

PACKAGING QUALITY ASSURANCE IN SUPPLY CHAIN

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Abstract

Packaging is a very important element in products quality maintenance that is why quality of packaging has great influence and its quality assurance is necessary. Physical flow in supply chain may deteriorate some of packaging features, so their monitoring and proper conditions of storage, transport and suitable protection are important.

The main goal of the paper was to present model of packaging supply chain with elements that are most influencing packaging quality. In the model are considered not only enterprises creating packaging supply chain but also units from its surroundings that have indirect impact. There were analyzed actions that are essential for quality assurance while physical flow of packaging in their supply chains. In the paper are shown the results of the questionnaire research concerning implementation in enterprises of chosen actions, such as: documentation requirement, good hygienic state performance and proper production process conducting. Analyzes were taking under consideration implementation of quality assurance and management systems in units that constitutes packaging supply chain. The research showed that companies are conducting only selected actions, not all required in respect of obligatory and facultative quality management systems, guaranteeing proper packaging quality. Continuous monitoring of quality and safety of product launched on the market is important for consumers protection policy fulfillment.

Key words: packaging, packaging supply chain, packaging quality assurance

1. INTRODUCTION

Supply chain is the material and informational interchanges in the logistical process stretching from acquisition of raw materials to delivery of finished products to the end user. All vendors, service providers and customers are links in the supply chain (Vitasek, 2006).

Therefore supply chain due to European Standard EN 14943 is the sequence of actions, which might concern manufacturing, transport and marketing bringing added value. Whereas as the structure it consist of group of enterprises realizing collective actions necessary to meet the demand on particular products in whole chain of goods flow – from the moment of obtaining raw materials to providing to end-consumer (*Słownikterminologiiilogistycznej*, 2006). In literature there is a lack of publications concerning packaging supply chain. Packaging is very important component of the logistic supply chain of majority of products present on the market. Packaging has a lot functions in the supply chain: protection of packed product, informative, logistical, economic and ecological.

Protection the objects enclosed in the package from quantitative and/or qualitative losses may require protection from physical factors such as: mechanical shock, vibration, electrostatic discharge, compression, temperature and biological, chemical and other factors. Packaging that creates a barrier from e.g. oxygen, water vapor, dust, etc. is often required. Keeping the contents clean, fresh, sterile and safe for the intended shelf life is a primary function. The protective function of packaging relies on protection the environment and user against products (dangerous materials and dangerous chemical substances) (Regattieri&Santarelli, 2013).

Packaging is a media of information transmission; in supply chain it is essential to provide proper information for products distributors, retailers and consumers. Handling marking helps to proper handling during storage and transportation of goods. Packaging might also be a carrier of electronic devices like RFID (Radio-

frequency identification) tags which helps to identify the products in real time, reducing the risk of thefts and increasing security. Packages can be used by marketers to encourage potential buyers to purchase the product.

Logistic function of packaging strictly impacts the effectiveness of informative-control, transport, handling or storage activities leading to proper functioning of the supply chain (Zemka-Podlaszewska&Tichoniuk, 2012).

The cost of packaging in the supply chain should be lower than the economic benefits of its application. The economic calculation should contain costs packaging with respect to whole packaging life cycle from raw materials obtain to waste management.

The ecological function should lead to meet all packaging supply chains stakeholders requirements.

