TRADE OF PAINTING & DECORATING

PHASE 2

Module 2

Surface Preparation

UNIT: 2

Knotting, Priming and Flush Filling Woodwork

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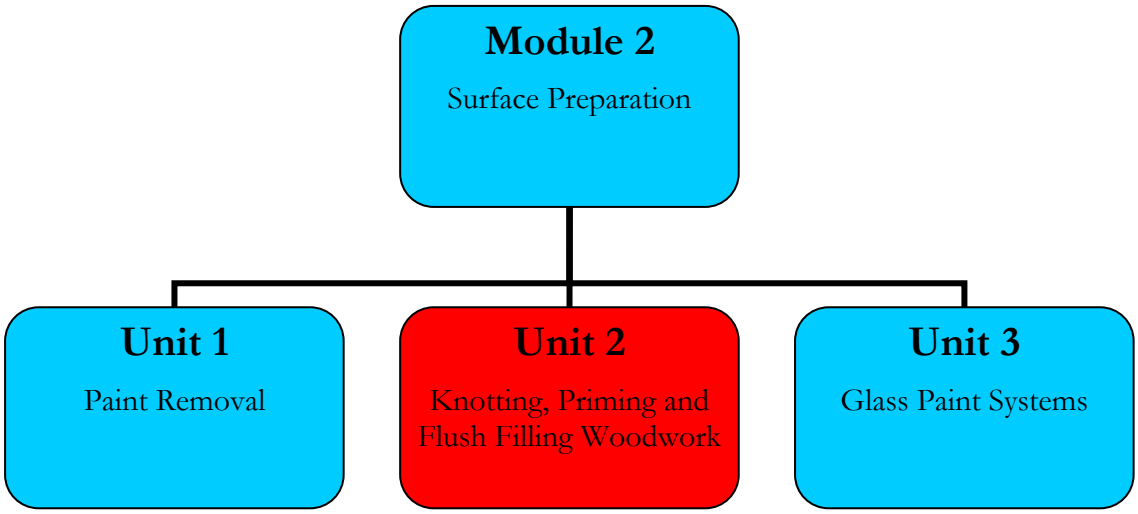
Introduction

Raw wood or wood that has been stripped must be knotted and primed to suit the coatings that are to follow. The most important part of any paint system is its foundation Preparation must be thorough and the use of inferior quality paints for priming should not be entertained as this will lead to an early breakdown of the paint system.

The substrate having been prepared will now need to be primed, stopped up or filled and painted with the necessary coats of paint. A knowledge of proper materials and procedures is essential in order that the task be successfully completed.

Fact sheets and health and safety data sheets should be read to become more aware of the products and their safe use. Wearing proper PPE equipment should also be part of our safe approach to work.



Learning Outcomes

By the end of this unit each apprentice will be able to:

- Knot, prime and flush fill woodwork in preparation for undercoating
- Sand and flush fill primed timber in preparation for undercoating
- State the properties and reasons for filling and priming

1.0 Preparation for Undercoating

1.1 Care when carrying & storing Filling Knives & Scrapers.

Filling knives and scrapers are important tools in the painter's kit. These tools have very sharp blades and if carelessly placed in overall pockets they can inflict serious injury to hands. Neither should they be carried in the side pocket of the overall as the protruding sharp blade is again a hazard. It is safer to carry them in the large pouch pocket of the overall.

1.2 Protection from Toxic Dust when Sanding

The environments the painter works in can range from light dust in domestic situations to building sites or industry where hazardous dust can be a major problem. Some types of dust can have large particles others can be of an extremely fine nature. Inhalation of dust can cause respiratory problems and it can also affect the eyes.

Regular exposure to dust can cause Sinus problems causing headaches, sore eyes, sore throat, lung problems resulting in asthma and bronchitis.

In places that seem not to be hazardous e.g. the domestic scene, the painter creates dust when rubbing down filler, plaster surfaces, new wood or painted surfaces (they may contain lead). Even mixing paste can create it's own share. All dust should be treated as hazardous and proper masks and goggles should be worn when in a dusty area.

