

**Deliverable B**

Needs Identification and Problem Statement

GNG 1103

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Group 19

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## 1. Introduction

Beyond the Pale is a local brewing company in Ottawa who requires a specific gravity and temperature monitoring system for their company. Measuring specific gravity is a vital step in the beer making process. Beyond the Pale's current process for measuring specific gravity is inefficient, resulting in loss of time and product. As the company looks towards expansion, it is imperative that these systems are put in place to prepare for the increased work they will take on. The following document will present the needs discussed and deduced during the first client meeting. These needs will be ranked in order of importance, and used to create a problem statement. Finally, user benchmarking will be presented.

## 2. Needs Identification and Ranking

Legend	User Needs	Data Collection and Management	Hardware Specifications	Technological Specifications
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#	Need	Rank of Importance (out of 5)
1.	Monitor the specific gravity, time and temperature of the contents of the tank	5
2.	Must repeat readings on a scheduled basis at at minimum of once an hour, but ideally every 1-2 minutes	5
3.	Must be food grade and pressure resistant	5
4.	Must be a closed system	4
5.	Must collect and translate all data monitored to a graph	4
6.	Must be resistant to build up using a filter membrane	4
7.	Must store all data monitored forever	4
8.	Must connect wirelessly to a monitoring interface	4
9.	Must be able to withstand 4 weeks without cleaning maintaining an accurate measurement	4
10.	Must source power from a cable and contain a battery backup	2
11.	Must be removable for cleaning	2
12.	Must be a "owned" non subscription based data monitoring and collection system	2
13.	Offers an alert when the fluid being monitored is deviating from the expected/planned temperature or specific gravity in order to save or recover a deviating batch	1

14.	Must be operational or feature components that can be used while wearing gloves and PPE	1
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### 2.1. Ranking Explanation

The needs for this project were separated based on the criteria required for essential functionality outlined by the client. Ranked first were the needs and functions that allowed the device to operate at a base level; such as: Must be food grade and Must be resistant to build up using a filter membrane. These were ranked higher on the list due to their properties that allow the device to operate at it's peak performance. In our eyes, the other specified needs while still taking importance, wouldn't be applicable to the product if it couldn't be implemented.

### 3. Problem Statement

A specific Gravity and temperature monitor is required to streamline and expand the brewing process at Beyond The Pale Brewing; allowing for simple and accurate data monitoring and collection. The monitor which will be mounted to the tank must be able to monitor at a consistent rate, meet all hygienic standards of the brewing process, and resist the brewing process conditions.

### 4. User Benchmarking

A hydrometer is a device used in many facilities, including what is currently being used by Beyond the Pale brewing. This product measures the specific gravity of a liquid, simply by floating. When a liquid is denser the hydrometer will float higher. In smaller scale breweries they are very efficient and easy to use; however, to measure the specific gravity, during the brewing process the liquid has to be removed from the tank. Due to the necessity to remove beer from the tank in order to record specific gravity, this process becomes inefficient and costly on a larger scale.

Another device currently used by breweries is an Optical Refractometer. Refractometers use light and how it behaves as it passes through a liquid to determine the approximate amount of sugar dissolved in the liquid. This device is easier to use and requires just a few drops for the measurement but it is not quite as accurate as a hydrometer.

The Tilt Digital Wireless Bluetooth Hydrometer & Thermometer is another device used in measuring specific gravity. It is both battery powered and floats inside of a tank, regularly reporting temperature and specific gravity measurements via bluetooth.

### 5. Conclusion

The first client meeting provided information that allowed us to interpret and rank client needs. This was used to create a problem statement that focuses on creating a solution that is efficient, safe, and accurate. We can use this information to move onto the next stage of the design process, and work to design a more effective specific gravity and temperature monitoring system for Beyond the Pale.

## References

The Electric Brewery. "Measuring Gravity." *The Electric Brewery*,  
<https://shop.theelectricbrewery.com/pages/measuring-gravity>.