

1 **Tricky relationships: chemicals, waste and product legislation**

2 -Short version -

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4 The European Commission targets two essential goals in the handling of substances and
5 materials known by the buzzwords "non-toxic environment" and "circular economy". There
6 are numerous interfaces in product, waste and chemicals legislation in these two areas. This
7 leads to conflicting objectives, e.g. with regard to the classification of waste in analogy to
8 chemicals as well as at the border between waste and secondary raw materials that are
9 further processed into products.

10 First of all, it should be noted that neither the one nor the other objective can be completely
11 achieved, and certainly not in combination: The REACH regulation does not know the term
12 "non-toxic". The Waste Framework Directive (WFD) does not define the terms "circular
13 economy" or "material cycles". It is not possible to dispense completely with hazardous
14 substances. In many cases, the hazard (e.g. corrosive, oxidising or flammable properties) is
15 closely linked with the intended function of a substance. Moreover, an environment without
16 any toxins is not realistic because of naturally occurring toxicants. From a scientific
17 perspective, material cycles cannot be closed completely due to the second law of
18 thermodynamics. Most products are not pure but "contaminated" for technical reasons with
19 various substances, such as alloy components, stabilisers, plasticisers, colorants, etc.
20 Moreover, the components or materials of many products cannot be easily disassembled
21 because they are irreversibly bonded. This may require a higher energy input for recycling or
22 prevent it completely for chemical reasons.

23 No doubt: we must strive to keep hazardous chemicals out of consumer products and also
24 massively reduce the depletion of primary resources! So far, we agree with the EP's and the
25 Commission's remark: "...it is necessary to promote measures to reduce the content of
26 hazardous substances in materials and products, including recycled materials, and to ensure
27 that sufficient information about the presence of hazardous substances and especially
28 substances of very high concern is communicated throughout the whole lifecycle of products
29 and materials. In order to achieve those objectives, it is necessary to improve the coherence
30 among the law of the Union on waste, on chemicals and on products...." (WFD, preliminary
31 note No 38).

32 A holistic view on the "life cycle" of products is required, from the extraction of raw
33 materials to waste. Since considerably more resources are to be extracted and recycled from
34 waste in the future, limit values for (potentially) hazardous substances are necessary in both
35 primary and secondary materials. Is such an approach also applicable to waste? How can the
36 interface between product and chemicals legislation and waste management be designed?
37 The Commission launched a consultation in 2018 on the interfaces between waste,
38 chemicals and product legislation (Communication on the implementation of the circular
39 economy package: options to address the interface between chemical, product and waste

40 legislation as of 16.01.2018. COM(2018) 32 final), the results of which have not yet been
41 published.

42 We analysed the European legislation (e.g. REACH, WFD, ...), international Conventions (e.g.
43 GHS, Stockholm, Basel), and some interesting national approaches on the basis of our
44 professional experience in waste management, risk assessment of chemicals and consumer
45 protection. The following considerations might be helpful in order, on the one hand, to take
46 a holistic view of the material flows and, on the other hand, to differentiate at the respective
47 levels so that chemical safety and resource protection can be achieved together in practice.

48 Chemicals are used in manifold products; manufacturers decide on the type and quantity of
49 materials and chemicals needed for their products. In addition, chemicals, as well as the
50 products into which they have been applied, may be used differently to the intentions of the
51 manufacturers. Hazard classifications as stipulated by the CLP regulation are therefore
52 unavoidable. Substances are processed with other substances to materials, combined to
53 make products and finally mixed as waste with other used products. This can also be coupled
54 with material changes due to biochemical or chemical reactions. This means that the
55 properties of a few starting materials are usually irrelevant for waste with the exception of
56 specific pre-consumer wastes (production wastes). Only in these cases is it still possible to
57 classify and label them as hazardous in accordance with the CLP regulation. For all other
58 types of waste, a risk assessment based on the presence of the substance in the respective
59 product matrix, its physical state and additionally on potential reactions of the waste
60 mixture is required. Therefore, identical classification criteria at each level are not necessary,
61 but may be even counterproductive.

