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Reciprocating internal combustion engines : Performance — Part V : Torsional vibrations

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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.

International Standard ISO 3046/V was developed by Technical Committee ISO/TC 70, *Internal combustion engines*, and was circulated to the member bodies in January 1978.

It has been approved by the member bodies of the following countries :

Australia	Italy	South Africa, Rep. of
Austria	Japan	Switzerland
Belgium	Korea, Dem. P. Rep. of	United Kingdom
Czechoslovakia	Korea, Rep. of	USSR
France	Mexico	Yugoslavia
Germany, F. R.	Netherlands	
India	Romania	

The member body of the following country expressed disapproval of the document on technical grounds :

Denmark

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Reciprocating internal combustion engines : Performance — Part V : Torsional vibrations

1 SCOPE

This International Standard establishes general requirements and definitions for torsional vibrations in shaft systems of sets driven by reciprocating internal combustion engines.

Where necessary, individual requirements can be given for particular engine applications.

2 FIELD OF APPLICATION

This International Standard covers sets driven by reciprocating internal combustion engines for land, rail-traction and marine use, excluding sets used to propel road construction and earth-moving machines, agricultural and industrial types of tractors, automobiles and trucks, and aircraft.

3 DEFINITIONS

3.1 set : The combination of mechanisms including an engine or engines with its driven machinery.

3.2 shaft system : All the components of a set associated with the transmission of power to the driven machine(s) relevant to the calculation of torsional vibrations.

3.3 barred speed range : The zone where the stresses caused by torsional vibrations exceed the permissible values for continuous operation.

4 GENERAL REQUIREMENTS

4.1 Set

4.1.1 The supplier of a set may be the engine manufacturer or the manufacturer of the driven machinery or a third contractor. If a purchaser buys an engine from one manufacturer and the driven machinery from another, the purchaser is regarded as the supplier of the set to himself.

4.1.2 The supplier of the set shall be responsible for ensuring that the torsional vibration conditions of the set are satisfactory.

If necessary, the engine and driven machinery manufacturers shall provide the supplier of the set with all necessary data for the equipment which they supply to enable the calculations for the torsional vibrations of the set to be carried out.

4.1.3 When previously agreed by contract, the supplier of the set shall be responsible for making calculations and for making measurements of torsional vibrations.

NOTE — Where the main exciting harmonics with respect to the natural frequency of the set do not cause the permissible stresses to be exceeded within the whole speed range, it is not necessary to carry out a complete torsional vibration calculation. For this reason sets driven by engines with only one or two cylinders are not usually subject to calculation or testing of torsional vibrations.

4.2 Torsional vibrations

4.2.1 Results of measurements and/or calculations of torsional vibrations shall be agreed upon between the supplier of the set, the engine and driven machinery manufacturers and by the inspecting and/or legislative authorities and/or classification societies when applicable.

4.2.2 When areas of dangerous torsional vibrations within the whole speed range of the set operating conditions exist, the supplier of the set and/or the engine or driven machinery manufacturer shall, by special agreement, take measures to eliminate these dangerous torsional vibrations or avoid these areas.

4.2.3 Stresses caused by torsional vibrations in the shaft system of a set shall not exceed permissible values within the whole speed range of operating conditions. Different limits for such permissible values apply for continuous and transient operation.

4.2.4 The limits referred to in 4.2.3 shall be agreed between the supplier of the set, the engine manufacturer and driven machinery manufacturer. Special requirements of inspecting and/or legislative authorities and/or classification societies specified by the customer shall be adhered to.

4.3 Barred speed range

4.3.1 The position of the barred speed range(s) within the whole speed range shall be agreed between the customer and the supplier of the set.

4.3.2 The special requirements of inspecting and/or legislative authorities and/or classification societies specified by the customer shall be adhered to.