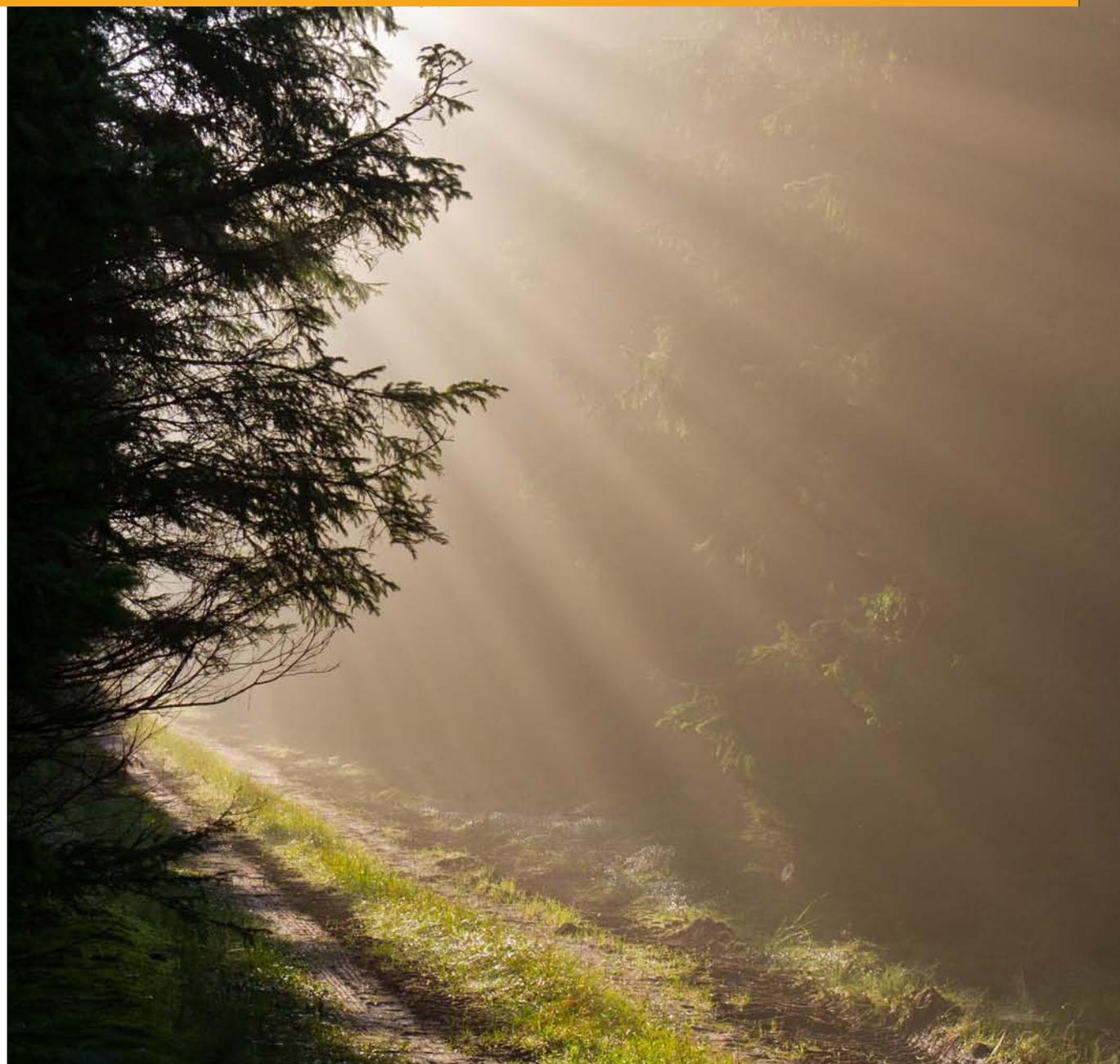


Troldekt A/S Corporate Social Responsibility

Report on Social Responsibility for the UN 2011





LEADERSHIP, VISION, AND VALUES

CSR should be integrated into the corporate strategy. Find out more about leadership visions for responsibility.

3-5

MARKETPLACE ACTIVITIES

At Troldekt, we focus on safety for our customers. Take a closer look at our product certificates.

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Prevention, retention, and fairness are Troldekt code words. Learn more about our workforce activities.

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The production methods of suppliers will be mirrored in the end product. Find out how we encourage good practice in the entire supply chain.

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Dialogue is an important tool when Troldekt needs to learn more about its professional stakeholder groups. Find out why.

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Troldekt A/S works in a sustainable fashion throughout the product life cycle. Discover our environmental performance.

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A Vision For Social Responsibility

A year ago, Trolldtekt A/S joined the world's largest initiative for corporate social responsibility – the UN Global Compact. Joining the Compact carries with it the commitment to report annually on our CSR-progress; in other words, on Trolldtekt A/S' social responsibility in the form of voluntary work in respect of social, ethical, and environmental matters.

Taking responsibility is not a new idea to us. Responsibility is firmly anchored in our values and business culture, just as responsibility plays a central role in our entire set of values. What is new, however, is communicating it to the world at large.

Compared to last year, our areas of activity have increased from four to seven. The new categories come from a report made by the Ashridge Centre for Business and Society on behalf of the Danish Commerce and Companies Agency. With these categories, we now have a methodical basis for working strategically with CSR.

From Cradle to Grave

The concept behind CSR is a natural extension of our own environmental

vision, in which the central idea is the 'product life cycle'. We seek systematically to reduce and minimise the consumption of resources and promote a green and sustainable way forward. Read more about the concept in this year's progress report where even more space has been devoted to the product life cycle than last year.

Enjoy your reading!

Sincerely,
Peer Leth
Managing Director, Trolldtekt A/S

TROLDTEKT A/S VALUES

- A** > **Acting responsibly**
We are positive, helpful and respectful of others
- C** > **Customers are kings**
We ensure our customers a truly sound experience
- O** > **Ongoing development**
We actively incorporate innovation and improvements
- U** > **Uniform quality**
We maintain a consistent and high quality while focusing on improvements
- S** > **Service is top of our agenda**
We provide superior service and consulting
- T** > **Trustworthy and loyal**
We stand by what we say and do
- I** > **Innovation creates value**
We create results
- C** > **Consulting**
We provide professional guidance
- S** > **Solutions**
We develop state-of-the-art solutions

Global Principles - Local Responsibility



The UN Global Compact is the world's biggest, voluntary initiative for corporate social responsibility with 8,700 unionised enterprises and organisations from more than 130 countries. Troldekt joined in 2010.

The aim of the UN Global Compact is a worldwide strengthening of corporate CSR initiatives - also called social responsibility. By joining the UN Global Compact, member organisations commit themselves to 10 principles within the fields of human rights, labour rights, the environment, and anti-corruption. These principles must be reflected in the individual organisation as well as its activities, and an annual progress report must be submitted to the UN.

Our active and solid strong points are the environment and labour rights. With our newly implemented Code of Conduct (see page 12), we are now focusing on human rights and anti-corruption in respect of our supplier management.

Useful Management Tool

Global Compact contains significant principles, and by signing up we will have a set of useful guidelines which, on one hand, demand our commitment and, on the other, provide both fuel and direction to our company's CSR initiatives. All our CSR reports are available for downloading on troldekt.dk. An English version will be available on troldekt.com and a German version on troldekt.de. Certain close associates will receive a printed version of the report while staff will be informed via our intranet.

Troldekt makes a voluntary annual monetary contribution to the Global Compact Foundation. The money is used to increase the awareness of corporate social responsibility worldwide.

THE TEN PRINCIPLES OF THE UN GLOBAL COMPACT

HUMAN RIGHTS

1. Businesses should support and respect the protection of internationally proclaimed human rights
2. make sure that they are not complicit in human rights abuses

LABOUR

3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining
4. the elimination of all forms of forced and compulsory labour
5. the effective abolition of child labour; and
6. elimination of discrimination in respect of employment and occupation

THE ENVIRONMENT

7. Businesses should support a precautionary approach to environmental challenges
8. undertake initiatives to promote greater environmental responsibility; and
9. encourage the development and diffusion of environmentally friendly technologies

ANTI-CORRUPTION

10. Businesses should work against corruption in all its forms, including extortion and bribery

OBJECTIVES FOR LEADERSHIP, VISION, AND VALUES

At Troldekt, we want to work specifically towards including social, ethical, and environmental initiatives in all aspects of our business and supply chain. In other words, the global social responsibility should be traceable in the daily work routines as well as the long term strategic decisions.





