Household Detergent Powders

How many make the grade and how much is too much?

Does buying a high-priced detergent guarantee cleaner clothes or Grade 1 quality? What really is Grade 1? The detergent market is a highly competitive one where several brands vie with each other to get the customers' attention. Each brand claims to clean whiter and better, boasting of power pearls and of ability to fight granules, and so on. In all this, what consumers may end up overlooking are the chemical composition and quality of the detergent powder they use, though their implications for personal health and the environment are critical enough to merit closer attention and action. Does anyone also boast about being eco-friendly? And if they are not doing that and are all synthetic, do they extend you the courtesy of at least warning that some precautions are in order? Here, the *Consumer Voice* team checks out various brands of detergent powders to assess which features are most important to consider.

A Consumer Voice Report

To begin with, let us register the fact that neither did any of the tested brands of household laundry detergent powders qualify to be Grade 1 if seen against the yardstick laid out by the Bureau of Indian Standards (BIS), nor did any of the brands declare their grade as specified by the standard, it being a voluntary provision. There are three grades – 1, 2 and 3 – prescribed in this standard.

In fact, if we consider the very important parameter of how well detergents wash dirt or clean stains, then the test findings reveal that the

costliest detergents do not always have to be the best cleaners. The 'detergency' test establishes how well detergents can remove dirt from soiled cloths/fabrics.

We had purchased samples of 14 popular brands from the retail market and evaluated and graded them as per their overall performance based on comprehensive lab test reports. The comparative testing was carried out in an independent, reputed laboratory and was mainly based on the requirements prescribed in IS 4955: 2001.

The skin irritation and sensitization tests prescribed in the standard are to be ascertained by the manufacturers, who are expected to test the safety of their formulation before releasing it into the market. The requirement of biodegradability is prescribed for the Indian label Ecomark, but due to facility limitations and longer testing time this test could not be conducted.

The detergent market in India consists of two major categories: hand-wash and the machine-wash categories. Powder detergents and bar detergents form a major portion of the hand-wash segment. In the machine-wash segment, powder detergents and liquid detergents are the main types.

The laundry soap that had been traditionally used for washing of cloths/fabrics has limitations in terms of performing in highly alkaline or acidic water. In alkaline water, part of the soap is consumed to first soften the water and in the process its cleaning property gets reduced. In acidic water the soap gets split into fatty acids and caustic solution, and this retards its cleaning property. These limitations of soaps have led to the development of synthetic detergents that are superior in performance.

No Stopping As of Now

The annual consumption of detergents in India is in the magnitude of hundreds of thousands of tonnes. The formal sector, with its increasing ability to influence consumers through advertisements, is rapidly expanding its market share.

The market for synthetic detergents was valued at about Rs 112 billion as of 2012–13, with a compounded annual growth rate (CAGR) of three per cent. The machine or automatic wash sales has been dominated by powder detergents (vis-ṁ-vis liquid detergents), with a 98 per cent share in the market and a size of Rs 18,700 million.

However, a much bigger segment of the market is the non-automatic or the hand-wash category, which has a size of Rs 85,466.8 million. It is also dominated by the powder detergents but by a smaller percentage compared to the machine-wash category, at about 68 per cent. The remaining contribution comes from the bar detergents. Hand-wash detergents have shown an impressive growth rate of 8.8 per cent CAGR since 2005, which has contributed to the growth in the overall detergent market.

Source: elkjournals.com

CV RECOMMENDATIONS | TOP PERFORMERS

Highest Price Category (Washing-Machine Use)

Ariel Matic

Medium Price Category

Surf Excel Quick Wash (Rs 135–Rs 185 sub-category)
Rin (Rs 80–Rs 96 sub-category)

Lowest Price Category

Fena Advanced

BRANDS TESTED

The 14 shortlisted brands went through a gamut of tests on parameters including detergency, active ingredients, ash built-up, active alkalinity, total phosphates and STPP, among others. As per their printed price, the brands have been categorized into four groups to make comparison within a particular price range; recommended applications have also been considered while categorising. The price of these detergent brands varies from Rs 45 per kg to Rs 205 per kg, and we have rated them not just according to their washing performances but also according to how environment-friendly they were (if they were at all) and how much value they gave for the money spent. Care was taken to ensure that no cross-comparisons were made across the categories for overall ranking purposes.

