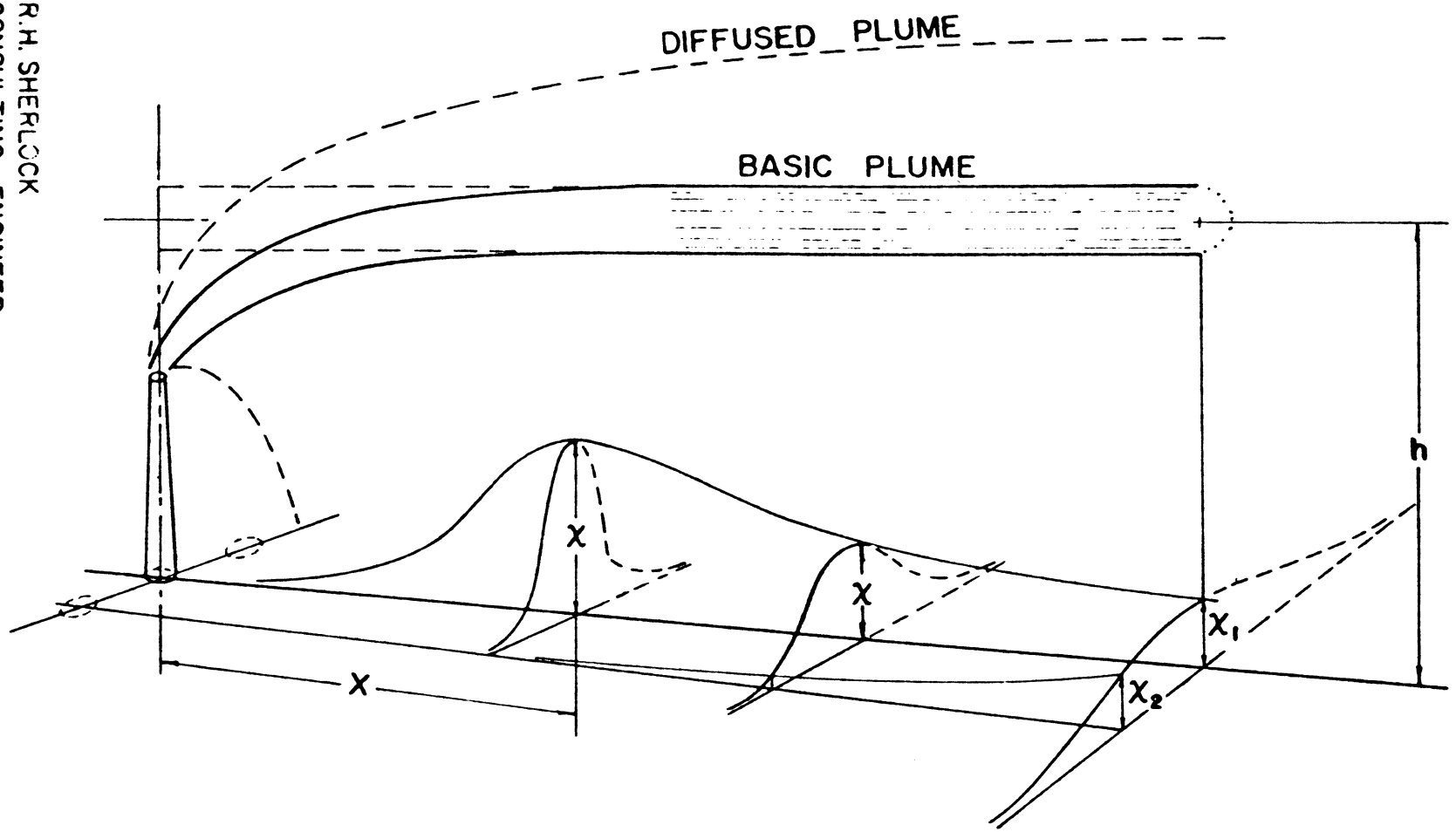
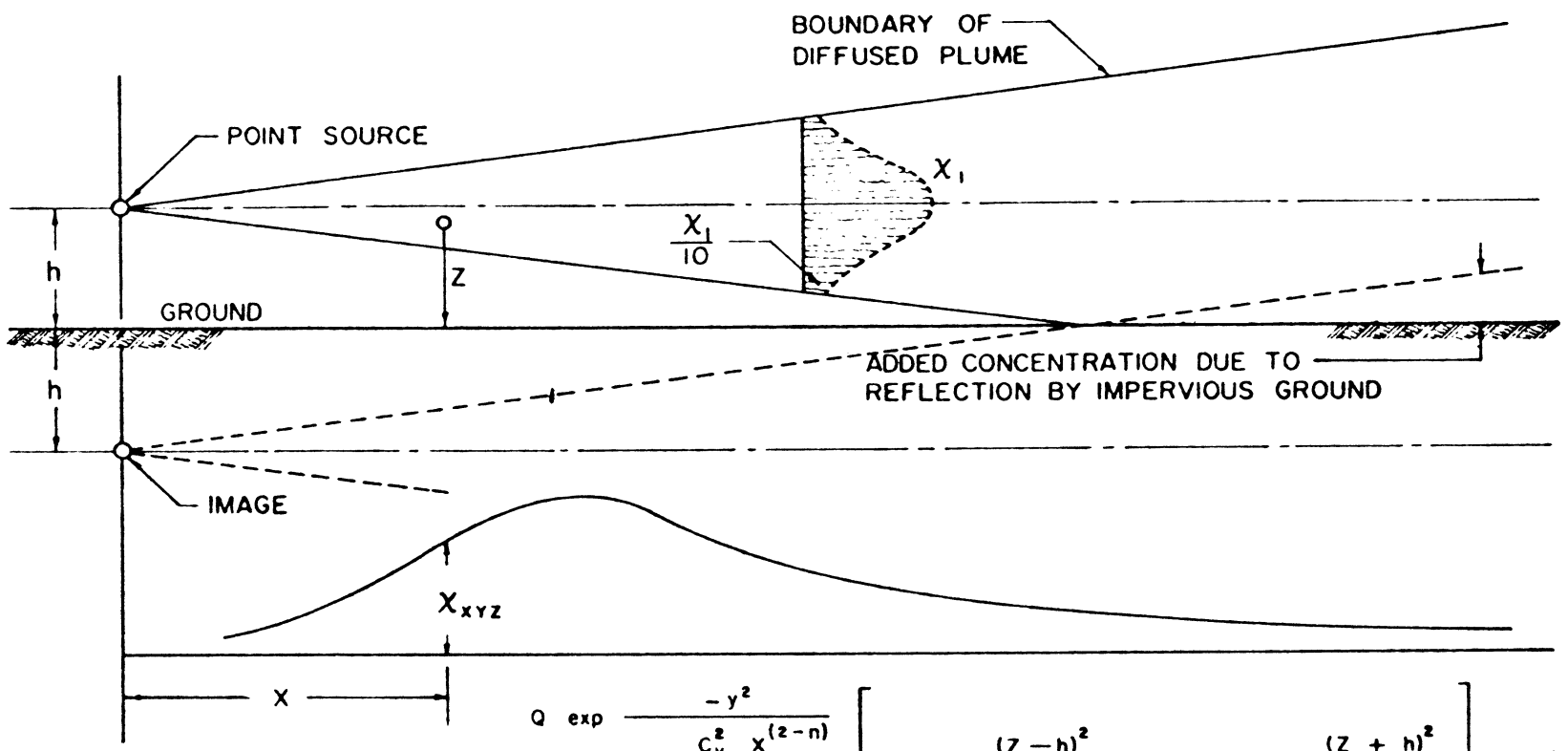


Fig. A1. Basic plume of stack gases.



$$\chi_{xyz} = \frac{Q \exp \frac{-y^2}{C_y^2 x^{(2-n)}}}{\pi C_y C_z V_w x^{(2-n)}} \left[\exp - \frac{(Z-h)^2}{C_z x^{(2-n)}} + \exp - \frac{(Z+h)^2}{C_z x^{(2-n)}} \right] \quad \text{---(1)}$$

$y = z = 0$

$$\chi_x = \left\{ \frac{2Q}{\pi C_y C_z V_w x^{(2-n)}} \right\} \left\{ \frac{1}{e \left[\frac{h^2}{C_z^2 x^{(2-n)}} \right]} \right\} \quad \text{----------(2)}$$

(EQUATIONS BY O. G. SUTTON)

Fig. A2. Sutton's equation with assumptions.

n = a diffusion parameter determined from the vertical wind profile; and

C_y, C_z = diffusion coefficients for the y and z directions, respectively.

Sutton's explicit form of the equation is shown in Fig. A2. Figures A1 and A2 show that the ground concentration under the center line of the plume will increase downwind to a maximum and then decrease slowly. Likewise, the ground concentrations will decrease laterally in the areas on both sides of the center line of the plume.

APPLICATION OF THE THEORY

The assumptions upon which the diffusion equation is based are only a rough approximation to nature. Thus, the gas does not appear at a point source but is discharged with considerable upward velocity from a stack of such size that it and the plant buildings constitute an obstruction around and over which the air must flow. There is also the additional rise of the plume due to flotation of the hot gas in that regime of flow in which the plume has not been entrained in the turbulence behind the stack or over the buildings.

REGIMES OF FLOW

The plume may experience any one of three regimes of flow.

(1) The first regime is that in which the gas has been entrapped in the turbulence of the stacks and buildings and has been brought to the ground. Here the flotational effect of high temperature is lost since the downwash has been completed.

(2) The second regime is that in which the plume has succeeded in escaping the adverse eddies at the top of the stack and is proceeding in an orderly way downwind. The plume is free to respond to the flotational forces and to rise to a greater height than would be the case under the influence of the wind and stack-gas velocity alone. The temperature of the plume decreases rapidly due to diffusion in the ambient atmosphere, but the flotational effect of high temperature is not entirely lost because the over-all heat content of the mixture of gas and air in the plume is not reduced. The theoretical rate of rise can be computed but, as with idealized diffusion, the basic assumptions are only a rough approximation to nature. In this regime of flow three influences act on the plume, namely (a) aerodynamic forces, which determine the conformation of the streamlines as the wind is deflected over and around the stacks and buildings; (b) stack-gas velocity, which adds height to the plume; and (c) flotational forces, which add height to the plume.

(3) The third regime of flow is that in which downwash is impending, that is, when the bottom of a plume is below the top of the stack and all or part of the plume is becoming entrapped, either in the tip vortices at the top of the stack, or in the eddies of the vortex sheath which separates the turbulent zone behind the building from the streamlines above, or in the downswerving streamlines near the vortex sheath. Previous experiments have shown that, in the regime of flow when downwash is impending, the behavior of the plume, within the limits of experimental error, depends only on the momentum-ratio and is independent of the gas temperature. This is because the flotational forces are so small compared to the adverse aerodynamic forces which are present in the tip vortices, in the vortex sheath, and in the down-swerving streamlines, that they produce no measurable effect. In the theoretical case the ratio of stack height to building height, and the exit velocity of the stack gases, will both be large enough so that the chance of entrapment of the plume will be remote, and regimes (1) and (3) may be ignored.

WIND-TUNNEL TESTS PLUS DIFFUSION COMPUTATIONS

The effects of the aerodynamic forces upon the plume, as shown by wind-tunnel tests, are reported in the Final Report (Part I). For purposes of applying Sutton's Equation, the position of the basic plume is obtained from the wind-tunnel tests and the height of the hypothetical point source is obtained by extending the level portion of the plume back to the position over the stack, as shown in Fig. A1. In reading the photographs for wind-tunnel data, the height of the center line of the plume as well as the height of the bottom of the visible plume above ground level (1792 ft) was noted.

DIFFUSION PARAMETERS

The observations at the Brookhaven National Laboratory of the U.S. Atomic Energy Commission contain the best diffusion parameters yet available, although they do not include the effect of turbulence generated by large stacks and buildings in the downwind wake within which the diffusion must take place. The results are also transferable only to other areas in which the terrain is not too dissimilar.

On a previous project Dr. E. Wendell Hewson, Professor of Meteorology at The University of Michigan, made a study of observations at various places and chose coefficients which seemed to him to be most suitable for this kind of use. It was decided that, since the results must be combined with data from the wind tunnel, the three turbulence parameters, n, C_y, and C_z, should be expressed as functions of wind speed. Four types of turbulence were specified, based on the Brookhaven definitions, as indicated in Table VIII, with slightly modified values of the parameters which were obtained from concentration measurements at the Brookhaven experimental station. See also "The Relationship Between Peak and Mean Concentrations," by I. A. Singer, Paper No. 60-46, Air Pollution Control Association, May, 1960, Table I.

TABLE VIII

VALUES OF TURBULENCE PARAMETERS
AS MODIFIED FROM BROOKHAVEN EXPERIMENTS BY E. W. HEWSON

(Trans. ASME, October, 1955, p. 1167)

Type of Turbulence	Parameter		
	n	$C_y(\text{meters})^{n/2}$	$C_z(\text{meters})^{n/2}$
B_1	0.28	0.40	0.39
C	0.48	0.54	0.34
B_2	0.17	0.31	0.36
E	0.38	0.47	0.365

Type E was devised for the special purpose of that investigation and was obtained by taking averages of the values of Types B_1 and C.

TABLE IX

TURBULENCE TYPE AS A FUNCTION OF WIND SPEED

Range of Wind Velocity, mph	Type of Turbulence
0 - 7	B_2
8 - 18	B_1
> 18	C

The parameters are fairly reliable even for conditions prevailing in day light when the turbulence conditions are variable with changing wind velocities, but the same parameters for the hours of darkness are less affected by changing turbulence with changing velocity. For winds 0-7 mph, all turbulence is assumed to be Type B_2, except for 1/2 hour each day for the five-month period from May to September, inclusive. During these 1/2-hour periods, intense concentrations may occur at the surface. These are evaluated by a separate technique, to be discussed later, under the heading "Breakup of Temperature Inversions."

BREAKUP OF TEMPERATURE INVERSIONS

On clear nights with light winds the plume from a stack flows downwind with sufficient horizontal diffusion to produce a lateral spreading with an angle of approximately 5°. The vertical diffusion is extremely small, so that the plume

may flow 20 or 30 miles with little increase in vertical thickness. The concentrations are very high in this slowly expanding horizontal ribbon of gas. After sunrise, solar heating of the ground warms a layer of air which is initially close to the ground but rapidly grows upward. Marked turbulence associated with high temperature lapse rates develops in this heated layer. When the top of the turbulent layer grows to the height of the ribbon of gas, the gas is rapidly diffused downward and reaches the ground in high concentrations under the plume. These high concentrations, which last only about 1/2 hour, occur about 8 or 9 a.m. during the warmer portion of the year, and are known as "fumigations." It is sometimes assumed that one fumigation of 1/2-hour duration, occurs each day during the period May to September, inclusive, and that the combined hours of fumigations should be divided equally between the 16 segmental areas around the plant. This would give 8 hours per year for each area. Actually they will usually not occur except with wind velocities lower than about 7 mph and the hours will not be divided equally between the various directional areas, but in proportion to the frequency of occurrence of wind velocities below 7 mph in each area.

This type of inversion is usually limited in thickness to several hundred feet, depending on the terrain and the weather conditions in the general area. There is no systematic record of the thickness of inversion above 200 ft in the Labrador City area.

Observations of three inversions in a valley in Vermont are given in the paper "Valley Wind Phenomena and Air Pollution Problems," by Ben Davidson, Paper No. 60-45, Air Pollution Control Association, 1960, Fig. 3. The typically rapid increase of velocity with height extended to approximately 350, 450, and 950 ft, respectively. It is stated that the "profile" of the 950-ft case "represents the most extreme profile that we have observed."

It appears at the time of this writing that the stack height which is finally adopted to meet other requirements, will place the plume at a height where it is beyond the reach of all except very extreme and infrequent ground inversions. It is therefore recommended that no attempt be made to predict the frequency, duration, or intensity of ground concentrations arising from the breakup of atmospheric temperature inversions.

ATMOSPHERIC STAGNATIONS

There are occasions when the pressure gradient is too small to generate enough wind to disperse pollutants adequately in the atmosphere. Such stagnant conditions may become serious when they last for several days so that the accumulated pollutants reach a high concentration. Fortunately these stagnations are relatively infrequent in any given area. Their adverse effects depend upon their duration, the presence of pollutants in the area, and their coincidence with the growing season of susceptible plant life.

Stagnations in industrial areas have sometimes induced such high concentrations of pollution that people have died or suffered injury, but this has occurred in an extremely small percentage of all cases of stagnation.

The warm anticyclones in which stagnations occur are deep and extend thousands of feet into the upper atmosphere. However, the stagnations are not a dead calm during their entire period, and even their very light winds have an increase of velocity with height. Higher stacks may therefore discharge the gases into a less stagnant wind regime so that there is a better chance for horizontal dispersion to take place, with a consequent lowering of the concentrations which reach the ground through vertical diffusion.

There is insufficient infommation about the meteorological structure of stagnations to permit a quantitative estimate of the benefits to be derived from stacks of different heights, especially where the situation is complicated by a lack of records in the area. It is therefore recommended that no attempt be made to predict the intensity of ground concentration that would accompany a stagnation of a given duration.

APPENDIX B. ATMOSPHERIC DIFFUSION, FINE DUST

It is seen from Table VII that 95.1% (by weight) of the dust particles are less than 10 microns in size. It is assumed that these will behave essentially as a gas while the plume is being diffused in its travel downwind. Some of the larger particles (+20) may tend to fall out rather soon but it will be on the side of safety to assume that all of the 155×10^6 particles per cu ft will be diffused the same as gaseous parcels within the gaseous plume, and that this behavior will persist even to the most distant of the critical areas shown in Fig. 4.

Sutton s Equation, discussed in Appendix A and shown explicitly in Fig. A2, shows χ (Chi), the mass concentration of the gaseous pollutant (SO_2 for example), on the left hand side of the equation; and Q, the rate at which the gaseous pollutant is leaving the point source, expressed as mass per unit time. The number of units of mass may be replaced by the number of particles in each case, with appropriate changes in the dimensional system, in order to obtain the number of particles per cubic foot near the ground at any desired distance downwind from the stack.

In order to expedite the use of the equation it was set up for an IBM computer and the results tabulated in Table X.

SUTTON'S EQUATION (x=0, y=0)

$$\text{Concentration of pollutant (Chi) } \chi = \left[\frac{2\,Q}{\pi\, C_y\, C_z\, V_w\, X^{(2-n)}}\right]\left[\frac{1}{e^{\left[\frac{h^2}{C_z^2\, X^{(2-n)}}\right]}}\right]$$

(Chi) χ = Grams of pollutant per cubic meter at a point at ground level and a distance X meters downwind from stack.

Q = Grams of pollutant released at source per second.

V_w = Velocity of wind, meters per second

C_y, C_z, n = Diffusion parameters.

X = Distance (meters) downwind from stack at which concentration = (Chi) χ.

h = Height of center line of plume above ground level (meters).

e = Base of natural logarithms. Note that e is raised to a bracketed power.

		Wind Velocity (mph)	Diffusion Parameters (hourly average) n	Cy	Cz
Large instability	B_2	0 - 7	.17	.31	.36
Unstable	B_1	8 - 18	.28	.40	.39
Adiabatic	C	> 18	.48	.54	.34

Using these parameters, Sutton's Equation was solved by an IBM machine and values of χ tabulated in Table X. Dust concentration values for the Labrador City mill were then calculated using this table as follows.

COMPUTATION OF DUST CONCENTRATION, χ, NEAR GROUND AT DOWNWIND DISTANCE, X

References:

(1) For dust loading see memorandum to A. Sobering from I. Mozer (February 3, 1964).

(2) For ranges of dust sizes see table attached to memorandum (Table VII of this report).

(3) For Theory of Diffusion see Sutton's Equation (Appendix A of this report).

Summer dust loading = 0.24 grains per cu ft
= 0.0155 grams per cu ft
1 gram = 9999 x $\overline{10}^6$ particles
9999 x $\overline{10}^6$ x 0.0155 = 155 x $\overline{10}^6$ MPPCF

Stack gas discharge = 800,000 cfm (letter dated August 21, 1963, A.R.M.)
= 13,300 cfs
= 206.5 grams per sec

Using this stack discharge rate, the dust concentration under the various conditions which were examined, were calculated by the procedure explained in Part I, page 29 and graphed in Figs(19 through 128, inclusive.

TABLE X

(IBM Tabulation)

Tabulated values of (Chi) χ expressed in grams per cubic meter at ground level ($z = 0$), directly under plume center line ($y = 0$) at X feet from stack. For convenience, Q is assumed to be 1000 grams per second emitted from stack. Range of stack height (h), 100 feet to 700 feet. Range of wind velocity, 5 miles per hour to 60 miles per hour. Range of distance downwind (X), 500 feet to 20,000 feet. Note that in the preparation of this table meters per second were converted to miles per hour and meters were converted to feet, but the concentration was left in terms of grams per cubic meter.

See pages 29-30 (Part I) for example illustrating the use of this table in calculating the concentrations graphed in Figs. 19 through 128, inclusive.

TABLE X

VALUE OF CHI FOR VALUES OF H

(Height to Center Line of Plume)

WIND VELOCITY (MPH)	X RANGE (FEET)	(H IN FEET) 100	150	200	250	300	350	400	450	500	600	700
5	500	.1249330	.0504519	.0141761	.0027715	.0003770	.0000357	.0000024	.0000001	.0000000	.0000000	.0000000
5	1000	.0591865	.0458628	.0320918	.0202779	.0115703	.0059616	.0027738	.0011654	.0004422	.0000469	.0000033
5	2000	.0192763	.0179420	.0162277	.0142620	.0121799	.0101075	.0081505	.0063865	.0048627	.0025866	.0012267
5	3000	.0094587	.0091411	.0087143	.0081946	.0076014	.0069555	.0062781	.0055897	.0049093	.0036348	.0025480
5	4000	.0056501	.0055372	.0053830	.0051910	.0049656	.0047119	.0044351	.0041411	.0038354	.0032115	.0026036
5	5000	.0037762	.0037259	.0036566	.0035694	.0034656	.0033468	.0032149	.0030715	.0029189	.0025940	.0022563
5	6000	.0027132	.0026872	.0026513	.0026059	.0025514	.0024884	.0024177	.0023400	.0022562	.0020733	.0018761
5	7000	.0020502	.0020353	.0020148	.0019887	.0019573	.0019207	.0018794	.0018337	.0017839	.0016737	.0015522
5	8000	.0016077	.0015986	.0015860	.0015698	.0015504	.0015277	.0015019	.0014732	.0014417	.0013715	.0012929
5	9000	.0012971	.0012912	.0012830	.0012724	.0012597	.0012448	.0012278	.0012089	.0011881	.0011412	.0010882
5	10000	.0010703	.0010663	.0010607	.0010535	.0010448	.0010346	.0010230	.0010099	.0009956	.0009631	.0009260
5	11000	.0008995	.0008966	.0008926	.0008876	.0008814	.0008742	.0008659	.0008566	.0008464	.0008231	.0007964
5	12000	.0007673	.0007653	.0007624	.0007587	.0007542	.0007489	.0007429	.0007361	.0007286	.0007114	.0006917
5	13000	.0006630	.0006614	.0006593	.0006565	.0006532	.0006492	.0006447	.0006396	.0006339	.0006210	.0006062
5	14000	.0005790	.0005779	.0005762	.0005741	.0005715	.0005685	.0005651	.0005612	.0005568	.0005469	.0005355
5	15000	.0005105	.0005095	.0005083	.0005066	.0005046	.0005023	.0004996	.0004965	.0004932	.0004854	.0004764
5	16000	.0004537	.0004529	.0004519	.0004506	.0004491	.0004472	.0004451	.0004427	.0004400	.0004338	.0004267
5	17000	.0004061	.0004055	.0004047	.0004037	.0004024	.0004009	.0003992	.0003972	.0003951	.0003902	.0003844
5	18000	.0003658	.0003653	.0003647	.0003638	.0003628	.0003616	.0003602	.0003586	.0003569	.0003529	.0003482
5	19000	.0003314	.0003310	.0003304	.0003297	.0003289	.0003279	.0003268	.0003255	.0003240	.0003207	.0003169
5	20000	.0003017	.0003014	.0003009	.0003004	.0002997	.0002988	.0002979	.0002968	.0002956	.0002929	.0002897
10	500	.0547933	.0143030	.0021818	.0001945	.0000101	.0000003	.0000000	.0000000	.0000000	.0000000	.0000000
10	1000	.0351518	.0233823	.0132131	.0063430	.0025868	.0008962	.0002638	.0000660	.0000140	.0000004	.0000000
10	2000	.0133914	.0118326	.0099503	.0079633	.0060653	.0043965	.0030330	.0019913	.0012442	.0004187	.0001156
10	3000	.0070071	.0065884	.0060439	.0054094	.0047237	.0040245	.0033453	.0027130	.0021467	.0012482	.0006576
10	4000	.0043551	.0041946	.0039797	.0037195	.0034244	.0031058	.0027748	.0024421	.0021172	.0015212	.0010292
10	5000	.0029955	.0029199	.0028171	.0026903	.0025430	.0023793	.0022034	.0020198	.0018326	.0014631	.0011212
10	6000	.0022013	.0021605	.0021047	.0020350	.0019530	.0018603	.0017588	.0016504	.0015372	.0013039	.0010734
10	7000	.0016945	.0016704	.0016371	.0015954	.0015458	.0014892	.0014265	.0013586	.0012865	.0011339	.0009767
10	8000	.0013500	.0013346	.0013135	.0012868	.0012549	.0012183	.0011773	.0011325	.0010845	.0009810	.0008713
10	9000	.0011042	.0010940	.0010798	.0010619	.0010404	.0010155	.0009875	.0009567	.0009235	.0008509	.0007723
10	10000	.0009224	.0009152	.0009053	.0008927	.0008776	.0008601	.0008403	.0008184	.0007945	.0007420	.0006845
10	11000	.0007836	.0007785	.0007713	.0007622	.0007512	.0007385	.0007240	.0007080	.0006904	.0006515	.0006083
10	12000	.0006752	.0006714	.0006661	.0006593	.0006511	.0006416	.0006307	.0006187	.0006055	.0005760	.0005429
10	13000	.0005887	.0005858	.0005818	.0005766	.0005704	.0005631	.0005548	.0005455	.0005354	.0005125	.0004868
10	14000	.0005185	.0005162	.0005131	.0005091	.0005042	.0004986	.0004921	.0004849	.0004769	.0004590	.0004386
10	15000	.0004607	.0004587	.0004564	.0004532	.0004494	.0004449	.0004398	.0004340	.0004277	.0004134	.0003971
10	16000	.0004124	.0004110	.0004090	.0004064	.0004034	.0003997	.0003956	.0003910	.0003859	.0003743	.0003611
10	17000	.0003717	.0003705	.0003689	.0003668	.0003643	.0003614	.0003580	.0003542	.0003501	.0003406	.0003297
10	18000	.0003369	.0003360	.0003347	.0003330	.0003309	.0003285	.0003257	.0003226	.0003191	.0003113	.0003023
10	19000	.0003071	.0003063	.0003052	.0003038	.0003021	.0003000	.0002977	.0002951	.0002923	.0002857	.0002782
10	20000	.0002812	.0002805	.0002796	.0002784	.0002770	.0002753	.0002733	.0002712	.0002687	.0002632	.0002568

TABLE X (Continued)

WIND VELOCITY (MPH)	X RANGE (FEET)	(H IN FEET) 100	150	200	250	300	350	400	450	500	600	700
15	500	.0365289	.0095353	.0014545	.0001297	.0000068	.0000002	.0000000	.0000000	.0000000	.0000000	.0000000
15	1000	.0234345	.0155882	.0088087	.0042287	.0017245	.0005975	.0001758	.0000440	.0000093	.0000003	.0000000
15	2000	.0089276	.0078884	.0066335	.0053089	.0040435	.0029310	.0020220	.0013275	.0009295	.0002792	.0000771
15	3000	.0046714	.0043923	.0040293	.0036063	.0031491	.0026830	.0022302	.0018087	.0014311	.0008321	.0004384
15	4000	.0029034	.0027964	.0026531	.0024796	.0022829	.0020705	.0018498	.0016280	.0014115	.0010141	.0006862
15	5000	.0019970	.0019466	.0018781	.0017935	.0016953	.0015862	.0014690	.0013465	.0012218	.0009754	.0007475
15	6000	.0014675	.0014403	.0014031	.0013567	.0013020	.0012402	.0011725	.0011003	.0010248	.0008693	.0007156
15	7000	.0011297	.0011136	.0010914	.0010636	.0010306	.0009928	.0009510	.0009057	.0008577	.0007559	.0006512
15	8000	.0009000	.0008898	.0008757	.0008579	.0008366	.0008122	.0007849	.0007550	.0007230	.0006540	.0005808
15	9000	.0007362	.0007293	.0007199	.0007079	.0006936	.0006770	.0006583	.0006378	.0006156	.0005672	.0005148
15	10000	.0006149	.0006101	.0006035	.0005952	.0005851	.0005734	.0005602	.0005456	.0005297	.0004947	.0004563
15	11000	.0005224	.0005190	.0005142	.0005081	.0005008	.0004923	.0004827	.0004720	.0004603	.0004343	.0004056
15	12000	.0004501	.0004476	.0004440	.0004395	.0004341	.0004277	.0004205	.0004124	.0004036	.0003840	.0003620
15	13000	.0003925	.0003905	.0003878	.0003844	.0003802	.0003754	.0003698	.0003637	.0003569	.0003417	.0003246
15	14000	.0003457	.0003442	.0003421	.0003394	.0003362	.0003324	.0003281	.0003232	.0003179	.0003060	.0002924
15	15000	.0003071	.0003059	.0003043	.0003022	.0002996	.0002966	.0002932	.0002893	.0002851	.0002756	.0002647
15	16000	.0002749	.0002740	.0002727	.0002710	.0002689	.0002665	.0002637	.0002607	.0002572	.0002495	.0002407
15	17000	.0002478	.0002470	.0002459	.0002445	.0002429	.0002409	.0002387	.0002362	.0002334	.0002271	.0002198
15	18000	.0002246	.0002240	.0002231	.0002220	.0002206	.0002190	.0002171	.0002151	.0002128	.0002075	.0002015
15	19000	.0002047	.0002042	.0002035	.0002025	.0002014	.0002000	.0001985	.0001968	.0001948	.0001905	.0001854
15	20000	.0001875	.0001870	.0001864	.0001856	.0001847	.0001835	.0001822	.0001808	.0001792	.0001755	.0001712
20	500	.0039110	.0000313	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
20	1000	.0168878	.0031350	.0002967	.0000143	.0000004	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
20	2000	.0141603	.0078716	.0034598	.0012024	.0003304	.0000718	.0000123	.0000017	.0000002	.0000000	.0000000
20	3000	.0094901	.0069117	.0044343	.0025060	.0012476	.0005471	.0002114	.0000719	.0000216	.0000013	.0000000
20	4000	.0067047	.0054634	.0041018	.0028374	.0018085	.0010620	.0005746	.0002865	.0001316	.0000217	.0000026
20	5000	.0050065	.0043271	.0035279	.0027133	.0019686	.0013473	.0008699	.0005298	.0003044	.0000843	.0000185
20	6000	.0039034	.0034949	.0029938	.0024536	.0019239	.0014433	.0010359	.0007114	.0004674	.0001767	.0000560
20	7000	.0031456	.0028822	.0025501	.0021787	.0017973	.0014318	.0011014	.0008181	.0005868	.0002718	.0001095
20	8000	.0026010	.0024218	.0021915	.0019272	.0016471	.0013681	.0011043	.0008663	.0006605	.0003524	.0001677
20	9000	.0021951	.0020679	.0019021	.0017084	.0014982	.0012828	.0010725	.0008755	.0006978	.0004127	.0002218
20	10000	.0018835	.0017901	.0016671	.0015213	.0013603	.0011918	.0010232	.0008607	.0007095	.0004535	.0002672
20	11000	.0016385	.0015680	.0014743	.0013620	.0012364	.0011027	.0009664	.0008321	.0007040	.0004780	.0003025
20	12000	.0014418	.0013873	.0013144	.0012263	.0011266	.0010191	.0009078	.0007963	.0006878	.0004900	.0003281
20	13000	.0012811	.0012381	.0011804	.0011100	.0010297	.0009423	.0008506	.0007574	.0006653	.0004927	.0003455
20	14000	.0011480	.0011135	.0010670	.0010100	.0009444	.0008725	.0007962	.0007178	.0006392	.0004888	.0003559
20	15000	.0010362	.0010081	.0009701	.0009233	.0008692	.0008093	.0007453	.0006789	.0006116	.0004803	.0003610
20	16000	.0009413	.0009182	.0008867	.0008479	.0008027	.0007524	.0006982	.0006416	.0005837	.0004688	.0003619
20	17000	.0008600	.0008406	.0008144	.0007817	.0007437	.0007010	.0006549	.0006062	.0005561	.0004554	.0003597
20	18000	.0007896	.0007733	.0007511	.0007235	.0006911	.0006547	.0006151	.0005731	.0005295	.0004409	.0003551
20	19000	.0007282	.0007144	.0006955	.0006719	.0006442	.0006128	.0005786	.0005421	.0005040	.0004258	.0003488
20	20000	.0006744	.0006625	.0006463	.0006250	.0006020	.0005749	.0005451	.0005132	.0004798	.0004105	.0003413

TABLE X (Continued)

WIND VELOCITY (MPH)	X RANGE (FEET)	(H IN FEET) 100	150	200	250	300	350	400	450	500	600	700
25	500	.0031288	.0000250	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
25	1000	.0135103	.0025080	.0002374	.0000115	.0000003	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
25	2000	.0113282	.0062973	.0027679	.0009619	.0002643	.0000574	.0000099	.0000013	.0000001	.0000000	.0000000
25	3000	.0075921	.0055293	.0035474	.0020048	.0009981	.0004377	.0001691	.0000575	.0000172	.0000011	.0000000
25	4000	.0053637	.0043707	.0032815	.0022699	.0014468	.0008496	.0004597	.0002292	.0001053	.0000174	.0000021
25	5000	.0040052	.0034617	.0028223	.0021707	.0015749	.0010779	.0006959	.0004238	.0002435	.0000675	.0000148
25	6000	.0031227	.0027959	.0023950	.0019629	.0015391	.0011546	.0008287	.0005691	.0003739	.0001413	.0000448
25	7000	.0025165	.0023058	.0020401	.0017429	.0014379	.0011454	.0008811	.0006545	.0004694	.0002174	.0000876
25	8000	.0020808	.0019374	.0017532	.0015418	.0013177	.0010944	.0008835	.0006931	.0005284	.0002819	.0001342
25	9000	.0017561	.0016543	.0015217	.0013667	.0011985	.0010262	.0008580	.0007004	.0005583	.0003302	.0001775
25	10000	.0015068	.0014321	.0013337	.0012170	.0010882	.0009534	.0008185	.0006886	.0005676	.0003628	.0002138
25	11000	.0013108	.0012544	.0011794	.0010896	.0009891	.0008822	.0007731	.0006657	.0005632	.0003824	.0002420
25	12000	.0011534	.0011098	.0010515	.0009810	.0009013	.0008153	.0007263	.0006371	.0005503	.0003920	.0002625
25	13000	.0010249	.0009905	.0009443	.0008880	.0008238	.0007538	.0006805	.0006059	.0005322	.0003941	.0002764
25	14000	.0009184	.0008908	.0008536	.0008080	.0007556	.0006980	.0006369	.0005742	.0005114	.0003910	.0002848
25	15000	.0008290	.0008065	.0007761	.0007387	.0006954	.0006475	.0005963	.0005431	.0004893	.0003843	.0002888
25	16000	.0007530	.0007345	.0007094	.0006783	.0006421	.0006019	.0005586	.0005133	.0004669	.0003751	.0002895
25	17000	.0006880	.0006725	.0006515	.0006254	.0005949	.0005608	.0005239	.0004850	.0004449	.0003643	.0002877
25	18000	.0006317	.0006187	.0006009	.0005788	.0005529	.0005238	.0004921	.0004585	.0004236	.0003527	.0002841
25	19000	.0005826	.0005715	.0005564	.0005375	.0005153	.0004903	.0004629	.0004337	.0004032	.0003406	.0002790
25	20000	.0005395	.0005300	.0005170	.0005008	.0004816	.0004599	.0004361	.0004106	.0003838	.0003284	.0002731
30	500	.0026073	.0000208	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
30	1000	.0112586	.0020900	.0001978	.0000095	.0000002	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
30	2000	.0094402	.0052478	.0023066	.0008016	.0002203	.0000479	.0000082	.0000011	.0000001	.0000000	.0000000
30	3000	.0063267	.0046078	.0029562	.0016707	.0008317	.0003647	.0001409	.0000480	.0000144	.0000009	.0000000
30	4000	.0044698	.0036422	.0027345	.0018916	.0012056	.0007080	.0003831	.0001910	.0000877	.0000145	.0000017
30	5000	.0033377	.0028847	.0023519	.0018089	.0013124	.0008982	.0005799	.0003532	.0002029	.0000562	.0000123
30	6000	.0026023	.0023299	.0019959	.0016357	.0012826	.0009622	.0006906	.0004743	.0003116	.0001178	.0000373
30	7000	.0020971	.0019215	.0017001	.0014524	.0011982	.0009545	.0007343	.0005454	.0003912	.0001812	.0000730
30	8000	.0017340	.0016145	.0014610	.0012848	.0010981	.0009120	.0007362	.0005775	.0004403	.0002349	.0001118
30	9000	.0014634	.0013786	.0012681	.0011389	.0009988	.0008552	.0007150	.0005837	.0004652	.0002751	.0001479
30	10000	.0012557	.0011934	.0011114	.0010142	.0009068	.0007945	.0006821	.0005738	.0004730	.0003023	.0001781
30	11000	.0010923	.0010453	.0009829	.0009080	.0008243	.0007352	.0006443	.0005547	.0004693	.0003187	.0002017
30	12000	.0009612	.0009248	.0008762	.0008175	.0007510	.0006794	.0006052	.0005309	.0004586	.0003266	.0002188
30	13000	.0008541	.0008254	.0007869	.0007400	.0006865	.0006282	.0005671	.0005049	.0004435	.0003284	.0002303
30	14000	.0007653	.0007423	.0007113	.0006733	.0006296	.0005816	.0005308	.0004785	.0004262	.0003259	.0002373
30	15000	.0006908	.0006721	.0006467	.0006156	.0005795	.0005395	.0004969	.0004526	.0004077	.0003202	.0002407
30	16000	.0006275	.0006121	.0005911	.0005652	.0005351	.0005016	.0004655	.0004277	.0003891	.0003126	.0002413
30	17000	.0005733	.0005604	.0005429	.0005212	.0004958	.0004674	.0004366	.0004042	.0003708	.0003036	.0002398
30	18000	.0005264	.0005155	.0005007	.0004823	.0004607	.0004365	.0004101	.0003820	.0003530	.0002939	.0002367
30	19000	.0004855	.0004763	.0004637	.0004479	.0004294	.0004086	.0003857	.0003614	.0003360	.0002838	.0002325
30	20000	.0004496	.0004417	.0004309	.0004173	.0004014	.0003833	.0003634	.0003422	.0003199	.0002736	.0002276

TABLE X (Continued)

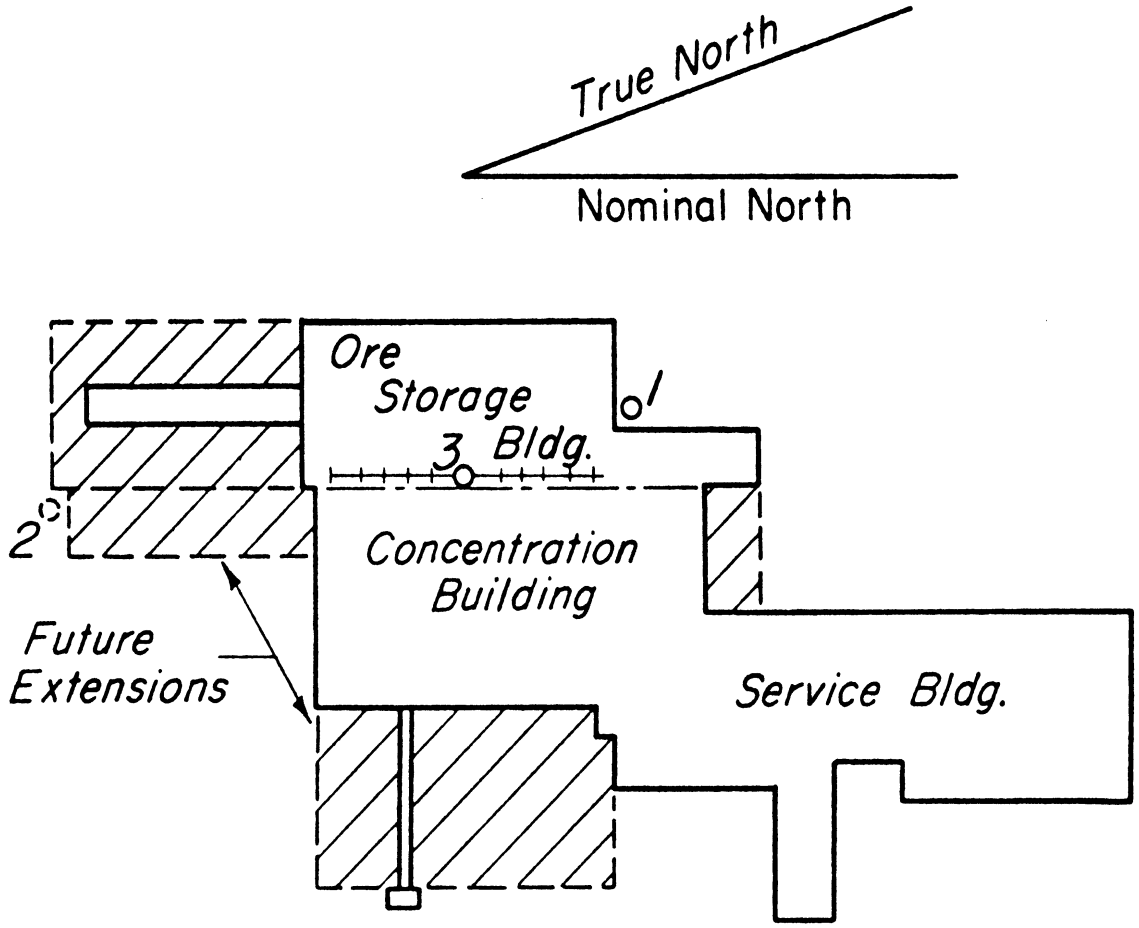
WIND VELOCITY (MPH)	X RANGE (FEET)	ΔH IN FEET) 100	150	200	250	300	350	400	450	500	600	700
35	500	.0022348	.0000179	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
35	1000	.0096502	.0017914	.0001696	.0000082	.0000002	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
35	2000	.0080916	.0044981	.0019771	.0006871	.0001888	.0000410	.0000070	.0000010	.0000001	.0000000	.0000000
35	3000	.0054229	.0039495	.0025339	.0014320	.0007129	.0003126	.0001208	.0000411	.0000123	.0000008	.0000000
35	4000	.0038312	.0031219	.0023439	.0016214	.0010334	.0006069	.0003283	.0001637	.0000752	.0000124	.0000015
35	5000	.0028609	.0024726	.0020160	.0015505	.0011249	.0007699	.0004971	.0003027	.0001739	.0000482	.0000106
35	6000	.0022305	.0019971	.0017107	.0014021	.0010994	.0008247	.0005920	.0004065	.0002671	.0001010	.0000320
35	7000	.0017975	.0016470	.0014572	.0012449	.0010271	.0008182	.0006294	.0004675	.0003353	.0001533	.0000625
35	8000	.0014863	.0013839	.0012523	.0011013	.0009412	.0007817	.0006310	.0004950	.0003774	.0002014	.0000958
35	9000	.0012544	.0011817	.0010869	.0009762	.0008561	.0007330	.0006129	.0005003	.0003988	.0002358	.0001268
35	10000	.0010763	.0010229	.0009526	.0008693	.0007773	.0006810	.0005847	.0004918	.0004054	.0002591	.0001527
35	11000	.0009363	.0008960	.0008425	.0007783	.0007065	.0006301	.0005522	.0004755	.0004023	.0002731	.0001729
35	12000	.0008239	.0007927	.0007511	.0007007	.0006438	.0005824	.0005188	.0004550	.0003930	.0002800	.0001875
35	13000	.0007321	.0007075	.0006745	.0006343	.0005884	.0005385	.0004861	.0004328	.0003802	.0002815	.0001974
35	14000	.0006560	.0006363	.0006097	.0005771	.0005397	.0004985	.0004550	.0004062	.0003653	.0002793	.0002034
35	15000	.0005921	.0005761	.0005544	.0005276	.0004967	.0004625	.0004259	.0003879	.0003495	.0002745	.0002063
35	16000	.0005379	.0005247	.0005067	.0004845	.0004587	.0004299	.0003990	.0003666	.0003335	.0002679	.0002068
35	17000	.0004914	.0004804	.0004653	.0004467	.0004249	.0004006	.0003742	.0003464	.0003178	.0002602	.0002055
35	18000	.0004512	.0004419	.0004292	.0004134	.0003949	.0003741	.0003515	.0003275	.0003026	.0002519	.0002029
35	19000	.0004161	.0004082	.0003974	.0003839	.0003681	.0003502	.0003306	.0003098	.0002880	.0002433	.0001993
35	20000	.0003854	.0003786	.0003693	.0003577	.0003440	.0003285	.0003115	.0002933	.0002742	.0002346	.0001951
40	500	.0019555	.0000156	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
40	1000	.0084439	.0015675	.0001484	.0000072	.0000002	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
40	2000	.0070801	.0039358	.0017299	.0006012	.0001652	.0000359	.0000062	.0000008	.0000001	.0000000	.0000000
40	3000	.0047450	.0034558	.0022171	.0012530	.0006238	.0002736	.0001057	.0000360	.0000108	.0000007	.0000000
40	4000	.0033523	.0027317	.0020509	.0014187	.0009042	.0005310	.0002873	.0001432	.0000658	.0000109	.0000013
40	5000	.0025033	.0021635	.0017640	.0013567	.0009843	.0006737	.0004349	.0002649	.0001522	.0000422	.0000093
40	6000	.0019517	.0017475	.0014969	.0012268	.0009620	.0007217	.0005180	.0003557	.0002337	.0000883	.0000280
40	7000	.0015728	.0014411	.0012750	.0010893	.0008987	.0007159	.0005507	.0004090	.0002934	.0001359	.0000547
40	8000	.0013065	.0012109	.0010957	.0009636	.0008235	.0006840	.0005522	.0004332	.0003302	.0001762	.0000839
40	9000	.0010976	.0010340	.0009511	.0008542	.0007491	.0006414	.0005362	.0004378	.0003489	.0002064	.0001109
40	10000	.0009418	.0008951	.0008336	.0007606	.0006801	.0005959	.0005116	.0004303	.0003547	.0002267	.0001336
40	11000	.0008192	.0007840	.0007371	.0006810	.0006182	.0005514	.0004832	.0004161	.0003520	.0002390	.0001512
40	12000	.0007209	.0006936	.0006572	.0006131	.0005633	.0005096	.0004539	.0003982	.0003439	.0002450	.0001641
40	13000	.0006406	.0006191	.0005902	.0005550	.0005149	.0004711	.0004253	.0003787	.0003326	.0002463	.0001727
40	14000	.0005740	.0005567	.0005335	.0005050	.0004722	.0004362	.0003981	.0003589	.0003196	.0002444	.0001780
40	15000	.0005181	.0005041	.0004851	.0004617	.0004346	.0004047	.0003727	.0003394	.0003058	.0002402	.0001805
40	16000	.0004707	.0004591	.0004434	.0004239	.0004013	.0003762	.0003491	.0003208	.0002918	.0002344	.0001810
40	17000	.0004300	.0004203	.0004072	.0003909	.0003718	.0003505	.0003274	.0003031	.0002781	.0002277	.0001798
40	18000	.0003948	.0003867	.0003756	.0003617	.0003456	.0003274	.0003075	.0002865	.0002647	.0002204	.0001775
40	19000	.0003641	.0003572	.0003477	.0003360	.0003221	.0003064	.0002893	.0002710	.0002520	.0002129	.0001744
40	20000	.0003372	.0003313	.0003231	.0003130	.0003010	.0002875	.0002726	.0002566	.0002399	.0002052	.0001707

TABLE X (Continued)

WIND VELOCITY (MPH)	X RANGE (FEET)	(H IN FEET) 100	150	200	250	300	350	400	450	500	600	700
45	500	.0017382	.0000139	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
45	1000	.0075057	.0013933	.0001319	.0000064	.0000002	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
45	2000	.0062935	.0034985	.0015377	.0005344	.0001468	.0000319	.0000055	.0000007	.0000001	.0000000	.0000000
45	3000	.0042178	.0030718	.0019708	.0011138	.0005545	.0002432	.0000939	.0000320	.0000096	.0000006	.0000000
45	4000	.0029799	.0024282	.0018230	.0012611	.0008038	.0004720	.0002554	.0001273	.0000585	.0000076	.0000011
45	5000	.0022251	.0019231	.0015680	.0012059	.0008749	.0005988	.0003866	.0002355	.0001353	.0000375	.0000082
45	6000	.0017349	.0015533	.0013306	.0010905	.0008551	.0006415	.0004604	.0003162	.0002077	.0000785	.0000249
45	7000	.0013981	.0012810	.0011334	.0009683	.0007988	.0006364	.0004895	.0003636	.0002608	.0001208	.0000486
45	8000	.0011560	.0010764	.0009740	.0008565	.0007320	.0006080	.0004908	.0003850	.0002935	.0001566	.0000745
45	9000	.0009756	.0009191	.0008454	.0007593	.0006658	.0005701	.0004767	.0003891	.0003102	.0001834	.0000986
45	10000	.0008371	.0007956	.0007409	.0006761	.0006046	.0005297	.0004547	.0003825	.0003153	.0002016	.0001188
45	11000	.0007282	.0006969	.0006552	.0006054	.0005495	.0004901	.0004295	.0003698	.0003129	.0002124	.0001344
45	12000	.0006408	.0006166	.0005842	.0005450	.0005007	.0004530	.0004035	.0003539	.0003057	.0002178	.0001458
45	13000	.0005694	.0005503	.0005246	.0004933	.0004577	.0004188	.0003780	.0003366	.0002957	.0002190	.0001535
45	14000	.0005102	.0004949	.0004742	.0004489	.0004198	.0003878	.0003539	.0003190	.0002841	.0002172	.0001582
45	15000	.0004605	.0004481	.0004312	.0004104	.0003863	.0003597	.0003313	.0003017	.0002718	.0002135	.0001605
45	16000	.0004184	.0004081	.0003941	.0003768	.0003567	.0003344	.0003103	.0002851	.0002594	.0002084	.0001608
45	17000	.0003822	.0003736	.0003619	.0003474	.0003305	.0003116	.0002911	.0002694	.0002472	.0002024	.0001598
45	18000	.0003509	.0003437	.0003338	.0003216	.0003072	.0002910	.0002734	.0002547	.0002353	.0001959	.0001578
45	19000	.0003237	.0003175	.0003091	.0002986	.0002863	.0002724	.0002572	.0002409	.0002240	.0001892	.0001550
45	20000	.0002997	.0002945	.0002872	.0002782	.0002676	.0002555	.0002423	.0002281	.0002132	.0001824	.0001517
50	500	.0015644	.0000125	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
50	1000	.0067551	.0012540	.0001187	.0000057	.0000001	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
50	2000	.0056641	.0031487	.0013839	.0004810	.0001322	.0000287	.0000049	.0000007	.0000001	.0000000	.0000000
50	3000	.0037960	.0027647	.0017737	.0010024	.0004990	.0002188	.0000845	.0000288	.0000086	.0000005	.0000000
50	4000	.0026819	.0021853	.0016407	.0011350	.0007234	.0004248	.0002298	.0001146	.0000526	.0000087	.0000010
50	5000	.0020026	.0017308	.0014112	.0010853	.0007874	.0005389	.0003479	.0002119	.0001217	.0000337	.0000074
50	6000	.0015614	.0013980	.0011975	.0009814	.0007696	.0005773	.0004144	.0002846	.0001869	.0000707	.0000224
50	7000	.0012583	.0011529	.0010200	.0008715	.0007189	.0005727	.0004406	.0003272	.0002347	.0001087	.0000438
50	8000	.0010404	.0009687	.0008766	.0007709	.0006588	.0005472	.0004417	.0003465	.0002642	.0001410	.0000671
50	9000	.0008780	.0008272	.0007609	.0006834	.0005993	.0005131	.0004290	.0003502	.0002791	.0001651	.0000887
50	10000	.0007534	.0007161	.0006668	.0006085	.0005441	.0004767	.0004093	.0003443	.0002838	.0001814	.0001069
50	11000	.0006554	.0006272	.0005897	.0005448	.0004946	.0004411	.0003866	.0003328	.0002816	.0001912	.0001210
50	12000	.0005767	.0005549	.0005257	.0004905	.0004506	.0004077	.0003631	.0003185	.0002751	.0001960	.0001313
50	13000	.0005124	.0004953	.0004721	.0004440	.0004119	.0003769	.0003402	.0003030	.0002661	.0001971	.0001382
50	14000	.0004592	.0004454	.0004268	.0004040	.0003778	.0003490	.0003185	.0002871	.0002557	.0001955	.0001424
50	15000	.0004145	.0004033	.0003880	.0003693	.0003477	.0003237	.0002981	.0002716	.0002446	.0001921	.0001444
50	16000	.0003765	.0003673	.0003547	.0003391	.0003211	.0003010	.0002793	.0002566	.0002335	.0001875	.0001448
50	17000	.0003440	.0003363	.0003257	.0003127	.0002975	.0002804	.0002620	.0002425	.0002225	.0001822	.0001439
50	18000	.0003158	.0003093	.0003004	.0002894	.0002764	.0002619	.0002460	.0002292	.0002118	.0001764	.0001420
50	19000	.0002913	.0002858	.0002782	.0002688	.0002577	.0002451	.0002314	.0002168	.0002016	.0001703	.0001395
50	20000	.0002698	.0002650	.0002585	.0002504	.0002408	.0002300	.0002181	.0002053	.0001919	.0001642	.0001365

TABLE X (Concluded)

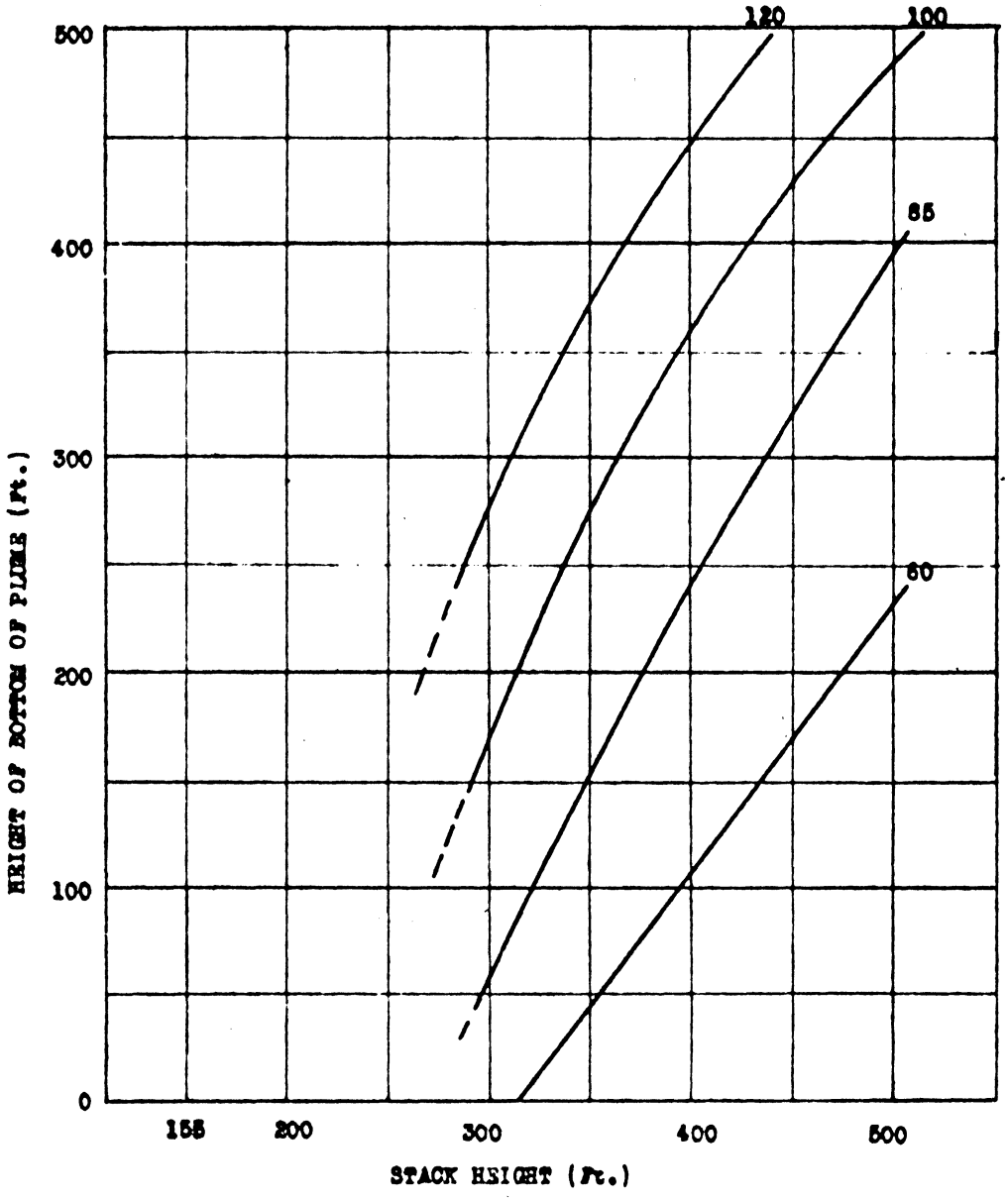
WIND VELOCITY (MPH)	X RANGE (FEET)	(H IN FEET) 100	150	200	250	300	350	400	450	500	600	700
55	500	.0014222	.0000114	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
55	1000	.0061410	.0011400	.0001079	.0000052	.0000001	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
55	2000	.0051492	.0028624	.0012581	.0004372	.0001201	.0000261	.0000045	.0000006	.0000001	.0000000	.0000000
55	3000	.0034509	.0025133	.0016125	.0009113	.0004537	.0001990	.0000769	.0000262	.0000078	.0000005	.0000000
55	4000	.0024381	.0019867	.0014916	.0010318	.0006576	.0003862	.0002089	.0001042	.0000478	.0000079	.0000009
55	5000	.0018206	.0015735	.0012829	.0009867	.0007159	.0004899	.0003163	.0001926	.0001107	.0000307	.0000067
55	6000	.0014194	.0012709	.0010887	.0008922	.0006996	.0005248	.0003767	.0002587	.0001700	.0000642	.0000203
55	7000	.0011439	.0010481	.0009273	.0007922	.0006536	.0005207	.0004005	.0002975	.0002134	.0000988	.0000398
55	8000	.0009458	.0008807	.0007969	.0007008	.0005989	.0004975	.0004016	.0003150	.0002402	.0001241	.0000610
55	9000	.0007982	.0007520	.0006917	.0006212	.0005448	.0004665	.0003900	.0003184	.0002538	.0001501	.0000807
55	10000	.0006849	.0006510	.0006062	.0005532	.0004946	.0004334	.0003721	.0003130	.0002580	.0001649	.0000972
55	11000	.0005958	.0005702	.0005361	.0004953	.0004496	.0004010	.0003514	.0003026	.0002560	.0001738	.0001100
55	12000	.0005243	.0005045	.0004780	.0004459	.0004097	.0003706	.0003301	.0002896	.0002501	.0001782	.0001193
55	13000	.0004659	.0004502	.0004292	.0004036	.0003745	.0003427	.0003093	.0002754	.0002419	.0001792	.0001256
55	14000	.0004174	.0004049	.0003880	.0003673	.0003434	.0003173	.0002895	.0002610	.0002324	.0001777	.0001294
55	15000	.0003768	.0003666	.0003528	.0003358	.0003161	.0002943	.0002710	.0002469	.0002224	.0001747	.0001313
55	16000	.0003423	.0003339	.0003224	.0003083	.0002919	.0002736	.0002539	.0002333	.0002122	.0001705	.0001316
55	17000	.0003127	.0003057	.0002961	.0002843	.0002704	.0002549	.0002381	.0002205	.0002022	.0001656	.0001308
55	18000	.0002871	.0002812	.0002731	.0002631	.0002513	.0002381	.0002237	.0002084	.0001925	.0001603	.0001291
55	19000	.0002648	.0002598	.0002529	.0002443	.0002342	.0002229	.0002104	.0001971	.0001833	.0001548	.0001268
55	20000	.0002452	.0002409	.0002350	.0002276	.0002189	.0002091	.0001982	.0001866	.0001745	.0001493	.0001241
60	500	.0013037	.0000104	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
60	1000	.0056293	.0010450	.0000989	.0000048	.0000001	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
60	2000	.0047201	.0026239	.0011533	.0004008	.0001101	.0000239	.0000041	.0000006	.0000001	.0000000	.0000000
60	3000	.0031634	.0023039	.0014781	.0008353	.0004159	.0001824	.0000705	.0000240	.0000072	.0000004	.0000000
60	4000	.0022349	.0018211	.0013673	.0009458	.0006028	.0003540	.0001915	.0000955	.0000439	.0000072	.0000009
60	5000	.0016688	.0014424	.0011760	.0009044	.0006562	.0004491	.0002900	.0001766	.0001015	.0000281	.0000062
60	6000	.0013011	.0011650	.0009979	.0008179	.0006413	.0004811	.0003453	.0002371	.0001558	.0000589	.0000187
60	7000	.0010485	.0009607	.0008500	.0007262	.0005991	.0004773	.0003671	.0002727	.0001956	.0000906	.0000365
60	8000	.0008670	.0008073	.0007305	.0006424	.0005490	.0004560	.0003681	.0002888	.0002202	.0001175	.0000559
60	9000	.0007317	.0006893	.0006340	.0005695	.0004994	.0004276	.0003575	.0002918	.0002326	.0001376	.0000739
60	10000	.0006278	.0005967	.0005557	.0005071	.0004534	.0003973	.0003411	.0002869	.0002365	.0001512	.0000891
60	11000	.0005462	.0005227	.0004914	.0004540	.0004121	.0003676	.0003221	.0002774	.0002347	.0001593	.0001008
60	12000	.0004806	.0004624	.0004381	.0004088	.0003755	.0003397	.0003026	.0002654	.0002293	.0001633	.0001094
60	13000	.0004270	.0004127	.0003935	.0003700	.0003432	.0003141	.0002835	.0002525	.0002218	.0001642	.0001152
60	14000	.0003827	.0003712	.0003557	.0003367	.0003148	.0002908	.0002654	.0002393	.0002131	.0001629	.0001186
60	15000	.0003454	.0003360	.0003234	.0003078	.0002897	.0002698	.0002484	.0002263	.0002039	.0001601	.0001203
60	16000	.0003138	.0003061	.0002956	.0002826	.0002676	.0002508	.0002327	.0002139	.0001946	.0001563	.0001206
60	17000	.0002867	.0002802	.0002715	.0002606	.0002479	.0002337	.0002183	.0002021	.0001854	.0001518	.0001199
60	18000	.0002632	.0002578	.0002504	.0002412	.0002304	.0002182	.0002050	.0001910	.0001765	.0001470	.0001184
60	19000	.0002427	.0002381	.0002313	.0002240	.0002147	.0002043	.0001929	.0001807	.0001680	.0001419	.0001163
60	20000	.0002248	.0002208	.0002154	.0002087	.0002007	.0001916	.0001817	.0001711	.0001599	.0001368	.0001138



Three Alternative Schemes
of Stack Location
(See Testing Program)

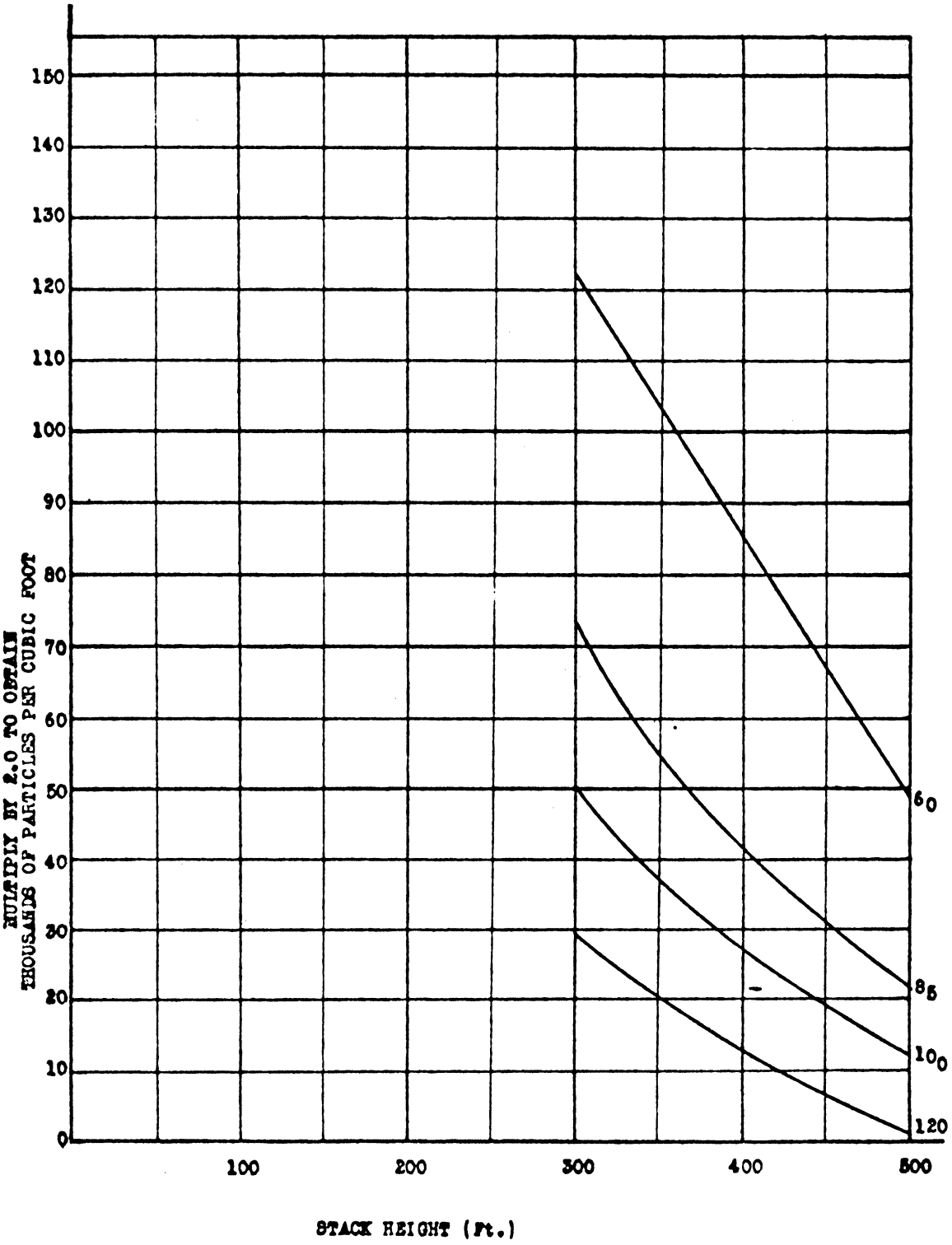
Scale: 1" = 200'

Fig. 16. Three alternative schemes of stack location.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.). PLANT WITHOUT EXTENSIONS.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S. PLUME HEIGHT ABOVE GROUND LEVEL,
STACK LOCATION 1. 5,000 FEET DOWNWIND FROM STACK.

