

The City of Providence
STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 1061

No. **499 AN ORDINANCE** IN AMENDMENT OF CHAPTER 1562 OF THE ORDINANCES OF THE CITY OF PROVIDENCE, ENTITLED "AN ORDINANCE REGULATING THE POLLUTION OF AIR IN THE CITY OF PROVIDENCE" (approved January 17, 1947) AS AMENDED.

Approved September 20, 1956

Be it ordained by the City of Providence:

SECTION 1. Section 1 (9) of Chapter 1562 of the Ordinances of the City of Providence, entitled "An Ordinance Regulating the Pollution of Air in the City of Providence", (approved January 17, 1947) as amended, is further amended to read as follows:

"9. Ringelmann Chart: The Ringelmann Chart with instructions for use thereon, entitled "Ringelmann's Scale for Grading the Density of Smoke" as issued by the U. S. Bureau of Mines and bearing notation in lower right-hand corner "Edition of 1955."

SECTION 2. Section 8 of said Chapter 1562 of the Ordinances of the City of Providence, 1947, is amended to read as follows:

"Sec. 8. Emission Prohibited and Standards of Measurements.
No person shall cause, suffer or allow to be discharged from any fuel-burning equipment, internal combustion engine, premises or open fire excepting railroad locomotives or vehicles, smoke the shade or density of which is equal to No. 2 of the Ringelmann chart for a period aggregating 8 minutes or more in any 30 minutes, or smoke the shade or density of which is greater than No. 2 of the Ringelmann chart except for a period or periods aggregating 3 minutes in any 15 minutes when building a new fire, cleaning a fire, or when breakdown of equipment occurs such as to make it evident that the emission was not reasonably preventable.

"No person shall cause, suffer or allow to be discharged from any railroad locomotive or vehicle, smoke the shade or density of which is equal to No. 2 of the Ringelmann chart for a period aggregating 8 minutes or more in any 30 minutes, or smoke the shade or density of which is greater than No. 2 of the Ringelmann chart except for a period or periods aggregating 30 seconds in any 2½ minutes, when building a new fire, cleaning a fire, or when breakdown of equipment occurs such as to make it evident that the emission was not reasonably preventable.

"For the purpose of grading the shade or density of smoke, the Ringelmann chart as defined in Section 1, Paragraph 9 of this Ordinance, a copy of which is attached and made a part of this ordinance, shall be standard.

CHAPTER

**AN ORDINANCE IN AMENDMENT
OF CHAPTER 1562 OF THE ORDIN-
ANCES OF THE CITY OF PROVID-
ENCE, ENTITLED "AN ORDINANCE
REGULATING THE POLLUTION OF
AIR IN THE CITY OF PROVIDENCE"
(approved January 17, 1947)
AS AMENDED.**

The City of Providence

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

PAGE 2

"Any copy of the Ringelmann chart issued by the U. S. Bureau of Mines and bearing the notation "Edition of 1955" in the lower right hand corner may be used by the Chief Air Pollution Regulation Engineer in determining whether or not there is a violation under this ordinance.

"No person shall cause, suffer or allow to be discharged from any fuel-burning equipment or premises or to pass any convenient measuring point in the stack, dust in the gases to exceed 0.85 pounds per 1000 lb. of gases, adjusted to 12 per cent CO² content for products of combustion. The amount of solids in the gases shall be determined according to the Test Code for Dust-Separating apparatus of the American Society of Mechanical Engineers, revised and amended to date, which is hereby made a part of this ordinance by reference.

"No person shall cause, suffer or allow to be discharged from any fuel-burning equipment, internal combustion engine, railroad locomotive, vehicle, premises, open fire, or stack, cinders, dust, gas, steam or noisome odors that are a detriment to the property of others, or that are a nuisance to any person not being therein or thereupon engaged.

"After any person owning, operating or in charge or control of any premises has been previously notified of three or more violations of this section upon such premises, within any consecutive 12-month period, in respect to the emission of smoke, dust, cinders, gas, steam or noisome odors, the persons owning, operating or in charge or control of these premises shall be notified to show cause before the Chief Air Pollution Regulation Engineer on a day certain, not less than 10 days from the date of notice, why the equipment causing such violations should not be sealed. The notice herein provided for shall be given by certified or registered mail directed to the last known address of the person to be notified, or if the person or his whereabouts is unknown, then by posting a notice on or near the premises at which the violations shall have occurred. Said notice shall set forth the condition complained of and the section of the within ordinance allegedly being violated. The person thus notified may appear for said hearing personally or by attorney. Upon this hearing, if the Chief Air Pollution Regulation Engineer finds that adequate corrective means and methods have not been employed to correct the cause of such condition, then it shall be his duty to seal the equipment until such time as an installation permit and operating permit, as provided under this Ordinance have been applied for and issued for the equipment."