Category (MRP Range)	Rank	Total Score out of 100 (rounded off)	Brand	Net Weight
Rs 203–Rs 220	1	78	Ariel Matic	500 gm
	2	75	Henko Matic	1 kg
	2	75	Surf Excel Matic	2 kg
Rs 135–Rs 185	1	80	Surf Excel Quick Wash	1 kg
	2	79	Henko Stain Champion	1 kg
Rs 80–Rs 96	1	78	Rin	1 kg
	2	74	Tide Plus	500 gm
	3	73	Super Nirma Blue	500 gm
	4	72	Uni Wash	500 gm
Rs 43–Rs 48	1	79	Fena Advanced	700 gm
	2	76	Active Wheel	1 kg
	3	74	555	1 kg
	4	72	Ghari	1 kg
	5	67	Nirma	1 kg

*Score rating: >90: excellent*****, 71–90: very good****, 51–70: good***, 31–50: average**, up to 30: poor**

KEY FINDINGS

- Ariel Matic was the top performer in the highest price category (for washing-machine use; Rs 203–Rs 220).
- In the price range of Rs 135–Rs 185, Surf Excel Quick Wash performed better.
- In the medium price range (Rs 80–Rs 96), Rin scored highest.
- In the lowest price category (Rs 43–Rs 48), the performance of Fena was quite satisfactory.
- Based on the test findings, none of the brands meet the requirement of detergency (cleaning efficiency) for Grade 1 of Indian Standard.
- The Indian Standard has defined three quality grades for detergents. However, none of the brands tested declared its grade on the label.

	MRP/Retail Price (Rs)	Manufacturer/Marketer	Use As Recommended by Manufacturer
	110/106	P&G Home Products Limited, Mumbai	Top-load and front-load washing machine
	205/198	Jyothy Laboratories Limited, Mumbai	Front-load washing machine
	406/396	HUL Limited, Mumbai	Front-load washing machine
	185/180	HUL Limited, Mumbai	Machine and bucket wash
	135/130	Jyothy Laboratories Limited, Mumbai	Machine and bucket wash
	80/78	HUL Limited, Mumbai	Machine and bucket wash
	48/47	P&G Home Products Limited, Mumbai	Machine and bucket wash
	40/39	Nirma Limited, Ahmedabad	No instruction provided
	48/43.75	RSPL Limited, Kanpur	Machine and bucket wash
	35/33	Fena (P) Limited, New Delhi	No instruction provided
	48/46	HUL Limited, Mumbai	No instruction provided
	45/44 (discount coupon)	Goramal Hariram Limited, New Delhi	No instruction provided
	48/48	RSPL Limited, Kanpur	Machine and bucket wash
	43/42(soap worth Rs.5 free)	Nirma Limited, Ahmedabad	No instruction provided

- Henko Matic, Henko Stain Chamipion, Super Nirma Blue and Uni Wash were found to have added phosphate in the range of 3.2 per cent to 5.4 per cent. Considering the amount of phosphate in these brands, these cannot be termed eco-friendly. Ariel Matic was found to be almost free of phosphate. The other nine brands contained very low phosphates (0.01 per cent to 0.2 per cent).
- With the exception of Henko Matic (7 per cent), Uni Wash (5.1 per cent), Super Nirma Blue (4.5 per cent) and Henko Stain Champion (4.3 per cent), all the tested brands were found with STPP below 0.01 per cent.
- None of the tested brands featured the prescribed caution statement that reads: *Detergent solutions can be skin irritants. Avoid prolonged contact. Rinse garments and hands thoroughly.*
- The environment-friendliness of detergents is an aspect on which there are no clear answers as of yet. No detergent brand has opted for the Eco-mark to have its environment-friendliness certified.
- Super Nirma Blue, Fena, Active Wheel and 555 did not specify use of their product – whether they can be used in machine wash also.

