

JEWELLERY – 2

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JEWELLERY – 2

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1. THE BASICS OF PEWTER CASTING INCLUDING SAFETY

2. MAKING A SIMPLE MOULD AND CASTING

3. DETAILED PEWTER CASTING INCLUDING A CASTING BOX.

4. LOST WAX CASTING

5. CUTTLEFISH BONE CASTING

6. CASTING WITH CHARCOAL BLOCKS

7. TUFA STONE CASTING

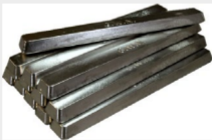
8. DELFT CLAY CASTING

WHAT IS PEWTER? WHAT IS A MOULD ?

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Pewter is an ALLOY which means it is composed of more than one metal. Most modern pewter is composed of 96 percent tin and 4 percent copper although there are many variations. It is a soft metal and can be shaped easily by hand tools and machine tools. Due to its low melting point (approximately 230 degrees centigrade) it is suitable for casting. It is a bright material, which makes it popular for the manufacture of 'silverware' such as tankards, candlesticks and even jewellery.

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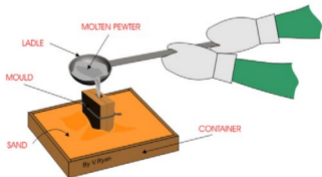


HEATING PEWTER AND POURING

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The diagram below shows pieces of the pewter ingot cut to a size suitable for heating in a ladle. Fire bricks have been arranged around the bowl of the ladle so that the heat from the brazing torch flame is reflected back onto the ladle. As the temperature rises the pewter begins to melt and quite quickly forms a molten liquid. The molten pewter is then carefully poured into the mould.

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PEWTER CASTING AND SAFETY

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Pewter casting is potentially very dangerous because of the high temperatures involved. Safety clothing similar to the type shown below must be worn and it is essential that all possible safety measures/precautions are taken. Pupils / students must be supervised directly during any casting.

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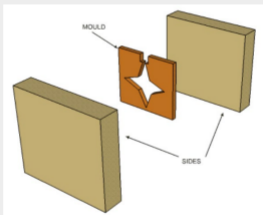
MAKING A SIMPLE MOULD

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MDF is ideal for use as a mould when casting pewter. The melting point of pewter is low and does not burn or damage the MDF so that it can be reused time and time again.

The sides are manufactured from 9mm MDF with the mould being made from 4mm MDF. The mould is small, so care is needed when cutting and shaping.

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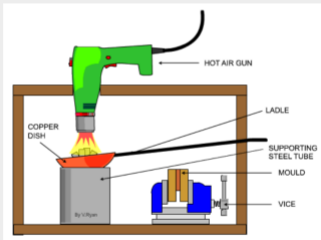


HEATING PEWTER WITH A HEAT GUN

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When the mould is finished it is placed between the two supporting pieces of MDF and secured in a vice. A hot air gun is normally used to strip old paint from wood. However, it is ideal for heating up pewter and usually takes about two to three minutes before it is ready for pouring.

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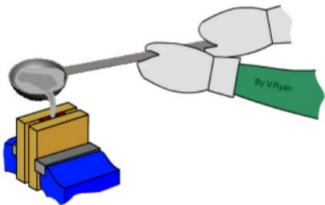


POURING THE PEWTER

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When the pewter is molten, it is ready to pour into the mould. Safety equipment should be worn when carrying out this procedure. Leather gloves, a safety visor and leather apron are usually worn.

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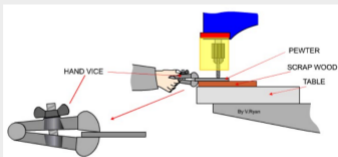
FINISHING THE CAST JEWELLERY

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The cast pewter, is drilled for a ring and chain. A hand vice is used to hold the casting, when it is drilled using a machine drill.

Emery cloth is used to smooth the sides, followed by polishing on a buffing machine.

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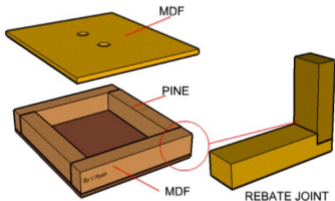


THE CASTING BOX - 1

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The first stage is to make a casting box. This is composed of two pieces of 3mm MDF and four sides made from pine or similar material. The sides can be jointed using rebate joints and glue or left as simple butt joints.

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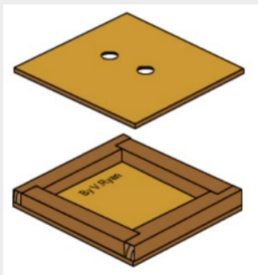


THE CASTING BOX - 2

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Simple Lap Joints can be cut to join the casting box. Two holes are drilled in the plywood top. One of the holes will be the for pouring the molten pewter (runner) and the other allows excess pewter to escape (riser)

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PACKING THE CASTING BOX

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The casting box is carefully packed with casting sand (such as petro-bond). The sand is shaken through a sieve, so that it is fine and pushed into place by hand. It is levelled off with a strickling bar. Then, the mould is pressed into position.