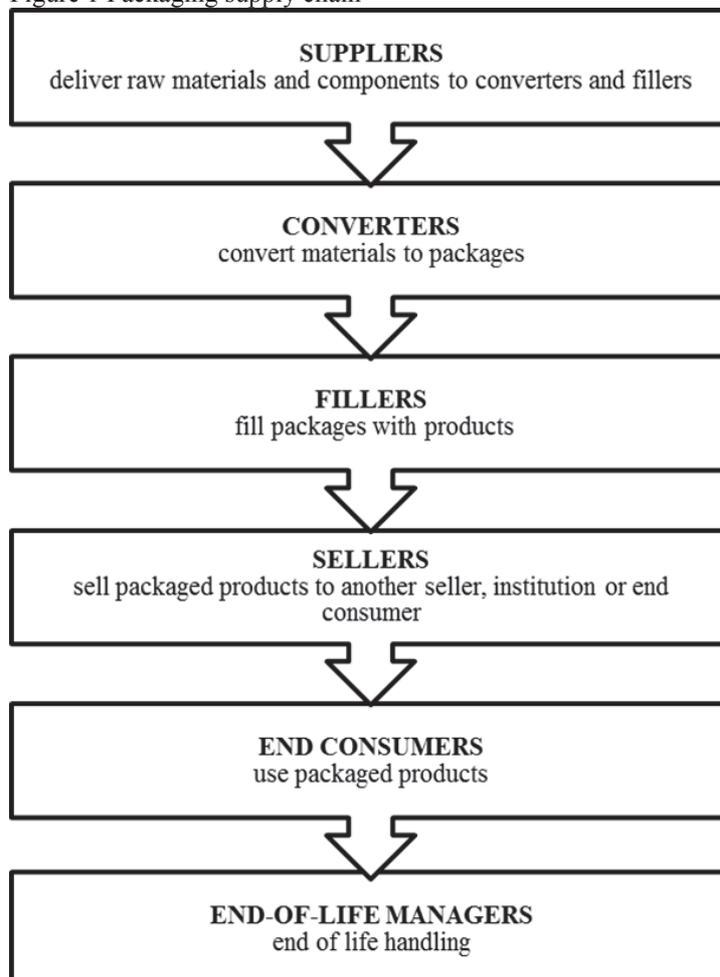
The structure of packaging supply chain is formed by enterprises related to whole packaging life cycle is presented on fig. 1 (Bix, 2009).

Packaging supply chain might be considered in relationship with logistics. In this chain are present physical flows, information flows, sequences of processes, relations between subjects, inputs and outputs of systems or structures. Important is also surroundings influencing on chain performance (Cholewa, 2006).

Raw materials and packaging elements suppliers are first step of physical flows in supply chain. Then materials are forwarded to packaging materials and packaging producers. The next step is packaging distributors or packaging users, which in packing process are shaping packaging or filling in ready packaging. Packaged products are forwarded to end-consumers. Consumers are transferring packaging waste to enterprises from the sector of waste management.

On packaging supply chain is influencing surroundings like government agencies, legislative bodies, national and international organizations, associations of producers, distributors and consumers.

Figure 1 Packaging supply chain



Source: own work on the basis of (Bix, 2009)

2. INFLUENCE OF PACKAGING APPLICATION ON CATEGORY OF RISK

Packaging sector is very diverse, raw materials, technologies, forms, shapes and applications are very different. Dynamic development of this sector and changing legislative and consumers requirements forces to classify group of packaging due to risk they might cause to packaged goods.