When working in private houses or offices provisions should be put in place to protect the people who live and work there. Protective screens can be easily erected that go from floor to ceiling and these restrict the dust to a specific area. A zipped door panel is used for access as an added precaution.

Furniture, curtains blinds pictures etc should be removed from the area of working before commencing and items that cannot be shifted should be covered to avoid damage from the dust that will be created.

A tack rag should also be used when dusting down. This is a cloth coated with a sticky material which when wiped over a dusty surface will collect the dust and prevent it from adhering to paint coatings. It also reduces the amount of dust in the immediate working area which is of great benefit to the painter as it keeps the surfaces grit free, but dust is also a health hazard and anything that reduces its presence in a work area should be used.

Rubbing down with wet and dry paper also helps reduce dust.

Cleaning up afterwards is very important and using good industrial vacuum cleaners is safer than brushing.

Employers must make their employees aware of any toxic dusts that are present in the working area and supply the recommended PPE (personal protective equipment).

The employee having been supplied with PPE must wear it.

On construction sites the variety of dusts increases and constant protection is needed at times.

For further information on the above refer to Module 2.1.1 and 2.1.2

A much more dangerous type of dust comes from asbestos and the following web site gives very detailed information:

http://www.citizensinformation.ie/categories/environment/environmental-protection/asbestos_regulations

1.3 Methods of Application of Knotting and Primer

Knotting Varnish:

After sanding down softwoods and before priming commences a coat of knotting varnish must be applied to all knots to stop the resin in the timber bleeding through and damaging the paint finish. It is quick drying and has good sealing properties over resin. It is thinned with methylated spirits, should be kept in a glass container or special knotting bottle.

Knotting Bottle.

When not applying the knotting varnish the brush should be left in the material to avoid going hard. Two thin coats should be applied with 10 to 15 minutes between coats. Brush out well to avoid build up of edges which can show through the finish.

Methylated spirit

An industrial alcohol with a methyl violet dye added to make it poisonous and so free from excise duty and evaporates very quickly. It is the thinner for spirit varnishes e.g. French polish, button polish, knotting varnish.

Wood primer

Application of primer:

The type primer should be selected to suit the work. It should be thinned to a brushable consistency to allow it penetrate the surface. It must also satisfy the porosity of the wood. Brushing is the best method for priming as it allows the paint to be forced into any cracks nail/screw holes or surface imperfections.

The primer must be applied with care, avoiding misses and coating top and bottom of doors etc. End grains should get special attention as they are very porous and will allow moisture through very easily if not well painted.

The heads of nails or screws should be punched or countersunk and coated with paint during priming to avoid rusting later on especially if water based fillers are to be used for filling.

1.4 Types of primer (oil, acrylic shellac based)

Types of primer:

- Aluminium wood primer
- White oil based wood primer
- Acrylic wood primer undercoat
- All purpose primer

Aluminium wood primer:

Ideal primer for resinous timbers e.g. pine & teak etc. and is also suitable for soft woods. Good sealing properties. For interior or exterior use. Sealer over surfaces treated with coal tar wood preservatives prior to application of oil paints. Oil based. Grey in colour. Thinner /brush wash white spirit. Good opacity, self knotting. Flexible coating. Good grip for succeeding coats of paint. Apply by brush. Drying method oxidation. Drys in 4 to 6 hours and is re-coatable in 16 to 24 hours.

White oil based wood primer:

Suitable for inside or outside use. General purpose primer. Good flexibility. Thinner/brush wash white spirit. Good opacity. Good grip for succeeding coats of paint. Apply by brush. Drying method oxidation Dry's in 4 to 6 hours and is re-coatable in 16 hours.

Acrylic primer/undercoat:

A quick drying paint for interior or exterior use on raw timber plaster, concrete, building boards. Film former Acrylic latex. Colour white. Thinner/brush wash water. Application by brush, roller or spray. Good opacity and adhesion. Alkali resistant. Drying method coalescence. Drying time 30 to 40 mins. and is re-coatable when touch dry. This will depend on the temperatures when applying. Nail heads and hinges etc. must be painted with a rust inhibiting primer before applying the acrylic primer undercoat. Do not apply under wet or frosty conditions.

