



OGDCL PAKISTAN:
OIL & GAS DEVELOPMENT
COMPANY LIMITED

KPD-TAY Compression Project (Phase-II)

ISSUED FOR TENDER

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ENAR Petrotech Services (Pvt.) Limited ,
7-B , Sector 7-A , Korangi Industrial Area ,
Karachi Pakistan

TITLE:

SPECIFICATION FOR FLOOR AND WALL FINISHES

PROJECT NO.
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OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 2 of 15

REV: 0

DATE: 6-Jan-2022

C O N T E N T S

<u>SECTION NO.</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1.0	MATERIAL	3
2.0	REINFORCED CONCRETE FLOORING	4
3.0	INSTALLATION OF TILE FLOORING	5
4.0	TERRAZZO FLOORING CAST IN SITU	7
5.0	ANTI –ACID TILES	10
6.0	BAISED /COMPUTER FLOOR	13



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 3 of 15

REV: 0

DATE: 6-Jan-2022

1.0 MATERIAL

1.1 Cement

Cement shall be ordinary Portland cement conforming to B.S 12 or P.S 232.

1.2 Sand

The grading of sand shall conform to B.S 882 Grading Zone 1 and 2 of which the gradation limits are described in Specifications for 'Plain and Reinforcement Concrete Works'.

1.3 Coarse Aggregate

All coarse aggregate shall conform to BSS No. 882 and be graded as described in Specifications for 'Plain and Reinforcement Concrete Works'.

1.4 Water

Water used for mixing concrete, curing or any other operation of the works specified herein shall be fresh, clean and free from organic or inorganic matters in solutions or in suspension. Only potable water of the approved quality shall be used for all constructional purposes as described in Specifications for 'Plain and Reinforcement Concrete Works'.

1.5 Ceramic Tiles

The ceramic tiles shall be local or imported, first grade quality, conforming to BS 1281. The size, colour and manufacturer of tile shall be approved by OGDCL / OGDCL's Representative.

1.6 Terrazzo Tiles

Terrazzo tiles shall be first grade mechanically compressed type conforming to PS-531. Tiles shall be of sizes specified on the drawings with a topping of 10mm thickness composed of 1:2 cement marble chips, the base being 1:2 cement mortar. The manufacturer, colour, quality and size of tiles shall be as approved by OGDCL / OGDCL's Representative.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 4 of 15

REV: 0

DATE: 6-Jan-2022

1.7 Cleaning Compound

The compound used for all cleaning of terrazzo shall be an approved neutral chemical cleaner free from acid and alkali or any other material that will affect the colour or otherwise damage the terrazzo and shall not affect the conductivity of terrazzo floors.

1.8 Vitrified Clay Tile

Vitrified clay tiles shall be local or imported first grade quality. The size, colour and manufacturer of tile shall be as approved by OGDCL / OGDCL's Representative.

1.9 Marble Tiles

Marble tile shall be first grade quality and of size and thickness approved by OGDCL / OGDCL's Representative. The minimum thickness of tiles to be used on floors shall be 12 mm and for steps it shall be 20 mm thickness. The marble tiles shall be applied with chemical polish after grinding operation. The locally available marble are Botichena, Fancy, Virona and Ziarat white etc.

1.10 Floor Tiles

The floor tiles shall be local or imported, conforming to BS 203. The size, colour and manufacturer of tile shall be approved by OGDCL / OGDCL's Representative.

1.11 Metallic floor Hardener / Topping

The metallic floor hardener / topping shall be the product of reputable manufacturer and shall conform to the following ASTM standards.

- ASTM C 109
- ASTM C 78
- ASTM C 779

The product and manufacturer for floor hardener shall be approved by OGDCL / OGDCL's Representative. The placement and application of floor hardener / topping shall be in accordance with manufacturer's instructions.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 5 of 15

REV: 0

DATE: 6-Jan-2022

2.0 REINFORCED CONCRETE FLOORING

The materials for R.C.C. flooring shall be same as already specified in Specifications for 'Plain and Reinforcement Concrete Works'.

