

On the efficiency of a Multiwash machine

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1. Introduction

This document summarizes the results of internal tests conducted in Haier Europe labs (Brugherio, Italy) on a Multiwash machine (Fig. 1). Washing performances have been measured on small drum of the Multiwash machine model HMQD 410CBL9-80. Big drum has nominal load of 10kg, small drums have nominal load 1kg.

Results have been compared with 8 different machines from the market as reference:

- Brand: H* model: WFQ* 8kg
- Brand: B* model: WAV* 9kg
- Brand: S* model: DV9* 9kg
- Brand: W* model: WMP* 9kg
- Brand: L* model: F4X* 9kg
- Brand: I* model: BWE* 9kg
- Brand: B* model: BMU* 9kg
- Brand: Haier model: HW90-B14387GTU1 9kg



Fig. 1 – Multiwash HMQD 410CBL9-80

The aim of this report is to demonstrate:

- Resources saving when washing small loads into the smaller drums in comparison to bigger drums from domestic washing machines found on EU market (8 to 10kg are studies in this report)
- Resources saving when performing 3 washing cycles all at once in a Multiwash machine (Compared to running the same wash cycles consecutively in the same 8–10 kg domestic washing machines)

2. Small load washing into small drums of a multiwash

1kg of cotton load according to IEC 60456:2024 has been tested into small and big drum of the Multiwash. Fig. 2 shows the load tested. The tested washing cycle used as reference is: Mix 30°C with spin speed of 1000rpm. Also, the machines from the market have been tested with the same cycle, same declared temperature and spin speed.

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Fig. 2 – 1kg cotton (2 pillowcases and 5 towels according to IEC 60456:2024)



Fig. 3 – 1kg cotton load tested inside the small drum of the Multiwash

The other parameters of the washing cycles are according to the manufacturer design. Whatever not specified in the test description, it is according to IEC 60456:2024.

Tab. 1 shows the results of the tests performed. As an example Figs. from 4 and 5 shows test measurements respectively of small and big Multiwash drums into graphs.

Tab. 1 – Results of “Mix” washing cycle 30°C 1000rpm, 1kg cotton load tested according to IEC 60456:2024.

Machine	Nominal drum load [kg]	Energy consumption [Wh]	Water consumption [l]	Cycle time [min]
Multiwash small drum	1	72	9,9	68
Multiwash big drum	10	245	26,8	61
Machine H* model: WFQ*	8	265	43,3	118
Machine B* model: WAV*	9	208	27,6	62
Machine S* model: DV9*	9	253	30,0	50
Machine W* model: WMP*	9	636	50,8	118
Machine L* model: F4X*	9	192	28,9	55
Machine I* model: BWE*	9	292	24,3	69
Machine B* model BMU*	9	289	45,5	106
Machine Haier model: HW90-B14387GTU1	9	240	38,9	60

Figs. 4 and 5 have the same scale on vertical axis, an immediate comparison of power, energy and water measured shows smaller data in Multiwash small drum (Fig, 4) vs all others when only 1kg is tested: the small tub has been designed to properly fit 1kg cotton load, reducing the amount of water inside.

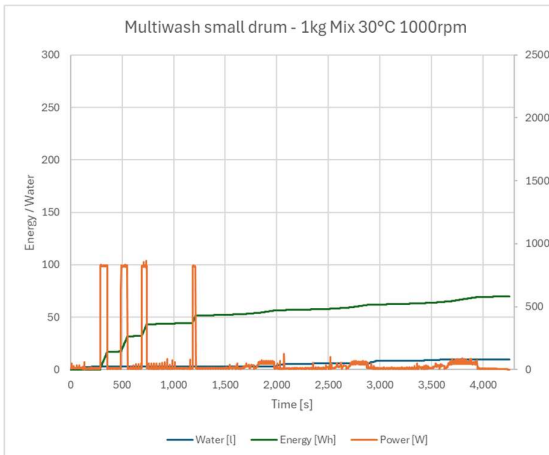


Fig. 4 – Multiwash HMQD 410CBL9-80, small drum. Tests according to IEC 60456:2024 on MIX cycle 30°C 1000rpm with 1kg cotton load

