
**Fine ceramics (advanced ceramics,
advanced technical ceramics) —
Methods of test for ceramic coatings
— Determination of internal stress in
ceramic coatings by application of the
Stoney formula**

Sample *Céramiques fines (céramiques avancées, céramiques techniques avancées) — Méthodes d'essai des revêtements céramiques — Détermination de la contrainte interne des revêtements céramiques par application de la formule de Stoney*

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Foreword

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Introduction

There is an increasing use of coatings to improve the functional performance of materials and components. This can be to protect against damage due to exposure to demanding environments including high stresses and aggressive chemical environments, but can also be to modify many other properties, e.g. thermal conductivity through thermal barrier coatings, friction through low friction coatings, such as diamond like carbon (DLC), and optical reflectivity through coatings with controlled optical properties.

Appropriate choice of coatings for particular applications depends on the mechanical and other functional requirements that arise. One factor that can be crucial in determining coating performance and lifetime is the residual stress that is generated by the deposition process and/or by thermal expansion mismatch between the coating and the substrate as the component is cooled from the processing temperature.

This document describes the application of a simple experimental technique using the Stoney formula to analyse the coating induced bending of coupons, of known mechanical properties, to determine the residual stress in the coating.

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