2.1 Composition of Concrete

Concrete shall be composed of Portland Cement, sand, coarse, aggregate and water, all well mixed and brought to the proper consistency. The Contractor shall mix the ingredients as indicated on the drawings. The proportions of the various ingredients shall be determined from time to time during the progress of the work and tests shall be made of samples of the aggregates and the resulting concrete. The mix proportions and appropriate water-cement ratio will be determined on the basis of the production of concrete having required workability, density, impermeability, durability and required strength.

2.2 Construction

The base course of the floor shall comprise of stone soling of the size shown on the drawing. The base course shall be thoroughly compacted by suitable compactor/ power rammers to the total consolidated thickness as shown on the drawings. The interstices shall be filled with smaller size crushed stone. The base course shall be blinded with sand and the whole surface watered. Over the well compacted base course, a layer of concrete of the required grade and thickness shall be laid, in panels of the sizes as indicated on the drawing.

After the C.C. bed has been cured, it shall be roughened and well watered before floor finishing is laid. The floor finish shall comprise of cement concrete of required grade using nominal reinforcement and shall be laid in panels to the required thickness as shown on the drawing. The concrete after laying will be thoroughly rammed and mortar worked upto the top and smoothed with a steel trowel. The edge of each section into which the floor is divided should be defined by wooden screeds of the approved width and of a depth equal to the depth of the floor concrete.

Freshly placed concrete floor and completed floor portions as finished shall be protected to prevent loss of water by covering with damp hessian or damp sand or other approved material, and shall be kept constantly damp for a period of four days or longer after concreting. The concrete shall be allowed to dry out slowly over a period of three days after wet curing is completed.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006
PAGE: 6 of 15
REV: 0
DATE: 6-Jan-2022

The expansion joints shall be filled in with hot bitumen, of the approved grade, as shown on the drawings.

3.0 INSTALLATION OF TILE FLOORING

The Contractor should note that all tiles before installation should be sorted out in a proper way, no under/over sized or damaged tile should be used.

When setting out the tiles, care shall be taken to establish the correct elevation for the floor. A gauge rod shall be used, indicating the overall measurement of a given number of tiles with specified joint width to reduce cutting.

After the floor has been machine finished, it should be covered with white, nonstaining sand or rags to protect it while other work is being done. After removal, the floor shall be thoroughly scrubbed.

3.1 General

The base shall be prepared by laying cement concrete of specified grade and of thickness as shown on the drawings.

As large an area of setting bed shall be spread at one time as can be covered with tiles before the mortar has set. Surplus mortar shall be removed. The thickness of setting bed in any space shall not be less than 12.5 mm or as shown on the drawings.

Floor and wall surfaces to receive the tiles shall be thoroughly cleaned of all dirt, dust, oil and other objectionable matters. Tiles shall be laid out from the centre line of each space in an outward direction and the pattern should be made symmetrical with a minimum number of cut tiles.

Joints between the tiles shall be of uniform width. Tiles shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Tiles shall be laid to the straight edges.

3.2 Terrazzo Tiles / Marble Tiles

The terrazzo tiles will be laid to the required lines, levels and grades over a setting bed of cement sand mortar comprising of 1 part of cement and 4 parts of sand by volume. The thickness of cement concrete shall be as shown on the drawing.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006
PAGE: 7 of 15
REV: 0
DATE: 6-Jan-2022

After seven days, the terrazzo tile floors shall be machine grounds to a true even surface using various grades of abrasive stones. After the first grinding the floor shall be grouted with the same colour composition as used for its manufacture. The grout shall be of the consistency of thick cream and shall be brushed over the floor to fill in the joints and after 72 hours the grouting coat shall be removed by grinding till a smooth and even surface is obtained. Areas and portion of the floor inaccessible for the grinding machine shall be ground and rubbed by hand. The final gloss shall be given by polishing the surface to the satisfaction of the OGDCL / OGDCL's Representative.

3.3 Glazed Ceramic Tiles / Floor Tiles

The glazed ceramic tiles shall be laid to the required lines, levels and grades over a setting bed of cement sand mortar comprising of one part of cement and 4 parts of sand by volume and the joints filled with neat white or grey cement including vertical and horizontal covers. The floor tile shall be kept wet for at least 72 hours and no traffic should be allowed on the tiles during curing period.

3.4 Cement Concrete/Vitrified Tiles

The cement concrete and vitrified clay tile shall be laid to the required, lines, levels and grades over a setting bed of cement sand mortar comprising of 1 part of cement and 4 parts of sand by volume.

