



Cabling and electrical cabinets

– with focus on hygiene

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Summary

The purpose of this document is to focus on hygiene design, particularly of cabling and electrical cabinets in food production zones. By illustrative and less illustrative examples, we aim to show how cabling can be done to achieve the best possible level of hygiene. We will focus on the use of photos to illustrate various solutions, and on making the document as brief as possible.

Key words

Electrical cables, cable routings, electrical cabinets, wire trays, cleaning, hygiene design.

Definition and use of guidelines

This guideline is prepared by a task group under the competence centre of the Danish stainless steel industry and is one in a collection of guidelines. The others are:

Guideline no. 1: Cabling and electrical cabinets

Guideline no. 2: Check list for purchase/sale of production equipment

Guideline no. 3: Conveyors

Guideline no. 4: Stainless steel in the food industry

Guideline no. 5: Design of piping systems for the food industry

Guideline no. 6: Installation of components in closed processing plants for the food industry

Enjoy!



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1. Domain

This guideline is thought as an inspiration to food manufacturers and suppliers of machinery for food producing companies alike. It deals with the topic of routing electrical cables, air hoses and the like.

2. Limitations

This guideline offers advice on how to establish routings for cables/air hoses and the like as hygienically as possible.

3. General considerations

Electricity and water should not be combined. Over the years, many production stoppages have been caused by water in sockets or water seeping into electrical machine parts through the cable connection. Bundles of cables may be the cause of product residue accumulating and giving rise to the development of microbes.

Generally speaking, cables, hoses etc. should be routed in a way that makes it possible to see dirt – **i.e. the routings should be as open and visible as possible** to facilitate cleaning **around and between them**.

4. Main routings

Routings where there are no product residue or spills in connection with production and cleaning. It is recommended that:

- Cables are placed in a wire tray that is mounted in a distance from ceiling and wall to allow cleaning of the area around it.
- Lids are mounted on horizontally mounted trays under ceilings so that dirt settles on the lid instead of between cables. The lid should be wider than the tray so that dirt cannot run into the cable trays. Likewise, the lid should be inclined so liquids can run off.
- It is possible to remove the lid for cleaning.
- Cables are not bundled but routed and fastened individually in a distance from each other that allows cleaning.
- As far as possible, main routings are established in technical ceilings/service corridors that have no direct access to the production area.

5. Routes over machines and equipment

It is recommended that:



- Cable routes are supported by wire trays.
- Cables are not bundled, but routed and fastened individually in a distance from each other that allows cleaning.
- In so far as possible, cables etc. are routed individually to the connection point from the route.
- Cable conduits are not used.

6. Routes on/in machines and equipment

It is recommended that:

- Cables are routed individually.
- The routing is supported by wire trays, either by placing the cables loosely in the tray or as single-cable routing through rings.
- Plastic strips are not used. If strips are the only option, they should be stainless steel strips.
- Cables are not routed under machines or in other areas with restricted access/visibility, and where cleaning could be hampered.
- Cable conduits are not used.

7. Electrical cabinets and operator panels

It is recommended that:

- Tightness as a minimum complies with the executive order on high voltage.
- Cabinets/panels are mounted with a distance to walls/machines. The clearance on all sides is at least 10 cm to allow cleaning.
- The cabinet and operator panel are mounted where they will be least exposed to splashes etc.
- The top is designed with a 30° inclination towards the front to allow water to run off and prevent that tools are placed on the top.
- The front edge of the inclining cabinet top should reach beyond the front door and the seal.



- Doors are designed to prevent the accumulation of dirt around seals and in other places.
- All materials used are able to withstand influences from product as well as detergents and disinfectants.

8. Applied methods

Knowledge is acquired from 1 July 2003 to 1 October 2005 through visits to Tuborg and Siltec. Furthermore, participants from various industries have contributed their knowledge, e.g. by the presentation of photos that served as a basis for discussion.

9. Safety and environmental precautions

We would like to emphasise that regardless of the hygiene design chosen, safety and environmental precautions should always have top priority. It is important not to be in conflict with legislation. Consequently, e.g. safety guards may not be removed with the argument that this makes the equipment more hygienic.

10. Concepts/terminology

Please see the EHEDG Glossary (<http://www.ehedg.org>). Go to Guidelines > Library > Glossary.

11. Appendices

Appendix 1: Photos – with examples from the above guideline. The material was collected by members of the group.



Appendix 1



Photo 1

Good distance to wall. Notice the block (red arrow). As it appears, however, cables are bundled in pairs, which is unfortunate in production areas, as cleaning is hampered.

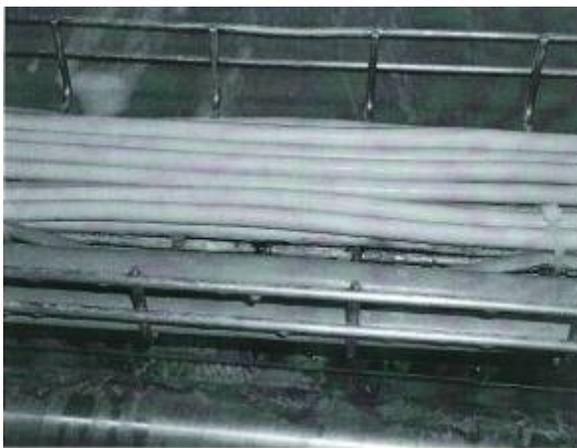
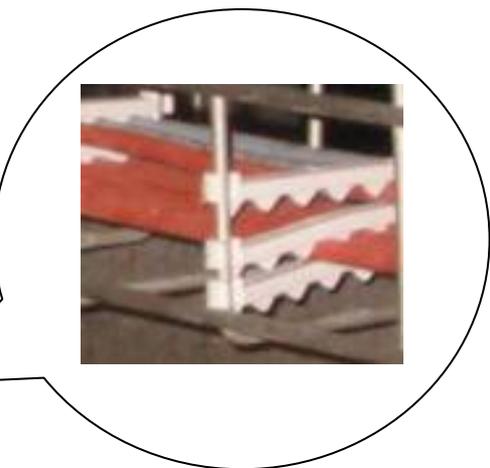


Photo 2

Very unfortunate solution. Notice how visible dirt accumulates when cables are bundled.



Photo 3



Here a practical cable separator has been used, which both keeps cables apart and facilitates cleaning.



Photo 4
Very poor hygiene design.
Notice the horizontal surface and the number of cables in bundles.



Photo 5
Attempt at improving the hygiene design by hanging the cabinet askew.
However, there are serious mistakes, as the electric cables have been collected in a sealed tube, which makes cleaning very difficult.



Photo 6

The distance between cabinet and beam is too small, which hampers cleaning. Also horizontal surfaces where water and dirt can accumulate.



12. Change protocol

This is the first edition. Future changes will be listed here.