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2-Part Epoxy Putty

The EPOXY PUTTY with a thousand uses

Product Information

STANDARD - TERRACOTTA
BLACK - SUPERFINE WHITE
SILVER GREY

MODELLING & SCULPTING
D.I.Y. & PLUMBING REPAIRS
PICTURE FRAME RESTORATION
MARINE REPAIRS

STANDARD MILLIPUT *is our general purpose grade – it has been used for many years for the toughest tasks. Suitable for modelmaking, sculpting, picture frame restoration, D.I.Y, marine and plumbing repairs. Temporary repairs for car petrol tanks, batteries, radiators and exhausts.*

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STANDARD

GARDEN URNS
POTS & STATUETTES
DAMAGED BRICKWORK
QUARRY TILES

TERRACOTTA MILLIPUT *is suitable for the repair of terracotta pots, garden urns and for damaged brickwork and quarry tiles both internally and externally. Terracotta Milliput has been featured in the gardening sections of national newspapers and leading gardening magazines.*

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TERRACOTTA

UPVC REPAIRS & FILLING
WHITE DOMESTIC APPLIANCES
PORCELAIN RESTORATION
BATHS & SINKS

SUPERFINE WHITE MILLIPUT *is for the restoration of porcelain and ceramics where a fine finish is desired. It is also suitable for UPVC (repairs and filling) and for chips and cracks in baths, sinks and tiles. Superfine White Milliput is recognised as one of the finest materials available for ceramic restoration.*

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WHITE

REPAIRS TO SLATE
CAST IRON
CERAMICS
BLACK PLASTIC PARTS

BLACK MILLIPUT *is for the repair of antique clocks, guttering, ebonised wood, marble, slate, cast iron, basalt ceramics and black plastic parts. Black Milliput is the latest addition to our range of colours.*

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BLACK

MODELLING & SCULPTING
D.I.Y.
GARDEN ORNAMENTS
CERAMICS

SILVER GREY MILLIPUT *is ideal for modelling and sculpting and for the restoration of ceramics and garden ornaments.*
All grades of Milliput are frost, heat and water resistant. Ideal for external work.

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SILVER GREY

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THE EPOXY PUTTY WITH A THOUSAND USES

Using Milliput for the first Time?
If you have never used Milliput before we suggest you make yourself familiar with its behaviour before attempting a repair. Take a small slice, say 1/4", from each part, mix them together for 4-5 minutes and roll into a small ball. flatten it to shape of a coin and observe it over 2 to 3 hours. Note how sticky and adhesive it is when first mixed. After an hour it becomes rubbery and less tacky. In 3-4 hours it becomes quite hard and tack free. Overnight it becomes rock hard.

Instructions For Use

Mix together equal parts of each stick from the pack. Knead and roll in the hands for at least 5 minutes until the colours merge and become uniform and no streaks can be seen, and then mix for another minute. The surfaces to which the putty is applied should be free from grease and dirt. Smooth surfaces should be cleaned with a suitable solvent or with soap and warm water to remove dirt and grease. Abrading the surface will improve adhesion. the putty may now be applied and will set hard in three to four hours without shrinking.

At all stages from initial mixing to final setting Milliput responds to the use of water. To aid manipulation and avoid sticking, fingers and tools should be kept moistened with water. There are certain instances when work may be carried out in a gentle stream of water under a tap. To obtain a smooth finish, mould or apply Milliput and then immediately wipe and smooth gently with wet finger or with a fine textured moist cloth.

When tools have been used for applying or contouring Milliput they should be cleaned immediately after use with a wet rag or paper. If the putty is allowed to harden on it will be almost impossible to remove.

In the putty state (ie before setting) Milliput, like most chemicals in domestic use, may cause irritation to sensitive skins. When mixing the two components it is advisable to use rubber gloves or throw-away polythene gloves. When rubber gloves have been used wash them immediately after use, and whilst still on the hands, using running water. If the hands have been used for mixing or manipulating Milliput wash them immediately after use with toilet soap and warm water. Milliput should be stored in a cool place.

Shelf Life
Although we say that Milliput has a shelf life of about 2 years, we do know that many of our customers are finding it workable for much longer (In fact we have heard of one user who has "refreshed" ten year old Milliput by warming it up in his microwave - although this is a practice we could not endorse!).

We recommend that Milliput is stored in cool, dry conditions and that the polythene bags are re-sealed after use.

