

PRESS REPORT

Renewed EHEDG guidelines on pasteurization and sterilization of liquid food

Breaking news: know-how to optimize food safety, productivity and energy efficiency

By Rob Groot, EHEDG Consulting Writer on behalf of Bengt Eliasson, Tetra Pak, Sweden, chair of the EHEDG Working Group “Heat Treatment”

Are these renewed EHEDG guidelines really breaking news? Judging from the assertions of the chairman of the EHEDG Working Group Heat Treatment Bengt Eliasson (also Manager of the Centre of Expertise Dairy in Tetra Pak Processing Systems) they certainly are. Eliasson: “These completely renewed guidelines contain many valuable insights. They are structured in a user friendly way and contain extensive know-how on how to optimize the food safety, productivity and energy efficiency of continuous pasteurization and ultra-high temperature sterilization processes.”

We’ve been pasteurizing and sterilizing for ages. Why renew these guidelines now?

Eliasson: “Pasteurization and sterilization are well established, most widespread and important methods to preserve liquid food. This is why the initial guidelines for continuous pasteurization and sterilization were the very first guidelines that EHEDG published to optimize food safety in the food industry. That was back in 1992. Since then, new technologies and new legal requirements and regulations have emerged. EHEDG translates all those new developments into practical guidelines that the food industry and its suppliers can actually work with to comply with all requirements. EHEDG also wants to help its community members to find the information they need more efficiently. Therefore, all EHEDG working groups recently agreed to structure their guidelines in a new format. And now the guidelines for the pasteurization and sterilization of liquid food are published in this new more user friendly format.”

So what’s new?

Eliasson: “These new guidelines contain hands-on information aimed at food producers, machine equipment developers and plant designers who need to comply with the latest food hygiene regulations. The old versions of these guidelines focused primarily on milk production, thus limiting the possible applications of these guidelines. The renewed guidelines also cover the production of other liquid foods and high acid products like fruit juices. They provide practical technical

frameworks that cover a wide array of topics ranging from general considerations regarding the applied pasteurization and sterilization techniques to hygienic process design and technical matters concerning effective flow diversion, recirculation and cleaning and control processes. All information is presented in line with the new EHEDG guidelines format that structures information into categories like design, production and maintenance aspects. For those who want to go one step further, these guidelines also contain useful information on techniques to optimize energy efficiency and minimize maintenance intervals.

Why did you publish two separate guidelines for pasteurization and sterilization?

Eliasson: “Since both methods apply to heating food in order to kill microorganisms and extend shelf life, many of the hygienic design principles in these guidelines are applicable to both methods. But when it comes down to hygienic design, the devil is always in the detail, so we decided to minimize any risk of misunderstandings by publishing two separate guidelines. One of the main differences between both methods is that pasteurization requires a distribution network through the cool chain. Consequently, pasteurization is more common in areas where a reliable cool chain infrastructure is available whereas sterilized or UHT treated products can be distributed at ambient temperature and are therefore generally more popular in warm climate areas. By focussing on pasteurization in guideline number 1, we could accommodate all technical aspects that are specific to sterilization in guideline number 6, that covers all aspects of continuous ultra-high temperature sterilization of liquid food, like the pre-sterilization of equipment and the specific aseptic design. And since sterilization processes are in general more complex than pasteurization, guideline 6 on the continuous ultra-high temperature sterilization is more extensive than guideline 1.”

Do these renewed guidelines cover everything we must know?

Eliasson: “There’s always more to know, but these publications are very comprehensive. They contain guidelines that help readers to make sure that correct temperatures and processing conditions are maintained, that unacceptable deviations in key process variables result in an automatic flow diversion or shutdown and that the production process is stopped before fouling becomes significant or before thermophilic bacteria growth becomes too intensive. The guidelines relate the importance of hygienic design to the different stages of the pasteurization and sterilization processes. The guideline on pasteurization for example states that the process equipment downstream of the holding tube must be of hygienic design and hence cleanable, possible to disinfect and bacteria tight. This guideline furthermore offers means to prevent the risk

of mixing pasteurized and unpasteurized products. And both of these guidelines even include practical guidelines on how to utilize hygienic design principles to tackle specific regional legislation requirements.”

