# USING THE INSTA 800 CLEANING QUALITY STANDARD FOR ADVANCING CLEANING

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## ABSTRACT
The INSTA 800 standard defines cleaning object groups, types of surface contaminants, inspection strategy, quality levels and compliance criteria. The standard is based on visual inspection, with instrument-based methods being optional. Examples are given how introduction and application of the standard by cleaning companies, cleaners and customers can be facilitated and some of the positive feedback received. Some limitations in the standard and use of visual assessment and possible solutions are discussed. Implementation of the standard will professionalize cleaning work and increase challenge and job satisfaction among cleaners and supervisors with the potential to improve quality of working life of cleaners. The standard provides an approach for quantifying and accumulating experience, linking types of rooms, room activities, used cleaning methods, and obtained quality levels. This know-how can be used for optimizing planning of cleaning and for improving cleaning methods and tools and for choice of cleaning solutions.

## INDEX TERMS
Cleaning and maintenance, Policy, standards and guidelines, Improved IAQ practices and technologies, Dust, Offices.

## INTRODUCTION
When has a room been properly cleaned? This question has always been a point for discussion between cleaning company and customer, and a difficult one. Neither customer nor cleaning company have had at their disposal objective criteria based on well-defined terminology of what should be understood by high or low quality in a cleaning context. This state of affairs has been changed by the INSTA 800 cleaning quality standard (INSTA, 2000). The standard defines cleaning object groups, types of surface contaminants, sampling strategies, quality levels, and rules for deciding compliance. Four types of surface contaminants are defined; *Litter/loose dirt*, litter meaning dropped particles/items that can be collected, e.g. pieces of paper, leaves and cigarette butts, loose dirt meaning small particles that are not easily resuspended, e.g. sand, ash, hair, insects and crumbs; *Dust*, meaning fine particles that form a layer on the surface of an object and can be resuspended; *Stains (dry or wet)* meaning sticky contaminants that are not due to damage or lack of structural maintenance on a limited area of a surface, e.g. coffee stains, blotches, rings, and chalk marks, and finally *Surface dirt*, meaning fixed contaminants that are not due to lack of structural maintenance on an unlimited area of a surface (i.e. continuous contaminant covering a large area) e.g. carbonate residues, rust deposits, heel marks, conditioning or cleaning agents, irregularities of finish. The number of occurrences of each type of contaminant is counted on four cleaning object groups; furnishing, walls, floor, and ceiling. All objects apart from ceiling are subdivided into easily accessible surfaces (Ea) and surfaces that are difficult to access (Da). If there is more than one

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deposit of the same type of contaminant within an area of 0.25m$^2$, they are counted as one occurrence.

Five quality levels are given in terms of the acceptable sum of the number of occurrences of litter/loose dirt, dust and stains, respectively percentage area covered by surface dirt (Table 1). The number of acceptable errors depends on the floor area of the room. Inspection can either be 100% or be based on a random sample, in which case ISO 2859-1 (ISO, 2001) is used. Identification and counting of occurrences is performed visually. The standard also specifies optional instrument based methods and corresponding quality levels for dust on surfaces, for hygiene, friction, gloss, static electricity and surface resistance. INSTA 800 is in agreement with the basic requirements specified in EN 13549 (CEN, 2001).

**Table 1**. Levels of cleaning quality given in INSTA 800 (INSTA, 2000).

| | Maximum combined number of occurrence of litter/loose dirt, dust and spots for different room sizes (A) in m$^2$ | | | | | | | | Maximum area fraction that may be covered by surface dirt |
|---|---|---|---|---|---|---|---|---|---|
| | A≤ 15 | | 15<A≤35 | | 35<A≤60 | | 60<A≤100 | | A≤100 |
| | Ea | Da | Ea | Da | Ea | Da | Ea | Da | Ea&Da |
| Level | | | | | | | | | |
| 5 | 1 | 1 | 1 | 2 | 2 | 4 | 4 | 6 | 0% |
| 4 | 2 | 3 | 3 | 5 | 5 | 6 | 7 | 8 | 10% |
| 3 | 5 | 6 | 6 | 8 | 9 | 12 | 12 | 18 | 25% |
| 2 | 7 | 8 | 8 | 10 | 13 | 15 | 18 | 20 | 50% |
| 1 | 10 | U | 12 | U | 18 | U | 24 | U | 75% |

Ea: easily accessible surface, Da: surface difficult to access. U: unlimited.

This paper describes how implementation and use of the standard can be facilitated, how implementation has the potential for advancing cleaning, and experience gained so far.

## METHODS

A checklist has been prepared for the terms of agreement in a cleaning contract based on INSTA 800, which the customer should specify, if needed with the assistance of a consultant or cleaning company:

- List of buildings and rooms that are covered by the agreement
- Detailed lists of objects belonging to each of the four groups of objects
- Quality profiles for each type of rooms for each of the four types of objects and for both groups of contaminants. Different levels can be chosen in individual rooms within a given type of room.
- Specification of acceptable quality levels (AQL) according to ISO 2859-1 for each level of cleaning quality
- Who performs the control
- Description of units (building, floor, section etc.) that forms the basis for size of sample to be inspected. Specification of frequency of inspection (at least 4/year)
- Optional inclusion of instrument based methods with corresponding quality levels and frequency of measurement
- Days per stated time period (e.g. 3 or 5 days a week) that quality profile must be met after cleaning.

