AC 150/5345-44B

DATE May 9, 1979

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Washington, D.C.

Subject: SPECIFICATION FOR L-858 TAXIWAY GUIDANCE SIGNS

1. PURPOSE. This advisory circular contains a specification for taxiway guidance signs for use on airports.

2. EFFECTIVE DATE. Effective November 9, 1979, only taxiway guidance signs qualified in accordance with the specification in this advisory circular will be listed in AC 150/5345-1, Approved Airport Lighting Equipment.

3. PRINCIPAL CHANGES. This advisory circular combines the requirements for taxiway guidance signs in one specification. Principal changes include standardization of sign colors to comply with requirements of the International Civil Aviation Organization (ICAO), addition of series circuit power adapter units, and revised test procedures.

4. CANCELLATION. The following advisory circulars are cancelled:

a. AC 150/5345-4, Specification for L-829 Internally Lighted Airport Taxiway Guidance Sign, dated October 15, 1963.

b. AC 150/5345-44A, Specification for L-858 Retroreflective Taxiway Guidance Signs, dated July 30, 1971.

5. METRIC UNITS. To promote an orderly transition to metric units, the specification includes both English and metric dimensions. The metric conversions may not be exact equivalents and until an official changeover to metric units is effected, the English dimensions will govern.

William V. Vitale

WILLIAM V. VITALE
ACTING DIRECTOR
OFFICE OF AIRPORT STANDARDS

Initiated by: AAS-200

SPECIFICATION FOR L-858 TAXIWAY GUIDANCE SIGNS

1. SCOPE AND CLASSIFICATION.

1.1 Scope. This specification covers the requirements for signs to be used on airports to provide taxiing information to aircraft pilots.

1.2 Classification. Three types, 3 sizes, 2 styles, and 2 classes of signs are covered by this specification.

1.2.1 Types. Signs of the following types are included:

Type 1 - lighted signs with a white reflective legend on a red reflective background

Type 2 - lighted signs with a black legend on a yellow reflective background

Type 3 - unlighted signs with a black legend on a yellow reflective background

1.2.2 Sizes. Signs of the following sizes are included:

Size 1 - 18-inch (46 cm) legend
Size 2 - 15-inch (38 cm) legend
Size 3 - 12-inch (30 cm) legend

1.2.3 Style. Lighted signs of the following styles are included:

Style 1 - for operation from a 120-volt AC source
Style 2 - for operation from a 6.6-ampere series lighting circuit

1.2.4 Class. Lighted signs of the following classes are included:

Class 1 - for operation down to -20°C
Class 2 - for operation down to -55°C

2. APPLICABLE DOCUMENTS.

2.1 General. The following documents, of the issue in effect on date of application for qualification, form part of this specification and are applicable to the extent specified herein:

2.1.1 Federal Aviation Administration publications.

AC 150/5345-26 Specification for L-823 Plug and Receptacle, Cable Connectors

AC 150/5345-42 FAA Specification L-857, Airport Light Bases, Transformer Housings, and Junction Boxes

AC 150/5345-47 Isolation Transformers for Airport Lighting Systems

FAA-STD-013 Quality Control Program Requirements

2.1.2 Federal specification.

L-S-300 Sheeting and Tape - Reflective: Nonexposed Lens, Adhesive Backing

2.1.3 Military standard.

MIL-STD-810 Environmental Test Methods

2.1.4 Federal Highway Administration publication.

FP-74-7 Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects

(Copies of FAA advisory circulars may be obtained from the Department of Transportation, Publications Section, M-443.1, Washington, D.C. 20590.)

(Copies of FAA standards may be obtained from the Federal Aviation Administration, Airway Facilities Service, Washington, D. C. 20591.)

(Copies of Federal specifications may be obtained from General Services Administration offices in Washington, D.C., Atlanta, Boston, Denver, Chicago, Kansas City, New York, San Francisco, and Seattle.)

(Copies of Military standards may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120, Attention: Code CDS.)

(Copies of Federal Highway Administration publications may be obtained from the Federal Highway Administration, Office of Traffic Operations, Washington, D.C. 20590.)

3. REQUIREMENTS.

3.1 Equipment to be supplied. Each sign shall be complete in accordance with all specification requirements and shall include mounting legs and hardware (3.3), electrical disconnect (3.3.3.1), series circuit adapter unit (3.3.3.2) for Style 2 signs, and instruction booklet (3.8).

3.2 Environmental requirements. The signs, including all required components, shall be designed for continuous outdoor operation under the following conditions:

3.2.1 Temperature. An ambient temperature range from -20°C to +50°C for Class 1 signs and from -55°C to +50°C for Class 2 signs.

3.2.2 Wind. Wind velocities up to 100 mph (161 km/h).

3.2.3 Rain. Exposure to driving rains.

3.3 Sign construction. The signs shall be constructed of lightweight materials to be as frangible as possible to avoid damage to aircraft if inadvertently struck, yet must be sufficiently rigid to withstand wind and jet blasts from aircraft. The mounting legs shall have frangible points near the bottom which will withstand wind loads due to jet blasts of 100 mph (161 km/h) but will break before reaching an applied static load over the sign face of 0.7 psi (4.83 kPa) for the Size 1 sign, 1.3 psi (8.96 kPa) for the Size 2 sign, or 2.0 psi (13.8 kPa) for the Size 3 sign. The signs shall be designed for installation on a level concrete pad, and all required mounting hardware shall be supplied with the sign. A typical sign installation is shown in Figure 1.

