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# International Standard



# 1546

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Procedure for milk recording for cows

*Méthode de contrôle laitier des vaches*

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**Descriptors** : agriculture, animal husbandry, dairy equipment, bovines.

## 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 1546 was developed by Technical Committee ISO/TC 34, *Agricultural food products*, and was circulated to the member bodies in September 1978.

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

Australia	Germany, F.R.	Netherlands
Brazil	Hungary	Poland
Bulgaria	India	Portugal
Canada	Ireland	Romania
Cyprus	Israel	South Africa, Rep. of
Czechoslovakia	Kenya	Thailand
Egypt, Arab Rep. of	Korea, Rep. of	Turkey
Ethiopia	Libyan Arab Jamahiriya	United Kingdom
France	Mexico	

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

New Zealand

This International Standard cancels and replaces ISO Recommendation R 1546-1970, of which it constitutes a technical revision.

# Procedure for milk recording for cows

## 0 Introduction

Capacity for milk production is one of the criteria by which the genetic qualities of cattle can be assessed.

This capacity is evaluated by systematically recording milk production and one or more of the qualitative characteristics of the milk, namely the fat content, dry defatted extract and protein content.

The collection, recording and rational use of these data with the aim of assessing the milk-producing capacity of a herd of cattle is termed "milk recording".

This method is based on the International Agreement on Milk Recording Practices for Cows, which was drawn up, adopted and ratified by the International Committee for Recording the Productivity of Milk Animals (ICRPMA).

Milk recording has two aims :

- a) at the individual level, it permits objective selection of females which have been inspected for the quantity and quality of their milk, and can result in better technical and economic management of the herd;
- b) at the collective level, it helps to characterize a given breed, determine the value of a bull and, in general, helps in undertaking genetic and economic research.

A standardized procedure for milk recording for cows is required so that the results can be presented in a uniform manner, not only for zootechnical reasons but also to enable processing by computer of the data obtained.

Furthermore, the results need to be directly comparable for purposes of interpretation and in particular to facilitate the rational organization of the sale of animals for breeding.

Any organization which adopts and ratifies this Agreement and complies with the conditions it contains has the right to use the special ICRPMA mark on its certificates and in its publications, in accordance with the rules governing the granting of this mark.

Any organization which adopts and ratifies this Agreement shall submit the annual report which it publishes to the Secretariat.

Any organization wishing to rescind this Agreement shall inform the ICRPMA, who will immediately inform the other member organizations, indicating the date on which the Agreement was rescinded. This rescission takes effect immediately. The right to use the special mark ceases as soon as the ICRPMA has been informed of the rescission.

This text of the International Agreement on Milk Recording Practices for Cows was adopted by the member organizations of the ICRPMA on 17 May 1976 and ratified by them at a later date. The above Agreement came into force on 3 April 1978.

Recording bodies which are not parties to this Agreement will be allowed to enter into it on request. Their admission will be communicated to the member organizations by the ICRPMA.

## 1 Scope and field of application

This International Standard specifies a procedure for milk recording which shall be applied to all cows of milk-producing breeds or breeds with a predominant milk-producing capacity, belonging to a herd.

## 2 References

ISO/R 1211, *Milk — Determination of fat content (Reference method)*.

ISO 1871, *Agricultural food products — General directions for the determination of nitrogen by the Kjeldahl method*.

ISO 2446, *Milk — Determination of fat content (Routine method)*.

## 3 Definitions

**3.1 milk recording** : A procedure for the measurement of the milk, fat and protein (where applicable), which should furnish a true indication of the milk, fat and protein production of a cow in a herd.

**3.2 herd** : Any group of cattle kept for the same purpose, belonging to one owner and accommodated in one and the same group of farm buildings.

## 4 Principle

Determination of the total quantity of milk, fat and protein produced by a cow in each lactation period and during 305 days of lactation or in each operational year in its existence.

## 5 Organization of milk recording

Although full liberty of action must be allowed with regard to the manner in which milk recording is organized in different countries, provided that the local associations are approved by the national organizations, it is essential to have official or semi-official supervision which may be effected by the Government or by an organization recognized by it.

## 6 Recording

### 6.1 Milk recording operations

Milk recording can, according to the conditions in the countries of member organizations, be carried out by different methods.

#### 6.1.1 Method A

In this method, the recording operations are carried out solely by an official recorder.

Recording time h	Average recording interval days	Symbol
24	14	A <sub>2</sub>
24	21	A <sub>3</sub>
24	30	A <sub>4</sub>
24	42	A <sub>6</sub>
Recording carried out alternately in the morning and in the evening	30	A <sub>T</sub>

Method A<sub>4</sub> shall be considered the standard method.

#### 6.1.2 Method B

In this method, the recording operations are carried out by the owner of the cows or by an official recorder in collaboration with the owner.

