MIL-STD-1234
CHANGE NOTICE 2
30 March 1967

MILITARY STANDARD

PYROTECHNICS: SAMPLING,

INSPECTION AND TESTING

TO ALL HOLDERS OF MIL-STD-1234:

1. The following pages of MIL-STD-1234 have been revised and supersede the pages listed:

New Page	Date	Superseded Page	Date
ii	30 March 1967	ii	18 December 1965
iii	30 March 1967	iii	22 June 1962
iv	30 March 1967	iv	18 December 1965
v	30 March 1967	v	18 December 1965
vi	30 March 1967	vi	22 June 1962

2. The following methods have been added:

Method No.	Title	Date
101.6	Moisture (Electrolytic Hygrometer Method)	30 March 1967
506.1	Friction Sensitivity (By the Roto-Friction Method)	30 March 1967

3. The following is a cumulative list of earlier changes:

a. Superseded pages,

New Page	Date	Superseded Page	Date
ii	18 December 65	ii	22 June 1962
iv	18 December 65	iv	22 June 1962
v	18 December 65	v	22 June 1962

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b. Superseded methods.

New Method	Date	Superseded Method	Date
101.1.1	18 December 65	101.1	22 June 1962
101.2.1	18 December 65	101.2	22 June 1962
101.3.1	18 December 65	101.3	22 June 1962
101.3.1	18 December 65	101.4	22 June 1962
102.1.1	18 December 65	102.1	22 June 1962
102.2.1	18 December 65	102.2.1	22 June 1962

c. New methods.

Method No.	Title	Date
101.5	Moisture (Karl Fischer Distillation Method)	18 December 1965

4. Retain this notice and insert before table of contents.

5. Holders of MIL-STD-1234 will verify that page changes and additions indicated have been entered and will destroy the previous notice (notice page only). The latest notice (notice page) will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the Military Standard is completely revised or cancelled.

Custodians:
Army - MU
Navy - OS
Air Force - 11

Review Activities:
Army - MU
Navy - OS
Air Force - 70

Preparing Activity
Army - MU

Project No. 1370-0227

DEPARTMENT OF DEFENSE
WASHINGTON 25, D. C.

Pyrotechnics: Sampling, Inspection and Testing

MIL-STD-1234

1. This Military Standard has been approved by the Department of Defense and is manditory for use by all Departments and Agencies of the Department of Defense.

2. Recommended corrections, additions, or deletions should be addressed to Commanding Officer, Picatinny Arsenal, Dover, New Jersey 07801, ATTN: SMUPA-DC7.

Supersedes page ii of 18 December 1965

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ALPHABETICAL INDEX OF TEST METHOD–Continued

NUMERICAL INDEX OF TEST METHODS

GROUP 100—GENERAL TEST METHODS

GROUP 200—PHYSICAL TEST METHODS

GROUP 300—SAMPLE PREPARATIONS

GROUP 400—CHEMICAL TEST METHODS

NUMERICAL INDEX OF TEST METHODS-Continued

METHOD 101.6

MOISTURE (ELECTROLYTIC HYGROMETER METHOD)

This method has been coordinated and approved for use by the Departments of the Army and Air Force.

1. SCOPE

1.1 This method is used for determining the moisture content of small grain or flaked propellants. The principle of the method is measurement of the current required for electrolysis of water that has been volatilized from the specimen. Other volatile compounds such as alcohols, amines and ammonia may interfere.

2. SPECIMEN

2.1 The specimen shall consist of 0.2-0.6 gm of propellant weighed to the nearest 0.2 mg.

3. APPARATUS

3.1 Solids Moisture Analyzer (Consolidated Electrodynamics Corporation, 360 Sierra Madre Villa, Pasadena, Cal. , or equivalent) See figure 1.

3.2 Nitrogen, extra-dry grade, in a cylinder with a pressure regulator to supply gas at 5 psig.

4. PROCEDURE

4.1 Prepare the instrument for operation according to the manufacturer's directions. For calibration of the instrument, use accurately weighed samples of either 0.05 to 0.1 gm of sodium tartrate dihydrate or 0.3 to 0.5 gm of potassium tartrate hemihydrate. On drying for 45 minutes at 150°C, the sodium salt should give a moisture content of 15.66 ± 0.05 percent while the potassium salt should give a moisture content of 3.83 ± 0.02 percent.

