

# Product Information

AquaSmart™ Washer (USA)

WL26CW1

CA: 96215



Compiled by Product Evaluation,  
Auckland

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**Fisher & Paykel**  
*innovative living*

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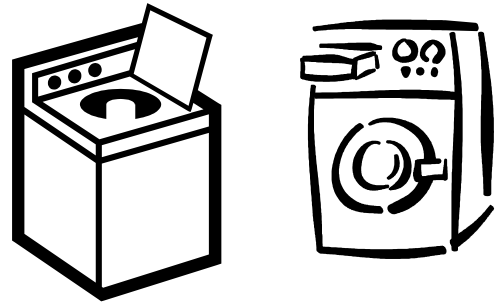
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## The Idea

Years ago when life was simple, there were two types of washers, traditional central post top-loaders and front-loaders.

One washed by immersing clothes in a large volume of water and one washed by tumbling them through a small volume of water.



We used to waste endless time arguing which mode was best, because the very thing that made each washer type good, is also what made it bad – that is of course Water.

The main benefit of a front-loader has been its water efficiency. But water is a wonderful thing, it dilutes out a lot of the bad things in the wash. The dye, the sand, the dirt, the grass, the micro-organisms. No matter how dedicated you are to saving water, when your child vomits in their bed you soon yearn for the dilution effects of a full immersion wash.

Whichever way we look at things the lower water volumes of HE washers, whether you get the clothes from the top or the side, can cause problems in the wash. But, with water consumption increasingly becoming an issue in areas where water shortages are rife, and Government bodies worldwide continuing to put pressure (e.g. rebates, legislation) on appliance manufacturers to reduce water usage, we realised that we could no longer justify traditional top-loader water consumption for the future of Fisher & Paykel laundry products.

Taking our inspiration from the automotive industry we thought, isn't the ideal solution a washer that can work in both front-loader and top-loader modes? We decided that we needed a hybrid of both types of washer.

### **The Aim**

The aim of the AquaSmart™ project was to design a High Efficiency top-loading washer - the first top-loading washer capable of achieving a water factor of 6.0.

We aimed to develop a product that provided the best of both worlds – the ergonomics, capacity and shorter cycles times of a top-loader, with the increased water efficiency of a front-loader. Customers would no longer have to make a decision between buying a top-loading or front-loading washer at the point of purchase; they would have all the features of both a Traditional and High Efficiency washer in one.

We were able to take the opportunity to design a product with all these benefits, based on the current SmartDrive™ platform. To overcome the water usage constraints of a traditional agitator system, we decided to set out to design a new, low profile agitator wash system.

## High Efficiency Washers

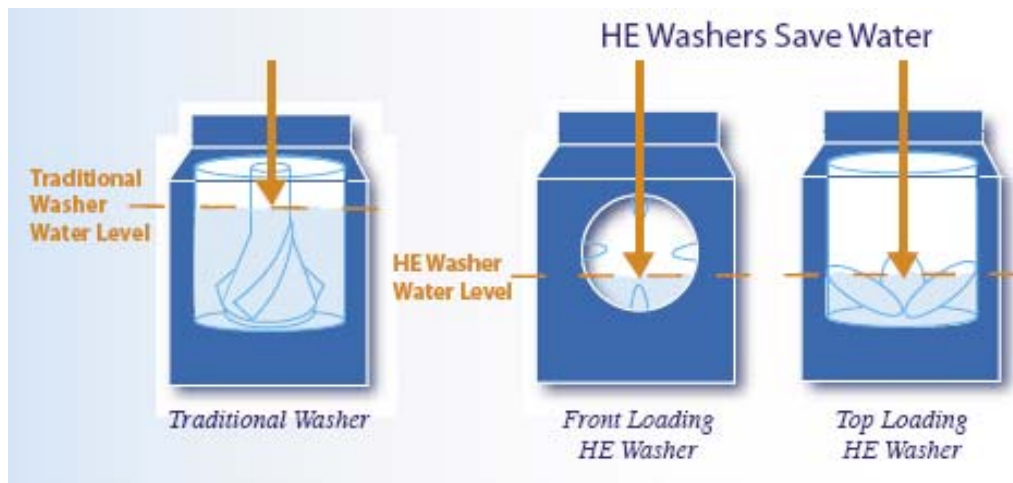
High Efficiency washers use less water than traditional washers do. They also use less energy, as there is less hot water to heat! High Efficiency washers therefore provide long-term cost savings to the consumer, as well as providing significant environmental benefits. There are two types of HE washers – front-loading and top-loading. Although each works via a different mechanical method, they both provide increased water and energy efficiency.

### Front-loading HE Washers

In front-loading washers, the laundry *tumbles* around as the tub rotates clockwise and then counter clockwise, moving the garments through the water-detergent solution. This repetitive tumbling motion is intended to do an efficient cleaning and rinsing job and is gentle on fabrics.

### Top-loading HE Washers

There are a growing number of High Efficiency washers that load from the top. These washers use spinning, rotating, and/or “wobbling” wheels, plates, or disks to achieve a gentle wash action. Some also spray or lightly shower clothes using re-circulated water from wash and/or rinse solutions.



## AquaSmart's Dual Mode System



AquaSmart™ also has the added benefit of the Dual Mode system, with the option of either High Efficiency or Conventional modes. **High Efficiency mode** utilises a unique wash action - a cleverly designed low profile agitator gently rolls the clothes over using very little water. Most of the washing is achieved by better detergent activity.



However, sometimes using a little more water can be an advantage (e.g. muddy football gear). AquaSmart™ offers a **Conventional mode** that is similar to a traditional immersion top loader wash, adding water until the clothes are submerged and gently agitating. Conventional mode is offered on the following cycles-Bed Sheets, Whites, Colors, Heavy Duty, Delicate Easy iron and Bulky as well as many Lifestyle cycles. For Heavy Duty and Delicate cycles simply turn High Efficiency OFF to activate this mode.

## **Wash Action**

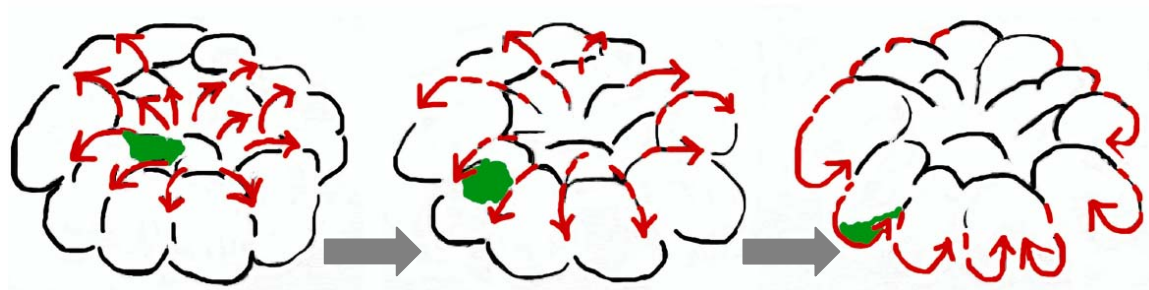
The AquaSmart™ wash action differs to traditional top loader washing machines. The low profile agitator is what makes this wash action so unique.



*Low profile agitator*

The agitator gently rolls the clothes over each other in a reverse-toroidal (circular) motion.

Items at the bottom are slowly pushed up through the centre, and gently roll over, move to the edge of the basket and work back towards the middle again. This process can be compared to a flower blooming.



*The AQUAMSART™ wash motion*

This wash action ensures that clothes are moved through the limited amount of water efficiently, creating an effective and even wash.

## Special Features of AquaSmart™

- **Dual Modes:** AquaSmart™ gives you the ability to select either a High Efficiency wash that minimises water and energy usage, or Conventional mode, which is a more traditional immersion-type wash.
- **Water Rating:** The AquaSmart™ washer's High Efficiency wash system delivers exceptional water savings – **5.96 Water Factor**, making it **North America's most water efficient top loading washer** (CEE SEHA Efficiency Tier 2 – effective Jan 1<sup>st</sup> 2007).
- **Energy Rating:** Save energy – AquaSmart™ uses only **211kWh** of energy per year and achieves a **MEF of 2.05** (CEE SEHA Efficiency Tier 2 – effective Jan 1<sup>st</sup> 2007).
- **Ergonomics** – The advantage of loading from the top, no crouching and bending into a front opening, with the added advantage of no central post - 'no loading around the agitator pole', and a wide mouth opening.
- **LCD Display:** AquaSmart™ has an easy touch control panel with LCD display screen, allowing advanced option selection and user tips.
- **Dispensing:** AquaSmart™ features a convenient and easy to use detergent and fabric softener dispensing system located in the topdeck. No need to open drawers or remove fiddly fabric softener cups.
- **Choice:** AquaSmart™ offers more than 30 different cycle combinations to offer you the best possible care for your washing.

### Plus all of the standard SmartDrive™ features...

- **1000rpm Spin Speed:** Excellent water extraction equates to faster drying times.
- **Intelligent Electronics:** A powerful microprocessor controls every aspect of the AquaSmart™, allowing it to continually monitor and respond to each wash.
- **Lid lock:** A safety feature designed to protect you and your family during hazardous parts of the cycle.
- **Reliability:** AquaSmart™ has no mechanical brake, pulleys or gears, which means fewer moving parts and greater reliability.
- **Direct Drive Motor:** Our revolutionary direct drive motor is capable of infinite wash actions, continuously adjusting its speed to the movement of your clothes, removing dirt while caring for the fabric, delivering the ultimate wash.

# Frequently Asked Questions



## 1 *What are the Wash Temperatures?*

Cold	Cold+	Warm/Cold	Warm	Warm/Hot	Hot
Incoming from faucet	68°F (20°C)	91°F (33°C)	102°F (39°C)	115°F (46°C)	140°F (60°C)

## 2 *What detergent should I use?*

Even though AquaSmart™ is a Top-Loading machine, the High Efficiency wash action means that a low foaming, **High Efficiency (HE)** detergent is required to avoid problems with over-sudsing. We recommend a liquid high efficiency detergent for optimum results. Using traditional top-loading detergent can result in over-sudsing and poor wash performance.



## 3 *Can I use liquid fabric softener?*

Yes, you can use liquid fabric softener in AquaSmart™. A fabric softener dispenser is located on the front-left corner of the machine for this purpose. Fabric softener requires a deep rinse to be evenly distributed through the load, so must be used with either a Fabric Softener or Spray and Deep Rinse. If High Efficiency mode is ON, then Fabric Softener must be selected in the Wash Options menu. If a Conventional cycle is selected, then fabric softener will automatically be dispensed in the deep rinse.

It is important that the Fabric Softener dispenser filled no higher than the MAX level indicated on the dispenser, as overfilling will contribute to scrud. Measure the softener as per manufacturer's directions, and then carefully pour it into the dispenser.

