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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Non-destructive testing - Guided wave testing with ultrasonic
phased array cylindrical imaging**

无损检测 相控阵超声柱面成像导波检测

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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 be subject to patents: The publisher of this document assumes no responsibility for identifying patents: This document is proposed and coordinated by the National Nondestructive Testing Standardization Technical Committee (SAC/TC56): This document was drafted by: Wuhan Zhongke Innovation Technology Co., Ltd., Shanghai Materials Research Institute Co., Ltd., State Grid Shanghai Electric Power Company Electric Power Research Institute, Jiangsu Fangtian Electric Power Technology Co., Ltd., National Petroleum and Natural Gas Pipeline Group Co., Ltd: West-East Gas Transmission Branch, Jiangsu Special Equipment Safety Supervision and Inspection Institute, Beijing University of Technology, China Energy Construction Group Co., Ltd., and Wuhan Engineering University: The main drafters of this document: Wang Zicheng, Lin Guanghui, Jiang Jiansheng, Wang Zhimin, Han Zhixiong, Gui Linlin, Li Yuke, Ding Jie, Han Lina, Luo Fangfang, Ma Junpeng, Wu Mingchang, Li Honglie, Guo Lei, Wu Jun, Liu Zenghua, Cheng Li, Zhu Qi, Yue Xianqiang: Nondestructive testing phased array ultrasonic cylindrical imaging guided wave testing

1 Scope

China's national method for guided wave testing using ultrasonic phased array cylindrical

imaging. Guided wave testing sends a low frequency ultrasonic wave along a pipe rather than through its wall, so that a single transducer ring can screen tens of metres in each direction from one access point - which is what makes it the technique for inspecting buried, insulated or elevated pipework without excavating or stripping it. Its weakness is interpretation: the conventional method reports a reflection at a distance without saying where around the circumference it lies or what it is, so an indication requires local excavation to resolve. Combining it with phased array imaging addresses exactly that, using the array to reconstruct the position around the pipe and produce an image rather than a trace. That turns a screening tool into one that can direct a repair.

This document specifies the testing principles, testing equipment, comparison test blocks, verification, testing steps, and results of phased array ultrasonic cylindrical imaging guided wave testing: Fruit evaluation and test reports: This document is applicable to phased array ultrasonic cylindrical imaging guided wave detection with a length of not more than 1500m and an outer diameter of not less than 10m and not more than 100m, transverse defects of cylindrical structural members whose length to outer diameter ratio is not less than 10:

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document:

GB/T 9445 Qualification and certification of non-destructive testing personnel GB/T 12604:

1 Non-destructive testing terminology Ultrasonic testing GB/T 12604:

13 Non-destructive testing terminology Part 13: Array ultrasonic testing GB/T 42399:

1 Non-destructive testing instruments - Performance and inspection of phased array ultrasonic equipment - Part 1: Instruments GB/T 42399:

2 Non-destructive testing instruments - Performance and inspection of phased array ultrasonic equipment - Part 2: Probes GB/T 42399:

3 Non-destructive testing instruments - Performance and inspection of phased array ultrasonic equipment - Part 3: Combined system

3 Terms and definitions

The following terms and definitions as defined in GB/T 12604:1 and GB/T 12604:13 apply to this document: 3:

1 Multiple wafers on the same plane are arranged in the circumferential direction to form a

circular (control direction) planar array:

Note: See Figure 1:

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