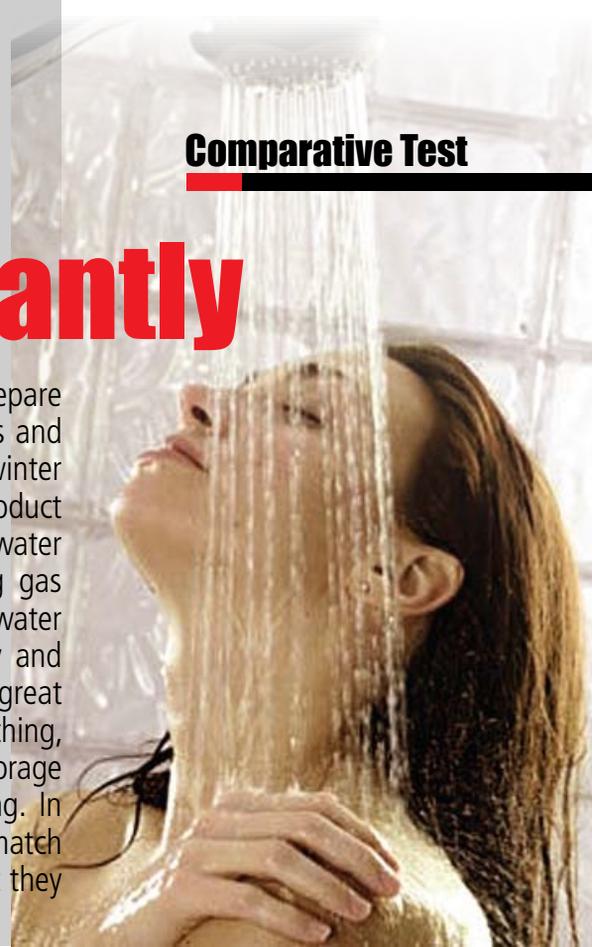


# Hot Water Instantly

The Chilly winter is round the corner and consumers prepare to give the winters a warm welcome with. Water heaters and room heaters are the most selling products during the winter season. We thought that water heaters were the right product to be tested to herald the winters. Room heaters and water heaters are no more a luxury in a time when cooking gas is costly and hard to get. Now a days various type of water heaters are available in the markets like Gas, Electricity and Solar water heaters. Instantaneous water heaters play a great role in providing hot water for washing, cleaning and bathing, almost instantly within 1-3 minutes as compared to storage water heaters which take more than half an hour for heating. In the tests, we found that the manufacturer claim did not match the reality as two brands were not upto the capacity that they claimed.



Durability, robustness and safety play a great role in Instantaneous Water Heater (IWH), as they are intended for long term use. Consumer's especially urban middle class find it as an useful appliance. IWHs are mostly available in upto 3 litres capacity for heating water to a temperature below boiling point. *Consumer VOICE* tested 11 brands of electric instantaneous water heaters of 1 litre, water 3 KW capacity, except Havells (upto 4500W). We tested them according to relevant Indian Standards IS: 8978: 2009

and IS: 302-2-35:1993 with relevant provisions of IS 302-1: 2008.



### Overall Performance of the brands

In terms of the overall performance, most of the brands scored high in the their performance. But none of the brands could be rated as excellent as they failed to perform to the optimum in some parameters. However all but one

Brand	Rank
Bajaj	1
Racold	2
Venus	3
Crompton Greaves	4
Elpar	5
Marc	6
Khaitan	7
V Guard	8
Sun Point	9
Indo	10

### Key findings

1. Bajaj topped in overall performance followed by Racold & Venus respectively.
2. Indo failed in safety tests i.e "abnormal operation" in spite of ISI mark.
3. Havells & Venus claimed 1 Litre capacity, however in our test their measured capacity found was 0.40 & 0.69 litres respectively, thus not meeting their claims and failed in this test.
4. Actual power input measured is between 2754 – 2920 Watts against the claimed value 3KW except Havells which was 4229 W against 4500 W.
5. Except Havells, all the brands were ISI marked
6. Havells has electronic control for regulating input up to 4500 Watts as per output water temperature

# Comparative Test

scored rating above 80% in our tests, with **Indo** being the only brand with a lowest score of 79.45 out of 100.

### **Overall performance test:**

Bajaj topped the overall performance test followed by Racold & Venus. Indo failed in safety tests particularly in "abnormal operation" test. Havells with 4.5 KW was rated separately.

