

## 2.7. Our Products Installation Charts

### FLOW CHART FOR FACING USING MASTER MATERIALS

#### 1. APPLICATION AREA

1.1 This flow chart has been designed for facing industrial and civil structures in the construction of new and reconstruction of existing buildings and structures.

1.2 The flow chart involves the use of MASTER materials.

1.3 The areas of application of each material depending on the facing application environment, the state of structures to be faced and their functionality are listed in Table 1.

1.4 Facing of a structure is carried out in order to ensure architectural and aesthetic properties of structures, premises and buildings; protect structures and buildings against weathering, corrosive environment, and other negative factors.

1.5 This flow chart has been developed for use in facing structures operated both inside and outside buildings.

1.6 All facing operations must be performed at an ambient temperature not below + 5 °C and above + 35 °C.

1.7 The scope of operations under consideration includes:

- examination of structures to be faced in order to determine the measures for surface preparation, choose materials and design and technological solutions;
- preparation of building structure surfaces for facing;
- surface priming (if required);
- preparation of adhesive concrete mixes;
- facing building structures;
- grouting tile joints;
- installation of deformation joints.

1.8 When using this flow chart for a specific facility in the process of drafting operations, the following must be clarified:

- grades of materials to be used for facing;
- the list and scope of operations to be done before facing;
- scaffolding, mechanisms and tools necessary for materials preparation and application;
- the list and scope of facing operations;

1.9 Structure exterior wall tile facing should be performed using scaffolds protected with and equipped with landing stages or jack-up platforms.

1.10 Facing quality control must be carried out according to the Ukrainian National Construction Regulation DBN V2.6-22-2002: Application of Coatings Using Dry Construction Mixtures.

#### 2. MATERIALS USED FOR FACING

2.1 Materials used for facing and their properties are shown in Table 1.

2.2 MASTER materials used for facing correspond to:

polymeric compositions – Ukraine Standard Specifications V.2.7-2627701052.001-2003

dry mortars - State Standard of Ukraine B V.2.7-126:2011

sealants – State Standard of Ukraine B V.2.7-158:2008

Table 1 Materials used for facing and their properties

No.	Product name	Application	Properties
1	MASTER Universal Primer; Inner Primer	To strengthen surfaces and increase adhesion to the facing material surfaces	Composition: aqueous copolymer hydrocarbon resin mortar. Appearance - white colloidal solution. Application temperature: + 5 to + 35°C. Consumption depends on the surface absorption and is approximately 0.1 to 0.4 L/m <sup>2</sup> . Drying time: about 4 hours
2	MASTER STANDART Adhesive Mix for Mounting Facing Materials	The adhesive cement for facing walls and floors with ceramic and porcelain tiles (water absorption - 1% and above), non-deformable surfaces as well as for exterior and interior application	Composition: cement-sand mixture modified with polymer additives. Color: gray. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Open time at standard conditions*: 15 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Application temperature: + 5 to +35°C. Dry mix consumption: 1.4 kg / m <sup>2</sup> / mm

3	MASTER NORMAL Adhesive Mix for Tile Facing	The adhesive cement for facing walls and floors with ceramic tiles (water absorption - 3% and above), non-deformable surfaces as well as for exterior and interior application	Composition: cement-sand mixture modified with polymer additives. Color: gray. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Open time at standard conditions*: 10 minutes. Adhesion to concrete base: at least 0.5 MPa The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Application temperature: + 5 to +30 <sup>0</sup> C. Dry mix consumption: 1.45 kg / m <sup>2</sup> / mm
4	MASTER FLEX Flexible Adhesive Mix for Mounting Facing Materials	The adhesive cement for facing walls and floors with ceramic, natural and artificial stone tiles, non-deformable surfaces as well as for exterior and interior application	Composition: cement-sand mixture modified with fillers and polymer additives. Color: gray. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Open time at standard conditions*: 25 minutes. Adhesion to concrete base: at least 1.0 MPa The recommended amount of water for mixing: 0.18 liters per 1 kg of dry mix. Application temperature: + 5 to +35 <sup>0</sup> C. Dry mix consumption: 1.4 kg / m <sup>2</sup> / mm
5	MASTER KRISTAL Adhesive Mix for Marble, Mosaic and Glass	The white cement adhesive for facing walls and floors with ceramic, natural and artificial stone tiles, white marble, glass, mosaic, non-deformable surfaces or surfaces subject to short-term deformations as well as for exterior and interior application	Composition: cement-sand mixture modified with fillers and polymer additives. Color: white. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Open time at standard conditions*: 30 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.25 liters per 1 kg of dry mix. Application temperature: + 5 to +40 <sup>0</sup> C. Dry mix consumption: 1.35 kg / m <sup>2</sup> / mm
6	MASTER STONEFIX Highly Adhesive Mix for Mounting Facing Materials	The white cement adhesive for facing walls and floors with ceramic, porcelain natural and artificial stone tiles (pressed boards), mosaic, non-deformable surfaces or surfaces subject to short-term deformations as well as for exterior and interior application	Composition: cement-sand mixture modified with fillers and polymer additives. Color: gray. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Open time at standard conditions*: 30 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.22 liters per 1 kg of dry mix. Application temperature: + 5 to +40 <sup>0</sup> C. Dry mix consumption: 1.35 kg / m <sup>2</sup> / mm
7	MASTER PROGRES Adhesive Mix for Porcelain Stoneware	The adhesive cement for facing non-deformable surfaces with low water absorption with porcelain and other tiles as well as for exterior and interior application	Composition: cement-sand mixture modified with polymer additives. Color: gray. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Open time at standard conditions*: 25 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Application temperature: + 5 to +35 <sup>0</sup> C. Dry mix consumption: 1.4 kg / m <sup>2</sup> / mm
8	MASTER PLITOPOL Adhesive Mix for Floor Facing	The adhesive cement for facing horizontal surfaces with low water absorption with ceramic and other materials (in particular, for under-floor heating) as well as for exterior and interior application	Composition: cement-sand mixture modified with polymer additives. Color: gray. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Open time at standard conditions*: 25 minutes. Adhesion to concrete base: at least 1.0 MPa