## 4 *What is that circular protrusion on the inside front of the lid?*

This is the Lid Lock mechanism. The protrusion slots into the hole in the topdeck of the washer, allowing the lid to automatically lock during the hazardous parts of the cycle.

## 5 *Can I open the lid at any time during the cycle?*

The lid lock is in effect for most of the cycle to protect the customer from potential hazards. One hazard is that due to the low profile agitator, children or animals are at risk of drowning should they enter the machine. If you wish to open the machine while the lid is locked, press START/PAUSE – the machine will stop and unlock the lid.

## 6 *Is it normal to have water on the floor at the end of the wash?*

No, it is not normal to have water on the floor at the end of the wash. Check the following:

- Excess foam during the wash can escape the machine and later break down into a puddle. Are you using a low sudsing detergent? Is your detergent dose correct?
- Are the inlet hoses connected properly? Is the drain hose connected properly?
- Is the machine level?
- Ensure that your machine is not overloaded.



## 7 **What if my incoming cold water is very cold?**

If the incoming cold water temperature is very low you will not get a very effective wash. If Cold+ is selected in the Wash Options menu, AquaSmart™ solves this problem, controlling the cold water temperature by adding a small amount of hot water to the wash in order to raise the temperature to 68°F (20°C). This is the minimum temperature that will activate the detergent, resulting in better soil removal. Many Lifestyle cycles (e.g. Jeans) use “controlled” Cold automatically. Cold will use cold water only, no matter what the water temperature.

## 8 **How much water does the High Efficiency option use?**

<b>Total Water Consumption per cycle</b>				
	<b>2 lb (1 kg)</b>	<b>7 lb (3 kg)</b>	<b>11 lb (5 kg)</b>	<b>15.5 lb (7 kg)</b>
AQUASMART (HE Regular)	14 G (54L)	16 G (60L)	18 G (69L)	22 G (82L)

**Note:** water consumption is only approximate, as it varies depending on the load type and basket float.

## 9 **Can I program my washer to remember the settings I always want to use?**

Yes, you can save your favourite options for each cycle:

- Press POWER to turn your machine on.
- Select the wash type (e.g. Regular)
- Select the wash option you wish to change (e.g. Temperature). Change the option to the setting you prefer (e.g. cold) and press SELECT. The display will prompt you “save for future washes?” Select YES.
- Repeat for all wash options that you wish to change.

## 10 **Can I lock the buttons to prevent them being activated accidentally?**

There is a Key Lock mode available. This can be turned on in the settings menu – SETTINGS > KEY LOCK MODE > ON or OFF. When Key Lock Mode is selected, you need to push and hold the POWER button for 3 seconds to access your display panel.

If you need to pause the machine during the cycle, press the START/PAUSE button twice. And to stop the washer and power off press the POWER button twice. The display screen will show a message to remind you how to access a locked machine.

## 11 **Can I lock use Bleach? If so, how?**

We recommend the use of detergent with built in bleach.

If you wish to use liquid bleach use the WHITES cycle and select the BLEACH icon in the wash options menu. Your washer will automatically pause 9 minutes into the wash cycle and unlock the lid to allow you to add bleach. Pour **diluted** bleach into the detergent dispenser, and press START to continue the wash cycle.

# AquaSmart™ Under Analysis

## Default Cycle Settings

Default Setting	Wash Time	Wash Action	Wash Mode	Eco Active Wash Temp	Rinse Type	Spin Speed	Spin Time
Regular	12-15 mins	Regular	High Efficiency	Warm	Aqua rinse (shower)	Fast (1000rpm)	6 mins
Sheets	15 mins	Sheets	Conventional	Warm	Spray/Deep	Fast (1000rpm)	6 mins
Whites	12-15 mins	Regular	Conventional	Warm/Hot	Spray/Deep	Fast (1000rpm)	6 mins
Colors	12-15 mins	Regular	Conventional	Cold	Spray/Deep	Fast (1000rpm)	6 mins
Heavy	15 mins	Heavy Duty	Conventional	Warm	Aqua rinse (shower)	Fast (1000rpm)	6 mins
Delicate	6 mins	Delicate	Conventional	Warm/Cold	Spray/Deep	Slow (300rpm)	3 mins
Easy Iron	12 mins	Regular	Conventional	Warm/Cold	Spray/Deep	Slow (300rpm)	3 mins
Bulky	6 mins + soak	Bulky	Conventional	Warm	Double Deep	Slow (300rpm)	6 mins
Rinse	N/A	N/A	N/A	N/A	Spray/Deep	Fast (1000rpm)	6 mins
Spin	N/A	N/A	N/A	N/A	N/A	Fast (1000rpm)	6 mins

Some cycles can be used in both modes and others work in one mode only to ensure the best possible clothes care.

	High Efficiency Mode	Conventional Mode
<b>Regular</b>	√	-
<b>Sheets</b>	-	√
<b>Whites</b>	-	√
<b>Colors</b>	-	√
<b>Heavy</b>	√	√
<b>Delicate</b>	√	√
<b>Easy Iron</b>	-	√
<b>Bulky</b>	-	√

## **Machine Specifications**

<b>Capacity (DOE)</b>	<b>Depth (mm)</b>	<b>Width</b>	<b>Height to console*</b>	<b>Height with lid open*</b>
3.1 cu ft	25 ¾ "	25 ¾ "	40 1/5" – 41"	37 1/2" - 38 1/2 "

*\* The exact height of your Aquasmart is dependent on how far the feet are inserted into the base of the machine.*

- Electrical Supply 110 – 120V, 60Hz Sinusoidal
- Inlet Water Pressure Max. 1MPa (150 psi) Min. 20kPa (3 psi)
- Standpipe Height 33½ " to 78" (850-1200mm)

### **Capacity**

AquaSmart™ has a huge 3.7 cu ft capacity (IEC). The list below outlines what is included in a 15.5lb (7kg) wash load (in accordance with ANSI/AHAM HLW – 1-2002).

- 2 Double sheets
- 2 Tablecloths
- 4 Shirts
- 6 Bath towels
- 4 T-shirts
- 4 Pillowcases
- 6 Under shorts
- 6 Wash Cloths
- 5 Handkerchiefs

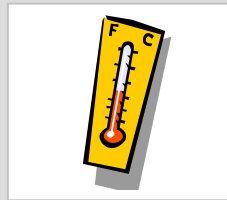


# Laundry Theory

Removing soil from clothes relies on three forms of energy in varying degrees:

1. **Mechanical Energy** provided by the washing machine or hand
2. **Chemical Energy** provided by the detergent
3. **Thermal Energy** in the form of hot water

The contribution of these three factors will determine the wash performance of any machine



Achieving acceptable wash performance is not just about getting the clothes clean. All three of the factors described above can potentially cause damage to clothing if they are not applied with due care.

Too much mechanical action causes excessive rubbing (abrasion) of the clothes that can cause cottons to 'pill' or woollen's to 'felt'. Too much thermal energy can result in shrinkage, dye/colour run, and wrinkling. Harsh detergents can cause irreparable fibre damage, weakening the fabric and making it more susceptible to rips and tears.

Achieving acceptable wash performance is about getting the right balance between soil removal and any negative 'side-effects'. The contribution of the three factors to the cleaning process depends on the method of washing. For example, if clothes are washed on rocks by a river, the contribution of mechanical action is enormous compared to the other two factors. In comparison, if clothes are washed in a front-loading washer the mechanical action is decreased, but the thermal and chemical energy is increased. In a traditional top-loading washing machine, thermal energy typically plays a slightly less important role and the mechanical energy slightly more.

The wash action of AquaSmart™ is somewhere in between that of a traditional top loader and a front loader. The low wash volumes mean that detergent is more highly concentrated, meaning increased chemical energy is imparted on the load. Mechanical action is still important, however the wash action is different to a traditional top loader. The clothes gently roll over each other, rather than being pushed by an agitator.

# Super-Efficient Home Appliance Initiative (SEHA)



The Consortium of Energy Efficiency (CEE) is a non-profit organisation made up of utilities, environmental and public interest groups and government agencies. CEE is dedicated to helping private and public interests form partnerships to accelerate the development and availability of technologies that save water and energy, maintain customer satisfaction and enhance environmental quality. CEE's Residential Clothes Washer Initiative was launched in 1993 to promote the manufacture and sales of energy-efficient clothes washers.

In 1997 the **Super-Efficient Home Appliance Initiative (SEHA)** was launched. This is a national program designed to stimulate manufacturer and consumer interest in highly efficient home appliances. It provides a nationally recognized definition of "super-efficiency" through the establishment of performance tiers that utilities can voluntarily adopt for use in local programs.

If an appliance qualifies for any of the three SEHA categories, this enables local utilities to grant rebates to the purchaser.

The SEHA scheme uses two categories to judge the energy efficiency of a washing machine:

- 1) **Modified Energy Factor (MEF)** calculated from DOE energy test method
- 2) **Water Factor (WF)** calculated from DOE energy test method

## CEE SEHA Tier Structure (Appendix J1)

Level	MEF	WF
Baseline* (as of Jan 2007)	1.26	13.3
Tier 1	1.8	7.5
Tier 2	2.0	6.0
Tier 3	2.2	4.5

MEF=Modified Energy Factor, a combination of Energy Factor and Remaining Moisture Content. MEF measures energy consumption of the total laundry cycle (washing and drying). It indicates how many cubic feet of laundry can be washed and dried with one kWh of electricity; the higher the number, the greater the efficiency.

WF=Water Factor (number of gallons needed for each cubic foot of laundry). A lower number indicates lower consumption and more efficient use of water.

\*Baseline MEF is the Federal minimum standard. Baseline WF is an average for washers sold, as supplied to DOE by the Association of Home Appliance Manufacturers (AHAM).

Tier 3 of the scheme houses the most energy and water efficient washers.

AquaSmart™ qualifies for **Tier 2** (effective 1<sup>st</sup> January 2007) of the SEHA scheme making it **America's Most Water Efficient Top Loading Washer** and as a result, qualifying for a good rebate.

AquaSmart™ also qualifies as an **Energy Star compliant** product (MEF= $\geq$ 1.72) and **easily meets the minimum federal standard energy levels** as of January 2007 (MEF= $\geq$ 1.26)



# DOE Energy Guide Label

According to the U.S. Government Department of Energy (DOE) test:

AquaSmart™ achieves a **2.0 MEF Energy Rating**,  
using as little as **211 kWh of energy per year**  
(based on 365 cycles/year).

