

Environmentally Preferable Floor Machines

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When determining whether a machine, a chemical product or a procedure is environmentally preferable, it is sensible and reasonable to consider the "big picture." Environmental preferability is a relative term not defined in black-and-white absolutes; therefore, knowledge of all factors involved coupled with a common sense evaluation will usually result in an optimum selection.

For example, most of us look at ethanol as an environmentally preferable alternative to gasoline. However, if we look at the "big picture" use of ethanol as an automotive fuel, we would further prefer to use ethanol produced from sugar beets rather than from corn since the petroleum required to produce a gallon of ethanol is significantly less with sugar beets. Sugar beets would, therefore, be considered to be a "greener", more environmentally preferable source of ethanol. If we only look at ethanol versus gasoline at the fueling station, we would miss this point entirely.

A COMMON MISCONCEPTION

There is a common misconception that battery-powered floor machines are inherently environmentally preferable to propane-powered floor machines because the former are considered to be free of emissions. This premise is based on the observation that propane-powered floor machines produce emissions at the point of use while battery-powered floor machines apparently do not. But point of use is not the entire picture.

Propane-powered machines produce emissions at the point of use consisting primarily of carbon dioxide and water plus small amounts of carbon monoxide, nitrogen oxides, and fine particulate matter. The latter 3 components are held to very low levels by the use of specialized carburetion and catalytic converters akin to those used in automobiles. All propane-powered floor machines have to meet strict EPA standards for sale in the US and CSA standards in Canada and most meet the even stricter California Air Resources Board (CARB) standards required for sale of the machines in that state.

While battery-powered machines may be free of gaseous and particulate emissions at the point of use, there are certainly emissions at the point where electricity is generated that is subsequently used to recharge the batteries. At present, electricity is generated primarily from the burning of coal or natural gas, from hydroelectric turbine generators or from nuclear reactors. Most electricity in the US is generated by burning coal which in addition to producing carbon dioxide, water, carbon monoxide, nitrogen oxides and fine particulate matter also yields sulfur dioxide (a major contributor to acid rain) and large amounts of solid waste in the form of ash.

Unfortunately, there is no hard data to clearly indicate precisely which is the greater source of emissions: (a) the total of numerous individual propane-powered machines; or (b) a single power plant producing electricity for the same number of battery-powered machines. Electricity will become "greener" over time as more and more is generated by wind, photo voltaic and other non-combustion sources; but for now the combustion of propane is significantly "cleaner" and "greener" than the combustion of coal.

Yet another environmental aspect worth considering is that propane is distilled primarily from petroleum and natural gas sources while coal is obtained both from underground and open pits mines. Which of these sources is environmentally preferable is debatable.



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BATTERY TYPES

The most commonly used deep cycle batteries are the lead-acid type with dilute sulfuric acid as the electrolyte. Contact of the electrolyte with human tissue is possible since proper maintenance requires that the level of electrolyte be checked each time the batteries are recharged. This acid is very corrosive to many materials and to the skin and eyes. Hydrogen gas is also produced during the battery recharging which can be a fire hazard unless the recharging area is well ventilated. Moreover, some lead compounds have been identified as potential carcinogens.

Operators are not exposed to electrolyte or lead in sealed gel batteries which makes this battery type environmentally preferable to non-sealed lead-acid batteries. However, gel batteries are on the order of 75-100% more expensive than non-sealed batteries and typically do not last as long. Economic factors should not be ignored when evaluating environmental preferability since the use of a greater number of batteries would require more resources to manufacture than would a smaller number of batteries that last longer.

MACHINE PRODUCTIVITY

One thing is certain when comparing propane-powered and battery-powered floor machines. Propane-powered machines have significantly higher productivity rates as a direct result of the effective horsepower available from these machines. A typical propane-powered burnisher with a Kawasaki engine will have at least 10 horsepower (and usually more) available while the typical battery-powered machine will have less than 3.5 horsepower (usually much less). The greater available horsepower in a propane-powered burnisher allows the use of higher pad pressures so that the gloss level desired can be achieved in less time when compared to a battery-powered machine. Higher pad pressures can be achieved on some battery-powered burnishers but at the sacrifice of machine run-time which is significantly shortened due to the increased power drain on the batteries. The greater available horsepower for the propane-powered burnisher also allows for the use of larger pad sizes, more aggressive pads and higher pad speeds, which further enhances productivity.

The other major productivity advantage that a propane-powered machine enjoys is essentially unlimited run time interrupted only for a few minutes to change the propane cylinder. A battery-powered machine, on the other hand, typically runs from 1-4 hours (depending on the factors cited above) and then has to be recharged for 10-12+ hours before it can be run again.

The only clear advantage that favors battery-powered machines over propane-powered machines is noise level. Battery-powered machines typically have noise levels in the range of 65-70 dBA while propane-powered machines are in the range of 85-87 dBA. This makes battery-powered machines more environmentally preferable in hospitals and nursing homes. However, for non-critical applications, a noise level of less than 90 dBA is not considered to be excessive per US OSHA standards and does not require hearing protection even over an 8-hour period.

SUMMARY

With the complexity of the variables involved, it is fallacious to categorically conclude that battery-powered machines are more environmentally preferable than propane-powered machines. Objective consideration of the "big picture" of emissions combined with common sense regarding productivity factors would indicate that the opposite is most likely the case.

The bottom line is that we should continually be seeking to get the job done utilizing the most environmental preferable solution possible. Using any product that we consider to be environmentally preferable but which does not get the job done properly is actually the worst case of all. By doing that we are simply wasting resources (and time) without achieving acceptable results.

shine on.

The logo for Pioneer Eclipse features the word "Pioneer" in a black, serif font, followed by a red arc that curves over the word "Eclipse", which is written in a black, cursive font.

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