			The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Application temperature: + 5 to +30 <sup>0</sup> C. Dry mix consumption: 1.45 kg / m <sup>2</sup> / mm
9	MASTER GRAFIKA Grout	Cement-based mix for grouting ceramic, natural or artificial stone tiles, mosaics, glass, as well as for exterior and interior applications, with antifungal effect	Composition: cement mix modified with fillers and polymer additives. Color specified on the package (13 colors). Aggregate size: max 0.2 mm. The dissolved mix suitability to use: at least 120 minutes. Compressive strength: at least 15 MPa The recommended amount of water for mixing: 0.33 liters per 1 kg of dry mix. Application temperature: + 5 to +25 <sup>0</sup> C. Dry mix consumption: 1.35 kg / m <sup>2</sup> / mm
10	MASTER FRONT Sand plaster for leveling and repair	Cement-based plaster for leveling and repairing surfaces for subsequent facing as well as for exterior and interior applications	Composition: cement-sand mixture modified with fillers and polymer additives. Color: gray/white. Aggregate size: max 0.8 mm. The dissolved mix suitability to use: at least 120 minutes. Compressive strength: at least 7 MPa The recommended amount of water for mixing: 0.22 liters per 1 kg of dry mix. Application temperature: + 5 to +25 <sup>0</sup> C. Dry mix consumption: 1.35 kg / m <sup>2</sup> / mm
11	MASTER SILICON Universal Sanitary Silicone Sealant	A single-component silicone sealant to fill cracks in concrete, bricks, plaster surfaces, seal joints and joints in windows and doors, bathrooms, showers, toilets, etc., as well as for internal and external application	Base: silicone; solvent: acetic acid; Skin formation time: 20 minutes; Density - 1 g/ml; Temperature resistance: -40 °C to +180 °C; Volumetric shrinkage: 10%; Joints to be filled: max 20mm

\*All the above recommendations are efficient under normal conditions: T = 20 °C, RH = 60%

### 3. MATERIALS, THEIR SCOPE OF APPLICATION AND PECULIARITIES OF FACING OPERATIONS

#### 3.1 Table 2 Materials, their scope of application and peculiarities of facing operations

No.	Product name	Application	Application area	Peculiarities
1	MASTER Universal Primer; Inner Primer	Priming mixes to prepare surfaces for further leveling or facing	The aqueous solution of polymer acrylic emulsion is used to reduce base water absorption, increase the adhesive layer strength and strengthen the base. Universal Primer is designed for internal and external application. Inner Primer is designed for internal application.	The temperature of base to which the primer is applied and the ambient temperature must be at least + 5 and max + 35 <sup>0</sup> C. Consumption depends on the surface absorption and is approximately 0.1 to 0.4 L/m <sup>2</sup> . Drying time: about 4 hours For highly absorbent surfaces the primer must be applied again after drying the previous one. Low-strength bases must be strengthened by primers for cement plasters with the max strength of 5MPa. Such a strengthening for adhesive mixes is not allowed.
2	MASTER FRONT Sand plaster for leveling and repair	White and gray plaster for leveling and repairing surfaces for subsequent facing	The cement mix for leveling the surface with the layer thickness of up to 20 mm. For surface repairs - grouting and sealing cracks, potholes and holes.	Leveling the surface with the layer thickness of up to 20mm. In case of deviations from the horizontal by more than 20mm, the next layer can be applied after the preceding one has hardened (after 48

				hours). The mortar suitability to use: at least 120 minutes. The base strength must not be less than the plaster strength: at least 7MPa. The recommended amount of water for mixing: 0.22 liters per 1 kg of dry mix. The base and environment temperature: + 5 <sup>0</sup> C to +25 <sup>0</sup> C. Dry mix consumption: 1.35 kg / m2 / mm
3	MASTER SILICON Universal Sanitary Silicone Sealant	A single- component silicone sealant to fill joints	Used to fill expansion joints in concrete, bricks, plaster surfaces, seal joints and joints in windows and doors, bathrooms, showers, toilets, etc., as well as for internal and external application	Skin formation time: 20 minutes; Seam width to be filled: max 20mm Temperature resistance: -40 °C to +180 °C; Volumetric shrinkage: 10%; Full curing of 5 mm: 24 hours. To increase the cement mix adhesion to the silicone seam, the silicone seam must be covered by Universal Primer

3.2 Materials, their scope of application and peculiarities of facing operations using cement-base adhesives are given in Table 3.

3.2.1 The dissolved mix is suitable for use within 120 minutes. To prevent drying of the upper layer and the formation of crust, dissolved mix should be periodically stirred.

3.2.2 Table 3 shows the open time for each type of adhesive. The base and environment temperature must be 20C, and the humidity - 60%. Open time is the area of the facing surface to which the dissolved adhesive mix is applied, and this applied adhesive mix must be covered with tiles in a period of time specified in Table 3. In increase of the base and environment temperature, the open time is reduced, thus the base area covered by the adhesive mass must be reduced.

3.2.3 Table 3 shows the recommended amount of water for dissolution. Reduced amount of water leads to a more viscous mass. Increased amount of water leads to an increased mobility. The user must select the amount of water optimum for a particular use on the basis of the recommended amount of water for mixing.

Table 3 Materials, their scope of application and peculiarities of facing operations using cement-base adhesives

No.	Product name	Application	Application area	Peculiarities
1	MASTER STANDART Adhesive Mix for Mounting Facing Materials	Cement-Based Adhesive for Tiles	For facing walls and floors with ceramic and porcelain tiles (water absorption - 1% and above), non-deformable surfaces as well as for exterior and interior application	Open time at standard conditions*: 15 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Dry mix consumption: 1.4 kg / m2 / mm The layer thickness must not exceed 10mm. Can be used as a leveling mix to prepare the surface. The temperature of base to which the mix is applied and the ambient temperature must be at least + 5 and max + +35 <sup>0</sup> C.
2	MASTER NORMAL Adhesive Mix for Tile Facing	Cement-Based Adhesive for Ceramic Tiles	For facing walls and floors with ceramic tiles (water absorption - 3% and above), non-deformable surfaces as well as for exterior and interior application	Open time at standard conditions*: 10 minutes. Adhesion to concrete base: at least 0.5 MPa The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Dry mix consumption: 1.45 kg / m2 / mm The layer thickness must not

