Académie de Caen **Session 2016**

Épreuve de DNL Anglais Physique-Chimie

Sujet n° 1 – Série Technologique

Durée de l'épreuve : 40 minutes

- **20min de préparation**
- **10 min de présentation et 10 min d'échange avec le jury**

Hempcrete – a sustainable building material ?

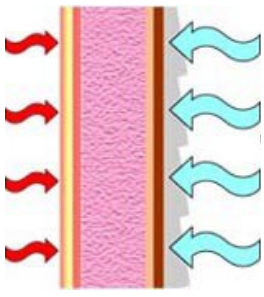
Doc.1 :

Hemp is a natural, non-toxic, renewable and low energy material which needs no pesticides and less water and fertiliser than cotton during its growth. Hempcrete replaces several layers of conventional building materials; bricks or cement, vapour barrier, insulation, and plaster board. All that is needed, inside as well as outside, is a whitewash finish.

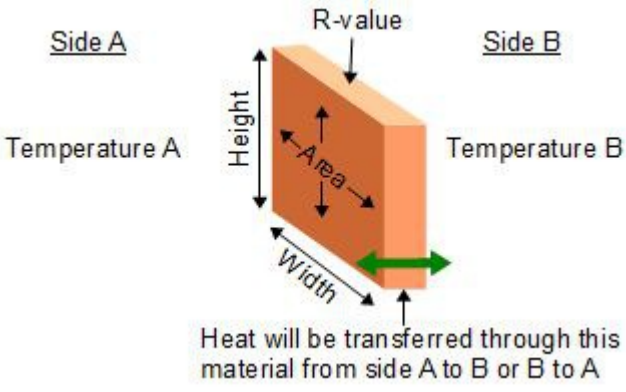
From :https://strugsus.wordpress.com/2014/12/02/hempcrete-a-sustainable-building-material/

Doc.2: heat conduction

Conduction is heat transfer by means of molecular agitation within a material without any motion of the material as a whole.



Insulated walls stop cooler outside air from penetrating and keep heat inside.



Typical R-values.

Material	Hempcrete (300mm)	Glass	Rockwool (80mm)	Concrete (300mm)
R -Value (m².K.W⁻¹)	*0.23*	*0.0075*	*2.0*	*0.15*

$$P = \frac{\Delta T}{R} \times A$$

P in watts(W)
T in Kelvin (K)
A in meter square (m²)

From: *http://www.hemp-technologies.com/*

Doc.3:

The typical compressive strength is around 1MPa, approximatively 1/20 that of residential grade concrete. Hempcrete walls must be used together with a frame of another material that supports the vertical load in building construction. This is also due to its density which is 15% of traditional concrete.

Tasks:

1. Referring to doc.1 explain what are the advantages of hempcrete.
2. Considering doc.2 disccuss the links between R-value, thickness, surface area and nature of the material.
3. Explain why in doc.3 we can see pieces of wood in the picture,
4. According to the documents given say if hempcrete should become the building material of tomorrow, develop to other materials achieving the same pupose.

Glossary:

Hemp : chanvre

Whitewash : enduit

Rockwool : laine de roche