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Specification for Block Masonry

REVISION DETAILS						
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1.0 GENERAL

1.1 Introduction

OIL & GAS Development Company Ltd. (OGDCL) is operating NASHPA Oil & Gas fields in Khyber Pakhtunkhwa of Islamic Republic of Pakistan. OGDCL intends to install LPG Recovery Plant, Compressors & Allied Facilities at this field.

1.2 Scope

The work under this specification includes block works of any thickness and heights shown on the drawings. The block works shall be carried out in cement sand mortars of proportion as specified on drawings/specifications.

1.3 Definitions

Within this document the following definitions apply:

Project	NASHPA Gas Processing and LPG Recovery Plant PROC-FC-CB/NASHPA/PROJ-1247 /2015
Company/Owner	Oil & Gas Development Company Ltd.(OGDCL)
Consultant	Zishan Engineers (Pvt.) Ltd.
Contractor	Hong Kong Huihua Global Technology Limited Wholly owned Subsidiary of China OIL HBP Science and Technology Corporation Ltd
Manufacturer/Supplier/Vendor	Party(ies), which manufactures and/or supplies material, equipment and service to perform the duties as specified by CONTRACTOR in the scope of supply
Shall	Indicates a mandatory requirement
Should	Indicates a strong recommendation to comply with the requirement of this document

2.0 REFERENCES AND ABBREVIATIONS

2.1 Codes and Standards

Doc. No.	Description
ACI 530-11	Building Code Requirements for Masonry Structures
IBC 2012	International Building Code
ASCE 7-10	Minimum Design Loads for Buildings and Other Structures
ASTM C34-03	Standard Specification for Structural Clay Load-Bearing Wall Tile
ASTM C426-07	Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units

Doc. No.	Description
ASTM C1006-07	Standard Test Method for Splitting Tensile Strength of Masonry Units
ASTM C1386-07	Standard Specification for Precast Autoclaved Aerated Concrete (AAC) Wall Construction Units

2.2 Project Specifications, Procedures and drawings

Particular reference is made to the following project specifications:

Design Basis for civil and Structure works	NGP-000-SCW-15.05-0001-00
General Notes for Reinforced Concrete Works	NGP-000-SCW-15.01-0001-00
Specification for Plain and Reinforced Concrete Works	NGP-000-SCW-15.03-0001-00

2.3 Abbreviations

The following abbreviations are used in this document:

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BS	British Standards
EN	European Standard
ISO	International Organization for Standardization

3.0 MANUFACTURE

3.1 Generally the blocks used shall be of local manufacture made with concrete in approved vibrated pressure machines. The fine aggregate to be used for blocks shall be clean and sharp approved sand. It shall be chemically and structurally stable and shall comply with the Table of Grading given hereunder. The cement, coarse aggregate and water to be used for blocks shall comply with the requirements given under specification for Plain and Reinforced Concrete Works. The following Mixing Table shall be strictly adhered to in all cases. Water/Cement ratio shall be strictly governed to produce a mix of standard slump.

3.2 Mixing Table

Nominal Mix (all by volume) for Concrete Block 1 part of Cement, 3 parts Fine Aggregate and 6 parts Coarse Aggregate. Nominal mixing for Cement Sand Block shall be1 part of Cement and 6 part of Coarse Sand.

3.3 Table of Grading

a) Fine Aggregate

BS 4100 Sieve No.	Approximate Size (mm)	Percentage (by weight) Passing BS Sieve
-	10.00	100
-	5.00	90-100
7	2.36	75-100
14	1.18	55-90
25	0.60	35-59
52	0.30	8-30
100	0.15	0-10

b) Coarse Aggregate - 10mm single size aggregate

3.4 The blocks shall be hard, sound, square and clean with sharp well defined arises and shall, unless previously approved be a work size of 12" long × 8" high × 6" (max.) thick (300 × 200 × 150mm) with properly formed half blocks for bonding.

3.5 Hollow blocks, where required, shall be of similar quality and overall size to the solid blocks, and shall be of local manufacture made with concrete as described above in approved vibrating pressure machines. The design of the cavities and webs shall be submitted for approval before manufacture. The thickness of the membranes or solid portions of hollow blocks shall be not less than 15/8" (40mm) each and the combined thickness of the solid portions shall exceed one third of the total thickness in either horizontal direction.

