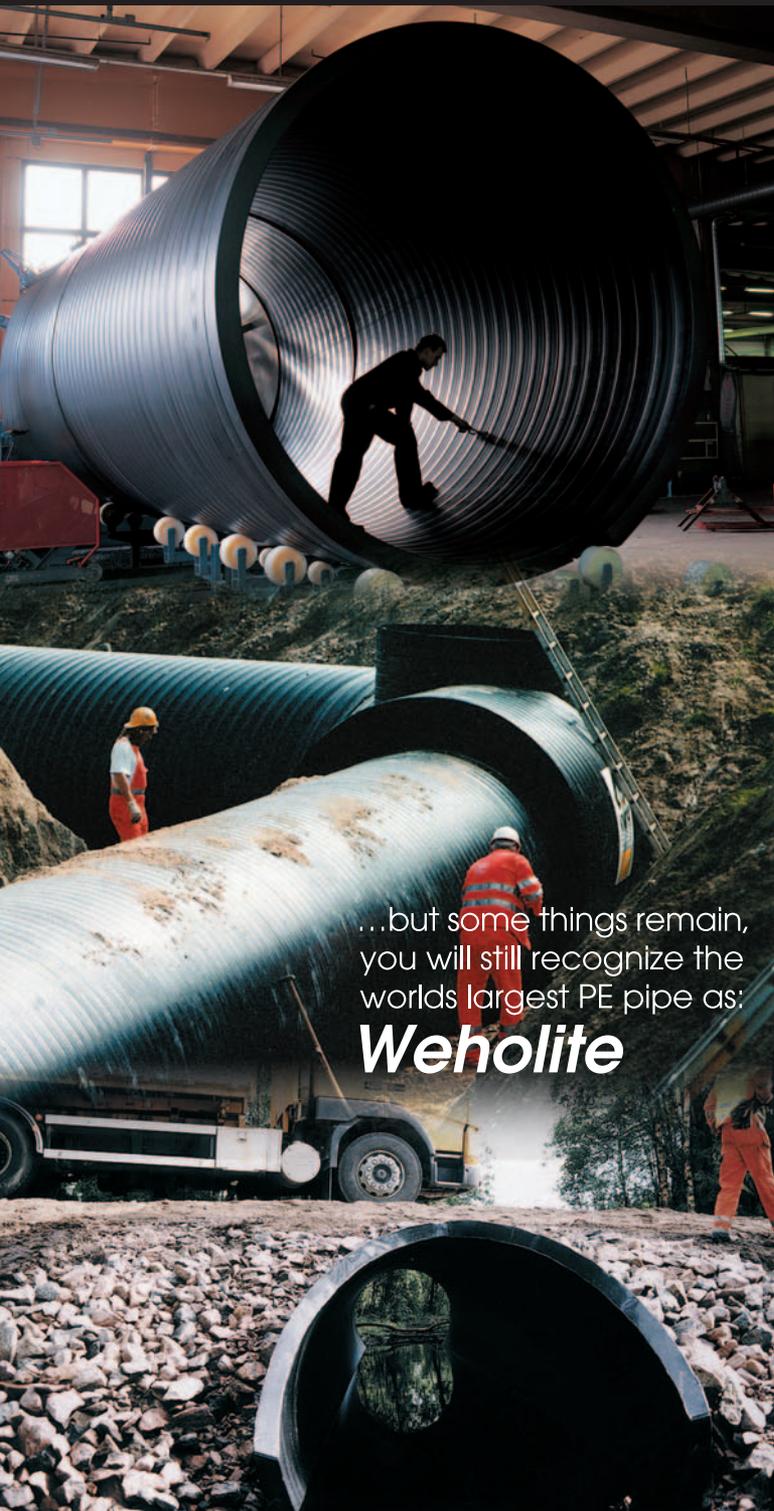




**50 YEARS OF PLASTIC PIPES**  
**Deep lake cooling in Toronto | Become a pipe manufacturer**

**PIPE WORLD – THE KWH PIPE CUSTOMER JOURNAL**

Now you will recognize the KWH Pipe's  
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The Double-Wall pipe family  
is now known as:

