

# FINISHING CONSTRUCTION WORKS

## LEVEL – IV

Based on October, 2023 Curriculum Version II



**Module Title: -Plaster by Projection Machine**

**Module code: EIS FCW4 M06 0323**

**Nominal duration: 60 Hour**

Prepared by: Ministry of Labor and Skill

September, 2023  
Addis Ababa, Ethiopia

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## ACKNOWLEDGEMENTS

The Ministry of Labor and Skills wishes to thank MoLS experts, regional labor and skill bureaus, Regional TVT bureaus, TVET Colleges, TVT trainers and industry experts who contributed their time and professional experience to the development of this Teaching, Training and Learning Materials (TTLM) for Applying Plaster by Projection Machine.

We would like to express our appreciation to the Ministry of Labor and Skills for their technical and financial support and workshop facilitation of this training module's development.

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## ACRONYM

OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
VOC	Volatile Organic Compound
UV	Ultraviolet

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## INTRODUCTION TO MODULE

This module covers the knowledge, attitude and skills required to understand the required Installing Tile regular and irregular roofs. The trainees will develop the skill on Applying Plaster by Projection Machine including Overview of Plaster by Projection Machine, Prepare the work area, Apply pre-blended plasters and render materials.

### This module covers the units:

- Overview of Plaster by Projection Machine
- Prepare the work area
- Pre-blended plasters and render materials.

### Learning Objective of the Module

At the end of this session, the trainee will able to:

- Overview of Plaster by Projection Machine
- Prepare the work area
- Apply pre-blended plasters and render materials.

### Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

1. Read the information written in each unit
2. Accomplish the Self-checks at the end of each unit
3. Perform Operation Sheets which were provided at the end of units
4. Do the “LAP test” giver at the end of each unit and
5. Read the identified reference book for Examples and exercise

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## Unit one: Overview of Plaster by Projection Machine

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Introduce to Plaster by Projection Machine
- Work instructions
- Plastering terminology
- OHS, barricades and signage requirements
- Tools and equipment
- Work materials and quantity
- Environmental protection

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, the trainee will be able to:

- Introduce to Plaster by Projection Machine
- Obtaining, confirming and applying work instructions
- Identify Plastering terminology
- Following OHS, barricades and signage requirements
- Selecting tools and equipment
- Calculating materials and quantity
- Identifying environmental protection

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## 1.1 Introduce to Plaster by Projection Machine

Plaster by projection machine, also known as spray plastering or machine plastering, is a modern technique used in the construction industry to apply plaster onto walls and ceilings quickly and efficiently. This method involves using a specialized machine that sprays a mixture of plaster and water onto the surface, creating a smooth and even finish.

The process of plastering by projection machine begins with the preparation of the surface. The walls or ceilings are cleaned and any loose debris or old plaster is removed. If necessary, a primer may be applied to improve adhesion. Once the surface is ready, the plaster mixture is prepared.

The plaster mixture used in projection machines typically consists of gypsum or cement-based materials mixed with water. The ratio of plaster to water can vary depending on the desired consistency and application requirements. Some machines also allow for the addition of additives such as accelerators or retarders to control the setting time of the plaster.

To apply the plaster, the mixture is poured into the hopper of the projection machine. The machine then uses compressed air to propel the plaster through a nozzle at high velocity onto the surface. As the plaster comes into contact with the surface, it adheres and forms a layer. The operator controls the direction and speed of the machine to ensure an even application.

One of the advantages of using a projection machine for plastering is its speed and efficiency. Compared to traditional hand-applied methods, machine plastering can cover larger areas in less time. This makes it particularly useful for large-scale projects such as commercial buildings or residential complexes.

Another benefit of using a projection machine is its ability to create a consistent finish. The high-pressure spray ensures that the plaster is evenly distributed across the surface, resulting in a smooth and uniform appearance. This can be especially important for projects that require a high level of aesthetic quality.

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Additionally, plastering by projection machine can help reduce labor costs. With traditional methods, multiple workers are required to manually apply and smooth the plaster. In contrast, a projection machine can be operated by a single person, reducing the need for additional labor.

It is worth noting that while plastering by projection machine offers many advantages, it also has some limitations. The machine requires a power source and access to water, which may not always be available on certain construction sites. Additionally, the machine itself needs regular maintenance to ensure optimal performance.

In conclusion, plastering by projection machine is a modern technique used in the construction industry to efficiently apply plaster onto walls and ceilings. It offers advantages such as speed, efficiency, consistency, and potential cost savings. However, it also has limitations that need to be considered before deciding to use this method.

## 2.2 Work instructions

Plastering by projection machine is a technique used to apply plaster onto surfaces quickly and efficiently. It involves using a specialized machine that sprays the plaster onto the desired area, creating a smooth and even finish. To successfully plaster by projection machine, it is important to follow specific work instructions.

There is a detailed guide on how to perform plastering by projection machine:

### Preparation:

- Ensure that the surface to be plastered is clean, dry, and free from any loose debris or contaminants. This can be achieved by thoroughly cleaning the surface with a brush or vacuum cleaner.
- Inspect the surface for any cracks, holes, or unevenness. These should be repaired before applying the plaster.
- Protect adjacent surfaces or areas that are not intended to be plastered. Use masking tape or plastic sheets to cover windows, doors, and other areas that need to be kept clean.

### Mixing the Plaster:

- Follow the manufacturer's instructions for mixing the plaster. Different types of plaster may have specific mixing ratios and requirements.

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- Use clean water and a clean mixing container. Avoid using contaminated water or dirty containers as this can affect the quality of the plaster.
- Mix the plaster thoroughly until it reaches a smooth and lump-free consistency. This can be done using a paddle mixer or by hand with a trowel.

#### **A. Setting up the Projection Machine:**

- Ensure that the projection machine is clean and in good working condition. Check for any clogs or blockages in the spray nozzle and clean if necessary.
- Adjust the settings on the machine according to the desired thickness of the plaster. This can usually be done by adjusting the air pressure and flow rate controls.
- Connect the machine to a suitable power source. Ensure that all electrical connections are secure and follow safety guidelines when working with electrical equipment.

#### **Applying the Plaster:**

- Start by applying a thin base coat of plaster onto the surface. This helps to create a good bond between the surface and the subsequent layers of plaster.
- Hold the projection machine at a consistent distance from the surface. This distance may vary depending on the type of plaster being used, so refer to the manufacturer's guidelines.
- Move the machine in a smooth and even motion. Avoid stopping or starting abruptly as this can result in uneven application.
- Overlap each pass slightly to ensure complete coverage. This helps to eliminate any gaps or missed areas.
- Continue applying additional coats of plaster until the desired thickness is achieved. Allow each coat to dry before applying the next one, following the manufacturer's recommended drying times.

#### **Finishing:**

- Once the plaster has dried, inspect the surface for any imperfections. Use a trowel or sandpaper to smooth out any rough spots or unevenness.  
Clean up any excess plaster or debris. Use a brush or vacuum cleaner to remove any loose particles from the surface and surrounding areas.

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- Allow the plaster to fully cure before painting or applying any further finishes. This typically takes several days, but refer to the manufacturer's instructions for specific drying times.

## **B. Specification**

- Plastering by projection machine, also known as machine plastering or spray plastering, is a technique used to apply plaster onto walls and ceilings using a specialized machine. This method offers several advantages over traditional manual plastering, including increased efficiency, faster application, and a more consistent finish. In order to achieve optimal results when using a plaster projection machine, certain specifications need to be considered.

The following are the key specifications to consider when using a plaster projection machine:

### **Plaster Mix:**

- The plaster mix used in the projection machine should be specifically formulated for machine application. It is important to use a mix that is suitable for the particular type of machine being used. The mix should have the right consistency and flowability to ensure smooth and even application.

### **Machine Settings:**

- The settings of the projection machine need to be adjusted according to the specific requirements of the project. This includes adjusting the air pressure, nozzle size, and flow rate of the machine to achieve the desired thickness and texture of the plaster.

### **Surface Preparation:**

- Before applying plaster with a projection machine, it is crucial to properly prepare the surface. This involves cleaning the surface thoroughly, removing any loose debris or contaminants, and ensuring that it is dry and free from any moisture or dampness. Additionally, any cracks or defects in the surface should be repaired prior to plastering.

### **Masking and Protection:**

- When using a projection machine, it is important to mask off areas that should not be plastered, such as windows, doors, and fixtures. This helps prevent overspray and ensures clean edges. Surrounding surfaces and objects should also be protected with drop cloths or plastic sheets to avoid any damage from plaster overspray.

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### Application Technique:

- Proper technique is essential when using a plaster projection machine. The operator should maintain a consistent distance from the surface being plastered and move in a controlled manner to ensure even coverage. Overlapping strokes should be used to avoid missed areas or uneven thickness.

### Drying and Curing:

- After plastering, the plaster needs sufficient time to dry and cure. The drying time can vary depending on factors such as temperature, humidity, and thickness of the plaster. It is important to follow the manufacturer's recommendations for drying and curing times to achieve optimal results.

### Finishing:

- Once the plaster has dried and cured, it can be finished to achieve the desired texture or smoothness. This may involve sanding, troweling, or applying a topcoat of plaster or paint.

### C. Quality requirement

When it comes to plastering by projection machine, there are several quality requirements that need to be considered. Plastering by projection machine is a technique used in construction to apply plaster onto walls and ceilings quickly and efficiently. It involves using a machine that sprays the plaster onto the surface, resulting in a smooth and even finish.

To ensure the highest quality of plastering, the following requirements should be met:

- **Surface Preparation:**

Before applying plaster by projection machine, it is essential to prepare the surface properly. The surface should be clean, dry, and free from any loose debris or contaminants. Any existing paint or wallpaper should be removed, and any cracks or holes should be repaired. The surface should also be properly primed to ensure good adhesion of the plaster.

- **Plaster Mix:**

The quality of the plaster mix is crucial for achieving a high-quality finish. The mix should be prepared according to the manufacturer's instructions, ensuring the correct ratio of plaster to water. It is important to use high-quality plaster that is suitable for machine application. The consistency of the mix should be smooth and free from lumps or air bubbles.

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- **Machine Calibration:**

Proper calibration of the projection machine is essential for achieving an even and consistent application of plaster. The machine should be set up correctly, with the appropriate nozzle size and pressure settings. This will ensure that the plaster is sprayed evenly onto the surface without any uneven patches or streaks.

