

Chemicals of Concern in the Building and Construction Sector





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Feedback and contact The United Nations Environment Programme encourages interested readers of this report to engage and share their views about the report.

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List of Acronyms

ABS	Acrylonitrile butadiene styrene
ACQ	Ammonium copper quaternary
ACZA	Ammonical copper zinc arsenate
ATH	Aluminium (tri)hydroxide
BBP	Benzyl butyl phthalate
C&D	Construction and demolition
CASRN	Chemical abstract service registry number
CBA	Copper boron azole
CCA	Chromated copper arsenates
CDP	Cresyl diphenyl phosphate
CEPA	Canadian Environmental Protection Act
CFC	Chlorofluorocarbon
CFL	Compact fluorescent lamps
СР	Chlorinated paraffins
DBDPE	Decabromodiphenyl ethane
DBP	Dibutyl phthalate
DEGBE	2-(2-butoxyethoxy)ethanol;diethylene glycol monobutyl ether
DEGME	2-(2-methoxyethoxy)ethanol;diethylene glycol monomethyl ether
DEHP	Bis(2-ethylhexyl) phthalate
DIBP	Diisobutyl phthalate
DMPP	Dimethyl propane phosphate
EBTBP	Ethylene bis(tetrabromophtalimide)
ECHA	European Chemicals Agency
EDC	Endocrine-disrupting chemicals
EPS	Expanded polystyrene
FCR	Fibre reinforced composite
FEP	Fluorinated ethylene propylene
FGD	Flue gas desulfurization
GCO-II	Global Chemicals Outlook II
GEF	Global Environment Facility
GHS	Globally harmonized system
HBB	Hexabromobiphenyl
HBCD	Hexabromocyclododecane
HBFC	Hydrobromofluorocarbon
HC	Hydrocarbon
HCFC	Hydrochlorofluorocarbon
HCFO	Hydrochlorofluoroolefin
HFC	Hydrofluorocarbon
HFO	Hydrofluoroolefin
HIPS	high impact polystyrene

IARC	International Agency for Research on Cancer
IPPDPP	Isopropylphenyl diphenyl phosphate
LCCP	Long-chain chlorinated paraffins
LED	Light emitting diode
MCCP	Medium-chain chlorinated paraffins
MDH	Magnesium (di)hydroxide
MDI	methylenediphenyl diisocyanate
MEA	Multilateral environmental agreements
ODS	Ozone depleting substances
OLED	Organic ligt emitting diode
PAH	Polyaromatic hydrocarbon
PAN	Polyacrylonitrile
PBDE	Polybrominated diphenyl ethers
PBT	Persistent, bioaccumulative and toxic
PC	Polycarbonate
РСВ	Polychlorinated biphenyls
PCN	Polychlorinated naphthalenes
PCP	Pentachlorophenol
РСТ	Polychlorinated terphenyls
PE	Polyethylene
PFA	Perfluoroalkoxy alkane
PFBS	Perfluorobutane sulfonate
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PFOS-F	Perfluorooctane sulfonyl fluoride
PIR	Polyisocyanurate
POP	Persistent Organic Pollutant
POPRC	Persistent Organic Pollutant Review Committee
PP	Polyproylene
PS	Polystyrene
PTFE	Polytetrafluoroethylene
PU	Polyurethane
PUR	Polyurethane
PVA	Polyvinyl alcohol
PVC	Polyvinyl chloride
PVDF	Polyvinylidene fluoride
RDP	resorcinal bis(diphenylphosphate)
REACH	European Union Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation Authorization and Restriction of Chemicals
KME	Risk management evaluation
SAICM	Strategic Approach to International Chemicals Management
SBR	Styrene butadiene rubber

SCCP	Short-chain chlorinated paraffins
SVHC	Substance of very high concern
ТВВРА	Tetrabromobisphenol A
TBPDPP	Tertbutylphenyl diphenyl phosphate
TCEP	Tris(2-chloroethyl)phosphate
TCEP	tri-chloroethyl phosphate
ТСР	tricresyl phosphate
ТСРР	tris-chloropropyl-phosphate
TDCPP	tris-dichloropropyl-phosphate
TPP	triphenyl phosphate
TSCA	United States Toxic Substances Act
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UPR	Unsaturated polyester resin
US EPA	United States Environmental Protection Agency
UV	ultraviolet
VOC	Volatile organic compound
XPS	Extruded polystyrene
ZHS	Zinc hydroxystannate
ZS	Zinc stannate