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and

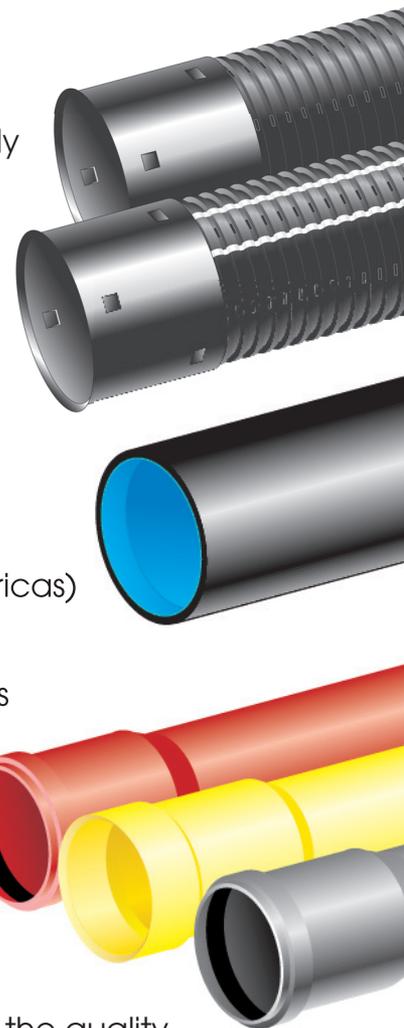
**Sclairpipe** (Americas)

Cable protection products  
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Only the names change – the quality,  
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## Be the best in what you do!

This year it is 75 years since my father, Emil Höglund, together with his good friend Edvin Wiik founded the oldest part of the KWH Group, Oy Wiik & Höglund Ab.

In 1984 the company saw the biggest change in its history as Keppo and Wiik & Höglund merged and the KWH Group got the name it still carries. After the merger the group had nine divisions but by joining similar branches we ended up with five.

Although many things have changed over the years, the fundamental values of the company are the same as they've always been. KWH is a family business, which primarily relies on its own resources and funds for its development.

This is one of the operating principles written down in the goals and guideline for the KWH Group and its divisions. As KWH Group encourages its divisions to independently develop their operations and these operating principles forms the fundamental goals that each division should aim for.

Just as the other divisions KWH Pipe focuses on niches with the goal to be a leading company in the chosen ones. To succeed in this goal we focus on what we know best and strive to be the best in what we do – this has always been an important key to success for KWH and will so remain.

Plastics has been a part of the KWH portfolio for over 50 years and this year as it happens we celebrate exactly 50 years since we produced our first plastic pipe.

During the years KWH Pipe has sustained its position as a leading PE-company around the world. Constantly breaking the records in innovative and big diameter plastic pipes. We have also at the same time developed welding machines for plastic piping and numerous other key features offering our partners the best solutions on the market.

No doubt the structure of the Group will change in some way in the future, too, since development often requires change. It will be exciting to look back at the structure again about 25 years from now when we celebrate our 100th anniversary.

**Peter Höglund**

KWH Pipe, Chairman of the Board  
KWH Group, Managing Director

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#### PIPE WORLD

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## NEWS



### KWH Pipe – Finnish company of the year 2005 in Poland

| **AT A CEREMONY** in March KWH Pipe Poland, the Polish division of KWH Pipe Group, was awarded the title “Finnish Company of the Year 2005 in Poland”. During the special gala at the Sheraton Hotel, Pekka Kuivalainen, General Director of the company, and Tomasz Boruc, Deputy Director General, received the award from Finnish ambassador to Poland, Jan Store.

“Finnish Company of the Year” is awarded every year to Finnish companies operating in Poland. It was initiated by Finpro Poland at the Finnish Embassy, in cooperation with the Finnish Chamber of Commerce. Companies contending for the title are evaluated according to three criteria: image, achieved success and persistence as well as their capacity to implement development projects.

▲ From left Markku Kuismin, head of Finpro, Jan Store, Finnish ambassador, Tomasz Boruc, Deputy Director General and Janne Karjalainen, chairman of the board of Finnish Trade Guild in Poland.

## Scrubbers for Biogas reactors

| **THE SURROUNDINGS** of biogas plants could often be quite unfriendly places as fumes containing both sulphur and ammonia from the process contaminate the air. The problem can be quite easily solved, however, by leading the air through a scrubber (aircleaner) before leading it into the open air.

KWH Pipes are well suited to holding not only the scrubber itself, but to building the complete pipe system required for the biogas reactor. KWH Pipe Denmark mounted the lot, including the scrubber parts in Weholite pipes, and prefabricated and delivered the carrier piping.



## Thank you for visiting us at the IFAT 2005 Exhibition!

| **THE 14TH INTERNATIONAL** Trade Fair brought more than 100,000 visitors to the New Munich Trade Fair Centre during 25–29 April. People from all over Europe came to see the latest trends and innovations in the water, sewage, refuse and recycling sectors. KWH Pipe was prominently present with its own innovation for sewage treatment, the WehoPuts package domestic wastewater treatment plant. Another eye-catching attraction at the KWH Pipe stand was the three metre Weholite pipe.

Please visit [www.kwhpipe.com](http://www.kwhpipe.com) for information on upcoming events!