- **Application Technique:**

The technique used for applying plaster by projection machine also plays a significant role in achieving a high-quality finish. The machine should be held at a consistent distance from the surface, typically around 1-2 feet away. The operator should move the machine in a smooth and controlled manner, ensuring that each area is covered evenly. Overlapping strokes can help to achieve a uniform thickness of plaster.

- **Drying Time:**

After applying the plaster, it is important to allow sufficient drying time before any further work is carried out. The drying time can vary depending on factors such as temperature and humidity. It is essential to follow the manufacturer's guidelines for drying time to ensure that the plaster sets properly and does not crack or shrink.

- **Inspection and Finishing:**

Once the plaster has dried, it should be inspected for any imperfections or defects. Any uneven areas or rough patches should be smoothed out using sandpaper or a trowel. The surface should then be primed and painted or finished according to the desired final appearance.

### Scope of work

Plastering by projection machine, also known as machine plastering or spray plastering, is a technique used to apply plaster onto walls and ceilings using a specialized machine. This method offers several advantages over traditional hand application, including increased speed, efficiency, and consistency of the plaster finish.

- Applications include walls, ceilings, inclined surfaces, sills and arches
- Substrates for application include block work, concrete, stonework and cement sheet.

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### 1.3 Plastering terminology

Plastering terminology related to plaster projection machines refers to the specific terms and phrases used in the context of using these machines for applying plaster to walls and surfaces. These terms are essential for understanding the process, techniques, and equipment involved in plaster projection.

**Plaster Projection Machine:** A plaster projection machine, also known as a plastering machine or a rendering machine, is a specialized piece of equipment used for applying plaster or render onto walls and surfaces. It automates the process of plastering, making it faster and more efficient compared to traditional manual methods.

**Hopper:** The hopper is a container attached to the plaster projection machine that holds the plaster mix. It feeds the mix into the machine's pump system for application.

**Pump System:** The pump system is responsible for moving the plaster mix from the hopper to the nozzle for projection onto the surface. It typically consists of a motor, pump, and hoses.

**Nozzle:** The nozzle is the part of the plaster projection machine that directs and sprays the plaster mix onto the surface being plastered. It can have different shapes and sizes depending on the desired application technique.

**Air Compressor:** An air compressor is often used in conjunction with a plaster projection machine. It supplies compressed air to aid in spraying and projecting the plaster mix onto the surface.

**Mixing Ratio:** The mixing ratio refers to the proportion of water to plaster powder used in preparing the plaster mix. It is crucial to achieve the right consistency for optimal application.

**Consistency:** Consistency refers to the texture and workability of the plaster mix. It should be smooth and easy to apply while still adhering well to surfaces.

**Spraying Technique:** Spraying technique involves controlling the direction, speed, and coverage of the sprayed plaster mix. It requires skill and experience to achieve an even and uniform application.

**Coverage Rate:** The coverage rate indicates how much area can be covered with a specific amount of plaster mix. It depends on factors such as the nozzle size, spraying technique, and thickness of the desired plaster coat.

**Thickness:** The thickness of the plaster coat refers to the depth or amount of plaster applied to the surface. It can vary depending on the desired finish and the condition of the substrate.

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**Bonding Agent:** A bonding agent is sometimes added to the plaster mix to improve adhesion to the surface. It helps ensure that the plaster coat bonds securely and remains durable over time.

**Curing Time:** Curing time refers to the period required for the plaster coat to dry and harden fully. It can vary depending on factors such as temperature, humidity, and the type of plaster used.

**Surface Preparation:** Surface preparation involves cleaning, repairing, and priming the surface before applying plaster. It ensures proper adhesion and a smooth finish.

**Trowel Finish:** Trowel finish is a technique used after the initial projection of plaster onto the surface. It involves using a trowel to smooth and level the plaster coat for a more refined appearance.

**Texture Finish:** Texture finish refers to creating a textured surface on the plaster coat for aesthetic purposes. Various tools or techniques can be used to achieve different textures, such as stippling, swirling, or combing.

**Clean-up:** Clean-up involves removing excess plaster from equipment, tools, and surfaces after completing the plastering job. It is essential for maintaining the longevity and performance of the plaster projection machine.

## 1.4 OHS, barricades and signage requirements

### 1.4.1 OHS Requirements

when it comes to operating a plaster projection machine, there are several Occupational Health and Safety (OHS) requirements that need to be followed to ensure the safety of workers and minimize the risk of accidents or injuries. These requirements are put in place to protect the health and well-being of individuals involved in operating, maintaining, or working around plaster projection machines. In this comprehensive response, we will discuss the various OHS requirements that should be considered when using a plaster projection machine.

#### **Machine Safety Guards and Devices:**

One of the primary OHS requirements for plaster projection machines is the installation and use of appropriate safety guards and devices. These guards and devices are designed to prevent access to hazardous areas of the machine during operation, reducing the risk of contact with moving parts or other potential hazards.

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Examples of safety guards and devices that may be required include:

- **Protective Enclosures:** Plaster projection machines should be equipped with protective enclosures that cover all moving parts, such as belts, pulleys, gears, and rotating blades. These enclosures should be securely fastened and designed to prevent accidental contact with these hazardous components.
- **Emergency Stop Buttons:** Plaster projection machines should have easily accessible emergency stop buttons or switches that can immediately halt the operation in case of an emergency or when a worker detects a potential hazard.
- **Safety Interlocks:** Safety interlocks can be used to ensure that certain actions or conditions are met before the machine can operate. For example, a safety interlock may require the closure of a protective enclosure before the machine can be started.
- **Safety Sensors:** Proximity sensors or other types of safety sensors can be installed on plaster projection machines to detect the presence of workers or objects in hazardous areas. These sensors can trigger an immediate stop or alert the operator if an obstruction is detected.

#### **Training and Competency:**

Another crucial OHS requirement for plaster projection machines is the provision of adequate training and ensuring the competency of workers operating or maintaining the equipment. Employers should provide comprehensive training programs that cover the safe operation, maintenance, and emergency procedures related to plaster projection machines. The training should include:

- **Machine Operation:** Workers should be trained on how to safely operate the plaster projection machine, including understanding its controls, settings, and limitations.
- **Maintenance and Inspection:** Proper maintenance and regular inspection of the machine are essential for its safe operation. Workers should receive training on how to perform routine maintenance tasks, such as cleaning, lubrication, and blade replacement. They should also be educated on how to identify and report any potential issues or defects.
- **Emergency Procedures:** Workers should be familiar with emergency procedures, including how to respond to potential hazards, use emergency stop buttons, and evacuate the area if necessary.

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### Personal Protective Equipment (PPE):

The use of appropriate Personal Protective Equipment (PPE) is another important OHS requirement when operating a plaster projection machine. PPE helps protect workers from potential hazards that cannot be eliminated through engineering controls alone. The specific PPE required may vary depending on the specific tasks involved in operating the machine but may include:

- **Eye Protection:** Safety goggles or face shields should be worn to protect against flying debris or particles that may be generated during the plaster projection process.
- **Hearing Protection:** If the machine produces excessive noise levels, workers should wear hearing protection such as earplugs or earmuffs to prevent hearing damage.
- **Respiratory Protection:** In situations where there is a risk of inhaling dust or other airborne contaminants, respiratory protection such as dust masks or respirators may be necessary.
- **Hand and Body Protection:** Depending on the specific tasks involved, workers may need to wear gloves, aprons, or other protective clothing to protect against cuts, abrasions, or chemical exposure.

#### 1.4.2 Barricades and Signage Requirements

When it comes to operating a plaster projection machine, it is important to ensure the safety of both the operators and those in the vicinity. This includes implementing appropriate barricades and signage to alert people to potential hazards and restrict access to the machine's operation area. In this comprehensive response, we will delve into the specific requirements for barricades and signage when using a plaster projection machine.

##### A. Barricade Requirements:

Barricades are physical barriers that are used to prevent unauthorized access to certain areas or to create a safe working zone around machinery. When using a plaster projection machine, it is crucial to establish barricades to protect both the operators and bystanders from potential hazards. The specific requirements for barricades may vary depending on local regulations and industry standards, but here are some general guidelines:

- **Identify the Restricted Area:** Begin by clearly identifying the restricted area where the plaster projection machine will be operated. This area should be clearly marked with

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appropriate signage (discussed in detail below) and physically demarcated using barricades.

- **Select Suitable Barricades:** Choose barricades that are sturdy, durable, and capable of effectively preventing unauthorized access. The type of barricade will depend on factors such as the size of the restricted area, the level of risk associated with the plaster projection machine, and any specific regulations or standards that apply.
- **Proper Placement:** Position the barricades in a way that creates a clear boundary around the restricted area. Ensure that there are no gaps or openings that could allow unauthorized entry. Consider factors such as visibility, accessibility for authorized personnel, and emergency egress routes when determining the placement of barricades.
- **Secure Barricades:** Once the barricades are in place, ensure they are securely anchored or fastened to prevent accidental displacement or tampering. This will help maintain the integrity of the restricted area and minimize the risk of unauthorized access.
- **Regular Inspections:** Regularly inspect the barricades to ensure they remain in good condition and are functioning as intended. Any damaged or compromised barricades should be repaired or replaced promptly to maintain the effectiveness of the safety measures.

## B. Signage Requirements:

In addition to barricades, appropriate signage is essential for communicating potential hazards and providing clear instructions to individuals in the vicinity of the plaster projection machine. Here are some key considerations for signage requirements:

**1. Warning Signs:** Place highly visible warning signs at the entrance points to the restricted area and other strategic locations. These signs should include universally recognized symbols or pictograms that convey the potential dangers associated with the plaster projection machine. The signs should also include clear and concise text indicating the specific hazards present.

**2. Restricted Access Signs:** Use signs that clearly indicate that access to the restricted area is limited to authorized personnel only. These signs should be placed on barricades, gates, or any other entry points to reinforce the message that unauthorized individuals should not enter.

**3. Safety Instructions:** Display signage that provides essential safety instructions for both operators and bystanders. This may include instructions on how to safely operate the plaster

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projection machine, emergency procedures, and any specific precautions that need to be taken in the vicinity of the machine.

4. **Illumination and Visibility:** Ensure that all signage is adequately illuminated and visible, especially in low-light conditions or areas with poor visibility. This can be achieved through proper lighting arrangements or by using reflective materials on the signs themselves.