4.2 Place the weighed specimen in the sample boat, insert into the oven with the aid of tweezers provided with the instrument and close the oven,

CAUTION: These steps must be done as rapidly as possible in order to minimize changes in moisture content.

4.3 Turn the temperature timer controls to the settings required in the applicable specification. When the test is completed, read the weight of moisture shown on the dial and convert to grams.

4.4 Calculate the moisture content of the propellant as follows:

$$\text{Percent of water} = \frac{100A}{W}$$

A = Weight of water shown on dial, gm

W = Weight of specimen, gm

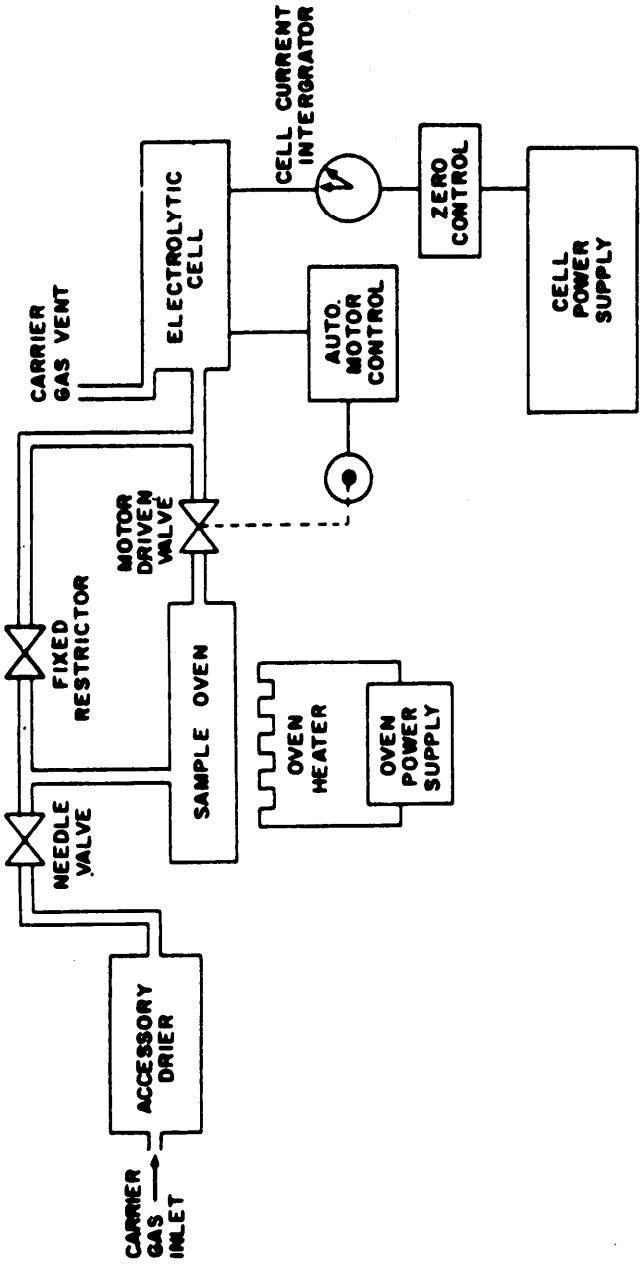


FIGURE 1. BLOCK DIAGRAM OF ELECTROLYTIC HYGROMETER

METHOD 506.1

Friction Sensitivity by the Rob-Friction Method

1. SCOPE

1.1 This method is used for determining the sensitivity to friction of pyrotechnics, explosives, propellants and other high energy compositions. The frictional energy of ignition is obtained by spinning a rod on a sample held in an alundum sample holder.

