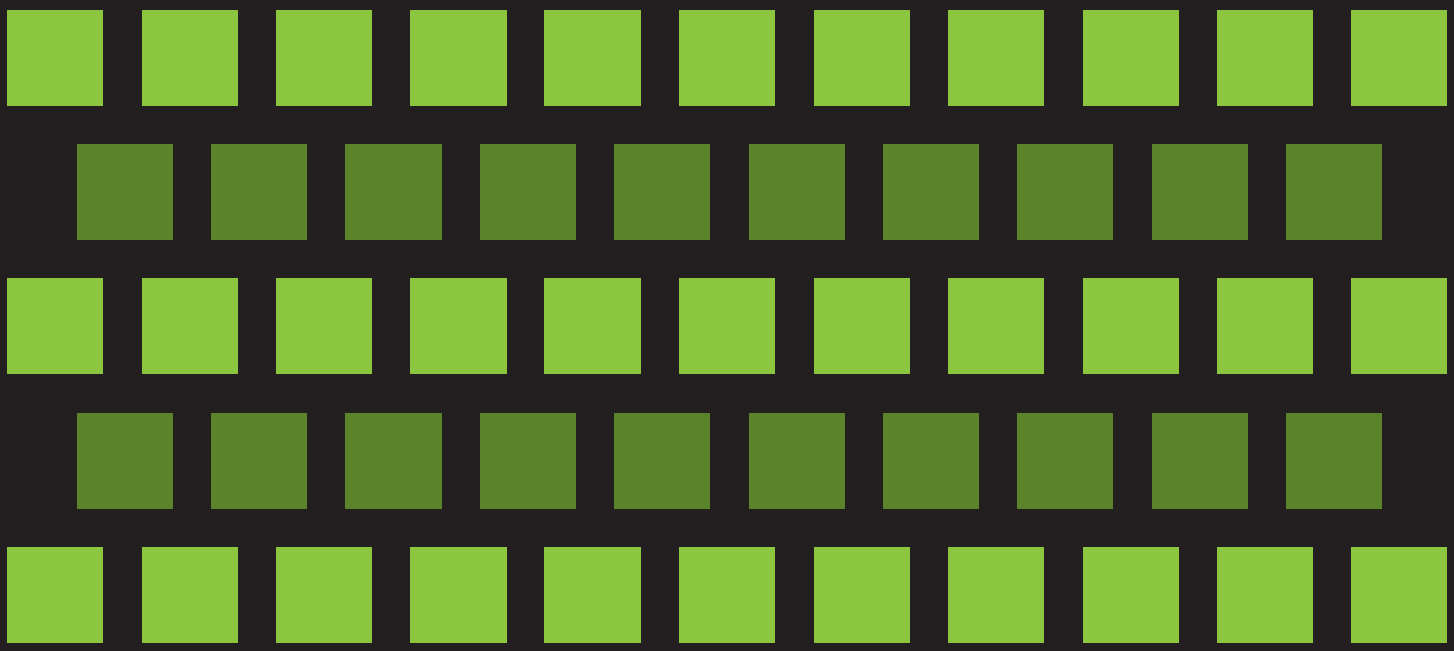
STP-PT-049

INVESTIGATION OF TEMPERATURE DERATING FACTORS FOR HIGH-STRENGTH LINE PIPE



ASME STANDARDS TECHNOLOGY, LLC

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INVESTIGATION OF TEMPERATURE DERATING FACTORS FOR HIGH-STRENGTH LINE PIPE

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Date of Issuance: September 28, 2012

This report was prepared as an account of work sponsored by ASME Pressure Technologies Codes and Standards and the ASME Standards Technology, LLC (ASME ST-LLC).

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ISBN No. 978-0-7918-3426-8

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

FOREWORD

This report reviews the ASME derating factors, identifies the range of line pipe steel grades that may be affected and the potential impacts to ASME pipeline and piping design standards, and makes recommendations for further study or experimental investigation as necessary.

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EXECUTIVE SUMMARY

The current ASME B31.8 code gives no derating of line pipe steels for temperatures below 250°F. For pipeline steels in the Grade X60-X70 range, data show that a reduction of the yield strength may be exhibited at temperatures below 250°F in some cases. Some pipeline design standards developed for other countries (e.g., Norway, Netherlands, and Australia) already apply derating factors at temperatures well below 250°F. Thus, the ASME derating factors appeared to be in need of review.

This report reviews the available information, identifies the range of line pipe steel grades that may be affected, identifies the potential impacts to ASME pipeline and piping design standards, and makes recommendations for further study or experimental investigation as necessary.

A review of data suggests that (a) there is a high likelihood of some decrease in the actual yield strength of high-strength low-alloy grades of line pipe in current usage at temperatures between 75°F and 250°F; (b) against a limited set of data the current Code derating factors appear to be adequate, provided room temperature yield strength is at least 5% above specified minimum levels; (c) there are insufficient data to recommend a change in the Code at this time; (d) there are insufficient data to determine whether the present Code derating factor is adequate for all variables of alloy design and steel processing used with current grades of high strength pipe; and (e) further investigation by testing a broader sample base is needed to adequately address these issues.