5. **Multilingual Signage:** If there is a possibility of individuals who do not understand the primary language used in the signage, consider incorporating multilingual signs or symbols to ensure effective communication across language barriers.

## 1.5 Tools and equipment

Plaster projection machines, also known as plastering machines or rendering machines, are advanced tools used in the construction industry for applying plaster or render onto walls and ceilings. These machines are designed to automate and streamline the plastering process, making it faster and more efficient compared to traditional manual methods. In this comprehensive response, we will discuss the various tools and equipment commonly used in conjunction with

### Plaster Projection Machine

The plaster projection machine itself is the primary tool used for applying plaster or render onto surfaces. It consists of a hopper or container that holds the plaster mix, a pump system that propels the mix through a hose, and a nozzle or spray gun that evenly distributes the plaster onto the desired surface. The machine is typically powered by electricity or compressed air.



Fig 1.1 plaster projection machines

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### Compressor:

A compressor is an essential component of a plaster projection machine. It supplies the necessary air pressure to propel the plaster mix through the hose and nozzle. The compressor should have sufficient power to generate the required pressure for smooth and consistent plaster application.



Fig 1.2 Air compressor machine

### Hose and Nozzle:

The hose connects the plaster projection machine to the spray gun or nozzle. It is usually made of durable materials such as rubber or polyurethane to withstand the high-pressure flow of plaster mix. The nozzle is attached at the end of the hose and determines the pattern and thickness of the applied plaster. Different nozzle sizes can be used depending on the desired finish.



Fig 1.3 Hose and Nozzle for plaster projection machine

### Mixing Station:

A mixing station is used to prepare the plaster mix before it is loaded into the plaster projection machine. It typically consists of a large container or mixer where water and dry plaster mix are combined to create a homogeneous mixture. The mixing station may also include features such as agitators or paddle mixers to ensure thorough blending of the materials.

### Scaffolding:

Scaffolding is often required when using a plaster projection machine, especially for higher walls or ceilings. It provides a stable platform for the operator to maneuver the machine and reach the desired areas. Scaffolding should be properly erected and secured to ensure safety during the plastering process.

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### Protective Gear:

- Plastering can be a messy job, and it is important for operators to wear appropriate protective gear. This may include:

#### Safety Glasses or Goggles:

- These protect the eyes from flying debris, plaster particles, or accidental splashes.



#### Dust Mask or Respirator:

- Plaster dust can be harmful if inhaled, so wearing a dust mask or respirator is essential to protect the respiratory system.



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#### Gloves and Protective Clothing:

- Gloves protect the hands from direct contact with plaster mix, while protective clothing such as coveralls or aprons shield the body from splatters and stains.



#### Cleaning Equipment:

After completing the plastering job, it is necessary to clean the plaster projection machine and

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associated tools thoroughly. Cleaning equipment may include brushes, scrapers, and water hoses to remove any residual plaster from the machine components.



## Plastering hand tools

Plastering hand tools are tools that are used to apply, smooth, and finish plaster. Plaster is a mixture of lime or gypsum, sand, and water that is used to coat walls, ceilings, and other surfaces. Plastering hand tools come in a variety of shapes and sizes, each designed for a specific task.

Some of the most common plastering hand tools include:

- **Trowel:** A trowel is a flat, rectangular tool with a handle. It is used to apply and smooth plaster. Trowels come in a variety of sizes, depending on the type of job being done. For example, a small trowel is used to apply plaster to corners, while a large trowel is used to apply plaster to large areas.
- **Hawk:** A hawk is a flat, metal tray with a handle. It is used to hold plaster while it is being applied. Hawks also come in a variety of sizes. A small hawk is used to hold a small amount of plaster, while a large hawk is used to hold a large amount of plaster.
- **Float:** A float is a tool with a wide, flat blade. It is used to smooth and finish plaster. Floats come in a variety of materials, including wood, metal, and plastic. A wood float is used to smooth plaster on rough surfaces, while a metal float is used to smooth plaster on smooth surfaces.
- **Darby:** A darby is a long, rectangular tool with a handle. It is used to smooth and level plaster over large areas. Darbies come in a variety of lengths, depending on the size of the area being plastered.
- **Corner trowel:** A corner trowel is a small, triangular trowel. It is used to apply and smooth plaster in corners. Corner trowels come in a variety of sizes, depending on the size of the corners being plastered.

- **Jointing knife:** A jointing knife is a small, flexible knife. It is used to apply plaster to joints between drywall panels. Jointing knives come in a variety of widths, depending on the width of the joints being plastered.



### Types of Plastering Projection Machines:

**Screw Pump Machines:** These machines use a screw pump mechanism to deliver the plaster mix onto the surface. They are commonly used for small to medium-sized projects and are suitable for both interior and exterior plastering.



Fig Screw Pump Machines

**Piston Pump Machines:** Piston pump machines utilize a piston mechanism to push the plaster mix through a hose and onto the surface. They are known for their high pressure and are often used for large-scale projects or when working with thicker plaster mixes.





Fig Piston Pump Machines

**Rotor/Stator Machines:** Rotor/stator machines consist of a rotating rotor and a stationary stator, which create a pumping action to deliver the plaster mix. They are versatile and can handle various types of plaster mixes, making them suitable for different applications.



Fig Rotor/Stator Machines

Characteristics of Plastering Projection Machines:

**Efficiency:** Plastering projection machines offer increased efficiency compared to traditional manual methods. They can cover larger areas in less time, reducing labor costs and increasing productivity.

**Consistency:** These machines ensure consistent application of plaster mix, resulting in a uniform finish across the entire surface. This helps to achieve a professional-looking result.

**Versatility:** Plastering projection machines can handle different types of plaster mixes, including cement-based plasters, gypsum plasters, lime plasters, and more. This versatility allows them to be used in various construction projects.

**Ease of Use:** These machines are designed to be user-friendly, with intuitive controls and adjustable settings that allow operators to customize the application process according to specific requirements.

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**Reduced Physical Strain:** By automating the plastering process, these machines reduce the physical strain on workers, minimizing the risk of injuries associated with manual application methods.

Uses of Plastering Projection Machines:

**Construction Projects:** Plastering projection machines are commonly used in construction projects for applying plaster to walls, ceilings, and other surfaces. They can be used for both new construction and renovation projects.

**Interior Design:** These machines are also utilized in interior design projects where a smooth and consistent plaster finish is desired. They can be used to create decorative patterns or textures on walls and ceilings.

**Restoration Work:** Plastering projection machines are valuable tools in restoration work, allowing for the accurate replication of historical plaster finishes. They help preserve the authenticity of heritage buildings while improving efficiency.

Limitations of Plastering Projection Machines:

**Initial Cost:** Plastering projection machines can be expensive to purchase or rent, especially high-quality models with advanced features. This initial investment may not be feasible for small-scale or occasional users.

**Maintenance and Cleaning:** Regular maintenance is required to keep these machines in optimal condition. Additionally, thorough cleaning after each use is necessary to prevent clogging and ensure proper functioning.

**Skill Requirement:** While plastering projection machines simplify the application process, they still require skilled operators who understand the machine's settings and techniques to achieve the desired results. Improper use can lead to subpar finishes.

## 1.6 work materials and quantity

### 1.6.1 Work materials

To effectively carry out plastering using a projection machine, you will need a range of work materials. These materials are essential for preparing the surface, applying the plaster, and achieving a smooth and professional finish.

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There is a comprehensive list of the work materials commonly used in plastering with a projection machine:

**1. Projection Machine:** The primary tool required for plastering with a projection machine is the machine itself. A projection machine, also known as a plastering machine or rendering machine, is designed to mix and spray plaster onto surfaces quickly and efficiently. These machines consist of a hopper or container to hold the plaster mix, a pump system to transport the mix, and a nozzle or gun to spray the plaster onto the surface.

**2. Plaster Mix:** Plaster mix is a key component in the plastering process. It is typically made by combining gypsum or cement with sand and water. The specific type of plaster mix used will depend on the desired finish and the surface being worked on. Common types of plaster mixes include gypsum-based plasters, cement-based plasters, lime-based plasters, and polymer-modified plasters.

**3. Water:** Water is essential for mixing the plaster and achieving the right consistency. It is important to use clean water free from impurities that could affect the quality of the plaster mix. The amount of water required will vary depending on the type of plaster mix being used and the desired consistency.

**4. Trowel:** A trowel is a handheld tool used for applying and smoothing out plaster on surfaces. It has a flat metal blade with a handle, allowing for precise control during application. Trowels come in various sizes, with larger ones used for initial application and smaller ones for finishing touches.

**5. Mixing Paddle or Drill Mixer:** To ensure proper mixing of the plaster, a mixing paddle or drill mixer can be used. These tools attach to a power drill and help achieve a consistent and lump-free plaster mix. They are particularly useful when working with larger quantities of plaster.

**6. Protective Clothing and Gear:** Plastering can be a messy job, so it is important to wear appropriate protective clothing and gear. This includes wearing coveralls or work clothes that can be easily cleaned, as well as gloves, safety glasses, and a dust mask to protect against dust and debris.

**7. Scaffolding or Ladders:** Depending on the height of the surface being plastered, scaffolding or ladders may be required to reach higher areas safely. It is crucial to ensure that the scaffolding or ladders are stable and secure before starting the plastering process.

**8. Drop Cloths or Plastic Sheeting:** Plastering can result in splatters and drips, which can be difficult to clean up. To protect surrounding areas from plaster debris, drop cloths or plastic sheeting should be used to cover floors, furniture, and any other items that could be damaged.

**9. Masking Tape:** Masking tape is useful for protecting edges and surfaces that should not be covered in plaster. It can be applied to windows, door frames, electrical outlets, and other areas where precision is required.

**10. Sponges and Buckets:** Sponges are handy for cleaning up excess plaster and smoothing out rough areas during the finishing stages. Buckets are used for holding water for sponge cleaning and for mixing smaller amounts of plaster.

**11. Plastering Beads or Profiles:** Plastering beads or profiles are used to create clean edges and corners in plastered surfaces. These metal or plastic strips are fixed onto the surface before applying the plaster, ensuring straight lines and preventing chipping or cracking.

**12. Hawk or Mortar Board:** A hawk or mortar board is a flat surface with a handle that is used to hold and carry small amounts of plaster. It provides a convenient way to access the plaster during application, allowing for easy reloading of the trowel.