Recording time h	Average recording interval days	Symbol
24	30	B

#### 6.1.3 Other methods

Any other method approved by the ICRPMA office may be used.<sup>1)</sup>

## 6.2 Requirements for the application of a method

**6.2.1** The practical recording procedure (including methods of testing for fat and protein).

**6.2.2** Recording interval and limits of this interval.

**6.2.3** Method of checking records.

**6.2.4** Method of supervision.

**6.2.5** Method of calculation of lactation and annual yields.

**6.2.6** Accuracy of the recording method based on large-scale use of this method in practice. The accuracy should be expressed in the terms periodically decided by the Board.

**6.2.7** Use of records for herd books, AI sire progeny testing, management, etc.

## 7 Milk recording techniques

### 7.1 Determination of the quantity of milk produced

The quantity of milk shall be determined using a weighing instrument graduated in 200 g maximum, approved by the recording association and checked periodically. The results shall be expressed in kilograms.

Volumetric methods may also be used, by applying a conversion factor of 1,03 g/cm<sup>3</sup>.

NOTE — As far as the use of milk meters and parlour jars is concerned, the specifications and instructions which were set up for that purpose and approved by the ICRPMA shall be followed.

### 7.2 Determination of fat content and protein content

#### 7.2.1 Constitution of the samples

The samples for analysis shall be constituted by mixing samples of milk produced by each cow individually so that they represent the milk produced over a period of 24 h.

1) ICRPMA has records of the approved methods, for its member's information.

## 7.2.2 Methods of evaluation

The fat and protein contents shall be determined, on the same sample (7.2.1), using the methods indicated in clause 2 and in annex A.

## 8 Duration of recording

Milk recording may be carried out :

- a) over the entire lactation period (the "lactation period method");
- b) over 365 consecutive days (the "operational year method").

For both these methods, the results of the recording over a period of 305 consecutive days after calving shall also be indicated, such records to be called the "standard" or "reference lactation".

The lactation period shall normally be considered ended when the cow is no longer milked twice a day. However, lactation can be regarded as continuing so long as a cow giving more than 3 kg of milk per day is milked regularly at least once a day for a period longer than 1 week.

In the case of monthly recording, the end of the lactation period is considered to occur on the 14th day after the last normal recording. This day shall be included in the calculations. In principle, with longer intervals between recordings, the date of drying off should not exceed half the recording interval.

## 9 Calculation methods

The total quantity of milk and the percentage of fat and/or protein shall be calculated according to one of the following two methods or any other method of equivalent accuracy.

### 9.1 Method No. 1

#### 9.1.1 Principle

For each interval between two successive recordings, a separate calculation is made of the quantity of milk produced, by multiplying the results of the weighing on the recording day by the number of days in the corresponding interval. The addition of the partial results obtained by this method represents the total milk produced by the cow for the entire lactation period.

The quantities of fat and protein contained in the milk are obtained in the same way.

### 9.1.2 Expression of results

The average percentages of fat and protein contained in the milk are obtained by multiplying the total quantities of fat and protein (in kilograms) by 100 and dividing these totals by the total quantity of milk (in kilograms).

## 9.2 Method No. 2

### 9.2.1 Principle

For each interval between two successive recordings, a separate calculation is made of the quantity of milk produced by adding the results of the weighings on the two recording days and dividing by two. The quotient is then multiplied by the number of days in the corresponding interval. The total yield of milk produced is obtained by totalling the milk yield calculated for all the intervals.

The quantities of fat and protein contained in the milk are obtained in the same way.

### 9.2.2 Expression of results

The average percentages of fat and protein contained in the milk are obtained as indicated for method No. 1.

NOTE Alternatively, the estimate may be obtained by using calculation periods ( $I$ ) of approximately equal length but with the testing taking place on a working day nearest to  $I/2$ .

### 9.3 Remarks

9.3.1 If, for any unavoidable reason<sup>1)</sup> (paid holidays for example), recording is suspended for a period not exceeding 68 days, the missing figure or figures can be replaced by results obtained using an equivalent method.

If the period of suspension is more than 68 days, such averages can only be recognized under exceptional circumstances.

9.3.2 The results obtained by the calculation methods outlined above shall be registered without corrections or modifications.

## 10 Report of the recording

### 10.1 Registration of the data

The report of the recording shall indicate the results obtained, without modifications or corrections. It shall also mention

- a) the method by which milk recording was carried out (method A or B);

1) The heat period with the cow is not considered to be an unavoidable reason.

- b) the duration of recording (lactation period or operational year);
- c) the information establishing the identity of the animal;
- d) factors which may have affected the yield, especially :
  - the date of birth of the cow (year and month);
  - number of daily milkings, where this is not exclusively twice daily (III means three daily milkings, III/II - means three daily milkings at the beginning of the lactation and later two milkings; alternatively, 3 × or 2 × may be used instead of III and II);
  - the precise dates of all calvings;
  - the duration of all previous lactations or number of milking days during the operational year;
  - total production of milk, fat and protein, in kilograms, in each lactation or operational year and 305 days' reference lactation; if the cow has produced milk for less than 305 days, the production during the real period of lactation shall be published;

- the date of the start of the operational year;

and optionally :

- the dry period;
- method of milking (manual or mechanical);
- type of food;
- state of health (any accidents or diseases occurring in or before the lactation period, foot and mouth disease, etc.);
- special environmental conditions : stabling, lowland or mountain pasture, altitude of mountain pastures, duration of mountain grazing.