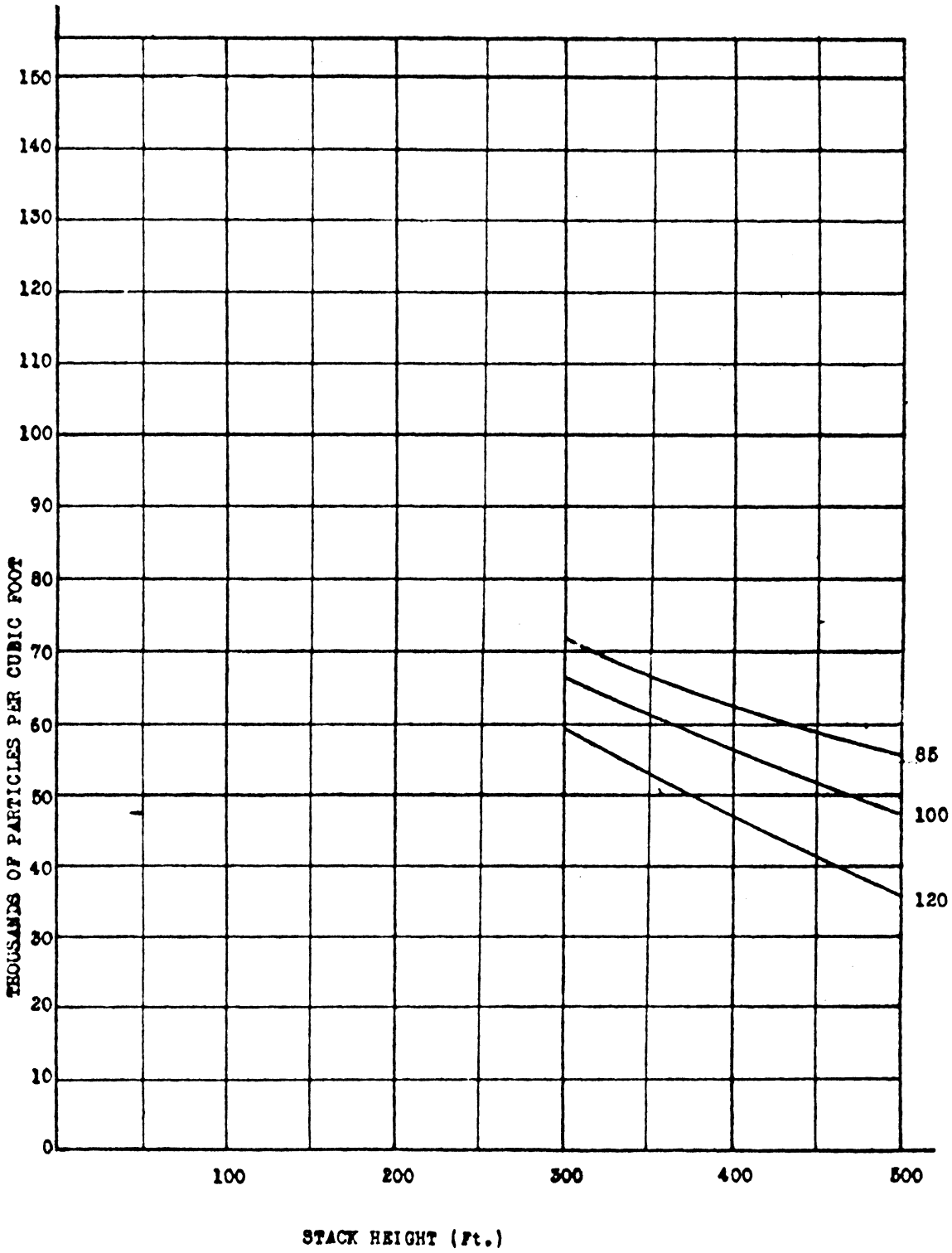
Fig. 19.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

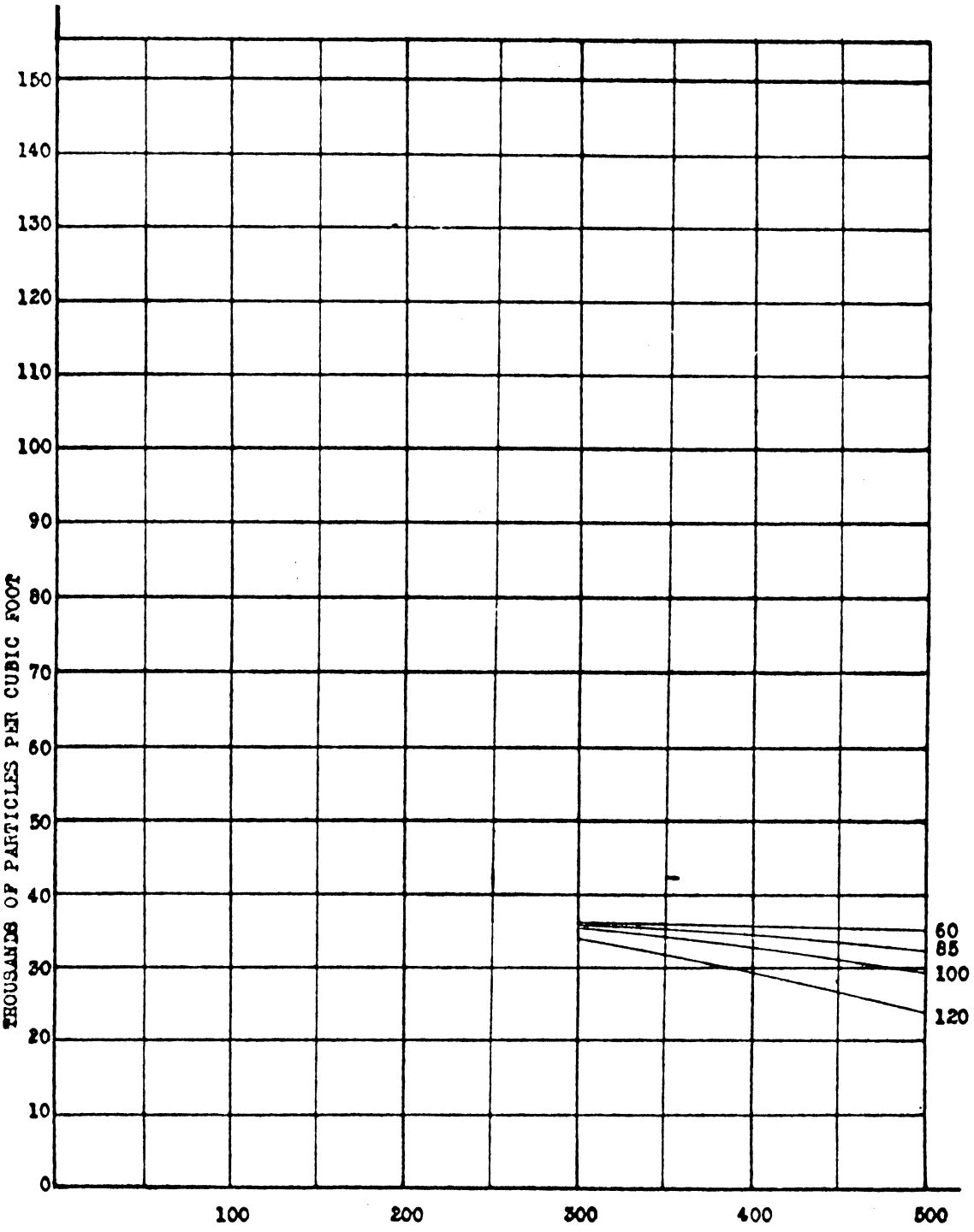
Fig. 20.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 7,500 FEET DOWNWIND FROM STACK.

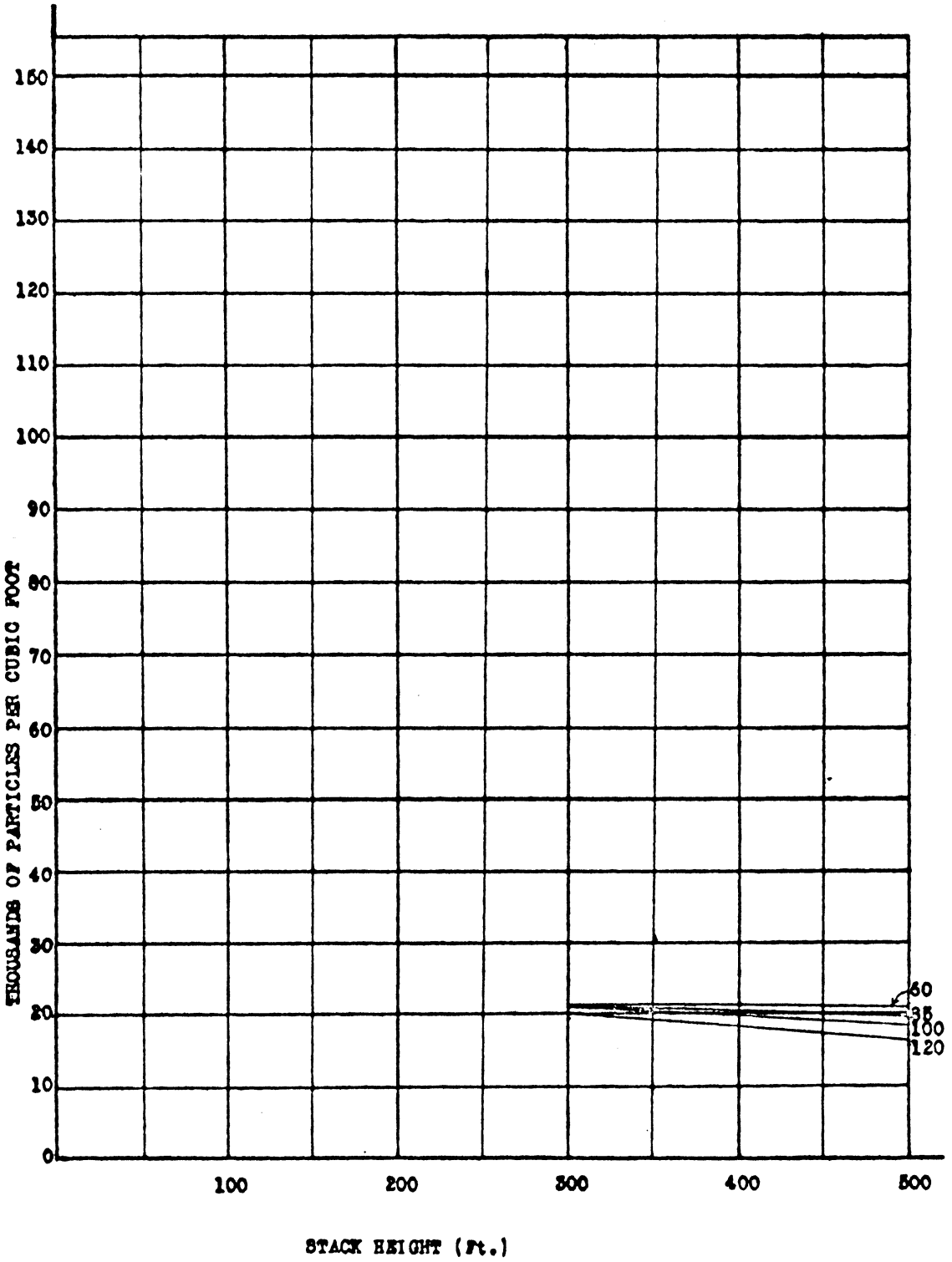
Fig. 21.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 12,000 FEET DOWNWIND FROM STACK.

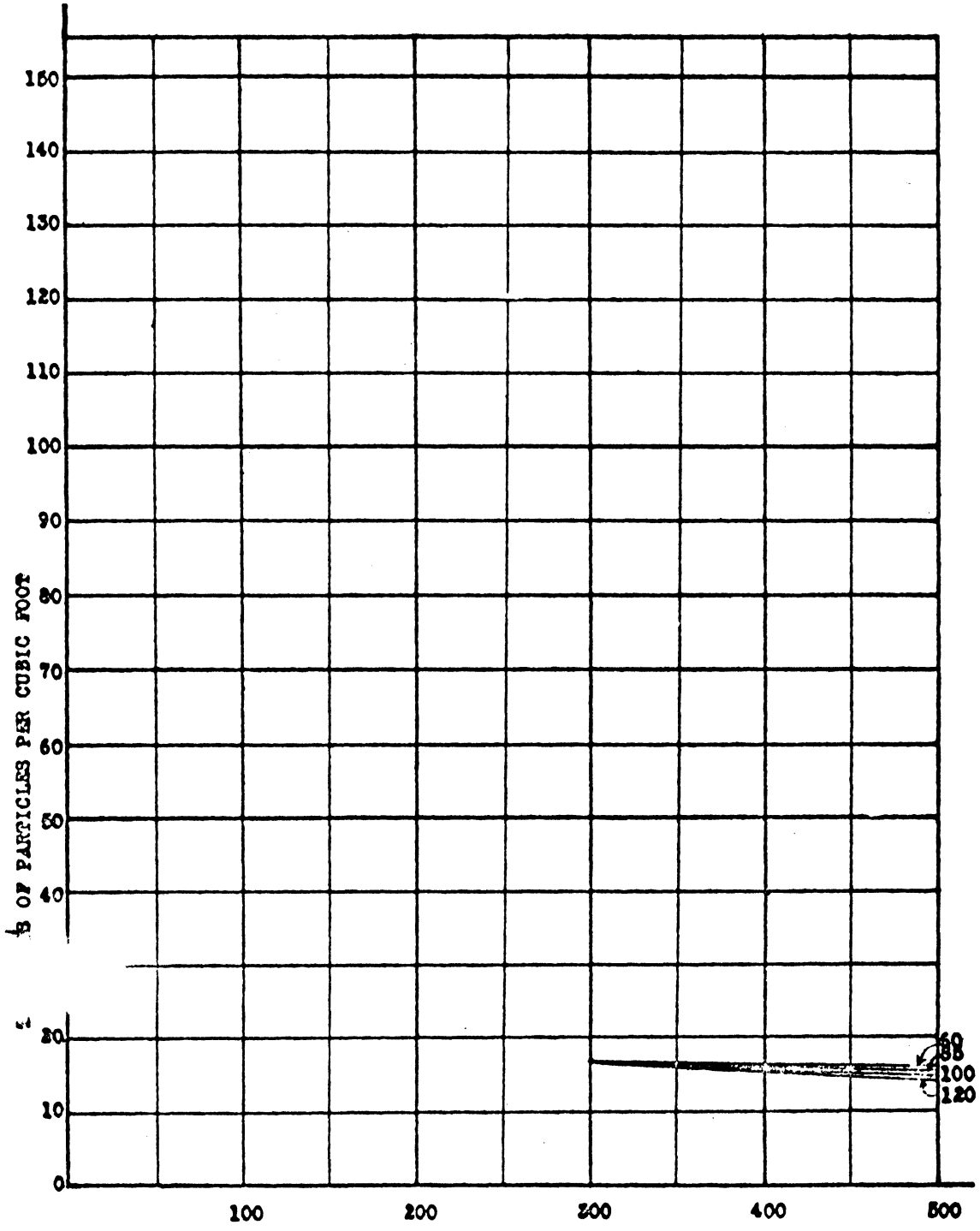
Fig. 22.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
17,000 FEET DOWNWIND FROM STACK.

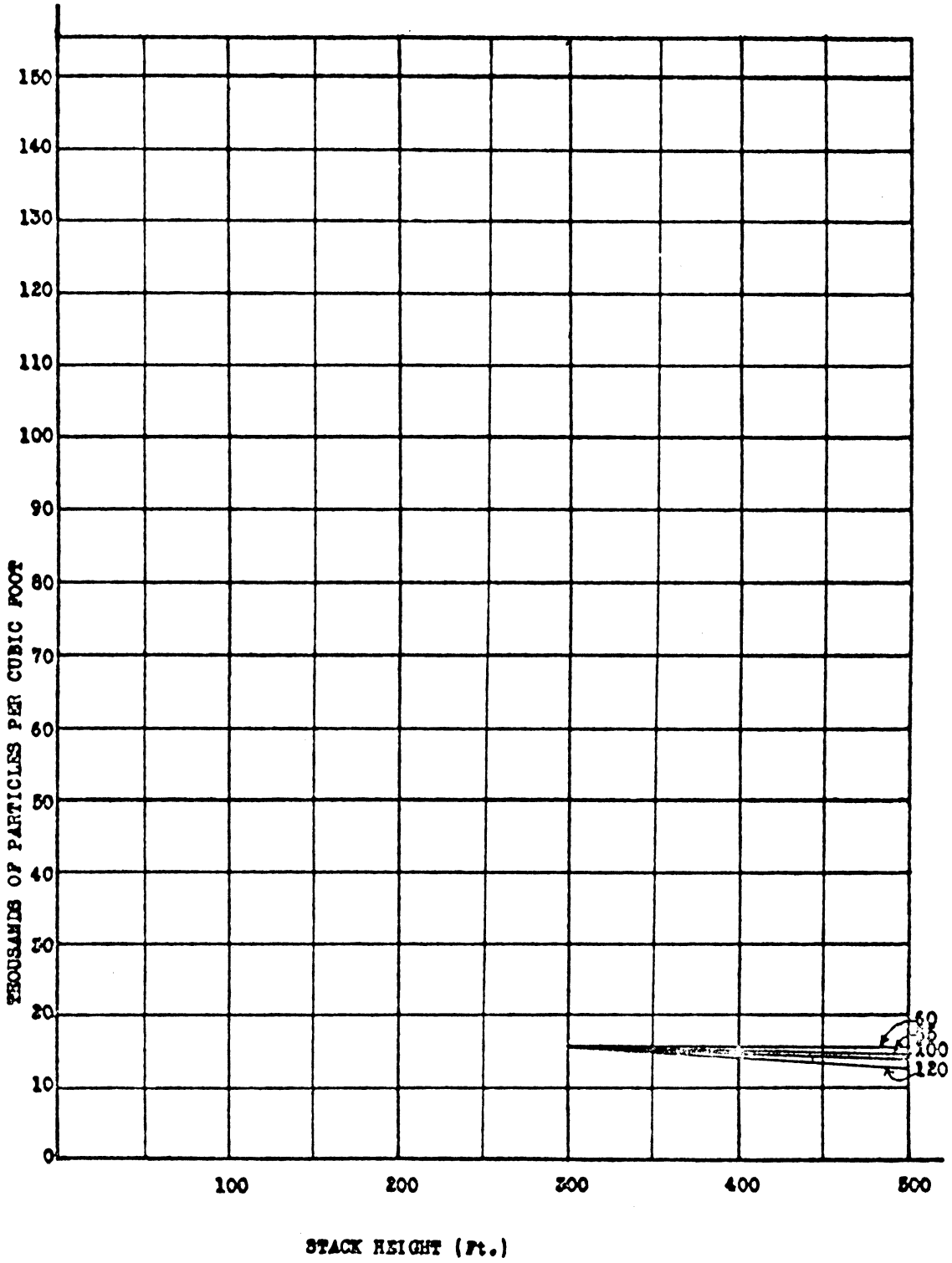
Fig. 23.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 19,000 FEET DOWNWIND FROM STACK.

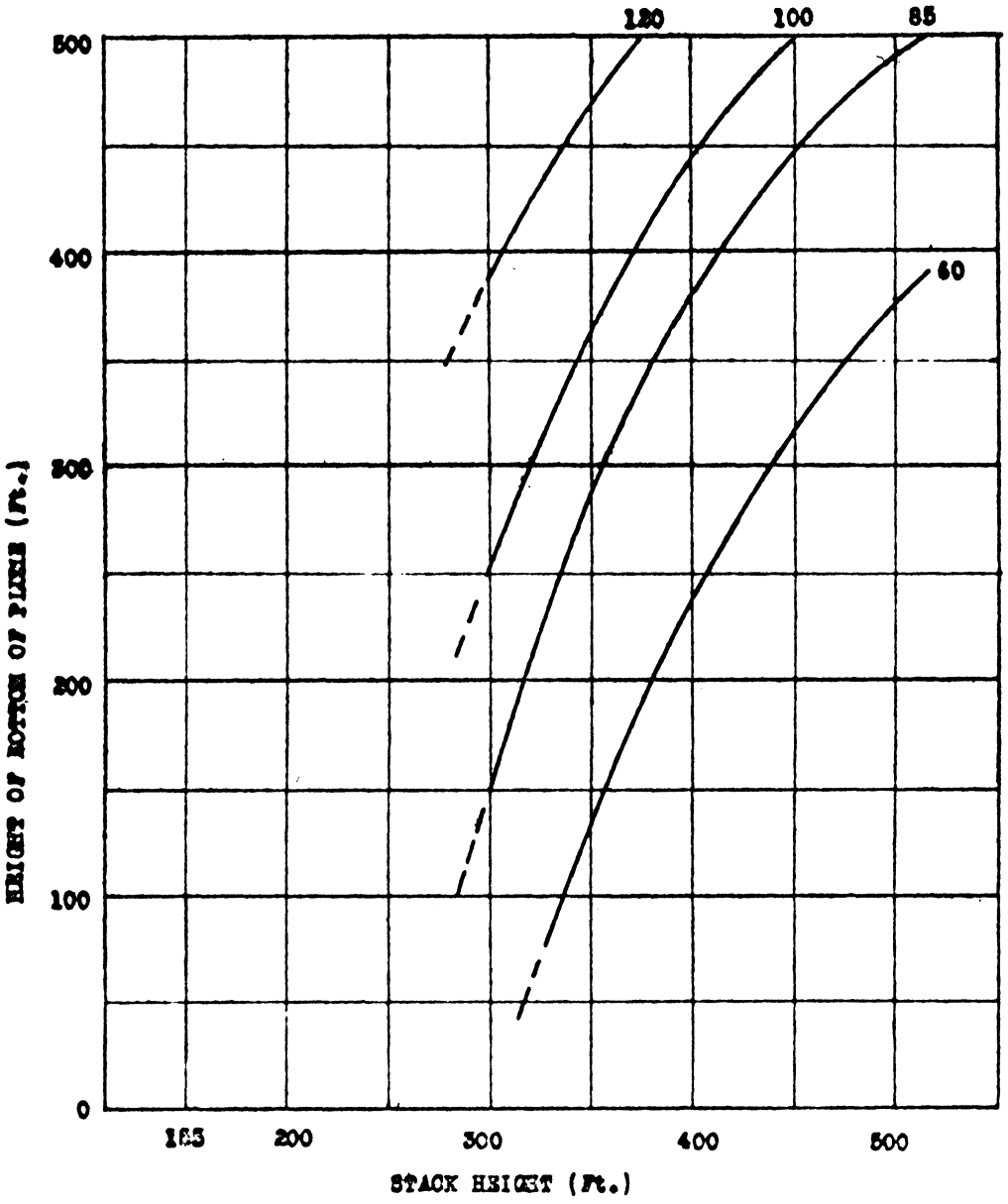
Fig. 24.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
20,000 FEET DOWNWIND FROM STACK.

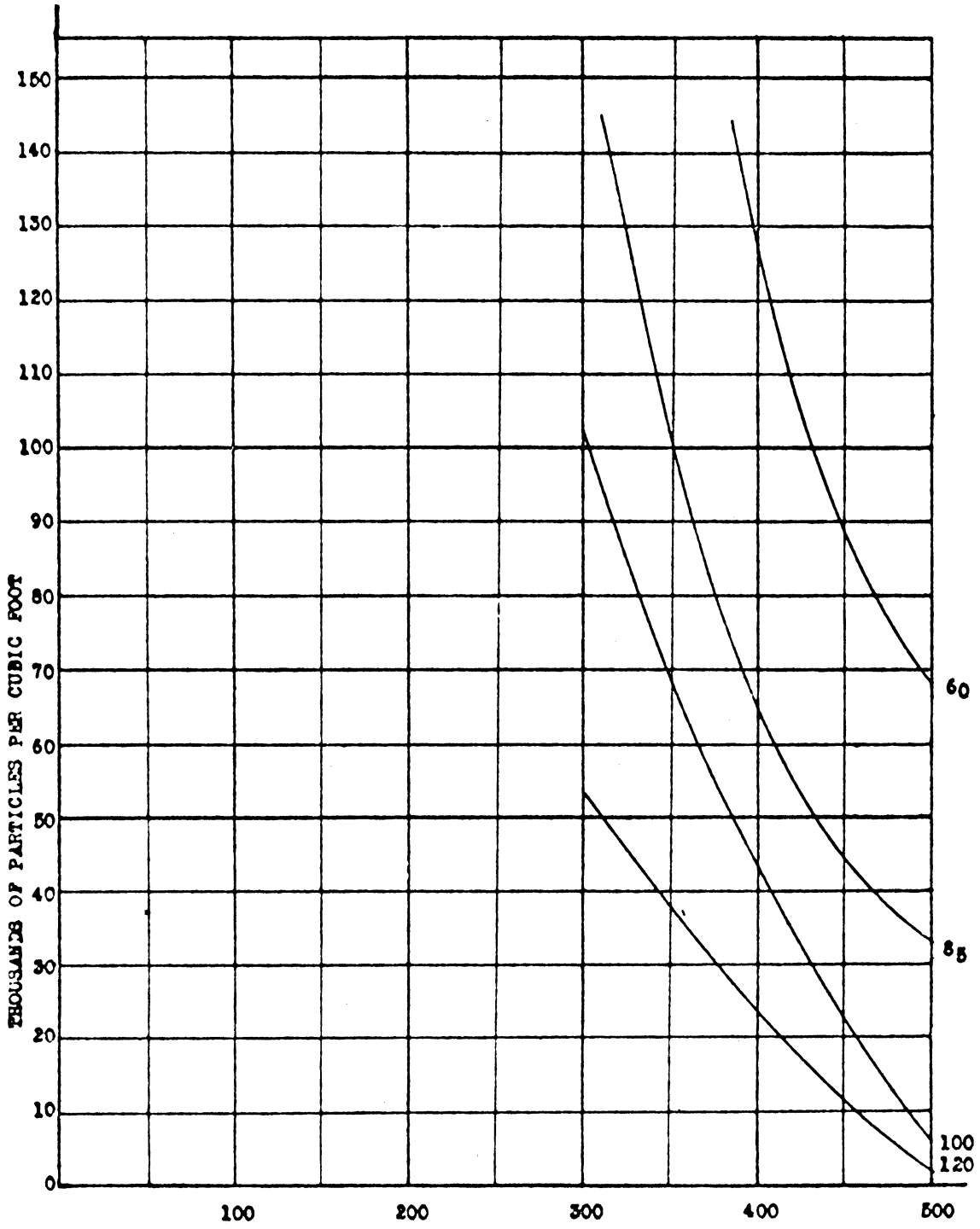
Fig. 25.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 3000 FEET DOWNWIND FROM STACK.

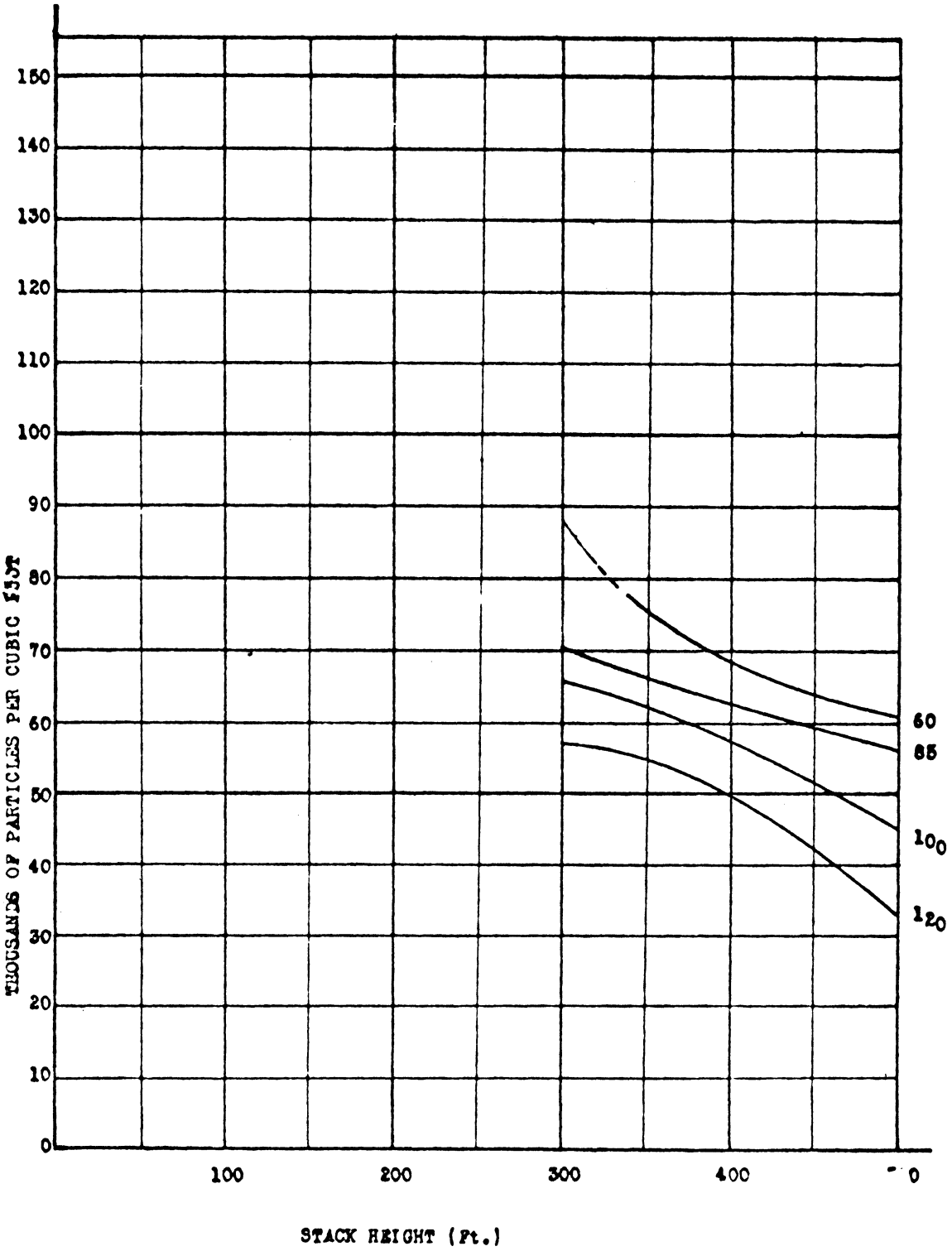
Fig. 26.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

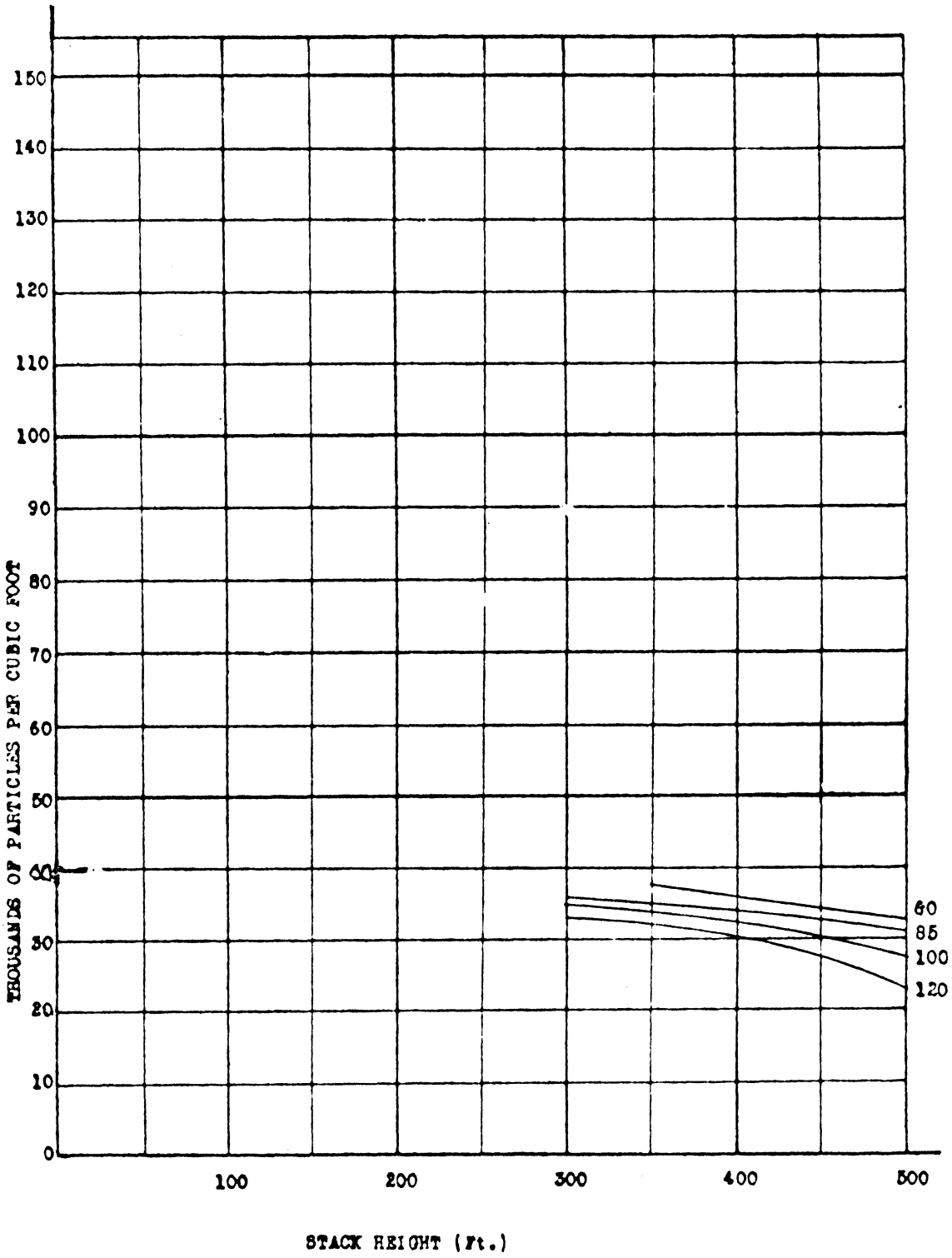
Fig. 27.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
7,500 FEET DOWNWIND FROM STACK.

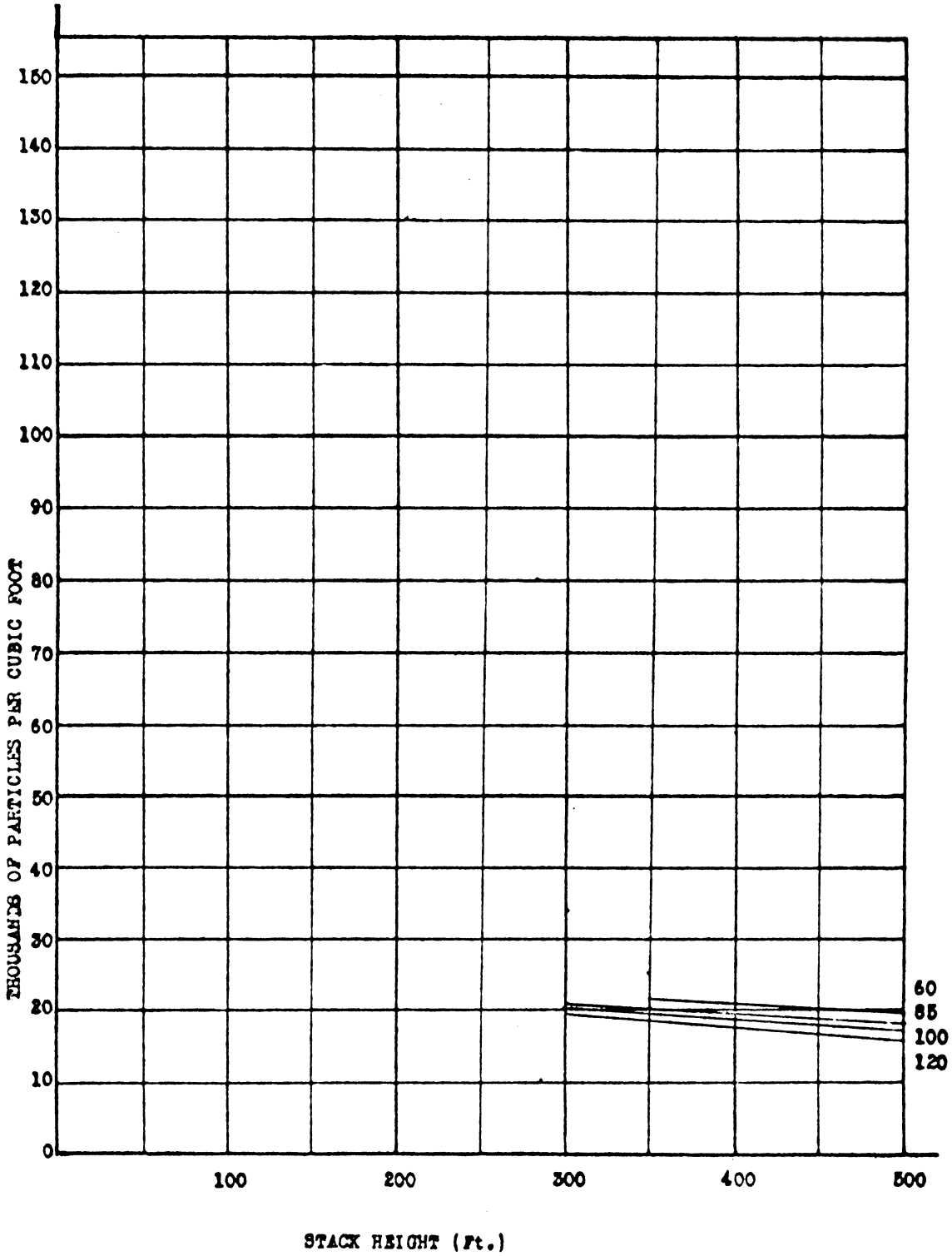
Fig. 28.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 12,000 FEET DOWNWIND FROM STACK.

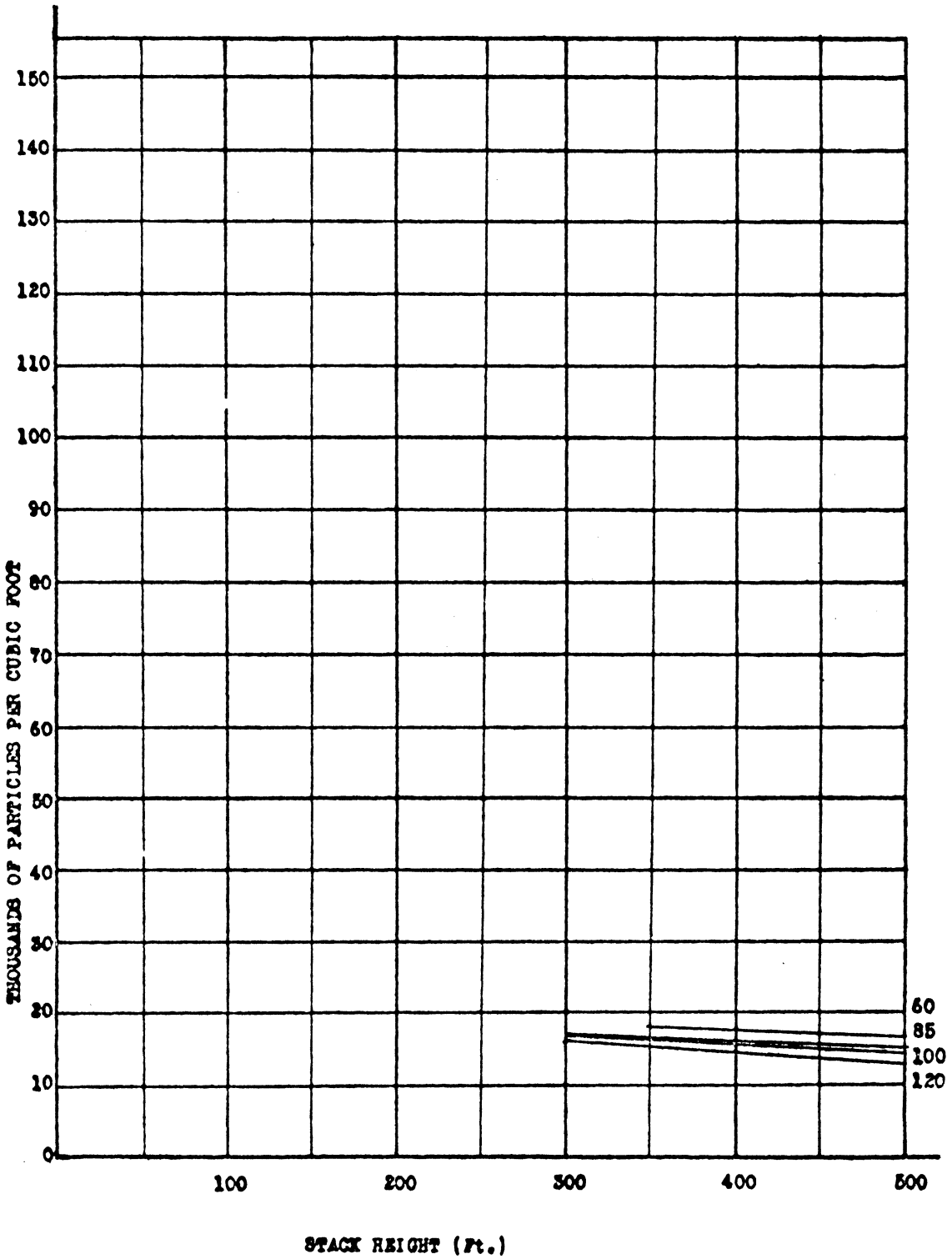
Fig. 29.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
17,000 FEET DOWNWIND FROM STACK.

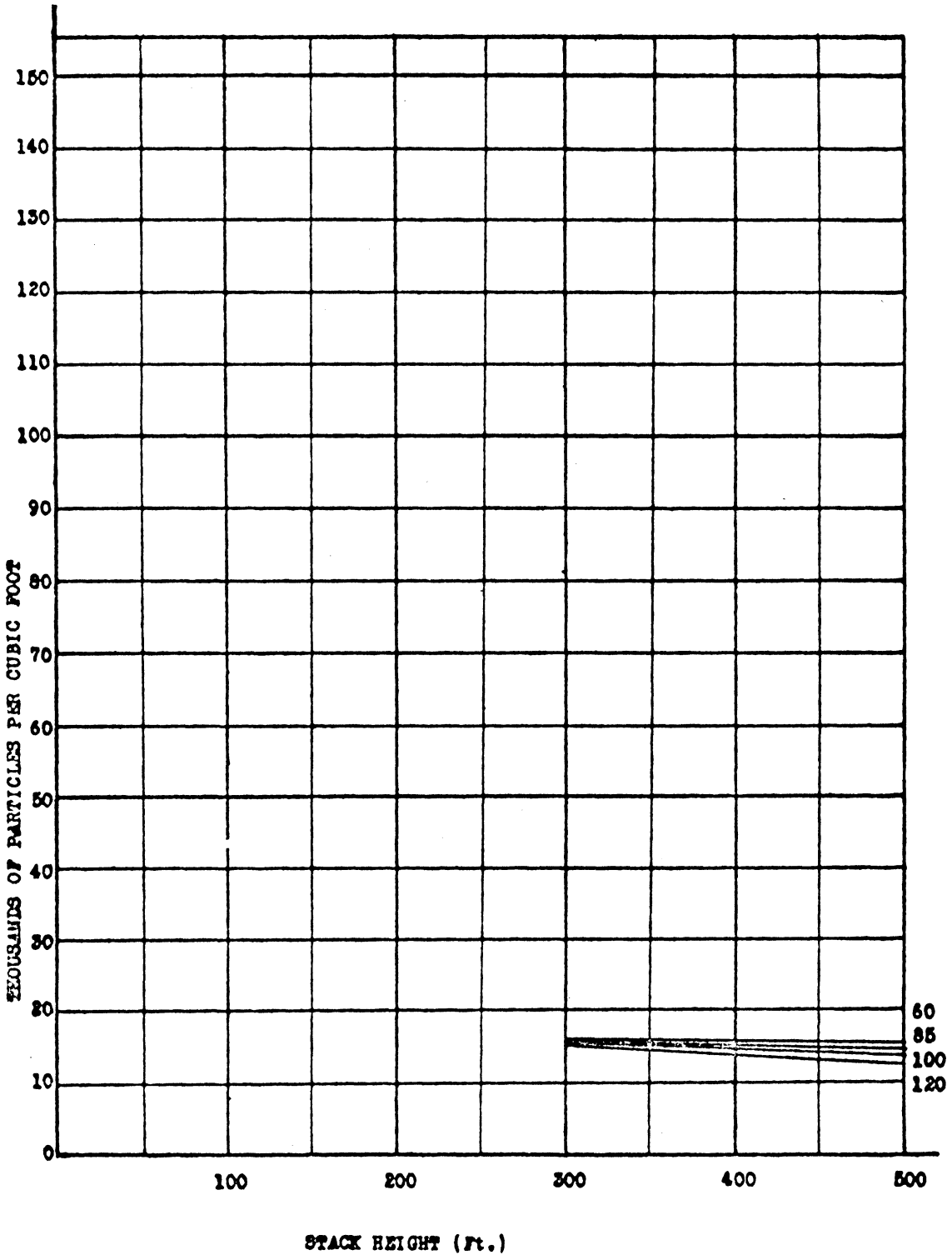
Fig. 30.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

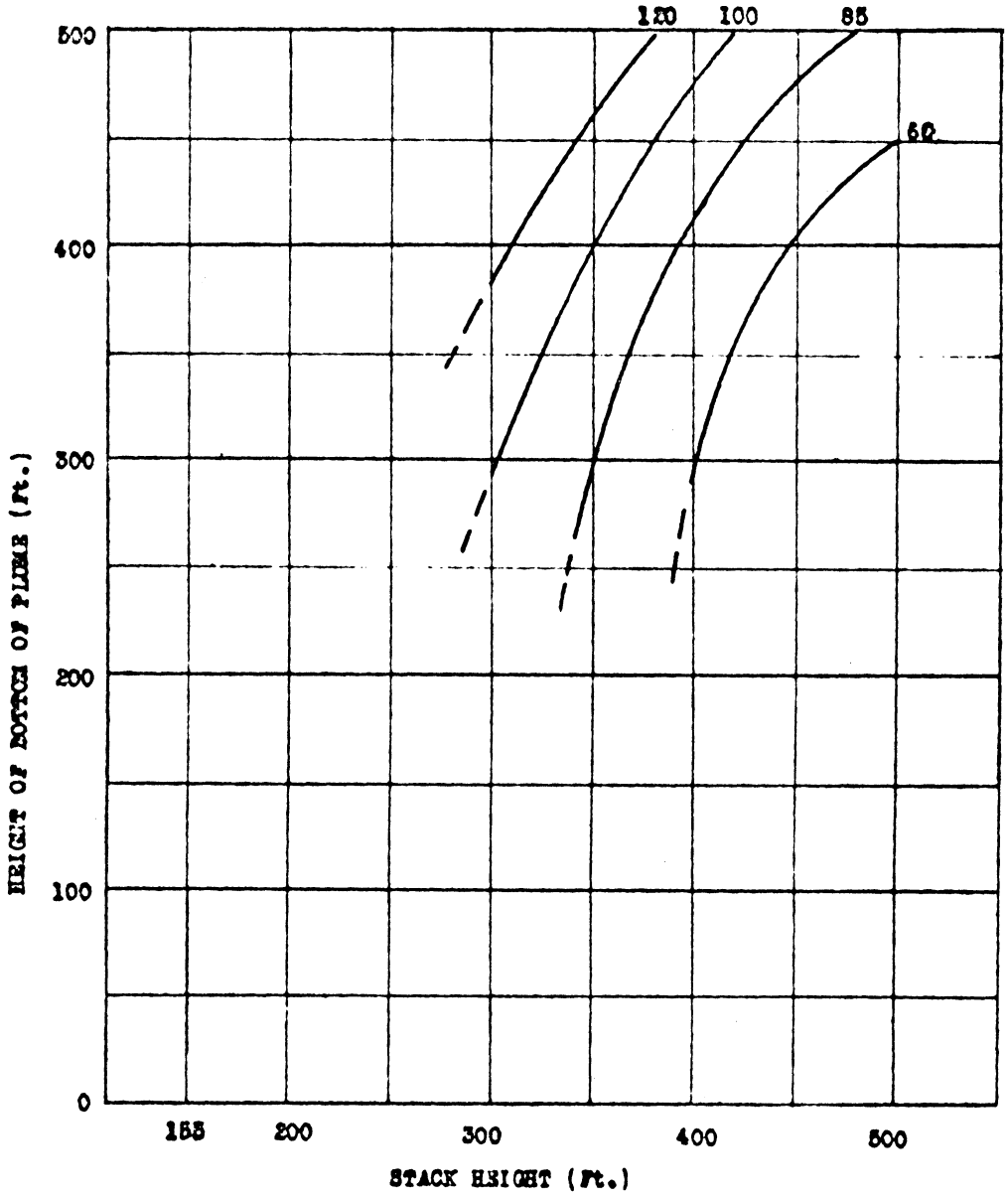
Fig. 31.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 20,000 FEET DOWNWIND FROM STACK.