**13. Scaffolding Boards or Planks:** When working on larger areas or multiple surfaces, scaffolding boards or planks can be used to create a stable working platform. These boards are placed across the scaffolding frames, providing a safe and level surface for the plastering process.

**14. Mixing Containers:** Mixing containers such as buckets or troughs are required for mixing larger quantities of plaster. These containers should be clean and free from any contaminants that could affect the quality of the plaster mix.

**15. Cleaning Tools:** After completing the plastering job, it is important to clean all tools thoroughly to prevent the plaster from hardening and damaging the equipment. Cleaning tools such as brushes, scrapers, and sponges should be used to remove excess plaster from trowels, nozzles, and other equipment.

### 1.6.2 Materials quantity

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When it comes to determining the quantity of materials required for plastering using a plaster projection machine, several factors need to be considered. These factors include the area to be plastered, the thickness of the plaster layer, and the type of plaster being used.

To calculate the quantity of materials needed for plastering, the first step is to measure the area that needs to be covered. This can be done by measuring the length and height of each wall or ceiling surface and multiplying them together. For irregularly shaped surfaces, it may be necessary to divide them into smaller sections and calculate each section individually.

Once the area has been determined, the next step is to decide on the thickness of the plaster layer. The thickness can vary depending on the desired finish and the type of plaster being used. Common thicknesses range from 10mm to 25mm (0.4 inches to 1 inch). Thicker layers may be required for uneven surfaces or when additional strength is needed.

After determining the area and thickness, it is necessary to consider the coverage rate of the plaster being used. The coverage rate refers to how much area can be covered by a specific quantity of plaster. This information is typically provided by the manufacturer and can vary depending on factors such as the composition of the plaster and its application method.

To calculate the quantity of plaster needed, divide the total area by the coverage rate. For example, if the total area is 100 square meters (1076 square feet) and the coverage rate is 2 square meters per bag of plaster, then 50 bags of plaster would be required. It is important to round up to the nearest whole number to ensure enough material is available.

In addition to the plaster, other materials may be required for the plastering process. These can include bonding agents, water, and additives. The quantity of these materials will depend on the specific requirements of the plaster being used and should be determined based on the manufacturer's recommendations.

It is worth noting that while plaster projection machines can significantly speed up the plastering process, they may also require additional materials compared to traditional manual methods. This is because the machine may require a higher flow rate of plaster to ensure proper coverage and consistency.

In conclusion, determining the quantity of materials needed for plastering using a plaster projection machine involves measuring the area to be covered, deciding on the thickness of the

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plaster layer, considering the coverage rate of the plaster being used, and rounding up to ensure enough material is available. It is important to follow the manufacturer's recommendations for all materials used in the plastering process.

### How to Calculate Cement, Sand Quantity for Plastering?

Common plastering mortar thickness and mix ratio listed below.

LOCATION	THICKNESS	RATIO
External Wall	20mm	1:6
Internal Wall	15mm	1:4
Ceiling	12mm	1:3

#### Quick Check

- Make sure you have selected optimum cement mortar ratio
- Make sure you are using good quality of sand (less silt content).
- Make sure you know the required plastering thickness.
- Make sure to follow proper plastering work procedure

#### Plastering Calculation

- Assume the trainees need to calculate plastering material quantity for 10 X 10 m ceiling.
- Required Plastering Area =  $10 \times 10 = 100 \text{ m}^2$  or Square Metre
- Plastering thickness = 12 mm
- Cement Mortar Ratio = 1:3 (1 Part Cement : 3 Part Sand)
- Required volume of Cement Mortar = plastering area x plastering thickness =  $100 \times 0.012 = 1.2 \text{ m}^3$
- Adding Bulking of Sand & Wastage
- So to get  $1.2 \text{ m}^3$  of wet cement mortar, we have to multiply the dry volume by 1.55.

*What is 1.55 constant in the calculation?*

**1. Bulking of Sand** – If the moisture is present in the sand, then it makes the sand look bulkier, which could result in inadequate sand proportion in the concrete ratio.

For Example, If we need to add  $1 \text{ m}^3$  sand in the concrete mix ratio, we take  $1.3 \text{ m}^3$  (30% more).

The reason for that is the moisture content present in the sand makes it a little bulkier. The 5% to

8% of surface moisture will increase the bulking of sand up to 20% to 30%. When we add more water (more than 8%) to the sand, the thin film will disappear, and volume decreases.

## 2. Wastage – Adding 20% wastage for joints and impressions filling

So if we need 1 m<sup>3</sup> of cement mortar in wet condition we have to take consideration of the bulking of sand & wastage as (34%+20%) = 54%

Thus every time you need to calculate the volume of cement mortar you need to add the above percentage with dry volume

Wet Volume of concrete = Dry Volume of concrete + 54% of dry volume of concrete or  
Wet Volume of concrete = Dry Volume of concrete x 1.54  
so whatever volume we get from the above formula, we need to multiply the value with 1.54%

$$\text{Volume of Cement Mortar} = \frac{\text{Cement Part}}{\text{Total Parts}} + \frac{\text{Sand Part}}{\text{Total Parts}}$$

So total part of mortar = 1+3 = 4

Therefore,

- Required Volume of Cement =  $\frac{1}{4} \times 1.55$  (Bulkage & Wastage) x Mortar Volume

$$= \frac{1}{4} \times 1.55 \times 1.5 = 0.581 \text{ m}^3$$

To convert into cement bags –  $(0.581 \times 1440)/50 = 16.7$  Bags

Unit weigh of Cement – 1440 Kg/m<sup>3</sup> 1 bag cement – 50 Kg

- Required Sand Volume =  $\frac{3}{4} \times 1.55$  (Bulkage & Wastage) x Mortar Volume

$$= \frac{3}{4} \times 1.55 \times 1.5 = 1.74 \text{ m}^3$$

So the required quantity of material for 100 sqm plastering with mortar thickness 15mm & mix ratio 1:3 is

- Cement = 16.7 Bags

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- Sand = 1.74 m<sup>3</sup>

## 1.7 Environmental protection

One of the main environmental benefits of plastering by projection machine is the reduction in material waste. Traditional hand-applied plastering often results in excess material being mixed, leading to wastage. In contrast, machine plastering allows for precise control over the amount of plaster being sprayed, minimizing waste and reducing the overall environmental impact.

Another environmental advantage of machine plastering is the reduction in energy consumption. The use of machines for plastering can significantly speed up the process compared to manual application. This not only saves time but also reduces the energy required to complete the task. Additionally, some modern projection machines are designed to be energy-efficient, further minimizing their environmental footprint.

Furthermore, machine plastering can contribute to improved indoor air quality. Traditional plastering methods often involve the use of dry mixtures that release dust particles into the air during application. These particles can be harmful when inhaled and may cause respiratory issues. In contrast, machine plastering involves spraying a wet mixture directly onto the surface, minimizing dust emissions and improving air quality within the construction site or building.

In terms of environmental protection, there are several considerations that should be taken into account when using a projection machine for plastering. Firstly, it is important to choose environmentally friendly plaster materials. Opting for plasters that have low volatile organic compound (VOC) content can help minimize air pollution and potential health risks associated with harmful emissions. Additionally, selecting plasters that are made from sustainable or recycled materials can further reduce the environmental impact of the construction process.

Secondly, proper waste management is crucial. Any leftover plaster or waste generated during the plastering process should be disposed of responsibly. This may involve recycling or reusing materials whenever possible, rather than sending them to landfills. Implementing a waste management plan that prioritizes recycling and minimizes the amount of waste generated can significantly contribute to environmental protection.

Thirdly, regular maintenance and cleaning of the projection machine are essential for its optimal performance and longevity. Proper maintenance not only ensures the machine operates efficiently

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but also reduces the likelihood of breakdowns or malfunctions that may result in unnecessary waste or energy consumption. Regular cleaning of the machine's components, such as nozzles and filters, helps maintain their effectiveness and prevents clogging, which can lead to material wastage.

Self-Check 1	Written test
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Name..... ID..... Date.....

**Part I: True or False question**

**I. Instruction: Say true if the statement is correct and false if the statement is incorrect.**

1. Plastering projection machines are used to apply plaster onto walls and ceilings

2. Plastering projection machines can be used for both interior and exterior plastering projects.
3. Plastering projection machines can achieve a smooth and even finish on the applied plaster.
4. Plastering projection machines can be used with various types of plaster, including cement-based and gypsum-based plasters.

## Part II: Matching

**Instruction: Match the following terms with their corresponding definitions.**

1. Which of the following is NOT a common troubleshooting tip for plaster projection machines?
  - A. Check the nozzle to make sure that it is not clogged.
  - B. Increase the water flow to the machine.
  - C. Add more plaster or render material to the mix.
  - D. Leave the machine running until it cools down.
2. What type of plaster or render material is best suited for use with a plaster projection machine?
  - A. Pre-blended plasters and render materials
  - B. Traditional lime plasters
  - C. Sand and cement render
  - D. Gypsum plasterboard
3. What is the most important safety precaution that should be taken when using a plaster projection machine?
  - A. Wear appropriate safety gear, such as goggles, gloves, and a dust mask.
  - B. Be careful not to overfill the machine.
  - C. Be aware of the electrical cord and make sure that it is not in the way of the machine.
  - D. All of the above

## Part III: Short Answer Questions

1. What is a plaster projection machine?
2. How does a plaster projection machine work?
3. What are the advantages of using a plaster projection machine?

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4. What are the key considerations when using a plaster projection machine?

## Unit Two: Prepare the work area

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This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Area determination for plasters and renders materials.
- Masking surrounding area protection.
- Mixing pump suit positioned.
- Clean plastering application and work area

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, the trainee will be able to:

- Determining area plasters and renders materials.
- Applying masking surrounding area protection.
- Setting mixing pump suit positioned.
- Cleaning plastering application and work area.

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## 2.1 Area determination for plasters and renders materials

Determining the area for plasters and renders materials from a plan and specification involves several steps. It is essential to accurately calculate the surface area to ensure that the correct amount of materials is ordered and applied. This process requires careful measurement and consideration of various factors such as wall heights, openings, and surface irregularities.

To determine the area for plasters and renders materials from a plan and specification, follow these steps:

### Obtain the plan and specification:

- The first step is to obtain the architectural plan and specification for the project. These documents provide detailed information about the building's dimensions, including wall heights, openings, and any specific requirements for plaster or render application.

