

4.8.26 Energy Efficient Hand Dryers

DESCRIPTION

This measure consists of installing efficient hand dryers that save energy by drying with air movement, using motion sensors, and reducing drying time. Energy efficient hand dryers use less energy per dry than standard hand dryers. Hand dryers are applicable in retail, commercial, and industrial settings.

This measure was developed to be applicable to the following program types: TOS, ERET. If applied to other program types, the measure savings should be verified.

DEFINITION OF EFFICIENT EQUIPMENT

To qualify for this measure, , a hand dryer must be motion operated with rated load of 1,500 W or less.

DEFINITION OF BASELINE EQUIPMENT

The baseline equipment for this measure is a push-button operated hand dryer with connected load in excess of 1,500 Watts.

DEEMED LIFETIME OF EFFICIENT EQUIPMENT

The measure life for a new energy efficient hand dryer is 10 years¹⁷²¹.

DEEMED MEASURE COST¹⁷²²

Incremental cost is \$483. Baseline cost for a hand dryer is \$368. Efficient cost for an efficient hand dryer is \$851.

LOADSHAPE

Loadshape C02 - Commercial Electric DHW

COINCIDENCE FACTOR

Formula of Coincidence Factor is as follows:

$$CF = \frac{\text{Cycle Time per Use} * \text{Use per Day} * \text{Site Occupied Days per Year}}{\text{Site Occupied Hours per Day} * 365}$$

¹⁷²¹ Based on studies conducted by two separate parties; Comparative Environmental Life Cycle Assessment of Hand Drying Systems by Quantis (pg 2) and Guidelines to Reduce/Eliminate Paper Towel Use by Installing Electric Hand Dryers by Partners in Pollution Prevention P3 (pg 17).

¹⁷²² Cost is the average retail costs for 16 baseline and 10 efficient hand dryers. See *Hand_Dryer_Analysis.xlsx* . Cost source: RestroomDirect.com

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Where:

Usage	Example Building Types	Cycles per Day ¹⁷²³	Occupied Days per Year (DPY) ¹⁷²⁴	Occupied Hours per Day ¹⁷²⁵	Coincidence Factor (CF)
Low	Office, Warehouse	50	250	8	0.04
Moderate	Restaurant, Small Grocery, Small Retail	125	365	15	0.09
High – <12 hr/day	K-12 School, University, Theater, Conference Center	250	200	9	0.16
High – ≥12 hr/day	Large Grocery, Retail Department Store	375	365	13	0.29
Heavy - Intermitent	Stadium, Theater, Place of Worship	250	80	6	0.10
Heavy Duty - 24/7	Transportation Center, Airport	750	365	23	0.34

Algorithm

CALCULATION OF ENERGY SAVINGS

ELECTRIC ENERGY SAVINGS

$$\Delta kWh = CPD * DPY * \frac{(Watts_{Base} * CycleTime_{Base} - Watts_{EE} * CycleTime_{EE})}{(3600 \frac{sec}{hr} * 1000 \frac{Watts}{kW})}$$

Where:

- CPD = Number of cycles per day.
= If not known, use assumption as defined in Coincidence Factor section.
- DPY = Number of days the facility operates per year.
= If not known, use assumption as defined in Coincidence Factor section.
- Watts = Unit wattage.
= Actual. If not known, use assumption from the table below.

¹⁷²³ Guidehouse, Inc. Engineering Estimate, 2022

¹⁷²⁴ Illinois TRM v9.0, Days per year, from 4.3.2 Low Flow Faucet Aerators

¹⁷²⁵ Occupancy based on Lighting HOU from Section 4.5, combined with days per year from Section 4.3.2.

Assumptions	Power (watts)

Cycle Time = Runtime seconds per use.
= Actual. If not known, use assumption from the table below.

Assumptions	Cycle Time (seconds)
Baseline ¹⁷²⁸	37
Efficient ¹⁷²⁹	12

For example, a new efficient hand dryer replacing a baseline hand dryer at a large grocery store, with unknown cycles per day and unknown days per year:

$$\begin{aligned}\Delta \text{kWh} &= (375 * 365 * (2,036 * 37 - 1,066 * 12) / (3600 * 1000)) \\ &= 2378 \text{ kWh}\end{aligned}$$

SUMMER COINCIDENT PEAK DEMAND SAVINGS

$$\Delta \text{kW}_{\text{Peak}} = \frac{(Watts_{\text{Base}} - Watts_{\text{EE}})}{1000} * CF$$

Where:

Watts_{Base} = As defined in section above.
Watts_{EE} = As defined in section above.
CF = Coincidence Factor as defined in Coincidence Factor section (shown here for convenience):

$$CF = \frac{\text{Cycle Time per Use} * \text{Use per Day} * \text{Site Occupied Days per Year}}{\text{Site Occupied Hours per Day} * 365}$$

Where:

¹⁷²⁶ CLEAResult survey of 24 hand dryers in convenience stores in Arkansas. See *Hand_Dryer_Analysis.xlsx*.

¹⁷²⁷ CLEAResult cost/specification survey of 10 unique efficient hand dryers. See *Hand_Dryer_Analysis.xlsx*.

¹⁷²⁸ CLEAResult survey of 24 hand dryers in convenience stores in Arkansas. See *Hand_Dryer_Analysis.xlsx*.

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Heavy - Intermittent	Stadium, Theater, Place of Worship	250	80	6	0.10
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For example, a new efficient hand dryer replacing a baseline hand dryer at a large grocery store, with unknown cycles per day and unknown days per year:

$$\begin{aligned}\Delta kW &= ((2,036 - 1,066)/1000)*0.29 \\ &= 0.28 \text{ kW}\end{aligned}$$

FOSSIL FUEL SAVINGS

N/A

WATER AND OTHER NON-ENERGY IMPACT DESCRIPTIONS AND CALCULATION

N/A

DEEMED O&M COST ADJUSTMENT CALCULATION

N/A

MEASURE CODE: CI-MSC-EEHD-V02-230101

REVIEW DEADLINE: 1/1/2026

¹⁷³⁰ Guidehouse, Inc. Engineering Estimate, 2022

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¹⁷³² Occupancy based on Lighting HOU from Section 4.5, combined with days per year from Section 4.3.2.