The specifications of the cleaning contract in relation to INSTA 800 is translated into specific check lists for each customer or group of customers, specifying all objects in each group of objects, and the quality profiles for each room type using a color code. The cleaner performs daily self-assessment of delivered quality each cleaning day in one room selected in cooperation with the supervisor and in a way that insures that all types of rooms are self-assessed over a period of one week. If the cleaner lacks the necessary education and training, checklists are further simplified by using pictures of the contaminant types and the object types specific for the given customer, and the supervisor performs the daily quality check. The cleaner takes part in this check as a natural part of worker involvement and this also provides on-the-job training in using the standard.

Software has been developed for planning and quality control of cleaning according to INSTA 800. One generally available system (http://clean.datec.no) is part of a larger Facilities Management system. It contains a complete CAD tool and allows drawings to be scanned in. Some companies have developed a system (www.dataknowhow.dk/INSTA_800), which at present is for internal use only. In this system, the computer selects individual rooms at random, and presents them one at a time in a sequence that minimizes walking. The results of the visual assessments are entered and the result in terms of acceptance or rejection is calculated. The result is not displayed until all rooms in the sample have been assessed in order to minimize assessment bias. All inspection results can be stored, which provides a complete documentation of the quality delivered during the contract period. A handheld computer can be used during field inspection.

**RESULTS**

By using the standard, activity-based cleaning programs have been transformed into cleaning programs based on outcome in terms of obtained quality of cleaning. This has implied changes in the way cleaners plan their work. They either have the possibility to select the set of methods they want to use from a specified list of options, given they can obtain the specified level documented by self-assessment, or they can get detailed instructions about the cleaning job. The choice depends on their own preferences and their experience in using the standard and is the responsibility of the supervisor.

The new approach professionalizes the cleaning job. The cleaners need to know more about the background for the standard and how to use the measurement results. They are given the competence to decide the proper methods and use them correctly, and by focusing on the individual types of contaminants, they can allot their time for cleaning to those objects that need it most. Some of the positive feedback from cleaners has stressed that this new approach provides greater influence on their own work and that they get greater responsibility. Also, each cleaner has the assurance that the cleaning ordered by the customer has been delivered. Cleaning work ranks low compared with other jobs regarding influence at work (Kristensen, 2001). The feedback indicates that the new approach has created greater job satisfaction. It is known that increased decision latitude in combination with increased demands increases job satisfaction and improves well-being and health (Karasek and Theorell, 1990).

Occupant feedback about positive experience indicates that they appreciate the clear information about the cleaning quality they can expect in their respective rooms and find it easier to discuss the level of cleaning with management. Feed-back from customers indicates that the standard provides a language in common with the cleaning company, which promotes the dialogue, also in situations where there is disagreement with the cleaning company on the cleaning quality. It also facilitates writing an invitation for tender. Actually, one of the reasons

for developing an instrumental method for quantifying surface dust was to provide the means for answering among others the question: do the customers get what they are paying for? (Schneider *et al.,* 1994). This method is now the optional instrumental method in the standard for measuring surface dust contamination.

Both customer and cleaning company have found it an improvement that they get regular documentation of the delivered quality level. Documentation of the quality delivered during the entire contract period can be useful for discussions with the customer if there has been failure in a single inspection. Figure 1 shows documentation of one quality profile obtained with the optional surface dust measurement method in five consecutive inspections.

