Degree Project, 15 higher education credits, Second Level

REVISION OF LACQUER RANGE

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REVISION AV LACKSORTIMENT

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Foreword

This report contains the result of my degree project for a Masters degree in Mechanical Engineering. The project was performed in collaboration with Emballator Ulricehamns Bleck, a part of Emballator Metal Group.

This project has meant writing, investigating, analyzing and drawing conclusions using knowledge from my studies in Mechanical Engineering at Halmstad University, Skövde University and Örebro University. I would like to thank my mentors Pr. Lars Bååth at Halmstad University and Crister Kaljo at Emballator Ulricehamns Bleck for invaluable help and inspiration during this project.

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Sammanfattning

Detta examensarbete utfördes på lack- och tryckavdelningen på företaget Emballator Ulricehamns Bleck med målet att undersöka om det fanns brister och slöserier i det befintliga lacksortimentet.

Efter en noggrann nulägesanalys som inkluderade bland annat genomgång av applicerbara datablad, arbetsplatsintroduktion och studiebesök hos en av företagets lackleverantörer genomfördes arbetet utan missöden. Nulägesanalysen resulterade i en översikt av dagens lacksortiment och efter det fortsatte arbetet med att ta fram en egenskapsmatris innehållande samtliga lacker i sortimentet. Efter att de lacker som föll inom författarens specifikation för dubbletter identifierats togs ett antal rekommendationer för hur företaget bör agera för att ha ett uppdaterat sortiment fram. Förutom detta har författaren tagit fram ett förslag på hur företaget skall testa sina insideslacker för att i framtiden ha möjligheten att undersöka om några av dessa kan tas ut ur sortimentet.

Summary

This degree project was performed in the coating and printing department at Emballator Ulricehamns Bleck. The task was to investigate if any waste and improvement opportunities in the lacquer range at Emballator Ulricehamns Bleck exist.

A thorough analysis of the current situation including a review of applicable data, work place introduction and a visit to one of the company´s suppliers was made. This gave a good understanding of the current status. The result of the analysis was an overview of the lacquer range that helped the author to compile a characteristic matrix including all the products in the lacquer range. Following this the author identified products that could be specified as duplicates. Furthermore the degree project has resulted in 5 recommendations regarding future work with the design of the lacquer range. The last part of the project resulted in an analysis of today’s test schedule and a suggestion how to modify it for future needs.

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1 Introduction

1.1 Background

In the weak economic climate of today there are many corporations that try to implement efficiency-enhancing methods and philosophies into their production. Several more or less proven tools and philosophies are being used to help them to success. Many of the tools and philosophies remind of each other and aim to solve the same kind of problems. At Emballator Ulricehamns Bleck the implementation of Lean Production and applicable tools has just begun. The company has started the journey down the Lean Production road, with implementation of tools like 5S and suggestion schemes.

There are no wide paved roads in product and production development you can follow to guaranteed success. The key is to get sufficient experience in the area to clearly understand what is applicable for your corporation. Since every corporation handles production in a more or less different way, tools that are used in production development are more like frameworks than lists to follow. What works for your competitor might not be applicable in your company at all, even though you are producing similar products. Therefore it is important to create easily accessible knowledge databases to help managers and shareholders to make the right decisions along the way.

This Master project was performed in association with Emballator Ulricehamns Bleck which is a part of the Emballator Metal Group. By performing a revision of the lacquer range at Emballator Ulricehamns Bleck we aimed to present an overview of the current situation and leave recommendations for future work.

1.1.2 Presentation of associate company

Emballator Metal Group develops and manufactures metal packaging solutions for the coating and chemistry industry in northern Europe. The company has got manufacturing units in Ulricehamn, Bradford, Copenhagen and Helsinki. Emballator Metal Group has got about 300 employees and an annual turnover of about 650 MSEK. 155 employees work at the facility in Ulricehamn where tin cans and lids ranging in sizes from 330ml to 25L are produced. The coating and printing department employs 29 people with an average employment time of circa 10-12 years.

At Emballator Ulricehamns Bleck the implementation of Lean Production has just begun. Personnel are under education and the implementation of 5S and

suggestion schemes is progressing as planned. Parallel with this question has been raised if the size of the current lacquer range is defendable.

As of today production flows somewhat satisfying, but by continuously improving it can only get better. Emballator Ulricehamns Bleck has specified five things that they want this degree project to investigate. Since questions have been raised if they actually need such a wide range of lacquers or if perhaps they should change their way of thinking and reduce it, the company wishes to find out what someone with fresh eyes think of their lacquer range and what this person would change if he could.

1.2 Problem description

Emballator Ulricehamns Bleck has come to a point where they wonder if their current lacquer range contains more variety than can be justified by function, customer needs and demands. There has not been any revision of the lacquer range for some time, mainly due to lack of time. We have found the following background facts by studying inventory lists and asking numerous questions to our mentor and other employees at Emballator Ulricehamns Bleck;

- Today there are 21 different lacquers in the lacquer range. These 21 products cover all the needs and demands that are set on the range. In the range there are lacquers specially designed for use on the outside and inside of cans, colored lacquers, sparkle lacquers and additional lacquers used to make sure that functionality of the finished product can be assured at all time.

- Lacquer that is used on the outside of the cans need to be able to withstand abuse from handling and different substances that is shipped in the can since these may leak when the can is opened. The first group of lacquers used on the outside of tin cans is the white lacquers:

    - White lacquer for printing, article number 15548-0017
    - White lacquer Non Varnish, article number 15547-0000
    - Flex White for printing, article number 15566-0006
    - Flex White Non Varnish, article number 15567-0007

- In addition, Emballator Ulricehamns Bleck has got a variety of colored lacquers used for the outside of tin cans and lids. These are the following:

    - Interblue, article number 15564-5220
    - Akzoblue, article number 15564-5150
    - Russian Red, article number 15564-3116

  - Alu-grey, article number 15524-0200
  - Black, article number 15584-9000

- In some cases, a sparkle colored lacquer is needed to achieve the right result. In the range today we find two sparkle lacquers:

  - Sparkle Blue, article number 13580-0196
  - Sparkle Silver, article number 13580-0195

- The lacquer used on the inside is chosen based on the contents of the can. Since the contents range from food to marine applications and paint there is a need for a range of lacquers that can handle different situations. Some substances that can be used on a tin can that shall contain paint cannot be used if there are to be food in the container and vice versa. Besides this, there are two inside lacquers that are specific to one company.

  The lacquers used on the inside of tin cans are:

  - A-Lack gold, article number 11060-0000
  - B-Lack pigment lacquer, article number 3125/002
  - C-Lack 2 component gold, article number 16-3451
  - C-Lack 2 component pigment, article number 49092
  - D-Lack gold, article number 2252-306D
  - DL-Lack gold, article number 11078
  - F-Lack gold, article number 2092-361A
  - I-Lack pigment lacquer, 2092/385

- The final category of lacquers in the range is what we choose to call additional lacquers. These are used as complement to the rest of the range to make sure that functionality is guaranteed at all times. The additional lacquers are:

  - Glidsilver, article number 11593-0000
  - Clear coat, article number 11524-0001

Not all of the lacquers in the range are used frequently. Since some of the lacquers are bought using forecasts parts of them may not be used due to lack of orders. Much money goes to waste when bought, and stored lacquers become too old to be used and have to be thrown away. Since lacquer is hazardous waste the company has to pay for the waste to be destroyed in the correct way.

The colors stored are the ones needed to cover customer needs and demands. Some of the lacquers are bought to make sure that they are in store at all times. Offering a numerous range of lacquer to their customers means that the company waste a lot of time on changes in production. In between every change in production all parts of the applicator that is in contact with the lacquered plate needs to be thoroughly cleaned and a new barrel of paint needs to be placed on the machine. The people working at the machines are skilled operators with much experience which shortens the time that the production stands still at every change, but there is still much production time to be found with fewer transitions between colors. Average time for a change is about 40 minutes, according to Crister Kaljo who is the prepress and printing manager at Emballator Ulricehamns Bleck. The company recently did an investigation regarding time spent on standstill in production and found that during the time period 20100419 to 20100427 (ca 155 working hours), the production stood still for approximately 2800 minutes (ca 47hours). Of the time that production stood still approximately 2100 minutes were due to changes in production. This short study shows that much time can be used to value adding activities if there would be a way to reduce the lacquer range and thereby reducing changes in production. The diagram made by Emballator Ulricehamns Bleck that shows the distribution of time that production stood still can be found in appendix 5.

Some of the lacquers in the range are only used on a single customer's products. The company is not sure if these lacquers can be removed or replaced since these customers order large quantities of other goods. Tests have shown that lacquers that theoretically should work for certain products from certain manufacturers does not work as thought, with damage to the inside lacquer as a result. In these cases the contents of the can may become useless and the can starts to corrode from the inside. To control that the lacquer meets demands Emballator Ulricehamns Bleck perform field tests on the lacquered can to make sure that it can handle the assigned content. These tests are made with few specimens. If the lacquer cannot hold for the abuse of the assigned content another lacquer is used.

1.3 Organizational Environment

This project has been carried out on site at Emballator Ulricehamns Bleck in Ulricehamn, and at Halmstad University. The author has got the chance to work on the shop floor to get a bigger picture of how the processes flow. During the project we have had much use of e-mail, phone and personal meetings with mentors at both locations. Working like this has meant that we have been able to develop our skills in communicating both in written and oral form and we feel that it has been a good way to approach this kind of situation.

1.4 Limitations

To make this project as efficient as possible and to help us keep the right focus the following limitations were decided:

- The project shall not present cost estimates to back up recommendations made. Instead, if applicable, time estimates will be presented.
- The characteristic matrix presented in the final revision shall only contain those characteristics that are of importance for production and the personnel.

2 Project description

The purpose and aim of this project was, as specified by EUB, to:

- Create an overview of the current lacquer range at Emballator Ulricehamns Bleck.
- Develop a characteristic matrix containing the current lacquer range.
- Identify duplicates and investigate if they need to remain in the range.
- Produce a test schedule for lacquers
- Based on the things mentioned above, give Emballator Ulricehamns Bleck one or more recommendations on how to develop their lacquer range.

We also carried out a literature study in line with the production development philosophy implemented at Emballator Ulricehamns Bleck. The study shows the ground principles of Lean production and working with continuous improvements.

3 Method

In theory the different scientific methods of working are thoroughly defined. In practice, it is not that unusual that the different methods are mixed up to ensure best possible result.

3.1 Qualitative and Quantitative studies

Qualitative studies are studies that investigate a few objects thoroughly. Using qualitative studies produces a deeper understanding for the subject than quantitative studies will. Seen as a broader way of approaching a problem qualitative study often means that you study people and how they act. Observations of different situations and open interviews (meaning that there are no predefined answers) are common methods in qualitative studies.

Quantitative studies are studies that are aimed at projects containing measurable information. A quantitative study gives a broader understanding for the subject than qualitative studies do. An example of a quantitative method is a questionnaire with predefined answers. Nationalencyklopedien (2010) defines Quantitative method as “a generic term for the systematic approach where the researcher collects empirical and quantifiable data, summarize them in statistical terms as well as analyze the results based on testable hypotheses. Work should be formalized and well defined. Quantitative methods are essential in the study of large populations”.

