

Focused Practical Task: Dip Coating a Metal Product

Objectives

Students will develop their D&T capability by learning about what causes metals to rust and three methods of plastic coating metal products.

By the end of the assignment, students will know that:

- metals rust in the presence of air and water
- rusting can be prevented by excluding air or water (or air and water) from the surface of a clean metal
- a film of plastic covering a metal will exclude both water and air from the surface of a metal and therefore prevent rusting from occurring
- plastic coatings may be applied by
 - dip coating in a fluidised bed of polymer powder
 - dip coating in a bath of Plastisol
 - flock spraying
- hot parts of ovens and heated metal and plastics will burn skin so:
 - risk assessments of the hazards should be carried out
 - safe working practices should be adopted

Success criteria

Each student:

- has designed and made an original product that satisfies the given design brief and specification
- has used tools safely and has strived to achieve quality in marking out, cutting, shaping, finishing and joining their chosen materials
- knows that thermoplastics can be softened by heating
- knows that line benders are used to heat (relatively) narrow areas of thermoplastic sheet materials
- knows that thermoplastics soften and can be bent when heated and become rigid again when cooled.
- knows that jigs may be used to:
 - aid bending thermoplastics
 - hold heated thermoplastics after line bending until the plastic is cool
- has assessed the risks associated with working with strip heaters and hot thermoplastics and has worked safely throughout the assignment
- shows evidence of having evaluated his/her work.

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Situation

Metals rust unless water and air are prevented from coming into contact with the metal. One way of preventing water and air from coming in contact with a metal is to plastic coat the metal. Plastic coating gives a thick, rubbery, water proof coating that if adhered to the metal properly, also prevents air from coming in contact with the metal.

Brief

Plastic coat a steel product, e.g. a coat hook or a screw driver made from a bent carbon steel rod, by either:

1. dip coating the metal in a fluidised bed of polymer powder
2. dip coating the metal in a bath of Plastisol.



Resources Required

The following are the essential resources that you will need to complete this assignment:

- at least one steel product that will be plastic coated
- emery cloth to remove all rough edges and rust from steel
- a degreasing agent, (washing up liquid, Jif etc)
- an oven to heat steel the product
- a fluidizing tank with polymer powder
- wire, tongs etc for holding the steel product
- Plastisol

What you must do

1. Clean your steel product
2. Heat your steel product to a temperature that will melt the polymer powder or Plastisol
3. Plastic coat your steel product using either:
 1. a fluidised bed of polymer powder
 2. a tank of Plastisol
4. Reheat your product to ensure that the polymer has melted throughout its thickness
5. Prepare a Risk Assessment of the hazards involved with plastic coating
6. Evaluate the final product, e.g.:
 1. how well the plastic coating has covered your steel product, checking for pin holes, unevenness, unmelted polymer.
 2. discover what others think about your product.
7. Work safely and complete the assignment on time.