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Test Procedures for Assessing the Peel Strength and Cleavage Resistance of Adhesively Bonded Joints with Elastic Adhesives under Detrimental Service Conditions

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Abstract : Adhesive bonding plays a pivotal role in various industrial applications, ranging from automotive manufacturing to aerospace engineering. The peel strength of adhesives, a critical parameter reflecting the ability of an adhesive to withstand external forces, is crucial for ensuring the integrity and durability of bonded joints. This study provides a synopsis of the methodologies, influencing factors, and significance of peel testing in the evaluation of adhesive performance. Peel testing involves the measurement of the force required to separate two bonded substrates under controlled conditions. This study systematically reviews the different testing techniques commonly applied in peel testing, including the widely used 180-degree peel test and the T-peel test. Emphasis is placed on the importance of selecting an appropriate testing method based on the specific characteristics of the adhesive and the application requirements. The influencing factors on peel strength are multifaceted, encompassing adhesive properties, substrate characteristics, environmental conditions, and test parameters. Through an in-depth analysis, this study explores how factors such as adhesive formulation, surface preparation, temperature, and peel rate can significantly impact the peel strength of adhesively bonded joints. Understanding these factors is essential for optimizing adhesive selection and application processes in real-world scenarios. Furthermore, the study highlights the role of peel testing in quality control and assurance, aiding manufacturers in maintaining consistent adhesive performance and ensuring the reliability of bonded structures. The correlation between peel strength and long-term durability is discussed, shedding light on the predictive capabilities of peel testing in assessing the service life of adhesive bonds. In conclusion, this study underscores the significance of peel testing as a fundamental tool for characterizing adhesive performance. By delving into testing methodologies, influencing factors, and practical implications, this study contributes to the broader understanding of adhesive behavior and fosters advancements in adhesive technology across diverse industrial sectors.

Keywords : adhesively bonded joints, cleavage resistance, elastic adhesives, peel strength
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