

# Test Plan

## Cup-O-Joe 7.0

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# 1. INTRODUCTION

## 1.1. Purpose

The Test Plan describes the testing approach, scope, schedule and testing activities. The plan will identify the tested item, processes the item performs and the components of the item.

The plan identifies the Cup-O-Joe 7.0 - product to be tested, the features to be tested, tests for the processes and functions that product provides, Features not to be tested, the types of testing to be performed, the personnel responsible for testing, the resources and schedule required to complete testing, and the risks associated with the plan.

## 1.2. Project description and overall process overview from product documentation

Cup-O-Joe is a product of Steamy Co., and represents a coffee making system designed for harsh environments, like construction sites, camp sites, and family homes with lots of children.

Water is stored in the water container and from there transferred through the heating unit by the water compressor. The heating of the water is initiated by pressing the 'Action' button on the Cup-O-Joe 7.0. During the heating of the water the display will show the message "Heating". Once the water is heated to the set temperature user is informed by a message "Ready" on the display. Once the confirmation button is pressed, the heated water is transferred through the coffee container where the brewing process takes place. The water does not stop at the coffee container unit and passes on through the deposit exit nozzle into the receptacle below.

## 1.3. Testing methods to apply

**1.3.1. Exploratory testing** – for the item as the entity and for the each part of the product that is in use, available to the end user

**1.3.2. Unit testing** – for the each segment/part of the item

**1.3.3. Integration testing** – for the item as the complete product with each process

**1.3.4. Functional testing** – for the item as the product which has basic and secondary functionalities

The methods above will be used in test scenarios and test cases based on this test plan.

## **2. TEST STRATEGY**

### **2.1. Scope of Testing**

The tests include the processes that will be performed by the end user. The technical issues such as elements of water pump and its characteristics, as well as heating element details are under the scope of technical support team.

#### **2.1.1. Outer body, brand, components overview**

Check the Cup-O-Joy item, explore the brand mark, check if it is stable, firm. Check each component:

- Water container
- Water heater
- Water pump
- Coffee container
- Cup stand
- Overflow container
- Display
- Control buttons
- Power supply

#### **2.1.2. Processes to be tested**

##### **2.1.2.1. Test – Turning the system on/off**

Test turning the system on and off. Check the hardware button “Action”. Check if the button is located on the top of the Cup-O-Joe 7.0 next to the display, as it is described in specification document.

##### **2.1.2.1.1. Test – Turning the system on**

Precondition is that the power supply must be working and the power provided to the system.

For turning the system on, test pressing the ‘Action’ button once. After the ‘Action’ button is pressed the display should show a welcoming message “Hello” for 3 seconds and then display the default HE temperature setting. Check each element of the described process.

##### **2.1.2.1.2. Test – Turning the system off**

Test turning the system off by pressing the ‘Action’ button and held for 3 seconds. After 3 seconds of button press, the display should show a message “Bye” for 3 seconds and then turn off. If the water pump and the HE are running, they should be stopped immediately.

Test turning the system off by pressing the ‘Action’ button and held for 2 seconds.

Test turning the system off by pressing the 'Action' button and held for 4 seconds.

Test the case the 'Action' button has not been pressed for 5 minutes, while the system is on. The system should turn off automatically.

### **2.1.2.2. Test – Water into the water container**

Exploratory test the WC. Check if there is a line on the WC wall to indicate minimal amount of water needed for the system.

#### **2.1.2.2.1. Test – Removing the water container**

Test removing the WC. The release button should be pressed and the WC removed by sliding it away from the Cup-O-Joe 7.0.

#### **2.1.2.2.2. Test – Filling the water container**

Test filling the WC. The lid of the WC should be lifted. There should be no lock for the lid of the WC.

The water level should not be below the indicated level on the WC wall.

#### **2.1.2.2.3. Test – Loading the water container into the system**

Test placing the WC into the Cup-O-Joe 7.0. The lid of the WC should be closed and the respective slot has to be cleared of any obstructions. Test what happens if WC lid is not closed. Test what happens if WC is not properly set, if it is leaning. Test the case if the WC is not securely inserted. Improper loading of the WC should be indicated by a red indicator strip in the WC release button.

Test loading the WC into the Cup-O-Joe 7.0 by sliding the WC into its respective slot by turning the direction indicator towards the corresponding indicator on the Cup-O-Joe 7.0 and sliding it into place. Test if indicator could be slide incorrectly.

