



## QA Expertise Test

## **The concept**

Our agile team has been working together to identify energy saving projects within the office. They realized they use the kettle quite frequently; now they have redesigned it for efficiency.

## **The design**

They have built a kettle with an air-tight lid that adjusts its height according to the level of the water. This is to ensure that the water, heat and pressure ratios are maintained for the most efficient boiling operation.

## **The business rules.**

- The lid must adjust to a level where air volume is half the water volume, in other words 500ml of water, the lid sits at 750ml mark.
- The kettle element sits at a flat height of 50ml mark; it must not turn on for water below 250ml (one cup).
- At a 110 degrees celsius the kettle must switch off and trigger the lid release air.
- When the water cools down to 95 degrees celsius, the lid valve must close to maintain the temperature above 90 degrees celsius for up to 45mins

The team has now received the kettle back from the engineering company that has designed it for them and wants you to help test that the kettle has been designed to work as specified.

## **Your task**

The team would like you to report on the following

1. Safety
2. Function
3. Efficiency

Please send us the test cases and steps you would use to achieve this.

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Below are the test cases and steps as requested .

- ***Test Cases***
- ***Test Scenario***
- ***Test Steps***
- ***Expected Result***

## **1. Safety Testing**

### **Test Case 1: Lid Adjustment Safety**

Scenario: Ensure that the lid adjusts safely according to the water level.

#### **Test Steps:**

- Fill the kettle with 500ml of water.
- Observe if the lid adjusts its height automatically to the 750ml mark.
- Verify that the lid remains stable and securely closed during the boiling process.
- Repeat the test with varying water levels to ensure the lid adjusts correctly each time

#### **Expected Results:**

- The lid should adjust its height to the 750ml mark when 500ml of water is filled.
- The lid should remain stable and securely closed during the boiling process.

### **Test Case 2: Element Activation Safety**

Scenario: Validate that the kettle element activates safely based on water level.

#### **Test Steps:**

- Fill the kettle with water below 250ml (one cup).
- Observe if the kettle element remains inactive and does not turn on.
- Repeat the test with different water levels above 250ml to verify that the element activates as expected.

#### **Expected Results:**

- The kettle element should remain inactive and not turn on when the water level is below 250ml.
- The kettle element should activate when the water level is above 250ml.

### **Test Case 3: Lid Release Safety**

Scenario: Ensure that the lid releases air safely after the kettle switches off.

Test Steps:

- Fill the kettle with water and let it boil until it reaches 110 degrees Celsius.
- Observe if the kettle automatically switches off at 110 degrees Celsius.
- Verify that the lid releases the air after the kettle switches off.
- Repeat the test multiple times to ensure consistent and reliable lid release functionality.

**Expected Results:**

- The kettle should automatically switch off when the water reaches 110 degrees Celsius.
- The lid should release the air after the kettle switches off.

## **2. Function Testing**

### **Test Case 4: Boiling Operation**

Scenario: Verify the proper functioning of the boiling process.

Test Steps:

- Fill the kettle with water.
- Turn on the kettle and observe if the water boils properly.
- Verify that the boiling process stops when the water reaches 110 degrees Celsius.
- Repeat the test with different water levels and ensure consistent boiling and stopping behaviour.

**Expected Results:**

- The water should boil properly when the kettle is turned on.
- The boiling process should stop when the water reaches 110 degrees Celsius.

### **Test Case 5: Lid Valve Control**

Scenario: Validate the control and functionality of the lid valve.

Test Steps:

- Boil water until it reaches 110 degrees Celsius.
- Observe if the lid valve opens to release the air.
- Allow the water to cool down to 95 degrees Celsius.
- Verify that the lid valve closes to maintain the temperature above 90 degrees Celsius for up to 45 minutes.

- Repeat the test multiple times to ensure proper functioning of the lid valve under different scenarios.

**Expected Results:**

- The lid valve should open to release the air when the water reaches 110 degrees Celsius.
- The lid valve should close to maintain the temperature above 90 degrees Celsius for up to 45 minutes.

### **3. Efficiency Testing**

**Test Case 6: Energy Consumption Efficiency**

Scenario: Evaluate the energy consumption efficiency of the kettle.

**Test Steps:**

- Measure and record the initial energy consumption of the kettle.
- Boil water until it reaches 110 degrees Celsius.
- Record the final energy consumption after the boiling process.
- Calculate the energy efficiency by comparing the initial and final energy consumption.
- Repeat the test with different water levels and compare the energy efficiency results.

**Expected Results:**

- The energy consumption should be reduced after boiling the water due to improved efficiency.
- The energy efficiency should be consistent across different water levels.

**Test Case 7: Efficiency - Time Efficiency**

Scenario: Assess the time efficiency of the kettle.

**Test Steps:**

- Measure the time taken to boil a specific amount of water.
- Compare the boiling time with a standard kettle or benchmark.
- Repeat the test with different water levels and verify consistent time efficiency.

**Expected Results:**

The kettle should boil water in a comparable or faster time than the standard kettle or benchmark.

The boiling time should be consistent for different water levels.