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PAN-NORDIC PACKAGING
Packaging requirements of Nordic countries

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ABSTRACT

In recent times, the suppliers have discovered the advantages of multinational products. Ability to sell one and the same product in more than one country provides a possibility to find savings in logistics trough more efficient supply chain structures as well as in purchasing trough greater economies of scale.

Creating a multinational product is quite a complex task as many different aspects of several countries have to be taken into concideration in designing the product and it's packaging. If the product itself is feasible as such there is an issue of varying packaging requirements of different countries. The requirements imposed on packaging are made to support the respective country's logistical infrastructure and therefore the same package may not be applicable in some other country. The only way for a supplier to have a multinational product package is to fulfill the requirements of each country where the product is intended to be sold.

This thesis examines the packaging requirements of fast moving daily consumer goods in Nordic countries. The focus is on the requirements of secondary and tertiary product packages. The aim of the the thesis is to provide information of what packaging requirements are in Nordic countries and how they differ from each other.

The thesis topic was issued by Semper Ab who wishes to harmonize their product assortments so that the same products can be sold in all Nordic countries. The topic is examined on general level but the thesis also provides a concrete list of required changes that Semper would need to make regarding their packaging.

As a conclusion the thesis presents applicaple packaging models for secondary and tertiary packages which fulfill the packaging requirements of all Nordic countries.

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1. Introduction and research question

This first chapter presents my chosen subject for the final thesis. A short background on the case leads us to the research question.

The Nordic food markets have undergone significant changes during recent years. Enterprises have grown, specialized and merged – both at the manufacturing and the retail level. New players have entered the market and a number of new products and brands have been introduced. These retail chains have integrated horizontally and vertically, performing activities that were traditionally performed by wholesalers. This way they can efficiently control the entire supply chain from purchasing to store checkout. Lately, international discount chains, like Lidl and Aldi, have entered the Nordic food markets (Nordic Food Markets 2005:10,21).

Growing market shares of discount chains have awoken traditional retail chains to take dramatic counter-measures. A good example of this is recent S-group's buy off of Spar-chain in Finland.

The strengthening of retailers has created pressure trough wholesalers on to suppliers to push down prices and at the same time provide better service. "Powerful buyers can negotiate low prices paving the way for lower consumer prices" (Nordic Food Markets 2005:80). In order to achieve this suppliers have to seek new ways to make savings without losing on service level.

Semper has decided to meet this challenge by improving its efficiency and profitability by seeking savings from enhancing the supply chain by centralizing warehousing activities and harmonizing products on the Nordic markets. The centralization project is already preceded from planning phase to the edge of execution. Product harmonization is planned to take place by gradually changing the products from country specific to Nordic products.

Nordic countries, Finland, Sweden, Norway, Denmark and Iceland are considered to have very different consumption patterns (Nordic Food Markets 2005:48). Therefore Semper, like most companies divide Nordic countries to separate markets. The division is also made because of the country specific standards, regulations and requirements, which are either placed there by the government, authority organizations or industry players (Stangdell 2006, interview)

The country specific standards, regulations and requirements in Nordic countries are generally associated with language and design of the consumer unit, but equally much they have to do with the logistical units of the product. Each Nordic country has organizations controlling the standards, regulations and requirements of product packaging. Besides these, there are also international organizations placing requirements on the packaging. Regardless from all the coordination work, all Nordic countries still have varying standards, regulations and practices in use. For a company wanting to harmonize its products on Nordic level, fulfilling all demanded requirements is challenging, as even between two countries the requirements may be mutually exclusive.

In the future the international organization GS1, who promotes ECR and best practices of commerce, is likely to introduce Pan-Nordic or Pan-European standards or best practices for packaging of FMCG, but it may take a long time until this happens and all industry players are able to adapt their products and infrastructures to it.

The objective of this thesis is to gather information on product packaging requirements from various sources, combine them and further process the information to a complete applicable packaging model that fulfills all requirements of product packaging for FMGC in all Nordic countries.

1.1 Scope of the thesis

In this thesis I intend to examine packaging from the logistical point of view. As the purpose of primary package is to be as appealing as possible for the consumer, the logistical attributes are not of primary relevance. The main logistical attributes of a product lay on the secondary and tertiary units, and this is where I will focus my study on.

Semper’s motive for issuing this thesis topic to me is that they want to make the current logistical packaging ready for expanding activities to all Nordic countries. Semper’s influence on the thesis is that I will limit my scope to examining only daily consumer goods and from these I will rule out cold chain goods, tobacco, alcohol and dangerous goods. As there is also such wide variety of logistical units and all have several different requirements, I will limit my scope by concentrating only on the logistical units that Semper uses: sales unit and a pallet. I will thereby not examine requirements of roll-cages, mixed pallets, display pallets, variable weight pallets or variable weight sales units.

The intention of the thesis is to provide a Pan-Nordic packaging model specifically for Semper's products, and I will therefore first examine the requirements on a general level aiming to build a general packaging model. Later I will apply the Pan-Nordic packaging model to Semper's current packaging to find out the required changes. As a result I aim to provide Semper an applicable Pan-Nordic packaging guidelines for all the products.

Research Question

What are the requirements of the secondary and tertiary packaging of daily consumer goods that have to be fulfilled for Nordic countries and how do Semper's current products match these requirements?

2. Background

Chapter two introduces the concept of Pan-Nordic products and Semper's interest to have a Pan-Nordic product assortment.

Companies generally consider Nordic countries as separate markets. This is, of course in many cases due to specific product preferences and some natural barrier such as short product shelf life, which makes exporting unfeasible. Still in many cases, although the actual product would be suitable to be sold in all Nordic countries as such, the language barriers and country specific standards, legislations and requirements regarding the goods flow in supply chain makes the use of Nordic products too challenging for the producer. It is much easier to produce a product according to the individual requirements of each country.

2.1 Pan-Nordic consumer product

A Pan-Nordic product is a product that can be sold in all Nordic countries. For a long time now there has been products sold with the same packaging in two or three countries, but truly Pan-Nordic products hardly exist due to several reasons.

The main barrier for having a Pan-Nordic consumer product is that the actual product may not have room in one or more markets. This is usually due to either the competition situation or consumer preferences in the markets.

One big issue is that countries do not share the same language. In many cases this is another crucial barrier, as it is might not be possible to fit and print product information in five different languages on a small product.

Moreover, there are also country specific regulations or legislations, which may influence packaging texts, actual product or the way it is marketed. In general it could be said that as a Pan-Nordic product is a sum of compromises, which have to be made on package design, languages and even with the actual product, it may not be sensible to make the product Pan-Nordic if one or more markets are inaccessible for some reason. Compromising on product packaging or its attributes might reduce its consumer appeal or produce extra costs. Since there may be extra costs or loss of consumer appeal from using Pan-Nordic products the supplier has to benefit from it in some other way.

The main benefit of Pan-Nordic products is that it enables to serve a larger customer pool with the same product. If a company has previously been serving several markets with several products and is now able to combine the markets into one and serve it with only one product without losing sales, the company can significantly improve it's profitability trough economies of scale in purchasing of packaging and raw materials. Also, as the sales of several products agglomerate on one product it may be possible to find savings in production and warehousing resulting from larger production batches, shorter production cycle, narrower product assortment and lower stock levels.

Having a Pan-Nordic product assortment makes it possible to launch a product quickly to a new market, as it is has designed to meet the requirements of even this particular market. Even just testing the market with a new product is possible, as it will not require any excess research and development input.

As previously mentioned, the purpose of primary packaging is to be as appealing as possible for the consumer; the logistical attributes are secondary. Examining Pan-Nordic consumer product is more of a marketing orientated issue and as interests of this thesis lay on logistics, I will not go further in examining the consumer unit. As I mention Pan-Nordic product in this thesis, I always refer to the logistical units, secondary or tertiary package.

2.2 Pan-Nordic logistical units

Making a Pan-Nordic product assortment is challenging from the point of graphical design, language and product description requirements of the consumer package. The purpose of primary package is to sell the product to the customer and the challenge is more marketing orientated. The logistical interests lay on the secondary and tertiary units. The challenge is to meet the various different requirements made to ensure product flow through the entire supply chain. The Pan-Nordic packaging model is a summary and a compromise of all of those requirements.

As previously mentioned, the Pan-European packaging standards are still under construction and the only way for a supplier to have Pan-Nordic products to fulfill each country's individual requirements even in countries where this would not be necessary. This means extra packaging costs and losing on the benefits that some country's more loose requirements may have on transportation and warehousing costs.

2.3 Semper AB

The history of Semper dates back to 1930s when Doctor Axel Wenner-Gren founded Svenska Mjölkprodukter AB in 1938. Semper has been producing baby food since 1940s when the worlds first manufactured breast milk substitute BabySemp was introduced. Production of baby food in glass jars began in the 1960s and in the 1990s gluten free products were introduced to product assortment (Semper Historik 2006).

In the summer of 2003 Semper was sold to the private equity firm Triton. Before this, Semper was a subsidiary to Arla. The cooperation with Arla has continued within two major areas; production of baby food and gluten-free products at Arla's production plants in Sweden and Denmark.

In February 2006 a Swiss company Hero acquired Semper. Hero sees Semper as an access company to a new affluent region also offering the potential to develop Hero's other product categories (Hero press release 2006).

Semper's brand is one of the most well known Swedish brands. In the fiscal year 2004 the total turnover of entire Semper was approximately EUR 111,4M. Semper operates in some way in most European countries. Baby food is sold in all Nordic countries and Russia. Gluten free products are exported to north and middle Europe. In Great Britain Semper is the market leader in gluten free category under the brand of Juvela.

In Finland Semper is operating in two business areas; baby food and gluten free. Currently Semper is the third largest baby food supplier holding approximately a 10% market share of baby food. In gluten free product category Semper is the market leader in Finland holding a 50% market share. Out of entire Semper's 2005 turnover Finnish market generated EUR 5,5M with baby food and EUR 2,2M with Gluten free products. Distribution and sales in Finland is done in cooperation with Arla Foods Oy.

Semper's vision is to become the Nordic region's leading food company producing baby food and gluten-free food.

2.4 Semper's interest to have Pan-Nordic products

Semper is currently restructuring the supply chain of finished goods to meet new business demands, which may affect in the way of how products are distributed to the Finnish market. In addition, Semper is conducting a Nordic product harmonization project in order to decrease the number of stock keeping units. Both measures are taken in intention to push down supply chain costs.

2.4.1 Pan-Nordic product assortment

Semper is seeking to improve its performance by making the supply chain more cost-effective. Semper has high product stock levels and a long production lead-time, attributes which both are quite typical for this type of business. High stock levels and long production lead-times are mainly caused by large amount of articles and strict regulations for making baby food. Also high start-up production cost of gluten free products results in higher stock levels (Stangdell 2006, interview). Currently Semper already has some products, which are used in Finland and Sweden but packaging of most products is still region specific although the actual product is the same in all markets. For Semper having a Pan-Nordic assortment means that all markets would still have the same product assortment as previously, but the packaging would change to such way that it can be used in all markets.

As baby food has very strict regulations, in regards to purity and healthiness, purchase of raw material is complex. Stock levels at factory become high as some materials are bought only once a year to ensure accessibility to raw material that meets the quality restrictions. Raw material is frozen and consumed in batches throughout the year. Production quantity of a batch has to be sufficient to last until the next production date. As there are over 100 different articles, production cycle of the entire assortment is about one month. Therefore the product stock levels at warehouses rise high.

With gluten free products the raw material acquisition is not the reason for high stock levels. The production of gluten free products requires the bakery to close down production of products, which contain gluten. A thorough clean up before production is necessary. These constraints results in, production having to be done in large batches to keep down the costs that comes from extra work in producing a gluten free product.

Due to complexity and long production cycle, Semper would be likely to benefit greatly from making its products Pan-Nordic. Pan-Nordic assortment would enable having lower stock levels, better service level, shorter production and batch cycle and better remaining shelf life.

2.4.2 Centralization of Semper's warehousing activities

Semper wishes to centralization its warehouse operations to a Nordic warehouse at Klippan in southern Sweden. This means closing the Finnish regional warehouse at Vantaa and the distribution channel market would be replaced with direct shipments from the Nordic warehouse. The warehouses Semper uses are third party warehouses operated by DHL.

2.4.3 Current supply chain structure

The Vantaa warehouse is a regional full service warehouse from where customers have a possibility to make orders on one-day lead-time. The goods are sold on ex-works terms from the Vantaa warehouse. All goods are imported from Sweden to the warehouse in full truckloads.

All baby food except for BabySemp and porridges are produced at Procordia Foods factory in Eslöv Sweden. Semper stores products intended for Swedish markets in Klippan warehouse and products intended for Finnish markets are delivered straight from Procordia to Vantaa warehouse. Gluten free products are produced in several bakeries and stored in Klippan, from where they are transported to Vantaa according to demand.

Baby food flow to Vantaa warehouse is managed with VMI-system, which is based on sales estimates of Finland. The system is maintained by planning division in Sweden. Production dates and quantities are preliminary set for 16months in advance and are modified according to true demand as time closes in. Gluten free products are ordered from Klippan due to shorter shelf life of some products. Also due to smaller volumes compared to baby food, products are delivered in quantities of estimated demand of next month.

The advantage of current supply chain structure is the cost-efficient transportation of goods from Sweden to Finland. The advantage to clients is that they are able to pick-up goods with high frequency from the Finnish regional warehouse.

The disadvantages of the current supply chain structure are the high costs resulting from having two separate warehouses performing activities that could be performed by only one, and the difficulty to react to sudden changes of demand. Failure to react to sudden changes of demand, results in either products being scrapped or product shortages due to long fixed production horizon. It is also difficult to secure high remaining shelf life at the pick-up point even if demand remains constant due to small demand in relation to minimum economic production batch size.

2.4.5 Warehouse centralization and it's effects

Semper is seeking to improve supply chain and to make it more cost-efficient. The shift from using two warehouses to one Nordic warehouse is intended to take place in fall 2006. The current decentralized supply chain provides possibilities for frequent pick-ups with short lead-time, but does not give good support true-demand satisfaction and high remaining shelf life. The intended centralized supply chain structure provides possibilities to secure true-demand satisfaction, high remaining shelf life and a possibility to lower transportation cost (Stangdell 2006, interview).

The centralized warehouse structure means that Semper would close down the Vantaa warehouse and move all it's functions to Klippan, which would serve as a Nordic warehouse.

The Klippan will continue as a full service warehouse for all markets instead of being a regional warehouse. This will enable Semper to cut off the relational cost of the Vantaa warehouse from product prices for Finnish clients.

Finnish clients can choose between two terms of delivery: either Ex Works term pick-ups at any time or DDU terms of deliveries three times a week. The delivery term will of course have an effect on product price, which will be a benefit for the clients, as now they will have a possibility to affect the transportation prices, which correlates directly with their own profit margins.

The order frequency from Klippan warehouse will be less frequent than from Vantaa. The clients themselves will likely limit their order frequency on Ex Works term to secure cost-efficient transportation and on DDU delivery terms Semper will have to limit the order frequency in the transport contract to secure cost-efficient transportation. Less frequent deliveries make the goods flow more cyclical than it currently is.

More cyclical flow is a disadvantage for the clients as constant flow gives possibility to have a lower stock and gives better chance to react to changes in demand. Also the order lead-time will be longer than it currently is. Both of these disadvantages will push up clients inventory, as they will have to increase their safety stock to secure their service level. Still this is a quite small disadvantage as Semper's products have a long shelf life and thereby threat of scrap is non-existing. Still the cost of tied capital and required extra warehousing space costs money to clients and even though Semper will cut the product prices, consumer prices are likely to remain the same (Stangdell 2006, interview).

