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**Method of inspection and acceptance
levels for resistance spot welds**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Welding Engineering Society (JWES) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS Z 3140:1989** is replaced with this Standard.

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Method of inspection and acceptance levels for resistance spot welds

1 Scope

This Japanese Industrial Standard specifies the grades, inspection method and acceptance criteria for resistance spot welds (hereafter referred to as welds) of mild steel, low alloy steel, high strength steel, stainless steel, aluminium and aluminium alloy materials with a sheet thickness not less than 0.4 mm and not greater than 5.0 mm. This Standard is applicable to surface-treated materials.

Further, this Standard is only applicable to resistance spot welding which forms nuggets.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS Z 3001-1 *Welding and allied processes — Vocabulary — Part 1 : General*

JIS Z 3001-2 *Welding and allied processes — Vocabulary — Part 2 : Welding processes*

JIS Z 3001-6 *Welding and allied processes — Vocabulary — Part 6 : Resistance welding*

JIS Z 3136 *Specimen dimensions and procedure for shear testing resistance spot and embossed projection welded joints*

JIS Z 3137 *Specimen dimensions and procedure for cross tension testing resistance spot and embossed projection welded joints*

JIS Z 3139 *Methods of macro testing and Vickers hardness testing for section of resistance spot, projection and seam welds*

JIS Z 3144 *Routine test of resistance spot and projection welds*

JIS Z 3400 *Quality requirements for fusion welding of metallic materials*

3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in JIS Z 3001-1, JIS Z 3001-2, JIS Z 3001-6, JIS Z 3144 and JIS Z 3400, and the following apply.

3.1 high strength steel

steel whose parent material has a tensile strength of not less than 370 MPa and not greater than 1 180 MPa

3.2 Type 1 tests

tests carried out for such purposes as establishment of welding conditions, evaluation of welding equipment and confirmation of weldability of materials, using single weld specimen either prepared individually or cut out from multiple weld test piece

3.3 Type 2 tests

tests carried out on test specimen cut out from the welded portion of a product or from the product-equivalent component, or directly carried out on the welds on the product

NOTE : Tests under this category are mainly applied to quality inspection of welds on products.

3.4 acceptance criteria

criteria laid out for tests or inspection on welds to determine whether or not the welds satisfy the specified requirements

4 Weld grades

The welds are graded according to the nugget diameter and planarity of weld surface, as shown in Table 1. Instead of nugget diameter, weld diameter may be used for grading. Weld grades A, AF, B and BF guarantee tensile shear strength and cross tensile strength, and are required to satisfy the corresponding weld strength requirements given in Tables 7, 8, and 9. The required grade of weld shall be stated in the welding procedure specifications or documented as the design information.

NOTE : The preparation of welding procedure specifications is specified in JIS Z 3400.

Table 1 Weld grades

Weld grade	Nugget diameter and surface planarity
Grade A	Formation of nuggets $5\sqrt{t}$ or more in average diameter
Grade B	Formation of nuggets $4\sqrt{t}$ in average diameter
Grade C	Formation of nuggets $3.5\sqrt{t}$ in average diameter
Grade AF	Formation of nuggets of Grade A size, plus surface planarity
Grade BF	Formation of nuggets of Grade B size, plus surface planarity
Grade CF	Formation of nuggets of Grade C size, plus surface planarity
NOTE : t : plate thickness (mm)	

5 Inspection items

5.1 Inspection and tests

The inspection items, divided into Type 1 and Type 2 test items, are listed in Table 2 for each weld grade. However, the items to be actually tested shall be agreed between the interested parties and a part of the items listed in Table 2 may be omitted. The inspection items to be employed shall be recorded in the welding procedure specifications.