Instructions for Superfine White Milliput:

It is very important when using this grade of Milliput, because the sticks are virtually the same colour, that you mix the two parts for at least five minutes.

Example Project - Restoring a Lute Player by Natasha Smith of LAA Ltd

Amongst all the many skills that a restorer must master, replacement of lost and damaged parts is arguably one of the most difficult. A restorer often replicates missing parts in order to enhance a damaged decorative object and for this process to be successful, fine moulding materials are required.
Finding easy to use and effective repair materials is an integral part of the role of a restorer. Indeed many are found which will serve particular functions but often lack versatility and long term stability. Suitable moulding materials are particularly difficult to find, as the complexity of the moulding and retouching process requires the material to exhibit a large range of characteristics.


Location for replacement of moulded lute 'head'. (Side elevation)

For freehand moulding, the most versatile and easy to use material is Milliput. Available in a variety of colours, it enables the restorer to begin matching the ceramic body colour at the first stage of the repair and is easily moulded to create a perfect base for application of colour.

This two-part epoxy putty is simply mixed in the hand and produces an ideal consistency for moulding even the most intricate of details, without any cracking or chipping. It responses excellently to being press moulded in plaster moulds and can be effortlessly shaped with any type of tool.

Its water solubility allows great versatility to create a variety of textures and patterns, and can be easily over painted with anything from acrylics to epoxy colours.

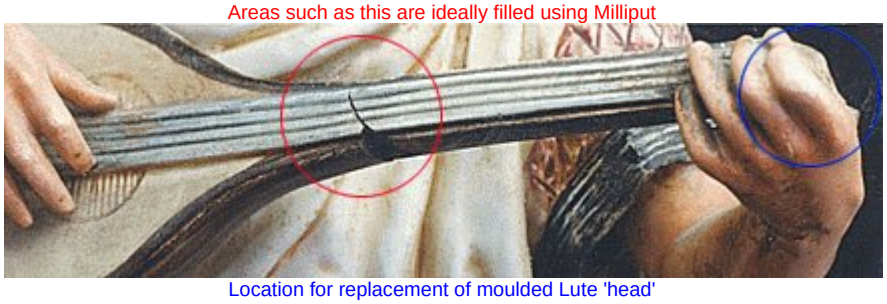
The damage to the earthenware ceramic piece in (Fig 1) was successfully repaired using Milliput to freehand mould a complete 'head' to the musicians lute.

Once the necessary research had been done to ascertain exactly how the original lute 'head' would have looked the piece was quickly moulded.

The non-shrinking properties of Milliput, attributed to curing by chemical reaction rather than solvent evaporation, allowed the correct amount to be selected.

The end of the lute was moulded by hand in a complete piece (individual pegs attached later), clean, angular edges were easily achieved using a small wet spatula and course paintbrush.

Areas such as this are ideally filled using Milliput


Location for replacement of moulded Lute 'head'

Once the Milliput was semi-dry (after approximately 1.5 hours depending on temperature, humidity etc.) the lute strings were simply carved using a needle into the new Lute 'head' and the pins moulded and attached. No adhesive was required for this attachment as Milliput has excellent bonding properties.
The curing time of Milliput (Approximately 3-4 hours) allowed for any re-adjustment. Once hard the surface was gently sanded to prepare it for colour. Colour was easily applied to the prepared surface and adhered well with no powdering or flaking. The surface of the repair was finished with a gloss vanish and the resultant repair was durable and ceramic like to the touch.
The adhesive qualities of Milliput ensured that the repair remains securely bonded to the original ceramic body.
Its ease of use and the possible professionalism of the final restoration ensures that Milliput is a superior moulding material for the beginner to the more experienced restorer.

Restoration and article by Natasha Smith, LAA Ltd.
LAA Ltd are conservation and restoration specialists for all types of decorative and structural objects, providing conservation solutions, advice on collection care, training and lecturing.
Visit http://www.laassociates.com

SOME BASIC TECHNIQUES IN EPOXY RESIN SCULPTURE By Eltham Jones

The techniques that follow in this feature have been developed with the standard and superfine white grades of Milliput but most other epoxy putties will respond similarly. The article Is intended not as a lesson in sculpture but as a guide to the problems, pitfalls and potential which confront someone using Milliput for the first time. It does assume some experience on the part of the reader.