For Semper the primary advantage is financial gain. Although Semper will cut product prices, shutting down Vantaa warehouse will bring savings. The secondary benefits for Semper are reduction of the whip effect resulting in better service level. Semper will also have fewer orders but the same sales volume making the orders bigger, thereby reducing the workload in amount of order handling.

2.4.6 Harmonized products and warehouse centralization

Product harmonization and centralization of warehousing activities are intended to push down supply chain costs. The combined effects of these measures are lower stock levels, shorter production cycle, higher service level, higher remaining shelf life and ability to make enhance product development and life cycle maintenance.

2.4.6.1 Lower stock levels and shorter production cycle

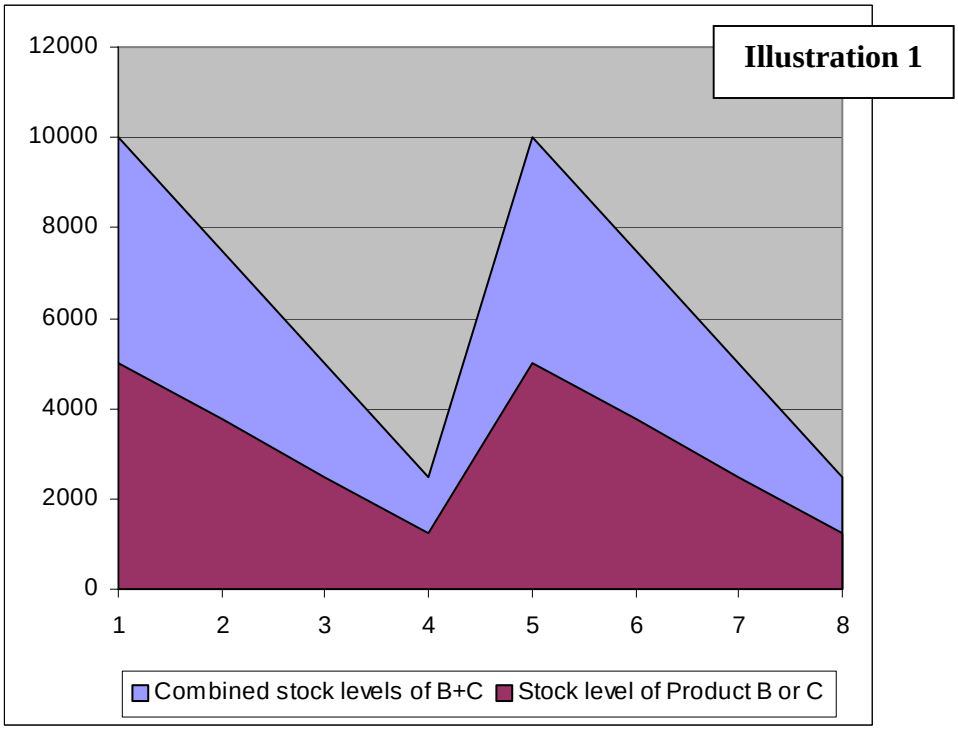
Centralization of warehousing to Klippan alone would not provide Semper any possibility to make savings in stock keeping costs as all markets would still need their own products in the stock and the total stock levels would remain the same.

Now as the products will be harmonized amongst markets, Semper can push down stock keeping costs and the remaining shelf life by producing more frequently in same size batches. This is illustrated in example 1.

Example 1

Semper produces Mango purée, but sells it as product B in Sweden and as product C in Finland.

- Weekly demand for B is 1250 pieces
- Weekly demand for C is 1250 pieces
- B and C have to be produced separately
- Minimum production quantity is 5000 pieces

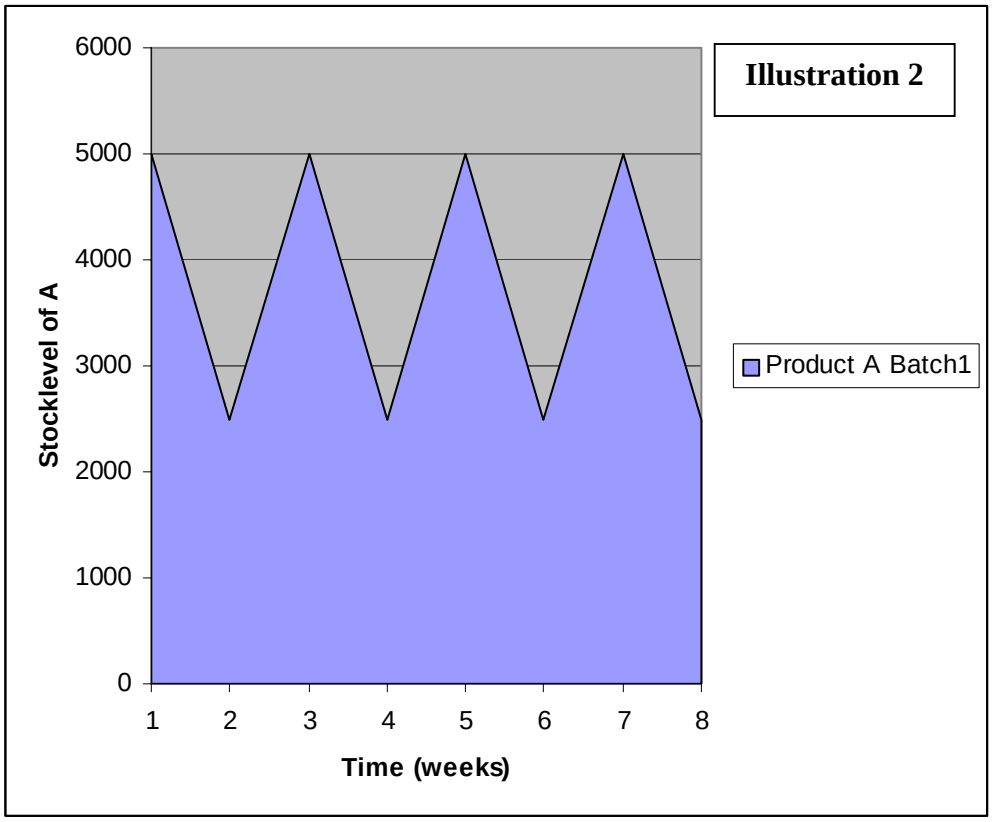


As Semper wishes to keep the stock levels low, the products are produced every four weeks in minimum batches of 5000 pieces and the combined total stock level of B and C after the production is 10000 pieces.

Illustration 1 shows us that products, which are needed in week four, have been produced and kept in stock for three weeks prior they are needed. Thereby they have produced excess stock keeping costs and products have now shorter remaining shelf life when they are delivered to the customer. A long production cycle will also make it hard to react to sudden changes in demand and the service level may suffer.

Semper harmonizes B and C so that both markets can use same product A. As both markets still have the same product as previously, just with new packaging, the demand remains at the same level.

- Weekly demand for A is 2500 pieces (B+C)
- Minimum production quantity is 5000 pieces



The product A can be produced every two weeks in minimum batches of 5000 pieces and the total stock level of A after the production is 5000 pieces.

Illustration 2 shows us that production batch is consumed in two weeks instead of the four weeks showed in illustration 1. Thereby the stock keeping costs are only half compared to illustration 1 and product A has longer remaining shelf life when it is delivered to the customer. With a shorter production cycle it is easier react to sudden changes in demand, which helps to keep the service level high.

2.4.6.2 Enhance of product development and maintenance

With current resources Semper is able to produce around ten new products for all markets together, foe example five products for Sweden, three for Finland and two for Norway. A Pan-Nordic assortment would enable enhance product development, as now resources for launching ten products for all markets would be possible or the amount of launches could be reduced to having only five new product for all the markets thereby reducing the product development costs. The workload of product life cycle maintenance would also be reduced due to smaller amount of different products.

Semper's home market is Sweden, where it is the market leader having a wide product assortment. Only one fourth of the Swedish products are available in Finland. Having Pan-Nordic product assortment in Sweden enables Semper to have wide assortment of products ready to be sold in Finland any time. Also as Semper currently has no sales of baby food in Denmark of Iceland, only gluten free products, expanding business to these countries will be simple, as the product base already exists without any research and development costs. Product can be tested on the market and if sales are not promising the test can be terminated without resulting in high scrapping cost and wasted R&D investments.

The combined effects of these measures are lower stock levels, shorter production cycle, higher service level, higher remaining shelf life and ability to make enhance product development and life cycle maintenance.

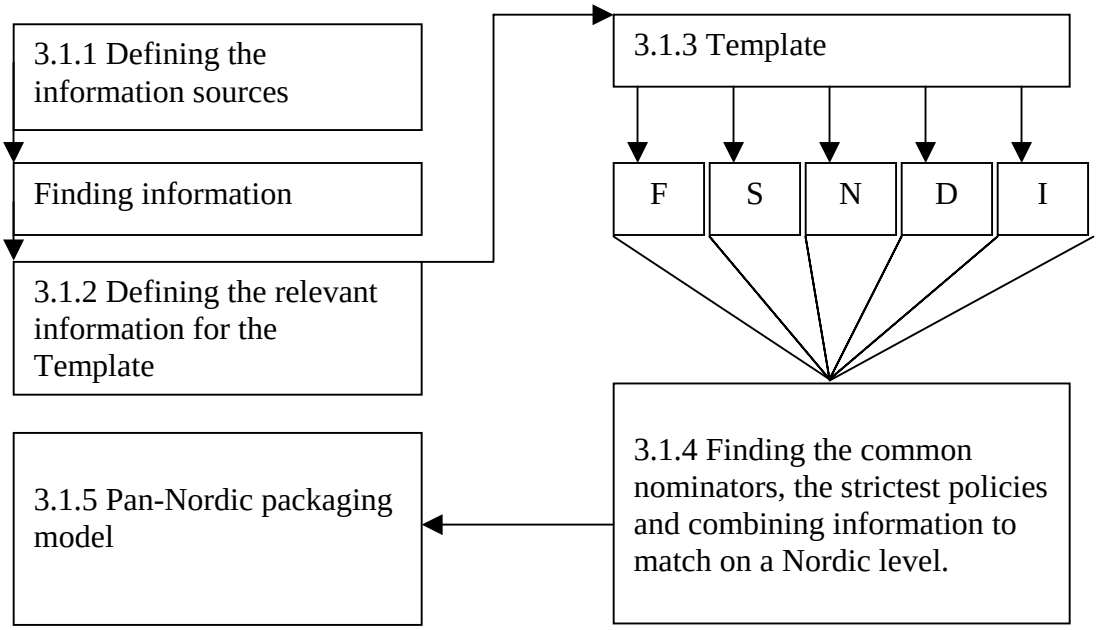
3. Methodology

The Methodology chapter introduces the research method I will use for examining the packaging requirements and the research path on how I will implement research results to build a Pan-Nordic packaging model.

3.1 Research method for building the Nordic packaging model

The method for first part of the research could be described as fundamental secondary research. I will combine existing information of various packaging instructions to comprehensive packages for each country separately and then I will find the common nominators, which together form a Nordic packaging model.

The picture 1 presents the intended research path. I will make a template where each country's information is inserted. I will find the common nominators from these templates and finally combine them into a Pan-Nordic packaging model.



Picture 1: A visualization of the research path

3.1.1 Defining the information sources

To find accurate information on each country's product packaging requirements, defining relevant sources is necessary. All Nordic countries have organizations controlling the product packaging standards and regulations. These organizations work together with the entire packaging industry and therefore they have established instructional guidebooks for product packaging, which take into consideration each country's standards, regulations and industry practices. These packaging guides are intended to instruct suppliers in product packaging. I have chosen these guidebooks as my main source of information as the industry players in each country have approved them and ensured the practices represented in the guides are the ones they follow. Besides these guidebooks I have decided to use also supplementary information found on other publications provided either by wholesalers or retail chains.

3.1.2 Defining the relevant information for the template

Products packaging features can be divided into common and country specific requirements. Common requirements can be seen as desirable features of packaging as they provide the product some extra logistical value like durability or transport cost efficiency. Common packaging requirements derive from the most efficient and cost effective way to package a product.

Country specific requirements on the other hand can be seen as undesirable features of packaging as they hinder supplier's freedom to take full advantage of packages attributes and thereby package becomes less efficient and cost-effective. Country specific packaging requirements typically derive from standards and practices that have been established.

A slightly absurd example gives us a good idea of how these two concepts; logistical attribute and requirement are in contradiction with each other. If the suppliers could solely decide on logistical attributes of a product without having any restricting requirements, pallets would be twice as wide and two and a half meters high, thereby providing supplier most economical transportation attribution. No EAN, SSCC codes or best before dates would be used as they provide the supplier no benefit, item and batch number on the pallet would be quite sufficient for the supplier to identify the product. For this reasons certain requirements has to be imposed on packaging.

Basically, common packaging requirements can be considered as worldwide principles of packaging as they are the most economical and convenient way to package. Therefore I intend examine what are common requirements and leave them out when examining Nordic countries packaging requirements, as they will be common for all countries. Country specific requirements of packaging are in connection to regional logistical infrastructure and practices. They are manmade agreements made to support the infrastructure and to ensure the goods flow in planned manner. I intend to concentrate on examining these requirements in Nordic countries with a questionnaire template. In chapter five of the thesis I will examine the different features of packaging and aim to make a distinction between which features are common principles of packaging and which are regional requirements.

3.1.3 Template

The template can be compared to a questionnaire form. Each country will have it's own separate but identical template. Templates will have questions to be answered based on the material gathered from each Nordic country. The purpose of the templates is to process available pieces of information into a coherent form, which will enable accurate and efficient comparison. Forming the template will start by examining the literature. This will help to define what information is relevant to ask in the template.

3.1.4 Finding common nominators

Finding the common nominators means comparing and combining the packaging requirements of each country and finding the common nominator that satisfies each requirement. Having the packaging requirements of each country in a coherent form on a template will make comparing logical as each piece of information is directly accessible.

The packaging requirements are not the same in all Nordic countries, although to a great degree the regulations are the same in all countries. When designing a package that can be used in all countries despite the small differences, the boundaries of the packaging must be set to serve the strictest policy in any country.

3.1.5 The Pan-Nordic packaging model

The Pan-Nordic packaging model will be result of combining each country's packaging requirements. The Pan-Nordic model will serve the strictest requirements countries have set. This model can therefore be applied to use in all Nordic countries as such.

4. Sources of packaging requirements

In this chapter I will describe the sources and organizations influencing the packaging requirements.

Requirements for packaging are the standards and best practices, which are generally agreed in the industry to support the logistical infrastructures and to ensure the goods flow in the planned manner.

These standards and best practices are results of consortiums where industry players have gathered to cooperate in order to make their activities more efficient. This kind of cooperation thinking has started to become more and more common due to ECR (Efficient Consumer Response) thinking concept, which has created a fertile platform for industry players to drift together.

4.1 Efficient Consumer Response

ECR, Efficient Consumer Response, is a concept of suppliers, manufacturers, wholesalers, retailers and third party service providers working closely together to fulfill the changing demands of the consumer better, faster and at lower cost.

The definition of ECR is working together to fulfill the consumer wishes better, faster and at less cost. ECR consequently focuses on the consumers and on working together (Packaging guide 2005).

The concept of ECR was born as a response to the challenging conditions in the grocery market: low growth, stiff competition, consumer pressure, development of new sales channels, new highly efficient players on the market and the traditional way that retailers and manufacturers views the other party as an opponent, which led to high costs. The industry's players concentrated more on doing business than on satisfying the needs of the consumers (Packaging guide 2005).

ECR is all about creating a holistic approach to the entire value chain: supplier, manufacturer, retailer, and consumer. All the work is aimed to increase efficiency and effectiveness in the flow of products and information and creating added value for the consumer. Although the consumer never sees the supply chain and it doesn't create any added value for the product as such, but in the last hand consumer will benefit from well-organized supply chain trough cheaper price.