TEST RESULTS

FOR PHYSICOCHEMICAL PARAMETERS

Detergency | Active ingredients | Ash built-up | Active alkalinity | Total phosphates | STPP | Moisture | Lather

◆ *Detergency*

Detergency is the ability to clean or remove soil, generally associated with the action of a cleaning agent such as soap, detergent, or alkaline salt. As per Indian Standard, the detergency percentage specified for detergent powders is: 65 per cent minimum for Grade 1, 55 per cent for Grade 2, and 45 per cent for Grade 3.

- *None of the brands met the specified requirement for Grade 1.*
- *The detergency percentage ranged from 57.68% (Ariel Matic) to a low of 39.15% (Uni Wash).*

◆ *Active ingredients*

Detergents have certain ingredients (known as 'active ingredients') that are responsible for ensuring their cleaning performance. The national standards have specified different minimum active ingredient levels for the three grades of detergents: 19 per cent for Grade 1, 16 per cent for Grade 2, and 10 per cent for Grade 3.

- *None of the brands claimed the relevant grade as specified in Indian Standard.*
- *The brands that met the minimum requirement for Grade 1 active ingredients were: Henko Stain Champion (27.5 per cent), Surf Excel Matic (23.7 per cent), Surf Excel Quick Wash (23 per cent) and Rin (23.2 per cent), Uni Wash (22.3 per cent) and Henko Matic (20 per cent).*
- *Ariel Matic (17.9 per cent) did not meet the minimum requirement for Grade 1 (19%). Tide Plus (14.2 per cent), if examined as per Grade 2 (16 per cent), did not match up to the level specified for active ingredients.*
- *In the lowest price category, Nirma was found to have the lowest levels of active ingredients at 7.8 per cent.*

◆ *Ash built-up*

This test determines the built-up of ash on a fabric. The Indian Standard has set the requirement as: 1 per cent maximum for Grade 1, 5 per cent for Grade 2, and 10 per cent for Grade 3.

- *Henko Matic (0.53 per cent), Henko Stain Champion (0.47 per cent), Super Nirma Blue (0.3 per cent) and Uni Wash (0.29 per cent) met the requirement for Grade 1.*
- *Active Wheel and 555, both with nine per cent, had the highest percentage of ash built-up.*

◆ *Active alkalinity*

Alkalinity is a measure of the ability of a solution to neutralize acids to the equivalence point of carbonate or bicarbonate. As per the Indian Standard, the active alkalinity of detergent powder of Grade 1, 2 and 3 should be 15 per cent, 20 per cent and 30 per cent, respectively.

- *Most of the brands met the requirement for Grade 1. The rest made it to Grade 2.*

◆ *Total phosphates*

The Indian Standard specifies the minimum quantity of phosphates as an ingredient in detergents – 11 per cent for Grade 1 and 7 per cent for Grade 2. No requirement has been specified for Grade 3.

As per the Ecomark criteria for detergent powders in the Indian Standard, any substitute used for phosphate shall be environment-friendly but should be of sufficient quantity to ensure similar performance of the product as compared to a detergent with phosphate.

- *The tested brands were found to contain total phosphate in various proportions. Henko Matic, Henko Stain Chamipion, Super Nirma Blue and Uni Wash were found to have added phosphate in the range of 3.2 per cent to 5.4 per cent. Considering the amount of phosphate in these brands, these cannot be termed eco-friendly.*
- *Ariel Matic was found to be almost free of phosphate. The other nine brands contained very low phosphates (0.01 per cent to 0.2 per cent).*

In India, most of the synthetic detergents are not phosphate-free due to lack of mandatory legislations. Some manufacturers tend to put in liberal quantities of phosphates in detergents to increase the cleaning efficacy.

Also, no detergent brand available in the market has opted for the Indian eco-label (known as Ecomark), which certifies environment-friendliness of a product. The BIS has laid down the standards for eco-labelling of detergents in India. The standards suggest replacing phosphates with any other environment-friendly substance. They also stress that the surfactants used in the manufacture of household laundry detergent powders should be readily biodegradable and the products be packed in packages made of recyclable or biodegradable materials.