3.3.1 Sizes. The heights of the signs shall be in accordance with the dimensions shown in Table I. The lengths of the signs will be determined by the message to be conveyed.

3.3.2 Sign faces. The signs may be either single face (message on only one side) or double face (messages on two sides). Reflective material for lighted signs shall meet the color and reflectivity requirements of Federal specification L-S-300, type 1, reflectivity 1. Reflective material for unlighted signs shall meet the color and reflectivity requirements for type III sheeting as contained in Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, section 633.06. The spacing, stroke, and shape of legends and symbols shall be in accordance with Appendix 1 of this specification. The sign face shall have a continuous border 0.5 inch (1.25 cm) in width. The color of the border shall be the same as the legend. Signs made in multiple sections shall appear to the viewer as a single sign with a continuous border and legend.

3.3.3 Lighted signs. Signs may be either internally or externally lighted. External lighting shall be attached to the sign and shall not interfere with the sign legibility nor produce objectionable glare or spill light. Style 1 signs shall be designed for operation from a 120-volt AC power source. Style 2 signs shall be designed for operation from an airport series lighting circuit with a current range of 4.8 to 6.6 amperes. The illumination shall be uniform over the sign face and shall be sufficient to make the background colors readily discernible at nightime up to a distance of 800 feet (244 m). Lamps shall be readily accessible for replacement, and lamp data, including type and rating, shall be located near the lamp socket.

3.3.3.1 Electrical disconnect. All lighted signs shall be equipped with a power input disconnect cable terminated with a plug conforming to Figure 1(a) of Advisory Circular 150/5345-26. The length of this cable shall permit the

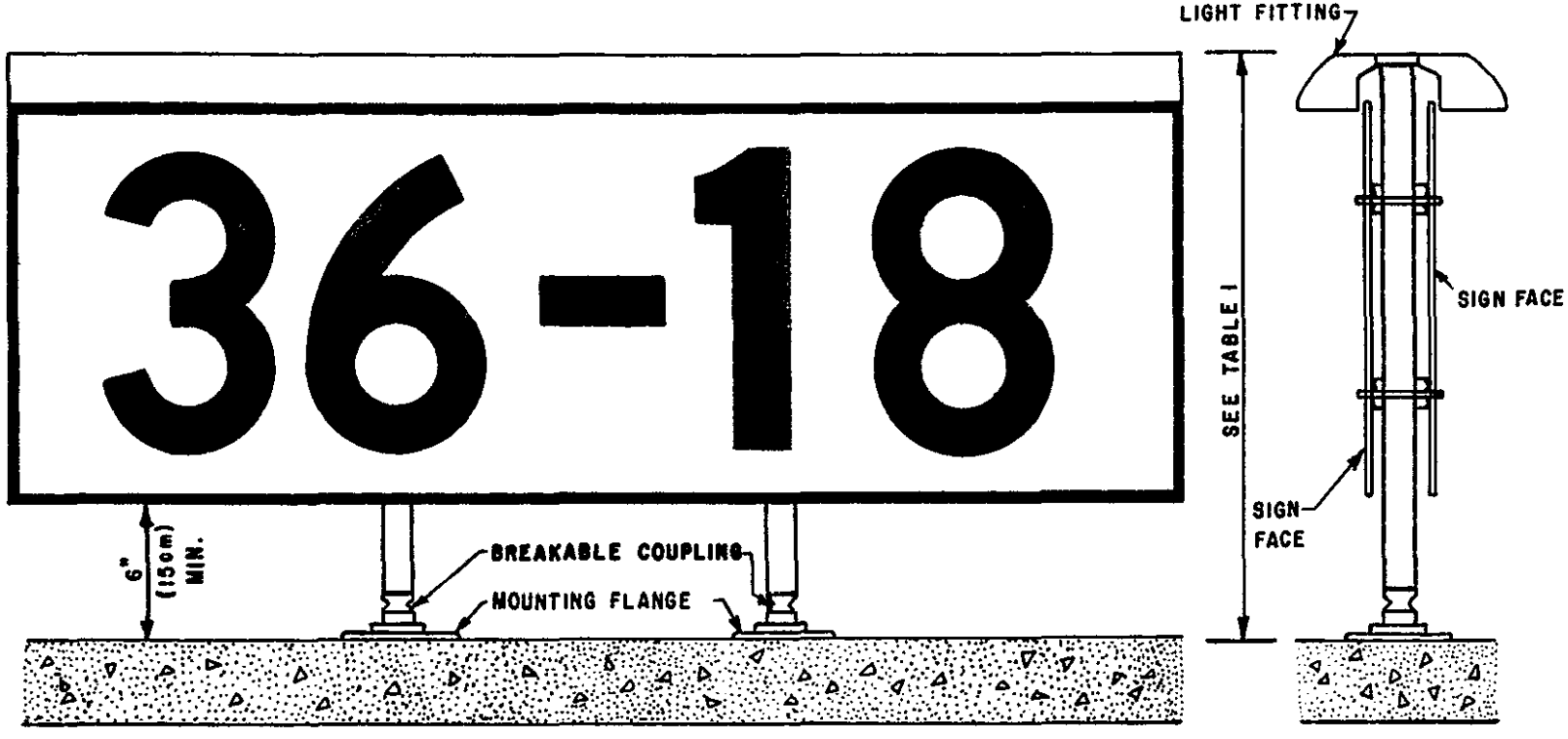

FIGURE 1. TYPICAL SIGN ASSEMBLY.

plug end to reach 6 inches (15 cm) below the top of the concrete pad on which the sign is mounted.

