Visibility clothing
for children

Thesis work by Åsa Jansson at the Division of Industrial Design, Lund Institute of Technology at Lund University, May 2006.
This degreework was initiated by a brief email send form the department of design science at Lund Institute of Technology, Lund University. It was an invitation from the company Reflectil Sverige AB about their interest to renew their selection of non-professional high visibility garment. The companies demand was to broaden their selection of non-professional high visibility garment. They wanted to improve their brand Sportlite towards a more attractive and modern design.

My intention was to make a more tailored product with personality without renouncing its main functions - to attract attention and safety. I wanted to see how I could improve Reflectil Sverige AB’s selection of non-professional high visibility garment without diverge from the European standard, EN-1150.

I choose to limit my target group to children, even though a product like this is something that can be of benefit to everyone. I wanted to work with children as the target group since children are less aware of dangerous situations, they are curious and likes to experience things. This sometime makes them unpredictable.

I assumed that this kind of additional accessory garment is supposed to be used any time and any where. This means it can be worn during the whole year. Since the choice of clothing differ from one season to another it affected the design. I came to the conclusion that the design of my visibility garment must be convenient and easy to put on and off. It must also be adjustable depending on what one is wearing under the accessory. I solved this by making my vest as an open piece that easily can be put on over the head, without having to pull the arms through any armpits. After that the vest is fastened with Velcro in each side of the waist.

Because I wanted to give my vest an own identity I also made a suggestion of a trademark. The inspiration for this was the cat species eye. The cat species have excellent night vision and their eyes also reflects light. The retroreflective area around the waist is also inspired by these animals. Of course this retroreflective decoration can be designed in many ways as long as it fulfil the European standard.
This is the documentation of my diploma work in industrial design at the Department of Design science at Lund Institute of Technology, Lund University. The work took place during the spring semester of 2006, and is equivalent to 20 university credit points. I call my work Visibility clothing for children.

With the existence of this document I would like to give an insight and an understanding of the design methodology I have applied to solve the problem of visibility clothing for children.

When the time had come to decide a diploma work my aim was to make contact with a company that had a current task to solve. Through a circular email send from the Department of Design science at Lund Institute of Technology, I got to know about the company Reflectil Sverige AB and their interest to renew their selection of high-visibility garment. The project seemed interesting since I have an interest in clothing as a functional equipment. I contacted Petter Högvard, VD at Reflectil Sverige AB. We agreed on that within the frame of my diploma work I would develop and propose a prototype of a non-professional high visibility garment.

Furthermore I wanted to have an external supervisor, i.e. a working industrial designer, to receive more insight of the working procedures involved. Therefore I contacted Gert Hanner, Design Manager at Avalon Technology in Helsingborg. He accepted to be my external supervisor. My in-house supervisor at the Department of Design science was Eva Wängelin, Ph D student.
<table>
<thead>
<tr>
<th>December</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>market research</td>
<td>company meeting</td>
<td>design concepts</td>
<td>supervision Avalon technology, Gert Hanner</td>
<td>fully detailed mock up</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>analysis &amp; definition of target group</td>
<td>final task target definition</td>
<td>idea generation form &amp; usage</td>
<td>Nordic fabric fair, Borås</td>
<td>usage technical description engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>context analysis</td>
<td></td>
<td></td>
<td>evaluation validation correction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>brief preliminary task</td>
<td></td>
<td></td>
<td>company meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>visiting company to get more information</td>
<td>supervision Avalon technology, Gert Hanner</td>
<td>supervision Avalon technology, Gert Hanner</td>
<td>selection optimization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>function analysis requirements</td>
<td></td>
<td>mock up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>supervision Avalon technology, Gert Hanner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>final design</td>
<td>presentation-work</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Final presentation of my diploma work**
- **Easter Holiday**
# TABLE OF CONTENTS

## INTRODUCTION
- Aim 1
- Definition 1
- Condition 1

## THE COMPANY
- Preliminary task 3

## FACTS
- European standard 4

## RESEARCH
- INTRODUCTION 9
- MARKET 11
- product competitors 12
- product positioning 13
- CONTEXT ANALYSIS 14
- product analysis 16
- functional analysis 18
- design demands 19
- TARGET GROUP 20
- thoughts and analysis 21
- story boards 22
DESIGN DEVELOPMENT 25

