Choosing Washers and Dryers

New washers and dryers use less electricity and less water, and clean better than machines just a few years old

BY SEAN GROOM

The washer and the dryer are go-to appliances that you rely on day in and day out without much thought. When you need fresh-smelling, clean clothes, you run a load of laundry. However, something eventually fails, and then you find yourself thinking a lot about washers and dryers. For me, this was last year.

The first thing I learned was that the gleaming front-loading appliances—the ones with oversize porthole windows, sensual curves at every edge, designer colors, and the capacity to wash 31 bath towels at a time—cost more per machine than I'd budgeted for the set. As I researched laundry-machine technologies, features, and relative costs, I developed a plan for choosing a laundry set: My first priorities were energy and water efficiency. The washer would have to exceed basic Energy Star standards with either a CEE Tier 2 or Tier 3 rating (see facing page). Then I decided what wash cycles and convenience features I needed to have. Colored cabinets typically add $100 per machine, so white it was. Five basic wash functions would be plenty, rather than paying several hundred dollars more for a machine with between nine and 14 cycles. My dryer would be the matched mate to the washer. Once I narrowed the list down to two or three options, I checked consumer magazines and online consumer reviews for reliability: I wanted to be able to take the laundry machines for granted instead of scheduling my day around service calls. This turned out to be a pretty good framework for choosing a washer and dryer, and I found an efficient LG washer and dryer pair that did everything I needed for $1000. The units I bought have since been replaced with models WM2140CW and DLE2140W, but the shopping lessons remain.

Sean Groom is a contributing editor. Photos courtesy of the manufacturers.

FIRST, CHOOSE THE WASHER

To my mind, washers without the Energy Star label should be ruled out at the start. The Energy Star program sets efficiency standards for both energy and water in the washing-machine category. Also called high-efficiency machines (marked with an "h•e"), they come in both front-loader and top-loader styles.

The two relevant efficiency figures for a washing machine are labeled MEF and WF. MEF, which stands for modified energy factor, is a measure of the energy used by the washing machine, the energy used to heat the water, and the energy used to dry the clothes. The last component, drying energy, can't precisely measure the energy consumption of a dryer. Instead, it's a calculation measuring spin-cycle effectiveness. It measures the moisture left in clothing because less moisture means that less energy is needed to dry the clothes. The higher the MEF, the better. Energy Star washers have an MEF of at least 2. (Federal rules state that all washers must have an MEF of at least 1.26.)

Water factor (WF), the other efficiency measure, is a measure of the water used per cycle divided by the size of the washer. It allows a relative measure of water used for a given quantity of clothing. With this metric, lower is better, and Energy Star machines must be less than 6. (Federal rules cap WF at 9.5.)

Not all Energy Star-rated washing machines are equal; some go well beyond the minimum-qualifying threshold. To see the relative performance of high-efficiency washers, check the Consortium for Energy Efficiency (CEE) category. CEE (a partnership of manufacturers, the Department of Energy, utility companies, and environmental groups) ranks qualifying appliances in three tiers: Tier 1 meets basic Energy Star standards; Tier 2 is awarded to machines with at least MEF 2.2 and WF 4.5; and Tier 3 is for washers with MEF 2.4 and WF 4.0 or better.

My new front-loading washer replaced a few-years-old, no-frills, standard top loader that you can purchase for about $320. The new washer uses only about 160 kwh/yr of electricity compared to 427 kwh/yr for the old machine.

The first thing I noticed was that towels and jeans were merely damp rather than wet at the end of the front loader's spin cycle. Spin cycles in excess of 1000 rpm and as high as 1600 rpm wring clothes nearly dry compared to a standard top loader spinning at about 600 rpm.

Cycles in high-efficiency machines don't run for preset durations. Instead, sensors measure water content and load balance, and calculate spin speed and duration to reduce dryer run-times.

Clean clothes with half the water

Not only do they extract more water from clothes by the end of the cycle, but high-efficiency machines also use dramatically less water—about 14 gal. per load opposed to an average of 27 gal. for standard washers. That's well and good, but will your clothes be clean? The short

Model: *LG WM2140CW*
Size: *3.5 cu. ft.*
Price: *list $729/street $699*
Efficiency: *CEE Tier 3*

Quiet efficiency

With high-speed spin cycles (1100 rpm for this model) that wring clothes nearly dry, front loaders save money by reducing drying time. As laundry machines have migrated from basements to living spaces, quiet spin cycles have become more important. Sensors on the drum's suspension system monitor vibration and adjust speed and cycle duration to maximize water removal and minimize noise. By slowly ramping up the spin speed, these washers ensure that clothes distribute evenly. LG and other manufacturers also use a handful of ball bearings as counterbalances that rotate within an outer chamber of the tub to reduce vibration, especially on wood-framed floors.