This compares to :

Brand	Model	Volume (cu ft)	Energy (kWh/year)	MEF	WF
<b>Fisher &amp; Paykel</b>	<b>Aquasmart (WL26CW1)</b>	<b>3.13</b>	<b>211</b>	<b>2.05</b>	<b>6.0</b>
Fisher & Paykel	Ecosmart (GWL15)	3.00	220	2.00	7.2
Fisher & Paykel	Intuitive (IWL16)	3.00	219	2.00	6.9
Bosch	Nexxt Essence (WFCM2100UC)	3.31	170	2.13	4.7
Frigidaire	Affinity (ATF6000ES1)	3.00	240	2.04	5.3
Frigidaire	FTF2140E	3.00	247	1.82	5.6
Kenmore	Oasis (HE27082)	3.89	316	1.95	7.3
LG Electronics	Tromm Steam Washer(WM2688HWM)	3.47	1.71	2.48	3.5
Maytag	Neptune (MAH5500B)	2.90	243	1.90	7.2
Maytag	Atlantis (MAV6451A (MAV5920))	3.44	347	1.48	10.0
Whirlpool	Duet (GHW9300PWO)	3.30	186	1.99	4.6
Whirlpool	Cabrio (WTW6600S & WTW6400S)	3.89	307	1.98	6.9

This model has been tested using the 2004 test procedure.  
Compare only with models displaying this statement.

Based on standard U.S. Government tests


## ENERGYGUIDE

Clothes Washer  
Capacity: Standard

Fisher & Paykel Appliances Inc.  
Model WL26CW1

Compare the energy use of this clothes washer only  
with other models tested using the 2004 test procedure.

This Model Uses  
**211kWh/year**



ENERGY STAR®  
A symbol of  
energy efficiency

Energy used (kWh/year) range of all similar models

Uses Least Energy  
**113**

Uses Most Energy  
**680**

kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use.  
Your utility company uses it to compute your bill. Only standard size  
clothes washers are used in this scale.

Clothes washers using more energy cost more to operate.  
This model's estimated yearly operating cost is:

**\$18** when used with an electric water heater

**\$10** when used with a natural gas water heater

Based on eight loads of clothes a week and a 2004 U.S. Government national average cost  
of 8.6¢ per kWh for electricity and 91¢ per therm for natural gas. Your actual operating  
cost will vary depending on your local utility rates and your use of the product.

Important: Removal of this label before consumer purchase violates the Federal Trade Commission's Appliance Labeling Rule (16 CFR Part 305)


421055A


# User Information



The Eco Guide Lid Label has been designed and included on the underside of the lid as a basic user guide for consumers. The Eco Guide is an effort to try and educate the user about the importance of using AquaSmart™ correctly; use of HE (High Efficiency) detergent only, correct use of the detergent and fabric softener dispensers, as well of the selection of the Fabric Softener and Bleach options to ensure both products are dispensed correctly.

Refer to your **User Guide** or [www.usa.fisherpaykel.com](http://www.usa.fisherpaykel.com) (USA), [www.fisherpaykel.ca](http://www.fisherpaykel.ca) (Canada)  
**For more information or advice, please call 1888 9 367 872**


**Sorting & Loading**  
Sort clothes according to color and type. To achieve optimum wash performance, choose the appropriate AQUASMART™ cycle. For example: wash non-color-fast items on the **COLORS** cycle, sheets on the **BED SHEETS** cycle. Ensure that you load your clothes **evenly** around the wash tub.

 **Detergent & Bleach**  
Your AQUASMART™ washer has been designed for use with low sudsing, (HE or front loader type) detergent. Pour measured detergent into the detergent dispenser. For liquid bleach select **WHITES** cycle and **BLEACH** option. At 9 mins into the wash AQUASMART™ will prompt you to add bleach through the detergent dispenser.

 **Fabric Softener**  
If you wish to use fabric softener, pour into the dispenser, no higher than max level. You will need to turn Fabric Softener **ON** in the wash options menu.

 Press  select cycle and any wash options by using the **SELECT** button, and touch **Start/Pause**.

Remember to remove clothes as soon as the cycle finishes.



Removable Sticker  
Part No. 421055

In addition to water and energy labelling, AquaSmart™ also has a User Information lid label – this gives the customer a bit more information about how to use AquaSmart™ to get the best possible performance.

A Use and Care Guide is provided with AquaSmart™, containing installation and safety instructions, as well as information on how to use the washer and washing tips to get the best possible performance.

# The AquaSmart™ Advantage – Key Claims



## Water Savings

AquaSmart™ qualifies for a **5.96 Water Factor** – making AquaSmart™ **more water efficient than many front load washers** as well as the **most water efficient top loading washer available.**



## Time

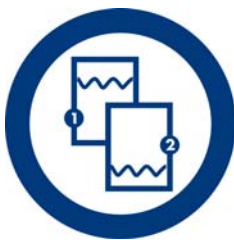
Completes a Regular cycle in both High Efficiency and Conventional modes in approximately 55 minutes.



## Energy

AquaSmart™ is an energy leader, qualifying for **2.05 MEF energy rating**, just 211kWh/year.

***This equates to approximately 1/3 of the energy of some front-loading competitors.***



## Dual Washing Modes

AquaSmart™ offers both High Efficiency and Conventional wash modes – allowing you to *choose* the best wash type for each laundry situation.



## Ergonomics

Ease of loading from the top, with the added advantage of no central post.

## Fisher & Paykel's First Multi-Lingual Washer

Three language options to choose from – English, French (Canadian), Spanish

# The Rinse



There are five main rinses that have been developed for the AquaSmart™ washer.

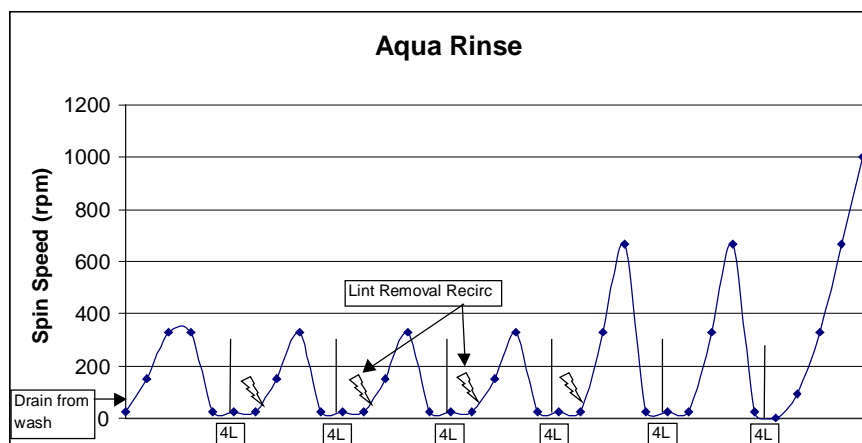
- Aqua Rinse
- Spray and Deep Rinse
- Fabric Softener Rinse
- Double Deep Rinse
- Allergy Rinse

The default rinse varies for each cycle, and the rinse may vary if the user selects certain options. All High Efficiency cycles default to an Aqua Rinse, while if Conventional is selected, a Spray and Deep Rinse is used. Bulky cycles use a Double Deep type rinse, as does Handwash. The majority of Lifestyle cycles use either a Spray and Deep or Double Deep rinse.

## AquaRinse

The Aqua Rinse is a spray rinse consisting of 6 sprays of 1 gallon (4L), 6 gallons (24L) in total. Despite the low volume of water used it is a good rinse, which removes most detergent and insoluble particles. Recirculation is utilised as part of the lint removal system.

1. The wash ends and the machine begins to drain. The basket begins to spin up and continues draining. At a slow spin speed (90rpm) basket balance and lid-lock are checked. Before the first intermediate spin commences, a pre-spin at 45rpm is completed, which measures the out-of-balance and decides whether the machine can spin.
2. The load is then gradually spun up to 330rpm, for 30secs. The basket is then slowed to 23rpm (stir speed).
3. Four litres of cold water is added (with a spray time of 22 seconds). This water is recirculated for at least 1 revolution of the basket to remove lint from the outside of the basket. The water is then drained and the basket spun up to 330rpm for 30 seconds.
4. This repeated for four sprays.
5. The basket is slowed to 23rpm (stir speed). 1 gallon (4L) of cold water is added (with a spray time of 22 seconds). The water is then drained and the basket spun up to 670rpm for 1 minute.
6. Step 5 is repeated twice (a total of 6 sprays so far).
7. After the 6<sup>th</sup> and final spray the basket stops, and the rinse program ends. Final spin up can now take place.





## **Adaptive Rinse**

The Aqua Rinse is a series of time-controlled sprays. These sprays are timed to give the correct water volume at 320kPA (standard) water pressure, but households frequently have lower water pressure. AquaSmart™ measures water pressure by timing the flow rate during fill and uses this information to extend the spray time if the flow rate is low to ensure that the correct amount of water is always used.

## **Spray Deep Rinse**

Spray and Deep is a good rinse combination - the spray removes a significant amount of detergent, while the deep rinse opens up folds in the clothes and acts as a finishing process. The spray section consists of three sprays of 1 gallon, interspersed with 300rpm intermediate spin-ups, and lint removal recirc (as in the Aqua Rinse). The deep rinse fills the basket to immersion water level and agitates for 3 minutes before proceeding to final spin. The fabric softener dispenser is flushed with water during the deep rinse in case the user has forgotten to turn Fabric Softener ON.

## **Fabric Softener Rinse**

The Fabric Softener rinse follows the same process as the Spray and Deep rinse. The fabric softener dispenser is filled and drained continuously during the fill to deep rinse, dispensing the fabric softener into the rinse water.

## **Double Deep Rinse**

Each deep rinse fills to the immersion water level and agitates for one-minute before draining. The two rinses are interspersed with a 300rpm spin. This rinse uses a lot of water, and is not as effective as many consumers may think. However, it is ideal for delicate or bulky items where the extra spinning involved in spray rinsing is not ideal. Fabric softener can be used with this rinse - it is dispensed during the second deep rinse.

## **Allergy Rinse**

The Allergy rinse is designed for situations when hygiene and thorough rinsing are important, and is the default rinse for the Allergy, Hygiene, Nappy Rinse, and Muddy lifestyle cycles. It is very effective at removing detergent, dirt, insoluble particles and debris from the clothes load. The Allergy rinse consists of a Double Deep rinse followed by three sprays interspersed with 300 rpm spins and a lint removal recirculation phase.

# The Motor

AquaSmart™ has a brushless DC motor, with 48 permanently magnetised ferrite poles. The stator has 36 electrically commutated poles and is controlled by 3 hall positioning sensors. The hall sensors provide the signal to electrically control the stator magnetic poles, via the current limiting switching electronics. The resulting magnetic field causes the rotor to rotate. The AquaSmart™ motor controller controls the switching sequence of electrical current to the stator.

The electrical power consumption of the motor is directly dependent on the load.

Speed range: 0 - 1000 rpm

Maximum torque: 28 Nm



**AquaSmart™ Stator**



**Curved Pole Tips**

Traditional auto-washers rely on a number of mechanical items to perform the functions required of a washing machine. For example, a gearbox for agitation, solenoids and clutches for spin, mechanical brakes to stop the basket, and timers and switches for the wash program. The Direct Drive technology utilised in AquaSmart™ has eliminated many of these mechanical parts, creating a simpler and inherently more reliable drive system.