				<p>exceed 10mm. Can be used as a leveling mix to prepare the surface. The temperature of base to which the mix is applied and the ambient temperature must be at least + 5 and max + +30<sup>0</sup>C.</p>
4	<p>MASTER FLEX Flexible Adhesive Mix for Mounting Facing Materials</p>	<p>Cement-based adhesive for tiles from various natural and artificial materials</p>	<p>For facing walls and floors with ceramic, natural and artificial stone tiles, non- deformable surfaces as well as for exterior and interior application</p>	<p>Open time at standard conditions*: 25 minutes. Adhesion to concrete base: at least 1.0 MPa The recommended amount of water for mixing: 0.18 liters per 1 kg of dry mix. Dry mix consumption: 1.4 kg / m<sup>2</sup> / mm The layer thickness must not exceed 10mm. Can be used as a leveling mix to prepare the surface. The temperature of base to which the mix is applied and the ambient temperature must be at least + 5 and max + +35<sup>0</sup>C.</p>
5	<p>MASTER KRISTAL Adhesive Mix for Marble, Mosaic and Glass</p>	<p>The white cement adhesive for heavy natural or artificial facing materials</p>	<p>For facing walls and floors with ceramic, natural and artificial stone tiles, white marble, glass, mosaic, non-deformable surfaces or surfaces subject to short-term deformations as well as for exterior and interior application</p>	<p>Open time at standard conditions*: 30 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.25 liters per 1 kg of dry mix. Dry mix consumption: 1.35 kg / m<sup>2</sup> / mm Can be used as a leveling mix to prepare the surface. The temperature of base to which the mix is applied and the ambient temperature must be at least + 5 and max + +40<sup>0</sup>C.</p>
6	<p>MASTER STONEFIX Highly Adhesive Mix for Mounting Facing Materials</p>	<p>The gray cement adhesive for heavy natural or artificial facing materials</p>	<p>For facing walls and floors with ceramic, porcelain natural and artificial stone tiles (pressed boards), mosaic, non-deformable surfaces or surfaces subject to short-term deformations as well as for exterior and interior application</p>	<p>Open time at standard conditions*: 30 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.22 liters per 1 kg of dry mix. Dry mix consumption: 1.35 kg / m<sup>2</sup> / mm Can be used as a leveling mix to prepare the surface. The temperature of base to which the mix is applied and the ambient temperature must be at least + 5 and max + +40<sup>0</sup>C.</p>
7	<p>MASTER PROGRES Adhesive Mix for Porcelain Stoneware</p>	<p>Cement-based adhesive for porcelain tiles and other materials with low water absorption</p>	<p>For facing surfaces with ceramic tiles (for bases with low water absorption), as well as for exterior and interior application</p>	<p>Open time at standard conditions*: 25 minutes. Adhesion to concrete base: at least 0.8 MPa The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Dry mix consumption: 1.4 kg / m<sup>2</sup> / mm Can be used as a leveling mix to prepare the surface. The temperature of base to which the mix is applied and the ambient temperature must be</p>

				at least + 5 and max + +35 <sup>0</sup> C.
8	MASTER PLITOPOL Adhesive Mix for Floor Facing	Cement-Based Adhesive for Floor Facing	For facing horizontal surfaces (with low water absorption) with ceramic and other materials (in particular, for under-floor heating) as well as for exterior and interior application	Open time at standard conditions*: 25 minutes. Adhesion to concrete base: at least 1.0 MPa The recommended amount of water for mixing: 0.2 liters per 1 kg of dry mix. Dry mix consumption: 1.45 kg / m2 / mm Has a high mobility. Can be used as a leveling mix to prepare the surface. The temperature of base to which the mix is applied and the ambient temperature must be at least + 5 and max + +30 <sup>0</sup> C.
9	MASTER GRAFIKA Grout	Color cement-based grout for facing materials	Cement-based mix for grouting ceramic, natural or artificial stone tiles, mosaics, glass, as well as for exterior and interior applications, with antifungal effect Color. Color specified on the package. 13 colors	Small size aggregate: max 0.2 mm. The mortar suitability to use: at least 120 minutes. Compressive strength: at least 15 MPa The recommended amount of water for mixing: 0.33 liters per 1 kg of dry mix. Application temperature: + 5 to +25 <sup>0</sup> C. Dry mix consumption: 1.35 kg / m2 / mm

#### 4. WORK ARRANGEMENT AND TECHNIQUE

##### 4.1 Work Arrangement

4.1.1 Before any facing work do the following:

- Inspect the construction object and determine its readiness to facing;
- Develop the operations project;
- Prime the surface (if required);
- Deliver materials, products, tools and accessories to the site;
- Prepare the construction site to work.

4.1.2 Inspect the construction object.

When inspecting the construction object determine his readiness to facing.

Before facing perform the following on construction object:

- General construction and installation work;
- Route all utilities and seal all ducts;
- Seal joints between the blocks or panels on the building facade;
- Seal junctions of window, door and balcony blocks with elements;
- Glaze windows and balcony doors and install double-glazed windows.

For repaired or reconstructed objects, start facing after:

- Repair or replacement of bases to be faced,
- Repair or replacement of utilities.

When inspecting and examining, determine the state of structures to be faced, namely:

- Check the presence and deviation of structures to be faced from the vertical and horizontal;
- Check the dirty presence, nature and area on the surface of structures to be faced;
- Check the strength of the base to be faced;
- Check the strength of plaster adhesion to the base.

Inspection and certification must be shaped with the certificate of preparing the construction object for facing. The results must be used to develop the work project (WP).

4.1.3 The WP must be developed (as appropriate) for each object to be faced with regard to:

- The object inspection and examination results;
- Recommended application area for MASTER materials given in Tables 2 and 3 of this flow chart, Technical Specifications of Ukraine V.2.7-2627701052.001-2003, Construction Standards and Regulations 3.04.01 Insulation and Finishes and Construction Standards of Ukraine V.2.6-22-2001 Coatings with Dry Building Mixes.

4.1.4 When planning and arranging the construction site determine the following:

- Site dimensions;
- The location and size of areas for storing materials, tools and accessories;
- The location and size of areas for preparing mortars from dry mixes;
- Points of rest for workers;
- Areas for waste storage and collection.

When arranging the site, the work must be carried out taking into account all possibilities to use temporary and permanent structures present on the site.

This must be carried out together with the general safety measures:

- Install the site fencing and ensure its lighting in the evening and at night;
- Provide drainage of surface water;
- Provide dangerous areas with warning signs;
- Provide the correct movement of vehicles, which guarantees free access to all buildings.

Water must be supplied to all areas for preparation of mortars.

4.1.5 Paving must be installed in accordance with the requirements of GOST 24258, GOST 28012, GOST 18347, SNIP 12-04-2002 and in accordance with other applicable regulatory documents regulating the paving and operational safety.

4.1.6 Materials, tools and devices necessary to perform the work must be delivered to the site by road, stored in locations designated in the arrangement of the construction site and in conditions that ensure their safety during the work.

Materials and tools must be supplied to the facing site by means of trolleys according to GOST 13188, GOST 12874 and hand carry.

4.1.7 Prepare the surfaces of building structures for facing.

The finishing layer that has lost bonding with the structure surface in its preparation for tile facing must be removed by shot blasting machines under Technical Specifications of Ukraine TU 3.5393180.005, as well as using a water jet, pressurized to 30 MPa. When scope of work is small, use picks, chisels, boosters and brushes for this purpose.

Sagging of concrete and mortar must be removed by electric hammers or manual drilling machines. When scope of work is small, use bush hammering, chisels, steel brushes. Large cracks that are not increasing and large potholes in the surface of the structure must be cleared from the destroyed material particles with compressed air.

The mortar that protrudes from the joints of masonry must be removed using a chisel, trowel and a booster, ensuring a smooth surface without protrusions.

Efflorescence, rust, grease and mold must be cleaned by methods and means specified in Table 4.