**Venus was rated as the best in terms of value for money**, which was followed by Bajaj and Racold. Indo failed in passing the tests and is therefore not recommended. Also Sun Point may also not be safe for long runs as its power cable of lower strength can melt or rupture causing short circuits.

**Safety Features:** Since water heaters are used for longer duration, it should be very robust, electrically safe from short-circuits & fire hazards. Havells has electronic control for regulating input upto 4500 Watts as per water temperature selection. Havells performed well but it is three times costlier than other brands.

### **2 brands fulfill only half their claims in Water storage Capacity**

The capacity of tank should be at least of the quantity as claimed by the manufacturer i.e. 1.0 Liter in this case. Except Havells & Venus all other brands of Instant Water Heater tested were complying with the requirements Havells & Venus

failed in the above criteria. They claimed 1 Liter capacity however measured capacity is 0.40 & 0.69 liters respectively, thus not meeting their claims. Bajaj and Racold had excess capacity 1.34 Lt. and 1.32 Lt. respectively against 1 Lt.

### **Deviations in claims of power input (consumption)**

The input denotes the power supply required to run the water heater or amount of power being consumed while Instant water heater is working. The Input power as stated by the manufacturer i.e. 3KW should not exceed or be less than the value of 3KW + 10%. All the brands were deviating from the claimed value but were within the specified limits of tolerance i.e. +-10% which is quite high. The lowest value was 2754.8 W in case of Khaitan & highest value was 2938 W in case of Bajaj against their claimed rating 3000W. Hence Bajaj was more closer in terms of rated input power.

### **Appropriate temperature rise in all brands**

This test was conducted on sub assemblies namely wall, ceiling, power supply cable, Internal wiring, external enclosur and the surroundings in the room in which it is operating. This test indicates the safety features of the subassemblies, outer casting and internal wirings of the Instant Water Heaters. The temperature rise

of all the brands was well within the specified limits.

### **Works well even when overloaded**

In this test it was found that during the overload condition, 15 cycles of operation, thermal cut-out shall not operate and no vapour or ignitable gas accumulate in the water heater. All the brands of Instant Water Heater met the requirement for over load operation.

### **Laudable endurance capacity**

Endurance is the ability or strength of IWH to continue or last longer and the insulation should not be damaged as a result of power like fluctuations and variations. All the brands of Instant Water Heater met the requirement for Endurance; hence all of the brands got full score.

### **Temperature of water at outlet when thermostat cut off**

A thermostat is the controlling device that regulates the temperature of IWH so that its system temperature is maintained near a desired pre-set temperature. We kept the water heater in ON stage till it was automatically shut off by thermostat after reaching the highest water temperature that is set by the manufacturer and the temperature of the water is measured. Brand V guard reaches lowest temp. 49°C and highest temperature 61.8°C found in case of Havells followed by Venus.

### **Indo Heating Element Ruptured**

For the 'abnormal test' water heater shall not emit flames or molten metal or ignitable gas. Enclosures shall not deform and Temperature rise shall not exceed the specified temperature of 150°C. and water heater should withstand even voltage of 1000 for one minute. During the abnormal operation test, Heating Element Ruptured in brand Indo and steady conditions could not be found hence it failed in this test.

### **Tips for IWH**

Consumers should have higher rating of power cables for house wiring, connected to an effective earthing, in order to handle the heavy load, so as to safeguard against electrical short circuit/fire hazards. It is always advisable to use IWH for shorter duration, not more than 10-15 minutes. IWH works very fast therefore it is suitable for kitchen use and small bath rooms. While buying an instant water heater one should keep in mind the uses, water capacity, ISI marked with warranty and lower priced, but with all safety features in place. For installation, the power supply source should be as close as possible for better safety.

