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STANDARDIZATION AND CERTYFICATION OF THE WOODEN PACKAGIG IN INTERNATIONAL TRADE

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Abstract: Standardization of requirements is a common practice in the trade of many products. The developed international standards and systems for wooden packaging (EPAL, UIC and ISPM15:2009) provide a unified standard for quality and safety that is updated and complemented by best practices and technologies. Confirmation of meeting the standard is to obtain a certificate or license. These standards have been recognized by logistics organizations, state administrations and packaging manufacturers in many countries in the world. The labeling of packaging meeting the requirements of the standards is recognizable and fulfills the function of confirming the legality of their origin and safety for the environment.

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1. INTRODUCTION

Standardization of quality and legal requirements for the production of products is common in most areas of the economy. Packages fulfill many roles and functions, so they have many requirements. Wood packaging used in the transport of goods must comply with the guidelines for the dimensions, origin, phytosanitary purity, and in recent times also confirm their sustainable production. The most common attestation of meeting the criteria of a standard is to issue a certificate by a qualified entity.

The publication was based on an analysis of the literature on the subject and the legal requirements for wooden packaging used in international trade (pallets are treated by the authors as part of the packaging).

The developed international standards and systems for wooden packaging (EPAL, UIC and ISPM15:2009) provide a unified standard for quality and safety that is updated and complemented by best practices and technologies. Confirmation of compliance with the standard is to obtain a certificate or license. These standards have been recognized by logistics organizations, state administrations and packaging manufacturers in many countries in the world. The labeling of packaging meeting the requirements of the standards is recognizable and fulfills the function of confirming the legality of their origin and safety for the environment.

Without the involvement of the organizations responsible for overseeing and controlling these systems, these systems would not develop properly. In this case, the control and certification function is invaluable and is carried out by independent and competent bodies.

2. PACKAGING – DEFINITIONS AND FUNCTIONS

Packaging is defined as a coating packaged goods, which can be separated from it, and whose main task is to protect that product (Korzeniowski, Fiddler & Cone, 2010, pp. 26–27). The package is one form of protection and securing loads from environmental influences and effects of mechanical energy during the entire transport process.

The international standard EN 14182 contains packaging terms and defines the packaging as a product to maintain a certain quality of the packaged product, to adapt it to transport and storage and presentation, and to protect the environment from the harmful effects of certain products (PN-EN 14182:2005, p. 5).

The European Directive on packaging and packaging waste requires the Member States to comply with this requirement, including packaging requirements (the Commission therefore encourages the development of European standards in this area), limiting their volume and weight to at least the results they will sustain. The level of safety, hygiene and consumer acceptance, the minimization of the

presence of hazardous substances in packaging materials or their components, the design of reusable packaging and recovery (Directive 94/62 / EC, 1994, p. 11).

From the point of view of logistics, packaging should meet the following characteristics (Korzeniowski, Fiddler & Szyszka, 2010, pp. 31–32):

- protection of the product during storage, transport and use and, in some cases, the protection of the environment from possible adverse effects of the goods;
- facilitating the production, movement, sale and use of products;
- information about the product, in particular its suitability for human consumption;
- appropriate presentation of the product (psychological impact on the consumer thanks to its aesthetic qualities);\
- economic values.

Based on these definitions and functions, the packaging can be defined as a ready-made product having the right design to protect the packaging of the goods from harmful external influences (or vice versa – protecting the environment from harmful effects of the product), enabling the products to be moved during storage, transportation, sales and use, and informing about the content, thanks to its aesthetic impact on the buyer and having economic value (Sowa, 2012, p. 173).

Packages occupy an important position in logistic systems, since about 90% of all products that are manufactured in the world require the use of appropriate security features (Sowa, 2012, p. 171). Packages have a significant influence on the development of inter alia. Storage space, use of loading surface of means of transport and mechanization of transshipment work. In addition, they protect the packed products from quality changes and quantitative losses (Korzeniowski, Skrzypek & Szyszka 2010, p. 34). The role of packaging is particularly important in the transport system, in streamlining and speeding up transshipment processes, in securing the quantity and quality of goods and in identifying goods in the distribution processes in the supply chains (Sowa, 2012, p. 174). The role of packaging can be included in the definition of 6R, i.e. the six essential roles they have to fulfill, i.e. storage roles, transport roles, picking roles, maximization of product movements, minimization of packaging, information role.