## APPOINTMENTS

### KWH Pipe Ltd

#### Holding



**Mr Matti Pirinen** was appointed Supply Manager in February 2005. He has previously worked on similar tasks at ABB.

#### Project Services



**Mr Vesa Penttilä** has been appointed Export Manager as of February 2005. He has previously worked as Sales Director at Peillituote Ltd.

### KWH Pipe Canada



**Mr Curt Smigel** was appointed Regional Sales Manager in March 2005 and will take responsibility for the Western Regional Sales office and its operations.



In February **Mr Sandeep Dhillon** was appointed Director of Finance and Administration. Sandeep was previously employed by Ernst & Young where he had previously been working with KWH Pipe.



**Ms Jennifer Schneider** joined KWH Pipe Canada as Fittings Product Manager in March 2005.

### KWH Pipe Finland



**Mr Juha Kainulainen** has been appointed Business Manager for Environmental Technology as of February 2005. Mr Kainulainen was previously Product Manager for PE Pipes at KWH Pipe Finland.



**Mr Pentti Moilanen** has been appointed Business Manager for Export Sales as of February 2005. Mr Moilanen has previously worked as Managing Director of ZAO KWH Pipe, Russia.

### KWH Pipe, Russia



**Ms Victoria Kirsanova** has been appointed ZAO KWH Pipe's new General Director as of February 2005. She has previously worked as Deputy Managing Director of the same company.



## New head office in Denmark

| **KWH PIPE DENMARK** has been growing so vigorously that the company has outgrown the offices and manufacturing space it has occupied for the last 30 years. Since the beginning of January, operations have been transferred to the town of Svinninge, where 7,000 m<sup>2</sup> of office, storage and manhole-manufacturing premises create totally new potential for expanding operations. Above all, the new premises will provide new opportunities for the manufacture of tanks and manholes in terms of component manufacturing and cooperation with designers. The new area at Svinninge covers a total of 28,000 m<sup>2</sup> but the lion's share of production by KWH Pipe Denmark takes place in the town of Middelfart.

## Supplier of the year in Finland

| **AT AN EVENT HELD** at the end of April, Finland's leading wholesaler in the building-services sector, Onninen Ltd, presented KWH Pipe Finland with the Infra business unit Supplier of the Year award for 2004. The citation on the trophy reads 'In recognition of its efficient, high standard of cooperation, the Infra business unit Supplier of the year for 2004 is KWH Pipe Ltd'.



**Wiik & Höglund, the predecessors of KWH Pipe, produced their first plastic pipes in 1955. That marked the start of an amazing success story.**

50 years of plastic pipes

# Plastic pipes – a blessing

In 1984, the Wiik family sold its 50 per cent stake in Oy Wiik & Höglund Ab, a company it had established, to Oy Keppo Ab. This is how the KWH Group came into being. However, the history of the company goes back to the 1920s and 1930s when the timber trade and fur farming were its core businesses.

It all started one night in August 1929 when two friends, Emil Höglund and Edvin Wiik, decided to set up a timber business under the name Wiik & Höglund. The new company soon began shipping timber to different parts of Europe and by the end of the 1930s it was one of the biggest exporters of round timber in Finland.

In 1951, Wiik & Höglund decided to go into the plastics business. At that time, plastic was not a widely used material in Finland,

and a company wishing to make profits out of plastics sales needed a broad product range. Consequently, Wiik & Höglund made several corporate acquisitions and invested heavily in production equipment.

As the company expanded, it needed better facilities. In 1952, Wiik & Höglund purchased a site in Vaasa, which is still the main location for plastic pipe manufacturing by the KWH Group. The timber trade became less important as Wiik & Höglund gradually transformed itself into an international plastics business. This year marks the 50<sup>th</sup> anniversary of its first polyethylene pipe deliveries.

### RESEARCH BRINGS SUCCESS

In the 1960s, Wiik & Höglund found its own niche in the plastics business as it continued to invest in product development and research. In 1961, the company started manufacturing plastic pipes of 400 mm, the maximum size considered achievable in those days. Finnish customers soon became important product development partners for Wiik & Höglund, and the cooperation brought benefits to everybody in the pipe business. As pipes were becoming larger in diameter, it also became necessary to develop better joining techniques. The company had already introduced methods for joining pipes in the 1950s, and the butt welding machinery used today still works in the same way as the welding techniques developed fifty years ago.

In 1963, plastic pipe scored another first as the local telephone company in Vaasa started using polyethylene pipes for applications such as the protection of underground telephone cables. At that time, those involved in the piping work were already fully aware of the advantages of using protective pipes, particularly in connection with repairs.

### WONDERS NEVER CEASE

In 1963, Wiik & Höglund acquired Oy Nars Ab, its most important competitor, and a year later, the company made international headlines with its record-breaking 600 mm pipes. Wiik & Höglund was now a world-class manufacturer of large pipes and by 1966 the timber business was wound up.

