INTERNATIONAL STANDARD

ISO 8821

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Mechanical vibration — Balancing — Shaft and fitment key convention

Vibrations mécaniques — Équilibrage — Convention relative aux clavettes d'arbres et aux éléments rapportés

Reference number
ISO 8821 : 1989 (E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8821 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*.

Annexes A, B, C, D and E of this International Standard are for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
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Introduction

There are currently three methods or "conventions" for balancing shafts or rotors and their fitments coupled together with keys:

— full-key convention;

— half-key convention;

— no-key convention.

It is often impossible or economically unreasonable to balance rotors and fitments after they have been assembled; they are, therefore, balanced separately. An appropriate balance tolerance is applied to each so that, when rotor and fitment are coupled together with the appropriate key, the assembly will meet the required balance tolerance and vibration severity level. However, if a different key convention has been used when balancing the shaft or rotor than the one used for balancing the fitment, it is quite likely that the assembly will have balancing errors exceeding the permissible residual unbalance.

This International Standard is intended to unify the key conventions used throughout the world. When consistently used, it will result in compatibility of shafts or rotors and fitments so that they can be balanced by different suppliers and, after being assembled, will meet balance and/or vibration tolerance levels for that assembly.

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Mechanical vibration — Balancing — Shaft and fitment key convention

1 Scope

1.1 This International Standard specifies a single convention for balancing the individual components (shafts or rotors, and fitments) of a keyed assembly. It is intended to provide compatibility of all balanced components so that when they are assembled they will meet the overall balance and/or vibration tolerance levels for that assembly.

1.2 This International Standard requires that half keys be used when balancing the individual components of a keyed assembly to avoid the balancing errors created if full keys or no keys were used.

1.3 This International Standard applies to rotors balanced in balancing machines, in their own housings, or *in situ*. This key convention should also be applied when measuring residual unbalance and vibration severity of rotors utilizing keyways but to which the fitments have not yet been assembled.

1.4 Although the figures in this International Standard show keys of constant rectangular or square cross-section, mounted parallel to the shaft axis, this International Standard applies also to keys mounted on tapered shaft surfaces, to woodruff, gib, dowel and other special keys. The principle of the half-key convention as outlined in the definition and elsewhere is then applied as is appropriate to the particular shape and location of the special key.

1.5 This International Standard includes instructions for the implementation (see annex A) and for the transition period that will occur as the half-key convention is adopted (see annex B).

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1925 : 1981, *Balancing — Vocabulary.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 1925, together with the following, apply.

3.1 fitment: Component without its own shaft which has to be mounted on a shaft or mandrel before its unbalance can be determined.

Examples include couplings, pulleys, pump impellers, blower fans and grinding wheels.

NOTE — A fitment becomes a rotor when it is placed on a shaft with journals (see also the definition of "rotor" in ISO 1925). This could not only be a balancing mandrel but also the shaft extension of an armature, which by itself already is a rotor. To avoid confusion between fitment and rotor, this International Standard hereafter uses only the terms fitment and shaft, whereby the latter may be any kind of shaft, for example a balancing mandrel, an armature shaft, turbine shaft, pump shaft, etc.

3.2 key; full key: Locking device used to prevent rotation between a fitment and its mating component, usually a shaft.

NOTES

1 Since the full key is used in the final assembly, it is often also called the final assembly key.

2 Figure 1 shows various types of key and keyway configurations.

3.3 half key: Key used in balancing, having the unbalance value of that portion of the final (full) key which will occupy either the shaft keyway or the fitment keyway in the final assembly.

NOTES

1 The unbalance value of the half key for a given shaft may differ from that needed for the mating fitment (of equal keyway length) due to differences in distance from the shaft centreline, depth of keyways, and clearances.

2 The required unbalance value for a half key may be calculated by assuming that the full key is separated into two half keys along the contoured parting line between shaft and fitment, taking half the height clearances of key and keyway in each of the key halves into consider ation (see figure 2).