SEC. 3. This Ordinance shall take effect upon its passage.

**IN CITY
COUNCIL**

SEP 6 - 1956

FIRST READING

READ AND PASSED

D. Everett Whelan

CLERK

**IN CITY
COUNCIL**

SEP 20 1956

FINAL READING
READ AND PASSED

D. Everett Whelan

CLERK

APPROVED

SEP 20 1956

Walter H. Ryland

No.

CHAPTER

AN ORDINANCE

IN CITY
COUNCIL

AUG 2 - 1936

Book
REferred TO COMMITTEE ON
ORDINANCES
Recommended for action

IN CITY
COUNCIL
AUG 2 - 1936
READ AND PASSED
CITY

RECEIVED
CITY
COUNCIL

RINGELMANN SMOKE CHART

(REVISION OF I. C. 6888)

BY RUDOLF KUDLICH (REVISED BY L. R. BURDICK)

* * * * * Information Circular 7718



UNITED STATES DEPARTMENT OF THE INTERIOR
Douglas McKay, Secretary
BUREAU OF MINES
J. J. Forbes, Director

Work on manuscript completed March 1955. The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is made: "Reprinted from Bureau of Mines Information Circular 7718."

August 1955

RINGELMANN SMOKE CHART

(Revision of I. C. 6888)

by

Rudolf Kudlich^{1/}

(Revised by L. R. Burdick^{2/})

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^{2/} Fuels technologist, Division of Solid Fuels, Bureau of Mines, Washington, D. C.

SUMMARY

The Ringelmann Smoke Chart fulfills an important need in smoke abatement work and certain problems in the combustion of fuels. A knowledge of its history and method of preparation is, therefore, of interest to many. Since instructions on its use are not shown on the recent edition of the chart, those included in this revision of the previous information circular, by Rudolf Kudlich, now are a necessary complement to the chart. More detail regarding the use of the chart is included than was given in the earlier manuscript.

INTRODUCTION

The Ringelmann Smoke Chart, giving shades of gray by which the density of columns of smoke rising from stacks may be compared, was developed by a Professor Ringelmann of Paris. Maximilian Ringelmann, born in 1861, was professor of agricultural engineering at l'Institute National Agronomique and Director de la Station d'Essais de Machines in Paris in 1888, and held those positions for many years thereafter.

The chart apparently was introduced into the United States by William Kent in an article published in "Engineering News" of November 11, 1897, with a comment that he had learned of it in a private communication from a Bryan Donkin of London. It was said to have come into somewhat extensive use in Europe by that time. Kent proposed in 1899 that it be accepted as the standard measure of smoke density in the standard code for power-plant testing that was being formulated by the American Society of Mechanical Engineers.

The Ringelmann Chart was used by the engineers of the Technologic Branch of the Federal Geological Survey (which later formed the nucleus of the present Bureau of Mines) in their studies of smokeless combustion beginning at St. Louis in 1904, and by 1910 had been recognized officially in the smoke ordinance for Boston passed by the Massachusetts Legislature.

The chart is now used as a device for determining whether emissions of smoke are within limits or standards of permissibility (statutes and ordinances) established and expressed with reference to the chart. It is widely used by law-enforcement or compliance officers in jurisdictions that have adopted standards based upon the chart.

In 1908 copies of the chart were prepared by the Technologic Branch of the Federal Geological Survey for use by its fuel engineers and for public distribution. Upon its organization in 1910, the Bureau of Mines assumed this service together with the other fuel-testing activities of the Technologic Branch.

Additional copies of the chart may be obtained free by applying to the Publications Distribution Section, Bureau of Mines, 4800 Forbes Street, Pittsburgh 13, Pa.

DESCRIPTION AND METHOD OF PREPARING THE CHART

The Ringelmann system is virtually a scheme whereby graduated shades of gray, varying by five equal steps between white and black, may be accurately reproduced by means of a rectangular grill of black lines of definite width and spacing on a white background. The rule given by Professor Ringelmann by which the charts may be reproduced is as follows:

Card 0 - All white.

Card 1 - Black lines 1 mm. thick, 10 mm. apart, leaving white spaces 9 mm. square.

Card 2 - Lines 2.3 mm. thick, spaces 7.7 mm. square.

Card 3 - Lines 3.7 mm. thick, spaces 6.3 mm. square.

Card 4 - Lines 5.5 mm. thick, spaces 4.5 mm. square.

Card 5 - All black.

The chart, as distributed by the Bureau of Mines, provides the shades of cards 1, 2, 3, and 4 on a single sheet, which are known as Ringelmann No. 1, 2, 3, and 4, respectively.