Whereas traditional auto-washer motors are usually capable of two speeds, the speed of the DC motor is dependent on the amount of current it takes from the mains. It draws less current when it wants to go slowly, and more when it wants to go fast, a method that allows the motor to run at any speed. Power input (current) is dictated by the motor controller, which constantly senses the position of the motor (via the Hall sensor) and alters the current to suit.

The motor is directly coupled to the low profile agitator via a shaft, so that when the motor moves so does the agitator. Therefore when the motor controller senses the position of the motor it is in fact sensing the position of the low profile agitator. This allows AquaSmart™ to continually sense what is occurring in the wash basket and feed this information to the computer (motor controller), which then responds appropriately, adjusting speeds, water levels etc. The "brain" of AquaSmart™ is the result of years of wash performance testing and thousands of loads of washing. In comparison, a traditional washer continues unchanging, no matter what happens.

# Electronics

The AquaSmart™ electronics are made up of two primary parts – the motor controller and the display module. Both contain thousands of lines of electronic code, programmed following years of testing and development, and designed to deal effectively with any situation.

## **Motor Controller**

The AquaSmart™ Motor Controller is very similar to SmartDrive. Primarily it controls the electronic switching hardware to regulate the phase currents in the DC motor. The microprocessor cannot only accurately control the velocity of the motor but also the acceleration. Accurate control is necessary in order to perform all the different wash processes available in AquaSmart™. The motor controller module also performs a wide variety of other tasks ranging from switching water valves on and off, to precisely sensing basket float.

## **Display**

The Display module provides the link between the washer electronics and the user. The display microprocessor interprets the information provided by the user (e.g. cycle selection) and communicates this information to the motor controller. Feedback on selection is given to the user via the display screen, and other audible and tactile feedback including lights and beeps.

## **Diagnostics**

AquaSmart™ has extensive self-diagnostic ability, due to the microprocessor control, electronic drive, DC motor technology and intelligent software. If a service call is needed, the service person can extract a lot of information from the machine that will help to quickly determine the cause of the problem. At the time of a fault, the machine saves information such as cycle position, motor speed, water level, fault code, and cycle count. If the machine faults it will indicate the fault by displaying a message on the display screen, meaning the service person can diagnose the problem before they even arrive, making servicing quick and easy.

## **Sleep Mode**

Fifteen minutes after a cycle is finished the product goes to “sleep” by shutting down the power supply. This reduces the stand-by power of the product to just over 1 Watt.

## **Brownout Recovery**

If the mains power is temporarily removed and reconnected, AquaSmart™ will simply carry on where it left off in the cycle.

# User Interface/Display



The new soft touch display is a sleek, minimalist design, with a **dot matrix LCD display screen** acting as the information hub of the washer. AquaSmart™ has the most wash cycles and options of any Fisher & Paykel washer yet. It features a multi-layer menu structure.

The new dot matrix screen allows us to present information in a simple, clear way, as the user needs it.

While simple interaction is important, we are also able to include extended functionality that is easy to interact with. People can access the information they want, when they want it and in the language they want.

This technology gives us great advantages in terms of usability, consistency and flexibility.

## ***It's about simple tasks and decisions***

We have based the display logic on the simple decisions consumers make as they use the product. The focus is on the user and their task, rather than the technical workings of the machine.

The depth of information and customization caters for different types of users:

1<sup>st</sup> level = simple choices

2<sup>nd</sup> level = wash option selection, more technical

3<sup>rd</sup> level = machine settings, wash option customization, most technical

Only need to go as far as the users feel comfortable

We have created our own unique F&P logic for the display interface, drawing our inspiration from many sources to ensure that the logic that we created did not conflict with the logic that people have become familiar with in other products.

## ***Share some of the Fisher & Paykel knowledge.***

We can share some of that knowledge with consumers by offering simple solutions to the tasks they are performing. We can also provide information that will inform their understanding of the products functionality through the display. This helps them to get the most out of the product.

## ***Understanding and confidence in technology***

We have utilized the interface to inform the user of machines performance and progress – enabling greater understanding and confidence in the functionality and technology, particularly for auto sensing phases.

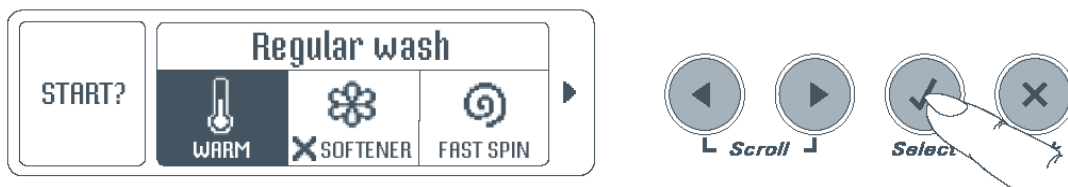
## ***Interface elements – Consistency and Flexibility***

This new style of accessing information will become consistent across the product family. All future products will use the same language, style, format and information structure including menu, shortcuts and settings. The consistent application of icons and functionality builds up an 'F&P language'. Commonality also provides some advantages in shared mechanical and software development, components and manufacture, as well as familiarity for the user.

When you first turn AquaSmart™ on, the main wash cycles are displayed. Highlight the chosen wash cycle using the SCROLL keys and press SELECT.



The wash cycle options will then be displayed for the chosen cycle. Wash options can be easily modified by using the scroll keys to select the appropriate option, and pressing the SELECT key.



The wash option setting can then be modified using the scroll keys. Once the new setting has been selected, a prompt will come up which gives you the option to save this setting for all future washes.



Once START/PAUSE has been selected and the cycle started, animations appear on the screen demonstrating what function is being performed, along with ongoing information regarding the chosen wash options and time remaining.



# Construction

At first glance the Aquasmart looks similar to the GWL15 and IWL16 but in fact most parts have been re-designed or modified in the Aquasmart. The suspension, outer basket, inner basket, neck ring, agitator, top-deck, display, fascia, electronics, pump, valves, and many more small parts have been redesigned. In fact the wrapper and lid and nozzle are the only parts unchanged from the previous models and the nozzle is a recent addition to the GW and IW to improve their water consumptions and rinse performance.



AquaSmart™ is a large, sturdy washer manufactured from quality materials, with a clean, sophisticated facade reminiscent of European styling. An innovative fascia with display screen and soft touch buttons has been developed especially for the product.



The durable, low maintenance lid is constructed from a co-injected composite of virgin ABS skin with a glass bead filled SAN core. This composite material is characterised by its strength, ease of cleaning, non-scratching surface and relatively low weight.



A wide mouth opening to allow easy access for loading and unloading washing, as well as increasing the perceived capacity of the machine. The smoothly contoured top-deck assists with loading, and adds to the sleek styling. AquaSmart™ has been designed to be as ergonomic and user friendly as possible.

# Mechanical Components

## **Outer Tub**

The outer tub is made of polypropylene, which is inherently resistant to chemical attack. The outer tub is moulded over a machined aluminium extrusion to form one of the main structural elements of AquaSmart™. It also features chutes to assist in the dispensing of detergent and fabric softener and moulded vanes in the bottom, which help to break up detergent, minimising detergent residue.

## **Inner Basket**

AquaSmart™ has a dual-cavity upper balance ring that is designed to provide both dynamic balancing during spin and structural stiffness to the upper part of the inner basket.

The basket base has small buffers (bumps) around the outside that encourage movement of the load during the wash. The basket base also provides passive balancing during spin and the structure for the inner basket assembly. All chambers in the basket base are activated (compared to just the inner chambers in the large SmartDrive™ Phase 7 machines).



The stainless steel wash basket provides a hygienic and easy to clean surface that does not chip or retain odours. The corrugations pressed into the basket are the key to the excellent water extraction that characterises AquaSmart™, giving the basket the necessary strength to make the 1000-rpm spin safe. The water is centrifuged outwards from the clothes and downhill from the top of the ridge to the valley and out the holes. Water-filled balance rings help to balance the basket during spin, flowing to the opposite side of the ring from the out of balance load.

## **Straps/Suspension**

Four suspension rods suspend the basket assembly and isolate the cabinet from the forces and vibrations that occur during the wash cycle. The suspension design has been modified from SmartDrive™ to provide increased dampening required by the new inner basket.

AquaSmart™ also has four elastomer straps that attach between the neck ring and the cabinet. These act as motion limiting devices, preventing the outer basket contacting the wrapper during agitate while supporting the wash action.

## **Single Shaft**

Like SmartDrive™, AquaSmart™ has only one drive shaft and, hence, only requires one seal. In traditional washers there two drive shafts: one to work the agitator and another to spin the basket. Each drive shaft must have a separate seal to allow them to work.

Fisher & Paykel's engineers have eliminated the second shaft and seal by designing the inner basket in such a way that it 'floats' upwards when water is in the machine and sinks down again when the water is pumped out. When the basket is floating, the shaft only drives the low profile agitator and the basket is free to move around. As the water in the tub is pumped out, the basket sinks and two sets of teeth engage, locking the basket to the shaft. This then allows the shaft to drive both the low profile agitator and the basket together, which is necessary for spinning.

## **Wrapper**

The wrapper (cabinet) is made of galvanised pre-painted steel to ensure a long, durable life.

## **Low Profile Agitator**



AquaSmart™ has a low-profile agitator that moves back and forth to “jiggle” the clothes gradually from the centre of the basket to the outside of the basket in a reverse-toroidal motion. The load gently rolls over, with each item being pushed up from the centre and turning over to disappear down the side in turn. We call this “blooming”, as it forms a flower like shape.

## **Pump**

AquaSmart™ uses SmartPump, an in-house design with central impeller, two outlet ports and a flapper. Its main advantage is that it eliminates the wax actuating valves used in the previous models and enables a quick change from drain to recirculation. The impeller spins to move the flapper to cover the appropriate port. It also has the ability to maintain a constant flow rate, automatically adjusting to drain heights up to 8 ft, and increasing pump speed as the pump efficiency drops throughout its life. SmartPump also has the ability to detect and attempt to recover from blockages.

## **Valves**

The AquaSmart™ washer has blue Invensys valves, which have both a digital hot and digital cold valve, both fitted with a 2½ gallons/min (10 L/min) flow restrictor. The cold valve flow rate was reduced from 4 gallons/min (16 L/min) in an effort to improve consistency in basket float values. A second set of valves controls the detergent dispenser and fabric softener siphon.

The AquaSmart™ washer has a pressure transducer, which can provide a reading of the water level height with an accuracy of 3/5” (±15mm). Each individual machine is calibrated during production to achieve this level of accuracy. The pressure transducer enables the product to both sense very small amounts of water and to sense any water level accurately. The software also monitors fill rates and drain rates continuously, which the product uses for fault diagnosis.

## **Top Deck and Dispensing System**

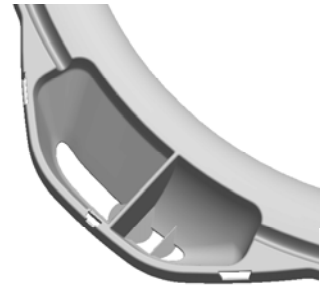
The top deck provides a detergent and fabric softener dispenser. The detergent dispenser is essentially a loading chute that directs detergent down into the funnel in the neck ring.

