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**Dairy plant — Hygiene conditions —
General guidance on inspection and
sampling procedures**

*Usine laitière — Conditions sanitaires — Directives générales pour les
méthodes de contrôle et d'échantillonnage*

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

International Dairy Federation
Diamant Building • Boulevard Auguste Reyers 80 • B-1030 Brussels
Tel. + 32 2 733 98 88
Fax + 32 2 733 04 13
E-mail info@fil-idf.org
Web www.fil-idf.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8086|IDF 121 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF), in collaboration with AOAC International. It is being published jointly by ISO and IDF and separately by AOAC International.

This edition of ISO 8086|IDF 121 cancels and replaces ISO 8086:1986, of which it constitutes a minor revision. Only editorial changes have been made.

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Foreword

IDF (the International Dairy Federation) is a worldwide federation of the dairy sector with a National Committee in every member country. Every National Committee has the right to be represented on the IDF Standing Committees carrying out the technical work. IDF collaborates with ISO and AOAC International in the development of standard methods of analysis and sampling for milk and milk products.

Draft International Standards adopted by the Action Teams and Standing Committees are circulated to the National Committees for voting. Publication as an International Standard requires approval by at least 50 % of the National Committees casting a vote.

ISO 8086|IDF 121 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF), in collaboration with AOAC International. It is being published jointly by ISO and IDF and separately by AOAC International.

All work was carried out by the Joint ISO/IDF/AOAC Group of Experts, *Sampling techniques for milk and milk products* (E38), under the aegis of its project leader, Mr K. Steen (DK).

This edition of ISO 8086|IDF 121 cancels and replaces IDF 121A:1987. Only editorial changes have been made.

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Introduction

The principal reason for checking plant hygiene is to ensure that the plant will not contaminate the product. However, if contamination has taken place, it is possible to discover where in the circuit bacteriological infection, chemical contamination or contamination from filth has taken place. Such checks will be necessary not only to ensure quality control requirements within the plant but also to ensure compliance of products with legal requirements. Also, the checks give information on the checking and sampling procedures used to endorse the practices adopted to ensure cleanliness of the plant.

There are three types of checks on the effectiveness of cleaning and disinfection for which sampling might be performed:

- a) checking all contact surfaces which have to be cleaned after and shortly before the production process, and checking re-usable product containers (bottles, moulds, etc.) which have to be cleaned and which will hold the finished product intended for sale;
- b) indirect checking on solutions or methods used for cleansing; such checks will principally concern the different operations carried out to ensure that optimum cleanliness is maintained;
- c) checking the raw materials or semi-finished products in the course of preparation or of finished products; in practice, such checks give a good idea of the quality of cleansing but they are ancillary to the quality of the raw material used and, in some cases, to the standard of hygiene of the operators of the plants.

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Dairy plant — Hygiene conditions — General guidance on inspection and sampling procedures

1 Scope

This International Standard gives general guidelines for inspection and sampling procedures to be used to check the effectiveness of cleaning and disinfection methods used in dairy plants and receiving stations, including milk-collection tankers.

It deals with

- visual inspection,
- sampling from plant surfaces (product line, bottle washing equipment, containers, etc.),
- re-usable product containers,
- air,
- sampling of water and aqueous solutions other than those added to the product, and
- sampling of raw materials and products.

It does not cover equipment normally installed in farms (e.g. milking machinery or refrigerated bulk milk tanks), nor does it deal with the equally important areas of health and hygiene of personnel, factory environment, internal arrangement of the factory, methods of cleaning, packaging materials brought in new from outside (paper, cardboard, plastic, new bottles, etc.), food ingredients and additives, selection of number of units and treatment of the sample in the laboratory.

The need for sampling is normally considered in the design of plant. It is important that any devices which are included to enable samples to be taken are so designed and fitted that their use results in representative samples being obtained without any adverse effect on the hygienic condition of the plant (e.g. by introducing dead spots in cleaning circuits). Such design is outside the scope of this International Standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 707, *Milk and milk products — Guidance on sampling*¹⁾

1) Equivalent to IDF 50.

3 General instructions

3.1 The demands for effectiveness of cleansing operations vary from plant to plant depending on management supervision, quality control requirements and the type of production undertaken.

3.2 A cleansing control should not be based solely on the results of microbiological tests even if such checks are clearly of prime importance; other checks (such as visual inspection, smell and touch, chemical and/or physical analysis and intelligent interpretation of records) are important in order not to overlook such factors as visible residues, malfunction of equipment, cleaning residues and corrosion.

3.3 Sampling for microbiological examination should be carried out only by personnel trained in sampling for this purpose.