USE OF CHART

To learn to use the chart, it is supported on a level with the eye, at such a distance from the observer that the lines on the chart merge into shades of gray, and as nearly as possible in line with the stack. The observer glances from the smoke, as it issues from the stack, to the chart and notes the number of the chart most nearly corresponding with the shade of the smoke, then records this number with the time of observation. A clear stack is recorded as No. 0, and 100 percent black smoke as No. 5.

To determine average smoke emission over a relatively long period of time, such as an hour, observations are usually repeated at one-fourth or one-half minute intervals. The readings are then reduced to the total equivalent of No. 1 smoke as a standard. No. 1 smoke being considered as 20 percent dense, the percentage "density" of the smoke for the entire period of observation is obtained by the formula:

$$\frac{\text{Equivalent units of No. 1 smoke} \times 0.20}{\text{Number of observations}} = \text{percentage smoke density.}$$

Figure 1 shows a convenient form for recording and computing the percentage of smoke density. This procedure is often used on acceptance tests of fuel-burning equipment.

The timing and extent of observations made for the purpose of determining compliance with a local smoke abatement ordinance depends upon the wording and smoke limitations of the ordinance.

There are two general methods of using the chart. One is for the observer to make actual reference to it, as previously described, while judging the smoke shade. The other method is based on the fact that, with proper experience, it is unnecessary

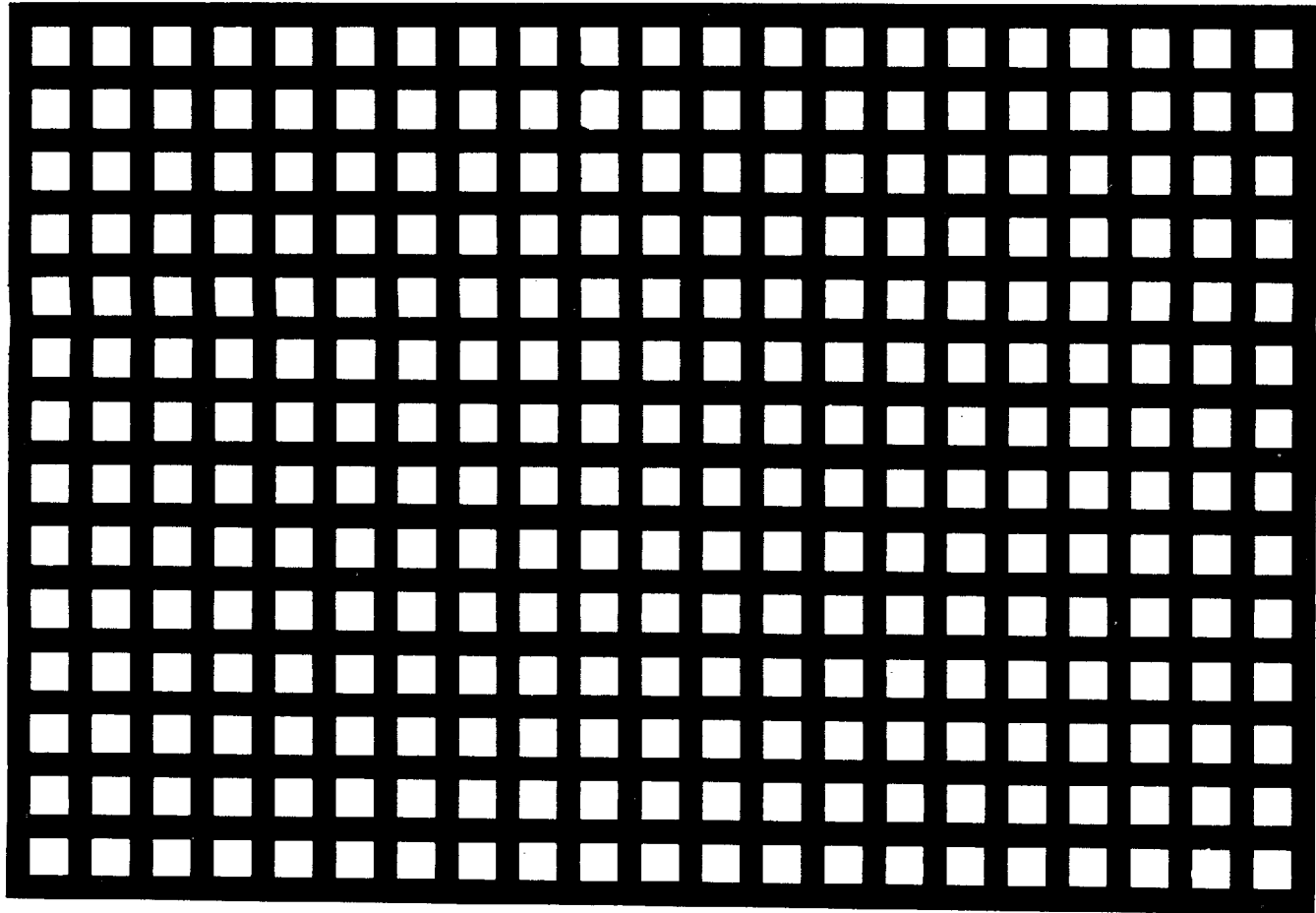
for an observer to continue to refer to the chart. By repeated reference to the chart, during a suitable training period, the shades on the Ringelmann scale become fixed in the observer's memory. Hence, the chart is used by most cities only for training and examination of smoke inspectors, before certification that they are proficient in judging smoke shade on the Ringelmann scale without referring to the chart. Since smoke-shade observations by inspectors, thus trained and certified, are easily made and are accepted as evidence in courts, this latter method of using the chart is preferred by most authorities.