3.2 The Mechanical Design Process

To make the work with this thesis effective we have worked using part of a beforehand specified framework. Ullman (2010) specifies a way of work for product development that has been used in this project. The framework is also applicable when working with production development and has provided a familiar work structure for the project.

The mechanical design process of Ullman (2010) consists of six steps that specify how to work during the different steps of the product development process. Since this project is aimed at producing a useable solution rather than a product, the framework is not fully used but still remains a good guidance in practically any area that involves developing existing products or solutions. The mechanical design process consists several steps which treats the evolution of the final product. Figure 2.1 shows the flow in the process.

3.2.1 Product discovery

Before one can develop something new or change an existing solution one has to decide in which area the solution shall be used and by whom. In this step the company brought forward their specification which then functioned as foundation for the project description.

3.2.2 Project planning

To ensure that we had time to perform all the tasks specified for this project without running out of time, a Gantt-schedule was made. The Gantt-schedule is found in appendix 1.

3.2.3 Product definition/project definition

This step was performed to make sure that the problem was defined and understood when setting the foundation for the project. To make sure that the project was appropriate for a master's thesis in mechanical engineering a project description was made that was audited by the mentor at Halmstad University prior to approval.

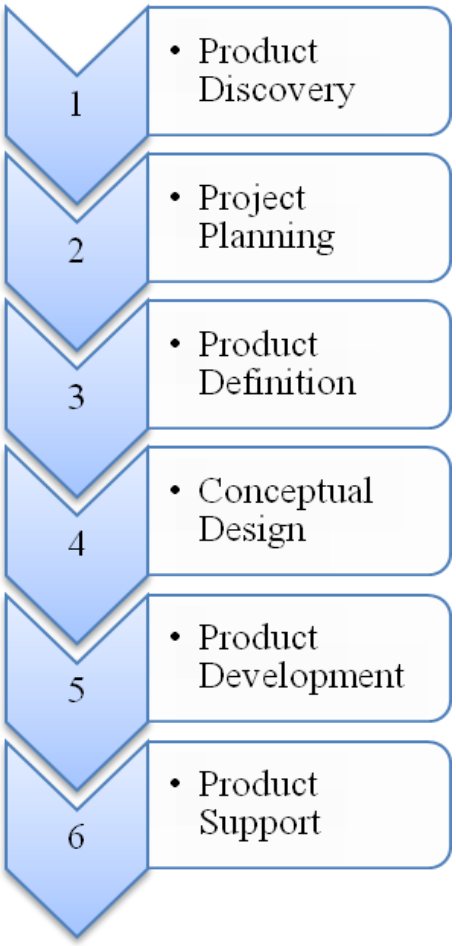

Fig 3.1 – The flow of the mechanical design process. Illustration made by the author.

3.2.4 Conceptual design

This project has not aimed to produce a product; the aim has been to recommend a new solution for the structure of the lacquer range at EUB. Therefore this step has inferred a slightly different way of work than Ullman (2010) suggests. The ideas that came up have been discussed with our mentor at the associate company and if applicable used to bring forward a possible solution.

3.2.5 Product development

Parts of the step product development that Ullman (2010) specifies, was not used in this project since the aim was not to develop a product. The applicable parts that have been used from this step are those that contain evaluation. The need for a critical review of our work has been the foundation for this step. What could have been done better? What would we change if we could do it all over and other questions has been answered in this step to ensure that the next revision of Emballator Ulricehamns Bleck can be made in a simple yet effective manner.

3.2.6 Product support
In this, the final step of the mechanical design process, we tie up the remaining loose ends by answering some remaining questions like who is responsible for further work and follow ups.

3.3 Preparation and data collection
Besides the framework that Ullman (2010) describes, the following tools for broadening the authors knowledge base has been used in this thesis.

3.3.1 Work introduction
To give us a brief understanding of the basic processes in production two days were spent studying the lacquer process, both when coating plates and printing plates.

3.3.2 Literature Study
Studies that investigate and illustrate important parts of efficiency enhancing work were carried out. Besides Halmstad University Library the databases Emerald and Samsök were used to find relevant literature.

3.3.3 Visit at lacquer supplier
To create an understanding of which possibilities there is to influence the supply chain between EUB and one of the paint suppliers a visit has been made at Lindgens metal decorating coating and inks AB in Helsingborg.

3.4 Rejected methods
During our time at the university we have worked with other methods for product development. Furthermore we have been introduced to numerous methods used in production development. Of all these one method has influenced the authors' way of work the most and is the one used on their bachelor thesis. Although perhaps not applicable in this thesis the following methods has probably influenced the way of work in some way.

Fredy Olssons method for Principal and Conceptual Construction
Fredy Olsons methodology is mainly focused on product development in mechanical construction. The methodology is made up of three parts, principal construction, primary construction and manufacturing construction. When these three phases have been completed the result is a product ready for production. Since this method is mostly a framework of how to develop and construct new products we felt that it was not a good method to use for this kind of project. The method that Ullman (2010) describes is also mainly meant to serve as a framework for product development, but as we see it, it is a more adaptable philosophy than Olson's.

4 Theoretical Framework

At Emballator Ulricehamns Bleck, the implementation of Lean Production has just begun. The way of work in this project is therefore influenced by the theories of Lean Production to ensure that the end result is not counterproductive to all the work that already has been made. In this chapter we aim to shed light on the basic principles of Lean Production and continuous improvements.

4.1 The PDCA-cycle and Kaizen

Many methods used for process improvement are based on the PDCA-cycle (Plan-Do-Check-Act), which, according to Evans & Lindsay (2005) was developed by Walter Shewhart. Evans & Lindsay (2005) also point out that the cycle was revised in 1990 by W. Edwards Deming, changing the word check into the word study. Evans and Lindsay (2005) describe the reason for doing the change: "Study is more appropriate; with only a check, one might miss something."

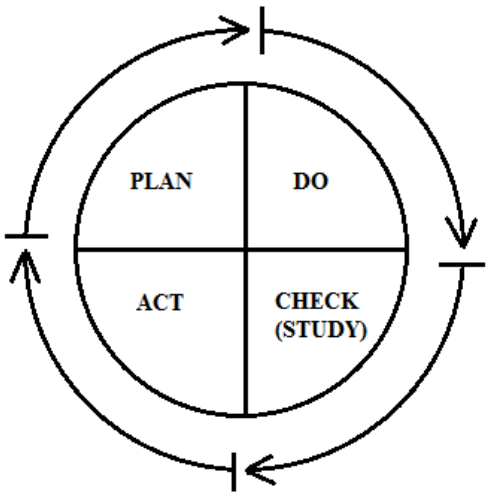

Fig 4.1. The PDCA-cycle, illustration made by the author

The PDCA-cycle is seen as a part of Kaizen (Imai, 1986), a way of thinking and working that is supposed to be implemented all over Emballator Ulricehamns Bleck in time. Kaizen is Japanese and means change to the better, to continuously improve to the better, both for management and employees. Imai (1986) present the theories behind Kaizen. Sörqvist (2007) say that when working with kaizen you should aim for numerous small improvements instead of major technological changes. When everyone does this, processes will evolve by themselves and make your company stronger. The tools and philosophies in Kaizen is described by Imai (1986) as an umbrella concept (fig. 4.2).

Fig 4.2 – The Kaizen Umbrella as shown at http://mfiles.pl/en/index.php/Kaizen

Brunet and Nev (2003) say that even though there are many different sayings on which feature in Kaizen is the most important; many focus on three key notions; quality, efficiency and the overall nature of the philosophy. Sörqvist (2007) agree with this, and describes Kaizen as many small changes that combined produce major changes.

4.2 Lean Production?

Lean Production is a way of work that focuses on eliminating waste from the different value flows in a company's production system. Sprung from the principles of the Toyota Production System (TPS) it has, since named Lean manufacturing by Womack, Jones & Roos (1990) really changed the way that many companies around the world work. Even though Lean Thinking has existed as a natural part of many Japanese companies for a long time, it was not until the 1980s it became clear that there was something special about Japanese quality and efficiency (Liker, 2003). Womack & Jones (2003) say " it provides a way to do more and more with less and less – less human effort, less equipment, less time and less space – while coming closer and closer to providing customers with exactly what they want." Dul & Neumann (2009) conclude that to make this happen, several business functions must work together.

When people describe quality work, the template is often TPS or other frameworks or philosophies sprung from the time directly following World War II. Lean Production is based on tools and principles that origins from that time. Since working with improving your processes is not something new, there are numerous "truths" on how to implement the work of others and how to avoid

common mistakes during that process. Ahrenfelt (2001) points out one of the most important parts, that change is always unique for the company and workgroup implementing it.

4.3 Waste?

The aim for a company working with Lean production is to eliminate waste from their processes and add value to their products. But what is waste?
The book Lean Thinking (Womack & Jones, 2003) describes waste as any activity requiring resources to perform without creating any value for the company.
Carreira (2004) lists the seven categories specified by Toyota:

Fig 3.3 The 7 wastes of Lean production as described on http://www.beyondlean.com/history-of-lean.html

4.3.1 Overproduction

Overproduction is often seen as the worst kind of waste since it gives the possibility for many other kinds of waste to occur. Overproduction can be defined as simply producing too much, too early, to make sure that you do not run out of products. It causes an uneven flow through the assembly line and makes your storage cost much money.

4.3.2 Waiting

Wait is seen as the second worst form of waste. Womack & Jones (2003) describe it as a contradictory to the even flow sought in Lean Production. If a product is not flowing through the value adding assembly line it cannot add values. Furthermore, if your employees have to wait on parts, materials, or new directions it is also to be seen as waste. The time that your employees do not have work to do they should perform other value adding tasks.

4.3.3 Unnecessary inventory

Any company needs some kind of storage to ensure that production is not at risk if anything unforeseen happens. It is when these storages become too expensive that they become waste. Having a large inventory affects productivity and quality negatively. It also binds money in not yet finished products. To avoid this from happening, Womack & Jones (2003) says that if you are to be lean and it is applicable, you should rebuild production into a pulling production. Unnecessary inventory is often the result of the opposite. You are allowed to keep storage of newly finished products, but only a small storage. A large inventory of products is a big risk, since technology might make them unsellable in a short period of time.

4.3.4 Transport

Moving unfinished product and the material needed to complete them to unnecessary many locations inside your company is waste since you are not adding any value to the products during this time. If you have a fully integrated pulling production you can avoid this.

4.3.5 Process

If you are not aware of what each process in your company aims to do, you ca not make it function efficiently. You want to aim to have processes that are dimensioned to cope with the exact needs you have.

4.3.6 Activities resulting from rejected products

By making things correctly on the first try you can avoid this category of waste. Rejected products can be either products that is discovered as defect before leaving the company or products that the customer returns. By working hard to make things right the first time, there is money to be saved.

4.3.7 Unnecessary motion

The seventh kind of waste is unnecessary motion. This is a kind of waste that has got two sides to it. There is the fine line of combining ergonomics and quality to make the people along the assembly line happy on one hand, and cutting down unnecessary transport between work stations on the other hand.

Womack & Jones (2003) says that overproduction and excessive inventory are the two most critical areas of waste in the lean philosophy. Furthermore they add the eighth kind of waste, seen below:

4.3.8 Not using human resources

If you do not listen to your personnel, the ones working with your processes every day, there is a great chance of missing out on improvement opportunities. After all, if you work in a process at the shop floor every day there is a greater chance

that you can suggest improvement than someone who never works on the shop floor.

