TECHNICAL NOTE #15

SANS 204: Energy Efficiency in Buildings

SANS 204 was published in 2008 as a voluntary National Standard for Energy Efficiency in Buildings. It was updated in August 2010 to fulfil the requirements of SANS 10400-XA.

SANS 204: Energy efficiency in buildings, introduces sensible and practical measures that save energy when new buildings are both designed and built.

TECHNICAL CONTRIBUTOR

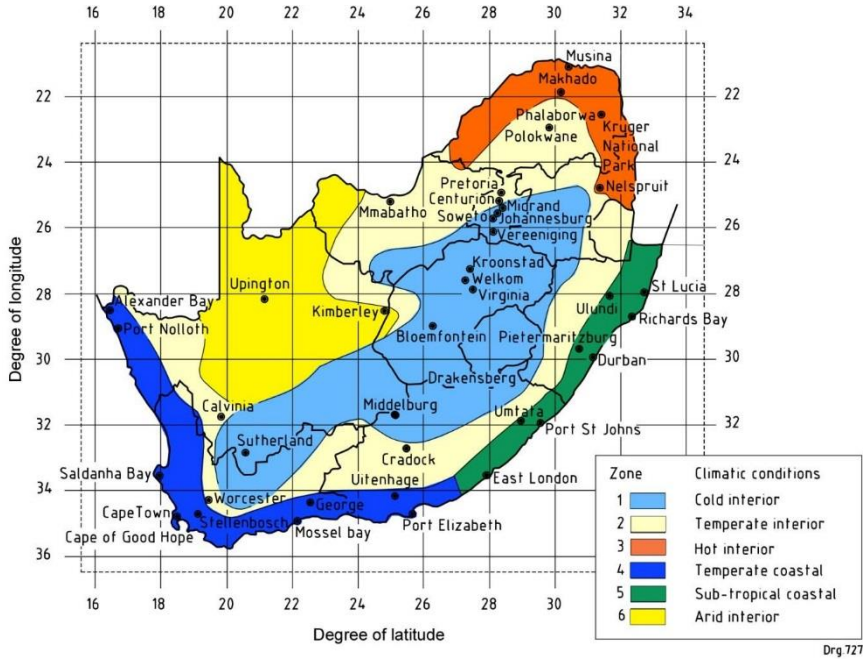
Technical Committee
Clay Brick Association of SA

SANS 204: Energy Efficiency in Buildings

Compliance for Clay Brick Masonry Walling

The South African National Standard (SANS) 10400-XA and the SANS 204 Regulations are an attempt made by government to regulate energy use and encourage energy efficiency in building.

SANS 204: Energy efficiency in buildings, introduces sensible and practical measures that save energy when new buildings are both designed and built. By eventually making the three parts of this standard mandatory, the government will slowly but surely begin to achieve savings in energy and savings in the cost of providing that energy.



SANS 204 was published as a voluntary National Standard for "Energy Efficiency in Buildings" in October 2008 and updated in August 2010 to fulfil the requirements of the National Building Regulations for the Construction Sector, i.e. SANS 10400, of which Part XA specifies the minimum deemed-to-satisfy requirements for compliance to Energy Usage in Buildings. It contains requirements that are higher than SANS 10400-XA and defines the minimum requirements that must be adhered to, to achieve a Green Building rating.

It covers Site and building orientation, Shading, Building design (Floors and External walls), Fenestration, Roof Assemblies, Roof lights, Building Sealing/Mechanical Ventilation and Air Conditioning and Services.

SANS 204 RELATING TO CLAY BRICK MASONRY

4 External Walls

4.4 Masonry walls such as, but not limited to, cavity, grouted cavity, diaphragm, collar-jointed and single leaf masonry, shall achieve the minimum CR-value given in Table 3 for the different types of occupancies in the different climatic zones (see Annexure A for Climatic Zones).

Table 3:

Minimum Thermal Capacity & Resistance (CR-Value) in Hours, for External Walling						
Occupancy Group	Climatic Zone					
	1	2	3	4	5	6
Residential E1-3,H1-5	100	80	80	100	60	90
Office & Institutional A1-4,C1-2,B1- 3,G1	80	80	100	100	80	80
Retail D1-4, F1-3, J1-3	80	80	120	80	60	100
Unclassified A5, J4	NR	NR	NR	NR	NR	NR
Note: NR = No Requirement						

Table 4:

Typical CR-Values	
Wall Type *Double-Skin Brick*	CR Product *Hours*
2 x 106mm with no air cavity	40
2 x 106mm with 50mm air cavity	60
2 x 106mm with 50mm air cavity with *R*=0,5 cavity insulation	90
2 x 106mm with 50mm air cavity with *R*=1 cavity insulation	130

Notes:

a. Table 4 provides typical values for double-skin Clay Brick masonry walls, with/without additional insulation. To establish the CR-value of prescribed walling systems, contact the relevant manufacturer/s.

b. *R*=0,5 and *R*=1,0 refers to the Thermal Resistance of the insulation only, in m2K/W. Thermal resistance that is added to external walling with high Thermal Capacity, should be placed between layers e.g. in the cavity of a masonry wall. Thermal Resistance should not be added to the internal face of a wall with high Thermal Capacity.

c. Wall systems that have low Thermal Capacity or Resistance (or both) will not meet the requirements given in Table 4.

d. Designers should consider that interstitial condensation occurs in walling systems which are not able to prevent or accommodate moisture migration. The selection of vapour barriers and appropriate construction materials, including insulation and weep-holes, is important for the thermal efficiency of walling in climate zones where damp and high relative humidity is experienced.

e. Internal walls in buildings with external walling (double brick), as above, should ideally have CR product values of at least 20 hours as would be provided by a single brick plastered wall . However, this is not a requirement for compliance.

f. See Page 1 for Climatic Zones.

4.4.3 External non-masonry walls shall:

a) Achieve the *CR*-values given in Table 4 by the addition of Capacity or Resistance (or both),

b) Have the following minimum *R*-values (except A5, D1 to D4, J1 to J4 which have no minimum *R*-value requirements) :

   i. For climatic zones 1 and 6, a total *R*-value of 2,2; and

   ii. For climatic zones 2, 3, 4 and 5, a total *R*-value of 1,9; or

c) Have R-values that comply with the requirements of ASTM C177, ASTM C518 and ASTM C1363.

NOTE: Internal walls in buildings with this type of external walling may be masonry or non-masonry.

DISCUSSION

The thermal performance of walling as indicted by the CR-value corresponds with the property of thermal diffusivity which is the product of thermal conductivity and the specific heat of any material. The thermal diffusivity takes the time for transfer of heat through a building element into consideration.

The tool in SANS 204 provides only for double-brick cavity wall constructions. However, by calculating in terms of a Rational Design, building professionals can achieve a similar CR-value result as those of Table 2.

Designers can check the CR-value of various combinations of high mass walling and thermal insulation products by making use of the online CR-value calculator available at: www.claybrick.org.

The most energy efficient walling systems can be designed and specified for South Africa's climatic conditions by making use of the CR-value tool in SANS 204.

For further information:
The Clay Brick Association of South Africa
Website: www.claybrick.org