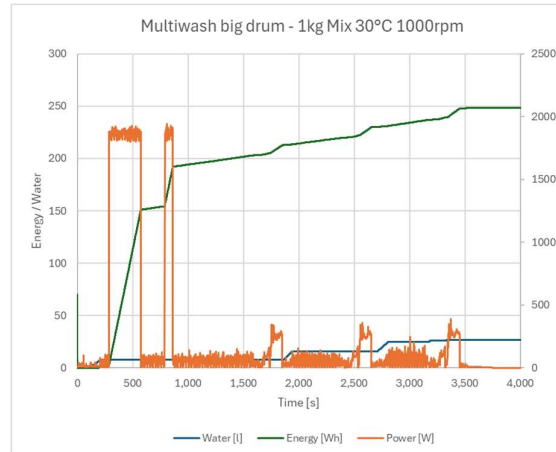


Fig. 5 – Multiwash HMQD 410CBL9-80, big drum. Tests according to IEC 60456:2024 on MIX cycle 30°C 1000rpm with 1kg cotton load

Figs. 6 and 7 respectively show the boxplot of energy and water consumption on machines tested and listed in Tab. 1. The boxplot show that the consumption of small drum corresponds to a saving of:

- 71% on energy from median value of machines tested
- 67% on water from median value of machines tested

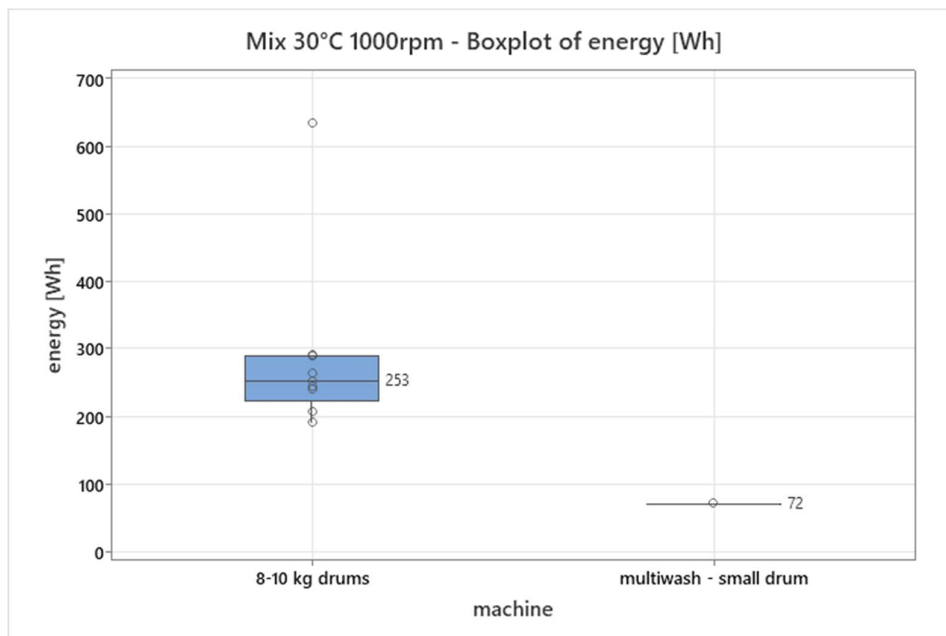


Fig. 6 – Comparison of energy consumption – 1kg cotton on MIX 30°C 1000rpm – small drum vs other machines tested