TABLE I

Legend Height inches (cm)	Face Height (minimum) inches (cm)	Overall Mounting Height (maximum) inches (cm)
18 (46)	30 (76)	42 (107)
15 (38)	24 (61)	36 (91)
12 (30)	18 (45)	30 (76)

3.3.3.2 Style 2 signs. Signs designed for operation from a series lighting circuit shall be capable of being energized at the lowest current setting and operate at any current value between 4.8 to 6.6 amperes without flickering or an appreciable decrease in sign illumination. Power input from the series lighting circuit shall be made through an isolation transformer, of the proper rating, conforming to Advisory Circular 150/5345-47. This transformer is not supplied with the sign. If the design requires power adapter circuitry for installation outside the sign, the circuitry shall be enclosed in a watertight container for installation in a light base can conforming to Advisory Circular 150/5345-42. The can will not be supplied with the sign, but the adapter unit shall be. This adapter unit shall be supplied with an output cable at least 24 inches (61 cm) in length and terminated with a receptable conforming to Figure 1(b) of Advisory Circular 150/5345-26. The power input cable shall be terminated in a plug conforming to Figure 1(a) of Advisory Circular 150/5345-26. If the isolation transformer is integral with the adapter unit, the power input leads shall be at least 24 inches (61 cm) in length with one lead terminating in a Figure 6(a) plug; the other, a Figure 6(b) receptacle conforming to Advisory Circular 150/5345-26.

3.4 Materials and components. All materials used in fabrication of the signs shall be suitable for the intended purpose and adequately protected against corrosion. All assembly hardware, including screws, bolts, nuts, washers, and latches, shall be 18-8 stainless steel. All wiring and components shall be adequately rated and shall not be operated in excess of the component manufacturer's recommended rating.

3.5 Finish. External surfaces of the signs, excluding the mounting legs and face panel, shall be painted with a primer coat and a low luster, black, finish coat. The surface color treatment of nonmetallic surfaces shall be equal in quality to that obtained on metal surfaces.

3.6 Nameplate. Each sign and adapter unit shall have a nameplate giving the manufacturer's name and address and catalog number of the item.

3.7 Workmanship. The equipment shall be fabricated in accordance with the highest quality workmanship. All wiring shall be neatly run and laced. All sharp edges and burrs shall be removed. Painted surfaces shall be free from runs, blotches, and scratches.

3.8 Instruction booklet. An instruction booklet shall be included with each order of signs and shall include installation instructions, maintenance procedures, and a complete parts list.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Qualification requirements.

4.1.1 Qualification request. Requests for qualification approval must be submitted in writing to the Office of Airport Standards, Attention: AAS-200, Federal Aviation Administration, Washington, D.C. 20591. This request must include:

(a) A list of the types, classes, styles, and sizes of equipment, along with the manufacturer's catalog numbers, for which qualification approval is requested.

(b) A copy of proposed test procedures and test data sheets and a statement as to whether the manufacturer proposes to conduct his/her own tests or name and location of the independent testing laboratory where the tests are to be conducted. (See 4.1.2.)

(c) A copy of the manufacturer's proposed guarantee for the equipment. (See 4.1.4.)

(d) A copy of the manufacturer's quality control plan. (See 4.1.3.)

(e) A preliminary copy of the equipment instruction booklet. (See 3.8.)

4.1.2 Qualification testing. The equipment must pass all tests in 4.2. The manufacturer shall supply all test equipment and bear all testing costs. Tests may be conducted at the manufacturer's plant, if facilities are available, or at an independent testing laboratory acceptable to the FAA. The FAA reserves the right to witness any or all tests. Where the FAA waives the option to witness tests, the manufacturer must submit a certified copy of all test reports.

4.1.3 Quality control provisions. The manufacturer shall provide and maintain a quality control program in accordance with FAA-STD-013 except that facilities for an FAA Quality Assurance Representative is not required.

4.1.4 Guarantee. The manufacturer shall provide the following minimum guarantee for each equipment: That the equipment has been manufactured and will perform in accordance with this specification and that any defect in material or workmanship which may occur during proper and normal use within 1 year from date of installation or a maximum of 2 years from date of shipment will be corrected by repair or replacement by the manufacturer fob factory.

4.1.5 Instruction booklet. The preliminary instruction booklet will be reviewed to assure compliance with 3.8 and recommended changes, if any, will be forwarded to the manufacturer. The manufacturer shall incorporate recommended changes and submit 13 copies of the final instruction booklet to the FAA prior to receiving qualification approval. These instruction booklets will be used by FAA personnel to monitor equipment as delivered to insure against nonapproved modifications to the equipment.