## Key performance results of various brands

Brands	Weight in kg	Price in ₹	Actual capacity against claimed one liter	Wattages (Actual/claimed Power)	Water Temp. at outlet, ° C	Temp. Rise, ° C
Bajaj 	2.28	2700/ 3250	1.34	2920.0/3000	51.3	24.3
Crompton Greaves 	2.05	2723/ 2725	1.06	2887.5/3000	54.4	27.4
Elpar 	2.12	1750/ -	1.06	2938.0/3000	50.6	23.6
Havells 	2.73	6700/ 7490	0.40	4291.6/4500	61.5	34.5
Indo 	2.22	1750/ 1800	1.16	2859.2/3000	51.2	24.2
Khaitan 	2.23	2300/ 2620	1.04	2754.8/3000	53.2	26.2
Marc 	2.01	1900/ 2300	1.06	2873.4/3000	59.0	32.0
Racold 	2.31	2300/ 2595	1.32	2880.0/3000	50.7	23.7
Sun Point 	2.03	1600/ 1995	1.14	2828.4/3000	49.6	22.6
V Guard 	2.09	2200/ 2750	1.10	2756.8/3000	48.6	21.6
Venus 	2.04	2100/ 2350	0.69	2799.8/3000	59.9	32.9

### Power supply chords need to be highly strong

Insulation of power supply cable in the long run should withstand the load of IWH while running and should not burn out. Therefore areas

of cross section of power supply cables were measured. The lowest value was in case of Sun point and highest in case of Venus. Havell's was rated for 4.5 KW that met the requirement.

### Bajaj IWH the heaviest

There is no weight requirement in national standard, but to satisfy consumer curiosity we measured the weight of the tank as well as of the geyser. Higher weight reflects quality

# Comparative Test

and durability. The net weight of the appliance was measured without water in their tanks. Bajaj and Rocold had the highest weight of 2.28 and 2.31 Kg and Marc had the lowest of 2.01 Kg.

### Bajaj and Venus give a perfect labelling

The water heaters shall have information indelibly marked on their outer visible surface or on a label firmly attached thereto like the Name or trade –mark of the manufacturer, rated capacity in litres, operating voltage range, loading in kilowatts and/or rating in amperes and so on. The warning "ELECTRIC SUPPLY MUST BE DISCONNECTED BEFORE OPENING THIS/INSPECTION COVER" should be clearly indicated at a place, so as to avoid electrocution when approaching any live part that might be touched during routine maintenance. All brands except Havells were ISI 8978: 2009 marked for complete appliance & safety. The requirements are to be specified as stated above on

the appliance / packaging. All these requirements were completely fulfilled by the brand Bajaj & Venus.

### Some results at a glance

**All brands moisture resistant:** Moisture can lower insulating effectiveness. All the brands of Instant Water Heaters were found to be resistant to moisture.

**Insulation Resistance & Electric Strength after Humidity:** All the brands withstood the electrical insulation, and there by passed in this test.

**Resistance of Heat, Fire, Tracking & Rusting:** All the brands of Instant Water Heater were found to meet the requirement for Resistance of heating, fire & tracking.

**Mechanical Strength:** An appliance with good mechanical strength shall be so constructed as to withstand rough handling as may be expected in normal use. All the brands passed this test.

**Protection against electric shock:** All the brands of Instant Water Heaters met the requirement for Protection Against electric shock.

**Marking:** Except Havells, all brands were ISI marked for complete appliance as well as safety. Bajaj and Venus fulfilled all marking requirements completely.

**Based on the above results Marc is efficient in performance among the brands tested. An instant water heater is an energy-efficient water heating system that heats water only when it is needed. It provides all the amount of hot water that you need, while still saving energy, space and money.**

While buying a water heater consider energy efficiency and yearly operating costs of a water heater before you decide which one is right for your needs. The size of your family, the utilities in your area and the space available for your water heater all play a role in determining how to choose a water heater. For storage water heaters, this information can be found in BEE energy label affixed on product. Always install the IWH vertically and close to the place you want to use. Install the water heater close to the power supply source and should be well protected through more than 15 Amp. of dual pole MCB.



### The Difference between Instant and Storage Water Heaters:

Instant Water Heaters	Storage Water Heaters
<ul style="list-style-type: none"> <li>Hot Water is instantly available as needed.</li> <li>Can save energy as only required quantity of water is heated.</li> <li>No waiting time for reheating</li> <li>Small, compact shape &amp; size.</li> <li>Ideal for small urban family</li> <li>Hot water not available in power failure.</li> <li>Hot water cannot be stored for later use as very little capacity (1-3 lit.).</li> </ul>	<ul style="list-style-type: none"> <li>Water heated &amp; stored for immediate or later use.</li> <li>Insulation reduces heat loss drastically and keeps water hot for long time.</li> <li>Hot Water may be available even when no power available later.</li> <li>Storage Heaters are Larger in size compared to IWH</li> <li>Higher temperature of hot water possible compared to IWH.</li> <li>Minimum Time required to heat to set temperature is more than half an hour.</li> </ul>