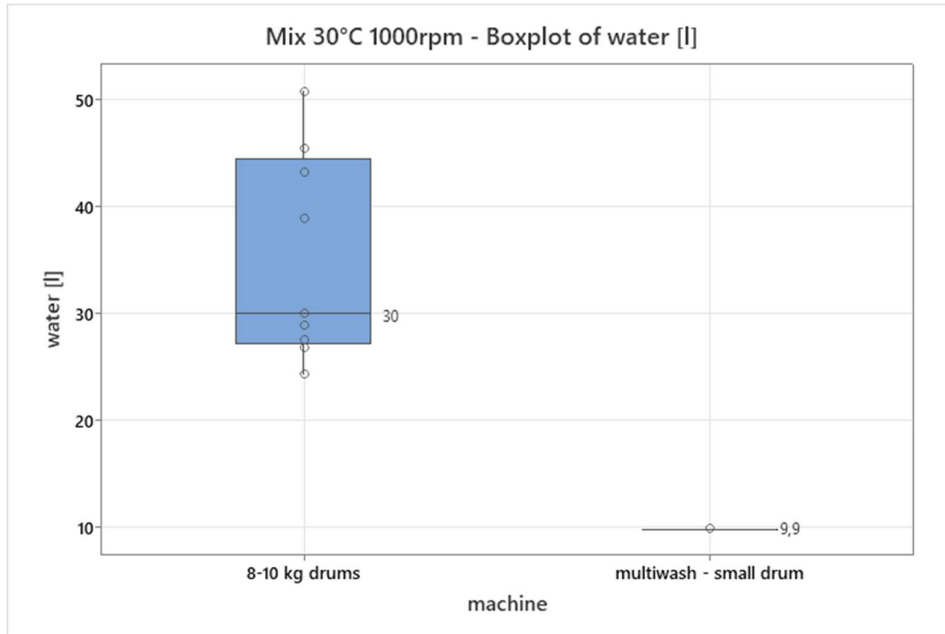


Fig. 7 – Comparison of water consumption – 1kg cotton on MIX 30°C 1000rpm – small drum vs other machines tested

4. Discussion on the use of 3 drums at the same time in the Multiwash

The Multiwash machine has the possibility to perform 3 washing cycles at the same time. It is here investigated the efficiency of performing 3 washing cycles at the same time or 3 cycles separately.

The machine listed in Tab. 1 all have Mix and Cotton cycles, but it was not possible to identify a third common relevant washing cycle of interest in all machines. For this reason, this analysis has been divided into 2 sections:

- Cotton 5kg + Mix 1kg + Sport 1kg
- Cotton 5kg + Mix 1kg + Delicate 1kg

Sport and Delicate have been chosen because in user manual of most of the investigated models it has been suggested to use small quantities of laundry, typically 1 to 2.5 kg. Cotton load has been used in these tests, according to IEC 60456:2024. For the sake of simplicity, default settings of the washing cycles (chosen by manufacturers) have been adopted. Figs. 8 to 10 respectively show results of energy, water and time saving when the 3 cycles Cotton 5kg + Mix 1kg + Sport 1kg run at the same time into a Multiwash machine. On the other hand, Figs. 11 to 13 respectively show results of energy, water and time saving when the 3 cycles Cotton 5kg + Mix 1kg + Delicate 1kg run at the same time into a Multiwash machine.

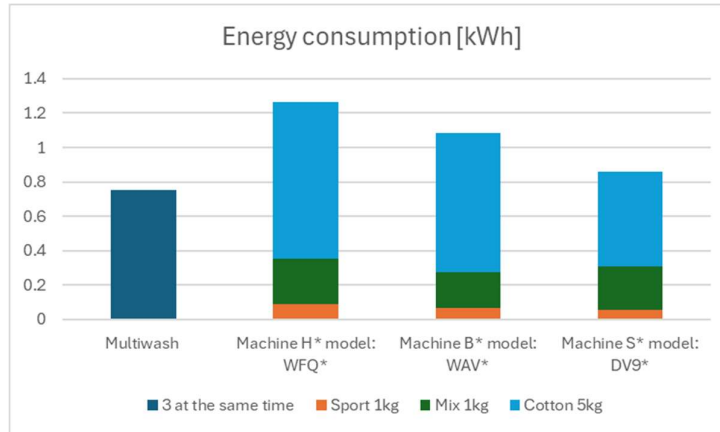


Fig. 8 – Energy saving when cycles cotton 5kg, Mix 1kg and Sport 1kg are performed at the same time into Multiwash.

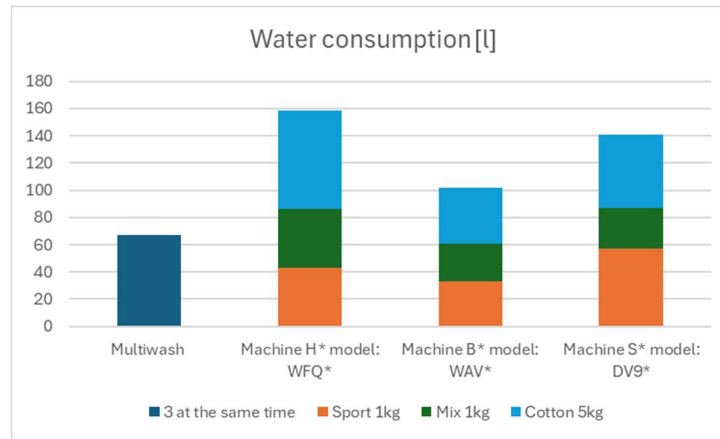


Fig. 9 – Water saving when cycles cotton 5kg, Mix 1kg and Sport 1kg are performed at the same time into Multiwash.