// SYNTHESIS
  user scenario, Time of the year 26
  mood board 28
  image board 29
  sketch phase 30
  two concepts 33
    front 34
    back 35
  details
    closing function 36
    pockets or alternative storage 37
    opening possibility 38
    identification pocket 39

// SELECTED MODEL 40

REFINEMENT 41

// FINAL DESIGN
  optimize 42
  the pattern 44
  details 45
  function 46
  identity 48
  decoration 49
INTRODUCTION

Aim
The aim has been to analyse and define when it is suitable to wear a high visibility garment as well as who the target group is that wear this kind of clothing and also who the consumer is. The intention was to make a more tailored product with personality without renouncing its main functions, to attract attention and ensure personal safety. I had a vision of designing a product that defines a new family of products in the category of protective clothing for non-professional use. Furthermore my vision was to make a garment that separates from similar products on today's market.

Definition
There is a difference due to the European Standard between professional and non-professional visibility garment. To a less versed person there is no noticeable difference between these two categories. In the design I wanted to improve Reflectil Sverige AB’s selection of non-professional high visibility garment without diverging from the European standard, EN-1150. The company wanted an attractive product. I believe that the meaning of attractive is not the same among all generations, so I decided to define a target group based on one generation.

Condition
During the work Reflectil has helped with valuable information about the European standard as well as technical information about possible manufacturing methods. To evaluate the work during the design process regular meetings was arranged with the company. My external supervisor Gert Hanner was also able to give me an insight of what design methods that could be used as a working industrial designer.
Reflectil Sverige AB form a part of the Reflectil Group, which is a Norwegian based company that operates in the area of personal visibility in several countries throughout Europe. Their business areas are high visibility garment and to convert reflective material.

The company has both production and logistic services in Portugal and China. Their export market is mainly concentrated to Norway and Sweden. Reflectil owns the brand Sportlite, which is their trademark for non-professional high visibility garment.

The company has also for many years been involved in the development of the European standards for high visibility garment.

The waistcoats of today >> and their package.
To improve Reflectil’s brand Sportlite towards a more attractive and modern design.

Reflectile Sverige AB wish to refresh their selection of privately used visibility garment to improve their market position of protective clothing. The company has a vision of a conspicuous commodity, desirable to the consumer.
Accordingly to the European standard EN-1150 there has to be a visible area of fluorescent material as well as a visible area of retroreflective material equally divided on the front and back. Furthermore there has to be a 25 mm wide stripe of retroreflective material that extends around the waist. If it is impossible to avoid a gap in the stripe it can not be wider than 50 mm.
The European Standard provides details on the performance of high visibility warning clothing for nonprofessional use together with minimum areas and placement of material to achieve enhanced visibility against most background conditions found in urban and rural situations both day and night.

The area of material is dependant on the height of the wearer and visibility is enhanced by high contrast between the garment and the ambient background.

This standard specifies the optical performance requirements for high visibility clothing to be worn by adults and by juveniles, and design for non-professional use. High visibility clothing for non-professional use is intended to signal the user's presence visually in any daylight condition and be illuminated by vehicle headlights or search lights in the dark as well as lit up in urban roads.

The standard is not applicable to accessories that are carried by persons or attached to garments.
Visibility garment certificated due to the European standard EN-1150.

In my opinion the today’s vest is rather impersonal and lack strength of character. The vests ability is to attract attention and make the user more visible. It is also these properties which demands for a product that the user can identify with.
Is there a demand for high visibility clothing?

According to Reflectil Sverige AB the demand for high visibility garment for non-professional use has increased in the last couple of years. They believe in a tougher market with a lot more competitors ahead.

What is high visibility garments?

High visibility garment is protective equipment to make people more visible, which can be desired in many situations.

You can observe these garments on people in exposure situations as for example on people working on the road, policemen, firefighters, etc. These days it is also common to see groups of kindergarten children wearing these visibility vests during excursions.

