

*

(/ / / / / /)

Cembureau

. []

. []

RILEM

[]

()

[] Cembureau

/ bar / bar

-

/

-

()

Cembureau

(K_o)

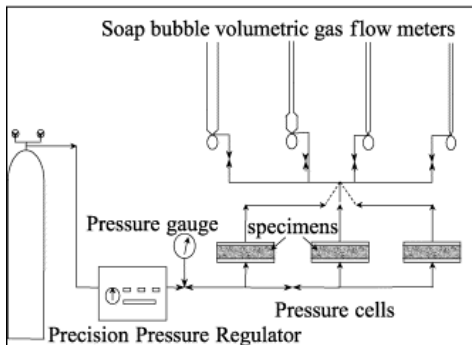
[]

m^2 m^2

-

Hagen-Poiseuille (K_o)

()



Cembureau

[]

K_o

$$K_o = \frac{2 \cdot Q \cdot p_a \cdot L \cdot \eta}{A(p^2 - p_a^2)}$$

()

Q (m^3)

K_o

L (m)

A (m^2)

$N \cdot s \cdot m^{-1}$

η (m)

p_a ($N \cdot m^{-2}$)

p ($N \cdot m^{-2}$)

($N \cdot m^{-2}$)

mm

mm

II

A

()

±

/

±

/

% /

±

B

()

()

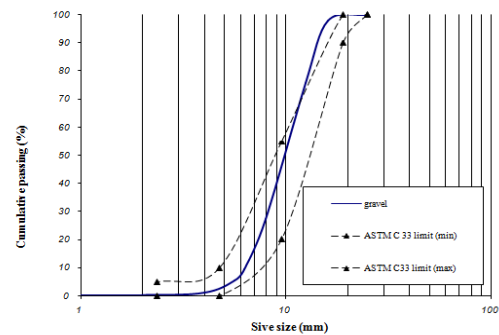
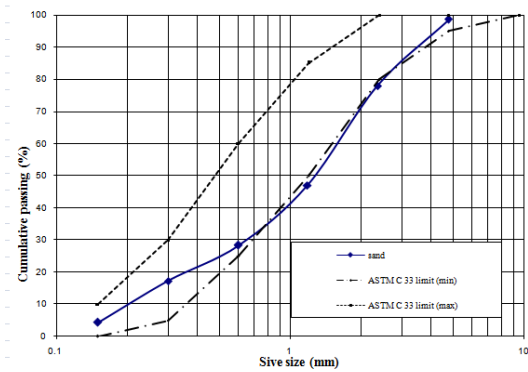
±

ASTM C33
 kg/m³ / % / /
 kg/m³ : () () ASTM C 33
 ()

(%)	(mm)	(kg/m ³)	(kg/m ³)	(kg/m ³)	(%)	
/		/				C
/		/				SF5
/		/				SF10
/		/			/	SF12.5

	II	
/	/	SiO ₂
/	/	Al ₂ O ₃
/	/	Fe ₂ O ₃
	/	CaO
/	/	MgO
/	/	SO ₃
	/	Na ₂ O
	/	K ₂ O
/	/	L.O.I
/	/	
/	/	

mm × mm × mm



mm

(cm)

L (cm²)

(K₀)

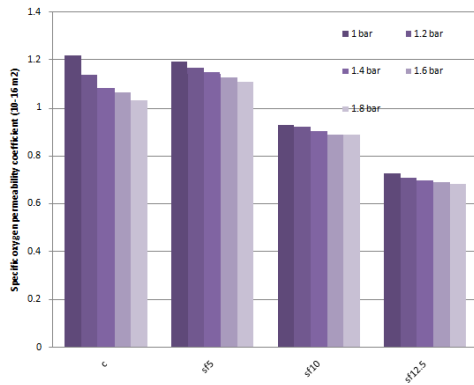
B) .

(Cembureau

()

[] Magee Alexander

bar



(AC)

[]

Klinkenberg

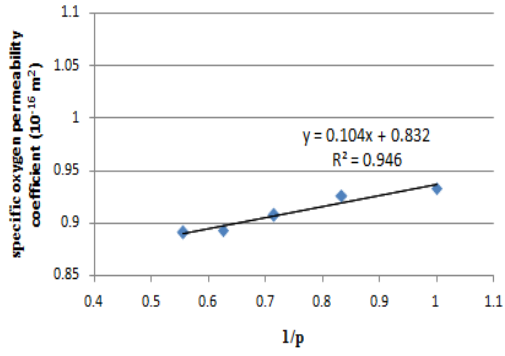
K.Ω

$$\rho = \frac{A.R}{L} \quad ()$$

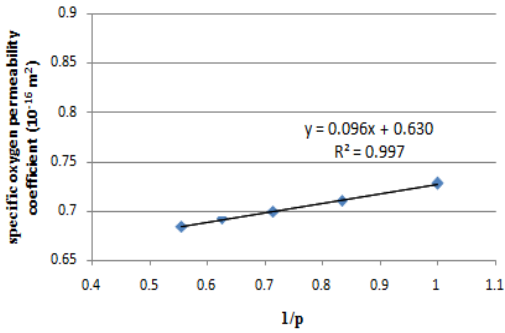
R (K.Ω.cm)