4.3.9 Eliminating waste

Liker (2005) says that every process has waste. Womack & Jones (2003) say that by making sure that everything has the best possible chance of being right at the first time you become more effective and increase the possibilities of eliminating waste. There is a lot of tools that you can use to eliminate waste. At Emballator Ulricehamns Bleck, the first tools under implementation are 5S and Suggestion schemes.

4.4 Implementing Lean

Liker & Meier (2007) concludes that it is important to begin with the fundamental skills and then move towards learning more advanced techniques to make the transition smooth for your company. When you understand the basic principles and concepts, you can apply them in any situation. Hobbs (2003) concludes that when implementing Lean it is important that the implementation is relatively quick, mainly depending on an individual company´s resistance to change. If implementation takes too long, you may need to perform activities that renew the enthusiasm for the members of your team.

4.5 Continuous Improvements and Suggestion Schemes

Liker & David (2005) say that when approaching production with the premise that every problem is an improvement opportunity you have to make sure that the company's organizational culture focuses on continuous improvement. At Emballator Ulricehamns Bleck this work is ongoing.

Part of quality work and process enhancement at Emballator Ulricehamns Bleck are suggestion schemes. These were introduced recently and the company has already set up targets for this process. The employees are encouraged to leave suggestions about improvements to make sure that all ideas are reviewed when improving production flow. Working with suggestion schemes as a part of continuous improvements is a well known and often successful method for manufacturing companies. Nilsson-Witell, Antoni and Dahlgaard (2005) describe continuous improvements as a mix of principles, procedures and techniques. When everyone does their best in making creative suggestions on how to make work easier and more efficient the company is on a track leading to success.

4.6 Lacquers and Coatings

In this degree project, the products in the lacquer range are referred to as lacquers regardless of what they are called in their data sheets.

The lacquer range at Emballator Ulricehamns Bleck consists of products named both lacquer and coating in their data sheets. This part of the report describes which kind is which and when it is used.

4.6.1 Outside coating – Inside lacquer

Everything that goes on the outside of cans and lids are Varnish and Non-Varnish polyester based resins. These products are in their data sheets called coatings. A coating is a film that is applied to a surface usually called a substrate. At Emballator Ulricehamns Bleck, the substrate is the plate on which the coating is applied. A coating is used to improve surface characteristics like appearance, adhesion, corrosion resistance and wear resistance of the substrate. In other cases, like in printing processes, the coating forms an essential part of the finished product.

The Varnish coatings in the range are suitable when you need to print decorations on the can afterwards and the Non-Varnish coatings in the range are used when printing is not needed.

On the inside of the cans, epoxy-phenol based lacquers are used. Lacquer forms a hard film using solvent evaporation. The solvent is a part of the lacquers chemical composition. After being applied to the tinplate it evaporates when heated in the hardening oven. The substances that evaporate are often unhealthy and the evaporating gases are carefully ventilated out of the oven. Dictionary.com (2010) specifies lacquer as “a protective coating consisting of a resin, cellulose ester, or both, dissolved in a volatile solvent, sometimes with pigment added”. Like the products named coatings, there are many kinds of lacquers that all have more or less different characteristics.

Coating and lacquer are both relatively easy to apply. At Emballator Ulricehamns Bleck both the outside coating and inside lacquer are applied using a roller mounted in the painting line. After the application of lacquer the plate goes directly in to the hardening oven to dissolve any harmful substances from the lacquer and harden it.

5 Results

The purpose of this project was, as specified by Emballator Ulricehamns Bleck to:

- Create an overview of the current lacquer range at Emballator Ulricehamns Bleck.
- Develop a characteristic matrix containing the current lacquer range.
- Identify duplicates and investigate if they need to remain in the range.
- Produce a test schedule for lacquers
- Based on the things mentioned above, give Emballator Ulricehamns Bleck one or more recommendations on how to develop their lacquer range.

In the following pages we present the result of the tasks performed in this thesis.

5.1 Overview of the current lacquer range

In this part of the report we present an overview of the lacquer range at Emballator Ulricehamn Bleck. We have divided the lacquer range in five different groups to make the overview easier to comprehend.

The text in this overview is written to fit in an oral presentation. If there is a need for Emballator Ulricehamns Bleck to describe their current range for people new to the company this text can be used. We believe that if you use the text in 5.1 together with a PowerPoint-presentation you should be able to make someone not working with this every day to understand how the lacquer range is designed.

5.1.1 White lacquers

The first group of the lacquer range consists of four white lacquers for use on the outside of the cans. The four lacquers are divided into two categories. The first category contains the lacquers called Non Varnish and cannot be used if you want to print the can afterwards. The second category is lacquers that can be printed on afterwards. Each category contains one lacquer for cans and one for lids.

During 2009 Emballator Ulricehamns Bleck bought the following amounts of white lacquers from the supplier Lindgens (rounded figures):

- 73.8 tonnes of 15548-0017
- 19.2 tonnes of 15547-0000
- 2.1 tonnes of 15566-0006
- 4.4 tonnes of 15567-0006

The white lacquers are the most widely used lacquers at Emballator Ulricehamns Bleck. The delivery time for 15548-0017 and 15547-0000 are 5 days. The two remaining lacquers have a delivery time of 2-4 weeks.

5.1.2 Color lacquers

There are five colored lacquers available; Interblue, Akzoblue, Russian Red, Alu-grey and Black. All of these are Non Varnish lacquers. If the company runs out of stock of any of these colors, they can be printed instead of lacquered.

During 2009 Emballator Ulricehamns Bleck bought the following amounts of color lacquers from the supplier Lindgens (rounded figures):

- 4.65 tonnes of 15564-5220 (Interblue)
- 1.1 tonnes of 15564-5150 (Akzoblue)
- 0 tonnes of 15564-3116 (Russian Red)
- 0.20 tonnes of 15524-0200 (Alu-grey)
- 0 tonnes of 15584-9000 (Black)

As seen above, lacquers 15564-3116 (Russian Red) and 15584-9000 (Black) were not bought at all during 2009. Nevertheless, they still remain in the range that Emballator Ulricehamns Bleck offers to their customers. These lacquers have a delivery time of 2-4 weeks and are ordered using production forecasts.

5.1.3 Sparkle lacquers

There are two sparkle lacquers in use today, Sparkle Blue and Sparkle Silver.

During 2009 Emballator Ulricehamns Bleck bought the following amounts of sparkle lacquers from the supplier Lindgens (rounded figures):

- 1 tonnes of 13580-0196 (Sparkle Blue)
- 2 tonnes of 13580-0195 (Sparkle Silver)

There is a possibility to use 13580-0195 and blue pigment instead of stocking 13580-0196. These lacquers have a delivery time of 2-4 weeks and are ordered using production forecasts.

5.1.4 Inside lacquers

There are eight lacquers used on the inside of the cans. Spanning from lacquers that can be used in food applications to lacquers for marine applications the lacquer range cover all possible demands. The applicable data sheets say that;

- 11060-0000 (A-lack) is used for food and some technical products
- 3125/002 (B-lack) is used for latex paints and alkyd base paints with water based colour tinting pastes.
- 16-3451 (C-lack) is used for water based paints without corrosion inhibitors. It is not suitable for strong solvents
- 49092 (C-lack) is used for water based paints without corrosion inhibitors. It is not suitable for strong solvents
- 2252-306D (D-lack) is used for corrosive industry lacquers
- 11078 (DL-lack) is used for corrosive industry lacquers
- 2092-361A (F-lack) is used for water based paints i.e. latex paints
- 2092/385 (I-lack) is used for latex paints and alkyd base paints with water based colour tinting pastes.

During 2009 Emballator Ulricehamns Bleck bought the following amounts of inside lacquers from the suppliers Lindgens, PPG and AKZO (rounded figures):

- 11.7 tonnes of 11060-0000 (A-lack)
- 22.3 tonnes of 3125/002 (B-lack)
- 27 tonnes of 16-3451 (C-lack)
- 48.6 tonnes of 49092 (C-lack)
- 7.2 tonnes of 2252-306D (D-lack)
- 0.22 tonnes of 11078 (DL-lack)
- 4.5 tonnes of 2092-361A (F-lack)
- 0.28 tonnes of 2092/385 (I-lack)

As seen above two of the inside lacquers are seldom used. 11078 is sold exclusively to a single customer to solve their needs. 2092/385 is used on parts of cans that are shipped to England to ensure that the English standards are met. The lacquer 11060-0000 has a delivery time of 5 days, the PPG supplied lacquers has got a delivery time of 4-6 weeks, the lacquers supplied by Akzo has got a delivery time of 2 weeks. The remaining lacquer from Lindgens has got a delivery time of 2-4 weeks. The inside lacquers are ordered on production forecasts.

5.1.5 Additional lacquers

In this part of the range we find glidsilver and klarlack.

During 2009 Emballator Ulricehamns Bleck bought the following amounts of the contents of this group from the supplier Lindgens (rounded figures):

- 3.1 tonnes of 11593-0000 (Glidsilver)

- 24 tonnes of 11524-0001 (Klarlack)

These lacquers have a delivery time of 2-4 weeks and are ordered using production forecasts.

5.2 Characteristic Matrix

In line with the task given a characteristic matrix including the entire lacquer range has been developed. The matrix can be found in appendix 2 and contains the 21 lacquers that are used in production today. All data regarding the lacquers are from the suppliers data sheets. These can be found in Appendix 6. The following 12 characteristics that have importance for productivity and efficiency are listed in the matrix.

Temp 1
The temperature used during the first hardening of the lacquer
Temp 2
The temperature used during the second hardening of the lacquer. (If applicable)

Temp1 and Temp2 were chosen because the temperature that is kept in the hardening oven is important to monitor. If the temperature is higher than prescribed there is a risk for faulty products. Since the oven is heated with substances that cost money, the higher the temperature in the oven, the more money it costs to produce cans or lids.

Time 1
The time the lacquer is exposed to the hardening temperature during the first hardening
Time 2
The time the lacquer is exposed to the hardening temperature during the second hardening. (If applicable)

Time 1 and Time 2 were chosen because the time it takes for the lacquer on a plate to be completely hardened affects the takt-time that can be held in production. Some of the lacquers are hardened twice to ensure that the capability in the lacquer is reached.

Film weight / layer (g/cm2)
The weight of the lacquer applied to the plate, shows the amount of lacquer used for every application. If you combine this headline with cost/kg from the supplier this figure tells you the cost committed to the product with each layer.

Coat thickness
The thickness of every layer of lacquer applied to the plate.
Viscosity (sec)
The resistance a liquid has got to flow. The higher the viscosity, the slower the liquid flows.

Coat Thickness and Viscosity show information important for production. The machines must be able to handle the specified data in these categories. Wear of machines and tools has to be inside tolerances to ensure that these specifications can be met.

Flashpoint
The lowest temperature at which the vapor of a combustible liquid can be ignited in air.
Storage conditions
Shows for how long the lacquer can be kept in storage before it has to be used. Since some of the lacquers in store is not used at a daily basis this is an important factor when deciding on how much to buy.

The categories Flashpoint and Storage Conditions show under which basic conditions the lacquer needs to be stored and for how long it can be stored before it no longer can be used. If lacquer is kept in storage longer than “best before-date” it has to be thrown away, a process that costs a lot of money and time.