These guidelines were developed by food safety experts? Who are they?

Eliasson: “I have included a list of all working group members to give these volunteers the credits they deserves. EHEDG made sure that the heat treatment working group consists of top level technical experts from a wide variety of disciplines. It is a broad team with origins in different parts of the industry, ranging from equipment design to process management, maintenance and quality control. Combined, these experts represent more than 200 years of hands-on experience. This way EHEDG makes sure that the guidelines are technically thorough and contain a high practical value. After reading these renewed guidelines, the EHEDG community knows what to do and how to do it.”

How did your team make decisions on controversial technical aspects?

Eliasson: “In the course of the development of these guidelines, there have been some discussions, especially at moments when we had to determine which specific techniques should be mentioned in the guidelines, but in the end there was nothing that we couldn’t agree upon. That’s because all team members contributed to these guidelines with a very clear objective in mind: we want to minimise risks and maximize food safety. When several methods were suitable to perform a certain functional part of the pasteurization e.g. sterilization process, we stated all the pro’s and con’s of each approach in the guidelines so that the reader can make up his own mind and make a substantiated choice. Our working group is very diverse and every member took actively part in the discussions, and while some members wanted to focus on high end state of the art equipment, others voted for simpler and cheaper technical options. So ultimately, there is something for everybody in these guidelines.”

You mentioned energy efficiency. How sustainable is hygienic design?

Eliasson: “Energy efficient solutions in general, and heat recovery techniques in particular, are becoming more and more important for food producers. They are willing to invest in new techniques to optimize efficiency - not only to save energy, water and chemicals, but also to maximize their productivity by minimizing cleaning time intervals and waste. Hygienic design offers

many possibilities to save energy and minimize downtime. These guidelines contain several chapters that help EHEDG community members to make sustainable choices to minimize contamination risks and to save energy and money. The guidelines illustrate that investing in hygienic design solutions is economically viable. By applying hygienic design we can shorten CIP times, make the production more efficient by overall increasing availability and reduce the total cost of production. Since investing in hygienic design improves overall efficiency, it's a cost saving investment it. It also avoids recalls and public health hazards.”

Is there a link between hygienic design and new forms of energy re-use?

Eliasson: “The guidelines also illustrate how certain systems work, for example a system that enables producers to preheat their products by heat recovery using a secondary circuit. Heat recovery systems are in general more complex in terms of plant design but the results are very satisfying, because they require significantly less energy. Even when investment budgets are limited, these guidelines offer interesting options. In sterilization processes for example, it's also possible to preheat a product after the holding section with a sterilized product in a regenerative heat exchanger, making for a less complex plant design and realizing the same amount of energy savings.”

So it's not the germs we need worry about then - it's our inner terrain.

Eliasson: “Exactly. And let me conclude with yet another quote of the great Louis Pasteur, who not only discovered the power of pasteurization, but who also had a very clear vision on how to handle food safety in general: ‘Whether our efforts are, or not, favored by life, let us be able to say, when we come near to the great goal, I have done what I could.’”



About EHEDG Heat Treatment Working Group

These are the experts that developed these guidelines:

Stefan Åkesson	Tetra Pak, Sweden
Franz-Josef Helms	GEA TDS, Germany
Steven Hoefkens	Stork Food & Dairy Systems, Netherlands
Anneginus Hummel	FrieslandCampina, Netherlands
Huub Lelieveld	EHEDG Board, Netherlands
Ole Poulsen	SPX Flow Technology, Denmark
Paul Skudder	SPX Flow Technology, United Kingdom
Ana Soares	Mondelēz International, United Kingdom
Joern Stistrup	SPX Flow Technology, Denmark
Jeroen Veldkamp	Heinz, Netherlands

About EHEDG

EHEDG (European Hygienic Engineering & Design Group) is an international foundation that aims to optimize food safety worldwide. EHEDG brings together stakeholders in the food supply chain to continuously improve food safety and sustainability and to increase cleaning efficiency and effectiveness through the advancement and practical implementation of hygienic design principles.