62 As re-use and recycling processes should be increased on a major scale to save resources,
63 the flow of information from material and product level to waste management urgently
64 needs to be improved and extended: For the recycling of waste fractions or used goods,
65 information on the presence of substances of concern is needed in order to ensure not only
66 recovery according to the waste hierarchy but at the same time the removal of pollutants
67 and their destruction or transfer to final sinks. However, a database covering only
68 "substances of very high concern" (SVHC) in products foreseen in the new WFD is by no
69 means sufficient. Information is required for possible re-use (e.g. repair instructions, spare
70 parts) and for material recovery (materials suitable for recycling, materials interfering the
71 recycling process). This is the only chance to introduce highly differentiated "used product"
72 or "used material" types. This means that an obligatory information transfer on the content
73 of substances of concern and substances which interfere with recycling processes must also
74 cover articles and should reach the waste manager and recycler. Responsibility for this
75 transfer of information must become part of product responsibility and involve all
76 stakeholders in the product chain – manufacturers, retailers, consumers. Collection systems
77 for specific products with a similar composition for which a recycling process has been
78 established are already a proven solution in some B2B cases and could be extended to
79 consumer products preferably motivated by economic instruments like deposits. However,

80 such systems for "pre-sorted" waste will only work if all parties in the value-added chain
81 (including the waste owner) play their part correctly. This will be even more successful if
82 "design for recycling" is taken into account in product design. The Ecodesign Directive and
83 other product-related directives (e.g. RoHS, Toy Safety Directive) could therefore be
84 supplemented by substance-related requirements in order to facilitate the dismantling of
85 products after use. The mere increase of "recycling quotas" will not result in additional
86 material recovery if information is not enhanced and the separation of waste fractions is not
87 enforced. Internationally approved "types of used material", like those for scrap metals and
88 waste paper, would be a major step forward, if the recommended recycling route and a
89 specific spectrum of minor constituents would be introduced to characterise types of used
90 material.

91 The recycling of materials from waste is challenging, in case certain pollutants cannot be
92 separated from the waste stream. In many cases, these products/waste streams have to be
93 incinerated (with energy recovery, if possible) or otherwise disposed of safely. Even if there
94 are no toxic but only interfering substances in the secondary material present this usually
95 leads to "downcycling": Products made of secondary material can then only be used for less
96 demanding applications; their further "recyclability" is limited or no longer possible. Under
97 certain conditions, this can take place in the same way for secondary materials containing
98 hazardous substances, i.e. if there is no relevant risk of carryover of the contaminant into
99 other mass flows and safe disposal of the recycled material in question after further use is
100 possible.

101 Considering the interfaces and intersections of the regulations mentioned, we conclude:

102 - We need clear requirements for the recyclability of products in product legislation.
103 The present delimitation of "ecodesign" to the energy consumption requirement in the use
104 phase must be complemented by "design for repair" and "design for recycling".

105 - Research and development of processes to separate substances of concern from
106 product waste for subsequent recycling should be encouraged.

107 - Substitution of substances in products which interfere technically with recycling
108 processes should be encouraged, too.

109 - In the case of substances that have previously been used but are now banned due to
110 their harmful properties, it must be checked whether corresponding materials are
111 acceptable for lower-quality products (downcycling) and, if necessary, whether exceptions
112 can be granted under REACH. Safe disposal of such products that cannot be re-used after
113 their "second use" should be mandatory. This should be encouraged by corresponding
114 labelling.

115 - The information system for SVHC in products initiated by the new WFD has a too
116 narrow scope and is therefore not sufficient. This must be supplemented because the
117 recycling of materials depends not only on the presence of SVHC but also of other hazardous
118 substances and compounds that cause technical problems.

119 The development of guiding principles to clarify these interfaces, based on a challenging
120 mission statement, is an appropriate way forward.

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