International Standard

ISO 16294

Basic chemical products — Basic chemicals resulting from chemical recycling — General principles

Produits chimiques de base — Substances chimiques de base résultant d'un recyclage chimique — Principes généraux

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Foreword

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This document was prepared by Technical Committee ISO/TC 47, *Chemistry*.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The purpose of this document is to provide general requirements for basic chemicals produced by chemical recycling, to help all stakeholder understand basic chemicals produced by chemical recycling properly and to support the use of basic chemicals produced by chemical recycling. Chemical products are essential to support various industries and our daily life. At the end of their life, these products can be valuable resources which should be recaptured and are indispensable for sustainable economic growth.

Chemical recycling is an important solution to achieve a circular economy. New chemical products (the recovered materials) can be produced by recovering resources through chemical recycling. The recovered resources can be used as replacements for virgin materials, which are manufactured by conventional fossil feedstock, such as coal or oil. Chemical recycling can contribute to resource circulation in circular economy (see Figure 1).

Basic chemical(s) or raw material(s) of basic chemicals (BCRM), which are produced by chemical recycling of organic material(s) (CR-BCRM) has been recognized as a challenge by purchasers of CR-BCRM. Given the innovative and recent character of chemical recycling technologies, general principles are needed on quality assurance, distribution of information such as CO_2 emissions and the amount of residues generated by these processes, etc.[1)] CR-BCRM should be selected from the perspective of not only the price they offer, but also effective use of resources, contribution to the environment, or the workplace environment they put value on such as employment status or wage system.

To smooth the transition from virgin to recycled material, methods such as the mass balance method have also been proposed. In light of the above, it is important to facilitate communication between purchasers and suppliers of BCRM resulting from chemical recycling of organic materials in order to support the use of CR-BCRM.

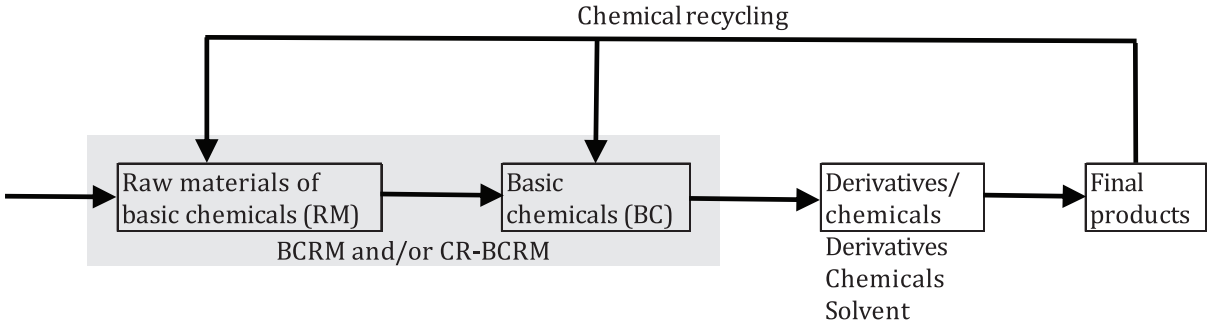


Figure 1 — Diagram to explain the relationships for chemical recycling

1) Chemical Recycling of Polymeric Materials from Waste in the Circular Economy - Final Report prepared for the European Chemicals Agency August 2021

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Basic chemical products — Basic chemicals resulting from chemical recycling — General principles

1 Scope

This document specifies general requirements for basic chemicals and raw materials of basic chemicals resulting from chemical recycling of organic materials.

This document does not provide specific requirements for materials covered by other ISO technical committees.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11014, *Safety data sheet for chemical products — Content and order of sections*

ISO 15270, *Plastics — Guidelines for the recovery and recycling of plastics waste*

ISO 20400, *Sustainable procurement — Guidance*

ISO 22095, *Chain of custody — General terminology and models*

ISO 26000, *Guidance on social responsibility*

3 Terms, definitions and abbreviations

For the purposes of this document, the terms and definitions given in ISO 15270, ISO 20400, ISO 22095, ISO 26000 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
recycling
activities to obtain recovered resources for use in a process or a product, excluding energy recovery

Note 1 to entry: Activities to obtain recovered resources include activities such as recovery, collection, transport, sorting, cleaning, and re-processing.

Note 2 to entry: Recycling does not include reuse.

[SOURCE: ISO 59004:2024, 3.5.24]

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3.2
chemical recycling
CR
manufacturing processes that convert waste materials into a feedstock by changing the chemical structure of waste materials to be used in the production of new polymers, monomers, intermediates, or other materials

Note 1 to entry: Processes can include, but are not limited to, pyrolysis, gasification, depolymerization, solvolysis, catalysis, reforming, purification, hydrogenation, dissolution, dehydrochlorination, and other similar existing or newly developed technologies or processes.

[SOURCE: ISO 5157:2023, 3.2.6.5]

3.3
basic chemical
BC
chemical which is suitable for use as an input for multiple chemical reactions

Note 1 to entry: Basic petrochemical products used as basic raw materials for synthetic resins and petrochemical products, and their derivative compound.

Note 2 to entry: Both organic and inorganic materials are acceptable as basic chemicals and basic chemical raw materials. Inorganic chemicals such as caustic soda, ammonia, sulfuric acid, hydrochloric acid, inorganic pigments, etc. are also included in basic chemicals.

Note 3 to entry: Applications are not limited to chemical reactions.

3.4
raw material of basic chemicals
RM
material from which *basic chemicals* (3.3) can be obtained

Note 1 to entry: Representative raw materials of basic chemicals are naphtha, diesel, product oils and synthetic gases.

3.5
organic material
carbon-based compound(s) in which a carbon is attached to the other carbon atom(s), hydrogen, oxygen, or the other elements atom(s) in a chain, ring, or three-dimensional structures

Note 1 to entry: It refers to carbon-containing materials but not necessarily to biomass.

3.6
BCRM
basic chemical(s) (3.3) or *raw material(s) of basic chemicals* (3.4)

3.7
CR-BCRM
BCRM(s) (3.6) produced by *chemical recycling* (3.2) of *organic material(s)* (3.5)

4 Principle

4.1 General

The purpose of chemical recycling is to recover resources through chemical processes which change chemical structure to produce BCRM. BCRM is obtained by converting waste that preferentially is not suitable for other recycling methods such as mechanical recycling or in cases where chemical recycling is considered the better alternative. As chemical recycling is complementary to other recycling processes from economical or technical point of view, chemical recycling can contribute to sustainable economic growth and the realization of a circular economy.

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