JIS A5525 Steel pipes piles

1. Scope

This Japanese Industrial Standard specifies the welded steel pipe piles (hereafter referred to as "piles"), used in the foundation of structures such as civil engineering works and architecture.

Remark

1. The piles for landslide determent are included.

2. The standards cited in this Standard are shown in Attached Table 1.

2. Constitution of pile and designation of each part of pile

The constitution of a pile and the designation of each part of a pile shall be as follows:

2.1 The pile shall comprise a single pipe or a combination of single pipes and the designation of each part of pile shall be as shown in Fig. 1.



2.2 A blank pipe is defined as pipe produced by are welding or electric resistance welding from a steel strip or a steel plate. A single pipe is defined as a blank pipe as it is or blank pipes jointed by circumferential welding at shop.

Further, the seam weld of blank pipes shall be welded with not less than 1/8 of the circumference of the pipes shifted out of place.

2.3 When blank pipes are to be welded together at site, the upper side, the middle side and the lower side of single pipes shall be called the upper pile, the middle pile and the

lower pile, respectively. In the case where the middle pile consists of two or more pipes, they are defined as the first middle pile, the second middle pile and so on from the lowest side upward.

| Standard basis | ĸs | | JIS | JIS | | |
|------------------|------------|------------|------------|------------|-----|--|
| Standard num. | F4602 | | A5525 | A5525 | | |
| | Old symbol | New symbol | Old symbol | New symbol | - | |
| | SPS30 | SPS290 | - | - | Gr1 | |
| Sumbol for close | SPS41 | SPS400 | SKK41 | SKK400 | Gr2 | |
| Symbol for class | SPS51 | SPS500 | - | - | | |
| | SPS50 | SPS490 | SKK50 | SKK490 | Gr3 | |
| | SPS55 | SPS540 | - | - | - | |

World standard comparative table

3. Welding materials and accessories

Welding materials and accessories shall be as follows

3.1 Welding materials used for the shop circumferential weld to connect blank pipes into a single pipe and for mounting the accessories shall have a tensile strength not less than that of the materials for the blank pipes and accessories and meet the requirements of one of the following standards:

JIS Z 3211

JIS Z 3212

JIS Z 3312

JIS Z 3313

JIS Z 3351

JIS Z 3352

4. Shape, dimensions, mass and tolerances

4.1 Shapes the shapes of the piles shall be as follows:

(1) The shapes of both ends of pile and site circumferential weld shall be as shown in Fig. 2. When the pipes different in thickness are to be connected, they shall be preliminarily worked at shop as shown in Fig. 3, as a rule. If especially required, reinforcement or work may be determined by agreement between the parties concerned with delivery.

Fig. 2. Shapes of both ends of pile and site circumferential weld







Note

(1) The length of cutting part inside the pipe shall be larger than 4(t1-t2). When t1-t2 is not more than 2 mm, or when t1-t2 is not more than 3 mm in the case of both-side welding of the shop circumferential weld, the cutting is not required.

(2) The length of blank pipe in the case of shop circumferential weld shall be not less than 2 m as a rule.

(2) Unless otherwise specified, the shapes and dimensions of the backing ring used for the backing strip of the site circumferential weld of pile and the dimensions of stopper attached to the lower pile shall be as shown in Fig. 4.



| Thickne | ss an | d height | of lbacking ring |
|----------------------|-------|---------------|---|
| | | | Unit: mm |
| Outside diameter D | T | \widehat{H} | ĥ |
| 1016 and under | 4.5 | 50 | $\widehat{155}$, in the case of $\widehat{H} = \widehat{50}$ |
| Over 1016 | 6.0 | 70, 50(3) | $\widehat{355}$, in the case of $\widehat{H} = \widehat{70}$ |

Note $(^3)$ 50 mm shall be taken when the pile installation by inner excavation is applied.

4.2 Dimensions and mass of single pipe

The dimensions and mass of the single pipe shall be as follows:

(1) Unless otherwise specified, the outside diameter, thickness, cross-sectional area and mass of single pipe shall be as given in Table 1 and Table2.

| | | Reference | | | | | |
|---------------------------|-----------------|------------------------------|-------------------|---|----------------------------|---------------------------------------|-----------------------------|
| Outside diameter mm | Thickness mm | Cross-sectional area P | Unit mass kg/m | Geometrical moment of area I(H ⁴) | Section modulus Z(Ж) | Radius of gyration of area i(H) | Outside surface area C/m |
| | 9 | 110.6 | 86.8 | 211 】 10 ² | 106】10 | 13.8 | 1.26 |
| 400 | 10 | 122.5 | 96.2 | 233】10 ² | 117】10 | 13.8 | 1.26 |
| | 11 | 134.4 | 106 | 254】10 ² | 127】10 | 13.8 | 1.26 |
| | 12 | 146.3 | 115 | 276】10 ² | 138】10 | 13.7 | 1.26 |
| 500 | 9 | 138.8 | 109 | 418】10 ² | 167】10 | 17.4 | 1.57 |
| | 10 | 153.9 | 121 | 462】10 ² | 185】10 | 17.3 | 1.57 |
| | 11 | 169.0 | 133 | 505】10 ² | 202】10 | 17.3 | 1.57 |
| | 12 | 184.0 | 144 | 548】10 ² | 219】10 | 17.3 | 1.57 |
| | 13 | 198.9 | 156 | 590】10 ² | 236】10 | 17.2 | 1.57 |