S-codes
Abbreviations showing recommended protection (equipment/behavior) when in contact with specified substances. A list explaining the applicable S-codes in this degree project can be found in appendix 4.
R-codes
Abbreviations showing possible risks when working with specified substances. A list explaining applicable in this degree project R-codes can be found in appendix 3.

The Security and Risk-codes are included in the matrix to point out if there are any other risks than the obvious when handling the lacquers. By saying obvious risks we mean; do not drink / do not apply to skin / do not use in areas without ventilation etc.

Delivery Time
In this column we display known delivery time from supplier. Most of the lacquers are ordered using forecasts. This is not really a characteristic but the category is included to create an easily understandable view of the lacquer range.

5.3 Identification of duplicates

Duplicates are two (or more) lacquers that meet the same needs.
We find that there are lacquers that can be eliminated in two of the five groups explained in 5.1. In one of the groups, inside lacquers, there is a need for further investigation before eliminating lacquers from the range. This is based on the fact that some of the inside lacquers exist to fill the need of a single customer.

5.3.1 White lacquers

We find that in among the white lacquers, two out of four lacquers are possibly unnecessary and therefore there is a need to investigate possibilities to exclude these from the range. Lacquers 15566-0006 and 15566-0007 are sufficient to fill customer demands. These lacquers are a little bit more expensive than the two lacquers excluded, but with two lacquers instead of four there is less time wasted on switching between colors. Emballator Ulricehamns Bleck recently did studies that show there is a lot of time wasted on changes done in production. Eliminating two out of four white lacquers shortens the time that production stands still during changes.

5.3.2 Color Lacquers

We find that in this section of the range there are no duplicates.

5.3.3 Sparkle Lacquers

We find that the lacquer 13580-0196 (Sparkle Blue) can be excluded from the range. The same result may be obtained by using the lacquer 13580-0195 (Sparkle Silver) and a pigment. This solution is viable since it, according to Crister Kaljo, Prepress and printing manager at Emballator Ulricehamns Bleck, already has been used on occasion.

5.3.4 Inside Lacquers

We find that in this section of the range there are no obvious duplicates. Though there are no obvious duplicates we believe that there is a need to investigate if a new updated range of inside lacquers is possible.

5.4 Test Schedule

When performing tests on lacquer suppliers focus on slightly different characteristics than Emballator Ulricehamns Bleck. The supplier run tests for flexibility and other technical characteristics. The tests that Emballator Ulricehamns Bleck does are aimed towards corrosion durability, wear resistance

and the use of applicable substances. Besides the test that Emballator Ulricehamns Bleck does, customers are encouraged to do their own tests to make sure that their goods can be contained in the cans delivered.

The tests that Emballator Ulricehamns Bleck performs today are the following;

- *Saltwater-test*: The can is lacquered with the inside lacquer that is to be tested, after doing this, the can is filled with hot tap water. 5% sodium chloride is added, dissolved in the water and a lid is mounted on the can. After 4 days, the can is inspected for corrosive wear and a test report is written.

- *Chemical tests of inside lacquers*
  First, the can is prepared with the right inside lacquer and filled with 5-10 cm of ”Piraya”. (“Piraya” is a substance that destroys all kinds of lacquer, the difference is how much time that pass until the test object has got to much wear to be functional.) After this, the can is controlled in different intervals every day for up to 2 weeks. When the test time has passed, the condition of the lacquer and cans are evaluated and a test report is written.

  Parallel with this test the cans are filled with the chemical product that the customer plans to use to make sure that no defects are showing after a short test period. Besides this test of the customers products, Emballator Ulricehamns Bleck recommend their customer to do their own tests to make sure that the lacquer is capable enough.

- *Cross-hatch test* The Cross-hatch test is;”a method to determine a coating adhesion or strength of the bond between substrate and coating, or between different coating layers or the cohesive strength of some substrates.” (Proinexinstruments, 2010). A pattern is cut in the lacquer using special tools. After doing this a comparison is made against an ideal pattern to find out if the lacquer is strong enough.

- *Rub test*. The test is done on a flat plate. The plate is put on a flat surface and a weight (such as a sledgehammer) is wrapped in a cloth soaked with methylethylketone. The package is rubbed against the plate and the lacquer should withstand at least 100 repetitions. This test is mostly used as a comparison test.

- *Copper sulphate test*. This sample is cut in a square of 7 * 10 cm and is bent over a pole, then the plate is put in a grip and a weight is dropped on it which gives the plate a form where it goes from a sharp bend into a circular shape.

The sample is then coated with copper sulphate in the curved surface and can be compared with other samples to see where the paint starts to "crack".

We believe that the tests that the company performs are enough to get “the big picture”. If the lacquers do not meet up to the demands during the tests, the company discusses new solutions with the suppliers and if a new suggestion is brought forward, new test are made.
When discussing the testing of the inside lacquers with our mentor at Emballator Ulricehamns Bleck we realize that as of today, some of the inside lacquers are used because there probably is no other option. The opinion that the best solution is using several different lacquers is based on a number of tests that show if the lacquer can withstand the abuse of the thought contents of the can. We have had the opportunity to read the documentation of some of the tests and have found nothing that seems to be wrong with the way the tests are performed.

Despite this we believe that there should be more extensive tests performed to make sure that there is not another lacquer in the range (or not in the range to this date), that can be used in a broader context instead of keeping a large number of inside lacquers. To make these tests, we believe that currently used test methods are sufficient to make sure that the lacquer can withstand the wear of specified contents. The only thing we can find that we believe should be changed is the number of tests made. We have read documentation that shows that only two cans coated with each lacquer were used to determine if the lacquer could be used or not.

5.5 Recommendations

The following recommendations are given to Emballator Ulricehamns Bleck.

1. By eliminating two out of four white lacquers from the range less time will be spent on changes in production. 15566-0006 and 15567-0006 are functional both when the outside needs to be printed on and when it does not. Furthermore they are flexible enough to be used on both cans and lids without quality issues.

2. We recommend that the lacquers that was not ordered for use during 2009, 15564-3116 (Russian Red) and 15584-9000 (Black) are excluded from the range. There is no need to offer these colors to customers when they are not used at all.

3. We recommend that 13580-0196 is excluded from the range. Sparkle colors are expensive and are used in few cases. If needed, this particular

color can be achieved with good results by using the lacquer Sparkle Silver and blue pigmentation.

4. We find that the use of 11078 (DL-lack) and 2092/385 (I-lack) should be evaluated. Both are only used to meet the demands of one customer. If possible, a solution would be to use other existing lacquers for these customers. To investigate the possibilities of doing this we recommend further testing of the lacquers. Change is not needed in the way the tests are made, if change is needed it is in the number of tests made.

5. We find that the possibility of developing a new range of inside lacquers should be investigated. We believe that it should be possible to still meet customer needs and demands with a smaller range.

6. In the future we recommend that a larger batch of cans is used to make sure that the results of lacquer tests can be seen as representative for a larger population.

If followed, these recommendations will hopefully help Emballator Ulricehamns Bleck to eliminate waste from their processes.

5.6 Future Work

In line with the recommendations above we suggest that Emballator Ulricehamns Bleck continue to work with the tasks given in this thesis. The main focus, besides excluding lacquers that are not in use should be to follow recommendation 1.
If there is a change to using only two white lacquers, the company will be able to eliminate a lot of changes in production. The slightly higher price of the lacquers will probably have little or no effect to the end result because of this.

In a meeting at the beginning of this degree project the possibility of using a small number of different lacquers that should cover all needs and demands was discussed. This would mean replacing the entire lacquer range with lacquer from a new supplier over a short period of time. We believe that this is not the way to go. There are too many uncertainties to make this a viable solution. If Emballator Ulricehamns Bleck get to a point when implementation of new lacquers is decided we recommend that they do it slowly and introduce the new lacquer parallel with the old one. It is important to make sure that every implemented change is functional before moving on to the next change. This to ensure that production will run unaffected for long periods of time.

6 Discussion

The results of this thesis show that there is a room for improvements in the lacquer range at Emballator Ulricehamns Bleck. We do not believe that the company was unaware of this before the thesis started, but it has not been deemed necessary to clear this up until now. As the range is arranged now, there are several kinds of waste represented.

What strikes us is that if you want to be a customer oriented company, there is often a need for compromise to make sure that the customer is satisfied. There are lacquers in the range today that has not been in storage for at least 18 months but are still offered to customers. Furthermore there are lacquers that are unnecessary due to new solutions. We hope that the work done in this report can shed some light regarding this situation and make the company aware of that this kind of waste is easily eliminated and does not lower the functionality of the production.

As shown in the result-part of this thesis, the current lacquer range at Emballator Ulricehamns Bleck is not something that needs to be edited over night, but we believe that the recommendations given can be useful if accepted, in accordance with the company philosophy of Lean Production.

We believe that the use of a characteristic matrix is a good way to give an uninitiated an easily understandable picture of the present situation. Since not everyone at Emballator Ulricehamns Bleck has got the need to have deeper understanding and technical knowledge about the lacquer range, a characteristic matrix like the one we have put together is hopefully somewhat useable for everyone.

7 Conclusions

There are ways to improve the lacquer range at Emballator Ulricehamns Bleck that do not demand major changes in production. Some of these changes can be done immediately. Before doing this it is important to get input from the correct channels inside the company. Cooperation between the different parts of the company is vital if the changes are to be successful.

As of today the lacquer range is decided on a very customer oriented strategy. This leads to offering customers lacquer that normally is not in stock. If these lacquers are excluded from the range, risk for overstocking lacquer is reduced.

The theories behind Lean Production point out the importance of being effective and to produce the right goods at the right time. Excluding parts of the lacquer range opens for a higher effectiveness since less time is wasted on changes in production.

Since certain lacquers are used by only one customer it is hard to withdraw them from the range. These lacquers are used by one single customer and remain within the range since the customer orders a lot of other products within the range. The loss that it means to keep the lacquer in the range is made up by the profit made on the other products sold to the customer.

When testing the functionality of a lacquer, a larger number of specimens should be included in the test schedule to make sure that the results are correct.

We believe that if Emballator Ulricehamns Bleck decided to invest time and effort into the project, it would be profitable to make a thorough re-design of the inside lacquers. This is not something that can be achieved within the framework of a thesis in this size. If the company's different parts work together, the competence of a project group containing not only engineers should be able to find a good solution.

8 Critical Review

Working alone
This thesis has meant that we did major work on our own for the first time. The experience has been valuable and we believe that it has done us good to open up, execute and finish a project of this size on our own.

Objectivity
We believe that there is a risk that objectivity is lost when a revision is made by one single person. In a thesis like this, it might have been better to divide work on two persons to make sure that nothing is left out. We hope that the result of this thesis is unaffected by the opinions from people we met and suggestions made in literature we read, but realize the risk of the opposite.

The Language barrier
Since the author has got Swedish as native language there is a risk that the report contains some repetitiveness in the language. Further practice will make this better.

The use of our mentor at the university
During the short time span of this thesis we have followed a Gantt-schedule that was produced for registration on the course. This has meant that we have been in phase with plan all along the project length. Despite this we feel that we would have been able to use time even better if we had used the mentor assigned by the university more. Since he is more used to writing reports of this kind we feel that some of the work might have been easier if we would have used his competence more.