Table 4 Methods and means of the surface from rust, grease and mold (Construction Standards of Ukraine V.2.6-22-2001).

Nature of dirt	Cleaning method
1	2
1. Grease stains	a) Treatment with aqueous solutions with salts or sodium hydroxide, or sodium-containing surface active agents (surfactants). The salts to be used are: Sodium carbonate; trisodium phosphate; sodium pyrophosphate; sodium tripolyphosphate. Use OP-7 or OP-10 (wetting agents) as surfactants, which are products of mono- and dialkylphenols oxyethylation. Solutions with salts and sodium hydroxide must be prepared with 4% to 5% consistency. The amount of a surfactant added must not exceed 1%. b) Treatment with organic solvents. To degrease, use trichlorethylene, perchlorethylene, mineral spirits. In treatment of wet and damp surfaces add ammonia, triethanolamine or methenamine in chlorinated carbohydrates. c) Treatment with emulsions, which include: organic solvents, water and surfactants. d) Drying oil spots must be cleaned by means of black clay.
2. Efflorescence	Treat with a solution of hydrochloric acid at a concentration of up to 6% followed by treatment with 4% soda solution; then rinse with water.
3. Bitumen stains	a) Clean surfaces with scraper (for small scopes) b) Wash with solvents (white spirit, petroleum solvent).
4. Soot	a) Clean surfaces with scraper (for small scopes). b) Wash with solvents (white spirit, petroleum solvent).
5. Water and non-aqueous paint stains	a) Clean surfaces with scraper (for small scopes). b) Sandblast surfaces (for large scopes). c) Clean with organic and inorganic fluids followed by surface mechanical cleaning. As for alkaline formulations, it is recommended to use an alkali metal hydroxide dissolved in water with the accelerator. Add tripropyleneglycol or its mix with a monophenyl ether of ethylene glycol. as the accelerator. The accelerator content in the mix must be 1 to 10%.
6. Dirt and dust	a) Blasting with compressed air. b) Sandblasting. c) Washing with soda solution. d) Washing with water and surfactant.
7. Traces of cleaning formulations	a) Mechanical treatment (clay removal from the surface). b) Washing with water. c) Blasting with compressed air.
8. Rust	Apply to the surface formulations containing inorganic acid, a surface active cationic or nonionic agent (Katain A or Katain K, Sintaenol DS-10, OP-7), tripoli. Post-treatment

	with formulations that contain sodium hydroxide, potassium bichromate.
9. Excess surface moisture after cleaning	a) Natural drying at a temperature of + 20 ± 5 °C. b) Blowing with warm air from the heater.

Large cracks and potholes must be primed with MASTER Primer, held for four hours until the primer has dried, then filled with a mixture of mortar MASTER FRONT. Cracks must be luted with hand trowel, first across cracks (crack is filled with a mortar mix), then along the crack (leveling mortar layer flush with the structure surface). Cracks up to 0.5 mm, as well as minor scratches are not grouted or filled. Where the structure was repaired or their surfaces were treated with special formulations, facing must begin no earlier than three days after the completion of the surface preparation.

#### 4.2 Work Process

4.2.1 The base to be faced must be strong and dry. Before preparing the base for facing hammer it in order to determine the loose layer. Thumping means that there are loose layers, thus, they must be removed, primed with MASTER primer and after 3-6 hours sealed with mortar, which is selected depending on the structure state, purpose and operating conditions (see Table 5).

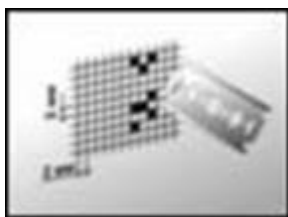
Table 5 Materials used for leveling the surfaces to be faced.

Structure purpose	Destruction degree	Materials for base leveling
Walls	Destruction depth: up to 20mm	It is recommended to level with the same mix used as an adhesive for facing
	Cracks up to 0.5 mm	Do not grout or seal
	Destruction depth: over 20mm	Level using MASTER FRONT plaster (layer thickness - 20mm). If the depth more than 20mm, leveling must be made with more than one layer. The next level can be applied after the preceding has hardened (after 48 hours).
Floors	Small cracks and holes	To be grouted and sealed with self-leveling MASTER mixes, which are used for preparation of the surface for facing. Before this, prime cracks and holes with MASTER Universal primer at least twice.
	Base destruction depth: up to 5mm	To be leveled with self-leveling MASTER mixes, which are used for preparation of the surface for facing. Before this, prime cracks and holes with MASTER Universal primer at least twice.
	Destruction depth: over 5mm	To be grouted and sealed with self-leveling MASTER mixes, which are used for preparation of the surface for facing. At the same the amount of water for self-leveling mixes must be 10% less than that indicated in the instructions for use. If the self-leveling mixes are not used, level using MASTER FRONT plaster (layer thickness - 20mm). If the depth more than 20mm, leveling must be made with more than one layer. The next level can be applied after the preceding has hardened (after 48 hours). Before this, prime cracks and holes with MASTER Universal primer at least twice.



4.2.2. When facing painted surfaces, check the paint adhesion to the base. For this purpose, make a grid on the painted surface using a blade. If the paint peels off as a result of such action, its adhesion to base is insufficient, so remove it mechanically, respectively (Figure 1).

Figure 1 Making a grid on the painted surface.



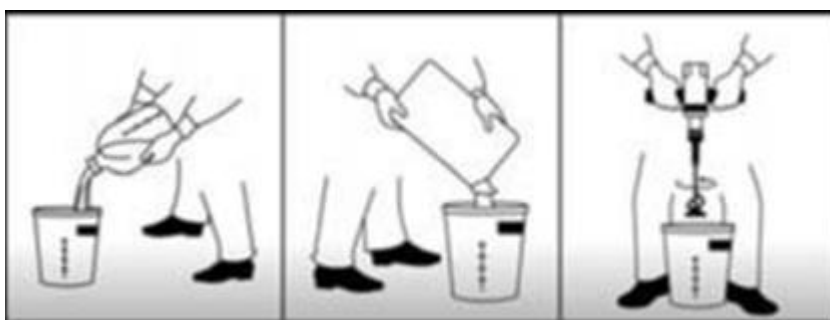
4.2.3 The base for facing must be even, and the deviations must not exceed the following:

- plastered walls at length of 2 m: max. 3 mm;
- in the entire room in vertical direction: max. 4 mm;
- in the horizontal direction: max. 6 mm;
- floors at length of 2 m: max. 4 mm;
- in the entire room: max. 5 mm;

4.2.4. Strong coatings having good adhesion to the base must be treated with coarse emery paper, the gypsum base must be subject to same treatment. Then, the surface must be cleaned from the dust with a brush and primed with the MASTER primer.

4.2.5 Preparation of mortar involves stirring the dry mix with a certain amount of water in a clean container using a slow-speed drill (Figure 2).

