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GB/T 47400-2026

**X-ray digital imaging method for the inspection of welded joints
in polyethylene pipes for petrochemical use**

石油化工用聚乙烯管道焊接接头X射线数字成像检测方法

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the China Petroleum and Chemical Industry Federation. This document is under the jurisdiction of the National Technical Committee on Standardization of Non-metallic Chemical Equipment (SAC/TC162). This document was drafted by: China Petroleum Engineering Materials Research Institute Co., Ltd., Sichuan Mingrui Jingcheng Technology Co., Ltd., and Jiangsu Shuangteng. Pipe Industry Co., Ltd., Zaozhuang Special Equipment Inspection and Research Institute, Ningbo Special Equipment Inspection and Research Institute, Weihai Special Equipment Inspection and Research Institute Fujian Provincial Boiler and Pressure Vessel Inspection and Research Institute, Jiaying Municipal Special Equipment Inspection and Testing Institute, Chengdu Municipal Special Equipment Inspection and Testing Institute (Chengdu) The Municipal Special Equipment Emergency Response Center), Foshan Testing Institute of Guangdong Provincial Special Equipment Inspection and Research Institute, and Pipeline Inspection and Testing Co., Ltd. of Pipeline Network Group (Xuzhou) Limited Liability Company, Linhai Weixing New Building Materials Co., Ltd., Hangzhou Huaan Testing Technology Co., Ltd., Sichuan Xinzhongtai New Materials Co., Ltd., Henan Su Yuanguan Industry Co., Ltd., and Tianhua Chemical Machinery and Automation Research and Design Institute Co., Ltd. The main drafters of this document are. Ma Weifeng, Yan Guanghui, Li Guangzhong, Wu Lei, Cao Guangmin, Yu Tao, Wang Ke, Nie Hailiang, Liu Linyong, and Mo Jiaming. Wang Fang, Sun Lei, Zhu Chaoming, Chen Hu, Yu Zhiyuan, Cao Fuxiang, Yang Tianxue, Ma Yunxiu, Yu Jinjie, Wu

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X-ray of welded joints of polyethylene pipes for petrochemical industry Digital imaging
detection methods

1 Scope

GB/T 47400-2026 is the Chinese national standard covering radiographing a plastic weld - a butt fusion joint in PE pipe has almost no density contrast, which is why digital detectors and careful technique are needed to see the cold welds and inclusions that a visual bead inspection cannot. First edition, 21,500 words, in force since 1 October 2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, as a first edition. The document is under the responsibility of the China Petroleum and Chemical Industry Federation. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document provides the symbols and explanations for X-ray digital imaging inspection of welded joints in polyethylene (PE) pipes used in petrochemicals. Generally, it is necessary to... Requirements, testing equipment and materials, testing methods, defect identification and measurement, result description and judgment, testing records and reports. This document applies to X-ray examination of thermofusion welded joints and electrofusion welded joints of polyethylene pipes with nominal wall thicknesses of 2mm to 100mm. Linear digital imaging detection. This document also applies to X-ray digital imaging inspection of welded joints in other thermoplastic pipes.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 3323.2 Nondestructive testing of welds-Radiological inspection-Part 2: X-ray and gamma-ray techniques using digital detectors

GB/T 12604.2 Nondestructive Testing Terminology. Radiographic Testing

GB/T 12604.11 Nondestructive Testing Terminology. X-ray Digital Imaging Inspection

GB/T 19278 General Terminology and Definitions for Thermoplastic Pipes, Fittings and Valves

GB/T 23901.1 Nondestructive testing-Radiographic inspection-Image quality-Part

3 Terms and Definitions

The terms and definitions defined in GB/T 3323.2, GB/T 12604.2, GB/T 12604.11 and GB/T 19278, as well as the following terms and definitions, apply. This document.

3.1 Buttfusion joint During the welding of polyethylene pipes, a special heating device is used to heat and melt the surfaces to be welded, and then press and fuse them together to form a continuous weld. Connecting bodies.

3.2 Electrofusion joint During polyethylene pipe welding, the resistance wire pre-embedded inside the polyethylene electrofusion sleeve is heated by energizing it, causing the polyethylene electrofusion sleeve to be inserted into the socket. The polyethylene plastic layers on the outer surface of the polyethylene pipe inside the sleeve and the inner surface of the polyethylene electrofusion sleeve are fully melted, mixed, and fused together, forming a solid structure after cooling. The connecting body (the structural form is shown in Figure 1).