An environmentally superior detergent is one that uses fewer chemical ingredients. The toxicity of detergents decreases if you remove additives like perfumes, colour and brightening agents. Synthetic surfactants may be replaced by nonpetrochemical surfactants or vegetable oil soaps; builders like phosphates can be replaced by sodium citrate and sodium bicarbonate; dyes and fragrances can be eliminated or minimised. Minimal packaging can also reduce environmental harm substantially.

◆ *STPP*

Sodium tripolyphosphate (STPP) is mostly used as a phosphate ingredient in many detergents. It softens the water and prevents dirt particles from adhering to the garment. However, the use of STPP is also associated with environmental hazards

The Indian Standard specifies the minimum quantity of STPP in detergent powder – at 9.5 per cent and 6 per cent by mass for Grade 1 and Grade 2, respectively. No requirement has been prescribed for Grade 3.

- *With the exception of Henko Matic (7 per cent), Uni Wash (5.1 per cent), Super Nirma Blue (4.5 per cent) and Henko Stain Champion (4.3 per cent), all the tested brands were found with STPP below 0.01 per cent.*

Common laundry detergent contains over 40 per cent STPP, although the global development is towards reducing this quantity, because it adversely affects the quality of the aquatic ecosystem and induces eutrophication (algal blooms, kills fishes and poor water quality).

As per data compiled by Indiastat from Central Statistical Organisation (CSO), about 817,933 tonnes of synthetic detergents were produced during 2009–2010. Almost all the laundry detergents in India contain STPP, ranging from 8 per cent to 35 per cent. Thus, total amount of STPP use in detergents is estimated to be 0.16 million tonnes.

Source: http://www.currentscience.ac.in

◆ *Moisture*

The national standards have not prescribed a maximum limit for moisture content in detergents, but it is known that the presence of high moisture leads to the detergent powder turning lumpy.

- *The brand with the highest moisture content is Uni Wash (8.6 per cent). The expensive Surf Excel Matic also has a relatively high moisture quantity at 5.2 per cent.*

- *At 2.2 per cent and 2.4 per cent, Tide Plus and Rin, respectively, had the lowest moisture content.*

◆ ***Lather***

There is no specified requirement for lather in the national standards. In any case, foam generation should be high and at a faster rate.

- *Both Surf Excel Matic and Ghari scored highest on this parameter. Ariel Matic had the lowest score.*

Fragrance

The fragrance ranged from perfumed (Ariel Matic, Henko Stain Champion) and floral perfumed (Henko Matic, Uni Wash) to slightly perfumed (Surf Excel Quick Wash, Rin, Tide Plus, Super Nirma Blue) and soapy (Surf Excel Matic, Active Wheel, Fena, Nirma, 555, Ghari).

Fragrances added to many cleaners, most notably laundry detergents and fabric softeners, may cause acute effects such as respiratory irritation, headache, sneezing, and watery eyes in sensitive individuals or allergy and asthma sufferers. The National Institute of Occupational Safety and Health has found that one-third of the substances used in the fragrance industry are toxic. But because the chemical formulas of fragrances are considered trade secrets, companies aren't required to list their ingredients but merely label them as containing 'fragrance'.

PHYSICOCHEMICAL

MRP Range →		Rs 203–Rs 220			Rs 135–Rs 185		
Brand → Parameter↓	Weightage %	Ariel Matic	Henko Matic	Surf Excel Matic	Surf Excel Quick Wash	Henko Stain Champion	
Detergency	35	25.38	21.53	17.78	23.42	21.88	
Active ingredients	16	10.72	11.68	13.46	13.12	15.28	
Ash built-up	10	7.66	10.0	9.16	9.61	10.0	
Active alkalinity	8	6.73	6.37	5.65	5.53	6.13	
Total phosphates	6	6.0	4.10	5.93	5.96	4.99	
STPP	6	6.0	3.0	6.0	6.0	4.13	
Foam height	4	1.72	3.94	4.0	3.16	3.28	
Moisture	4	3.35	3.35	2.99	3.09	3.52	
Flavor/odour	2	2	2	1.0	2	2	

Which Variant to Use and Where?