Epoxy resin is a binary compound comprising two components, inert when separate, which combine chemically when mixed to form an insoluble polymer. This reaction occurs gradually over a period of time. The result is that the working properties of the medium change as the curing progresses, closely paralleling those of ceramic materials. These properties may be used to our advantage as will be seen later.

THE ARMATURE

This is a wire framework used to support a piece of sculpture while it is being worked on. Small wax figures may be modelled with almost no armature at all, but the characteristics of Milliput are those of a viscous elastic fluid so it requires quite a sophisticated armature.

My armatures are made in three sections, each corresponding to a principal subdivision of the skeleton. Pectoral girdle, defining shoulders and arms; the spine, setting thoracic depth and posture; the pelvic girdle fixing the dimensions and posture of the legs. Each bend in the armature corresponds to a main body joint and animation of the armature is done only at these points. ensuring that poses are natural and proportions are maintained through even the most tortuous and dynamic postures.

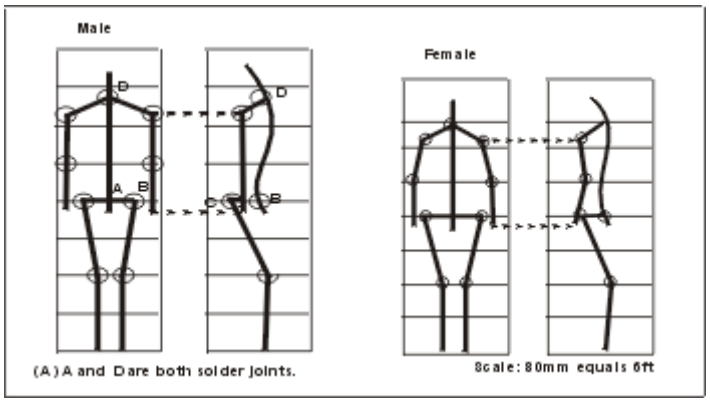
The best material for use is galvanised iron wire as this is easy to mark, cut and solder. Twenty-two SWG is suitable for 60 mm(54mm) or 90mm figures but for anything larger sixteen SWG is better (Tiranti's can supply it if it is not available at the local ironmongers.) Other types of wire can be used but do not always provide the ideal combination of support and pliability.

BODY SIZE

The armature may be plotted either by direct physiological measurement of a suitably amenable person or by using a sketch. A useful tool is the rule-of-thumb formulae traditionally used by painters and draughtsmen. These are called 'canons' and are a way of defining bodily proportions in terms of the ratio of overall height to head height.

Expressed in this way, an eight head (8Hh) canon represents a figure whose overall height is eight times that of the head. The most commonly used canons range from 7.5Hh to 9Hh but the diversity of human development demands that variations will occur outside these accepted limits. Children are differently proportioned from adults and some ethnic groups display minor variations according to their environmental adaptation characteristics. These must he incorporated into the armature as it has a direct effect upon the proportions of the finished figure.

The general proportions of an armature in relation to the typical 8Hh canon are shown in below.



Hips are positioned at about half body height, knees half way between hips and ground. The shoulder joint is a little over three-quarters of the total height, and the wrists are a little below the hips. The elbows are half way between the shoulder and the wrist. Width should be almost 2Hh. The side view shows how closely the armature mimics the posture of a real human skeleton Note also the difference in posture and proportion between male and female armatures, especially the relatively wider pelvic width of the female and shallower spinal curve giving rise to a more upright angle to the thigh

The dimensions of some of the elements in the armature are greater than those shown in the front and side elevation as the dimensions in the plan are projections of the real dimensions. The thigh and shoulder dimensions may be estimated as the angles involved are quite shallow, but the pelvis must he calculated geometrically from the front and side projections.

Calculating the length of a projected line from forward and lateral projections by geometric method. Scale: 160mm equals 6ft.
(i)Using compasses, mark line AB on perpendicular ST to create new line AX
(ii) Project a line, parallel to base datum to meet perpendicular S'T' at point P
(iii) Extend lien CD to meet XP at point Y.
(iv) Measure CY. This is the dimension of which AB and CD are projected.Details on how to animate convinsingly are beyond the scope of this article. A good book on drawing is useful, but the artist's best asset is his ability to observe the world and analyse the information he derives from it.