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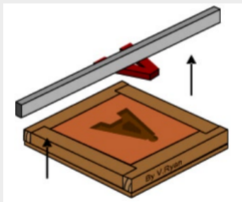


REMOVING THE MOULD

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The mould / pattern is removed. In this example, the mould is a child's magnetic fridge letter. As the letter has a magnetic back, it 'sticks' to a steel bar, and can be lifted out of the sand. If a wooden mould is used, small screws are screwed into the wood, to remove it from the sand.

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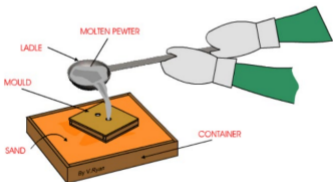


FINAL CASTING

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The plywood top is placed on top of the box. The molten pewter is poured in one hole (the runner) and it rises up the other hole (the riser), when the cavity left by the mould / pattern is full.

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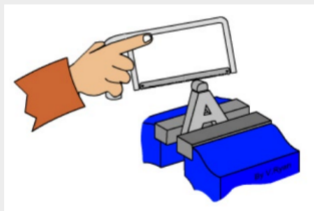


CLEANING UP THE CASTING

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When removed from the casting sand the two sprues (runner and riser) are clearly visible. They are cut level with the rest of the casting using a hacksaw / junior hacksaw. Filing takes place to reduce rough surfaces, followed by emery cloth and polishing,

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LOST WAX CASTING INVESTMENT METHOD

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Lost wax casting is a process whereby, a wax model of the final product is used to manufacture a mould. A mould composed of a mixture called 'investment' is formed around the wax model. Once the mould has solidified, the wax is melted by heating in a kiln / oven. The molten metal is poured into the mould, cooling to form the final product.

Tap the images for information / an exercise regarding mixing / preparing the 'investment'



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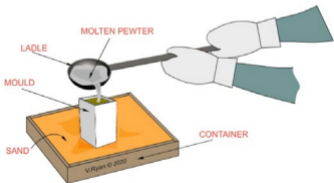


LOST WAX CASTING

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The molten pewter is carefully poured into the 'investment' mould. It is important that the flask is stood in sand, in case any of the molten metal runs down the sides. If this happens, the molten metal will simply stay on the surface of the sand and cool down. The flask should never be placed on a cold surface. If molten metal comes in contact with a cold surface, it will 'splatter' violently. Anyone close to the area will be in serious danger.

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LOST WAX CASTING – USING A SILICON RUBBER MOULD

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An alternative casting technique, is to use 'silicone rubber' in the place of 'investment'. This surrounds the wax model, producing the mould.

The RTV is a two-part mix, which cures at room temperature, over a couple of days. Great care must now be taken, to cut the mould accurately in two, using a craft knife. The wax model can then be removed, leaving the cavity. The two halves are wired or carefully clamped together, ready for accepting molten metal. Casting of the molten metal can then take place.

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CUTTLEFISH BONE CASTING

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Cuttle fish are a deep sea mollusc, related to Octopus and Squid, found in the Mediterranean / tropical seas, from the Baltic to South Africa. Cuttle bone is lightweight, soft and has a chalky texture, the internal structure Cuttlefish. When Cuttlefish die, their internal chalky structure, often washes up on beaches. It has been used for centuries as a treatment for rashes and skin ulcers. It is also valued by jewellers.

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PREPARING CUTTLEFISH BONE

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1. The surfaces of the two cuttlefish bone that meet, are flattened, by rubbing on a sheet of glass paper or similar abrasive. It is important that they fit together, without any gaps, through which molten metal can escape.
2. Cut away the 'top' of each cuttlefish bone with a hacksaw, leaving a straight edge.



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an exercise



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CRAVING THE CUTTLIFISH BONE

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The cuttlefish bone can be shaped with simple carving tools or even a sharp knife, producing the mould.

Alternatively, a metal shape can be pressed into the soft cuttlefish bone, leaving a cavity for the molten metal to fill.

A 'sprue' is also cut, down which the molten metal will be poured.

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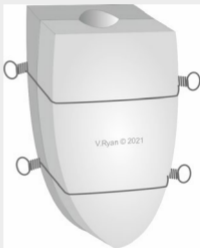
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GETTING READY FOR CASTING

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The two sides of the cuttlefish bone are wired together (they can be clamped). They are now ready for the casting procedure.