### Measure wall lengths:

- Using a measuring tape or laser distance meter, measure the lengths of all walls that require plaster or render application. Take accurate measurements from corner to corner, ensuring that you account for any deviations or irregularities in the wall surface.

### Calculate wall areas:

- Once you have measured the lengths of all walls, calculate their individual areas by multiplying the length by the height. If there are variations in wall height, divide each wall into sections with consistent heights and calculate their areas separately.

### Account for openings:

- Deduct the areas of any openings such as doors, windows, or vents from the total wall area. Measure each opening's width and height accurately and subtract their product from the respective wall area. For irregularly shaped openings, break them down into simpler shapes (e.g., rectangles) to calculate their areas.

### Consider surface irregularities:

- If there are any significant surface irregularities such as recesses or projections on the walls, measure their dimensions separately and deduct their areas from the total wall area. These irregularities can affect material requirements and should be accounted for in the calculations.

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**Calculate total area:**

- Sum up all individual wall areas after deducting openings and surface irregularities to obtain the total area that requires plaster or render application. This value represents the surface area that needs to be covered with materials.

**Factor in waste and overlaps:**

- It is advisable to add a percentage of waste and overlaps to the calculated total area to account for material loss during application. The specific percentage may vary depending on the project's requirements and the type of plaster or render being used. Consult the project specifications or industry standards for guidance on waste allowances.

**Order materials:**

- With the accurate total area determined, you can now calculate the quantity of plaster or render materials required. This calculation typically involves considering the desired thickness of the application and the coverage rate specified by the manufacturer. Multiply the total area by the desired thickness to obtain the volume of material needed.

**Consider multiple coats:**

- If multiple coats of plaster or render are required, multiply the volume obtained in the previous step by the number of coats needed. This adjustment ensures that enough materials are ordered to complete all necessary layers.

When determining the area for plasters and renders materials for plastering projection machines, several factors need to be taken into consideration. These factors include the type of surface to be plastered, the thickness of the plaster or render, and the coverage rate of the specific material being used.

**Type of Surface:**

- The type of surface plays a crucial role in determining the area for plastering. Different surfaces require different preparation and application techniques. Common surfaces include concrete, brickwork, blockwork, and drywall. Each surface may have specific requirements in terms of priming, levelling, or filling before applying the plaster or render.

### Thickness of Plaster or Render:

The desired thickness of the plaster or render is another important factor in determining the area. Plaster thickness can vary depending on the purpose and location. For example, interior walls may require a thinner coat of plaster compared to exterior walls. The thickness also affects the coverage rate of the material.

### Coverage Rate:

- The coverage rate refers to how much area can be covered by a specific quantity of plaster or renders material. This rate is typically provided by manufacturers and can vary depending on the product and its application method. It is usually expressed in square meters per bag or bucket of material.

To calculate the area for plasters and renders materials, you can use the following formula:

➤  $\text{Area} = \text{Quantity} / \text{Coverage Rate}$

For example, if a bag of plaster covers an area of 10 square meters and you have 5 bags of plaster, the total area that can be covered would be:

- $\text{Area} = 5 \text{ bags} / 10 \text{ square meters per bag}$
- $\text{Area} = 50 \text{ square meters}$

Additionally, it's recommended to add a small percentage (usually around 10%) to account for wastage, uneven surfaces, or any errors in measurement. This ensures that you have enough material to complete the plastering project without running out.

## 2.2 Masking surrounding area protection

When it comes to plastering and rendering materials, masking the surrounding area is an important step to ensure protection and prevent any damage or unwanted marks. Masking involves covering or protecting adjacent surfaces, such as windows, doors, floors, and furniture, from splatters, spills, or accidental contact with plaster or render materials.

There are several methods and materials that can be used for masking surrounding areas during plastering and rendering projects. One common approach is to use masking tape and plastic sheeting. Masking tape is applied along the edges of surfaces that need to be protected, creating a

barrier between the plaster or render and the adjacent area. Plastic sheeting is then attached to the tape, covering the entire surface and providing an additional layer of protection.

Another option for masking is the use of specialized masking products specifically designed for plastering and rendering applications. These products often come in the form of adhesive films or sheets that can be easily applied to surfaces and removed without leaving any residue. They provide a more secure and reliable masking solution compared to traditional tape and plastic sheeting.

In addition to tape and plastic sheeting, drop cloths or protective covers can also be used to safeguard floors and furniture from any potential damage. These covers are typically made of durable materials such as canvas or plastic and are placed over the surfaces that need protection.

It is important to note that proper preparation before applying any masking materials is crucial for achieving effective protection. Surfaces should be clean, dry, and free from dust or debris before applying tape or adhesive films. This ensures that the masking materials adhere properly and provide a tight seal against the plaster or render materials.

During the plastering or rendering process, it is essential to work carefully and avoid excessive splattering or spills. However, accidents can happen, so having a well-maintained masking system in place is crucial to minimize any potential damage.

After completing the plastering or rendering work, the masking materials can be carefully removed. It is important to do this slowly and gently to avoid any damage to the surfaces underneath. Any residue left behind by the masking materials can be cleaned using appropriate cleaning agents or methods, depending on the type of surface.

When using a projection machine for plastering, it is important to ensure proper masking and protection of the surrounding area. This is necessary to prevent any damage or unwanted plaster on surfaces that should not be coated. Masking the surrounding area involves covering and protecting surfaces such as floors, furniture, windows, and fixtures.

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## A. Masking materials:

There are various materials that can be used for masking during plastering with a projection machine. These include:

### Plastic sheeting:

- Plastic sheeting is commonly used for masking large areas such as floors and furniture. It is lightweight, easy to handle, and provides effective protection against plaster splatter. Plastic sheeting can be taped or secured using masking tape or adhesive to create a barrier between the working area and the surrounding surfaces.

### Drop cloths:

- Drop cloths are typically made of canvas or heavy-duty fabric and are used to protect floors and furniture from plaster debris. They are more durable than plastic sheeting and can withstand heavy foot traffic during the plastering process.

### Masking tape:

- Masking tape is an essential tool for securing plastic sheeting or drop cloths in place. It is used to create clean edges and prevent any plaster from seeping underneath the protective materials.

## B. Masking techniques:

Proper masking techniques are crucial to ensure thorough protection of the surrounding area during plastering with a projection machine. Here are some important steps to follow:

### 1. Clear the working area:

- Remove any furniture, decorations, or items that could be damaged by plaster splatter. This will create a clear space for the projection machine and make it easier to mask the surrounding surfaces.

### 2. Cover floors:

- Lay down plastic sheeting or drop cloths on the floor, extending them beyond the working area to catch any falling debris or splatter. Secure the edges with masking tape to keep them in place.

### 3. Protect walls and fixtures:

- Use plastic sheeting or drop cloths to cover walls, windows, doors, and any other fixtures that should not be coated with plaster. Secure the protective materials using masking tape, ensuring they are tightly sealed to prevent any plaster from seeping through.

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#### 4. Seal off openings:

If there are any openings or gaps in the working area, such as doorways or vents, seal them off with plastic sheeting or masking tape to prevent plaster from spreading to other areas.

#### 5. Mask delicate surfaces:

- For surfaces that require extra protection, such as delicate furniture or electronics, consider using additional layers of plastic sheeting or specialized protective covers.

#### Cleaning up after plastering:

- Once the plastering job is complete, it is important to carefully remove all masking materials and clean up the surrounding area. Remove plastic sheeting and drop cloths, disposing of them properly.
- Use a vacuum cleaner or broom to remove any remaining debris or dust from the protected surfaces.

### 2.3 Mixing pump suit positioned of a Plaster Projection Machine

#### 2.3.1 Setting Up and Positioning the Mixing Pump

The mixing pump suit positioned of a plaster projection machine is a crucial component in the process of creating a plaster cast. The machine is used to project a mixture of plaster and water onto a subject, creating a precise and accurate mold of the subject's body. The mixing pump suit is responsible for mixing the plaster and water to the correct consistency, ensuring that the final product is of high quality and free from defects.

The mixing pump suit is typically made of a durable material, such as stainless steel or plastic, and is designed to withstand the rigors of repeated use. It is equipped with a series of gears and motors that work together to mix the plaster and water to the correct consistency. The suit is also equipped with a series of sensors and controls that allow the operator to adjust the mixture to the desired consistency.

To use the mixing pump suit positioned of a plaster projection machine, the operator first fills the machine with the appropriate amount of plaster and water. The operator then puts on the mixing pump suit and activates the machine, which begins to mix the plaster and water to the correct consistency. The operator can adjust the mixture as needed using the sensors and controls on the suit.

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Once the mixture is correct, the operator can begin projecting the mixture onto the subject using the plaster projection machine. The machine is equipped with a series of nozzles that spray the mixture onto the subject, creating a precise and accurate mold of the subject's body. The operator can adjust the nozzles as needed to ensure that the mixture is applied evenly and that the final product is of high quality.

It is important to note that the mixing pump suit positioned of a plaster projection machine is a complex piece of equipment, and it is recommended that only trained professionals use the machine. Improper use of the machine can result in defects in the final product, or even injury to the operator.



Fig 2.1 Mixing of mortar by plaster projection machine

Proper setup and positioning of the mixing pump are essential to achieve a consistent and high-quality plaster finish.

The steps to follow are:

**1. Choose the Right Pump:** The first step is to select the appropriate mixing pump for the plaster projection machine. The pump should be capable of mixing the plaster material and the hardener to the correct ratio. The pump should also be able to handle the viscosity of the plaster material and the hardener.

**2. Position the Pump:** Once the right pump has been selected, it needs to be positioned correctly. The pump should be placed close to the mixing tank to ensure that the plaster material and the hardener are mixed properly. The pump should also be positioned in such a way that it can easily mix the materials without any obstruction.

**3. Adjust the Pump Speed:** After positioning the pump, the speed of the pump needs to be adjusted. The speed of the pump should be adjusted to ensure that the plaster material and the hardener are mixed properly. The speed of the pump should be adjusted based on the viscosity of the plaster material and the hardener.

**4. Check the Pump Pressure:** The pump pressure should be checked to ensure that it is within the recommended range. The pump pressure should be adjusted based on the viscosity of the plaster material and the hardener.

**5. Maintain the Pump:** The mixing pump should be regularly maintained to ensure that it is working properly. The pump should be cleaned and lubricated regularly to prevent any damage or clogging.

How to Position the Pump for plastering?