2. SPECIMEN

2.1 The specimen shall consist of approximately 20 ± 1 milligram (mg) of powder.

3. APPARATUS

3.1 The apparatus shall consist of an alundum sample holder (Drawing (Dwg) No. RDT 2883) mounted in an aluminum cam torque converter (Dwg No. RDT 2822-2837) which turns on bearings. A friction rod (Dwg No. RDT 2884) spins on top of the sample held in the alundum sample holder. A selected force is applied to the rod by means of a weight as indicated in Figure 1. A variable speed electric motor, or a motor fitted with a variable belt drive, turns the rod at the desired revolutions per minute (r.p.m.). The r.p.m.'s are checked with a strob-o-scope. Any suitable bench drill press may be used as the driving force for the rod. A calibrated weight is attached to the cam by a line, run over a grooved drum. Table I converts the cam's degrees of revolution to inches so that the torque is read in ounce-inches.

The test apparatus is operated behind a ½ inch safety glass, at room temperature.

4. PROCEDURE

4.1 Place a sample weighed to 20 ± 1 mg in the alundum sample holder.

4.2 Place weights on the friction rod to produce the desired force.

4.3 Select the desired r.p.m. and the torque load.

4.4 Lower safety shield.

4.5 Start the motor.

4.6 The spinning rod shall be lowered to rest on the sample and the timer shall be started at the same time.

4.7 The timer shall be stopped the moment the sample fires, and the spinning friction rod disengaged, before the friction rod motor is shut off. The firing may be noted as a flash of fire, a cloud of smoke or as an audible report.

4.8 If the time of fire is too short to be read, the weights on the friction rods or the r.p.m., shall be reduced. (A desirable time range is 2 to 10 seconds.)

4.9 The torque reading in degrees should be between 5° and 355°. The torque reading in this range may be obtained by adjusting the r.p.m. , the weights applied to the friction rod, the torque weight or a combination of these factors.

4.10 The energy shall be calculated in foot-pounds (ft - lbs) by use of the following formula:

$$E = \frac{\pi W t (.0052T)}{30} = WtT\ (.000544)$$

Where:

E= energy in ft-lbs.
W= the angular velocity in revolutions per minute (r. p. m.) of the rotating friction rod.
t = time to fire in seconds
T= torque on the rod in ins. - oz.

NOTE: Since energy is to be calculated in ft-lbs and the torque value (T) is obtained in oz-ins, the product of these two values is converted to ft-lbs by multiplying by .0052. Calculation of the formula is simplified by calculating the three constants, $\frac{\pi \cdot .0052}{30}$ = .000544 and multiplying the product of the three variables by this value.

4..11 The factors defining the conditions of the test may be entered in a table as follows:

TORQUE		RPM	Time to Fire Sec	lbs Load on friction Rod	Ignition energy ft-lbs	Notation of observation
Load oz.	Degrees Deflection					

4.12 Degrees deflection shall be converted to torque in inches by multiplying the number of degrees deflection by .00381 and adding 1.25 or by use of Table 1.

4.13 A standard powder should be checked periodically to verify reproducibility of the apparatus.

TABLE 1

Rotation in Degrees	Torque Arm Length in Inches
0°	1.25000
5°	1.26905
10°	1.28810
15°	1.30715
20°	1.32620
25°	1.34525
30°	1.36430
35°	1.38335
40°	1.40240
45°	1.42145
50°	1.44050
55°	1.45955
60°	1.47860
65°	1.49765
70°	1.51670
75°	1.53575
80°	1.55480
85°	1.57385
90°	1.59290
95°	1.61195
100°	1.63100
105°	1.65005
110°	1.66910
115°	1.68815
120°	1.70720
125°	1.72625
130°	1.74530
135°	1.76435
140°	1.78340
145°	1.80245
150°	1.82150
155°	1.84055
160°	1.85960
165°	1.87865
170°	1.89770
175°	1.91675
180°	1.93580
185°	1.95485
190°	1.97390
195°	1.9929S
200°	2.01200
205°	2.03105
210°	2.05010
215°	2.06915
220°	2.08820
225°	2.10725

TABLE 1 (Cont'd)

Rotation in Degrees	Torque Arm Length in Inches
230°	2.12630
235°	2.14535
240°	2.16440
245°	2.18345
250°	2.20250
255°	2.22155
260°	2.24060
265°	2.25965
270°	2.27870
275°	2.29775
280°	2.31680
285°	2.33585
290°	2.35490
295°	2.37395
300°	2.39300
305°	2.41205
310°	2.43110
315°	2.45015
320°	2.46920
325°	2.48825
330°	2.50730
335°	2.52635
340°	2.54540
345°	2.56445
350°	2.58350
355°	2.60255
360°	2.62160

Each degree rotation represents .00381" increase in the torque arm. The torque arm length in distance is equal to the degrees of rotation X .00981 inch plus 1.25 inches.

