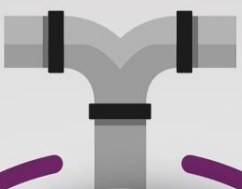


The Right Choice - The Role of **EPD** In The Selection Of Pipe Systems

Franz Huelle

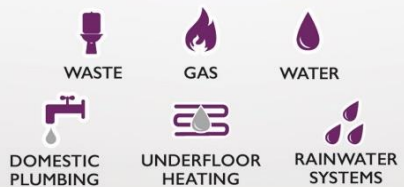
02.09.2021

THE BPF PIPES GROUP



The **BPF Pipes Group** is the leading trade association representing manufacturers and material suppliers of plastic piping systems in the United Kingdom.

UTILITIES



RECYCLABILITY
All Plastic pipe waste is either recyclable into new products or a viable source of a calorifically rich fuel.

18
AT LEAST
18 DIFFERENT APPLICATIONS
for plastic pipes

1
FIRST PVC PIPES
introduced in 1930s

BPF PIPES GROUP MEMBERS
are committed to sell and promote products that are third party approved to the appropriate standards

ABOVE GROUND
198,000KM

BELOW GROUND
90,000KM

AMOUNT OF PIPE INSTALLED ANNUALLY
288,000KM

UK MEMBER EMPLOYEES
6200

DIRECT EMPLOYEES
5500

INDIRECT EMPLOYEES
700

THE BPF PIPES GROUP
is committed to raising industry standards through best practice and guidance documents

OVER 400 STANDARDS
(BS/BS EN/BS ISO)
for thermoplastic pipes

ANNUAL TURNOVER
of members
£8.9 billion

REPRESENTING MANUFACTURERS
since 1962

TODAYS UNDERGROUND PLASTIC PIPES HAVE A LIFE EPECTANCY OF OVER 100 YEARS

Learning objectives

- LCA, EPD, what are they?
- What are Impact Categories?
- Good questions to ask in relation to an EPD
- Know where to find out more



Agenda

- 1) Why do we care
- 2) Life Cycle Assessment
- 3) Impact categories
- 4) EPD
- 5) Good Questions to ask
- 6) Further Resources



1. Why do we care?

- International protocols
- 2008 Climate Change Act U.K.
- Construction 8% of UK GHG
- LCA & EPDs essential tools
- BREEAM & Home Quality Mark rely on EPDs to BS EN 15804



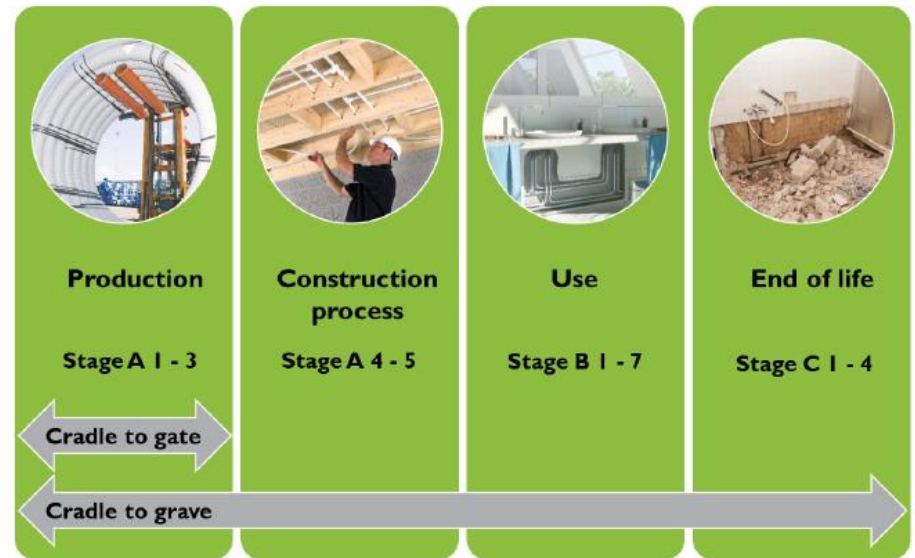
2. Life Cycle Assessment

- Most recognised method to quantify environmental impacts
- Show the environmental effects of a product over its entire life cycle



