

External Pressure Design in Creep Range





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FOREWORD

This document was developed under a research and development project that resulted from ASME Pressure Technology Codes & Standards (PTCS) committee requests to identify, prioritize and address technology gaps in current or new PTCS Codes, Standards and Guidelines. This project is one of several included for ASME fiscal year 2009 sponsorship which are intended to establish and maintain the technical relevance of ASME codes & standards products. The specific project related to this document is project 09-03 (BPVC #2) titled "External Pressure Design in Creep Range".

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ABSTRACT

At the present time the ASME Boiler and Pressure vessel code does not include rules for the design of components under external pressure and axial compressive loads in the time-dependent creep regime. A method is suggested in this report for designing components in the time-dependent creep regime. The design methodology is developed for columns and cylindrical shells under axial compression as well as cylindrical, spherical and conical shells under external pressure. An external pressure chart for 2.25Cr-1Mo steel was developed at 1000°F to demonstrate the applicability of the methods developed in this report. In addition, variable factors of safety are imbedded in the design equations in order to transition from the design factors used in the time-independent External Pressure Charts of Section II to the lower design factors specified in Section III for time-dependent, creep buckling.