Rotational Molding
Rotational molding machines are present in all major manufacturing countries in the world. While the outward appearance of these machines may look different, there are four main steps that occur in all cases. This goes back to the very basic principle of rotational molding, which has its origins well over 200 years ago. Since that time, mold-makers have been following these basics steps to create molded objects through rotational movement.

Step 1: Mold Preparation

You can think of this akin to baking a cake. You fill your hollow mold with the exact mix of your material – polymer powder or resin, often polyethylene, polyvinyl chloride or nylon – including pre-compounds for color and hardness properties. You wouldn't bake a cake without first buttering the pan, however. This is where our mold release comes into play, and allows for clean, easy release at the end of the molding process. The mold is preheated according to the properties of your material, and after loading your powder, the mold is closed and moved to the oven. The amount of preheating is related to your mold design and polymer selection.

Step 2: Mold Heating

One of the key fundamentals of rotational molding is the rotation that occurs on two axes to produce adequate material spreading and coverage. Rotating about a single axis would not guarantee an even dispersal, and maintaining consistent wall thickness would be impossible. The speed at which this rotation occurs, below 20 rotations every minute, ensures that the molten material is not subject to centrifugal forces and therefore provides excellent coverage. Timing in this stage is very important. Insufficient time affects polymer melting and adherence to the mold wall, whereas too much time will degrade the end mechanical properties of the material and make it less resistant to wear and impact in final form.

Step 3: Mold Cooling

It is a common mistake to assume that mold cooling can and should occur as quickly as possible, and that it's simply to get the parts down to room temperature. On the contrary, mold cooling is an important rotational molding parameter, and the cooling rate needs to

be as carefully controlled as the heating rate. Air or water can be used to cool the outside of the mold, which in turn cools the polymer inside. With the correct rate of cooling, the molder can eliminate problems related to shrinkage and warping – cooling too fast – and undesired flow and inconsistent wall thicknesses – cooling too slowly. Sophisticated software programs exist to help predict the solidification pattern of the material in your mold, and will help you optimize your cooling rates.

Step 4: Mold Unloading

The last step sounds easy, but care must be taken when you design your process to ensure your parts leave the mold easily, and without being damaged. This is where the attention you paid to properly applying mold release in the first step pays off. Careful mold design is also critical - to allow parts to freely separate from the mold cavities. Modern polymers and materials can offer excellent surface finishes, tight tolerances and paintable surfaces, so proper de-molding is critical to guarantee high-quality parts. Once your parts are removed from the mold, it is time for your finishing, inspection and assembly or packaging operations.

Rotational molding is used across a variety of industries to make everything from children's toys to medical devices. Advanced automation, precision control and advanced mold-cavity materials and finishes have helped make rotational molding a highly-efficient and reliable method of manufacturing a wide range of parts.