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Authorised and notified according to Article 10 of the Council Directive (89/106/EEC) of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products.



European Technical Approval ETA-05/0224

Trade name:

James Jones JJI-Joist

Holder of approval:

James Jones & Sons Ltd
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Generic type and use of construction product:

Light composite wood-based beams and columns for structural use

Valid from: to:

24th November 2005
30th November 2010

Manufacturing plant:

James Jones & Sons Ltd
Timber Systems Division
Greshop Industrial Estate
Forres
Morayshire IV36 2GW
UK

This European Technical Approval contains:

8 pages including two Annexes which form an integral part of the document



European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

1 This European Technical Approval is issued by the British Board of Agrément in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 [Construction Products Directive (CPD)] on the approximation of laws, regulations and administrative provisions of Member States relating to construction products⁽¹⁾, modified by the Council Directive 93/68/EEC of 22 July 1993⁽²⁾
- UK implementation of CPD Statutory Instruments 1991, No 1620. The Building and Building Construction Products Regulations 1991 — made 15 July 1991, laid before Parliament 22 July 1991, coming into force 27 December 1991, and amended by the Construction Products (Amendment) Regulations 1994 (Statutory Instruments 1994, No 3051)
- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC⁽³⁾
- EOTA Guideline for European Technical Approval ETAG 011 *Light Composite Wood-based Beams and Columns*, January 2002.

2 The British Board of Agrément is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4 This European Technical Approval may be withdrawn by the British Board of Agrément, in particular after information by the Commission on the basis of Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European Technical Approval, including transmission by electronic means, shall be in full. However, partial reproduction can be made with the written consent of the British Board of Agrément. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.

6 The European Technical Approval is issued by the approval body in its official language. This version should correspond to the version circulated within EOTA. Translations into other languages have to be designated as such.

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

Definition of product

JJI Joists are I-joists of composite construction with solid timber flanges and OSB webs and are available in a range of sizes (see Annex 1).

The flanges are of grade C24 structural timber to BS 4978 : 1996, planed all around (PAR) and finger jointed to length in accordance with EN 385 : 2001.

The web, consisting of OSB to EN 300 : 1997 and EN 12369-1 : 2001 and with the strand parallel to the span, is glued into the grooved flanges in 2440 mm long sections. The OSB sections have glued tongue-and-groove joints to form a continuous web.

Two-part phenol-resorcinol, or one-part polyurethane, adhesive is used in all joints.

Intended use

The product is intended for use as structural elements, eg floor joists, beams, rafters, wall studs, ceiling ties, as defined in BS EN 1995-1-1 : 2004 (Eurocode 5) and Essential Requirements 1, 2, 3 and 6 *Mechanical resistance and stability, Safety in case of fire, Hygiene, health and environment and Energy economy and heat retention* respectively (CPD, Annex 1), apply.

The provisions made in this ETA are based on an assumed intended working life for the joist of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be used as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

2 Characteristics of product and methods of verification

The assessment of fitness for the intended use (see part II, section 1) has been made in accordance with ETAG 011.

The product is available in the range given in part II, section 1, and has the characteristics listed in Annex 2.

ER1 Mechanical resistance and stability

The mechanical properties and characteristic load-carrying capacities for the product have been derived in accordance with ETAG 011. They should be used for designs in accordance with BS EN 1995-1-1 : 2004 (Eurocode 5). The load-carrying capacities have been derived by calculation and by design assisted by test.

No performance has been determined in relation to ductility of a joist under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed and is outside the scope of this ETA.

ER2 Safety in case of fire

In relation to reaction to fire, the joists are classified as D-s2, d0, in accordance with EN 13501-1 : 2002 by reference to EC Decision 2003/43/EC.

Performance in relation to fire resistance would be determined for the complete structural element with any associated finishes, therefore, for a joist, there are no

(1) Official Journal of the European Communities No L40, 11.2.1989, p12.

