

WISE STEPS INC.
SAFETY AND INDUSTRIAL HYGIENE CONSULTING
INDUSTRIAL HYGIENE REPORT

P.O. BOX 3895 SALEM, OREGON 97302
TELEPHONE: 503-585-4002 FAX 503-585-3317

TO: **JENNIFER HAYWARD, EHS SPECIALIST**

FROM: **KATHY ELLIS, WISE STEPS, INC INDUSTRIAL HYGIENE CONSULTANT**
REVIEWED BY: **DEETTA BURROWS, CIH**

PROJECT: **TESTING BACTERIA LEVELS PRE/POST HAND DRYER USE**

TESTING: **DECEMBER 18, 2009**
REPORT DATE: **DECEMBER 30, 2009**

Overview and Purpose

Staff have concerns over potential exposure to bacteria during hand drying using hand dryers in the restrooms. There is also a concern over the amount of noise the hand dryers produce.

Wise Steps was requested to test the air of the restrooms before and during use of the dryers using the amount of E.coli bacteria in the air to determine if hand dryers result in more airborne bacteria. Noise readings were taken during the use of the dryers. Ultrafine particle measurements were also taken during the use of paper towels and the hand dryers to quantify amount of aerosols and small particles emitted into the air during the drying process.

Test Results

Testing was done in two restrooms with hand dryers and two restrooms with only paper towels for hand drying. Test locations were:
B7 – Main floor restroom – Hand dryer
B3 – Towel dispense drying
Center Building – Hand dryer
B16 - Towel dispense drying

Bacteria tests

All tested restrooms during the drying process using air or paper towels resulted in a slight increase in airborne bacteria. The amount of bacteria in the air was insignificant using either type of drying method. The tests do not indicate the drying process results in exposure to elevated levels of E.coli.

Bacteria Test Results

Location	Before Hand Drying	During Hand Drying
	Total E.coli CFU/Plate	Total E.coli CFU/Plate
B7 Hand dryer	2	10
B3 Paper Towels	2	4
Center Hand dryer	0	6
B16 Paper Towels	1	8

Sound Level Exposures

Instantaneous sound levels were measured in each tested restroom before and during hand drying.

The hand dryers when in use increased the sound levels from the 46-48 decibel level to 94-95 decibels. The amount of noise while the hand dryers were used is significant, however, the amount of time of exposure should be less than 30 seconds so hearing loss would not occur.

Noise Levels

Location	Before Hand Drying	During Hand Drying
B7 Hand dryer	48-49 db	92-94 db
B3 Paper Towels	48 db	51-70 db
Center Hand dryer	46 db	88-95 db
B16 Paper Towels	58 db	71db

Ultrafine Dust (Particles/cc)

The test instrument used was an ARTI dust monitor that sizes and quantifies the amount of particles being measured in particles/liter. These measurements provide instantaneous data on the quantity and size of particles including aerosol droplets and paper.

The samples found more particles are in the air of the restrooms that have hand dryers and the amount of ultrafine particles does increase during the time the dryers are operating.

Hand Dryers

B7

	Ambient	During Hand Dryer Use
0.5 um	1676	1914
0.7 um	891	1073
1.0 um	629	769
2.0 um	415	520
5.0 um	9	42
10.0 um	0	1

Center – 4th Floor

	Ambient	During Hand Dryer Use
0.5 um	1540	1581
0.7 um	570	631
1.0 um	341	378
2.0 um	181	202
5.0 um	3	4
10.0 um	0	0

Hand Towels

B3

	Ambient	During Towel Use
0.5 um	851	1303
0.7 um	310	537
1.0 um	183	312
2.0 um	111	183
5.0 um	0	2
10.0 um	0	0

B16

	Ambient	During Towel Use
0.5 um	782	785
0.7 um	274	275
1.0 um	151	164
2.0 um	85	87
5.0 um	1	2
10.0 um	0	0

Laboratory Report

Test Location	Total E.coli CFU/plate
B7 Prior to hand dryer	2
B7 During use of dryer	10
B3 Prior to use of towels	2
B3 During use of towels	4
Center Prior to hand dryer	0
Center During use of dryer	6
B16 Prior to use of towels	1
B16 During use of towels	8