

CHAPTER 1

ADMINISTRATIVE PROVISIONS

SECTION 101 PURPOSE

101.1 Purpose. This standard is intended to establish minimum requirements for landscape irrigation emission devices to ensure adequate safety and performance, specify testing methods used to quantify product performance to enable component selection and specification in irrigation systems, and promote uniformity in classifying, rating and marking landscape irrigation emission devices.

SECTION 102 SCOPE

102.1 Scope. This standard shall apply to sprinklers and emitters intended to dispense water from landscape irrigation systems onto a landscape.

SECTION 103 APPLICABILITY

103.1 Applicability. This standard shall apply to sprinklers and emitters designed by the manufacturer for utilization within landscape irrigation systems. This standard shall not apply to sprinklers and emitters for use exclusively within agricultural irrigation systems or hose-end watering products or valve-in-head devices.

SECTION 104 CONVENTIONS

104.1 Conventions. Dimensions that are not stated as “maximum or minimum” are absolute. All dimensions are subject to conventional industry standards.

104.2 Units. Dimensions that are not stated shall be provided in inch/pound format with SI (metric) units provided in parentheses. References to gallons refer to U.S. gallons.

SECTION 105 REFERENCED DOCUMENTS

105.1 Reference documents. The codes and standards referenced in this standard shall be considered part of the requirements of this standard to the prescribed extent of each such reference. Chapter 5 contains a complete list of all referenced standards.

SECTION 106 MATERIALS

106.1 Materials. Landscape irrigation emission devices shall be resistant to UV degradation or oxidation without adversely impacting performance.

CHAPTER 2

DEFINITIONS

SECTION 201 GENERAL

201.1 General. For the purpose of this standard, the terms listed in this chapter have the indicated meaning.

201.2 Undefined terms. The meaning of terms not specifically defined in this document or in referenced standards shall have ordinarily accepted meanings such as the context implies.

201.3 Interchangeability. Words, terms and phrases used in the singular include the plural and the plural include the singular.

SECTION 202 DEFINED TERMS

ARC. Angular portion of a full circle covered by the discharge of a landscape irrigation spray, rotor, bubbler or emitter.

APPLICATION RATE. The rate at which water is applied to a given area by sprinkler(s) and emitter(s), usually expressed as depth per unit time (inches per hour or mm per hour). Also known as “Precipitation Rate.”

COEFFICIENT OF VARIATION (CV). A measure of the variability of discharge of a random sample of a given make, model and size of microirrigation emitter, as produced by the manufacturer and before any field operation or aging has taken place; equal to the ratio of the standard deviation of the discharge of the emitters to the mean discharge of the emitters.

DISTANCE OF THROW. The distance measured from the sprinkler centerline to a point at which the sprinkler deposits water at the minimum rate required.

DISTRIBUTION PATTERN. A water depth-distance relationship measured from a single emission device.

DISTRIBUTION UNIFORMITY (DU). The measure of the uniformity of irrigation water applied to a defined landscape area.

Distribution uniformity of lower quarter (DULQ). The ratio of the average of the lowest one-fourth of measurements of irrigation water to the average of all measurements captured by collection devices, expressed as a dimensionless number with two decimal places.

EMISSION DEVICE. An irrigation system component that is used to dispense irrigation water to the landscape at a specific rate.

Sprinkler. An emission device consisting of a sprinkler body with one or more orifices to convert irrigation water pressure to high velocity water discharge through the air, discharging a minimum of 0.5 gallon per minute (1.9 liters per minute) at the largest area of coverage available for the

nozzle series when operated at 30 psi (206.8 kPa) or more with a full-circle pattern.

Spray. A sprinkler that continuously applies water in a pattern to a defined landscape area.

Rotor. A sprinkler that applies water in a pattern by means of one or more rotating streams to a defined landscape area.

Bubbler. An emission device that floods the soil, discharging greater than 6.3 gallons per hour (24 liters per hour) when operated at 30 psi (206.8 kPa) and distributing water primarily through capillary action.

Microirrigation emission device. An emission device intended to discharge water in the form of drops or continuous flow at rates less than 30 gallons per hour (113.5 liters per hour) at the largest area of coverage available for the nozzle series when operated at 30 psi (206.8 kPa), except during flushing. Also known as “Low Volume Irrigation.”

Drip emitter. A microirrigation emission device, with a flow rate less than or equal to 6.3 gallons per hour (24 liters per hour) when operated at 30 psi (206.8 kPa), designed to dissipate pressure and discharge a small uniform flow or trickle of water at a constant discharge rate.

Drip line emitter. A tube that discharges water from integrated evenly spaced emitters, perforations or a porous wall. Also known as “Line-Source Emitters” or “In-Line Emitters.”

Multiple outlet emitter. A microirrigation emission device with more than one emission point from a centralized assembly.

Point-source emitter. A drip emitter that discharges water at a single emission point.

