The Truth About Hot Air Hand Dryers

- The Myth -

A warm flow of air efficiently evaporating the moisture from washed hands, providing our valued customers and associates an agreeable and sanitary solution while reducing costs and protecting landfills, natural resources and the environment.

- The Truth -

Unsanitary - According to a University of Westminster study, London, England, at least six species of gut bacteria were isolated from the air flows of 63% of dryers tested - indicating possible fecal contamination. Furthermore, hot air dryers can deposit this harmful bacteria onto the hands and body and can be inhaled or blown into the eyes whenever the dryers are operating.

Inefficient - Hot air dryers require at least three times as long for one hand dry. Nearly half of the users end up wiping their hands on their clothes following dryer use - resulting in an unsatisfied experience and increasing chances of further contamination.

Expensive to own & operate - Besides the initial expense of purchase or lease, numerous moving parts, electrical components, frequent repairs, and continuous energy use all contribute to the excessive costs associated with hot air hand dryers.

Not Environmentally Friendly - Considerable energy is required to manufacture the numerous metal and electrical components of a hot air hand dryer, as well as continuous energy usage to operate the dryer. Many of the components are not recyclable. Today, the vast majority of paper towels are made with 100% recycled paper containing a high percentage of post-consumer content.

What the experts say about hot air hand dryers:

"Wet hands readily transfer pathogens to food, utensils and other surfaces. ***Eliminate all blow dryer systems*** from employee handwash stations. Research has demonstrated ***hot air drying is counter to good hand hygiene practices***. Select and install single-use paper towels that deliver soft, fast, one-sheet drying results."

"Ignoring handwashing as a priority is easy until a company is faced with a crippling outbreak of foodborne illness."

"Dry hands with fresh paper towel."

"Care should be taken to avoid contamination of hands after handwashing (paper towels or single use cloth towels should be used; if the faucet is hand-operated, the towel should be used to turn of the spigot)."

"***Avoid restrooms equipped with only air dryers*** as no one has time to thoroughly dry their hands and wet hands transfer germs much more effectively than dry hands."

"In a comparison of methods to test efficiency of hand drying for removing bacteria from washed hands, ***warm air drying performed worse than drying with paper towels***. Furthermore, air dryers may be less recommendable because of longer time needed to achieve dry hands, with a possible negative impact on hand hygiene compliance, and because of the aerosolization of waterborne pathogens."

"Ideally, drying of hands should be done by using individual paper towels."

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written by Emily Muhlhausen

"Patrons to this Penn Station restroom in New York unanimously preferred paper towels to hand dryers…"
"...even people who work for a company selling dryers don't use them."
"Paper towels consumed significantly fewer non-renewable resources than dryers…"

World Dryer, the hand dryer manufacturer, estimates that a fast-food restaurant switching from paper towels to dryers saves 34 trees. "Nonsense!", says Glen Whitman, an economics professor at California State University. Trees are a renewable resource, he pointed out, unlike the fossil fuels powering electric dryers. "Nobody goes around saying that cows will go extinct if we eat beef," Whitman said.

In a study conducted for this article, hand-drying choices were observed in two busy public restrooms in New York's Pennylvania Station. Results show that when given a choice, women (this reporter did not invade the men's room) prefer paper towels. In the first restroom, in a waiting area, both paper towels and electric dryers are available. Of the 17 women who used the facilities in 10 minutes, not one chose to blow their hands dry.

The second restroom, located in a busier concourse, offered only electric dryers. Thirty-one women entered and only 19 used the dryers. Of the rest, five wiped their hands on their clothing, three walked out with hands still dripping, and several did not wash their hands at all.

"There are many people who will choose not to wash their hands if there's an electric hand dryer. They're a deterrent to good hand-washing," said Jim Mann, executive director of the Handwashing for Life Institute, an industry partnership group that says it is "devoted to advancing the science of hand hygiene."

Paper towels offer an undeniable sanitary advantage by allowing restroom visitors to avoid contaminated surfaces, said Robert Brubaker, the program manager of the nonprofit American Restroom Association. "A lot of people really like to use paper to cover the door handle when leaving the restroom," he said.

HAND DRYING: STUDIES OF THE HYGIENE AND EFFICIENCY OF DIFFERENT HAND DRYING METHODS

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Studies carried out since 1993 out at the University of Westminster have consistently shown that warm air dryers do not perform as well as paper towels or continuous cotton towels in terms of speed, drying efficiency, hygiene and microbial environmental contamination. This summary highlights the main findings and conclusions of these studies.

Previous studies on hand hygiene have mainly concentrated on the effect of hand washing and the type of soap on the bacterial contamination of the hands. However, it has been shown that the hand drying method is as important as the hand washing method in reducing the number of bacteria on the hands and in minimizing the risk of transfer of these organisms to food and other objects in the home and after using public toilets.

The steady increase in the incidence of food poisoning cases in the UK and the 1996 E. coli outbreak have increased interest in all aspects of food hygiene and have helped to demonstrate the importance of hand hygiene in wholesale, retail, catering and domestic situations.