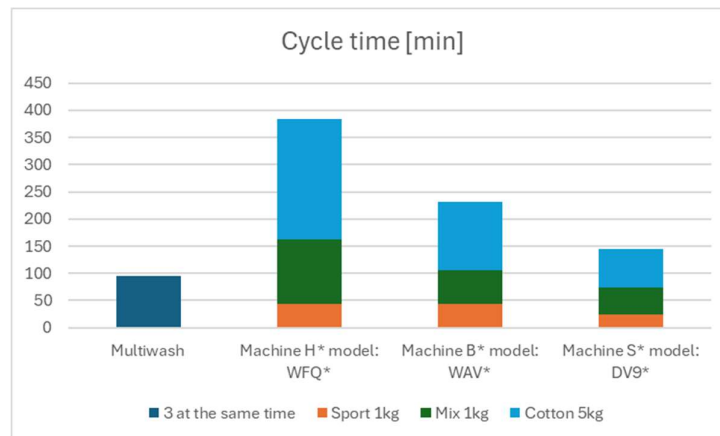


Fig. 10 – Time saving when cycles cotton 5kg, Mix 1kg and Sport 1kg are performed at the same time into Multiwash.

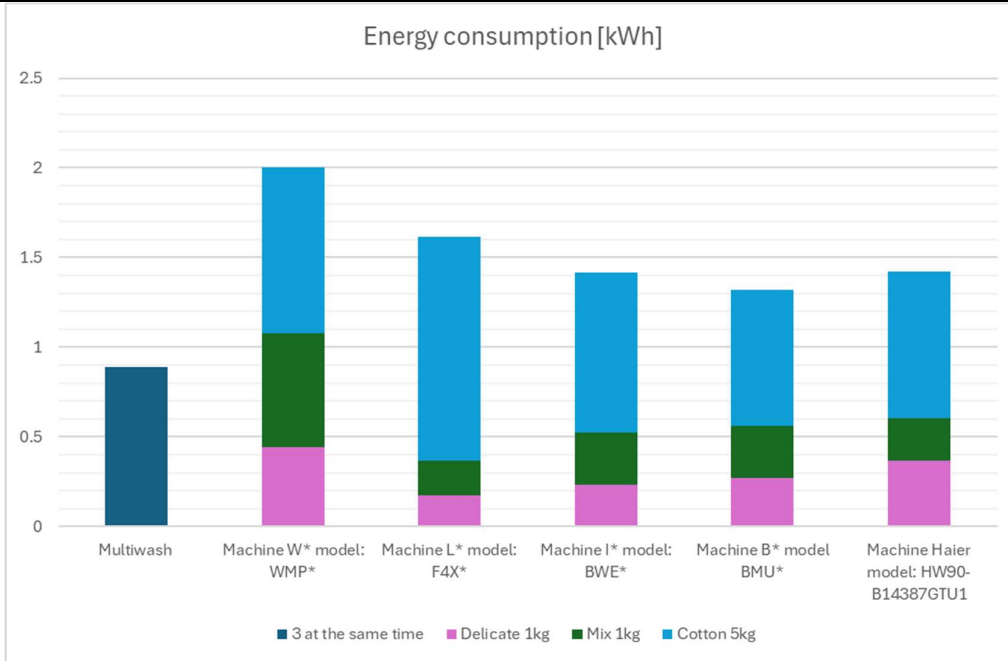


Fig. 11 – Energy saving when cycles cotton 5kg, Mix 1kg and Delicate 1kg are performed at the same time into Multiwash.