(2) Official Journal of the European Communities No L220, 30.8.1993, p1.

(3) Official Journal of the European Communities No L17, 20.1.1994, p34.

aspects of performance relevant to this aspect of this Essential Requirement.

ER3 Hygiene, health and environment

According to the manufacturer's declaration, apart from the OSB web having a formaldehyde potential class of E1 in accordance with BS EN 13986 : 2002, the product specification has been compared with the dangerous substances detailed in Council Directive 76/769/EEC (as amended) and listed on the database established on the EC construction website to verify that it does not contain such substances above the acceptable limits.

The joists are not preservative-treated nor do they contain pentachlorophenol.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (eg transposed European legislation and national laws, regulations and administrative provisions). To meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

ER4 Safety in use

Not relevant to this product.

ER5 Protection against noise

Not relevant to this product.

ER6 Energy economy and heat retention

When calculating heat losses, the thermal conductivity (λ) of the JJI-joist may be taken as $0.13 \text{ Wm}^{-1}\text{K}^{-1}$.

Aspects of durability, serviceability and identification

The product is for use in Service Classes 1 and 2 as defined in Eurocode 5 and in Hazard Classes 1 and 2 as defined in EN 335-1 : 1992. In such environments, in a well designed and maintained construction, the product can be expected to have a working life in excess of 50 years.

Attack from insects such as house longhorn beetle, dry wood termites and woodworm may reduce the durability of the product.

The ability of the joists to resist loads without undue deflection (serviceability) is dealt with in the section headed *ER1 Mechanical resistance and stability*.

Each joist bears the manufacturer's identification mark, the product type and the CE marking as described in section 3.3.

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity system

The system of attestation of conformity applied to this product shall be that laid down in the CPD, Annex III, 2(i) (referred to as System 1).

3.2 Responsibilities

3.2.1 Tasks for the manufacturer, factory production control

The manufacturer continues to operate a factory production control system. All elements, requirements and

provisions adopted by the manufacturer are documented to ensure that product conforms with this ETA.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan⁽⁴⁾. The raw materials shall be subject to controls and tests by the manufacturer before acceptance. Checks on incoming materials, shall include control of the certificates of conformity presented by suppliers (comparison with nominal values) by verifying dimensions and determining material properties.

The manufactured joists are checked for:

- flange and web material
- dimensional accuracy
- visual quality
- glue spread
- fit of component parts
- strength of completed joist.

The frequency of controls and tests conducted during production and on the assembled joist is laid down in the prescribed test plan, taking account of the manufacturing process of the joist.

The results of factory production control are recorded and evaluated. The records include at least:

- designation of the product, basic material and components
- type of control or testing
- date of manufacture of the product and date of testing of the product or basic material and components
- result of control and testing and, if appropriate, comparison with requirements
- signature of person responsible for factory production control.

The records shall be presented to the inspection body involved in the continuous surveillance.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan included in the technical documentation of this European Technical Approval.

(4) The control test plan has been deposited with the British Board of Agrément and is only made available to the approved bodies involved in the conformity attestation procedure.

3.2.2 Tasks for approved bodies

3.2.2.1 Initial type-testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary type-testing has to be agreed between the British Board of Agrément and the approved body involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan, the factory, in particular the staff and equipment, and the factory production control, are suitable to ensure a continuous and orderly manufacturing of the joist with the specifications given in part II, section 2.

3.2.2.3 Continuous surveillance

The approved body shall visit the factory at least twice per year for routine inspections. It shall be verified that the system of factory production control and the specified manufacturing processes are maintained, taking account of the prescribed test plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body to the British Board of Agrément.

Where the provisions of the European Technical Approval and the prescribed test plan are no longer fulfilled, the certificate of conformity shall be withdrawn by the certification body.

