ENVIRONMENTAL BENEFITS OF DRYWALL

Compared to brick or block wall system

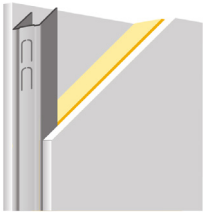
GYPSUM FOREVER

Third-party lifecycle assessment comparison, between plasterboard systems and traditional partitions systems, in BRAZIL

Placo SAINT-GOBAIN

Two wall profiles commonly used in Brazil, were assessed in this study, as described below:

THE PLACO® DRYWALL SYSTEM:

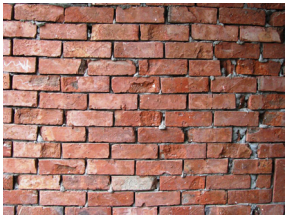


Insulated metal stud drywall

Details: Structure composed for STUD M70 and Chanels R70, the Steel thickness is 0,50 mm. Placo® Standard Plasterboard 12,5 mm in the both side of the structure Glasswool 50 mm, finish by paper tape and pre mix compound and the Acoustic tape.

Reference: 95/70/600/ST 12,5 mm + Glasswool 75 mm

THE TRADITIONAL WALL SYSTEM:



Cement plastered 140 mm large brick

Details: Ceramic brick block for internal partitionning with 14cm thickness and gypsum plaster levelling (1 cm) in both sides

Reference: Tabique gran formato

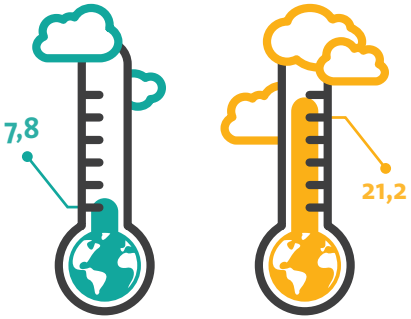
Main environmental impacts of the Placo® drywall system and the traditional brick partition wall

Environmental parameters analysed for 1m² of wall profile	Unit	Placo® Drywall System	Traditional Wall System
Global Warming Potential (GWP)	kg CO_2 equiv/FU	7.8	21.2
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ/FU	121.8	239.1
Use of net fresh water	m^3/FU	3.2 E-02	5.0 E-02
TOTAL WEIGHT	kg/FU	21.2	108.3

The environmental benefit of using drywall systems instead of brick systems, on 1m² of wall profile

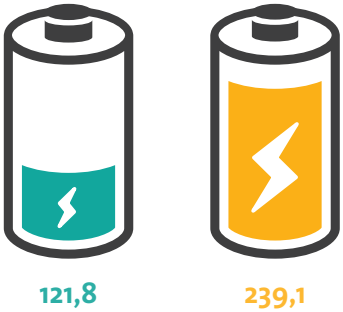
1m²

For **1 m²** of partitions walls, using drywall systems instead of traditional systems **would save**:



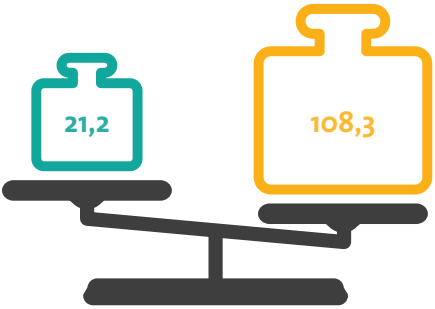
63%

reduction in global warming potential (kg CO_2 equiv/FU)



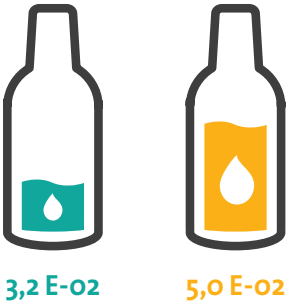
49%

reduction in primary energy use (MJ/FU)



80%

reduction in wall system weight (kg/FU)



36%

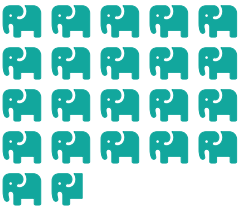
reduction in fresh water usage (m^3/FU)

The environmental benefits from using drywall systems at building level:

For an average building with **10 000 m²** of partitions walls, using drywall systems instead of traditional systems **would save**:

16 trips around the circumference of the Earth by car[1]

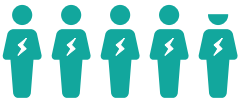
Equivalent to **637 602 km** travelled by car or **133 tonnes** of CO_2 emissions



The weight of 217 elephants[2]

Equivalent to **870 tonnes** of material to be installed and also removed at the end of life

180 m³ of net fresh water



The electricity usage of a Brazilian city of 49 000 people for 24h[3]

Equivalent to **1 227 GJ** of energy used in materials manufacture

[1] CO_2 emissions for average petrol cars is 0.2086 kgCO_2e/km (carbon trust UK 2011: https://www.carbontrust.com/media/18223/ctl153_conversion_factors.pdf). Thus, 1 tonne CO_2eq is equivalent to drive 4794 km by car. Circumference of the Earth is 40 075 Km.

[2] Average of 4 tonnes for one African elephant - http://animals.nationalgeographic.com/animals/mammals/african-elephant/

[3] Electric power consumption (kWh per capita) - http://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC/countries

**All stated figures are an approximation based on the 2016 study conducted by Renuables.*

METHODOLOGY OF THIS STUDY

PRODUCTION

This life cycle assessment (LCA) comparison was conducted by a **third-party** – **Andrew Norton** – *Renuables UK*.

STANDARDS

This study has been produced in accordance with international LCA and EPD standards, **ISO 14040 series** and **EN15804**.

SCOPE AND SYSTEM BOUNDARIES OF THE STUDY

The LCA addresses the life cycle stages **from Cradle to Gate**. I.e. raw material supply, transport to manufacturing, manufacturing and materials for installation at construction site, but did not include waste at construction site, transport to site, service life or disposal.

FUNCTIONAL UNIT (FU) USED IN THIS LCA COMPARISON*

"A representative 1m^2 section of a standard partition wall system (non-load bearing) installed with finishing plaster and not including final decoration".

DATA MODELLING

For drywall systems, data was taken from **Saint-Gobain Environmental Product Declaration** (EPD) results. For traditional systems, the databases or libraries within **SimaPro version 7.2** that include **Ecoinvent v2.2** data, have been used for all processes and materials concerning the traditional wall types and for sundry materials not covered by EPD information for the drywall materials.

References: Study conducted by Andrew Norton – Renuables UK; (www.renuables.co.uk) for Placo®. May 2016.

CASE STUDY: THE TECNISA APARTMENT COMPLEX, SAO PAOLO

The Tecnisa apartment project in *Sao Paulo* has a potential total of **17 400m²** of drywall that could be used over the three, 29 storey buildings.

By **extrapolating the quantity of drywall** to be the equivalent of the systems studied here, with a switch to the drywall system, it is calculated that the project would save around:

→ **230 tonnes of CO_2 emissions**

→ **313 m³ of net fresh water**

→ **2 140 GJ of energy used in materials manufacture**