ECR promotes collaboration between suppliers and retailers with the aim of cutting costs from the supply chain and delivering a better end product and service to consumers.

Picture 2 presents the focus areas of ECR. ECR is divided into the two main areas: demand and supply, as well as tools for a common standard for data and communications and for planning. The improvement concepts on the demand side include optimization of assortments, product introductions and promotions. On the supply side, design of the entire supply chain is should to consider from the ECR point of view. (ECR Europe 2006)

Picture 2: Focus areas of ECR
Source: http://ecrnet.org/, ECR Europe

The packaging requirements are enablers of improved supply chain management. The common standards and mutual best practices are created and developed to make the entire supply chain more effective. In this way the concept of ECR has had a huge influence on how product packaging looks today and what information they deliver.

4.2 Organizations influencing packaging requirements

There are several organizations promoting concept of ECR. The main object of these organizations is to provide support and to act as aggregating bodies for companies implementing ECR principles. Organizations are non-profit seeking and each organization focuses on a bit different fields of development of ECR. Below are descriptions of organizations that have most influence on packaging requirements in Nordic countries.

4.2.1 Global Commerce Initiative (GCI)

The Global Commerce Initiative ("GCI") is a worldwide voluntary body created in October 1999 by manufacturers, retailers and sponsors (Trade Industry Associations, regional ECR initiatives, VICS and standard bodies). GCI believes that the interests of consumers worldwide can best be served through the standardization and improvement of key business processes.

The objective of GCI is to improve the performance of the international supply chain for consumer goods. This is done by working together with member companies, associations, ECR initiatives and existing standard bodies to develop and facilitate and endorsement of optimum, commercially viable voluntary standards and best practices. GCI itself it is not a standards body but a global user group. It is a unifying force bringing together manufacturers and retailers on a worldwide basis to simplify and enhance global commerce and to improve consumer value in the overall retail supply chain.

GCI Executive Board is composed of senior representatives of more than 45 companies from manufacturing and retailing, doing business across continents or via global supply chains. Administration activities of GCI are funded by sponsorship of eight organizations representing the interests of one million small and large businesses. Four of the sponsors, AIM, CIES, GMA and FMI, represent the interests of manufacturers and retailers. Two of the sponsors, the ECR organizations and VICS, develop working tools for the collaborative management of the supply chain (GCI 2006).

4.2.2 ECR Europe

ECR Europe is a regional ECR initiative formed in 1994 to promote the implementation of ECR across the European grocery industry. ECR Europe governs several national ECR organizations that run several region- and nation-level projects. Participation in projects at European and national levels is open to all industry players in the fast moving consumer goods sector. These projects are aimed to explore new areas of working together to fulfill consumer wishes better faster and at less cost (ECR Europe 2006).

4.2.3 Nordic Nation-level ECR organizations

The nation-level ECR organizations work in two-way consortium with the ECR Europe. On one hand they implement the common agenda initiatives but also drive forward their own country specific projects that ECR Europe may decide to implement on larger scale. There is an ECR organization in each Nordic country, but their activity level varies greatly. Some organizations have been much more active in making projects than others. This is likely due to monetary resources at their disposal.

- ECR Denmark was founded in 1998 by DagSam in cooperation with ECR Europe. The ECR Denmark Board consists of manufacturers, retailers and EAN Denmark

- ECR Finland was founded in 1996 and consists currently of approximately 90 members. The ECR Finland Board consists of twelve manufacturers, retailers and logistics service providers. The administration and coordination of operational activities is performed by EAN-Finland.

- ECR Norway was founded in October of 1996. The activities are by EAN Registrene AS.

- ECR Sweden was founded in 1996. Head of ECR Sweden are DLF - Dagligvaruleverantörers Förbund (Grocery Manufacturers of Sweden) and SDH - Svensk Dagligvaruhandel (Swedish Food and Drink Retailers' Federation).

- ECR Iceland was founded in 2002 by 8 retailers, manufacturers and importers in co-operation with EAN Iceland. ECR Iceland is represented by EAN Iceland.

4.2.4 GS1 International

European Article Numbering Association was formed in Belgium in 1977. After expanding outside Europe, the name was changed to EAN International. When going global, EAN International changed its name again in February 2005 to GS1 International.

GS1 International is the organization that manages the GS1-systems worldwide. Organization is dedicated to design and to implement global standards and solutions to improve the efficiency and visibility of supply and demand chains. GS1's goal is to simplify global commerce by connecting the flow of information with the

flow of goods. GS1 International participates in the European ECR Executive Board and provides technical and secretariat support to the EDI project within ECR Europe.

The GS1 system of standards is the most widely used supply chain standards system in the world. It is in use in 140 countries and there are national organizations in 103 countries. The function of these national organizations is to facilitate the use of EAN-system in their respective region according to GS1 International guidelines (GS1 international 2006).

GS1 has been the most influential organization in development of packaging standards and best practices, especially in developing the information flow and techniques.

4.2.5 International Standardization Bodies

The purpose of these liaisons is to ensure that GS1 standards are endorsed by these bodies and gain full international recognition (GS1 international 2006).

CEN
CEN is the European Committee for standardization and its members are the 15 European Union and 4 EFTA countries. The majority of European GS1 Member Organizations take part in this process at all levels.

International Standards Organization (ISO)
GS1 takes part in the work of two ISO technical committees, ISO/TC 122/WG4 on Packaging and ISO/IEC/JTC1/SC31 on automatic data capture.

UN/EDIFACT
Through GCC (Global Communications Committee), GS1 is in contact on all levels of the UN/EDIFACT organization. The objective is to have a GS1 influence on the EDIFACT development process.

AIM
AIM is a worldwide trade association for ADC (automatic data capture) equipment and service providers. GS1 is in contact with AIM International and AIM Europe at an international level. The purpose is to ensure that the AIM members support and meet the requirements of EAN-UCC standards.

International User Groups and Official Bodies
GS1 also collaborates with a number of international user groups from various industries on particular projects and on an on-going basis. In addition, the interests of GS1 are represented at meetings with official bodies such as the European Commission, the United Nations as well as other associations and institutions.

4.2.5 Regional organizations

Besides the regional ECR organizations, there are also several other organizations or associations working with packaging requirements. They typically make more ground level work than the ECR organizations.

DLF
"DLF, Dagligvaruleverantörers Förbund (Grocery Manufacturers of Sweden), is a non-profit trade association for the brand manufacturers in the Swedish food retail and foodservice markets. Our mission is to promote the interests of our members when representing them before retailers, authorities and politicians on issues of general concern to the industry" (DLF 2006) Besides the Sweden, DLF exists also in Norway and in Denmark.

Päivittäistavarakauppa ry, Suomen pakkausyhdistys ry and Kaupan pakkaustoimikunta
These organizations practically are the Finnish equivalents to the DLF organizations of other Nordic countries.

4.3 Achievements influencing the packaging requirements

Achievements of these ECR-organizations on field of logistics are principles, best practices and standards of supply chain management. They provide efficiency, increased follow-up of the shipments, more efficient handling and inventory management, increased security of distribution and speed of operations.

On packaging of goods, these organizations have introduced several guides, which inform the best practices discovered in the industry and state guidelines on how goods should be packaged. Organizations have also made several innovations, which improve the goods and information flow and make traceability of goods and shipments possible and more effective, thereby making the supply chain more cost efficient.

4.3.1 Modular System

Modular system is developed for coordination of the packaging sizes. The secondary and tertiary packages should be compatible, by size and shape, with the logistics infrastructure. This eliminates the costly empty space in transportation, stores and warehouses. For this Nordic countries have been using the modular system for a long time (Pakkausten maailma 2000).

“The aim of the modular system is to tailor the various technical components in the transportation chain, such as packages, cargo units, pallets, containers and transport vehicles to each other to optimize the economic viability and safety of transport operations” (Transport information service 2006).

The area module size is 400x600 mm. All packages should be adjusted to this base module size by using it’s multiples. The base module is derived from the international standard pallet dimensions of 800 mm x 1200 mm and 1000 mm x 1200 mm. Use of these dimensions utilizes of payload area in most optimal manner and the load will be secured on the pallet.

4.3.2 Shelf ready packaging

SRP stands for Shelf Ready Packaging, which is a term used to describe a secondary unit that can be displayed as such on the store shelf.

Shelf ready packaging is another innovation produced by the ECR-organizations organizations. SRP quickens the handling of the secondary package in store and utilizes the shelf and transportation space more efficiently providing cost efficiency.

Traditionally secondary package has been a brown cardboard box from where the consumer units are unloaded on to store shelf one by one, which is quite time consuming. The purpose of SRP is to reduce the workload of unloading products on to retail store shelf. A secondary package that is designed according to SRP principles exposes the consumer units in a decent manner and thereby the entire secondary package can be set on the shelf as such, saving a lot of time compared to unloading the consumer units one by one. A shelf ready package is typically a box, but as it is opened, it becomes a tray revealing the consumer units.

The Swedish packaging guide (2005) defines the secondary packages SRP principles as

- Package should have simple and clear opening instructions
- Package should not need tools for opening
- An opened outer package should be designed so that it can be placed directly on the shelf in the store to display the goods
- The edge of the tray must not be so high that it obscures information on the consumer package.

The consumer package's bottom surface and height should be adapted to the store's fixtures and the shelf space in the store for the product group in question. The consumer and outer packages must be designed so that they can be displayed as a unit. It must also be possible to display the consumer package separately.

Many large retail chains have realized the cost savings that a SRP's bring and they have started to demand this packaging attribute from the suppliers. In an English magazine, Food Manufacturer, Tim Knowles (2005) describes Tesco's harsh demand to suppliers by sarcastically quoting them "Commit to shelf-ready packaging (SRP) before the next range review and implement it during 2005 and you may keep your listings".

4.3.3 EAN-System

As the package plays an important role as an information carrier in each stage supply chain, the package must be able to state the information in a uniform manner. EAN stands for European Article Numbering. It is a worldwide system used for identification of product in all stages of supply chain from producer to consumer. For quick and easy reading purpose bar code system is used to enable scanning and information delivery in an electronic format.

The basic principle is that each product is given it's own individual number according to the EAN-rules. The product information is represented in the form of article numbers and bar codes, in accordance with EAN's regulations.

Trade Item Declaration (TID) contains information about length, width, height, the number of consumer packages in an outer package, the number of outer packages on a loading pallet. Trade Item declaration combined together with EAN article numbers and bar codes on packages provide logistical efficiency throughout the entire distribution chain.

5. Package and it's functions in the supply chain

In this chapter I will describe the basic structures of Nordic supply chains of food and function of package in it. I will examine the different features of packaging and aim to make a distinction between which functions produce common requirements for packaging and which produce country specific requirements. As a result I aim to define common packaging requirements that all suppliers and Nordic countries share and to distinct those from of the country specific requirements I will study further for finding the common nominators.

A package is generally conceived as the protector and container of the product. UK institute of Packaging provides three definitions for packaging (Robertson 1992:2):

- A coordinated system of preparing goods for transport, distribution, storage, retailing and end-use;
- A means of ensuring safe delivery to the ultimate consumer in sound condition at minimum cost;
- A techno-economic function aimed at minimizing costs of delivery while maximizing sales (and hence profits)

These are the principles of packaging and should be followed when designing a package. Besides the principles of packaging the requirements of the supply chain should be taken in to consideration. Supply chain practices vary between Nordic countries and so do their requirements on packaging.

As the principles of packaging derive from the most economical and convenient way to package goods they are common worldwide. The packaging requirements are the agreed guidelines according to which the packaging principles should be fulfilled. The requirements of packaging derive from practices, agreed principles and standards of supply chains. In most cases the packaging requirements are not common worldwide.

Therefore a distinction between the common packaging requirements and country specific requirements should be made. The common packaging requirements do not need to be further examined as the suppliers already fulfill them, but the country specific requirements should be further examined for establishing guidelines for Pan-Nordic packaging requirements.

Examining the product package, Nordic supply chain structures and packages functions in them, will enable making a distinction between the two requirement concepts.

5.1 Nordic Supply chain structures

When it comes to FMCG, Nordic countries share quite similar supply chain structures consisting of manufacturers / suppliers, wholesaler, and retail outlets.

A very typical feature is that practically all retail stores are organized in different chains or groups (Nordic Food Markets 2005:11), which are committed to one single wholesaler who takes care of the all logistics operations for the particular chain. Another typical feature of the Nordic grocery markets is that usually a few major retail chains dominating the market. This means that these large players are the ones determining the requirements of packaging. Small players have to adapt to the requirements imposed by the large.

As these major retail chains are committed to one wholesaler, who takes care of all logistical flow, they have pushed the responsibility on development and overseeing the packaging requirements to wholesaler, who ensures the packaging is done according to the needs of the retail chains. At the same time the wholesaler who also has some additional requirements on packaging can draw up very precise guidelines on how all packaging of goods should be done. The wholesalers publish guidebooks stating these guidelines and expect that manufacturers and suppliers are aware of all the requirements.

The large players and wholesalers cooperate with each other accordingly to principles of ECR, meet each others at logistical consortiums, follow the agreed guidelines and take advantage from the best practices that ECR organizations recommend. They have agreed to follow the regional ECR organizations guidelines and thereby it is not necessary to examine the packaging guides of each wholesaler separately as the regional ECR organizations or their subordinate organizations have made packaging guidebooks for each Nordic country.

Below are the organizations and the publication that each country’s industries have agreed to use as guidelines for packaging of FMCG. The publications state all requirements on packaging of supply chain in particular country. Besides these there are also some international level publications stating packaging requirements on narrower subjects like on EAN system. These information sources should be used for establishing the Pan-Nordic guidelines.

Sweden
Organization: ECR-Sverige
Publication: Packaging guide for FFMG

Organization: GS1-Sverige
Publication: Förpackningsmärkningar (GS1-Sverige website)

Finland
Organizations: Suomen Pakkausyhdistys RY, Kaupan Pakkaustoimikunta
Publications: Tehokkaat päivittäistavara pakkaukset, Pakkausten Maailma, Pakkausten optimointi

Organization: EAN-Finland
Publication: Pakkausten ja lavakuormien kuljetusyksikkömerkinnät

Norway
Organization: EAN-Norge
Publication: Standard for labeling D-packs and pallets in the Norwegian Grocery Sector

Organizations: DLF and DMF
Publications: Beste praksis for tilbaketrekking og tilbakekalling I norsk dagligvarebransje, Packaging and logistics in the grocery trade

Denmark
Organization: DagSam
Publication: Emballage 2001

Organization: EAN-Denmark
Publication: Placering af stregkodesymboler 2003

Iceland
Organization: EAN á Íslandi
Publication: Handbók EAN á Íslandi

Nordic level
Organization: Cooperation of five Nordic countries regional EAN-organizations
Publication: Requirements for labeling TUs and Pallets in the Nordic FMCG Sector

Organization: EAN International and Uniform Code Council, Inc
Publication: General EAN.UCC Specifications

5.2 Product package

In recent decades, the product package has developed into one of the cornerstones of efficient logistics. The flow of goods and information from manufacturer to consumer has become increasingly complex, which affects those who sell and supply packaged goods. The package must carry product information needed in different stages of supply chain, to be the protector of the product and to have proper design to meet various requirements placed on modern day package. The package must be able to fulfill various requirements, regulations and standards set either by the industry, nature of goods, the consumer or the government.

“A distinction is usually made between the various “levels” of packaging” (Robertson 1992: 3). Robertson (1992:2) divides the packaging levels in to three categories: Primary package is the one in direct contact with the actual product. The secondary package contains a number of primary packages and the purpose of it is to ease handling and to be used as a display for primary packages. The tertiary package contains a number of secondary packages and the purpose is to make handling of large quantities possible.

