

**SPECIFICATION
FOR
DRYERS, TUMBLERS, COMMERCIAL, STEAM**

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers steam heated drying and conditioning laundry tumblers. It does not include all types and sizes which may be commercially available, but only those generally used by state agencies and public schools.

I. CLASSIFICATION

Commercial laundry drying and conditioning tumblers covered by this specification shall be of the following types, sizes:

Type I - Single door, end loading, reversible

Size 1 - 100 lbs. (Nominal Dry weight capacity)
30 cu.ft. minimum cylinder volume

Size 2 - 120 lbs. (Nominal Dry weight capacity)
36 cu.ft. minimum cylinder volume

Size 3 - 150 lbs. (Nominal Dry weight capacity)
45 cu.ft. minimum cylinder volume

Size 4 - 200 lbs. (Nominal Dry weight capacity)
80 cu.ft. minimum cylinder volume

Size 5 - 400 lbs. (Nominal Dry weight capacity)
120 cu.ft. minimum cylinder volume

Type II - Pass through, end loading, reversible

Size 1 - 200 lbs. (Nominal Dry weight capacity)
80 cu.ft. minimum cylinder volume

Size 2 - 400 lbs. (Nominal Dry weight capacity)
120 cu.ft. minimum cylinder volume

II. APPLICABLE STANDARDS

The following documents of issue in effect on the date of the Invitation for Bids shall form a part of this specification:

NEMA Publications

National Electrical Manufacturer's Association (NEMA)
2101 L Street, NW
Washington, DC 20037

UL Standards

Publications Stock
333 Pfingsten Road
Northbrook, IL 60062

NFPA Standards

National Fire Protection Association (NFPA)
60 Batterymarch Street
Boston, MA 02110

U.S. Department of Labor
200 Constitutional Avenue, NW
Washington, DC 20210

N.C. Department of Labor
OSHA Division
4 West Edenton Street
Raleigh, NC 27611

III. REQUIREMENTS

A. PERFORMANCE AND DIMENSIONS

TABLE I
TYPE I, SINGLE DOOR, END LOADING
(REQUIREMENTS ARE MINIMUM UNLESS OTHERWISE INDICATED)

Requirements	Size	Size	Size	Size	Size
	1	2	3	4	5
1. Dry Wgt. Capacity (lbs., Nominal)	100	120	150	200	400
2. Cylinder Volume (cu. ft.)	30	36	45	80	120
3. Single Cylinder	Yes	Yes	Yes	Yes	Yes
4. End Loading	Yes	Yes	Yes	Yes	Yes
5. Reversible Cylinder	Yes	Yes	Yes	Yes	Yes
6. Door Size (in. dia.)	27	27	27	44	44
7. No. of Tumbling Ribs	3	3	3	6	6
8. Forward Tilt	No	No	No	Yes	Yes
9. Backward Tilt	No	No	No	Yes	Yes
10. Blower Motor HP	1.0	1.0	1.5	10.0	15.0
11. Cylinder Motor HP	0.75	0.75	0.75	3.0	3.0
12. Boiler HP	9.0	10.0	10.0	25.0	25.0
13. Air Flow Rate (CFM)	2000	2000	2200	5000	6000
14. Max Operating Pressure (psig min.)	100	100	100	125	125

TABLE II
TYPE II, PASS THROUGH, END LOADING
(REQUIREMENTS ARE MINIMUM UNLESS OTHERWISE INDICATED)

Requirements	Size	Size
	1	2
1. Dry Wgt. Capacity (Nominal)	200	400
2. Cylinder Volume	80	120
3. Single Cylinder	Yes	Yes
4. End Loading	Yes	Yes
5. Reversible Cylinder	Yes	Yes
6. Door Size (in. dia.)	44	44
7. No. of Tumbling Ribs	6	6
8. Forward Tilt	Yes	Yes
9. Backward Tilt	Yes	Yes
10. Blower Motor HP	10.0	15.0
11. Cylinder Motor HP	3.0	3.0
12. Boiler HP	25.0	25.0
13. Air Flow Rate (CFM)	5000	6000
14. Max Operating Pressure (psig min.)	125	125

B. DESIGN

The design and construction shall conform to the general and detail requirements as specified hereinafter. The equipment shall be a currently standard product of an established manufacturer, except for such deviations as called for in this specification. All accessories and components normally furnished commercially with the standard product offered under this specification shall be in the same quantity and of the same quality as furnished commercially with the standard product. All equipment furnished under this specification shall conform to applicable standards of the National Electrical Code for construction, and the National Electrical Manufacturers' Association standards for electrical controls and motors.

C. SAFETY DEVICES

Tumblers shall be equipped with the following safety devices:

1. Excess temperature cut-out switches and operating temperature controls.
2. Excess temperature sprinkler protection.
3. Door and tilt interlocks so that the tumbler shall operate only with the door closed and the cylinder in the proper drying position, except when loading and unloading, for which a manually operated switch shall be provided.
4. A light to designate that the tumbler is operating.
5. A manual override device to permit opening the door in case of a power failure.
6. A guard for Type I and Type II tumblers shall be provided around the base to prevent the placement of objects under the machine.
7. Guards shall be provided to eliminate hazards created by heated and moving parts.

D. CONTROLS AND FEATURES

1. Standard Controls and Features

The following minimum controls and features shall be provided:

- a) Lights and alarm to signal end of cycle.
- b) Automatic timer for hot and cool down cycle.
- c) Automatic temperature control and thermometer.
- d) Door and tilt switch (front and rear for passthrough). No tilt switch for Type I, sizes 1, 2, and 3.
- e) (1) Reverse non-reverse switch.
- f) Push button unloading (front and rear for pass through).