3.3 CE marking

The CE marking⁽⁵⁾ shall be affixed to each joist and the accompanying documentation. The CE symbol shall be accompanied by the following information:

- identification number of the certification body
- identification of the product
- name or identification mark of producer and the registered address of the producer
- the last two digits of the year in which the CE marking was affixed
- number of the EC certificate of conformity
- number of the European Technical Approval.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The joists are manufactured in accordance with the provisions of the European Technical Approval using the manufacturing processes as identified in the inspection of the plant by the British Board of Agrément and the approved body and laid down in the technical documentation.

4.2 Installation

A joist is deemed fit for its intended use provided:

- it is designed in accordance with Eurocode 5 or an appropriate national code using the design data given in Annex 2. Design and detailing of structures containing JHJoists as loadbearing elements should be carried out by a suitably experienced person in accordance with the manufacturer's instructions and the requirements of this ETA
- verifiable calculation, notes and drawings are prepared taking account of the loads to be resisted
- characteristic values, as shown in Annex 2 are used. For bearing lengths other than those shown in Table 3, the manufacturer's advice should be sought.

4.3 Criteria

The fitness for use of the joist can be assumed if it is installed correctly in accordance with the following requirements:

- installation is carried out by personnel under the direction of supervisors, all of whom are appropriately qualified for this work
- installation is in accordance with the manufacturer's specifications and drawings prepared for that purpose, and the appropriate tools are used
- the flanges must not be drilled, notched or otherwise altered on site
- The joists should be handled and installed in a similar manner to solid timber beams. However, the strength and stiffness of joists about their minor axis is less than that of corresponding solid timber sections. Therefore, care must be exercised to ensure that joists are not damaged during handling due to bending about their minor axis. In accordance with normal good practice for timber the joists should be protected from wetting during installation
- the characteristic bending moments given in Annex 2, Table 1, are based on the assumption that lateral bracing to the compression flange (at a spacing not exceeding ten times the flange width) is in place. Alternative bracing will require separate analysis
- depending on the Service Class, characteristic values for shear and deflection should be modified by the factors in Tables 4 and 5. As failure can be governed by the web as well as the flange, the manufacturer should be consulted as to the appropriate factors to be used for the bearing values
- the joists should have a moisture content at the time of installation close to that attained in service
- temporary bracing should be provided to keep the joists in a straight and plumb position during installation
- rigid service pipes can be incorporated within the floor or roof void by passing through site-cut holes in accordance with the manufacturer's literature or software.

(5) See EU commission Guidance Paper D CE Marking under the Construction Products Directive.

5 Recommendations

5.1 Recommendations on packaging, transport and storage

Delivery and site storage must be carried out in accordance with the manufacturer's instructions.

During transportation the joists must be protected from adverse weather.

The joists should be stored clear of the ground and stacked with the webs vertical. Precautions should be taken to minimise changes in moisture content due to the weather. Full cover should be provided but with sufficient ventilation to permit free passage of air.

5.2 Recommendations on use, maintenance and repair

The assessment of the fitness for use is based on the assumption that maintenance is not required during the assumed intended working life.

Should repair prove necessary, an assessment must be made in each case.

It is the responsibility of the manufacturer to ensure that the information on the specific conditions given in part II, sections 1, 2, 4.2 and 4.3, is given to those concerned. This information may be communicated by replicating the respective parts of the European Technical Approval. In addition, all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).