When positioning the pump for plastering by projection machine work, there are several factors to consider in order achieving optimal results. Proper positioning of the pump is crucial for efficient and effective plastering. Here are some steps to follow:

**1. Select a suitable location:**

- Choose a location that provides easy access to the area being plastered. It should be a flat and stable surface that can support the weight of the pump and other equipment. Ensure that there is enough space around the pump for maneuvering and operating the machine.

**2. Secure the pump:**

- Once you have chosen the location, secure the pump in place using appropriate anchoring methods. This will prevent any movement or vibrations during operation, ensuring stability and accuracy in plaster application.

**3. Position the pump at an optimal height:**

- The height at which you position the pump is important for achieving consistent and even plaster application. The ideal height may vary depending on factors such as the type of projection machine being used and the specific requirements of the project. However, as a general guideline, positioning the pump at waist height or slightly below is often recommended.

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#### 4. Consider the angle of projection:

- The angle at which plaster is projected onto the surface can affect its adhesion and overall quality. It is advisable to position the pump at an angle that allows for smooth and controlled application. Experiment with different angles to find what works best for your specific project.

#### 5. Ensure proper hose length:

- The length of the hose connecting the pump to the projection machine should be sufficient to reach all areas that need plastering without causing strain or restrictions during operation. Avoid excessive hose length as it can lead to pressure loss and decreased efficiency.

#### 6. Check for obstructions:

- Before starting plastering, make sure there are no obstructions or obstacles in the path of the projection machine's hose. Clear away any debris, furniture, or other objects that may hinder smooth operation.

#### 7. Test the pump:

- Prior to beginning the plastering work, it is essential to test the pump to ensure that it is functioning properly. Check for any leaks, blockages, or other issues that may affect its performance. Adjust the pressure settings as needed to achieve the desired consistency of plaster.

#### 8. Maintain a consistent distance:

- When operating the projection machine, maintain a consistent distance between the nozzle and the surface being plastered. This will help ensure an even application and prevent unevenness or streaks in the plaster.

#### 9. Clean and maintain the pump:

- After each use, thoroughly clean the pump and its components to prevent any build-up or clogging. Regular maintenance will prolong the lifespan of the pump and ensure its continued efficiency.



Fig 2.2 positioning the plaster projection and render machines

### 2.3.2 Application Techniques for Plastering Projection Machines

Plastering projection machines are a crucial aspect of the manufacturing process for creating high-quality projections.

The following are some application techniques for plastering projection machines:

#### 1. Preparation of the Machine:

- Before starting the plastering process, the machine must be properly prepared. This includes cleaning the machine with a solvent to remove any dirt or debris that may interfere with the plastering process. The machine should also be degreased to ensure that the plaster adheres properly.

#### 2. Choosing the Right Plaster:

- The type of plaster used will depend on the specific application and the desired finish. There are different types of plaster available, including gypsum, lime, and cement. Each type of plaster has its own set of properties and advantages, so it is important to choose the right one for the specific application.

#### 3. Applying the Plaster:

- Once the machine is prepared and the right plaster has been chosen, the plastering process can begin. The plaster should be applied in thin layers, allowing each layer to dry completely before applying the next one. This will help to ensure that the plaster adheres properly and that the finish is smooth and even.

#### 4. Finishing Techniques:

- After the plaster has been applied, there are several finishing techniques that can be used to achieve the desired finish. These techniques include sanding, grinding, and polishing. Sanding can be used to smooth out any rough spots or bumps, while grinding can be used to remove any imperfections or to create a specific texture. Polishing can be used to create a high-gloss finish.

#### 4. Quality Control:

- Quality control is an important aspect of the plastering process. It is important to inspect the machine regularly to ensure that the plaster is adhering properly and that there are no defects

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or imperfections. Any defects or imperfections should be addressed immediately to ensure that the final product meets the desired specifications.

### **Properties of Plastering and Cement Rendering Materials for Use with Projection Machines**

When it comes to using projection machines for architectural visualizations, it is important to consider the properties of the plastering and cement rendering materials used. These materials can affect the quality of the projection, as well as the longevity of the machine and the overall

Key properties to consider:

**Density:** The density of the plastering and cement rendering materials is an important factor to consider. A higher density material will provide a more even and consistent surface for the projection, resulting in a better image quality. Look for materials with a density of at least 1.5 g/cm<sup>3</sup>.

**Porosity:** Porosity refers to the amount of air pockets present in the material. A material with low porosity will provide a smoother surface for the projection, reducing the risk of hotspots or other issues. Look for materials with a porosity of less than 20%.

**Water Absorption:** Water absorption can be a major issue when using projection machines, as excess moisture can damage the machine and the surface being projected onto. Look for materials with low water absorption rates, such as those with a water absorption rate of less than 5%.

**Hardness:** The hardness of the plastering and cement rendering materials can also affect the quality of the projection. A harder material will provide a more durable surface that can withstand the wear and tear of the projection machine. Look for materials with a hardness of at least 4 on the Mohs scale.

**Color Consistency:** Color consistency is important when using projection machines, as any variations in color can be noticeable on the final image. Look for materials with consistent colors, and avoid materials with visible streaks or patterns.

**Cost:** Finally, the cost of the plastering and cement rendering materials should be considered. While it may be tempting to opt for the cheapest option, it is important to remember that the quality of the materials can have a significant impact on the overall success of the project. Look for materials that offer good value for money, rather than simply the lowest price.

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## Characteristics and Limitations of Plastering and Cement Rendering Materials for Use with Projection Machines

When it comes to using projection machines, the surface on which the projection is being made is of utmost importance. Plastering and cement rendering materials are commonly used to create a smooth and even surface for projection. However, these materials have their own set of characteristics and limitations that need to be considered before selecting them for a particular project.

### Characteristics of Plastering and Cement Rendering Materials

#### 1. Smoothness:

- Plastering and cement rendering materials are known for their smoothness, which is essential for a high-quality projection surface. A smooth surface helps to minimize the visibility of any imperfections or distortions in the projection.

#### 2. Durability:

- Both plastering and cement rendering materials are highly durable and can withstand the wear and tear of frequent projection use. They can also resist the effects of moisture and temperature fluctuations, making them ideal for use in a variety of environments.

#### 3. Fire resistance:

- Plastering and cement rendering materials are non-combustible, making them a safe choice for use in projection applications where fire safety is a concern.

#### 4. Acoustic properties:

- Plastering and cement rendering materials can help to improve the acoustics of a space by absorbing sound waves and reducing echo and reverberation.

### Limitations of Plastering and Cement Rendering Materials

#### 1. Cost:

- Plastering and cement rendering materials can be more expensive than other projection surface materials, such as paint or wallpaper.

#### 2. Time-consuming application:

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- Applying plastering and cement rendering materials can be a time-consuming process, especially if the surface is not properly prepared.

### 3. Limited flexibility:

- Once applied, plastering and cement rendering materials cannot be easily moved or adjusted, so any mistakes or imperfections can be difficult to correct.

### 4. Weight:

- Plastering and cement rendering materials can be heavy, which can put additional stress on the structure of the building.

### 5. Maintenance:

- Plastering and cement rendering materials require regular maintenance to keep them looking their best and to prevent damage. This can include cleaning, patching, and re-applying the material as needed.

## 2.4 Clean plastering application and work area

When it comes to clean plastering application and maintaining a tidy work area with a plaster projection machine, there are several steps and practices that can be followed to ensure a clean and efficient process. Proper cleaning and maintenance of the machine, as well as the surrounding work area, are essential for achieving high-quality plastering results.

### 2.4.1 Cleaning the Plaster Projection Machine:

**1. Preparation:** Before starting the cleaning process, it is important to disconnect the machine from the power source and ensure that all moving parts have come to a complete stop. This will help prevent any accidents or injuries during the cleaning process.

**2. Dust Removal:** Begin by removing any excess dust or debris from the machine. Use a soft brush or compressed air to gently remove dust from the exterior surfaces of the machine. Pay special attention to areas such as vents, filters, and cooling fans, as these tend to accumulate dust over time.

**3. Disassembly (if applicable):** If your plaster projection machine has removable parts or components, such as spray nozzles or hoses, it is recommended to disassemble them for thorough cleaning. Follow the manufacturer's instructions for disassembling and reassembling these parts.

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**4. Cleaning Solution:** Prepare a cleaning solution by mixing mild detergent or soap with warm water. Avoid using harsh chemicals or abrasive cleaners, as they may damage the machine's components.

**5. Wiping Surfaces:** Dip a soft cloth or sponge into the cleaning solution and gently wipe down all accessible surfaces of the machine. Pay attention to areas that come into direct contact with plaster, such as the hopper, spray gun, and mixing chamber. Remove any plaster residue or buildup using gentle circular motions.

**6. Rinsing:** After wiping down all surfaces with the cleaning solution, rinse them thoroughly with clean water to remove any soap residue. Ensure that no water enters electrical components or sensitive areas of the machine.

**7. Drying:** Allow the machine to air dry completely before reassembling and storing it. Avoid using heat sources or direct sunlight to speed up the drying process, as this may cause damage to the machine.

#### **2.4.2 Maintaining a Clean Work Area:**

**1. Preparation:** Before starting any plastering work, it is important to prepare the work area properly. Cover floors, furniture, and any other surfaces that may be exposed to plaster with protective sheets or plastic covers. This will help prevent plaster splatters and spills from causing unnecessary mess.

**2. Containment:** Use barriers or temporary walls to create a contained area for plastering. This will help confine the plaster dust and debris within a specific space, making it easier to clean up afterward.

**3. Regular Cleaning:** Throughout the plastering process, periodically clean up any excess plaster that may accumulate on the floor or surrounding surfaces. Use a broom, vacuum cleaner, or damp cloth to remove any loose plaster particles.

**4. Waste Disposal:** Dispose of waste materials, such as used plaster bags or excess plaster, in designated containers or bags. Properly seal and dispose of these materials according to local regulations and guidelines.



1. **Final Cleaning:** Once the plastering work is complete, thoroughly clean the entire work area. Sweep or vacuum the floors to remove any remaining dust or debris. Wipe down surfaces with a damp cloth to remove any residual plaster or dirt

<b>Self-Check 2</b>	<b>Written test</b>
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Name..... ID..... Date.....