Product Certificates – To Be on the Safe Side

Naturally, Troldekt products meet current legal requirements. In addition, we have decided to test and label our products according to a number of voluntary schemes – to provide consumers with extra safety.



All Troldekt products are CE-marked and declared in accordance with the following standards:
EN 13168: The European standard for cement-bonded wood wool. The standard covers the product generally, and is sufficient if cement-bonded wood wool is used for ordinary ceilings e.g. direct installation on battens.
EN 13964: The European standard for suspended ceilings. Suspended ceilings are defined as ceilings with a minimum of 1 m³ air behind. The product requirements in this standard are tougher than in EN 13168. As a producer, we have, in effect, no way of knowing whether the Troldekt panels will be applied as a direct installation or as a suspended ceiling. For this reason, we have opted to play safe with regard to our customers and mark all Troldekt acoustic panels according to both standards.



Troldekt holds the Indoor Climate Label in the best category. See page 25 for more information.



Troldekt is PEFC-certified. See page 20 for more information.



Ceiling and wall claddings in sports centres are exposed to considerable impact. Impact resistance is a parameter in EN 13964, but, in addition to this, we have chosen to have a number of constructions tested according to the voluntary German norm, DIN 18032, Teil 3. The constructions have passed a so-called ball impact test and are thus suitable for ceilings and walls in sports centres.



Having got the Finnish M1-labelling, we can guarantee that Troldekt products comply with strict requirements in respect of chemical emission in workplaces and private homes. This is a voluntary labelling scheme and a counterpart to the Indoor Climate Label, which is recognised in Denmark as well as in Norway.

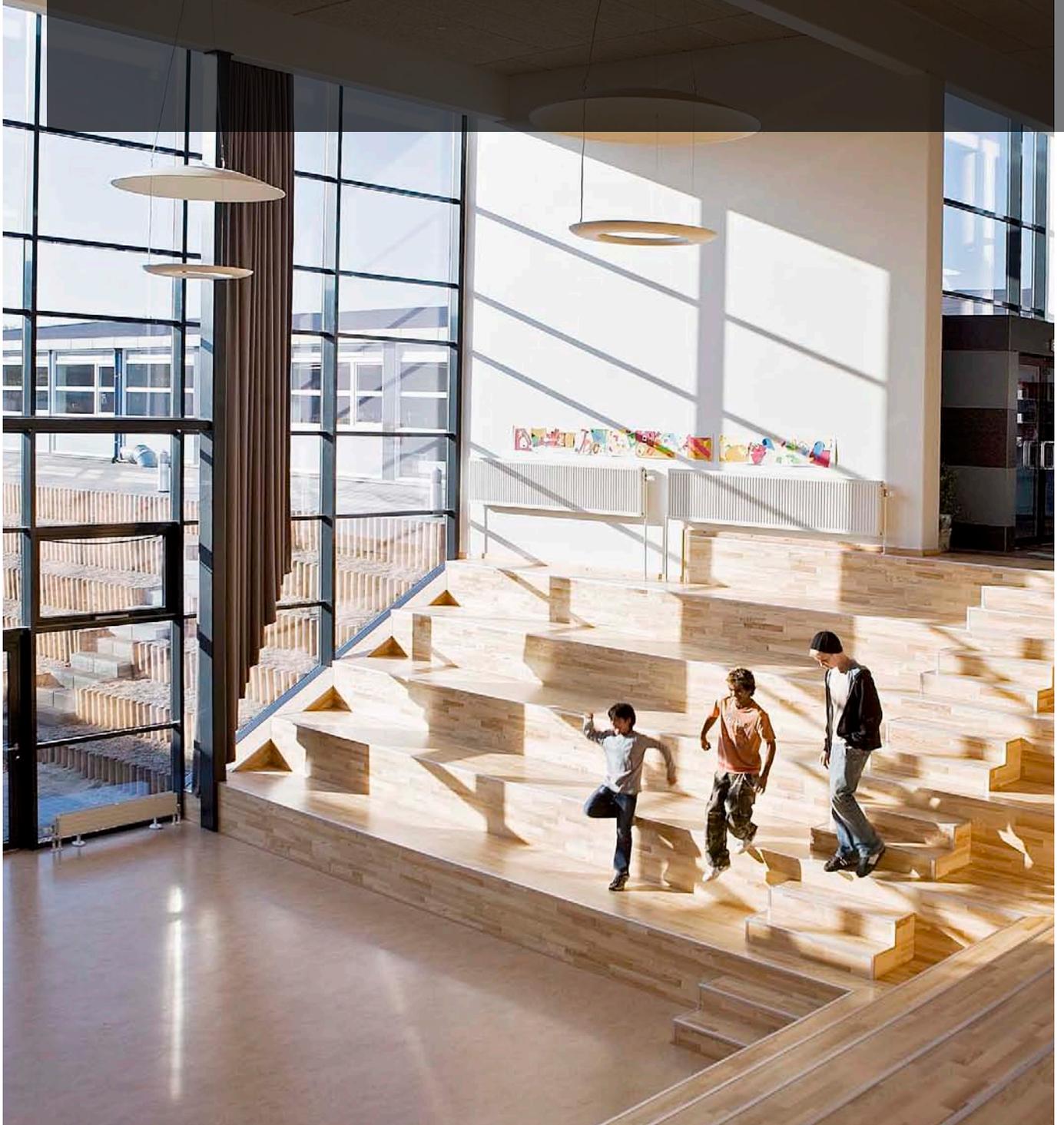


Although CE-marked, Troldekt products are also MK-approved. The Danish MK-Approval is a voluntary certification scheme for materials and constructions in the building sector. The CE-marking system does not reflect the requirements of the Danish Building Regulations and thus the MK-approval provides consumers with the guarantee that the product may be used legally in Denmark.

OBJECTIVES FOR MARKETPLACE ACTIVITIES

Troldtekt products should always meet the legal requirements on the markets where they are sold.

In addition to this, we shall endeavour to test and label our Troldtekt products according to voluntary schemes in order to give our customers extra reassurance in respect of durability, health, and environmental impact.





Prevention, Retention and Fairness

At Troldekt A/S, we believe in an open, trusting, and unprejudiced dialogue based on our staff manual and general staff policy. The point of departure is a positive view on people and mutual respect regardless of sex, working capacity, and origin. We know that staff development equals business development.

We wish to support and accommodate our staff so that everyone has the best possible conditions for thriving at work. Therefore, all new colleagues are channelled through an induction programme – typically on-the-job training. Representatives from both management and employee sides come together in the works

committee to discuss work-related issues, policies, and post-training, but also to harmonise expectations to machinery and method. We offer flexible working hours for staff with relevant personal, family, or health-related needs.

Diversity is Second Nature

We view differences in sex, age, ability, and ethnic background as a strength. We believe that the diversity of backgrounds that exist among our colleagues bring valuable competencies to the company. Approximately 30 per cent of the production staff at Troldhede are not ethnic Danes – several of these have celebrated their 10th and 15th anniversaries with us. Two colleagues are employed with wage subsidy, and staff members on long-term sick

leave are offered a slow job return with 1-2 working hours per day.

Education Benefits All

In 2009, we offered all employees – from production to management – a Danish language course to strengthen individual language competence. We arranged three basic courses in the categories of grammar, dyslexia, and an intermediate language level. The courses ended in spring 2010 and was seen as quite an eye-opener. In addition to these ad hoc courses, we continue to train our maintenance staff, who service our production machinery, on a daily basis. This is an integral part of retaining and developing their competencies – e.g. within robot technology. Relevant post-training is an offer open to all staff if they so wish.



Health, Safety, and Stability

Troldtekt A/S aims to create a secure and stable workplace. A prerequisite for this is safety and a healthy working environment. Our strategy is, firstly, prevention where possible - and, secondly, to be prepared for anything.