Where can you observe high visibility garments?

professional

non-professional
As mentioned earlier it is the Nordic countries which are the principal market to Reflectil Sverige AB’s non-professional visibility garment. Current retailers are distributors of company gifts and company clothing as well as sports retailers. Through my market research I found out that there are also possibilities to by vests on the internet.

The market for my product will probably be the most common sports retailers in Sweden: Team Sportia, Intersport, Sportpringen and Stadium.

These retailers are associated with sport items within different categories and to a certain extent also outdoor life. They have a wide range of brands. You can find these dealers over the entire Sweden, mainly in smaller and medium-sized towns, with the exception of Stadium which have their sales activity located in medium-sized towns to bigger cities.

Reflectil Sverige AB also want to see local retailers of children clothes as their future retailers.
I have concentrated the market research to products and brands that in one way or another compete on the market for outdoor equipment which somehow makes the user more visible. This since the advantages of using a reflex is outdoor.

The consumers meet the brand Sportlite through retailers. Therefore the brand has to compete with a number of other brands.

When the consumer is about to buy a visibility accessory I think she or he care more about how to wear it; how it will look on; if it complements the personality more than what kind of standard it fulfil and what that means.
The red cross indicates where I would like to position my product among other outdoor equipment with the purpose to make the user more visible.

My intention has been to make a product that attracts the target group as well as the consumer. I wanted the result to be a functional garment and also a garment which the wearer feel proud to wear.
Why should you wear high visibility garment?

to inform of your presence
to feel secure
to warn

Because you care about your life
Applications of a high visibility garment.

outdoor activity
on in lines
- cycling
- running
- going on scooter
- acting walking
- walking the dog
- when shoveling
car breakdown
outdoor playing in the residential area
- playground
- learning to bike
- on a day trip in preschool
- going down the hill
- with sled
- skateboarding
- snow boarding
- riding

When being mobile
- public transportation
- as a pedestrian
- biking
- on inlines
- going on scooter

When shall you wear high visibility garment?

High visibility garment has advantages when used outdoor at night as well as during any daylight condition and in low visibility situations. When it comes to the brand Sportlite it gives you associations to sport and activity. With this in mind I listed possible occasions where a high visibility garment can be of benefit to a private person. The answer was that a garment like this can be worn any time, any where.

Among all generations, young and old, there is a need to be able to feel safe whenever practicing any kind of outdoor activity. There is a need to be visible and to attract attention of the surroundings, and to make road users aware of the presence of a human being.
RESEARCH // CONTEXT ANALYSIS
product analysis

What is wanted and what is required for a garment that is supposed to be worn any time any where. I came up with several statements about what the product should be like and its properties. Before I had a meeting with the company to discuss the priority of these statements I analysed all functions and judged them in a functional analysis.

usage

carried outside the overgarment

attract attention during daylight as well as at night and in low visibility situations.

attract attention in searchlights

enhance the feeling of being safe

easy to take on and off

make it possible to manage by oneself

be convenient and something the user approves to wear

an accessory throughout various outdoor activities

make it possible to use throughout the seasons

the product itself must not injure the user

be able to keep and easy to bring along

---

format/design

the design shall invite to usage

interpret as a secure and up to date product

road users shall be aware of the presence of a human being

with believability radiate attention and express protective clothing for non-professional usage

communicate the height and size of the user

express affiliation to an attractive life style of our time

both form and function shall invite to purchase

attract to the users and explicit show the field of application

be possible to mark who it belongs to
detail that is recognized as Reflectil
material
possible to wear in all kinds of weather conditions without getting destroyed
tolerate moisture
tolerate dirt
possible to clean
make cleaning possible
endure frequent usage during various outdoor activities
endure strain
retroreflective material (approved retroreflective material)
utilize existing manufacturing methods

manufacturing
be possible to make use of all ready existing manufacturing methods

economy
the product shall be affordable
reasonable sales price

environment
stand all kind of strains form the surroundings
tolerate external environment

standard
fulfil the European Standard, EN 1150, approved by CEN, European Committee for standardization.
CE- certificated
## Research // Context Analysis