RINGELMANN-CHART READING

Location										
Hour <u>9:00-10:00 A.M.</u> Date										
9	0	1/4	1/2	3/4		0	1/4	1/2	3/4	Point of observation
0	-	-	-	-	30	1	1	1	1
1	-	-	-	-	31	1	1	1	1
2	-	-	-	-	32	-	-	-	-	Distance to stack
3	1	1	1	1	33	-	-	-	-	Direction of stack
4	1	1	1	1	34	-	-	-	-	Direction of wind
5	2	2	2	2	35	1	1	1	1	Velocity of wind
6	2	3	3	3	36	1	1	1	1	Equiv. No. 1 Units
7	3	3	3	3	37	1	1	1	1	..7. Units No. 535.....
8	2	2	1	1	38	1	1	-	-	..7. Units No. 428.....
9	1	1	-	-	39	-	-	-	-	..7. Units No. 381.....
10	-	-	-	-	40	-	-	-	-	..34. Units No. 268.....
11	-	-	-	-	41	-	-	-	-	..52. Units No. 152.....
12	-	-	-	-	42	-	-	-	-	113. Units No. 00.....
13	-	-	-	-	43	-	-	-	-	240. Units264.....
14	-	-	-	-	44	1	1	2	2	264 X 20% =
15	-	-	-	-	45	2	2	3	322%..... Smoke density
16	-	-	-	-	46	3	3	3	3	
17	-	-	-	-	47	3	3	4	3	
18	-	-	-	-	48	2	2	2	2	
19	2	2	2	2	49	2	2	2	2	
20	2	2	2	2	50	2	1	1	1	
21	2	2	2	2	51	1	1	1	1	
22	3	3	3	3	52	1	1	1	-	
23	3	4	4	4	53	-	-	-	-	
24	4	5	5	5	54	-	-	-	-	
25	5	5	5	5	55	-	-	-	-	
26	4	4	3	3	56	-	-	-	-	
27	3	3	3	3	57	-	-	-	-	
28	2	2	1	1	58	-	-	-	-	
29	1	1	1	1	59	-	-	-	-	

