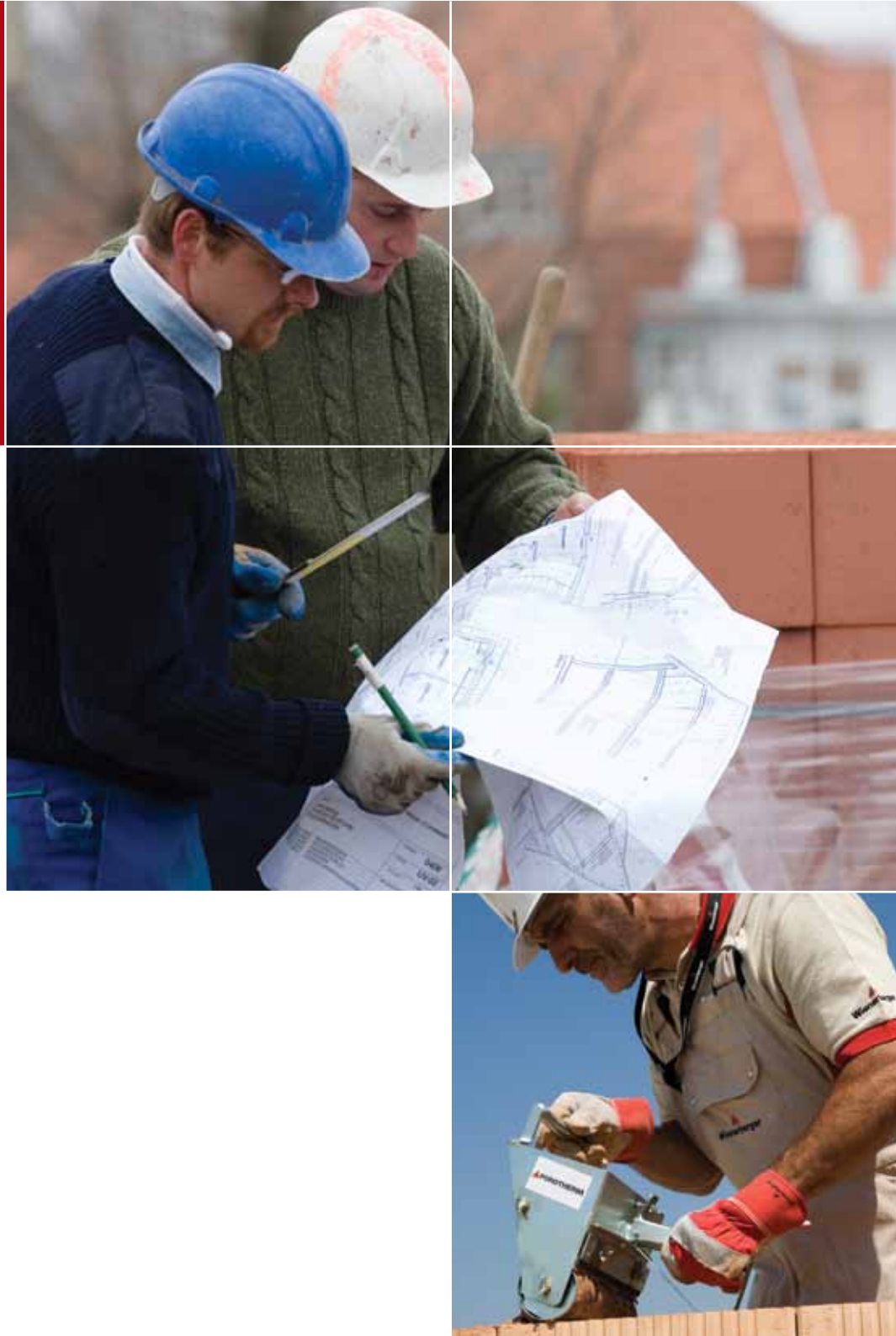
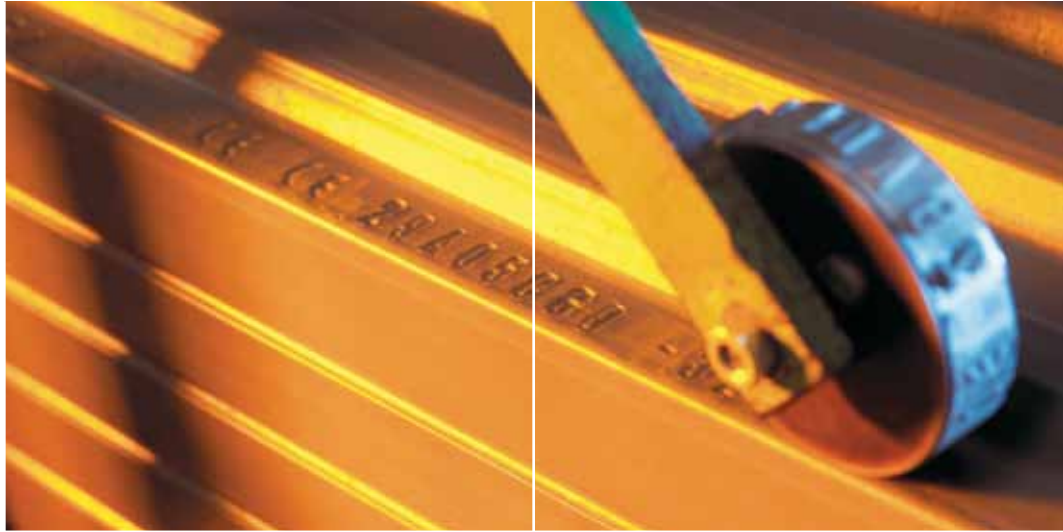