Figure 2 Mortar preparation.



The amount of water and stirring time depending on their grades are given in Table 6.

Table 6 Technological parameters of the adhesive mortar preparation.

Mix grade	The recommended amount of water, liters per 1 kg of dry mix.	Requirements for stirring
MASTER STANDART Adhesive Mix for Mounting Facing Materials	0.2	Stir until complete wetting and smooth mix without lumps, then keep for 5 minutes, and then stir for 1 minute again
MASTER NORMAL Adhesive Mix for Tile Facing	0.2	
MASTER FLEX Flexible Adhesive Mix for Mounting Facing Materials	0.18	
MASTER KRISTAL Adhesive Mix for Marble, Mosaic and Glass	0.25	
MASTER STONEFIX Highly Adhesive Mix for Mounting Facing Materials	0.22	
MASTER PROGRES Adhesive Mix for Porcelain Stoneware	0.2	
MASTER PLITOPOL Adhesive Mix for Floor Facing	0.2	

4.2.6. Put the adhesive mix prepared this way on a notched trowel with a trowel (Figure 3), and then use the putty spatula to apply it to the wall surface. The area of the surface to which the adhesive is applied depends on the adhesive grade, the ambient and base temperatures. If the base temperature is 20 °C and the relative humidity is 60%, the open time and the time for adjusting are given in Table 7.

Figure 3 Mortar application

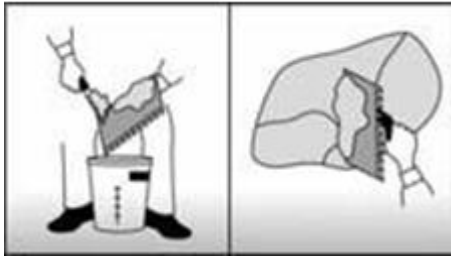


Table 7 Technological parameters of the adhesive mortar preparation.

Adhesive mix grade	Adhesive mix open time, minutes	Adhesive mix adjusting time, minutes
MASTER STANDART Adhesive Mix for Mounting Facing Materials	15	Up to 20
MASTER NORMAL Adhesive Mix for Tile Facing	10	Up to 10
MASTER FLEX Flexible Adhesive Mix for Mounting Facing Materials	25	Up to 30
MASTER KRISTAL Adhesive Mix for Marble, Mosaic and Glass	30	Up to 40
MASTER STONEFIX Highly Adhesive Mix for Mounting Facing Materials	30	Up to 40
MASTER PROGRES Adhesive Mix for Porcelain Stoneware	25	Up to 30
MASTER PLITOPOL Adhesive Mix for Floor Facing	25	Up to 30

If air temperature, base temperature or humidity changes at different base absorbency listed in Table 7, indicators change as well:

- if temperature increases and humidity decreases, the open time and adjusting time reduce;
- if temperature decreases and humidity increases, the open time and adjusting time increase;
- if the base absorbency increases, the open time and adjusting time reduce.

4.2.7 The adhesive must be uniformly distributed by the smooth edge of the putty spattle and then make a comb with the notched side. At the same time trowel notches must touch the base, and the spattle must be kept at the equal angle. This provides a uniform distribution of the mortar along the surface (Figure 4).

Figure 4 Distributing the mortar with the notched trowel.



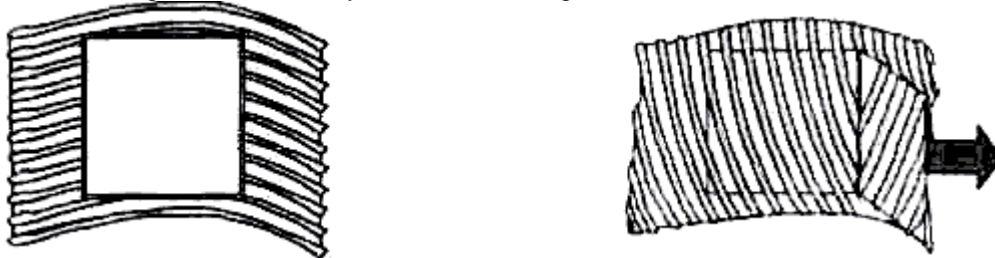
4.2.8 The trowel notches must be selected depending on the size of tiles (Table 8).

Table 8 Dependence of the trowel notches on the tile size

Tile size	Trowel notch size
1	2
10x10	4
15x15	6
10x20	6
25x20	8
30x30	10
40x40	12

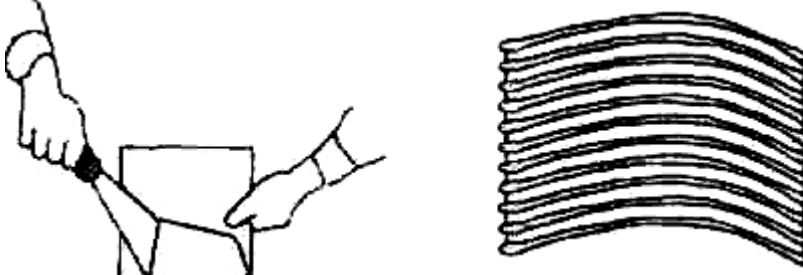
4.2.9 With the right mix consistency and the size of the trowel notch the mortar mix must cover not less than 65% of the tile surface (Figure 5). In this case, the tile will not slip from a vertical surface; if this is not respected, use the trowel with larger notches.

Figure 5 Determining the adhesive layer area contacting the tile surface



4.2.10 When facing exterior surfaces of buildings and surfaces in wet areas the adhesive mortars must be applied not only to the base, but also to the tile. The mortar mix layer thickness must be within 1 mm (Figure 6). When using natural or artificial stone tiles with the size of 400x400 mm and a thickness exceeding 10 mm, additional mechanical fixation is required.

Figure 6 Applying the adhesive layer on the tile surface and the base

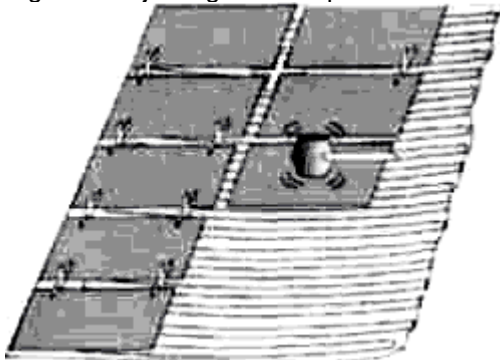


4.2.11 To install metal and plastic fasteners (brackets, hooks, anchors, hinges, etc.) use the anchoring mix in buildings and tiles.