## 10.2 Publication of results

Certificates concerning the results of milk recording can only be issued by milk recording organizations and by breeding associations recognized by milk recording organizations.

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## Annex A

### Methods of evaluation

#### A.1 Means of determining fat content

Any method giving results which can be reliably compared with the reference Röse-Gottlieb method (see ISO/R 1211) may be used, for example :

Gerber method (see ISO 2446)

Milko-Tester apparatus

Infra-red analysis

Lindström

Methods for estimating the fat content of milk shall undergo regular and continuous checks using the Röse-Gottlieb method as reference.

#### A.2 Means of determining protein content

Any method giving results which can be reliably compared with the reference Kjeldahl method for determination of the protein content of milk (see IDF Standard No. 20-1960 and ISO 1871) may be used and the conversion factor of 6,38 shall be used to calculate the protein (crude) content, for example :

Colorimetry (Amido Black method<sup>1)</sup>, Acid Orange 12 method<sup>2)</sup>)

Infra-red analysis

The apparatus shall be subjected to appropriate inspection. It shall be ensured that the necessary reagents are used in a constant concentration so that the analyses give equivalent results.

The procedures adopted for the determination of milk protein content shall be subjected to regular and continuous checks. The Kjeldahl method for the determination of the protein content of milk, used as a reference method, shall be used in accordance with IDF Standard No. 20-1960.

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1) This is dealt with in a draft drawn up by the joint Group IDF/ISO/AOAC.

2) See AOAC Methods of Analysis, 11th edition, **16.036**.

## Annex B

### Calculation examples

Calving : 25 March 1976

Date of recording	Quantity of milk weighed kg	Percentage fat	Fat g
8 April	28,2	3,35	945
6 May	24,8	3,15	781
3 June	26,6	3,20	851
1 July	23,0	3,25	748
29 July	20,2	3,45	697
26 August	14,8	3,65	540
23 September	11,0	3,70	407
21 October	7,4	3,95	292
17 November	4,8	4,10	197
16 December	3,2	4,95	158

Start of lactation : 26 March 1976  
 End of lactation : 30 December 1976  
 Duration of lactation period : 280 days  
 Number of weighings : 10

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Method No. 1

Date of recording	Quantity of milk kg	Number of days in interval	Percentage fat	Total	
				Milk kg	Fat kg
8 April	28,2	28	3,35	790	26,465
6 May	24,8	28	3,15	694	21,861
3 June	26,6	28	3,20	745	23,840
1 July	23,0	28	3,25	644	20,930
29 July	20,2	28	3,45	566	19,527
26 August	14,8	28	3,65	414	15,111
23 September	11,0	28	3,70	308	11,396
21 October	7,4	28	3,95	207	8,177
17 November	4,8	27	4,10	130	5,330
16 December	3,2	29	4,95	93	4,604
		280		4 591	157,241

Total quantity of milk : 4 591 kg

Total quantities of fat : 157,241 kg

Average percentage of fat :  $\frac{157,241}{4 591} \times 100 = 3,43 \%$



## Method No. 2

Interval (including two recording days)	Number of days in interval	Daily production		Total	
		Milk kg	Fat g	Milk kg	Fat kg
26 March – 8 April	14	28,2	945	395	13,230
9 April – 6 May	28	(28,2 + 24,8)/2	(945 + 781)/2	742	24,164
7 May – 3 June	28	(24,8 + 26,6)/2	(781 + 851)/2	720	22,848
4 June – 1 July	28	(26,6 + 23,0)/2	(851 + 748)/2	694	22,386
2 July – 29 July	28	(23,0 + 20,2)/2	(748 + 697)/2	605	20,230
30 July – 26 August	28	(20,2 + 14,8)/2	(697 + 540)/2	490	17,318
27 August – 23 September	28	(14,8 + 11,0)/2	(540 + 407)/2	361	13,258
24 September – 21 October	28	(11,0 + 7,4)/2	(407 + 292)/2	258	9,786
22 October – 17 November	27	(7,4 + 4,8)/2	(292 + 197)/2	165	6,602
18 November – 16 December	29	(4,8 + 3,2)/2	(197 + 158)/2	116	5,148
17 December – 30 December	14	3,2	158	45	2,212
	280			4 591	157,182

Total quantity of milk : 4 591 kg

Total quantity of fat : 157,182 kg

Average percentage of fat :  $\frac{157,182}{4 591} \times 100 = 3,42\%$

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