> NEW TECHNOLOGY IN THE MACHINING DEPARTMENT

During summer 2011, new robots were installed in our stacking unit. The robots will relieve the operators of the work involved in sorting the 14kg-apiece Troldtekt panels according to quality. Earlier, the operators had to manually put the faulty panels aside as well as placing fresh pallets into the unit when the previous ones were full. But no longer. The new robots save one employee having to lift 1 ton per day.

> FITNESS DAY

On 22 September, we closed down the factory for a day to stage a fitness day for the staff. This took place at Troldhede Kultur- og Fritidscenter (local sports centre) and included football, hockey, curling, table tennis, and badminton.

> GOOD HEALTH STRENGTHENS THE COMPANY

Employees at Troldtekt A/S are covered by a health insurance scheme which ensures fast treatment by specialists or at private hospitals, and also the majority of treatments at e.g. chiropractors, physiotherapists, psychologists, and clinical dietitians. In addition to the legally required health checks for our night shift staff, we also have special guidelines regarding how to prevent and reduce sick leave, occupational accidents and diseases. These guidelines are written into our policy on human resources.

> STRONG ON SAFETY

Troldtekt A/S works in a goal-oriented way to reduce the number of occupational accidents and we make considerable efforts at ensuring a healthy physical and psychological working environment. To this end, we have held first-aid courses, purchased defibrillators and trained staff in their use; we are also keeping a register of near misses - in 2011, a fire and evacuation exercise was held in conjunction with Falck (Danish emergency service). Furthermore, we have a well-functioning safety organisation and carry out a systematic effort with regard to workstation assessments in conjunction with AM-Gruppen. As a result of this, dust and noise levels are monitored closely, and uneven driveways will be repaired so that truck drivers will avoid jolts and bumps.



Love without Limits

Troldekt A/S believes that love between people should be limitless - even extending beyond borders. So we decided to give economic support to an employee whose wife is struggling to gain residence in Denmark.

26-year-old Rafaz Mohammed from Sri Lanka is a textbook example of a well-integrated immigrant. He has a job, a wife and two children, he is a house-owner - and he is a former Danish Youth Cricket Team player. All the same, the Danish authorities refuse to grant permanent residence to his wife, Shifani, also a Sri Lankan, regardless of the fact that she would seem to meet all requirements and has no longer any connection to her country of birth.

- My wife and I are very desperate. We do not know what to do. We have two children. A girl of three and a baby girl of two months who cannot do without her mother's care and proximity. If my wife will have to leave the country, she will

not even be able to bring our baby daughter, because there is not sufficient time for her name to be entered in Shifani's passport. It is inhumane, says Rafaz Mohammed.

The Limits of Love Becoming Evident

During the summer of 2007, Rafaz married his childhood friend, Shifani, whom he had known since school in Sri Lanka. That year, when Shifani moved to Denmark to be with her husband who lived - as he still does - with his parents in a bungalow in Herning, the family quickly applied for residence for her. This was not possible, however, as the newly-weds were only 22 years of age and therefore did not meet the Danish family reunification rules - which stipulate a minimum age of 24.

A Helping Hand From Troldekt

During the process, Rafaz and his wife have been in contact with several lawyers who have helped them appeal their case. However, it

is both expensive and exhausting for a young family to bring a case against the authorities. Therefore, it was a welcome shimmer of hope when Rafaz received a grant from the Troldekt A/S Hammerich Foundation, which assists employees going through a difficult period in their lives.

- My shop steward had heard about my family situation and had then contacted the Managing Director without my knowing. They decided then to give us economic help from the Hammerich Foundation, which now contribute to the payment of our legal fees while the case runs, says Rafaz, who is very grateful for the support.

> ABOUT THE HAMMERICH FOUNDATION

The Hammerich Foundation is named after the former company owner, the wholesaler L. Hammerich, and was set up in 1936. Its aims are to provide present and former employees with economic assistance in times of need.

OBJECTIVES FOR WORKFORCE ACTIVITIES

The objectives for the reporting period 2010-2011 were to reduce occupational injuries to 5. So far, this has been achieved as we have had 4 occupational injuries during the first 3 quarters.

Furthermore, sick leave should be kept below 2 per cent. In the first quarter, it amounted to a mere 1.36 per cent.

In 2012, Troldekt aims to continue the work to keep sick leave below 2 per cent on an annual basis, and occupational injuries below 5. We will also continue to provide assistance to employees with special needs.

Occupational injuries:

2010: 5
2011: 4 (Jan - Sept)

Sick leave:

2010: 1.96 %
2011: 1.36 % (Jan - Mar)





Responsibility in Several Tiers

With the new Code of Conduct, we want to ensure that our suppliers subscribe to environmental, ethical, and social concerns at a similar level to ourselves.

With a Code of Conduct, we have gained an efficient tool to ensure commitment from our suppliers. The raw materials included in our acoustic panels - wood and cement - are already produced with focus on sustainability in accordance with strict environmental requirements. Using the Code of Conduct, we can focus systematically on the remaining suppliers, eventually achieving a sustainable purchasing policy with regard to the entire supply chain.

The Work

For a structured approach to supplier management, we have centralised our purchasing activities. In practice, we have divided the approximately

100 largest suppliers into types and categorised them according to volume of turnover. Our ambition is that 90 per cent of the product-related suppliers, who constitute 90 per cent of our purchasing volume, will have signed a Code of Conduct within a three-year period.

Dialogue is Crucial

Troldtekt A/S categorises suppliers in risk groups according to their strategic importance, and the degree of risk of them contravening the guidelines. Those in the low-risk group will be asked to sign our Code of Conduct. Those in the medium-risk group will, furthermore, be asked to complete a self evaluation form, while those in the high-risk group may receive a visit from Troldtekt A/S. At present, 95 per cent of our product-related suppliers land in the low-risk group, five per cent in the medium-risk group, and we have no-one in the high-risk group. Should

circumstances change with regard to existing suppliers, or should the ongoing supplier assessment turn up suppliers in the high-risk group, we would basically wish to continue our collaboration and, through dialogue, seek to persuade them to heighten their standards.

> CODE OF CONDUCT FOR TROLDTEKT A/S

Troldtekt A/S asks suppliers to sign a Code of Conduct, thereby committing themselves to observe the internationally recognised standards with regard to:

- Forced labour
- Child labour
- Non-discrimination
- Freedom of association
- The working environment
- Terms of employment
- Health and safety
- Company products
- Environmental protection

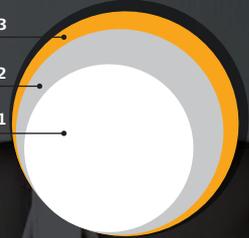
OBJECTIVES FOR SUPPLY CHAIN ACTIVITIES

Troldekt A/S will work towards getting suppliers to effectively adopt our Code of Conduct. Our aim will be, gradually, to ensure that 90 per cent of the product related suppliers, who constitute 90 per cent of our purchasing volume, will have implemented our Code of Conduct in 2013.

We expect to reach our stated objective of 50 per cent for 2011 before the end of the year.

Implementation of the Code of Conduct

- 90% in 2013
- 75% in 2012
- 50% in 2011





The Dialogue About Future Considerations

CSR is about incorporating ethical considerations into the business strategy. It is important to us that these considerations are developed and evaluated in a current dialogue with our stakeholders.

Troldtekt A/S has a number of different stakeholders. One of these has already been described elsewhere in this report, so let us now focus on architects and industry trade groups.

Architects

We have an on-going dialogue with architects who often need advice about how to best meet the requirements with regard to acoustics - e.g. reverberation times in teaching facilities or childcare centres as stipulated by the authorities. To assist with this, we have developed a web-based acoustics calculator - www.troldtekt.com/Acoustics-calculator - where you can get an idea of the acoustic effect the architect's choice of materials will have. In close collaboration with architects, we

have developed a free three-hour seminar on acoustics where e.g. the acoustician, Jan Voetmann, presents the essential concepts on the subject of acoustics.

