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Precast prestressed concrete products

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In the event of any doubts arising as to the contents,
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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 Japan Precast Concrete Standard Committee (JPCC)/Japanese Standards Association (JSA) 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 A 5373**:2010 is replaced with this Standard.

However, **JIS A 5373**:2010 may be applied in the **JIS** mark certification based on the relevant provisions of Article 19 Clause 1, etc. of the Industrial Standardization Law until October 19, 2016.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Precast prestressed concrete products

1 Scope

This Japanese Industrial Standard specifies the precast prestressed concrete products (hereafter referred to as PC products). However, this Standard is not applied to the concrete products for buildings separately specified in Japanese Industrial Standards.

This Standard is not applied to the products which use the prestressing tendon [1], etc. for the purpose of ensuring the safety in construction, and is not intended to have the prestressed concrete structure.

The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex F.

Note [1] The prestressing tendon means the materials specified in **JIS G 3109**, **JIS G 3137** and **JIS G 3502**.

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) listed below shall be applied.

JIS A 0203 *Concrete terminology*

JIS A 1108 *Method of test for compressive strength of concrete*

JIS A 1136 *Method of test for compressive strength of spun concrete*

JIS A 5361 *Precast concrete products—General rules for classification, designation and marking*

JIS A 5362 *Precast concrete products—Required performance and methods of verification*

JIS A 5363 *Precast concrete products—General rules for methods of performance test*

JIS A 5364 *Precast concrete products—General rules of materials and product methods*

JIS A 5365 *Precast concrete products—General rules for method of inspection*

3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in **JIS A 0203**, and the following apply.

3.1 Group I

PC products which are manufactured based on specifications that have been confirmed by actual results to satisfy the required performances

The recommended specifications are shown in respective Annexes.

3.2 Group II

PC products manufactured based on the performance requirements and specification which are agreed previously between the parties concerned with delivery

4 Classification

PC products shall be classified as specified in Table 1 according to the applications.

They shall be classified into Group I and Group II according to the determination method of performance and specification.

Table 1 Classification of PC products

Type	Applicable clause in Annex
Poles	See **A.2**.
Bridges	See **B.2**.
Retaining walls	See **C.2**.
Covered conduits	See **D.2**.
Piles	See **E.2**.
Other products Example : Disaster prevention facilities	As agreed between the parties concerned with delivery.
NOTE : Each Annex contains specifications of Group I and Group II. Recommended specification is provided for Group I, but not for Group II.	

5 Quality

5.1 Appearance

PC products shall be free from any flaw, crack, chip, camber, torsion (board products), etc. detrimental to practical use.

5.2 Performance

The performance according to the type of PC products shall conform to the provisions of Table 2. The performance tests for the verification of performances shall be as specified in **9.2**.

Table 2 Performances of PC products

Type	Applicable clause in Annex
Poles	See **A.3**.
Bridges	See **B.3**.
Retaining walls	See **C.3**.
Covered conduits	See **D.3**.
Piles	See **E.3**.
Other products Example: Disaster prevention facilities	a) **Performance** Specific items of performance shall be selected and designated as agreed between the parties concerned with delivery according to **JIS A 5362**. When the correlativity between the performance and the product specifications (dimensions, materials, constructions, etc.) is proven by actual results, the product specification indicated in **b**) may be alternatively given. b) **Alternative specification for performance** As follows. 1) Dimensions 2) Compressive strength of concrete 3) Bar arrangement 4) Effective prestress

6 Shape, dimensions and dimensional tolerances

The shape, dimensions and dimensional tolerances shall be as specified in Table 3.

Table 3 Shape, dimensions and dimensional tolerances of PC products

Type	Applicable clause in Annex
Poles	See **A.4**.
Bridges	See **B.4**.
Retaining walls	See **C.4**.
Covered conduits	See **D.4**.
Piles	See **E.4**.
Other products Example: Disaster prevention facilities	As agreed between the parties concerned with delivery.