## Comparative Performance Score of Instantaneous Water Heaters

Brand/ Model Parameters	Bajaj	Racold	Venus	Crompton Greaves	Elpar	Maarc	Khaltan	V Guard	Sun Point	Indo	Havells
Retail Price/M.R.P	2700/ 3250	2300/ 2595	2100/ 2350	Solarium 2723/ 2725	Stillo 1750/-	Solitaire 1900/ 2300	Flamingo 2300/ 2620	Sprin Hot 2200/ 2750	Civic 1600/ 1995	Hot Star 1750/ 1800	<b>Fino 6700/ 7490</b>
Warranty, Year	2	2	1	1	1	1	2	1	1	1	<b>2</b>
Measured / Rated Package, Watts	2920/ 3000	2880/ 3000	2799.8/ 3000	2887.5/ 3000	2938/ 3000	2873.4/ 3000	2754.8/ 3000	2756.8/ 3000	2828.4/ 3000	2859.2/ 3000	<b>4291.6/ 4500</b>
Packaging & Marking	6	5.5	5.5	4.7	4.5	5	4	4	4	4.5	<b>5.5</b>
Net Weight	4	2.9	2.1	2.14	2.36	2	2.74	2.26	2.06	2.7	<b>3.5</b>
Capacity	3	2.8	1.2	3	3	3	3	3	3	3	<b>0.9</b>
Finishing, Durability & Aesthetics	6	5	5	5	3	5	4	4	4	4	<b>6</b>
Cross section area of power cable	5	3.75	5	3.9	3.92	3.48	3.91	3.96	2.62	3.38	<b>3.64</b>
Protection against electric shock	2	2	2	2	2	2	2	2	2	2	<b>2</b>
Input Power	8	7.02	5.38	6.58	7.31	4.46	4.76	4.78	5.76	4.83	<b>4.58</b>
Temperature rise	8	7.396	7.092	7.031	6.885	7.086	7.68	7.337	6.666	7.417	<b>7.165</b>
Operation under over load condition	5	5	5	5	5	5	5	5	5	5	<b>5</b>
Leakage current at Operating Temperature	4	3.1	3.4	3.8	3.7	2.5	3.6	2.1	2.9	2.3	<b>4</b>
Moisture Resistance	4	4	4	4	4	4	4	4	4	4	<b>4</b>
Insulation & electric strength after humidity treatment	5	4.79	4.97	4.83	4.8	4.81	5	4.67	3.25	4.75	<b>4.8</b>
Abnormal Operation	7	6.42	6.6	6.49	6.22	6.37	6.28	6.34	6.56	1.4	<b>6.25</b>
Mechanical Strength	3	3	3	3	3	3	3	3	3	3	<b>3</b>
Construction	10	8.44	9.1	8.68	8.38	9.02	8.59	8.24	8.32	8.44	<b>9.22</b>
Resistance of earthing wire	2	1.9	1.88	1.86	1.88	1.96	1.94	2	1.82	1.98	<b>2</b>
Resistance to Heat, Fire & Tracking	6	6	6	6	6	6	6	6	6	6	<b>6</b>
Resistance to Rusting	2	2	2	2	2	2	2	2	2	2	<b>2</b>
Endurance	6	6	6	6	6	6	6	6	6	6	<b>6</b>
Temperature of water at outlet	4	2.7	2.75	3	2.7	3.7	2.85	2.5	2.65	2.75	<b>4</b>
<b>Over All Score</b>	<b>100</b>	<b>89.72</b>	<b>89.18</b>	<b>89.01</b>	<b>86.66</b>	<b>86.39</b>	<b>86.35</b>	<b>83.19</b>	<b>81.60</b>	<b>79.45</b>	<b>89.56</b>

Rating: >90 – Excellent \*\*\*\*\*, 71-90- Very Good \*\*\*\*\*, 51-70- Good \*\*\*, 31-50- Average \*\*, upto 30 – Poor \*

Note: 1) Construction Tests includes various requirements like water temp. at outlet and temp. Difference of inlet & outlet, pressure, material of container, capacity etc.

2) Havells has electronic control for regulating input from 1000 to 4500 Watts and had two elements of 2.5 KW with choice for temperature selection.