Robertson (1992:3,4) defines the product packaging functions as containment, protection, convenience and communication. Packages purpose is to enable agglomeration of small items and bulk products for easier handling. The package should protect the product from damage that may occur in any stage of the supply chain. The packaging should encourage customer to purchase the product by its design. With its design the package can also provide convenience function for the user. Packaging also delivers various types of information of the product for the customer.

These functions apply for all levels of packaging but the actual meaning depends on who is considered as the customer. The customer can be considered to be the parties in the supply chain who use the package. For primary package these parties are the consumer and the retail store. Parties using the secondary packaging are the retail store and the wholesaler. The parties using the tertiary unit are wholesaler, transporter and the supplier.

The distinction between the requirement concepts of common and country specific requirements can be made by examining closer the four functions of each level of packaging in each stage of the supply chain.

5.3 Primary packages functions in the supply chain

The functions of the primary package, also called as consumer package, are aimed to consumer and the retail store. Package contains the actual product and protects it, making sure that product is unharmed and unused. Primary package is a marketing tool by encouraging consumers to purchase the product with its design. Primary package also delivers information for the consumer on the product. Primary package also acts as the tool for category management of the store by providing data on the sales.

Consumer requirements of primary packaging

- The information on package must be easy to read
- The packaging needs to be tempting
- The packaging must be easy to open and to use

The retail stores requirements of primary packaging

- Packages must be easily identifiable in both ways; visually and scanning

The functions of primary package in other stages of the supply chain are practically nonexistent. The main function of the primary package is to sell the product to the consumer the appearance has to be made as appealing as possible and this is more important than logistical benefits, though it would be beneficial to make the primary package fully modularly adjusted making handling and space utilization more efficient.

The requirements of the primary package are mainly restrictions and requirements on the product description and markings imposed by the governments and other authorities. The retail stores require that the primary package is equipped with rapid means of identification for the store check out.

As the scope of the thesis is limited to examining the requirements of secondary and tertiary packaging, the primary packaging requirements will not be further examined.

5.4 Secondary packages functions in the supply chain

Secondary package, also called as the sale unit, has many functions in the supply chain aimed for the retail store and the wholesaler. The secondary package holds together and protects the primary packages until they reach the retail store.

The secondary package is typically the orderable unit of the store. On the way from manufacturer to the store shelf the secondary unit is first loaded on to a pallet, stored on a pallet, picked from the storage and loaded on to a transport unit (roll cage), handled in the store and unloaded on to the shelf. The secondary package should be compatible, by size and shape, to all supply chain infrastructures thereby eliminating empty space. Each step of the supply chain requires identification of the secondary unit.

The retail stores requirements of primary packaging

- The outer package must be easy to open and to set to shelf
- Shelf ready packaging
- The amount of consumer packages in an outer package must be optimal in regard to product in store turnover rate.
- Packages must be easily identifiable in both ways; visually and scanning

Wholesaler's requirements of tertiary packaging

- The package must be modularly adjusted to achieve greatest degree of filling a standard roller container or loading pallet.
- The package must be strong enough to endure picking without sustaining damage.
- Packages must be easily identifiable in both ways; visually and scanning

Secondary package should be made so that it is easy to handle in the warehouse and at the store. According to the Swedish packaging guide (2005:10) the secondary package must be adapted so that it is easy to be picked, handled, loaded and unloaded on the way from manufacturer to the store. Identification of the secondary unit should quick and secure.

5.5 Tertiary packages functions in the supply chain

Tertiary package, generally referred to as the pallet, is usually the orderable unit of wholesaler. The purpose of tertiary package is to serve as a proper unit for storing and transportation of secondary units. The tertiary package should be compatible, by size and shape, to all supply chain infrastructures thereby eliminating empty space.

Wholesaler's requirements of tertiary packaging

- The package must be strong enough to endure picking without sustaining damage
- Packages must be easily identifiable in both ways; visually and scanning

The transporters requirements of tertiary packaging

- Pallet overhang is to be avoided to ensure maximum use of space
- Pallet height should be adjusted so that two pallets can be loaded on top of each other.
- Addressing of the package needs to be clear

The pallet also carries various types of information needed in many stages of the supply chain. This information should enable quick and secure identification, tracking and tracing back.

5.6 Conclusions

Considering the functions of the package in the supply chain making a distinction between the common and the country specific requirements is possible. The common packaging requirements are in connection with the containment and protection functions of the packaging. The country specific requirements of the package are in connection with the convenience and communication functions.

The common packaging requirements

The low cost of packaging is in the interests of the supplier and the cost minimization of packaging material is therefore a common requirement. All suppliers should package the products at minimum cost, still fulfilling the other requirements of packaging. The packaging material must be cheap and the package should be as small as possible to save on warehousing and transportation.

Containment function of the packaging is a common requirement as it is in the interest of the supplier to package product in an appropriate manner. Also the package should be adapted to the turnover rate of the product for reducing scrap and excess costs. A too large package results in products expiring before they are consumed and a too small package produces excess packaging costs.

Protection function of the packaging is a common requirement in all Nordic countries as it derives from the best way to package the products according to the nature of goods. And as it is in the interest of the supplier to be able to deliver the product unharmed to the consumer, the supply chain doesn't have impose any strict requirements on protection. All suppliers should package the products in such way that they are protected against any possible damage that may occur.

As these functions of packaging can be considered as common on Nordic level, examining them further is not necessary. Therefore they will be excluded from the research template.

The country specific requirements

Shelf ready packaging is not a common requirement. There are no standards or best practices on measures of a store shelf in Nordic countries, so the measurements of shelves and size of the secondary package should be further examined in the template to see if they differ. Other principles of SRP, like exposure of product, are not important to study, as they are in the interests of the supplier for to make the product as appealing as possible.

Also other measurements of packaging should be further examined as they may vary between the Nordic countries. A one country may consider the maximum weight or height for packaging to be different than another country.

One of the most important functions of the package is the communication. Although the EAN coding system has published guidelines for labeling in Nordic member countries the countries still have differing practices on what information should be delivered and

in what format. This can be noticed by comparing each country's specific labeling guide to the Nordic guide. The guidebook also presents several exceptions to the rule that supplier has to take into consideration in different Nordic countries. To be able to establish common guidelines for package communication in Nordic countries, it is necessary to examine each country's requirements on what information the package has to carry and in what format.

The country specific requirements should be broken down to smaller more specific requirements and these should be examined to find the common nominators for Pan-Nordic guidelines.

6 The template forming process

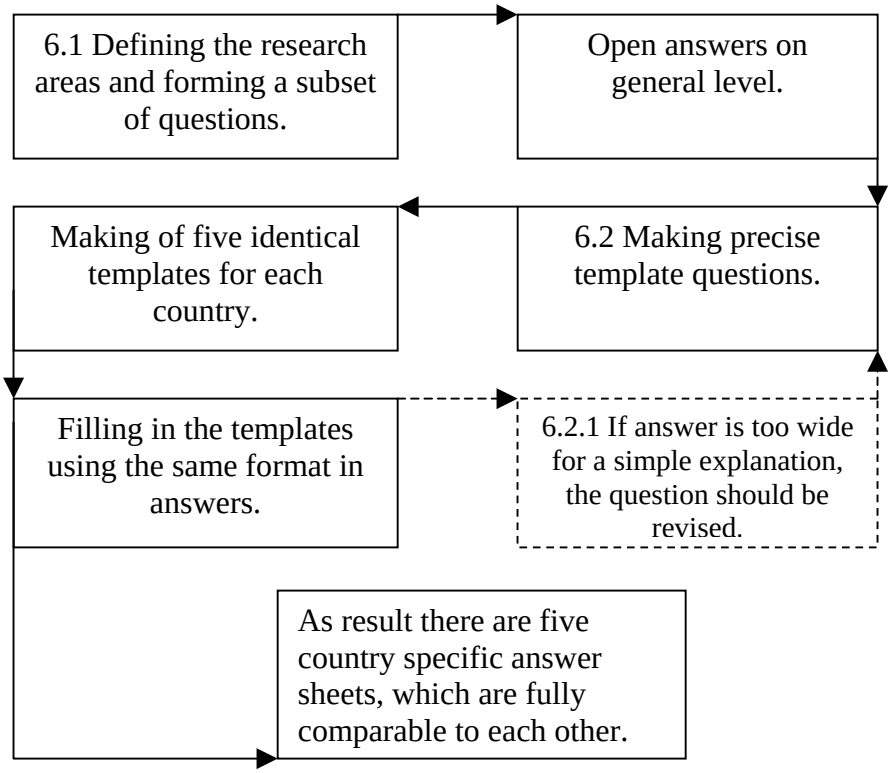
In this chapter I will describe how the template for examining the packaging requirements in Nordic countries was formed. The template will only concentrate on examining the country specific requirements stated in previous chapter.

The attributes of packaging, which are required in each particular Nordic country, are stated in various guidebooks, drawn up by several different organizations and wholesalers. Some guidebooks are written entirely on one particular narrow subject like labeling requirements and some guidebooks are more extensive covering all packaging requirements for FMCG.

The goal of the thesis is to draw up a Pan-Nordic packaging model, which basically means taking into consideration five different Nordic countries packaging requirements and fulfilling all of them. As some requirements are likely to be mutually exclusive, the Pan-Nordic has to state the boundaries, which within the model may lie and still fulfill all requirements.

To be able to compare and eventually to combine them to one Pan-Nordic model, all information should be in the same format. As there is such a wide spectrum of various types of literature available and all state the required information in variable formats, the template should be a multiple-choice type of a form. Although the answer possibilities cannot be described at forehand because of the endless number of possible answers, making a multiple-choice template non feasible. Still, as the answers are needed in the same format, but a multiple-choice template is not feasible, the template should be built from the basis of a guiding subset of questions according to research area that needs to be examined.

Based on the answers of the subset questions, it will be possible to form a set of more precise template questions that will have a quite narrow scope of possible answers making it possible to process the answer into same format for comparison purposes. So that the answers are comparable, the format should be carefully considered before filling in an answer. The answers should be filled in for all five countries at the same time to avoid any format distortion.
As some countries have more precise requirements regarding the packaging, it may be necessary to revise and edit the question to get narrow self-explanatory answers. Also new areas that need to be examined may turn up and therefore the template should be left open for editing purposes. Picture 2 illustrates the template forming process.



Picture 3: An illustration of template forming process

As a result of the entire template forming process there will be five identical form answer sheets, one for each country. As the answer sheets are comparable to each other, it will be possible to find the common nominators and boundaries that satisfy packaging requirements of each Nordic country.

6.1 The template research areas and general questions

Before making the actual questions of the template the research areas should be determined. The country specific requirements should be broken down to subset of question, which specify the actual information that needs to be discovered.

Market and the customers:
Big players on the market have more influence requirements of packaging. These players are continuously improving their work processes to gain competitive edge and higher profit margins. They are in close cooperation with organizations and suppliers this and in this way have more influence on requirements of packaging. These big players can more or less dictate the packaging requirements,

whereas the smaller players are forced to comply with these requirements in order to stay in business.

To get perspective on the players on the Nordic grocery market I will examine the market situation in each country and make a briefing of the situation and issues that should be taken in to concern. I will find out who are the major retail stores of each market influencing the packaging requirements most and with which organizations these players coordinate and develop the requirements.

- *How is the grocery market divided between the retail chains?*
- *What organizations control and develop packaging requirements?*

Secondary package measure restrictions
As stores preferably receive the goods in shelf ready secondary package packages it is necessary to examine what are each Nordic country's shelf dimensions.

- *What are the recommended secondary package measures?*

Beside this, as there may be restrictions made on how heavy loads a person may lift and handle at work, it is also to examine the weight restrictions of a secondary package.

- *What is the maximum secondary package weight?*

Pallet dimension restrictions
Pallets come in various sizes and all may be not accepted in all countries. Also the pallet load may be restricted and therefore the pallet dimensions need to be examined.

- *Are the pallet dimensions restricted in some way*

Labeling
As delivering information in the modern day supply chain has become increasingly important, it is necessary to examine what information is required in each country's supply chain.

- *What information needs to be presented on the secondary package label?*
- *What information needs to be presented on the pallet label?*

Besides the label information, it is important to examine in which format it is presented.

- *In what way and format the information should be presented on the secondary package label?*
- *In what way and format the information should be presented on the pallet label?*

Correct placing and amount of the labels is important for easy reading purposes and requirement on these should be examined.

- *How many labels are required on a trade item and where should they be placed?*
- *How many labels are required on a pallet and where should they be placed?*

Label information should be presented in human readable text and in optically scannable bar codes. As each Nordic country has it's own language, it should be examined if information can be presented in English or if countries own language is required. Also as the information is presented in bar codes, the quality requirements should be examined.

- *Is it adequate to use only English as labeling language?*
- *What is the requirement for label printing quality?*

6.2 Template questions

To get simple questions, the research area questions should be broken down to smaller specific questions, which can be answered coherently. The template question itself should preferably contain a reference to the answer format.

For clarity the template questions will be separately on the secondary package and pallet.

Secondary package measure restrictions
What are the recommended secondary package measures?

- Maximum height in millimeters
- Maximum width in millimeters
- Maximum height in millimeters

What is the maximum secondary package weight?

- Maximum weight in kilograms

Secondary package Labeling

What is the requirement for label printing quality?

- Requirement standard
- Text size in millimeters
- Barcode height in millimeters
- Barcode printing quality requirement
- Bar code X-dimension

How many labels are required on a trade item and where should they be placed?

- What is the recommended label size width mm* height mm
- How many labels are required
- Barcode location on secondary package

Is it adequate to use only English as labeling language?

- Is English only adequate

In what way and format the information should be presented on the secondary package label?

Answer to this question is quite complex, as the required format depends on the respective information. To avoid too complex answers, the way and format information should be presented is affiliated to the respective information with a table where following questions will be replied for each piece of information that needs to be presented.

- Does the information need to be presented in human readable format
- Does the information need to be presented in barcode format
- What barcode format should be used

What information needs to be presented on the secondary package label?

- EAN-article number of the secondary package
- Name of the brand owner
- Address of the brand owner
- Article description
- Batch or lot number
- Best before date
- Net weight / content
- Supplier’s article number

Pallet measure restrictions
Are the pallet measures restricted in some way?

- Standard
- Maximum weight in kilograms
- Maximum height in millimeters
- Maximum width in millimeters
- Maximum depth in millimeters

Pallet labeling
How many labels are required on a pallet and where should they be placed?

- Label height in millimeters
- Label width in millimeters
- Location on pallet
- How many are required

What is the requirement for label printing quality?

- Requirement standard
- Text size in millimeters
- Barcode height in millimeters
- Barcode printing quality requirement
- Bar code X-dimension

In what way and format the information should be presented on the pallet label?
This question will be answered by using a similar table for affiliating to the respective information with required format, like with secondary package label.

- Does the information need to be presented in human readable format
- Does the information need to be presented in barcode format
- What barcode format should be used

What information needs to be presented on the pallet label?

- Name of the brand owner
- Address of the brand owner
- SSCC CODE
- AEN article code for pallet
- EAN-code of secondary packages on the pallet
- Number of secondary packages on the pallet
- Article description
- Batch number
- Production date
- Best before date

- Net weight of pallet
- Gross weight of pallet
- Maximum stacking weight

6.2.1 Revising the questions

If a template question produces a too large answer, or the answer cannot be processed to same format for all the countries, the question should be revised and set in another format or broken down to smaller questions.

7. Pan-Nordic packaging model

The chapter presents a Pan-Nordic packaging model for secondary package and a pallet, which fulfills the requirements set for fast moving consumer goods in Nordic countries. Chapter summarizes the most important discoveries of the country answer sheets and presents the market situation. Chapter also presents the required changes that should to be done to Semper's secondary package and pallet to align them to Pan-Nordic model.