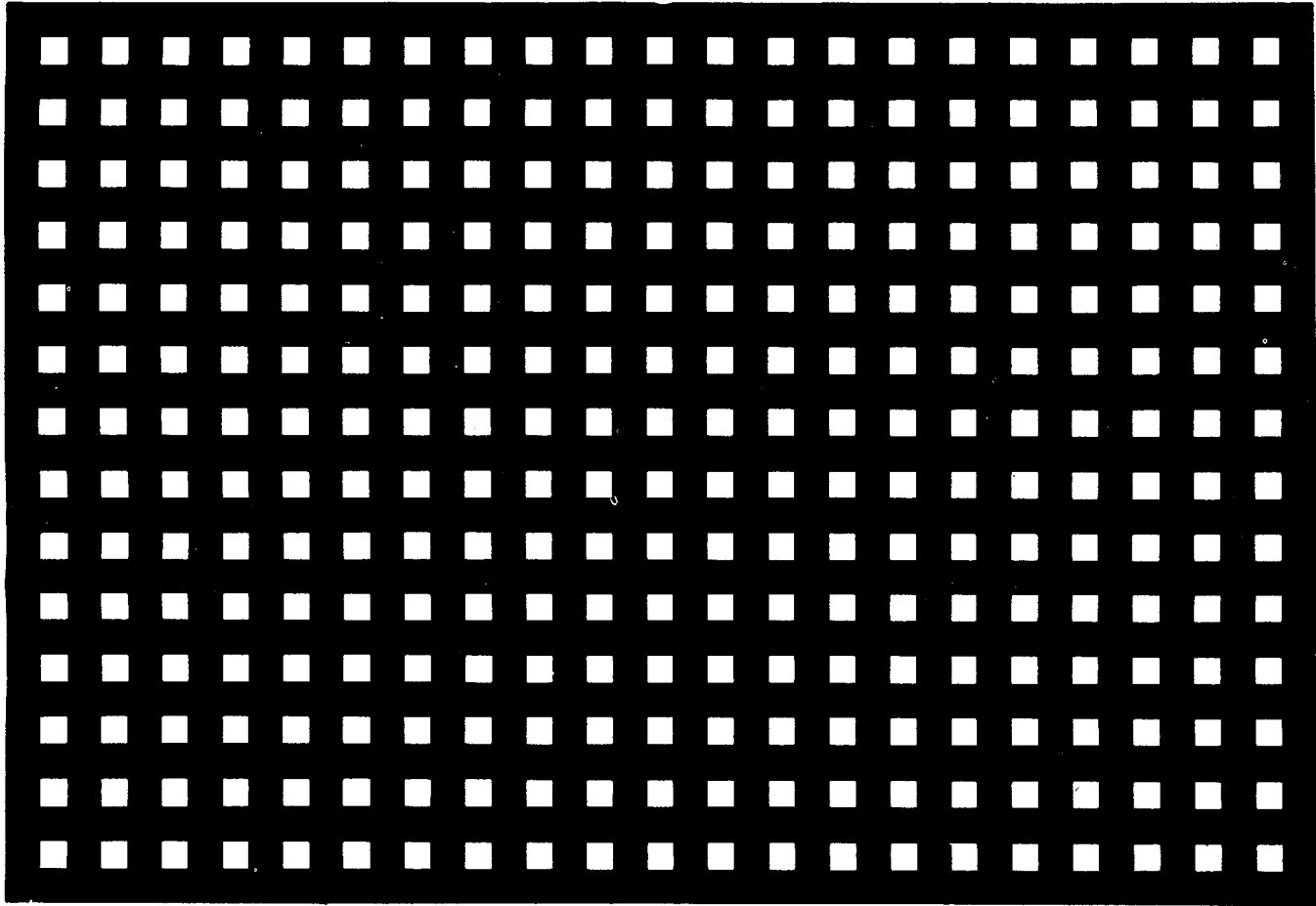
Observer

Checked by

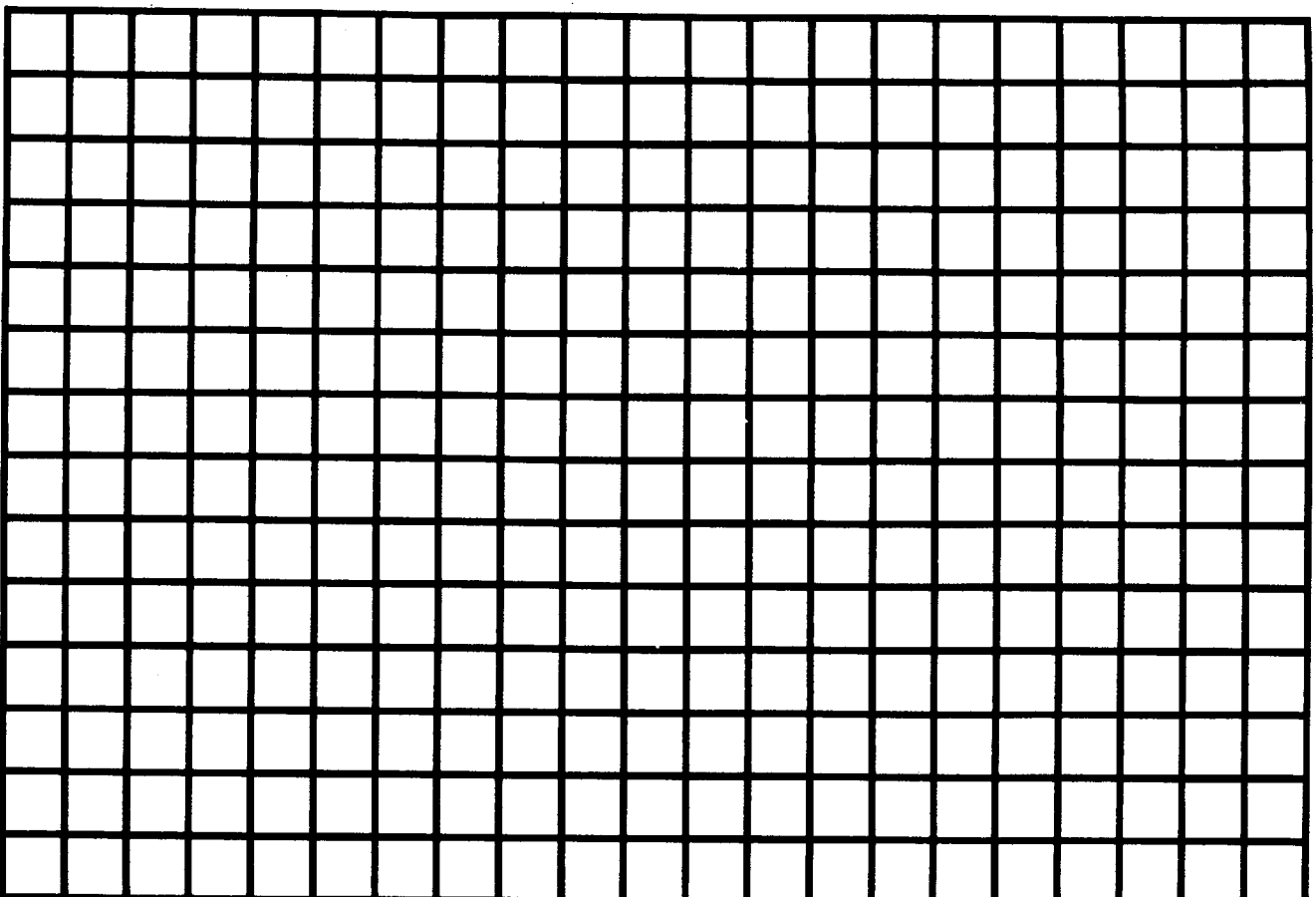


3. EQUIVALENT TO 80 PERCENT BLACK.