All purpose primer or universal primer (acrylic type)

A variety of these primers are available an the are a very handy type as they can be applied internally or externally to a wide variety of surfaces including wood, building boards, plaster and concrete. They also adhere to galvanised metal, aluminium, tiles plastic etc

The are self knotting. They can be applied to smoke damaged areas and are general stain blockers. They are alkali resistant and re-coatable in 1 hour. They can be painted over with oil or water based paints.

Shellac based primer

Pigmented shellac based paint. that for application to glossy surfaces can be applied to new or previously painted wood plaster or building boards. Suitable for applying to glossed painted surfaces, tiles et. Dries in15 minutes.

Re-coatable in 45 minutes. Self knotting. A good stain blocker for smoke damage mould stains, seals back water stains. Not suitable for use outdoors. Ready mixed,no need to thin. Brushes to be washed in Methylated spirit.

1.5 Advantages of Abrading Woodwork Prior to Filling

Surfaces are rubbed down or abraded to

- Provide grip or key to assist adhesion
- Reduce the roughness of a surface
- Smoothes the filler
- Remove nibs and surface imperfections

Wood that has been primed is quite rough to touch and must be rubbed down before filling to reduce either the natural roughness of the timber or the fibres that have been stiffened by the application of the primer. as it would be impossible to apply the filler evenly without carrying out this procedure.

The rubbing down is best done with a sanding block and an abrasive that is not too coarse on the flat areas. Abrasives that are too coarse scratch the primer exposing the wood. Care must be taken with mouldings etc. as these are easily damaged. Sanding pads or worn abrasive are best used. Dust off and remove any dust carefully.

1.6 Tools for Applying Fillers

Filling knives:

Filling knives are very similar in appearance to paint scrapers but they have a lighter type blade which is flexible so that it can force filler into cracks and surface imperfections.

Filling knives

Flexible blade

Filling knife edges must be keen and straight to perform their task of filling and after use they should be cleaned and covered to protect the edge before placing in the tool kit. Good smooth application of fillers cannot be achieved with dirty knives and even clean ones should be lightly sanded before using. A filling knives must never be used as a scraper as the fine edge will be damaged rendering it useless.

1.7 Filling, Sanding & Second Filling Moulded Woodwork

After priming and rubbing down fillers are applied to give the surface a smooth finish before undercoating. Fillers are applied with a narrow or broad filling knifes to flat areas in the direction of the grain to fill the open grain and surface imperfections.

This is a skill that will be developed with practice. The filler can be brushed into moulding.

When dry the filler can be rubbed down using a sanding block on the flat areas and sanding pads for mouldings. Do not use coarse sand paper as it will tear tracks in the filler. Worn sandpapers are best.

At this stage a light application of a ready made fine surfaces filler produces a glass like finish. When dry rub down very carefully with a fine abrasive.

2.0 Sand & Flush fill primed Timber in Preparation for Undercoating

Key Learning Points

- Mixing and application of fillers, application of caulk
- Final sanding to standard for undercoating
- Back priming, shop primed timbers
- Wood preservatives

2.1 Mixing and Application of Fillers and caulk

Reference: Module 1 Unit 2 and Module 2 Unit 1

Application of caulk

A Skeleton, Caulking or Mastic gun is a tool for expelling caulk from a tube. It enables a "bead" of material to be applied to cracks and seams. A caulk gun is an ideal material and system for filling the tops of skirting around architraves gaps in door mouldings etc. It can be applied when all the filling is complete. The top of the tube of caulk is cut off and a supplied nozzle fitted. The top of the nozzle is cut at a suitable angle and fitted to the gun Pull the trigger to apply the filler. The material is drawn along the area to be filled and sponged off cleanly as it cannot be sanded when dry.

Leave to dry before painting.