Model: *Samsung WF330ANW*
Size: *3.7 cu. ft.* ***Price:*** *list $899/street $899*
Efficiency: *CEE Tier 3*

Hot wash cycles worthy of the name

An increasing number of washers control water temperature with an internal water heater to ensure that wash cycles reach the target temperature. Because high-efficiency machines fill in low-volume spurts, the cold water in the pipe between the household water heater and the washer can turn a hot cycle lukewarm. With a tankless water heater, the flow rate may not be enough to activate the water heater for much of the draw. The internal water heater can raise the water temperature to 150°F to kill bacteria and allergens with an NSF-certified sanitize cycle.

Cleaned and dried in the washer

Many higher-end washers continue to tumble clothes periodically and blow fresh air over them when the cycle ends to prevent the pile of damp clothes from picking up stale odors. GE's top-of-the-line front loader lets you run loads of up to six or eight light items and dries them overnight in the washer. Mount the washer on a SmartDispense pedestal ($630), and it will automatically dose each load with detergent and fabric softener from its store of 700 oz. of detergent and 95 oz. of fabric softener.

Model: *GE PFWS4605LMG* ***Size:*** *4.3 cu. ft.*
Price: *list $1499/street $1400*
Efficiency: *CEE Tier 3*

answer is yes, and in most cases, they will be cleaner.

You need a combination of three things to clean clothes effectively: water temperature, detergent, and motion. High-efficiency machines—both top loaders and front loaders—are engineered without a tall post in the middle of the tub (called an agitator) that creates motion in standard top loaders.

In a standard machine, the tub fills with water, and the agitator swishes back and forth to move the clothes in the water and cycle them from the top to the bottom of the pile. Clothes are cleaned as they move in the water and against each other. When the spin cycle starts, clothes with straps and long, thin articles tend to get wrapped around the agitator. It's fairly easy for the load to become unbalanced, stopping the cycle.

A high-efficiency top loader is oriented on a vertical axis like a standard washer, but it trades the agitator for an impeller, which looks like someone chopped off the business end of an agitator. Cycling both clockwise and counterclockwise, the impeller creates a water action that pulls clothes from the bottom of the tub to the top of the water and out toward the edges in what one product engineer describes as a "blooming flower" motion. Because high-efficiency machines use less water and concentrated detergent, the impeller doesn't require as much motion to move the water, and the space opened up inside the tub by removing the agitator allows more room for clothes to circulate without as much rubbing against one another. It's a much more efficient, gentler means of washing.

Because a front loader turns the washtub on the horizontal axis relative to a top loader, the tub motion pulls clothes out of the water and enlists gravity to drop them back into the water. This tumbling action pushes and pulls the detergent and water into fabric repeatedly and is the most effective means of creating the mechanical action for laundering clothes. For example, Whirlpool's Duet front loaders use about 10% less water and 15% less energy than its high-efficiency Vantage top loader, according to senior brand manager Brett Oleson.

While standard-efficiency top loaders automatically fill the tub to match the load size you've chosen, high-efficiency washers rotate the tub a turn or two at a time and inject small quantities of water into the tub. During the interludes, sensors weigh the load and measure the amount of water absorbed by the clothes. This creates a fairly accurate picture of the types of fabric in the load. Coupling this information with the cycle you've chosen, the machine starts to fine-tune the duration of each part of the cycle and the amount of water it will use. In higher-end machines, the detergent is metered out across the entire water fill, while less expensive washers front-load the detergent injection. Either way, the detergent is mixed in the fill stream and is spread evenly throughout the load rather than poured onto clothes before starting the machine, as it's done with many standard top loaders. High-efficiency machines generally also have dispensing trays that can inject bleach or OxiClean-type products into the wash at appropriate times.

Direct drive or belt drive?