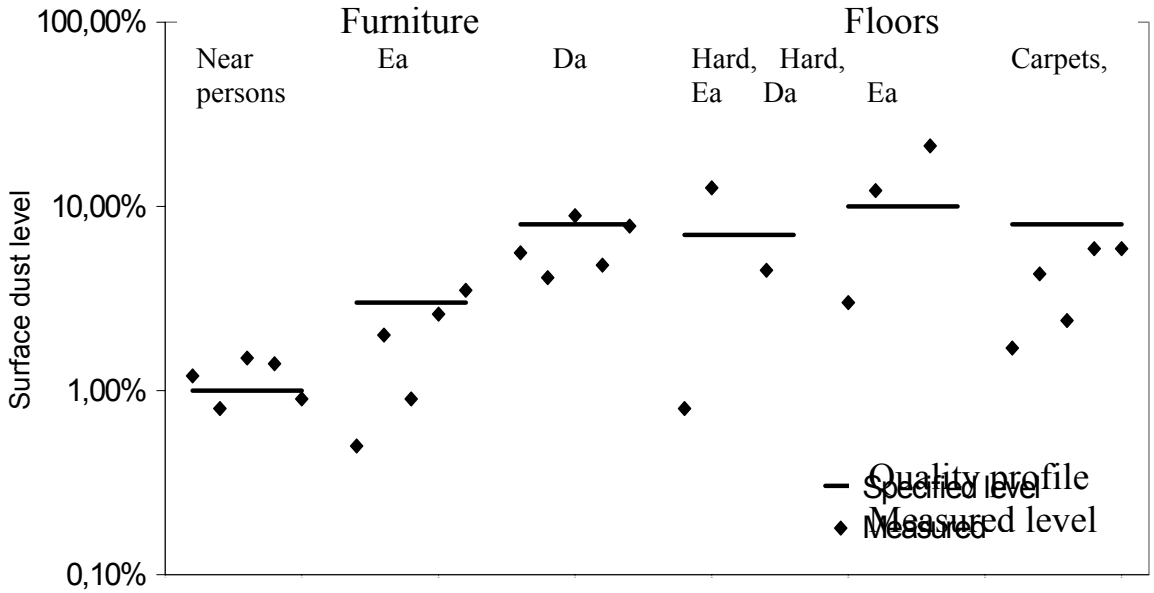


**Figure 1.** Five consecutive instrument based control measurements of surface dust, shown for one quality profile as agreed with customer. For furniture, the unit is percent area covered by particles, for carpets it is an index. Notice the additional position 'Near persons' for instrument based measurements.

Experience has shown that the records can be used to trace the type and excessive occurrence of contamination. Is it a given type of contaminant, is it a given object type, do some cleaners perform poorer than others, etc. This information has been used for problem solving, such as choice of a more efficient mop-system, given the intensity of use of the rooms, change of mop washing procedure, or giving the cleaner better instructions in use of the standard.

**DISCUSSION**

Previously, quality requirements were specified in terms of cleaning activities, such as frequency and method for each type of objects. Use of the well-defined terminology and the entire approach of INSTA 800 implies that the focus is on the outcome of cleaning and thus on the contaminant and type of contaminant, and on the sources of contaminants. Such an approach not only directs the attention to how a given contaminant is best removed, but also to how a customer can contribute to reducing re-contamination.

The amount of dust in carpets, that can be resuspended, is an important measure of contamination of carpets, but cannot be assessed visually. Thus, if the cleaning activities are based on visual assessment relatively high levels of resuspendable dust in carpets could be present. If, on the other hand, cleaning is performed after an activity-based program, carpets are at least vacuumed at regular intervals. It should be noted that the standard includes an instrument-based method for dust in carpets that is based on resuspension, but this method is optional. Future revision of the standard should include an instrument-based measurement of resuspendable dust in the normative part.

Visual assessment and classification of dust into types has an element of judgment. The outcome will depend on the individual interpretation of what has been seen and is affected by visibility, which in turn depends on intensity and direction of illumination, size of dust particles, texture and coloring. Furthermore, color and texture of surfaces can be chosen on purpose to camouflage spots and dust (Lönn and Lööf, 1982). Invariably, if a group of assessors inspect the same objects there will be disagreement between assessors. Also a given assessor may judge differently on different days. Thus for determining and reducing the overall uncertainty in using the standard, the magnitude of such disagreement would need to be investigated and a quality management program of the assessment method would need to be established. What counts in practice, however, is that customer and cleaning company agree on what they see and it can be recommended that they perform the visual assessment together.

Since the INSTA 800 standard concerns the quality of the cleaning process, it requires the quality to be assessed immediately after cleaning or not later than before taking the room into use. The standard does not directly address re-contamination of surfaces after cleaning, despite the fact that if the cleaning frequency in relation to the re-contamination rate is too low, room occupants may have to work part of the time in environments they perceive as dirty. Such conditions could influence the degree of satisfaction or dissatisfaction with the indoor environment to a higher degree than the overall cleaning quality right after the cleaning. However, INSTA 800 can be used to measure the degree of re-contamination in terms of increase in levels between two cleanings, giving a re-contamination profile. This information can be used to select proper cleaning frequencies, but as guidance only, since, from the point of view of the cleaning company, it is not suitable to include maximum contamination levels between cleanings in a contract. This is because the re-contamination rate is outside the control of the cleaning company. It can be mentioned that EN 13549 addresses timing of inspection but only states that timing shall be specified, and suggests only that timing could be as in INSTA 800, independent of the time of cleaning, or taking into account the degree of re-contamination.

Perception of surface contamination (visual, tactile) may affect occupant response to the indoor environment quality, but little is known. A likely hypothesis could be that perception of surface contamination confounds reporting of symptoms, and that the degree of confounding depends on the quality level. There is inadequate evidence of an association between airborne particulate matter and health effects, including discomfort (Schneider et al., 2002).

## CONCLUSION AND IMPLICATION

Implementation of INSTA 800 and its use in everyday practice of cleaning will be a leap forward for the entire cleaning industry. It will professionalize cleaning work and increase challenge and job satisfaction among cleaners and supervisors. It is likely that this will be an important parameter for recruitment of cleaning personnel.

The standard provides an approach and metric for quantifying and accumulating experience, linking types of rooms, room activities, used cleaning methods, and obtained quality levels. This provides crucial know-how and cleaning companies can use it for optimizing planning of cleaning, for improving cleaning methods and tools, and for improving their guidance of customers regarding choice of cleaning solutions.

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