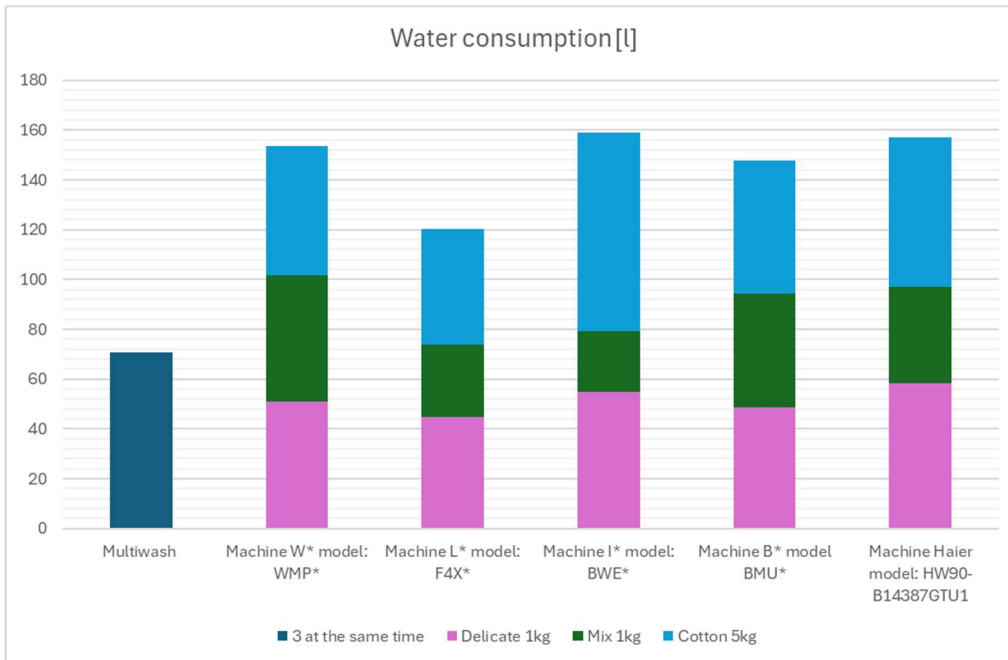


Fig. 12 – Water saving when cycles cotton 5kg, Mix 1kg and Delicate 1kg are performed at the same time into Multiwash.

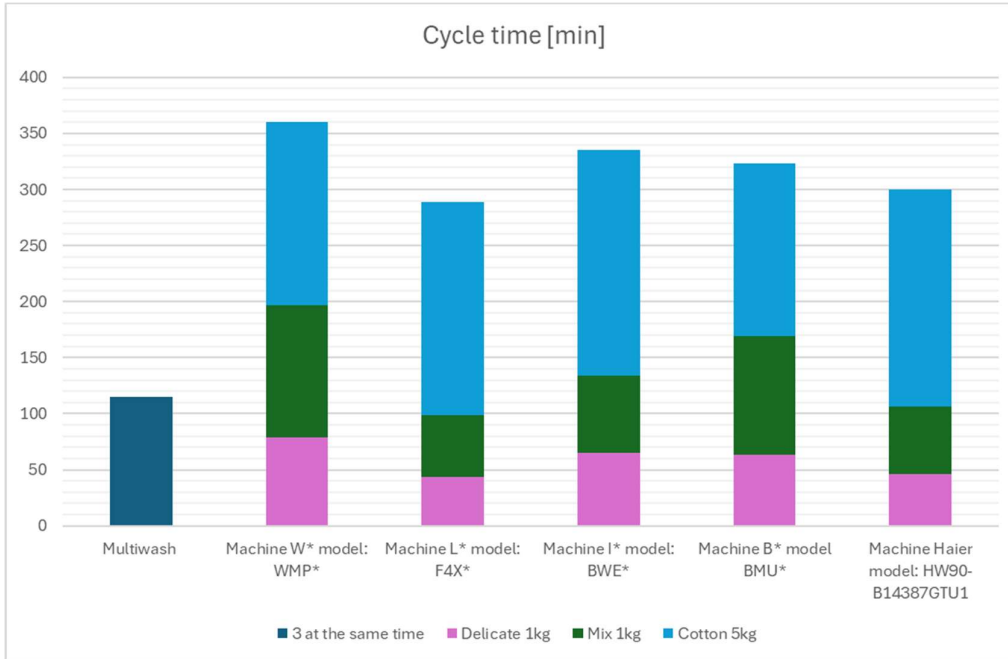


Fig. 13 – Time saving when cycles cotton 5kg, Mix 1kg and Delicate 1kg are performed at the same time into Multiwash.