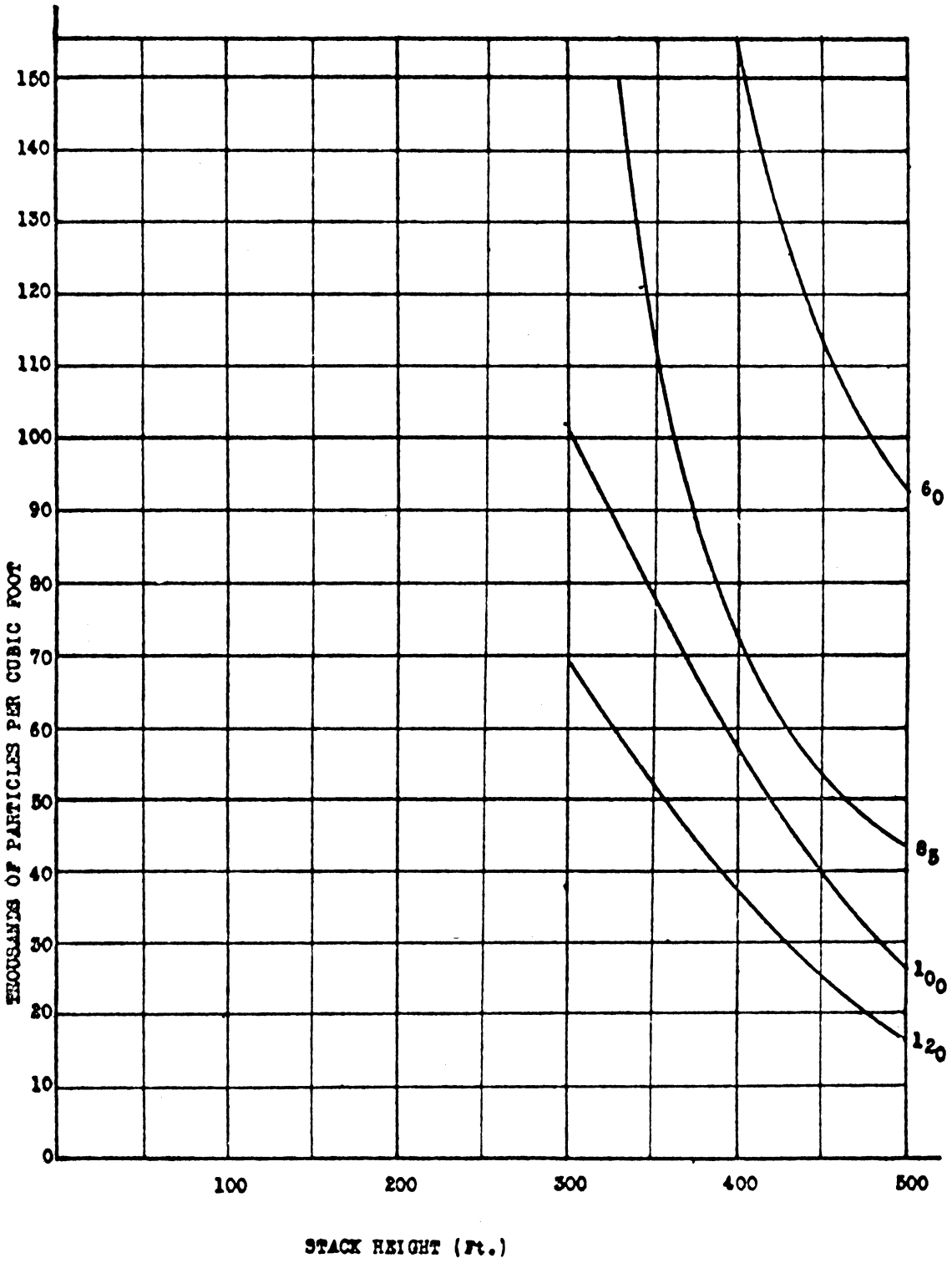
Fig. 32.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 M.P.H.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

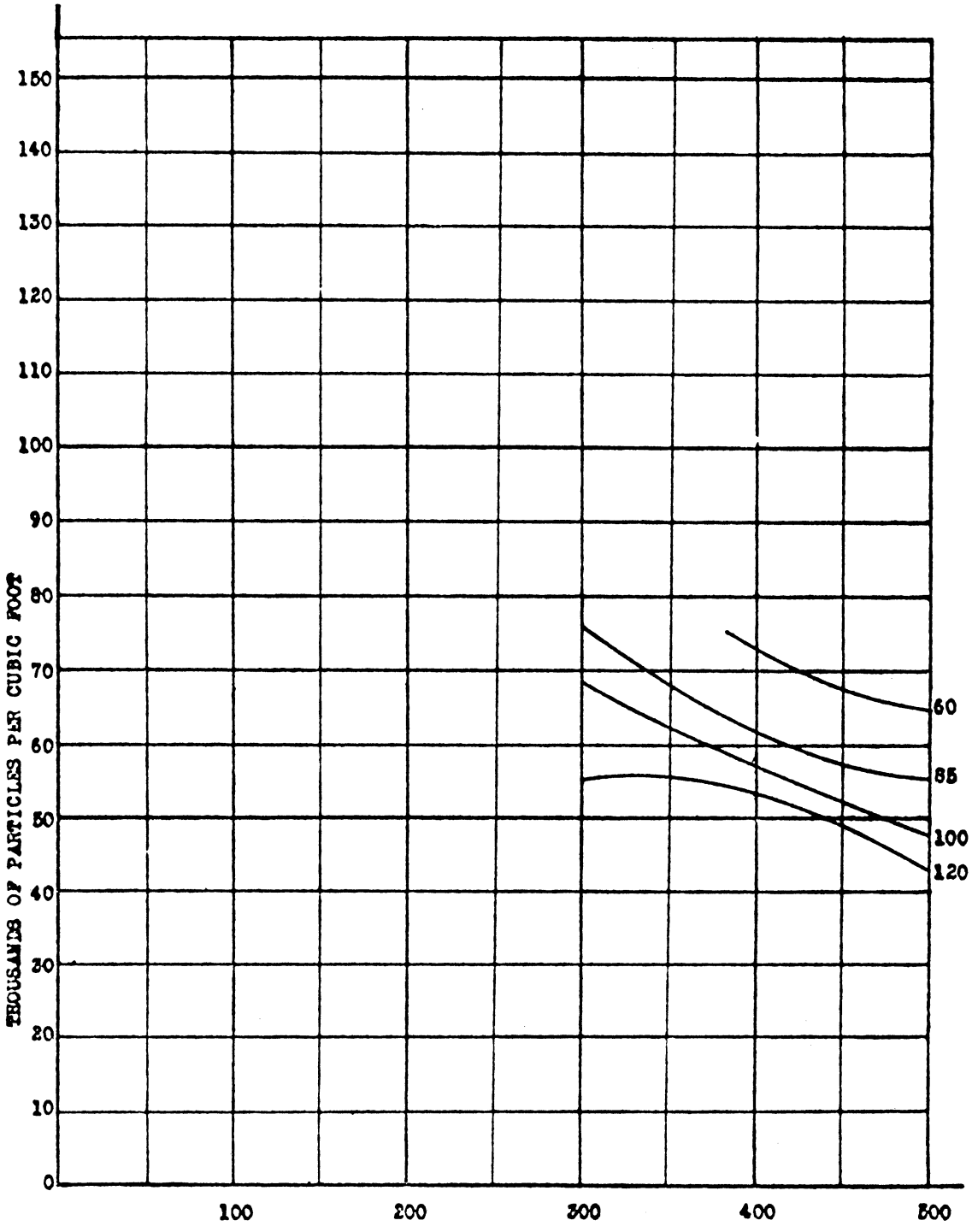
Fig. 33.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

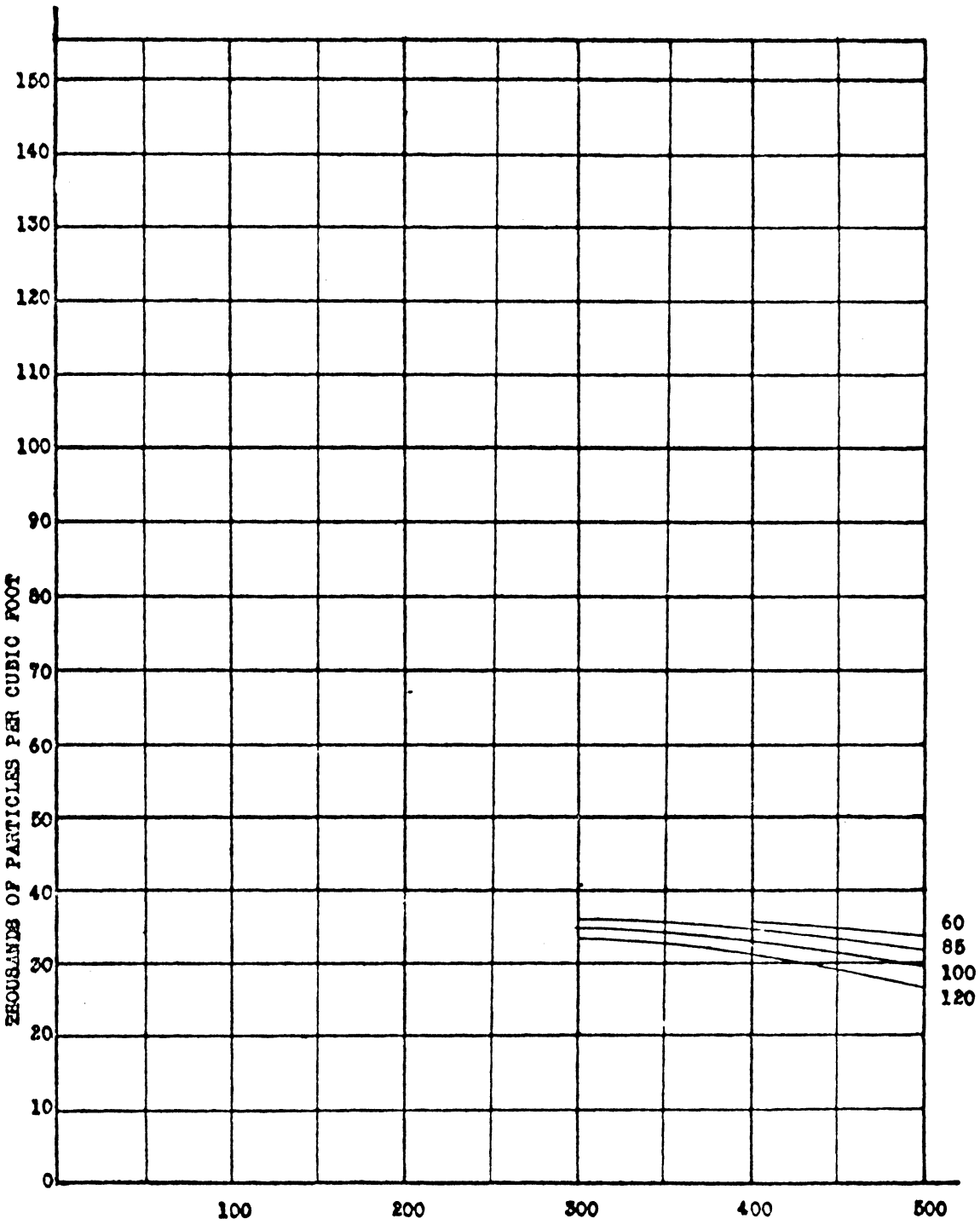
Fig. 34.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 7,500 FEET DOWNWIND FROM STACK.

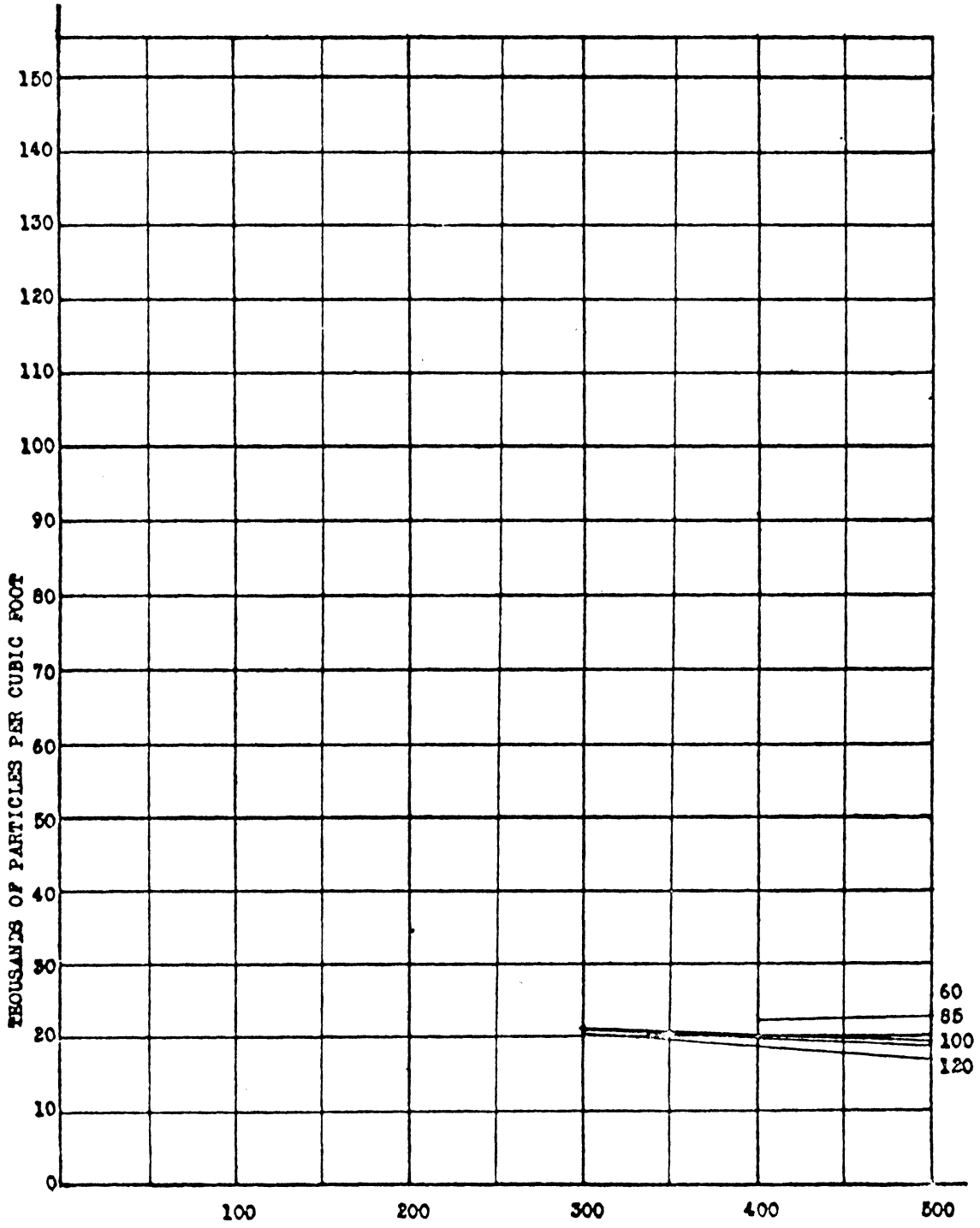
Fig. 35.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100,120 F.P.S.
STACK LOCATION 1

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 12,000 FEET DOWNWIND FROM STACK.

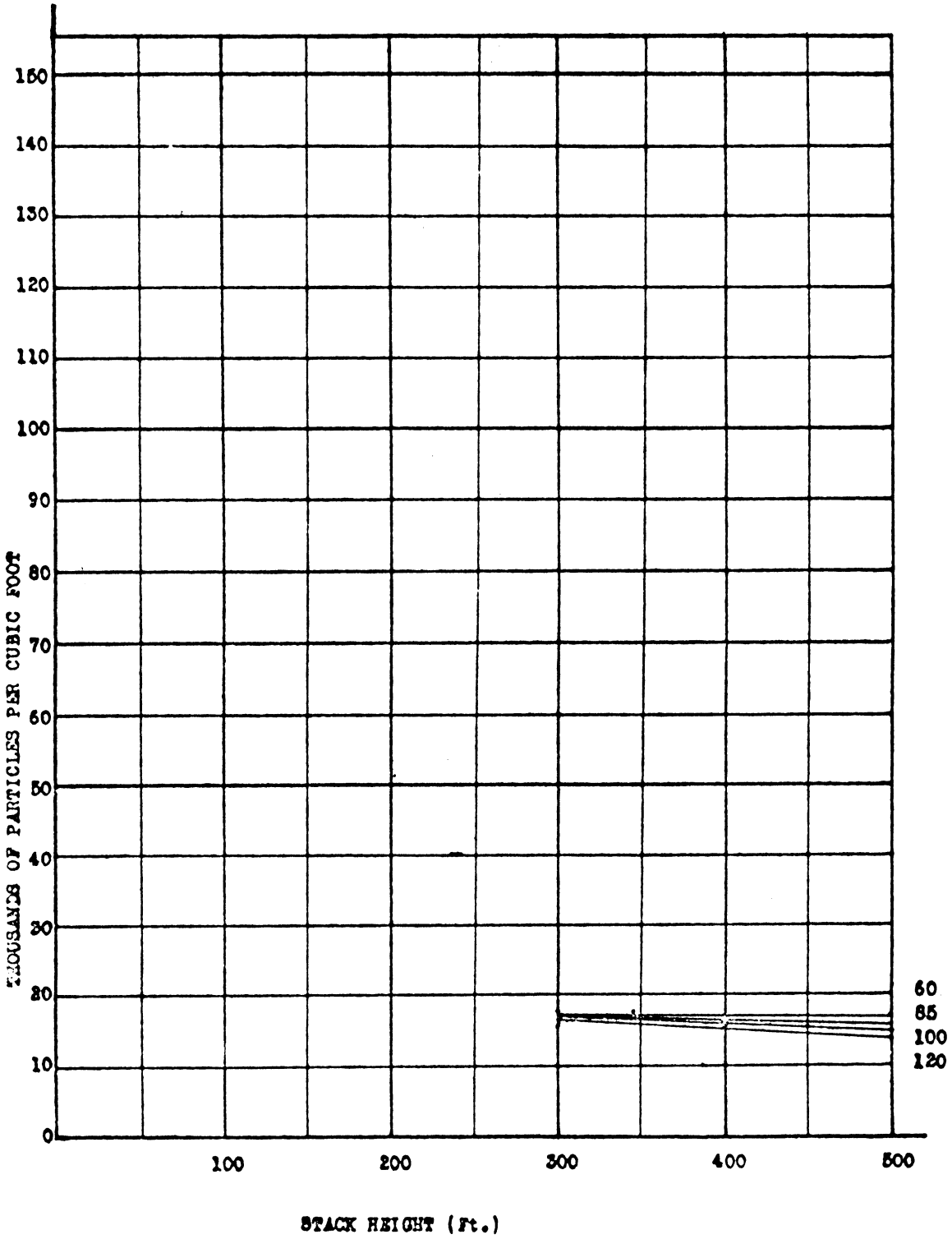
Fig. 36.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
17,000 FEET DOWNWIND FROM STACK.

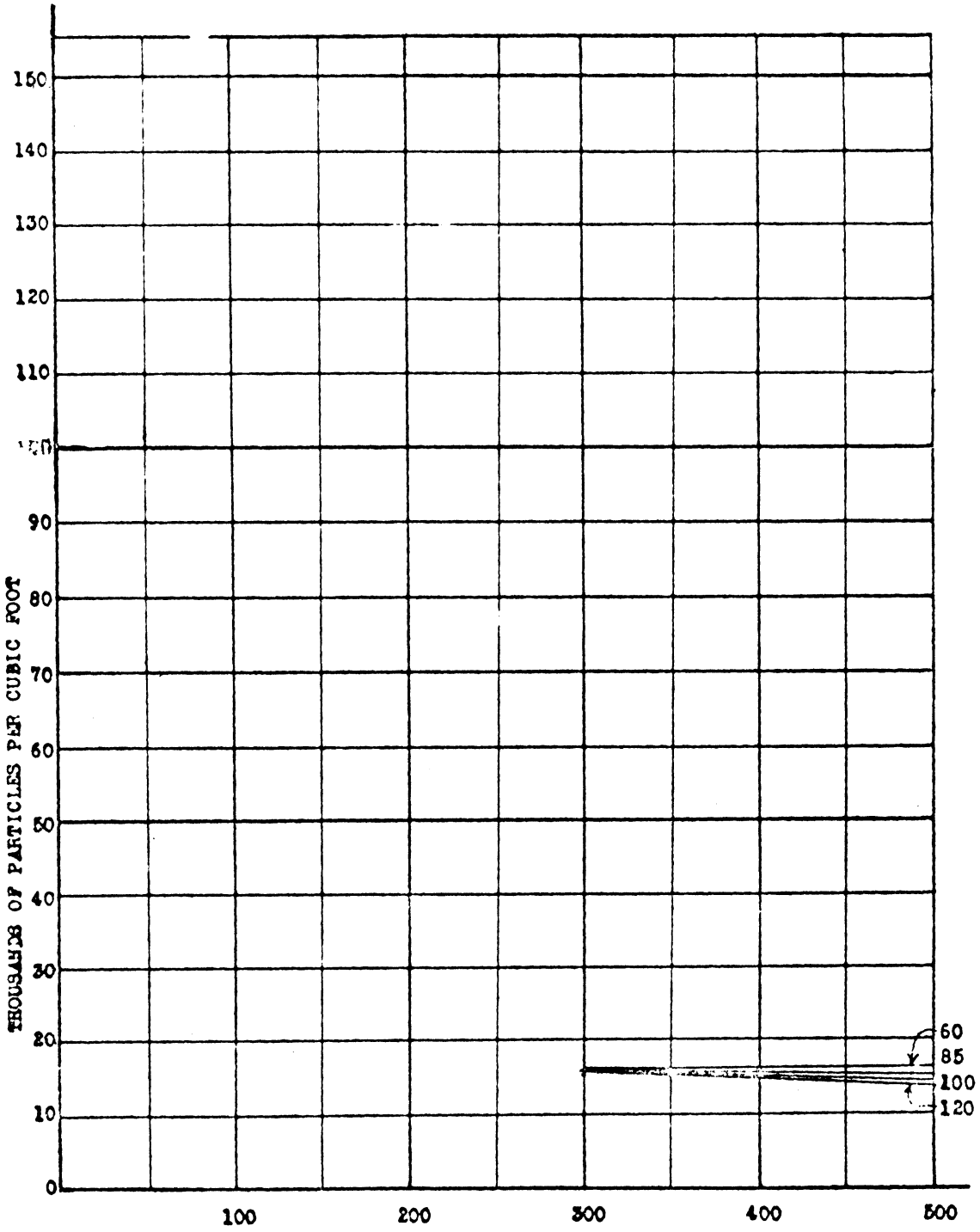
Fig. 37.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

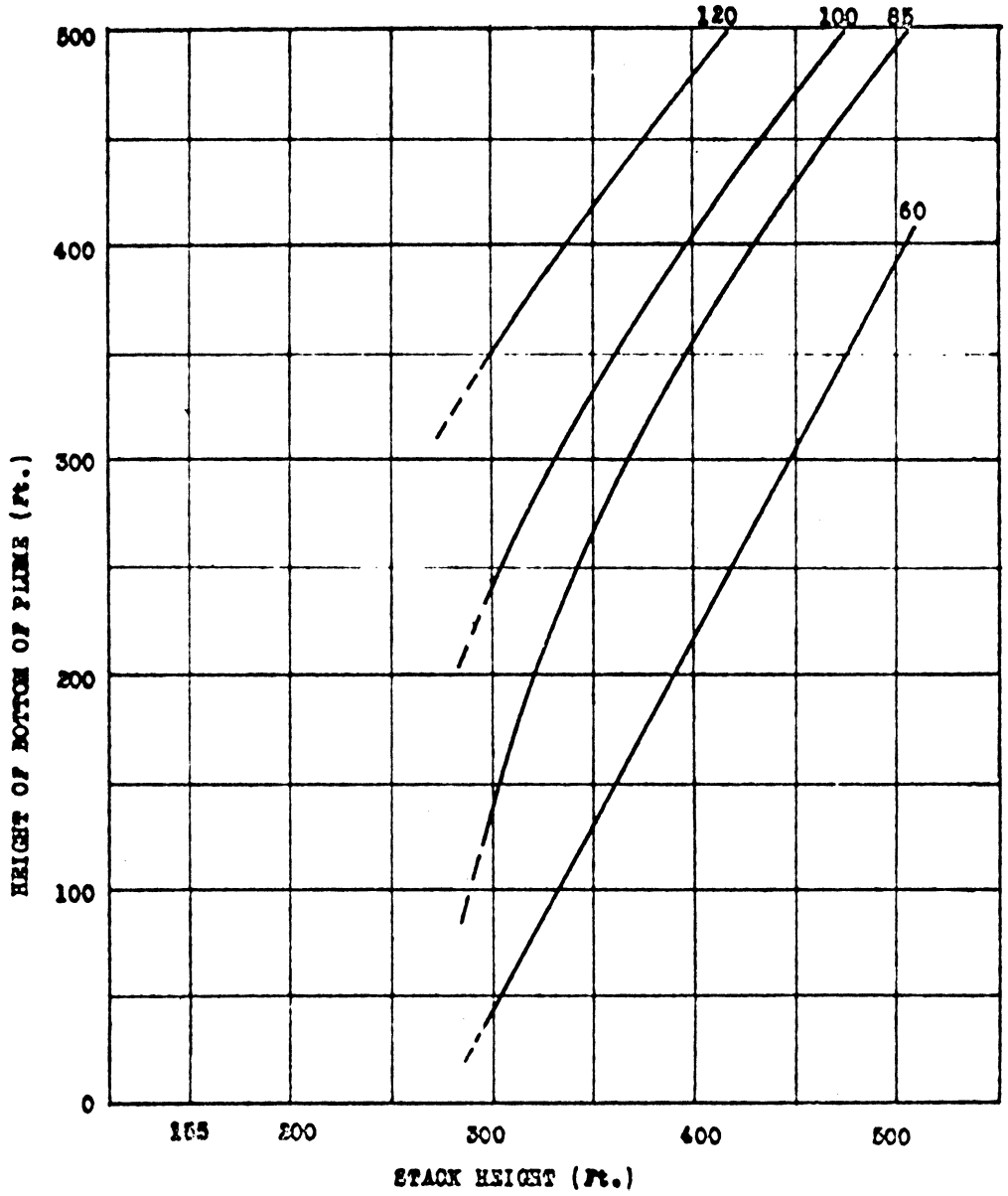
Fig. 38.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F. P. S.
STACY LOCATION 1.

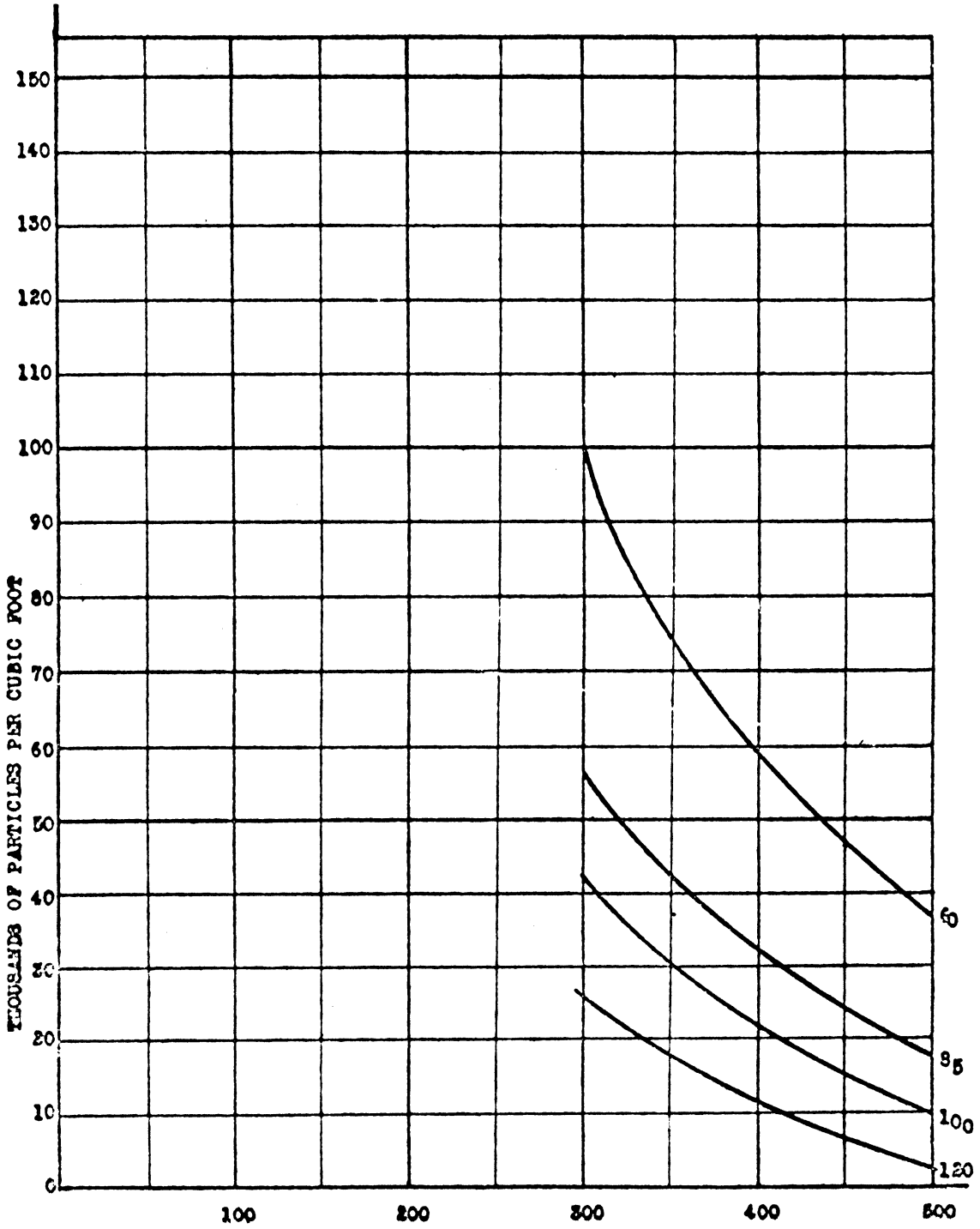
PLANT WITH EXTENSIONS
DUST CONCENTRATION AT GROUND LEVEL, 20,000 FEET DOWNWIND FROM STACK.

Fig. 9.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.). PLANT WITH EXTENSIONS.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S. PLUME HEIGHT ABOVE GROUND LEVEL,
STACK LOCATION 2. 3,000 FEET DOWNWIND FROM STACK

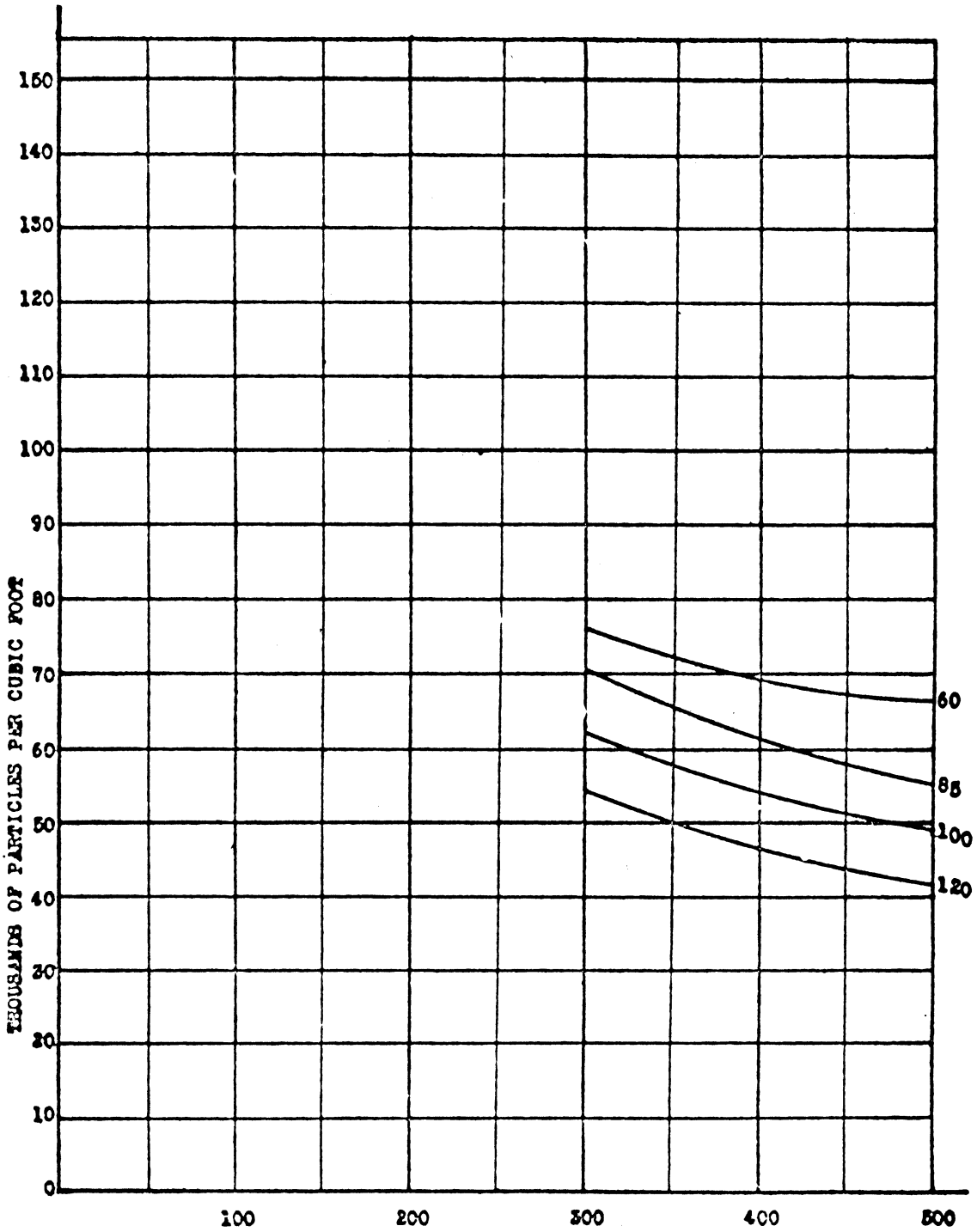
Fig. 40.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 5,000 FEET DOWNWIND FROM STACK.

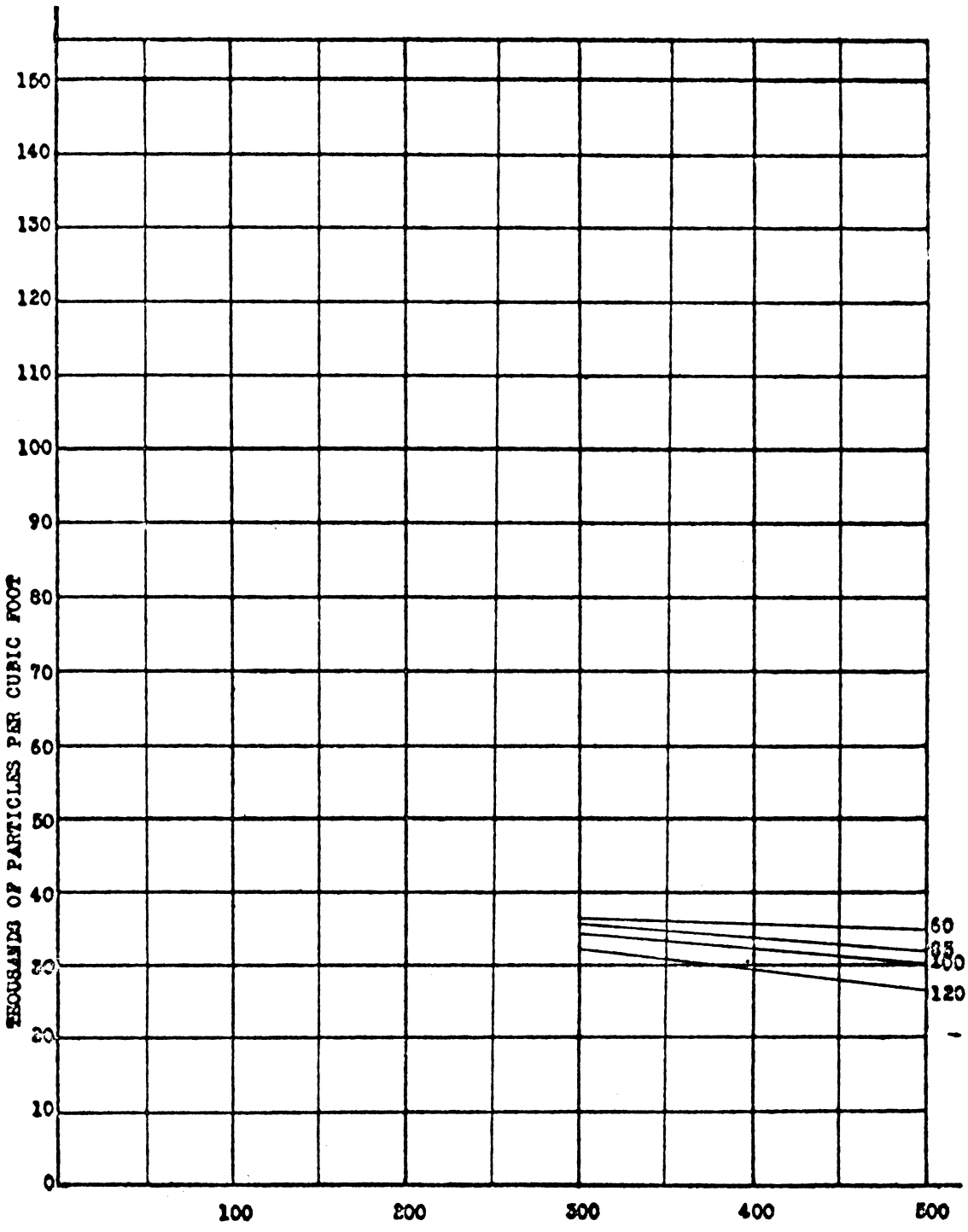
Fig. 41.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 7,500 FEET DOWNWIND FROM STACK.

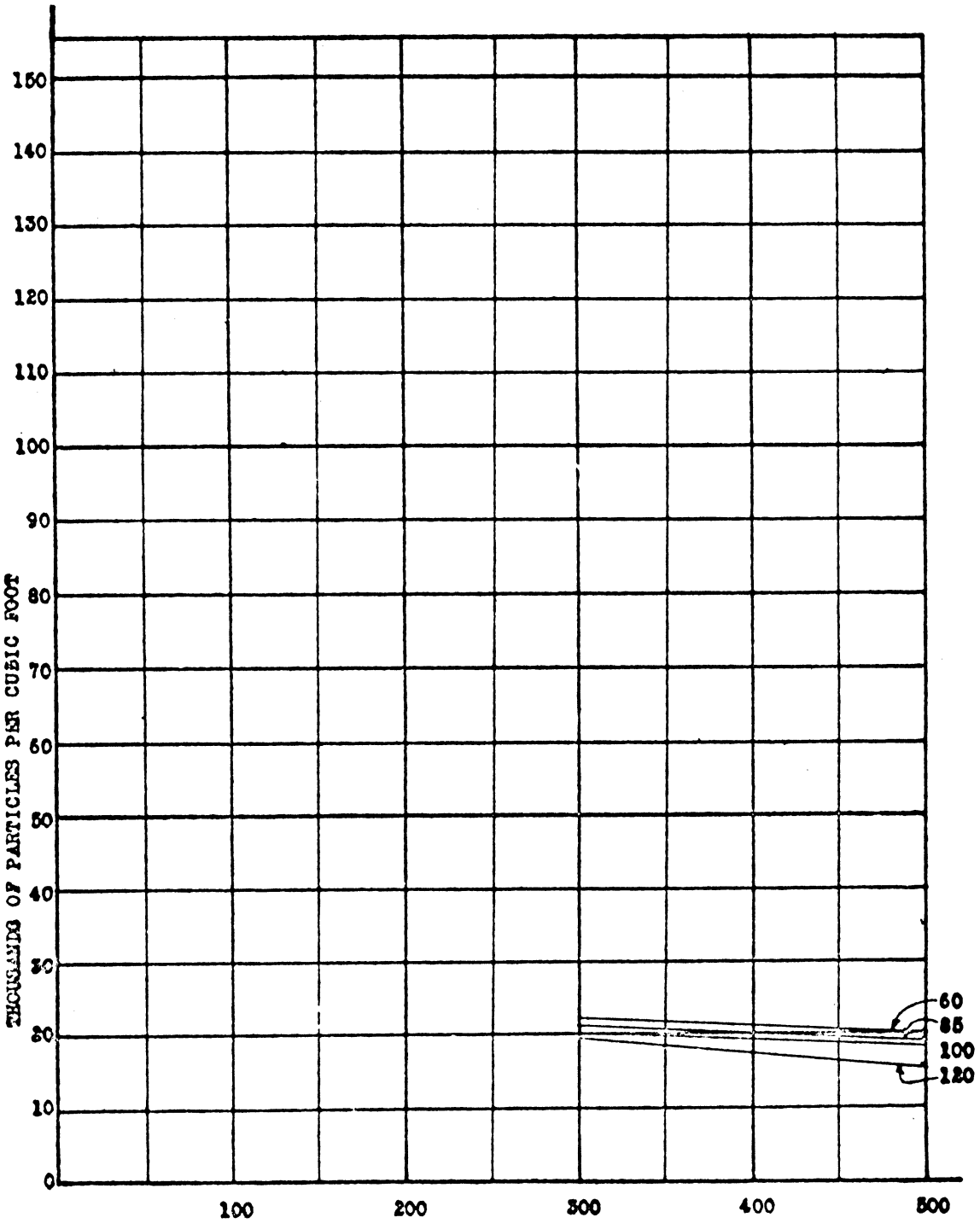
Fig. 42.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 12,000 FEET DOWNWIND FROM STACK.

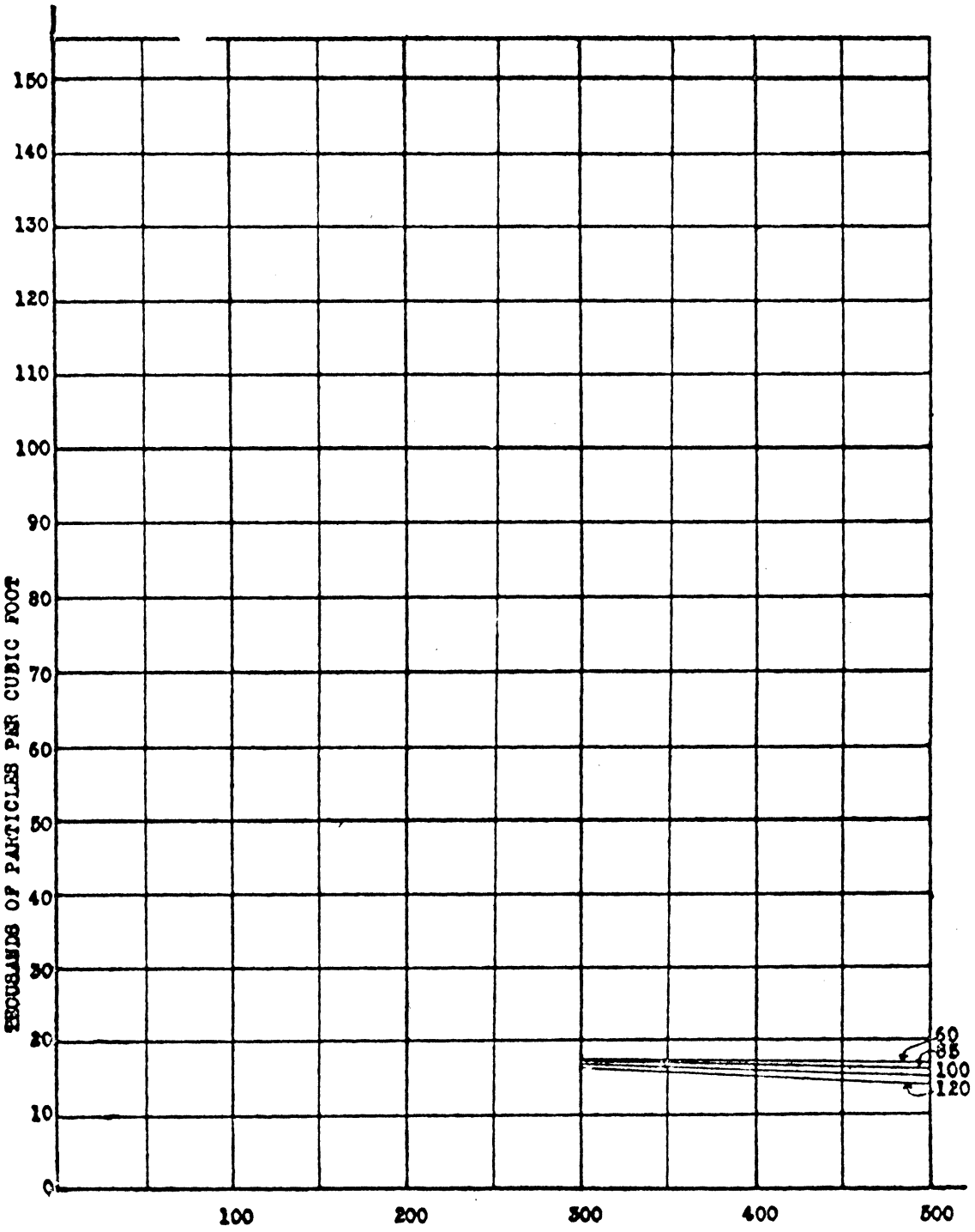
Fig. 43.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION E.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL.
17,000 FEET DOWNWIND FROM STACK.

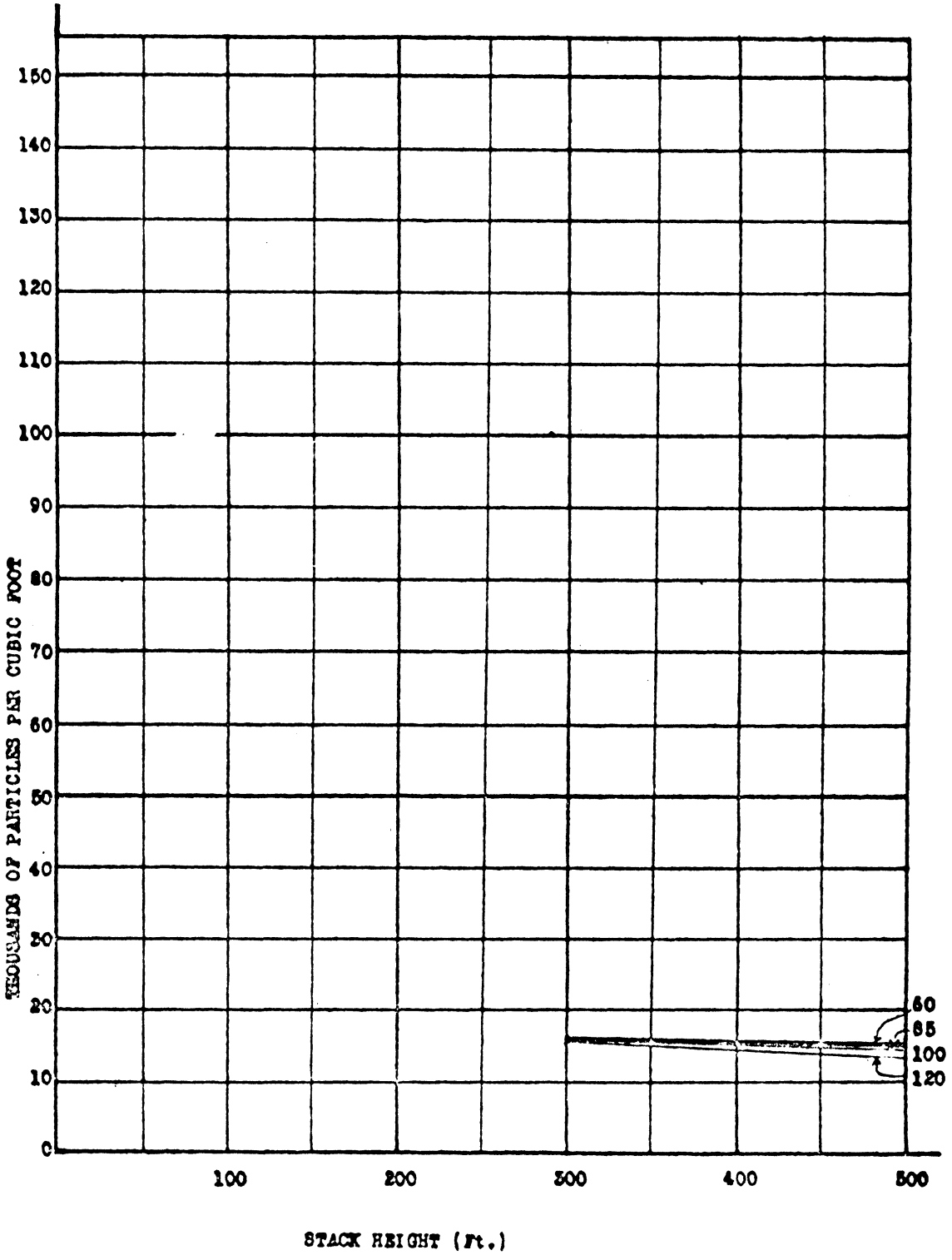
Fig. 44.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

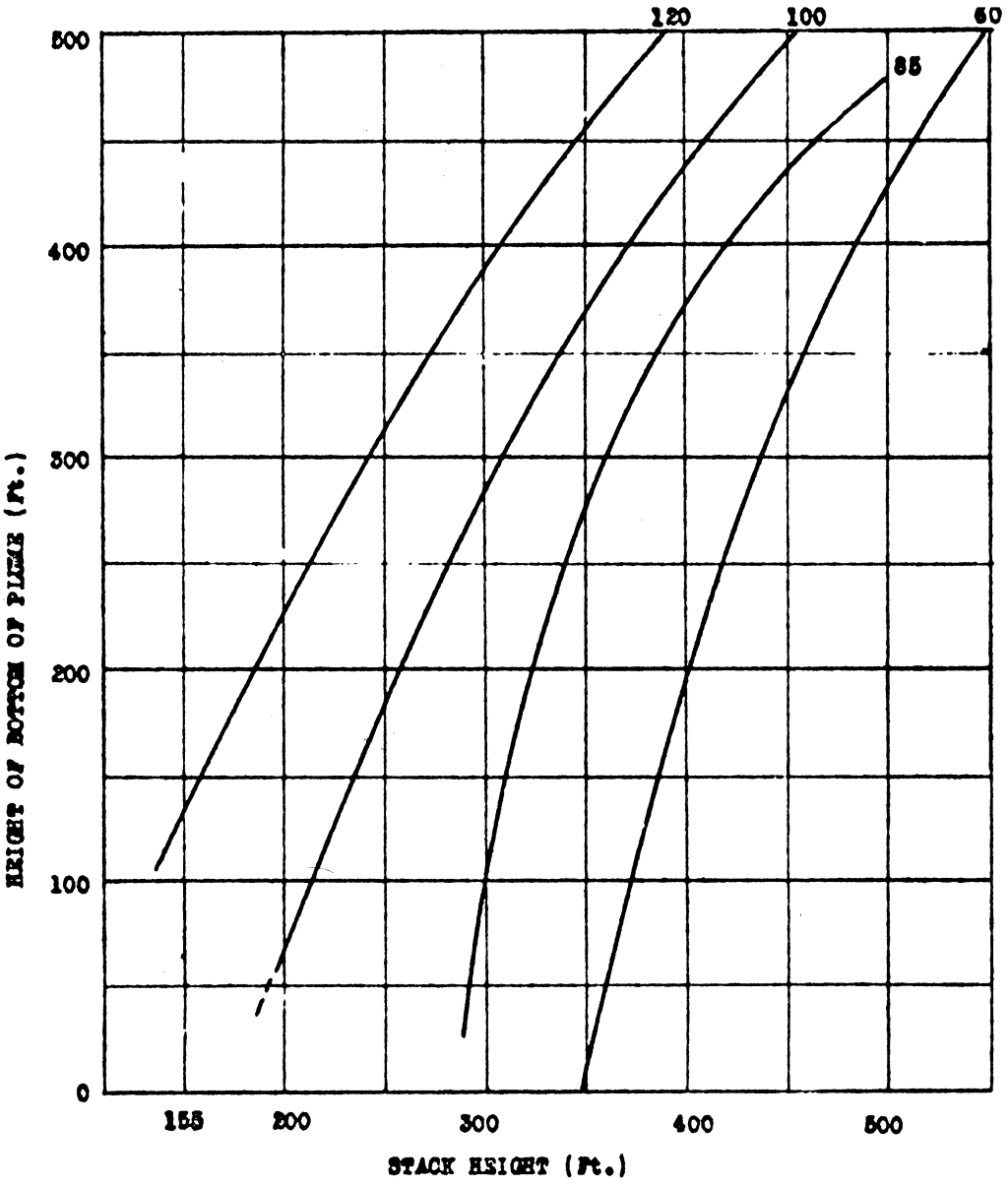
Fig. 45.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
20,000 FEET DOWNWIND FROM STACK.

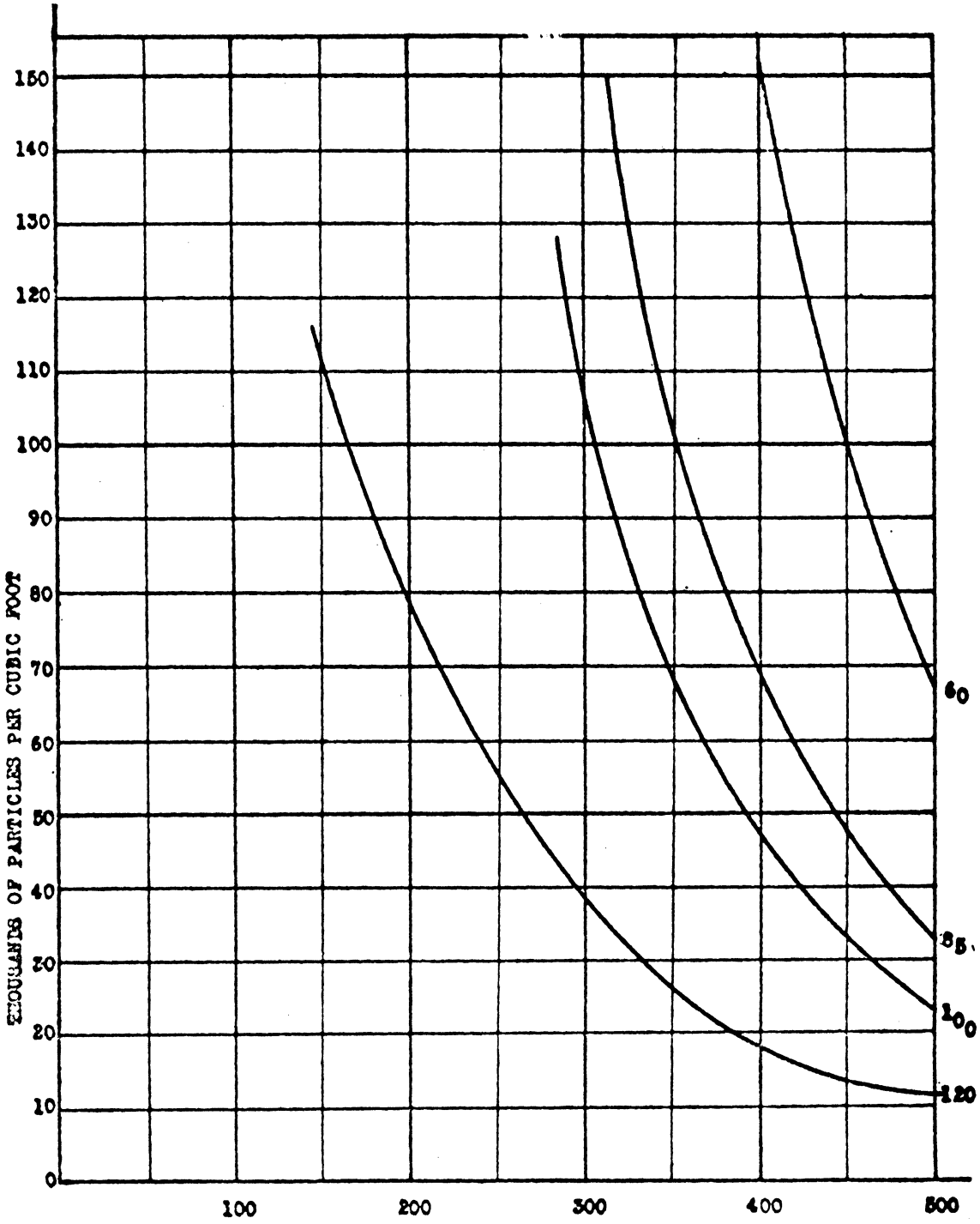
Fig. 46.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

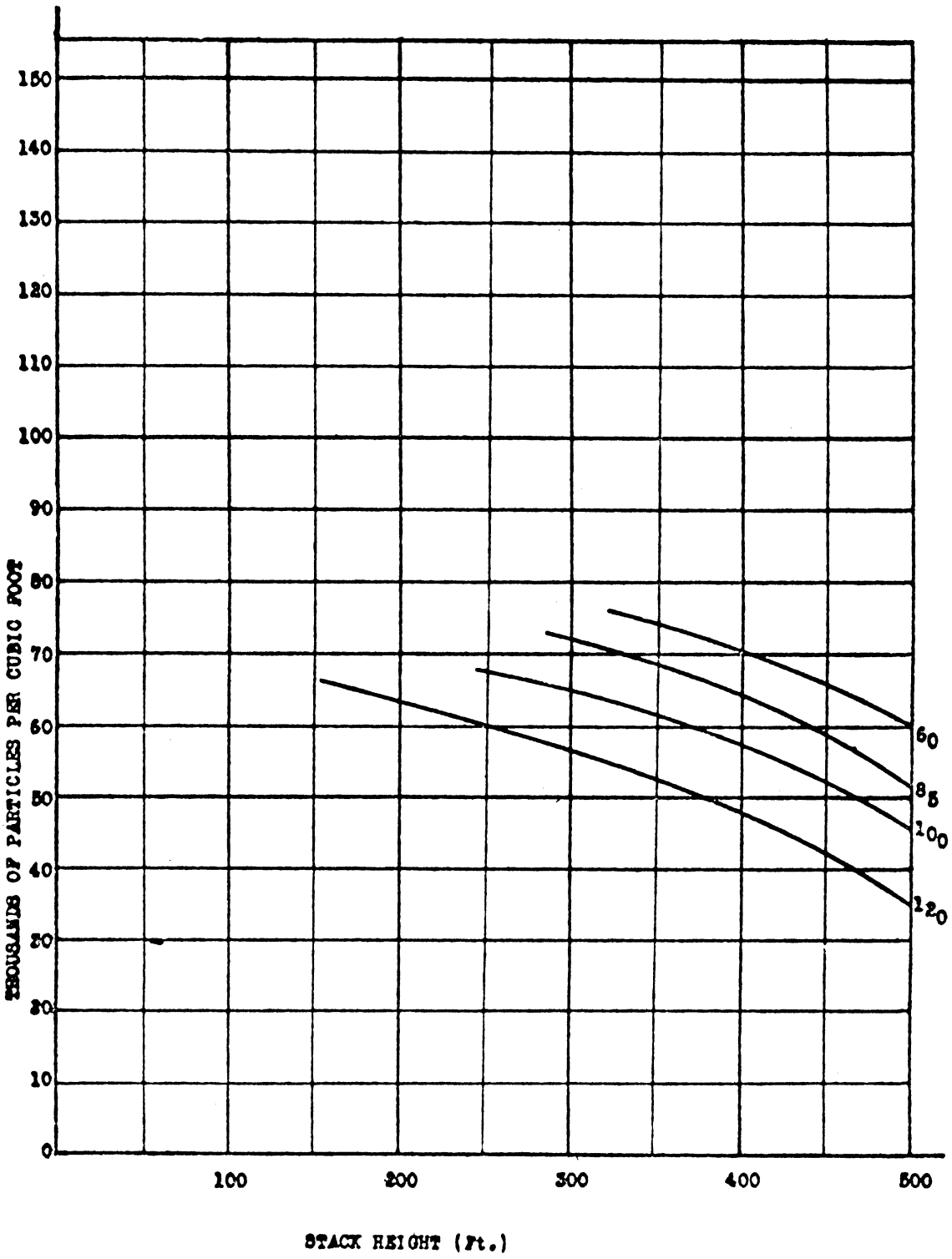
PLANT WITH EXTENSIONS
PLUME HEIGHT ABOVE GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

Fig. 47.



WIND FROM NORTH-WEST AT 20.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATIONS.
PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 3,000 FEET DOWNWIND FROM STACK.