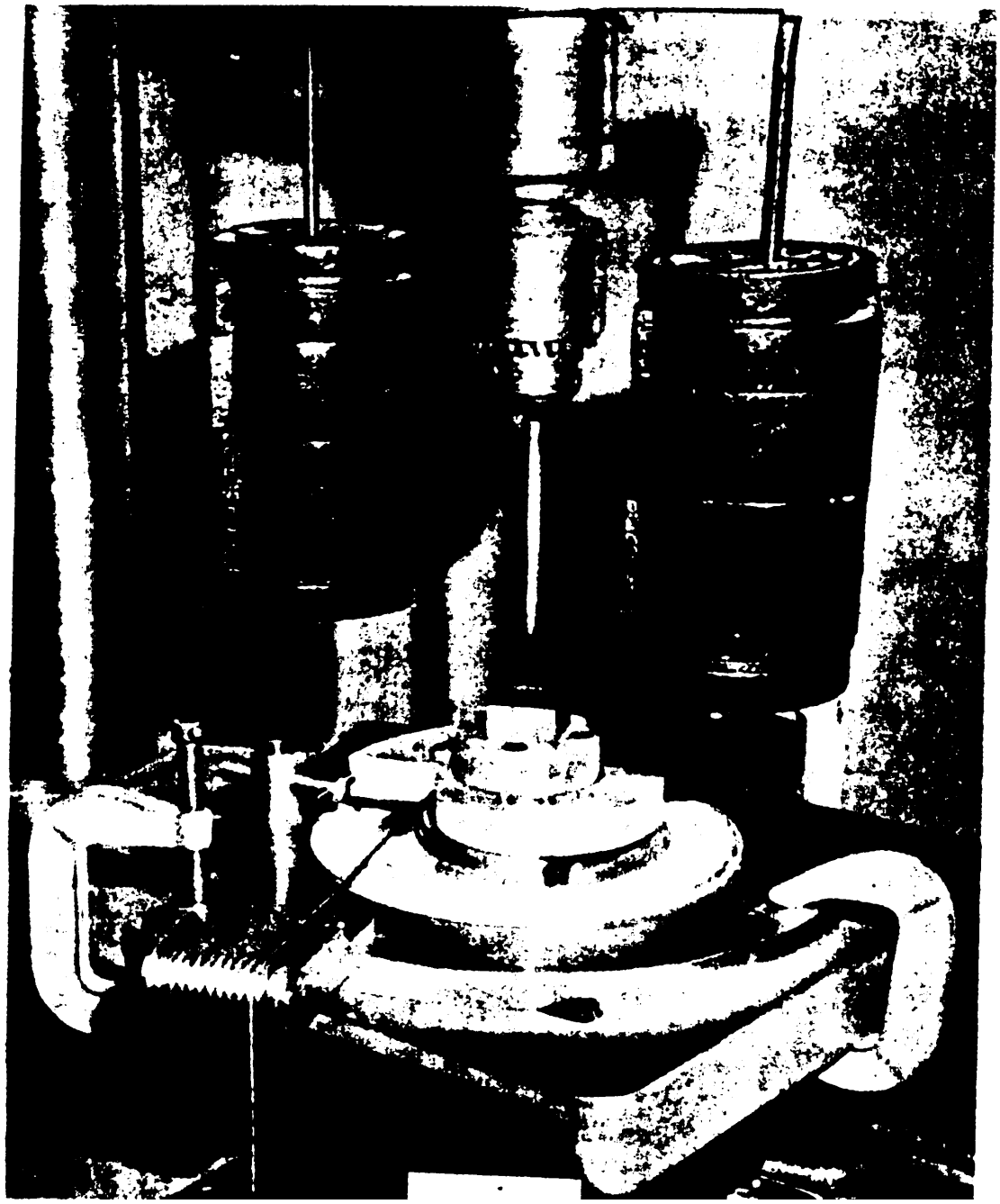
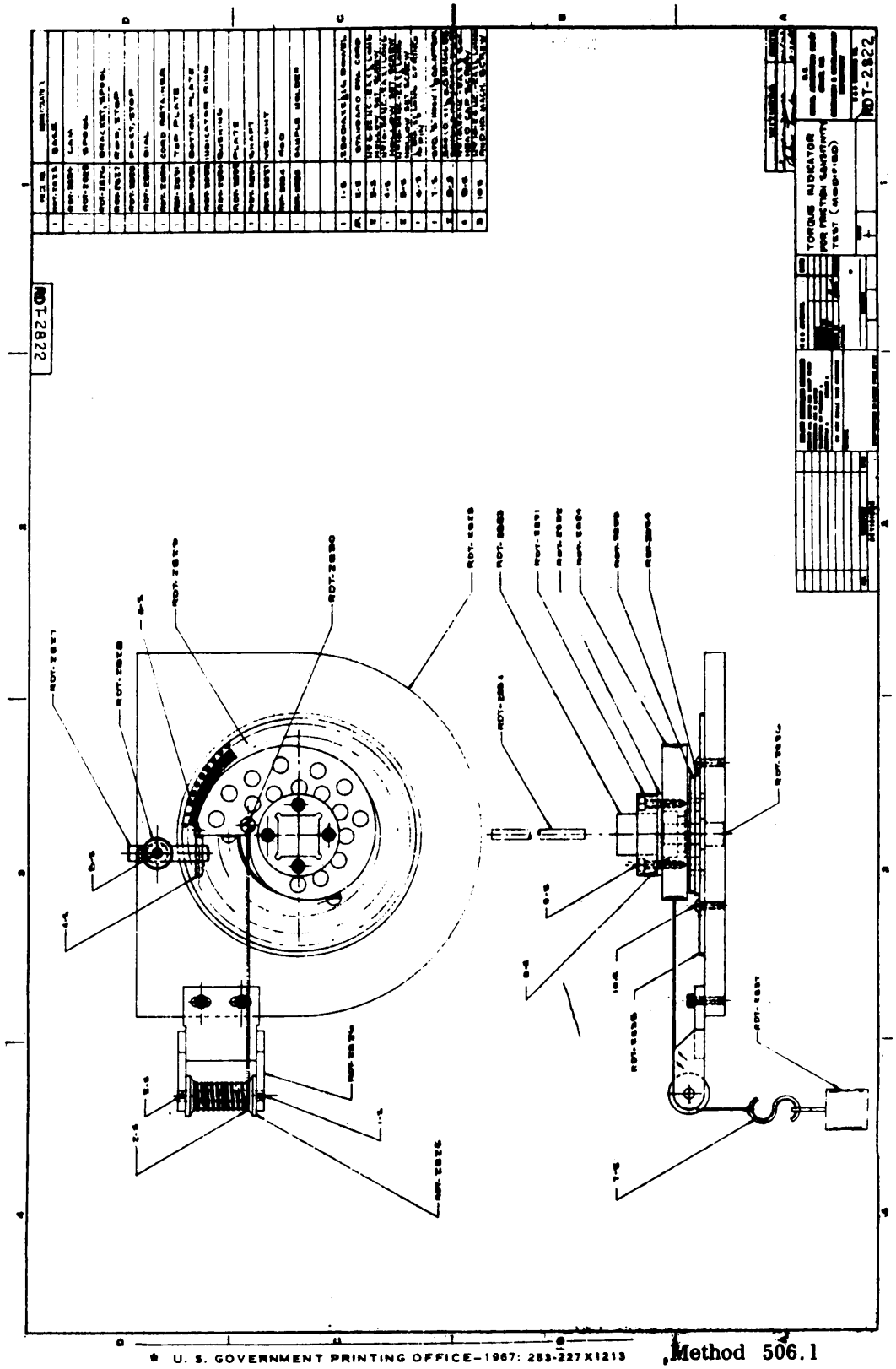


FIGURE 1



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