Retrofit System for Smart Reduction of Detergent Usage by Washing Machines

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Empirical studies have shown that we spend several times more laundry detergents than is actually required for efficient washing, which inflicts a double blow on the environment due to excessive production of detergents, and causes detergent associated water pollution. For any type of soiling and for different fabrics, there is a critical concentration of detergents in a solution, further increase of which does not lead to better washing, and only causes detergents waste. So we invented a new washing control method in which washing powder or liquid is fed gradually, in small doses, with a constant feed-back monitoring of detergent solution opalescence. And once the detergent solution transparency ceases to decrease, addition of the detergent stops because that means all the dirt, which could be extracted from the fabric, is separated and coagulated. The effectiveness of a new method of washing and simplicity of process control was experimentally tested on several working mockup washing machines and washing cycles. Almost all modern washing machines can be easily modified to a discrete supply of detergent and continuous optical transparency control of detergent solution. The cost of such a machine will increase no more than by 1-2 percent, which, considering the savings for detergents during few months of operation will fully pay for suggested innovation, and further lead to significant savings. For example in the US alone, this method of washing will annually save several billion (!) Dollars. And most importantly, natural resources are used more efficiently and the environment will be better protected from polution.

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