

## Cold-water laundry detergent is a hot idea

Household laundering takes a lot of energy—not even counting what's required to haul the loads up and down stairs. In the U.S. and Canada, most of that energy is used to heat water for laundry detergents designed to work with warm water. But earlier this year, Procter & Gamble (P&G) launched Tide Coldwater, a version of its popular laundry detergent that is designed for good cleaning in cold water.

Home laundering accounts for up to 36% of total household hot water use, according to a study by P&G and Exponent, a consulting firm, which will appear in the journal *Integrated Environmental Assessment and Management* (doi 10.1897/2005-016). Citing information from Natural Resources Canada in 2004, the authors wrote, "On average, the thermal energy required to heat water using either gas or electric energy constitutes 80–85% of the total energy consumed per wash in conventional, vertical-axis (top-loading) washing machines." Agitation in the washer accounts for the remainder.

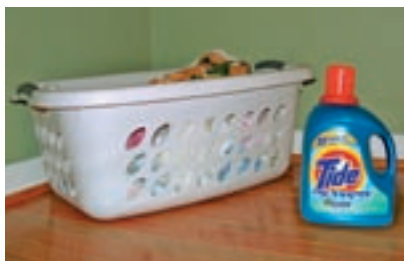
In a separate calculation, P&G claims U.S. consumers can save up to \$63 per year in energy costs by washing in cold water. Their calculation is based on national average electricity costs in July 2004, a water heater set at 140 °F, 7 loads of laundry per week, and conversion from warm to cold water.

So how cold is cold? Most detergents are geared for warm water that is 90 °F, but the industry standard for very cold water is 60 °F, says P&G senior engineer Michael Orr.

Coming up with an effective cold-water detergent was a challenge because the stain-fighting power of conventional detergent formulations decreases "by an order of magnitude for every 10 °F that you decrease the temperature," says P&G senior scientist Donna Wiedemann, who for-

mulated Tide Coldwater.

Wiedemann explains that, like other detergents, Tide Coldwater contains enzymes, surfactants, and builders. The surfactant system for Tide Coldwater is specialized for cold water, she says. Enzymes catalytically remove the soil and stains from fab-



RHONDA SAUNDERS

**Tide Coldwater can help consumers save energy, and it is as safe for the environment as regular laundry detergents.**

ric, surfactants emulsify and suspend the grime removed by the enzymes to prevent them from resetting on the clothes during the cycle, and builders deal with minerals in the water.

Tide Coldwater includes three enzymes: amylase breaks down starch; protease tackles proteins like grass and blood; and a proprietary enzyme attacks stains containing guar, which is used as a thickener in processed foods, says Wiedemann. Tide Coldwater's surfactant system is more hydrophobic than conventional detergents to help clean grease and oil, which is tougher in cold water, says Wiedemann. The builder system sequesters the minerals and transition metals from the water so they don't interfere with stain removal.

Because Tide Coldwater has "about 20% more active ingredients" than Tide Regular, it costs more to use, says Wiedemann. Comparing bottles of equal volume and price, a consumer who follows the prescribed amount can do six more loads with Tide Regular than with Coldwater. It works out to a few more pennies per load.

Cold-water washing can have two

problems, says S. Kay Obendorf, a professor of textiles and apparel at Cornell University. First, she says, in reality, cold water is whatever temperature runs from the tap. Where she lives in upstate New York, that temperature can hover near 32 °F during the winter. Second, clothes washed in cold water can come out of a wash "dirtier" than when they went in because live microbes can redeposit on the clothing. Even if cold-water formulations address these issues, she recommends washing heavily soiled items, such as diapers, in hot water with bleach.

Ian Hardin, a professor of textile sciences at the University of Georgia, also worries about cold-water washing. "If you want better cleaning, higher temperature is always better," he says. For example, he recommends hot-water washing and thorough drying if transferring a bacterial or a viral illness through a household is a concern. "In creating a product like this, [detergent makers] are responding to the fact that they know there are a lot of people out there who want to do [a] cold-water wash." In certain cases, it might work. "Compared to a generation ago or maybe two generations ago, most of us don't get clothes nearly as dirty as we used to," he says, so "if someone wants to cold-water wash [lightly soiled clothes], I'm sure these products will be just fine."

Although nonprofit groups do not endorse products, some are promoting this concept. The Alliance to Save Energy, a U.S. energy-efficiency organization, partnered with P&G to educate the public with the Cold-water Challenge. The Canadian Energy Efficiency Alliance, a separate organization, has an initiative called Switch to Cold.

Purex also advertises a detergent that works well in cold water, but the manufacturer Dial Corp. did not respond to requests for more information.

—RACHEL PETKEWICH