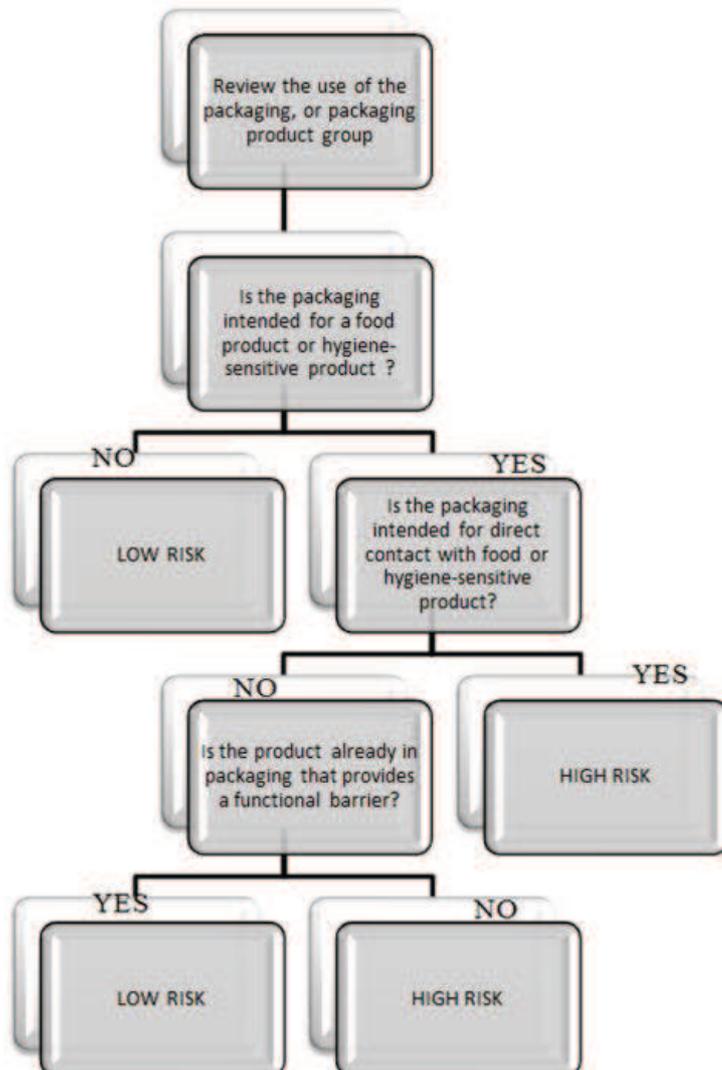
The requirements depend on the type of packaging produced. Due to BRC/IoP standard (Global Standard for Packaging and Packaging Materials) it might be possible to group packaging on two categories:

- Packaging directly contacting with products of increased requirements (such as food, pharmaceuticals, cosmetics).
- Packaging for non-direct contact with products of increased requirements or for product of regular requirements.

The decision tree in fig. 2 determines the appropriate packaging risk category and should be used to decide which risk category is relevant.

Proper category of risk selection determines range of requirements which must be meet to ensure effective activities in whole processes in supply chain. Moreover it is important that all activities are lead in order to requirements of quality assurance systems operating in supply chain companies.

Figure 2 Decision tree for packaging category determination



Source: Guide to Enrolment Program for BRC Global Standard for Packaging and Packaging Material issue 4, London 2014.

3. PACKAGING QUALITY ASSURANCE

The quality of packaging is essential; it is important element of products quality and supply chain effectiveness. On the quality of packaging influencing: quality of raw materials, proper conduct of the production, storage, transport and distribution processes in company. That is why a lot of companies implement quality assurance or management systems (Lisińska-Kuśnierz&Kawecka, 2013).

In respective to packaging risk category there are different requirements. The most restrictive requirements concerning food packaging, they are stated in legal acts like:

- Regulation (EC) No 1935/2004 of the European Parliament and of the Council of 27 October 2004 on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC
- Commission Regulation (EC) No 2023/2006 of 22 December 2006 on good manufacturing practice for materials and articles intended to come into contact with food.

The most important requirements in respective to food packaging is that materials shall be manufactured in compliance with good manufacturing practice so that, under normal or foreseeable conditions of use, they do not transfer their constituents to food in quantities which could: endanger human health, bring about an unacceptable change in the composition of the food and bring about a deterioration in the organoleptic characteristics thereof (Regulation (EC) No 1935/2004). Moreover the packaging labelling, advertising and presentation shall not mislead the consumers. Regulation also state that (Regulation (EC) No 1935/2004):

- the traceability of packaging materials shall be ensured at all stages in order to facilitate control, the recall of defective products, consumer information and the attribution of responsibility.
- business operators shall have in place systems and procedures to allow identification of the businesses from which and to which materials are supplied.
- the materials which are placed on the market shall be identifiable by an appropriate system which allows their traceability by means of labelling or relevant documentation or information.

Commission Regulation (EC) No 2023/2006 of 22 December 2006 on good manufacturing practice for materials and articles intended to come into contact with food requires the business operator shall establish, implement and ensure adherence to an effective and documented quality assurance system. Quality assurance system is understood as: “the total sum of the organized and documented arrangements made with the purpose of ensuring that materials and articles are of the quality required to ensure conformity with the rules applicable to them and the quality standards necessary for their intended use” (Commission Regulation (EC) No 2023/2006).