Until recently, packaging (boxes, pallets) were the product of a one-off, but the need for cost reduction and environmental protection requirements change this state of affairs. At the same time, we are looking for ways to limit the amount of packaging, and thus packaging waste. To this end, the use of reusable and recyclable packaging is maximized (Sowa, 2012, p. 172). These are actions fit within the requirements of the European directive on packaging and packaging waste, ie measures to reduce the production of packaging waste and promote recycling, reuse and other forms of recovery of waste and their definitive disposal must be treated as a definitive solution (Directive 94/62/EC, 1994)

3. QUALITY EVALUATION SYSTEMS OF WOODEN PACKAGING

Wood packaging performing many functions and roles must also meet quality requirements, technical and legal. In order to meet these requirements have been developed surveillance systems of their production systems, marking and supervision of their flow, repair and recycling. Solutions developed in this area are, among others, licensing systems for the production of Euro-pallets and phytosanitary certification systems security packaging. These actions serve the observance of due diligence in the production of wood packaging material complying with the law.

The license system for the production of wooden packaging is mainly used in the Euro-pallet, which was created in 1950 by the Swedish concern BT Industries. In 1961, on the initiative of the International Union of Railways UIC (Union Internationale des Chemins), an agreement was signed in the field of standardization and interchangeability of pallets. This was the basis for the creation of the European Pallet Pool (EPP). EUR mark in the oval became a registered trademark of the UIC [www.uic.org].

The UIC is based on standardization euro palettes and is described in the UIC Code 435, which consists among other things of UIC 435-2 concerning the production of flat wooden pallets and UIC 435-4 on the repair of flat wooden pallets. There are also the UIC cards, which describe pallets other than EUR-pallet dimensions (EUR2, EUR3 and EUR6) and metal baskets – wood (Gitter-boxes have been purchased). An independent audit organization SGS has the task of maintaining the guarantee of quality and services Euro-pallets in the system UIC [www.uic.org].

Polish State Railways S.A. are a member of the International Railroad Union (UIC) and until 2004 had a license to manufacture Euro-pallets and mark them with the EUR and PKP mark. Unfortunately, in 2004 the Polish State Railways S.A. lost their license to produce EUR-pallets.

In 1995 the international pallet organization EPAL (European Pallets Association e.V.) was launched. Within this organization up to now, 17 EPAL national committees have been established and about 1500 licenses have been issued for the production of pallets, Gitter boxes or tools for their production in the world. EPAL pallets production volume in 1998 was about 21 million, and in 2012 – about 67 million units and continues to grow. It is estimated that currently in circulation is approximately 450 million pallets EPAL (www.log4.pl). In Poland, the Polish National Committee EPAL was established in 1999 by transforming the Polish Association of Employers of Europalet Manufacturers. He became a full-fledged member of the international organization of the European Pallet Association EPAL (www.epal.org.pl).

The EPAL system is essentially based on the guidelines of the harmonized standard EN 13698, which includes the requirements for 800 mm x 1200 mm flat

wooden pallets and the UIC Code 435. In more detail, this standard specifies the characteristics of the production of flat, Two-disc, irreversible, four-way, nine-fold, reusable, 800 mm x 1200 mm, used for transportation, storage, handling, and exchangeable. It also includes some requirements for production and labeling and safety issues (EN 13698-1:2005).

In order to guarantee the quality of products and services, EPAL cooperates with the independent audit organization (Bureau Veritas), logistic organizations and key users of pallets (www.epal.org.pl).

The basic assumptions of the EPAL system is 100% safe and interchangeability mark EPAL pallets marked. The quality of the pallets is guaranteed by the licensing of their production and the control by an independent auditor. It follows that only licensed establishments in the EPAL system can produce the packaging and label it in accordance with the guidelines of the system. The marking of pallets in this system consists of (before 31 July 2013): railway sign (UIC member) or EPAL in oval on left bracket (legible at least one of two), EUR sign in oval on right bracket (legible at least one of two), the metal buckle on the center bracket (absolutely for new pallets) and fixing nail on the center bracket (for pallets sorted or repaired confirm the authenticity of the pallet and preserve the required parameters). The Euro-pallet labeled in this way allows for identification of its manufacturer and the legality of its origin.