Industry Sector Groups

We are an active member of the industry sector group, DI Byggematerialer (Confederation of Danish Industry - building materials sector). Our Managing Director, Peer Leth, sits on the DI Byggepolitiske specialudvalg (special committee on construction policy), established to create a joint debating forum within DI where agendas for construction policy can be discussed.

We attempt, together with other Danish building materials suppliers, to actively influence TUN (the Danish association of timber merchants) to make a strategic decision to the effect that the distributive sector must prioritise sustainable building materials. In 2011, TUN hosted the European UFEMAT Congress with particular focus on the climate,

energy, and the environment and how producers and suppliers of building materials might make a difference in this field. The main speaker of the conference, Connie Hedegaard, European Commissioner for Climate Action, emphasised the necessity for the sector to back up suppliers' sustainable solutions, thus giving consumers a real opportunity to opt for climate-friendly building materials. As the recipient of the Danish Construction Sector's Environment Award in 2010, Troldtekt was asked to speak at the conference.

'Acoustics is a subject, about which we architects know very little. So we have been very happy to get a serious introduction to essential concepts such as reverberation time, STI-values and frequency areas at the mini seminar held by Troldtekt A/S.'

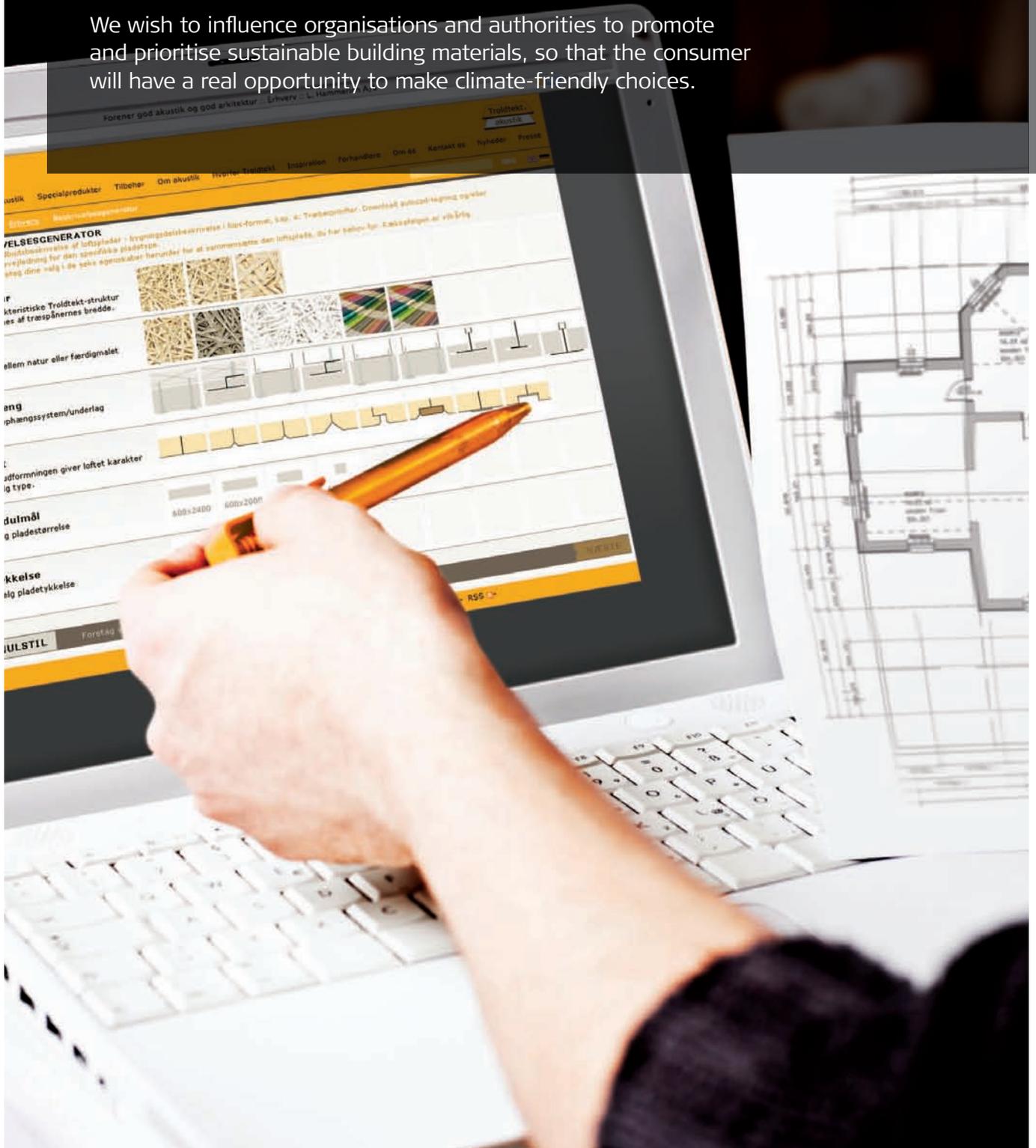
Katja Viltoft, seminar participant
JJW ARKITEKTER

OBJECTIVES FOR OUR STAKEHOLDER ENGAGEMENT

Troldtekt A/S wants a close dialogue with all stakeholders. We wish to develop and improve our website and web solutions, providing a basis for increased dialogue with our stakeholders.

We wish to influence building sector players to include acoustics in buildings at an early stage thus avoiding bad acoustics and costly adjustments later on.

We wish to influence organisations and authorities to promote and prioritise sustainable building materials, so that the consumer will have a real opportunity to make climate-friendly choices.





Support Where it Makes a Difference

800,000 Danes have sound or hearing disorders and good acoustics is particularly important for them. That is why Troldekt A/S collaborates with Høreforeningen (The Danish Association of the Hard of Hearing).

In 2010, Troldekt became a sponsor for Høreforeningen. A sponsorship which makes good sense, because everyday life for the hard of hearing is greatly improved by a comfortable sound environment. In this way, Høreforeningen and Troldekt share an interest in getting the message about acoustics being an essential part of good architecture across to the various players in the building process.

Film for the Hard of Hearing

As part of the work with Høreforeningen, Troldekt sponsored the external acoustician, Jan Voetmann, to give a lecture on the 2010 national event for parents to children with hearing disorders. Our film on acoustics, which introduces the essential ideas of acoustics, has now been subtitled for the hard of hearing - requested by Høreforeningen. Recently, we also made a subtitled version for the hard of hearing of a family's 'before-and-after' story.

> TROLDTEKT SPONSORS

Høreforeningen

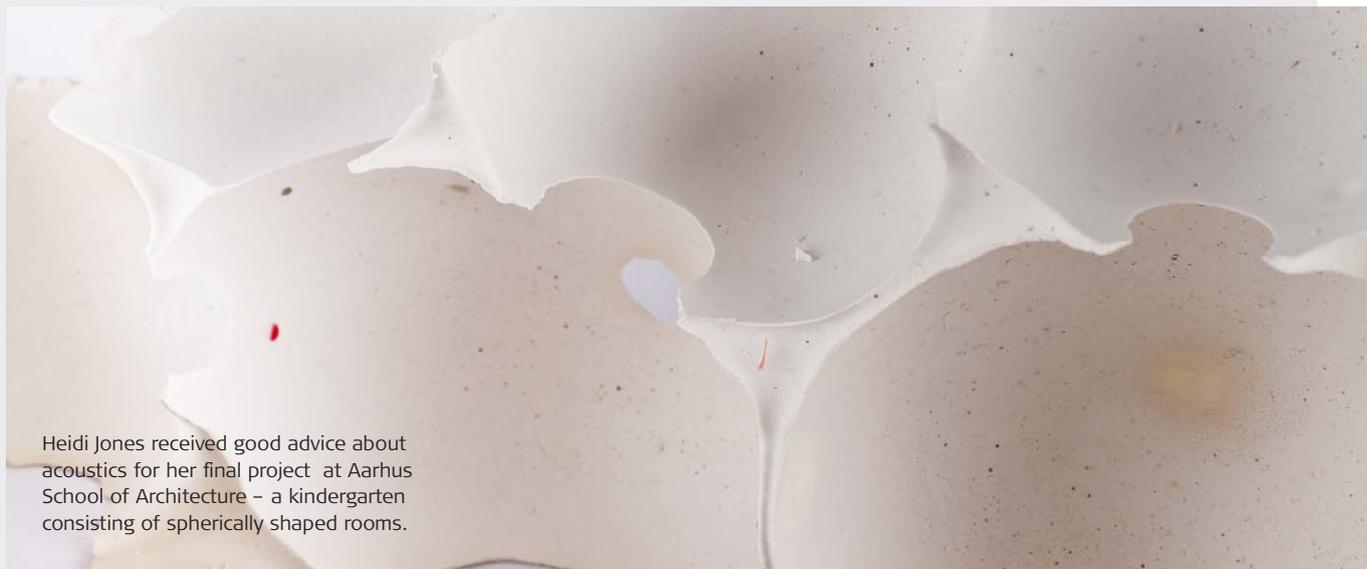
Høreforeningen is a disability organisation handling the concerns of more than 800,000 people with hearing disorders. They do this by mainly working to improve living conditions for those affected by hearing problems or diseases of the ear. This affects every sixth person over the age of 18.



