

Milking machine installations — Mechanical tests

ICS 65.040.10

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

This British Standard, having been prepared under the direction of the Consumer Products and Services Sector Board, was published under the authority of the Standards Board and comes into effect on 15 April 1997

© BSI 11-1998

ISBN 0 580 27263 X

Amendments issued since publication

Amd. No.	Date	Comments

Contents

	Page
National foreword	ii
Foreword	iii
Text of ISO 6690	1

National foreword

This British Standard reproduces verbatim ISO 6690:1996 and implements it as the UK national standard. It supersedes BS 5545-3:1988 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AW/32, Milking machine installations, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request.

This revision incorporates technical changes based on field experience and technical development and has been updated to meet the needs defined in BS 5707; it was produced by a joint working group of ISO and the International Dairy Federation (IDF). Reference should be made to BS ISO 3918 *Milking machine installations — Vocabulary*, and to BS ISO 5707 *Milking machine installations — Construction and performance*.

A number of changes have been made so that mechanical testing provides a more accurate reflection of performance under normal operating conditions. In particular, regulation sensitivity and loss are measured, in addition to regulator leakage, to reflect the effect of installation on the performance of the regulator. A number of tests, intended to be carried out by manufacturers or installers, are included to provide reference data.

Annexes A and B form integral parts of Part 3. Annexes C, D and E are for information only.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, pages ii to iv, pages 1 to 19 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

INTERNATIONAL
STANDARD

ISO
6690

Second edition
1996-12-15

**Milking machine installations —
Mechanical tests**

Installations de traite mécanique — Essais mécaniques de vérification



Reference number
ISO 6690:1996(E)

Contents

	Page
Foreword	iii
1 Scope	1
2 Normative references	1
3 Definitions	1
4 Test equipment	1
4.1 Measurement of vacuum level	1
4.2 Measurement of atmospheric pressure	1
4.3 Measurement of back pressure	1
4.4 Measurement of air flow	1
4.5 Measurement of pulsation characteristics	1
4.6 Measurement of pump rotational frequency	1
4.7 Teatcup plugs	1
5 Installation test	2
5.1 General requirements and preparation	2
5.2 Effective reserve for milking	2
5.3 Vacuum-pump capacity	3
5.4 Vacuum pump exhaust back pressure	3
5.5 Regulation sensitivity	3
5.6 Regulation loss	3
5.7 Regulator leakage	3
5.8 Vacuum gauge accuracy	3
5.9 Airline leakage	4
5.10 Milk system leakage	4
5.11 Pulsation system	4
5.12 Vacuum drop in airline	4
5.13 Air-flow rate at the end of the long milk tube	5
5.14 Leakage in releasers	5
5.15 Vacuum drop at vacuum taps	5
6 Component tests	5
6.1 Leakage through cluster shut-off valves	5
6.2 Air vent and leakage into cluster	5
7 Calculations for other atmospheric pressures	6
7.1 Normal atmospheric pressure	6
7.2 Vacuum pump capacity	6
7.3 Predicted effective reserve	7
Annex A (normative) Laboratory test of vacuum in the milking unit	8
Annex B (normative) Effective volumes	11
Annex C (informative) Alternative method to the measurement of air inlet and leakages in cluster	11
Annex D (informative) Examples of test procedure to reduce the test work	12
Annex E (informative) Test report for testing milking machine installations in accordance with ISO 6690:1996	15
Figure 1 — Teatcup plug	2
Figure A.1 — Artificial teat	8
Figure A.2 — Representative shape of the long milk tube	9
Table 1 — Normal atmospheric pressures at different altitudes	6
Table 2 — Correction factor K_1 at different atmospheric pressures	6
Table 3 — Correction factor K_2 for various atmospheric pressures	7

Descriptors: Agricultural machinery, livestock equipment, mechanical milking installation, tests, mechanical tests, performance tests.

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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6690 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*.

This second edition cancels and replaces the first edition (ISO 6690:1983), which has been technically revised taking into account practical experience, technical developments and the requirements of ISO 5707:1996.

Annexes A, B and C form an integral part of this International Standard. Annexes D to E are for information only.

1 Scope

This International Standard specifies mechanical tests for milking machine installations in order to verify compliance of an installation or component with the requirements of ISO 5707. It also stipulates the accuracy requirements for the measuring instruments.

This International Standard is applicable for testing new installations and for periodic checking of installations for efficiency of operation.

Test procedures described in annexes A, B and C are primarily for testing in the laboratory. An example of a field test procedure which can reduce the time and effort involved in testing is given in annex D and the corresponding test report in annex E.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were 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 editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3918:1996, *Milking machine installations — Vocabulary*.

ISO 5707:1996, *Milking machine installations — Construction and performance*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 3918 apply.

4 Test equipment

The measuring equipment shall have a precision that ensures that the requirements given in ISO 5707 can be recorded with the stated accuracy. The instruments shall be checked regularly to ensure the given specifications.

4.1 Measurement of vacuum level

The instrument used for measuring vacuum level shall have an accuracy of at least $\pm 0,6$ kPa and a repeatability of at least $\pm 0,3$ kPa.

NOTE A vacuum gauge of accuracy class 1,0 will usually meet this requirement if calibrated at a vacuum level close to that measured. The accuracy class is the maximum permissible error expressed as a percentage of the pressure range for the gauge.

4.2 Measurement of atmospheric pressure

The instrument used for measuring the atmospheric pressure shall have an accuracy of at least ± 1 kPa.

4.3 Measurement of back pressure

The instrument used for measuring back pressure shall have an accuracy of at least ± 1 kPa.

4.4 Measurement of air flow

The instrument used for measuring air flow shall be capable of measuring with a maximum error or 5 % of the measured value and a repeatability of 1 % of the measured value or 1 l/min, whichever is the greater, over a vacuum range of 30 kPa to 60 kPa and for levels of atmospheric pressure from 80 kPa to 105 kPa.

Correction curves shall be supplied if they are necessary to achieve this accuracy.

NOTE 1 A fixed orifice flow meter is suitable for air flows admitted in from the atmosphere.

NOTE 2 A variable area flow meter is suitable for measuring the air admission and leakage to a cluster (see 6.2 and 6.1). The instrument can be inserted in the long milk tube.

As flow meters are actually measuring the flow at the operating vacuum level, most meter readings have to be corrected for that vacuum level and the ambient atmospheric pressure according to the instructions from the manufacturer.

An alternative method for measuring those air flows without a flow meter is given in annex C.

4.5 Measurement of pulsation characteristics

The instrument used for measuring pulsation characteristics, including connection tubes, shall have an accuracy of ± 1 pulse/min for measuring pulsation rate and an accuracy of ± 1 unit of percentage for measuring the pulsation phases and the pulsator ratio (see ISO 3918:1996, Figure 7).

NOTE The dimensions of the connection tube and T-piece used for attachment to the installation should be specified by the instrument manufacturer.

4.6 Measurement of pump rotational frequency

The instrument(s) used for measuring the rotational frequency of the pump, expressed in minutes to the power minus one, shall have a maximum error of 2 % of the measured value.

4.7 Teatcup plugs

Standard teatcup plugs, which are in accordance with Figure 1, shall be used.

The plugs shall withstand cleaning and disinfection. The materials shall comply with the requirements given in ISO 5707:1996, subclause 4.5, for materials in contact with milk. Some means shall be provided to keep the plug in the liner (for example, a bead or a cylindrical part).