2. Optional Controls and Features

When so stated in the Invitation for Bids, the following options shall be furnished:

- a) Moisture retention device to provide for conditioning the clothes to a moisture retention of approximately 15 to 45 percent range.
- b) Teflon coating on the cylinder.

E. HEATING COILS

Steam heating coils shall be of copper or alloy construction and of the extended surface type for a maximum operating pressure as specified in III.A, Tables 1 & 2. The coils shall be divided into two or more sections. Each section shall have a steam supply and drain. Inlet and return valves shall be provided to permit the bypassing of one or more sections, and connecting returns to a common outlet. Coil headers, if required, shall be fabricated from malleable iron, bronze, or steel.

Necessary integral pipe, fittings, condensate traps, pressure reducing valves, and all other valves for steam and drains shall be installed or furnished as complete assemblies suitable for installation with unions or other standard fittings. All steam lines shall be installed to comply with accepted plumbing practice. Installation instructions shall be furnished with uninstalled assemblies.

Steam, drain, condensate (with three-valve-bypass and trap for each heating coil), and other operational valves shall be so installed that they are readily accessible for operation and maintenance.

A boiler, of a minimum horsepower specified in III.A, Tables I and II, shall be provided.

F. ELECTRICAL SYSTEM AND CONTROLS

The electrical installation shall be in accordance with the applicable portions of the National Electrical Code and the National Electrical Manufacturer's Association Standards. Motors shall be continuous drip proof, or splash proof type. Motors shall have windings impregnated to resist moisture.

All motors shall be protected by thermal overloads. Minimum motor horsepower shall be as specified in III.A, Tables I & II. Starters and relays shall be heavy duty, industrial type, and sized to NEMA Standards. All wiring to be run in electrical conduit in compliance with applicable electrical codes.

G. FRAME

The frame shall be constructed of ferrous metal formed to provide a rigid support for the cylinder housing, heating unit, fan, and driving mechanism. Tilt requirements are to be as specified in III.A, Tables I & II.

H. HOUSING

The cylinder, heating unit, and fan, shall be enclosed in a ferrous metal housing. The housing shall be of airtight construction and shall be provided with a tight fitting door or removable panels giving ready access to parts requiring maintenance.

I. DOOR

The door(s) shall be a minimum size as specified in III.A, Tables I & II. Door(s) shall be automatically operated and shall be interlocked with tilting controls to prevent tilting until door is in open position.

J. CYLINDER

The cylinder shall be of open end construction. The door closure may be to the cylinder or the exterior housing. The cylinder shall be fitted with a minimum number of tumbling ribs as specified in III.A, Tables I & II.

The cylinder shall be coated with teflon or similar non-stick material when specified in the Invitation for Bid.

K. EXHAUST AIR OPENINGS

Openings of ample size shall be provided for exhausting the air after passage through the tumbler. The opening shall be provided with duct connections.

A built-in lint trap shall be provided.

L. TYPES

1. Type I

The Type I tumbler shall be single cylinder, end loading, reversible, with arrangement for non-recirculation of the heated air. The tumbler shall be provided with an electrical device to reverse the cylinder at regular intervals and equipped with a mechanical timing device capable of timing a maximum cycle of sixty minutes. An audible and visual signal to notify the operator when the end of the cycle is reached shall be provided. The timer shall be mounted on the front of the housing in a location accessible to the operator.

2. TYPE II

The Type II tumbler shall be single cylinder, pass through, end loading, and reversible.

It shall conform to the other requirements of Type I.

M. INSTALLATION

The successful bidder shall provide a qualified installer to supervise the installation of the equipment. Unless otherwise specified in the Invitation for Bids, preparation of the foundation and installation of the equipment will be accomplished by the purchaser with the successful bidder furnishing all the necessary drawings. After installation, the successful bidder shall conduct operating tests of his equipment in the presence of designated personnel and give instructions in the operation of the equipment to key laundry personnel.

IV. WARRANTY

The contractor warrants to the owner that all equipment furnished under this specification will be new, of good material and workmanship, and agrees to replace promptly any part or parts which by reason of defective material or workmanship shall fail under normal use, free of negligence or accident, for a minimum period of 12 months from date of acceptance. Such replacement shall be free of any charge to the owner or his representative.

V. SERVICE, PARTS, AND MANUALS

The contractor shall guarantee the owner promptly available spare parts and technical assistance. The services of a qualified representative of the contractor shall be available to the owner within 24 hours after requesting this service.

At least one copy of an operating and parts manual shall be furnished with each dryer.

VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE

The contractor shall conduct the following test of his equipment in the presence of designated personnel and also give instructions in the operation of the equipment to key laundry personnel. A minimum of one 8-hour working period shall be devoted to testing and instructions.

1. Operational Testing

Each tumbler furnished shall be operationally tested, without a load, to establish compliance with all performance requirements.

2. Functional Testing

Each tumbler shall be tested under full service load. The following items and operations shall be checked:

- a) Cylinder volume and capacity of machine.
- b) Timing device for compliance with requirements of Section III.N.
- c) Controls for compliance with requirements of Section III.D.

VII. DELIVERY AND PAYMENT

Delivery of and payment for drying tumblers under this specification shall be in accordance with the terms and conditions of the Invitation for Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

VIII. ORDERING DATA (For Procurement Use Only)

Purchasers should exercise any desired option offered herein and should specify the following:

1. Title, number, and date of this specification.

2. Type and size of dryer required.
3. Optional controls and features required (see III.D.2.above)
4. If teflon, or other non-stick coating on the cylinder is required.
5. If a moisture retention device is required.
6. Electrical characteristics required.
7. If agency requires inspection by Quality Assurance Representative.
8. If preparation of the foundation for installation is required of the bidder.