Dansk Akustisk Selskab

The aim of Dansk Akustisk Selskab (DAS) (Danish Acoustics Association) is to disseminate knowledge and awareness of acoustics and its application in Denmark and to make contact between interested parties home and abroad.





Heidi Jones received good advice about acoustics for her final project at Aarhus School of Architecture – a kindergarten consisting of spherically shaped rooms.

Support for the Up and Coming

Troldtekt recognises that students of architecture, design, and engineering work with the most recent trends, ideas and possibilities. This we would like to support. Firstly, because we appreciate the inspiration and, secondly, because the students, one day, will be decision makers and, finally, because we wish to back up the building trade and the development of the individual student.

> PLAYING WITH ORGANIC SHAPES

Heidi Jones, a young student of architecture from Aarhus embarked on her final project in spring 2011 – a kindergarten consisting of spherically shaped rooms. She found herself needing good advice on acoustics, so she contacted our product developer, Niels Kappel. At the college, she had already made a plaster cast model using small water balloons. According to the requirements of the Danish Building Regulations on acoustics in daycare centres, the reverberation time must be max. 0.4 sec. In other words, the noise made in the room must disappear in 0,4 seconds flat – failing which the sound conditions will not meet the legal requirements. Niels Kappel suggested cladding the upper half of the sphere with Troldtekt panels with added mineral wool on the reverse side to ensure that children as well as staff would be able to make themselves heard. Heidi was pleased with this advice.

> GALLERY FOR YOUNG ARTISTS

Where do young artists from West Denmark go to share their art with the world? Soon, the answer will be Vestjyllands Kunstpavillon – a new gallery in Ringkøbing-Skjern Municipality focusing on the up and coming and the newest in architecture, design, and art. The aim of the art gallery, which is still on the drawing board, is to provide those coming from West Denmark with space and inspiration to develop their own ideas, creative powers, and storytelling skills. The people behind the gallery are two artists with associations to Videbæk: The painter, Jens Lund, and the architect, Henning Larsen. Troldtekt A/S is the sponsor and the local collaboration partner on the gallery project.

> SUPPORT TO YOUNG TIMBER MERCHANTS

Troldtekt sponsors Foreningen for Unge Trælastfolk (The Association of Young Timber Merchants) whose aim is to gather young people within the building trade and keep them updated on matters of interest within their field. In February 2012, we shall be welcoming the young merchants to a factory visit in Troldhede.





A Natural Talent

Niels Brix, a student of architecture, became the first recipient of the Troldekt Award, which was inaugurated in 2010 to celebrate the 75th anniversary of Troldekt. Find out more about his winning entry 'Soundbubbles', which provides decorative lighting as well as improving acoustics in large rooms.

The way the fibres in the cement-bonded wood wool intertwine, 'Soundbubbles' resemble huge, glowing balls of wool more than anything else. But the creative bubbles in cement-bonded wood wool are conceived as installations in various dimensions hanging from the ceiling in rustic environments with large surfaces. The idea was conceived by Niels Brix, a student at The Royal Danish Academy of Fine Arts, School of Architecture in Copenhagen. He has now received the 2010 Troldekt Award and a trip to Rio de Janeiro for his unconventional and original use of Troldekt.

– It is a huge pat on the back to be the first to receive the Award, says Niels Brix and adds the following comments about the idea which resulted in the Award:

– I wanted to challenge the structure of the Troldekt panels, which are very static in their form. My aim was a solution with a warm lighting source inside, which can change the size and structure of the bubble. In a large factory hall, the aesthetic qualities can break up the ceiling surfaces while also remodeling the sound.

Judges Surprised

The panel of judges found the idea sufficiently surprising to select Niels Brix for the Troldekt Award, which now has been presented for the first time.

– The project was not something we could have conjured up just like that. It presents a challenge to the material form and inspires us judges to further creative development, says Helene Høyer Mikkelsen, architect MAA, and a member of the panel.

– 'Soundbubbles' could hang in an old factory where they would add a certain atmosphere to the lighting while also having an acoustic impact, she says.



> ABOUT THE TROLDEKT AWARD

The Troldekt Award goes to a student who includes Troldekt in an architectural project in a new and original way. Acoustic considerations need not be part of the idea. The Award was inaugurated in connection with the 75th anniversary of Troldekt, in 2010.

> NEW CONCEPT FROM 2012

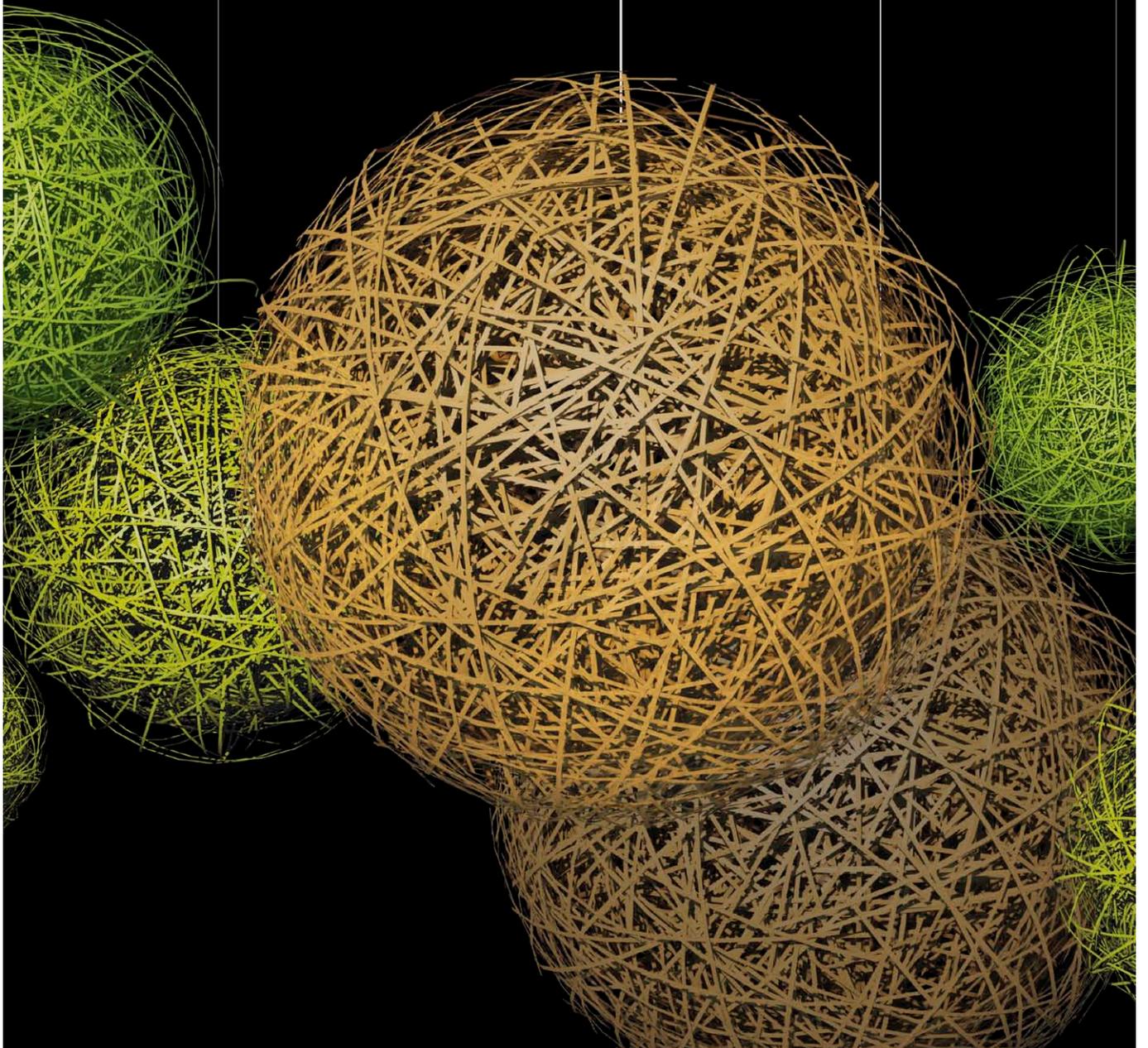
In future, the Troldekt Award will be given away biennially – next time in 2012 – and now also available to students of architecture abroad.