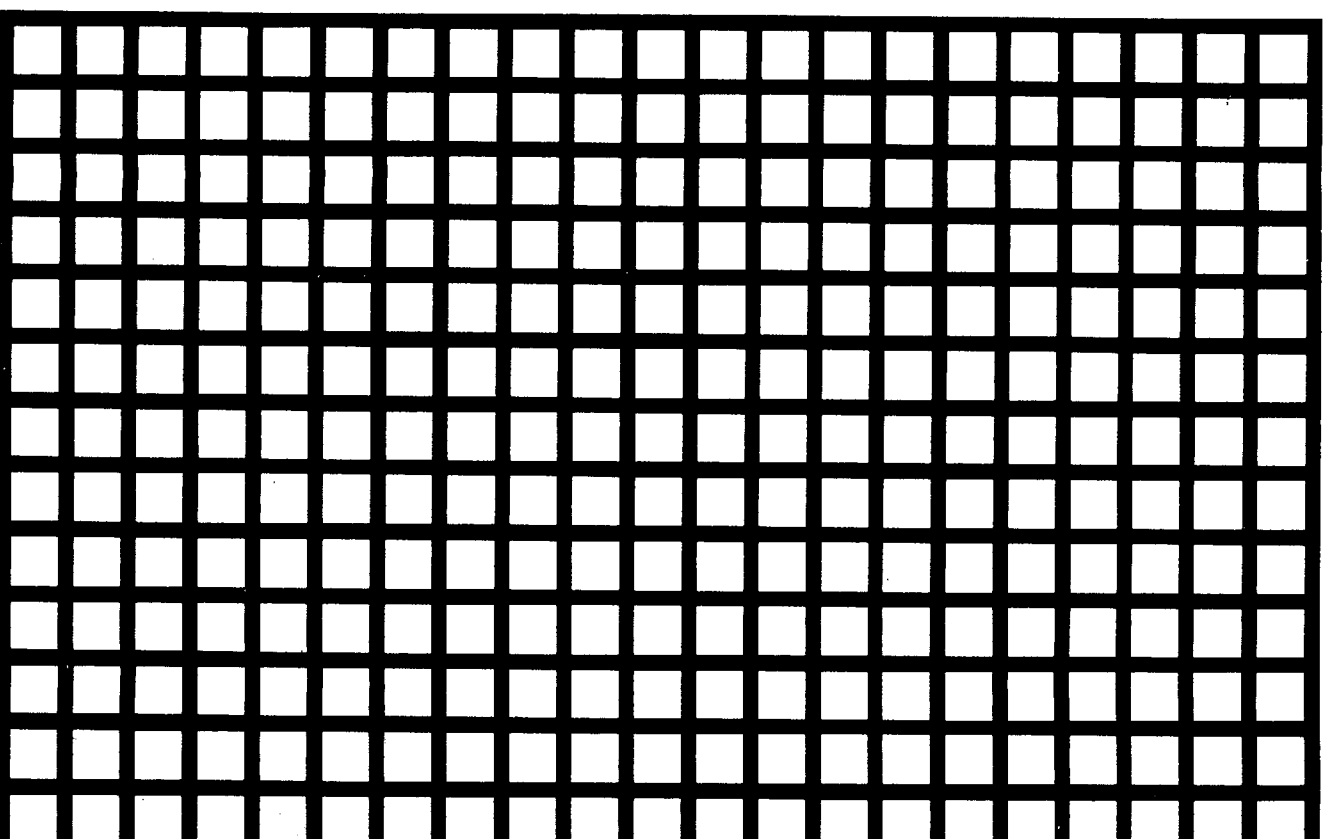
FOR GRADING THE DENSITY OF SMOKE
hart, see Bureau of Mines Information Circular 7718