4.1.6 Qualification approval. Manufacturers who have met all requirements in this specification will be listed as approved suppliers in AC 150/5345-1, Approved Airport Lighting Equipment. Once approval has been granted, the manufacturer may not make any changes in the equipment without prior FAA approval. Requests for design or component changes must be submitted to the office listed in 4.1.1 and must be accompanied by supporting documentation for the change plus 13 copies of revised instruction booklet pages which reflect the proposed change. Substitution of components which are identical in rating and size and equal or better in quality does not require prior FAA approval.

4.2 Qualification tests.

4.2.1 Visual examination. The signs shall be visually inspected for conformance to dimensional requirements, component ratings, material requirements, uniform illumination, and quality of workmanship. Lighted signs shall be viewed at a distance of 800 feet (244 m) at nighttime to determine if the illumination level is sufficient to make the background colors readily discernible.

4.2.2 Wind load and frangibility test. The sign shall be tested for its ability to withstand wind loads of 100 mph (161 km/h) without damage. The test shall be made with the sign completely assembled and mounted in position by the base assembly. A static load of 0.28 psi (1.93 kPa) shall be applied uniformly over the entire surface of the sign face for a period of 10 minutes. The sign shall not break at the frangible points nor suffer permanent distortion. The static load shall then be increased until the sign fails by breaking at the frangible points. Failure shall occur before the loading reaches an applied static load over the sign face of 0.7 psi (4.83 kPa) for the Size 1 sign, 1.3 psi (8.96 kPa) for the Size 2 sign, or 2.0 psi (13.8 kPa) for the Size 3 sign. If the loading is applied with

the sign mounted on a vertical surface, the weight of the sign shall be included as part of the total applied weight for this latter test.

4.2.3 Rain test. A rain test shall be conducted in accordance with MIL-STD-810, Procedure I. The sign shall be operated during the last 10 minutes of the test. Failure of the sign to operate or evidence of water on circuit components shall be cause for failure.

4.2.4 Immersion test. A water immersion test shall be performed on the adapter unit in accordance with MIL-STD-810, Procedure I. Evidence of water leakage shall be cause for failure. This test shall be conducted after the unit has been subjected to the high temperature test in 4.2.5 to insure that efficacy of the gasket material was not impaired.

4.2.5 High temperature test. A high temperature test shall be conducted on the sign and adapter unit in accordance with MIL-STD-810, Procedure II. The maximum chamber temperature shall be 50°C. Failure of the unit to operate or evidence of damage shall be cause for failure.

4.2.6 Low temperature test. A low temperature test shall be conducted on the sign and adapter unit in accordance with MIL-STD-810, Procedure I. The lowest operating temperature shall be -20°C for Class 1 signs and -55°C for Class 2 signs. Failure of the equipment to operate or failure to reach normal sign illumination within 2 minutes after it is energized shall be cause for failure.