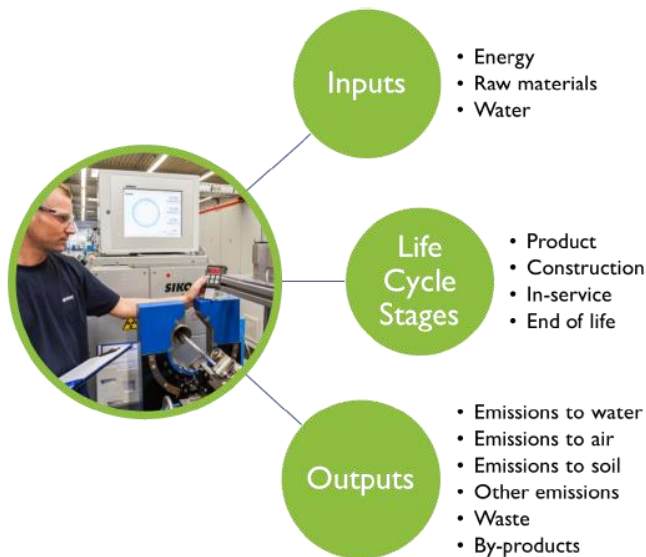
2. Life Cycle Assessment

- BS ISO 14040 / 14044
- Critical Review by independent experts
- All stages of life “Cradle to Grave”

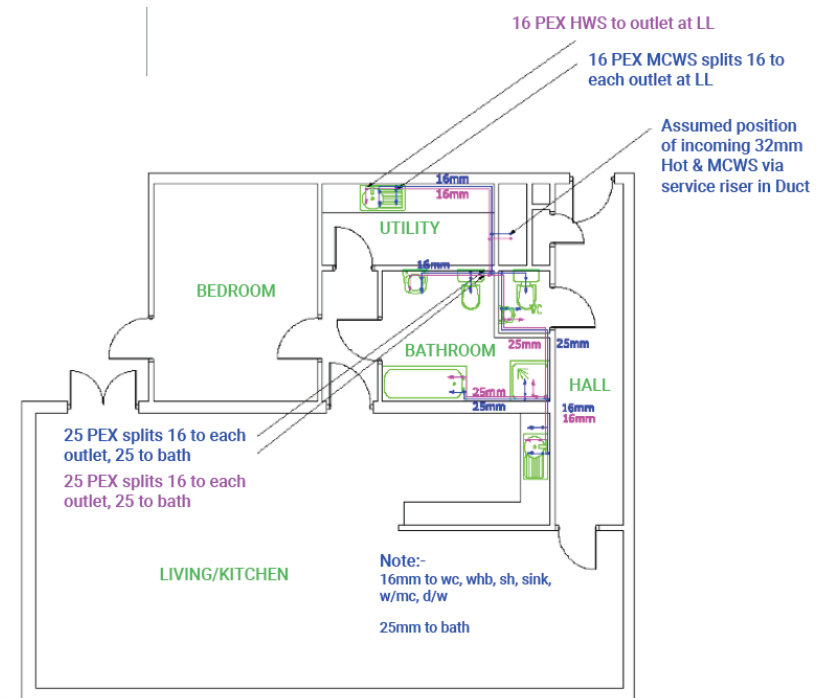


2. Life Cycle Assessment

- Inputs & Outputs at all life cycle stages



- Functional Unit at core of LCA



3. Impact / Indicator Category



Depletion of Abiotic Resources
- non fossil APDn
- fossil ADPf

Over extraction of non-living elements from an ecosystem.

- Non-renewable resources are consumed (e.g. aggregates, ores, minerals)
- unavailable for future use.



Acidification of Soil and Water AD

Reaction of acidic gases + water => 'acid rain'

- 'acid rain' causes damage to the local ecosystem



Eutrophication EP

Increases nitrates & phosphates in water

- Excessive growth of algae
- Reduced oxygen levels
- Less biodiversity
- Effect on animals & humans

3. Impact / Indicator Category



Global Warming Potential GWP (*Embodied Carbon*)

Climate change thru GHG emissions into atmosphere, e.g. CO₂

- GHGs trapping heat from the sun
- Global temperature rise causes climatic disturbance, desertification, rising sea levels and spread of disease



Ozone Depletion Potential ODP

Breakdown of ozone by ozone depleting gases, e.g. CFCs, HCFCs and halons

- Less ability of the 'ozone layer' to protect from UV light
- Increase in carcinogenic UVB light results e.g. in skin cancer, cataracts or damage to the immune system
- Damage to animals and crops



Photochemical Ozone Creation POCP

Ozone created by sunlight, nitrogen oxides and volatile organic compounds

- Ozone smog in lower atmosphere
- Crop damage, increase of asthma
- Varying effects on geography, climate
- Compounded in urbanised areas with existing pollution