LOADING THE ARMATURE

When modelling in wax or carving in wood, accepted procedure is to produce an approximation of the final form then gradually refine the detail, working on all areas of the sculpture simultaneously to avoid an unbalanced result. This is fine with materials which remain continuously workable, but Milliput is malleable for only about two hours. The compromise is enough to make an orthodox technician wince, but it works for me, so here it is...

Having animated the armature to the required posture, mount it on some form of working base. I insert the surplus wire on the end of the legs into a plaster blob which more often than not becomes the figure's base, but in the past I have used drilled wood or even lumps of wax.

Begin by mixing a small quantity of Milliput and covering the legs and spine thinly. This initial covering should he thicker where you expect the finished figure to be of heavy cross-section and thin at constricted points such as ankles. Continue by modelling the feet and as much of the lower leg as you can manage in the time available. There are no rules, but it is wise to work only in small quantities and to finish each successive section at a natural cut-off point such as the top of a boot.

Any excess left over from each operation should he loaded onto the armature to help build up a core, particularly on the thighs and torso. A feature of Milliput is its tendency to deform throughout its bulk on application of localised pressure. Working over a core of hardened Milliput offsets this considerably.

Each completed section should be left to set until it will withstand pressure before proceeding with the next section, as it is all too easy to obliterate an hour's careful work with a carelessly placed finger.

It is important, when working in this piecemeal fashion, not to be too distracted by detail. It is a trap which is easy to fall into and many modellers are so concerned with small details they fail to notice elementary faults like bad posture or inaccurate proportions.

FINISHING

Milliput is slightly water soluble owing to its high filler loading, and it is commonplace for sculptors to lick their fingers and implements to lubricate them and inhibit adhesion. This produces a nice finish but is inadvisable on health grounds.

A safe substitute is KY Jelly, a medical lubricant, diluted with a small quantity of water. Most chemists sell it. Do not predilute large quantities as it is bio-degradable and will not keep in this form. Water on its own is of little use as it does not cling to the tools.

Another solvent which may be used is methylated spirits. This should be applied gently by brush before the Milliput has reached the 'leather-hard' stage, to remove blemishes or to achieve textural effects. It is even possible to reduce the putty to liquid form but this has limited value and an adverse effect on cured properties.

ROLLING AND MOULDING

For me, Milliput's most useful characteristic is its ability to he rolled into sheets as thin as 0.2mm and subsequently moulded into compound forms to form structures of great delicacy. This is something of an acquired skill, which perhaps explains why few people have yet exploited it, but once mastered it opens the door to all sorts of constructions: aircraft spinners and cowlings, small boat hulls, shields, helmets, belts and strapping and, most convincingly, drapery and even feathers.

Mix the Milliput well and leave it for about an hour at room temperature, after which it should be kneaded again. At this point in its cure cycle it has begun to lose its adhesive properties and, having partially polymerised, can be rolled without splitting or tearing at the edges.

What you need now is a flat clean surface, resistant to abrasion and a clean cylindrical roller. I use a length of 5/8" mild steel for the roller and a glass slab.

Grease the slab well with Vaseline and press the Milliput into a pancake. Starting in the middle, roll back and forth, keeping the roller well greased. If you are aiming for a very thin section it may help to lift the sheet from the slab and turn it over. Removal is assisted by a blunt craft knife or spatula passed between the sheets and the slab.

FABRICS AND FEATHERS

What you do with it now is limited only by your imagination and ambition. Fabric may he simulated by cutting the sheet to the required pattern, dusting it with talc to prevent it sticking to itself and draping it over the figure. A wooden implement should be used to coax the sheet into folds.

Plume feathers are made by rolling the sheet very thinly and cutting it to shape in situ on the slab. A herring-hone pattern is then cut into the shape leaving a 1mm spine. When the feather is peeled off with the spatula the cut areas will curl into realistic fronds.

SHAPING

Hollow shells may be made by shaping the sheet over formers, or external moulds. Formers should be non-porous and as smooth as possible. If they are porous they should be sealed first. A layer of Vaseline on the former ensures that the sheet will cling to the former while curing, yet release easily when removed. After the sheet has been applied to the former the whole assembly should be put aside to set.

After three to four hours the Milliput will have passed into the 'leather-hard' stage. At this point it should he gently released from the former with a probe and a soft brush. Do not remove it completely. Loosen it so that when you come to remove it after it has cured it will pop off without breaking.