OBJECTIVES FOR COMMUNITY ACTIVITIES

We want to increase our collaboration with Høreforeningen in the form the Association finds most appropriate in order to benefit from our competencies and knowledge of acoustics and sound.

We want to strengthen the collaboration with relevant educational institutions to facilitate the exchange of know-how and inspiration for the benefit of the individual student, the colleges, and Troldekt A/S.

The Troldekt Award will become an international competition for architects appealing to students from widely different design cultures.



1. MATERIALS

Danish raw materials – PEFC-certified wood from Danish forests and cement from Aalborg Portland.



2. PRODUCTION PROCESS

State-of-the-art and environment conscious production at Trolldhede.



3. TRANSPORT PROCESSES

Raw materials from local area minimises transport.

5. DISPOSAL

Can be composted and re-used as soil improver.

4. APPLICATION

Indoor climate labelling in the best categories according to Dansk Indeklimamærkning.



From Cradle to Grave

Trolldtekt's Product Life Cycle

Materials, production, transport, application, and disposal. During the entire product life cycle – from cradle to grave – Trolldtekt A/S attaches great importance to minimising environmental impact. This is the idea behind the product life cycle which forms a green and sustainable foundation in the company's environmental vision.

Trolldtekt is a natural product made from wood originating from Danish forests and cement from the Danish subsoil. PEFC-certification ensures traceability to sustainable forestry operations. The trees are grown locally and they have been growing for at least 50 years without the addition of artificial fertilizers, pesticides, or other chemical substances. The cement comes from

Aalborg Portland, which is subject to stringent environmental regulations.

Green Heating

The production of Trolldtekt takes place in western Denmark and, more specifically, in a closed circuit without the discharge of waste water. 95 per cent of the energy used for heating the modern factory comes from CO₂-neutral wood waste and bark from the production of Trolldtekt.

A Minimum of Transport

As Trolldtekt aims to use raw materials from the local area – wood from forests in western Denmark and cement from Aalborg Portland – the environmental impact resulting from transport has been significantly reduced.

Indoor Climate in the Best Category

Already in 1997, Dansk Indeklima Mærkning (The indoor climate labelling in Denmark) awarded Trolldtekt the Indoor Climate Label in the best category. This means, in practice, that Trolldtekt releases a minimum of particles and gasses in the application phase.

Back to Nature

KomTek A/S processes the waste from the production plant at Trolldhede into soil improvers. Production waste is particularly effective as compost, as the high calcium content of the cement increases oxidation and the fibre content of the panels makes high quality compost

Read more about the Trolldtekt product life cycle on the next seven pages.





PHASE 1:
MATERIALS



Product Life Cycle Materials

> CEMENT FROM AALBORG PORTLAND

The extraction of cement is a process demanding heavy resources, but the cement used for Troldekt products come exclusively from Aalborg Portland, which is subject to stringent Danish environmental regulations. Aalborg Portland produces the cement using state-of-the-art production methods, and they carry out intensive research into making environmental and energy improvements as well as reducing the CO₂-discharge.



> AALBORG PORTLAND'S ENVIRONMENT CERTIFICATES

ISO 14001:2004: International standard for environmental management. A guarantee that the company's processes, activities, and competencies are directed towards minimising external environmental impact.

EMAS: Means Eco Management and Audit Scheme. Companies which are EMAS-registered must, in addition to introducing environment management, also prepare an environmental statement, which must be publicly available.

Positive verification declaration on CO₂-discharge: Aalborg Portland reports their CO₂-discharge annually to the Danish Energy Agency. An independent verification report is then made, which, using objective criteria, will assess whether the consumption is positive or negative in relation to the allocated CO₂-offset.

All certificates are approved and issued by DS Certificering A/S.



PHASE 1:
MATERIALS



Product Life Cycle Materials



> PEFC-CERTIFIED WOOD

The wood in Troldekt products are supplied, in part, by Hede Danmark, who manages huge forested areas in western Denmark. Here, the trees have grown for at least 50 years without the addition of artificial fertilizers, pesticides, or other chemical substances. As the wood meets the definition and recommendations of European governments with regard to sustainable forestry operations, Troldekt has achieved PEFC-certification. The certification is based on clear and palpable standards for forestry operations together with traceability, marking, and independent checks. PEFC is the ideal link between producer and consumer.

> HEDEDANMARK A/S

- is one of Denmark's leading service and trading enterprises within care and development of woodland, open country, gardens and parks as well as townscapes.
- manages more than 100,000 ha. of woodland in Denmark for pension funds and farmers, in particular.
- assists forest owners in getting certified.





HedeDanmark

– Sustainable Forestry Operations

The need to protect the world's forests will increase the demand for sustainable wood, felled with care to the natural diversity of the forests. HedeDanmark has chosen to have still more of their forests PEFC-certified. In this way, they are able to document to customers and the community at large that their forests are not just for business, but allow space for flora and fauna.

HedeDanmark supplies a good deal of the PEFC-certified wood purchased by Troldekt A/S. HedeDanmark is a major supplier of sustainable wood from Danish forests – and so they rank among Denmark's expert companies within PEFC-certification.

– It is not that a certification will revolutionise the way we manage the forests in Denmark, says Kim Nyrup Nielsen, who is a forest engineer with HedeDanmark. He refers to the fact that Danish forestry generally enjoys reasonable conditions.

– Denmark has a long tradition for sustainable forestry, because the Danish forestry legislation has been formulated with the aim of maintaining and extending wooded areas, he explains. But that is not to say that the certification is superfluous.

– The certification documents sustainable forestry, he says. Documentation is required, certainly. Not least in relation to customers and the public who increasingly wants to have proof that the forestry operations are carried out in a responsible fashion.

From Monoculture to Diversity

In certain aspects, forestry has become greener. The PEFC certification means, for example, that a more extensive percentage of forests are now untouched – five per cent must not be touched, at all, but must be left to develop as nature intended. Diversity is a theme in the certification concept which also means that the forestry workers

must not drive machines through the wet areas of the forest, which act as natural habitats for amphibians and insects. All wet areas must be registered so that the forestry workers always know which areas to avoid. The composition of tree types are also altered as a result of certification. For centuries, Danish forests have been characterised as monocultures, but the PEFC-certification requires the tree types to be mixed. This is intended to create better living conditions for animal life and will also stabilise the forests, which may be rendered vulnerable during storms.

> HEDEDANMARK'S PEFC-CERTIFICATION MEANS THAT

- 5 per cent of the forests remain completely untouched.
- forest machinery must not pass through natural wet areas.
- a thorough forestry plan is prepared for each individual forest – a so-called green forestry plan.
- all conditions in the forest are registered and mapped.