4.2.12 After fastening several tiles, fill the gaps between them and the wall with the liquid adhesive mix.

4.2.13 When facing the floor, the position of large floor tiles must be adjusted with a rubber mallet (Figure 7).

Figure 7 Adjusting the tiles position with the rubber mallet

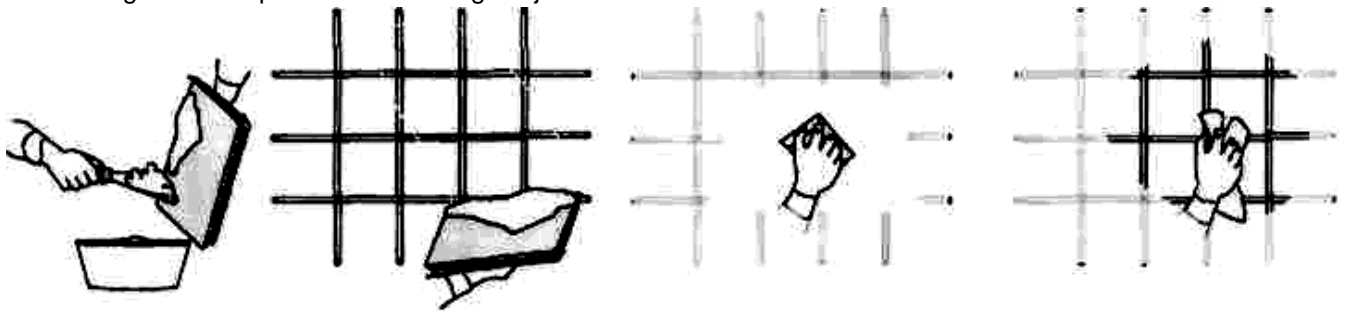


4.2.14 Before grouting with colored grout check whether the pigmented mass removes easily from the tile surface.

4.2.15 Start the grouting after the adhesive layer curing. After 48 hours

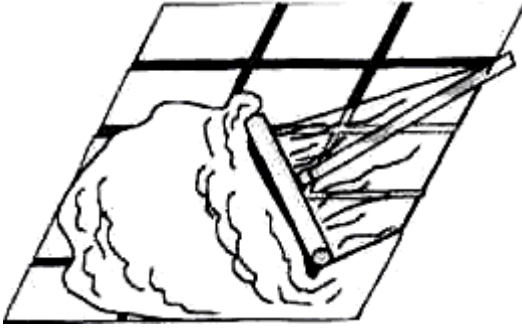
4.2.16 First, press the grout mix prepared according to 4.2.5 into the joints perpendicular, and then at an angle to the tile trowel (Figure 8) with a rubber trowel or trowel.

Figure 8 The procedure for filling tile joints with mortar



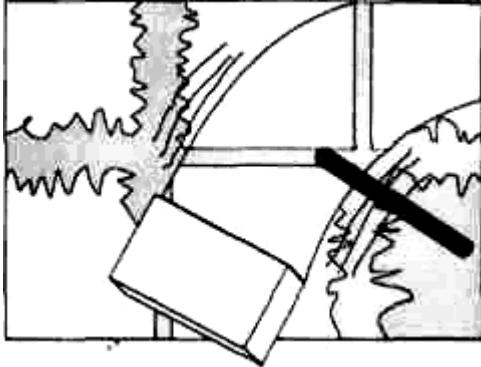
4.2.17 To fill the floor tile joints you can use rubber scrapers (Figure 9). Floor facing is grouted similarly to 4.2.16.

Figure 10 Grouting with the rubber scraper



4.2.18 Collect the excess of grout from tile surface with a damp porous sponge regularly washed. To make the joints concave, level the mortar mix in the joint by a rounded plastic, rubber or wooden stick (Figure 11).

Figure 11 Forming the grout surface in joints



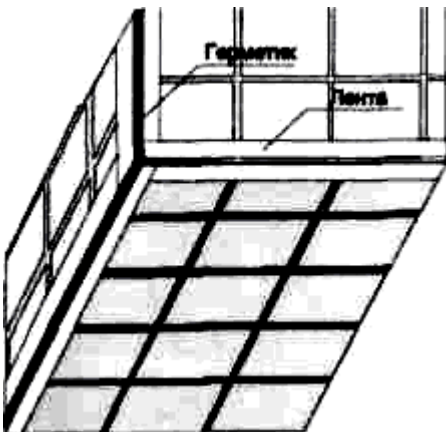
4.2.19 At high temperature and low humidity protect the grout from too rapid drying out by moisturizing lightly with a smooth soaked sponge. When moisturizing wide joints, do this very carefully so as not to damage the grout surface.

4.2.20 Clean the dry grout on the tile surface after 24 hours using a light dry cloth.

4.2.21 Expansion joints, joints between walls and the floor, between walls and joints between the facing and sanitary facilities (bathrooms, sinks, etc.) must be filled with silicone sealant MASTER.

The joint surface must be dry and free of residual adhesive; to protect the facing surface from dirtying with the sealant, it must be covered with the adhesive tape (Figure 12).

Figure 12 Filling joints with the sealant



4.2.22 Five minutes after applying the sealant wet its surface with the aqueous soap solution, which then allows you to mold the joint surface using the rounded plastic stick dipped in this solution. Then, remove the tape and the sealant remains. Fresh dirt sealant can be removed with alcohol.

## 5. ESTIMATING LABOR COSTS TO FACE 1M2

Estimation of labor costs to face 1m2 of buildings is shown in Table 9.

Table 9 Estimation of labor costs to face 1m2 of buildings.

No. No.	Base	Work Description	Unit of measure	Scope of Work	Standard time per unit of measure, man-hours	Time spent for the scope of work, man-hours
1	Unified Norms and Prices ENiRE 8-1-1	Cleaning walls from concrete and mortar sags	m <sup>2</sup>	1	1.24	1.24
2	Unified Republican Catalog of Standard Unit Prices ERKUER 21-124	Cleaning walls from dust	m <sup>2</sup>	1	0.12	0.12
3	Unified Norms and Prices ENiRE 8-1-1	Priming the wall surface with the MASTER primer	m <sup>2</sup>	1	0.015	0.015
4	Unified Norms and Prices ENiRE 11-49	Delivering MASTER dry mixes and tiles from the storage location to the lifting location	tons	4	1.2	4.8
5	Unified Norms and Prices ENiRE 11-76	Lifting MASTER dry mixes and tiles to a height of 10m (add 0.12 man-hour for each additional 5m)	m <sup>3</sup>	1	2.22	2.22
6	Unified Norms and Prices ENiRE 11-49	Preparing mortar using MASTER mixes (Table 3)	m <sup>3</sup>	1	1.58	1.58
7	Unified Republican Catalog of Standard Unit Prices ERKURER 11-37	Applying the adhesive mortar on the base and (if necessary) on tiles	m <sup>2</sup>	1	0.32	0.32
8	Unified Norms and Prices ENiRE 8-1-40	Attaching tiles to the base	m <sup>2</sup>	1	2.2	2.2
9	Unified Norms and Prices ENiRE 8-2-21	Making expansion joints in the tile	rm	10	0.19	1.9

Remarks: Norms and prices of work with dry building mixes specified in the estimation of labor costs comply to accepted standards for work using conventional materials

Facing experience showed that productivity using dry construction mixes increases by 2.2-3.0 times, and the labor costs reduce respectively.