- Brands in the category priced between Rs 203 and Rs 220 per kg are recommended purely for the automatic washing machine. Ariel Matic topped in overall performance, followed by Henko Matic and Surf Excel Matic.
- Brands in the second category priced between Rs 135 (Henko Stain Champion) and Rs 185 (Surf Excel Quick Wash) are recommended for top-loading auto and semi-auto washing machines and tub wash. While both brands are neck and neck, Surf Excel Quick Wash was found to be better due to its higher detergency.
- In the third category priced between Rs 80 and Rs 96, meant for machine and bucket wash, Rin topped in terms of performance and was followed by Tide Plus, Super Nirma Blue and Uni Wash.
- Among the brands priced Rs 43–Rs 48, meant for heavily soiled fabrics, Fena topped in performance and was followed by Active Wheel, 555, Ghari and Nirma. Only one brand, Ghari, claimed applicability for both machine and bucket wash. The other brands did not specify whether they were to be used for machine or bucket wash.

Packing and Marking

All the tested brands were in polypack, with the exception of Henko Matic and Surf Excel Matic, which were in polypack with cardboard packaging. The scores were assigned according to the quality of packing material used.

Each packet of detergent powder should be marked/labelled with these particulars:

a) Name and grade of the material

b) Indication of the source of manufacture

SCORES

	Rs 80–Rs 96				Rs 43–Rs 48				
	Rin	Tide Plus	Super Nirma Blue	Uni Wash	Fena	Active Wheel	555	Ghari	Nirma
	18.64	21.03	21.27	15.66	24.10	19.68	17.63	16.00	18.17
	15.49	9.73	11.14	14.91	14.64	15.20	14.32	14.0	8.64
	7.78	7.87	10.0	10.0	7.48	7.30	7.30	7.36	7.42
	7.33	7.28	5.67	6.37	5.38	7.35	7.09	6.01	7.02
	5.99	5.99	5.21	5.10	5.99	6.0	6.0	6.0	6.0
	6.0	6.0	4.05	3.80	6.0	6.0	6.0	6.0	6.0
	2.56	2.50	3.16	3.74	3.40	2.80	3.52	4.0	2.74
	3.66	3.71	2.70	2.18	2.97	3.52	3.30	3.33	2.80
	2	1.5	15	2	1	1.0	1	1	1

All the brands were found to be above the declared net weight.

c) Net mass of the material when packed
d) Batch number or lot number in code or otherwise:
e) Month and year of manufacture
f) MRP
g) Standard mark, if any;
h) Critical ingredients in descending order of quantity, (percent by mass):

According to the labelling requirements laid down by BIS, each packet of detergent powder should also carry a caution statement that reads: *Detergent solutions can be skin irritants. Avoid prolonged contact. Rinse garments and hands thoroughly*.

The scores were assigned according to information provided by manufacturers. It must be noted that not one of the tested brands featured the prescribed cautionary statement.

Comparative Test

MRP Range →		Rs 203–Rs 220			Rs 135–Rs 185		
Brand → Parameter ↓	Weightage %	Ariel Matic	Henko Matic	Surf Excel Matic	Surf Excel Quick Wash	Henko Stain Champion	
MRP (Rs)/net weight (gm)		110/500	205/1,000	203/2,000	185/1,000	135/1,000	
Retail price (Rs) per kg		206	198	198	180	130	
Packing	2	1.6	2.0	2.0	1.6	1.6	
Marking	4	3.7	3.7	3.7	3.4	3.4	
Net weight	3	3	3	3	3	3	

Plastic Alert

According to various environmental protection agencies (EPAs), the laundry detergents are marketed in plastic packets that mostly happen to be non-biodegradable and non-recyclable. The big volume of detergent packaging generates heaps of plastic rubbish creating an enormous environmental impact.