### Functional Analysis

<table>
<thead>
<tr>
<th>Functions</th>
<th>Remark/ Boundaries</th>
<th>Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head Function</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attract attention</td>
<td>during daylight as well as in darkness with searchlights</td>
<td></td>
</tr>
<tr>
<td><strong>Sub Function: Usage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carried outside</td>
<td>the size of the outer garment varies with the season</td>
<td></td>
</tr>
<tr>
<td>Permit handling</td>
<td>users from 3 years old shall be able to dress on and off</td>
<td></td>
</tr>
<tr>
<td>Permit movability</td>
<td>not be in the way, comfortable</td>
<td></td>
</tr>
<tr>
<td>Useful accessory</td>
<td>suit during various outdoor activities</td>
<td></td>
</tr>
<tr>
<td>Utilize seasons</td>
<td>use the entire year</td>
<td></td>
</tr>
<tr>
<td>Make storage possible</td>
<td>be able to pack, minimize the size</td>
<td></td>
</tr>
<tr>
<td>Invite usage</td>
<td>appeal to the target group</td>
<td></td>
</tr>
<tr>
<td>Explained usage</td>
<td>use outdoor</td>
<td></td>
</tr>
<tr>
<td>Show belongings</td>
<td>who is the owner of the product</td>
<td></td>
</tr>
<tr>
<td>Tolerate moisture</td>
<td>use during bad weather</td>
<td></td>
</tr>
<tr>
<td>Tolerate dirt</td>
<td>soil and clay, food, beverages</td>
<td></td>
</tr>
<tr>
<td>Make cleaning possible</td>
<td>tolerate detergent, a majority of laundries at 40 degree Celsius</td>
<td></td>
</tr>
<tr>
<td>Endure strain</td>
<td>daily usage during outdoor activities</td>
<td></td>
</tr>
<tr>
<td>Reasonable sales price</td>
<td>worth to invest in</td>
<td></td>
</tr>
<tr>
<td><strong>Sub Function: Safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhance safety</td>
<td>visible outdoor</td>
<td></td>
</tr>
<tr>
<td>Prevent injury</td>
<td>the product must not cause any serious injury</td>
<td></td>
</tr>
<tr>
<td>Express security</td>
<td>the user shall feel safe and secure</td>
<td></td>
</tr>
</tbody>
</table>
# Research // Context Analysis

## Design Demands

<table>
<thead>
<tr>
<th>Functions</th>
<th>Remark/Boundaries</th>
<th>Judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE-certificated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicate to target group</td>
<td>Express identity and attitude through choice of material, shape and pattern</td>
<td></td>
</tr>
<tr>
<td>Invite purchase</td>
<td>Function and design</td>
<td></td>
</tr>
<tr>
<td>Communicate modern</td>
<td>Through form and material</td>
<td></td>
</tr>
<tr>
<td>Express trendy</td>
<td>Influenced by the vogue</td>
<td></td>
</tr>
<tr>
<td>Communicate Reflectil</td>
<td>Associate the product with the company</td>
<td></td>
</tr>
<tr>
<td>Permit convenience</td>
<td>Ventilation</td>
<td></td>
</tr>
<tr>
<td>Utilize existing manufacturing</td>
<td>Tailoring in China, printing in Portugal</td>
<td></td>
</tr>
<tr>
<td>Tolerate external environment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At the end of this analysing process — after consulting with the company — I came to the conclusion that the design demands during my development phase must be:

A supplement to everyday clothes
Communicate Reflectil
CE-certificated
Easy to use
Comfortable
Adjustable
Who is the target group?

It can be desirable to have a target group as broad as possible. A high visibility product is something that can be of benefit to everyone, to a child or a grown up person.

But what is seen as attractive and modern among one generation is not necessarily the same in another generation. The same thing with needs, they differ due to different type of occupation and activities.

I choose to limit the main target group to children. But also I had to have in mind that with children as users, the parents are also a target group interesting as consumers.
The awareness of a person’s life and safety comes with the years. Children are less aware of dangerous situations than a mature person who has experiences of critical situations. Children can be unpredictable. They are curious and likes to experience things. This characteristics in combination with the fact that children not solely can take responsibility for their life and their safety, is something I would like to incorporate in my work.