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REVISION OF LACQUER RANGE

APPENDICES

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Master program in Mechanical Engineering, 60 higher education credits

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REVISION AV LACKSORTIMENT

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Appendix 1 - Gantt-schedule

	V12	Kursstart, V13	V14	V15	V16	V17	V18	V19	V20	V21
Projektbeskrivning										
Insamling av litteratur metod och teoretisk referensram										
Litteraturstudie gällande metod och verktyg som skall användas										
Genomgång och utvärdering av tillgänglig data från Emballator										
Framtagning av egenskapsmatris										
Utvärdering av information i egenskapsmatris										
Framtagning av provschema för lacker										
Framtagning av skriftlig rekommendation till Emballator										
Framtagning av presentationsmaterial till Emballator och HH										
Rapportskrivning										
Inlämning av preliminär rapport till handledare och opponenter										
Granska rapport jag skall opponera på och lämna feedback på denna										
Halvtidsredovisning HH										
Slutredovisning HH										
Kick-off redovisning Emballator										
Halvtidsredovisning Emballator										
Slutredovisning Emballator										
Möten med handledare på Emballator										
Möten med handledare Prof. Lars Bååth på HH										

Appendix 2 - Characteristic Matrix

Type	**Supplier article**	**SAP article**	**Supplier**	**Temp 1** (˚C)	**Time 1** (min)	**Temp 2** (˚C)	**Time 2** (min)	**Film weight / layer** (g/cm2)	**Viscosity** (sec.)	**Flashpoint** (°C)	**Coat thickness** (µm)	**Storage conditions** (months)	**S-codes**	**R-codes**	**Delivery time**	**Used 2009** (tonnes)
1. *White Lacquers*																
White lacquer for printing	15548-0017	24999115	Lindgens	180	10			14±2	90±10	53	8	12		R67, R20/22	5 days	73,8
White lacquer Non Varnish	15547-0000	24999121	Lindgens	180	10			13±1	100±10	51	7	12	S23, S24	R67	5 days	19,2
Flex White for printing	15566-0006	24999175	Lindgens	180	10			12-16	120±10	53	Unknown	12			2-4 weeks	2,1
Flex White Non Varnish	15567-0006	24999177	Lindgens	180	10			15-20	120±10	53	Unknown	12	S23, S24	R67, R20/22, R20/21, R43	2-4 weeks	4,4
2. Color Lacquers																
Interblue	15564-5220	24999122	Lindgens	180	10			8±1	100±10	50	6	6	S24	R67, R20/21	2-4 weeks	4,65
Akzoblue	15564-5150	24999112	Lindgens	180	10			7±0,5	120±10		6	12			2-4 weeks	1,1
Russian Red	15564-3116	24999066	Lindgens	180	10			11±1	120±10	25	9	6	S23, S24/25	R11, R67	2-4 weeks	0
Alu-pig (grey)	15524-0200	24999139	Lindgens	180	10			4,5±0,5	55±5		4	12			2-4 weeks	0,203
Black	15584-9000	24999123	Lindgens	180	10			10±2	140±10	51	9	12	S23, S24	R67, R41, R43	2-4 weeks	0
3. *Sparkle Lacquers*																
Sparkle Blue	13580-0196	24999153	Lindgens	180	10			8±1	120±5	50	7	6		R67	2-4 weeks	1
Sparkle Silver	13580-0195	24999061	Lindgens	180	10			8±1	120±5	50	7	6	S23, S24	R67, R20/21/22, R15	2-4 weeks	2
4. Inside Lacquers																
D-lack Gold	11078	24999060	Lindgens	200	10			4-6	40±5	32	Unknown	6			2-4 weeks	0,22
A-lack Gold	11060-0000	24999117	Lindgens	205	10			4-6	65±5	30	5	5		R41, R20, R22, R11, R61, R67	5 days	11,7
F-lack Gold	2092-361A	24999111	PPG	180	10	200	10	5±1	55	24	10	6	S36/37/39	R40	4-6 weeks	4,5
D-lack Gold	2252-306D	24999110	PPG	185	8-12	200	8-12	5-6	40	33	8	6	S36/37/39	R40, R67, R24/25	4-6 weeks	7,2
C-lack 2 component Gold	16-3451	24999109	AKZO			200	9	6±1	95±25	27	6	6	S36/37/39	R41	2 weeks	27
C-lack 2 component pigment	49092	24999108	AKZO	190	9			11±1	130±30	40	8	6	S24/25, S51	R40, R20/21/22	2 weeks	48,6
B-lack pigment	3125/002	24999116	PPG	205	10			11-13	105±5	23	9	6		R40	4-6 weeks	22,3
I-lack pigment	2092/385	24999155	PPG	170	10	200	10	7±1	105±5	30	9	6		R40	4-6 weeks	0,275
5. *Additional Lacquers*																
Glidsilver	11593-0000	24999119	Lindgens	200	10			5±1	45±5	26	5	12	S23	R41, R67	2-4 weeks	3,1
Klarlack (tryck)	11524-0001	24999114	Lindgens	180	10			5±1	55±5	42	5	12		R67	2-4 weeks	24

Appendix 3 - Explanation of R-codes in characteristic matrix

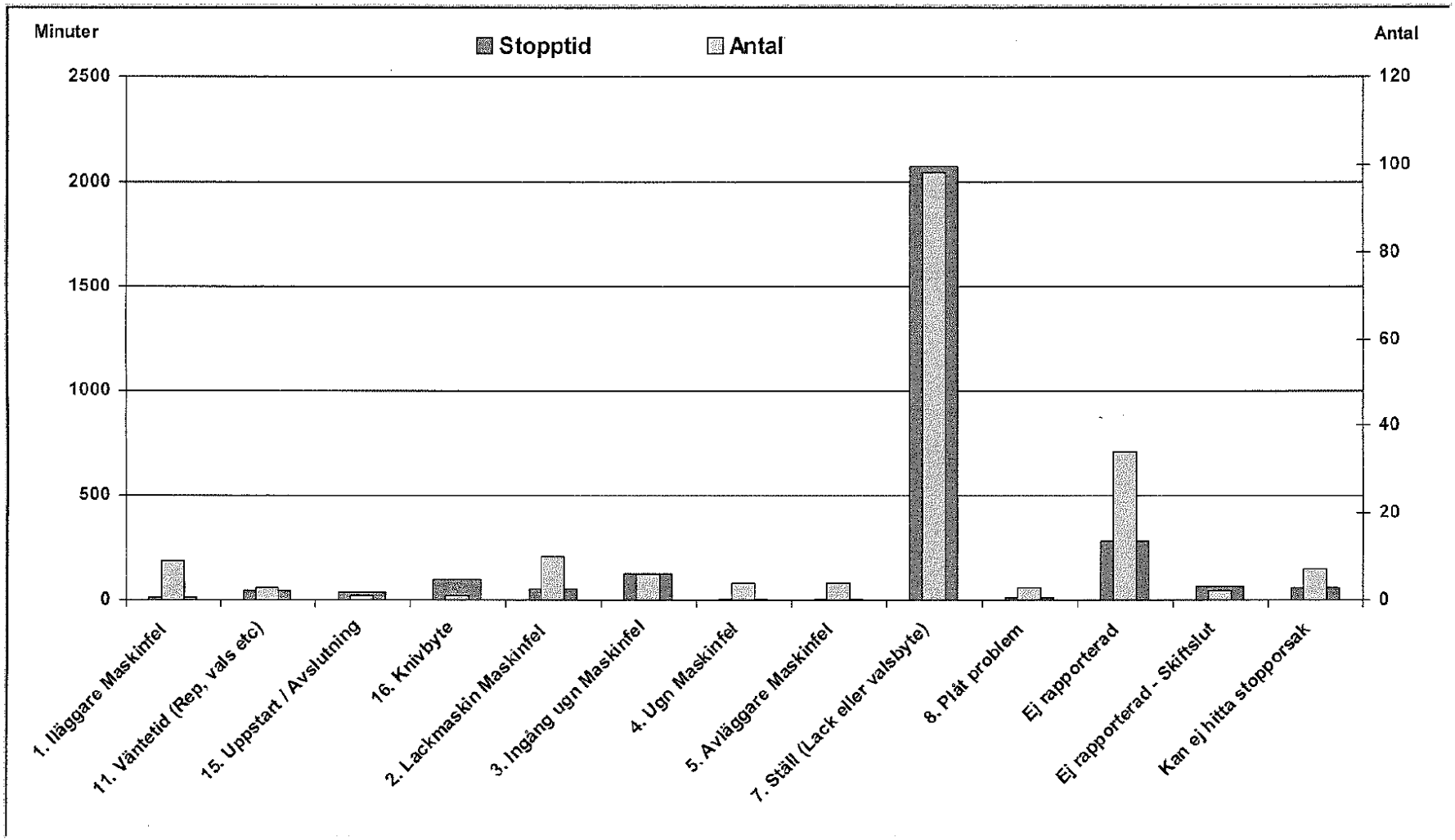
R 11 Highly flammable
R 15 Contact with water liberates extremely flammable gases
R 20 Harmful by inhalation
R 20/21 Harmful by inhalation and in contact with skin
R 20/22 Harmful by inhalation and if swallowed
R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed
R 22 Harmful if swallowed
R 24/25 Toxic in contact with skin and if swallowed
R 40 Limited evidence of a carcinogenic effect
R 41 Risk of serious damage to eyes
R 43 May cause sensitization by skin contact
R 61 May cause harm to the unborn child
R 67 Vapours may cause drowsiness and dizziness

Appendix 4 - Explanation of S-codes in characteristic matrix

S 23 - Do not breathe gas/fumes/vapour/spray
S 24 - Avoid contact with skin
S 24/25 - Avoid contact with skin and eyes
S 36/37/39 - Wear suitable protective clothing, gloves and eye/face protection
S 51 - Use only in well-ventilated areas

Appendix 5 – Stop time analysis

emballator **Lackiinjen** Från: 2010-04-19 00:00:00
Stopporsak Till: 2010-04-27 23:59:00 V16-



Appendix 6 - Data sheets

LINDGENS™
METAL DECORATING COATINGS & INKS

PACLAC®

WHITE NON-VARNISH

15567-0006

Type of product	Non varnish white basecoat with excellent flexibility, gloss and hardnes.
Suitable for	External of closures and caps.
Remarks	As a NON VARNISH quality – PACLAC 15567-0003 has limited acceptance of most printing inks and overvarnishes. Sterilisation resistant.

TECHNICAL DATA

Resin system	Modified Polyester		
Delivery viscosity	120 ± 10 sec	DIN 4 at 23°C	
Specific gravity	1,38 g/cm³		
Solid content	60 ± 2 %	by weight	(180°C 30 min)
Film weight dry	15-20 g/m²		
Film weight wet	20 –33 g/m²		
Flash point	53°C		(EN 456:1991)
Storage time	12 months	at 20°C	

NOTE **Stir well before use!**

SUBSTRATE

Tinplate, Aluminium

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	As supplied

CURING CONDITION

Circulating air: 180°C, 10 min peak

Mentioned curing figures are approximate. Drying time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control.

Issue 2009-07-21

LINDGENS™
METAL DECORATING COATINGS & INKS

PACLAC®
WHITE BASE COAT
15566-0006

Type of product:	Pigmented white basecoat with excellent flexibility, gloss, hardness and UV-ink adhesion
Suitable for:	External protection of 3-piece, deep drawn food cans and all type of closures.
Remarks:	Correctly cured the film of **PACLAC 15566-0006** stands sterilisation at 121°C for 90 min in water or steam.