ρ

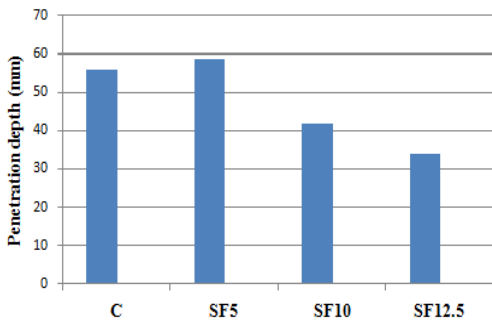
A (K.Ω)



(SF10)



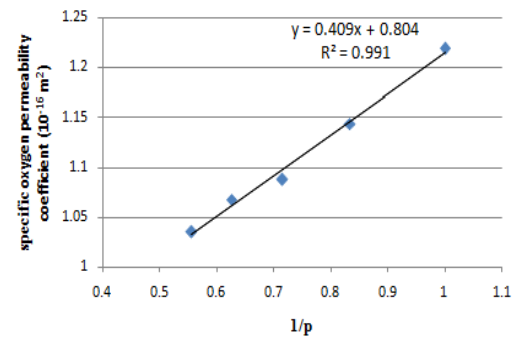
(SF12.5)



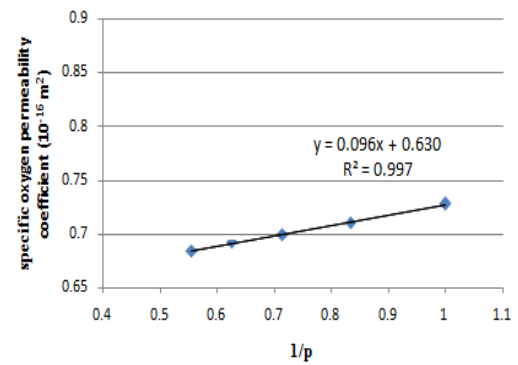
()

SF5

SF5



()



(SF5)

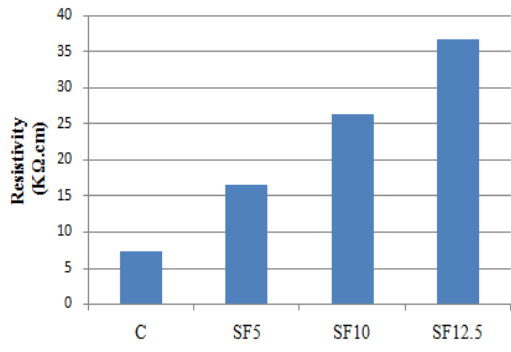
[]

K_o

() ()

(bar / / / /)

K_o



()

()

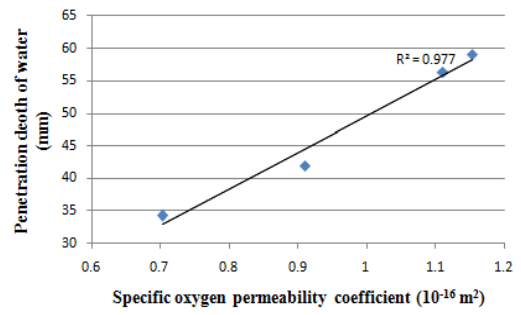
Cembureau

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Ca(OH)₂

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- 1- Mehta, P. K. and Monteiro, P. J. M. (2006). *Concrete –Microstructure, Properties and Materials*, 3rd Edition, McGraw-Hill, New York.
 - 2 - Maage, M. (2001). "The effect of silica fume on corrosion of steel reinforcement – a Review." *Proc. 7th Int. Conf. on fly Ash, silica fume, slag and natural pozzolans in concrete*, V. M. Malhotra, ed., American Concrete Institute, Madras, India, PP. 477-497.
 - 3- RILEM TC 116-PCD (1999). "Concrete Durability- An approach toward performance testing." *Materials & Structures*, Vol. 32, PP. 163 – 173.
 - 4 - Kollek, J. J. (1989). "The determination of the permeability of concrete to oxygen by the Cembureau method – a recommendation." ASCE, *Materials and structures*, Vol. 22, PP. 225-230.
 - 5- Verdier, J., Carcasses, M. and Ollivier, J. P. (2002). *Modelling of a gas flow measurement: Application to nuclear containment vessels*, Elsevier, Cement and Concrete Research, Vol. 32, No. 8, PP. 1331-1340.
 - 6 - Whiting, D. A. and Nagi, M. A. (2003). *Electrical resistivity of concrete – a literature review*, report serial No. 2457, Portland Cement Association.
 - 7 - Alexander, M. G. and Magee B. J. "Durability performance of concrete containing condensed silica fume." *Cement and Concrete Research*, Vol. 29, PP. 917-922.
 - 8 - Torrent, R. (1999). *The gas-permeability of high-performance concretes- site and laboratory test*. 2nd Int. Conf. on High-performance concrete and performance and quality of concrete structures, V. M. Malhotra, ed., American Concrete Institute, Gramado, PP. 291-308.
 - 9 - Shekarchi, M. Debicki, G. Clastres, P. and Billard, T. *Influence of silica fume on permeability of concrete to oxygen for temperatures up to 500°C*. 6th Int. CANMET/ACI International Conf. on Fly Ash, Silica Fume, Slag and Natural Pozzolans in Concrete, V. M. Malhotra, ed., American Concrete Institute, Bangkok, Thailand, PP. 975-996.
 - 10 - Neville, A. M. (1995). *Properties of concrete*. 4th. Chapter 7, Ed. Pitman Publishing INC, Massachusetts.
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