The fabric softener dispenser provides a well for holding the softener until it is dispensed during the deep rinse. Rinse water is used to siphon out the softener and flush the well. It is important that the Fabric Softener dispenser is not filled above the max level as this will cause it to be prematurely siphoned into the bowels of the washer.



## **Neck Ring**

The polypropylene neck ring was re-designed for AquaSmart™ and serves a number of functions. It is shaped to create a desirable spray pattern for recirculated water. It also contains receptacles for the dispensing system, separating detergent and fabric softener, and directing them down the wall of the outer tub. The neck ring also provides stability to the shape of the outer tub.



*Above. Section of neck-ring, showing receptacles for the dispensing system.*

## **Nozzle**

A new nozzle was designed for AquaSmart™ to improve the pattern of inlet water onto the load, and also to ensure efficient performance under all water pressures. This new nozzle design is the key to being able to decrease the Water Consumption without sacrificing Rinse Performance. The previous nozzle directed a portion of the water straight down the drain without touching the clothes. This new nozzle ensures this does not happen.

We used this nozzle to achieve the Water Factors of 7.2 and 6.9 in the GW and IW products in January 07, so although it was designed for the Aquasmart we actually got to production in the current products first.

## **IMD Fascia**



AquaSmart™ has an in-mould-decorated (IMD) display with smooth, capacitive touch buttons that are very sensitive, and require only the gentlest touch to activate. The feel of the buttons can be compared to those on the Dishdrawer or an ipod. The buttons also have positive audible and tactile feedback including lights and beeps. A high-resolution dot matrix display indicates selections and wash progress.

# Detergent



## Type

Even though AquaSmart™ is a top-loading washer, it is a High Efficiency machine and requires a low foaming High Efficiency (HE) detergent due to the low water volumes. These detergents are available in both liquid and powder forms. For the best results we would recommend using liquid HE detergent.

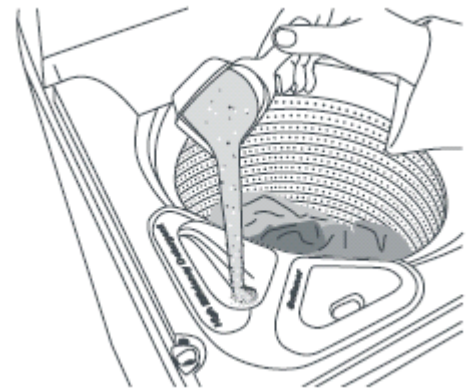
## Dosage

Use the instructions on the detergent packet as a guide to the correct amount to use. The correct amount of detergent will vary depending on the size of the load and how heavily soiled it is. For example, work clothes and gym gear will require more detergent than towels. Detergent dosage will also vary to suit individual conditions i.e. more detergent is needed in areas of hard water.

## Where?

Detergent is placed in the specially designed dispenser, found on the front left of the machine.

- 1 Detergent is kept separate from the clothes until it is dissolved, which happens as soon as possible, so as not to damage fabric
- 2 The dispensing system, specially designed ribs and the recirculating Eco Active Wash help dissolve, disperse and dilute the detergent
- 3 Detergent is kept in solution as much as possible and foaming is kept to a minimum, so detergent action is maximised



*Above. Adding detergent to the detergent dispenser.*

## How it works

When detergent is poured into the dispenser most will fall straight through into the sump (the gap between inner and outer tub). For the first 1 inch (25mm) of fill, the basket is stationary and water is flushed through the dispenser. This removes any leftover detergent, and helps to dissolve detergent.

Once the 1 inch (25mm) water level has been reached the dispenser stops being flushed, and the basket starts stirring. Water and detergent mix together in the sump to dissolve the detergent. The specially designed ribs (or vanes) in the outer tub base create turbulence to ensure the detergent dissolves before it is circulated onto the clothes.

When using the shorter cycles like Delicate we recommend you use liquid detergents or dissolve the powdered ones in a cup of warm water first. This will help prevent detergent residue.

# Fabric Softener



## Type

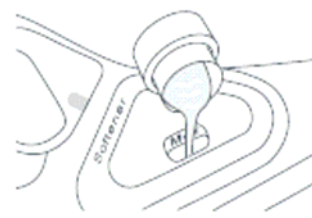
Yes, you can use liquid fabric softener in AquaSmart™. However Fisher & Paykel do not recommend the use of in-wash liquid fabric softeners as they can produce a waxy build up known as scrud inside the machine, damaging your appliance. Instead we advise using dryer softener sheets, which are added to your clothes in the dryer. However, for those people who prefer using liquid fabric softeners, AquaSmart™ does have a fabric softener dispenser.

## Dosage

Use the manufacturer's instructions on the fabric softener packet to carefully measure the right amount to use. Thinner varieties are recommended as they dispense more cleanly than thick liquids. Dilute thicker varieties with water.

## Where?

A fabric softener dispenser is located on the front left of the machine, next to the detergent dispenser. The dispenser is designed to keep fabric softener separate from detergent, preventing the formation of scrud. It is important that the Fabric Softener dispenser is not overfilled, as this will contribute to the formation of scrud. The dispensing funnel has a "Max Fill" line that should not be exceeded.



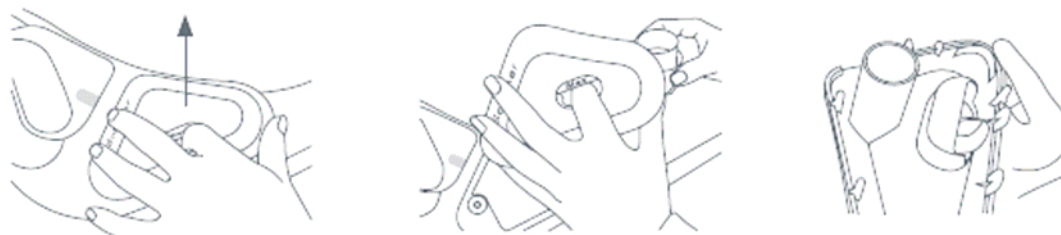
*Above. Adding softener to the fabric softener dispenser*

## How it works

The fabric softener works by filling the well with water, and siphoning the softener out down into the sump. This water/fabric softener mix is then further diluted and spread throughout the load.

Fabric softener requires a deep rinse to be evenly distributed through the load, so must be used with either a Fabric Softener or Spray and Deep Rinse. **If High Efficiency mode is ON, then Fabric Softener must be selected in the Wash Options menu.** This changes the rinse to a spray and deep rinse. If a Conventional cycle is done, then fabric softener will automatically be dispensed in the deep rinse. All deep rinses will flush the fabric softener dispenser during fill in case the user forgets to select the fabric softener option.

The fabric softener dispenser needs to be washed frequently to prevent residue from building up. The dispenser is designed so the top part (funnel) can easily be removed, and may be washed in a dishwasher or simply held under the tap and wiped clean. The siphon tube remains in place, and may have become blocked. If so, clean with a damp cotton bud.



*Above. Removing the fabric softener funnel*

When the funnel is removed a yellow bubble is visible. This is used for levelling the machine during installation. The funnel must be replaced before washing can begin to avoid leaks.

# Bleach



## **Type**

We recommend the use of a detergent with built in bleach. If you do wish to use liquid bleach please follow the following instructions carefully.

AquaSmart uses only a small volume of water to wash a load of laundry, and because of this concentrated wash liquor AquaSmart needs only approximately **half** the recommended dose of liquid bleach. This gives the same result as a full dose of bleach.

To use liquid bleach select the **WHITES** cycle and select the **BLEACH** icon in the wash options menu. This will allow you to turn Bleach ON. Your washer will automatically pause 9 minutes into the wash cycle and unlock the lid to allow you to add bleach. This will ensure that bleach is added to the cycle at the correct time for optimum effectiveness. Pour diluted bleach into the detergent dispenser, and press START to continue the wash cycle.

Examples of liquid bleach: Clorox, Clorox 2, Clorox 2 powder, Clorox Advantage.

## **Dosage:**

We strongly recommend that our customers use half the dose of bleach that they used in their previous machines. For example for Clorox liquid use  $\frac{1}{2}$  cup, for Clorox 2, use  $\frac{3}{4}$  cap, Clorox advantage use  $\frac{1}{2}$  cup. This is because during the Aquasmart wash, the clothes are in a much smaller volume of wash liquor. As a result the concentration of the bleach is much higher. You only need to use half as much to get the same result. For smaller loads even less bleach is needed. Consistently using too much bleach may decrease the life of your clothes.

## **Where?**

Diluted liquid bleach must be poured into the detergent dispenser, 9 minutes into the wash cycle, when instructed by the washer. Powdered bleach should be poured into the detergent dispenser with laundry detergent before the start of the cycle.

# Hygiene

## **Background**

Micro-organisms such as bacteria, fungi, parasites, and viruses are a major cause of human disease. Bacteria are by far the most significant of these, accounting for approximately 90% of human infections. The human body has a large number and variety of bacteria present both on the skin and in the digestive tract. These mostly perform tasks that are useful, or even essential, to human survival and are expected to be present. Under normal circumstances they do not cause disease and are termed 'normal flora'. These bacteria, when found in abnormal numbers or spread throughout the wrong parts of the body can cause disease and/or odour, as can a number of bacteria found in the environment.



*Above. Bacteria grown from wash water*

One function of washing clothes is the elimination of such disease causing organisms (known as 'pathogens'). A hot wash is one way to do this- almost all bacteria (including common disease causing bacteria such as *E. coli*) will be killed at temperatures of 158-194°F (70°C-90°C). However, using hot water on every cycle is inefficient, impractical and costly. A combination of other factors, including detergent, wash action, and rinse performance will affect bacteria removal from clothes.

## **The Aquasmart™ Difference**

Testing has shown the AquaSmart™ Regular High Efficiency cycle has better than average hygiene and rinse performance, **even in cold water**. However, some situations require specific care and attention. The AquaSmart™ has several cycles designed especially for these cases.

### ***When someone is ILL or has an INFECTION:***

Washing can help prevent spreading of infection and re-infection. Use the Hygiene Cycle (which is especially designed for such situations: LIFESTYLES > FAMILY > HYGIENE). Avoid leaving washing sitting damp before or after washing as this encourages bacterial growth. Hanging washing in the sun to dry or setting the dryer to a high temperature also helps. The Hygiene cycle uses a Hot Eco Active wash. This very concentrated detergent solution at 140F is extremely effective at killing bugs. We follow this with a warm agitate and lengthy rinses to remove all traces of detergent etc.

### ***For those prone to ALLERGIES:***

For those prone to allergies from grass, pollen, dust mites and detergent, or people with sensitive skin the Allergy cycle is the best option. It kills mites, thoroughly washes garments and intensively rinses clothes so the least possible amount of allergens remains in garments after washing. Select LIFESTYLES > FAMILY > ALLERGY. This also uses a hot Eco-active wash but with even more rinsing.