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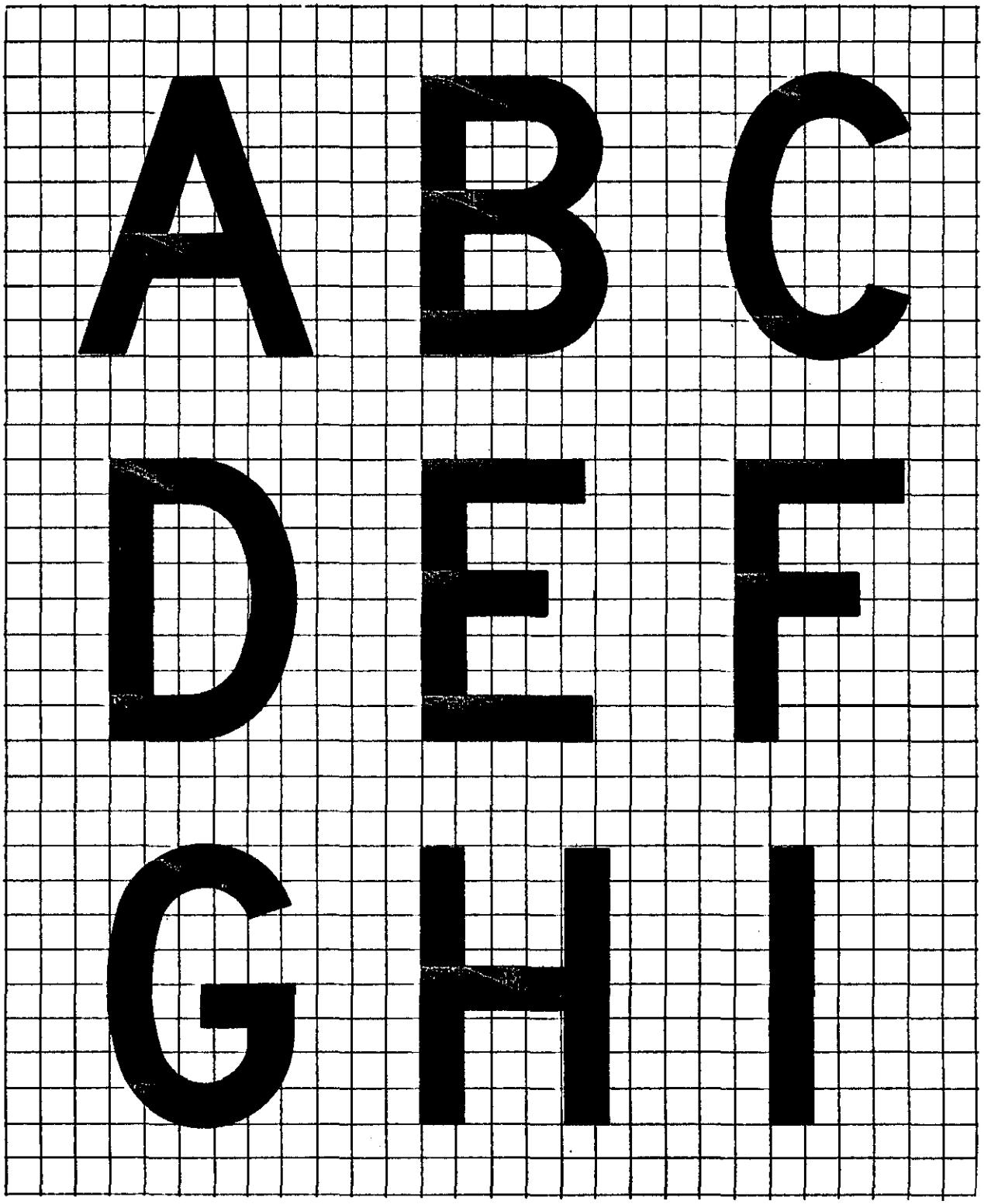
SEE APPENDIX 1 (PAGES 1 TO 6) FOR DETAILS OF SIGN LETTERS AND SYMBOLS.