3.5 Brick Tile Facing

The brick tile facing, where specified, shall be laid to the required, lines, levels and grades by means of cement sand mortar comprising of 1 part of cement and 4 parts of sand by volume.

4.0 TERRAZZO FLOORING CAST IN SITU

4.1 Mix

The terrazzo mixes shall be composed by weight as follows:

Plain terrazzo for all floors and bases indicated as terrazzo and not otherwise specified, shall be composed of one part cement, white or grey, and 2 parts of marble chips of the sizes and colours hereinafter specified.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 8 of 15

REV: 0

DATE: 6-Jan-2022

4.2 Preparation for Terrazzo

The grade and thickness of concrete as shown on the drawings shall be laid as under-bed to receive terrazzo. The surface of the bed shall be roughened for bounding with the terrazzo finish. If the surface is too smooth it shall be roughened with a toothed chisel and, prior to laying the terrazzo the bed shall be cleaned of all dirt, oil grease and extra loose material.

4.3 Division Strips

Terrazzo floors and bases shall be divided by glass or brass strips. The division strips between fieldwork and borders shall have exposed tops in full width of the strips. The division strips shall be set immediately after the spreading of the under-bed, the strips being partially embedded therein, securely anchored to the sub-floor and grouted solid.

All division strips shall be set, straight to lines and to the proper level to ensure that the tops of the strips will show uniformly after grinding and smoothening operations are completed and joints and intersections shall be fitted tight. Strips shall be braced to prevent bulging during the placing of terrazzo.

Unless otherwise shown on the drawings, the divisions in fieldwork of large areas shall not exceed 1m × 1m and in small areas shall not exceed 600mm × 600mm. Edging strips shall be placed at door ways between terrazzo and types of flooring and along the edges of all terrazzo bases or borders and adjoining other types of floor finishes or floor covering.

The edging strips at doorways shall be placed in line with the step face of doors. All edging strips shall be anchored and grouted solid in the under-bed or to the concrete sub- floor and braced to prevent bulging as specified for division strips.

4.4 Laying Terrazzo

The sub-surface shall be swept clean, thoroughly moistened, but not saturated, and slushed with a coating of neat cement grout. The under-bed consisting of class 'C' cement concrete screed shall be spread and brought to a level not less than 25mm below the finished floor level. The dividing strips shall be installed in the green under-bed. The terrazzo mix shall be spread, tamped and rolled into a compact mass not less than 25mm thick. After rolling additional aggregate mix shall be sprinkled over the surface to fill up all depressions, to take up excess moisture and to permit the terrazzo to be trowelled to a level, dense and even surface, slightly above the finish line of floor.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006
PAGE: 9 of 15
REV: 0
DATE: 6-Jan-2022

This level shall allow for the surface grinding necessary to expose the specified area of aggregate, and to produce smooth, level floors free of waves and depressions.

4.5 Seasoning

The completed terrazzo shall be allowed to season for 6 days during which time it shall be kept moist and free of traffic. The curing shall be accompanied by (1) covering with approximately 25 mm thickness of sand; or (2) covering with hessian cloth, or (3) sprinkling with water at every 10 hour interval.

4.6 Surface

Following the curing period, the terrazzo shall be machine ground to a true, even surface using a No. 24 grit followed by a No. 80 grit or finer abrasive stone. After the first grinding, the floors shall be thoroughly grouted with the same cement and colour composition as specified for the matrix of the terrazzo mix. The grout shall be of the consistency of thick cream, and shall be brushed over the floor to eliminate all pits and thoroughly fill the surface for final grinding.

4.7 Finishing

Not less than 72 hours after application, the grouting coat shall be removed by grinding. In the later stages of grinding, the grit stones or other abrasive used in the grinding machine shall be of a grain or fineness that will give the surface smooth finish. Small areas, inaccessible portions and corners, which cannot be reached by the grinding machine shall be ground and rubbed Carborundum stone.

4.8 Protection

The walls and all surfaces of the finished work of other trades shall be properly protected from damage and spoiling during the process of grinding and washing of the terrazzo. After the finish grinding has been completed and the surface treatment applied, the terrazzo work shall be covered and protected until completion of the work of all other trades.