# AquaSmart™ Functionality

## Dual Mode

In High Efficiency mode, AquaSmart™ fills with just enough cool water to lift the clothes off the low profile agitator (see automatic water level, below). As the agitator rotates, the clothes gently roll over each other. This mode uses minimal water, similar to many front loaders, with the benefit of water savings and higher detergent concentrations, maximising soil removal.



Conventional mode is similar to the Immersion wash traditionally used by top-loading washing machines. Cool water is added until the load is completely submerged. This mode is recommended where extra water is an advantage to help dilute and flush away sediment, excess dye etc.



Heavy Duty and Delicate are the only cycles that can be used in both modes; the others are restricted to one. The Regular cycle can be used in the "High Efficiency" mode only for Standards reasons. If we had dual modes for the Regular cycle the Water Factor would be the average of each mode.

## Fully Automatic Water Level

AquaSmart™ has no set water levels – the selection of water level is entirely automatic, and is individually sensed for each load, ensuring minimal water usage and optimum performance (i.e. infinite number of water levels). AquaSmart™ determines the correct water level by filling just until the basket "floats". Testing has shown that this is enough water to enable the clothes to turnover well. The basket float level is also used to help determine the appropriate wash action. Achieving clothes turnover is dependent on good contact between the clothes and the Low profile agitator. This helps understand why we do not allow customers to select their own water level. Too much water decreases the plate-clothes contact and the wash action is compromised.

## Top Up

As air is removed from the clothes during agitation, the water level naturally drops. The software compensates by performing a "top up" of cold water to increase the water level back to its original level during agitation. There is a maximum top-up limit of 10 3/5" (270mm).

## Wash Water Temperature Control

Unlike most top-loading washers, AquaSmart™ measures the incoming water temperature with a thermistor, which is accurate to within 2°F (1°C).

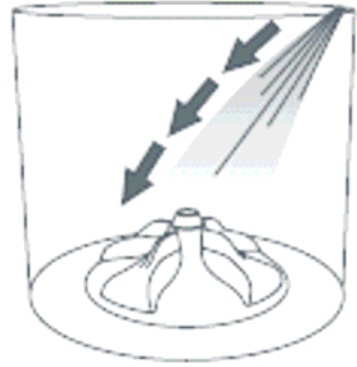
### **Water Valves:**

- Cold Valve - Digital with 2.6 gallons per minute flow restrictor
- Hot Valve - Digital with 2.6 gallons per minute flow restrictor

Both hot and cold water valves are digital meaning that the flow of water is either on or off. Feedback from the thermistor is used to control water flow rates so the incoming water is mixed to the selected wash temperature (Cold, Cold+, Warm/Cold, Warm, Warm/Hot, Hot).

## Eco Active Wash

AquaSmart™ begins each cycle with an Eco Active wash, designed to activate detergent and use hot water more efficiently. Just enough warm water is added to the machine so the clothes are saturated. This creates a highly concentrated detergent solution that is circulated through the clothes – the sudsy water is diverted up a special portal and is sprayed back over the clothes in a waterfall effect. This process thoroughly dissolves and activates the detergent, and the high detergent concentration ensures optimum soil removal.



## Pre Bowl/ Basket Float

The filling procedure begins by testing for basket float (a process known as prebowl) in order to gain an indication of the load size. This is done by periodically accelerating the motor to test the inertia of the system. Inertia is decreased dramatically at the point of clutch disconnection. Once the basket float level has been measured, filling will cease and agitation can begin. Where Conventional cycle has been selected, an immersion water level is calculated as an offset of this basket float value.

## **AGITATE**

### 23 Rpm Stir

The AquaSmart™ DC motor allows the basket or agitator to be moved at any speed. During fill, the basket is rotated slowly (23 rpm) to ensure even wetting of the clothes (except for the first 1 inch (25mm) when water is flushed through the detergent dispenser, during which the basket is idle).

## Variable Profiles

AquaSmart™ has an intelligent system that uses the basket float value to calculate a wash profile based on a wash curve ( $y=mx+c$ ), rather than a set of discrete values, such as SmartDrive™ uses. The advantage of this system is that, in combination with load composition sensing, each load will have an individual water level and wash profile specifically tailored for it. Each wash will use at least two different profiles – an initial profile, that is more vigorous and is designed to instigate blooming in the first part of the wash, and a turnover profile, that is used for the majority of the wash. AquaSmart™ will revert to the initial profile for 10-seconds every minute to help continue load turnover.

### **How does it work?**

Once the basket float value is determined, this is used to determine the wash profile based on a series of wash curves.

For example, the speed is calculated using the wash curve  $y= 41x + 28$ , where  $x=$  basket float. If the basket float value was 170, then the speed of the agitate stroke would be 98rpm ( $y= (0.41 \times 170) + 28$ ).

SMALL LOADS BF $\leq$ 199 VALUES				
	Initial		Turnover	
	m	c	m	c
Speed	41	28	40	30
Ramp	-6	117	15	91
Plateau	-4	45	-7	49

Above. Example of some wash curves used by AquaSmart™ to determine wash profiles via  $y= mx+ c$  curve, where  $x=$  basket float value.

## **Load Composition Sensing**

Different load types behave very differently when washed in AquaSmart™ due to varying mixes of fabric types and weights. Two main load types commonly used were identified – heavy/mixed loads and cotton/light loads. Heavy mixed loads require more vigorous profiles in order to bloom and continue to turnover adequately. However, the higher speed and longer plateau required for these loads are very rough on cotton/light loads, causing bunching and precessing, and making it harder to bloom. In the development of this product it became very clear that a single wash action was not going to work for both load types.

To counter this, the AquaSmart™ team developed a unique load composition sensing technique that measures the motor current in order to assess how the load is coupling to the plate, and adjusts the wash process accordingly. This process means each load will get a customised wash action to best suit the load type.

## **Blooming**

The AquaSmart™ wash action differs to traditional top loader washing machines. The low profile agitator gently rolls the clothes over each other in a reverse-torrodial motion. Items at the bottom are slowly pushed up through the centre, and gently roll over, move to the edge of the basket and work back towards the middle again. This process looks like a flower blooming, hence the name.

## **Recovery Mode**

AquaSmart™ relies on loads blooming in order to achieve good wash performance results. Sometimes blooming is prevented by large items getting stuck over the top of other items (engulfing/ bridging), or if the load is distributed unevenly (bunching). AquaSmart™ has the ability to detect when engulfing or bunching occurs, and corrects this by implementing Recovery mode. The first Recovery sequence simply uses a more vigorous profile to help initiate turnover. If this sequence is not successful, then a second Recovery sequence is initiated. The second sequence involves adding more water and using a specially designed wash action. The wash time may also extend to ensure that adequate washing has occurred.

## **Smart Pump**

The new Smart Pump replaces the need for an additional diverter valve to change the flow of the water from recirculation to drain. The transition from one mode to another on the previous waxed actuated valve was not immediate, as it relied on a thermally activated actuator. This meant that the drain or recirculation phase of the wash could not start until the diverter valve was in the correct position, which could taken up to 3 minutes (depending on the ambient temperature)- Smart Pump has done away with these time delays. The advantage of the new Smart Pump system is that it can divert water from recirculation to drain in a matter of seconds.

## **Automatic Lint Removal System**

AquaSmart™ has a self-cleaning lint removal system that works by continuous water circulation, resulting in the separation of lint from the wash liquor. As a result of the agitator action, lint and wash liquor are sucked underneath the low profile agitator into the cavity between the inner basket and outer tub. The extruded holes of the inner basket are shaped to allow the wash liquor to flow back into the basket, but prevent the lint from following. The lint then floats to the surface of the water between the inner and outer tub where it remains until it is flushed out the drain at the end of the wash cycle.

A lint removal system is also utilised during the AquaRinse, where rinse water is re-circulated at low speed for at least one revolution of the basket, flushing lint from the outer tub and draining it away.

# SPIN

## **1000 Rpm**

The AquaSmart™ washer has an inherently balanced direct-drive DC motor that allows us to achieve higher spin speeds than with a conventional belt-driven AC motor.

## **Pre-Spin**

Before commencing spin AquaSmart™ will rotate the basket at 45rpm to check that there is not a severe out-of-balance load. This helps to prevent cabinet denting - if a large out-of-balance mass is detected then spin will not be attempted. Pre-spin is completed at the end of the wash, before the first intermediate spin, and before the final spin.

## **Oversuds Detection**

The intelligent electronics in AquaSmart™ can detect excess friction in the basket during spinning caused by over-sudsing (too much foam) and the machine compensates accordingly. It will initially stop, drain for a period, and then retry spinning. If over-sudsing is still detected, the product will stop and report it. Once again, this is only possible because of the motor technology utilised by AquaSmart™.

## **Intelligent Out of Balance Response**

The response of the machine to an out-of-balance load (OOB) is dependant on the cycle position, and what the machine is doing at the time. The user also has some control over this via the Setting menu. For example, if an out of balance load is detected at 1000rpm, the machine will slow down to 700rpm and continue. If it the machine is still out of balance, it will stop and report an OOB fault, or if the OOB recovery option is set (turned ON in Settings menu), it will re-fill with water, agitate (to re-distribute the load), drain and spin again.

# Safety Features

## **Auto Drain**

Unsupervised clothes washers filled with water can present a drowning hazard to children and animals. AquaSmart™ has been programmed to recognise when this hazard occurs, and to react by draining water to a safe level. If AquaSmart™ is paused at any time during the cycle, Auto Drain will be activated after 3 minutes.

## **Lid Lock**

AquaSmart™ has a lid lock that is engaged for nearly the whole cycle to prevent the customer from potential hazards of moving parts. It also prevents a child or pet drowning in the large open basket. Special sensing circuitry and intelligent software allow us to sense that the lid-lock mechanism has correctly engaged. The lid-lock has a locking pin that can only be engaged with the lid in place. If the pin is not able to engage correctly (e.g. if the lid is open or a fault has developed), the electronics sense resistance and recognises the fault. The machine will not then spin up.



As an added safety feature, AquaSmart™ performs a slow, torque-limited stir for 5 seconds before locking the lid. This is so that if a small child is trapped in the basket with the lid closed, they have a chance to push the lid open when they feel the basket starting to turn, before the lid is locked.

## **Flood Protection**

Flood protection operates continuously by constantly monitoring the water level. If it detects the water is above a predetermined "flood" level then the pump will turn on and drain water until the appropriate water level is reached. This reduces the chance of overflow occurring.

# AquaSmart™ Cycles

AquaSmart™ has a large range of cycles – Regular, Sheets, Whites, Colours, Heavy Duty, Easy Iron, Delicate Bulky (Synthetic Comforter, Feather Comforter, Sleeping Bag, Jacket, Blanket, Throw), Rinse & Spin, and Spin Only, as well as 19 pre-programmed Lifestyle cycles.