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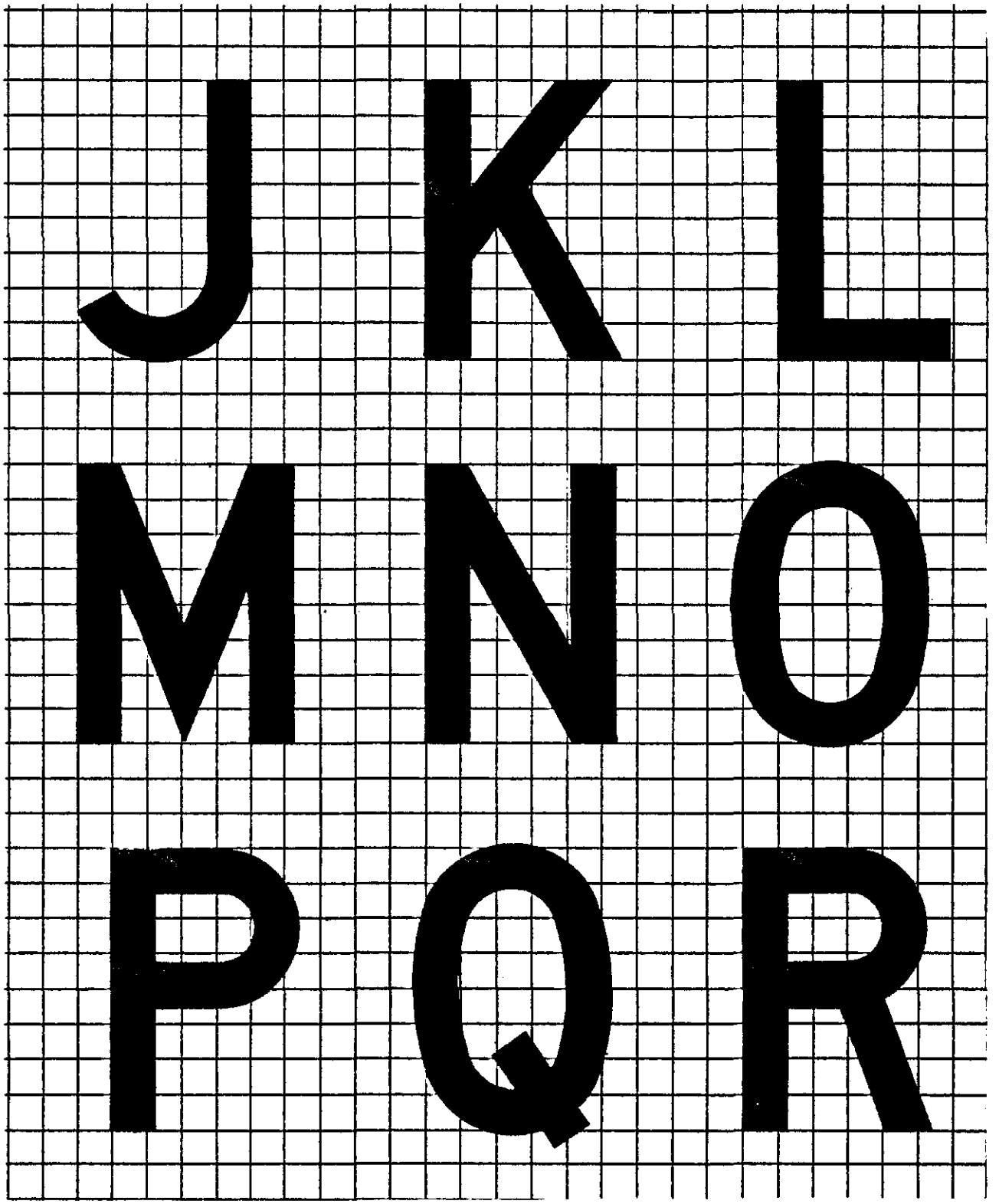
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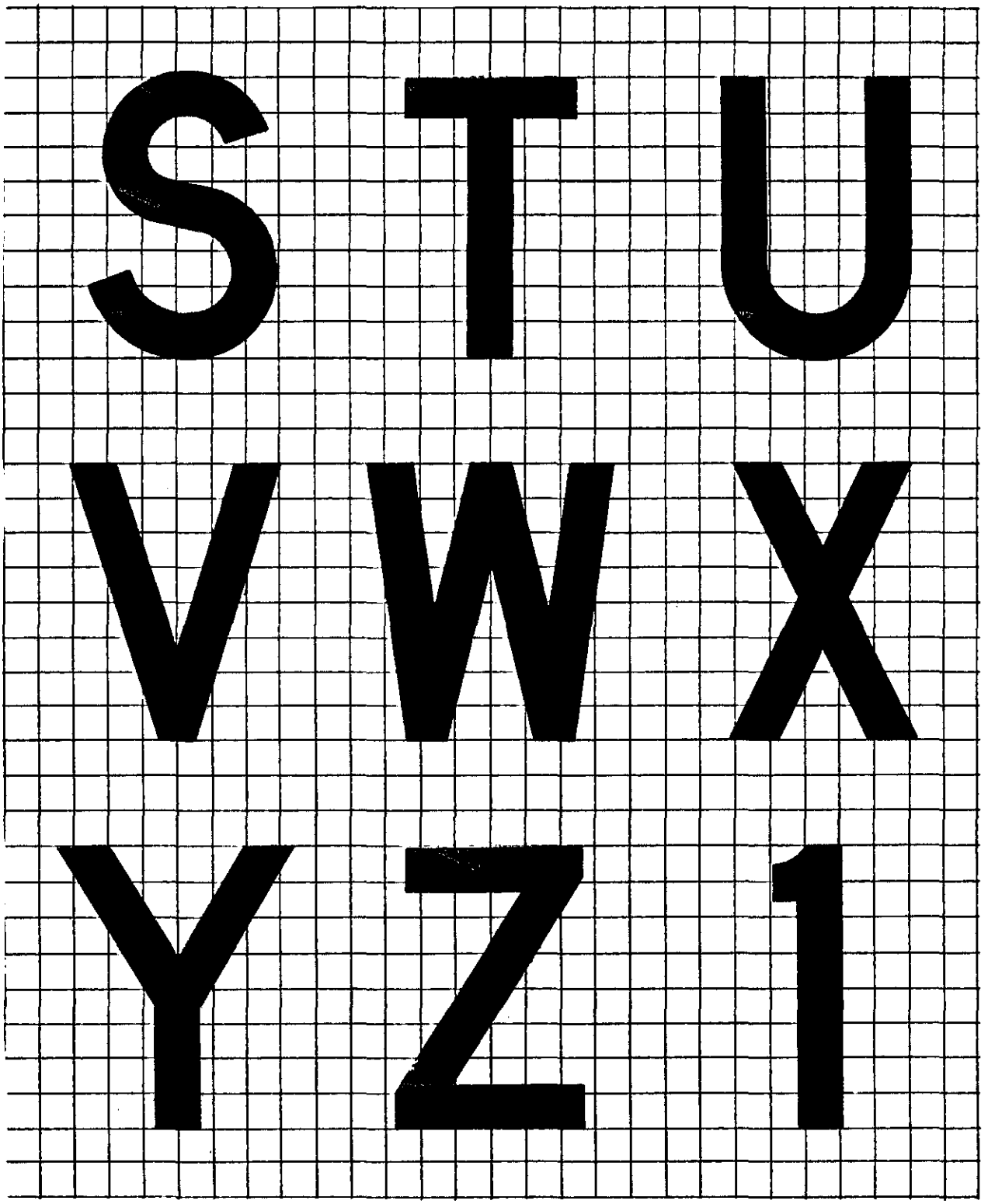