Polyethylene pipes of 600 mm were first used for sewers in Vaasa in 1964. This was a pioneering achievement as the pipes in question were the world's largest plastic sewer



pipes produced using extrusion technology.

This was by no means the end of the story, however; in 1965, Wiik & Höglund introduced polyethylene pipes of 800 mm, which were also exported to countries such as Germany and Switzerland. The first Finnish customer for the new large-diameter product was Typpi Oy, which used it for a combined discharge pipe for cooling and acidic water.

### SMOOTH INSERTION

By the mid 1960s, sewer networks in many Finnish towns and cities were in need of repairs. In 1966, a corroded sewer in Pori on the west coast of Finland was relined by inserting a durable polyethylene pipe inside the old pipe. This was the first application of the technique in Finland and its success meant that it was no longer necessary to dig up whole streets. Furthermore, costs were more than halved.

### LARGEST PIPES IN THE WORLD

In 1966, Wiik & Höglund's plant in Vaasa started manufacturing extruded plastic pipes of 1,000 mm. The pipe, intended for sewers, was first shown at the Nord Plast 66 fair in Denmark and the new product aroused a lot of attention among experts and other visitors.

The upward trend in pipe size was relentless: in 1969, Europlast Rohrwerk GmbH, a Finnish-owned plastics manufacturer in Hamburg, started producing polyethylene pipes of 1,200 mm.

However, even this record was soon broken. In 1976, Wiik & Höglund introduced polyethylene pipes of 1,600 mm. As one metre of such a product weighed 250 kilos, the pipe had to be supplied in sections, which were put together at the construction site with the butt-welding equipment developed by the company.

KWH Pipe came into being in 1988 as the divisions of KWH Group were made into separate companies. At the same time, KWH Pipe developed two lightweight pipe systems (WehoDuo and Weholite).

### RESTRUCTURING STREAMLINES OPERATIONS

In 1989–1992 the KWH Group underwent radical restructuring. It sold more than 15 of its companies, while at the same time it made about ten new acquisitions.

The early 1990s were a difficult period for the KWH Group as demand for its products went down for several years in a row. However, renovation and civil engineering projects kept



# Ingemar Björklund

– a Nordic pioneer in plastic pipe installations

In the 1970s, a young engineer named Ingemar Björklund worked in Stockholm for the consulting company Sweco, where one of his colleagues was Lars-Eric Janson. At the time, Janson was one of the best experts on plastic pipes, and it was with his guidance that Björklund was introduced to the secrets of the pipes from the ground up.

Sweco took part in numerous research and development projects in the 1970s and 1980s. Lars-Eric Janson and Ingemar Björklund worked with research institutes, the plastic pipe industry, and raw material manufacturers. Ingemar learned a lot about plastic pipes and probably realized before many others what great potential the new product had to offer.

At Sweco, which carried out major projects around the world, Ingemar became the company's own 'plastic pipe expert' and he accumulated vast experience from its plastic pipe projects.

30 years later, Ingemar can only say that "We were right in the 70s when we chose plastic pipes, despite the opposition of more conservative engineers. Plastic pipes have

performed superbly and withstood much more than pipes made of other materials."

## CORROSION RESISTANCE AND PRICE RECOMMEND PLASTIC PIPES

The plastic pipes that began to conquer the markets in the late 1950s and early 60s were small at the outset. These small pipes competed well with pipes made of other materials and earned their place on the market. Since then, the plastic pipe industry has been doing continuous development work. Production equipment has improved and today, larger pipes compete favourably in price with steel, concrete, and fibre-glass pipes. PE and PVC pressure pipes of up to 600 mm are price-competitive.

Björklund believes that consumers today understand the many advantages of plastic pipes. They break rarely because they withstand corrosion. Corrosion poses the greatest threat to pipes laid in the ground.

Today there is a wide range of pipe components for plastic pipe installations that were not available when plastic pipes came on the

the Group afloat and product development continued. For example, in 1994 the KWH Group introduced a new electric welding system, and it also developed microprocessor technology enabling the entire pipe welding process to be done at the push of a button.

KWH Pipe has sought to remain a profitable growth business by focusing on exports. Already in the 1970s, the company supplied pipes to several large projects outside Finland, and in the 1980s KWH Pipe continued to expand its international operations, while at the same time streamlining its product range. KWH Pipe had established factories in Canada, Denmark and Thailand, and in the 1990s it set up production facilities in Malaysia, Poland and Portugal. As a result of its acquisitions, KWH Pipe was also able to add industrial pipes to



market. And plastic pipes are usually more economical. All these factors together have ensured their success.

