



## How we develop next generation chemicals

Future chemical products have to be resource efficient, circular, neutral in greenhouse gas emissions and safe for people and the environment. To achieve this, we need to develop the full chemical tool-box in line with chemicals regulation. With our expertise in risk management and safe and sustainable innovations we at BASF will deliver on alternative substances and solutions while maintaining high performance.

### A pan-European guidance for innovators

Developing chemistry fit for the future has turned into a multidimensional competition: Research and development will have to qualify on multiple levels from resource efficiency, life cycle cost, circularity, emissions reduction to the elimination of substances of very high concern from consumer applications. Much like competing athletes facing their disciplines, a new chemical substance needs to pass its gates from ideation, through the lab, test centers, customer requirements, REACH registration until it is fit to enter the market. Minimum requirements for chemical products are: can the product be safely handled and are there consequences for human health and the environment?

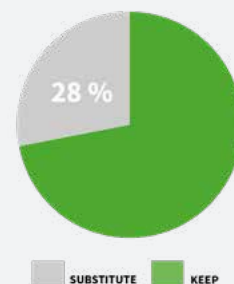
**Safe and Sustainable by Design (SSbD)** is intended to be a pan-European framework which will give the necessary guidance to innovators and developers. Criteria for SSbD products will be established as a recommendation, which will deeply influence how research and innovation will be conducted in the near future in Europe.<sup>1,2</sup> SSbD has the potential to be Europe's success story



BASF leads in responsible innovation. Our innovation processes cover four dimensions: Safety of chemicals, environmental protection and human health, and the performance of new materials and products.

### Consumer safety in focus

The Chemicals Strategy for Sustainability (CSS) means to better protect people and the environment. As a consequence, the CSS will change one fifth of Europe's chemical portfolio according to Cefic's estimates. As a framework to assess chemical products before they enter the market Safe and Sustainable by Design is meant to ensure consumer safety and increased product sustainability.



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if designed conveniently, implemented smartly and used as a solid and widely recognized methodology to guide but not limit innovation processes across the industry.

### Why necessary

The paradigm shift in European chemicals legislation demands the development of new materials and solutions. With the Generic Risk Approach the European Commission intends to ban further substances based on hazard properties alone, extending it from consumers to professional users. As a consequence, many chemical products will disappear from the market; the chemical toolbox shrinks. **This is where the new concept of SSbD kicks in:** As a key element within the EU Chemicals Strategy for Sustainability (CSS) SSbD shall foster much needed substitutions for chemical products that will be phased out with stricter chemicals regulations and thus drive innovation.

### Example Hexamoll® DINCH

Plasticizers are used to soften rigid PVC (polyvinylchloride) and to turn it from being hard and brittle to soft and flexible. Hexamoll® DINCH has replaced phthalate plasticizer in many sensitive goods such as toys, medical devices or sport equipment. Entering the market in 2002, Hexamoll® DINCH has since set high standards with regard to sustainability. It was evaluated using the Sustainable Solution Steering methodology, and BASF has invested more than €7m in its toxicological research.



### BASF adheres to Safe and Sustainable by Design.

Already since 2012, BASF uses its Sustainable Solution Steering method to evaluate and steer its product portfolio based on safety and sustainability criteria. This is also reflected in our innovation processes which help us to identify safe and sustainable solutions early on. We support the introduction of voluntary SSbD criteria and best practice sharing to further improve innovation processes throughout the industry and strengthen consumer trust in modern chemistry.

We support and develop new industry principles from lab to launch to build products as a new benchmark for safe and sustainable chemicals worldwide. Our products, solutions and technologies help to achieve the U.N. Sustainable Development Goals<sup>3</sup>, especially Climate action, Responsible consumption and production, Affordable and Clean Energy, and Industry, innovation and infrastructure.

### Example Cavior® – reliable insulation

Cavior® is the world's first 3-component system for manufacturing a mineral-based in-situ foam. It helps reduce dust and fibers, when fixing the insulation layer into position. Cavior® was developed at BASF through eight years of intensive research with over 5000 test recipes, and is protected by multiple patents. The system received the European Technical Approval (ETA-19/0240) in 2020. Cavior® combines the advantages of a hydrophobic and open-pore mineral insulation material with the fast, safe, and seamless processability of a self-sealing foam system. In contrast to most other systems on the market, Cavior® foam can be disposed of along with construction waste without having to separate it during renovations or demolitions, or re-used as a foundation material.



### Innovators in chemistry need a reliable framework

The CSS further increases the need for safe and sustainable materials. Innovative substitutions such as Hexamoll® DINCH and Capivor® require enormous efforts and longterm commitment. Regulatory measures will therefore influence Europe's innovativeness for years to come. Given freedom to innovate, we will be able to strengthen Europe's competitiveness through creativity and short times to market. The SSbD framework should therefore:

- assess both "Safety" and "Sustainability" over the full life cycle and dependent on the use, because the benefits and sustainability performance are mostly in the end-product;
- use existing methodologies, tools, standards, and acknowledge qualitative assessments towards a lean decision tree comparing the incumbent solutions rather than a complex model with cut-off criteria;
- ensure predictability of access to market, aligned with the European Green Deal's targets and derived regulatory actions;
- build on the industry-wide established methodology Portfolio Sustainability Assessment (PSA) developed under the umbrella of the WBCSD<sup>3</sup>, which already today is used for assessing improved safety and sustainability outcomes;
- strengthen the link between the SSbD framework and innovation processes; this should be based on a joint understanding of reasonable maturity levels for data.

**What BASF brings to the table:** BASF actively supports the two-year testing period<sup>4</sup> for SSbD, which was announced by EU COM end 2022. A thorough check for practicability is critical to ensure the SSbD framework will become operational and will foster innovation in chemicals and materials. We thereby support the ambition to shift towards safe and sustainable chemicals and offer our expertise in evaluating and steering R&D portfolios.

### References

- <sup>1</sup> More about SSbD on Cefic: <https://cefic.org/media-corner/newsroom/how-can-safe-and-sustainable-by-design-boost-innovation-and-growth-in-europe>
- <sup>2</sup> European Commission. Joint Research Centre. *Safe and Sustainable by Design Chemicals and Materials: Review of Safety and Sustainability Dimensions, Aspects, Methods, Indicators, and Tools.*; Publications Office: LU, 2022. Brussels, 8.12.2022 C(2022) 8854 final; ANNEX to the COMMISSION RECOMMENDATION establishing a European assessment framework for 'safe and sustainable by design' chemicals and materials EN EN.
- <sup>3</sup> Product Portfolio Steering Framework - World Business Council for Sustainable Development (WBCSD). <https://www.wbcd.org/Projects/Chemicals/Product-Portfolio-Steering-Framework> (accessed 2022-12-19).
- <sup>4</sup> Caldeira, C., Garmendia Aguirre, I., Tosches, D., Farcal, R., Mancini, L., Lipsa, D., Rasmussen, K., Rauscher, H., Riego Sintes, J., Sala, S. (2023) *Safe and Sustainable by Design chemicals and materials. Application of the SSbD framework to case studies. JRC technical report for consultation.* JRC131878

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We create chemistry

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