4.9 Cleaning and Coating

After the work of all other trades has been completed and the protective covering removed, all terrazzo work shall be washed with cleaning compound, mixed with warm water and using a fine abrasive where necessary to remove any stains or cement

smears. The terrazzo shall be allowed to dry thoroughly and shall be given a sealing application of preservative material. The sealing material shall be applied in accordance with the manufacturer's directions, leaving all terrazzo work in clean condition as approved by OGDCL / OGDCL's Representative.

4.10 **Dado/Skirting**

The ingredients of dado/skirting shall be one part of cement and two parts of marble chips varying from Nos. zero to 2. Skirting shall be laid over a base of plaster of specified thickness. The thickness of dado/skirting layer shall be as specified. The surface shall be grinded and polished to the satisfaction of the OGDCL / OGDCL's Representative.

5.0 **ANTI-ACID TILES**

- 5.1 Anti-acid floor and wall tiles shall be of approved manufacturer.
- 5.2 Sample shall be submitted for approval along with the laboratory test report proving anti-acid resistance tiles.
- 5.3 The anti-acid tiles shall be unglazed of 120 × 245mm size, having minimum 12mm thickness.
- 5.4 The dimension tolerance will be 1% in length, .5% in width and less than ±1 mm in thickness.
- 5.5 The physical properties of anti-acid tiles are as follows:

Physical Properties

- | | |
|----------------------------|--------------------------------------|
| – Water Absorption | < 4% |
| – Strength | More than 300 Kg/Cm ² |
| – Resistance to Absorption | 7000 Cycles |
| – Thermal Shock Resistance | 10 shocks of Hot 110°C and cold 15°C |
| – Chemical Resistance | Resistance to acids and alkalis |

5.6 **Anti-acid Mortar for Tiles**

- a) Material for Mortar shall be prowded acrylic or dry- bond.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 11 of 15

REV: 0

DATE: 6-Jan-2022

<u>Properties</u>	<u>1-Day Cure</u>	<u>28-Day Cure</u>
– Flexural Strength (Psi)	1350	1585
– Tensile Strength (Psi)	645	–
– Compressive Strength (Psi)	5450	5715
– Impact Strength (in/lbs)	12	16
– Bond Strength (Psi)	–	> 1,000

- b) Material for coating shall be probond epoxy 811.

Properties

– Pot Life (Minutes)	
at 32 °F	35
at 50 °F	36
at 73 °F	38
– Contact Time (Hr.)	2
– Viscosity (Poise)	8
– Bond Strength (Psi)	3000
– Absorption	1.00 (Max.)

5.7 Anti-acid Paint

a) **Effective for 98% Concentration**

Material Description	High Build Epoxy Solvent Free SF-10
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Specification

Chemical Resistance Concentrated acids alkalis, fuel & diesel oil

– Adhesion	Concrete & steel surfaces
– Type	Two packs
– Mixing Ratio	Component A two parts by volume and Component B one part by volume
– Viscosity	1800 - 2000 Cp at 25°C



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 12 of 15

REV: 0

DATE: 6-Jan-2022

- Shelf Life 6 Months
- Pot Life 1.5 - 2 hours at 25°C

b) **Effective for 35-40% Concentration**

Two materials are available.

- Epoxy Coaltar Paint - EP-TAR-10
- High Build Epoxy Paint Finishing - EP-F-10 with primer EP-R-10.

Specification

- Chemical Resistance Acids, Alkalis, Crude, Fuel & Diesel Oils.
- Type Two packs
- Adhesion Concrete & steel surfaces
- Mixing Ratio Component A 2 parts by volume & Component B 1 part by volume
- Viscosity of Mixed Comp. 3.5 ± 0.5 poise
- Shelf Life 6 Months
- Pot Life 3 - 4 hours

5.8 **Laying Procedure**

- The tiles shall be true to shape, flat and free from flaws, cracks and crazing and keyed on the reverse side.
- The base for laying tiles should be free from dust, grease, hard surface and in addition, be level and true both horizontally and vertically.
- Bedding mortar shall be cement and sand and all in accordance with the materials stated in concrete work.
- Any admixture to the mortar must be approved before use.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006
PAGE: 13 of 15
REV: 0
DATE: 6-Jan-2022

