

## SAFE, HIGH PERFORMANCE BATTERY-POWERED BURNISHERS

Propane-powered floor burnishers have traditionally been used due to their low acquisition cost, high pad speed and continuous run time. However, recent advances in battery-powered burnisher technology have enhanced the performance and productivity of battery-powered burnishers, so that today they provide a beautiful high-gloss finish.

Today's battery-powered burnishers are ergonomically designed and offer longer run time, with more power and improved pad speed. They also are ultra quiet, require minimal maintenance, and offer excellent health and safety benefits when compared to propane-powered burnishers.

### Health Benefits

Propane-powered burnishers create indoor air quality problems due to propane fume emissions that make them difficult to use when people are present, limiting when they should be used. These burnishers are incredibly loud (ranging as high as 89 dBA) for operators, patients, students and customers, and typically feature poor dust containment. Burning propane indoors degrades indoor air quality and incomplete combustion of propane can increase airborne particles<sup>1</sup>, the main ingredient of haze, smoke and airborne dust.

According to the U.S. Environmental Protection Agency (EPA), short-term exposures (as short as a few hours) to particles can aggravate lung disease, causing asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections. Doctors define asthma as a "chronic inflammatory disease of the airways" that can cause any or all of the following – shortness of breath, tightness in the chest, coughing or wheezing. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias<sup>2</sup>.

From 1999 to 2004, an average of 439 persons died annually in the United States from unintentional, non-fire related CO poisoning<sup>3</sup>. One of those victims, was a 50-year-old janitor who was found dead in an office building where he was cleaning floors with a propane-powered buffer. The victim was about 6 feet from the buffer, which was still running in idle mode. No external doors or windows had been opened to allow proper

ventilation. Following a blood test, the medical examiner declared the cause of death to be carbon monoxide poisoning<sup>4</sup>.

Numerous studies have shown that airborne particles (either solid or liquid) cause serious health problems and negatively impact society. Scientists have found a correlation between exposure to airborne particles and increased hospitalizations for asthma attacks, worsening of lung disease, chronic bronchitis, and heart damage<sup>5</sup>.

In addition, according to the Centers for Disease Control and Prevention (CDC), Americans are suffering from asthma in record numbers, and nearly one in 10 children – or more than 7 million – and almost one in 12 Americans of all ages now has asthma<sup>6</sup>. The prevalence of asthma in Canada has increased over the last 20 years and it is estimated that more than 3 million Canadians currently have asthma<sup>7</sup>.

Asthma is one of the leading causes of school absenteeism. According to the CDC, in 2008 asthma accounted for an estimated 14.4 million lost school days in children with an asthma attack in the previous year<sup>8</sup>. Using battery-powered burnishers can help officials in healthcare, educational and retail facilities do everything they can to improve indoor air quality by reducing potential asthma triggers.

According to the EPA, a growing body of scientific evidence has indicated that the air within homes and other buildings can be more seriously polluted than the outdoor air in even the largest and most industrialized cities. Other research indicates that people spend approximately 90 percent of their time indoors. So for many people, the risks to health may be greater due to exposure to air pollution indoors rather than outdoors<sup>9</sup>.

Unlike propane-powered burnishers, battery-powered burnishers have no emissions, so there are no worries about carbon monoxide (CO) poisoning. Exposure to CO can reduce the oxygen-carrying capacity of the blood. People with several types of heart disease already have a reduced capacity for pumping oxygenated blood to the heart, which can cause reduced oxygen to the heart (myocardial ischemia), often accompanied by chest pain (angina), when exercising or under increased stress. For these people,

short-term CO exposure further affects their body's already compromised ability to respond to the increased oxygen demands of exercise or exertion<sup>10</sup>.

CO poisoning is a frequently reported incident associated with propane powered floor care machines, and is caused by excessive exhaust emissions. Symptoms of CO poisoning are headache, dizziness and nausea. A major cause involves engines with poor preventive maintenance practices, usually those with dirty air filters and machines operated in confined areas without adequate ventilation. Another cause may be substandard, inexpensive machines with no emissions control technology and improperly set carburetion.

Propane burnishers cannot be safely used in all facilities. For example, small enclosed areas with low ceilings and poor air circulation are not ideal places to use propane burnishers, because carbon monoxide can build to dangerous levels. CO detectors should be used whenever propane-powered burnishers are used. However, never rely solely on CO detectors as a substitute for regular inspection and maintenance of propane-powered burnishers.

High-efficiency particulate air (HEPA) filters on advanced Tennant and Nobles battery-powered burnishers provide 99.97 percent filtration at 0.3 microns to further enhance safety for employees, visitors and guests. This excellent dust control eliminates the need for follow-up dust mopping to remove dust on floors and products.

