Manufahi Toilets – Quantities of concrete blocks and cement required per toilet.

Number of blocks required:

Standard block size = 400 x 200 x 100

Standard mortar joint = 10mm (+/-3mm)

Pit construction:

Make pit from 14 blocks per course, hence inside circumference = (400 + 10) x 15 = 6150

Hence internal diameter = 6150/3.146 = 1955mm

And outside diameter = 1955 + 2(100) = 2155mm

Size of slab around pit = 2400 x 2400.

Depth of pit = 2000 below ground level. Finished height is 100mm above ground level, so total height of blocks is 2100 = 10 blocks x 210.

So number of blocks required = 15 x 10 = 150 per pit.

Toilet Block Construction:

Main walls = 30 blocks

Height 2100 = 10 blocks high so total 30 x 10 = 300 blocks

Water tanks 6 x 3 = 18 blocks

Shelf = 2 block

Total = 320 blocks.

Total:

Pit:	150
Building:	300
Total	450

Order 500 blocks per toilet to provide allowance

Volume of concrete = 500 x (.4 x .2 x .1) = 4m3
Weight of blocks: 4 x 2.4 = 9.6 tonnes.

Volume of concrete slab Estimate

Pit base slab

Assume pit is dug 3m diameter

Area of slab = 3 x 3 x 3.146/4 = 7 m2. X 0.1 = 0.7 m3.

Allow 1 m3 concrete for thickening under wall

Pit top slab

Area 2.4 x 2.4 = 5.76m2

Less hole Area = 2.155 x 2.155 x 3.146/4 = 3.65 m2

Slab area = 5.76 – 3.65 = 2.11m2

Thickness = 100mm so Volume concrete = 2.11 x 0.1 = 0.211 m3. Allow 0.3m3

Building Slab

3.5 x 2.1 x 0.1 = 0.735 – allow 1 m3 to allow for thickening under walls.

Totals:

Pit base =	1 m3
Pit lid surround =	0.3m3
Building =	1.0m3

Total = 2.3m3/per toilet

Allow 2.5 m3/toilet

Mix 1:2:4 cement:sand:aggregate

Hence need 294 x 2.5 = 735 kg cement. (from on-line calculator)

Mix = Mortar; 1:4 cement:sand

For pit, number of blocks = 150. Mortar joints on bottom = 150 x 0.4 x 0.01 = 0.6 m3
For vertical joints, inside = 10mm, outside = 44 mm, average = 27mm. Volume = 150 x 0.21 x 0.027 = 0.85m3

Total = 0.6 + 0.85 = 1.45 m3

Building: 300 block so mortar = 300 x (0.41 + 0.21) x 0.01 = 1.86 m3.

Total mortar = 1.45 + 1.86 = 3.31 m3. Say 4 m3.

Cement required = 4 x 390 = 1,560 kg.

So total cement = 735 + 1560 = 2295kg. (46 x 50 kg bags, **say 50 bags (2500kg)**