Further more it is the characteristics of a high visibility garment, to attract attention and announce the presence of a person, which make me choose children as the main target group.

This causes an indirect target group of parents. They are the consumers, since they usually decides what to buy, and to some extent they decides what their children shall wear. The parents are also interesting as they serve as models to the children.

By introducing the product in the early years there is a possibility to create a behaviour, a need, which stays with the person, under the prerequisite that there are designed models that meet the needs of grown ups.
RESEARCH // TARGET GROUP

story board

There is quite a big difference between an three year old child and an eleven years old child. The latter one is closer to an teenager than to a child. What is attractive and wanted is not the same among these two age-groups. The following three scenarios where presented to the company. After discussion around these scenarios we agreed on limiting the target group to children of age three to eight years old.

3 years old

Kalle is out playing with the family dog, Findus. A cat passes by and catches the dogs attention. Kalle starts to hunt the cat. He runs after as fast as he can. Kalle is paying no attention to anything but the dog and the cat. Luckily Kalle is wearing his new visibility garment.
8 years old
Frida is out shopping with her mother. She finds a package with visibility accessorise that she has seen on kids in school. Frida really like to have one too. Her mother agrees because she is satisfied with the functionality of it.

10-12 years old
The cool skateboard gang is hanging around down town in the afternoon. They show each other their new tricks and do their best to impress on the audience.
Final target group >>
Children between three and eight years old.
DESIGN DEVELOPMENT
DESIGN DEVELOPMENT // SYNTHESIS

user scenario, time of the year

The additional accessory garment is supposed to be used any time, any where. This means it can be worn during the whole year. Since the choice of clothing differ from one season to another that will affect the design of my more tailored garment.

winter season
less sun hours
cold weather
many layers of clothes
transporting to and from preschool and school break and excursions
group activities with supervision
time pressure

summer season
more sun hours
warmer weather
less clothes
many outdoor activities with go independent activities
spending many hours outdoor out late
Weather conditions affects the choice of clothing.

During spring time and the summer period one dose not bother too much about layers of clothes. We are lightly dressed and enjoy just to slip in to the shoes and walk out.

During the dark and cold seasons of the year one is wearing rather a lot of layers of clothes, some quite bulky. There are also many accessories to put on, like gloves and scarfs among other things.
DESIGN DEVELOPMENT // SYNTHESIS

mood board

Un additional accessory must be convenient and easy to dress on and off, also adjustable in relation to what one is wearing under the accessory. I want my product to have a feeling of being . . .

adjustable
time effective
flexible
accessory
attitude
exciting
colourful
metallic
details
playful
pattern
DESIGN DEVELOPMENT // SYNTHESIS

sketch phase

The collar and the belt are connected in the back.

Popper to be able to adjust lengthways in the back.

Construction as a back pack, makes it possible to adjust the size.

The chest is covered by a big fluorescent collar and the belt consists of the retroreflective area. It closes with Velcro.

Wrestling back, facilitates movability.
Sporty look with spacious armpits.

Loops on each side as an alternative storage.

Generous neck opening to make it easier to put on.

Western inspired

Create a retroreflective decoration, maybe let the decoration spread over the garment.
An open piece to put on over the head without having to pull the arms through any armpits.

Create a woven pattern of fluorescent yarn.

Closes with a zipper in one side.
At the end of this sketch phase I had come up with two concepts. The main difference between these two concepts is how the overall design affects how to handle the vest when putting it on and off. In concept 1 the user do not have to put his arms through any armpits which is the case in concept 2, even though the generous armpits makes dressing easier.

I made a sketch model of each concept and presented them to the company. I also brought sketches of detail solutions as pockets, collar and its opening possibilite and an identification pocket for the garment, to that meeting with the company. These sketches follows in the next pages.
DESIGN DEVELOPMENT // SYNTHESIS

two concepts - front

opening possibility
to make it easy to pull over
the head

pockets or
alternative storage

closing function

concept: I

concept: II
Identification pocket
A pocket where the owner of the garment can put his or her personal identification to show who the vest belongs to.

Sketch model of concept: I

Sketch model of concept: II

concept: I and concept: II
An elastic cord keeps the flaps in the waist in place. It is possible to adjust the elastic cord to get some variations of the width.