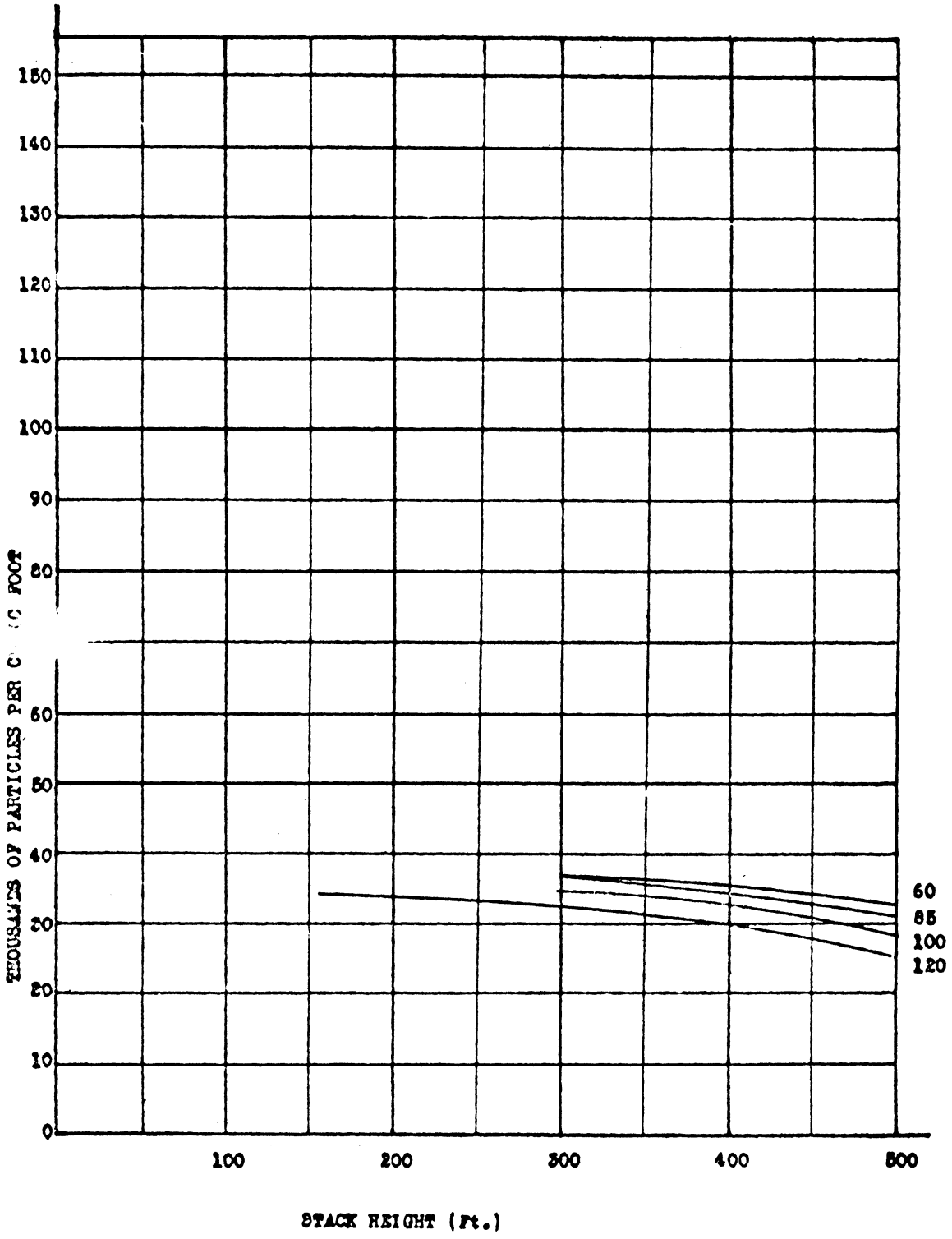
Fig. 48.



WIND FROM NORTH-WEST AT 10.35 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 5.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
7,500 FEET DOWNWIND FROM STACK.

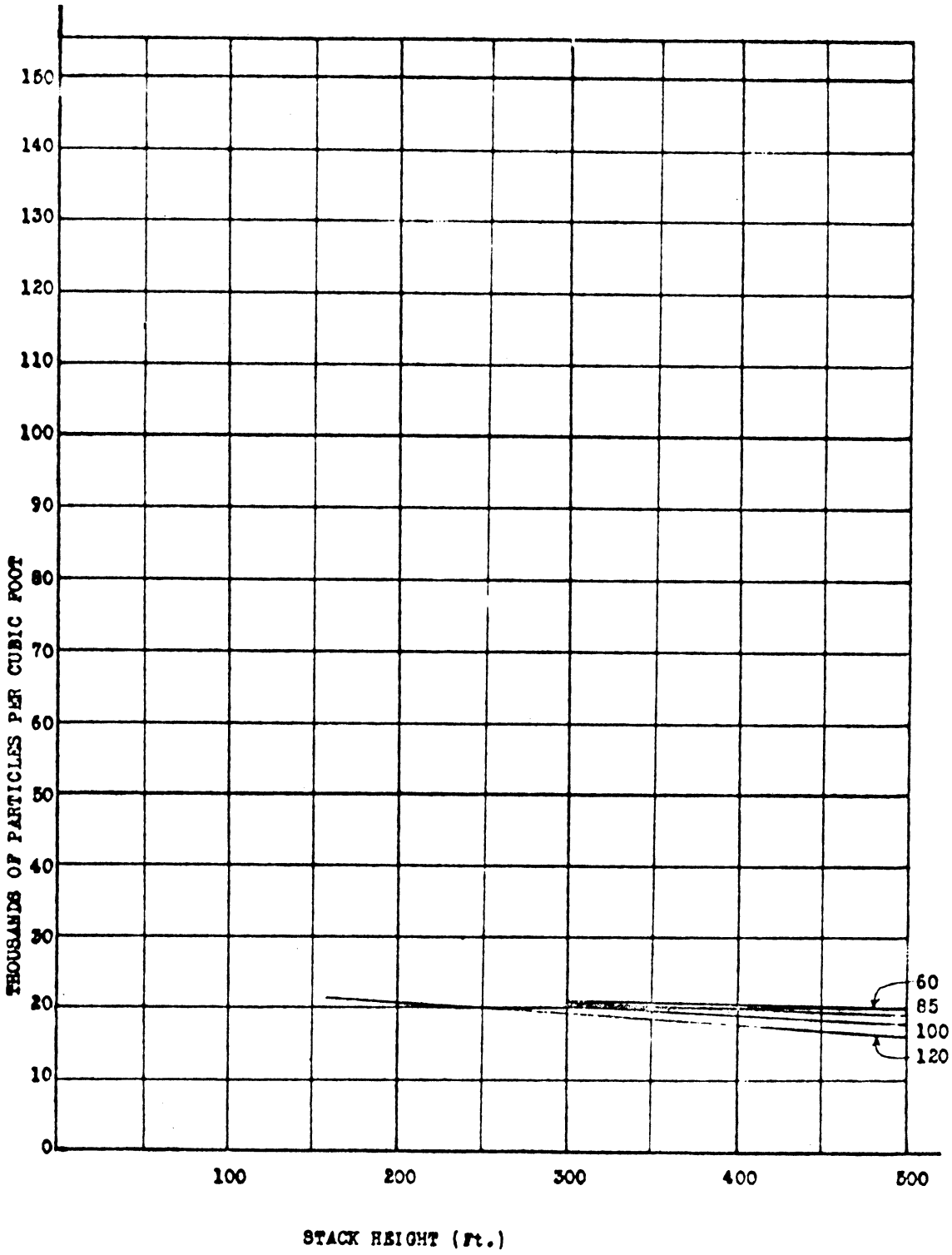
Fig. 49.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.)
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
12,000 FEET DOWNWIND FROM STACK.

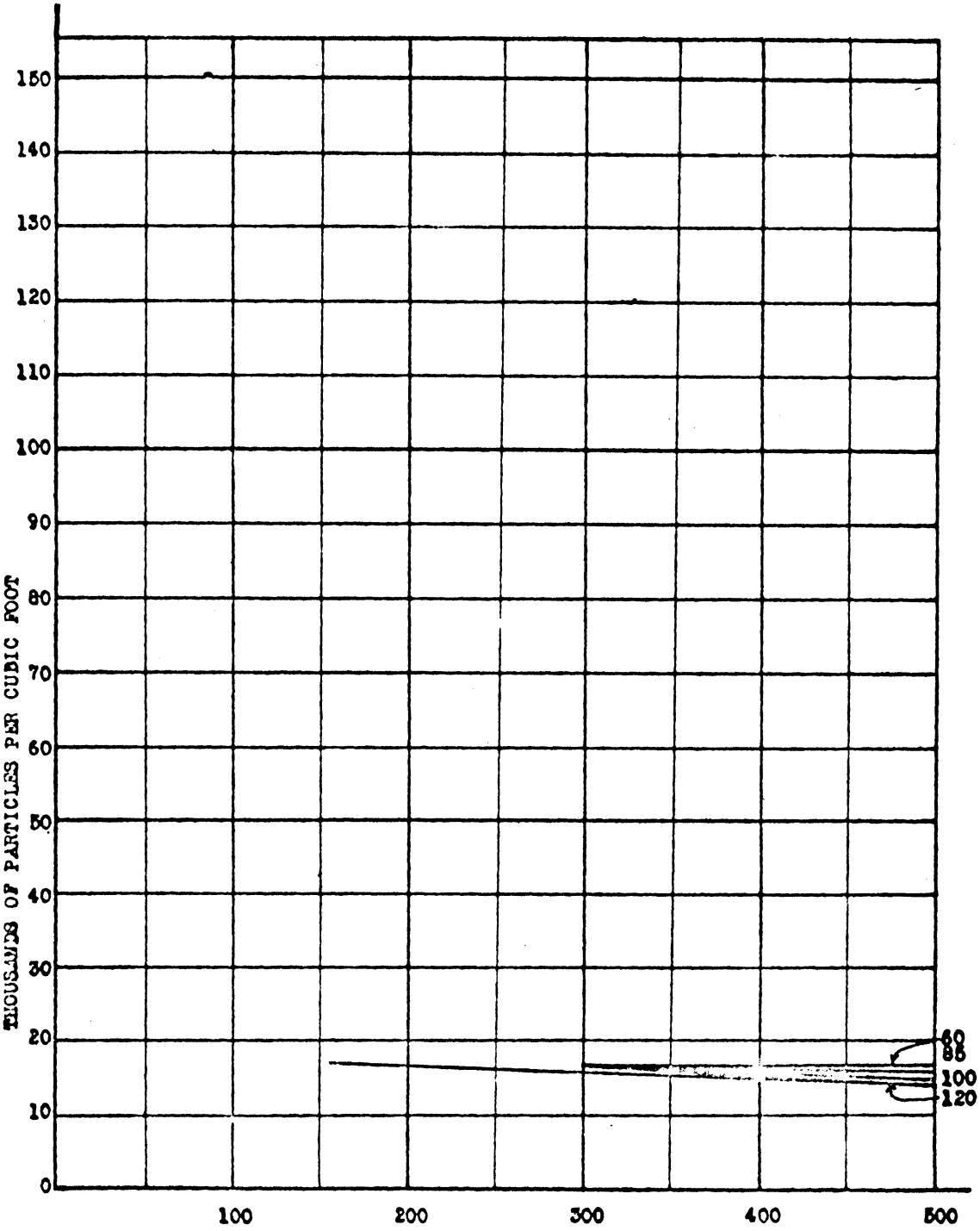
Fig. 50.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S. (
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
17,000 FEET DOWNWIND FROM STACK.

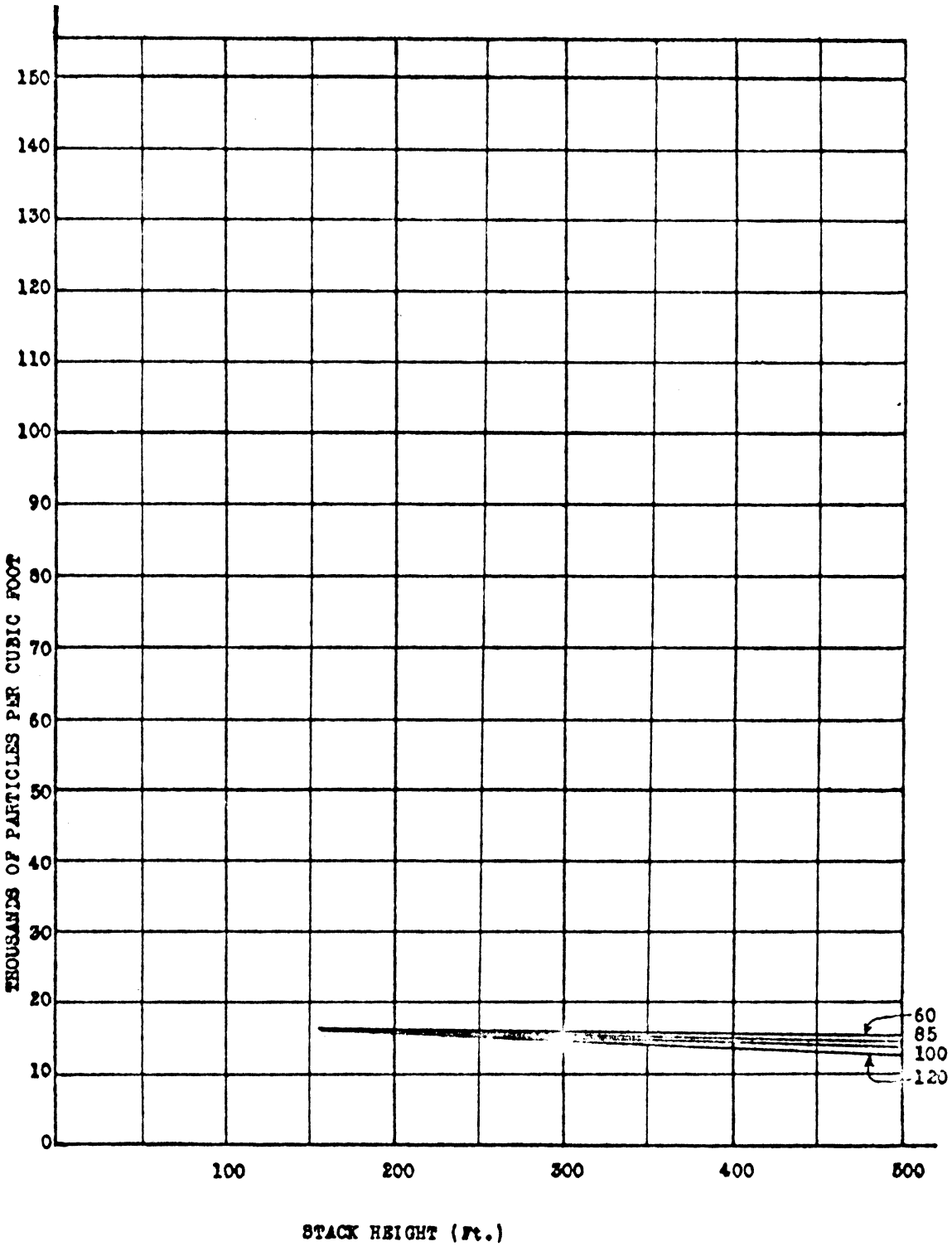
Fig. 51.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 5.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

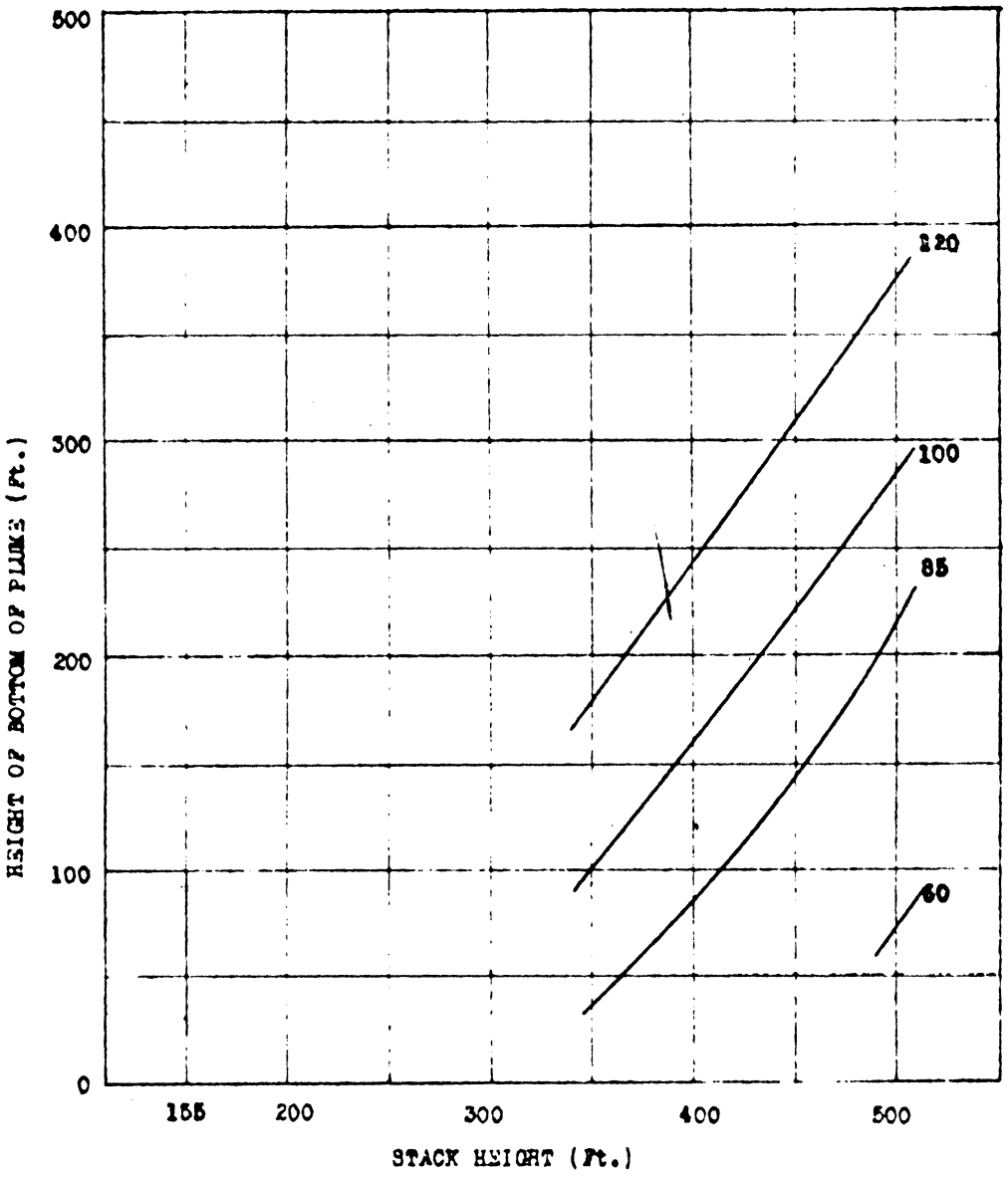
Fig. 52.



WIND FROM NORTH-WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

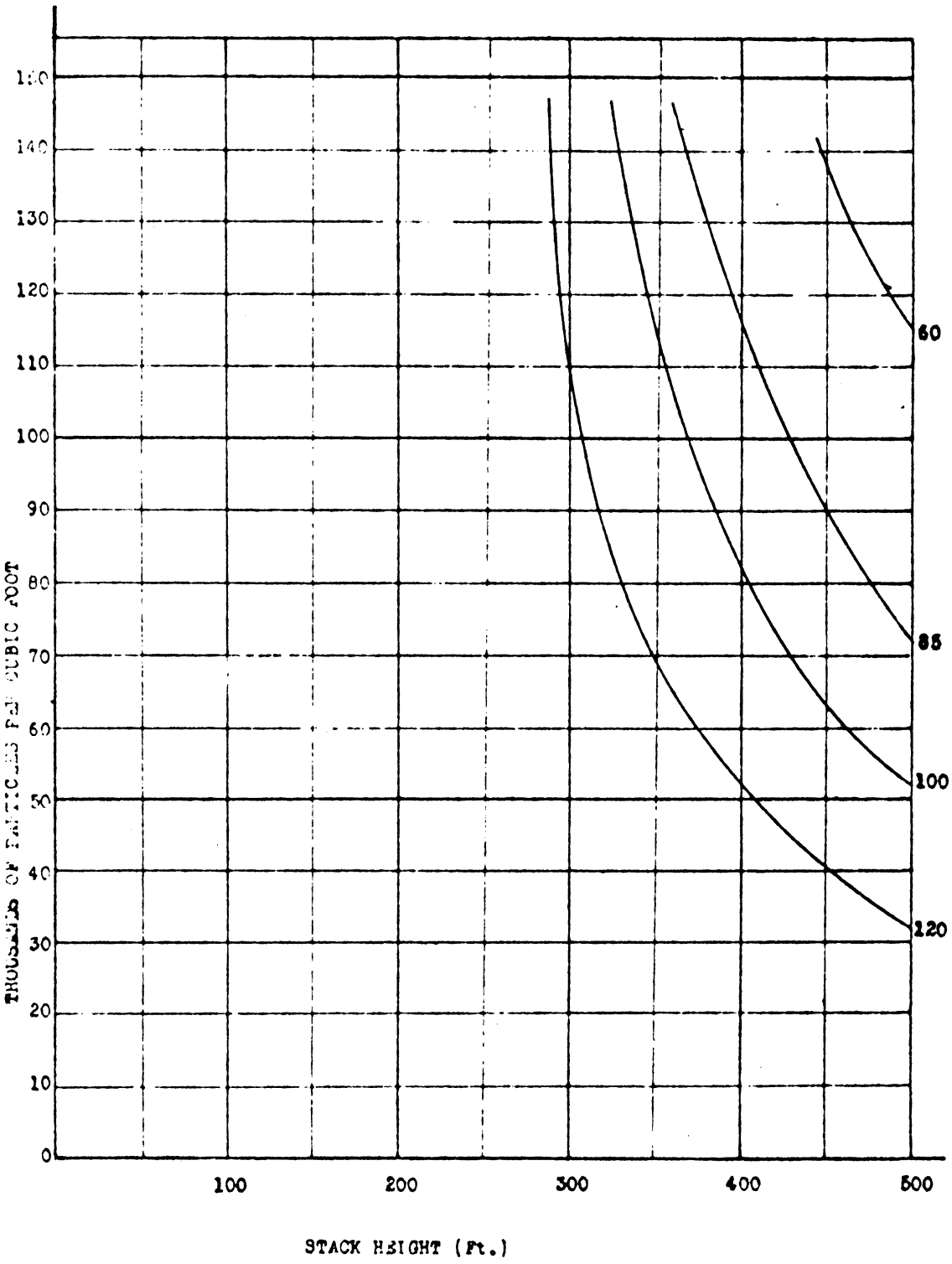
PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
20,000 FEET DOWNWIND FROM STACK.

Fig. 53.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.
PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 3,000 FEET DOWNWIND FROM STACK.

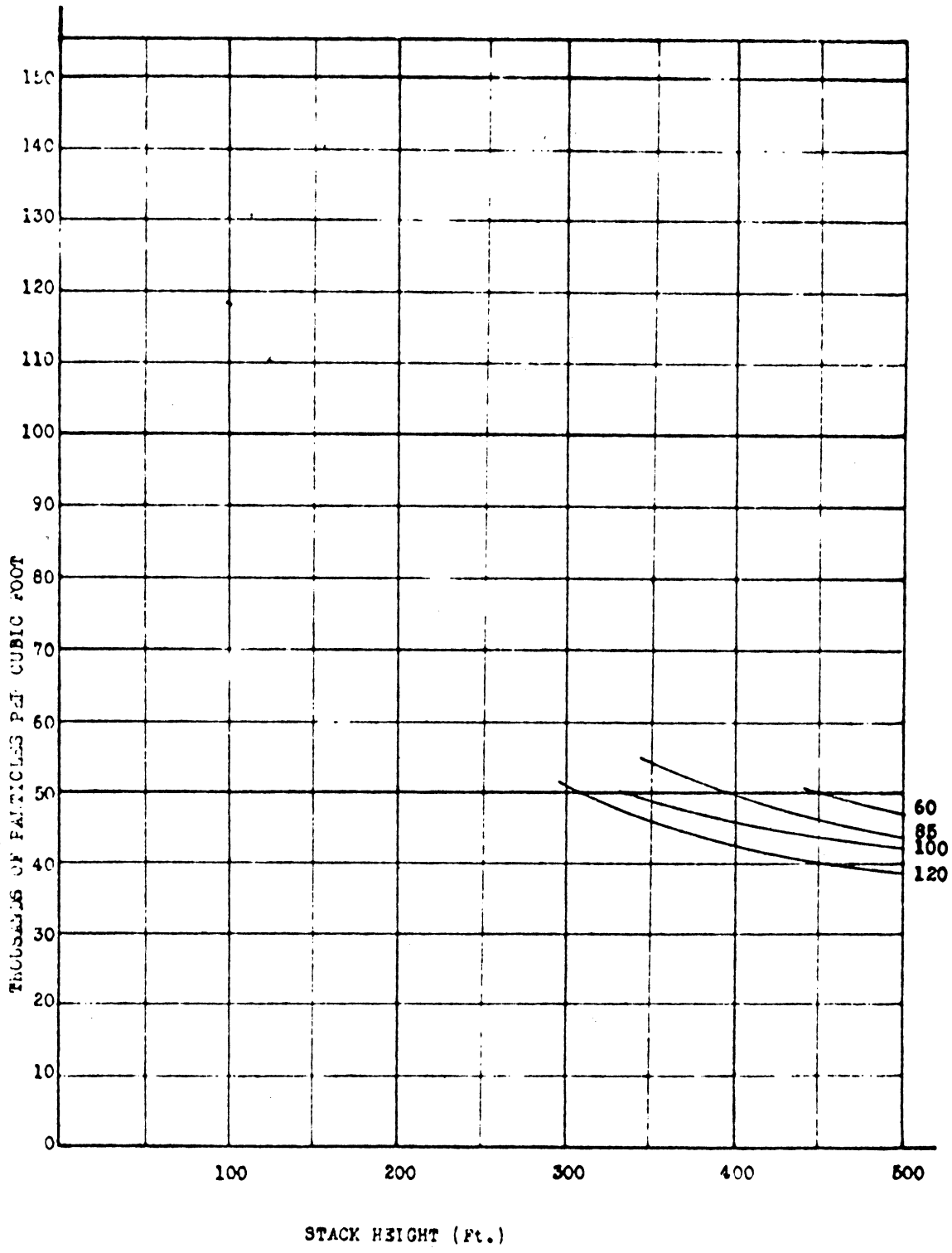
Fig. 54.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

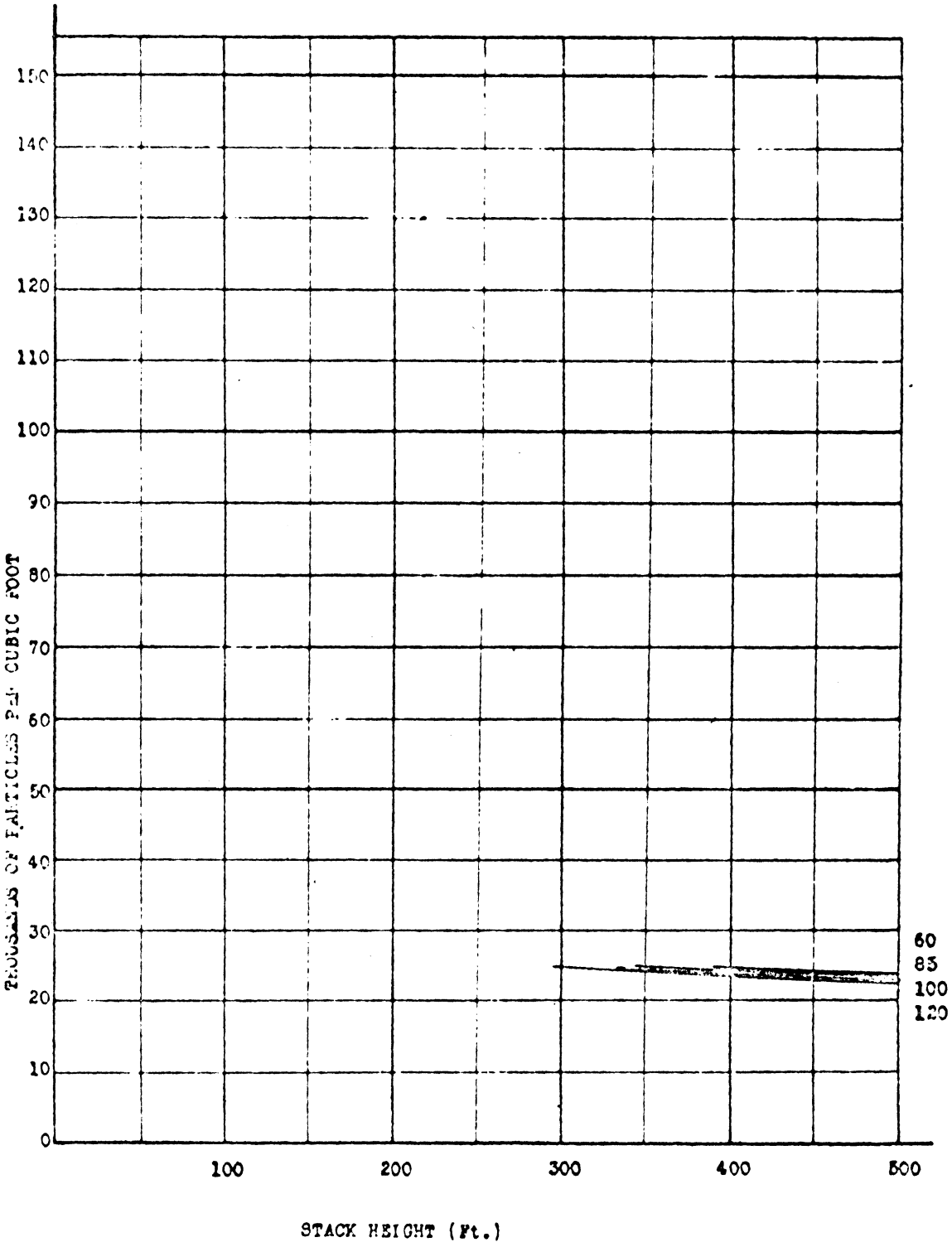
Fig. 55.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS
DUST CONCENTRATION AT GROUND LEVEL,
7,500 FEET DOWNWIND FROM STACK.

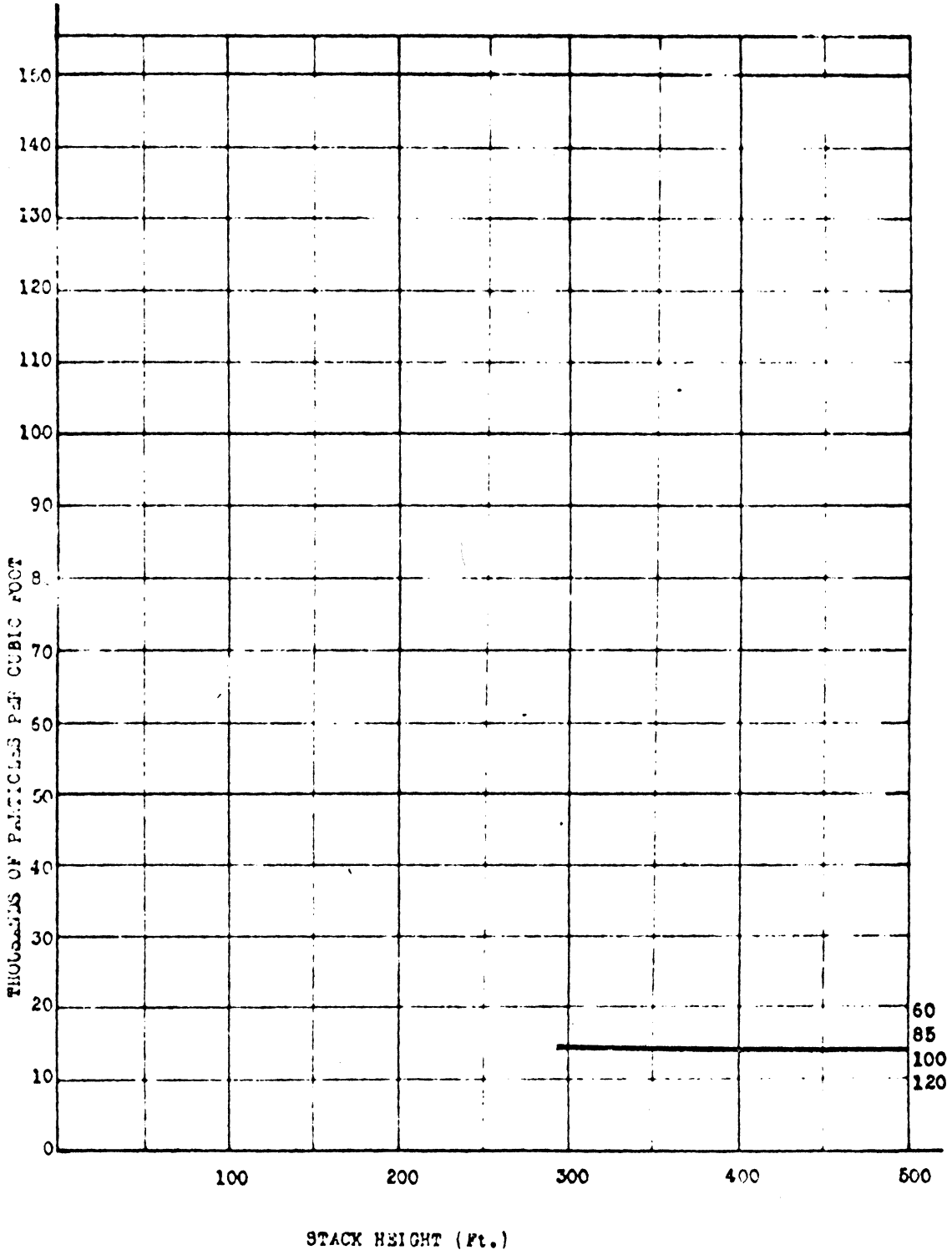
Fig. 56.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

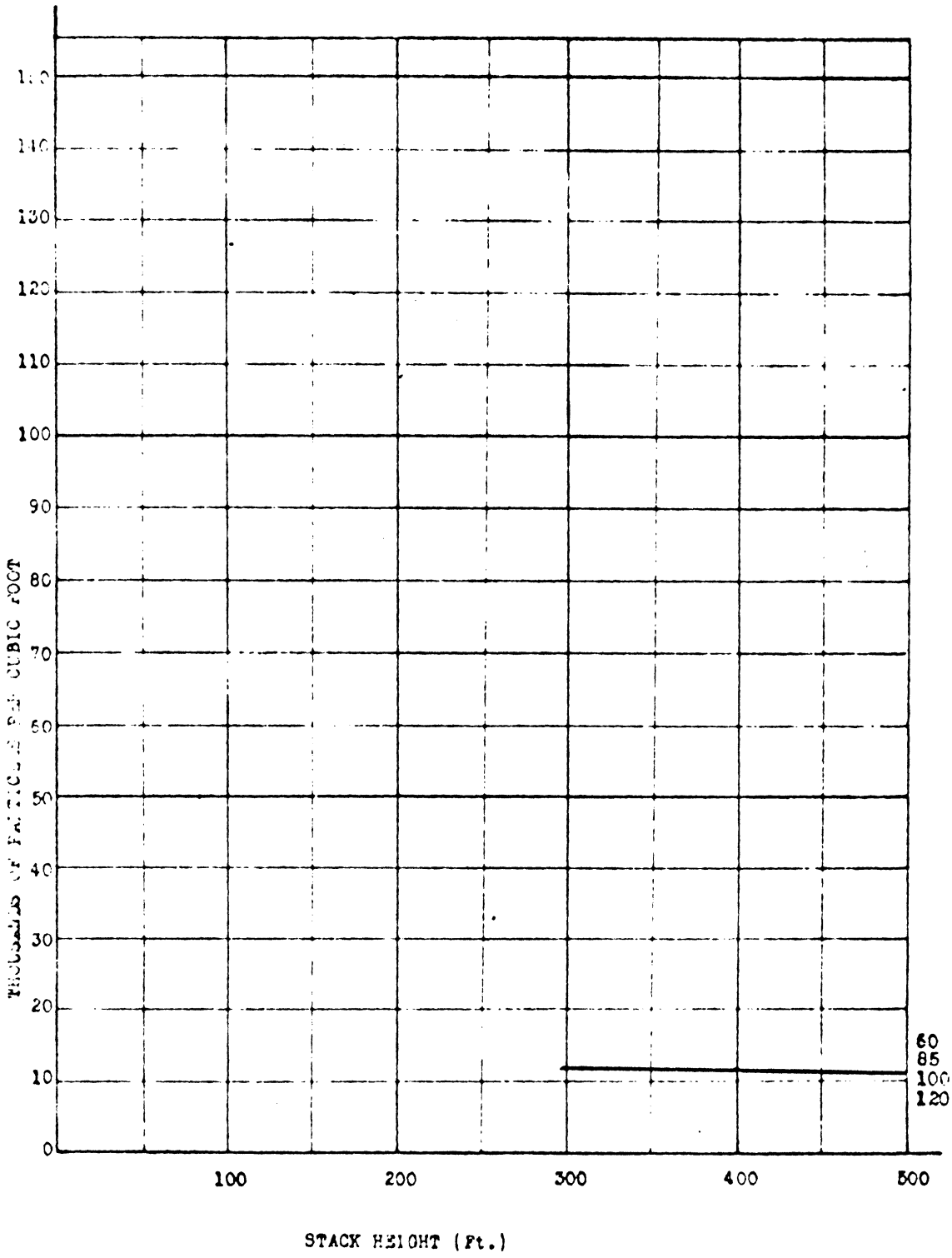
PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 12,000 FEET DOWNWIND FROM STACK.

Fig. 57.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.
PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 17,000 FEET DOWNWIND FROM STACK.

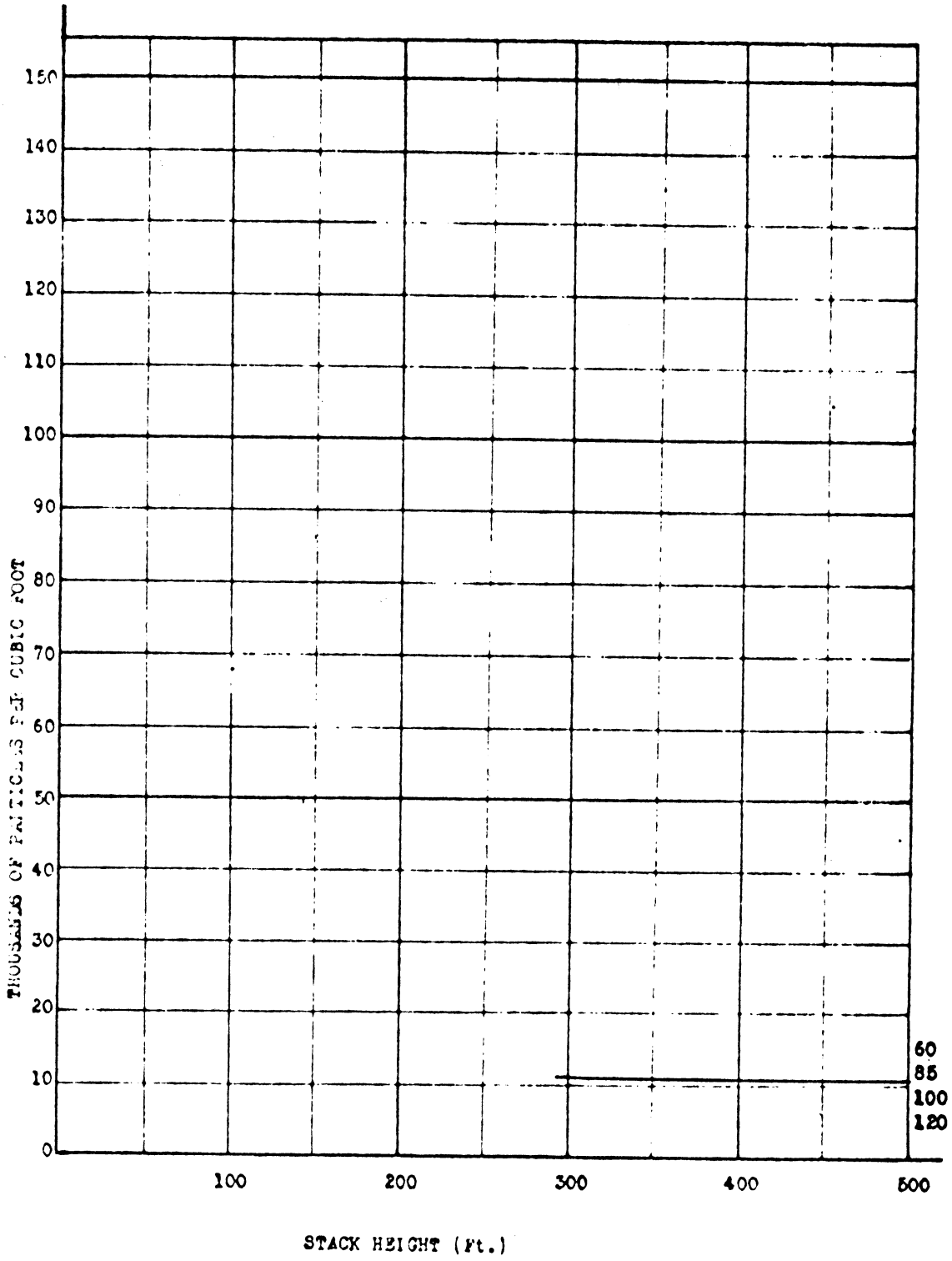
Fig. 58.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

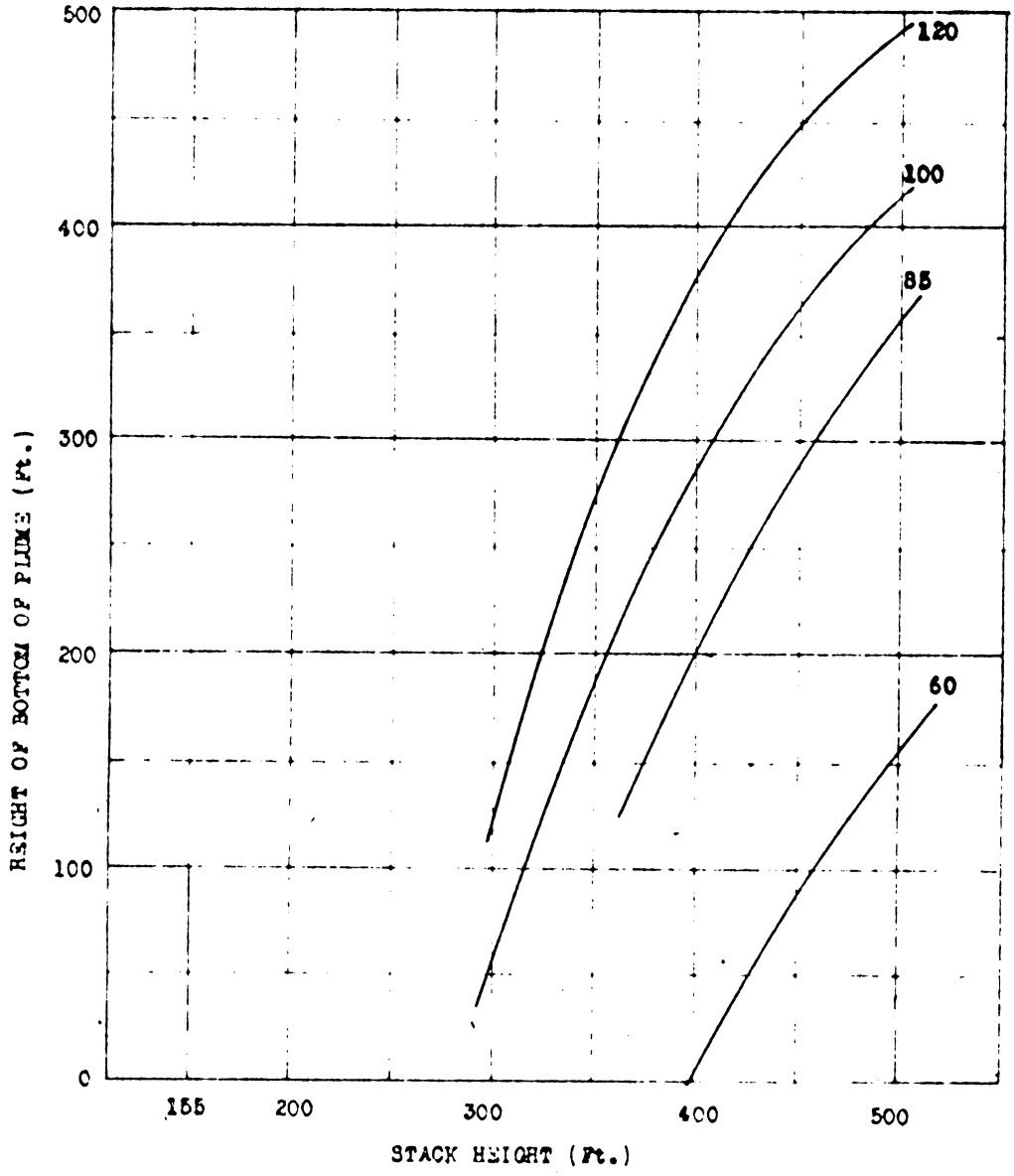
Fig. 59.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 5.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
20,000 FEET DOWNWIND FROM STACK.

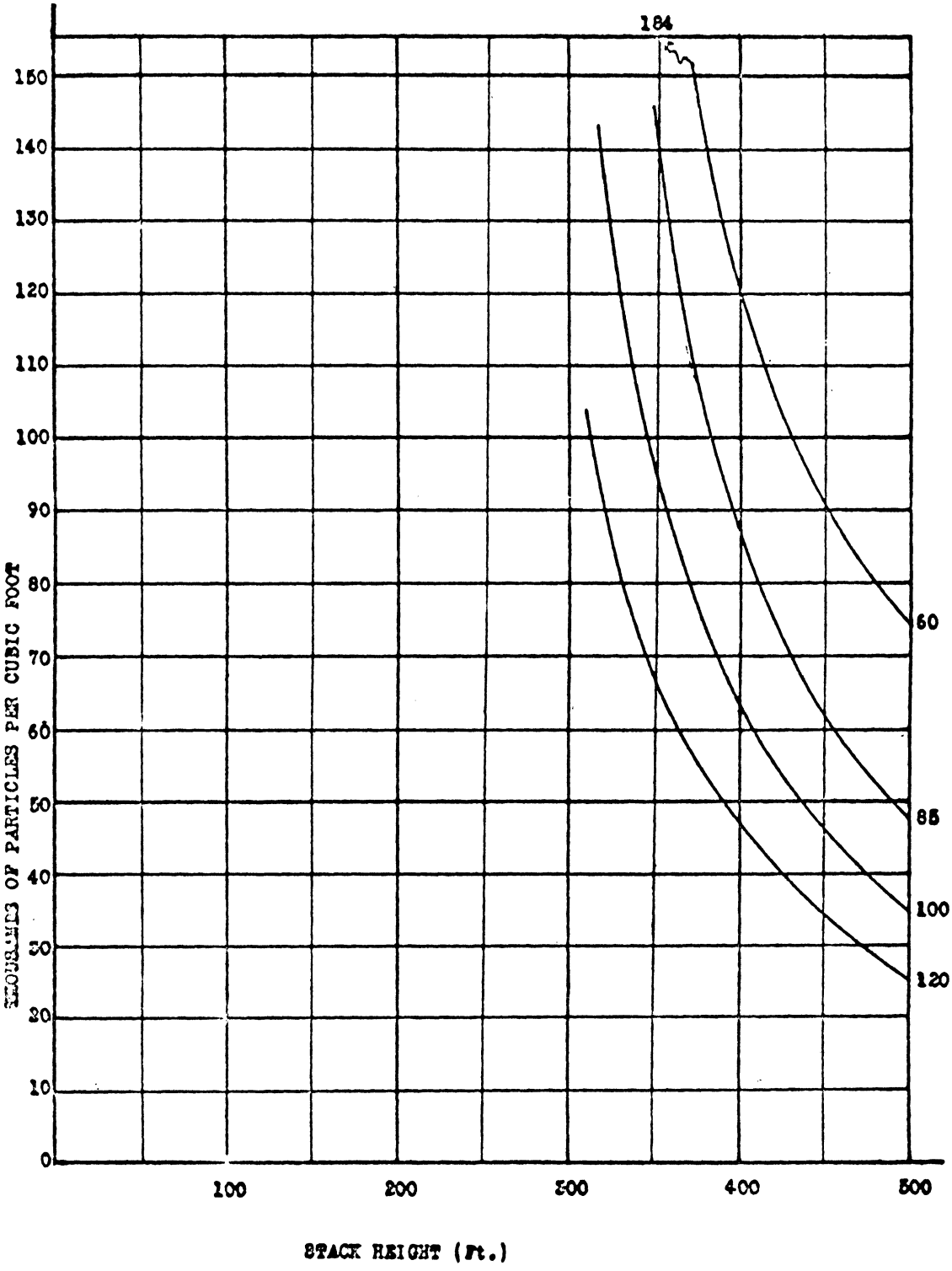
Fig. 60.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3

PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL
3,000 FEET DOWNWIND FROM STACK.

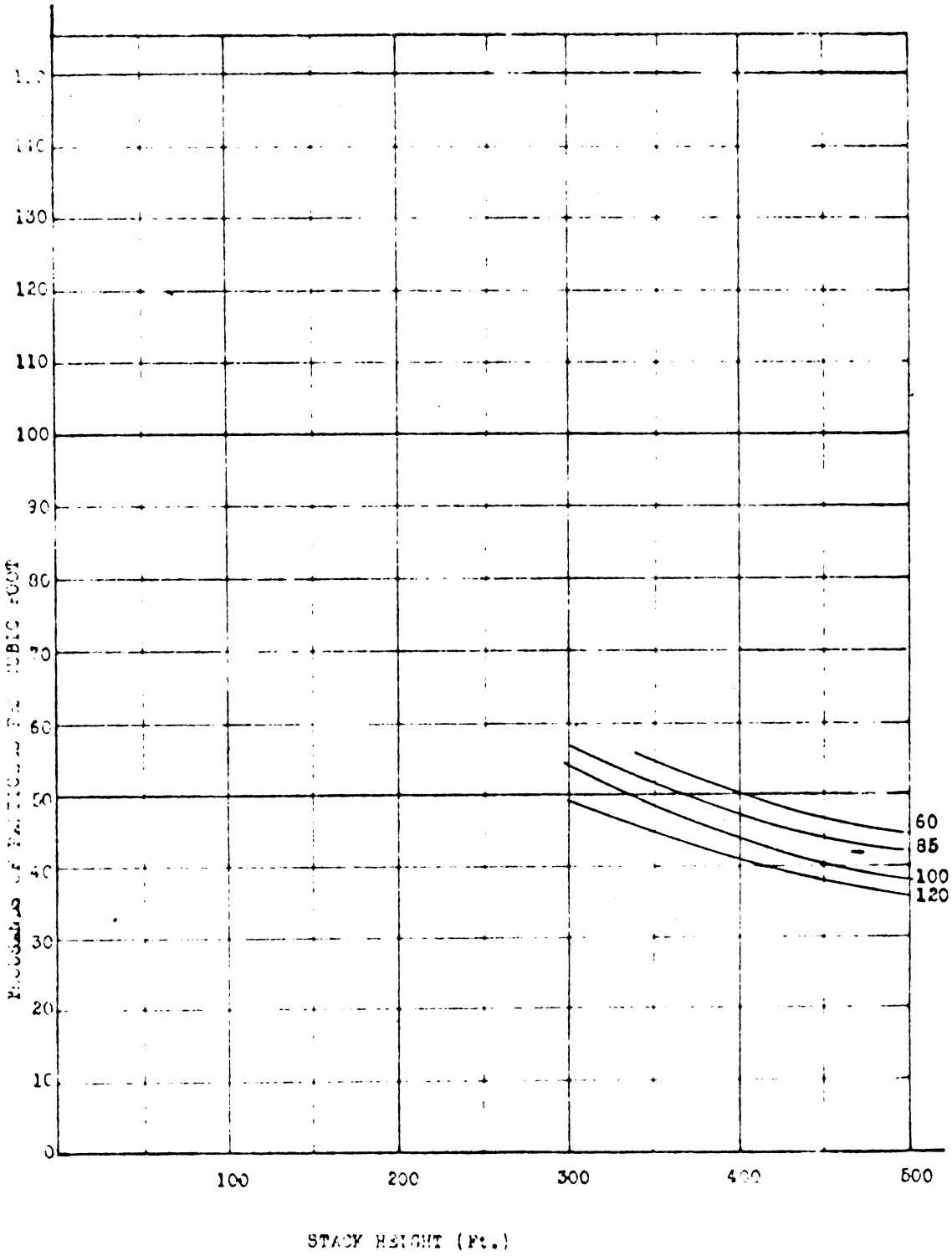
Fig. 61.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 5.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 5,000 FEET DOWNWIND FROM STACK.

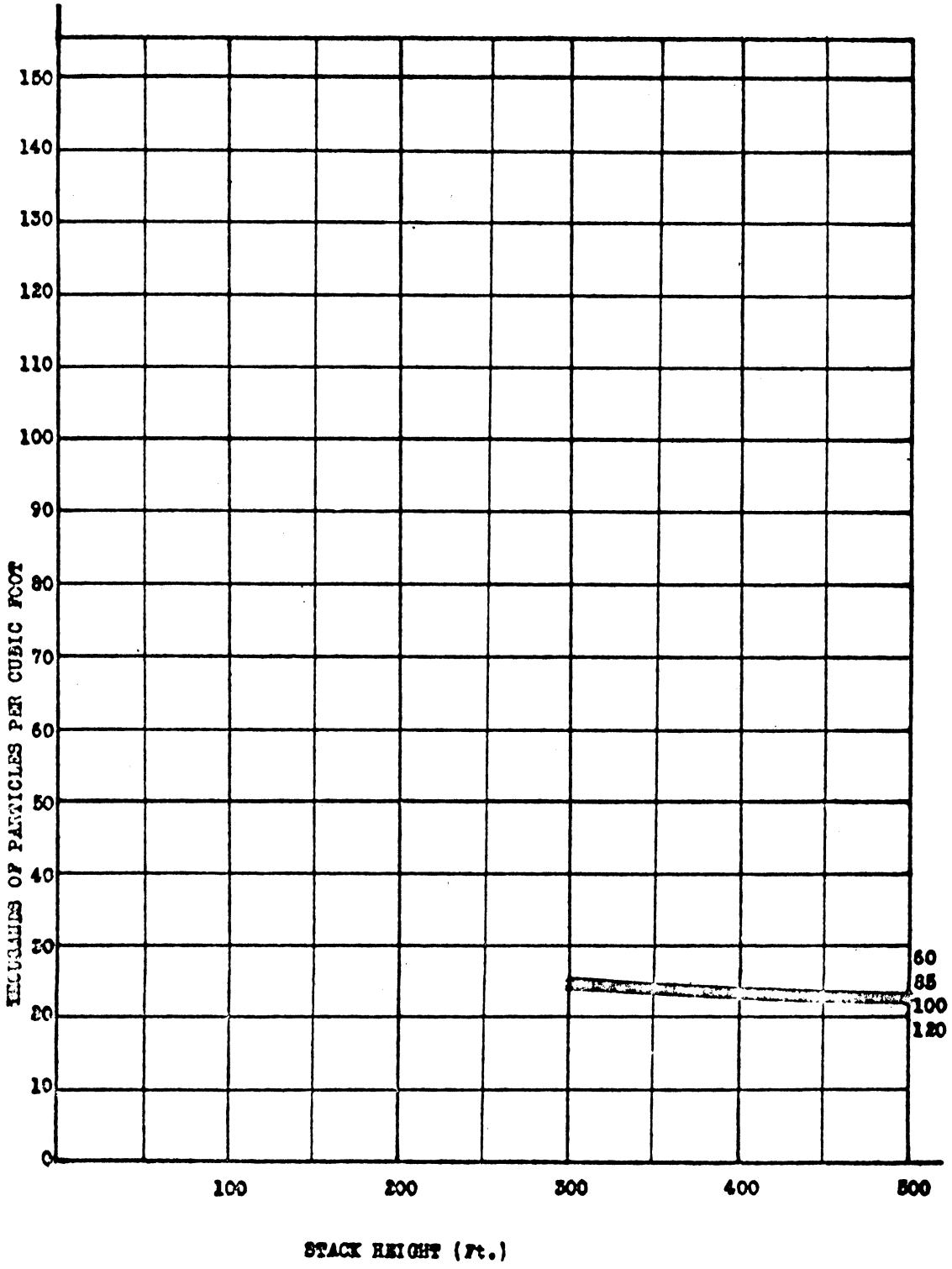
Fig. 62.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
7,500 FEET DOWNWIND FROM STACK.

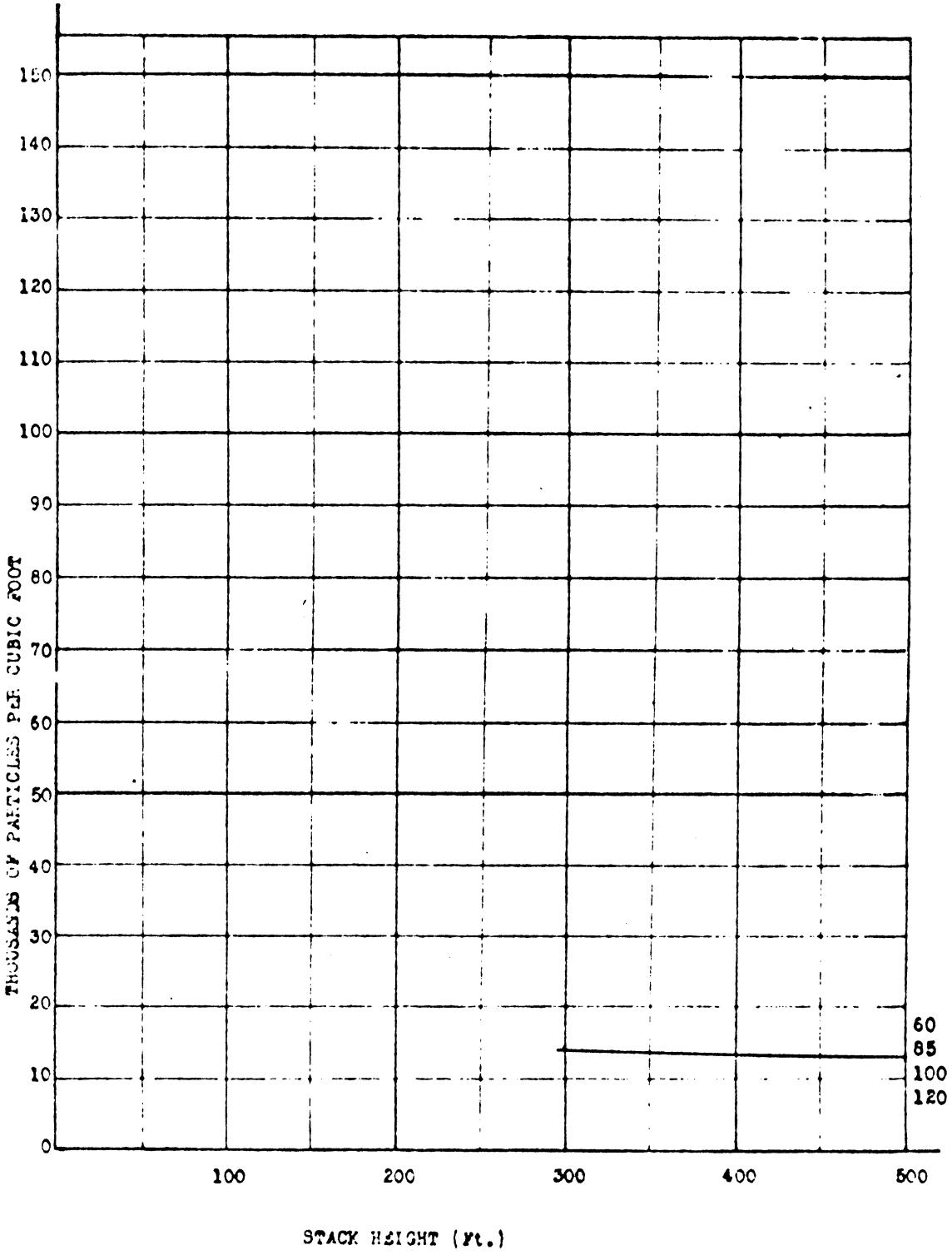
Fig. 63.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 12,000 FEET DOWNWIND FROM STACK.