The quality assurance system must be characterized adequacy of personnel, their knowledge and skills, and the organization of the premises and equipment such as is necessary to ensure that finished materials and articles comply with the rules applicable to them and is taking into account the size of the business run by the operator, so as not to be an excessive burden on the business.

Moreover the packaging sector operators should implement proper quality control systems, which ensure effective quality control and ensure monitoring of the implementation and achievement of Good Manufacturing Practice (GMP) and identify measures to correct any failure to achieve GMP. Such corrective measures shall be implemented without delay and made available to the competent authorities for inspections.

Beside the obligatory systems, there are facultative quality management systems. In respective to food packaging operators there are functioning:

- ISO 9001:2008 Quality management systems – Requirements.
- ISO 22000:2005 Food safety management systems – Requirements for organizations throughout the food chain.
- EN 15593:2008 Packaging – Management of hygiene in the manufacture of packaging for food-requirements.
- The BRC/IOP Global Standard for Packaging & Packaging Materials.

ISO 9001:2008 specifies requirements for a quality management system where an organization needs to demonstrate its ability to consistently provide product that meets customer and applicable statutory and regulatory requirements, and aims to enhance customer satisfaction through the effective application of the system. Moreover including processes for continual improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements (ISO 9001:2008).

ISO 22000:2005 specifies requirements for a food safety management system where an organization in the food chain needs to demonstrate its ability to control food safety hazards including food packaging hazards in order to ensure that food is safe at the time of human consumption. It is applicable to all companies, irrespective of size. The system is dedicated to operators which are involved in any aspect of the food chain including production, distribution of packaging and packing process, and want to implement systems that consistently provide safe products (ISO 22000:2005).

The EN 15593 Standard is devoted to all organizations that want to effectively manage the hygiene in the production of packaging for food. The requirements of the standard include health management system, hazard

analysis and risk assessment, pollution sources and requirements for plants and personnel. EN 15593 can be a tool to improve the quality management system for packaging of food (EN 15593:2009).

The BRC/IOP Global Standard for Packaging & Packaging Materials is dedicated for packaging sector companies which produce packaging and packaging materials used in food and non-food industry. The main idea in creating the standard was to provide an efficient tool for packaging industry to ensure consumers safety and fulfilment of legal requirements (BRC/IOP Global Standard for Packaging & Packaging Materials).

A large number of management systems to compliance forces at least minimum level of integration of management systems in order to ensure the effective functioning of the supply chain stakeholder. Currently there are standard guidelines for the integration of the management systems (Nowicki et al., 2013). Integration might be lead based on models like (Kafel&Sikora, 2010):

- Global SAI. AS/NZS 4581:1999 Management system integration – guidance to business, government and community organizations,
- HB 10190:2001 IMS: The framework (Integrated Management Systems Series),
- PAS 99 Specification of common management systems requirements as a Framework for integration,
- NTS (1996) Management Principles for Enhancing Quality of Products and Services, Occupation Health and Safety and the Environment,
- DS 8001:2005 Management System – Directive on developing and Integrated Management System,
- UNE 66177:2005 Integración Sistemas de Gestión.

The integration of management systems bring many benefits for organization such as: improvement of effectiveness and efficiency, reduce costs in whole activities areas, especially the number of internal and external audits and increase competitiveness of companies from supply chain.

4. CONCLUSIONS

Packaging is a very important element in products quality maintenance that is why quality of packaging has great influence and its quality assurance is necessary. Physical flow in supply chain may deteriorate some of packaging features, so their monitoring and proper conditions of storage, transport and suitable protection are important. Following the procedure of quality management systems is the guarantee of packaging quality assurance. The requirements of implemented systems are different in respective to different packaging risk category. Although functioning obligatory and facultative quality management systems it is essential their conscious implementation and monitoring of their activity for proper adjustment to packaging risk category. Only those activities might bring expected and effective results.

It is necessary to conduct continuous monitoring of obligatory quality assurance systems implementation in enterprises constituting packaging supply chain. It is important for consumers protection policy fulfillment, which is one of the basis of common market rule in European Union.

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