TECHNICAL DATA

Resin system:	Modified Polyester	
Delivery viscosity:	120 ± 10 sec	DIN 4 at 23°C
Specific gravity:	1,36 g/cm³	
Solid content:	63 ± 2 % by weight	125°C 60 min
Film weight dry:	12-16 g/m²	
Film weight wet:	19-25 g/m²	
Flash point:	53°C	(EN 456:1991)
Storage time:	12 months at 20°C	

NOTE

Stir well before use!

SUBSTRATE

Tinplate, Aluminium, tinfreesteel (TFS/ECCS)

HANDLING INSTRUCTIONS

Application	Thinner	Application visc
Roller coater	19041-0000	As supplied

CURING CONDITIONS

Circulating air:	180° C, 10 min peak

Mentioned curing figures are approximate. Curing time and temperature depends on type of equipment, ventilation and amount of coating applied. All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control

Replaces version dated: 2006-07-20

Issued: 2007-06-01

LINDGENS™
METAL DECORATING COATINGS & INKS

PACLAC®
WHITE BASECOAT
15548-0017

Type of product:	White basecoat with UV ink adhesion
Suitable for:	External of 3-piece **Food & Technical cans** and **Lids**.
Remarks:	Correctly cured the film of PACLAC 15548-0017 stands sterilization at 121°C for 90 min in water or steam.

TECHNICAL DATA

Resin system:	Modified Polyester	
Delivery viscosity:	95 ± 10 sec	DIN 4 at 23°C
Specific gravity:	1,30 g/cm³	
Solid content:	56 ± 2 % by weight	180°C 30 min
Film weight dry:	12-16 g/m²	
Film weight wet:	21-28 g/m²	
Flash point:	53°C	EN 456:1991
Storage time:	12 months at 20°C	

NOTE

Stir well before use!

SUBSTRATE

Tinplate, Aluminium, tinfreesteel (TFS/ECCS)

HANDLING INSTRUCTIONS

Application	Thinner	Application visc
Roller coater	19960-0000	As supplied

CURING CONDITIONS

Circulating air:	180° C, 10 min peak

Mentioned curing figures are approximate. Curing time and temperature depends on type of equipment, ventilation and amount of coating applied. All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control

Issue 2009-07-24

PACLAC®

WHITE BASECOAT
EXTRA NONVARNISH

15547-0000

Type of product	Pigmented white basecoat - **EXTRA NON VARNISH**.
Suitable for	External of 3-piece **Food & Technical cans** and **Lids**.
Remarks	Correctly cured the film of PACLAC 15547-0000 stands sterilisation at 121°C for 90 min in water or steam. PACLAC 15547- accepts commonly used self adhesive labels as well as commonly used jet ink marking. PACLAC 15547-0000 **EXTRA NON VARNISH** is ment for fully WHITE bodies, ends and lids and has - as a NON VARNISH quality – a limited accept of most printing inks and overvarnishes.

TECHNICAL DATA

Resin system	Modified Polyester		
Delivery viscosity	100 ± 10 sec	DIN 4 at 23°C	
Specific gravity	1,34 g/cm³		
Solid content	62 ± 2%	by weight	(125°C 60 min)
Film weight dry	10-14 g/m²		
Film weight wet	16-22 g/m²		
Flash point	51°C		(EN 456:1991)
Storage time	12 months	at 20°C	

NOTE **Stir extra well before use!**

SUBSTRATE

Tinplate, Aluminium, tinfreesteel (TFS/ECCS)

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	90-110 sec

CURING CONDITION

Circulating air: 180°C, 10 min peak

Mentioned curing figures are approximate. Drying time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability

1D23

LINDGENS

Säkerhetsdatablad
Enligt 1907/2006/EG, Artikel 31

Datum för utskrift: 27.08.2008 *Omarbetad: 21.04.2008*

1 Namnet på ämnet/preparatet och bolaget/företaget

· **Produktuppgifter**

· **Handelsnamn:** **PACLAC BLACK NONVARNISH**

· **Artikelnummer:** MF-155849000
· **Ämnets användning / tillredningen** Se tekniskt datablad

· **Tillverkare/leverantör:**
Lindgens MDC & Inks AB
Cindersgatan 16, Box 743
SE-251 07 Helsingborg
Sweden

· **Område där upplysningar kan inhämtas:**
phone +46 42 10 88 00 fax +46 18 08 34 sweden@lindgens.com
· **Upplysningar i nödfall:** +46 42 10 88 00 (kontorstid)

2 Farliga egenskaper

· **Farobeteckning:**

N Miljöfarlig

· **Speciella hänvisningar beträffande risker för människa och miljö:**
Produkten är märkningspliktig på grundval av beräkningsmetoden för EG:s "Allmänna klassificeringsdirektiv för tillredningar" i sin slutgiltiga version.
Vid längre eller upprepad kontakt med huden kan dermatit (hudinflammation) uppstå p.g.a. lösningsmedlets avfettande verkan.
R 10 Brandfarligt.
R 51/53 Giftigt för vattenlevande organismer, kan orsaka skadliga långtidseffekter i vattenmiljön.
R 66 Upprepad kontakt kan ge torr hud eller hudsprickor.
R 67 Ångor kan göra att man blir dåsig och omtöcknad.
· **Klassificeringssystem:**
Klassificeringen motsvarar aktuella EG-listor, men har kompletterats med uppgifter ur facklitteratur och med firmauppgifter.

3 Sammansättning/information om beståndsdelar

· **Kemisk karakterisering**
· **Beskrivning:** Blandning bestående av nedan upplistade ämnen samt ofarliga tillsatser.

· **Farliga ingredienser:**

CAS: 64742-94-5 EINECS: 265-198-5	aromatnafta, tung ☒ Xn, ☒ N; R 51/53-65-66-67	25-50%
CAS: 100-51-6 EINECS: 202-859-9	Benzylalkohol ☒ Xn; R 20/22	2,5-10%
CAS: 124-17-4 EINECS: 204-685-9	2-(2-butoxyethoxy)ethyl acetate	2,5-10%
CAS: 71-36-3 EINECS: 200-751-6	1-butanol ☒ Xn, ☒ Xi; R 10-22-37/38-41-67	≤ 2,5%
	CAS nr 64742-95-6 solventnafta (petroleum), lätt aromatisk ☒ Xn, ☒ Xi, ☒ N; R 10-37-51/53-65-66-67	≤ 2,5%
CAS: 138-86-3 EINECS: 205-341-0	dipenten ☒ Xi, ☒ N; R 10-38-43-50/53	≤0,5%

(Fortsättning på sida 2)

LINDGENS
METAL DECORATING COATINGS & INKS

Säkerhetsdatablad
Enligt 1907/2006/EG, Artikel 31

Datum för utskrift: 10.03.2008 *Omarbetad: 31.01.2008*

1 Namnet på ämnet/preparatet och bolaget/företaget

· **Produktuppgifter**

· **Handelsnamn: PACLAC NOVAR RUSSIAN RED**

· **Artikelnummer:** MF-155643116
· **Ämnets användning / tillredningen** Se tekniskt datablad

· **Tillverkare/leverantör:**
Lindgens MDC & Inks AB
Cindersgatan 16, Box 743
SE-251 07 Helsingborg
Sweden

· **Område där upplysningar kan inhämtas:**
phone +46 42 10 88 00 fax +46 18 08 34 sweden@lindgens.com
· **Upplysningar i nödfall:** +46 42 10 88 00 (kontorstid)

2 Farliga egenskaper

· **Farobeteckning:**

Xi Irriterande

· **Speciella hänvisningar beträffande risker för människa och miljö:**
Produkten är märkningspliktig på grundval av beräkningsmetoden för EG:s "Allmänna klassificeringsdirektiv för tillredningar" i sin slutgiltiga version.
Vid längre eller upprepad kontakt med huden kan dermatit (hudinflammation) uppstå p.g.a. lösningsmedlets avfettande verkan.
R 10 Brandfarligt.
R 36 Irriterar ögonen.
R 52/53 Skadligt för vattenlevande organismer, kan orsaka skadliga långtidseffekter i vattenmiljön.
R 66 Upprepad kontakt kan ge torr hud eller hudsprickor.
R 67 Ångor kan göra att man blir dåsig och omtöcknad.
· **Klassificeringssystem:**
Klassificeringen motsvarar aktuella EG-listor, men har kompletterats med uppgifter ur facklitteratur och med firmauppgifter.

3 Sammansättning/information om beståndsdelar

· **Kemisk karakterisering**
· **Beskrivning:** Blandning bestående av nedan upplistade ämnen samt ofarliga tillsatser.

· **Farliga ingredienser:**

CAS: 34590-94-8 EINECS: 252-104-2	(2-methoxymethylethoxy)propanol		10-25%
CAS: 64742-94-5 EINECS: 265-198-5	aromatnafta, tung	Xn, N; R 51/53-65-66-67	10-25%
CAS: 108-65-6 EINECS: 203-603-9	2-metoxi-1-metyletylacetat	Xi; R 10-36	2,5-10%
CAS: 1330-20-7 EINECS: 215-535-7	xylen	Xn, Xi; R 10-20/21-38	2,5-10%
CAS: 1119-40-0 EINECS: 214-277-2	dimethyl glutarate		2,5-10%
CAS: 71-36-3 EINECS: 200-751-6	1-butanol	Xn, Xi; R 10-22-37/38-41-67	2,5-10%

(Fortsättning på sida 2)

LINDGENS
METAL DECORATING COATINGS & INKS

PACLAC®
ALU-PIGM OVERVARNISH
11524-0200

Type of product: Aluminium pigmented overvarnish as a system with white basecoat.

Suitable for: External varnishing of 3-piece **Technical cans** and **Lids**.

Remarks: For 3-piece Technical cans and Lids in system with PACLAC BASECOAT WHITE, 15548-. Correctly cured, the lacquer stands sterilisation on can bodies at 121°C for 90 min, in water or steam.

TECHNICAL DATA

Resin system:	Modified polyester
Delivery viscosity:	55 ± 5 sec, DIN 4 at 23°C
Specific gravity:	1,02 g/cm³
Solid content:	53 ± 2 % by weight, 125°C 60 min
Film weight dry:	4-5 g/m²
Film weight wet:	9-11 g/m²
Flash point:	42°C
Storage time:	12 months at 20°C

NOTE

Stir well before use!

SUBSTRATE

Tinplate, tinfreesteel (TFS/ECCS), Aluminium

HANDLING INSTRUCTIONS

Application	Thinner	Application visc
Roller coater	19960-0000	As supplied

CURING CONDITIONS

Circulating air: 180 ° C, 10 min peak

Mentioned curing figures are approximate. Curing time and temperature depends on type of equipment, ventilation and amount of coating applied. All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control

Replaces version dated: 2003-05-08

Issue 2006-05-18

LINDGENS™
METAL DECORATING COATINGS & INKS

PACLAC®

SUPERFLEX NONVARNISH INTERBLÅ 15564-5220

Type of product	Blue pigmented basecoat with excellent flexibility and gloss. **NON VARNISH**
Suitable for	Exterior of lids and bodies for 3-piece technical cans.
Remarks	PACLAC 15564-5220 accepts commonly used self adhesive labels as well as commonly used jet ink marking. PACLAC 15564-5220 **NON VARNISH** is ment for fully blue bodies, ends, lids and has - as a NON VARNISH quality – a limited accept of most printing inks and overvarnishes.