As a result of the separation of the EPAL organization from the UIC, Euro-pallets produced after August 1, 2013 by EPAL members are labeled only with the logo of the EPAL organization (without the EURO sign) (Fig. 1).

Fig. 1. Pallet marking in the EPAL system (www.epal.org.pl)

EPAL also licenses pallet repair companies, pallet component manufacturers as well as nail and equipment used for the production of pallets.

Pallet characteristics in the EPAL system (www.epal.org.pl):

- The ability to exchange worldwide.
- Quality control by an independent inspection company (now Bureau Veritas).

- Short transport routes, thanks to the universal availability of EPAL pallets.
- Pallets made of natural raw materials, without chemical treatment.
- Unified quality standards around the world.
- Standardized dimensions for the whole supply chain.
- Transparency of costs.
- More than 450 million pallets traded worldwide.
- Access to over 1,500 licensees.
- Neutral CO2 balance.

Since 2013, a pallet quality assessment system has been implemented based on the new ECL EPAL Pallet Assessment Cards. These cards contain the key information concerning the quality requirements specified in EN 13698 and UIC code 435. Depending on the type of information contained KOP cards have different color and so KOP red refers to unacceptable defects, KOP green features include the correct pallets, KOP yellow palette shows the damage that are acceptable and blue KOP contains information about the type of evaluation Euro-palettes in the system EPAL (pallets: Epal 1 Epal 2 Epal 3 Epal 6). These cards have been prepared in the graphical version allows you to print their version of the poster. This allows you to place them in the workplace of people responsible for the production, sorting, recycling and reparation. The KOP card system simplifies the assessment of material used in the manufacture and repair of Euro-pallets.

4. LEGAL AND PHYTOSANITARY REQUIREMENTS FOR RAW WOOD PACKAGING

Packaging made from raw wood constitute a reservoir for the introduction and spread of harmful organisms, so-called. quarantine pests. This is facilitated by the fact that wood packaging are often made from fresh wood, which has not undergone sufficient treatment that would allow to kill harmful organisms. It is believed that the pests found in wood packaging may have a negative impact on the state of forests and biodiversity of the country to which the parcels were shipped.

In view of the above, it is concluded that wood packaging constitute a reservoir of a serious threat in terms of phytosanitary regulations, including the findings of the International Plant Protection Convention of 1997. This problem was signalled in Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community of European Union countries. In such circumstances, it was necessary to take action to reduce the above threat in international and transcontinental traffic.

The activities of the international organizations the UN FAO (United Nation Food and Agriculture Organization) initiated the process of establishing common rules for wood packaging. To do this, the phytosanitary measures have been

identified which, although they do not serve to permanently protect wooden containers from harmful organisms, but protect them for some time and eliminate their original infection. This reduces the possibility of the spread of pests and their negative impacts on biodiversity and forest condition of different regions of the world. The scope of these activities is part of the development of the International Standard for Phytosanitary Measures number 15 (ISPM15) by the IPPC (International Plant Protection Convention), it is the International Plant Protection Convention, which is linked organizationally with the UN FAO and engaged in the fight against the spread of plant diseases (International Standard For Phytosanitary Measures, 2013, p. 3). The ISPM15 document was adopted by the Temporary Committee on Phytosanitary Measures (ICPM) in March 2002 as a guideline on rules for packaging wooden in international trade. The current version is ISPM15: 2009 (International Standards For Phytosanitary Measures No. 15) and the latest changes were made in April 2013 (www.ippc.int).

The responsibility for preventing the introduction and spread of harmful organisms rests on the exporting and importing and the National Plant Protection Organization (KOOR). KOOR responsible for the application of phytosanitary and sign packages. In order to fully supervise the implementation of the tasks, KOOR cooperates with the customs service and the organizations that supervise the movement of goods. KOOR of the importing country is also obliged to notify KOOR of the exporter's country in the following cases: detection of harmful organisms in the package, absence of markings on packaging, other non-compliances (International Standard for Phytosanitary Measures, 2013, p. 4).