Skeleton / Caulking gun / Mastic gun

2.2 Final Sanding for Undercoating

The surface should be checked for any misses in the filling and spot filled as once undercoating has been applied no more filling should take place. Fillers are absorbent materials and need at least two coats including the finish paint to hide them. Spot filling and then finishing with gloss or eggshell paint is out of the question as the patch of filler will be highlighted by low gloss and colour.

Sanding must now be very carefully completed with fine or worn abrasives to remove any nibs or edges from the filler. Dust off or tack rag and clean up.

2.3 Back Priming and Shop Primed Timbers

Back priming

External joinery such as doors/door frames, windows/window frames, fascias and soffits should be primed back and front with special attention to end grains before installation. This is necessary because the joinery will be fixed in position and their back sections will be hidden and unable to be painted in the future. This priming helps to keep moisture from penetrating the timber during construction and providing a dry surface for further coatings. No timber should arrive on site and be exposed to the elements. This is bad building practice and a proper preservation paint system cannot be guaranteed.

Shop primed timbers

These primers refer to pre primed building boards, doors etc. that are available, are usually well sanded and ready for second coating. Generally for indoor use.

2.4 Wood preservatives

Wood preservatives

Are non film forming materials that protect timber from decay. They have very good penetration properties and offer resistance to wood boring insects and fungal attack. When wood has to be used externally and its natural appearance is to be maintained, coating with a wood preservative is necessary. Woods that are exposed to the elements and are not naturally weather resistant can absorb a lot of moisture and be very susceptible to fungal attack

Joinery for buildings should be dry before treating with wood preservative. The best system for applying the wood preservative is the double vacuum method or immersion. They must be allowed to dry thoroughly before painting.

NB. When using preservatives masks & goggles should be worn. Hands protected with rubber gloves & barrier cream and ensure adequate ventilation when applying. Do not apply near naked flames.

Types:

Organic solvent preservatives

Good resistance to insect & fungal attack. Can be painted over. Best applied by double vacuum process or immersion. Brushing or spraying is not recommended except on site where parts of the treated wood have been cut for fitting. Made by dissolving waxes and resins in white spirit or naphta. Clean up with white spirit

Water borne preservatives:

Odourless. Can penetrate damp timber. Toxic to fungal spores. Best applied by pressure impregnation and can be painted over when thoroughly dry.

Application methods in order of effectiveness:

- Pressure impregnation
- Steeping
- Dipping 4.
- Brush roller or spray.

Many solvent based preservatives are brushed by the painter as the wood to be treated is in situ e.g. cladding on buildings. They are clear or coloured and can also be painted over if necessary.

Need no thinning. Drying method evaporation drying time depends on the rate of penetration, type & consistency of the preservative.

Many types are available for the painting of fences, sheds and garden furniture. There have a good range of colours, odour free and clean up is with water.

A wide range of manufacturer's websites are available on the internet

3.0 Properties and Reasons for Filling and Priming

Key Learning Points

- Function and properties of primer and filler.
- Safe and clean working practice
- Calculate materials and costs relating to linear meters (e.g. skirting boards door frames etc.)

3.1 Function and properties of Primer and Fillers

Function of a wood primer

The first complete coat of paint of a painting system applied to an unpainted timber and is the foundation of a good paint system. The primer must secure good adhesion to the wood and with a good foundation to adhere to. It must also satisfy the porosity of the wood. The type of primer varies with the wood its condition and the painting system to be used.

The wood should be sound and dry. The wood contains a certain amount of moisture and it should not exceed 9% to 11% for indoor wood and 15% to19% outdoors.. This can be checked using a moisture meter. Moisture trapped by painting will cause the paint film to blister and break down.

Moisture meter

Function of a filler:

Generally fillers are supplied in two forms, powders and waterborne.

Powder:

Ready to be mixed with water to a creamy consistency for application to primed surfaces Based on water soluble cellulose and white Portland cement or gypsum Their function is to fill surface

Waterborne:

Ready made. Supplied in paste form ready for use. A wide variety of types available.