Washing machines spin the tub either with a motor-driven belt or a direct-drive motor. Belt-drive systems are as old as motor-driven washing machines. The simple design makes it easy and cheap to repair, often by the owner. Critics point out that the spin speeds are lower and

Traditional loading, bigger capacity, less water

High-efficiency top loaders are much more efficient than standard top loaders. Using an impeller and self-sensing water level, this machine has a water factor (WF) of 4 and uses about 18 gal. for a full load—higher than many front loaders but much less than the 40 gal. a non-Energy Star washer can use. The soft-closing top lid can't slam, and with spin speeds up to 1100 rpm, this washer wrings water from the load as well as a front loader.

Model: *LG WT501CW* ***Size:*** *4.5 cu. ft.*
Price: *list $949/street $900*
Efficiency: *CEE Tier 3*

sometimes noisier. Bosch, however, relies on belt drives in all its models, and its efficiency across the brand is unrivaled.

A direct-drive motor can be thought of as a magnetic drive. Supporters say that because there are no touching parts, there are fewer opportunities for things to break and that direct-drive motors can achieve the highest spin speeds. When something does break, it's more difficult and expensive to repair. Rather than choosing a particular type of motor, pick a brand with a 10-year warranty.

Features for every wash

High-end washers offer up to two dozen cycles, each with several customizable permutations. You can certainly get by with five basic cycles and still have clean clothes—I took that route to keep down costs. But you may find conveniences worth the cost.

Quick question: Does hot water or cold water better remove grass stains? What about dried tomato sauce? I confess ignorance on the subject, and laundry manufacturers suspect I'm not alone.

Because your happiness with your washer depends on whether clothes come out clean, regardless of the cycle chosen or whether stains were pretreated, manufacturers create features that try to ensure stains are removed.

One approach is Whirlpool's onboard stain resource, available on its premium front-loader (Duet WFW97HEXL, $1500) and top-loader (Vantage WTW7990XG, $2000) models. You can look up different stains on the LCD display, and the machine recommends temperature and cycle settings.

Bosch's approach is to throw the whole arsenal of cleaning tricks at the entire load. Add the stain-removal option to a cycle, and the washer runs an automated program designed to remove 14 common stains. Starting with cold water, the washer's internal water heater steps through a range of carefully calibrated temperatures. It holds each temperature for three minutes before raising the temperature to the next setting so that the range of temperature and detergent combinations attacks the stains.

Many washer models have added steam cycles as a stain-removal tool. In my interviews with company product managers, it became clear that not every manufacturer agrees that steam offers cleaning benefits. Those companies that offer steam cycles point out that steam is excellent at removing oil-based stains, especially skin oils that show up on shirt collars. Steam cycles are offered on higher-end machines, and you'll have to spend at least $1000 for one.

Companies that don't offer steam cycles claim it makes little sense to add a cloud of steam to a wet environment when washers already offer high-temperature wash cycles. Among these very hot cycles, also found only on more expensive models, are allergen and sanitize cycles. Designed to kill or remove nuisances like dust mites and pet dander with 150°F water, these cycles are great for bedding if there are allergy sufferers in the house.

One of the more innovative features offered on higher-end machines is an overnight "wash-and-wear" cycle. If you really need a particular outfit in the morning, you can toss it in the washing machine on your way to bed, and in the morning, the clothes will be washed and dried without switching machines.

After the normal wash cycle is complete, the tub continues to spin while a stream of room-temperature air is pushed through the tub. The moist air is vented into the room. This feature works only on very small loads of less than six or eight items, and it works best with lightweight hydrophobic materials such as those used for workout gear.

A wash cycle for every item

With 12 automatic cycles, 14 specialty cycles, and 16 adaptive wash actions, there's an option for every garment and every stain. The large, color LCD display has an encyclopedic resource where you can look up the best way to treat stains. There's even a hand-wash option that gently rocks the tilted tub rather than spinning it to clean the most delicate fabrics. A cool feature about this Duet model is that you can open the door and add clothes after the cycle starts. Once the cycle has started on front-loader models, the door can't be opened.

Model: *Whirlpool Duet WFW97HEXW*
Size: *4.3 cu. ft.* ***Price:*** *list $1600/street $1400*
Efficiency: *CEE Tier 3*

Worry-free leak protection

Two of Bosch's full-size model washers feature Aquastop, a leak-protection system. The double-walled supply lines contain water if the inner hose fails, and a shutoff valve stops the water supply. Also, if a sensor detects water in the bottom of the machine, it pumps water out to the standpipe and shuts down the machine. The 800 series shown here uses 13 gal. of water for a full cycle and has a sanitary function that uses an internal water heater to raise the water temperature to 170°F.