Combining all data from Figs. 8 to 13, it is possible to confirm following savings comparing Multiwash running 3 cycles at the same time and other machines from Tab. 1 running cycles separately:

- Energy saving of 38% on median value in Cotton 5kg + Mix 1kg + Delicate 1kg (Fig. 14)
- Energy saving of 31% on median value in Cotton 5kg + Mix 1kg + Sport 1kg (Fig. 14)
- Water saving of 54% on median value in Cotton 5kg + Mix 1kg + Delicate 1kg (Fig. 15)
- Water saving of 52% on median value in Cotton 5kg + Mix 1kg + Sport 1kg (Fig. 15)
- Time saving of 64% on median value in Cotton 5kg + Mix 1kg + Delicate 1kg (Fig. 16)
- Time saving of 59% on median value in Cotton 5kg + Mix 1kg + Sport 1kg (Fig. 16)

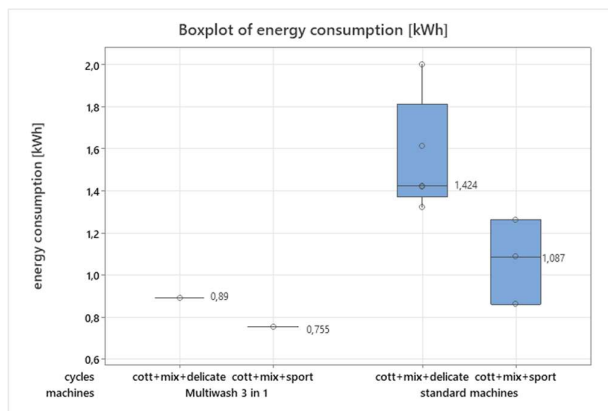


Fig. 14 – Energy saving when 3 cycles are performed at the same time into Multiwash.

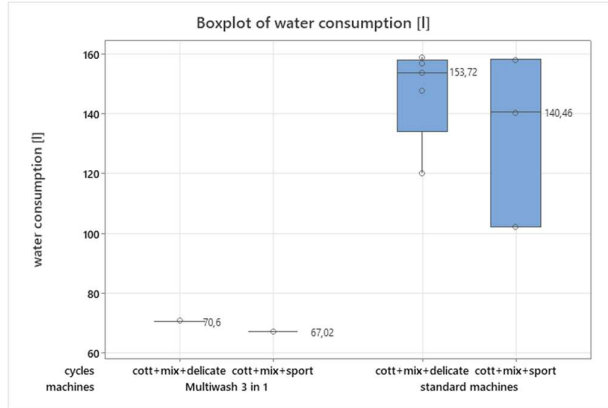


Fig. 15 – Water saving when 3 cycles are performed at the same time into Multiwash.

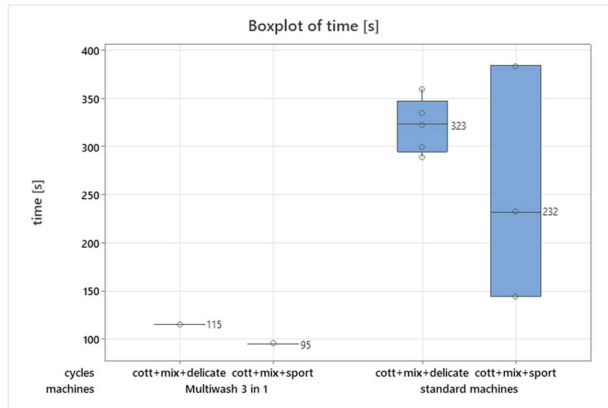


Fig. 16 – Time saving when 3 cycles are performed at the same time into Multiwash.

5. Disclaimer on test conditions

Tests performed are according to IEC 60456:2024. However, cycles tested are not ECO 40-60 as requested by Commission Regulation (EU) No 2019/2023. User cycles default settings can therefore change from machine to machine according to manufacturer designs. Furthermore, variability from machine to machine and lab to lab testing may exist, regulations does not ask to keep them under control into tested user cycles, and are not investigated in this report.

6. Conclusions

Tests performed show that small drums are optimized to save energy and water when the user of the domestic washing machine requires to wash no more than 1kg of laundry. Up to 70% of saving both on water and energy could be achieved when comparing to standard 8

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to 10kg domestic washing machines chosen randomly on the market.

When the user requires to perform 3 different washing cycles (and 2 of them are no more than 1kg in mass) the Multiwash demonstrated to be a time, water and energy saving solution in comparison to standard domestic appliances that require to run consecutively the 3 washing cycles and not all 3 at the same time.