Observations of peoples' hand washing and drying habits under natural conditions have been carried out. The results have shown that disposable paper towels and continuous cotton towels are a much quicker and more efficient means of drying the hands than warm air dryers. People rarely use warm air dryers long enough to ensure more than 55-65% dryness and often complete drying by wiping their hands on clothes, etc.

Microbiological studies have shown that using towels after washing helps remove bacteria from the hands and reduces general bacterial counts by an average of 58% (paper) and 45% (cotton). However, in controlled studies warm air dryers were found to significantly increase general bacterial counts on the hands by an average of 255%, with some types of bacteria showing greater increases (e.g. 438% rise with some skin and gut bacteria).

Bacteria have been isolated from the air flow, outlet nozzle and air inlet of warm air dryers in nine types of location (including hospitals, eating places, railway stations, public houses, colleges, shops and sports clubs). Bacteria were found to be relatively numerous in the air flows and on the inlets of 100% of dryers sampled and on 97% of the surfaces of nozzles. Bacterially contaminated air was found to be emitted whenever a warm air dryer was running, even when not being used for hand drying. Staphylococci and micrococci (probably from skin and hair) were blown out of all of the dryers sampled, with 95% showing evidence of the potential pathogen Staphylococcus aureus. At least 6 species of gut bacteria (Enterobacteriaceae) were isolated from the air flow of 63% of dryers, indicating possible contamination by faecal bacteria. The presence of these bacteria in the air flow of such a high proportion of warm air dryers and the increase in the numbers of these bacteria on the hands of the average user demonstrate the potential for the spread of food poisoning organisms such as salmonellas and E. coli.

Whilst some studies have confirmed the results summarized here, other studies differ in their appraisal of the performance of warm air dryers. However, any differences can usually be explained by the fact that these studies have generally used brand new dryers in artificial laboratory situations and/or unusually long drying times. The studies carried out by the University of Westminster used warm air dryers in real locations and drying times that were realistic.

It is suggested that the use of warm air dryers should be carefully considered on hygiene grounds, especially in sensitive locations such as clinics, hospitals, catering establishments and food preparation areas.

General Conclusions:

The studies have shown that on average, warm air dryers do not perform as well as paper or cotton towels with any of the assessments of hand drying efficiency that were tested, i.e.

- **Speed -** warm air dryers are slower than towels at drying the hands
- **Drying Efficiency -** in normal usage warm air dryers do not dry the hands as well as towels
- **Hand Hygiene -** in normal usage the number of bacteria on the hands is increased by warm air dryers but reduced by towels
- **Environmental Contamination** - bacteria are emitted in the air flow of warm air dryers

Table 1: Main Findings and Conclusions

#			Paper Towel	Cotton Towel	Warm Air Dryer	Conclusion
1	Average time people spend drying their hands	MEN	12 secs	8 secs	20 secs	On average, people spend approximately twice as long drying hands using a warm air dryer as they do using paper or cotton towels.
		WOMEN	9 secs	8 secs	25 secs	
2	Percentage dryness achieved after average drying time	MEN	96%	94%	55%	In normal usage, warm air dryers do not achieve the same dryness of the hands as paper or cotton towels.
		WOMEN	93%	94%	68%	
3	Average time to achieve 95% dryness	BOTH SEXES	12 secs	10 secs	43 secs	Warm air dryers take approximately 4 times as long as towels to achieve the same dryness of the hands. Most people use dryers for considerably less than 43 seconds.
4	Average time that a warm air dryer remains switched on (dryer cycle time)		N/A	N/A	30 secs	Most people do not use the full drying time (see point 1 above), but even if they did, hands will only be about 80% dry.
5	Average temperature of flow of warm air dryer		N/A	N/A	55º C	This temperature is insufficient to kill most bacteria emitted in the air flow of dryers
6	Percentage of people who dry their hands on clothes, hair, etc. after using drying method	MEN	0%	20%	43%	A high proportion of people finish drying their hands by wiping them on their clothes, hair, etc. after using warm air dryers. This is probably because hands are not usually as dry after using a warm air dry as after using paper or cotton towels.
		WOMEN	5%	4%	39%	
7	Average change in general bacterial numbers on fingertips after drying	BOTH SEXES	-58%	-45%	+255%	Paper and cotton towels help reduce the numbers of bacteria on the hands. Warm air dryers significantly increase the numbers of all types of bacteria, including potentially pathogenic types. This is mainly due to the inadequate drying of the hands and also to bacteria emitted in the air flow.
8	Average bacterial counts in 25-second air flow and swab counts from the outlet nozzle and air inlet of warm air dryers	AIR FLOW	N/A	N/A	153	Paper and cotton towels show negligible levels of bacteriia contamination. Most warm air dryers are contaminated with bacteria; some very heavily. Bacteria are blown out of the dryers onto the hands of users, into the general environment and can also be found in the outles and inlets.
		OUTLET			540	
		INLET			1980	
#			Paper Towel	Cotton Towel	Warm Air Dryer	Conclusion