7 Bar arrangement and tolerances on bar arrangement

The bar arrangement (reinforcing bar and prestressing tendon) of PC products shall be measured as specified in **9.3**, and the arrangement and the tolerance shall conform to the provisions of the following **a**) and **b**).

a) **Bar arrangement** The bar arrangement (including covering of reinforcing bar) shall be as specified in Table 4. However, as agreed between the parties concerned with delivery, other bar arrangement may be adopted unless it compromises the performance of PC products (including the provisions of **5.2**). The manufacturer

shall prepare the bar arrangement drawing for each product, and shall provide it to the purchaser, if requested.

Table 4 Bar arrangement of PC products

Type	Applicable clause in Annex
Poles	See **A.5**.
Bridges	See **B.5**.
Retaining walls	See **C.5**.
Covered conduits	See **D.5**.
Piles	See **E.5**.
Other products Example : Disaster prevention facilities	Determined by the manufacturer.
NOTE : General precautions for designing the bar arrangement should be as follows. — The minimum gap between the reinforcing bar and the prestressing tendon should be at least 5/4 of the maximum dimension of coarse aggregates. — The necessary cross-sectional area of reinforcing bar and prestressing tendon shall be determined from the structural calculation or the structural details; however, there are more than one combination of diameter and the number of reinforcing bars and prestressing tendons which satisfy the cross-sectional area. The diameter and the number of reinforcing bars and prestressing tendons shall be selected in consideration of the thickness of components, the maximum dimension of coarse aggregates, etc. The bar arrangement shall be selected to ensure the complete adhesion between the reinforcing bar, prestressing tendon and concrete, and to obtain the good crack dispersion of concrete components.	

b) **Tolerance on bar arrangement** The tolerance on bar arrangement [2)] shall be determined by the manufacturer according to the type of product within the range in which the required performance can be satisfied.

Note [2)] The tolerance on bar arrangement means the limit of deviation between the positions of reinforcing bar and prestressing tendon indicated on the bar arrangement drawing, and the positions of reinforcing bar and prestressing tendon of the product.

8 Materials and production methods

The materials used for PC products and the production methods shall be as specified in **JIS A 5364**.

9 Test methods

9.1 Appearance test

The appearance shall be tested visually, and the product shall be examined for flaw, crack, chip, camber, torsion (in the case of board products), etc. detrimental to practical use.

9.2 Performance test

The test method of performance shall be as specified in **JIS A 5363** and Table 5.

Table 5 Performance test method of PC products

Type	Applicable clause in Annex
Poles	See **A.7**.
Bridges	See **B.7**.
Retaining walls	See **C.7**.
Covered conduits	See **D.7**.
Piles	See **E.7**.
Other products Example: Disaster prevention facilities	As agreed between the parties concerned with delivery.

9.3 Measurement of bar arrangement

In the measurement of bar arrangement, the diameter, number and covering of reinforcing bars and prestressing tendons shall be checked. The method shall be any of the following.

a) **Method by non-destructive test** The measurement by the non-destructive test shall be conducted using the electromagnetic induction method, radar method, etc. According to each designated measurement method, the diameter, number, and covering of reinforcing bars and prestressing tendons shall be measured.

b) **Method using broken sample** The measurement using the broken sample shall be conducted after finishing the performance test such as outside pressure test. The concrete part of the sample shall be chipped; reinforcing bars shall be exposed; and the diameter of reinforcing bar and prestressing tendon, and the number and covering thereof shall be measured.

c) **Method using bar arrangement before placing concrete** If the positions of reinforcing bar and prestressing tendon before and after placing concrete are not affected by the assembly method of reinforcing bar and prestressing tendon, fixing method of reinforcing bar and prestressing tendon to a formwork, and securing method of covering, the positions of reinforcing bar and prestressing tendon can be regarded as the positions of reinforcing bar and prestressing tendon of finished product by measuring the diameter, number, and covering of reinforcing bar and prestressing tendon before placing concrete.

10 Inspections

10.1 Division and items of inspections

The inspections on PC products are divided into the final inspection and the delivery inspection and as follows.

a) **Final inspection** The final inspection shall be conducted by the manufacturer of product on the following items.