A Pan-European packaging standard is still under process, the only way for a supplier to have Pan-Nordic products to fulfill all countries individual requirements.

Making product packaging according to one country's packaging requirements is typically the most optimal and cost efficient way to package as making the packaging according to many countries requirements may result in having excess costs on some markets due to one country's strict requirements.

A good example of this is the Finnish pallet standard SFS 5897, which states that maximum height for pallets sold in Finland is 1100mm. As the Pan-Nordic package is follows the strictest policy of any of the counties, the height of a Pan-Nordic pallet may not exceed 1100mm. Swedish requirement on pallet height is that height may not exceed 1250mm. Using a 1100mm high pallet in Sweden means that the pallet is not entirely utilized, it could contain 12% of more goods. This directly results in higher transportation and warehousing costs since 12% of excess goods have to be stored and transported.

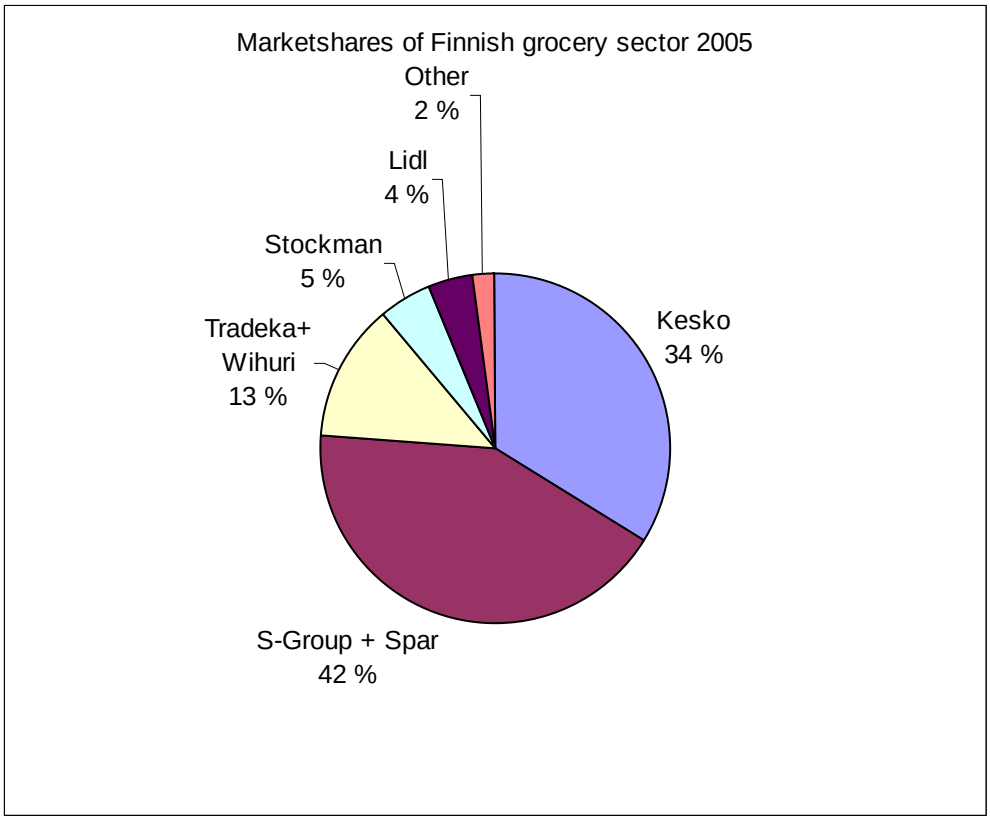
For the excess cost resulting from the Pan-Nordic product assortment, the companies utilizing it must benefit from it in some other way. Semper expects to benefit from Pan-Nordic product assortment trough economies of scale in purchasing of packaging and raw materials and trough savings in production and warehousing as a result of larger production batches, shorter production cycle, slimmer product assortment and lesser stock levels. Also, Semper will be able to lower product prices and to provide a better remaining shelf life for products.

The Pan-Nordic packaging model presented here is a combination and a compromise of the minimum packaging requirements of Sweden, Finland, Norway, Denmark and Iceland.

7.1 Country summaries

The country summaries provide information on the current market situation of the major grocery retail chains of the particular country to have proper knowledge on who are the major players influencing the packaging requirements. The country summaries also summarize the most important findings discovered in the answer sheets of each country.

7.1.1 Finland



The Market

The wholesale and retail of Finnish grocery sector are divided between three major players, Kesko, S-group and Tradeka. Trough past few years, S-group has been gaining Kesko's market share and in the end of 2005, S-group's share exceeded Kesko's. At the same time S-group announced about purchase of Spar chain, which further strengthened their position on the market. Also Tradeka grew its share by purchasing Wihuri (Päivittäistavarakauppa 2005).

The logistical infrastructures of these companies have been arranged in the following ways. Kesko has it's own logistics company taking care of all logistical process and sells services to some small shops. Now as Tradeka has sold off all its shares, S-group has become the sole owner of logistics company Inex. As Tradeka has now quit with Inex, they moved all their logistics process to Tuko, which also serves Stockmann and other segment. Tuko is thereby the only major wholesaler of food in Finland operating with more than one retail chain. Lidl has its own logistical infrastructure, which serves only Lidl.

Packaging requirements

The packaging of FMCG is very well organized and informed. There are several guidebooks that give deep insight on packaging. The information though is mostly in Finnish and therefore it would be hard to for a foreign supplier to access all information.

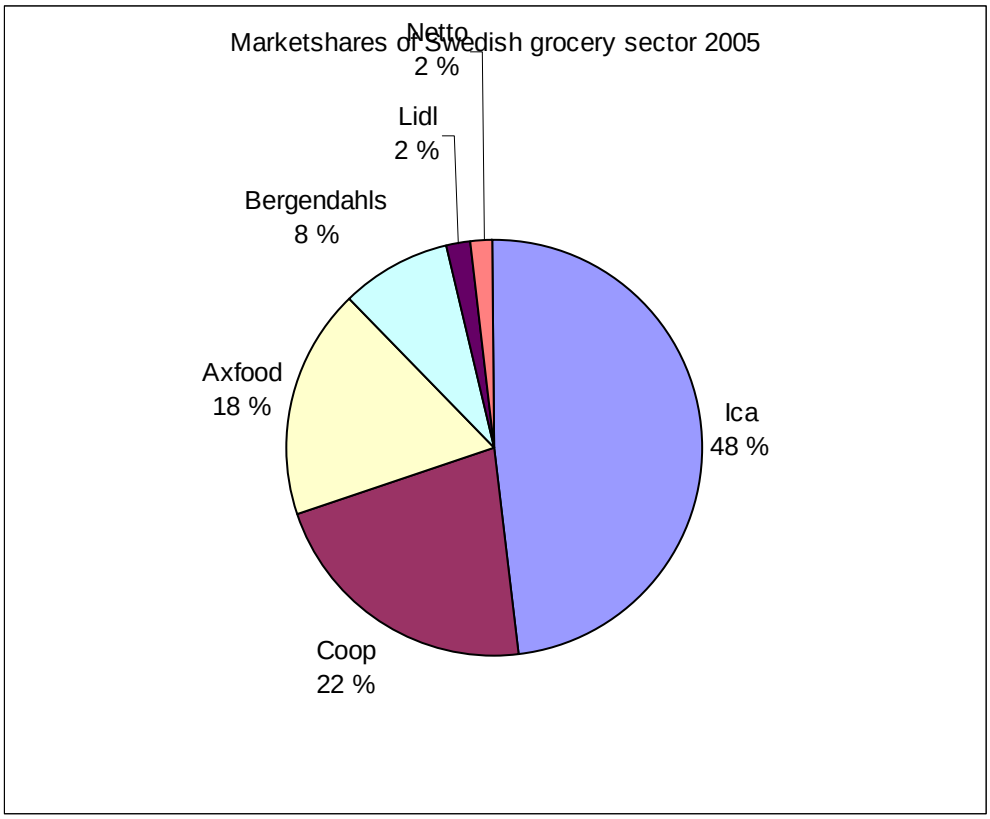
Apart from Lidl, all players in the market are members of the Finnish Packaging Association (Pakkaus ry), which has established the recommended guidelines for packaging. FPA is an association dealing with joint operations between all companies, entities and other organizations, which have to do with packaging. The association has all in all 220 member companies.

The Finnish retail chains are quite committed to the requirements that have been agreed. This is largely due to The Finnish Packaging Association, a single body representing the whole packaging chain in Finland. As there is one single body organizing and informing the entire chain, all members have adopted the practices.

Special remarks

Finland has set the lowest height standard on pallets. The pallet height is limited to 1100mm, where as in other countries the maximum pallets height varies from 1200mm to 1800mm. This results in suppliers having to lower the pallets in order to sell products in Finland. Although the standard has been set to the level of 1100mm, wholesalers are generally known to make agreements on exceeding the standards under certain terms. Finland is also the only Nordic country requiring the print quality of barcodes to be ISO/IEC Grade 3, while other countries settle for lesser quality.

7.1.2 Sweden



Market

The Swedish grocery Sector is highly concentrated and it is dominated by three large players; ICA, Coop and Axfood. The sales of the total Swedish grocery sector increased from 2004 to 2005 by 2.5%, to a total of 211 billion kronas. ICA is playing in a league of it's own in the Swedish grocery market. The Bergendahl Group increased sales and their market share. Coop's and Axfood's sales growth was relatively weak, and the companies' market shares declined slightly. The big winners of the year were discount chains Lidl and Netto, which both increased sales and market share. Lidl's sales climbed by 85% to 3.2 billion kronas and Netto's sales rose 70% to 2.1 billion kronas. But they still have a relatively small share of the market overall (DLF 2006).

Packaging requirements

From all of the Nordic countries, Sweden is the most well organized as it comes to packaging requirements. In Sweden the packaging requirements are well described and made available. There are several guidebooks that give deep insight on packaging requirements.

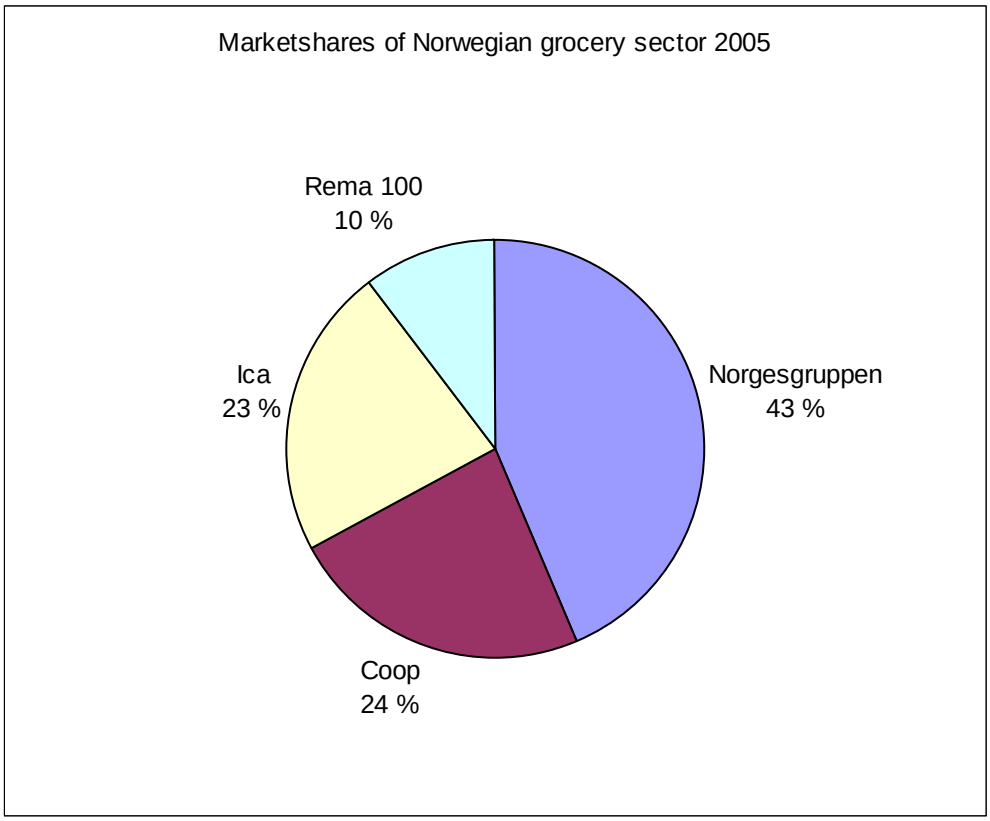
The Swedish retail chains are very committed to follow the agreed requirements. This is largely due to good work of ECR-Sverige on cooperating with the retail sector and informing.

Besides ECR Sverige and GS1 there are other organizations, like the Grocery Manufacturers of Sweden (DLF), which supply information on packaging thereby making the information network very extensive.

Special remarks

From all the Nordic countries, Sweden had the “lowest” requirements for packaging meaning that the requirements of Sweden would be fulfilled by any other country’s requirements, except for Denmark’s pallet height requirement. Therefore a secondary and tertiary package used in any other Nordic country could be used in Sweden as it is, providing the information is in English and the pallet height doesn’t exceed 1250mm. This should be viewed as strength of Sweden as the packaging requirements do not create barriers of trade within Nordic countries.

7.1.3 Norway



The Market
The total sales of the Norwegian grocery sector increased from 2004 to 2005 by 4.1%, to a total of 105 billion Norwegian kronas. (AC Nielsen 2006)

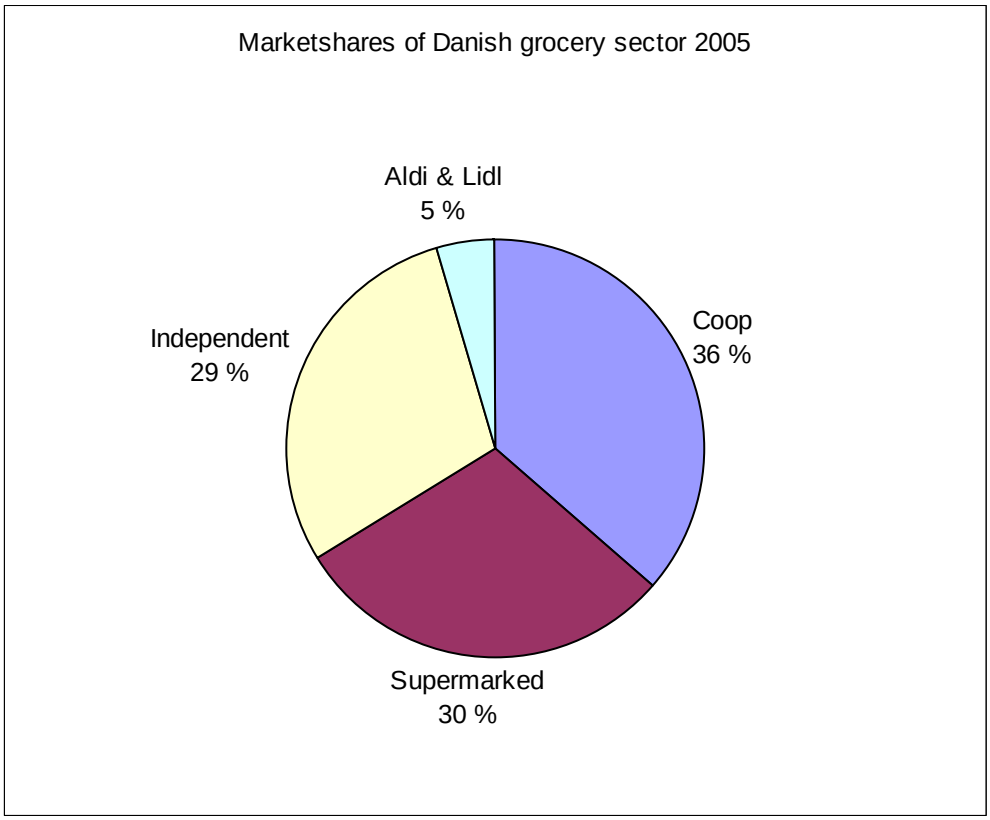
Consisting mainly of small companies, there is now a trend towards economies of scale in all parts of the distribution chain, thus giving the retailers greater power at the expense of the manufacturers and wholesalers. This is particularly obvious in the grocery sector, in which four large groups have a market share of more than 80 per cent (Norwegian ministry of trade and industry 2006). Norgesgruppen increased its market share to 43 percent while as other retail chains slightly lost market shares to discount chains.