## 6. MATERIAL AND TECHNICAL RESOURCES

6.1. The consumption of materials and products to face 1m2 is shown in Tables 10 and 11.

6.2. Machinery, equipment, tools and devices necessary for facing are shown in Table 12.

Table 10 Materials and products necessary for facing 1m2.

Materials and elements	Grades Regulations governing the requirements for materials and products	Materials and elements purpose	UOM	Material consumption per 1m2 facing
Tile	As per GOST 6141-91 (STSEV 204788)	Facing arrangement	m <sup>2</sup>	0.98
Firming primer	MASTER Universal Primer; Inner Primer Technical Specifications of Ukraine TUU V.2.7-2627701052.001-2003	To reduce base water absorption, increase the adhesive layer strength and strengthen the base	dm <sup>3</sup>	0.2 (depends on the base absorbency)
Adhesive Mix for Mounting Facing	MASTER STANDART State Standard of Ukraine	For facing walls and floors with ceramic and porcelain	kg	3.5 (depends on the base)

Materials	DSTU B V.2.7-126:2011	tiles (water absorption - 1% and above), non-deformable surfaces as well as for exterior and interior application		type and layer thickness)
Adhesive Mix for Tile Facing	MASTER NORMAL State Standard of Ukraine DSTU B V.2.7-126:2011	For facing walls and floors with ceramic tiles (water absorption - 3% and above), non-deformable surfaces as well as for exterior and interior application	kg	3.8 (depends on the base type and layer thickness)
Flexible Adhesive Mix for Mounting Facing Materials	MASTER FLEX State Standard of Ukraine DSTU B V.2.7-126:2011	For facing walls and floors with ceramic, natural and artificial stone tiles, non-deformable surfaces as well as for exterior and interior application	kg	3.5 (depends on the base type and layer thickness)
Adhesive Mix for Marble, Mosaic and Glass	MASTER KRISTAL State Standard of Ukraine DSTU B V.2.7-126:2011	For facing walls and floors with ceramic, natural and artificial stone tiles, white marble, glass, mosaic, non-deformable surfaces or surfaces subject to short-term deformations as well as for exterior and interior application	kg	3.3 (depends on the base type and layer thickness)
Highly Adhesive Mix for Mounting Facing Materials	MASTER STONEFIX State Standard of Ukraine DSTU B V.2.7-126:2011	For facing walls and floors with ceramic, porcelain natural and artificial stone tiles (pressed boards), mosaic, non-deformable surfaces or surfaces subject to short-term deformations as well as for exterior and interior application	kg	3.3 (depends on the base type and layer thickness)
Adhesive Mix for Porcelain Stoneware	MASTER PROGRES State Standard of Ukraine DSTU B V.2.7-126:2011	For facing non-deformable surfaces with low water absorption with porcelain and other tiles as well as for exterior and interior application	kg	3.5 (depends on the base type and layer thickness)
Adhesive Mix for Floor Facing	MASTER PLITOPOL State Standard of Ukraine DSTU B V.2.7-126:2011	For facing horizontal surfaces (with low water absorption) with ceramic and other materials (in particular, for under-floor heating) as well as for exterior and interior application	kg	3.8 (depends on the base type and layer thickness)
Grout	MASTER GRAFIKA State Standard of Ukraine DSTU B V.2.7-126:2011	For grouting ceramic, natural or artificial stone tiles, mosaics, glass, as well as for exterior and interior applications, with antifungal effect	kg	1
Sand plaster for leveling and repair	MASTER FRONT State Standard of Ukraine DSTU B V.2.7-126:2011	For leveling and repairing surfaces for subsequent facing as well as for exterior and interior applications	kg	4 (depends on the state of surface to be faced)
Universal Sanitary Silicone Sealant	MASTER SILICON	For filling cracks in concrete, bricks, plaster surfaces, seal joints and joints in windows and doors, bathrooms, showers,	kg per running meter	0.3

		toilets, etc., as well as for internal and external application		
Water	GOST 23732-72	Mortar mix preparation	dm <sup>3</sup>	In accordance with the instructions for the preparation of mortars (Table 6)

Table 11 Necessary auxiliary materials

Material name	Material purpose	Unit of measurement	Material consumption per 1 m <sup>2</sup>
Sealing tape	Expansion joints (when facing baths, showers, swimming pools, etc.)	rm	0.3
Adhesive tape	Protection of the surface faced from dirt	rm	0.3
Plastic spacers	Fixing the tile position, if necessary	pcs.	1
Porous sponge	Cleaning the surface faced from the excess grout	pcs.	1

Table 12 Necessary machinery, equipment, tools and devices

Machinery, equipment, tools and devices name	Brand, regulation documents for materials	Qty.	Purpose	Brief technical specifications
Mortar mixer	SO-46B	pcs.	Preparing adhesives from dry mixes	Capacity - 80m <sup>3</sup> ; drive engine power - 1.5 kW; weight - 200 kg
Low speed drill with a special attachment	IE-1023A	pcs.	Preparing adhesives from dry mixes	Drive power - 0.6 kW; weight - 3.9 kg
Rotary hammer	IE-1511 or E-4717	pcs.	Drilling holes when mounting facing materials	Drive power - 0.5 kW; two-speed; drilling diameter - 13mm
Industrial vacuum cleaner	SE60E	pcs.	Cleaning surfaces from dust, and purging holes after drilling	Intake air volume - 3600m <sup>3</sup> ; drive power - 1,2kW; canister capacity - 18dm <sup>3</sup> ; hose length - 3.5 m; weight - 11kg
High-pressure painting unit	700H	pcs.	Flushing the surface in preparation for facing	Operating pressure - 25 MPa; weight - 75 kg
Angle grinder	IE – 2110 (IE 2107)	pcs.	The surface mechanical treatment in preparation for facing	Drive power - 0.56 kW
Tile cutter	MT 116A		Cutting tiles at the workplace	-
Polyethylene buckets (5dm <sup>3</sup> , 20 dm <sup>3</sup> and 30 dm <sup>3</sup> )		10 pcs.	Preparing mortars; delivering mortars from preparation location to the workplace	-
Distempering brush	GOST 10597-87	pcs.	Applying MASTER primer	-
Trowel for tiler	GOST 9533-81	pcs.	Applying the adhesive mortar to the facing tile surface	-
Notched trowel	-	pcs.	Leveling the adhesive mortar on the surface of the base faced	Notch width - 6mm to 12mm
Outer corner spattle	GOST 10778-83	pcs.	Sealing and smoothing plastered ends and expansion joints	-
Inner corner spattle	GOST 10778-83	pcs.	Surface smoothing	-
Feather edge	GOST 25782-90	pcs.	Checking surfaces and corners horizontal and vertical	-
Metal spattles	GOST 10778-83	pcs.	Sealing cracks and luting	Blade width: 10 cm; 20