Model: *Bosch WFVC844PUC* ***Size:*** *3.3 cu. ft.*
Price: *list $1649/street $1400* ***Efficiency:*** *CEE Tier 3*

DRYERS SHOULD KNOW WHEN TO STOP

American consumers don't have the benefit of an Energy Star label or even energy-guide label to help them choose the most efficient dryer. That's because there aren't big efficiency differences between dryers of the same size. If you're serious about using less energy, and aren't willing to rely on a clothesline, check Energy Star in Canada's energy-use listings (www.oee.nrcan.gc.ca/energystar).

Regardless of whether a dryer runs on electricity or natural gas, the most important feature to look for is a moisture sensor. This little bar in the drum registers the water content of the fabric as the tumbling clothes slap against the bar. You decide the air temperature, and the moisture sensor controls the cycle duration. Once the clothes are dry, the sensor shuts the dryer off, reducing unnecessary wear on your clothes.

You can "see" the moisture sensor in action by watching the dryer's time-remaining display. When a dryer begins a normal cycle, the display will show something like 50 minutes remaining. About 10 minutes later, however, the display might show 15 minutes remaining. The dryer's computer updates the cycle duration based on the amount of moisture left in the clothes. This uses less energy than the traditional approach of having each cycle run for a set amount of time.

The presence of a moisture sensor generally means clothes are dry when the cycle is done, saving you the hassle of running another cycle. Occasionally, with large, bulky items such as heavy blankets, you'll find damp portions within folds after the cycle is done because these portions can't hit the moisture sensor. Some dryers also monitor the incoming and outgoing air temperature to prevent this. Damp fabric in the load reduces the air temperature. If the outgoing air is cooler than the incoming air, the dryer will continue running even if the moisture sensor indicates that the load is dry. Air-temperature monitoring is beneficial for small loads, too, because the clothes won't often hit the moisture sensor.

Wrinkle-reducing options

Dryers should treat clothing gently and eliminate wrinkles. The moisture sensor limits the amount of hot air clothes are subjected to. Additionally, look for—and use—cycles that have a cool-down feature (often called perma-press). Working in conjunction with the moisture sensor, the cool-down function turns off the heating element for the last portion of the cycle and uses the residual heat to warm the air. This reduces fatigue on fabrics, saves a bit of energy, and can reduce wrinkles on some fabrics.

Bosch tries to improve fabric care by slightly decreasing air temperature and increasing air volume. The entire back of the drum is perforated for greater airflow, whereas a typical dryer has a small cluster of holes for an air inlet. Each manufacturer touts features in its drum

No duct needed

Condensing dryers capture and store or drain moisture rather then venting hot, moist air to the outside. They are generally used in small apartments and town houses where venting is difficult. This dryer has a compact 24-in.-wide cabinet and is designed to be stacked with an integrated outlet for the washing machine. The condensate is pumped to the standpipe, although other models collect the water in a container that can be emptied manually. To prevent wrinkles from developing, this dryer continues to rotate the drum at specific intervals for up to two hours after the cycle ends.

Model: *Bosch WTE86300US*
Price: *list $1249/street $990*

Is bigger better?

In an ideal world, washer and dryer sizes would be described in meaningful terms. Instead, they're described in cubic feet. (At least the industry standardized its methodology in 2011 so that sizes are comparable across brands.) Even worse is the convention of describing the capacity of a washer as the number of pounds of clothes it holds. This may be why manufacturers resort to marketing copy like "Wash up to 31 bath towels in a single load." (Great, if you're running a hotel.)

When choosing a washer size, consider whether your household tends to do small loads frequently or large loads just a few times a week. It's most efficient to run full loads, so choose a smaller machine if you do frequent, small loads and a large machine if you wait for dirty clothes to pile up.

If your old washer has just died or is on its last legs, it's likely 10 to 12 years old. In the early 1990s, the largest washers were between 2.8 and 3.0 cu. ft. These days, washers under 3.0 cu. ft. are considered small, 3.0 to 3.5 cu. ft. medium, 3.5 to 4.0 cu. ft. large, and over 4.0 cu. ft. extralarge. If you've been doing multiple large loads on wash day, a 4.0-cu.-ft. or greater capacity washer could reduce the number of loads.

design that make it gentle on fabrics, whether it's the shape of the carry arms or the number of seams between sections of the drum.