Value  
assessment.



The right solutions.



### **We Believe**

We believe that Porotherm offers both short and long term value to all involved in the building process - from bricklayer to client and everyone in between.

However, it is inevitable that with the introduction of any new construction system the question arises "How does it compare?"

- In terms of cost?
- Other construction methods?
- Productivity on site?

Here we endeavour to provide some guidance on areas of the construction process where the Porotherm System provides the user with benefits that need to be considered when endeavouring to produce a realistic comparison - for both 'Hard' and 'Soft' costs and hence value.

## Hard costs – Porothersm speed/cost comparator

This is an extract from the interactive version available online at [www.wienerberger.co.uk](http://www.wienerberger.co.uk)

PLEASE SELECT BLOCK	POROTHERM PTH 140	AIRCRETE 140mm 7N	LIGHTWEIGHT CONCRETE 140mm 7N	DENSE CONCRETE 140mm 7N Midi	CUSTOMER OPTION COSTS 140mm
<b>Block Details</b>					
Strength N/mm <sup>2</sup>	10	7	7	7	
Weight Kg	7.9	10	19.6	17.3	
Length (mm)	300	440	440	290	
Height (mm)	224	215	215	215	
Width (mm)	140	140	140	140	
Lambda Value	0.28	0.19	0.47	1.28	
No. per m <sup>2</sup>	15	10	10	15	
Delivered Cost £/m <sup>2</sup>					
Laying Rate per Day - m <sup>2</sup> /man (indicative)	33.00	11.00	9.00	7.00	
Laying Cost £/m <sup>2</sup> (indicative)					
Mortar Cost £/m <sup>2</sup>		1.38	1.38	1.50	
Power/Water allowance for mixing Bed Joint Mortar/m <sup>2</sup>	0.30				
Laying Cost £/m <sup>2</sup>					
Period to construct 1000m <sup>2</sup> - in days	10	30	37	48	

The premier question is usually “how much does it cost and how long does it take to build”? This model has been developed to allow potential users of Porothersm to gauge the base cost of construction in Porothersm to construction in other masonry blocks together with the relevant production rates. This is a live model allowing you to use not only the indicative costs and production rates entered, but also your own figures if you wish.

With wall costs roughly equal and with significantly faster build potential, the programme advantages of the virtually dry Porothersm System can be substantial.