- Cement and sand mortar bed (1:3 Mix) should have no cavities and shall be minimum 10mm thickness or as shown on drawing. The plastered surface shall be roughened by means of steel brush before initial setting of mortar bed.
- Use 'Prowled Acrylic' or equivalent in preparing mortar for perfect bond strength. Mixing ratio will be as per manufacturer specification.
- Tiles shall be firmly tamped into mortar to form a level surface.
- Apply neat gray or coloured cement on the back of the tile.
- Before laying tap four corner and centre so that no air trap is left, and the tile levels with the surface of the adjacent tiles.
- The tiles should be placed with 3.5mm space between the joints.
- Grout shall be done with white or coloured cement or anti-acid cement.
- No need of soaking or wetting the tile before use.
- Allow one-hour time for initial setting before cleaning the surface of the tile, which must be cleaned by sweeping with clean cloth.
- Remove traces of cement remain on the surface, fill the joint with cement and clean it with wet rubber foam.
- Final setting time will be minimum 24 hours.
- Continue curing and leave the surface wet for one day in the shaded area and two days in open area.

6.0 RAISED /COMPUTER FLOOR

6.1 Scope

The work under this section of the specifications consists of furnishing all plant, labor, equipment, appliances, materials and in performing all operations in connection with installation of raised / computer floor including supporting system complete in strict accordance with this section of the specification and the applicable drawings and subject to the terms and conditions of the Contract.



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 14 of 15

REV: 0

DATE: 6-Jan-2022

6.2 **General**

Raised / Computer Floor shall be installed wherever indicated on drawings or specified through skilled technicians experienced in this type of work. Installation shall not commence in any room or space before approval of shop drawings by the OGDCL / OGDCL's Representative.

Shop drawing shall be submitted showing reflected floor plan locations of built in products and access facilities, dimensions, layout arrangements, locations framing connections, pattern and panel joints sectional details. The shop drawing shall be got approved by the Contractor from the OGDCL / OGDCL's Representative in advance of undertaking this item of work.

Samples shall be submitted of raised / computer floor panels system and accessories for approval of the OGDCL / OGDCL's Representative, color will be selected from manufacturer's standard colors.

Catalogue/data of standard products and printed installation of the floor manufacturers shall be submitted for approval of the OGDCL / OGDCL's Representative before commencing of work.

- 6.3 The raised floor system to be installed on locations as indicated on drawing by providing a 450 mm raised anti-static platform facilitating the Instrumentation/ Electrical distribution mains/cable networks to be hidden underneath. The floor should be adjustable to provide required openings for the equipment to be installed by others at a later date.
- 6.4 The Contractor will submit the name of the manufacture along with the samples for approval prior to manufacturing. He shall also arrange visit of the OGDCL / OGDCL's Representative to the manufacturer's workshop to assure the quality of product and capability of the manufacture in respect of the following components.
1. Modular Floor Panel
 2. The Supporting System
 3. Anti Static Device
 4. Lifting Device



OGDC PAKISTAN
KPT-TAY COMPRESSION PROJECT
SPECIFICATION FOR FLOOR AND WALL FINISHES

DOC NO: 0258-CA-7006

PAGE: 15 of 15

REV: 0

DATE: 6-Jan-2022

– 1. **The Modular Floor Panel**

These are to be 600 mm x 600 mm or 2 ft x 2 ft. independent interchangeable, high pressure laminates and rest either directly over pedestal heads or on stringers supported over pedestals. The panels to be made up of high density particle boards 25 mm thick, pressure bonded with a galvanized steel tray, sealed with a thermo-vinyl/asbestos vinyl anti static covering glued to the top and PVC strip lining along the four sides of the panels. The floor panels to rest on anti-vibrant gasket placed over the stringers/pedestal heads. The floor panels to be available in various color choices

2. **The Supporting System**

These are to be Aluminum or galvanized steel pedestal heads resting over screw jacks/pipes with check-nut system for adjusting the floor level to plus minus 20 mm. The screw-jacks/pipes to be supported over a pedestal base, which can either be glued or fixed through bolts to be concrete sub-floor.

3. **Anti-Static Device**

The Raised Floor System to be properly connected to the earthing system (provided by others) and protected against static electricity.

4. **Lifting Devices**

To be provided for each panels or fraction thereof to lift the modular floor panels through vacuum action.