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/ an exercise

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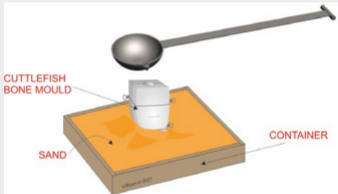
CASTING

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The cuttlefish bone mould is 'stood' upright and securely in sand (builders sand is ideal).

The sand is 'built up' around the mould, so that the mould cannot 'topple' over. If any of the molten metals 'leaks' or 'spills' from the mould, it will come to a rest safely in the sand.

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CLEANING UP THE CASTING

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After pouring the metal, the mould and its casting are left to cool slowly. When cold, the mould is split open, revealing the casting. The sprue is removed with a junior hacksaw and any necessary filing and polishing are carried out.

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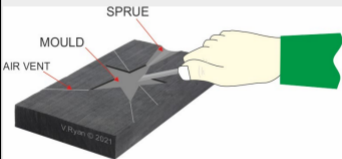


CASTING WITH CHARCOAL BLOCKS

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Charcoal is relatively soft, making it easy to carve. Carving jewellery designs in the surface, can be achieved with simple tools and even homemade tools. The set of tools shown below, are actually wood carving tools, but they perform well with charcoal.

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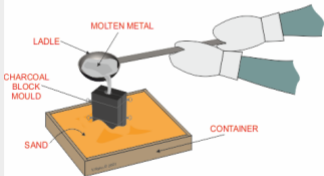


CASTING WITH CHARCOAL BLOCKS

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The two charcoal blocks are wired together (or clamped). The diagram below, shows the completed mould, embedded in sand. This holds the mould in the vertical position securely. If a molten metal flows down the side of the mould or misses it completely, it will run on to the sand, harmlessly.

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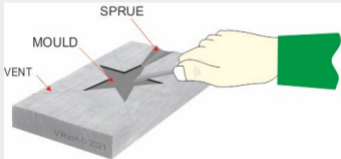


TUFA STONE CASTING

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Tufa stone is a soft rock, composed of petrified volcanic ash. It is easy to cut and carve and can be used to form casting moulds. Tufa stone is worked in the same way as a charcoal block, using the same carving tools and equipment. Alternatively, a Pendant Drill or 'Dremel Multi-Tool', can be used to carve the shapes.

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CARBONISING TUFA STONE MOULDS

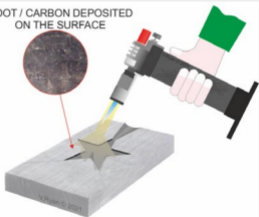
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The tufa stone surface is 'carbonised' with a blow torch. This technique deposits 'soot' on the surface, which helps to release the casting, when it has cooled, after pouring.

The soot is produced, if a soft gas flame is used, with minimum air / oxygen mix. The flat surface of the second piece of tufa stone, is also carbonised.

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SOOT / CARBON DEPOSITED
ON THE SURFACE



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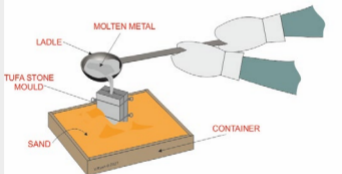


TUFA STONE CASTING

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The tufa stone mould is wired together and placed in a sand box. The sand is 'piled' around the mould, holding it in position. The sand will catch any excess molten metal, if it runs down the side of the mould.

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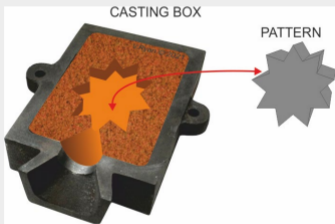
DELFT CLAY CASTING - 1

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Delft clay is a very fine sand (mixed with a special oil and clay) and is often used when casting detailed jewellery. It is the type of clay, that will not dry out and can be reused. Ideal for metals such as pewter, silver, gold and brass.

Delft clay is 'packed' in casting boxes.

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DELFT CLAY CASTING - 2

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The mould / pattern is pushed into the delft clay and then carefully removed, leaving an impression of the pattern. The steel sprue of the casting box, is extended into the sand/clay, carved with a small spoon / knife. Thin air vents are 'scratched' into the surface of the clay. These vents and holes allow gases to escape when the metal is poured.



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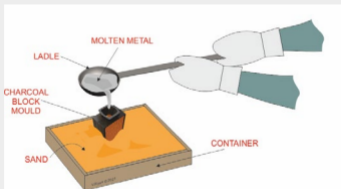


DELFT CLAY CASTING - 3

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The second casting box, called the 'cope', is prepared in exactly the same way. The two casting boxes (the 'cope' and 'drag') are put together. Locating pins on either side of the boxes, ensure that they line up with each other. The molten metal is carefully poured into the casting boxes, via the sprue.

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