**Abstract**

The goal of this project was to expedite the cleaning, drying, and storage times associated with “doing dishes”. The DryMate is a water-resilient cabinet that allows the user to store and dry their dishes simultaneously, eliminating the need for a dish rack. The DryMate features a two-tiered rack setup to hold ample dishes, with two fans respectively ordered behind to introduce turbulent, convective flow to maximize drying times. Testing shows that the design can support a load on the order of fifty pounds without failing and that the drying time was reduced significantly.

**Design Development**

The DryMate has several ergonomic features convenient to the consumer. The features for the DryMate follow:

1. Two fans in the back reduce drying time by utilizing forced convection
2. Easily replaceable air filter
3. Rolling racks provide ease of access to dishes
4. Adjustable racks and pins accommodate dishes of all sizes and shapes (Figure 2)
5. Slanted, water-resistant bottom allows water to flow into a removable tray.

From analysis of the benchmark, the following performance goals were determined (Table 1).

<table>
<thead>
<tr>
<th>Table 1 Performance goals of the DryMate</th>
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<tr>
<td>Maximum weight</td>
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<tr>
<td>Drying Time</td>
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<tr>
<td>Amount of Dishes</td>
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<tr>
<td>Waterproof</td>
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<td>Lifetime</td>
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The DryMate was designed to achieve optimum performance considering cost of materials. The DryMate features a sleek, stylishly colored wooden body and ABS plastic for the racks. The door is made of a transparent polycarbonate plastic adding durability and giving the consumer the ability to see inside the cabinet without the need to open it.

The ¾” thick body provides structural integrity. All wooden pieces are held together using either coated or stainless steels to prevent corrosion for long-lasting use. A resin was applied to all surfaces where water flows; this allows the DryMate to drain water smoothly and efficiently.

The ABS plastic for the inner components of the DryMate was chosen for its high machinability, strength, impermeability and low cost. The rack and dowels shown in Figure 2 are composed of this material.

**Test and Results**

Tests were performed to compare the performance of the benchmark to that of the prototype. These included:

- A Solidworks physics simulator to test the distributed load on a rack of ABS plastic. Results are shown in Figure 4. The rack was able to sustain the given load of 25 lbs without any major deformation or fracture.
- A test in which two equally wet dishes were loaded within the DryMate and a conventional dish rack. At the end of ten minutes, the total number of water droplets that remained on the dishes were compared.
- A maximum capacity test to determine the amount of dishes the prototype can hold versus the standard dish rack was performed.

**Conclusion**

After testing the prototype under the established performance parameters, it was found that the prototype surpassed the benchmark in every critical category of performance.

**Acknowledgements**

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**References**