Packaging requirements
The packaging requirements are well described and made available in Norway. ECR-Norway, GS1-Norway and Grocery Manufacturers of Norway (DLF) publish and supply the information on packaging. DLF's presence in Norway is very visible as it has approximately 90 member companies covering close to 80 % of grocery (FMCG) turnover in the Norwegian market (DLF Norway 2006). The main

fields of DLF's activity are: industry-trade relations, logistics and information systems and standardization, ECR and government relations.

Special remarks
Of all the Nordic countries, Norway required most informative labeling. Information that has to be stated on the labels in Norway is intended to clarify and prevent problems in handling. Also as the only Nordic country Norway has published a guidebook on how to prepare for pulling off a product batch from the market.

7.1.4 Denmark



The Market
The Danish grocery market deviates from all other Nordic countries by having a large portion of the sales in the independent sector. A third of the all groceries are sold trough independent non-chain retail stores. The market leader is the Coop chain with a 36% market share and the Dansk Supermarked has 30% share of the market. Aldi and Lidl have a 5%market share and independent retail stores account for 29% of the entire market.

The large independent retail sector in the Danish grocery market is an interesting phenomenon as other Nordic countries are highly dominated by the retail chains. The independent sector has however begun to concentrate under the competitive pressures as the amount of independent retail chains has been constantly declining (Knudsen 2006).

Packaging requirements

The informing and organizing the packaging requirements of FMCG in Denmark is not very coordinated. The GS1 Denmark organization is merely a fatigue shadow of the other Nordic GS1 organizations. The Danish DLF organization is a sister organization to Norway's DLF trying to harmonize the practices of wholesalers and suppliers, but the work is much less apparent. This is probably due to the fact that the retail sector is quite shattered because of the large amount of independent stores. As the entire retail sector is not actively participating in the work of developing mutual practices, the packaging requirements differ between retail chains inside the country.

The Danish DLF has published a guidebook on packaging, Emballage 2001, which provides interesting information on packaging requirements. In many parts it separates the wholesalers from each other stating the requirements that each one of them demands from the suppliers.

Special Features

As previously mentioned the wholesalers and retail chains are not completely cooperating on country level to harmonize their practices. This results in varying practices inside the country, which the supplier has to be aware of.

Denmark has no country specific packaging requirements that would always apply on all the suppliers. The pallet height issue is here as well the main divider of practices. Supermarked chain accepts 1800mm height, while as Coop declines anything over 1550mm. Also some chains accept pallet over hang and others strictly deny it. DLF Denmark attempted to harmonize the standard pallet height to be 1200mm, but the retail sector didn't agree to this (Thygesen interview 2006).

Still, as the chains are in contact with GS1 international, they share the same practices on labeling and coding, which makes the supplier's job a bit easier.

7.1.5 Iceland

There is very little information available on the Icelandic grocery market and none in English, which is due to the small size of the sector. For this reason, market shares are not available and the retail chains are not described here. Iceland has in total of app. 145 grocery stores, which are highly concentrated on Reykjavik area.

Packaging requirements

Despite the small retail sector Iceland has it's own regional ECR organization, which is governed by GS1-Iceland. GS1 has published a guidebook on the use of EAN in Iceland, but no packaging guide is available. For this reason Iceland's answer sheet has not been fully filled, as no information was available. However, GS1 assured that the Norwegian packaging requirements apply in Iceland in all aspects as Norwegian goods are imported as such.

Special Features

Iceland, being a small country and having a small number of retail shops has to comply with the packaging requirements made by other Nordic countries. Declining packages accepted in other countries would create a barrier of import. Iceland complies fully at least with the Norwegian requirements.

7.2 Pan-Nordic secondary package

7.2.1 Secondary package requirements

Shelf ready packaging is not yet a demanded attribute of secondary package, but as seen with Tesco (Knowles 2005), sooner or later the retail chains will be strongly demanding it from the suppliers. Also ECR-Europe is conducting a project on best practices of shelf ready packaging, which is to be published by the end of 2006 (SRP work plan 2006). Therefore a Pan-Nordic secondary package should be done according to the principles of SRP as in short while SRP will be an industry wide practice.

The dimensions of the secondary package are not strictly defined in any Nordic country and the store shelf measurements vary even inside the countries. However as SRP principles are complied with, the dimensions of the secondary package must be proportions or multiples of the dimensional module 600x400 millimeters. Thereby the secondary package will optimally fill a store shelf, which is designed according to the SRP principles. By using one of the dimension alternatives for secondary package presented in the Table 1, supplier also ensures the optimal utilization of pallet space as the alternatives are in accordance with modular system.

Length (mm)	Width (mm)
600	400
400	300
400	200
400	150
300	200
200	150
200	100

Table 1: Pan-Nordic secondary package dimension alternatives

The height of the secondary package cannot be defined or standardized as it fully depends on the size of the consumer unit. However as the Pan-Nordic pallet has an effective load height of 960mm, which should be fully utilized for maximal efficiency, the secondary package height should be a multiple or a proportion of 960mm, which are presented in Table 2.

Height (mm)
80
96
120
160
192
240
320

Table 2: Recommended secondary package heights

The secondary package weight may not exceed the weight of 15 kilograms, as a heavier weight would complicate manual handling.

7.2.2 Secondary package label and bar code requirements

GS1 has done a lot of work to harmonize the practices of EAN coding system in Nordic member countries, which should share common principles (ECR Nordic 2004). Despite this work, some differences in requirements of labeling came up in regional EAN-guidebooks that were published after creating the common Nordic guidelines.

Although every Nordic country has it's own language, having only English on the secondary package and pallet label is adequate. The label should have a human readable field and an optically readable field. The label size is not restricted.

Human readable text field should contain the following information in English. The text height is not restricted.

- Name and address of the brand owner
- Article description in format: Name and quantity of the consumer per secondary package times the consumer unit's net weight.
- Suppliers article number
- Amount of consumer units in secondary package times the EAN article number of the secondary package
- EAN article number of the secondary package
- Batch number
- Best before date in format DD.MM.YYYY

The secondary package is typically the orderable unit of the stores and is not thereby intended to pass the point of sales, thereby making use of EAN-13 code unnecessary. EAN-128 symbology should be used for delivering information needed in supply chain. The optically readable field should contain following information encoded with EAN-128 symbology and barcode.

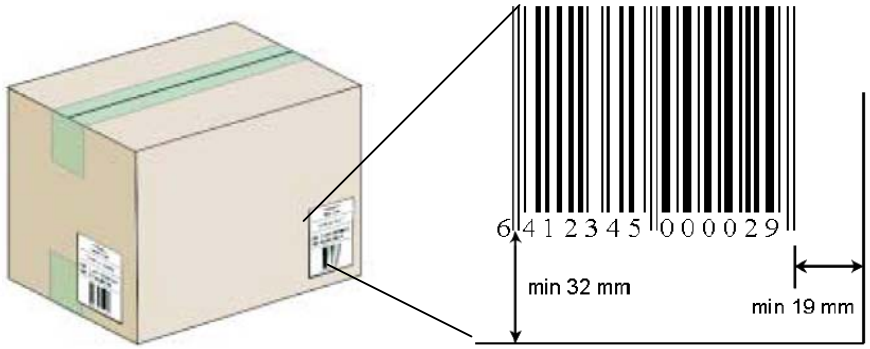
- EAN article number of the secondary package: (01)EAN-14 or (01)0+EAN-13
- Best before date: (15)YYMMDD
- Batch number: (10)batch number

Requirement on printing quality of the barcode in Finland is ISO / IEC 15416 Grade 3, which is a higher requirement than in other countries. A supplier using a lower quality printing standard will not likely face any problems, but the Pan-Nordic requirement is ISO / IEC 15416 Grade 3. The barcode should be at least 13 millimeters high.

Picture 4 presents a model for a Pan-Nordic secondary package label, where each Nordic country's requirements have been taken into consideration. Empty space on the label represents the possibility to add additional information, like SSCC code, in EAN-128 format.

Picture 4: A Pan-Nordic secondary package label

The secondary package should have two identical labels, one on the short side and one on the adjacent long side on the right. They should be placed so that the barcode is at least 19 millimeters from the closest vertical edge and at least 32 millimeters from the bottom edge of the secondary package. In cases where the obeying this rule is not possible due to small size of the secondary package, the label should be placed so that the barcode is as far as possible from edges of the secondary package to ensure scannability of the barcode. The correct placement of the label is illustrated in picture 5.



Picture 5:Location of the label on a secondary package (Pakkausten ja Lavakuormien Kuljetusyksikkömerkinnät 2005)

The Pan-Nordic secondary package model presented here fulfills the minimum packaging requirements of Sweden, Finland, Norway, Denmark and Iceland set for non-variable weight goods with an expiry date. The model applies only to packaging of FMCG, excluding cold chain and variable weight goods, alcohol, tobacco, dangerous goods and any goods packaged in returnable packages. For these types of products there are additional requirements, which were not examined.

7.3 Pan-Nordic tertiary package

7.3.1 Tertiary package dimensions

In Nordic countries, the tertiary package has basically only two widely accepted base dimensions, 1200mm x 1000mm (FIN, ISO) and 1200mm x 800mm(EURO).

When a pallet is either of these sizes, they are generally referred to as the FIN-pallet and as the EURO-pallet, which is a little misleading as FIN and EURO are recirculation systems and although a pallet is either size it may belong to a totally different recirculation system, for example to CHEP system or be a non-recyclable pallet.

But as no Nordic country defines the circulation system where the actual pallet should belong to, only the dimensions are important. The 1200x1000 pallet is widely used only in Finland, but still accepted in other countries depending on the customer. As this may prove to be a problem, 1200x800 should be used as tertiary packages base dimensions it is widely accepted in all Nordic countries.

Unlike the base dimensions, the load on the pallet defines the pallet height. This pallet height issue proved to be the biggest issue in creating a Pan-Nordic model, as each country has set a requirement on this. The Finnish requirement is the strictest of all countries,

according to the standard SFS 5897; the total pallet height must be less than 1100 millimeters. Having the Finnish pallets height requirement as the Pan-Nordic requirements results in excess costs of warehousing and transportation in other Nordic markets. The Swedish pallet height requirement is 1250mm, Norwegian and Icelandic requirement is 1200mm and Denmark has not set any strict requirement on the pallet height. For maximal cost efficiency the pallet space, base and height should be fully utilized and using a 1100mm high pallet in Sweden would mean that only 88% of the pallet is utilized resulting in higher transportation and warehousing costs than with using the Swedish requirement. Regardless of the excess cost, the Pan-Nordic packaging has to fulfill the requirements of all the five Nordic countries, and as a result Pan-Nordic pallet must be less than 1100 millimeters high.

The load on the pallet also defines the weight of the pallet. The pallet holding the goods defines the maximum pallet weight. A EURO-pallet can carry a maximum weight of 1000 kilograms, which should be considered as the Pan-Nordic requirement.

All these requirements result in that the accepted dimensions of a Pan-Nordic pallet are strictly defined. The accepted measures are presented in Table 3.

Width (mm)	Length (mm)	Max. Height (mm)	Max. Weight (kg)
800	1200	1100	1000

Table 3: Pan-Nordic tertiary packages dimension

7.3.2 Pallet label and bar code requirements

Like secondary package label the pallet label form and information are quite harmonized in Nordic countries by GS1. All countries share the same principles and the required information is same in all countries besides Norway. Norwegian pallet label contains all information required in other countries and also some additional information. Thereby a Norwegian pallet label can be considered as a Pan-Nordic pallets label as it fulfills the requirements of all countries.

The width of the pallet label has been agreed in all the countries to be 105 or 148 mm. The height must be less than 210mm.

Like with the label of a secondary package, the pallet label should contain two fields, a human readable field and an optically readable field.

Human readable text field should contain the following information in English. The text height must be more than 7 millimeters, making the text readable from the distance of two meters.

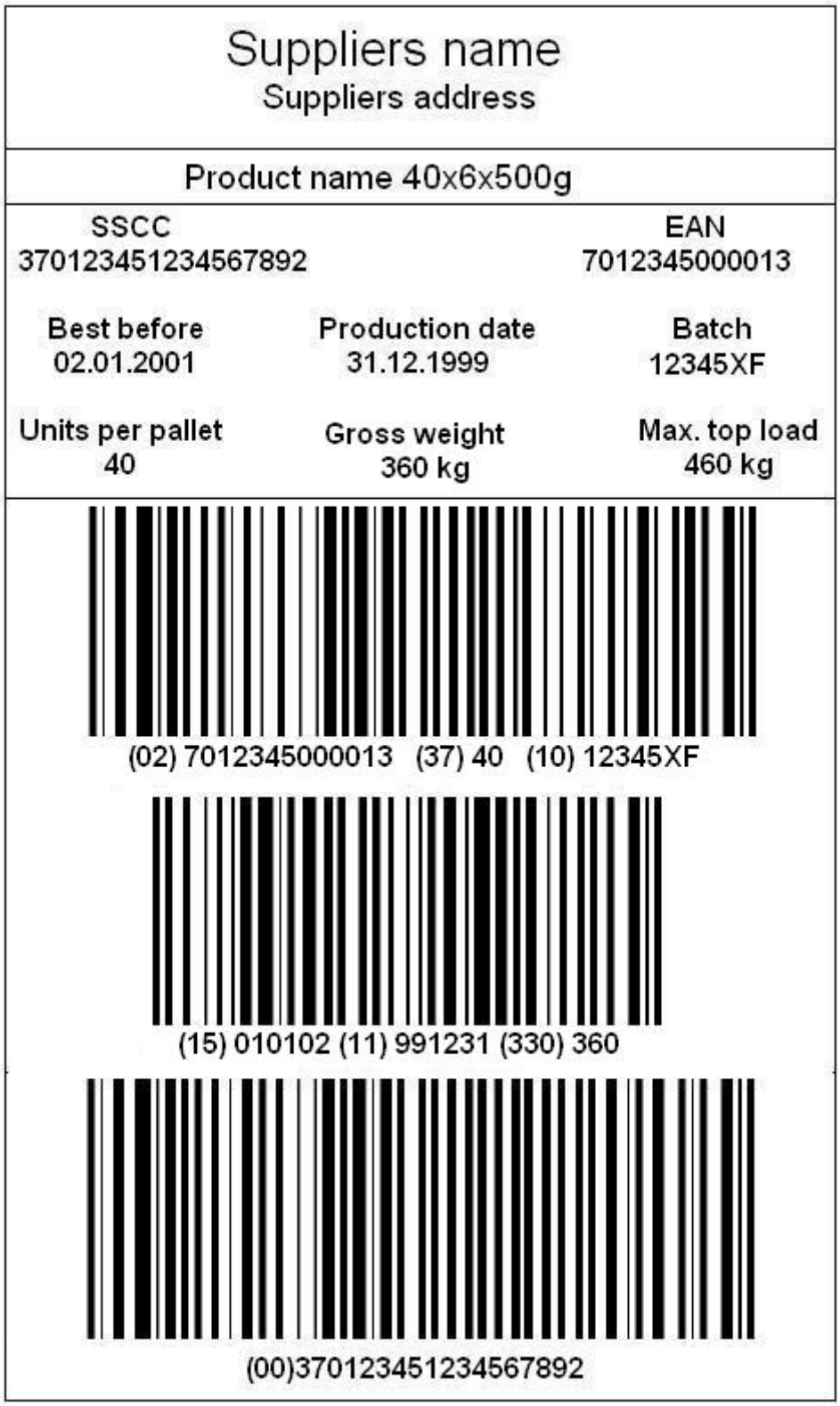
- Name and address of the brand owner
- Article description in format: Name and quantity of the secondary packages per pallet times the amount of consumers units per secondary package times the consumer unit's net weight.
- SSCC code
- EAN article number of the secondary package
- Best before date in format DD.MM.YYYY
- Production date in format DD.MM.YYYY
- Batch number
- Amount of secondary packages on the pallet
- Gross weight of the pallet in kilograms
- Maximum stacking weight for the pallet

The optically readable field should contain following information encoded with EAN-128 symbology and barcode.