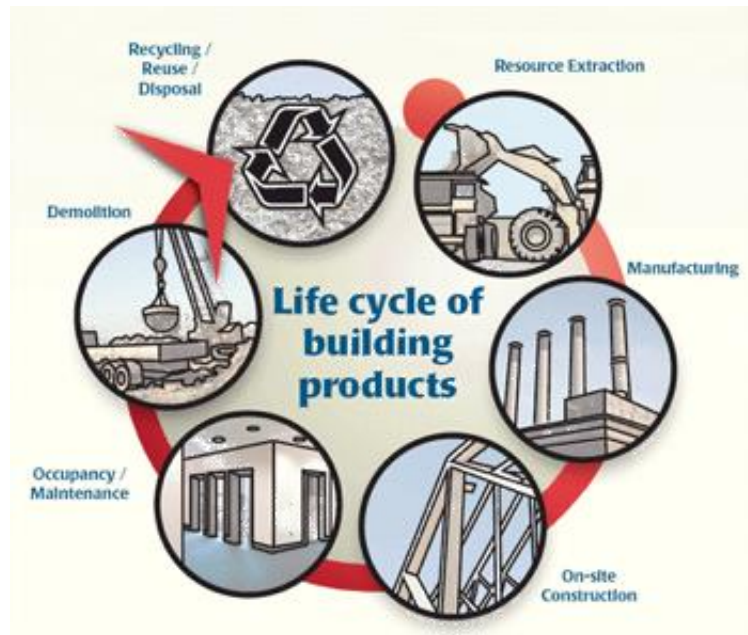
4. EPD

BS EN 15804:2012+A2:2019
Incorporating corrigendum February 2014



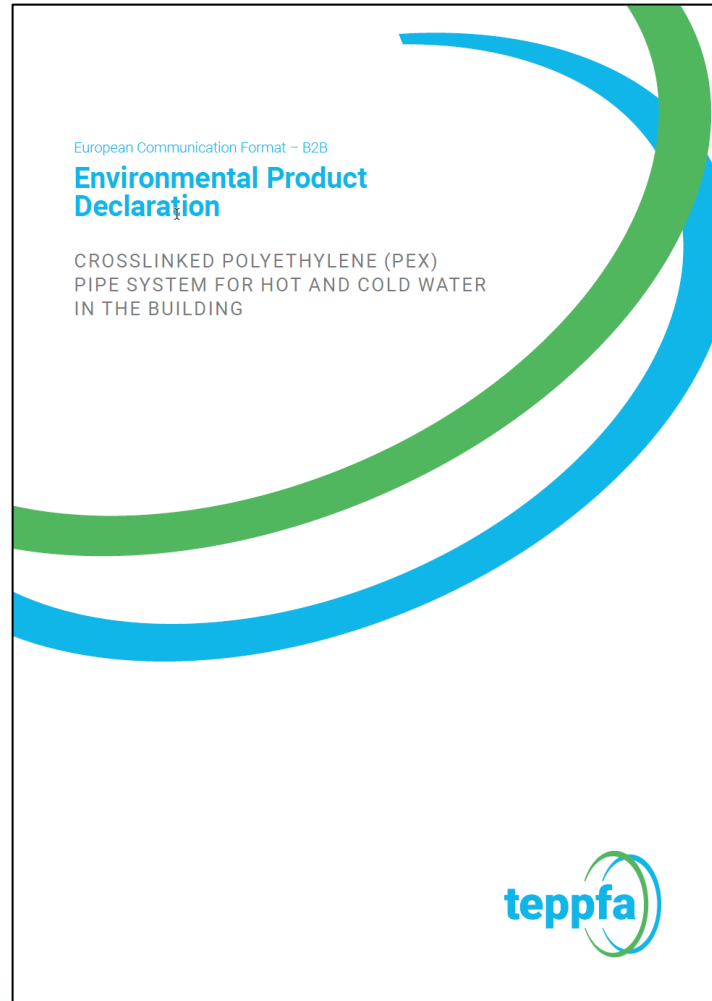
BSI Standards Publication

**Sustainability of construction works —
Environmental product declarations — Core rules
for the product category of construction products**



bsi.