4. EQUIVALENT TO 80 PERCENT BLACK.



1. EQUIVALENT TO 20 PERCENT BLACK.



2. EQUIVALENT TO 40 PERCENT BLACK.

The City of Providence
STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 1062

No. 500 AN ORDINANCE PROVIDING FOR THE PAYMENT OF
RHODE ISLAND BLUE CROSS AND RHODE ISLAND MEDICAL SOCIETY PHYSICIANS
SERVICE FOR CERTAIN EMPLOYEES OF THE CITY OF PROVIDENCE.

Approved September 20, 1956

Be it ordained by the City of Providence:

SECTION 1: The City Treasurer of the City of Providence shall make payment to the Hospital Service Corporation of Rhode Island and Rhode Island Medical Society Physicians Service for the full cost of Blue Cross (Comprehensive Plan), and Physicians Service, individual membership, at such rates as may be established from time to time, for all officers and employees of the several departments of the City of Providence, as designated by the Mayor and Finance Director, except officers and employees of the School Department.

SEC. 2. The cost thereof shall be charged to the appropriation provided therefor in the annual appropriation ordinance.

SEC. 3. This Ordinance shall take effect October 1, 1956.

IN CITY COUNCIL
SEP 6 - 1956
First Reading Read and Passed
Referred to Committee on
FINANCE

W. Everett Whelan
Clerk

IN CITY
COUNCIL

SEP 20 1956
FINAL READING
READ AND PASSED

Angel G. Williams
PRESIDENT
W. Everett Whelan
CLERK

APPROVED

SEP 20 1956

Walter Reynolds
MAYOR

No.

CHAPTER

AN ORDINANCE PROVIDING

**FOR THE PAYMENT OF RHODE
ISLAND BLUE CROSS AND
RHODE ISLAND MEDICAL SO-
CIETY PHYSICIANS SERVICE
FOR CERTAIN EMPLOYEES OF
THE CITY OF PROVIDENCE.**

APPROVED AND PASSED BY THE
CITY COUNCIL OF THE CITY OF PROVIDENCE
THIS 12TH DAY OF MAY 1964
AT PROVIDENCE, RHODE ISLAND

The City of Providence

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

—ONE—

CHAPTER 1063

No. 501 **AN ORDINANCE** AMENDING THE APPROPRIATION ORDINANCE CHAPTER 987 BY ADDING THE SUM OF TEN THOUSAND (\$10,000) DOLLARS TO THE APPROPRIATION CONTAINED THEREIN FOR GENERAL PUBLIC ASSISTANCE-UNALLOCATED, ITEM 3.

Approved September 20, 1956

Be it ordained by the City of Providence:

SECTION 1: Chapter 987 of the Ordinances of the City of Providence as approved September 16, 1955, entitled: "An Ordinance Making Appropriation of \$31,832,600.04 for the Support of the City Government for the Fiscal Year Ending September 30, 1956", as amended, is hereby further amended by adding the sum of Ten Thousand (\$10,000) Dollars to the appropriation contained therein for GENERAL PUBLIC ASSISTANCE-UNALLOCATED, ITEM 3.

SECTION 2: The said sum of Ten Thousand (\$10,000) Dollars shall be obtained by charging Three Thousand (\$3,000) Dollars to Funds Not Otherwise Appropriated and increasing the receipts from State of R.I. (Grants-In-Aid) General Public Assistance, Seven Thousand (\$7,000) Dollars.

SECTION 3: This Ordinance shall take effect upon its passage.