Clothes acquire wrinkles and creases when they sit in the dryer after the cycle ends. Starting with dryers priced around $650, you can find wrinkle-prevention cycles that tumble the load intermittently after the dryer has stopped.

Steam also has found a place in dryers as a way to keep the iron on the shelf and to reduce trips to the dry cleaner. Again, it's only in the more expensive machines, and you can expect to pay at least $1000 for a dryer with a steam cycle. Manufacturers use steam cycles differently, so be sure the model you're considering works in a way that's convenient for you. The water source for steam dryers depends on the manufacturer. Some connect to the washer fill hose; others have a tank reservoir that must be filled manually. Some dryer models allow you to add steam to drying cycles to reduce wrinkles and static cling, but other manufacturers limit steam to a separate cycle for loads that are already dry.

Two types of steam cycles are intended for dry clothes. The first type, refresh cycles, is for small loads (less than a half-dozen items). It's intended to remove light wrinkles or odors such as cigarette smoke. It's best thought of as a way to squeeze a couple of extra uses from an item before bringing it to the dry cleaner. The second type, touch-up cycles, is run on full loads that have been left sitting in the dryer and helps to remove some of the wrinkles that have developed. Temperature settings in the steam mode are medium to high, so it's not for delicate items.

Dryers for hard-to-vent places

When it's difficult or impossible to run ducting, or when a supertight building envelope means a traditional dryer could cause backdrafting, consider a condensing dryer.

A condensing dryer recirculates air in the machine between an electric heating element and a condensing unit that pulls water out of the air. Hot, dry air is blown into the drum, and then exiting moist, warm air is blown across the condenser to remove moisture before the air is reheated and blown through the drum again. The condensate is pumped either into the drain shared with the washer or into an internal container that must be emptied after the cycle.

Energy-consumption data for condensing dryers is hard to come by because there is no standardized measurement, and North American manufacturers aren't required to publish energy data. Condensing dryers take longer to dry a load than conventional dryers and are more expensive. Depending on whom you believe, either this longer run-time uses enough energy to make condensing dryers less efficient than conventional dryers, or recirculating the hot air reduces energy demand enough to make them more efficient than traditional dryers. The emerging consensus seems to be that there is no discernable difference in energy consumption between the two. It's worth noting that ventless dryers can raise room temperatures significantly, which can add to summer discomfort or cooling loads.

Fewer wrinkles

Nearly every manufacturer offers a dryer with a steam cycle, which promises fewer wrinkles and the ability to remove odors in clothes without washing or dry-cleaning them. However, there are a couple of caveats to buying steam dryers: Steam isn't necessarily an option for every cycle, and you may need to add water. This Whirlpool Duet has a separate 15-minute cycle for already-dry clothes. Quick Refresh is for small loads of one to four dry items and helps to smooth wrinkles and remove odors. Enhanced Touch Up helps to smooth out wrinkles in loads left in the dryer for a long time. Other manufacturers, such as LG, let you add steam to other cycles to reduce wrinkles and static cling. The Duet's steam generator uses a Y-connect on the washer's cold-water supply, while LG requires manually filling a reservoir.

Model: *Whirlpool Duet WED9550*
Price: *list $1000/street $900*

If you've been using a top-loading washing machine, filling a front loader with clothes may take some getting used to: Top-loading machines can be filled with clothes only up to the water fill line, but the entire drum of a front loader can be stuffed full because the horizontal rotation ensures that the entire load is rotated into the water. According to Bosch's laundry product manager, Lan Deal, the average household wash load is only 9 lb., but even Bosch's 1.9-cu.-ft. compact washer can effectively wash 13 lb. of clothes. This means that you may be able to get by with a smaller washer and dryer, and then devote a little less space to the appliance area.

Washers and dryers are sold in matched pairs; the dryer is slightly larger to provide extra volume around clothes for airflow. If you're buying a set, there's no real reason to break up the matching pair. If you're replacing a broken appliance, however, there's no reason to replace the whole set. Brett Oleson, senior brand manager at Maytag Laundry, says a good rule of thumb is that a dryer should be 1.5 times the washer size.