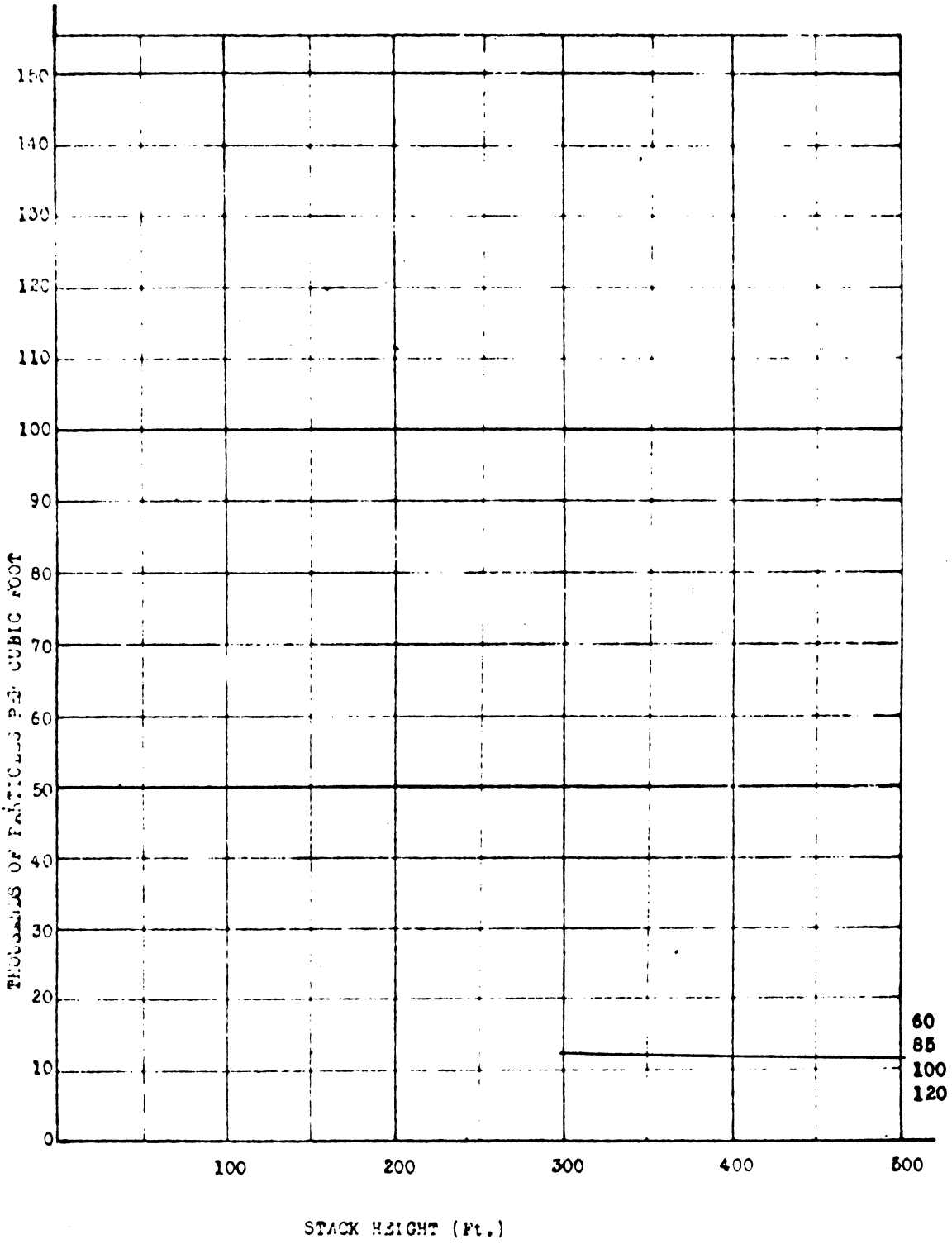
Fig. 64.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 5.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 17,000 FEET DOWNWIND FROM STACK.

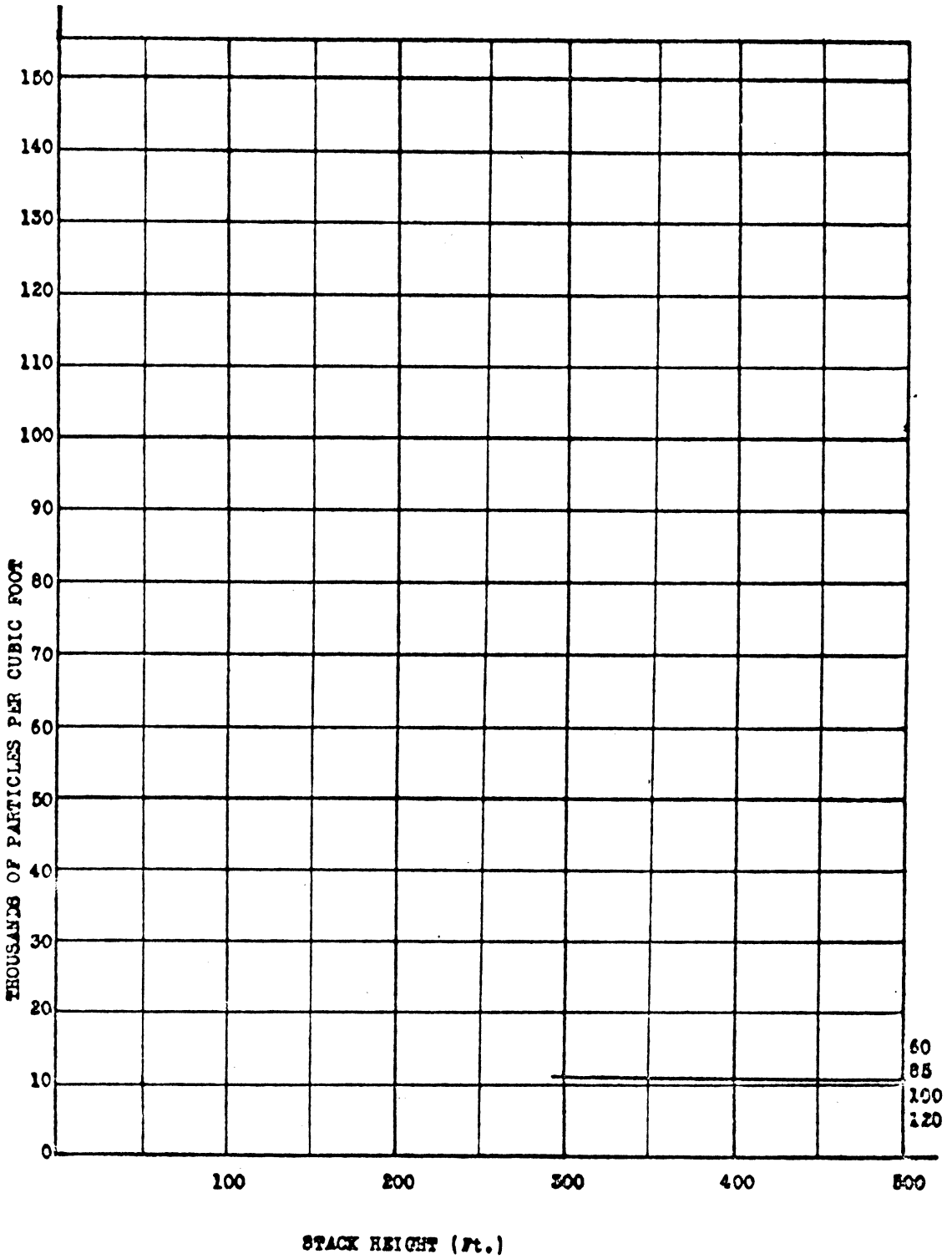
Fig. 65.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 5.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

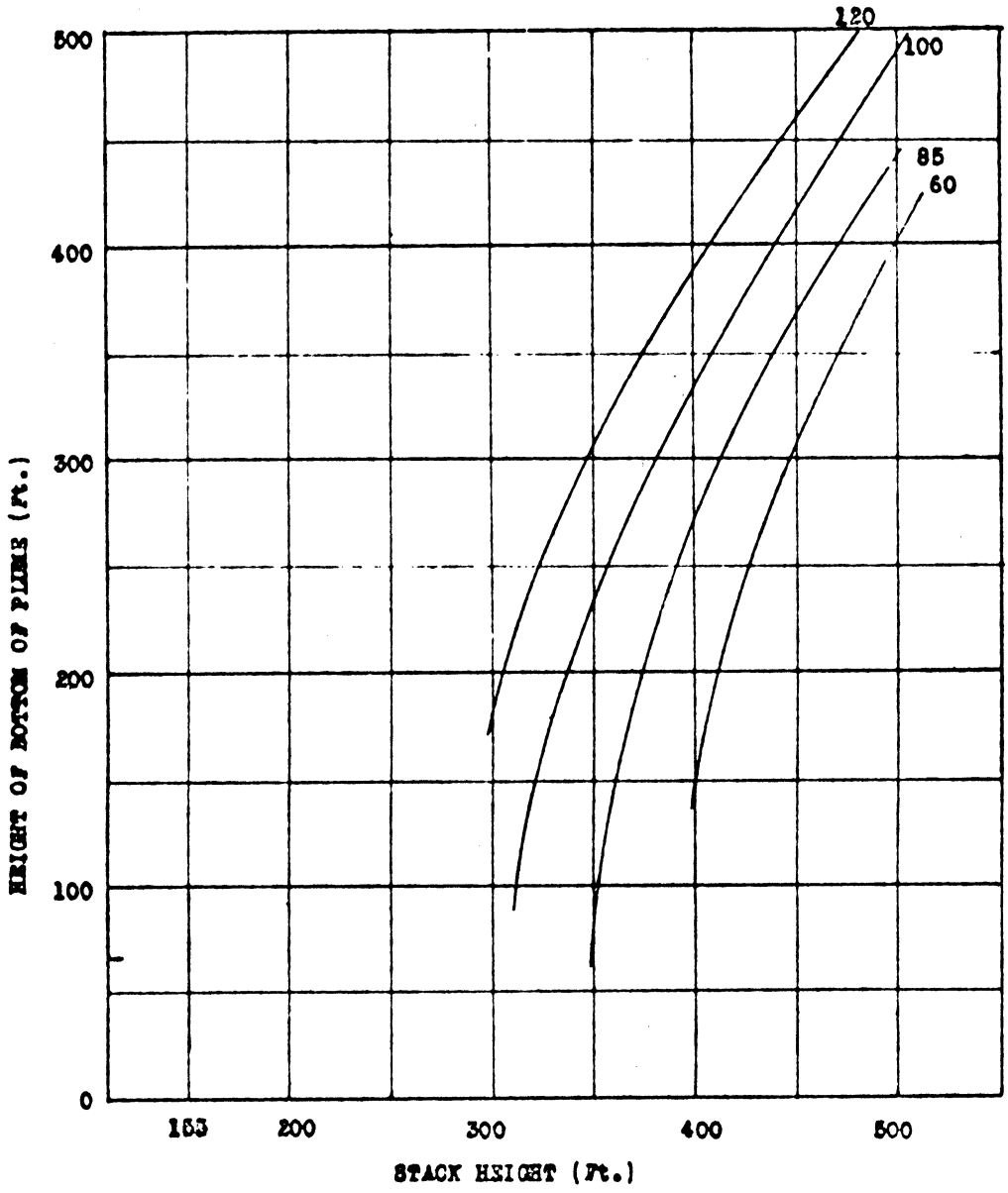
Fig. 66.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRSTION AT GROUND LEVEL,
20,000 FEET DOWNWIND FROM STACK.

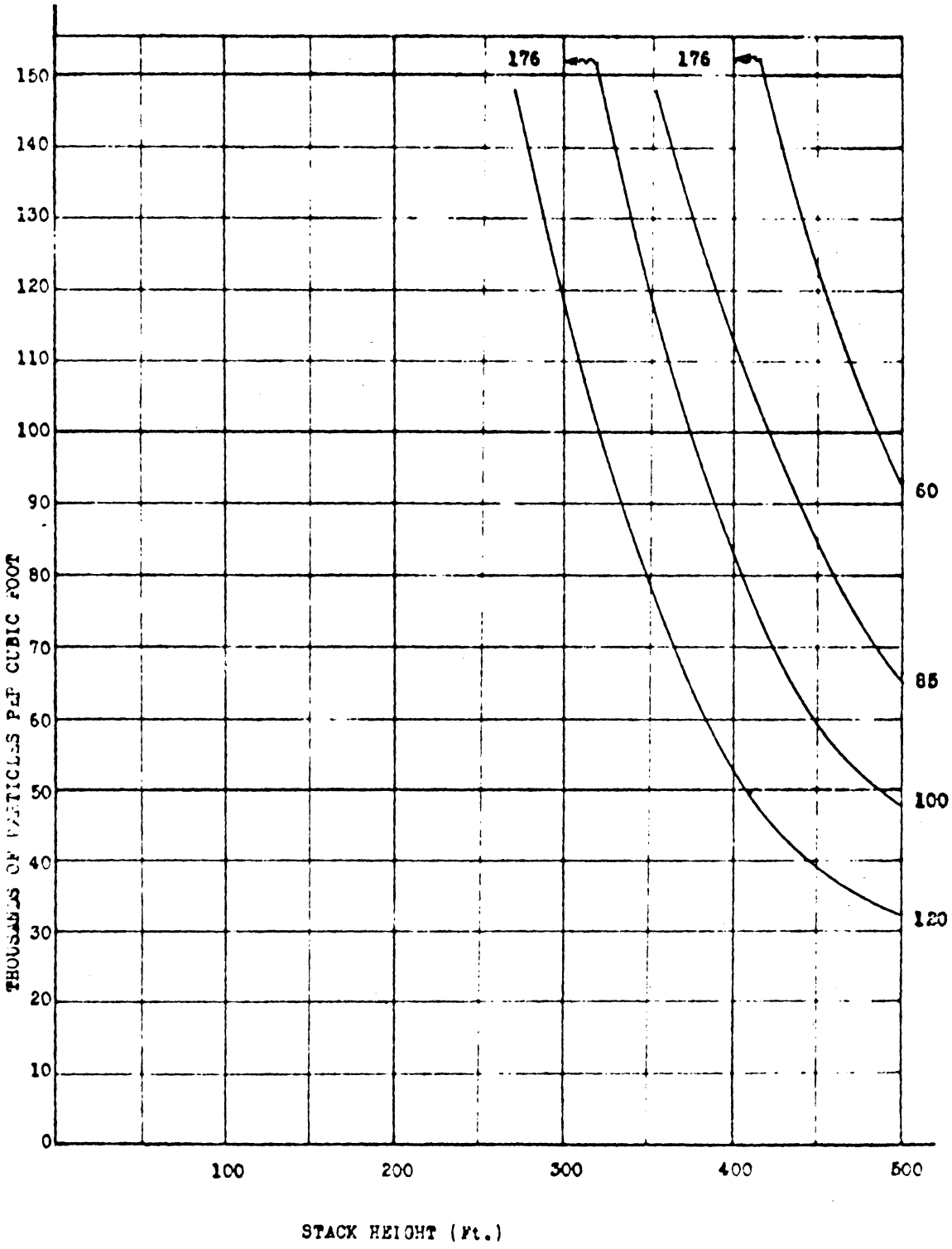
Fig. 67.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS
PLUME HEIGHT ABOVE GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

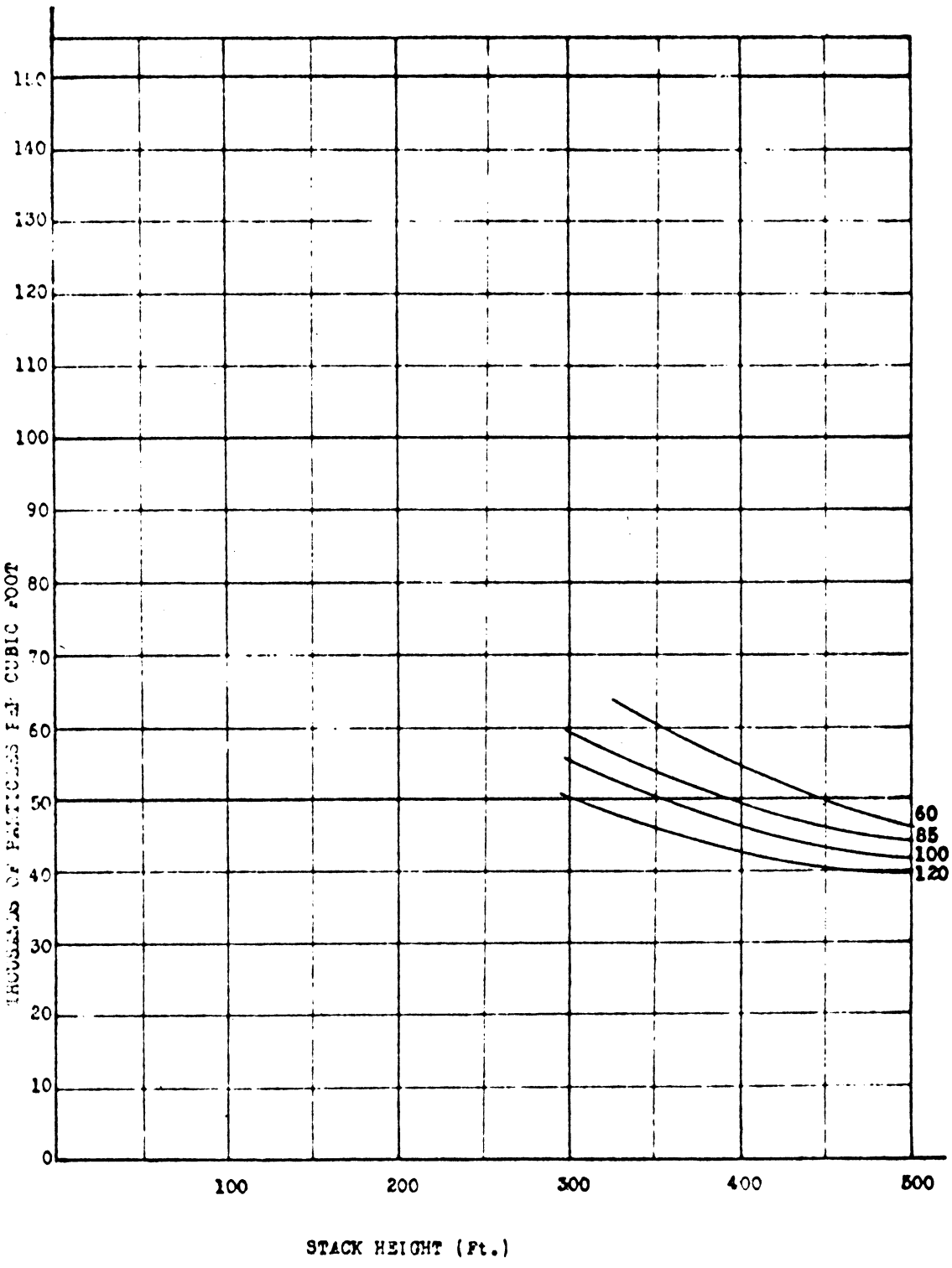
Fig. 68.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

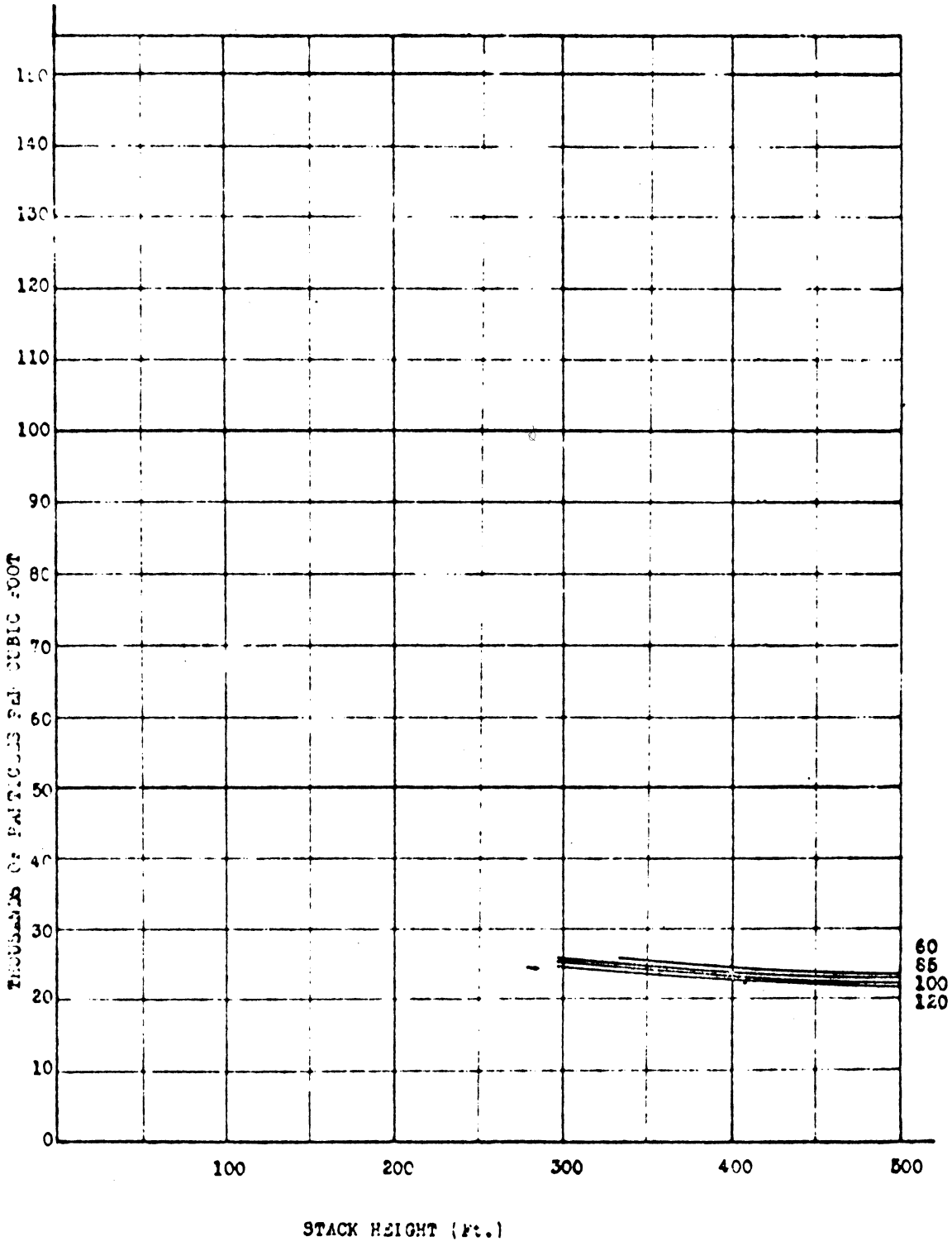
Fig. 69.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
7,500 FEET DOWNWIND FROM STACK.

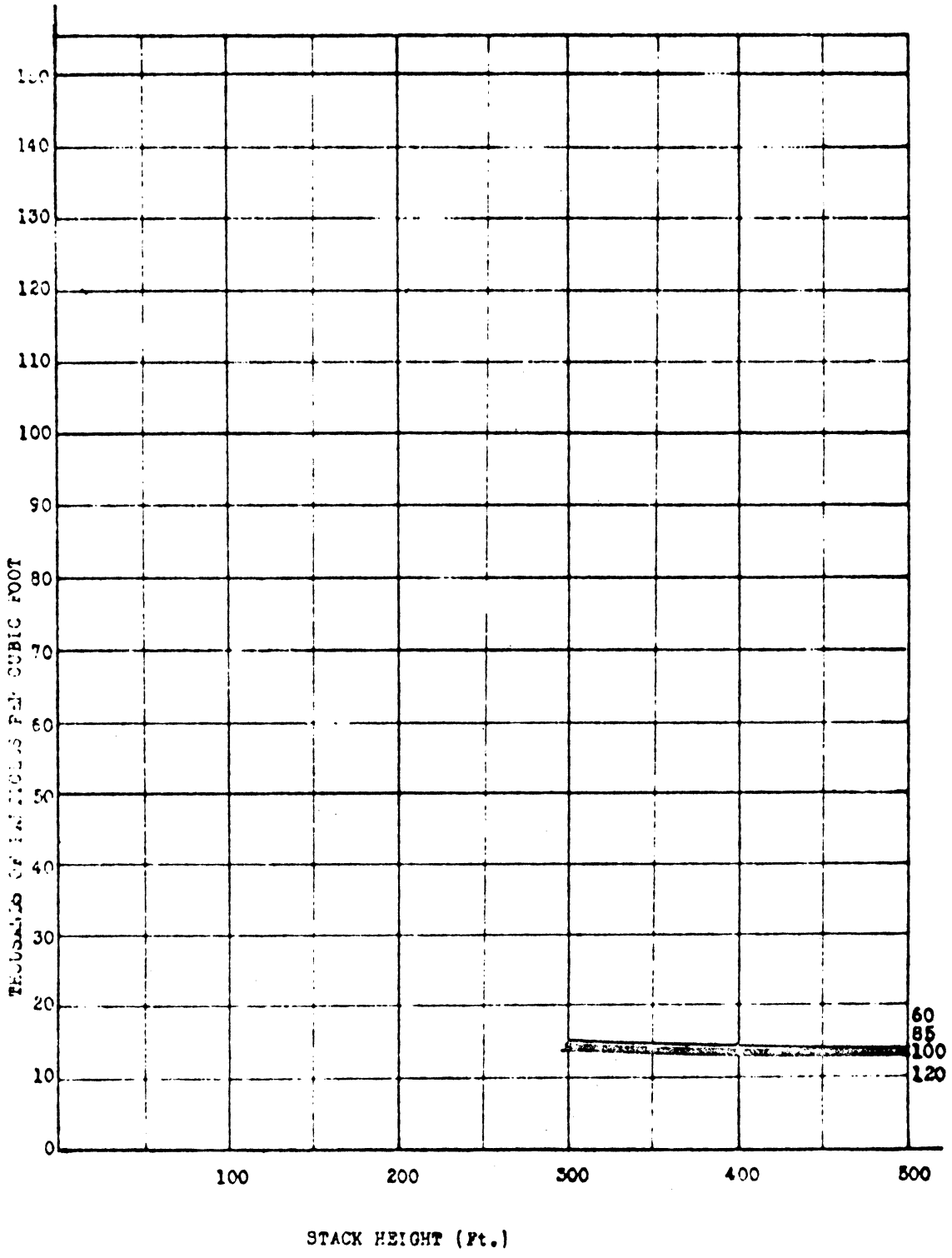
Fig. 70.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 12,000 FEET DOWNWIND FROM STACK.

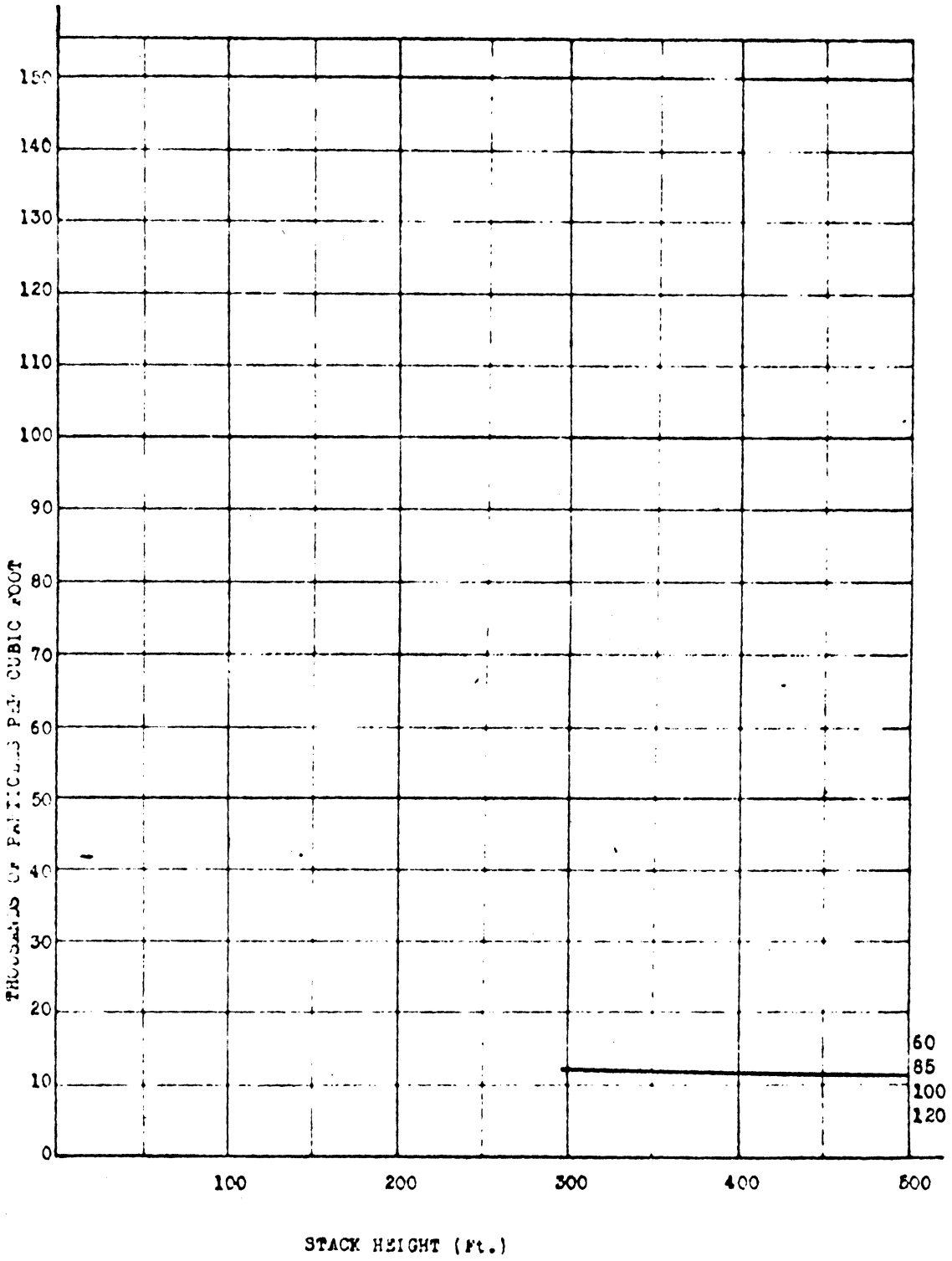
Fig. 71.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL
17,000 FEET DOWNWIND FROM STACK.

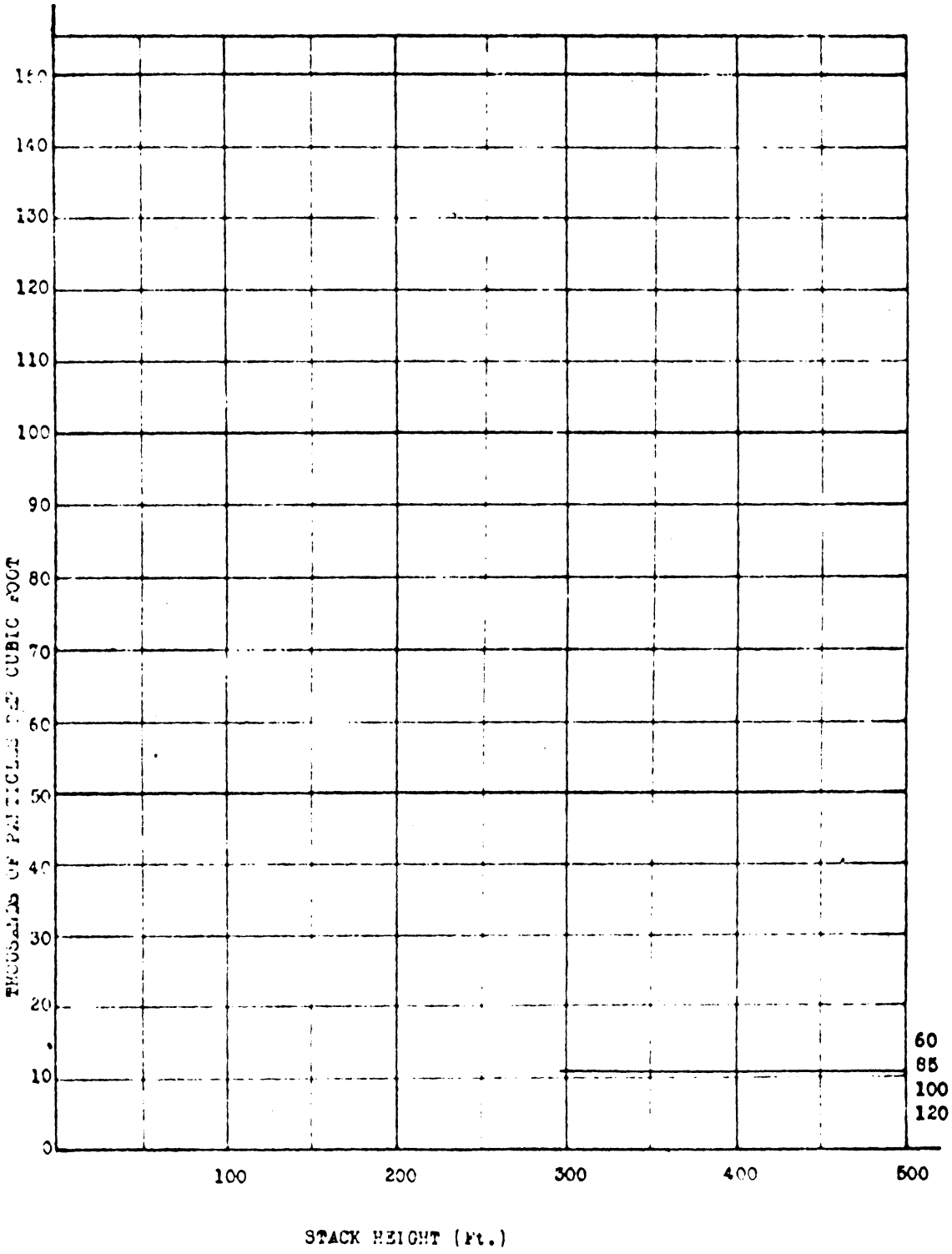
Fig. 72.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

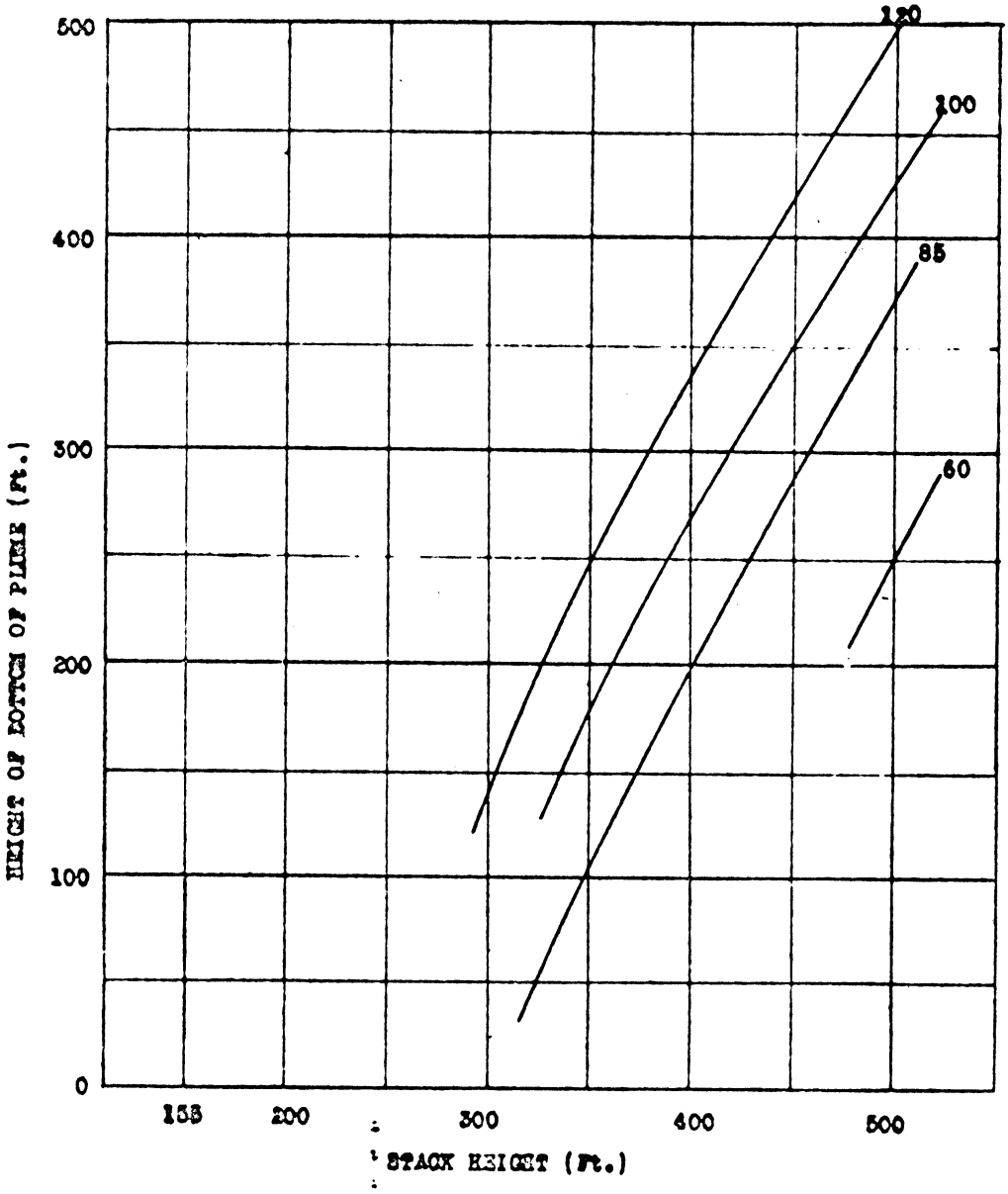
Fig. 73.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
20,000 FEET DOWNWIND FROM STACK.

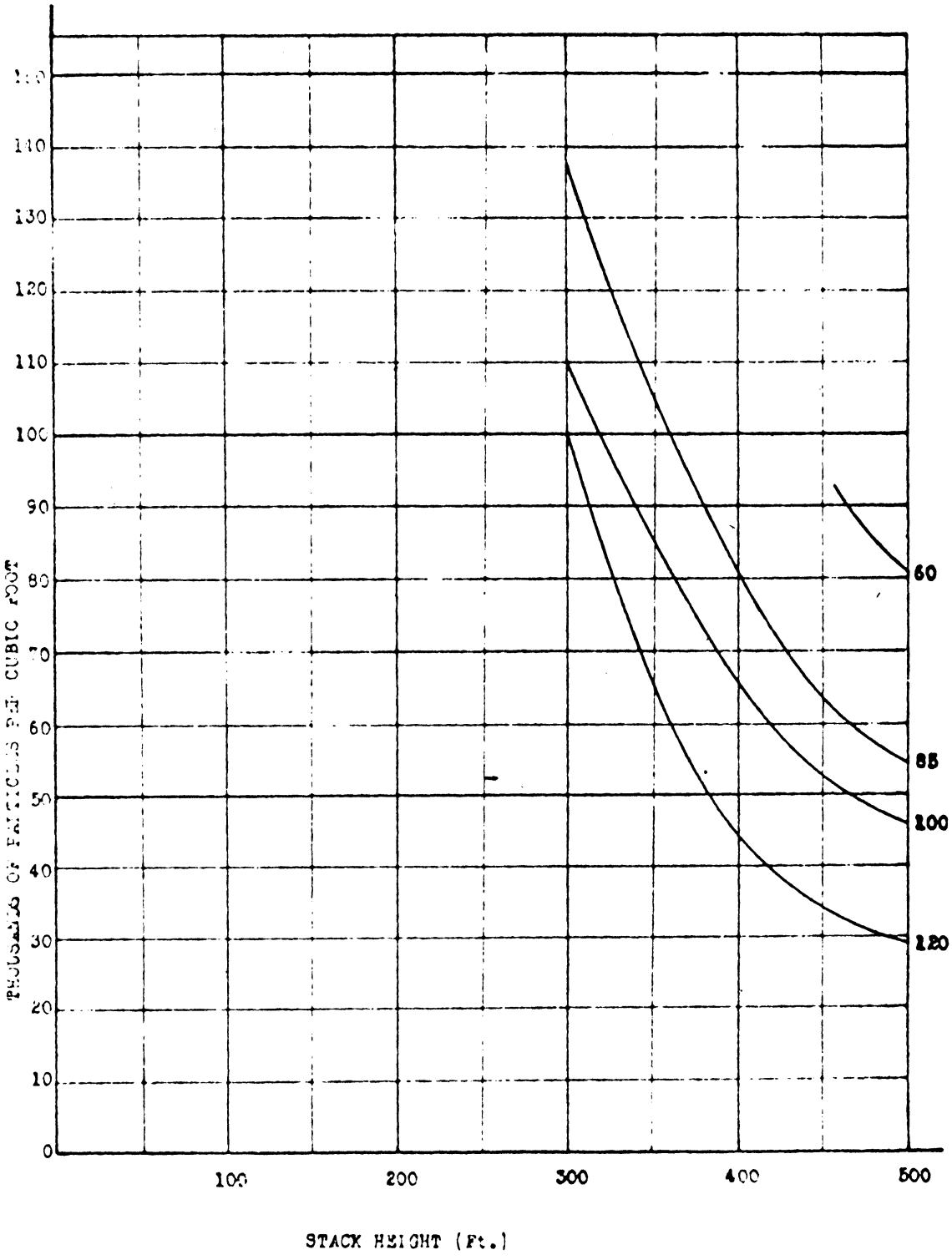
Fig. 74.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

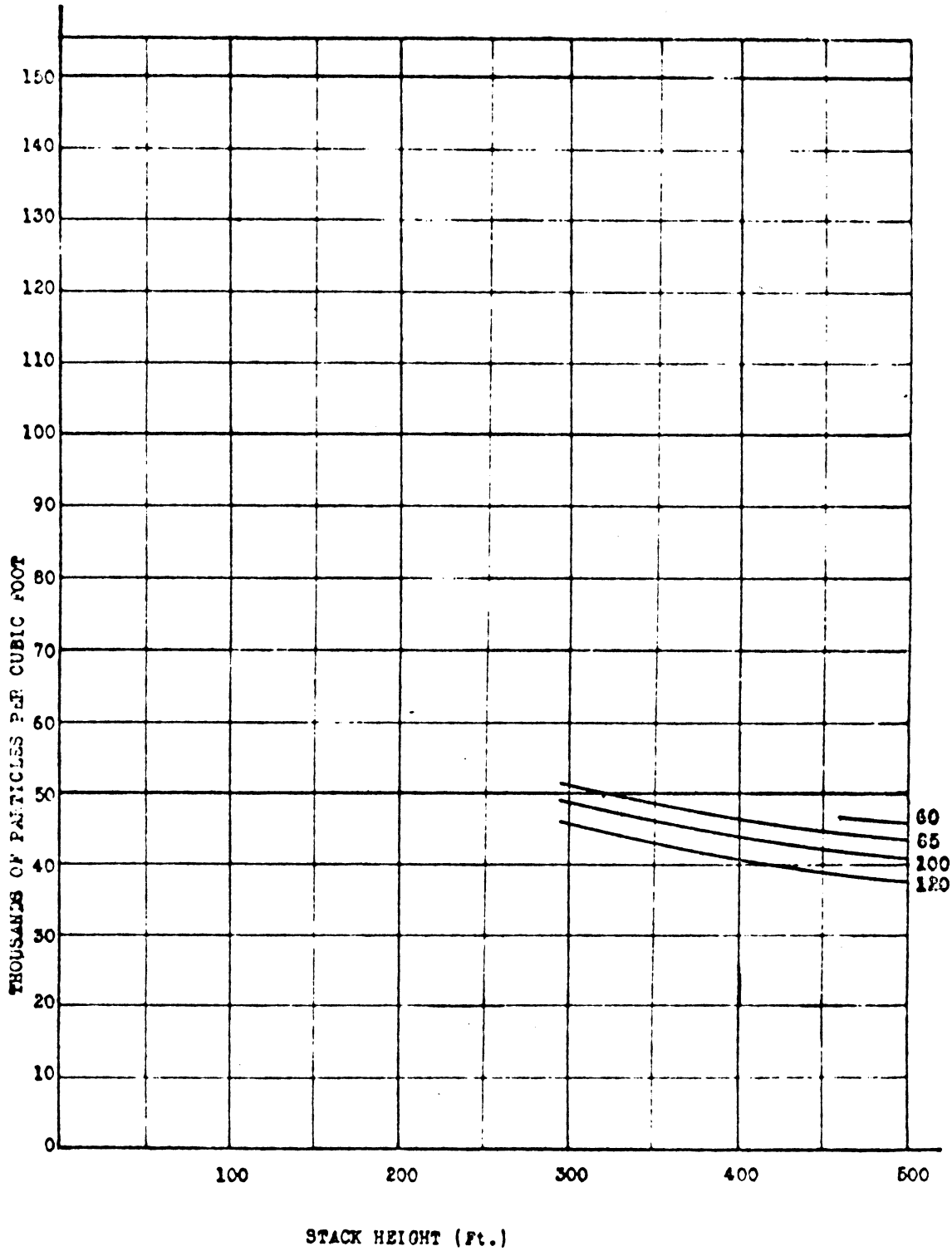
Fig. 75.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
3,000 FEET DOWNWIND FROM STACK.

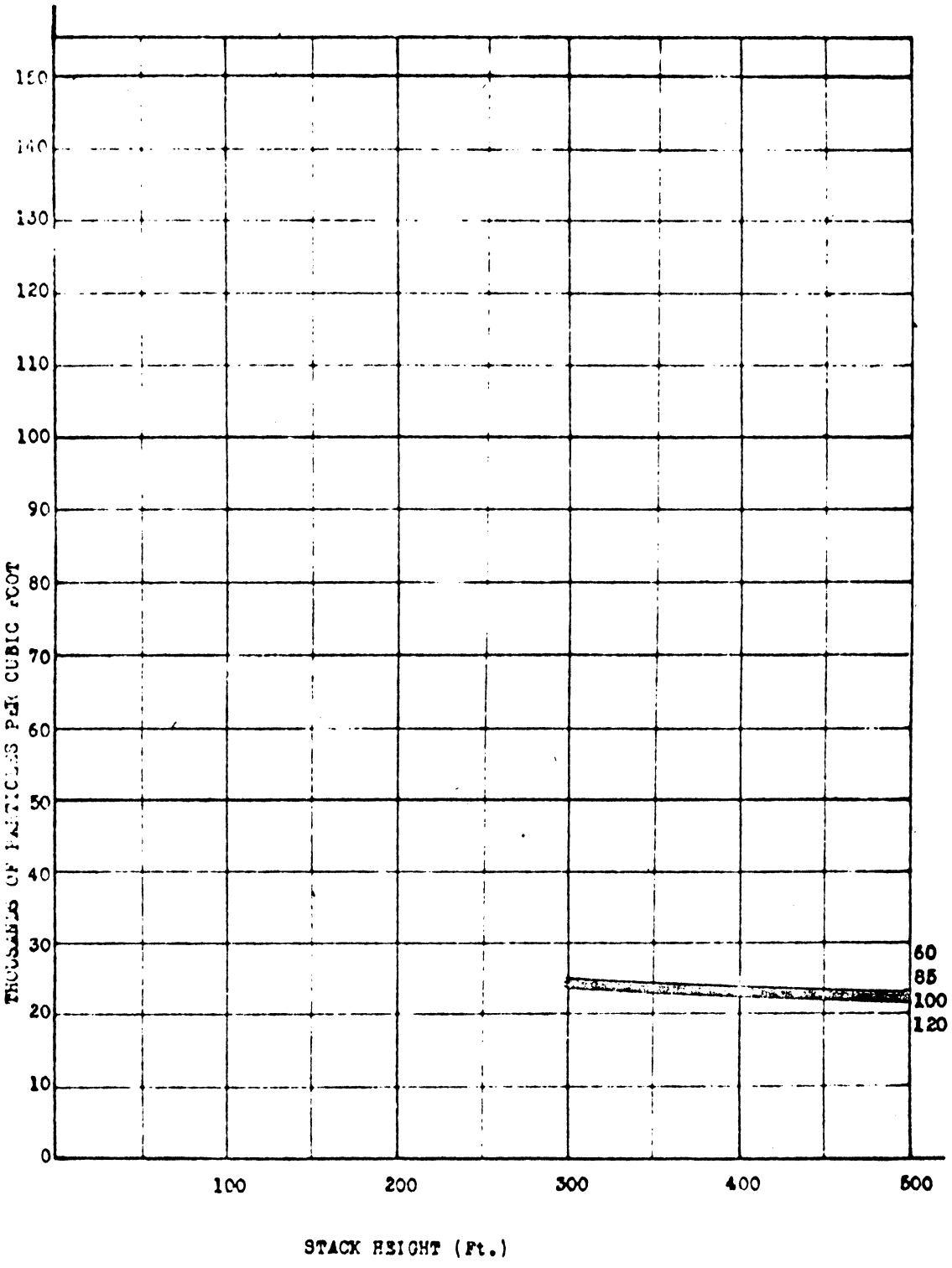
Fig. 76.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 65, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 7,500 FEET DOWNWIND FROM STACK.

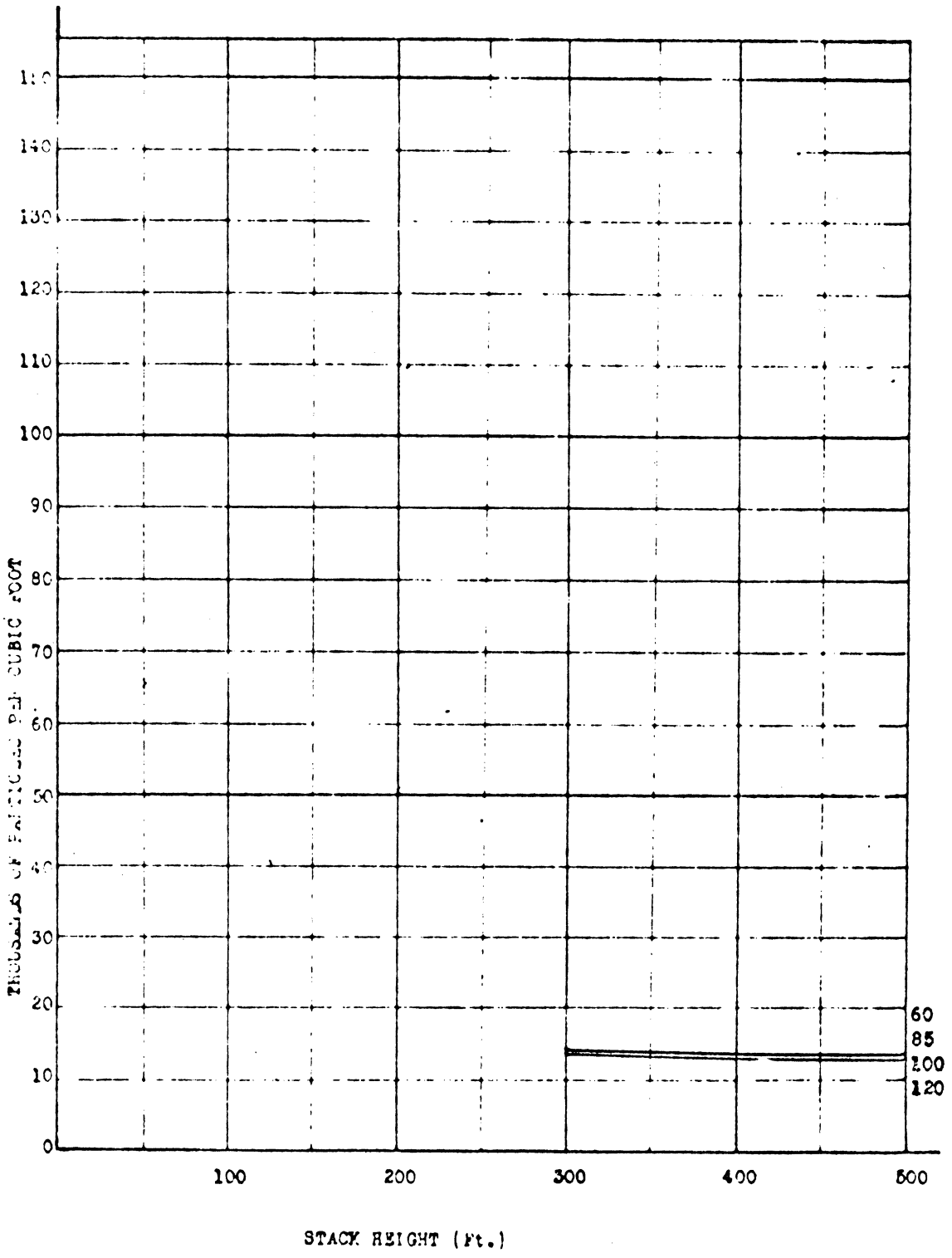
Fig. 77.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
12,000 FEET DOWNWIND FROM STACK.

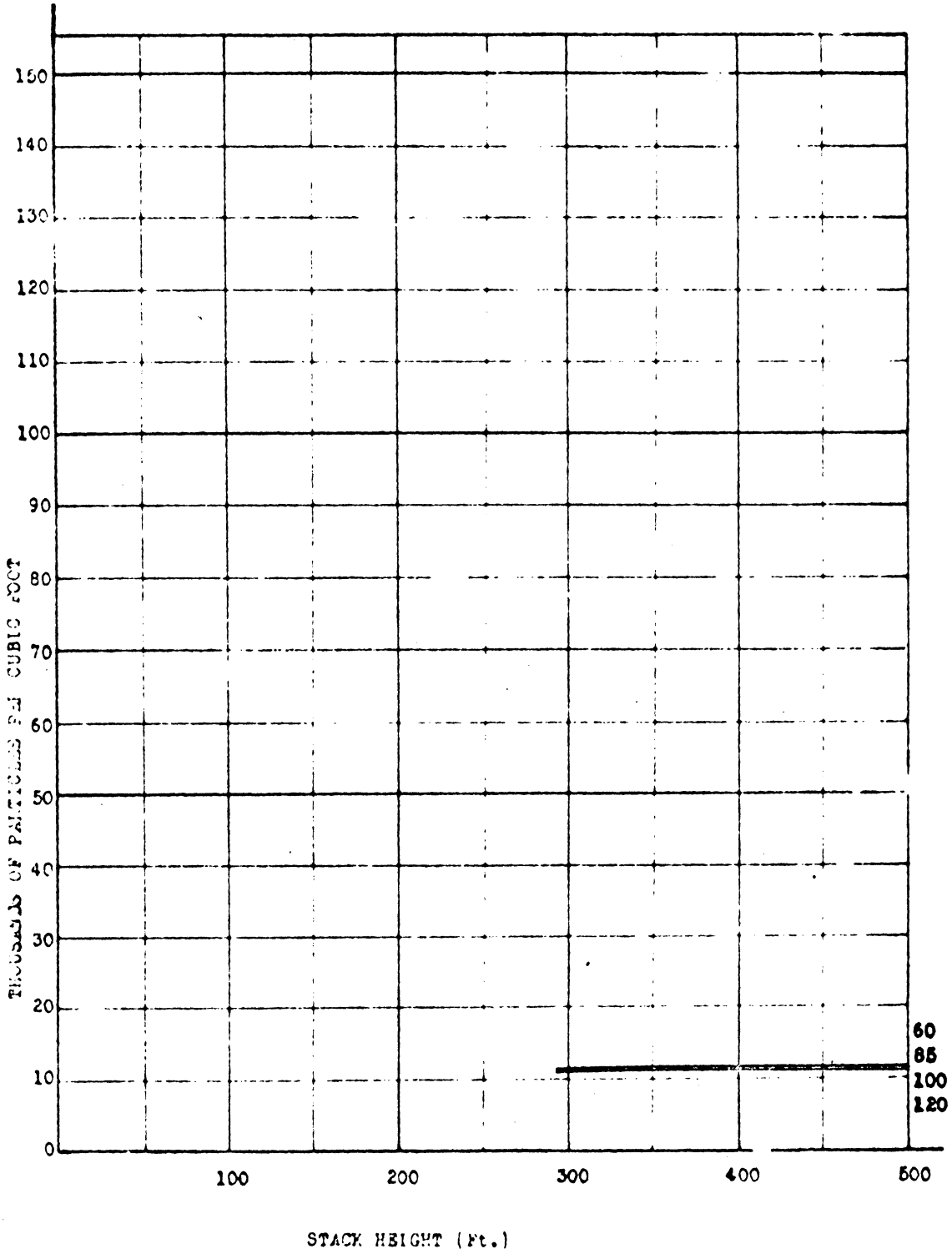
Fig. 78.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
17,000 FEET DOWNWIND FROM STACK.

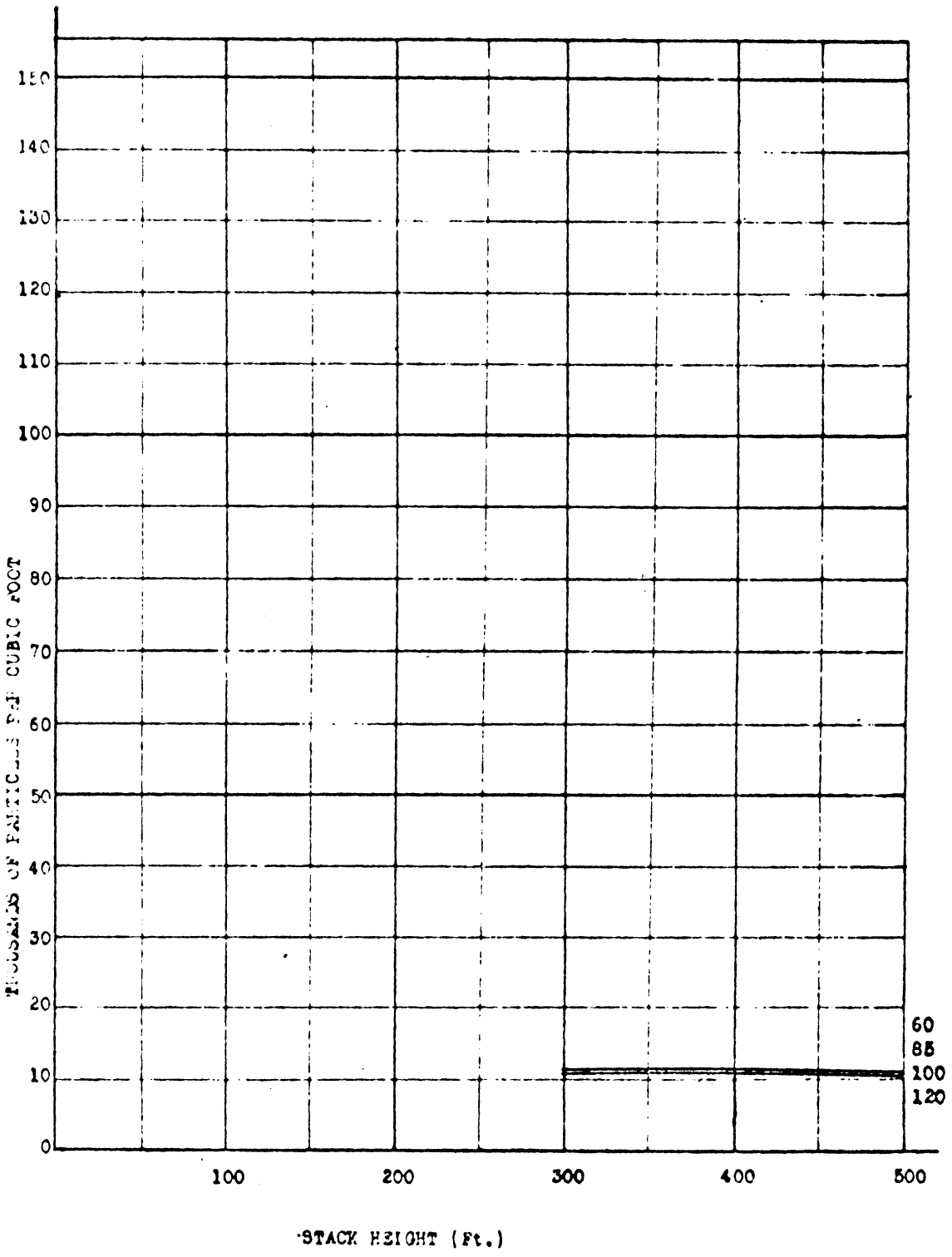
Fig. 79.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

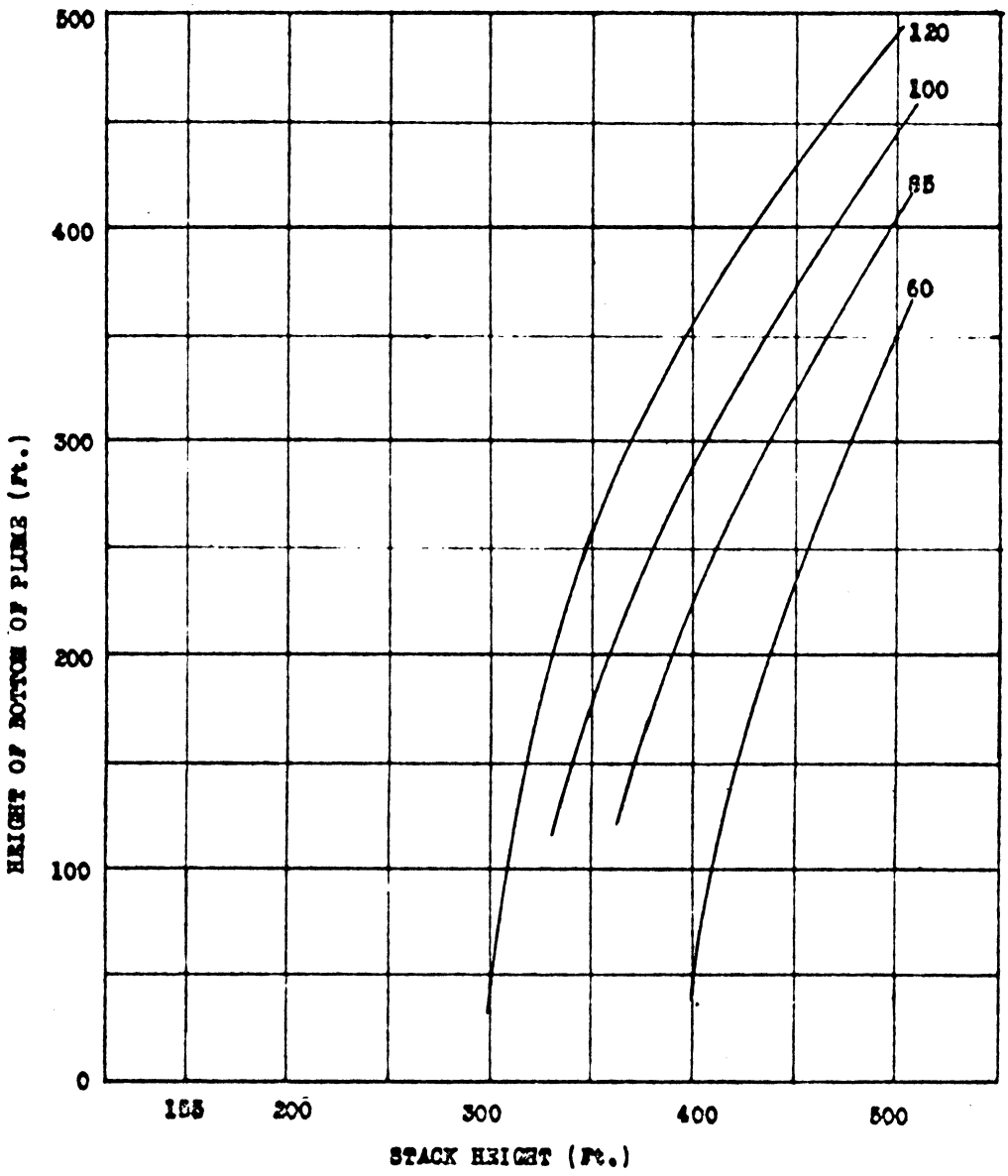
Fig. 80.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 20,000 FEET DOWNWIND FROM STACK.