Table 1. Dimensions and mass

| | 14 | 213.8 | 168 | 632】10 ² | 253】10 | 17.2 | 1.57 |
|-----|----|-------|-----|-----------------------|--------|------|------|
| | 9 | 167.1 | 131 | 730】10 ² | 243】10 | 20.9 | 1.88 |
| | 10 | 185.4 | 145 | 807】10 ² | 269】10 | 20.9 | 1.88 |
| | 11 | 203.5 | 160 | 883】10 ² | 294】10 | 20.8 | 1.88 |
| 400 | 12 | 221.7 | 174 | 958】10 ² | 319】10 | 20.8 | 1.88 |
| 000 | 13 | 239.7 | 188 | 103] 10 ³ | 344】10 | 20.8 | 1.88 |
| | 14 | 257.7 | 202 | 111 】 10 ³ | 369】10 | 20.7 | 1.88 |
| | 15 | 275.7 | 216 | 118】10 ³ | 393】10 | 20.7 | 1.88 |
| | 16 | 293.6 | 230 | 125 】 10 ³ | 467】10 | 20.7 | 1.88 |
| | 9 | 195.4 | 153 | 117] 10 ³ | 333】10 | 24.4 | 2.20 |
| | 10 | 216.8 | 170 | 129】10 ³ | 369】10 | 24.4 | 2.20 |
| | 11 | 238.1 | 187 | 141 】10 ³ | 404】10 | 24.4 | 2.20 |
| 700 | 12 | 259.4 | 204 | 154】10 ³ | 439】10 | 24.3 | 2.20 |
| 700 | 13 | 280.6 | 220 | 166 】10 ³ | 473】10 | 24.3 | 2.20 |
| | 14 | 301.7 | 237 | 178】10 ³ | 507】10 | 24.3 | 2.20 |
| | 15 | 322.8 | 253 | 189] 10 ³ | 541】10 | 24.2 | 2.20 |
| | 16 | 343.8 | 270 | 201] 10 ³ | 575]10 | 24.2 | 2.20 |

| | ~ | D ¹ | |
|---------|---|-----------------------|------|
| Table | 2 | Dimensions | mass |

| | | Reference | | | | | |
|---------------------------|-----------------|--------------------------------|------------------------|--|----------------------------|------------------------------------|-----------------------------------|
| Outside diameter mm | Thickness mm | Cross-sectional area A P | Unit mass W kg/m | Geometrical moment of area I(H ⁴) | Section modulus Z(Ж) | Radius of gyration of area i(H) | Outside surface area C/m |
| 406.4 | 9 | 112.4 | `88.2 | 222] 10 ² | 109】10 | 14.0 | 1.28 |
| | 10 | 124.5 | 97.8 | 245] 10 ² | 120] 10 | 14.0 | 1.28 |

| | 11 | 136.6 | 107.0 | 267] 10 ² | 132】10 | 14.0 | 1.28 |
|-------|----|-------|-------|-----------------------|----------|------|------|
| | 12 | 148.7 | 117 | 289】10 ² | 142】10 | 14.0 | 1.28 |
| | 9 | 141.1 | 111 | 439】10 ² | 173] 10 | 17.6 | 1.60 |
| | 10 | 156.4 | 123 | 485】10 ² | 191] 10 | 17.6 | 1.60 |
| E08 0 | 11 | 171.8 | 135 | 531] 10 ² | 209】10 | 17.6 | 1.60 |
| 508.0 | 12 | 187.0 | 147 | 575] 10 ² | 227】10 | 17.5 | 1.60 |
| | 13 | 202.2 | 159 | 620】10 ² | 244】10 | 17.5 | 1.60 |
| | 14 | 217.3 | 171 | 663] 10 ² | 261] 10 | | |

4.3 Shapes and tolerance

(1) The shapes and tolerances on dimensions of the single pipe shall be as given in Table 5.