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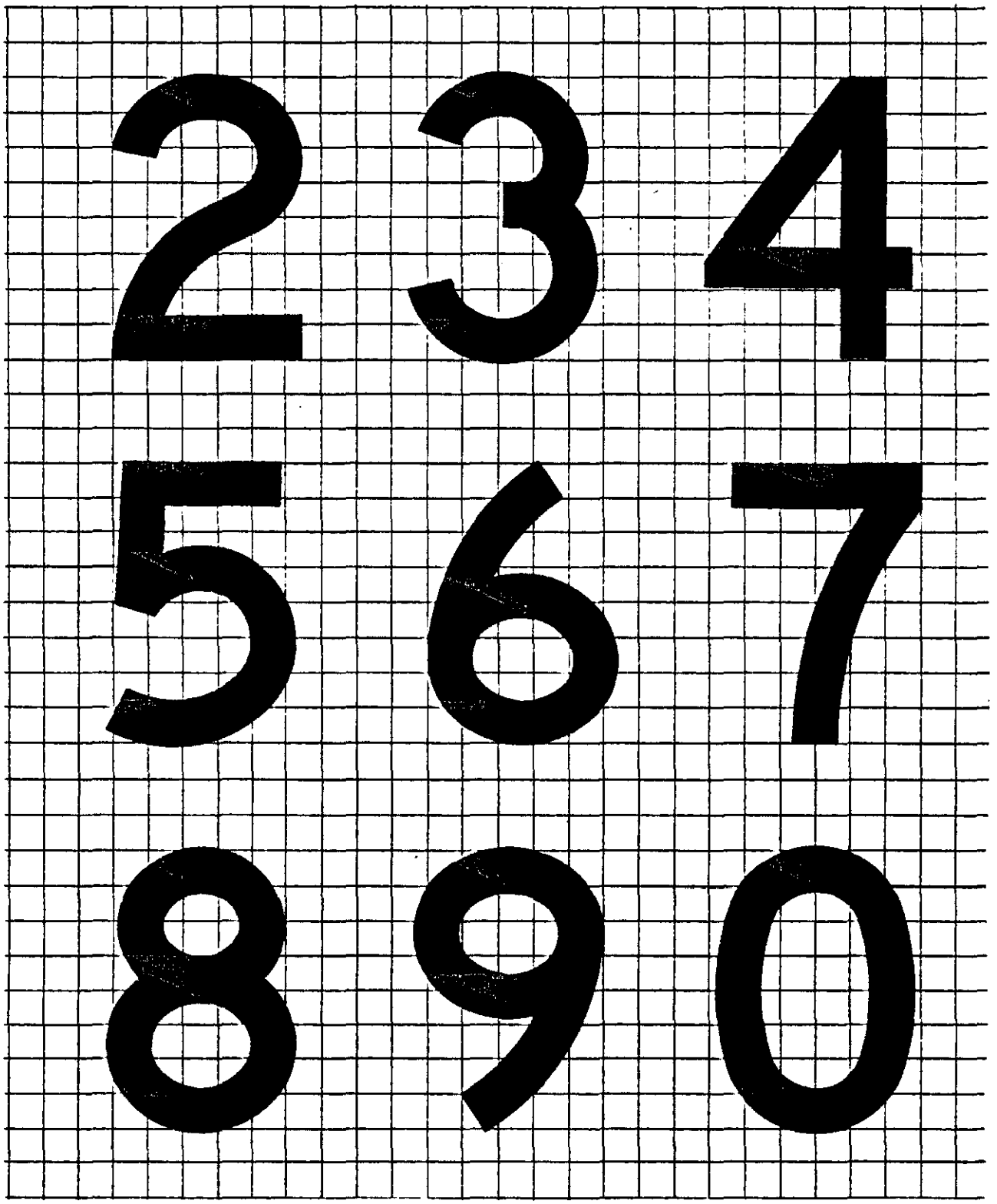
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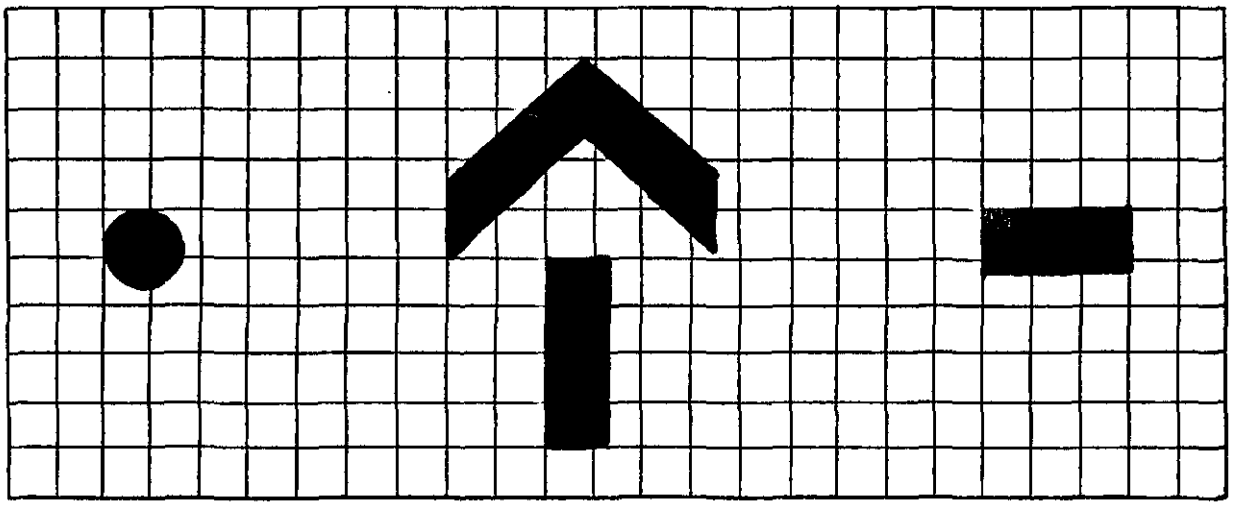

