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Adhesives — Guideline for separating adhesively bonded joints enabling repair and improving recycling

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Foreword

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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

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.

Introduction

Given the background of a growing world population, increasing demand for goods, a continuing rise in waste production and environmental pollution and, last but not least, the expected effects of climate change, the transition from a linear economy to a circular economy is becoming increasingly important.

The aim of the circular economy concept is to establish closed material cycles through circular strategies and thereby to build a regenerative system in which value creation, prosperity and security of supply are achieved within planetary boundaries. In addition to a reduction in the use of resources, the preservation of the value of raw materials, materials and products are at the forefront of the strategies compiled in the framework of 9 R-strategies.

The contents of the 9 hierarchically structured R-strategies can be described by the following keywords:

— Refuse;

— Rethink;

— Reduce;

— Reuse;

— Repair;

— Refurbish;

— Remanufacture;

— Repurpose;

— Recycle.

When considering the various R-strategies in the design of products, conflicting goals between the different R-strategies are certainly conceivable. For example, the weight of a product (e.g. rail vehicle) can be significantly reduced by using different materials that are joined together in an adhesive bonding process, thus reducing the energy requirement during the utilization phase. It is also conceivable that the service life of a product (e.g. electronic components) can be extended by adhesive bonding. On the other hand, the disadvantage is that bonded joints may make it more difficult to repair or recycle the materials at the end of the product's life cycle.

In order to identify the most favourable solution from the point of view of resource consumption in the event of conflicting objectives, a holistic assessment of the resource requirements is required, starting with the manufacture of the product, through the entire product life to the end of life with the recycling of the materials and consideration of the type and quantity of residual waste to be removed from the cycle that cannot be recycled.

With this document, procedures are provided and further explained in Annex A by practical examples with which the apparent contradiction between adhesive bonding and reparability and recyclability of the product can be avoided.