## RAW MATERIALS HAVE IMPROVED OVER THE YEARS

The development of 'skinless' PVC in the mid-1970s improved the properties of PVC pipes considerably. The new PVC material was easier to work. PVC pipes of the first generation broke more easily, and careless installation sometimes damaged the pipes. The arrival of the new raw material substantially improved

## ENVIRONMENTAL CONSIDERATIONS HAVE ALWAYS BEEN A HIGH PRIORITY FOR KWH PIPE.

its range. At the onset of the 21<sup>st</sup> century, the company is increasingly focusing on product families and project services that help to improve the quality of living and the environment. In addition to pipes, these include design assistance, installation work and project management, particularly in connection with large and demanding undertakings.

Environmental considerations have always been a high priority for KWH Pipe. Without taking any shortcuts in quality, the company recycles as much of the plastic it uses as possible and it has also developed high-quality wastewater treatment plants.

### WEHOLITE – CHARMINGLY LIGHTWEIGHT

KWH Pipe manufactures Weholite pipes up to 3,000 mm. Weholite is a double-wall pipe with smooth outer and inner surfaces. It is flexible and adaptable to different loadings, and being lightweight, it is easy to install.

No wonder that more and more customers are opting for Weholite. In addition to KWH Pipe's own plants, it is also manufactured in seven other countries under licence. Because of its large diameter and lightweight construction, Weholite is increasingly the number one choice for tanks, wells and culverts as well as

for carrying water in large volumes.

We interviewed Jari Kinnunen, site manager at Skanska Tekra, in connection with the upgrading of the Finnish highway 9 in autumn 2004.

He sums up the advantages of plastic pipes: "They are extremely light, supremely easy to install and logistically cost-effective. Transporting a 1,500 tonne concrete pipe would be a nightmare!"

KWH Pipe can look back on an eventful history as it continues to produce innovations for a better living environment and to supply its customers with safe, lightweight and trouble-free piping solutions.



been of high quality since the outset.

Plastic pipes have been a success, particularly in the Nordic countries. This is the result of two factors.

First, Nordic plastic pipe manufacturers invested in quality at an early stage and spent a relatively large amount of time and money on development and cooperation with the authorities and research institutes. As a result, the pipes have always been of high quality. "We in the Nordic countries were quick to learn how to put them into the ground," points out Björklund.

Second, the plastic pipe industry turned to independent research institutes for supervision of its own quality control and brought pipes on the market with a quality label. This also helped to convince the customers.

Nor should we forget the significance of the KP council as an inspection and quality label organization for non-standard plastic pipe products or how quickly the Finnish standardization organization for plastic pipes worked. Thanks to the SFS standard and KP pipes developed early on, local authorities in the Nordic countries had access to high-quality products years ago.

The good experience obtained with plastic pipes has led to further success on the market.

In many other countries, plastic pipe companies have competed with each other and offered customers the cheapest possible products. This has meant thinner pipes and

lower quality. When problems arose with these pipes, the market responded accordingly. "The foreign plastic pipe industry has a lot to learn from the Nordic countries," says Björklund.

### PLASTIC HAS BECOME MORE COMMON IN NON-PRESSURE PIPES, TOO

"The flexibility of plastic pipes and good resistance to corrosion make plastic pipes unbeatable in ground installation. Today, plastic pipe is virtually the only pipe used for such installations in the Nordic countries", explains Björklund.

Plastic pipes are at least as suitable for non-pressure pipes as other kinds, although their market share is not as high as in other applications. In the future, however, they will also become more widespread in such uses. Björklund is of the opinion that plastic pipes should be able to increase their market share in profile-wall and large-diameter pipes.

### WILL SPECIAL PIPES INCREASE THEIR MARKET SHARE?

Ingemar Björklund believes that the use of plastic pipes will continue to increase.

"PVC and PE will probably retain their status as the main raw materials for pipes, although we will see more progressive plastic pipes developed for special purposes. Extruded multi-layer pipes and double-wall pipes tailored to different uses will increase their market shares," predicts Björklund.

the breakage figures for PVC pipes.

The raw materials for PE pipes have also improved. The PE raw materials for the first generation were replaced in the mid-1970s with PE80, and PE100 came on the market in the mid-1980s. Today there are also PE raw materials that offer greater heat resistance.

Although modern PE raw materials are in many respects superior to the first generation of raw materials, it is interesting to note that the capacity of the first PE pipes to withstand damage was also excellent.

In the Nordic countries, plastic pipes have

# Sustainable solutions

for the Archipelago

**Living in the archipelago at Emäsalo off Porvoo, Finland, will soon be more sustainable and easier because water for the area will soon come from a pipe. The building of a large cluster of small treatment plants has been sparked off by good results from wastewater treatment methods.**

**E**mäsalo is an island off Porvoo that has more than 750 properties where water supply and sewage disposal have up until now been the responsibility of every resident. Over 300 homes are lived-in all year round and there are many residents who spend long stretches of their free time on the idyllic island.