TECHNICAL DATA

Resin system	Modified Polyester		
Delivery viscosity	100 ± 10 sec	DIN 4 at 23°C	
Specific gravity	1.065 g / cm^3		
Solid content	45 ± 2 %	by weight	(125°C 60 min)
Film weight dry	7-9 g/m^2		
Film weight wet	15-20 g/m^2		
Flash point	50°C		(EN 456:1991)
Storage time	6 months	at 20°C	

NOTE **Stir well before use!**

SUBSTRATE Tinplate

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	As supplied

CURING CONDITION

Circulating air: 180°C, 10 min peak

Mentioned curing figures are approximate. Drying time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control.

Issue 2003-05-12

LINDGENS™
METAL DECORATING COATINGS & INKS

PACLAC®

NONVAR AKZOBLÅ

15564-5150

Type of product	Blue pigmented topcoat with excellent flexibility and gloss. NON VARNISH.
Suitable for	Exterior of lids and bodies for 3-piece technical cans.
Remarks	Should be applied on PACLAC BASECOAT 15548-0000 in order to obtain the right colour shade. PACLAC 15564-5150 accepts commonly used self adhesive labels as well as commonly used jet ink marking. PACLAC 15564-5150 **EXTRA NON VARNISH** for bodies, ends and lids has - as a NON VARNISH quality – a limited accept of most printing inks and overvarnishes.

TECHNICAL DATA

Resin system	Modified Polyester		
Delivery viscosity	140 ± 10 sec	DIN 4 at 23°C	
Specific gravity	1.04 g/cm^3		
Solid content	46 ± 2 %	by weight	(125°C 60 min)
Film weight dry	7 -8 g/m²		
Film weight wet	15-17,5 g/m²		
Flash point	53°C		(EN 456:1991)
Storage time	12 months	at 20°C	

NOTE **Stir well before use!**

SUBSTRATE

White base coated Tinplate

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	As supplied

CURING CONDITION

Circulating air: 180°C, 10 min peak

Mentioned curing figures are approximate. Drying time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control.

Issue 2008-11-05

PACLAC®

SPARKLE BLUE SILVER

13580-0196

Type of product	Aluminium pigmented blue shaded basecoat with glitter effect.
Suitable for	For general line 3-piece cans and lids.

TECHNICAL DATA

Resin system	Modified Polyester		
Delivery viscosity	120 ± 5 sec	DIN 4 at 23°C	
Specific gravity	1,06 g/cm³		
Solid content	47 ± 2 %	by weight	(125°C 60 min)
Film weight dry	7-9 g/m²		
Film weight wet	16-21 g/m²		
Flash point	50°C		(EN 456:1991)
Storage time	6 months	at 20°C	

NOTE **Stir well before use!**

SUBSTRATE

Tinplate, Aluminium, tinfreesteel (TFS/ECCS)

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	115-125 sec

CURING CONDITION

Circulating air: 180°C, 10 min peak

Mentioned curing figures are approximate. Curing time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control..

Issue 2007-01-15

Replaces version dated: 2005-08-26

PACLAC®

SPARKLE SILVER

13580-0195

Type of product	Aluminium pigmented basecoat with glitter effect.
Suitable for	For general line 3-piece cans and lids.

TECHNICAL DATA

Resin system	Modified Polyester		
Delivery viscosity	120 ± 5 sec	DIN 4 at 23°C	
Specific gravity	1,04 g/cm³		
Solid content	43 ± 2 %	by weight	(180°C 30 min)
Film weight dry	7-9 g/m²		
Film weight wet	16-21 g/m²		
Flash point	50°C		(EN 456:1991)
Storage time	6 months	at 20°C	

NOTE **Stir well before use!**

SUBSTRATE

Tinplate, Aluminium, tinfreesteel (TFS/ECCS)

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	115-125 sec

CURING CONDITION

Circulating air:	180°C, 10 min peak

Mentioned curing figures are approximate. Curing time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control..

Issue 2007-01-15

Replaces version dated : 2003-05-12

ID 21

Reviderat datum : 17-10-2002
Utfärdandedatum: 14-1-2003

SÄKERHETSDATABLAD
i enlighet med direktiv 2001/58/EG

1. NAMNET PÅ PREPARATET OCH FÖRETAGET

1.1. Namnet på preparatet:

- Produktens namn : PPG3125-002/1 Vernis beige
- Varutyp : 3125-0021

1.2. Användning av preparatet:

- Emballage lackering

1.3. Namnet på bolag/företag:

PPG Coatings S.A.
7, Allée de la Plaine
Gonfreville l'Orcher
76700 HARFLEUR
France

- Teknisk kontakt: Packaging Laboratory
- Tel: +33 (0)2 35 53 54 00
- Fax: +33 (0)2 35 53 54 05

1.4. Telefonnummer för nödsituationer:

- Företagets nödtelefonnummer : +33 (0)2 3553 5400

2. SAMMANSÄTTNING / ÄMNENAS KLASSIFICERING

Kemisk familj : Epoxi-fenol

Ämnen som utgör fara för hälsa eller miljö enligt vad som avses i direktivet om farliga ämnen direktiv 67/548/EG med ändringar.
Se avsnitt 3 för faror med beredningen.

ÄMNE % I vikt I produkten	SYMBOL och R(-kategorier av det rena ämnet		CAS nr.	EINECS/ELINCS
PHENOL 0.1 - < 0.2 %	T	R24/25,R34	108-95-2	203-632-7
FORMALDEHYD- 0.1 - < 0.2 %	T	R23/24/25,R34,R40,R31	50-00-0	200-001-8
PROPYLBENSEN 0.2 - < 0.5 %	Xn N	R65,R37,R51/53,R10	103-65-1	203-132-9
KUMEN 0.2 - < 0.5 %	Xn N	R65,R37,R51/53,R10	98-82-8	202-704-5
MESITYLEN- 1 - < 2 %	Xi N	R37,R51/53,R10	108-67-8	203-604-4
1-METOXIPROPAN-2-OL 1 - < 2 %	R10		107-98-2	203-539-1
2-METYLPROPAN-1-OL 1 - < 2 %	Xi	R41,R37/38,R67,R10	78-83-1	201-148-0
1;2;4-TRIMETYLBENSEN 3 - < 5 %	Xn N	R20,R36/37/38,R51/53,R10	95-63-6	202-436-9

1160

Paints	Safety Datasheet according to 91/155/EWG (2001/58/EC)	ICI Packaging Coatings

1. Identification Of Preparation And Company

Product Information

Product Name:	N 49092	**Revision Date:**	04/11/2005
	300400	**Supersedes:**	10/10/2005
Recommended use:	Pigmented lacquer		
Supplied by:	ICI Packaging Coatings GmbH Düsseldorfer Str. 96-100 D-40721 Hilden Tel.: +49 (0)2103-771 Fax: +49 (0)2103-77463		
Emergency Telephone:	France: +33-1-45 42 59 59 Germany: +49-2103-51046 Spain: +34-977-55 15 77 United Kingdom: +44-121-771-2525		

2. Composition/Information On Ingredients

Hazardous Ingredients:

EINEC No.	CAS-No.	Name according to EEC	%	Symbols	R-Phrases
203-905-0	111-76-2	2-BUTOXYETHANOL	10-25	Xn	R20/21/22-36/38
265-198-5	64742-94-5	SOLV. NAPHTHA, HEAVY AROMATIC	10-25	N, Xn	R51/53-65-67
203-539-1	107-98-2	1-METHOXY-2-PROPANOL	10-25		
203-603-9	108-65-6	1-METHOXYPROPYLACETATE	2.5-10	Xi	R36
215-535-7	1330-20-7	XYLENE	1.0-2.5	Xn	R20/21-38
2-436-9	95-63-6	1,2,4-TRIMETHYLBENZENE	1.0-2.5	N, Xn	R20-36/37/38-51/53-65-67
212-112-9	763-69-9	ETHYL ETHOXY PROPIONATE	1.0-2.5	N	R52/53
200-751-6	71-36-3	BUTANOL	1.0-2.5	Xn	R22-37/38-41-67
202-049-5	91-20-3	NAPHTHALENE	1.0-2.5	N, Xn	R22-40-50/53
265-199-0	64742-95-6	SOLVENT NAPHTHA,LIGHT AROMATIC	< 1.0	N, Xn	R51/53-65-67
203-604-4	108-67-8	MESITYLENE	< 1.0	N, Xi	R37-51/53
		EPOXY RESIN (Epoxy constituents)	< 1.0	N, Xn	R36/38-36-38-43-51/53

Additional information : The text for R phrase codes shown above (if any) is given in section16.

3. Hazards Identification

Possible Hazards

R10	Flammable.
R20/21/22	Harmful by inhalation, in contact with skin and if swallowed.
R36/38	Irritating to eyes and skin.
R40	Limited evidence of a carcinogenic effect.
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

4. First Aid Measures

1D66

Varuinformationsblad enligt EC-Dir. 91/155 (2001/58/EC)

Enlight bstämmelserna
I Sverige

ICI Packaging Coatings

1. Namnet På Produkten Och Företaget

Produkt information 16-3451/L/1

Produktnamn: GOLG LACQUER **Reviderad Datum:** 24/01/2003

300046 **Supercedes:** 24/01/2003

Leverantör

ICI Packaging Coatings GmbH
Düsseldorfer Str. 96-100
D-40721 Hilden
Tel.: 02103-771
Fax: 02103-77463

Nödtelefonnummer:
France: +33-1-45 42 59 59
Germany: +49-2103-51046
Spain: +34-972-87 42 09
United Kingdom: +44-121-771-2525

2. Sammansättning/Ämnenas Klassificering

Kemisk Benämning
Description: Gold Lacquer

Farliga Komponenter:

EEC-No.	CAS-No.	Name according to EEC	%	Symbols	R-Phrases	OEL OEL-value
603-064-00-3	107-98-2	1-METHOXY-2-PROPANOL	10-25			
603-004-00-6	71-36-3	BUTANOL	10-25	Xi,Xn	R22-36/37/38-41-67	
601-022-00-9	1330-20-7	XYLENE	2.5-10	Xi,Xn	R20/21-38	
603-014-00-0	111-76-2	2-BUTOXYETHANOL	2.5-10	Xi,Xn	R20/21/22-36/38	
606-004-00-4	108-10-1	METHYL ISOBUTYL KETONE	2.5-10	Xi,Xn	R20-36/37	
649-356-00-4	64742-95-6	SOLVENT NAPHTHA,LIGHT AROMATIC	2.5-10	N,Xn	R51/53-65-67	
601-043-00-3	95-63-6	1,2,4-TRIMETHYLBENZENE	2.5-10	N,Xi,Xn	R20-36/37/38-51/53-52/53	
601-023-00-4	100-41-4	ETHYLBENZENE	2.5-10	Xn	R20	
649-424-00-3	64742-94-5	SOLV. NAPHTHA, HEAVY AROMATIC	0.1-2.5	N,Xn	R51/53-65-67	
607-038-00-2	112-07-2	2-BUTOXYETHYL ACETATE	0.1-2.5	Xn	R20	
601-025-00-5	108-67-8	MESITYLENE	0.1-2.5	N,Xi	R37-51/53-52/53	
601-024-00-X	103-65-1	PROPYLBENZENE	0.1-2.5	N,Xi,Xn	R37-51/53-52/53-65	
604-004-00-9	95-48-7	ORTHO CRESOL	1.0	C,T	R24/25-34	

Ytterligare information: The text for R phrase codes shown above (if any) is given in section 16.