TABLE I

LETTER TO LETTER CODE NUMBER

Preceding Letter	Following Letter		
	B, D, E, F, H, I, K, L, M, N, P, R, U,	C, G, O, Q, S, X, Z,	A, J. T, V, W, Y,
A	2	2	4
B	1	2	2
C	2	2	3
D	1	2	2
E	2	2	3
F	2	2	3
G	1	2	2
H	1	1	2
I	1	1	2
J	1	1	2
K	2	2	3
L	2	2	4
M	1	1	2
N	1	1	2
O	1	1	2
P	1	2	2
Q	1	2	2
R	1	2	2
S	1	2	2
T	2	2	4
U	1	1	2
V	2	2	4
W	2	2	4
X	2	2	3
Y	2	2	4
Z	2	2	3

To determine the proper space between letters or numerals, obtain the code number from Table I or II and enter Table VI for that code number to the desired letter or numeral height.

TABLE II

NUMERAL TO NUMERAL CODE NUMBER

Preceding Numeral	Following Numeral		
	1, 5,	2, 3, 6, 8, 9, 0,	4, 7,
1	1	1	2
2	1	2	2
3	1	2	2
4	2	2	4
5	1	2	2
6	1	2	2
7	2	2	4
8	1	2	2
9	1	2	2
0	1	2	2

TABLE IV

WIDTH OF LETTERS

	Letter Height					
	12" (30.48 cm)		15" (38.10 cm)		18" (45.72 cm)	
	(in.)	(cm)	(in.)	(cm)	(in.)	(cm)
A	10.03	25.48	12.55	31.88	15.06	38.25
B	8.06	20.47	10.08	25.60	12.09	30.71
C	8.06	20.47	10.08	25.60	12.09	30.71
D	8.06	20.47	10.08	25.60	12.09	30.71
E	7.31	18.57	9.14	23.22	10.97	27.86
F	7.31	18.57	9.14	23.22	10.97	27.86
G	8.06	20.47	10.08	25.60	12.09	30.71
H	8.06	20.47	10.08	25.60	12.09	30.71
I	1.88	4.78	2.35	5.97	2.81	7.14
J	7.50	19.05	9.38	23.83	11.25	28.58
K	8.25	20.96	10.32	26.21	12.38	31.45
L	7.31	18.57	9. 4	23.22	10.97	27.86
M	9.28	23.57	11.61	29.49	13.94	35.41
N	8.06	20.47	10.08	25.60	12.09	30.71
O	8.44	21.44	10.55	26.80	12.66	32.16
P	8.06	20.47	10.08	25.60	12.09	30.71
Q	8.44	21.44	10.55	26.80	12.66	32.16
R	8.06	20.47	10.08	25.60	12.09	30.71
S	8.06	20.47	10.08	25.60	12.09	30.71
T	7.31	18.57	9.14	23.22	10.97	27.86
U	8.06	20.47	10.08	25.60	12.09	30.71
V	9.00	22.86	11.25	28.58	13.50	34.29
W	10.50	26.67	13.13	33.35	15.75	40.01
X	8.06	20.47	10.08	25.60	12.09	30.71
Y	10.12	25.70	12.66	32.16	15.19	38.58
Z	8.06	20.47	10.08	25.60	12.09	30.71

TABLE III

WIDTH of STROKE

Letter Height	Stroke Width (in.)	(cm)
12" (30.48 cm)	1.88	4.78
15" (38.10 cm)	2.35	5.97
18" (45.72 cm)	2.81	7.14

TABLE V

WIDTH of NUMERALS

	Numeral Height					
	12" (30.48 cm)		15" (38.10 cm)		18" (45.72 cm)	
	(in.)	(cm)	(in.)	(cm)	(in.)	(cm)
1	2.91	7.39	3.65	9.25	4.38	11.13
2	8.06	20.47	10.08	25.60	12.09	30.71
3	8.06	20.47	10.08	25.60	12.09	30.71
4	8.81	22.38	11.02	27.99	13.22	33.58
5	8.06	20.47	10.08	25.60	12.09	30.71
6	8.06	20.47	10.08	25.60	12.09	30.71
7	8.06	20.47	10.08	25.60	12.09	30.71
8	8.06	20.47	10.08	25.60	12.09	30.71
9	8.06	20.47	10.08	25.60	12.09	30.71
0	8.44	21.44	10.55	26.80	12.66	32.16

TABLE VI

SPACE measured horizontally from the extreme right edge of the preceding letter to the extreme left edge of the following letter (numeral).

CODE NUMBER	Letter (numeral) Height					
	12" (30.48 cm)		15" (38.10 cm)		18" (45.72 cm)	
	(in.)	(cm)	(in.)	(cm)	(in.)	(cm)
1	2.81	7.14	3.52	8.94	4.22	10.72
2	2.25	5.72	2.82	7.16	3.38	8.59
3	1.50	3.81	1.88	4.78	2.25	5.72
4	0.75	1.91	0.94	2.39	1.12	2.84

*U.S. Government Printing Office: 1979-281-568/135