“It would be misleading to talk about summer residents as many holiday-season residents often live on Emäsalo outside the traditional holiday periods,” explains Esko Väänänen who is heading-up the large water project. He was also in charge of the water project for the village of Londböle on the neighbouring island of Vessö in 2003. His passion for improving water management was aroused at that time as a result of his own needs.

“I live in Londböle where we drilled two wells. But salt soon began to seep through into both wells. Poor water tastes unpleasant and destroys household appliances using water in no time at all. We also dug two ring wells, but they were equally unsuccessful. For some time we even had to rely on fetching water,” Väänänen recalls.

Porvoo is a well-known zone for radon and arsenic where drilling a good well in the fragmented rapakivi granite may even be

impossible. Salt deposits in the bedrock, too, can quickly become a problem for a well owner.

Väänänen emphasizes respect for the delicate archipelago as being the starting point for the new plans. In addition to getting clean water, some consideration had to be given to managing sewage. The sewage disposal system is now being renewed at the same time. “It will be for the benefit of us all,” says Väänänen.

## THE COOPERATIVE WILL MANAGE THE PRACTICALITIES

The water supply and sewerage works cooperative for the Archipelago of Porvoo was established four years ago to coordinate the area’s water supply and sewage project. The project on Vessö island acted as a useful pilot scheme for the major project on Emäsalo.

The successful renewal scheme has been a spur for continuing with the project. The cooperative owns the existing water-pipe network and at the same time is responsible for the functioning of the small treatment plants. The mains are supplied by water from the City of Porvoo.

Efficiently managing the further treatment of sewage was one condition for re-



ceiving assistance for water and sewage management from the Uusimaa Environment Centre, which has been applauded for its flexible approach. Different alternatives were considered, although the location of Emäsalo island, far from the municipality’s basic infrastructure, limited the potential, as did the rocky terrain.

“The terrain is really difficult, alternating from stony to soft. There isn’t really any terrain in the area that is normal and easy to work with and is firm at the same time,” confirms contractor Markus Blomqvist from McMachine Oy.

Laying pipes in old residential areas takes patience because it is not possible to blast trenches next to houses. “You have to watch what you’re doing here to find a suitable route to fit in two pipelines,” explains Blomqvist.



## PURIFIED WATER FOR WATERING THE GARDEN

In May 2004, the cooperative invited tenders for various small wastewater treatment and pump well engineering solutions. The tender was won by KWH Pipe's WehoPuts 95 small wastewater treatment plant, which receives praise from Väänänen because of the treatment results.

"The main criteria in reaching the decision was the good results from the water analyses made by officials. We already had some experience of similar technology used on Vessö island; the performance of the system was convincing," elaborates Väänänen on the biological-chemical treatment plant.

In principle the treatment plant is a closed system in which only a small quantity of suspended solids remains. The sus-

pending matter can be composted. Nitrogen gases are discharged into the air and it is possible to use the treated wastewater, i.e. the 'permeate' for watering the garden. "We have complete confidence in the operations and expertise of KWH Pipe", explains Väänänen.

Some 360 households interested in the joint water and sewage management system have already joined the cooperative. Ten Wehoputs95 small wastewater treatment plants can treat the sewage for over 100 properties. The residents of Emäsalo do not intend to rush the project through; the first three treatment plants were introduced in March 2005 at which point wastewater treatment covers 30–40 properties.

"The project will cost a million euros and last until the end of 2006. We have lived for over a thousand years without water from



The small waste treatment plant at Emäsalo was installed during a period of mild weather in January.

The terrain was partly full of boulders and partly soft, causing problems for the people installing the plant; however, the plant was firmly installed.

the municipality so a few more months won't make any difference."

## A SAFE RELIABILITY SYSTEM

Esko Väänänen became interested in water management issues through a strange turn of events. For decades he worked in the IT sector, designing programs and selling computers in Finland and abroad.

His own water project encouraged him to go into a new business sector, so part of his livelihood now comes from the consultancy firm responsible for the water management project, which is also managing the research. This interesting new sector totally captivated Esko Väänänen.

An important control study is currently in progress in the sector. "A system is being developed to help prevent environmental damage caused by malfunctions or breakdowns in components used in the treatment of sewage," explains Väänänen enthusiastically.

The research will provide information needed to ensure that small waste treatment plants function in the most environmentally friendly way possible under different conditions and with different pollution loads.

Entering new markets with new products usually involves new challenges and obstacles just as KWH Pipe realized in 1995, when the company launched production of Weho Manholes, Tanks and different sewage fittings in Poland. There were many administrative obstacles such as technical permits from local authorities and difficulties caused by lack of experience in the use of materials other than reinforced concrete. The lack of Polish references that would convince potential investors to adopt such an innovative solution proved to be a serious problem. However, designers and builders turned out to be the key to market entry and an important ally. They quickly started to appreciate the numerous advantages of the Weholite system and prefabricated Weho Manholes and Tanks.