Occupational Safety and Health Administration (OSHA) standards specify the noise limit of higher than 90 dBA permissible exposure limit (PEL) for more than eight hours a day can prove hazardous to human health. Propane-powered floor burnishers have noise levels ranging as high as 89 dBA. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise-induced hearing loss<sup>11</sup>. Ultra quiet 63-65 dBA battery-powered burnishers maintain safe sound levels for operators and can be used anytime without affecting patients, students or guests.

### Safety Advantages

Overfilled propane cylinders can result in fires, and increasingly building service contractors (BSCs) are required to store their propane cylinders off-site, and must transport and install propane cylinders each time they burnish.

This results in more time spent handling and transporting propane cylinders, and



potentially increases risk of accidents. Some educational facilities no longer allow outdoor propane cages due to the perceived safety threat of storing flammable gas on campus.

The need to transport, store and handle propane cylinders – plus provide appropriate training for employees assigned to handle these tasks – can significantly increase the cost of using propane-powered burnishers.

Depending on the size and configuration, each propane storage cage can cost hundreds or thousands of dollars. Aluminum cages are virtually maintenance free, but typically cost more than twice as much as a comparable steel propane storage cage that will rust and degrade over time.



Handling, transporting and storing propane cylinders, plus purchasing and maintaining propane storage cages increase costs and take time away from performing the actual burnishing. There also is the very real possibility that thieves using bolt cutters can damage the propane storage cages and steal propane tanks worth hundreds of dollars. For operators who rely on propane, this denies them the ability to perform their jobs, and incurs more costs to repair and replace damaged and/or lost assets.

There also are training costs to consider. The National Fire Protection Agency (NFPA) Standard for Storage and Handling of LP Gas (NFPA #58) requires that all personnel employed in the handling of propane gas be trained in proper handling and operating procedures<sup>12</sup>. It also requires them to carry a written certification from their employer or training supervisor to attest to such training.

Compliance Guide No. OSHA 30 sets minimum requirements for the storage, handling and transfer of propane and other LP gases, and directs that affected employee training records should be periodically reviewed to verify that employees assigned LP-gas storage or handling tasks are qualified as competent persons<sup>13</sup>.

Propane storage cages must be properly labeled for safety and comply with NFPA #58 standards for storing propane. The U.S. Department of Transportation (DOT) also has established regulations regarding the safety of fuel cylinders including those used on propane-powered floor care machines.

Local and state laws limit the number of cylinders and the amount of propane that can be transported in closed-bodied vehicles such as passenger cars and vans. Check state and local codes to learn more<sup>14</sup>.

## Maintenance

Unlike low maintenance battery-powered burnishers, propane-powered burnishers require periodic maintenance and emissions checks to ensure they fall within the guidelines established by OSHA for hazardous gasses. Maintenance and operating costs for propane-powered burnishers are much higher than battery-powered burnishers. Performing this expensive maintenance may also limit the availability of a propane-powered burnisher for work.

Maintenance for propane-powered burnishers includes periodic oil changes, air filter and spark plug checks, and engine pulley belt adjustments. Grease fittings should be serviced with a grease gun; the pad driver must be checked for wear or slippage; and wheel bolts, engine mount bolts and handle bolts all must be checked and tightened. Regulators and fuel lines also need close inspection to prevent fuel leaks.

To obtain maximum engine life, some propane-powered burnishers may recommend engine oil changes as frequently as every 20 hours of operation, and the engine should never be allowed to run more

than 100 hours between oil changes. Propane-powered burnishers should always be inspected, repaired and serviced by a qualified technician. Any maintenance work on propane-powered burnishers should be concluded with an emissions check, to ensure emissions fall within acceptable OSHA guidelines for hazardous gases.

## Flexibility

Propane-powered burnishers are generally large and heavy, making them difficult or impossible for some staff members to handle. This limits the staff that can use propane-powered burnishers compared to battery-powered burnishers.

Because Tennant's larger battery-powered burnishers are self-propelled, they are easier to move/maneuver, so any staff member can use them. This enables greater flexibility in staffing.

## Summary

Battery-powered burnishers provide high-gloss results, and enhance health and safety for operators, students, patients, staff and guests by eliminating emissions and significantly reducing potentially hazardous dust, fumes and noise. Powerful, 36-volt battery-powered systems ensure long run time for improved productivity, and optimized down pressure and pad speed deliver high performance burnishing results.

For more information on battery-powered burnishers, contact your Tennant sales representative or visit [www.tennantco.com](http://www.tennantco.com).

## Sources

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