### **2.1.2.3. Test – Water to heating element**

#### **2.1.2.3.1. Test – Pumping water into heating element**

Test 2.1.2.1.1. is test to turn on the system. After that the water pump should pump water into the HE. The water pump should maintain the maximum level of water in the HE before the HE reaches the set temperature. Once the pumping of water from the HE through the CC has started, the pump will no longer pump water into the HE. Check the process is as described.

#### **2.1.2.4. Test – Heated water through coffee container**

Test if the water in the HE is stored until it reaches the set temperature. Once the set temperature has been reached, there should be the message “Ready” shown on the display. Test trigger the pumping of the now hot water through the CC and through the exit nozzle into the CR by pressing the ‘Action’ button once for less than 3 seconds while the display shows the message “Ready”. Once the ‘Action’ button is pressed, the HE should shut off. Once all the water has been moved from the HE through the CC, the message “Done” should be shown on the display for 3 seconds, after which it should return to blank. After the message “Done” is shown, the water pump should refill the HE with water from the WC. Check the process is as described.

Test what happens if CC is not present in CC slot.

Test what happens if CC is not properly set in CC slot.

Test what happens if there is no CR on the receptacle platform.

#### **2.1.2.5. Test – Loading coffee to coffee container**

##### **2.1.2.5.1. Test – Removing the coffee container**

Test removing the CC by pressing the release button on the CC slot and sliding the CC away from the Cup-O-Joe 7.0 CC slot.

##### **2.1.2.5.2. Test – Filling the coffee container**

Check if maximal amount of coffee grounds that can be inserted into the CC is indicated by a line on the inside wall of the CC. To continue fill the coffee container.

##### **2.1.2.5.3. Test – Loading the coffee container into the system**

Test to insert CC by sliding it into the CC slot towards Cup-O-Joe 7.0. Test if the CC is steadily set.

Test the case that the amount of coffee grounds in the CC is above maximum allowed. The CC should not lock into place. Unsuccessful inserting of the CC is indicated by a red indicator strip on the CC release button. Check if the process is as described.

Test the case where the CC is not securely inserted into the CC slot. A red indicator strip should be shown on the CC release button. Process of passing the water from the HE through the CC is disabled until the CC is inserted properly. Check if the process is as described.

#### **2.1.2.6. Test – Setting the brew temperature**

Test to select the desired temperature to which the water should be heated. Setting of the temperature is done by the correction keys. The current temperature setting is shown on the Cup-O-Joe 7.0 display.

##### **2.1.2.6.1. Test – Display**

Test the display messages.

##### **2.1.2.6.2. Test – Setting the water temperature**

Test to set the temperature to which the HE should heat the water by using the correction keys on the Cup-O-Joe 7.0 display. By pressing the “-” correction key once, the HE temperature setting is decreased by 1 degree Celsius. By pressing the “+” correction key once, the HE temperature setting is increased by 1 degree Celsius. Test decreasing and increasing the set temperature.

Check the Table 2: Table of Cup-O-Joe 7.0 display states from Cup-O-Joe 7.0 documentation and compare by exploratory method.

#### **2.1.2.7. Test – System cleaning**

##### **2.1.2.7.1. Test – Water container cleaning**

Test to remove WC from the Cup-O-Joe 7.0 and removing the sediment or impurities manually.

##### **2.1.2.7.2. Test – Coffee container cleaning**

Test cleaning the CC by removing it from the Cup-O-Joe 7.0 and removing the sediment or impurities manually.

##### **2.1.2.7.3. Test – Overflow receptacle cleaning**

Test the OR cleaning by removing it from the Cup-O-Joe 7.0 and removing the sediment or impurities manually. Removing the OR is done by sliding it away from the Cup-O-Joe 7.0 OR slot. Loading the OR is done by sliding it into the OR slot towards the Cup-O-Joe 7.0.

#### **2.1.2. Features and processes not to be tested, conditions for stopping the testing process, exceptions**

The features and processes below are not to be tested because they are not in scope of the item



itself or they are not under the competence of the end user.

All processes that may create a security issue will not be tested.

The testing process should be stopped and technical support should be contacted in the situations listed below.