PHASE 2: PRODUCTION PROCESS



Product Life Cycle

Production Process

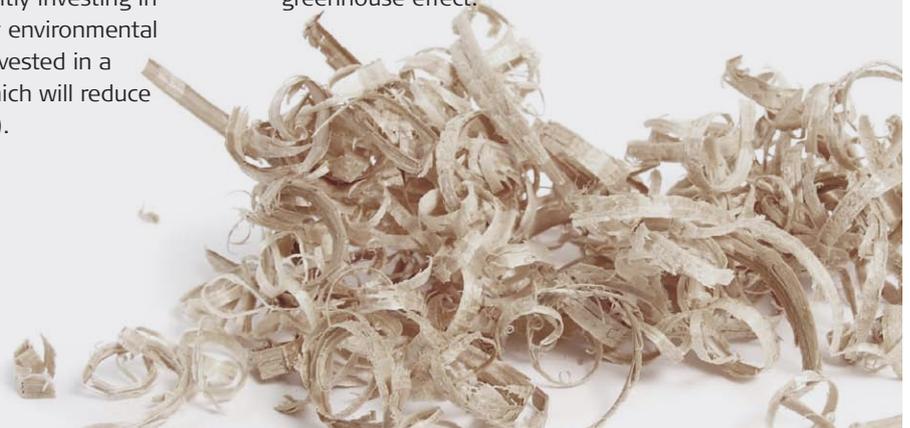
> CONSIDERING WATER, SOIL, AND AIR

Troldtekt panels are made of 100 per cent natural materials – and considerations about the environment can be traced throughout the production. It is important to us that the consumption of raw materials and discharge into water, soil, and air will take place with a minimum of external environmental impact. Although we do a lot for the environment, we are always looking for solutions which will further environment-friendly production processes. We are currently investing in new technology which will bring our environmental vision forward. Recently, we have invested in a Danish-made spray painting unit which will reduce paint waste (read more on page 23).

With CO₂-neutral fuels such as bark and waste wood, Troldtekt manages to heat approx. 95% of the factory at Troldhede.

> CO₂-NEUTRAL ENERGY

Approximately 95 per cent of the energy consumed to provide heating at the factory comes from CO₂-neutral wood fuel from wood waste and bark from the production of Troldtekt. Wood is a CO₂-neutral energy (fuel), because the burning of wood releases carbon dioxide (CO₂) which is already in circulation, while the burning of coal, oil, and gas will add new carbon drawn from the centre of the earth into the carbon cycle, responsible for enhancing the greenhouse effect.





New in 2011

Robopaint Reduces Paint Waste

In 2011, we found a new method to spray-paint our acoustic panels. A method which not merely reduces the consumption of paint, but which also means that we need to use less water to clean the unit. Investing in the spraying unit, Robopaint, made this possible.

No More Over-Consumption

Although Troldekt exclusively uses water-based paint, we do not want to use more paint than absolutely necessary. With our old spraying unit, we often had to overdose the paint somewhat in order to ensure adequate coverage. Consequently, the consumption was relatively high, and from time to time there were problems with varying paint

thickness on the open surface structure.

Uniform High Quality

With the Robopaint unit, we have achieved an increasingly uniform product quality. This is, not least, due to a more stable feed of panels into the unit and also to the angled jets making sure that the paint reaches well under the top fibres thus giving an increasingly uniform paint application on the whole surface.

Saving Water for Cleaning

Less waste and over-consumption also mean that the cleaning procedure has become much easier. Earlier, the unit had to be cleaned using a high-pressure cleaner between each changeover. Now, everything can be done using a

bucket of water and a few cloths. On a yearly basis, there have been savings on both electricity and water.

> WISE INVESTMENT

Towards the end of 2010, Troldekt A/S managers became aware that the painting process at the Troldekte factory could be optimised. Already in January 2011, the new unit was installed and it has been running round the clock ever since working in three shifts. Calculations show that the investment will have paid for itself in less than two years.

PHASE 3: TRANSPORT PROCESSES



Product Life Cycle

Transport Processes

> MAKING A LITTLE GO A LONG WAY



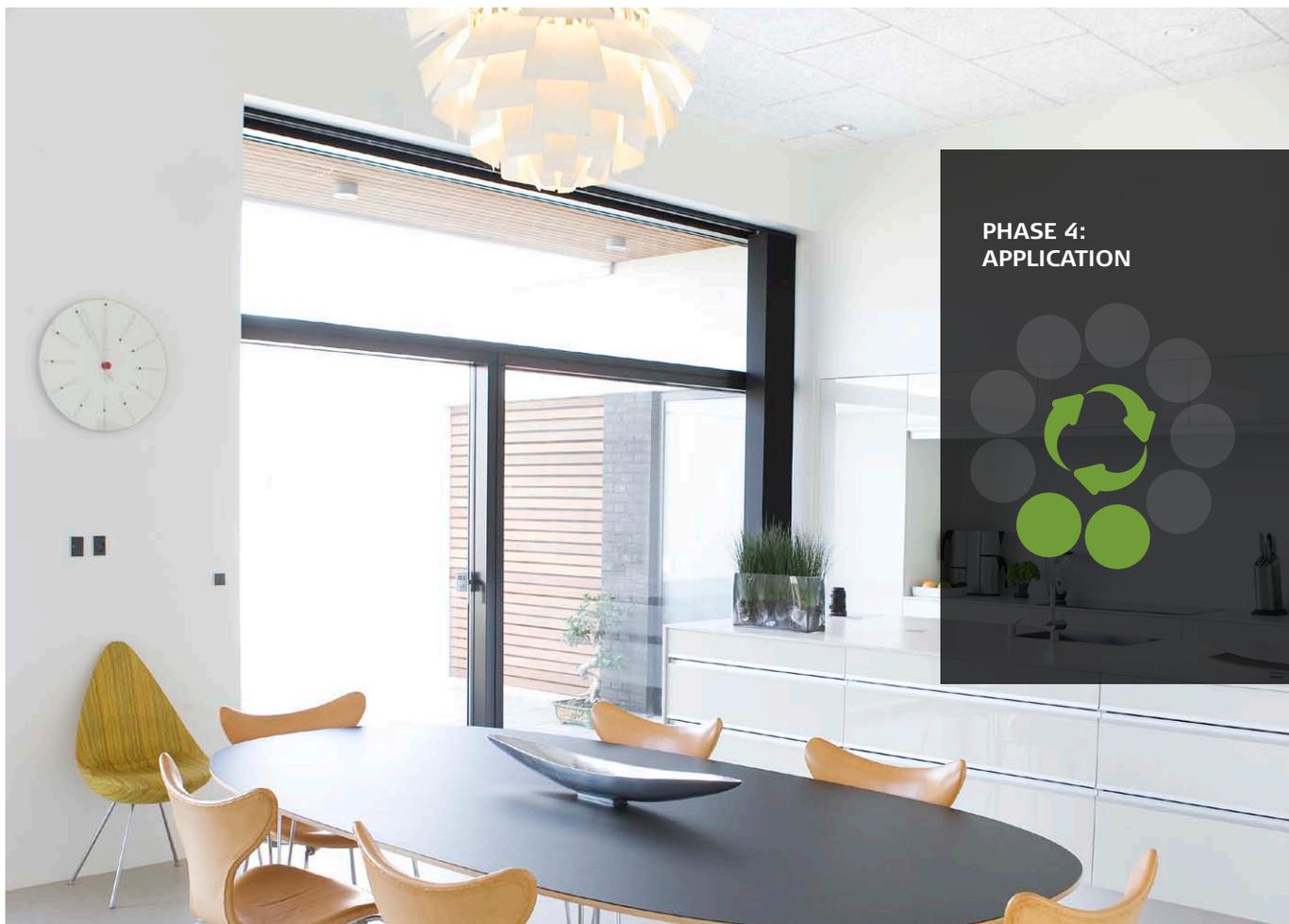
As part of Trolldtekt A/S' vision for the environment, we attempt to limit the fuel consumption for transport where possible. This we do e.g. by using raw wood from the local area i.e. the forests in western Denmark. The wood is transported to the factory at Troldhede by lorry and the consumption of petrol and diesel for tree-felling and transport of raw wood to public roads is very limited. The finished Trolldtekt products are sold through timber merchants who, to a large extent, stock the products. This means that we are able to transport full loads when making deliveries. Fewer trips means less fuel consumed and less CO₂ discharged into the air. We see this as an extra advantage.