3.6 Arises shall be sharp and true; blocks which have damaged arises are not to be used in the works and shall be discarded at the expense of the Contractor.

3.7 Immediately after moulding, the blocks shall be placed on clean, level, non-absorbent pallets. Blocks shall not be removed from the pallets until inspected and approved. Blocks shall be cured by being kept thoroughly wet by means of water sprinklers or other approved means for a period not less than three days. Blocks must not be left on earth or sand during the curing process. Blocks shall be stacked in honeycomb fashion. Solid stacking will not be permitted..

3.8 Average crushing strength of plain cement concrete block shall not be less then 8.4 N/mm^2. (Average of 12 blocks).

4.0 MORTARS

4.1 The sand to be used for mortar shall be clean and sharp. It shall be chemically and structurally stable and shall comply with the Table of Grading below.

BS 4100 Sieve No.	Approximate Size (mm)	Percentage (by weight) Passing BS Sieve
-	3.00	95-100
7	2.40	80-100
14	1.20	60-100
25	0.60	30-100

52	0.30	5-65
100	0.15	0-15

Note:

The above figures represent the limits of percentages (by weight) passing sieves of the sizes mentioned.

4.2 The cement and water to be used for mortar shall comply with the given requirements and the methods of measuring and mixing shall be the same. The following Mixing Table shall be strictly adhered to in all cases.

4.3 Mixing Table..

Nominal Mix.	**Cement Kilos**	**Sand m^3**
1:4	361	1.00

4.4 The mortar generally shall be cement and sand (1:4) mix.

4.5 All mortar shall be used before the initial set has begun. Mortar shall not be remixed after the initial set has taken place.

5.0 CONSTRUCTION

5.1 All Block Work shall be set out and built to the dimensions shown on the Drawings.

5.2 Walls shall be carried up regularly without leaving any part more than one meter lower than another unless the permission is first obtained. Work which is left at different levels shall be racked back. In the case of cavity walls, both thicknesses shall not be carried up more than about 400mm.

5.3 The courses of Block Work shall be properly levelled. The perpendicular joints shall be properly lined and quoins, jambs and other angles plumbed as the work proceeds.

5.4 All walls shall be thoroughly bonded in accordance with the best constructional practice and as directed. Broken blocks shall not be used except where required for bond.

5.5 All concrete blocks shall be soaked with water before being used and the tops of walls left off shall be wetted before work is recommended. The faces of walls shall be kept clean and free from mortar droppings and splashes.

5.6 All blocks shall be properly spread with mortar before being laid and all joints shall be thoroughly flushed up solid through the full thickness of the wall at each course as the work proceeds.

5.7 For block walls the gauge shall be ten courses.

5.8 Walls to be left un-plastered shall have a fair face consisting of selected blocks pointed with a neat weathered or flush joint as the work proceeds using the same mortar mix as for the jointing.

5.9 Walls to be plastered shall have the horizontal joints raked out to a depth of 15mm to form a key.

5.10 Block Work shall be bonded to concrete columns and the like with 200 × 200 × 60 × 6mm non-ferrous metal ties cast in concrete and subsequently bent down ragged and built into every course of Block Work. Gunning ties to concrete will not be permitted.

5.11 Cavity walls shall be built to the dimensions shown on the Drawings and the two thicknesses shall be bonded together with wall ties spaced one meter apart horizontally and approximately 400mm apart vertically and staggered. Extra ties shall be provided at reveals, quoins and openings..

5.12 The ties shall be of the butterfly twist type of NO.10 SWG mild steel wire zinc coated and similar to those described in BS 1243. The length of the ties shall be approximately 80mm less than the total thickness of the screeds or other means and shall be left clean at completion..

5.13 Allowance shall be made for leaving, temporarily, open courses immediately under all structural members built into the walls. These open courses shall be left in suitable positions to permit the structural members to take up their full deflection. The open courses shall be made good and pointed up after the structural members have been fully loaded and before the completion of the Works.

6.0 ENVICRETE BLOCKS

ENVICRETE blocks to be manufactured as per suppliers instructions. Mortar, laying, curing shall be as per article 4.0 and 5.0 of this specification.