The introduction of ISPM15 in the European Union caused that are not required phytosanitary certificates for raw wood packaging, but only the credentials to carry out pest control treatment occur in / on wood in international transport to countries that have implemented this standard. To date, the standard was implemented by countries of the European Union, Argentina, Australia, Bolivia, Brazil, Chile, China, Croatia, Egypt, Ecuador, the Philippines, Guatemala, Honduras, Indonesia, Israel, Jamaica, Japan, Jordan, Cameroon, Canada, Kenya, Colombia, South Korea, Costa Rica, Cuba, Maldives, Malawi, Malaysia, Mexico, Nicaragua, Nigeria, Norway, New Caledonia, New Zealand, Oman, Panama, Paraguay, Peru, Dominican Republic, South Africa, Senegal, Sri Lanka, United States, Switzerland, Thailand, Taiwan, Tunisia, Turkey, Ukraine, Venezuela, Vietnam. Some of these countries have adopted this standard conditionally, it is with some reservations as even Jordan, where it is forbidden to use boxes or other packaging materials previously used in the exporting country to the packaging or transport of materials prohibited for safety reasons, phytosanitary (www.ippc.int).

Poland also implemented ISPM15 standard and on its basis are granted certificates for manufacturers of wooden packaging by the Institute of Wood Technology in Poznan, on the basis of the authorization of the Ministry of Agriculture and Rural Development. Polish companies that meet the requirements of the standard are registered in the National Register of Companies Qualified

Conditions Production of Wood-Based Packaging Materials in Phytosanitary Aspects, in particular according to the FAO/IPPC/ISPM Standard (525 companies as of July 31, 2015) (www.itd.poznan.en).

4.1. The scope of the standard ISPM15:2009

Standard ISPM15:2009 refers to the requirements for the wooden material used in packaging, among others, such as crates, boxes, cages, dunnage, pallets, drums and reels for winding cables and any kind of wood material, which can be present in almost any imported consignment, including in consignments that are not subject to routine phytosanitary inspection. Some packaging are not the subject to these requirements: wooden packaging material made entirely of thin wood (the thickness max 6 mm), wooden packaging material made entirely of processed wood using glue, high temperature or pressure or a combination of these (e.g. Plywood, particle board, OSB or veneer), and also barrels for wine or spirits subjected to high temperatures during production, wine packaging, cigars and other objects made from processed wood and/or the production process eliminating harmful organisms, as well as sawdust, edgings and wood wool and wood components permanently fixed to the transport vehicles and containers. This exclusion is due to the fact that these packages have been made from fully processed material that eliminates the risk of raw wood (International Standard for Phytosanitary Measures, 2013, pp. 4–5).

The standard contains information on authorized phytosanitary measures to reduce the risk of introduction and spread of quarantine pests in wooden packaging materials made from raw wood used in international trade (International Standard for Phytosanitary Measures, 2013, pp. 5–6).

For packaging timber that has been repaired or regenerated, special requirements have been developed. The repackaged wooden packaging material is considered to contain packaging less than one third of which has been replaced. KOOR must ensure that repairs to the marked wooden packaging material will only be carried out using treated wood conforming to this standard or processed wood. Regenerated material must be re-treated and labeled (International Standard for Phytosanitary Measures, 2013, p. 6).

Standard requires that the wood packaging material was made from debarked wood (with a defined tolerance range for the residual cortex) and subjected to the approved treatments is shown in Annex 1 of the standard and labeled as described in Annex 2. KOOR may take measures other than those listed in Annex 1 (under bilateral agreements with trading partners), in which case the sign in Annex 2 shall not apply.