On behalf of the British Board of Agrément

Date of issue: 24th November 2005



Chief Executive

ANNEX 1 PRODUCT DETAILS

Figure 1 Section

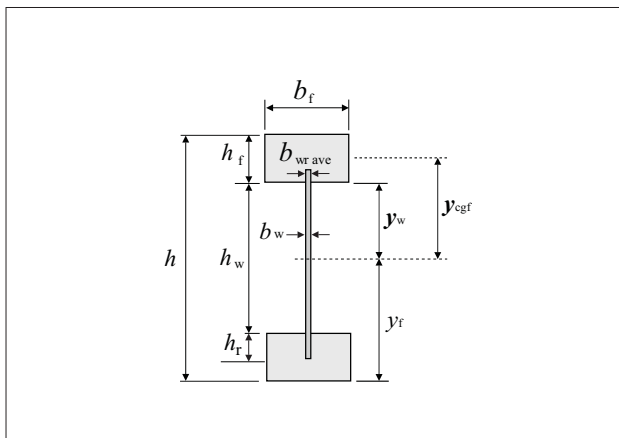


Table 1 Dimensions

| Designation | Depth nominal (mm) | Flange depth x width (mm) |
|-------------|--------------------|---------------------------|
| JJI 145 A | 145 | 45 x 45 |
| JJI 195 A | 195 | 45 x 45 |
| JJI 195 B | 195 | 45 x 60 |
| JJI 195 C | 195 | 45 x 72 |
| JJI 195 D | 195 | 45 x 97 |
| JJI 220 A | 220 | 45 x 45 |
| JJI 220 B | 220 | 45 x 60 |
| JJI 220 C | 220 | 45 x 72 |
| JJI 220 D | 220 | 45 x 97 |
| JJI 235 A | 235 | 45 x 45 |
| JJI 235 B | 235 | 45 x 60 |
| JJI 235 C | 235 | 45 x 72 |
| JJI 235 D | 235 | 45 x 97 |
| JJI 245 A | 245 | 45 x 45 |
| JJI 245 B | 245 | 45 x 60 |
| JJI 245 C | 245 | 45 x 72 |
| JJI 245 D | 245 | 45 x 97 |
| JJI 300 A | 300 | 45 x 45 |
| JJI 300 B | 300 | 45 x 60 |
| JJI 300 C | 300 | 45 x 72 |
| JJI 300 D | 300 | 45 x 97 |
| JJI 350 C | 350 | 45 x 72 |
| JJI 350 D | 350 | 45 x 97 |
| JJI 400 C | 400 | 45 x 72 |
| JJI 400 D | 400 | 45 x 97 |
| JJI 450 D | 450 | 45 x 97 |

Table 2 Tolerances

| Member dimension | Tolerance (mm) |
|------------------|----------------|
| Joist length | ± 3 |
| Joist depth | ± 2 |
| Flange depth | ± 2 |
| Flange width | ± 2 |
| Web thickness | ± 0.8 |

Table 3 Flange — Material properties of C24 solid timber

| Property | Value |
|--|-------|
| Characteristic tension strength parallel to grain at 3 m length ($f_{t,0,k}$) (Nmm ⁻²) | 14 |
| Characteristic flat wise bending strength ($f_{m,k}$) (Nmm ⁻²) | 24 |
| Characteristic compression strength parallel to grain ($f_{c,0,k}$) (Nmm ⁻²) | 21 |
| MOE ⁽¹⁾ — characteristic value $E_{0,05}$ (Nmm ⁻²) | 7400 |
| MOE ⁽¹⁾ — characteristic E_{mean} (Nmm ⁻²) | 11000 |
| Density — mean (kgm ⁻³) | 420 |
| Characteristic compression strength perpendicular to grain ($f_{c,90,k}$) (Nmm ⁻²) | 2.5 |

(1) Modulus of elasticity.

Table 4 Web — Material properties of OSB/3⁽¹⁾

| Property | Value (Nmm ⁻²) |
|--|----------------------------|
| Mean MOE ⁽²⁾ in tension ($E_{t,90,mean}$) | 3000 |
| Mean MOE ⁽²⁾ in tension ($E_{t,0,mean}$) | 3800 |
| Mean MOE ⁽²⁾ in compression ($E_{c,90,mean}$) | 3000 |
| Mean MOE ⁽²⁾ in compression ($E_{c,0,mean}$) | 3800 |
| Mean panel shear modulus ($G_{v,mean}$) | 1080 |
| Characteristic panel shear strength ($f_{v,k}$) | 6.8 |
| Characteristic tension strength ($f_{t,0,k}$) | 9.9 |
| Characteristic compression strength ($f_{c,0,k}$) | 15.9 |
| Characteristic compression strength ($f_{c,90,k}$) | 12.9 |

(1) OSB board to comply with BS EN 12369-1 : 2001, or better.