## Regular

High Efficiency Mode ON – for normally soiled everyday cotton loads eg. towels, sheets, t-shirts, shirts, shorts

Conventional Mode (High Efficiency OFF) – unavailable

	<b>High Efficiency ON Default Mode</b>	<b>Conventional Mode High Efficiency OFF</b>
<b>Wash Time</b>	12-15 minutes	N/A
<b>Wash Action</b>	Regular High Efficiency	
<b>Recirc Temperature</b>	Warm	
<b>Recirc Time</b>	3 minutes	
<b>Fill Temperature</b>	Controlled Cold	
<b>Rinse Sequence</b>	AquaRinse	
<b>Rinse Timing</b>	6x 22 second (adaptable) rinses	
<b>Spin Speed</b>	Fast (1000rpm)	



## Sheets

High Efficiency Mode ON – unavailable

Conventional Mode (High Efficiency OFF) – Recommended cycle for sheets, tablecloths, and comforter covers.

	<b>High Efficiency ON</b>	<b>Conventional Mode High Efficiency OFF Default Mode</b>
<b>Wash Time</b>	N/A	15-16 minutes
<b>Wash Action</b>		Bed Sheets Conventional
<b>Recirc Temperature</b>		Warm
<b>Recirc Time</b>		3 minutes
<b>Fill Temperature</b>		Controlled Cold
<b>Rinse Sequence</b>		Spray and Deep
<b>Rinse Timing</b>		3x 22 second sprays + 3 minute deep rinse
<b>Spin Speed</b>		Fast (1000rpm)



## Whites

High Efficiency Mode ON – unavailable  
 Conventional Mode (High Efficiency OFF) – ideal for white garments and incorporates a bleach option.

	High Efficiency ON	Conventional Mode High Efficiency OFF Default Mode
<b>Wash Time</b>	N/A	12-15 minutes
<b>Wash Action</b>		Regular Conventional
<b>Recirc Temperature</b>		Warm/Hot
<b>Recirc Time</b>		3 minutes
<b>Fill Temperature</b>		Warm/Cold
<b>Rinse Sequence</b>		Spray and Deep
<b>Rinse Timing</b>		3x 22 second sprays + 3 min deep rinse
<b>Spin Speed</b>		Fast (1000rpm)



## Colors

High Efficiency Mode – ideal for delicate, lightly soiled items.  
 Conventional Mode (High Efficiency OFF) – For new or colored items that may release dye during the wash.

	High Efficiency ON	Conventional Mode High Efficiency OFF Default Mode
<b>Wash Time</b>	N/A	6 minutes
<b>Wash Action</b>		Regular Conventional
<b>Recirc Temperature</b>		Controlled Cold
<b>Recirc Time</b>		3 minutes
<b>Fill Temperature</b>		Controlled Cold
<b>Rinse Sequence</b>		Spray and Deep
<b>Rinse Timing</b>		3x 22 second sprays + 3 minute deep rinse
<b>Spin Speed</b>		Fast (1000 rpm)

## Heavy Duty



High Efficiency Mode – high temperature wash to keep white garments looking white.

Conventional Mode (High Efficiency OFF) – ideal for white garments where more water is important.

	<b>High Efficiency ON Default Mode</b>	<b>Conventional Mode High Efficiency OFF</b>
<b>Wash Time</b>	12-15 minutes	12-15 minutes
<b>Wash Action</b>	Regular High Efficiency	Regular Conventional
<b>Recirc Temperature</b>	Warm/Hot	Warm/Hot
<b>Recirc Time</b>	3 minutes	3 minutes
<b>Fill Temperature</b>	Warm/Cold	Warm/Cold
<b>Rinse Sequence</b>	AquaRinse	Spray and Deep
<b>Rinse Timing</b>	6x 22 second (adaptable) rinses	3x 22 second sprays + 3 min deep rinse
<b>Spin Speed</b>	Fast (1000rpm)	Fast (1000rpm)



## Delicate

High Efficiency Mode ON – ideal for delicate, lightly soiled items.

Conventional Mode (High Efficiency OFF) – when you want to wash your delicate items in more water.

	<b>High Efficiency ON</b>	<b>Conventional Mode High Efficiency OFF Default Mode</b>
<b>Wash Time</b>	6 minutes	6 minutes
<b>Wash Action</b>	Delicate High Efficiency	Delicate Conventional
<b>Recirc Temperature</b>	Warm/Cold	Warm/Cold
<b>Recirc Time</b>	3 minutes	3 minutes
<b>Fill Temperature</b>	Controlled Cold	Controlled Cold
<b>Rinse Sequence</b>	AquaRinse	Spray and Deep
<b>Rinse Timing</b>	6x 22 second (adaptable) sprays	3x 22 second sprays + 3 minute deep rinse
<b>Spin Speed</b>	Slow (300 rpm)	Slow (300 rpm)



## **Easy Iron**

High Efficiency Mode ON – Unavailable

Conventional Mode (High Efficiency OFF) – the recommended cycle to minimize wrinkling.

	<b>High Efficiency ON</b>	<b>Conventional Mode High Efficiency OFF Default Mode</b>
<b>Wash Time</b>	N/A	12-15 minutes
<b>Wash Action</b>		Regular Conventional
<b>Recirc Temperature</b>		Warm/Cold
<b>Recirc Time</b>		3 minutes
<b>Fill Temperature</b>		Controlled Cold
<b>Rinse Sequence</b>		Spray and Deep
<b>Rinse Timing</b>		3x 22 second sprays + 3 minute deep rinse
<b>Spin Speed</b>		Slow (300 rpm)



## **Bulky**

AquaSmart™ has six different bulky cycles – Synthetic Comforter, Feather Comforter, Sleeping Bag, Jacket, Blanket, and Throw. Each has slightly different water level curves and wash actions to accommodate their specific needs. However, the cycle sequence is the same for all cycles.

	<b>High Efficiency ON</b>	<b>Conventional Mode High Efficiency OFF Default Mode</b>
<b>Wash Time</b>	N/A	6 minutes
<b>Wash Action</b>		Appropriate Bulky Conventional
<b>Recirc Temperature</b>		Warm
<b>Recirc Time</b>		5 minutes
<b>Fill Temperature</b>		Warm/Cold
<b>Soak</b>		30 minutes
<b>Rinse Sequence</b>		Double Deep
<b>Rinse Timing</b>		1 minute Deep Rinse agitate
<b>Spin Speed</b>		Slow (300rpm)



## **Rinse & Spin**

High Efficiency Mode ON - This cycle allows you to select a water efficient rinse and spin only.

Conventional Mode (High Efficiency OFF) – This cycle allows you to select a rinse and spin only, using more water in the rinse for those situations that require it.

	<b>High Efficiency ON</b>	<b>Conventional Mode High Efficiency OFF Default Mode</b>
<b>Wash Time</b>		
<b>Wash Action</b>		
<b>Recirc Temperature</b>		
<b>Recirc Time</b>		
<b>Fill Temperature</b>		
<b>Soak</b>		
<b>Rinse Sequence</b>	AquaRinse	Spray and Deep
<b>Rinse Timing</b>	6x 22 second (adaptable) sprays	3x 22 second sprays + 3 minute deep rinse
<b>Spin Speed</b>	Fast (1000rpm)	Fast (1000rpm)



## **Spin Only**

This option gives you the ability to select a spin only. This option also allows you to customize the spin speed to meet your needs.

	<b>High Efficiency ON</b>
<b>Wash Time</b>	
<b>Wash Action</b>	
<b>Recirc Temperature</b>	
<b>Recirc Time</b>	
<b>Fill Temperature</b>	
<b>Soak</b>	
<b>Rinse Sequence</b>	
<b>Rinse Timing</b>	
<b>Spin Speed</b>	Fast (1000rpm) or as selected





## **Family**

Especially designed cycle to combat some common household washing situations.

<b>Cycle</b>	<b>Comforter</b>	<b>Allergy</b>	<b>Hygiene</b>	<b>Diaper Rinse</b>	<b>Soft Toys</b>
<b>Recirc</b>	5 minutes	3 minutes	3 minutes	No	1minute
<b>Recirc Temp</b>	Warm/Cold	Hot	Hot	N/A	Warm/Cold
<b>Wash Type</b>	Conventional + Soak	Conventional	Conventional	N/A	Conventional + Soak
<b>Wash Temperature</b>	Cold	Warm/Hot	Warm/Hot	N/A	Warm/Cold
<b>Wash Curve</b>	Duvet/Doona	Regular Conventional	Regular Conventional	Regular Conventional	Delicate Conventional
<b>Fabric Sensing</b>	No	Yes	Yes	N/A	Yes
<b>Water Level Curve</b>	Duvet/Doona	Immersion Curve	Immersion Curve	N/A	Water Level = 240mm
<b>Rinse</b>	Double Deep	Allergy Rinse	Allergy Rinse	Allergy Rinse	Double Deep
<b>Spin</b>	Slow (300 rpm)	Fast (1000 rpm)	Fast (1000 rpm)	Fast (1000 rpm)	Slow (300 rpm)



## **Sports**

Outdoor activities can create some unique washing challenges – these cycles are designed to deal with these tricky washing situations.

<b>Cycle</b>	<b>Sweaty</b>	<b>Muddy</b>	<b>Sports Shoes</b>	<b>Beach Gear</b>
<b>Recirc</b>	3 minutes	3 minutes + Pre-wash	1 minute	3 minutes
<b>Recirc Temp</b>	Warm/Hot	Cold	Warm/Cold	Cold
<b>Wash Type</b>	High Efficiency	Conventional	Conventional + Soak	Conventional
<b>Wash Temperature</b>	Cold	Cold	Warm/Cold	Cold
<b>Wash Curve</b>	Regular High Efficiency	Regular Conventional	Delicate Conventional	Regular Conventional
<b>Fabric Sensing</b>	Yes	Yes	Yes	Yes
<b>Water Level Curve</b>	N/A	Immersion Curve	Water Level = 240 mm	Immersion Curve
<b>Rinse</b>	Spray and Deep	Allergy Rinse	Double Deep	Double Deep
<b>Spin</b>	Fast (1000 rpm)	Fast (1000 rpm)	Slow (300 rpm)	Fast (1000 rpm)

## **Clean Up**



All "High Efficiency" machines have much less water flushing through them so it's important to regularly clean the machines to ensure no unhygienic build-ups occur.

We have equipt the Aquasmart with a "Clean-up" cycle that can be accessed through the Lifestyles –Sports-Clean up. It ensures the inner and outer baskets are kept clean and should be used without clothes and with detergent.

We are unsure how frequently it will be necessary to do this bit of maintenance but after 100 cycles the user will be reminded to do one. It is annoying but we are convinced we are not over-reacting to the problems we have seen in the Maytag Neptune and other High Efficiency machines. IEC have committed to having a test method to measure the amount of residue left to grow in machines. The term they have given to this is "Biofilm". Fisher & Paykel have decided to be proactive here and prevent build-ups. This is us leading, others will follow.