### Part I: True or False question

**I. Instruction: Say true if the statement is correct and false if the statement is incorrect.**

1. It is necessary to clean the work area before starting the plastering process.
2. Applying a bonding agent to the walls is not necessary when using a projection machine for plastering.
3. It is not important to ensure proper ventilation in the work area during plastering.

### Part II: Matching

**Instruction: Match the following terms with their corresponding definitions.**

	<u>A</u>	<u>B</u>
1	Should be removed from the work area before plastering begins.	A. Cover the floor and any other surfaces in the surrounding area with plastic sheeting.
2	Should be done to prepare the walls and ceiling for plastering.	B. Remove all loose plaster, paint, or wallpaper.
3	Should be done to protect the surrounding area from plaster dust.	C. Wear safety glasses to protect the eyes from plaster dust.
4	Safety precautions should be taken when plastering.	D. Patch any cracks or holes with plaster.

### Part III: Short Answer Questions

1. What should be removed from the work area before plastering begins?
2. What should be done to prepare the walls and ceiling for plastering?
3. What should be done to protect the surrounding area from plaster dust?
4. What safety precautions should be taken when plastering?

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## Operation sheet-1

### Operation Title:

- Prepare the work area for plastering for projection machine

### Purpose:

- To ensure that the surface is properly prepared and ready for the application of plaster.

### Precautions:

- Cleanliness
- Protective gear
- Ventilation
- Temperature and humidity control
- Fire protection
- Electrical equipment protection
- Drop cloths
- Protective coverings
- Water proofing
- Safety nets

### Tools and materials

- Gloves
- Wire Brush
- Scraper
- Sandpaper
- Power Washer
- Plaster Mixer
- Buckets
- Measuring Tools
- Projection Machine
- Trowel
- Hawk
- Plaster
- Water
- Primer

### Procedure:-

1. Clean the Work Area
2. Protect the Surrounding Areas
3. Secure the Projection Machine
4. Prepare the Plastering Materials
5. Apply a Primer (Optional)
6. Apply the First Coat of Plaster
7. Smooth the Surface

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8. Apply Additional Coats (If Necessary)

9. Finish with a Final Coat

10. Sand and Paint (Optional)

**Quality criteria:**

- Clean and Dust-Free Surface
- Proper Surface Preparation
- Adequate Protection of Adjacent Surfaces
- Surface Moisture Control
- Proper Substrate Preparation
- Mixing and Consistency
- Machine Calibration
- Safety
- Cleanup

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## Lab Test

Name: -----

Date: -----

Time started: -----

Time Finished: -----

Time Allowed: 3 hours

**Instruction:** For this operation you have given 3 hours and you are expected to finish in the given time.

**Task 1:** Prepare the work area for plastering by projection machine

## Unit Three: Pre-blended plasters and render materials

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Operating mixing pump
- Screening material correct thickness
- Plastering techniques projection materials
- Producing schedule finishes material

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, the trainee will be able to:

- Operating mixing pump.
- Screening material correct thickness.
- Applying plastering techniques projection materials.
- Producing schedule finishes material.

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## 3.1 Operating mixing pump

### 3.1.1 Operation of Mixing Pump for Pre-blended Plasters and Render Materials

Pre-blended plasters and render materials are pre-mixed combinations of cement, sand, and other additives that are designed to be mixed with water and applied to walls and other surfaces. To ensure proper mixing and application, a mixing pump is often used to combine the ingredients and deliver them to the work area.

Here are the steps involved in the operation of a mixing pump for pre-blended plasters and render materials:

#### 1. Prepare the Materials

- Before starting the mixing process, make sure that all the necessary materials are on hand, including the pre-blended plaster or render, water, and any additional additives that may be required.

#### 2. Connect the Hoses

- Connect the hoses from the mixing pump to the containers holding the pre-blended plaster or render, and water. Make sure that the hoses are securely attached and that there are no leaks.

#### 3. Set the Pump

- Set the mixing pump to the appropriate speed and flow rate, depending on the specific requirements of the material being mixed.

#### 4. Add Water

- Begin adding water to the pre-blended plaster or render through the pump, slowly increasing the amount of water as the mixture thickens.

#### 4. Mix the Materials

- Continue mixing the materials until they are thoroughly combined and free of lumps. The mixture should have a consistent, smooth consistency.

#### 5. Adjust the Consistency

- Adjust the consistency of the mixture as needed, adding more water to thin the mixture or more pre-blended plaster or render to thicken it.

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## 6. Test the Mixture

- Test the mixture for proper consistency and flowability by applying it to a small area and allowing it to dry. If the mixture is too thin, it may not provide adequate coverage or may run off the surface. If the mixture is too thick, it may be difficult to apply and may not cure properly.

## 7. Pump the Mixture

- Once the mixture has been tested and adjusted as needed, pump it to the desired location, using a hose or other delivery system.

## 8. Apply the Mixture

- Apply the mixture to the surface, using a trowel or other applicator tool. Make sure to apply the mixture evenly and in the correct thickness, as specified by the manufacturer.

## 9. Allow the Mixture to Cure

- Allow the mixture to cure for the recommended amount of time, which can vary depending on the specific product and environmental conditions.



Fig 3.1 Operation of Mixing Pump

### Safety precautions:

- Wear appropriate safety gear, such as goggles, gloves, and a dust mask.
- Be careful not to overfill the mixing pump, as this can cause it to malfunction.
- Be aware of the electrical cord and make sure that it is not in the way of the machine.
- Do not operate the machine in wet or humid conditions.

## 3.2 Screening material correct thickness

When using a plastering projection machine to apply pre-blended plasters and render materials, it is important to use screening material of the correct thickness. The screening material serves as a

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barrier between the machine and the material being projected, ensuring that only properly mixed and consistent material is applied to the surface.

The correct thickness of the screening material will depend on various factors, including the type of plaster or render being used, the desired finish, and the specific requirements of the projection machine being used. It is essential to consult the manufacturer's guidelines and recommendations for both the plaster/render material and the projection machine to determine the appropriate thickness of the screening material.

In general, screening materials for plastering projection machines are available in different thicknesses, typically ranging from 0.5mm to 2mm. Thinner screening materials are suitable for fine finishes and thin applications, while thicker materials are more appropriate for heavier applications or textured finishes.

The purpose of using screening material is to ensure that any lumps, debris, or foreign objects in the pre-blended plaster or render mixture are filtered out before they reach the projection machine. This helps prevent blockages in the machine's nozzle or hose, which can lead to uneven application or equipment damage.

By using screening material of the correct thickness, you can achieve a consistent and uniform application of pre-blended plasters and render materials with a plastering projection machine. This ensures a high-quality finish and reduces the risk of issues such as clogging or blockages during the application process.

In conclusion, when using a plastering projection machine to apply pre-blended plasters and render materials, it is crucial to use screening material of the correct thickness. The appropriate thickness will depend on factors such as the type of material being used, desired finish, and machine specifications. Consulting manufacturer guidelines and recommendations is essential to determine the suitable thickness for your specific application.

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## General Installation Guidelines for screening material correct thickness

When it comes to installing screening material for pre-blended plasters and render materials using a plastering projection machine, there are several general guidelines to follow. These guidelines ensure that the screening material is of the correct thickness and properly applied for optimal results.

### 1.Preparation

- Before starting the installation process, it is essential to prepare the surface properly. The substrate should be clean, free from dust, dirt, grease, or any loose material that could affect the adhesion of the screening material. Any existing coatings or finishes should be removed or adequately prepared to provide a suitable bonding surface.

### 2. Selection of Screening Material

- The choice of screening material depends on various factors such as the type of plaster or renders being used, the desired finish, and the specific requirements of the project. It is crucial to select a screening material that is compatible with the pre-blended plaster or render and provides the necessary strength and durability.

### 3. Thickness of Screening Material

- The thickness of the screening material plays a vital role in achieving a smooth and even finish. The correct thickness ensures proper coverage and helps to hide any imperfections on the substrate. The recommended thickness may vary depending on the specific product being used, but generally, it ranges from 6mm to 10mm.

### 4.Application Process

To apply the screening material using a plastering projection machine, follow these steps:

- a) Set up the projection machine according to the manufacturer's instructions.
- b) Load the pre-blended plaster or render into the machine's hopper.
- c) Adjust the machine settings to achieve the desired thickness of the screening material.
- d) Start applying the screening material onto the prepared substrate in a consistent and even manner.
- e) Use appropriate tools such as trowels or floats to level and smooth out the applied material.
- f) Ensure that all areas are adequately covered and there are no gaps or inconsistencies in thickness.

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## 5. Curing and Finishing

- After the screening material has been applied, it is essential to allow it to cure properly before proceeding with any further finishing or decoration. The curing time may vary depending on the specific product used and environmental conditions. Once cured, the surface can be finished according to the desired texture or decorative treatment.

### **Quality requirement for screening material correct thickness by plastering Projection machine**

When it comes to screening material and determining the correct thickness by plastering projection machines, there are several quality requirements that need to be considered. These requirements ensure that the screening material is applied accurately and effectively, resulting in a smooth and even finish. Here are some key factors to consider:

#### **1. Material Thickness:**

- The thickness of the screening material plays a crucial role in achieving the desired plastering projection. It is important to ensure that the material is of the correct thickness to achieve an even and consistent application. The thickness can vary depending on the specific requirements of the project, such as the type of surface being plastered and the desired finish.

#### **2. Material Composition:**

- The composition of the screening material also affects its suitability for plastering projection machines. The material should be specifically designed for plastering applications, ensuring that it adheres well to the surface and provides a strong bond. Common materials used for plastering include cement-based mixes, lime-based mixes, and synthetic materials like acrylic or polymer-based compounds.

#### **3. Compatibility with Projection Machine:**

- The screening material should be compatible with the plastering projection machine being used. Different machines may have specific requirements in terms of material consistency, viscosity, and flow rate. It is important to choose a screening material that can be easily applied using the selected projection machine without causing any clogging or blockages.

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#### 4. Adhesion Properties

- The screening material should have good adhesion properties to ensure that it bonds well with the surface being plastered. This helps in preventing cracks, delamination, or detachment of the plaster over time. Proper adhesion also ensures that the plastered surface remains durable and long-lasting.

#### 5. Workability

- The workability of the screening material refers to its ease of application and manipulation during the plastering process. It should have a suitable consistency that allows for smooth spreading and leveling without excessive effort. The material should also retain its workability for a sufficient amount of time, allowing the plasterer to complete the application without interruptions.