| L | Ta | ble 5. Shapes and to | lerances on din | nensions Remarks |
|----------------------------|--------------------------|---|-----------------------------|--|
| Outside di- ameters (D) | Pipe end part | 19101 | ± 0.5 % | Outside diameter (D) = length of outside circumference + π |
| | | Outside diameter Under 500 mm | + not specified - 0.6 mm | Xee at a second |
| (1) | Thickness under 16 mm | Outside diameter 500 mm to 800 mm excl. | + not specified - 0.7 mm | 1 |
| kness | | Outside diameter 800 mm to 2000 mm incl. | + not specified - 0.8 mm | 2 <u>—</u> 2 |

| 1.2 | | | | |
|--|--|---|---|----|
| Thi | Thickness | Outside diameter Under 800 mm | + not specified - 0.8 mm | |
| | 16 mm and over | Outside diameter 800 mm to 2000 mm incl. | + not specified - 1.0 mm | |
| Leng | gth (L) | | + not specified 0 | |
| War | ping (M) | | Within 0.1 % of length (L) | |
| Flatness of end face forming the site circumferential weld (h) | | | 2 mm and under | |
| Perp | endicularity of e circumferential v | nd face forming the veld (c) | Within 0.5 % of outside diam- eter with the maximum of 4 mm | 90 |

Remarks: The single pipe having an outside diameter exceeding 2000 mm or in the case where $\frac{t}{D}$ is less than 1.0 % shall be preliminarily agreed upon by the parties concerned with delivery.

(2) The allowable value of dislocation for connecting the outsides of single pipes on site (hereafter referred to as "dislocation of site circumferential weld") shall be as given in Table 6.

| Outside diameter | Allowable value | Remarks |
|-----------------------------|-----------------|---|
| Under 700mm | 2 mm and under | Indicate the difference in length of outside circumference between the upper pile and the lower pile, |
| | 2 mm and under | and the lower pile, and make the difference not more than 2 mm |
| 700 mm to and incl. 1016 mm | 3 mm and under | Indicate the difference in length of outside circumference between the upper pile and the lower pile, |

Table 6. Allowable values of dislocation of site circumferential weld

| | | and the lower pile, and make the difference not more than 3 mm |
|---------------------------|----------------|---|
| Over 1016 mm to and incl. | | Indicate the difference in length of outside circumference between the upper pile and the lower pile, |
| 2000 mm | 4 mm and under | and the lower pile, and make the difference not more than 4 mm |

Remarks

1. The single pipe of an outside diameter exceeding 2000 mm and of t/D less than 1.0 % shall be preliminarily agreed upon by the parties concerned with delivery.

2. When it is necessary to decide the combination of a part or all of single pipes to be combined shall be marked with a number or symbol to foreclose error during site works.

5.Test

5.1 Analysis test

The analysis test shall be as follows:

(1) The general items and sampling method of the analysis test shall be as specified in 3. (Chemical composition) of JIS G 0303.

(2) The analysis method shall be in accordance with one of the following standards:

JIS G 1211

- JIS G 1212
- JIS G 1213
- JIS G 1214
- JIS G 1215
- JIS G 1253

JIS G 1256

JIS G 1257

5.2 Tensile test

5.2.1 Test piece The test piece shall be as follows:

(1) The test piece for the tensile test shall be No. 5 test piece specified in JIS Z 2201 and the sampling method shall be either one of the following:

(a) Cut the test piece, for the pipe other than the one formed by expanding, from the pipe itself or from steel plates, sheets or strips used for the pipe.

(b) Cut the test piece, for the pipe formed by expanding, from the pipe itself.

(2) Weld tensile test piece of arc welded steel pipe shall be No 1. test piece specified in JIS Z 3121, and shall be cut from the specimen taken from the end part welded under the same conditions as the pipe or pipe body.

5.2.2 Test method The test method shall be in accordance with JIS Z 2241.

5.3 Flatness test

5.3.1 Test pieces From a steel pipe welded by electric resistance welding, cut out a length not less than 50 mm from its end to make a flatness test piece.5.3.2 Test method The test method shall be as follows : Put the test piece between two flat plates as it is kept at ordinary temperature, compress it until the distance between the flat plates becomes the specified distance and when the test piece becomes flat, examine the existence of flaws or cracks on the wall of pipe.

6. Inspection

6.1 Inspection

The inspection shall be as follows:

(1) The general items of inspection shall be as specified in JIS G 0303.

(2) The inspection of shape, dimensions and appearance of the piles shall be carried out for each pile and the results shall comply with the specifications of 3. (2), 7. and 8.

(3) The chemical composition and mechanical properties of the blank pipes shall comply with the specifications of 4. and 5.

(4) The purchaser may specify the non-destructive inspection on the shop circumferential weld.

The criteria of acceptance or rejection for this inspection shall be preliminarily agreed upon between the parties concerned with delivery.

6.2 Reinspection

A retest in accordance with 4.4 (Reinspection0 of JIS G 0303 may be conducted for final acceptance.

7. Marking

The single pipe accepted in the inspection shall be indelibly marked with the following items. The order of arranging the items is not specified.

(1) Symbol for class

(2) Manufacturer's mane of abbreviation

(3) Serial number of manufacture

(4) Dimensions (outside diameter, thickness and length)

8. Report

The manufacturer shall submit an inspection certificate and the table of dimension inspection result (one for every 10 or its fraction) to the purchaser.