The European branch of the International Association for Soaps, Detergents and

Maintenance Products launched an industry-wide initiative in the year 2009 to substantially reduce the size of detergent powder packaging by manufacturing smaller packages filled with highly concentrated detergent powders. The industry association, however, pointed out that for making such a packaging-reduction strategy successful, the consumers must first of all carefully read the printed labels and then make a habit to proportionately cut down on the quantity of detergent powder to be taken in a bucket. This is because, in the new perspective, significantly less quantity of the detergent powder would be required for the same cleaning efficiency of the powder as observed before because of the adoption of new concentrated formula strategy. If this initiative comes into practice in a vast country like India, the problem of creation of huge-sized plastic heaps in the streets can also be drastically reduced.

Source: www.environmentaljournal.org

What You Can Do or Look out for

- Avoid products that list active ingredients of chlorine or ammonia, which can cause respiratory and skin irritation and will create toxic fumes if accidentally mixed together.
- Protect water quality and aquatic life by refusing to purchase detergents containing phosphates, which may cause algal blooms, or alkylphenol ethoxylates, including nonylphenol and octylphenol. (Unfortunately, these ingredients are rarely, if ever, disclosed on labels.)
- Don't waste detergent. Household habits can be hard to break. While single-use packs make proper dosage simpler for average-size loads, it's all too easy to inadvertently waste the new concentrated products by using the same amounts you added of the old products. Remember to follow the directions on the packaging and actually measure – the best detergents have clearly marked lines on their fill caps and pictures of the actual caps on their instructions.
- When possible, make your own detergents. You can use soap and other household cleaning products. Soap, unlike detergents, is made from animal fat and is an excellent cleanser because of its ability to act as an emulsifying agent. Being salts of weak acids, soaps get converted by mineral acids into free fatty acids. These fatty acids, having a lower solubility, form a precipitate or soap scum, rendering

	Rs 80–Rs 96				Rs 43–Rs 48				
	Rin	Tide Plus	Super Nirma Blue	Uni Wash	Fena	Active Wheel	555	Ghari	Nirma
	80/1,000	48/500	40/500	48/500	35/700	48/1,000	45/1,000	48/1,000	43/1,000
	78	94	78	87.50	47	45	44	48	42
	1.6	1.6	1.6	1.6	1.4	1.2	1.2	1.5	1.2
	3.7	3.7	3.7	3.7	3.4	3.4	3.4	3.4	3.4
	3	3	3	3	3	3	3	3	3

them ineffective in acidic water. The formation of these insoluble salts in hard water can be overcome by mixing in such household chemicals as borax or washing soda that can help get better results.

- One of the traditional alternatives to detergents is reetha, which is known for its washing properties and is used in a number of shampoo preparations as well.

Do It Yourself: Laundry Detergent Recipe

Here's what you need (a lot of these items are household staples):

– One bar of soap (try to get a non-toxic one)

– One box of washing

– One box of borax (this is not necessary, but I've found it really kicks the cleaning up a notch – one box of borax will contain more than enough for tons of batches of this homemade detergent – if you decide to use this, be careful)

– A five-gallon bucket with a lid (or a bucket that will hold more than 15 litres)

– Three gallons of tap water

– A big spoon to stir the mixture with

– A measuring cup

– A knife

Step One

Put about four cups of water into a pan on your stove and turn the heat up on high until it's almost boiling. While you're waiting, whip out a knife and start shaving strips off the bar of soap into the water, whittling it down. Keep the heat below a boil and keep shaving the soap. Eventually, you'll shave up the whole bar. Stir the hot water until the soap is dissolved and you have some highly soapy water.

Step Two

Put three gallons of hot water (11 litres or so) into the five-gallon bucket. Then mix in the hot soapy water from Step One, stir it for a while, then add a cup of the washing soda. Keep stirring it for another minute or two, then add a half cup of borax if you are using borax. Stir for another couple of minutes, then let the stuff sit overnight to cool. And you're done.

When you wake up in the morning, you'll have a bucket of gelatinous slime that's a paler shade of the soap that you used (in our case, it's a very pale greenish blue). One measuring cup full of this slime will be roughly what you need to do a load of laundry – and the ingredients are basically the same as laundry detergent. Thus, out of three gallons, you'll get about 48 loads of laundry.