3. Farliga Egenskaper

Farliga föroreningar

R10	Brandfarligt.
R20/21/22	Farligt vid inandning, hudkontakt och förtäring.
R36/37/38	Irriterar ögonen, andningsorganen och huden.
R41	Risk för allvarliga ögonskador.

ID 21C

Reviderat datum : 17-10-2002
Utfärdandedatum: 14-1-2003

SÄKERHETSDATABLAD
I enlighet med direktiv 2001/58/EG

1. NAMNET PÅ PREPARATET OCH FÖRETAGET

1.1. Namnet på preparatet:

- Produktens namn : PPG2092-361/A Vernis or
- Varutyp : 2092-361A

1.2. Användning av preparatet:

- Emballage lackering

1.3. Namnet på bolag/företag:

PPG Coatings S.A.
7, Allée de la Plaine
Gonfreville l'Orcher
76700 HARFLEUR
France

- Teknisk kontakt: Packaging Laboratory
- Tel: +33 (0)2 35 53 54 00
- Fax: +33 (0)2 35 53 54 05

1.4. Telefonnummer för nödsituationer:

- Företagets nödtelefonnummer : +33 (0)2 3553 5400

2. SAMMANSÄTTNING / ÄMNENAS KLASSIFICERING

Kemisk familj : Epoxi-fenol

Ämnen som utgör fara för hälsa eller miljö enligt vad som avses i direktivet om farliga ämnen direktiv 67/548/EG med ändringar.
Se avsnitt 3 för faror med beredningen.

ÄMNE % i vikt i produkten	SYMBOL och R(*)-kategorier av det rena ämnet		CAS nr.	EINECS/ELINCS
PROPYLBENSEN 0.2 - < 0.5 %	Xn N	R65,R37,R51/53,R10	103-65-1	203-132-9
PHENOL 0.2 - < 0.5 %	T	R24/25,R34	108-95-2	203-632-7
FORMALDEHYD- 0.2 - < 0.5 %	T	R23/24/25,R34,R40,R37	50-00-0	200-001-8
KUMEN 0.2 - < 0.5 %	Xn N	R65,R37,R51/53,R10	98-82-8	202-704-5
RESIN,POLYMER WITH O-CRESOL,FORMALDEHYDE AND TETRABUTYLTITANATE 1 - < 2 %	Xi	R36/37/38	68910-64-5	
1-METOXIPROPAN-2-OL 1 - < 2 %	R10		107-98-2	203-539-1
MESITYLEN- 2 - < 3 %	Xi N	R37,R51/53,R10	108-67-8	203-604-4
2-METOXI-1-METYLETYLACETAT 3 - < 5 %	Xi	R36	108-65-6	203-603-9

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SÄKERHETSDATABLAD
i enlighet med förordning (EG) nr 1907/2006

1. NAMNET PÅ PREPARATET OCH FÖRETAGET

1.1. Namnet på preparatet:

- Produktens namn : 2252-306D
- Varutyp : 2252-306D

1.2. Användning av preparatet:

- Emballage lackering

1.3. Namnet på bolag/företag:

PPG Coatings S.A.
7, Allée de la Plaine
Gonfreville l'Orcher
76700 HARFLEUR
France

- Teknisk kontakt: Packaging Laboratory
- Tel: +33 (0)2 35 53 54 00
- Fax: +33 (0)2 35 53 54 05
- e-postadress : EurMsdsContact@ppg.com

1.4. Telefonnummer för nödsituationer:

- Företagets nödtelefonnummer : +33 (0)2 3553 5400

2. FARLIGA EGENSKAPER

- Xn - HÄLSOSKADLIG
- Farligt vid inandning, hudkontakt och förtäring.
- Risk för allvarlig ögonskada.
- Irriterar andningsorganen och huden.
- Skadligt för vattenorganismer, kan orsaka skadliga långtidseffekter i vattenmiljön.
- BRANDFARLIGT.

3. SAMMANSÄTTNING / ÄMNENAS KLASSIFICERING

Kemisk familj : Epoxi-fenol

Ämnen som utgör fara för hälsa eller miljö enligt vad som avses i direktivet om farliga ämnen direktiv 67/548/EG med ändringar.
Se avsnitt 2 för faror med beredningen.

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PACLAC®

GOLD INTERNAL

11078-0000

Type of product	Internal lacquer with high resistance to acetic acid.
Suitable as	Paint can internal (single or double coat) and external.
Remarks	Suitable for passivation 311 tinplate

TECHNICAL DATA

Resin system	Polyester / phenolic		
Delivery viscosity	65 ± 5 sec	DIN 4 at 23ºC	
Specific gravity	1,01 g/cm³		
Solid content	34 ± 2 %	by weight	(125°C 60 min)
Film weight dry	4-6 g/m²		
Film weight wet	12-18 g/m²		
Flash point	32ºC		(EN 456:1991)
Storage time	6 months	at 20ºC	

NOTE **Stir well before use!**

SUBSTRATE

Tinplate

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	As supplied

CURING CONDITIONS

Circulating air: 200ºC, 10 min peak

Mentioned curing figures are approximate. Drying time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control.

Issue 2007-01-12

Replaces version dated : 2005-09-26

LINDGENS™
METAL DECORATING COATINGS & INKS

PACLAC®
GOLD LACQUER
11060-0000

Type of product: Gold lacquer. Special development with very low odour.

Suitable for: Internal and external protective coating for food and technical cans.
2 or 3-piece, deep drawn cans, lids and ends.

Remarks: All non volatile components comply with the regulation of FDA 175.300.
Migration certificate is available.
PACLAC 11060- contains slip agent and accepts doublecoat
For optimum results, when two layers are applied, cure as follow:
First layer: 195ºC 10 min peak
Second layer: 205ºC 10 min peak
Correctly cured, the film stands sterilisation at 121ºC for 90 min in water or steam.
.

TECHNICAL DATA

Resin system:	Epoxy/Phenolic	
Delivery viscosity:	65 ± 5 sec	DIN 4 at 23ºC
Specific gravity:	0,99 g/cm³	
Solid content:	38 ± 2 % by weight	125°C 60 min
Film weight dry:	4-6 g/m²	
Film weight wet:	10-15 g/m²	
Flash point:	30ºC	(EN 456:1991)
Storage time:	5 months at 20ºC	

NOTE
Stir well before use!

SUBSTRATE
Tinplate, Aluminium, tinfreesteel (TFS/ECCS)

HANDLING INSTRUCTIONS

Application	Thinner	Application visc
Roller coater	19960-0000	As supplied

CURING CONDITIONS
Circulating air: 205 ° C, 10 min peak

Mentioned curing figures are approximate. Curing time and temperature depends on type of equipment, ventilation and amount of coating applied. All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control

Replaces version dated : 2006-02-01 Issue 2007-08-30

Packaging Coatings

Packaging Coatings **PPG2092-385/A**

Product Data Sheet **LACQUER**

RESIN TYPE	Epoxy phenolic	
COLOUR	Buff	
MANUFACTURING CODE	**P-2092385A**	FG

Physical Characteristics (as manufactured)

VISCOSITY	65-75 sec	ISO 6/25°C
	125-150 sec	AFNOR 4/25°C
SPECIFIC GRAVITY	1,15 - 1,18	20°C
SOLID CONTENT BY WEIGHT	44-48 %	30mn/200°C
FLASH POINT	>23°C	NFT 30050
SHELF LIFE	6 months *(Viscosity increase must be expected during storage.)*	

Thinning and cleaning

RECOMMENDED THINNER	Universal thinner TF-2007B (P-TF2007B)
RECOMMENDED EQUIPMENT CLEANER	Universal thinner TF-2007B (P-TF2007B)

Comments

Spray application after thinning.

. Before using this product, refer to Health, Safety data sheet, plus the appropriate application data sheet.
. For professional use only.

Ref : **P-2092385A** EX: 99980893

Date : 07/08/2001 (SL) Supersedes sheet dated : 24/06/1998

PPG Coatings SA – Siège Social : 7, allée de la Plaine – Gonfreville L'Orcher – 76700 Harfleur – France – Tél. : 33 (0)2 35 53 54 00 Fax : 33 (0) 2 35 53 54 87

LINDGENS
METAL DECORATING COATINGS & INKS

PACLAC®
CLEAR SLIP LACQUER
11593-0000

Type of product	Clear protective lacquer with high scratch resistence and excellent flexibility.
Suitable for	Internal and external coating of LIDS AEO & SEO Lids, 2- & 3-piece cans. External on caps.
Remarks	Sheets lacquerd with 11593-0000 PACLAC CLEAR can be formed and pressed without any pretool lubrication. All non volatile components comply with the regulation of FDA 175.300 Correctly cured, the lacquer withstands sterilisation at 121°C for 90 min in water or steam.

TECHNICAL DATA

Resin system	Modified Epoxi		
Delivery viscosity	45 ± 5 sec	DIN 4 at 23°C	
Specific gravity	0,95 g/cm³		
Solid content	32 ± 2 %	by weight	(125°C 60 min)
Film weight dry	4 g/m²		
Film weight wet	13 g/m²		
Flash point	26°C		(EN 456:1991)
Storage time	12 months	at 20°C	

NOTE **Stir well before use.**

SUBSTRATE

Aluminium, Tinplate

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	40-50 sec

CURING CONDITION

Circulating air: 200°C, 10 min peak

Mentioned curing figures are approximate. Drying time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control.

Issued 2006-02-03

Replaces version dated : 2003-05-08

LINDGENS
METAL DECORATING COATINGS & INKS

PACLAC®

Overvarnish

11524-0001

Type of product	Overvarnish with excellent scratch-, adhesion-, wet on wet- and HI-BAKE properties as a system with white basecoat.
Suitable for	External varnishing of 3-piece Food & Technical cans and .
Remarks	For 3-piece Food & Technical cans and Lids in system with PACLAC BASECOAT WHITE, 15548- among others. Correctly cured, the lacquer stands sterilisation on can bodies at 121°C for 90 min, in water or steam.

TECHNICAL DATA

Resin system	Modified polyester		
Delivery viscosity	55 ± 5 sec	DIN 4 at 23°C	
Specific gravity	1,02 g/cm³		
Solid content	53 ± 2 %	by weight	(125°C 60 min)
Film weight dry	4-5 g/m²		
Film weight wet	9-11 g/m²		
Flash point	42°C		(EN 456:1991)
Storage time	12 months	at 20°C	

NOTE **Stir well before use.**

SUBSTRATE

Basecoated tinplate, aluminium, tinfreesteel (TFS/ECCS)

HANDLING INSTRUCTIONS

Application	Thinner	Application visc.
Roller coater	19960-0000	50-60 sec

CURING CONDITION

Circulating air: 180° C, 10 min peak

Mentioned curing figures are approximate. Drying time and temperature depends on type of equipment, ventilation and amount of coating applied.
All information is based on results from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage, attributable to reliance thereon as conditions of use lie outside our control.

Issue 2006-03-02

Replaces version dated : 2003-05-28

Appendix 7 – Project Members

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