4. EPD



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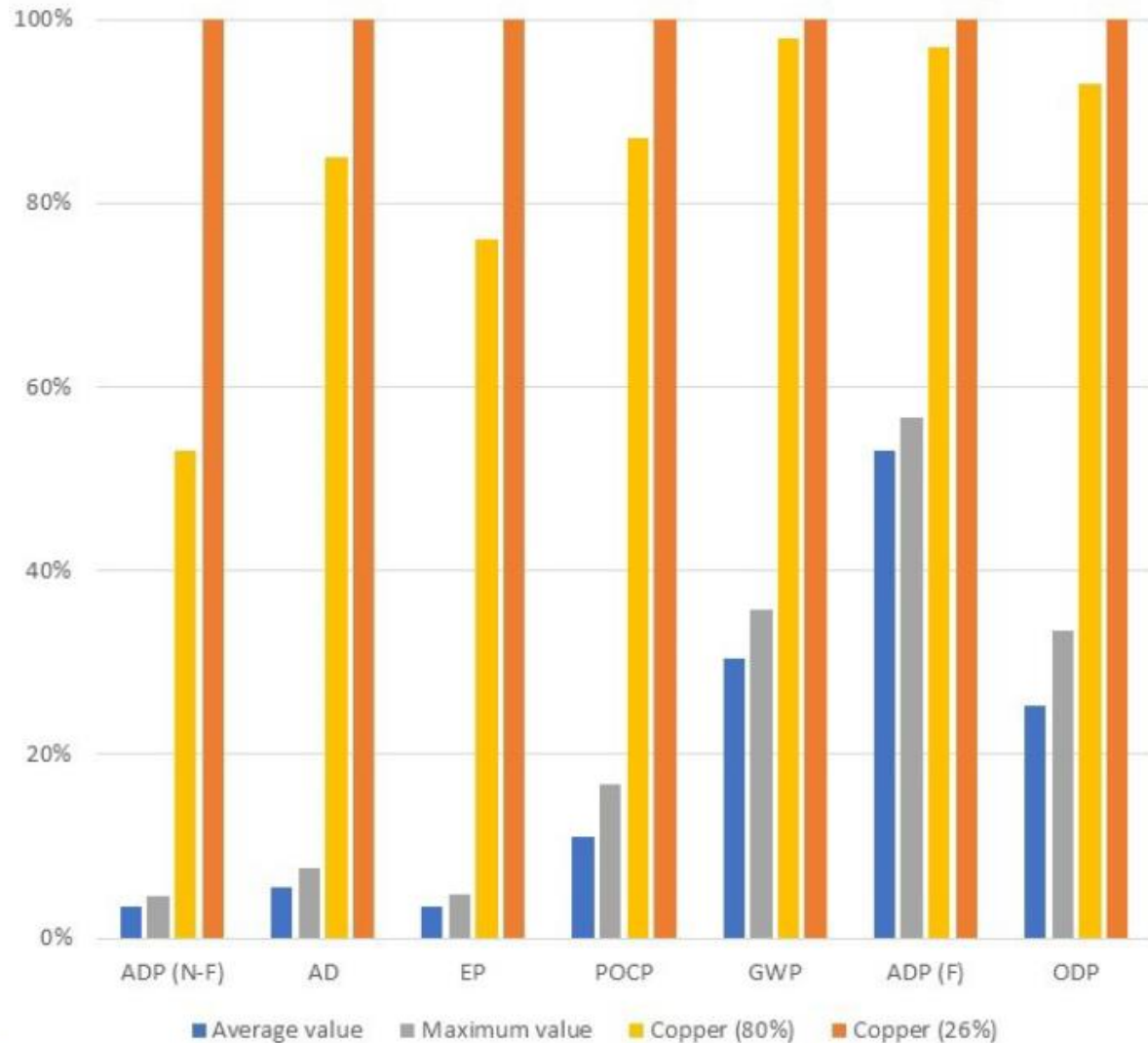
4. EPD

- Commonly used plastic pipe systems in hot & cold services
- Functional unit of 100m² apartment
- Cradle to Grave
- Units in kg of reference substances causing same environmental breakdown

	Unit	Polybutene	Multilayer	Cross-linked PE	Polypropylene
ADP (non-fossil)	kg Sb eq	2.25×10^{-5}	4.47×10^{-5}	4.39×10^{-5}	2.08×10^{-5}
Acidification	kg SO ₂ eq	5.99×10^{-3}	5.62×10^{-3}	3.65×10^{-3}	2.5×10^{-3}
Eutrophication	kg PO ₄ eq	1.59×10^{-3}	1.22×10^{-3}	1.18×10^{-3}	0.64×10^{-3}
POCP	kg C ₂ H ₄	3.36×10^{-4}	5.27×10^{-4}	3.65×10^{-4}	1.50×10^{-4}
GWP	kg CO ₂ eq	1.01	1.08	0.87	0.73
ADP (fossil)	MJ, net cal	2.0	1.7	1.85	1.98
Ozone depletion	kg CFC-11 eq	6.46×10^{-8}	9.09×10^{-8}	7.85×10^{-8}	4.08×10^{-8}

4. EPD

- Comparison to copper pipe system
- Sensitivity analysis for up to 80% recycle rate on copper
- Impact of production overshadows all else



4. EPD

Two takeaways:

- GWP & ADPf are typical good indicators for all seven impact categories
- All 4 commonly used plastic pipe systems for hot and cold water supply inside buildings have in all seven categories a significantly lower impact than copper pipe systems for the same application.