## Typical build



Start: 11.52am End: 12.32pm  
 Two men 40 minutes to lay 130 blocks = 8m<sup>2</sup>  
 Laying Speed = 6m<sup>2</sup> per man per hour



## Background

During the Autumn of 2008 and Spring of 2009 an extensive review of cost of construction using PoroTherm was undertaken and found to be similar to that for an equivalent wall constructed from Aircrete or Medium Dense blocks. Typical laying performance figures, and costs were sourced from a number of contractors, and over a period of time, verified with others to provide basic constructed wall costs against which to compare PoroTherm. Conservative laying speeds for PoroTherm were utilised, with rates which ensured that the bricklayers maintained or exceeded their comparable daily wages even when laying for only 6 hours per day, leaving 2 hours for setting out, mixing and the like.

Laying speeds achieved have since been shown by experience to be significantly better than those initially utilised - although it is important that the logistics of loading out and safe access are given due consideration to maximise the benefits.

The conclusion of this exercise clearly showed that the cost of constructing with PoroTherm was usually equal, and often more, economical than traditional concrete block work even without taking into consideration the significance of the potential for additional benefits which the system brings - soft costs.

## Soft Costs - Hidden Benefits of the Porotherm System

With conditions varying around the country and contractors allocating costs differently within their cost build ups, the following notes are designed to provide guidance in respect of those areas where 'soft costs' should be considered to obtain a realistic overall comparison.

### Production

Porotherm has a typical construction speed which exceeds that of traditional concrete block work. Typically five times quicker - dependant upon the type of blockwork with which Porotherm is compared. Porotherm's 1mm joint not only prevents settlement during construction with the associated expression of mortar from traditional 3mm or 10mm joints, but also prevents floating and minimises instability during construction. The majority of strength is gained within 2 hours, full strength is gained in around 24 hours. However due to the nature of both the Bed Joint Mortar and the 1mm joint, initial 'set' is gained within 30 minutes, providing a remarkably rigid structure very quickly, allowing construction to proceed without the risk of 'float' or 'settlement'. Therefore, the usual restrictions on lift height do not apply.

### Benefits

- Providing adequate returns or intermediate/buttress walls are present to provide stability, then storey height in a day is a practical proposition.
- Reduced programme periods – leading to potential for reduced preliminary costs.
- Watertight shell achieved in a reduced period – leading to potential for parallel working, both inside the building and on the external facade.
- Reduced drying time means the construction is ready for following trades sooner and there is less moisture in the building.
- Negligible expressed mortar ensures very clean construction, which means no mortar contamination in the cavities and a clean workplace at the end of construction requiring minimal clearing up.
- Allows full inspection during installation of insulation to ensure all batts/sheets fully abut with no air gaps, maximising thermal efficiency.

### Weather

The 1mm joint allows Porotherm to be constructed in conditions when inclement weather would render it impractical to construct traditional blockwork. The normal rules of cold weather working still apply e.g. min. +3°C on a rising thermometer etc. With relatively minimal temporary protection, (e.g. a timber batten on the head of the wall at the end of shift) Porotherm will take up little water and due to its pore structure releases that moisture easily, drying out quickly.

### Benefits

- Reduced period to watertight shell reduces the period for which the project is susceptible to inclement weather – reducing risk of programme delays.
- The best possible weather conditions can be utilised for construction of the external leaf, bringing further benefits from improved quality and cleanliness.
- Reduced risk of wind damage due to swift initial set.





### **Bed Joint Mortar**

Small quantities mixed locally to the point of use.

#### Benefits

- No requirement for establishing silo's – whilst the silo itself is often provided free of charge there is an associated cost of both installation and removal of the base, together with water and power supplies.
- Reduced forklift requirement which also reduces pedestrian/plant interface or 'hook' time requirement on multi-storey projects, the latter in particular often an issue where concrete pours cause friction/delays with the smooth supply of mortar to bricklayers. The use of Porotherm may result in avoiding the need to hire in additional pumping or lifting plant to maintain production on all fronts.
- Reduced wastage - small amounts mixed at any one time reduces wastage at the shift end or when the weather deteriorates.
- Reduced site water usage – around 95% less than required for traditional mortar.
- Minimal Bed Joint Mortar usage, particularly when applied by roller, means a very clean work area, no mortar droppings to clear up or dispose of and no spots to clear and dispose of at the shift end.