3.4 The frequency of sampling depends essentially on the type of manufacture, the means of checking available to the organization, and the costs acceptable to the organization in carrying out the checking. In theory, a check should be carried out after each cleansing or at a stated interval when cleansing is continuous during a production run (e.g. the case of a bottle washer), or just prior to recommencement of production. However, in practice, a number of checks are carried out to ensure the quality of the product and those checks provide an indirect check on the efficiency of cleansing. Thus, in practice, the checking of effectiveness of cleansing depends upon the quality assurance for the product, bearing in mind that a deterioration in quality is often due to failure in cleansing.

3.5 Generally, it can be said that the frequency of sampling should be determined by measuring the variability of the process and comparing this with the risk of making non-standard product. The optimum solution to this problem requires a good quantitative knowledge of the process, an understanding of statistical quality control, and deliberate management decisions on the degree of risk which is acceptable.

3.6 It is essential that samples be accompanied by a report which identifies the place, date and time of sampling, including any batch details, and the name and designation of the sampling personnel. Where appropriate, the report should include any relevant conditions or circumstances (e.g. the condition of the product containers and their surroundings, the temperature and relative humidity of the atmosphere, the method of sterilization of the sampling equipment, the location of the sampling point on the equipment, and whether a preservative substance has been added to the samples) and any special information relating to the product being sampled (e.g. difficulty in achieving homogeneity of the product).

4 Inspection and sampling procedures

4.1 Visual inspection

4.1.1 An immediate and important impression of the cleanliness of a production line in a dairy plant can be obtained by visual inspection of the accessible parts of a plant. Included in this are all open containers and those closed with a lid, pipe fittings with their washers and gaskets, powder transport lines, air filters, parts which are operated by mechanical means (e.g. homogenizers, pistons, counting devices, stirrers and pumps) and re-usable product containers.

Visual inspection should allow detection of damage due to corrosion or erosion.

4.1.2 Visual inspection may be carried out using good natural or artificial light. Use of ultraviolet light should be resorted to only rarely because of the hazards involved. If ultraviolet light is used, it is more effective when the plant has been flushed with a fluoresceine dye; it is essential to cleanse the plant fully after use of such dyes.

Among many other confirmatory tests, the following may be applied to the surface under examination:

- a) a clean spatula may be used to scrape a surface carefully, to demonstrate the presence of a film or residues on improperly cleansed equipment;

- b) a piece of clean disposable muslin or tissue paper (moist, if desired) wiped over the inside of a can or over metal surfaces of other equipment will be soiled if the surface is improperly cleansed;
- c) no sign of fluorescence should be detectable when the surface is carefully inspected with long wavelength ultraviolet light (340 nm to 380 nm).

4.1.3 Stains, greasy residues, powder, or thin hard films are indicative of inadequate cleansing conditions (e.g. inadequate times, chemical concentrations, flow velocities).

4.1.4 More substantial residues of product indicate poor training or discipline of cleaning personnel and/or inadequate circulation and/or leaking valves. Incomplete drainage of equipment increases the risk of contamination of product with chemicals and microorganisms.

4.1.5 At intervals based on past observations and experience, product pumps and valves should be opened and seals and rubbers inspected, especially if products with a high viscosity are processed. This is important even when cleaning in place (CIP) is fully automated.

It is equally important to inspect at regular intervals the spray cleaning devices of the CIP system to ascertain whether they are working correctly.

If plant must be dismantled for checking, a rinse and disinfection cycle of the section of plant involved should follow reassembly.

4.1.6 Whenever visible residues are found in the equipment, it is essential that the cause be traced and measures be taken to remedy the fault. There is only limited value in a microbiological check of visually dirty equipment. Even if a sample were found to be satisfactory from a microbiological viewpoint, all other consequences of inadequate cleansing should be considered. However, determination of the main composition of the residue by chemical means is often more helpful when it comes to trouble-shooting.

4.1.7 Because visual inspection is the most rapid, cheapest and easiest method of examination, it should be carried out as often as possible, i.e. daily.

4.2 Sampling procedures for equipment

4.2.1 Contact surfaces

Although all product contact surfaces should be checked, many such surfaces are inaccessible and only limited facilities are available for sampling and checking the samples. Therefore, a rigorous selection will be necessary in practice. Particular attention should be given to those places which are difficult to cleanse, for example recesses, elbows, valves, shafts, stirrer paddles, gauges, probes.

Sampling by fixed sampling cocks can often cause contamination of the sample and the results of the examination of such samples should be treated with reserve.

4.2.2 Times of checking

Appropriate times of checking are after the cleansing and disinfection of the processing equipment and shortly before re-use of the processing equipment, to check that it has not become contaminated while out of operation.

4.2.3 Direct methods

The methods for the examination of contact surface infection are numerous, but in a dairy plant where all surfaces should be preferably disinfected if not sterilized, rinse and swab tests are preferred. Swab tests are used for plant and equipment where the rinsing technique is not applicable. Also used is the impression method, where a sterile medium is pressed onto the contact surface, then placed and held in a sterile container and later incubated.