> BETTER PACKAGING - LESS TRANSPORT DAMAGE

Damage to building materials during transport leads to irritation, delays - and costs money. To alleviate this, Trolldtekt A/S has now improved the packaging of Trolldtekt panels, reduced the volume of packaging and edge protection which will ease the unpacking on the building site.

> FACTS ON COMPANY CARS

All our petrol-driven company cars have now been replaced by diesel-driven ones doing more mileage to the gallon. This is done to reduce the consumption of fossil fuels - and will further reduce the CO₂-discharge.



Product Life Cycle Application

> TROLDTEKT HELPS YOU - AND NATURE - BREATHE

Troldtekt holds the Indoor Climate Label in the best categories according to Dansk Indeklima Mærkning (Danish Indoor Climate Labelling), which is a voluntary labelling scheme documenting the effect of building materials and products on the indoor climate. In practice, this means that Troldtekt products contribute to a healthy indoor climate, because they ensure natural air circulation within the four walls. This enables the end user to turn down the ventilation while also preserving the environment by reducing electricity consumption.

> TAKING RESPONSIBILITY FOR NEW STANDARDS

Troldtekt does not just passively observe while others dictate the norms for a good indoor climate standard. We assume responsibility in developing them. Partly for this reason, our product developer, Niels Kappel, is a member of the Committee for Indoor Climate Classification (S-474) where he works towards defining and implementing the new standard for classifying indoor climate quality – the so-called DS 3033 standard.



> FACTS ABOUT THE INDOOR CLIMATE LABEL

- The Indoor Climate Label includes extensive requirements to the product in its application phase and provides documentation that the product is suited for all-purpose indoor use. Danish Indoor Climate Labelling issues the Label to products which have undergone extensive testing and possess documentation for only negligible release of chemical substances to the air, only causing very slight pollution of the room.
- To achieve the Danish Indoor Climate Label, de-gassing of the product must decrease within the first 60 days after installation. Troldtekt already meets the requirements by the first monitoring which takes place after 10 days. Ceiling products are also tested for fibre and particle release, and here, too, Troldtekt lands in the best category which is termed 'low particle release'.



**PHASE 5:
DISPOSAL**



Product Life Cycle Disposal

> THE PRODUCT'S LAST JOURNEY

Waste products from the production of Trolldtekt panels are composted by the company, KomTek A/S, utilising bio mass for the production of soil improvers. The cement content of Trolldtekt increases oxidation in the composting process, and the wood constitutes organic material in the compost where the fibre structure helps to improve the quality of the compost. The Trolldtekt waste is sorted so that screws, nails, and other materials will not be mixed with the cement-bonded wood wool waste.

VOLUME OF WASTE 2010

- Cement-bonded wood wool

No. of weighings: 139
Total weight: 2,840.90 tons

- Bark

No. of weighings: 34
Total weight: 818.83 tons

50% of the waste disappear by composting.

> KOMTEK WORKS FOR THE ENVIRONMENT

- KomTek composts cement-bonded wood wool panels and dust including wood wool cement from Trolldtekt A/S.
- Residual products are mixed with other residual products and are composted indoors in long piles. This is a treatment process where organic material is converted into compost by biological breakdown taking place naturally with the presence of oxygen.
- After this, the compost is sold as either bio compost to farming or forestry, or it is used as processed products such as topdressings used for reinforcing the grass in parks or on football pitches.
- Wood wool cement is handled in accordance with an order dealing with the application of organic residual products for agricultural purposes. KomTek holds a permission from e.g. Region Syddanmark (Southern Municipality) for re-using wood wool cement made of white cement for agricultural purposes after having undergone controlled composting.



Communication Without Harming the Environment

Brochures, letters, and magazines traditionally mean a huge waste of resources. However, today there are several ways in which to reduce environmental impact – while still getting your message across to customers and other stakeholders.

This printed matter is
CLIMATE NEUTRALIZED
 according to GA climate calculator
www.ga.dk/climate
 Cert.no. 0007

> CLIMATE NEUTRAL PUBLICATIONS

Troldtekt has decided to collaborate with Zeuner Grafisk, which is one of the first printing houses in Denmark certified to offer climate neutral publications. Using the tool, 'GA climate calculator', Zeuner Grafisk can calculate the extent to which Troldtekt will impact the climate with its printed matter – and then make them carbon neutral by purchasing carbon offsets or carbon credits. In this way, Troldtekt A/S' printed matter will be included in the greater, global environmental accounts setting out clear limitations to environmental impact.



> LESS WASTE WITH DIGITAL PRINTING

Today, digitalisation presents new possibilities of producing printed matter in a responsible manner. For example, at Troldtekt A/S, we have decided to have some of our communication materials printed at We Produce. With digital printing, we are able to print the precise quantity of publications needed – thus reducing waste, energy consumption, and discharge of those chemicals used in normal offset printing.

> READING THE MATERIAL ON THE INTERNET

All printed communication material is accessible at the Troldtekt website as readable pdf-files, there is no need to print them out in order to get a comfortable format. At present, we are working on an online solution which will further improve your reading experience. Our ultimate ambition is to make reading on the internet equally attractive to reading on paper.



> CARBON NEUTRAL WEBSITE

More than 1.800 participants from more than 50 countries have joined this Danish climate initiative. Members support sustainable energy projects such as:

- Establishing Hvidovre Vindmøllelaug (wind mill association) producing carbon neutral energy.
- Golden Standard – an African project replacing open fires with stoves to reduce carbon discharge.
- Purchase and annulment of rights to carbon discharge in the EU.



Energy Savings - More Than Just Good Business

Trolldtekt is a production company – and we cannot run our business without consuming huge quantities of electricity, water, and heating. We have, therefore, made a commitment to save where possible. Fortunately, the economic savings often have a positive effect on the environment.

> RECOVERING WASTE HEAT

For several years, Trolldtekt A/S has had talks with the local Trolldhede CHP (Combined Heating and Power) about the possibility of recovering waste heat from the factory at Trolldhede. In practice, the collaboration would mean that Trolldhede CHP could reduce its heating production, carbon emission as well as offering cheaper heating to the local residents. The necessary approvals from the authorities have now been granted. Trolldtekt expects that the project will start during the spring of 2012 provided that the project is viable and can be realised for the benefit of the town as well as for Trolldtekt A/S.

> EFFECTIVE EXTRACTION REDUCES ENERGY CONSUMPTION

In 2011, Trolldtekt installed a new extraction system which reduces energy consumption and is easy on the environment. The old system consisted of a large fan connected to five separate extraction tubes which were running constantly. Thanks to a sensor, the two new, smaller fans now only extract where machines are actually running. This new equipment saves Trolldtekt 204,600 kWh per year. A saving which will also benefit the environment by way of reduced carbon emission.

> WHAT IS WASTE HEAT?

Waste heat is defined as the heat for which no useful energy application can be found in the production process after optimisation has been completed.

OBJECTIVES FOR ENVIRONMENTAL ACTIVITIES

Troldekt A/S wants primarily to utilise wood from documented sustainable forestry.

In 2010, therefore, we set up the target that 70% of our wood supply in 2013 must be PEFC-certified.

This target has already been achieved as our share of PEFC-certified wood in the period September 2010 – September 2011 has reached 73.63%.

Name	Troldtekt A/S
Address	Head Office Sletvej 2A, DK-8310 Tranbjerg J Production and warehouse Østergade 37, Troldhede, DK-6920 Videbæk
White collar staff	25
Blue collar staff	38
Sector	Construction sector
Contact	Tina Kristensen Head of Marketing and Communications tkr@troldtekt.dk 8747 8100

About Troldtekt

Troldtekt acoustic solutions for ceilings and walls are among the leading products providing good acoustics, effective fire safety, and a healthy indoor climate. Our main product is acoustic panels made from the natural materials, wood and cement. Troldtekt products are used for anything from office and buildings and commercial premises to schools, institutions, sports centres, and private housing. Troldtekt A/S was founded in 1855 as a trading company in Aarhus, and, since 1935, the company has been producing Troldtekt cement-bonded wood wool at Troldhede in western Denmark.

Acknowledgement by