Phytosanitary treatments approved in Annex 1 to ISPM15:2009 is considered to be generally effective against the majority of organisms harmful to living trees. These measures are characterized by universality, which means it can be used against various harmful organisms have high efficiency, are easy to make and

available. Approved treatments are thermal treatments by a conventional steam chamber or the drying chamber (HT), the thermal treatment with the use of volumetric heating (DH), treatments with methyl bromide (MB), the other approved alternative treatments. Entities providing treatment should be approved by the national plant protection organization (KOOR) (International Standard for Phytosanitary Measures, 2013, pp. 10–14).

Wood packaging must be made strictly from debarked wood. The standard permits the presence on the wood of small pieces of bark with a width of no more than 3 cm (regardless of length) or a width of more than 3 cm (up to 50 cm2). Debarking of wood reduces the likelihood of secondary infection by harmful organisms. If methyl bromide is used, the bark must be removed prior to application and, in the case of thermal treatments, the bark may be removed after the wood protection treatment has been carried out. The content of the bark should be included in the measurements conducted during the thermal protection of timber (International Standard for Phytosanitary Measures, 2013, p. 10).

Standard ISPM15:2009 allows treatments involving high temperatures, for example, conventional treatment with hot steam, the drying chamber, a chemical impregnation under high temperature and high pressure, and the heating volume (using microwaves or radio waves). These processes are considered appropriate if they ensure that the parameters specified in the standard are met. KOOR to be obliged to ensure that the contractor will monitor the temperature of the wood treatment and that the temperature of the treatment will be maintained for the whole batch of wood.

Thermal treatment by a conventional steam chamber or the drying chamber (HT) needed to achieve a minimum temperature of 56 ° C for the entire cross section of the wood (including the core) for at least 30 minutes without interruption. The temperature can be measured by placing sensors in the wood core. An alternative solution for vending or other heating chambers is to develop treatment plans based on a series of tests that measure the temperature of the wood core at different points in the chamber, the results of which should be related to the air temperature in the chamber, taking into account wood moisture and the other basic parameters (species and thickness of wood, air flow and humidity). During the tests, it shall be demonstrated that a minimum temperature of 56°C of the entire cross-section of the timber is achieved for at least 30 minutes without interruption. Treatment plans should be specified or approved by KOOR. During the inspection at the manufacturer, the following areas are verified: the tightness of the heating chambers, the air flow inside the chamber through the wood and around it, the proper use of the relevant fans in the chambers, the correct location of the temperature sensors, the treatment plans, the process time and temperature of the process, the process safety procedures, the sensor calibration, archiving records of treatments and calibration (International Standard for Phytosanitary Measures, 2013, pp. 10–11).

During the thermal treatment with the use of volumetric heating (DH), microwave heating of the wood material is used. This material should have

a diameter of 20 cm measured at the narrowest point of the timber element or the prism and has to reach a temperature of at least 60 ° C throughout the cross-section timber for 1 minute without interruption. This temperature must be reached within 30 minutes from the start of treatment. The plans for these treatments should also be specified or approved by KOOR. For thermal treatment using volumetric heating, attention should be paid to: constant process monitoring, temperature and process time measurement, the number of sensors used and their regular calibration, type and quality of the recording equipment, record keeping and calibration (International Standard for Phytosanitary Measures , 2013, p. 12).

Standard ISPM15:2009 also allows the use of methyl bromide (MB). This is avery common method in the world, and in some regions only available. Due to the adverse effects of methyl bromide on the ozone layer, it is advisable to search for alternative phytosanitary measures to replace the measure (International Standard for Phytosanitary Measures, 2013, pp. 12–13).

For fumigation with methyl bromide, a process plan must also be developed and approved by KOOR to ensure that the minimum CT (product of the concentration of the agent and the exposure time) is reached within 24 hours, assuming the temperature and final residual concentration (given in the standard). The CT value must be achieved throughout the wood profile, including its core (concentration measurement is made in the environment). The minimum temperature of the wood and its surroundings cannot be less than 10 ° C and the minimum exposure time is not shorter than 24 hours. The gas concentration is monitored 2, 4 and 24 hours after the start of treatment. Wooden packaging material comprising the elements with the smallest cross-section of more than 20 cm cannot be subjected to a treatment with methyl bromide. The inspection verify: the uniformity of gas distribution in the chamber, filling of the chamber up to 80% volume, chamber tightness, tarpaulins and sealing of seams, impermeability of the substrate, gas circulation in the chamber and under the tarp, dose calculation and gas concentration measurement, calibration of the temperature sensors and gas concentration, keep records of treatments and calibration (International Standard for Phytosanitary Measures, 2013, p. 13).