Elastic part to facilitate dressing and to get a nice profile when wearing the garment.

Velcro solution

Closing with poppers.
DESIGN DEVELOPMENT // SYNTHESIS

details - pockets or alternative storage

- Pockets with zipper
- Open pockets
- Inside pocket

Pockets with pocket flaps, Velcro keeps the pocket flaps in place.
A decorated inside of the collar as a contrast to the outside.

Elastic bands across the opening in the collar allows the collar to stretch over the head when putting it on.

Lacing with an elastic cord. The cord lock makes it possible to adjust the lacing, hence also the opening in the collar.
The tag indicates where to open the hatch. Velcro keeps the hatch in place.

Open upwards.

Close and opening solution as a slide seal bag.

Make the identification pocket as a large see-through tag.

A loop to hang an own personal mobile in, the loop can also be used when hanging the garment up.
After consultation with the company we agreed on further work on concept 1. The reason to this was that this concept had most potential to fulfil the design demands. We also judged the two concepts with respect to the key words; being adjustable, time effective and flexible. Also from this point of view the company and I experienced that the concept 1 was the right way to go from here.

Furthermore we discussed the different detail solutions of the vest. Together we came to the conclusion that the design of the vest should include Velcro as a closing function of the vest, a zipper as an opening possibility on the collar and a see-through pocket on the back piece. Because there is less fabrics on the front piece and because of the design of the closing mechanism, we came to the conclusion not to have any pockets in the final design.
REFINEMENT // FINAL DESIGN

optimize
When I had the final pattern of my design, I contacted the company Stenwall & Ljungkvist to digitize my pattern and grade it according to the height measurements in the European standard, EN-1150.
1. Wide collar with a zipper
The wide collar makes the vest spacious over the chest and neck which both facilitates dressing and wearing outdoor garment underneath. The opening possibility make it easier to pull the garment over the head.

2. Generous armpits
The generous armpits is to make it easier to move with garment underneath.

3. Closing function
The vest closes with Velcro which is easy to use and provides you a possibility to adjust the width around the waist.

4. Alternative storage
The loops makes it possible to attach for example glowes or a whistle by using a carbine hook.

5. Identification pocket
The user can put his or her personal identification.

6. Elastic piping
The elastic part over the shoulders makes the vest follow the body.

7. Retroreflective area
the retroreflective area extends around the waist.

8. Cord lock adjustment
The canal with a thin rubber band gives a possibility to adjust the lower width according to the amount of clothes worn under.

9. Trade mark
Since the vest is designed as an open piece it is just to pull the head through the generous neck opening. The vest is then fastened by Velcro over the stomach. This is easy to handle also for a child.
I made a suggestion of a trademark to give my vest its own identity. The arc in Reflectil logo type was developed into a trade mark, also inspired of the cat species eye. I got inspired of the cat species eye because of a cats excellent night vision and also that their eyes reflects light, just as retroreflective material do.
I wanted to develop the retroreflective area around the waist from the two plain strips that extends around the waist of today's vests to something more interesting and decorative. My intention was to create an expression of adventure and playfulness.

As with the trademark I was still inspired of the cat species when I continued my work of developing the retroreflective area. The eye in the trademark turned into a cat. I also experimented with other symbols inspired by a treasure map. To me wild animals and treasure hunts can represent child adventures.
During the phase of creating a functional ornament in retroreflective material I learned a lot about different types of reflective materials and their related manufacturing processes. Since I wanted my vest to fulfil the European standard — EN-1150 — there was restrictions about what retroreflective materials that could be used. There are some reflective materials that are approved and some are not.

After consultation with the company I also realized that some of my patterns had too many details to be manufactured at a reasonable price.
Finally I decided to concentrate on the cat pattern and adapt it to my vest.
[Autumn 2007]

When I had presented the vest as my degree work Reflectil and I continued to cooperate. I made some refinements of the vest to optimize the design for production and to make the vest more cost efficient. At that time Reflectil’s intention was to launch the vest to the Swedish market in the autumn 2008. Today we are working on another design of a high visibility vest which is going to be produced in China this autumn 2007.