#### 6. Durability and Resistance

- The screening material should be able to withstand the environmental conditions and stresses it will be exposed to after application. It should have good resistance to factors such as moisture, temperature changes, UV radiation, and physical impact. This ensures that the plastered surface remains intact and maintains its appearance and functionality over time.

#### 7. Compatibility with Finishing Materials

- If the plastered surface is intended to be further finished with paints, coatings, or decorative finishes, it is important to consider the compatibility of the screening material with these finishing materials. The screening material should not negatively interact with the finishing materials or compromise their performance.

### 3.3 Plastering techniques projection materials

Blended plasters and render materials are commonly used in construction and renovation projects to provide a smooth and durable finish to walls, ceilings, and other surfaces. The application of these materials can be done manually or with the help of plaster projection machines, which offer several advantages in terms of efficiency and consistency. In this comprehensive answer, we will discuss the application techniques of blended plasters and render materials using plaster projection machines.

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- **Plaster Projection Machines**

Plaster projection machines, also known as plastering machines or rendering machines, are mechanical devices designed to apply plaster or render materials onto surfaces quickly and efficiently. These machines consist of a hopper or container that holds the blended plaster or render mix, a pump system that propels the material through a hose, and a nozzle or spray gun that evenly distributes the material onto the surface.

- **Blended Plasters and Render Materials:**

Blended plasters and render materials are mixtures of cement, sand, lime, and other additives that are used to create a smooth and durable finish on walls and ceilings. These materials can be pre-blended by manufacturers or mixed on-site according to specific ratios and requirements. Blended plasters and render materials offer various benefits such as improved workability, increased strength, enhanced adhesion, reduced cracking, and better resistance to weathering.

- **Application Techniques**

When using a plaster projection machine to apply blended plasters and render materials, several techniques can be employed to ensure an even and consistent finish. These techniques include:

**1. Surface Preparation**

- Before applying the blended plaster or render material, it is essential to prepare the surface properly. This involves cleaning the surface from dust, dirt, grease, or any loose particles that may affect adhesion. Additionally, any existing coatings or paints should be removed or properly primed.

**2. Masking and Protection**

- To prevent overspray or splatter onto adjacent surfaces, it is crucial to mask and protect areas that should not be coated. This can be done using plastic sheets, masking tape, or other suitable materials.

**3. Mixing and Loading the Machine**

- The blended plaster or render material should be mixed according to the manufacturer's instructions or specific project requirements. Once mixed, the material is loaded into the hopper of the plaster projection machine. It is important to ensure that the machine is clean and free from any residual material from previous applications.

**4. Adjusting Machine Settings**

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- Plaster projection machines offer various settings that can be adjusted to control the flow rate, pressure, and spray pattern of the material. These settings should be adjusted based on the desired thickness and texture of the finish.

## 5. Spraying Technique

- When applying the blended plaster or render material, it is recommended to start from the top of the surface and work downwards in overlapping strokes. The nozzle or spray gun should be held at a consistent distance from the surface to ensure an even application. It is important to maintain a steady and controlled motion to avoid uneven thicknesses or streaks.

## 2. Multiple Coats

- Depending on the desired finish and thickness, multiple coats may be required. Each coat should be allowed to dry before applying the next one. It is essential to follow the manufacturer's instructions regarding drying times and curing processes.

## 7. Finishing Techniques

- Once the final coat has been applied, various finishing techniques can be employed to achieve different textures or decorative effects. These techniques include troweling, sponging, stippling, or using specialized tools for creating patterns or designs.

## 3.4 Producing job finishes material schedule

To produce a schedule for plastering finishes using a projecting machine, several factors need to be considered. These include the type of plastering finish required, the size and complexity of the project, the availability of resources, and the efficiency of the projecting machine. By carefully planning and organizing the process, it is possible to create a detailed schedule that ensures timely completion of the plastering finishes.

### Determining the Type of Plastering Finish:

- The first step in creating a schedule for plastering finishes is to determine the specific type of finish required. Plastering finishes can vary widely, including smooth finishes, textured finishes, decorative finishes, or specialized finishes like Venetian plaster. Each type of finish may require different techniques and materials, which can affect the overall timeline.

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### Assessing Project Size and Complexity:

- The size and complexity of the project play a crucial role in scheduling plastering finishes. Larger projects with multiple rooms or extensive wall surfaces will naturally take longer to complete compared to smaller projects. Additionally, complex architectural features such as arches or intricate designs may require more time and attention to detail.

### Resource Availability:

- The availability of resources is another important consideration when creating a schedule for plastering finishes. Resources include not only materials but also skilled labor and equipment. It is essential to ensure that all necessary resources are readily available throughout the project duration to avoid delays.

### Efficiency of Projecting Machine:

- Using a projecting machine can significantly speed up the plastering process. These machines are designed to apply plaster quickly and evenly over large areas. When creating a schedule, it is important to consider the efficiency and capacity of the projecting machine being used. Factors such as its output rate, maintenance requirements, and any potential downtime should be taken into account.

### Creating a Detailed Schedule:

- Once all relevant factors have been assessed, a detailed schedule can be created for plastering finishes using a projecting machine. The schedule should include specific tasks, their start and end dates, and the resources required for each task. It is essential to allocate sufficient time for each step of the plastering process, including surface preparation, plaster application, drying time, and any additional finishing touches.

### Considerations for a Successful Schedule:

To ensure a successful schedule for plastering finishes using a projecting machine, it is important to consider the following:

#### 1. Project Phases:

- Divide the project into manageable phases to track progress effectively. This could include dividing the work by room or floor.

#### 2. Resource Allocation:

- Allocate resources such as manpower, materials, and equipment based on the project's requirements. Ensure that resources are available when needed to avoid delays.

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### 3. Contingency Planning:

- Account for potential delays or unforeseen circumstances by building in contingency time in the schedule. This allows for flexibility in case of unexpected issues.

### 4. Communication and Coordination

- Maintain clear communication channels with all stakeholders involved in the project. Regularly update them on progress and any changes to the schedule.

### 5. Quality Control

- Incorporate quality control measures throughout the process to ensure that the plastering finishes meet the desired standards. This may include regular inspections and adjustments as necessary.

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<b>Self-Check 3</b>	<b>Written test</b>
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Name..... ID..... Date.....

**Part I: True or False question**

**I. Instruction: Say true if the statement is correct and false if the statement is incorrect.**

1. Pre-blended plasters and render materials are ready-to-use mixtures that require no additional ingredients.
2. Pre-blended plasters and render materials can be used for both interior and exterior applications
3. Pre-blended plasters and render materials offer improved durability compared to traditional plaster mixes.
4. Pre-blended plasters and render materials are more expensive than traditional plaster mixes.

**Part II: Matching**

**Instruction: Match the following terms with their corresponding definitions.**

<u>A</u>	<u>B</u>
1 Consistency	A. Ready-to-use mixtures save time and effort in on-site mixing.
2 Convenience	B. Manufactured under controlled conditions, ensuring consistent quality and performance.
3 Quality	C. Formulated with the right proportions of ingredients, resulting in better workability, durability, and finish.
4 Time-saving	D. Reduces the time required for mixing, testing, and adjusting on-site.
5 Reduced waste	E. Precise formulation minimizes material waste.

**Part III: Short Answer Questions**

1. What are pre-blended plasters and render materials?
2. What are the advantages of using pre-blended plasters and render materials?
3. What are some common applications of pre-blended plasters and render materials?
4. How are pre-blended plasters and render materials applied?



## Operation sheet-2

### Operation Title:

- Pre-blended plasters and render materials

### Purpose:

- To provide a smooth, protective, and decorative finish to a variety of surfaces, including concrete, brick, and masonry.

### Precautions:

- Carefully read and understand the instructions provided by the manufacturer.
- Wear protective gear such as gloves, safety goggles, and a dust mask or respiratory protection to prevent skin contact, eye irritation, and inhalation of dust particles.
- Work in well-ventilated areas or use fans to improve air circulation.
- Avoid direct contact with skin and eyes
- Store the materials properly in a dry and secure location, away from moisture and direct sunlight.
- Follow proper waste disposal practices for any leftover or unused materials.

### Tools and materials

- |                                |                                     |
|--------------------------------|-------------------------------------|
| • Spray machine                | • Hawk or plastering board          |
| • Mixing container or bucket   | • Plasterer's float or sponge float |
| • Mixing paddle or drill mixer | • Spray equipment (optional)        |
| • Measuring tools              | • Surface preparation tools         |
| • Trowels                      | • Clean water supply                |

### Procedure:-

1. Prepare the surface
2. Apply a primer
3. Mix the plaster or render
4. Apply the plaster or render

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5. Smooth out the plaster or render
6. Protect the plaster or render

**Quality criteria:**

- Check for any signs of delamination or poor adhesion, especially at corners, edges, and joints.
- Measure the thickness at different points to ensure uniformity.
- It should be free from visible lumps, bumps, or unevenness.
- It should cover the entire surface evenly and without any gaps or thin areas.
- The plaster or render material should have strong bond strength to the substrate, ensuring long-term durability.
- The finish should be smooth, uniform, and free from defects that may affect the aesthetic appeal.
- It should cure evenly and dry within the specified time frame provided by the manufacturer.

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## Lab Test

Name: -----

Date: -----

Time started: -----

Time Finished: -----

Time Allowed: 3 hours

**Instruction:** For this operation you have given 3 hours and you are expected to finish in the given time.

**Task 1:** Apply Pre-blended plasters and render materials using plaster projection machine.

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Name	Qualification (Level)	Field of study	Institute	Phone number	Email
BirhanuDemelash	A	M.Sc. COTM BSc Road construction,	woldeya poly technic	0910686578	birhanudemelash14@gmail.com
MihiretabGashaw	B	BSc building construction technology and Computer engineering	Addis ketema industrial	0922079011	mihiretabgashaw@gmail.com
NasirAmane	B	BSC construction technology	Shashemane poly technic	0916005870	nasiraman5870@gmail.com
NigussieTeshome	A	Geotechnical enginer(M.sc) Civil engineering (B.sc)	Arbaminch PTC	0913767770	teshomeng@gmail.com
TesfayeAyalew	A	MSc in building construction technology management	DebreBrhan poly technic	0910469898	tesfaye.ay21@gmail.com
WondwesnGirma	A	COTM(M.sc) Civil engineering (B.sc)	Harar polytechnic College	0912778365 0703608365	wondwesngirma@gmail.com