4 Half-key convention

4.1 Description

The half-key convention requires that a half key be used in the shaft keyway while balancing the shaft without its fitment. A

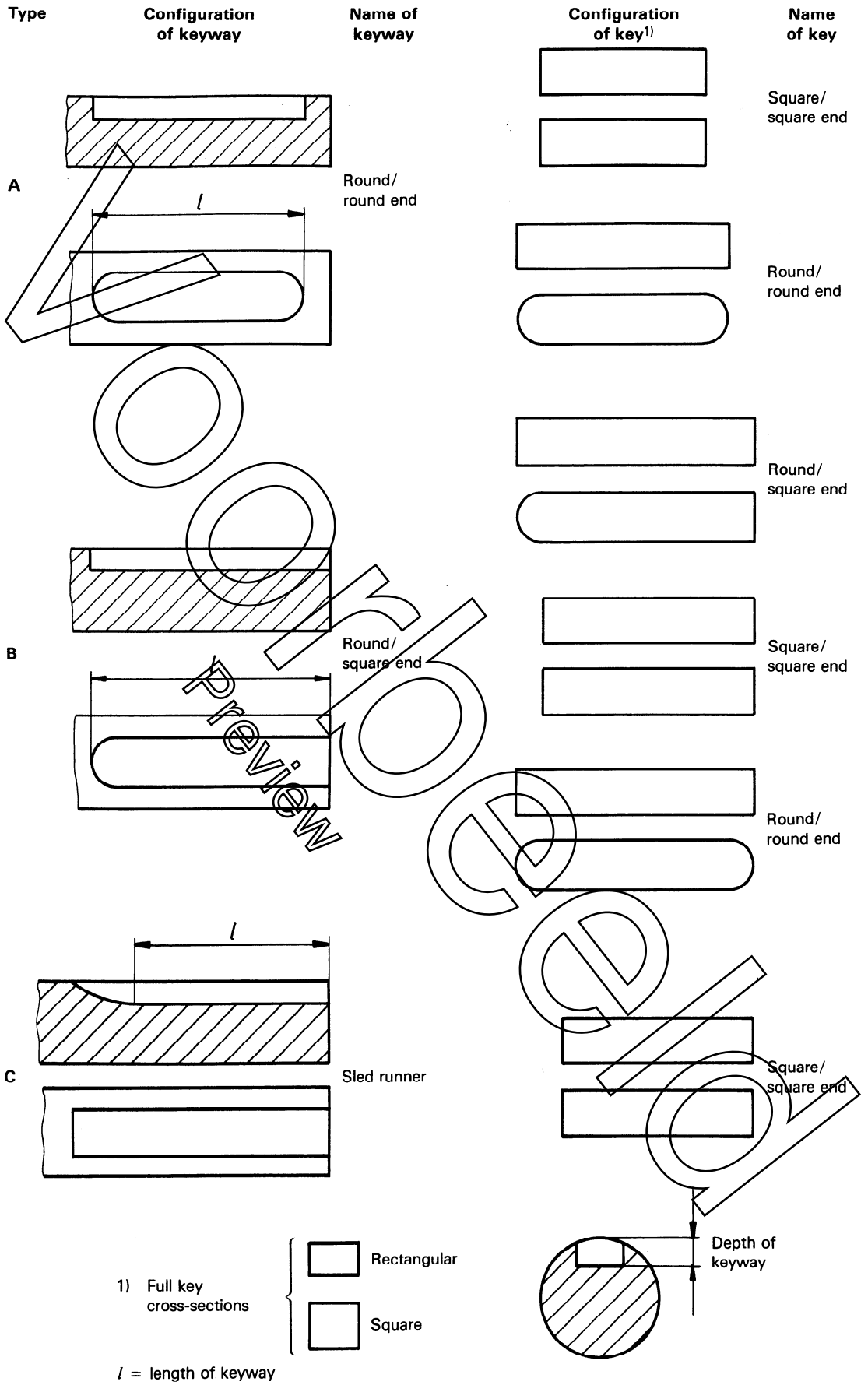

Figure 1 — Major types of shaft keyways and keys (see also ISO/R 773 and ISO/R 775)

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