- The power supply is the precondition and no tests will deal with the precondition.
- In case of “Action” button is malfunctioning the testing process will be stopped and technical support should be informed.
- In case of sudden power outage and system malfunction as a result, the testing process will be stopped and technical support should be informed. Check Cup-O-Joe 7.0 documentation point 4.1.3.4 and the Caution below.
- The tests where the water level in the WC is below the minimum required mark, indicated by a line on the WC, will not be conducted. Check Cup-O-Joe 7.0 documentation point 4.2.4.1 and the Caution below, 4.3.2.6 and the Caution below as well as the following CAUTION.
- In case the display is not working the testing process will be stopped and technical support should be informed.
- In case the heater is not working the display will show the message “Error” if the malfunction is detectable. The testing process will be stopped and technical support should be informed.
- In case the pump is not working the display will show the message “Error” if the malfunction is detectable. The testing process will be stopped and technical support should be informed.
- In case the tube or filter leading from the WC to the HE is blocked, the water cannot be pumped into the HE. The pump will try to compensate for the blockage by decreasing the pressure. When the pressure has reached the pump maximum capacity the pump will shut off and the message “Error” will be shown on the display. The testing process will be stopped and technical support should be informed.
- In case the tube leading from the HE to the CC is blocked, the water cannot be pumped through the CC. The pump will try to compensate for the blockage by increasing the pressure. When the pressure has reached the pump maximum capacity the pump will shut off and the message “Error” will be shown on the display. The testing process will be stopped and technical support should be informed.
- In case the correction buttons are not working the testing process will be stopped and technical support should be informed.
- The built-in water filter cannot be accessed by the end user and it will not be tested for cleaning.
- Tubes for transferring water from the WC to the HE, and from the HE through the CC cannot be accessed by the end user and it will not be tested for cleaning.
- In case the sediment in the WC cannot be removed technical support should be informed. There is security issue described in Cup-O-Joe 7.0 documentation point 4.7.6.1 below I.
- In case the sediment in the CC cannot be removed technical support should be informed.
- In case the sediment in the OR cannot be removed technical support should be informed.

**The mentioned conditions and issues are strictly defined in the product specification Cup-O-Joe 7.0 documentation.**

**The working capacity of the Cup-O-Joy 7.0 will not be tested manually and it is not in the scope of this testing plan. Specific automated testing is predicted to test the maximum number of cycles between system cleaning (5.000) and the maximum number of cycles for one Cup-O-Joy 7.0 unit**

(20.000).

## **2.2. Risks and issues**

### **2.2.1. Risk – Tester lack the required skills for using the coffee machine**

- Solution – Plan short training course where the tester should be acquainted to using the known brand of well-known coffee machine.

### **2.2.2. Risk – The project schedule is too tight**

- Solution – Plan to set test priority for each activity

### **2.2.3. Risk – A lack of cooperation from technical support team**

- Solution – Organize meeting with the technical support team and encourage them to work as one team on this project

### **2.2.4. Risk – Wrong budget estimate**

- Solution – Determine the scope before beginning work, pay a lot of attention to project planning and constantly track and measure the progress

## **2.3. Test logistics**

### **2.3.1. Who will test?**

The project predicts the team specified in 5.2 of this document for the testing. Team leader will communicate with the technical support and the management.

### **2.3.2. When will test occur?**

The testing team will start the test execution when all the following conditions are ready:

- Product is completed
- Product is approved for testing from technical support
- Test plan, test scenarios and test cases are created and approved
- Test environment is prepared
- Preconditions are checked and approved
- Inspection and walkthrough meetings with the technical support are done

### **3. TEST OBJECTIVE**

#### **3.1. Processes to be carried out by end users**

The test objectives are to verify the functionality of Cup-O-Joe 7.0. The project should focus on processes described in 2.1.1:

- Turning the system on and off
- Loading the water container
- Pumping water to the heating element
- Pumping heated water to the coffee container
- Loading the coffee container
- Setting the brew temperature
- Cleaning the system

#### **3.2. Test scenarios**

- Verify the outer body of machine, each element as a unit, characteristics, and volume, minimum, maximum. The mentioned elements are: water container (WC), coffee container (CC), overflow receptacle (OR), water pump, water heater, cup stand for coffee receptacle (CR), display and control buttons, power supply cable.
- Verify the brand name.
- Verify each process that is necessary to provide elements for starting the system; filling the water and coffee container, properly set the removable elements to the system
- Negative scenarios; incorrect setting the elements, CC above maximum...
- Verify the whole process of coffee preparation
- Verify what happens if an element is missing
- Check the receptacle platform capacity
- Turning the system on/off
- Setting the brew temperature
- Power outage in each stage of coffee preparation
- Press 'Action' button multiple times in each stage of coffee preparation
- Press 'Action' button together with '-' and '+' buttons
- Measure process time for one cycle
- Measure prepared coffee volume for one cycle
- Measure prepared coffee temperature and compare it with brew set temperature

## **4. TEST CRITERIA**

### **4.1. Suspension criteria**

If the testing team leader reports that there are 30% of test cases failed, the testing process should be suspended until the technical support fixes the issues which brought to failed cases.