			base in preparation for facing	cm; 30 cm
Measuring tools, meter, tape measure, level, plumb bob, etc.	-	pcs.	Checking the size, horizontal, vertical, etc.	-
Wooden lath	-	pcs.	Determining wall flatness	Length: min. 2 m
L-squares	GOST 3749-74	pcs.	Determining wall flatness and esconson deviation	-
Level	GOST 9416-83	pcs.	Deviation from the horizontal	-
A set of probes	Technical Specifications TU 22-034-0221197-011-91	pcs.	Measuring the thickness of layers	-
Moisture meters	GOST 29027-91	pcs.	Base surface humidity	-

## 7 SAFETY REQUIREMENTS

7.1 Start facing only upon availability of the work plan. In some cases (for objects with small scope of facing) the work plan can be replaced by the flow chart after its approval for this object.

7.2 Before starting the work, all the workers and engineering and technical personnel must learn the work plan or flow chart.

7.3 Before starting the work:

- Determine the location for storing materials, equipment, and tools on the construction site;
- Install scaffolding; to prevent tools, materials and waste falling from the scaffolding, install fences in accordance with the requirements of GOST 12.4.059; protect ladders for workers with a handrail;
- Determine lifting equipment installation location and install it;
- Protect entrances to the building with the canopy wider than the entrance and the outreach from the building wall of not less than 2 meters;
- Provide emergency lighting of the construction site; provide drinking and process water supply to the site;
- Install safety signs in places that are dangerous in the process of people movement; equip recreational areas for workers;
- Check scaffolding for uniformly distributed load - 200 kg/m<sup>2</sup>;
- Check horizontal elements of the scaffolding by a concentrated load of 130 kg; check hand rails with the concentrated load of 70 kg;
- Check a gap between the wall and the working platform (must be no more than 150 mm);
- Equip the areas for materials preparation (sawing insulation, preparing mortar from the dry mix);
- Provide all workers with personal protective equipment; firmly secure mobile mortar mixers by installing bolted pads on running wheels;
- Connected mortar mixers to a specially equipped board having a receptacle and a fuse, designed for a maximum current of 10 A;
- Ground the mortar mixer.

7.4 Face building structures according to the requirements of GOST 12.1.003: Occupational Safety Standards; Noise; General Safety Requirements; GOST 12.1.005: Occupational Safety Standards; General Sanitary and Hygienic Requirements for Air in Working Area, GOST 12.1.019: Occupational Safety Standards Electrical Safety; General Requirements and Protection Type Nomenclature; GOST 12.1.030: Occupational Safety Standards; Electrical Safety; Protective Grounding and Neutralling; GOST 12.2.003: Occupational Safety Standards; Manufacturing Equipment; General Safety Requirements; GOST 12.2.013.0: Occupational Safety Standards; Hand Electric Devices; General Safety Requirements and Test Methods; GOST 12.2.030: Occupational Safety Standards. Hand Devices; Noise Characteristics; Standards; Methods of Control; GOST 12.2.062: Occupational Safety Standards; Manufacturing Equipment; Protective Fencing; GOST 12.3.009: Occupational Safety Standards; Handling Operations; General Safety Requirements; GOST 12.4.011: Occupational Safety Standards; Personal Protective Equipment; General Safety Requirements and Classification; GOST 12.4.026: Occupational Safety Standards; Signal Colors and Safety Signs; GOST 12.4.059: Occupational Safety Standards; Construction; Safety Fencing; General Technical Specifications; SNiP SH 4: Safety in Construction

7.5 Facing can be preformed by persons with professional training and training in safe methods and techniques of work.

7.6 Before starting facing the workers must have the introductory briefing about the methods and ways of working to ensure compliance with safety rules in accordance with the Standard Provisions on Training, Briefing and Testing Knowledge of Workers in Occupational Safety, taking into account the specifics of work at the facility.

7.7 Before starting the work, check:

- The state of lifting equipment, cables, hoses;
- Operation of the equipment and manual electric and pneumatic tools when idling;
- The presence and condition of personal protective equipment.

All the equipment and tools used must be in good condition. Use of the defective or faulty equipment or tools is prohibited. Hazardous moving parts of the equipment must be equipped with protective devices, except for the parts fencing of which is not permitted by their structure. Cases of all mechanisms and manual electrical devices



must be grounded. Cable connections must be insulated. All starters must be placed in such a way as to prevent the start-up of machines and hand-held electric tools by unauthorized persons.

Impact tools (bush hammers, hammers) must be firmly installed on oval handles with a thickened free end and wooden or metal wedges secured on them.

7.8 During facing:

- When working with power tools monitor the state of the cable insulation, the absence of sharp bends, or loops; do not pull the cable when moving from one workplace to another with power tools;
- Store materials at workplaces in quantities not exceeding the needed one;
- Compositions of facing and sealing materials as well as compositions used to clean the surface from dirt must be prepared outdoors, or indoors equipped with forced ventilation;
- Mortar mixers in which mortar mixes are prepared must be serviced by persons with special training;
- Operations in confined spaces must be performed with operating ventilation; a duty person must be at the entrance to confined spaces; a worker in a confined space must have a portable lamp (12V) and a safety belt; the free end of the belt rope must be located at the second worker;
- When degreasing surfaces with solvents:
  - Deliver solvents to workplaces in galvanized steel or aluminum containers in the amount not exceeding needed one;
  - Work only with the operating ventilation;
  - Rags used in surface treatment must be put in a metal box with a lid; remove used rags every day;
  - All work must be carried out using personal protective equipment, including:
    - Glasses according to GOST 12.4.029;
    - Overalls according to GOST 12.4.029, GOST 12.4.100;
    - Respirators according to GOST 12.4.028;
    - Gloves according to GOST 12.4.010, footwear according to GOST 12.4.137;
    - Safety belts in accordance with GOST 12.4.089 (only for those workers working on the scaffolds);
    - Overalls must be dedusted and washed in accordance with the instructions for use.

When the work is finished, disable power, clean the hand tool and put it in the tool box, clear the work area from debris; waste materials used in carrying out tiling must be collected in containers and disposed of in accordance with the requirements of Public Health Standards and Regulations 2.2.7.029: Public Sanitary Rules and Standards, Hygienic Requirements for Industrial Waste and Determining Its Class of Danger to Public Health.

7.10 Before eating and after finishing the work workers must wash their hands thoroughly with a brush and soap and warm water.