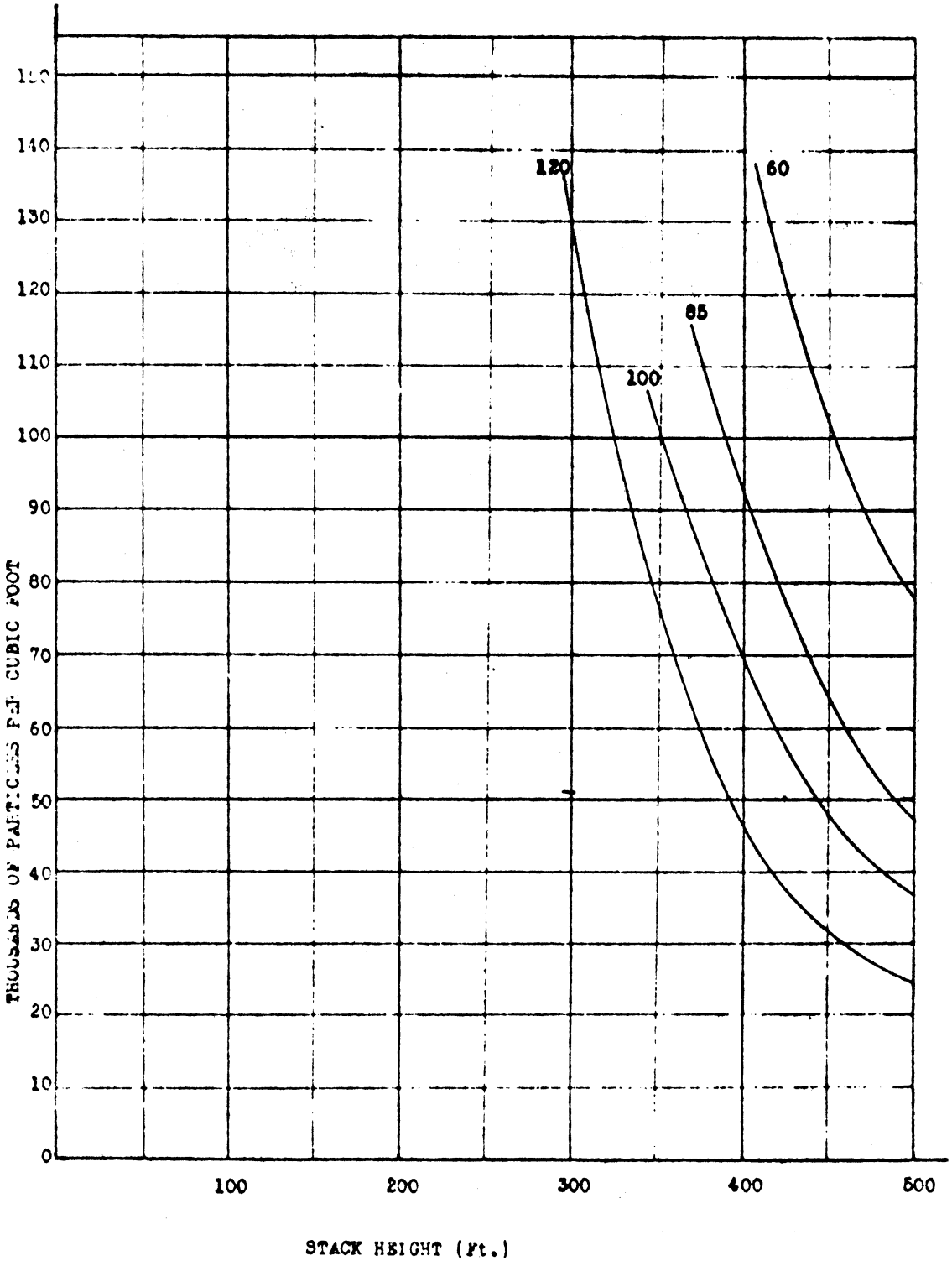
Fig. 81.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION S.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 3,000 FEET DOWNWIND FROM STACK.

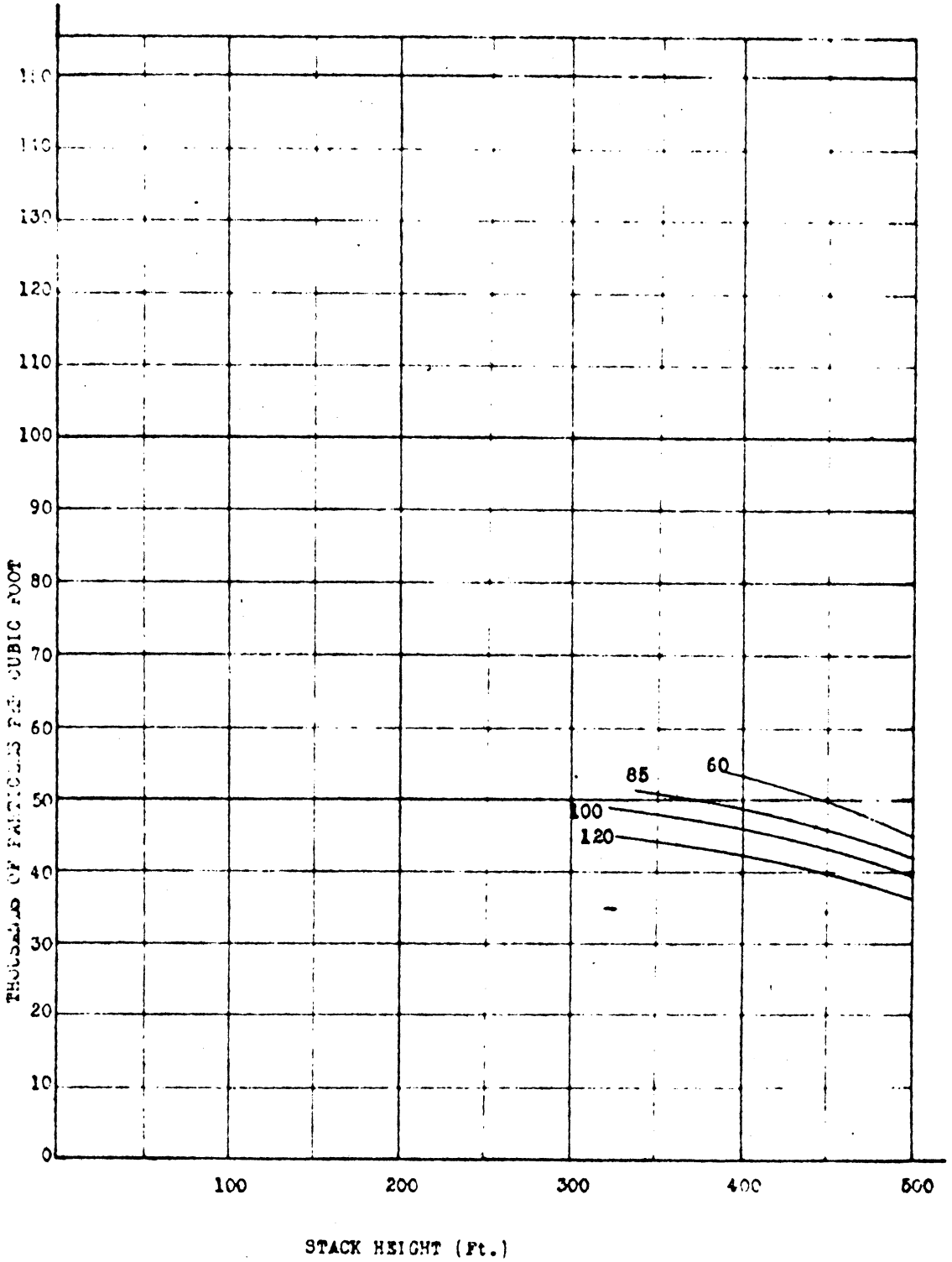
Fig. 82.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 5.

PLANT WITH EXTENSIONS
DUST CONCENTRATION AT GROUND LEVEL,
5,000 FEET DOWNWIND FROM STACK.

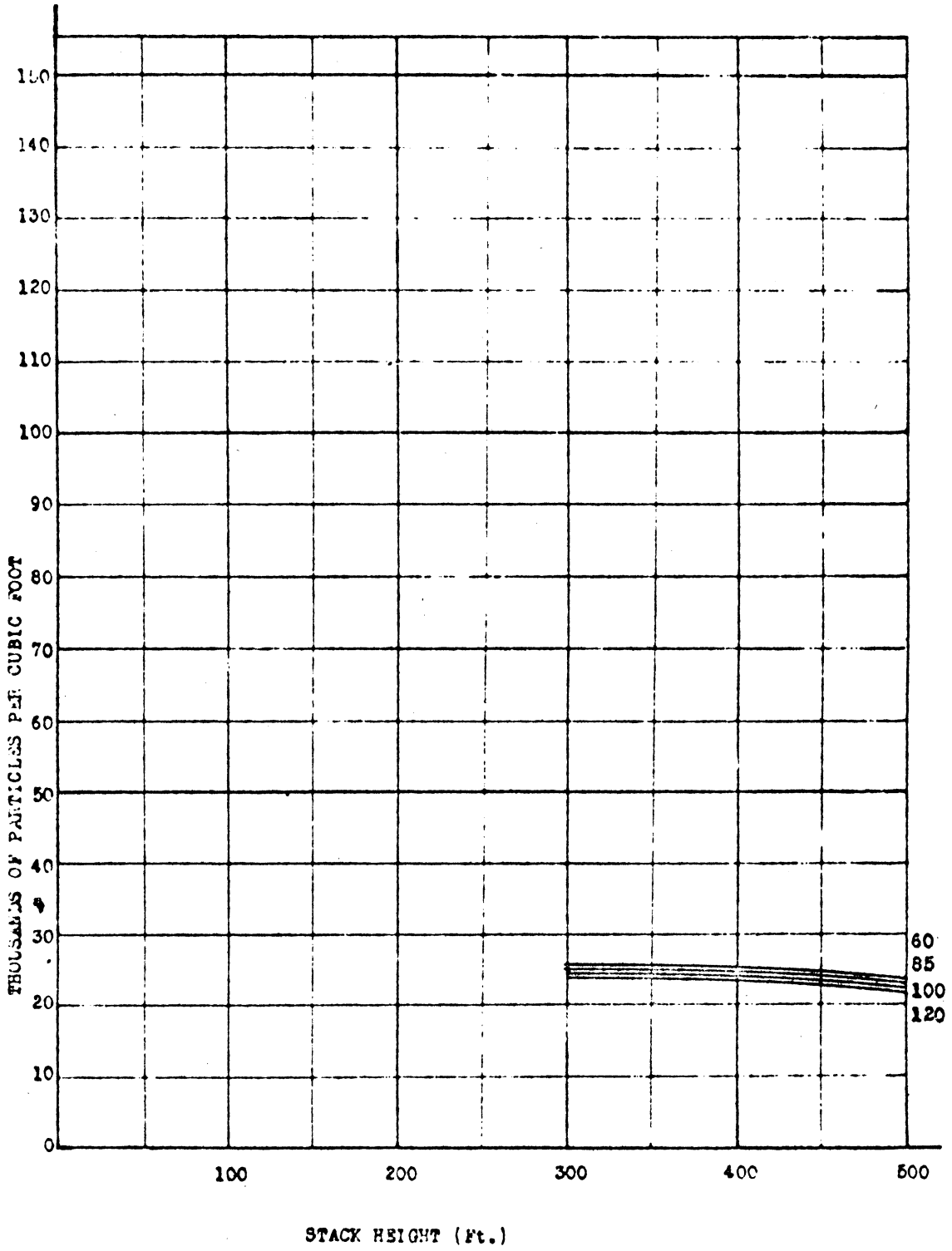
Fig. 83.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
7,500 FEET DOWNWIND FROM STACK.

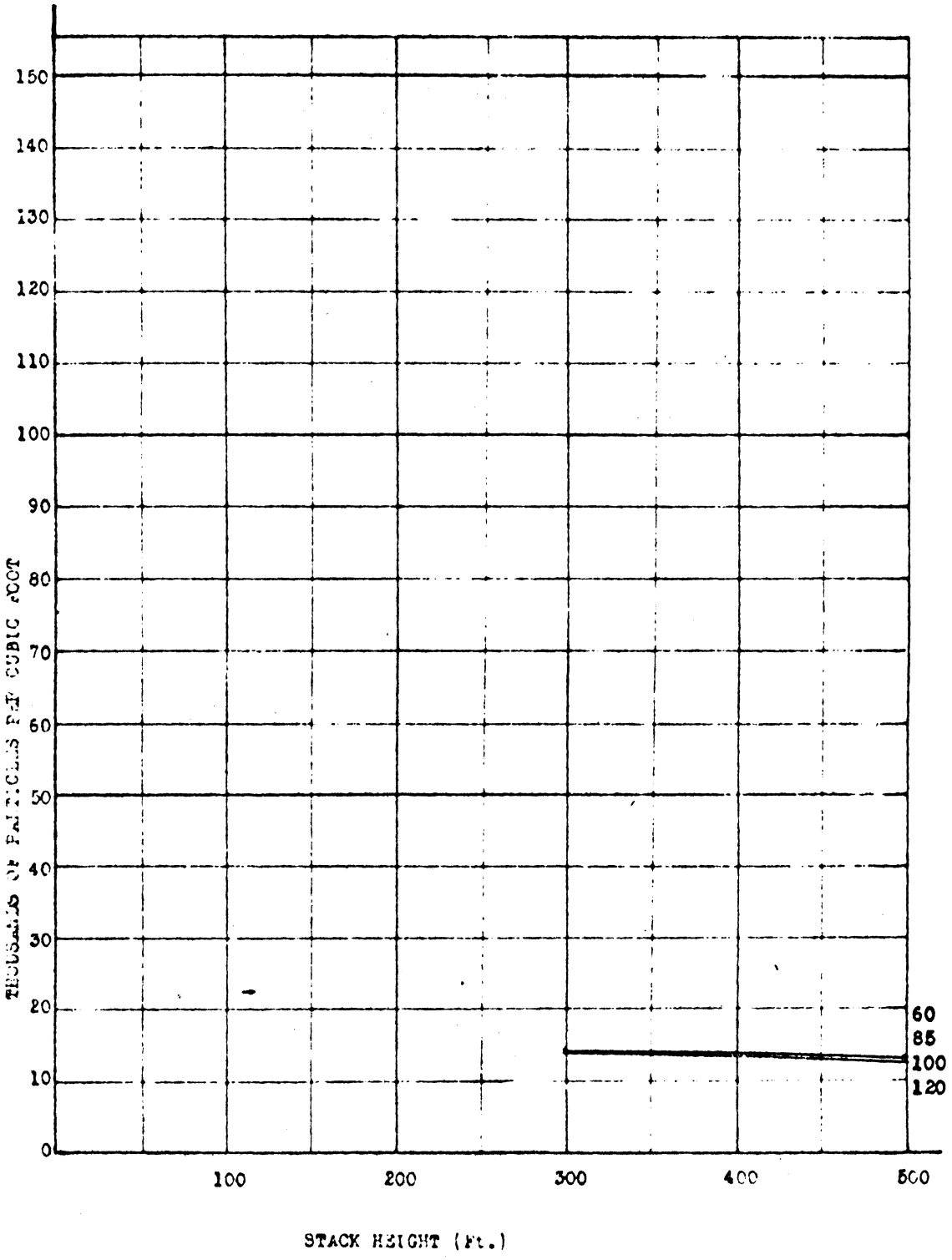
Fig. 84.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
12,000 FEET DOWNWIND FROM STACK.

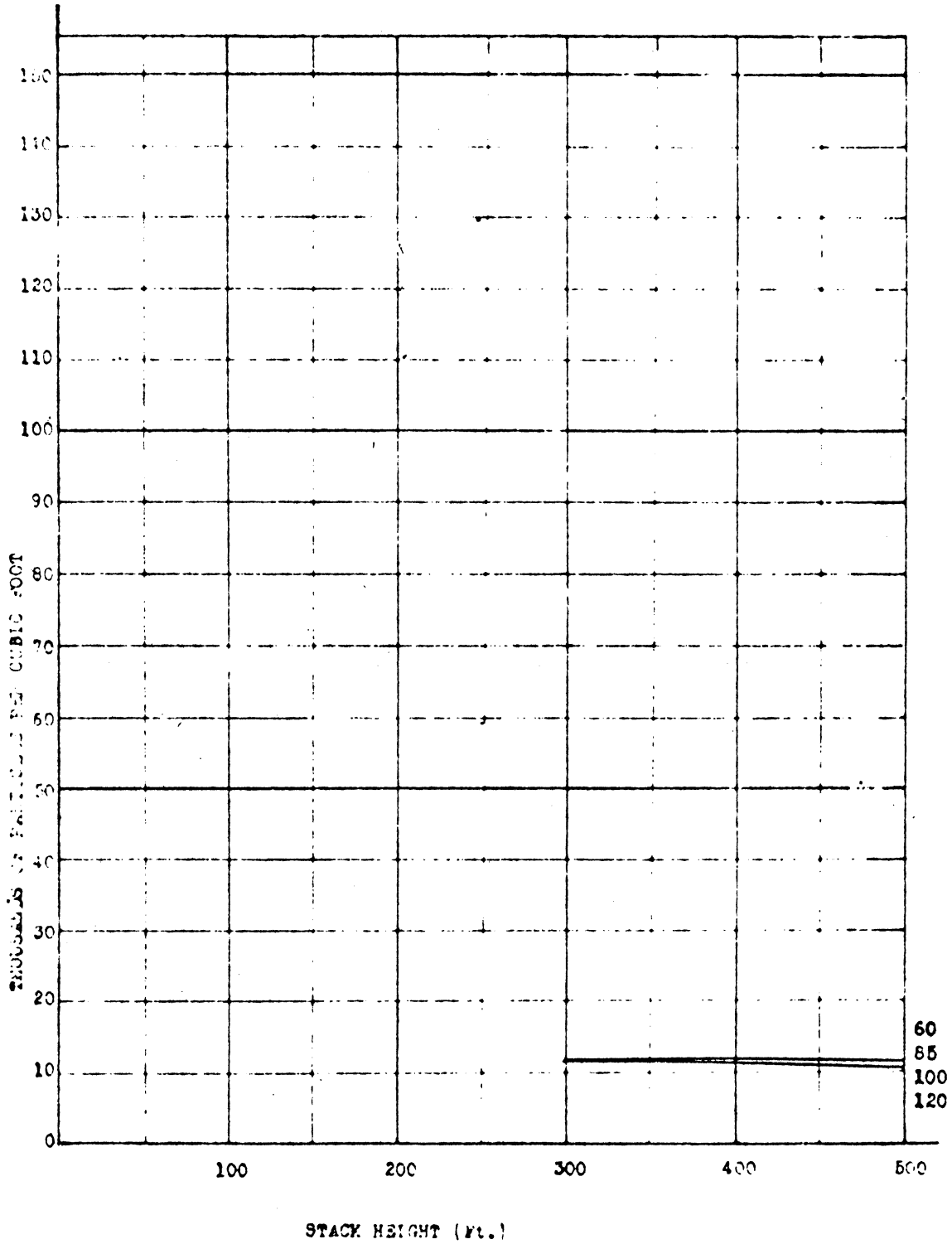
Fig. 85.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
17,000 FEET DOWNWIND FROM STACK.

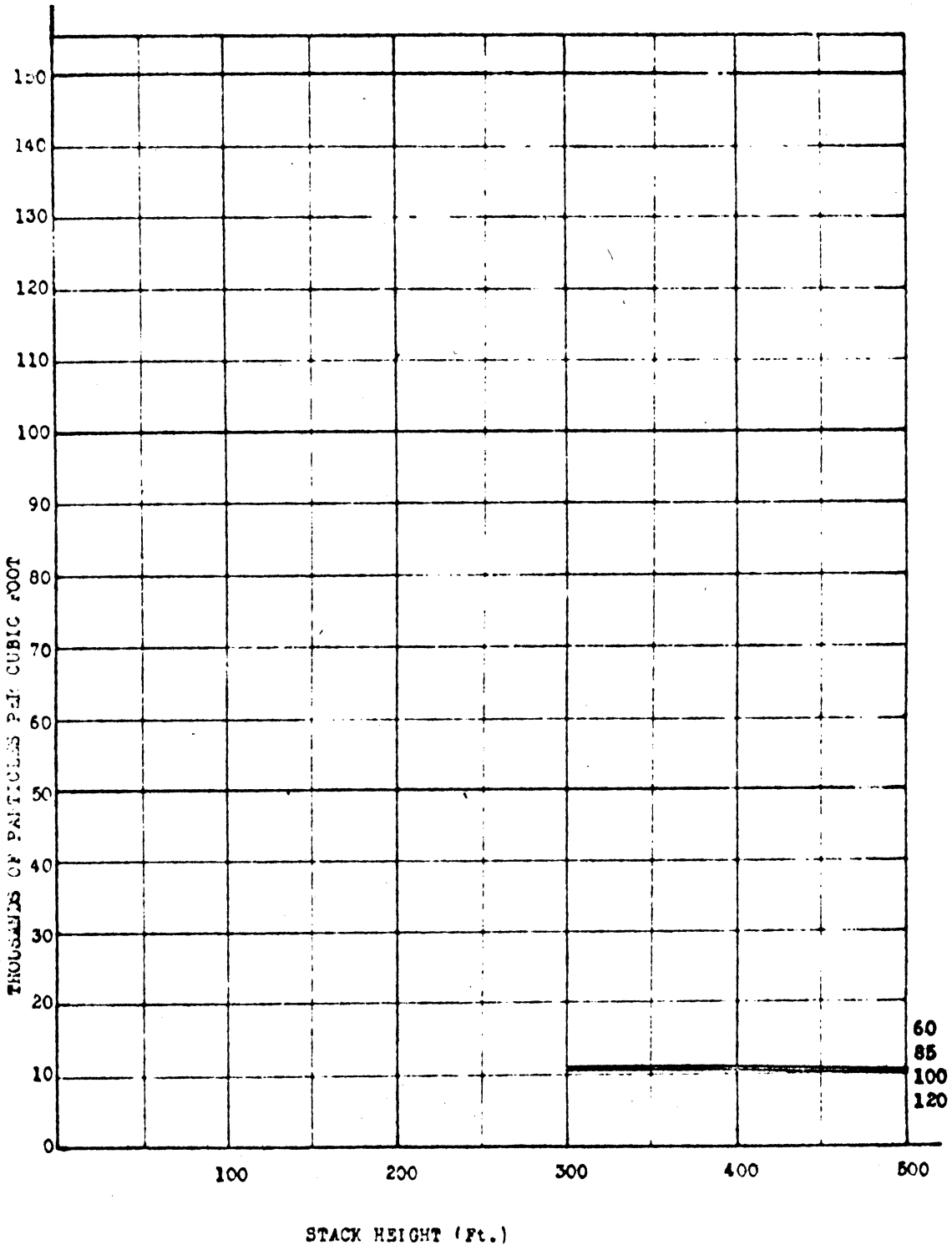
Fig. 86.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS
DUST CONCENTRATION AT GROUND LEVEL,
19,000 FEET DOWNWIND FROM STACK.

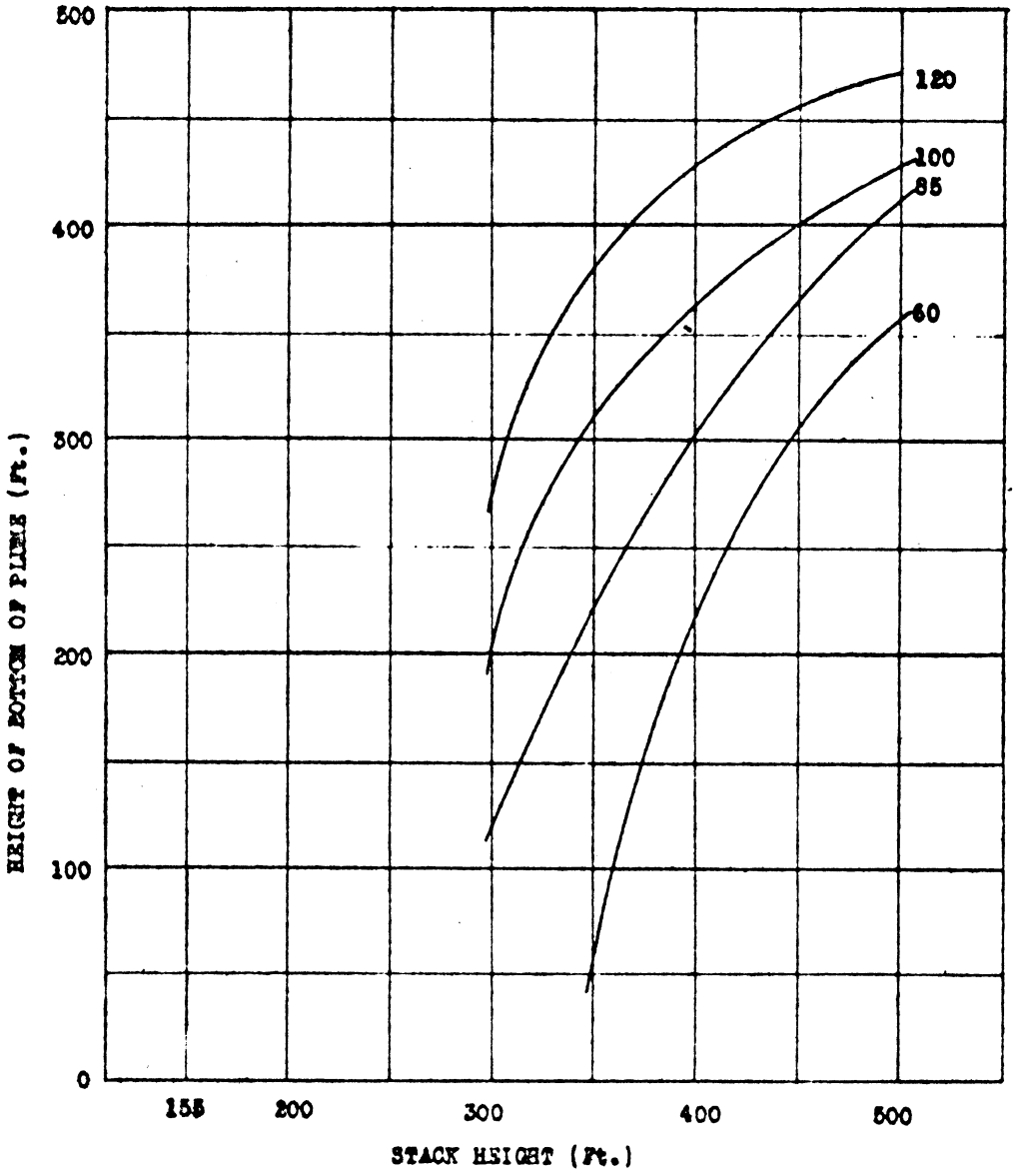
Fig. 87.



WIND FROM NORTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

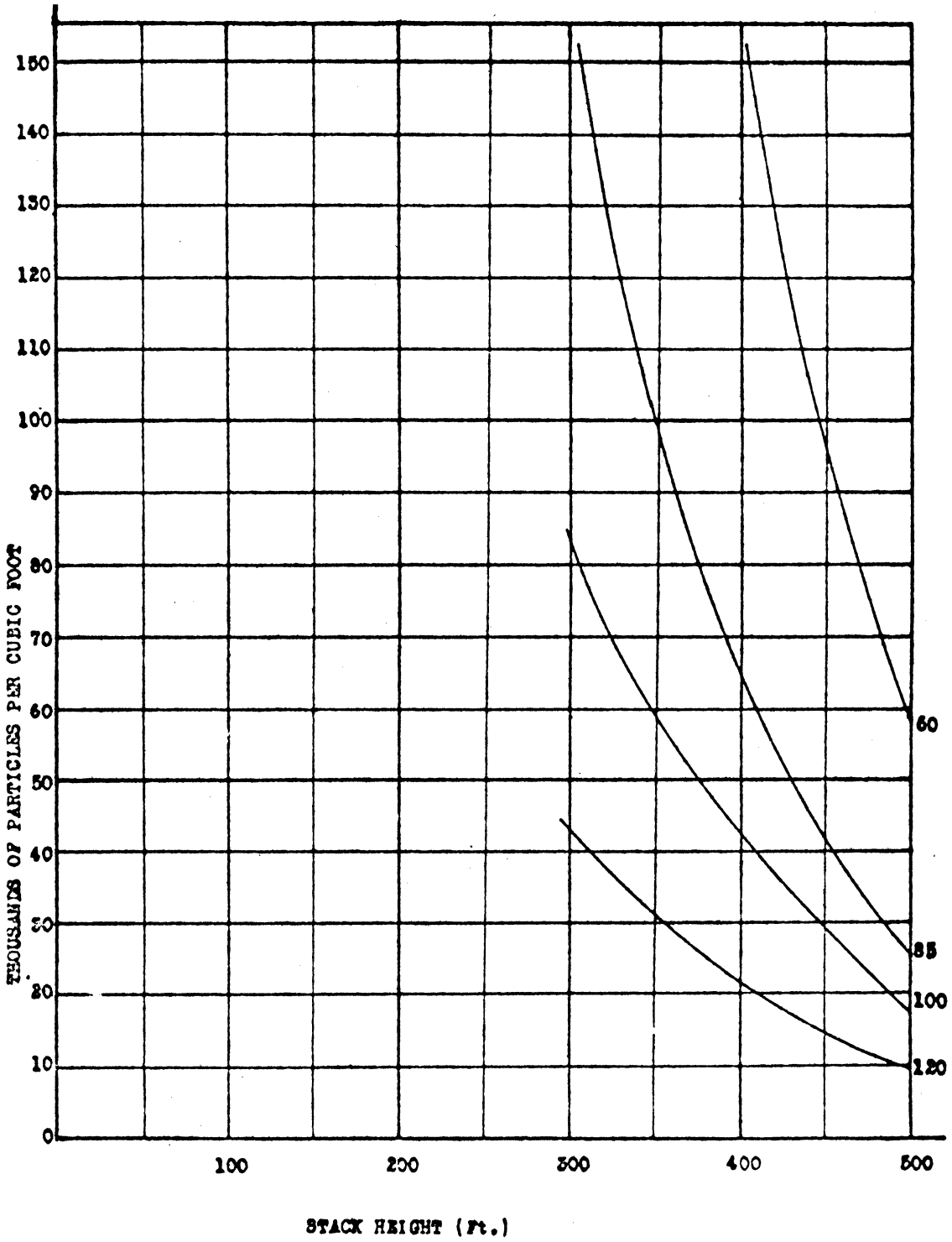
PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
20,000 FEET DOWNWIND FROM STACK.

Fig. 88.



WIND FROM WEST AT 10.25 M.P.H. (Avg.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.
PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

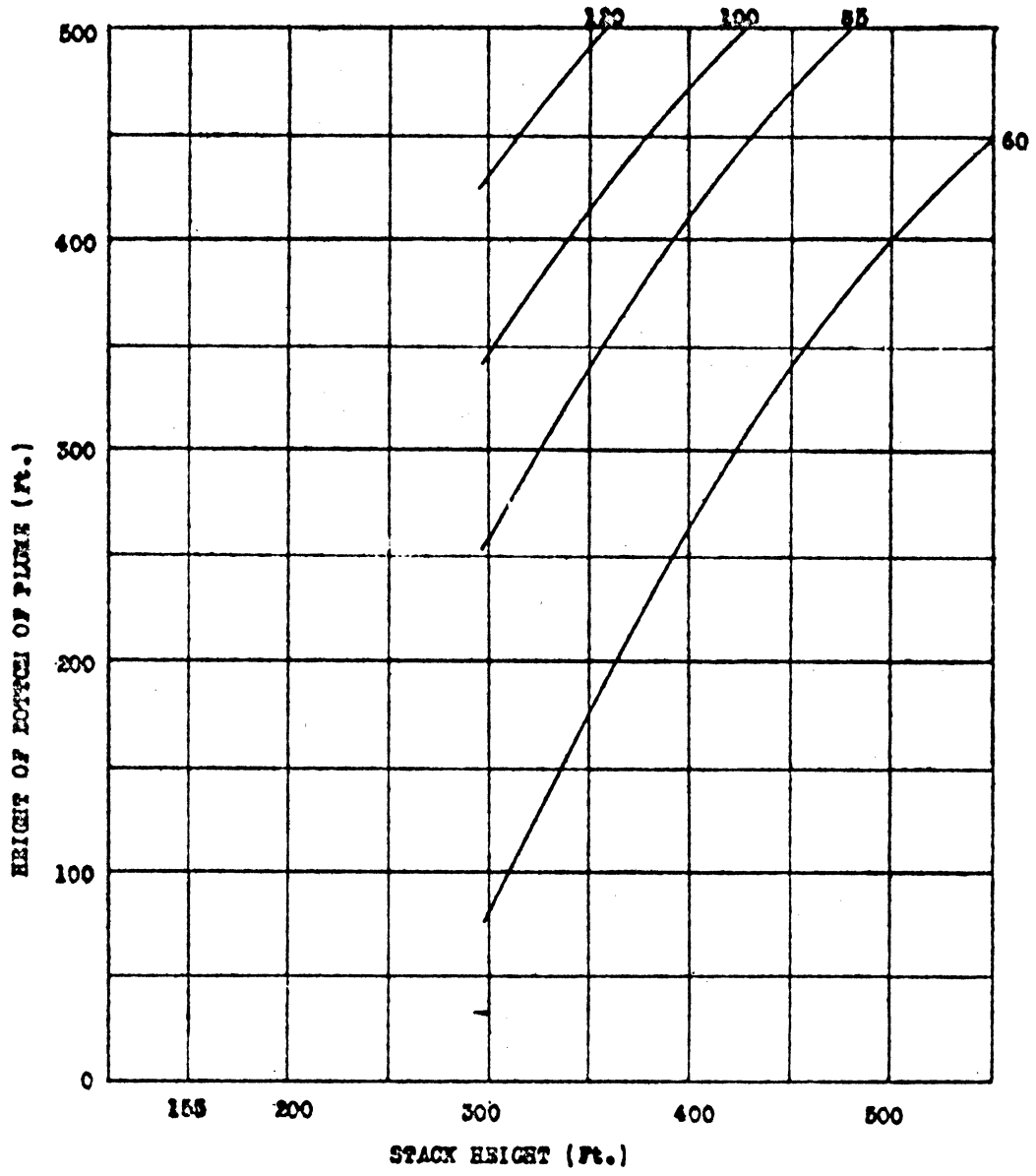
Fig. 89.



WIND FROM WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXHAUSTERS.
DUST CONCENTRATION AT GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

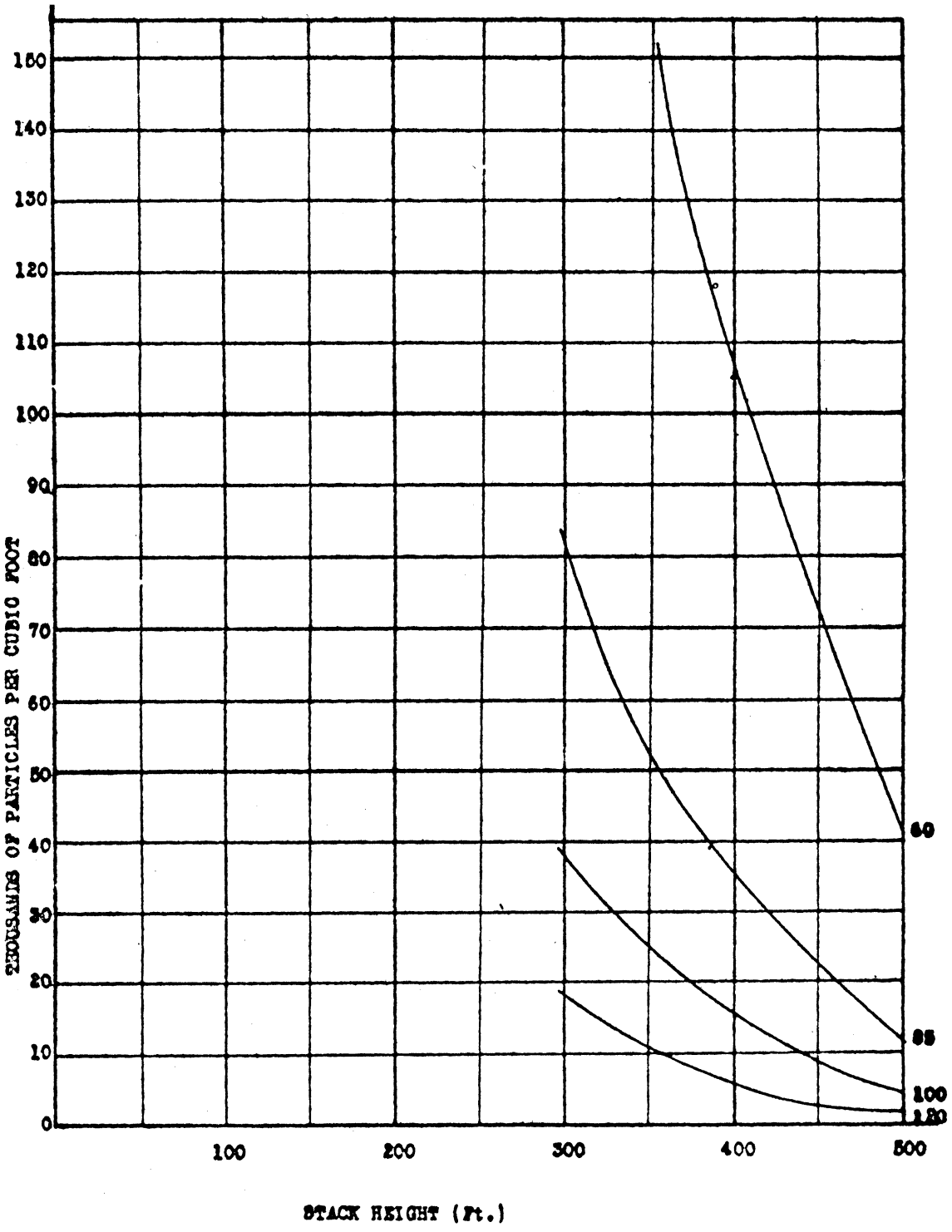
Fig. 90.



WIND FROM WEST AT 10.25 M.P.H. (Avg).
STACK GAS VELOCITIES, 60. 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

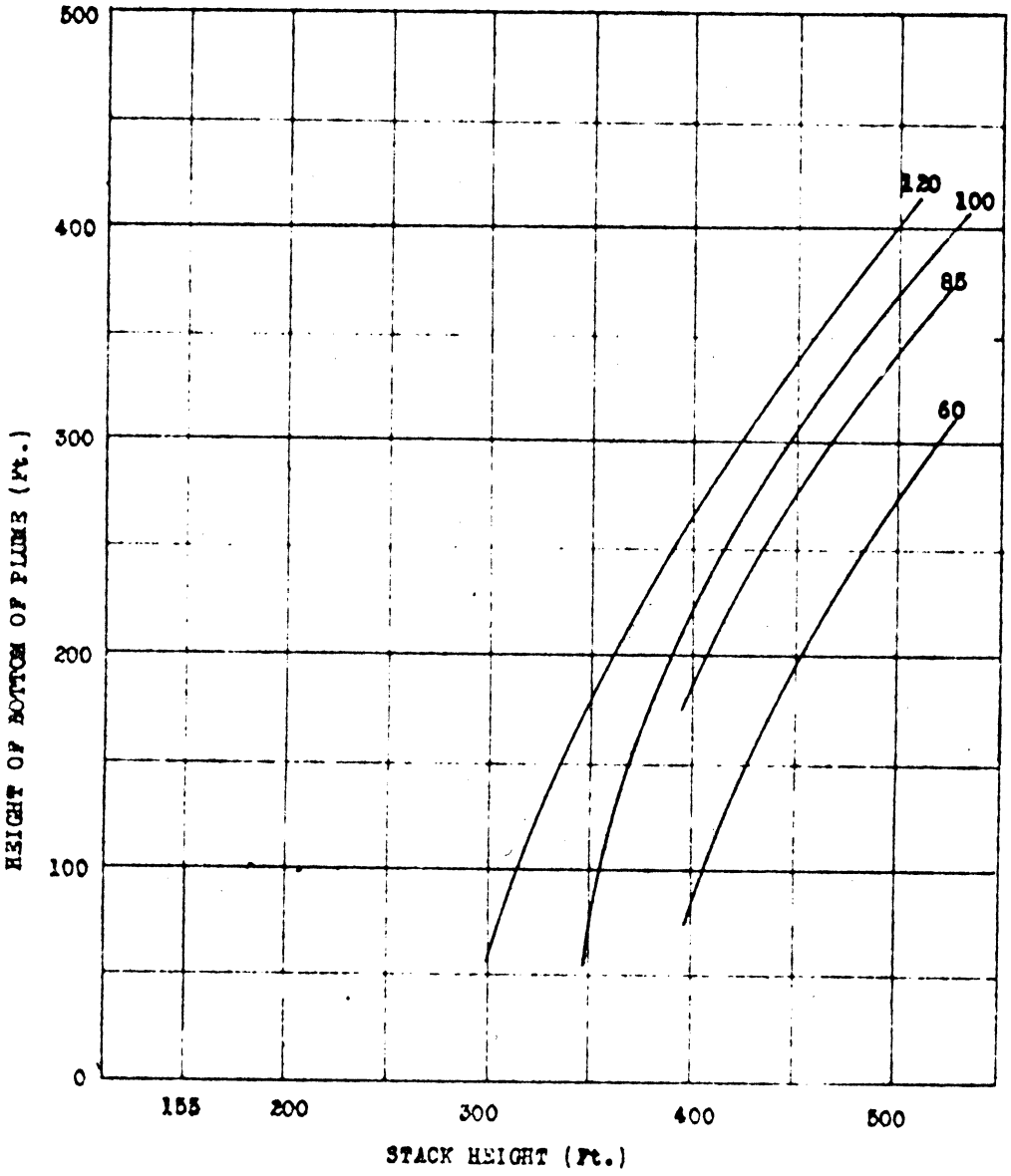
Fig. 91.



WIND FROM WEST AT 10.33 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

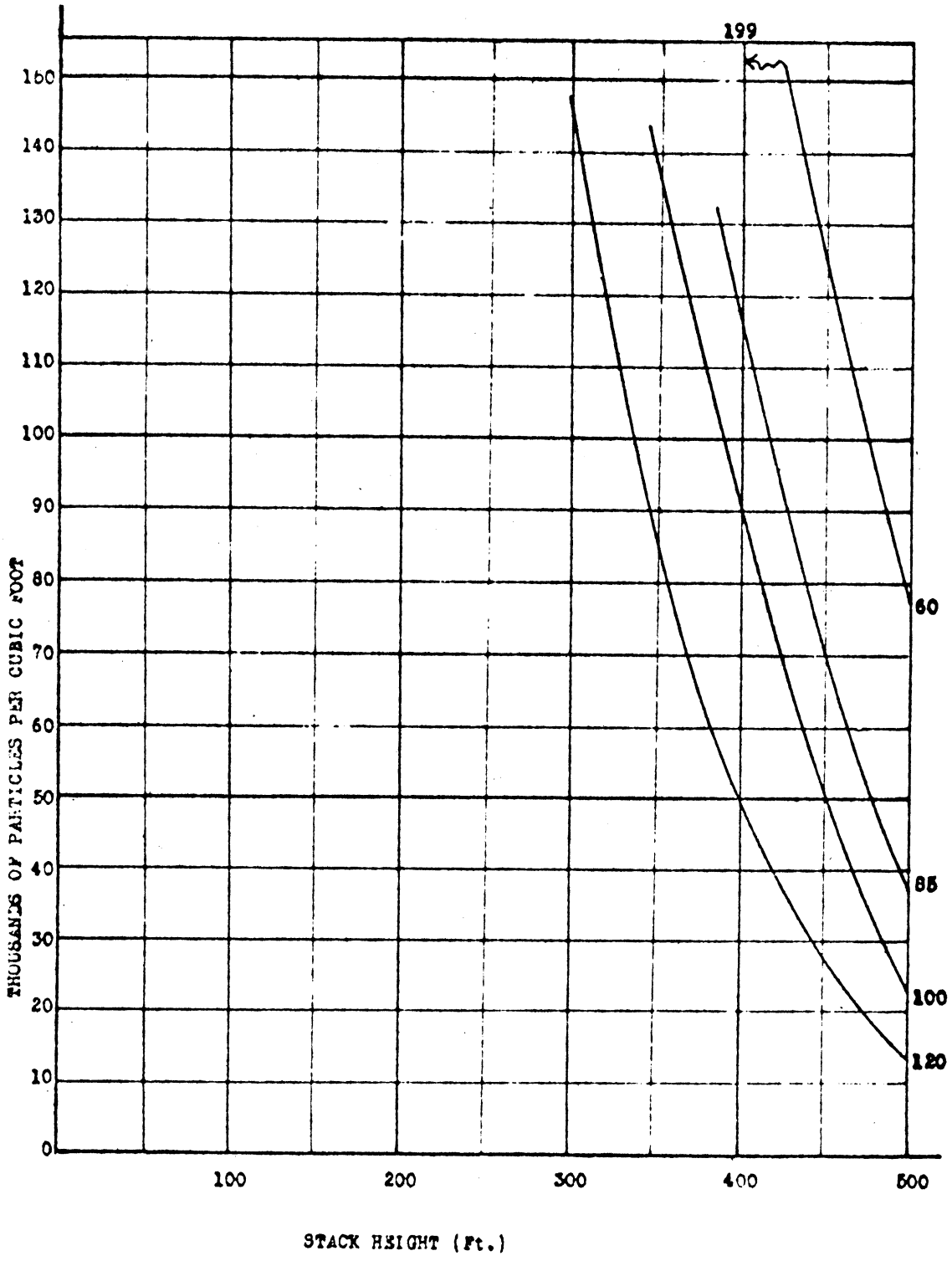
Fig. 92.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
2,200 FEET DOWNWIND FROM STACK.

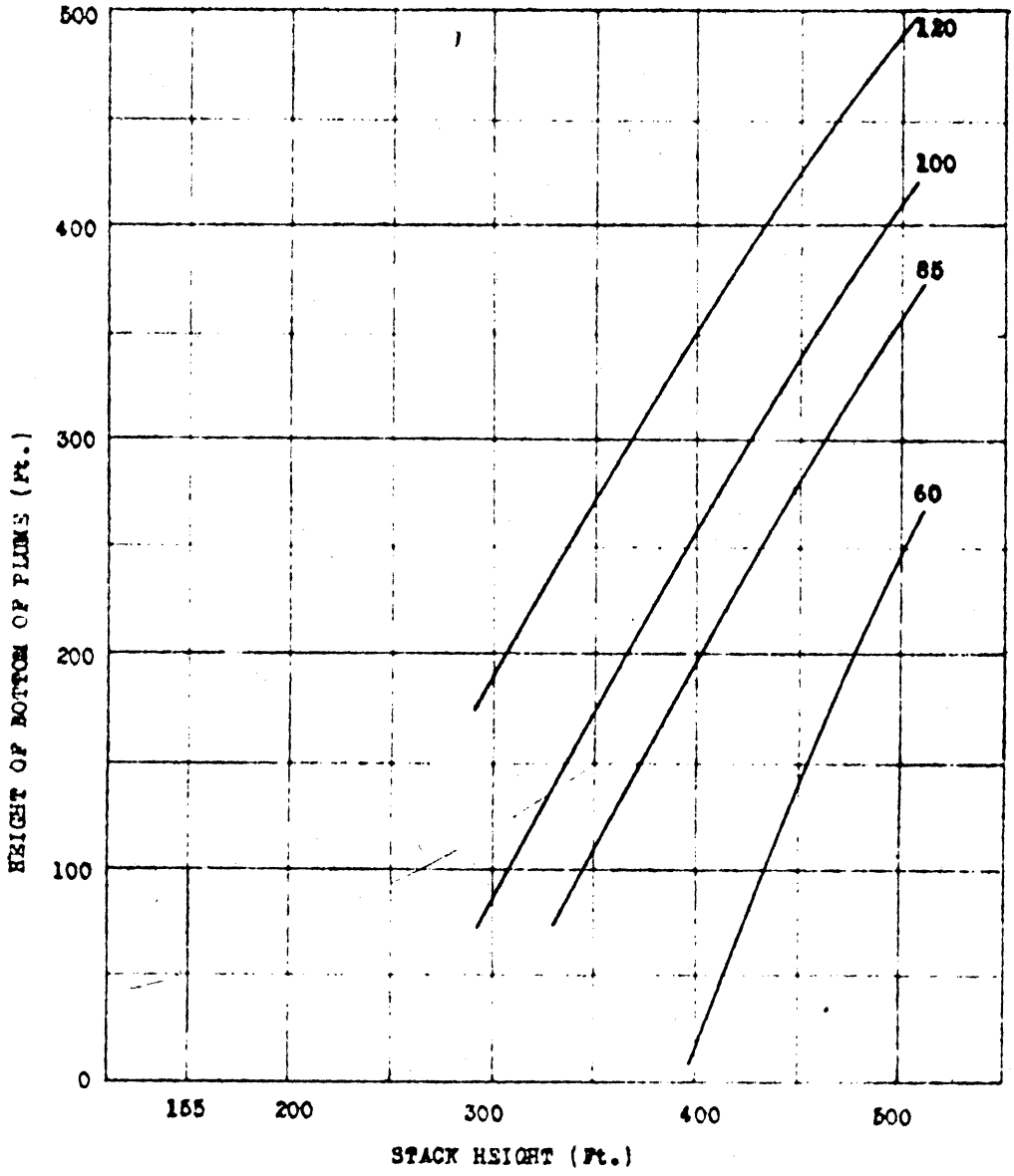
Fig. 93.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

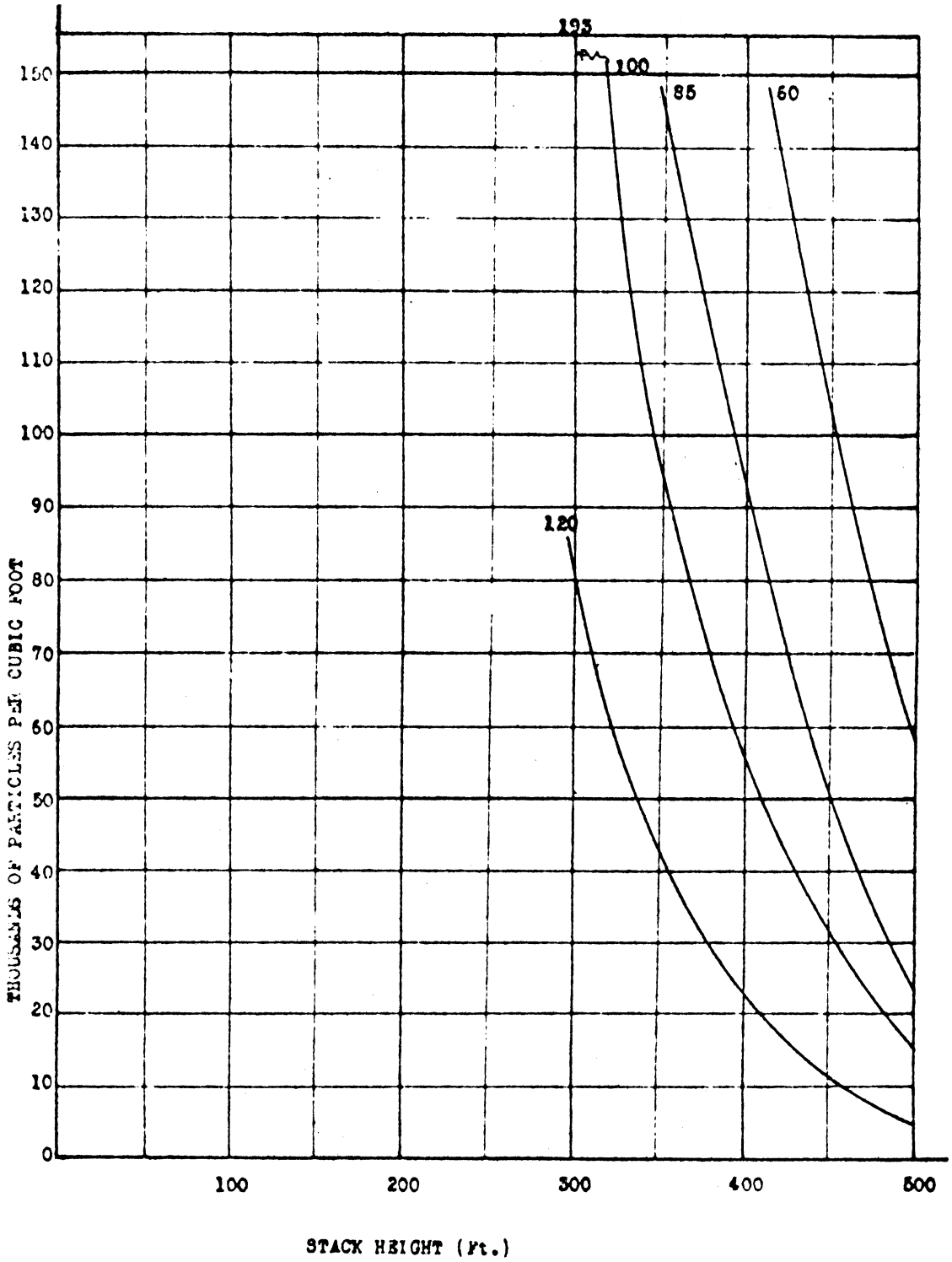
Fig. 94.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS
PLUME HEIGHT ABOVE GROUND LEVEL,
2,200 FEET DOWNWIND FROM STACK.