A turning point in the use of Weholite pipe system came with the creation of a full range of Weho fittings and manholes. As a result, a completely homogenous PE sewage system was introduced, without any foreign elements such as concrete manholes. Combined with the benefits in reduced installation costs and longer life-span, the use of PE pipes for the construction of big sewage collectors outperformed the competition from rigid pipes in Poland.

**FLEXIBILITY IN PE MANHOLES AND TANKS**

PE has offered designers a good deal of freedom in designing. Manholes made in



PE allow production of any manhole and fitting to order; very odd models tailor-made to optimize the properties and designs are often impossible to obtain in concrete.

At one show, an experienced designer made the following statement: “Weho Manholes are universal. KWH can produce anything if the design is technically correct. You say it’s impossible? No, it WAS impossible.” Providing a special tee – a chamber joining two collectors guiding wastewater to the sewage treatment plant – presented a convenient solution instead of constructing an expensive reinforced concrete chamber. The investor did not imagine that this type of chamber could be produced in Weholite technology. The diameter of interceptors

is DN1800 mm and becomes one pipe-line of DN2000 diameter. The installation of the fitting took two days instead of the planned three weeks that the conventional technology (reinforced concrete) would have required. Savings in time, machinery, and labour force can be easily recalculated into reduced investment costs. In another investment carried out in Poland, KWH Pipe provided a manhole with a diameter of 1.4 metres placed on a collector of 2.2 metres with a side-inlet of 1.8 metres. That was one of the largest manholes ever produced by our prefabrication unit, one of the biggest ever made of plastic in Poland.

Weho Manholes are adapted to generally used standard sizes: DN400, DN600,

**The Weholite pipe system forms a complete structured wall polyethylene pipe system for wastewater, sewage and storm water.**

# Breaking new ground with Weholite



**COMMON AREAS OF USE FOR WEHO TANKS**

- Drinking water tanks
- Storage tanks (rain water)
- Flood control reservoirs
- Wastewater (septic) tanks
- Tanks for agriculture use

**THE WEHOLITE PIPE SYSTEM**

- Leakproof and failure-free operation
- Easy installation
- Functionality – allows introduction of changes such as installation of side connections on the construction site
- Lightweight – no need to use heavy machinery
- No need for any additional anti-corrosion protection

DN800, DN1000, DN1200 and DN1400. The manholes can be mounted with Weholite, WehoDuo or WehoTripla collectors with diameters ranging from 110 to 3000 mm.

One of the main advantages of Weho Manholes and Weho Tanks is their homogeneity as regards construction; this allows 100% leak-proof construction. As with manholes and fittings, Weho Tanks can be tailored to special order and by connecting several tanks a group of tanks can form a complete package with a capacity of several hundred cubic meters.

Over the years, the production and sale of manholes and tanks in PE has been steadily growing and, for example, in Poland KWH Pipe currently manufacture about 5000 units per year.

KWH Pipe manholes, tanks and fittings have modernized the market for construction materials used in the production of interceptors. In many parts of Europe,

architects, builders and investors, have recognized the value and advantages of the complete and fully integrated Weholite piping system.

The complete Weholite pipe system performs its function, not only in sandy soil, but also in unstable soil and soil with low bearing capacity. The material benefits of PE used for the Weholite pipe systems enables the installation to be flexible and work with the surrounding soil without any risk of the cracks you get with reinforced concrete constructions. Moreover, Weho Manholes and other systems combined with Weholite pipelines represent fully independent systems, which offer a total cost benefit



where the incurred investment costs will be regained in the form of savings during the period of use.



# Deep lake cooling in Toronto

**Toronto unveils unique twofold system of cool, clear drinking water and deep lake cooling for buildings.**

It's usually referred to as the Enwave Deep Lake Water Cooling System. But actually it's a fresh drinking water system thermally interfaced with a closed loop 52,000 ton capacity district cooling system capable of serving 6.1 million square metres of downtown office space.

The two systems only come close in the energy transfer facility in a downtown Toronto pumping station where the now treated 4°C potable water from Lake Ontario rises in temperature to 12.5°C for the City's water system and the building cooling system water is returned to 4.4°C.

System separation is further ensured by elevating the city potable water at least 25 psi pressure above the Enwave chilled water.

"It's a real physical world and someday a leak will happen," says Robert Shute, a Principal of The Mitchell Partnership/consulting engineers.

"If a leak ever does develop it will be from the City water. No leakage from Enwave water is possible," he stated.

## FRESH, TASTY WATER

A major benefit to the City is a clear, cool and clean source of water. Although City of Toronto drinking water is of excellent quality, occasionally during past summers, the growth of algae became a problem at existing plant intakes.