Microspray. A microirrigation emission device with one or more orifices to convert irrigation water pressure to water discharge with a flow rate not to exceed 30 gallons per hour (113.5 liters per hour) at the largest area of coverage available for the nozzle series when operated at 30 psi (206.8 kPa). Microsprays are inclusive of “microbubblers,” “microspinners” and “micro-spray jets.”

EMISSION POINT. The location where water is discharged from an emission device.

EMITTER EXPONENT. A numerical value that establishes the exponential relationship between the flow rate and inlet pressure of a drip emitter.

FILTER. Device used in micro- and sprinkler irrigation systems to remove debris from the water that might clog or otherwise foul emission devices.

DEFINITIONS

HOSE-END WATERING PRODUCT. A temporarily positioned device that is used to dispense water to a landscape and is connected to a hose or pipe that is attached to a water supply system.

INTEGRAL CHECK VALVE. A self-acting component integral to an emission device designed to prevent water flow through an emission device up to a specified pressure when the emission device or group of sprinklers and emitters are not pressurized, usually expressed as “feet of elevation” or “feet of head.”

LANDSCAPE. For the purposes of this standard, landscape refers to any and all areas that are planted or installed and intended to receive irrigation including, but not limited to, turfgrass, ground covers, shrubs, trees, flowers and similar plant materials as opposed to agricultural crops grown and harvested for monetary return.

LATERAL. A pipeline that supplies water from the valve to landscape irrigation emission devices.

NOMINAL FLOW RATE. The manufacturer’s published flow rate data of a microirrigation emission device at the recommended operating pressure.

NOZZLE. The discharge opening or orifice of a sprinkler used to control the volume of discharge, distribution pattern and droplet size.

Multistream, multitrajectory (msmt) nozzles. Nozzles designed to distribute discharge water in a number of individual streams, of varying trajectories, which rotate across the distribution area.

NOZZLE ORIFICE. The emission point from a nozzle into the atmosphere.

OPERATING PRESSURE.

Maximum operating pressure. The highest manufacturer recommended pressure to ensure proper operation.

Minimum operating pressure. The lowest manufacturer recommended pressure to ensure proper operation.

Recommended operating pressure. The manufacturer’s recommended pressure for operation of a sprinkler or emitter.

POP-UP STEM. A sprinkler component that elevates one or more nozzles a distance above grade when subjected to water pressure and retracts when water pressure is reduced.

PRECIPITATION RATE. See “Application Rate.”

PRESSURE REGULATOR. A device that maintains constant downstream operating pressure immediately downstream from the device, which is lower than the upstream pressure.

RADIUS OF THROW. The distance of throw for a circular wetted pattern.

RISER. A pipe or tubing used to elevate an emission device above a lateral in an irrigation system.

SPRINKLER BODY. The exterior case or shell of a sprinkler incorporating a means of connection to the piping system, designed to convey water to a nozzle or orifice.

SPRINKLER HEAD. See “Sprinkler Body.”

SPRINKLER IRRIGATION. A method of irrigation in which water is broadcast through the air to a defined area.

STRESS CRACK. An external or internal rupture in a plastic caused by tensile stresses less than its short-time mechanical strength.

Stress crack, environmental. A stress crack, the development of which has been accelerated by the environment to which the plastic is exposed, such as chemicals or elevated temperatures.

TRAJECTORY. The angle above the horizontal plane of the stream of water as it leaves an emission device.

TURF. The ground cover surface of mowed grass.

VALVE. A device used to control the flow of water within an irrigation system.

VALVE-IN-HEAD SPRINKLER. A sprinkler with an integral control valve intended to be operated from a remote location.

WETTED AREA. A wetted pattern created by one or more emission devices in a defined area (see “Radius of Throw” and “Distance of Throw”).

SECTION 203 SYMBOLS

psi	=	Pounds per square inch
kPa	=	Kilopascals
gpm	=	Gallons per minute
gph	=	Gallons per hour
lpm	=	Liters per minute
ml/min	=	Milliliters per minute
mm/h	=	Millimeters per hour
ft	=	Feet
cm	=	Centimeters
mm	=	Millimeters
m	=	Meters
A	=	Area
AP	=	Pattern collection area
in/h	=	Inches per hour
ft/s	=	Feet per second
m/s	=	Meters per second
s_q	=	Standard deviation of flow rate
D	=	Deviation (%)
C_v	=	Coefficient of variation
AR	=	Application rate
\underline{Q}	=	Volumetric flow rate
\bar{Q}	=	Mean volumetric flow rate
Q_n	=	Nominal volumetric flow rate

Q_{gpm}	=	Average flow rate (gallons per minute) for a given pressure.
DULQ	=	Lowest quarter distribution uniformity (unitless)
V_{LQ}	=	Volume of lowest quarter of samples
V_{avg}	=	Average volume
gal	=	Gallons
L	=	Liters
wt%	=	Weight percent
°F	=	Degrees Fahrenheit
°C	=	Degrees Celsius
N	=	Newtons