Reference Module Unit 2 Mix and apply filler to damaged surface correctly

3.2 Work Area Kept Clean at all Times

Work areas should at all times comply with Health and Safety regulations. Wet floors, tools and other equipment lying around, and general untidiness can be a serious safety and/or fire hazard. A sense of order is essential for a clean working environment. High quality work cannot be produced in an untidy or dirty area. When working in a domestic/office area consideration must be given to the people using the building. Cleaning up should not be left to the end of the day but should be carried out regularly to give clear uncluttered access Vacuum up rather than brush up and use tack rags when possible dust to a minimum. Display wet paint signs and if necessary use red and white tape to cordon off a work area.

Cloths used for cleaning or wiping should dampened and dumped immediately after use as they could ignite due to spontaneous combustion.

Oil paints and their thinners should be kept covered to avoid spillage and kept in an outside store area if possible.

3.3 Calculate Materials and Costs Relating to Linear Meters

When a decorator is asked to tender for the painting of a building the price he submits must be realistic as other competitors will also be submitting prices. Guess work is not an option as a mistake can be costly. Measurements must be taken accurately and a linear pricing structure for woodwork which takes into account the number of coats, the amount of filling etc. will be the recognised costing system of the decorator. For example €3.50 per metre.

Sometimes this work is calculated from the plans of a building so that all everything is costed by the builder before the work starts.

The decorator will check the height and width of a sample door and a calculation of a measurement for the door frames and architraves can be arrived at from this. Multiplying this measurement by the number of doors gives the total amount for the building.

Measuring the length and width of each room will give the total linear measurement for skirting. Adding all these together will give the total number of linear meters for painting.

Sample:

The door frames architraves and skirtings of five classrooms are to be painted. Each room measures 10m x 7m and have a door that measures 2032mm x 830mm. They must be knotted, primed filled undercoated and gloss finished.

The rate per linear meter is €3.75.

Measurements:

Skirtings = 10 + 7 + 10 + 7 = 34m.

Achitraves = 2032mm x 2 = 4064 + 830mm = 4894mm = 4.894m.

Rounded up = 5m.

Door Frames the same as architraves	= 5m	
Total for 1 classroom	= 34m + 5 + 5	= 44m
Total for 5 classrooms	= 44 x 5	= 220m
Cost per linear meter	= €3.75	
Cost of painting	= 220m x 3.75	= €825

Summary

The temptation to cut corners at this stage in the belief that good preparation is not important needs to be avoided at all cost as any deficiencies in the correct treatment of the timber will lead to a premature breakdown of the paint system.

The development of good filling techniques along with proper care and maintenance of equipment will maximise quality of the work and the life span of the tools etc.

Suggested Exercise

1. Knot, prime and flush fill moulded panel in preparation for undercoating. Select a previously stripped moulded panel.

    a. Rub down knot and prime.
    b. Flush fill
    c. Rub down smooth.
    d. Clean up and store tools and materials.

Questions:

Q.1 What materials are used to make knotting varnish?

Q.2 What is methylated spirit?

Q.3 Why is knotting varnish used before priming?

Q.4 Why are wood primers used?

Q.5 What is meant by back priming.?

Q.6 How would you recognise a filling knife.?

Q.7 Where would a flexible filler be used?

Q.8 You are requested to tender a price for painting the new woodwork skirtings, door frames and architraves of four rooms. Three coats are needed. The doors are not to be painted.

The measurements are as follows.

Room 1.	7m long x 5m wide
Room 2.	8m long x 4m wide
Room 3.	10m long x 6m wide
Room 4.	10m long x 5m wide

Each room contains a door.
The measurement for door frames is 5m
The measurement for architraves is 5m
The cost per linear meter is €3

Calculate the cost of painting the woodwork.

Suggested reading

Painting and Decorating an Information Manual 5th Edition

ISBN1-4051-1254-9

Authors Fulcher Rhodes Stewart Tickle Windsor and Butterfield

Training Resources

Tool kit, plain panel, moulded panel, knotting, fillers, filling board, tack rags, wet and dry abrasive paper, classroom and workshop facilities, notes/information sheets

SOLAS
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