- EAN article number of the secondary package: (02)EAN-14 or (01)0+EAN-13
- Amount of secondary packages on the pallet (37)amount
- Best before date (15)YYMMDD
- Production date (11)YYMMDD
- Batch number (10)batch number
- Net weight if product has variable weight: (3103)weight in kilograms
- SSCC code (00)SSCC

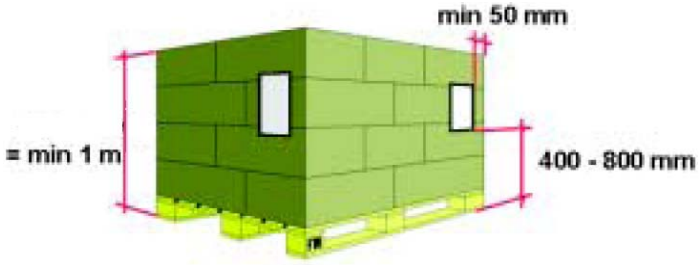
Requirement on printing quality of the barcode is ISO / IEC 15416 Grade 3. The barcodes should be at least 32 millimeters high. The bar code with the SSCC code should be printed separately from other barcodes on the bottom line. The numbers and text below the barcodes should be at least three millimeters high.

Picture 6 presents a model for a Pan-Nordic pallet label, where all required information of each Nordic country have been taken into consideration.



Picture 6: A Pan-Nordic pallet label

The Pallet should have two identical labels, one on the short side and one on the adjacent long side on the right. They should placed so that the label is at least 50 millimeters from the closest vertical edge and at least 400 millimeters from the bottom edge, but not higher than 800 millimeters. If pallet is less than one meter high and obeying this rule is not possible, the label should be placed as high as possible. Picture 7 illustrates the correct placing of the pallet label.



Picture 7: Location of the label on a pallet
(Kuljetusyksikkömerkinnät 2005)

Besides the pallet label presenting the product facts, the pallet requires a transportation label or documents. The transportation label information and documents state the sender, receiver and information on goods. The transporter defines the required information and provides the transportation label model, which the supplier attaches to the pallet. Therefore there are no general guidelines for making a Pan-Nordic transportation label.

The Pan-Nordic pallet model presented here fulfills the minimum packaging requirements of Sweden, Finland, Norway, Denmark and Iceland set for non-variable weight goods with an expiry date. The model applies only to packaging of FMCG, excluding alcohol, tobacco, dangerous goods and any goods packaged in returnable packages. For these types of products there are additional requirements, which were not examined.

7.4 Implementing Pan-Nordic packaging model on Semper's products

Semper currently has all its products according to the Swedish packaging requirements and therefore no major changes to the packaging need to be done. But as such, the secondary packages and pallet are not in perfect alignment with Pan-Nordic packaging model and some small changes are required.

7.4.1 Required changes on the secondary package

All Semper's secondary packages are shelf ready packages, but the sizes of the secondary packages are not perfectly aligned with base sizes of the modular system. The secondary package base size for baby food is 185mm x 245 mm, for mother's milk substitute 193mm x 385mm and with gluten free products the secondary package base unit varies greatly. Changing the packaging sizes is a challenging and a complex task, which Semper is not likely to start since full alignment with unit sizes of the modular system is not mandatory business. But as obeying the modular systems sizes provides better utilization of the pallet and shelf space, the matter should be given consideration especially now as Semper will have to lower the pallet height to obey the Finnish height standard of 1100mm, which will result in poor pallet space utilization in Sweden. Being able to lower the secondary package height might result in a possibility for having an additional pallet layer on the pallet thereby reverting the amount of secondary packages per pallet to the previous.

Semper's secondary package currently has a bilingual label stating the following information:

- Suppliers name
- Supplier article number
- Product name
- Article description in format: Name and quantity of the consumer per secondary package times the consumer unit's net weight.
- Best before date DD.MM.YYYY

Semper should change the secondary package label so that the information in human readable text field would be in English and add the following information fields:

- Semper's address
- Batch
- Amount of consumer units in secondary package times the EAN article number of the secondary package
- EAN article number of the secondary package

The optically readable field in Semper's secondary package label is currently encoded with EAN-128 symbology, which is quite well in alignment with the Pan-Nordic secondary package label. The EAN-128 barcode contains following information:

- EAN article number of the secondary package: (01)EAN-14 or (01)0+EAN-13
- Best before date: (15)YYMMDD

Thereby no large are required, only one information piece should be added.

- Batch number: (10)batch number

Semper currently has one label on the short side of the secondary package and another identical label should be added on the adjacent long side on the right. Location of the secondary package label is correct.

By making these suggested changes, Semper‘s secondary package will fulfill the requirements of each Nordic country's packaging requirements.

7.4.2 Required changes on the pallet

Semper's pallets currently have a label stating the following information in English:

- Suppliers name
- Supplier article number
- Article description in format: Name and quantity consumers units per secondary package times consumer unit's net weight.
- SSCC code
- EAN article number of the secondary package
- Best before date in format YY.MM.DD
- Batch number
- Amount of secondary packages on the pallet

Semper's should change the pallet label so that the following information in human readable text field would be changed into a correct format:

- Article description should be in format: Name and quantity of the secondary packages per pallet times the amount of consumers units per secondary package times the consumer unit's net weight.
- Best before date should be in format DD.MM.YYY

The following information should be added to the human readable field:

- Suppliers address
- Production date in format DD.MM.YYYY
- Gross weight of the pallet in kilograms
- Maximum stacking weight of the pallet

The optically readable field in Semper's pallet label is currently encoded with EAN-128 symbology, containing all information required for Pan-Nordic pallet label and therefore the field doesn't require any changes. In addition to all required information, the optically readable field contains also suppliers article number.

The EAN-128 barcode contains following information.

- EAN article number of the secondary package: (02)EAN-14 or (01)0+EAN-13
- Amount of secondary packages on the pallet (37)amount
- Best before date (15)YYMMDD
- Production date (11)YYMMDD
- Batch number (10)batch number
- SSCC code (00)SSCC

Semper currently has all its products on 800m x 1200mm pallets, which is in alignment with the Pan-Nordic pallet model. Also the pallet weight for none of the products exceeds 1000kg, the Pan-Nordic requirement. The pallet height is the only issue with pallet dimensions that is currently not accordingly to the Pan-Nordic pallet model.

Semper currently takes advantage of the allowed pallet height (1250mm) in the Swedish market with most products sold in Sweden. According to Semper's product information, taking off a one pallet layer from too pallets that are too high would lower the height down to less than 1100 mm. This action would mean an increase in warehousing and transportation costs, but is unavoidable if the pallets must be according to the Pan-Nordic model. To estimate the cost of this action a cost analysis was conducted.

By making these suggested changes, Semper‘s secondary package will fulfill the requirements of each Nordic country's packaging requirements they need to fulfill.

7.4.2.1 Cost analysis for lowering pallet height

For the excess costs the pallet height reduction would bring, a cost analysis was conducted. The facts, calculations and details of the analysis are profoundly presented in appendix 2: The cost analysis of pallet height reduction. The appendix is not available for public viewing as it contains information Semper wished to keep secret. Below is presented the summary and the conclusion of the cost analysis.

Based on Semper's product information, taking off a one pallet layer from any pallet would be enough to make the pallet height less than 1100mm. Therefore the analysis question became: How much would it cost to Semper to take off a one layer from all pallets, with a height more than 1100mm.

The starting point to the calculations is the fact that Semper's transportation and warehousing costs are based on amount of pallets. First it had to be determined, how many more pallets would have to be taken in, handled, stored and transported if a layer was taken off from pallets that are too high. The percentual increase in the amount of the pallets will directly increase all warehousing and transportation costs.

The products were first divided in to two categories: pallets over 1100mm and pallets under 1100 mm. Then to find out the increase, Semper's sales data was used to determine the amount of pallets sold of each product in 2005. For the products on pallets under 1100mm, no increase would occur. For the products on pallets over 1100mm, an increase of one pallet layer per sold pallet would occur. The total increase of pallets would thereby be the total amount of sold pallets over 1100mm divided by the respective amount of pallet layers on each products.

The calculations required a large amount of base data on sales and products and Excel was used for processing this information.

All calculations were based on the Semper's transportation, warehousing and sales data of 2005 and the results therefore reflect the situation of 2005. The results do not take into account the cost effect of the warehouse centralization and the results cannot be considered to reflect anything else than cost increase of 2005 if all pallets were less than 1100mm high. Semper's chief of logistics, Martin Stangdell considered this to be adequate level of analysis for making a decision weather it would be wise to pursue pallet height reduction on entire product assortment or to find another alternative.

Scenario 1 is a calculation on how much would the costs increase if all pallets were under 1100mm. The result of the Scenario 1 of the cost analysis shows us that implementing the Pan-Nordic pallet height on entire product assortment would be very expensive, increasing the costs by approximately 1.9 MSEK. Stangdell considered this cost as unacceptable and suggested a conduct of another Scenario, a partial height reduction.

As Semper does not sell all its products in Finland, for now it would be adequate to reduce the pallet height for all the markets only on products, which are sold in Finland.

Scenario 2 is a calculation on how much would the partial pallet height reduction cost. The result of the Scenario 2 proved to be a lot cheaper producing excess costs of 0.5 MSEK, which Semper considers to be an acceptable cost.

As a conclusion of the cost analysis, partial height reduction of the products is recommendable for Semper. Products should be divided in to two categories; products sold in all markets and to products sold in all markets except in Finland.

Products sold in all markets will be perfectly Pan-Nordic, having a maximum pallet height of 1100millimeters. Products sold in all markets but Finland will be perfectly Pan-Nordic from all the other aspects except for the maximum pallet height, which is 1250 millimeters.

Having these two different categories enables Semper to take full advantage of the Pan-Nordic packaging model without suffering from the strict pallet height requirements unnecessarily on markets, where obeying the requirement is not mandatory.

7.5 Recommendations for further development of packaging

Logistics is a constantly evolving field, where implementations and standards become outdated sooner or later. During recent decades the pace of development has been increasing and implementations and inventions become outdated before they even become industry-accepted practices. Therefore Semper should constantly be on top of the changes, new inventions and implementations of logistics and packaging.

7.5.1 Participation in ECR-organization's projects

Regional and international ECR organizations constantly have on-going projects aimed to improve supply chain functions for the company and the entire industry. Active participation on ECR-organizations activities is very recommendable for any company. Especially now as Semper is conducting the product harmonization project, they should constantly keep up with the requirements of each Nordic country and be able to change the product to meet the new requirements. Information on packaging requirements is available trough ECR-organizations and being in touch with them would be a proper gateway to gain easy access to the information.

7.5.2 RFID technology

Participation in various development projects would improve efficiency of Semper's supply chain. A one key future development area of logistics is implementation of RFID technology, which Semper should already now start planning. Radio Frequency Identification (RFID) is an automatic identification method that provides means for replacing barcodes in the future.

RFID is seen as one of the biggest inventions in the grocery industry bringing efficiency to handling in the supply chain. Automated product controls are expected to improve product availability and total transparency of logistical chain makes it possible to reduce losses. (Elfers, Ulrichs 2006) Currently RFID is not really used in the grocery industry due to high cost of the technology, but in near future it will be widely available at a reasonable cost. As RFID seems to be the future method of identification, Semper should start planning how they could benefit from using RFID technology. ECR Europe will have the first European conference on implementing the RFID technology in September 2006 in Düsseldorf. Participating in to this conference would be a good kick-off for planning the implementation of RFID technology at Semper. (GS1 Sverige RFID 2006)

8. Summary

For a company having business in several Nordic countries, ability to pool the demand of all the markets with harmonized products would be a great benefit. Making a Pan-Nordic primary package is a very complex task requiring deep knowledge on each country's product requirements, market situation and consumption patterns. Self-explanatory always-applicable guidelines cannot be stated due to the complexity of the issue and developing a Pan-Nordic consumer package is something the suppliers themselves should look into.

Like consumer unit, the secondary and tertiary packages purpose is to protect the product and to deliver information. But the secondary and tertiary units do not have the competition and marketing pressure the primary units have. Thereby only the supply chain packaging requirements restrict developing a Pan-Nordic secondary and tertiary packaging.

The packaging requirements of supply chain typically define the size, weight the secondary package and the pallet, the requirements also define the information that the unit has to carry and the form in which it has to be delivered. The packaging requirements are drawn up to ensure smooth product flow through the entire supply chain. The retailers and wholesalers drive forward the requirements and demand that the supplier's comply with the requirements. Various organizations have made it possible that within each country the packaging requirements are quite harmonious.

This research has shown that it is possible to build Pan-Nordic secondary and tertiary packages. This can be done by taking into account all the individual requirements of each Nordic country and fulfilling them all.

As requirements in some countries are looser than in others, the strictest requirement should be fulfilled. This might in some cases produce excess costs on transportation, warehousing or packaging. The benefits of Pan-Nordic product assortment should be compared to the possible unnecessary excess costs it might bring.

As the main excess cost providing element in creating a Pan-Nordic logistical unit is the pallet height and as all countries have different pallet height standard, the Pan-Nordic requirement has to be set to serve the Finland's SFS 5897 standard, which states that the pallet may not be higher than 1100mm.

Using a lower pallet than the market allows, is poor utilization of pallet space. This can however be avoided as seen with Semper. As a conclusion it could be said that; if having a perfectly Pan-Nordic assortment will produce high excess costs, making the assortment only partially Pan-Nordic may produce the desired effect without increasing the costs.

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Appendix 1 Template information sources

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Packaging guide for FFMG 2005. ECR-Sweden 2005.

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10. Appendix

Appendix 1 contains the filled templates for each country and also a Pan-Nordic template, where the requirements of all countries have been combined.

Appendix 2 is the cost-analysis of pallet height reduction for Semper Ab. As it contains business critical information, Semper wishes to keep publicity limited. Appendix 2 is not available for public viewing and may not be published without Semper's approval. For further information, contact Semper's chief of logistics Martin Stangdell.