5. Good Question to ask

- Request an independently verified EPD to BS EN 15804 for each option.
- Check the EPD for:
 - ✓ Is it current? (see date of declaration and validity)
 - ✓ Is it for the product / system proposed? (see product description and standard)
 - ✓ Does it cover the complete system? (see functional unit)
 - ✓ Does it cover all stages of life (cradle to grave)?
- Ask again! EPDs for a single product (e.g. pipe or fitting) or a limited part of the life cycle (e.g. cradle to gate) are not giving you the whole picture

6. Further Resources

The screenshot shows the BPF website's 'Sustainability and the Circular Economy' page. The header includes the BPF logo, navigation links (Home, About, Members, Support & Downloads, Applications, Sustainability & the Circular Economy, Webinars, Contact), and a search bar. The main content area features a large image of a wind turbine and the title 'Sustainability and the Circular Economy'. Below the title, there is a sub-section 'Application Group Overview' with a contact number (+44 (0)1932 343 409) and email (secretary@bfpipesgroup.com). The main text discusses the environmental credentials of plastic piping systems and lists six environmental bulletins: 1. Introduction, 2. Life Cycle Assessment, 3. Balancing Environmental Impacts, 4. Interpreting Environmental Product Declarations, 5. Applying Your Knowledge, and 6. Asking the Right Questions - making choices. At the bottom, there is a section for 'Sustainability and Circular Economy News Articles' with a circular icon.

<https://www.bfpipesgroup.com/sustainability-and-the-circular-economy/overview/>

The screenshot shows the Teppfa website's 'Ecological Footprint' page. The header includes the Teppfa logo, navigation links (Home, Applications, Sustainability, Benefits, Standards, Media & Downloads, About), and a search bar. The main content area features a large image of a river flowing through a lush green landscape with a circular graphic overlay. The title 'Ecological Footprint' is prominently displayed in a dark box over the image.

In addition to the numerous benefits of the plastic pipe systems there is also a strong and reliable scientific evidence that, in general plastic pipe systems offer a lower product environmental footprint than the alternative materials.

<https://www.teppfa.eu/sustainability/responsible-consumption-and-production/environmental-footprint/>

The screenshot shows the Teppfa website's 'EPD Calculator' page. The header includes the Teppfa logo and navigation links. The main content area features a large image of a green landscape with a circular graphic overlay. The title 'EPD Calculator' is prominently displayed in a dark box over the image. Below the title, there is a table with columns for 'Material', 'Quantity', and 'CO2e'. The table contains data for various materials and their corresponding CO2e values. A bar chart is also visible on the right side of the page, showing the CO2e values for different materials.

<https://www.teppfa.eu/sustainability/responsible-consumption-and-production/environmental-footprint/epd/epd-calculator/>

Learning objectives Summery

- Introduction to LCA & EPD – How they are linked
- Seven Impact Categories assessed in a LCA
- Questions to ask in relation to an EPD
- Know where you can find out more

Any questions?

BRITISH PLASTICS FEDERATION PIPES GROUP

EXTRANET LOGIN Search Site

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LEARN MORE DOWNLOADS

About Us

BRITISH PLASTICS FEDERATION PIPES GROUP

The British Plastics Federation (BPF) Pipes Group is the leading trade federation of the UK plastic piping systems industry and a member of the European Plastic Pipes and Fittings Association (TEPPFA).

> Learn More

Applications

Under the directive of the BPF Pipes Group Council the group is split into Application Groups encompassing the wide range of applications covered by plastic piping systems.

- > Civils/Utilities
- > Building Services

Support and Downloads

Access information resources in the form of News Articles, Guidance Notes and Position Statements which cover areas of interest to specifiers, manufacturers and installers of plastic piping systems.

> Learn More

Webinars

Schedule of upcoming BPF Pipes Group webinars. These free webinars cover a range of topics and are delivered by our members who are experts in their application areas.

> Learn More

www.bfpipesgroup.com

September 2021

Future webinars

- The Role Plastic Pipes Will Play In The Delivery Of Net Zero – 20th October
- Designing Drains And Sewers – 24th November

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