The testing process will be temporarily stopped for the reasons specified in the point 2.1.2 of this document. The mentioned reasons demand technical support team to react and resolve the issue.

### **4.2. Test cycles**

There will be two cycles for functional testing. Each cycle will execute all the test cases on each of the test environment stands defined in 6.1 point of this document.

The objective of the first cycle is to identify any blocking, critical defects, and most of the high defects.

The objective of the second cycle is to identify remaining high and medium defects, remove the work-around from the first cycle, and obtain performance results.

UAT test will consist of one cycle on each of the test environment stands defined in 6.1 point of this document.

### **4.3. Test cases execution order**

Test cases should be conducted in logical order which will be followed in the numbering of test cases.

Each test case should be defined as it might be executed as a single unit, especially in occasions of test case repeating after eventual bugs fixes.

### **4.4. Exit criteria**

Specifies the criteria that denote a successful completion of a test phase

- Pass rate is mandatory to be 95% unless a BRD author/responsible person instruct otherwise.
- 100% test cases executed
- No open critical or high severity defects
- 95% of medium severity defects have been closed

## **5. RESOURCE PLANING**

### **5.1. System resource**

Testing team should have 3 Cup-O-Joy 7.0 items for testing purposes. The items should be complete, with all the parts and mechanisms given in the diagram Figure 1: Cup-O-Joe 7.0 process flow of the Cup-O-Joe 7.0 documentation.

#### **5.1.1. Cup-O-Joy 7.0 parts capacity and range**

- Water container capacity is defined in the Cup-O-Joe 7.0 documentation, point 5.2
- Heating element capacity and range is defined in the Cup-O-Joe 7.0 documentation, point 5.3
- Water pump capacity is defined in the Cup-O-Joe 7.0 documentation, point 5.4
- Coffee container capacity is defined in the Cup-O-Joe 7.0 documentation, point 5.5
- Receptacle platform capacity is defined in the Cup-O-Joe 7.0 documentation, point 5.6
- Overflow receptacle capacity is defined in the Cup-O-Joe 7.0 documentation, point 5.8

### **5.2. Human resource**

- Test Manager – Person responsible for the whole project; defines project directions; acquires adequate resources.
- Test Lead – identifies and describes adequate test techniques, tools; verifies the test approach; implements the test scenarios, test cases; manages the test execution; communicates with test manager and technical support; reports the defects.
- Testers – execute the test cases following the testing documents; keep records of test results; compare expected test results vs actual results; reports to test lead and test manager. There should be 3, at least 2 testers in this team.

## **6. TEST ENVIROMENT AND RESOURCES**

### **6.1. Stand for the Cup-O-Joy 7.0**

As Cup-O-Joy represents a coffee making system designed for harsh environments, like construction sites, camp sites, and family homes with lots of children, the adequate environment should be provided. There should be 3 different stands for the machine and all tests should be conducted on each of the stand.

1. Solid stand, absolute horizontal
2. Solid stand, slope 8°
3. Non sold stand, possible to minor displacement

### **6.2. Power usage and capacity**

The power consumption of the Cup-O-Joe 7.0 during one cycle is 800 WATS (with the margin of tolerance of 50 WATS).

The Cup-O-Joe 7.0 system runs on 230 V 50 Hz AC power. In case of power fluctuations the built-in power regulator will shut off the Cup-O-Joe 7.0 to avoid the damage to the system.

### **6.3. Other resources**

The below items and materials should be provided for the testing:

- Cups, mugs or other receptacle in sufficient number
- Water in sufficient quantity
- Coffee grounds in sufficient quantity
- Timer or stopwatch
- Containers or other instruments for measuring the volume of a liquid/water and coffee ground
- Thermometer for room temperature
- Thermometer for fluid temperature
- Weight scale

## **7. SCHEDULE & ESTIMATION**

### **7.1. Testing project tasks and time estimation**

The schedule refers to the process after the acceptance of this document and test scenario and test cases written in details.

- The testing team examination with the documentation and the item before testing process starts – 3 days
- Testing cycle first – 7 days
- Testing cycle second – 7 days
- UAT – 7 days
- Test report checking – 3 days
- Test delivery – 2 days
- Total – 29 days

### **7.2. After the testing**

- Test results, analyze reports
- Defect report
- Release notes