Appendix 1
Country answer sheets

Pan-Nordic

Trade Unit

DIMENSIONS

Max Weight kg	15
Max Height mm	320
Max Width mm	300
Max Depth mm	400

LABEL

Requirement standard:	ISO /IEC 15416, Grade 3
Label size	
TextSize:	>5mm
X-dimension:	0,495-0,94
Barcode Printing Quality:	ISO /IEC 15416, Grade 3
Barcode Size:	>13mm high
Print contrast Signal:	>80%
Barcode location in TU	32mm from bottom, 19mm from nearest edge

TU Label

How many:	2

LANGUAGE English

Information	Human readable text	Barcode	EAN/UCC 128 format
EAN article number of TU	Must be labelled	Must be labelled	(01) 0+EAN 13 of TU or (01)EAN 14
Name of the brand owner	Must be labelled	No labelling required	
Address of the brand owner	Must be labelled	No labelling required	
Article description	Name and quantity CU /TU * CU Net weight	No labelling required	
Batch or lot number	Must be labelled	Must be labelled	(10)+batch no
Best before date	DDMMYYYY	Must be labelled	(15)YYMMDD
Net weight / content	If product has variable weight	If product has variable weight	(3103)weight in KG, up to 3 decimals
Supplier´s article number	Must be labelled	No labelling required	

Pallet

DIMENSIONS

Standard	SFS 5897
Max Weight kg	1000
Max Height mm	1100
Width mm	800
Depth mm	1200

WRAPPING

Waste	EU regulations
Material	EU regulations

LABEL

Width	105 mm or 148mm
height	<210mm
How many & what:	2;on short side and on long side on the right
Location:	Height: between 400-800mm and >50mm from the closest vertical line

LABEL

TextSize:	>0,7mm
X-dimension:	0,495-0,94mm
Barcode Printing Quality:	ISO /IEC 15416, Grade 3
Barcode height	32mm
Max Length	165mm, 48 symbols

LANGUAGE English

pallet label

Information	Human readable text	Barcode	EAN/UCC 128 format	
Name of the brand owner	Must be labelled	No labelling required		
Address of the brand owner	Must be labelled	No labelling required		
SSCC CODE	Must be labelled	Must be labelled	(00)SSCC	
AEN article code for pallet	No labelling required	No labelling required		
EAN of Tu's on pallet	Must be labelled	Must be labelled	(02)0+EAN13	
Number of Tus on pallet	Must be labelled	Must be labelled	(37)number Tus on pallet	
Article describtion	X*A*B*C*W	No labelling required		X=article name
Batch or Lot No.	Must be labelled	Must be labelled	(10) batchno.	A= amount of TU 1on pallet
Production date	DDMMYYYY	Must be labelled	(11)YYMMDD	B= amount of TU 2 in TU 1
Best before date	DDMMYYYY	Must be labelled	(15)YYMMDD	C= amount of Cus in TU2
Net weight of pallet	yes if product weight is variable	yes if product weight is variable	(3103) weight in KG	W=Net weight of CU
Gross weight of pallet	Must be labelled	No labelling required		
Max. Stacking weight	Must be labelled	No labelling required		
Temperature requirement	If the product has such	No labelling required		

Finland

Trade Unit

DIMENSIONS

Max Weight kg	25
Max Height mm	320
Max Width mm	400
Max Depth mm	600

LABEL

Label size	may vary
TextSize:	>7mm in text field, elsewhere 3 mm
X-dimension:	0,5-0,94
Barcode Printing Quality:	ISO/IEC standard 15416, Grade 3
Barcode Size:	>13mm
Print contrast Signal:	>80%
Barcode location in TU	19mm from vertical, 32mm from bottom

TU Label

How many:	1, but 2 recommended

LANGUAGE Finnish & Swedish or English

Information	Human readable text	Barcode	EAN/UCC 128 format
EAN article number of TU	Yes	Yes	(01) 0+EAN 13 of TU or (01)EAN 14
Name of the brand owner	Yes	No	
Address of the brand owner	Yes	No	
Article description	Name and quantity CU /TU * CU Net weight	No	
Batch or lot number	No	No	
Best before date	DDMMYYYY	Yes	(15)YYMMDD
Net weight / content	If product has variable weight	If product has variable weight	
Supplier´s article number	Yes	No	

Pallet

DIMENSIONS

Standard	SFS 5897
Max Weight kg	1000
Max Height mm	1100
Width mm	800 or 1000
Depth mm	1200

WRAPPING

Waste	EU regulations
Material	EU regulations

LABEL

Width	105/148
height	<210mm
How many & what:	2: one on long side and one on short side
Location:	400-800mm*50mm

LABEL

TextSize:	>5mm
X-dimension:	0,495-0,94mm
Barcode Printing Quality:	ISO /IEC 15416, Grade 3
Barcode height	32mm
Max Length	165mm, 48 symbols

LANGUAGE English

pallet label

Information	Human readable text	Barcode	EAN/UCC 128 format	
Name of the brand owner	Yes	No		
Address of the brand owner	Yes	No		
SSCC CODE	Yes	Yes	(00)SSCC	
AEN article code for pallet	No	No		
EAN of Tu's on pallet	Yes	Yes	(02)0+EAN13	
Number of Tus on pallet	Yes	Yes	(37)number Tus on pallet	
Article describtion	X*A*B*C*W	No		X=article name
Batch or Lot No.	Yes	Yes	(10) batchno.	A= amount of TU 1on pallet
Production date	Yes	Yes	(11)YYMMDD	B= amount of TU 2 in TU 1
Best before date	DDMMYYYY	Yes	(15)YYMMDD	C= amount of pcs in CU2
Net weight of pallet	yes if product weight is variable	yes if product weight is variable	(3103) weight in KG	W=Net weight of CU
Gross weight of pallet	No	No		
Max. Stacking weight	No	No		
Temperature requirement	Yes, if needed	No		

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Pakkausten ja Lavakuormien Kuljetusyksikkömerkinnät 2005
Pakkausten Maailma
Pakkausten ja Lavakuormien Kuljetusyksikkömerkinnät
Pakkausten optimointi
Tehokkaat päivittäistavara pakkaukset
Requirements for labeling TUs and Pallets in the Nordic FMCG Sector 2004
General EAN.UCC Version 6.0 2005

Norway

Sources:

Packaging and logistics in the grocery trade 2003
Beste praksis for tilbaketrekking og tilbakekalling I norsk dagligvarebransje 2004
Standard for labeling D-packs and pallets in the Norwegian Grocery Sector
Requirements for labeling TUs and Pallets in the Nordic FMCG Sector 2004
General EAN.UCC Version 6.0 2005

Trade Unit

DIMENSIONS

Max Weight kg	15
Max Height mm	320
Max Width mm	400
Max Depth mm	600

LABEL

Label size	may vary
TextSize:	>5mm in text field, elsewhere 3 mm
X-dimension:	0.495-0,90
Barcode Printing Quality:	ISO/IEC standard 15416, Grade 2
Barcode Size:	>13mm
Print contrast Signal:	adequate
Barcode location in TU	19mm from vertical, 32mm from bottom

TU Label

How many:	2

LANGUAGE Norwegian or English

Information	Human readable text	Barcode	EAN/UCC 128 format
EAN article number of TU	Yes	Yes	(01) 0+EAN 13 of TU or (01)EAN 14
Name of the brand owner	Yes	No	
Address of the brand owner	No	No	
Article description	Name and quantity CU /TU * CU Net weight	No	
Batch or lot number	Yes	Yes	(10)+batch no
Best before date	DDMMYYYY	Yes	(15)YYMMDD
Net weight / content	If product has variable weight	If product has variable weight	
Supplier´s article number	No	No	

Pallet

DIMENSIONS

Standard	
Max Weight kg	1000
Max Height mm	1200
Width mm	800
Depth mm	1200

WRAPPING

Waste	Must be minimized, but sufficient to fullfill its purpouse
Material	Plastic wrap or tape / self binding load

LABEL

Width	105-148
height	vary
How many & what:	2: one on long side and one on short side
Location:	400-800mm*50mm

LABEL

TextSize:	>5mm
X-dimension:	0,495-0,94mm
Barcode Printing Quality:	ISO /IEC 15416, Grade 3
Barcode height	32mm
Max Length	165mm, 48 symbols

LANGUAGE English

pallet label

Information	Human readable text	Barcode	EAN/UCC 128 format
Name of the brand owner	Yes	No	
Address of the brand owner	No	No	
SSCC CODE	Yes	Yes	(00)SSCC
AEN article code for pallet	No	No	
EAN of Tu's on pallet	Yes	Yes	(02)0+EAN13
Number of Tus on pallet	Yes	Yes	(37)number Tus on pallet
Article describtion	X*A*B	No	
Batch or Lot No.	Yes	Yes	(10) batchno.
Production date	No	No	
Best before date	DDMMYYYY	Yes	(15)YYMMDD
Net weight of pallet	yes if product weight is variable	yes if product weight is variable	(3103) weight in KG
Gross weight of pallet	Yes	yes if product weight is variable	
Max. Stacking weight	Yes	No	
Temperature requirement	Yes, if needed	No	

X=article name
A= amount of TU 1on palle
B= amount of TU 2 in TU 1
C= amount of pcs in CU2
W=Net weight of CU

Sweden

Sources:

Packaging guide for FFMG 2005

GS1 Sweden - Förpackningsmärkningar

Requirements for labeling TUs and Pallets in the Nordic FMCG Sector 200

General EAN.UCC Version 6.0 2005

Trade Unit

DIMENSIONS

Max Weight kg	15
Max Height mm	-
Max Width mm	400
Max Depth mm	600

LABEL

Label size	may vary
TextSize:	>5mm in text field, elsewhere 3 mm
X-dimension:	0.495-0,95
Barcode Printing Quality:	ISO/IEC standard 15416, Grade 2
Barcode Size:	
Print contrast Signal:	adequate
Barcode location in TU	19mm from vertical, 32mm from bottom

TU Label

How many:	1, 2 recommended

LANGUAGE Swedish or English

Information	Human readable text	Barcode	EAN/UCC 128 format
EAN article number of TU	No	yes	(01) 0+EAN 13 of TU or (01)EAN 14
Name of the brand owner	Yes	no	
Address of the brand owner	No	no	
Article description	Quantity CU * CU Net weight	no	
Batch or lot number	No	no	
Best before date	YYMMDD or DDMMYYYY	yes	(15)YYMMDD
Net weight / content	If product has variable weight	If product has variable weight	
Supplier´s article number	Yes	no	

Pallet

DIMENSIONS

Standard	
Max Weight kg	1000
Max Height mm	1250
Width mm	800
Depth mm	1200

WRAPPING

Waste	EU regulations
Material	EU regulations

LABEL

Width	105-148
height	vary
How many & what:	2: one on long side and one on short side
Location:	400-800mm*50mm

LABEL

TextSize:	>5mm
X-dimension:	
Barcode Printing Quality:	ISO 15416 class C
Barcode height	32mm
Max Length	165mm, 48 symbols

LANGUAGE English

pallet label

Information	Human readable text	Barcode	EAN/UCC 128 format	
Name of the brand owner	Yes	No		
Address of the brand owner	No	No		
SSCC CODE	Yes	Yes	(00)SSCC	
AEN article code for pallet	No	No		
EAN of Tu's on pallet	Yes	Yes	(02)0+EAN13	
Number of Tus on pallet	Yes	Yes	(37)number Tus on pallet	
Article describtion	X, AxBxCxW	No		X=article name
Batch or Lot No.	Yes	No		A= amount of TU 1on pallet
Production date	No	No		B= amount of TU 2 in TU 1
Best before date	YYDDMM or DDMMYYYY	Yes	(15)YYMMDD	C= amount of pcs in CU2
Net weight of pallet	yes if product weight is variable	yes if product weight is variable	(3103) weight in KG	W=Net weight of CU
Gross weight of pallet	No	No		
Max. Stacking weight	No	No		
Temperature requirement	Yes, if needed	No		

Denmark

Trade Unit

Sources:

Emballage 2001

Placering af stregkodesymboler 2003

Requirements for labeling TUs and Pallets in the Nordic FMCG Sector 2004

General EAN.UCC Version 6.0 2005

DIMENSIONS

Max Weight kg	15
Max Height mm	-
Max Width mm	400
Max Depth mm	600

LABEL

Label size	may vary
TextSize:	>5mm in text field, elsewhere 3 mm
X-dimension:	0.495-0,95
Barcode Printing Quality:	ISO/IEC standard 15416, Grade 2
Barcode Size:	
Print contrast Signal:	adequate
Barcode location in TU	19mm from vertical, 32mm from bottom

TU Label

How many:	1

LANGUAGE Danish or English

Information	Human readable text	Barcode	EAN/UCC 128 format
EAN article number of TU	yes	yes	(01) 0+EAN 13 of TU or (01)EAN 14
Name of the brand owner	yes	no	
Address of the brand owner	yes	no	
Article description	Quantity CU * CU Net weight	no	
Batch or lot number	yes	no	
Best before date	DDMMYYYY	yes	(15)YYMMDD
Net weight / content	If product has variable weight	If product has variable weight	
Supplier´s article number	no	no	

Pallet

DIMENSIONS

Standard	-
Max Weight kg	1000
Max Height mm	Depends on receiver
Width mm	800
Depth mm	1200

WRAPPING

Waste	EU regulations
Material	EU regulations

LABEL

Width	105/148
height	vary
How many & what:	2: one on long side and one on short side
Location:	400-800mm*50mm

LABEL

TextSize:	>5mm
X-dimension:	0,495-0,94mm
Barcode Printing Quality:	ISO /IEC 15416, Grade 3
Barcode height	32mm
Max Length	165mm, 48 symbols

LANGUAGE English

pallet label

Information	Human readable text	Barcode	EAN/UCC 128 format	
Name of the brand owner	Yes	No		
Address of the brand owner	Yes	No		
SSCC CODE	Yes	Yes	(00)SSCC	
AEN article code for pallet	No	No		
EAN of Tu's on pallet	Yes	Yes	(02)0+EAN13	
Number of Tus on pallet	Yes	Yes	(37)number Tus on pallet	
Article describtion	Product X*A*B*C*W	No		
Batch or Lot No.	Yes	Yes	(10) batchno.	X=article name
Production date	No	No		A= amount of TU 1on pallet
Best before date	DDMMYYYY	Yes	(15)YYMMDD	B= amount of TU 2 in TU 1
Net weight of palle	yes if product weight is variabl	yes if product weight is variabl	(3103) weight in KG	C= amount of pcs in CU2
Gross weight of pallet	No	No		W=Net weight of CU
Max. Stacking weight	No	No		
Temperature requirement	Yes, if needed	No		

Iceland

Sources:

Handbók EAN á Íslandi

Requirements for labeling TUs and Pallets in the Nordic FMCG Sector 2004
General EAN.UCC Version 6.0 2005

Trade Unit

DIMENSIONS

Max Weight kg	
Max Height mm	
Max Width mm	
Max Depth mm	

LABEL

Label size	may vary
TextSize:	>5mm in text field, elsewhere 3 mm
X-dimension:	0.495-0,95
Barcode Printing Quality:	ISO/IEC standard 15416, Grade 2
Barcode Size:	>8mm
Print contrast Signal:	adequate
Barcode location in TU	19mm from vertical, 32mm from bottom

TU Label

How many:	1

LANGUAGE Icelandic or english

Information	Human readable text	Barcode	EAN/UCC 128 format
EAN article number of TU			
Name of the brand owner			
Address of the brand owner			
Article description			
Batch or lot number			
Best before date			
Net weight / content			
Supplier´s article number			

Pallet

DIMENSIONS

Standard	
Max Weight kg	
Max Height mm	
Width mm	
Depth mm	

WRAPPING

Waste	
Material	

LABEL

Width	
height	
How many & what:	
Location:	

LABEL

TextSize:	
X-dimension:	
Barcode Printing Quality:	
Barcode Size:	
Barcode height	
Max Length	

LANGUAGE

pallet label

Information	Human readable text	Barcode	EAN/UCC 128 format
Name of the brand owner			
Address of the brand owner			
SSCC CODE			
AEN article code for pallet			
EAN of Tu's on pallet			
Number of Tus on pallet			
Article describtion			
Batch or Lot No.			
Production date			
Best before date			
Net weight of pallet			
Gross weight of pallet			
Max. Stacking weight			
Temperature requirement			

X=article name
A= amount of TU 1on pallet
B= amount of TU 2 in TU 1
C= amount of pcs in CU2
W=Net weight of CU

Appendix 2
Cost analysis of pallet height reduction for Semper

NOT AVAILABLE FOR PUBLIC VIEWING