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

GB/T 33645-2017

**Welding procedure qualification test for laser-arc hybrid
welding of steels, nickel and nickel alloys**

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Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the re-drafting method to amend the use of ISO 15614-14..2013 "metal materials welding process specifications and assessment of welding process

Tests - Part 14. Laser - arc hybrid welding of steel, nickel and nickel alloys.

The differences between this and ISO 15614-14..2013 technologies are as follows.

--- on the normative reference documents, this standard has made a technical differences in the adjustment to meet the technical conditions of our country. Adjust the situation

The situation is reflected in Chapter 2, "Normative references", as follows.

* increased by GB/T 19869.1-2005, base metal group divided by the standard (see 8.3.1);

* increased GB/T 2654-2008, hardness test according to the standard (see 7.4.6.1);

* ISO /T R15608 referenced by ISO 15614-14..2013 is deprecated;

* Please refer to Appendix B for the correspondence and consistency of our country's standard and ISO standard.

--- Deleted ISO 15614-14..2013 Appendix A Joint Stretch Test Test Report "Elongation", "Section shrinkage" and "Yield

Strength "index, because the tensile of the welded joints does not involve these indicators.

This standard has also made the following editorial changes.

--- the standard name to "steel, nickel and nickel alloy laser - arc composite welding process assessment test."

- Added Appendix B (informative).

This standard is proposed by the National Welding Standardization Technical Committee (SAC/TC55).

The drafting of this standard. Institute of Mechanical Science and Technology Harbin
Institute of Welding, Shanghai Special Equipment Supervision and Inspection Technology
Research Institute, Guangzhou

Special pressure equipment testing Institute, Dongguan City is willing to Industrial Co., Ltd.

1 Scope

This standard specifies the test method for laser-arc composite welding process qualification.

This standard applies to steel, nickel and nickel alloys.

2 normative reference documents

The following documents are indispensable for the application of this document. For dated references, dated only dates apply to this

file. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 2650 welding joint impact test method (GB/T 2650-2008, ISO 9016..2001, IDT)

GB/T 2651 welding joint tensile test method (GB/T 2561-2008, ISO 4136..2001, IDT)

GB/T 2653 welding joint bending test method (GB/T 2653-2008, ISO 5173..2000, IDT)

GB/T 2654 Test method for hardness of welded joints (GB/T 2654-2008, ISO 9015-1..2001, IDT)

GB/T 3323 metal fusion welding joint radiography (GB/T 3323-2005, ISO 17636..2003, MOD)

GB/T 11345 Non-destructive testing of welds Ultrasonic testing technology, inspection grade and evaluation (GB/T 11345-2013,

ISO 17640..2010, MOD)

GB/T 16672 Definition of inclination and corner of weld working position (GB/T 17662-1996, ISO 6947..1993, IDT)

GB/T 18851.1 Non-destructive testing - Penetration test - Part 1. General (GB/T 18851.1-2012, ISO 3452-1..2008,

IDT)

GB/T 19805 Welding operator skills assessment (GB/T 19805-2005, ISO 14732..1998, IDT)

GB/T 19866 General principles of welding procedure and assessment (GB/T 19866-2005, ISO 15607..2003, IDT)

GB/T 19867.6 laser - arc composite welding process (GB/T 19867.6-2016, ISO 15609-6..2013, IDT)

GB/T 19868.4 Process evaluation based on pre-production welding test (GB/T 19868.4-2005, ISO 15613..2004, IDT)

GB/T 19869.1 Welding procedure qualification test for steel, nickel and nickel alloys (GB/T 19869.1-2005, ISO 15614-1..2004, IDT)

GB/T 26951 Non-destructive testing of welds Magnetic particle inspection (GB/T 26951-2011, ISO 17638..2003, MOD)

GB/T 26955 Destructive test of welds in metallic materials - Macro and micro inspection of welds (GB/T 26955-2011, ISO 17639..2003, MOD)

GB/T 32259 Nondestructive testing of welds Fused joint inspection (GB/T 32259-2015, ISO 17637..2003, MOD)

GB/T 33214 Guidance on classification of defects in laser-arc composite welded joints for steel, nickel and nickel alloys (GB/T 33214-2016, ISO 12932..2013, MOD)

3 terms and definitions

GB/T 19866 Definitions and the following terms and definitions apply to this document.