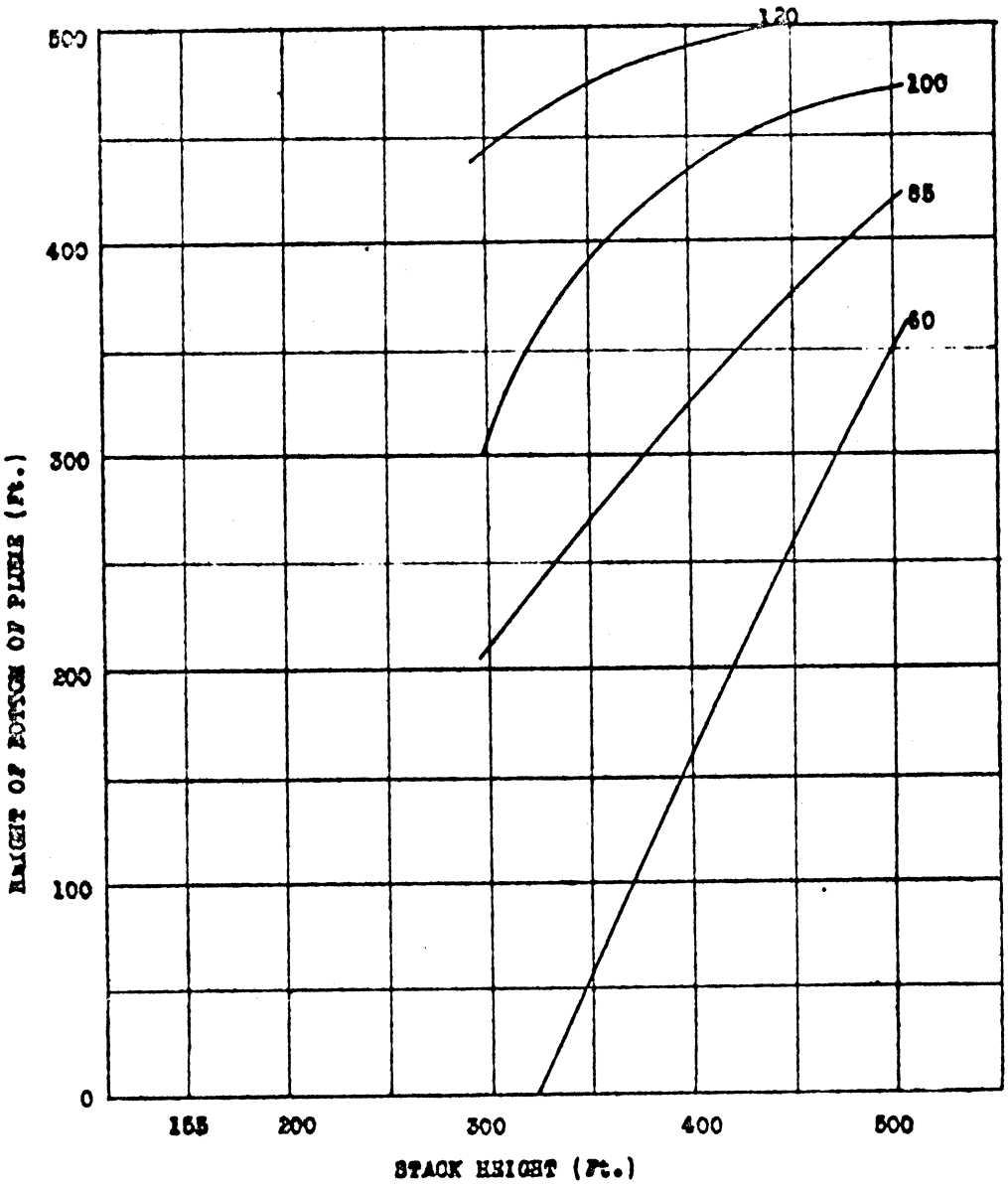
Fig. 95.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

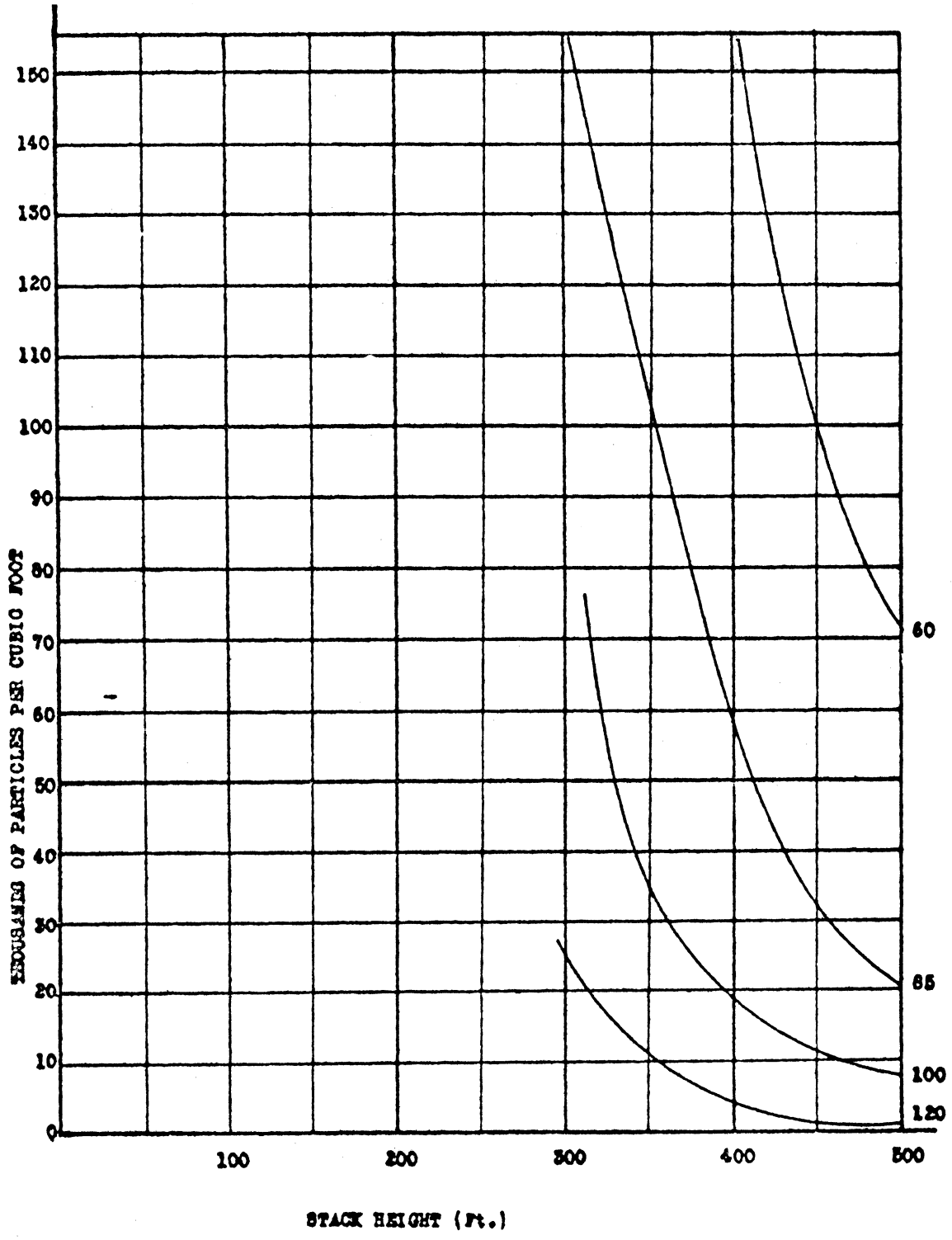
Fig. 96.



WIND FROM WEST AT 10.25 M.P.H. (Avg.).
STACK GAS VELOCITIES 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

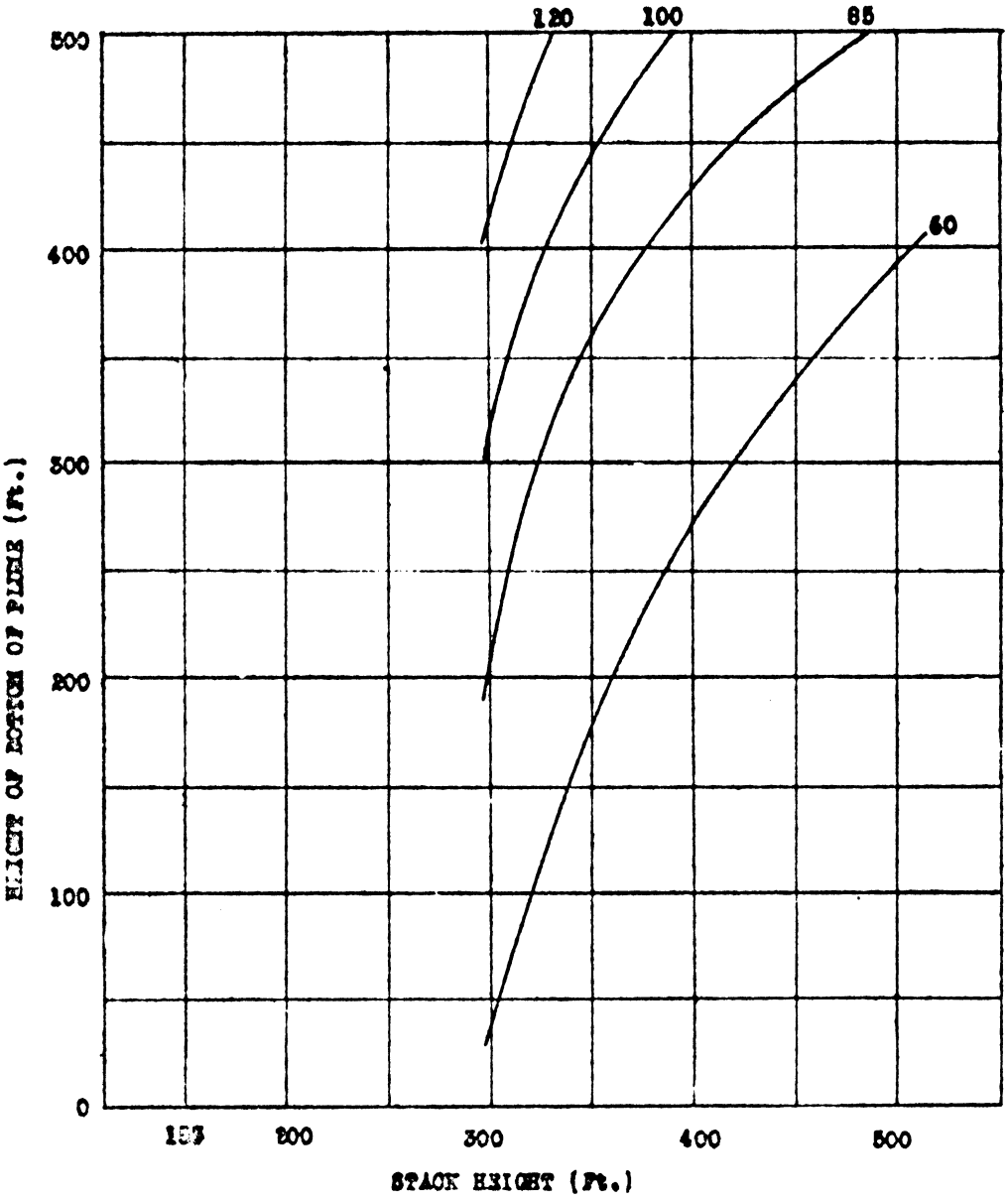
PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
2,200 FEET DOWNWIND FROM STACK.

Fig. 97.



WIND FROM WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.
PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

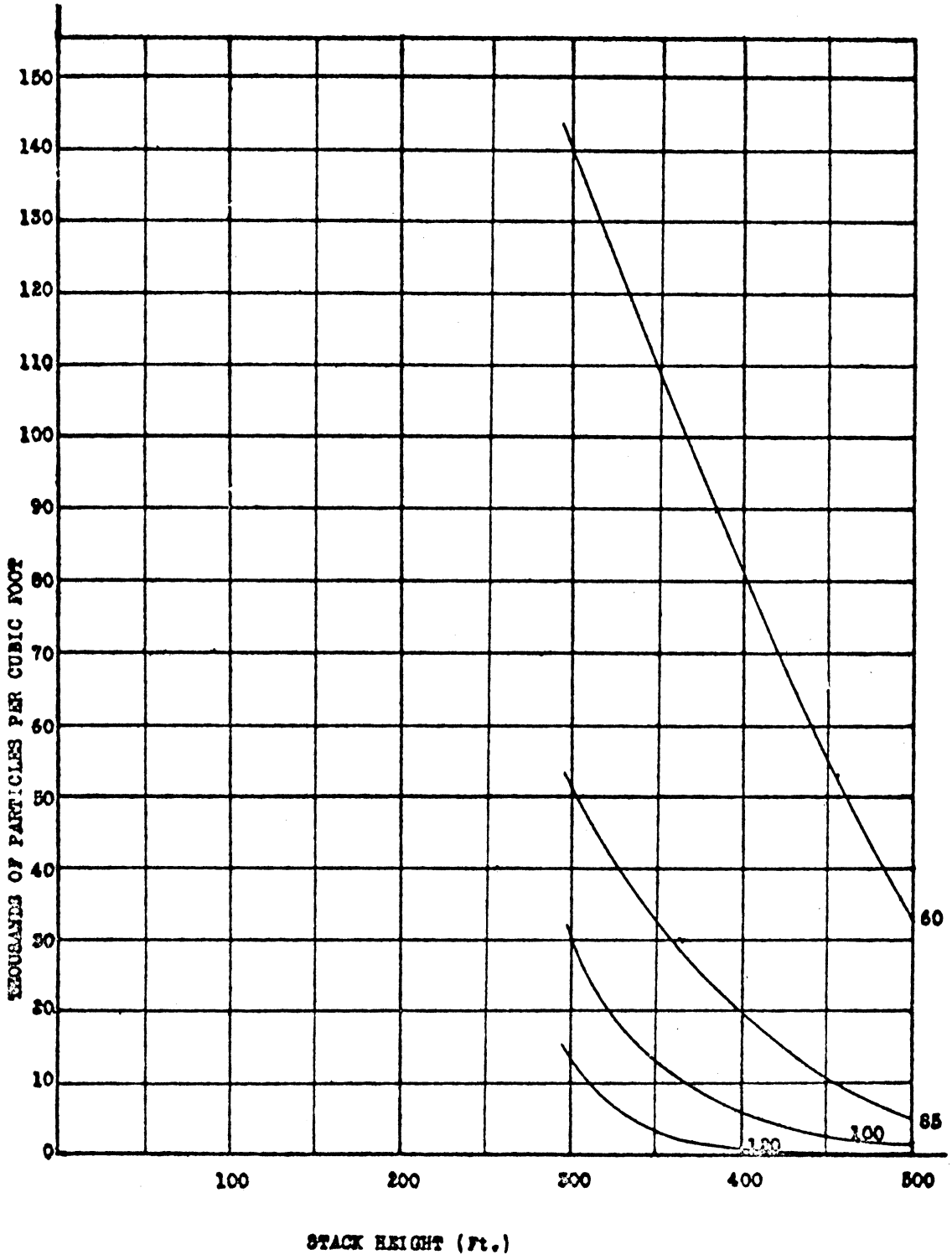
Fig. 98.



WIND FROM WEST AT 20.83 M. P. H.(Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION B.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
2,000 FEET DOWNWIND FROM STACK.

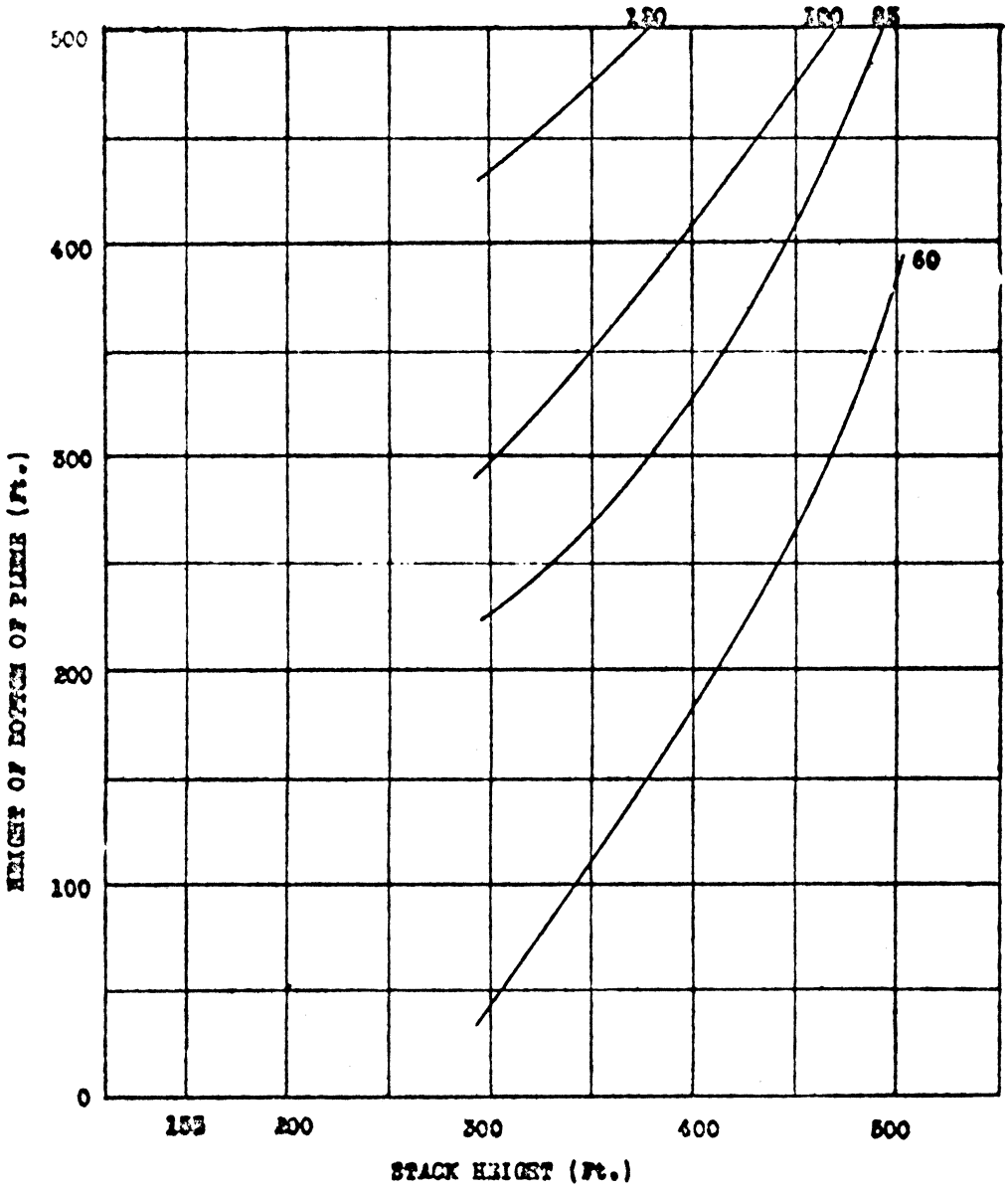
Fig. 99.



WIND FROM WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 M.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS
DUST CONCENTRATION AT GROUND LEVEL,
2,200 FEET DOWNWIND FRO... ...TACK.

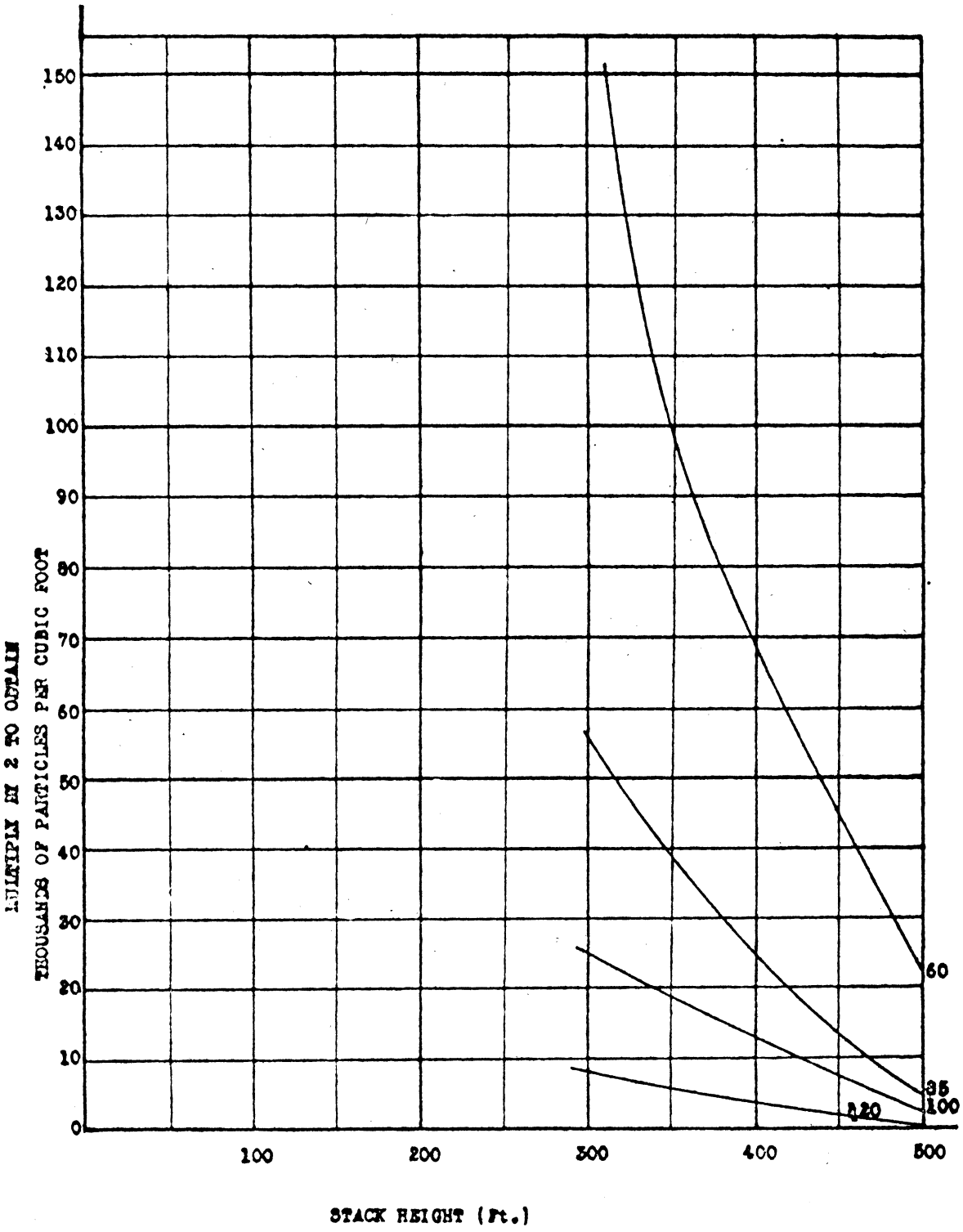
Fig. 100.



WIND FROM WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 65, 100, 150 F.P.S.
STACK LOCATION 3.

PLANT WITH [illegible] STACKS.
PLUME HEIGHT ABOVE GROUND LEVEL,
2,200 FEET DOWNWIND FROM STACK.

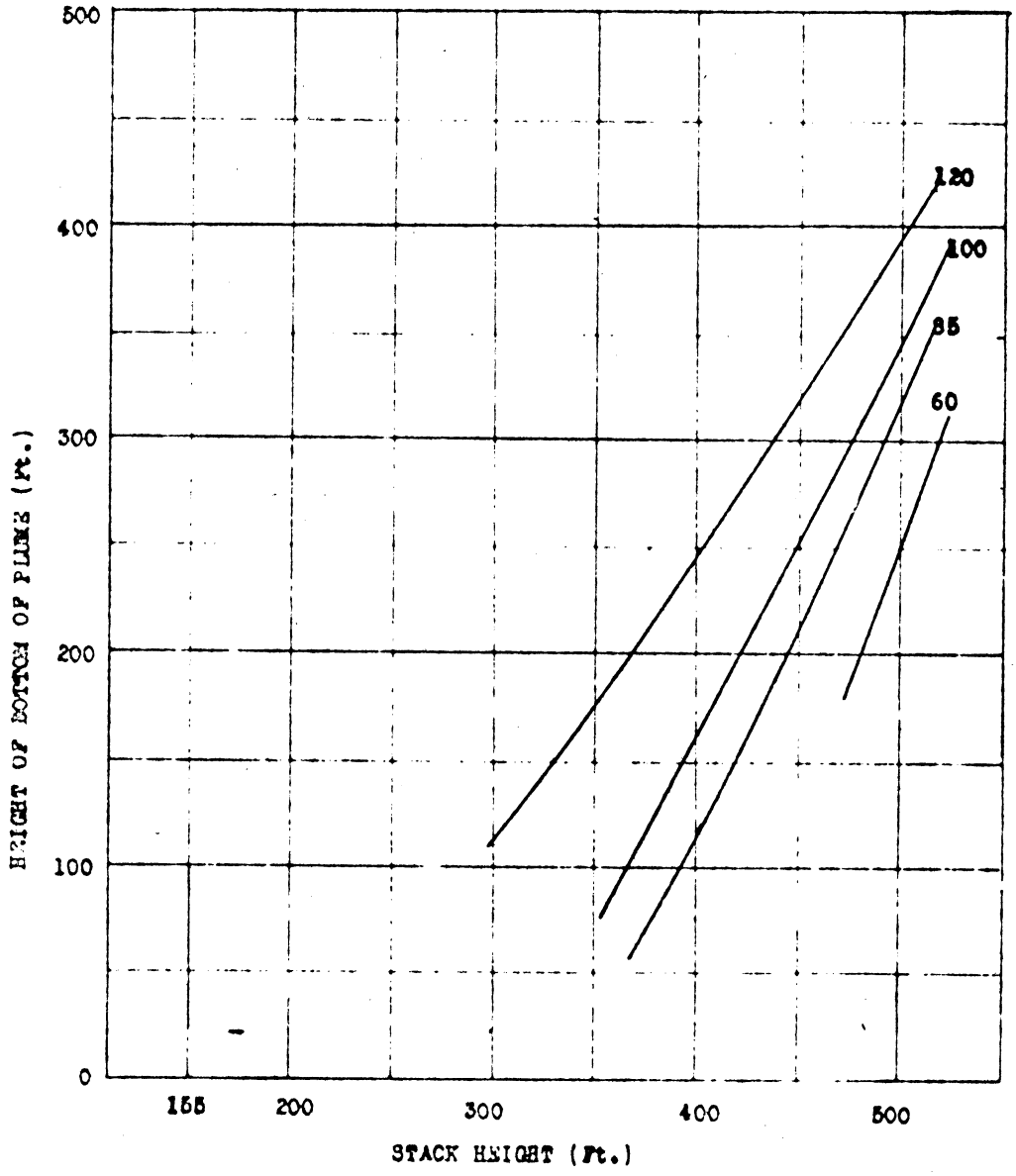
Fig. 101.



WIND FROM WEST AT 10.25 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
[illegible] LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL.
2,200 FEET DOWNWIND FROM STACK.

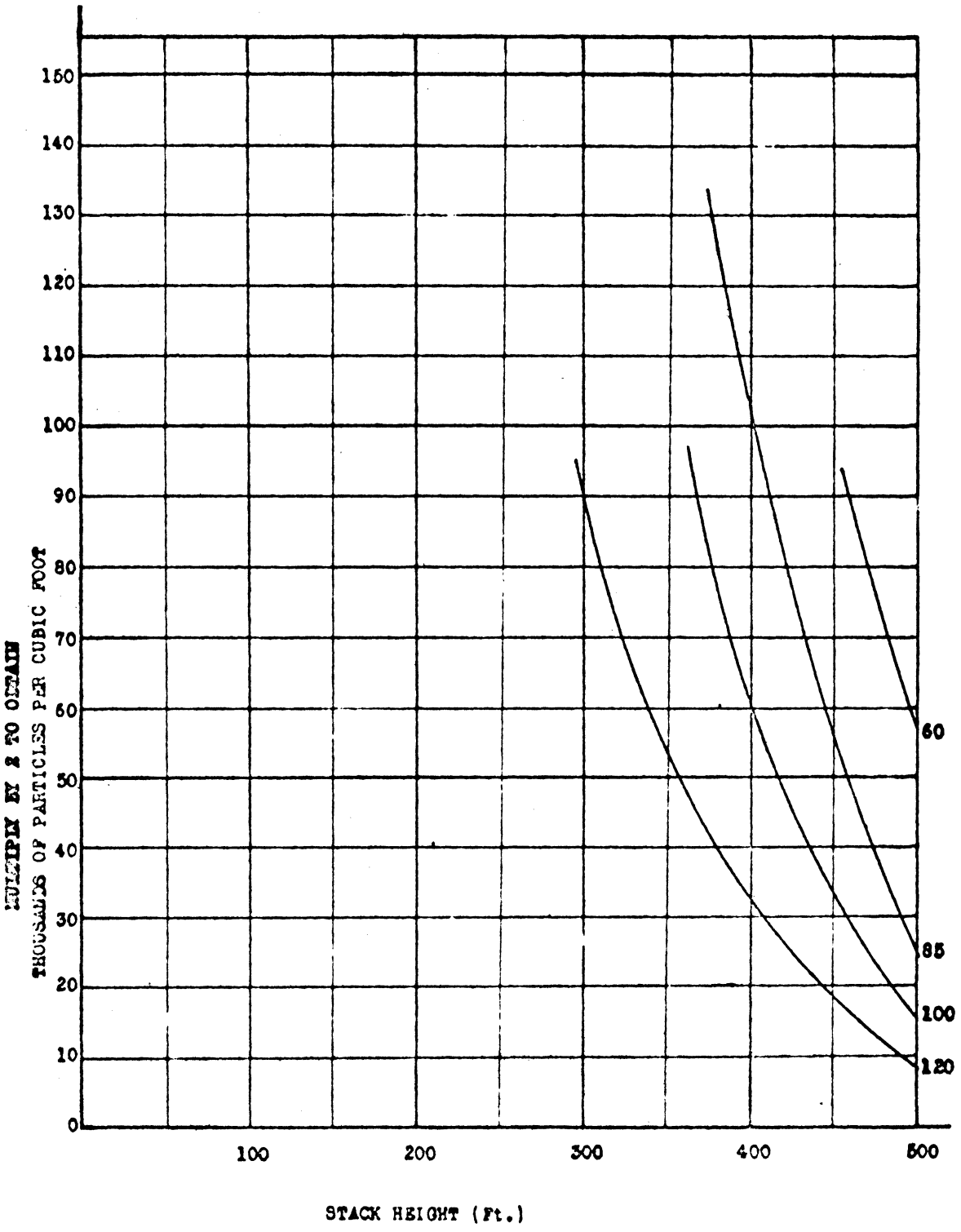
Fig. 102.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

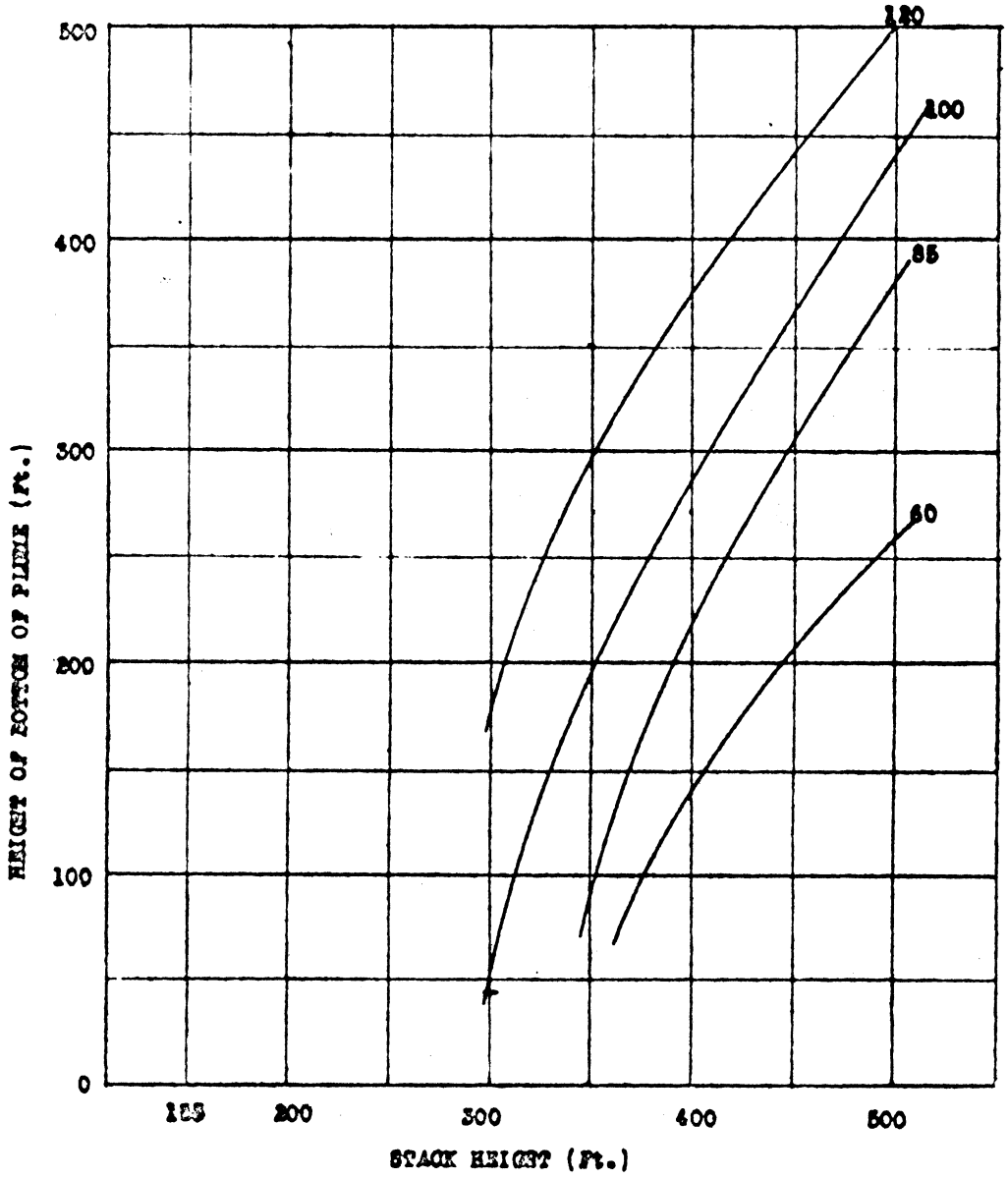
Fig. 103.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
2,200 FEET DOWNWIND FROM STACK.

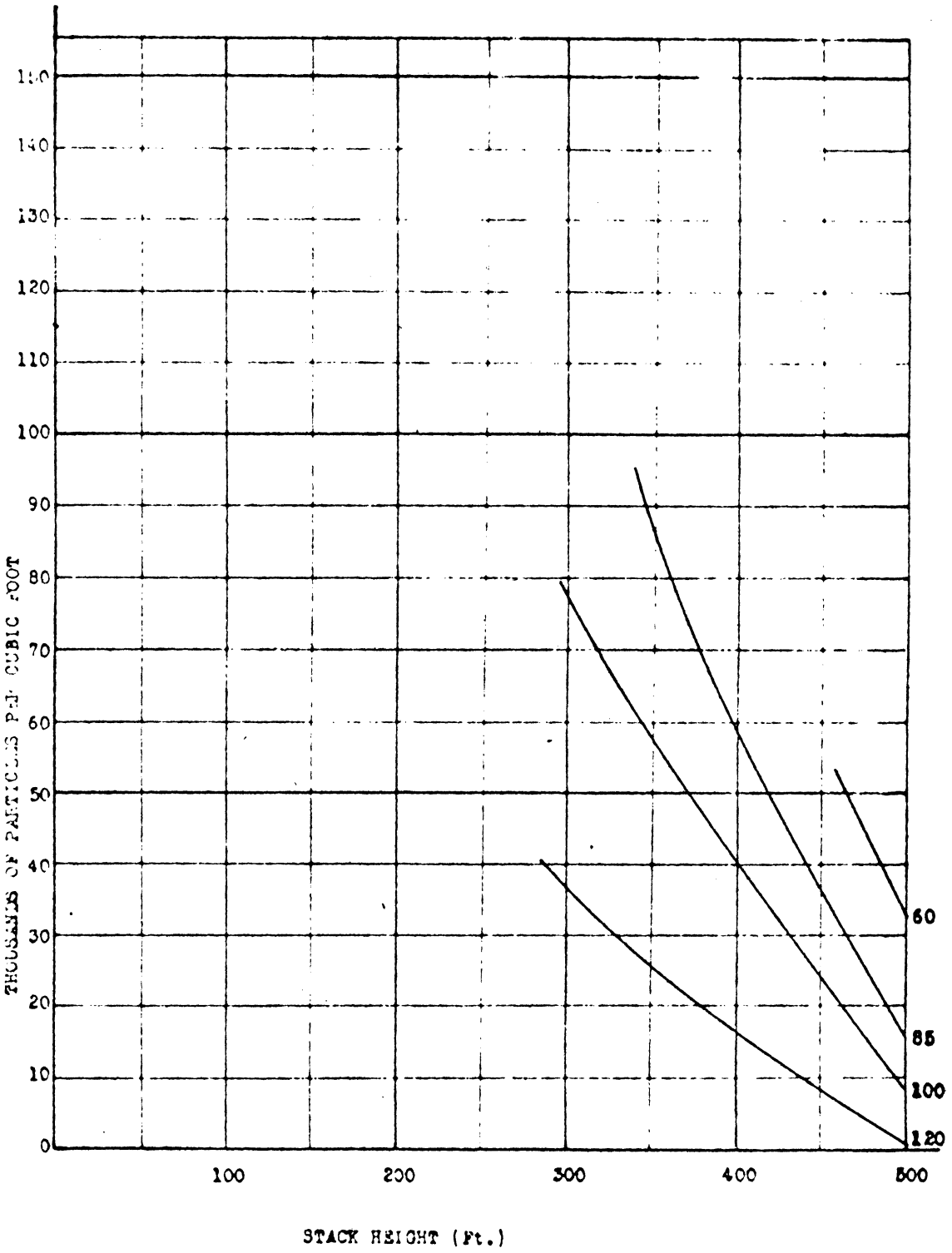
Fig. 104.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION B.

PLANT WITH EXTENSIONS
PLUME HEIGHT ABOVE GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

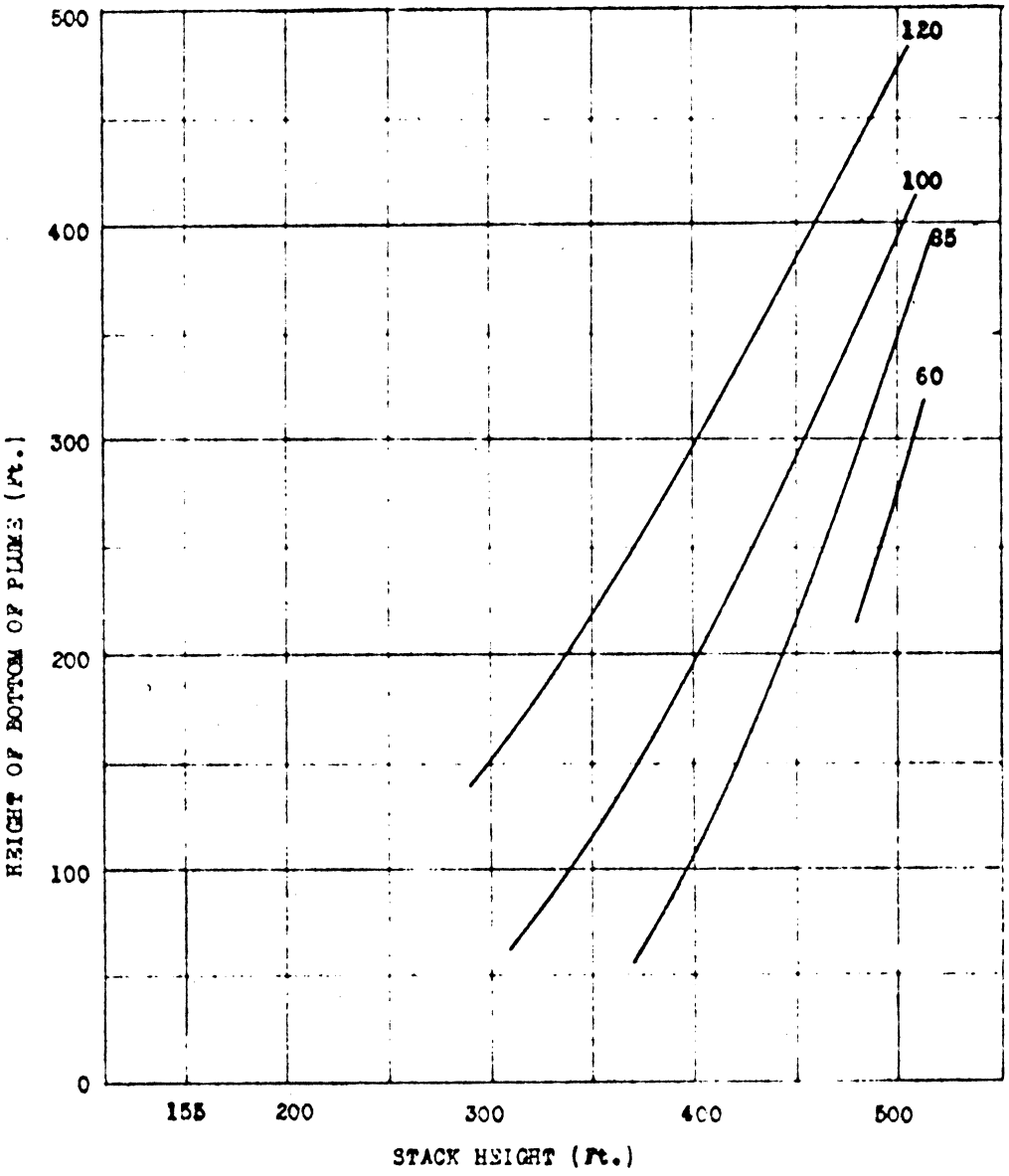
Fig. 105.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK IN LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
2,200 FEET DOWNWIND FROM STACK.

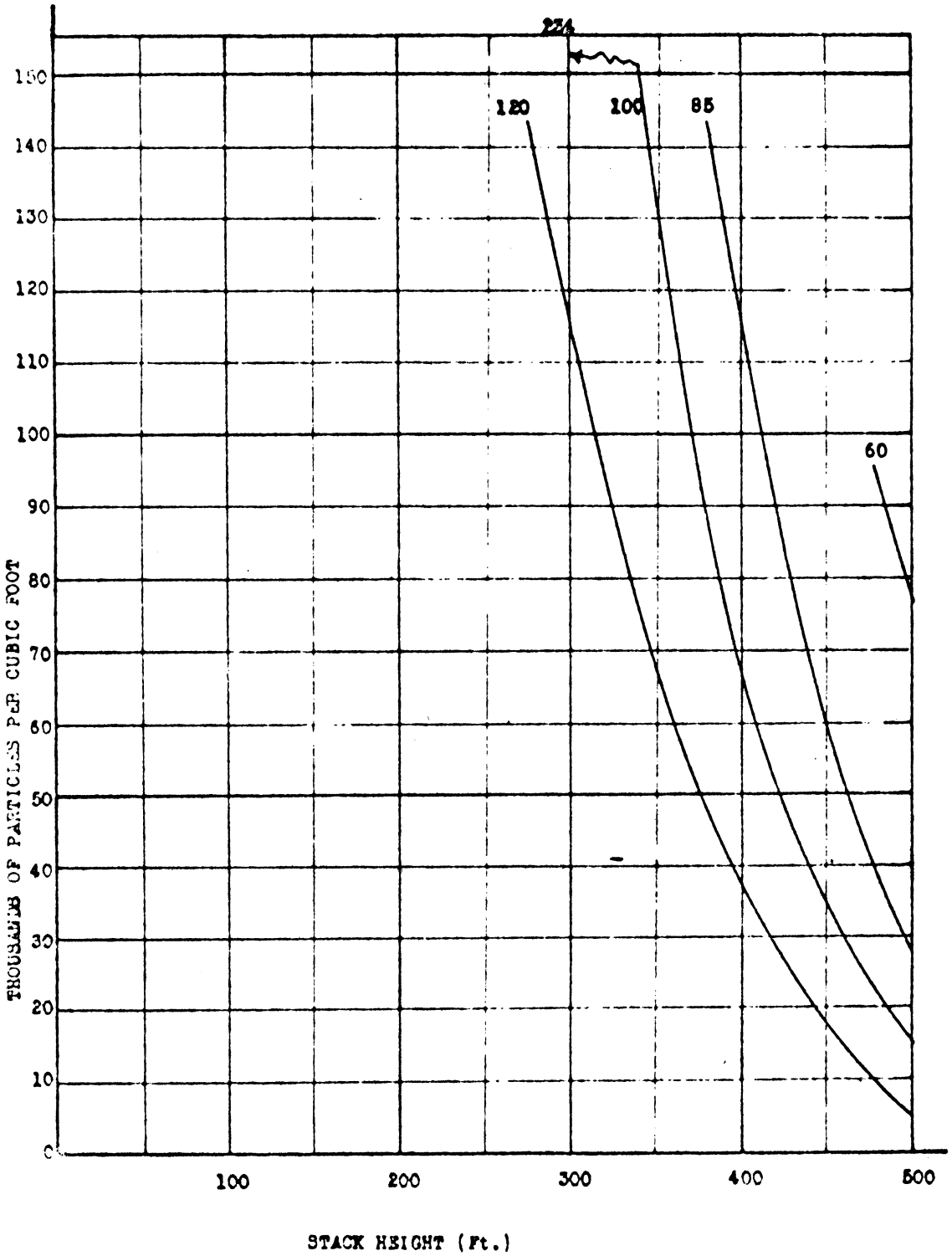
Fig. 106.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS
PLUME HEIGHT ABOVE GROUND LEVEL,
2,200 FEET DOWNWIND FROM STACK.

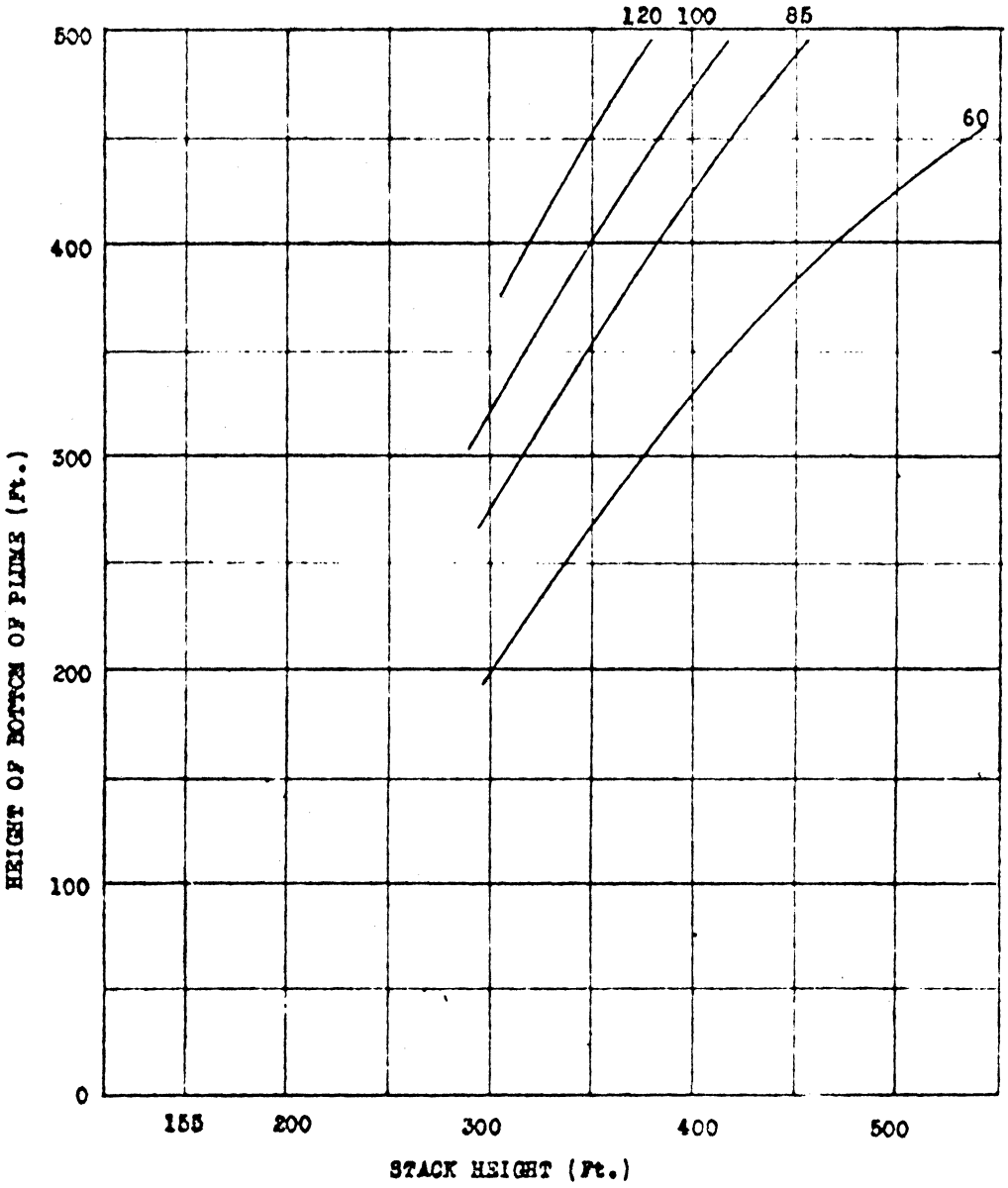
Fig. 107.



WIND FROM WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 2,200 FEET DOWNWIND FROM STACK.

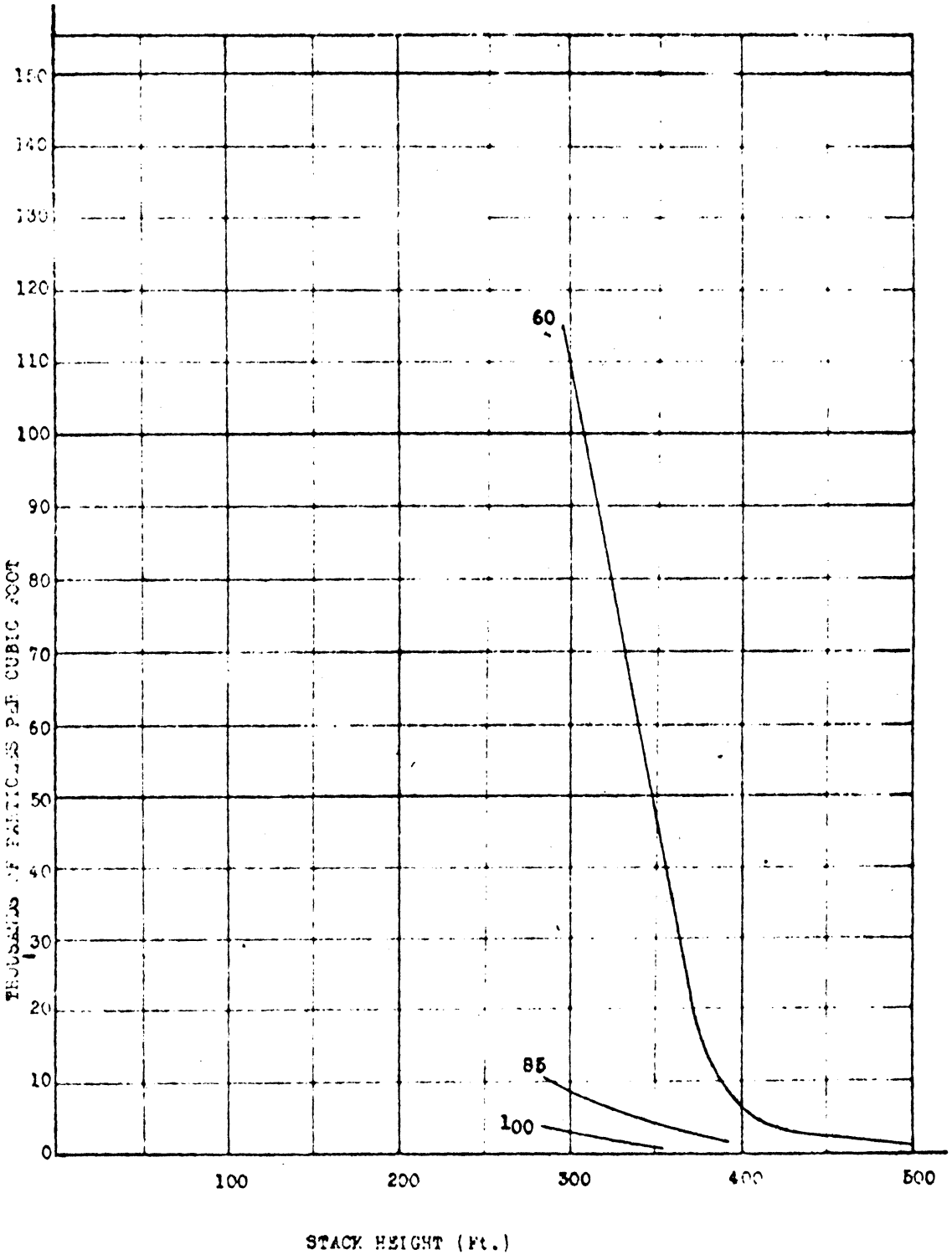
Fig. 108.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL
1000 FEET DOWNWIND FROM STACK.

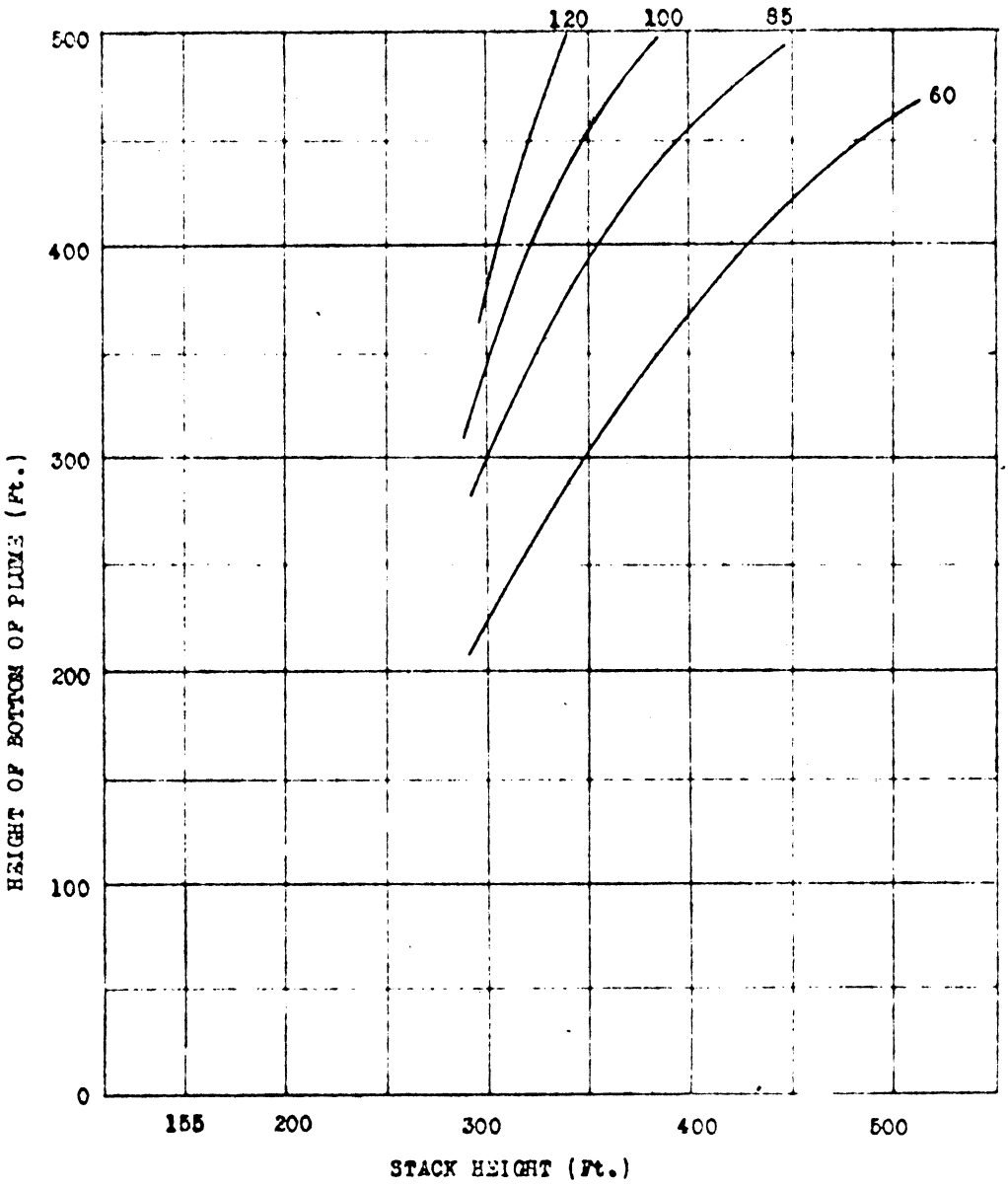
Fig. 109.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 1,000 FEET DOWNWIND FROM STACK.

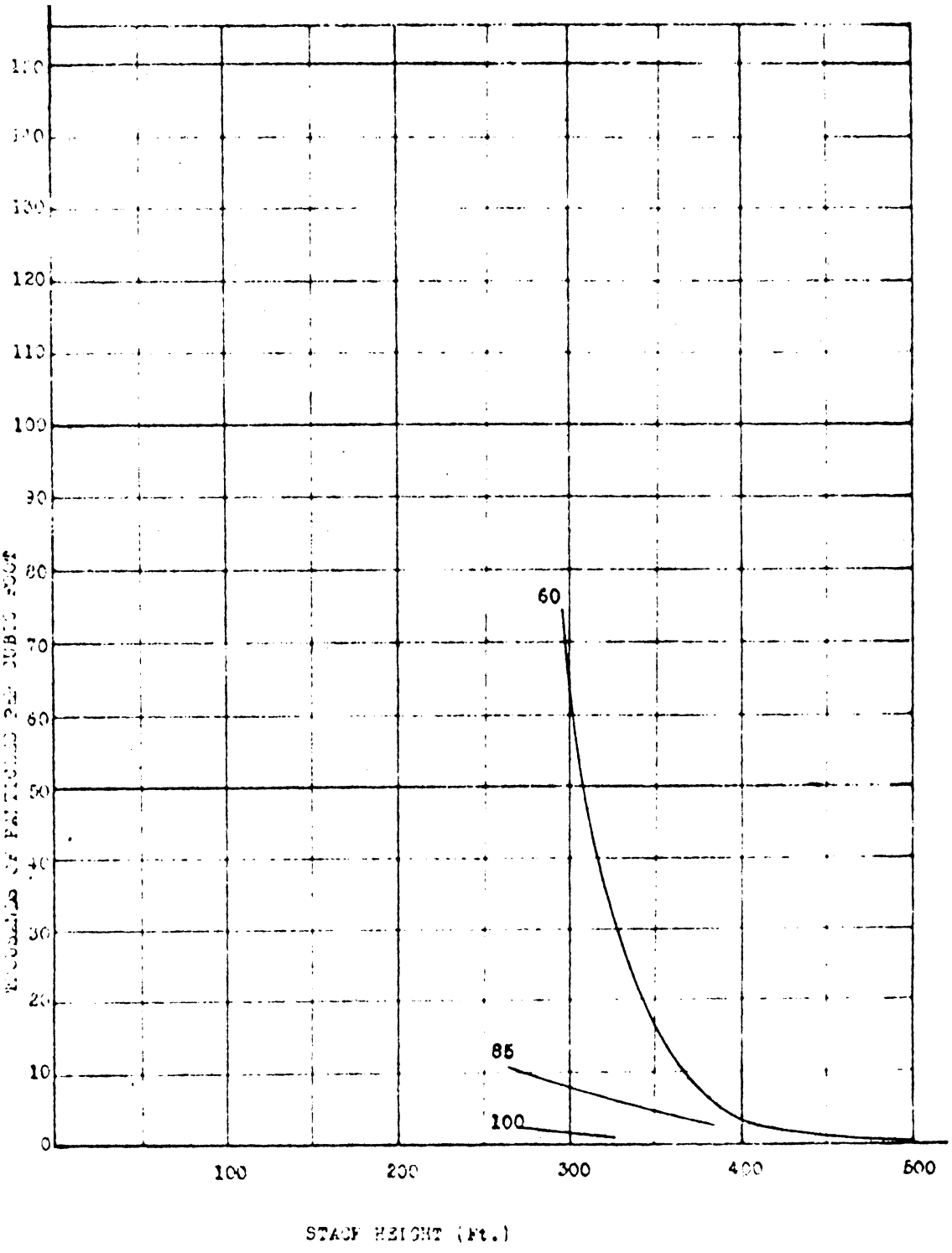
Fig. 110.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

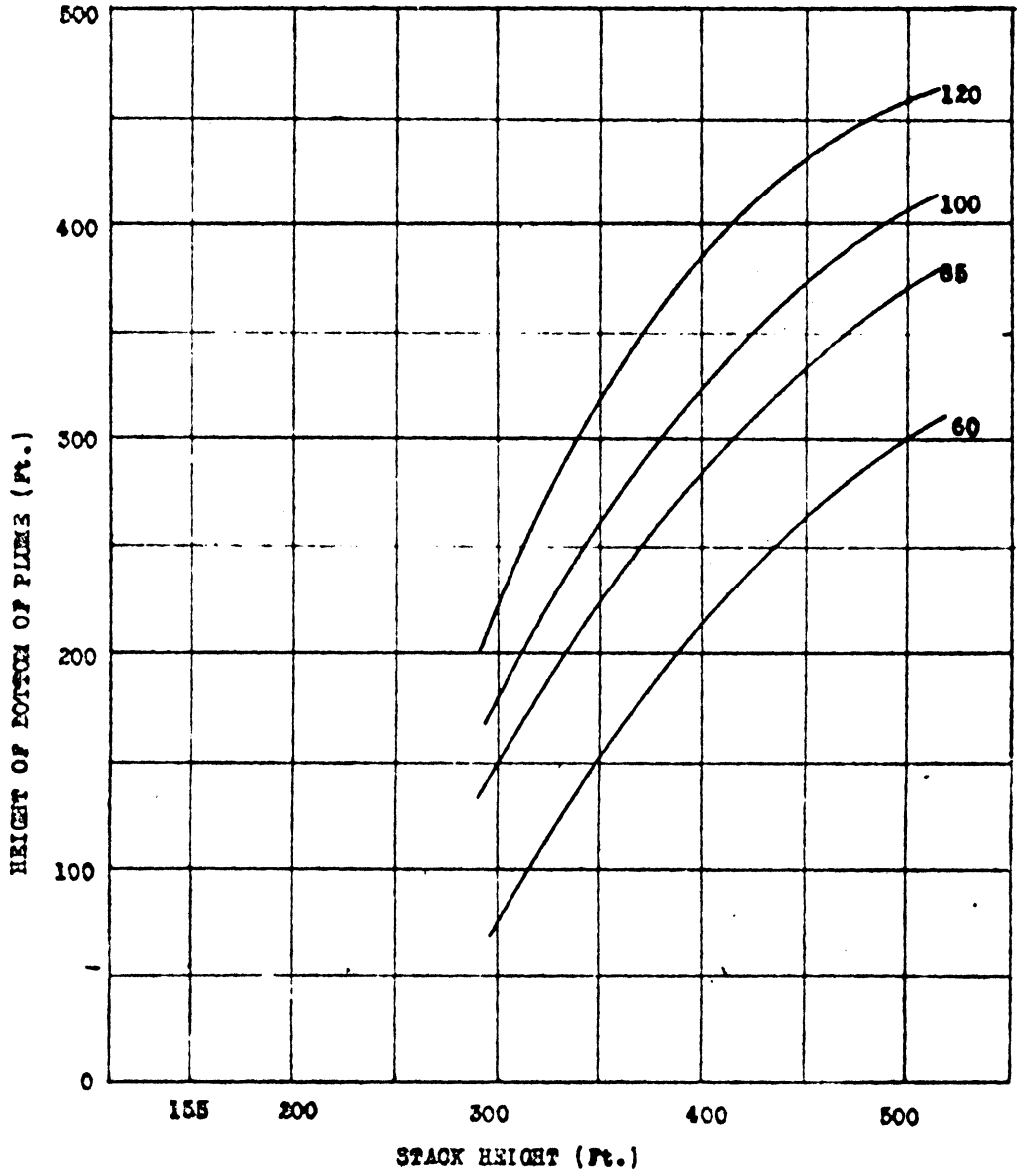
PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 1,000 FEET DOWNWIND FROM STACK.