(2) Modulus of elasticity.

ANNEX 2 PRODUCT CHARACTERISTICS*Table 1 Characteristic bending resistance values*

| J/I Ref | Weight mean (kgm ⁻²) | Moment capacity non-system (kNm) | Moment capacity system (kNm) | Flexural rigidity EI (Nmm ²) | Shear rigidity GA (N) |
|---------|-------------------------------------|-------------------------------------|---------------------------------|---|--------------------------|
| 145 A | 2.18 | 3.75 | 4.13 | 1.18E+11 | 7.48E+05 |
| 195 A | 2.48 | 5.48 | 6.02 | 2.56E+11 | 1.23E+06 |
| 195 B | 3.08 | 6.92 | 7.62 | 3.42E+11 | 1.23E+06 |
| 195 C | 3.57 | 8.03 | 8.83 | 4.11E+11 | 1.23E+06 |
| 195 D | 4.58 | 10.22 | 11.24 | 5.55E+11 | 1.23E+06 |
| 220 A | 2.62 | 6.37 | 7.01 | 3.48E+11 | 1.48E+06 |
| 220 B | 3.23 | 8.05 | 8.85 | 4.64E+11 | 1.48E+06 |
| 220 C | 3.72 | 9.32 | 10.26 | 5.57E+11 | 1.48E+06 |
| 220 D | 4.73 | 11.86 | 13.04 | 7.50E+11 | 1.48E+06 |
| 235 A | 2.71 | 6.92 | 7.61 | 4.09E+11 | 1.62E+06 |
| 235 B | 3.32 | 8.73 | 9.60 | 5.46E+11 | 1.62E+06 |
| 235 C | 3.80 | 10.11 | 11.12 | 6.55E+11 | 1.62E+06 |
| 235 D | 4.82 | 12.85 | 14.14 | 8.83E+11 | 1.62E+06 |
| 245 A | 2.77 | 7.28 | 8.01 | 4.54E+11 | 1.72E+06 |
| 245 B | 3.38 | 9.19 | 10.11 | 6.05E+11 | 1.72E+06 |
| 245 C | 3.86 | 10.64 | 11.70 | 7.25E+11 | 1.72E+06 |
| 245 D | 4.87 | 13.52 | 14.87 | 9.77E+11 | 1.72E+06 |
| 300 A | 3.09 | 9.34 | 10.28 | 7.40E+11 | 2.25E+06 |
| 300 B | 3.70 | 11.75 | 12.92 | 9.84E+11 | 2.25E+06 |
| 300 C | 4.18 | 13.58 | 14.94 | 1.18E+12 | 2.25E+06 |
| 300 D | 5.20 | 17.22 | 18.95 | 1.59E+12 | 2.25E+06 |
| 350 C | 4.48 | 16.31 | 17.94 | 1.69E+12 | 2.74E+06 |
| 350 D | 5.49 | 20.65 | 22.71 | 2.27E+12 | 2.74E+06 |
| 400 C | 4.77 | 19.09 | 21.00 | 2.31E+12 | 3.23E+06 |
| 400 D | 5.78 | 24.12 | 26.53 | 3.09E+12 | 3.23E+06 |
| 450 D | 6.07 | 27.64 | 30.40 | 4.04E+12 | 3.71E+06 |

