



BISON PRECAST

a Forterra brand

TECHNICAL INFORMATION

for Retaining Walls

DESIGN SCOPE / PHILOSOPHY

The reinforced concrete precast retaining wall unit has been designed in accordance with the latest set of Eurocodes in particular BS EN 1997-1:2004 - Eurocode 7 - Geotechnical Design with the UK National Annex and BS EN 1992-1-:2004 - Eurocode 2 - Design of concrete structures with the UK National Annex have been used.

STORAGE CAPACITY

The unit will be designed to be loaded from either side with the following conditions; retained material level with the top of the wall and with an applied surcharge of 10kN/m² or a sloping backfill with a maximum angle of 35° without an imposed surcharge. The retained material will be assumed to be granular and drained with a specific maximum moist density of 18kN/m³, for more information on specific material densities see table 1. When installed with a suitable joint sealant the wall becomes waterproof.

OVERALL STABILITY

The primary job of the unit is to retain the material behind and to do this the stem and the base have been designed to withstand the applied forces. However, to resist overturning and sliding with a factor of safety of 2 for overturning and 1.5 for sliding respectively the units require anchoring into a mass or reinforced in situ concrete base which will be designed by others to give enough resistance to the overturning and sliding forces.

The grouted anchor bolts will be post fixed into the suitable base below and secured with a washer plate on top of the unit to increase the bearing capacity onto the base slab and prevent punching shear of the bolt head through the unit. The resistance of the anchors into the base must be checked by others.

In addition to the overturning and sliding resistance of the supporting in situ base, the overall ground bearing pressure must be checked by others and considered when designing the in situ support base.

STEEL GRADES

All steel to be grade S275 UNO

All Anchor Bolts to be grade 8.8 UNO
See detailed bolt calculations

CONCRETE SPECIFICATION

The concrete shall be produced in accordance with BS8500-2.

Compressive strength class	C40/50
Maximum aggregate size	20 mm
Aggregates	Freeze thaw resisting
Chloride content class	Cl 0,40
Consistence class	S3

REINFORCEMENT NOTES

All reinforcement to be high yield with a yield strength of 500N/mm².

All reinforcement to be Type 2 deformed bars including any specified mesh.

Minimum lap length to be 40 x smallest lapped bar diameter.

Table 1- Storage material densities

Material									
	Medium dense sand	Loose sand / gravel	Grain	Woodchip	Sewage waste	Rolled Silage	Paper waste	Composted green waste	PFA
Density (kN/m ³)	18	16	8	8	11	4+72z (see note 1)	6	5	10
Note 1 – z = depth below rolled surface of grass silage or the compacted surface of bedding (in m). Silage loading is in accordance with BS 5502-22: 2003									
Note 2 – For other material bulk densities please refer to Table 7 within BS 5502-22: 2003									

EXPOSURE CONDITIONS

Due to a nominal cover of 45mm (including Δc of 5mm) and the strength of concrete used in the manufacture of the retaining wall units, they are suitable for a range of exposure conditions as defined in BS8500.

The limiting crack width will be taken as 0.3mm and the design lifespan will be at least 50 years.

HOLDING DOWN BOLTS

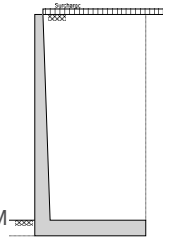
M20 (grade 8.8) Anchor with 200mm minimum embedment into the in situ foundation with 100x100x10mm washer plate with 22mm diameter hole. Hole to be grouted up using non-shrink grout with minimum strength of 40N/mm².

FOUNDATION TYPE

Assumed to be uncracked, mass / reinforced concrete base of minimum strength 25N/mm². This is to be designed by others to resist the overturning and sliding forces exerted by the retaining wall unit and to consider the allowable ground bearing pressure to the relevant site.

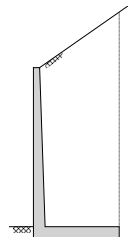
LOADING OPTION 1

- BACKFILL POSITIONED OVER BASE OF UNIT
- LEVEL BACKFILL
- 10KN/M² SURCHARGE
- DRAINAGE ASSUMED TO REAR OF WALL STEM



LOADING OPTION 2

- BACKFILL POSITIONED OVER BASE OF UNIT
- SLOPING BACKFILL - 35°
- NO SURCHARGE
- DRAINAGE ASSUMED TO REAR OF WALL STEM



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