Some mouldings, such as crusader helms, can only he made in two, or more parts. In these cases it is necessary to produce a controlled part line. The sheet is laid over the former in as many pieces as may be necessary, but as few as the sheet's malleability will allow. Any excess sheet is trimmed and all seams burnished gently with a smooth surfaced, hard, modelling tool. New part lines may be introduced by pressing through the sheet with a sharp scalpel blade. The part lines are then dusted with talc to prevent re-sealing and lightly burnished with a finger or polishing tool until they almost disappear. Removal follows the usual procedure.

CARVING

Many forms respond better to carving techniques than to modelling or moulding. Many people experience problems when carving Milliput, especially when dealing with small, intricate items and thin sections. Brittleness and porosity are the biggest drawbacks, but this only happens if Milliput is allowed to set without further treatment. The strength of sheet Milliput is the result of the repeated rolling and stretching which aligns the chain molecules of the polymer in one direction, improving tensile strength. Similar treatment is applied to hour-old Milliput when moulding carving blanks. The putty is rolled into a long sausage, folded hack on itself and rolled again. This is repeated several times before the blank is moulded.

Using this method I have been able to carve delicate items like wavy-bladed 'Zweihander' swords, two inches long and less than 1/32" thick.

PLUMBING REPAIRS WITH MILLIPUT

Before attempting a plumbing repair read these instructions carefully, also the general instructions for the use of Milliput, a copy of which is included in every carton.

Milliput will repair bursts in lead, copper and mild steel pipe, in both hot and cold systems. It will seal leaking W.C. joints, seepages from pipe joints, leaks in radiators etc.

We wilt describe the use of Milliput to repair a burst in a domestic water pipe which would normally be repaired by a plumber using solder and a blow lamp. In using Milliput for such a repair it must be borne in mind that although Miiliput will set and cure at normal temperatures it will not do so at freezing temperatures and therefore at the appropriate

stage the application of gentle heat is essential. The ideal method is to use a portable electric hair dryer set at hot, but other forms of heat may be used e.g. radiant heat from an electric fire.

The Repair - Burst pipe.
Materials required : Pack of Milliput, bowl of water (tepid if possible), piece of rag, source of heat.

Procedure.
Turn of the water at the stop tap. Allow the pipe to drain and wipe as dry as possible. Mix sufficient Milliput to make a "bandage" about 2" wide, 1/4" thick and long enough to wrap completely round the pipe at the burst (about 1/3rd stick Of each colour). Press this bandage firmly round the pipe at the burst.

Dip the hands into the tepid water and then with wet fingers mould the Milliput round the pipe working it inwards towards the burst and feathering it out at each end (Fig 3).

Keep dipping the fingers into water whilst doing this, the water stops the fingers sticking to the job and does no harm to the Milliput. Finally soak the piece of rag in water, squeeze out excess and then gently wipe the repair over to make it perfectly smooth. Now apply heat as described above. Every two or three minutes touch the repair **very gently** until you feel it beginning to harden. When it is so hard that it cannot be depressed continue heating for at least the time that it took to set. this completes the cure and the repair should now be rock hard. Test by scraping with a penknife or screwdriver. If the repair is still cheesy continue to heat until it is rock hard. The repair is now complete and the water may be turned on again.

A Simple Guide To Repairing Terracotta Pots

Compared with some of the miracles of porcelain restoration performed by our customers the repair of large terracotta garden pots is simplicity itself. Nevertheless even the repair of a plant pot calls for a degree of know-how and skill.

1. Make sure you scrub the pot to remove grease and dirt.

2. Knead equal amounts of the two sticks for 5 minutes until the colours become uniform. Mix slightly more Milliput than you think will be required.

3. Moisten the crack and firmly apply the Milliput, pressing with your fingers and thumbs.

4. At this stage, the two pieces of the pot could be pushed together with the putty stood proud of the crack

5. A spatula is ideal for working the putty into the crack. Keep the tools and putty moist. A sponge/wet cloth would come in useful.

6. Leave it for an hour or so until the Milliput reaches the stage when it will cut cleanly with a sharp knife. Wet a sharp knife and cut off the surplus. Scratch the proud layer on the inside and leave the repair for 3-4 hours to harden and cure.

7. The following day, mix sufficient Milliput to cover the area of the crack on the inside. With a wet spatula feather the Milliput onto the good part of the pot. Leave until fully hardened.