This cycle uses a hot wash to clean the basket and fabric softener dispenser, followed by a 2-hour soak, double deep rinse and quick spin.

The user will be reminded to complete a Clean Me cycle every 100 cycles.

## **Wash Options**

### **Customizing Options**

Nearly all of the AquaSmart™ wash options can be customized to the preferred settings of the user (except for the Lifestyle cycles, which are pre-programmed to provide the best performance for specific washing situations). For example, if the user wants to program the machine to always select Cold wash temperature or select a Fast spin speed, they can program this permanently (i.e. can change the default). To do this, select the appropriate wash option and change it to your preference. The machine will then prompt you "save for future washes? Select YES. Repeat for any other wash options. Your customised cycle will then be saved.

### **Intelligent Options Restrictions**

The software prevents the user from setting an option that is potentially damaging to the intended fabric type. For example, where Delicate has been selected, the user cannot choose a hot water temperature or a fast spin, as these options may damage delicate clothes.

### **Temperature Options**

AquaSmart™ has six temperature options. The temperatures may vary slightly depending on water pressure and extreme incoming temperature situations:

<b>Cold</b>	<b>Cold+</b>	<b>Warm/Cold</b>	<b>Warm</b>	<b>Warm/Hot</b>	<b>Hot</b>
Incoming from faucet	68°F (20°C)	91°F (33°C)	102°F (39°C)	115°F (46°C)	140°F (60°C)

## **Spin Speed**

AquaSmart™ has three spin speeds - Slow (330rpm), Medium (670rpm) and Fast (1000rpm). It is also possible to select No Spin. The spin speed may automatically decrease if an out-of-balance load is detected.

## **Fabric Softener**

When fabric softener is used, Fabric Softener must be turned ON. AquaSmart™ will then complete a Fabric Softener rinse, which correctly dispenses fabric softener onto the clothes.

## **Soak**

When Soak is selected AquaSmart™ will stop in the middle of the wash phase and soak for 2 hours before completing the cycle. During the soak period the washer will agitate for a few seconds every minute. Soak can be exited at any time and the cycle commenced by pressing the BACK key.

## **Delay Start**

Selecting Delay Start will delay the start of the wash cycle by the chosen time: between 15-minutes and 18-hours. Once Delay Start is selected the machine will begin the delay period. It is not necessary to press START/PAUSE. No beeps will sound at the end of the cycle if Delay Start has been selected.

## **Drip Dry**

When Drip Dry is selected AquaSmart™ will pause the machine at the end of the rinse before continuing into final spin. This allows delicate garments to be removed. AquaSmart™ beeps and displays a message to remind you to remove drip-dry items.

# How to Keep AQUASMART™ Clean

It is important to keep your AquaSmart™ clean. The lid and fabric softener compartments are all designed to be easily removed and cleaned.

## Lid

To remove the lid, open it fully, and, holding one side, gently pull the other side upward to remove from hinge. The other side can then be lifted and the lid removed fully, allowing easy cleaning of the hinge area. To replace the lid, hold the lid vertically and align both hinges before pushing down firmly.



*Above. Removing the lid for cleaning*



*Above. Removing the fabric softener funnel*

## Top Deck

Wipe down top deck, detergent and fabric softener dispensers using a soft damp cloth. The funnel of the fabric softener dispenser can be removed for cleaning by placing a finger down the centre and clicking off. Clean the siphon tube using a cotton

## Display

Clean display and screen using a soft damp cloth. Avoid using chemical or scouring cleaners, as these will damage the paint and plastic surfaces.

## Basket

The basket also requires washing occasionally, especially if cycles are done mostly in cold water and/or if fabric softener is used. To clean the inside of the washer, use the Clean Me cycle – LIFESTYLES > CLEAN UP > CLEAN ME. We recommend you use this cycle 5-6 times per year.

Residue can build up inside washing machines, and this should be prevented where possible. A muddy residue known as scum can also build up at the base of the machine and at the tide-line on the outer tub. Scum occurs when too little detergent is used, and consequently dirt cannot be held in suspension and flushed out of product.

The other residue that commonly builds up in a washer is known as scrud, and is a waxy residue that is very difficult to remove. Scrud occurs when detergent and fabric softener come into contact and can often be seen around the dispensing area or on the outer tub. Both of these residues can be prevented with correct use and care of the AquaSmart™.

## Low Profile Agitator

If the low profile agitator becomes stained, it can be easily cleaned using household bleach. Apply bleach sparingly to the agitator using a soft cloth, being careful to avoid metal parts. Allow the bleach to soak in for 10 minutes, then put the machine through a Clean Me cycle to remove any residual bleach. You may need to repeat this process.

# Problem Solving

AquaSmart™ is capable of diagnosing its own problems and will beep and display a message telling the customer what is wrong. If it is a problem that the customer is capable of solving it will give a musical series of beeps every 5 seconds.

## **FAULTS A CUSTOMER MAY BE ABLE TO FIX:**

### **"My load is out of balance":**

Wash load is out-of-balance.

Ensure the machine is stationary and level, then manually re-distribute the load.

Check that your machine is level (refer to Installation instructions)

### **"I am not getting any WATER":**

The taps have not been turned on.

Inlet hose filters are blocked, or hoses are kinked or squashed.

The drain hose is too low or the drain hose is pushed into standpipe too far and the water is siphoning out of machine.

The flow rate of supply water is too low.

### **"I am not getting any HOT WATER":**

Hot water supply is not hot enough to maintain the wash temperature you have selected.

Select a lower wash temperature.

Inlet hoses may be blocked or kinked.

Hot tap has not been turned on.

Inlet hoses connected to wrong taps.

The flow rate of supply water is too low.

### **"I am not getting any COLD WATER":**

Cold water temperature exceeds recommended limits.

Inlet hoses may be blocked or kinked.

Cold tap has not been turned on.

Inlet hoses connected to wrong taps.

The flow rate of supply water is too low.

### **"I am OVERLOADED":**

The machine is overloaded and cannot continue the cycle.

Ensure the machine is stationary and remove items until the remaining ones can move freely.

Check that the machine is not siphoning (refer to Installation instructions).

### **"I have too many SUDS":**

The machine has a suds build-up. Too much detergent was used for amount of soil in load.

Ensure that you are using a high efficiency or front-loading type detergent.

Wait for the suds to dissolve (~20mins).

Re-rinse clothing using the Rinse and Spin cycle, or run through another cycle.

### **"I can't LOCK THE LID":**

Check that the lid is closed.

Press START/PAUSE.

If symptom persists call your Fisher & Paykel dealer or Authorised Service Centre.

**If the AquaSmart™ has a fault that requires service it will continuously beep once every second.**

**Before you call for service...**

1. Turn your machine off at the wall,
2. Wait for 60 seconds and turn it back on.
3. Check the machine is level.
4. Remove load and retry.
5. Put through a Rinse and Spin cycle.
6. If the fault re-occurs turn it off at the wall.

If the machine will still not work then call Fisher and Paykel and/or an Authorised Service Agent to arrange service.

**Operating Problems**

**Pressing POWER does not turn the machine on:**

- Is the power switched on at the wall?
- Switch the power off at wall and wait 60 seconds before turning power back on again.
- Is your household power supply at fault? Try plugging in another electrical appliance.
- Key Lock mode may be activated. Try holding down the POWER button for 3 seconds (refer instructions)

**Pressing START/PAUSE does not start the fill:**

- Are both hot and cold taps turned on?
- Are the inlet hoses blocked or kinked?

**The machine is filling continuously:**

- Ensure standpipe or tub is at least 850-2400mm high.
- Ensure drain hose is located in standpipe or tub.

**Not spinning properly:**

- Is the load out of balance?
- Check the machine is level and does not rock.
- The machine has suds-lock. Wait 20 minutes and try again.

**Spin speed sounds slower than it should:**

- The clothes are unevenly distributed around the wash basket – AquaSmart™ has compensated by lowering spin speed for safety.

**Water level is low**

- Your machine is designed to automatically sense load size and minimise water use, therefore the water level may look different to your previous washer- this is normal

**Wash water temperature is not warm**

- This unique wash system uses two wash phases. The second phase can be cooler than the first to minimise energy use. This is normal and will not affect wash performance.

**Too many soap suds**

- First phase of the wash may create generous amounts of foam, check suds level after the fill phase of wash cycle.
- Ensure you are using a low suds or HE detergent.
- Try using a little less detergent, especially if garments are only lightly soiled.

**Small puddle of water coming from under machine:**

- The detergent dispenser may be blocked
- Fabric softener dispenser may not be fitted correctly
- Machine may have been overloaded, causing splash from clothes as machine filled. Try reducing load size or select Bulky cycle for large, bulky items.

**Wash cycle time is longer than usual**

- If water pressure is low, cycle times will increase due to longer fill times. Ensure inlet hose filters are not blocked.
- Recovery mode may have been initiated. Ensure your load is distributed evenly, and wash heavy or very large items separately.

**Adding water in the middle of the wash/ increased wash volume**

- Recovery mode may have been initiated. Ensure your load is distributed evenly, and wash heavy or very large items separately.

**Small amount of water in basket at the end of the cycle**

- It is normal for a small amount of water to be discharged from the nozzle at the end of the wash.

# Wash Problem Solving

Listed below are possible causes and solutions to some common wash problems.

## ***Creasing:***

- Was the washer or dryer overloaded?
- Selecting the Easy Iron cycle will minimise creasing.
- Try not to leave wet clothes in washing machine or laundry basket.

## ***Linting:***

- Was the washer overloaded?
- Wash lint-givers (e.g. towels, flannel sheets) separately from lint collectors (e.g. synthetics).
- Have you used enough detergent to hold lint in suspension?
- Over-drying in dryer can cause a build-up of static electricity causing them to collect lint.
- Try using a Conventional cycle.

## ***Poor soil removal:***

- Did you use enough detergent for load size or amount of soil? (Note: Hard water requires more detergent than normal or soft water situations).
- Are you using a good quality detergent?
- Is the washing machine overloaded?
- Separate heavily and lightly soiled garments.
- Use a wash temperature appropriate to soil type e.g. blood and mud are better washed in cold water, while oily soils are better in warmer water.

## ***Residue detergent:***

- Is the washing machine overloaded?
- Using too much detergent for the size of the load.
- Is your cold water less than 68°F (20°C)? – Select Cold + temperature option (rather than cold directly from the faucet).

## ***Dye transfer:***

- Remember to separate colors and whites.
- Wash non-colorfast items separately and select Colors cycle.
- Remember to remove items from washer as soon as the wash is finished.

## ***Tangling:***

- Separate larger items from smaller items.
- Use the Easy Iron cycle to wash shirts.
- Wash sheets using the Sheets cycle.

## ***Black or grey marks on clothes:***

- A build-up caused by the interaction of fabric softener and detergent can flake off and mark clothes. Mark clothes and put through a Clean Me cycle.
- Are you using enough detergent for the amount of dirt?