Table 2 Characteristic shear values

| Depth (mm) | Flange (mm) | Shear value (kN) |
|------------|-------------|------------------|
| 145 | A | 9.38 |
| 195 | A | 10.49 |
| | B | 11.61 |
| | C | 12.44 |
| | D | 14.06 |
| 220 | A | 11.18 |
| | B | 12.27 |
| | C | 13.09 |
| | D | 14.71 |
| 235 | A | 11.62 |
| | B | 12.70 |
| | C | 13.51 |
| | D | 15.12 |
| 245 | A | 11.93 |
| | B | 12.99 |
| | C | 13.80 |
| | D | 15.40 |
| 300 | A | 13.73 |
| | B | 14.72 |
| | C | 15.49 |
| | D | 17.07 |
| 350 | C | 17.16 |
| | D | 18.70 |
| 400 | C | 18.91 |
| | D | 20.41 |
| 450 | D | 22.18 |

Table 3 Characteristic bearing values

| Depth (mm) | Flange type | 45 mm end bearing | | 89 mm intermediate bearing | |
|------------|-------------|-------------------|-----------|----------------------------|-----------|
| | | Unstiffened | Stiffened | Unstiffened | Stiffened |
| 145 | A | 9.1 | 9.1 | 17.7 | 17.7 |
| 195 | A | 9.1 | 9.1 | 17.7 | 17.7 |
| 195 | B | 12.2 | 12.2 | 23.6 | 23.6 |
| 195 | C | 14.4 | 14.6 | 28.3 | 28.3 |
| 195 | D | 14.4 | 19.7 | 30.1 | 31.2 |
| 220 | A | 9.1 | 9.1 | 17.7 | 17.7 |
| 220 | B | 12.2 | 12.2 | 23.6 | 23.6 |
| 220 | C | 14.4 | 14.6 | 28.3 | 28.3 |
| 220 | D | 14.4 | 19.7 | 30.1 | 31.2 |
| 235 | A | 9.1 | 9.1 | 17.7 | 17.7 |
| 235 | B | 12.2 | 12.2 | 23.6 | 23.6 |
| 235 | C | 14.4 | 14.6 | 28.3 | 28.3 |
| 235 | D | 14.4 | 19.7 | 30.1 | 31.2 |
| 245 | A | 9.1 | 9.1 | 17.7 | 17.7 |
| 245 | B | 12.2 | 12.2 | 23.6 | 23.6 |
| 245 | C | 14.4 | 14.6 | 28.3 | 28.3 |
| 245 | D | 14.4 | 19.7 | 30.1 | 31.2 |
| 300 | A | 9.1 | 9.1 | 17.7 | 17.7 |
| 300 | B | 12.2 | 12.2 | 23.6 | 23.6 |
| 300 | C | 13.9 | 14.6 | 28.3 | 28.3 |
| 300 | D | 13.9 | 19.7 | 30.1 | 31.2 |
| 350 | C | 10.8 | 14.6 | 28.3 | 28.3 |
| 350 | D | 10.8 | 19.7 | 30.1 | 31.2 |
| 400 | C | 9.5 | 14.6 | 28.3 | 28.3 |
| 400 | D | 9.5 | 19.7 | 30.0 | 31.2 |
| 450 | D | 7.8 | 19.7 | 25.0 | 31.2 |

Table 4 Ultimate limit state⁽¹⁾ — Shear strength

| Service Class | $K_{mod,w}$ (web dependent) | | | | | Test | Instant |
|---------------|-----------------------------|-----------|-------------|------------|------|------|---------|
| | Load duration | | | | | | |
| | Permanent | Long-term | Medium-term | Short-term | | | |
| 1 | 0.30 | 0.40 | 0.50 | 0.70 | 1.00 | 1.10 | |
| 2 | 0.20 | 0.25 | 0.35 | 0.50 | 1.00 | 0.90 | |

(1) When designing to Eurocode 5 the characteristic values of the joists can be modified by k_{mod}

Table 5 Serviceability limit state

| Service Class | $K_{def,w}$ for shear deflection (web dependent) $k_{def,w}$ |
|---------------|---|
| 1 | 1.5 |
| 2 | 2.25 |



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