Due to the development of new technologies, new treatments phytosanitary protection of the packaging material timber are being developed. CPM may approve alternative treatments or new treatment plans. The guidelines in this regard IPPC has provided in ISPM28:2007, and upon approval the new techniques may be included in the standard and considered appropriate.

4.1. Marking compliance with ISPM15:2009

Annex 2 to the standard ISPM15:2009 provides information on the method of marking of packaging previously subjected to an approved phytosanitary treatment. The marking consists of: symbol (IPPC), the country code (XX), treatment provider code (000), the treatment code (HT, DH or BM) (Fig. 2).

The mark should be legible, durable and non-portable, otherwise placed in a prominent position on the packaging (preferably on two opposite sides of the package). The sign cannot be written by hand. The size of the sign should be legible for inspectors without the need for glasses or magnifying glasses. No red or orange colour can be used for marking (International Standard for Phytosanitary Measures, 2013, p. 16).

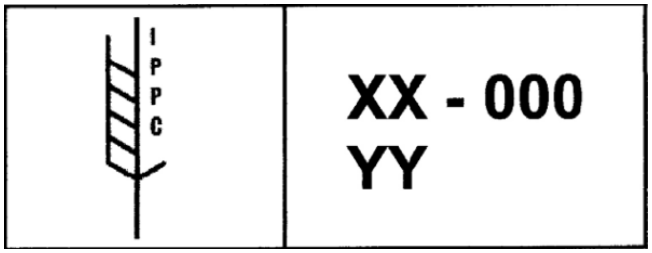

Fig. 2. Exemplary labelling for packaging meeting the requirements of ISPM15:2009 (International Standard for Phytosanitary Measures, 2013, p. 16)

In the case of dunnage, it is required that the wood used is treated and has the correct marking (clear and legible). Marking such timber is carried out by repeated application of character in small distances, so that each piece of wood has the entire mark.

If the wooden packaging material is found to be unmarked or during inspection will be collected evidence of the ineffectiveness of the wood preservation treatment, KOOR should take appropriate action, which may include: stopping the material until the matter is clarified, removal of material not in accordance with regulations, applying the treatment, Destruction of packaging by burning, deep burial (at least 2 meters), crumbling for further processing, other methods of disposal or referral (International Standard for Phytosanitary Measures, 2013, p. 18).

5. CONCLUSION

Packaging has many functions, including the security of the goods, and consequently the need for standardization in terms of quality and legal requirements. An example is the international quality standards (EPAL system, UIC) and ISPM15: 2009. Confirmation of meeting the standard is the entity obtaining a certificate or license. Since the establishment of these requirements changed a lot of wooden packaging and market surveillance. The quality and legal requirements for wooden packaging are covered by international standards recognized by logistics organizations, state administrations and packaging manufacturers in many countries in the world. Also the designation used for packaging meeting the requirements

of the standards is recognizable and facilitates their verification by the quality and customs services. The measures taken in the field of standardization contributed to the implementation of the system of supervision over the flow of packaging in international trade and increase biodiversity countries import safety. They also fit with the objectives of the European Union in the field of sustainable use of packaging, with special emphasis on their multiple uses and recycling

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BIOGRAPHICAL NOTES

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Ilona Olsztyńska is a student at the Doctoral Studies at the Poznan University of Technology in the Faculty of Management Engineering. He is a specialist in timber and biomass logistics as well as wood products, stock control, material flow and production management. He authored and coauthored over a dozen scientific articles in this area. Currently he is interested in the problem of waste management, in particular the use of biomass for renewable energy.

Sebastian Scholz is a graduate of Poznan University of Economics – master in economics. Currently he studies at the Doctoral Studies at the Poznan University of Technology in the Faculty of Management Engineering. Currently he is interested in the problem of waste management issues in manufacturing companies, optimization of waste recycling and treatment processes, including the production of waste fuels and RDF.