Fig. 111.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.
PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 1,000 FEET DOWNWIND FROM STACK.

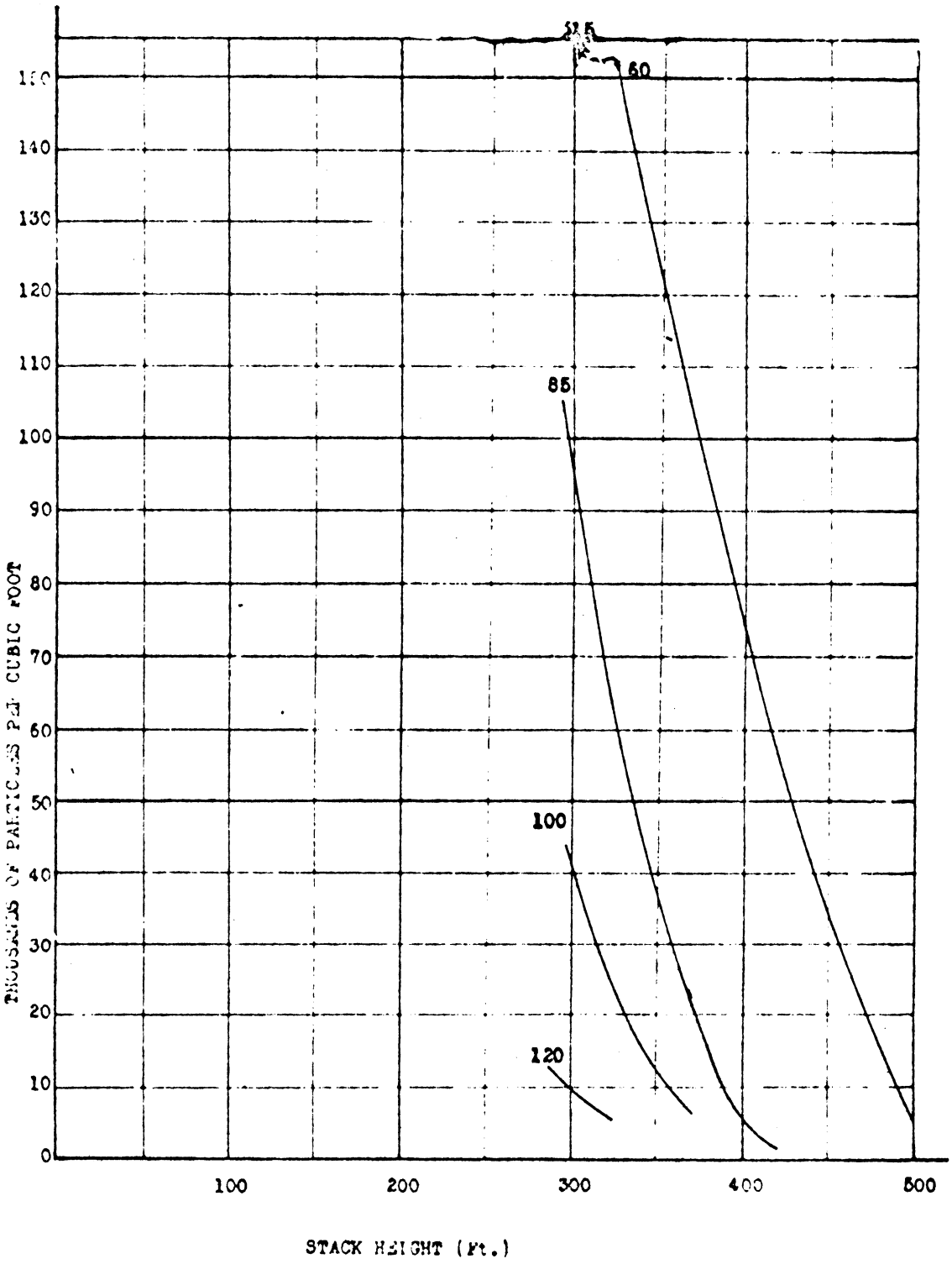
Fig. 112.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 1,000 FEET DOWNWIND FROM STACK.

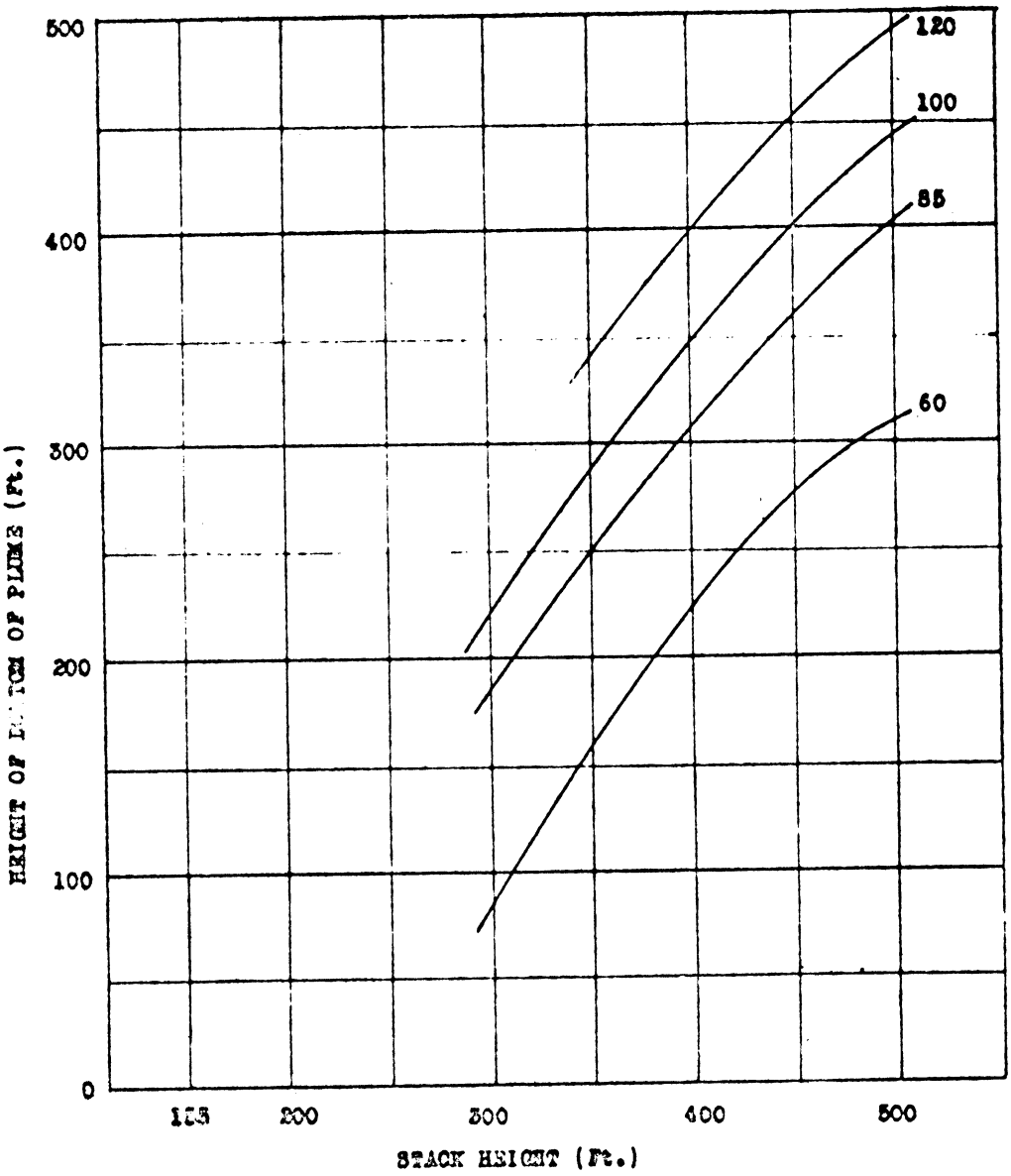
Fig. 113.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

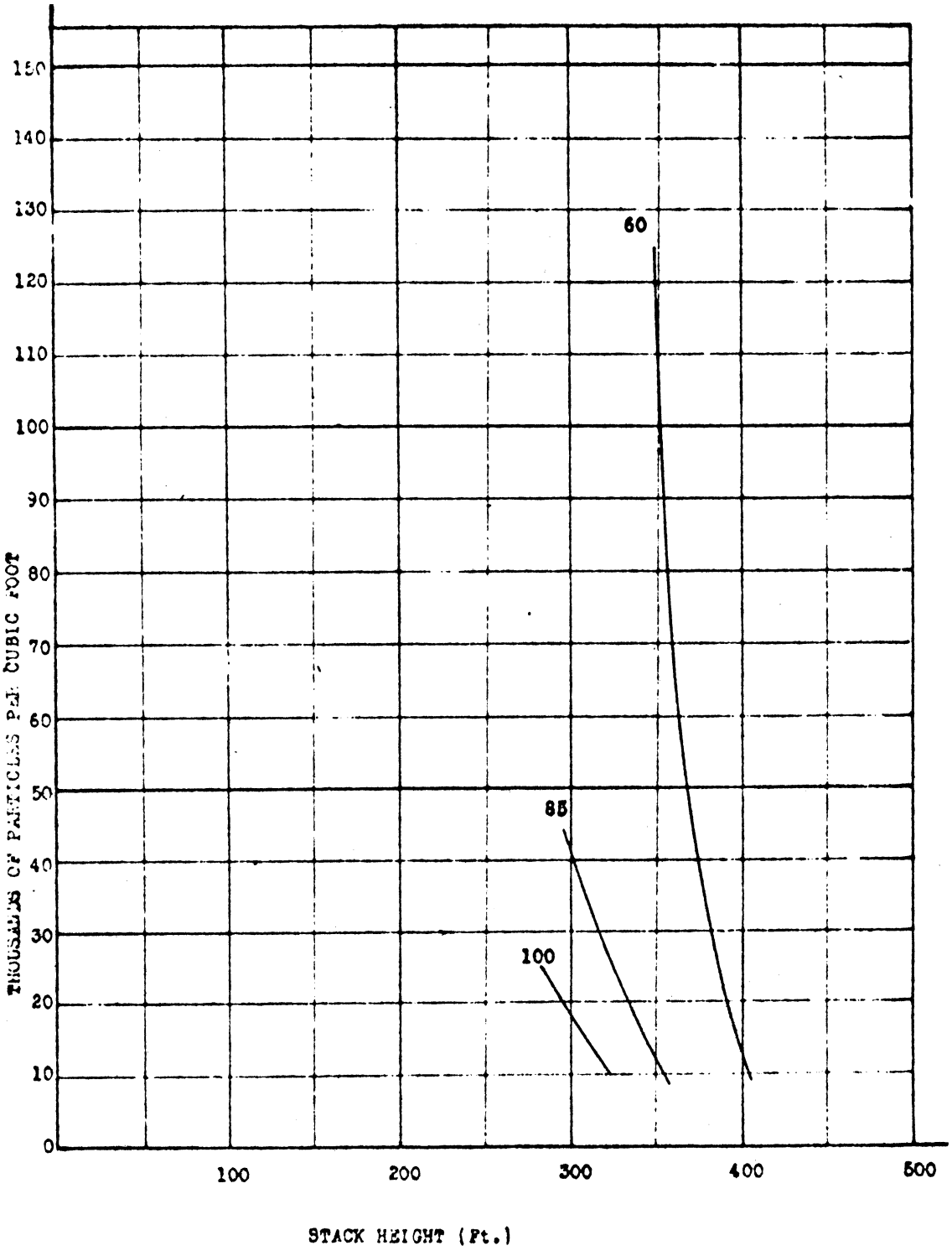
Fig. 114.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
1,000 FEET DOWNWIND.

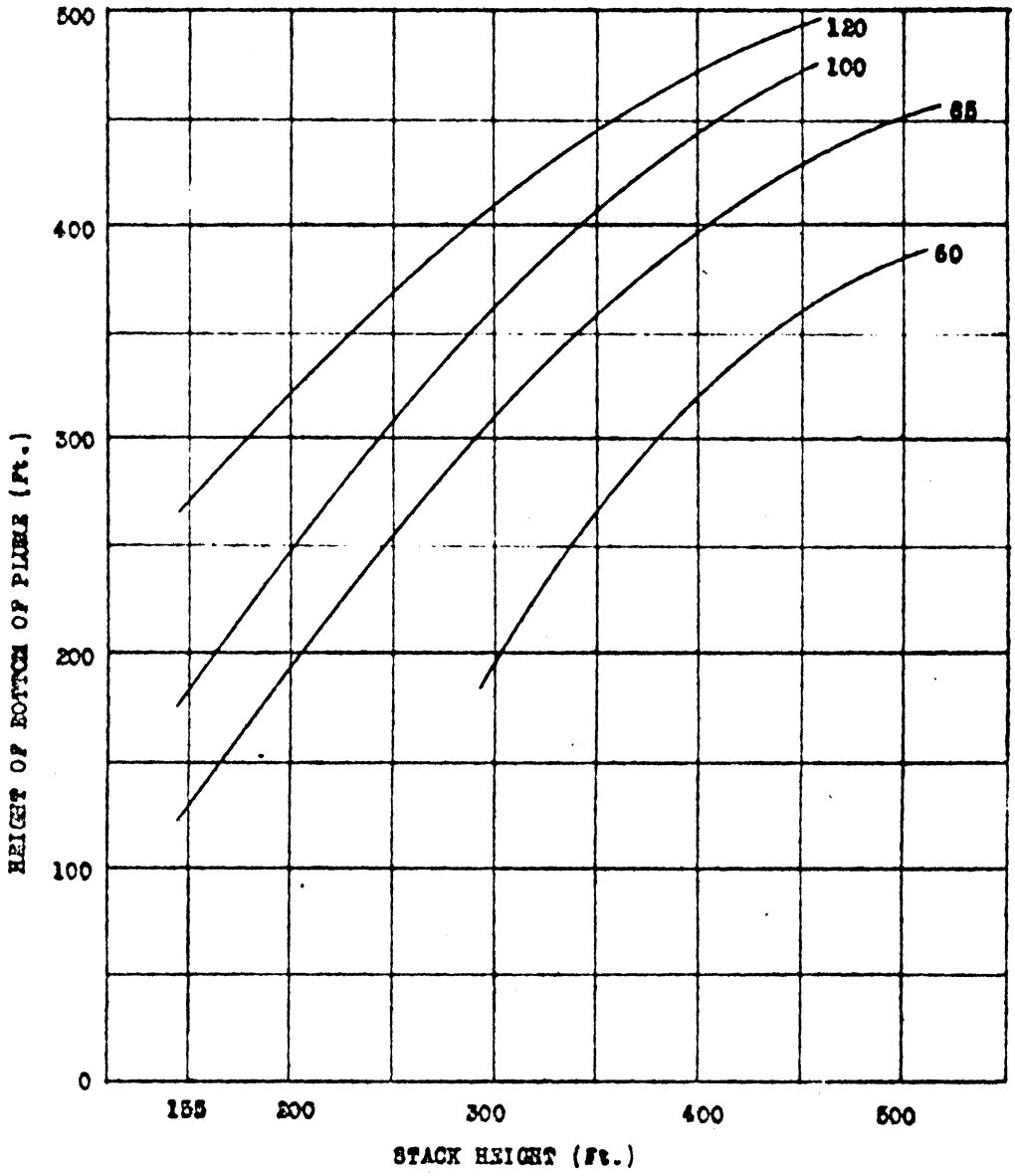
Fig. 115.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITHOUT EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL, 1,000 FEET DOWNWIND FROM STACK.

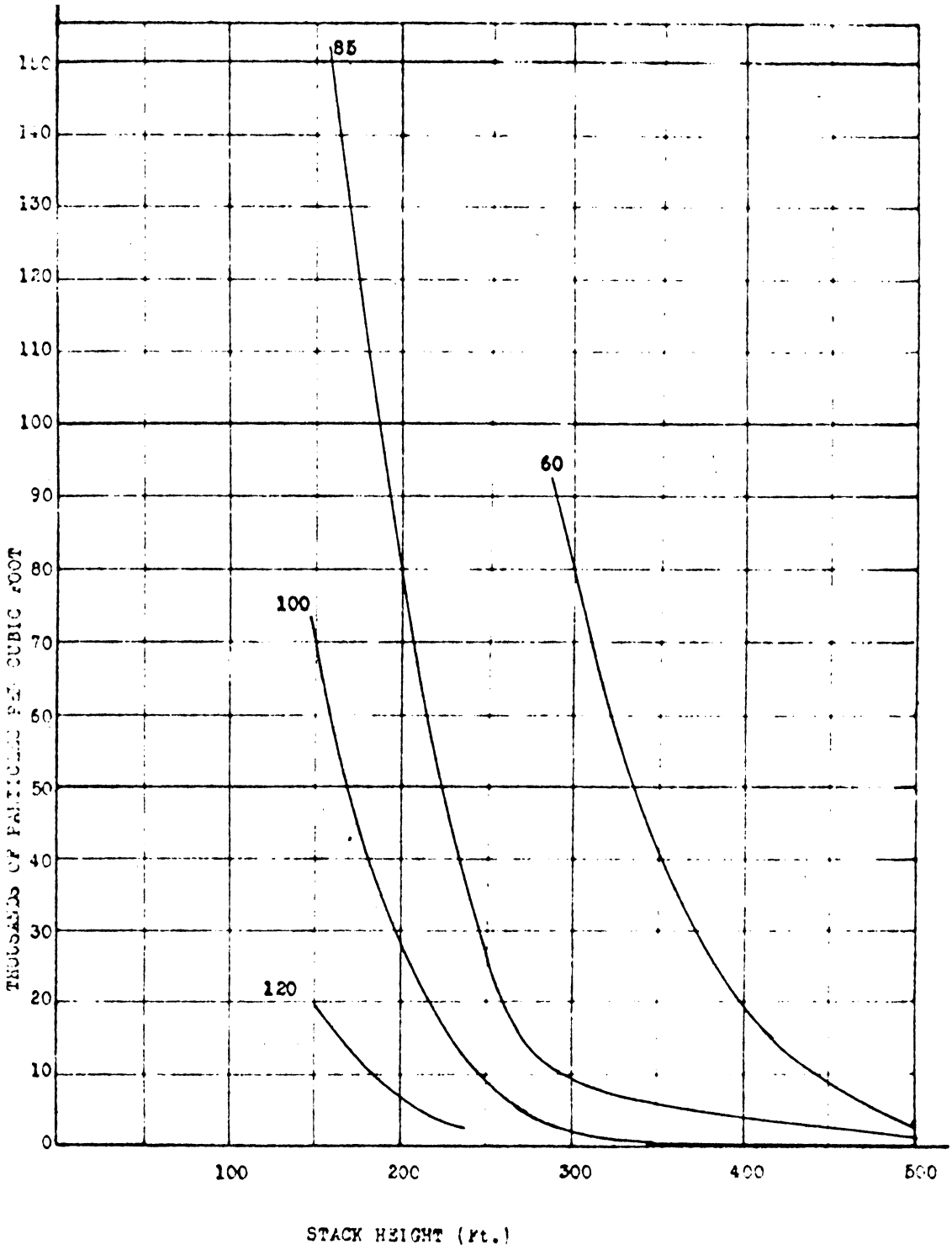
Fig. 116.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL
1000 FEET DOWNWIND FROM STACK.

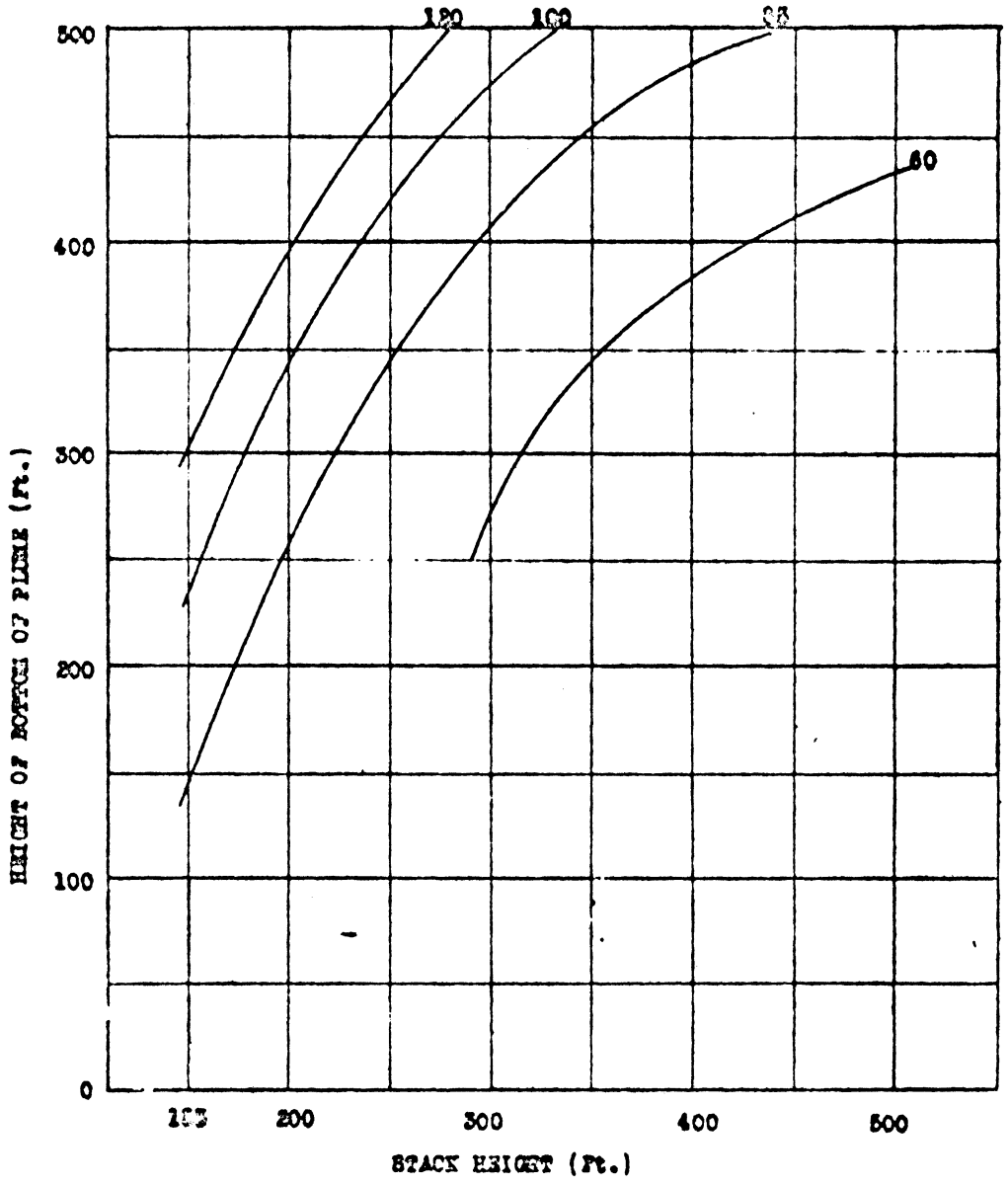
Fig. 117.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

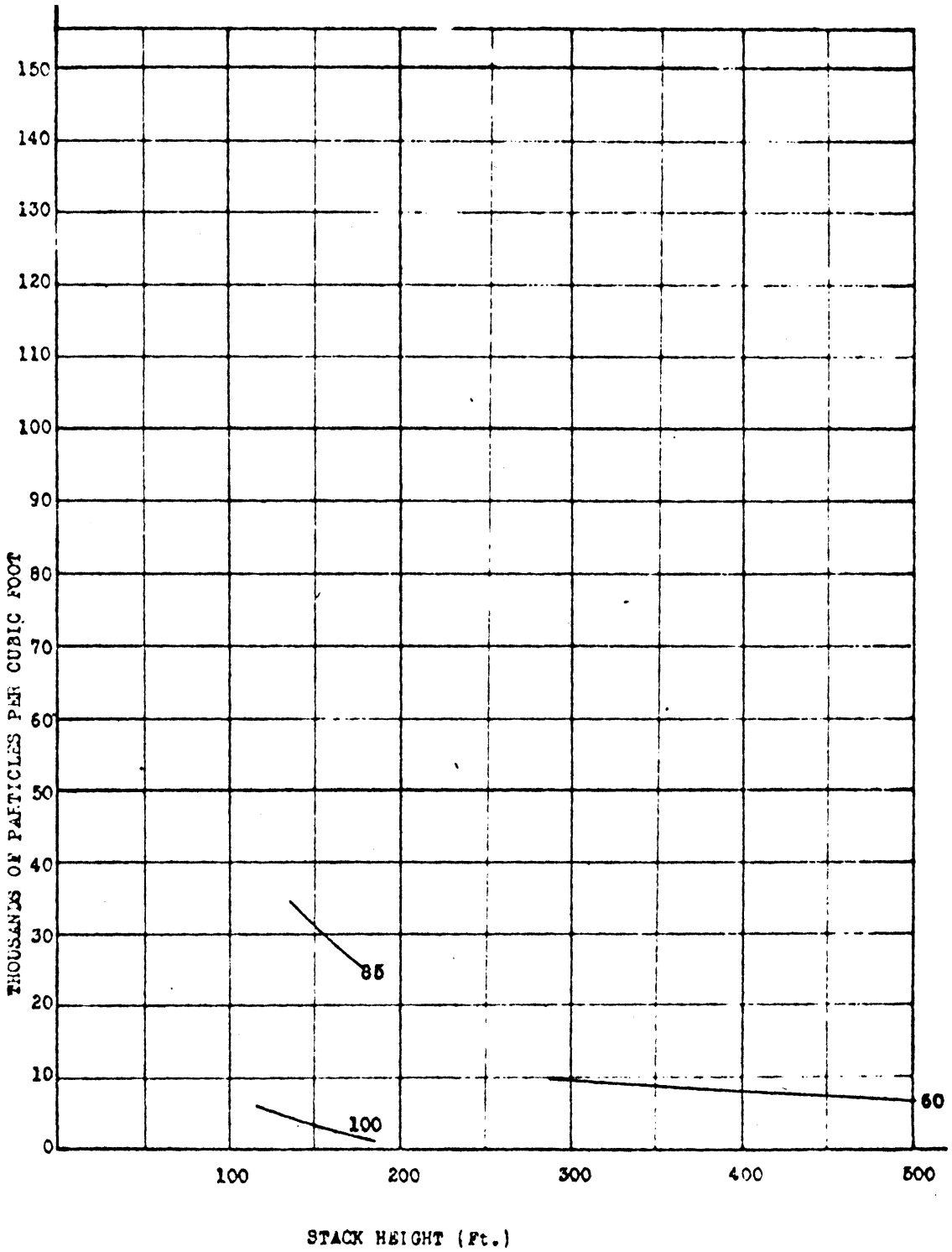
Fig. 118.



WIND FROM COVER-TEST AT 8.5 M.P.H.
STACK GAS VELOCITIES 80, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 1000 FEET DOWNWIND FROM STACK.

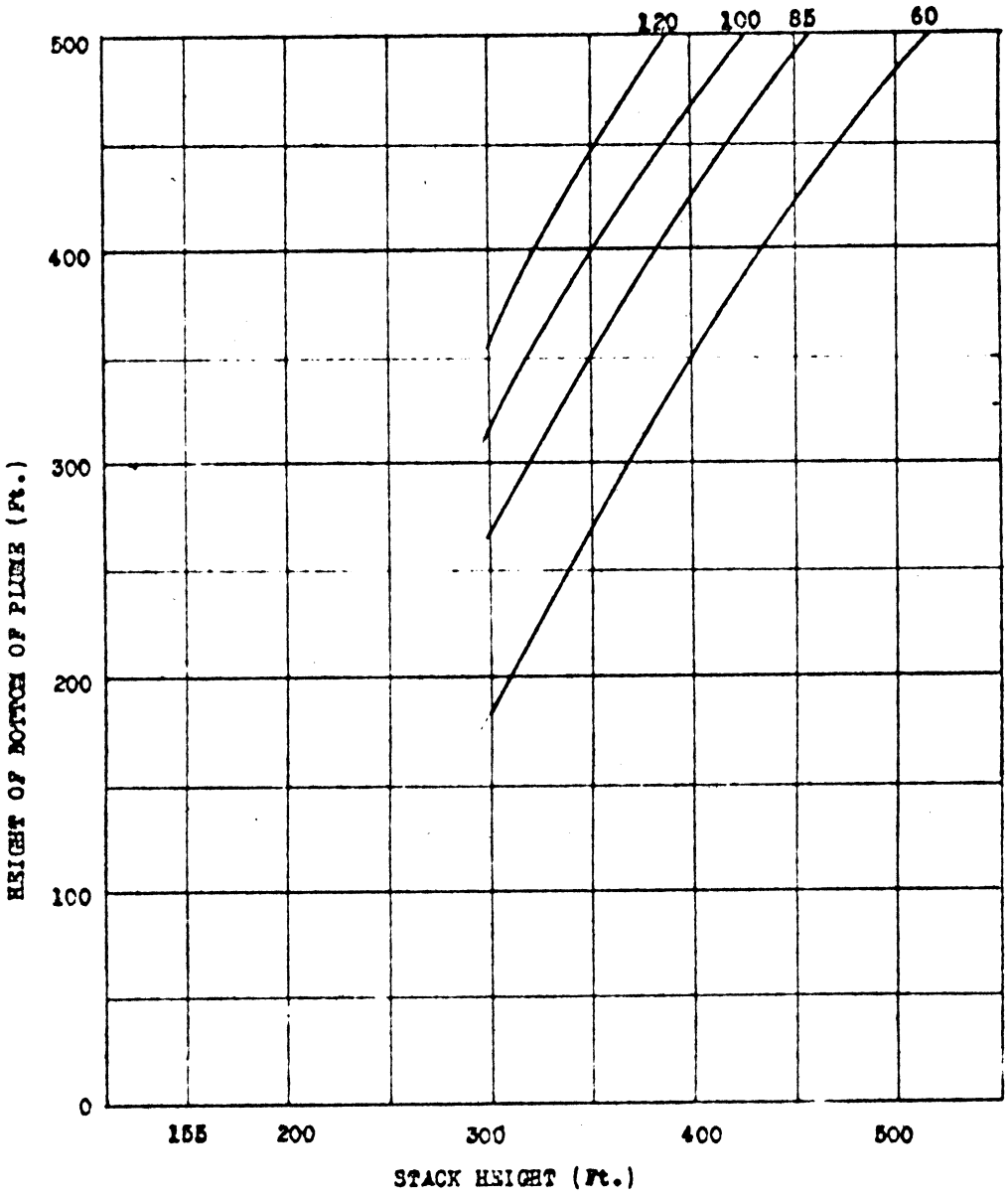
Fig. 119.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

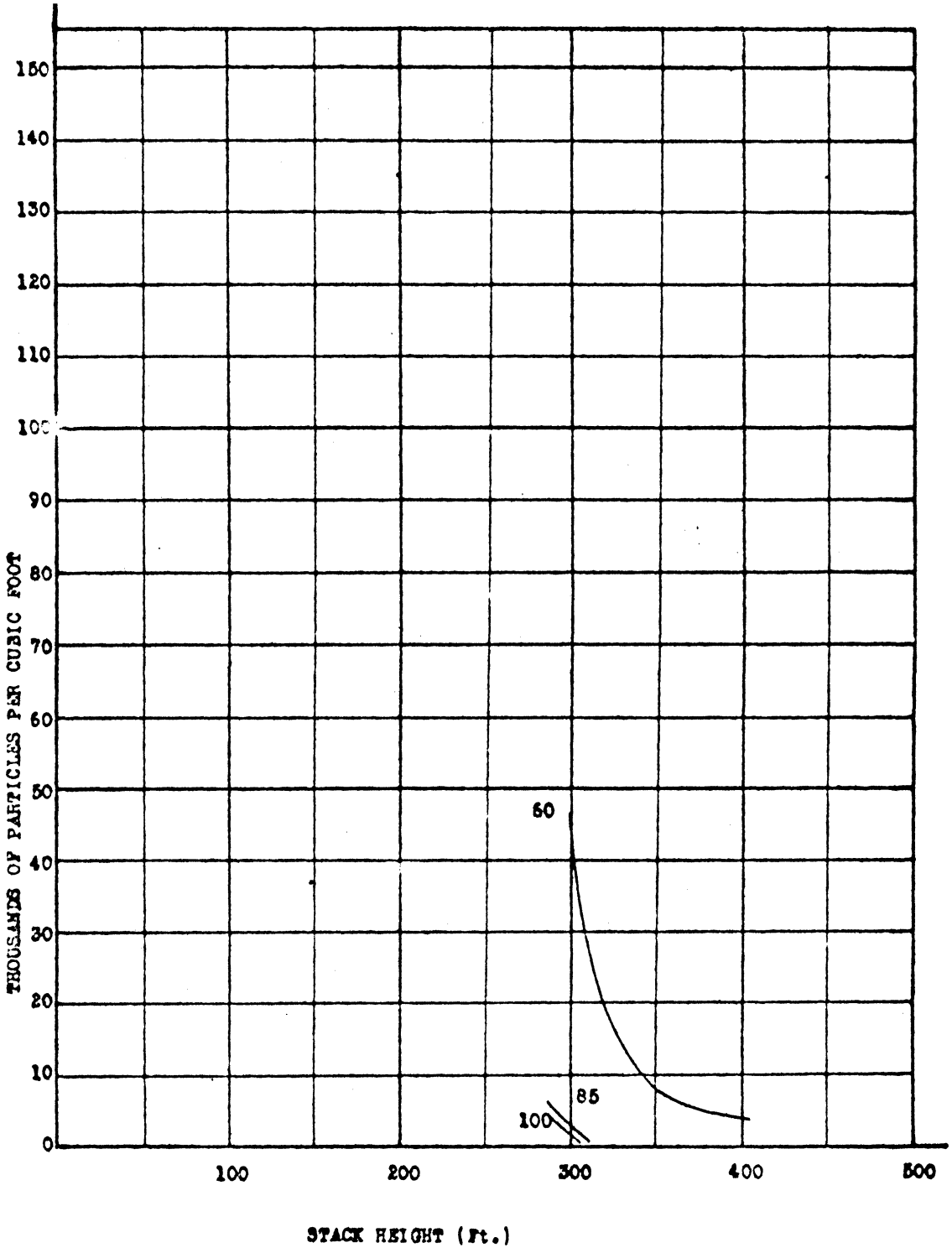
Fig. 120.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

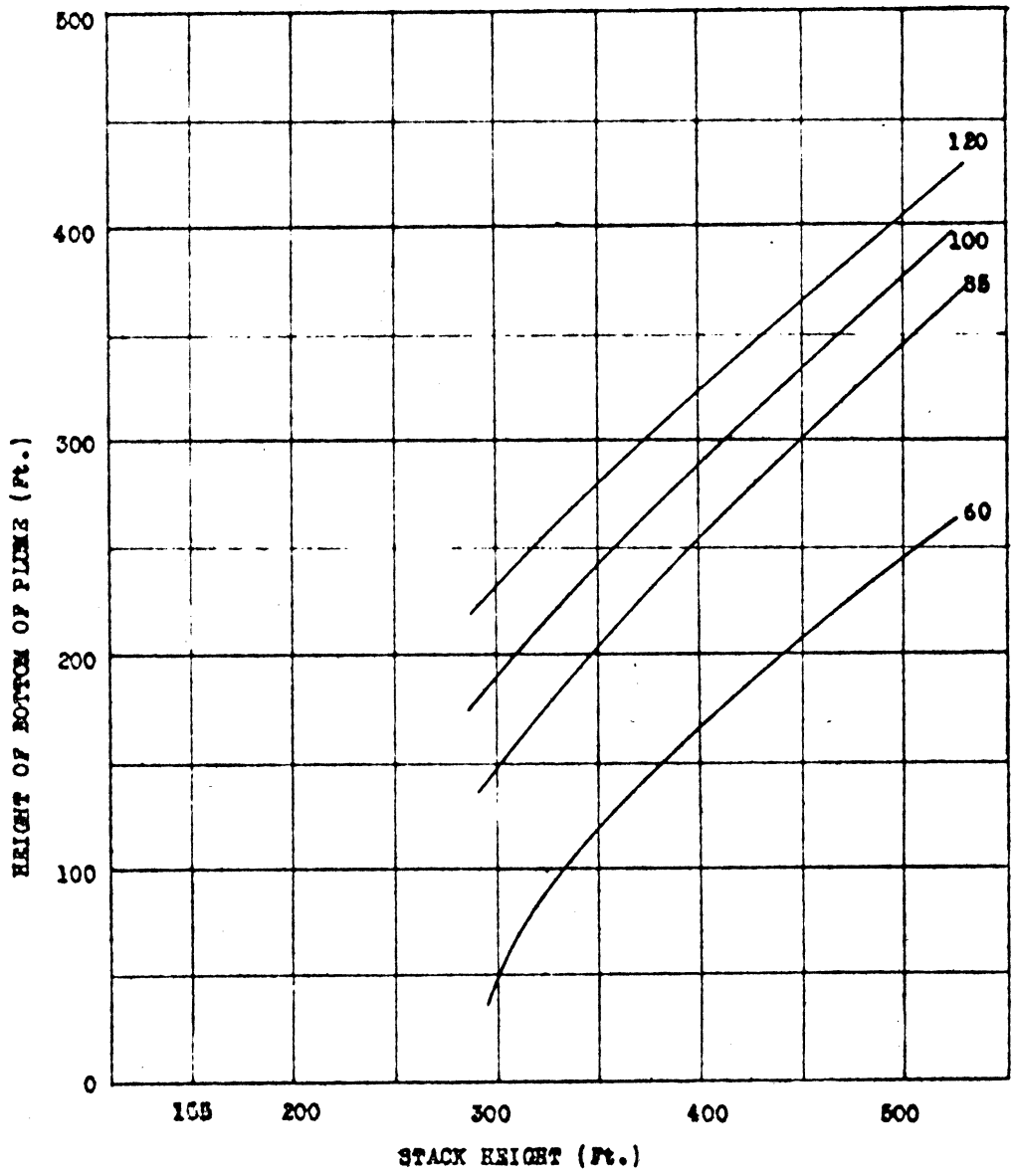
Fig. 121.



WIND FROM SOUTH-WEST AT 8.5 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS
DUST CONCENTRATION AT GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

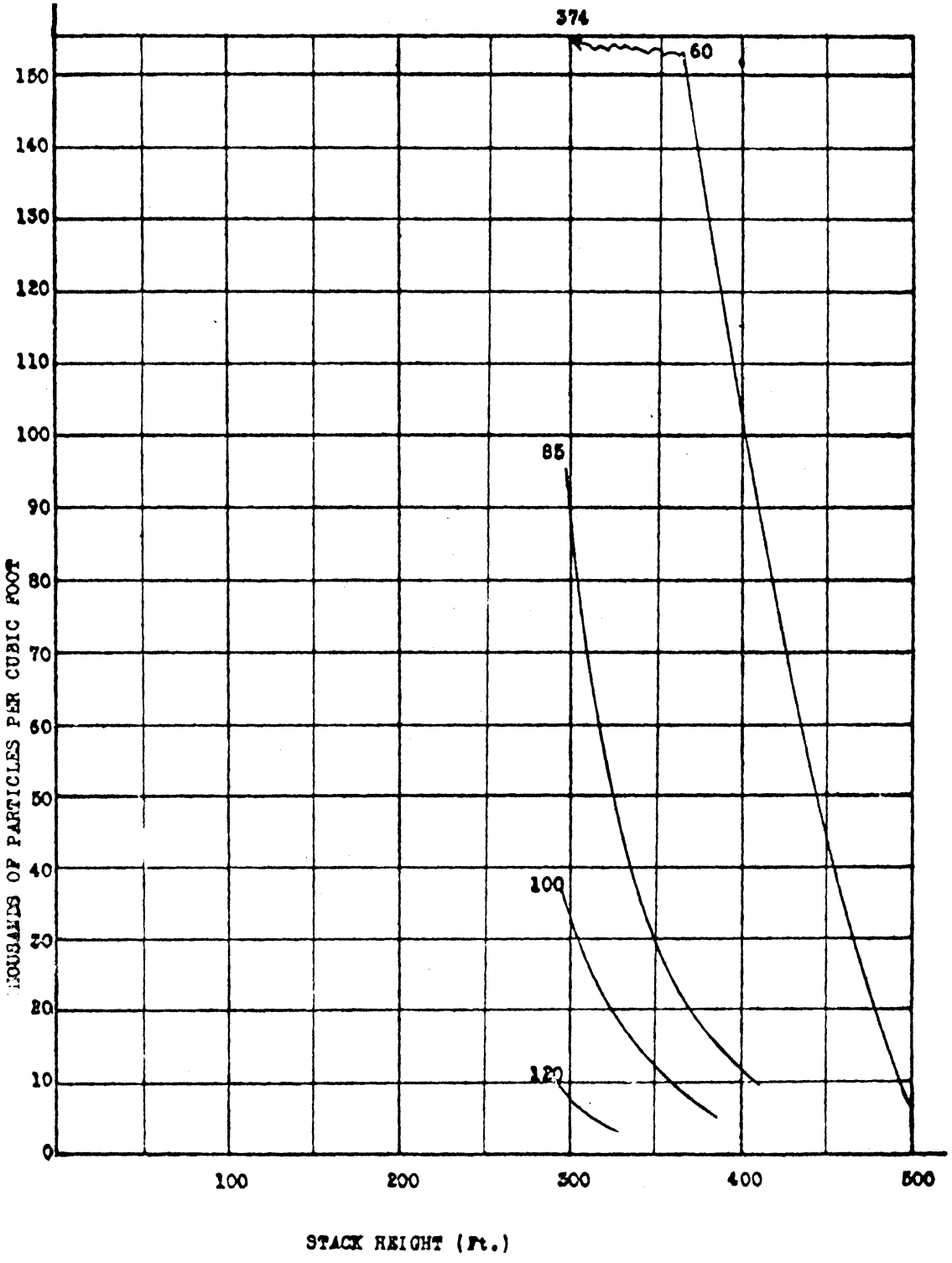
Fig. 122.



WIND FROM SOUTH-WEST AT 15 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 1,000 FEET DOWNWIND FROM STACK.

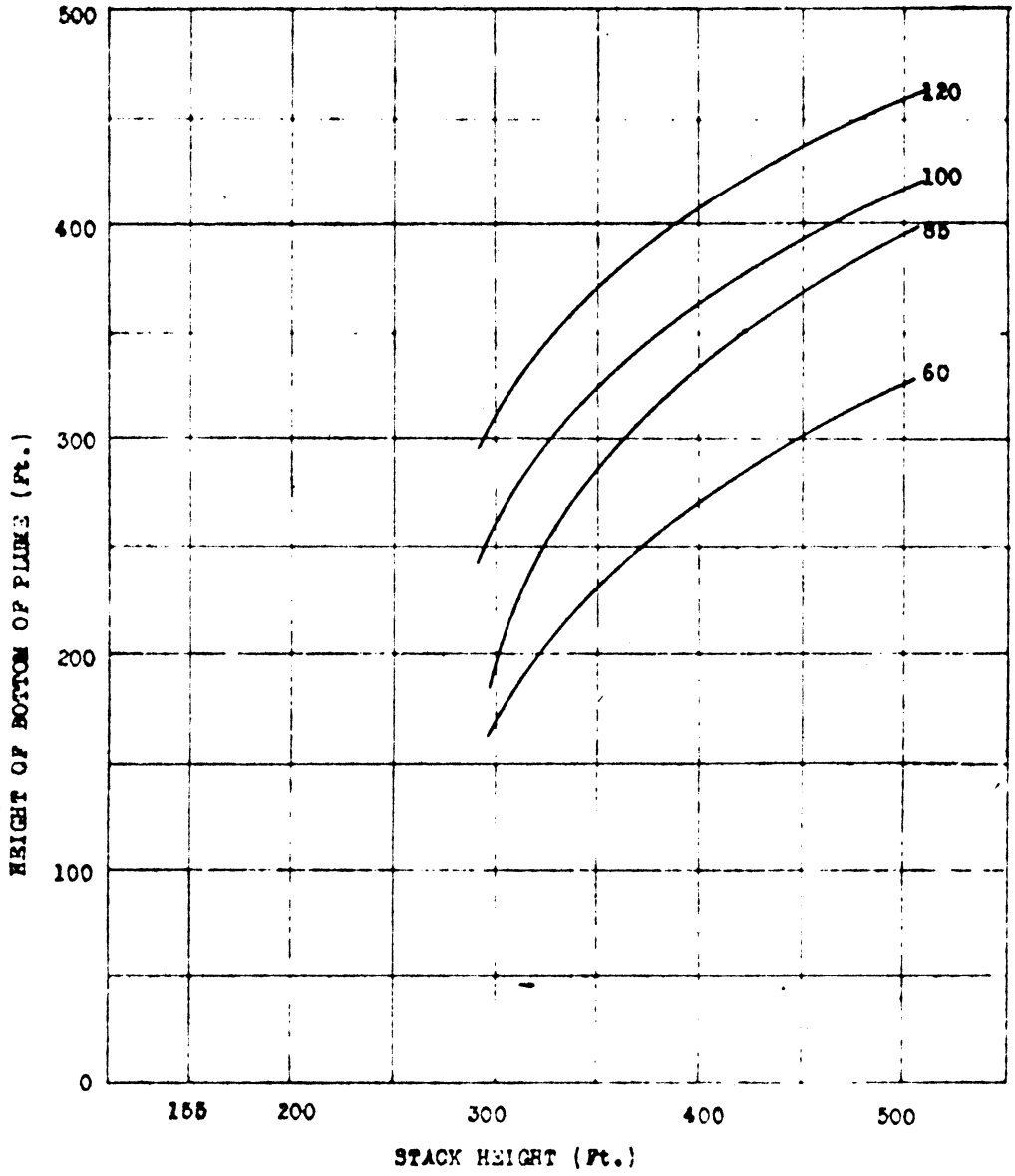
Fig. 123.



WIND FROM SOUTH-EAST AT 15 M.P.H. (Ave.).
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 1

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

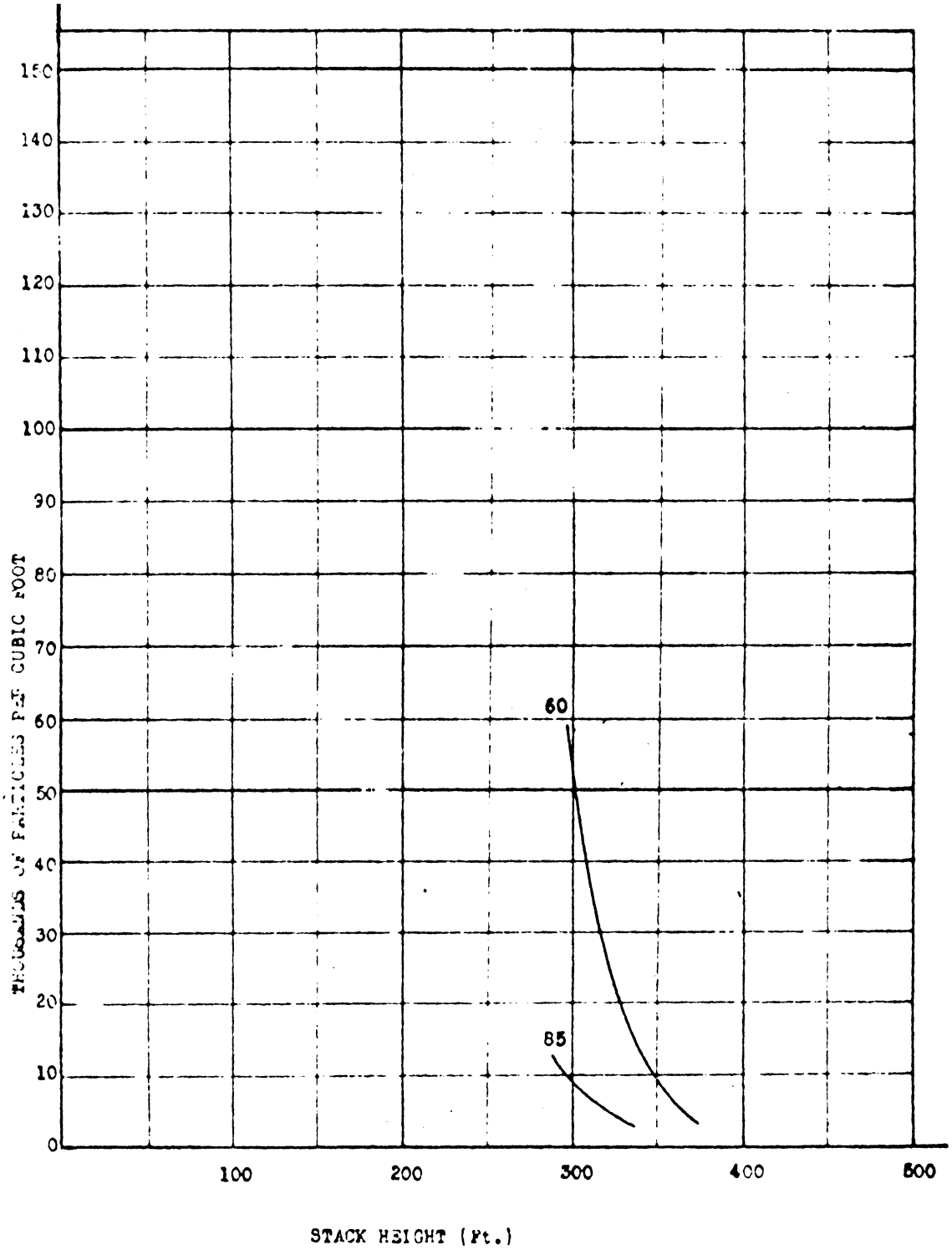
Fig. 124.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

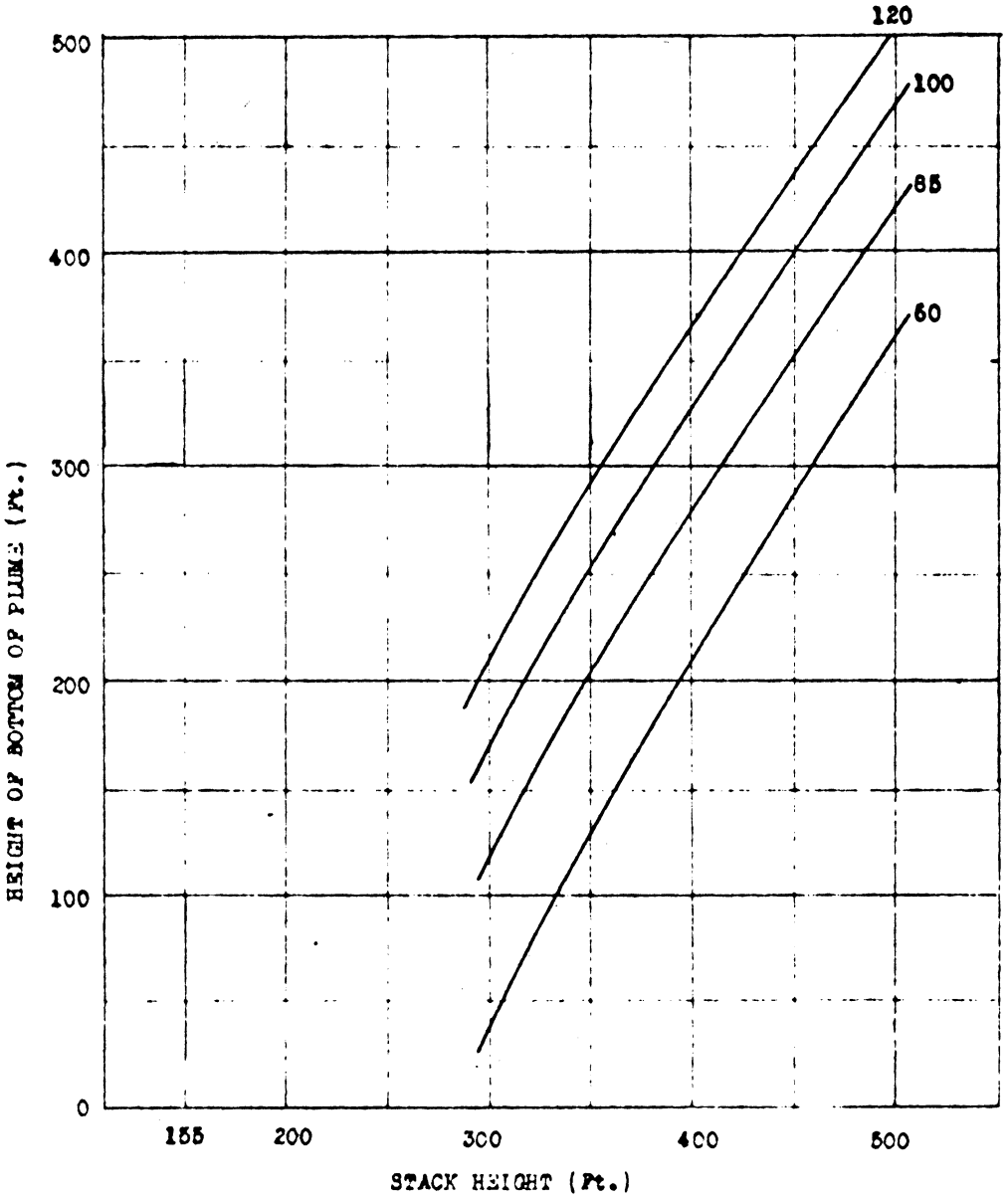
Fig. 125.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, F.P.S.
STACK LOCATION 2.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

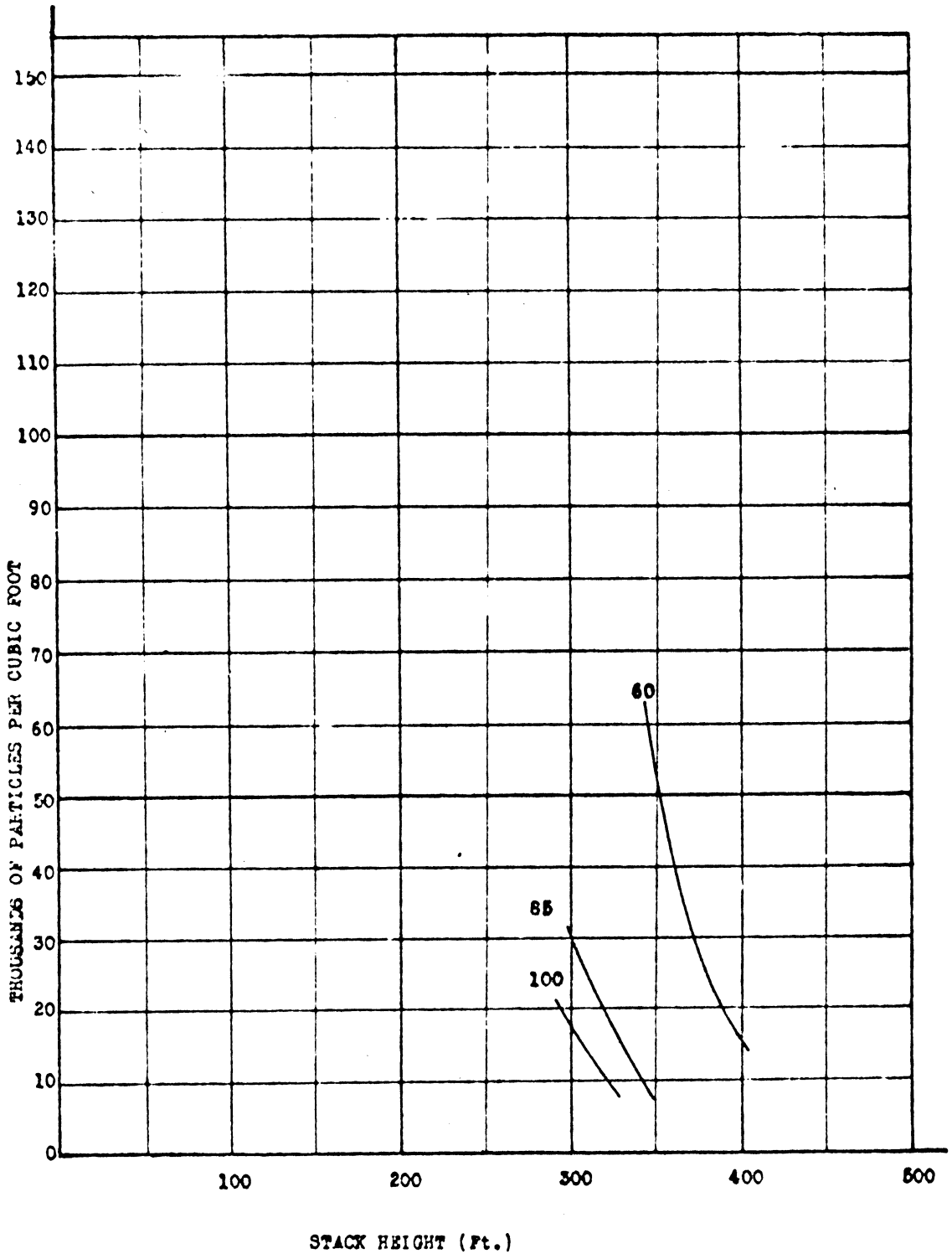
Fig. 126.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
PLUME HEIGHT ABOVE GROUND LEVEL, 1,000 FEET DOWNWIND FROM STACK.

Fig. 127.



WIND FROM SOUTH-WEST AT 15 M.P.H.
STACK GAS VELOCITIES, 60, 85, 100, 120 F.P.S.
STACK LOCATION 3.

PLANT WITH EXTENSIONS.
DUST CONCENTRATION AT GROUND LEVEL,
1,000 FEET DOWNWIND FROM STACK.

Fig. 128.