### **Health and Safety**

#### Benefits

- The unit weight of the blocks, together with smooth corners/surfaces reduces the risks of muscular strain, cuts and abrasions which inevitably carry a hidden cost to any project in production lost.
- Reduced interface with cement minimises risk of dermatological problems for bricklayers.

### **Build Quality**

#### Benefits

- Exacting height tolerances for the blocks encourages improved accuracy in construction.
- Reduced water utilised in construction reduces moisture available for take up by first and second fix items, increasing stability and reducing potential for shrinkage.
- Stability of the Porotherm blocks leads to reduced thermal movement or cracking.

### **Client / End User**

#### Benefits

- Reduced construction programme leads to reduced interest costs and/or earlier release of capital.
- Earlier use of development and/or income stream.
- A better quality building.

## Timber Frame - Porotherm Construction Comparison

How Porotherm performs against timber frame is a frequent question and the following Comparison Table provides guidance on how the principle elements compare.

ELEMENT	TIMBER FRAME CONSTRUCTION	POROTHERM CONSTRUCTION	COMPARISON	
			TIMBER FRAME	POROTHERM
<b>Structure</b>				
Inner leaf	Timber frame panel 89mm or 140mm stud plus OSB and external membrane	Porotherm		
Wall ties	Timber frame ties	Thin joint ties	=	=
Holding down straps	As required by Structural Engineer	Not required		✓
Cavity closure around openings	Required	Required	=	=
Fire stop barriers to cavities (typically mineral wool in polythene sock)	Required at all floor and eaves levels and party walls	Only if partial fill		✓
Outer leaf	Constructed after principal structure	Constructed after principal structure	=	=
Outer leaf (If brickwork)	Typically at a premium cost as no blockwork	No premium		✓
<b>Insulation and Thermal Performance</b>				
Insulation	90mm or 140mm batts between cavity studs	Porotherm has an insulation value so less insulation required		✓
U value performance of walls	Little benefit from timber elements and OSB board with 90mm glass fibre $\lambda$ 0.033 and FR Bubble foil, brick outer u value 0.30. Bubble foil is a relatively expensive option	Benefits from performance of inner leaf with 100mm glass fibre $\lambda$ 0.033 u value < 0.27		✓
<b>Internal Finishes</b>				
Inner finish	Vapour membrane. The nuisance of ensuring intact prior to plasterboarding is probably more relevant than the actual cost	Not required		✓
Parge coat	Not required	Advisory if not wet plastered	✓	
Plasterboard	Nailed or drywall screws	Dabbed	=	=
Settlement	Allowance needed at all windows and potentially at storeys when multi-storey	No requirement		✓
Post completion shrinkage	Potential for shrinkage cracks etc.	Minimal - extremely stable material		✓
<b>Construction Considerations</b>				
Construction cost	Modern Masonry Alliance typically advise 15% more expensive than equivalent masonry construction			✓
Fire risk during construction	Specific measures required and/possibly additional insurance	None		✓
Weather	Potential for rain damage to timber	Porotherm less vulnerable and dries out quickly		✓
Scaffold	Generally erected prior to commencement	Erected in parallel to ground floor in readiness for installation of first floor	=	=
<b>Design Considerations</b>				
Flexibility for design changes	Lengthy lead in time for panel design and manufacture to accommodate changes	Incorporated with ease		✓
Intermediate floor - multi-storey	Deep floorzone, to achieve sound and fire requirements (circa 500mm overall depth)	Concrete widespan, beam and block or insitu can be used. (circa 300mm overall depth)		✓
Staircases	May require additional fire protection to timber flights in multi-storey	Concrete stairs can be utilised		✓

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