IN CITY COUNCIL
SEP 6 - 1956
First Reading Read and Passed
Referred to Committee on
FINANCE

Deverett Whelan
Clerk

IN CITY
COUNCIL

SEP 20 1956
FINAL READING
READ AND PASSED

Angel Hill
PRESIDENT
Deverett Whelan
CLERK

SEP 20 1956
Nathan H. Reynolds

CHAPTER
AN ORDINANCE

AN ORDINANCE TO AMEND THE CHARTER OF THE CITY OF CHICAGO, ILLINOIS, BY CHANGING THE NAME OF THE BOARD OF COMMISSIONERS TO THE BOARD OF ALDERMEN, AND TO REPEAL THE ACT OF THE LEGISLATURE OF THE STATE OF ILLINOIS, PASSED MARCH TWENTY-NINE, ONE THOUSAND NINE HUNDRED AND SEVEN, IN RELATION TO THE CHARTER OF THE CITY OF CHICAGO, ILLINOIS.

SECTION 1. That the name of the Board of Commissioners of the City of Chicago, Illinois, be and the same is hereby changed to the Board of Aldermen, and the Board of Commissioners of the City of Chicago, Illinois, be and the same is hereby authorized to execute the duties of the Board of Aldermen until the first meeting of the Board of Aldermen after the adoption of this ordinance.

SECTION 2. That the salary of the Board of Aldermen be and the same is hereby fixed at the sum of \$10,000 per annum, and the salary of the Board of Commissioners be and the same is hereby fixed at the sum of \$10,000 per annum, and the Board of Commissioners be and the same is hereby authorized to execute the duties of the Board of Aldermen until the first meeting of the Board of Aldermen after the adoption of this ordinance.

SECTION 3. That this ordinance shall take effect upon its passage.

ATTEST:
CITY CLERK
CHICAGO, ILLINOIS
JANUARY 1, 1907

The City of Providence
STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 1064

No. 502 AN ORDINANCE AMENDING THE APPROPRIATION ORDINANCE
CHAPTER 987 BY TRANSFERRING THE SUM OF TWENTY ONE THOUSAND
(\$21,000) DOLLARS TO THE APPROPRIATION CONTAINED THEREIN
FOR GENERAL PARKS-ITEM 1.

Approved September 20, 1956

Be it ordained by the City of Providence:

SECTION 1: Chapter 987 of the Ordinances of the City of Providence as approved September 16, 1955, and entitled: "An Ordinance Making Appropriation of \$31,832,600.04 for the Support of the City Government for the Fiscal Year Ending September 30, 1956," as amended, is hereby further amended by transferring the sum of Twenty One Thousand (\$21,000) Dollars to the appropriation contained therein for GENERAL PARKS, ITEM 1.

SECTION 2: The said sum of Twenty One Thousand (\$21,000) Dollars shall be obtained by transferring Fourteen Thousand (\$14,000) Dollars from Payment to Fire Pensions and Seven Thousand (\$7,000) Dollars from Payment to Police Pensions.

SECTION 3: This Ordinance shall take effect upon its passage.

IN CITY COUNCIL
SEP 6 - 1956

First Reading Read and Passed
Referred to Committee on
FINANCE

L. Everett Whelan
Clerk

IN CITY
COUNCIL

SEP 20 1956
FINAL READING
READ AND PASSED

Charles A. Bell
PRESIDENT
L. Everett Whelan
CLERK

Walter H. Reynolds
FOR

The City of Providence
STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 1065

No. 503 AN ORDINANCE AMENDING CHAPTER 987 BY TRANSFERRING THE SUM OF FIVE THOUSAND (\$5,000) DOLLARS FROM WATER-TRANSMISSION And DISTRIBUTION, ITEM 0 to WATER-TRANSMISSION and DISTRIBUTION, ITEM 3.

Approved September 20, 1956

Be it ordained by the City of Providence:

SECTION 1: Chapter 987 of the Ordinances of the City of Providence as approved September 16, 1955, entitled: "An Ordinance Making Appropriation of \$31,832,600.04 for the Support of the City Government for the Fiscal Year Ending September 30, 1956", as amended, is hereby further amended by transferring the sum of Five Thousand (\$5,000) Dollars from Water-Transmission and Distribution, Item 0 to Water-Transmission and Distribution, Item 3.

SECTION 2: The City Controller and the City Treasurer are hereby authorized and directed to pay over from the General Fund-Water Department, Transmission and Distribution, Item 3, the sum of Five Thousand (\$5,000) Dollars to an account in the Trust and Special Fund to be known as Water-Transmission and Distribution Revolving Fund. When this fund is no longer needed it shall revert to Water Receipts.

SECTION 3: This Ordinance shall take effect upon its passage.

IN CITY COUNCIL
SEP 6 - 1956

First Reading Read and Passed
Referred to Committee on
FINANCE

Devereett Whelan
Clerk

IN CITY
COUNCIL

SEP 20 1956
FINAL READING
READ AND PASSED

Devereett Whelan
PRESIDENT
Clerk

Walter H. Reynolds
Clerk