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1 Background, aims and scope

Chemicals in products has been a longstanding emerging policy issue under the Strategic Approach to International Chemicals Management (SAICM) [1]. To further advance this issue, a GEF-funded project on "Global best practices on emerging chemical policy issues of concern under SAICM" has been launched in 2019. Amongst others, the activities under the project aim at increasing the ambition of different stakeholders to track and control chemicals along the value chains of the building and construction sector. In order to contribute to the current discussion on emerging policy issues and to provide a basis for further activities related to chemicals of concern in the building and construction sector, the project foresees the development of a report on chemicals of concern and alternatives in the construction sector, which is provided in this document.

This report aims at providing an overview of the challenge that chemicals of concern pose in the context of products relevant for the building and construction sector. It outlines the relevance and linkages of chemicals of concern with regards to a building life cycle and highlights existing gaps, challenges and opportunities regarding the imperative of increasing circularity in the building and construction sector.

Furthermore, the report aims at identifying selected chemicals of concern that have relevance in the context of products of the building and construction sector. The scope of the analysis covers chemicals that have documented applications in products (including building materials) and formulations intended for incorporation in the built environment in a permanent manner and may be of concern during at least one life-cycle stage of a building. This also includes chemicals and formulations used for installation of building products, such as glues for the installation of floor tiles. The scope of the report does not cover electric installations that may be found in the built environment, such as wiring or technologies for heating, ventilation or air conditioning.

However, given the sector's complexity and its considerable diversity of products, the range of chemicals of concern and their applications in the building sector identified within this report is not intended to serve as an exhaustive list. Rather, the goal is to provide the reader with a first overview of how certain chemicals of concern link to products of the building and construction sector and to provide starting points for further activities under the project as well as for future sector-specific activities. For chemicals that are currently addressed under multilateral environmental agreements (MEAs), such as the Stockholm Convention on Persistent Organic Pollutants, factsheets summarizing information on chemical identities, relevant applications and potential alternatives are provided as an annex to the report. For Chemicals that are currently addressed by national regulatory action relevant for the building and construction sector an overview table is presented.

2 The building life cycle through the lens of chemicals of concern

Building and construction is one of the most chemical-intensive sectors downstream of the chemical industry. It is the largest end market for chemicals and the sector generating the highest chemical revenue [2]. Driven by rapidly accelerating urbanization, the global construction sector is expected to grow by 3.5% annually with its chemicals market estimated to grow by 6.2% annually between 2018 and 2023 [2]. Many of the sector's products are relatively chemical-intensive and some of the chemicals used in products of the building and construction sector can cause severe harm to human health and the environment.

Compared to other consumer products, such as textiles, electronics or toys, products relevant for the building and construction sector (i.e. building products) are used solely in the context of the built environment and therefore their uses are directly linked to the life cycle of buildings. The typical life cycle of building products is illustrated in Figure 1. After raw material extraction and feedstock production, building products are designed and manufactured. Shipped to installation sites, building products are installed into the built environment during building construction or renovation and are in use during a building's operation phase. After removal from a building, either during renovation or building demolition, the product enters its end-of-life stage as construction and demolition (C&D) waste and is either disposed or reused or recycled.



Figure 1: Life cycle of a building product.

The life cycle of a building, especially the use phase can be very long, often spanning several decades sometimes up to centuries. Due to this, the life cycles of building products are much longer compared to other products, such as toys or electronics. During this long lifetime, a variety of different actors may use and come into contact with different building products. These actors include construction workers, renovators with professional or non-professional backgrounds, and demolition workers, as well as building inhabitants that may come into contact with certain building products and material during a building's use phase (e.g. with flooring material). The life cycle of building products is closely linked to potential impacts and challenges of chemicals of concern in the sector are important to consider in the discussion of this issue.

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