Although algae and other impurities are filtered out, and the water is perfectly safe

to drink, it acquired a notice-able taste and odor for short periods of time. With the 5 km PE-HD pipelines, "water quality is much better and consistent coldness will make it fresh, tasty and pure," says Mr. Shute.

## SYSTEM BASICS

Three, 5 kilometre long, 1,600 mm (63") OD PE-HD Sclairpipe intake pipes bring 4°C fresh water – from 83 metres down near the bottom of Lake Ontario – to an upgraded water filtration plant on Toronto Island.

After treatment the water carries on through a 2,438 mm diameter existing tunnel in bedrock under Toronto harbour to the energy transfer facility in the John Street pumping station.

## CAPACITY REDUNDANCY

“Actually, full drinking water capacity is available from two intakes at normal lake levels,” said Kevin Loughborough, P. Eng., Vice President, Major Projects, Enwave District Energy Limited. “At the minimum lake level of the last 40 years, capacity of two intakes together would be slightly short of full capacity.”

“Recent tests of the intakes found they had more capacity than anticipated. This is because the inside of the Sclairpipe is smoother than was assumed,” Kevin added.

“As a result of higher assumed roughness, the design called for three intakes,” Kevin stated. “As we build out the cooling network, we can contemplate firm customers and interruptible customers for the last 2,000 tons of cooling. Bottom line is: we have full redundancy under normal conditions and almost full redundancy under extreme conditions,” he stated.

## CONSISTENT COLD

Consistent 4°C water is a feature of the system. To ensure it was always available, three years were spent conducting studies of lake temperatures. The studies included analysis of spring and fall temperature inversions plus consideration of summertime S and S/W winds that pile water on the shore. When the water comes back out warmer, it tends to be drawn along the bottom of the lakebed. The studies showed that if the intake was 5 km offshore, it would avoid these shoreline effects.

## A 25 YEAR DREAM

The deep lake cooling system has been an actively discussed goal and dream from the late 80s. Many civic politicians, environmentalists and engineers have discussed its need and potential merits. Construction began on June 19, 2002. Pipes were deployed in June, July and August 2003,

and the system turned operational in July 2004.

Enwave District Energy Limited is the successor to the Toronto District Heating Corporation which has supplied up to 523 MWth district heating from an amalgamated district heating system since 1982 and district cooling, as Enwave, since 1997.

## TUNNEL OR PIPE

The nature of the intake system was one of the design challenges. The idea of tunneling a channel below lake bottom was advanced by RV Anderson Associates Limited of Toronto. However, it was expected to take more than two years to complete and cost \$90 million. This was partially because of very deep construction shafts required for the tunnel to negotiate under deep valleys carved into the shale bedrock under the lakebed during glacial times.

Enwave looked south to a deep lake water cooling project at Cornell University in Ithaca, New York, supplying 20,000 tons of cooling compared to Enwave's 40,000 tons of lake cooling. The engineers employed 1.600 mm OD Sclairpipe for a 3.2 kilometres long intake from Cayuga Lake. The engineers on that project, Gryphon International Engineering of St. Catherines, Ontario had conducted a year-long study on various pipe line materials. “Based on that study we went with PE-HD Sclairpipe and it's been a very positive experience,” said Lead Civil Engineer, Michael Steadman. “The design phase plus deployment was very successful and the pipes are performing very well.

The KWH Pipe is thickest near the shore – a 3.15” thick wall. “As it goes deeper into the water the thickness is reduced,” noted Mr. Steadman.

Concrete collars are used to weigh the Sclairpipe down and keep it in place despite lake bottom currents and wave induced forces. “Near the shore the collars

## SYSTEM BENEFITS

- Saving at least 30 million kilowatt hours of electricity per year – a 75% reduction in energy use compared with conventional chillers.
- 35 MW of electrical load removed from Ontario's electrical grid.
- Reduced annual carbon dioxide emissions by 36,400 tons – the equivalent of taking 5,000 cars off the road.
- Alternative to replacing chillers in downtown buildings with elimination of use of ozone depleting coolants such as CFCs and HCFCs.
- Cutting nitrogenoxide, which contributes to respiratory tract ailments, by 70 tons a year.
- Elimination of noise, visual pollution and humidity generated by chillers, fans and cooling towers.
- Reducing sulphur dioxide emissions by 176 tons a year. Sulphur dioxide combines in the atmosphere to make sulphuric acid which kills organic life in Ontario lakes.
- Reduction in smog.

are spaced every 9 or 10 feet. We need more collars at the shore because of the higher wave and water current loads,” Mr. Steadman states. “In the deeper water we tend to go with the thinnest pipe suitable, and as underpressure loads are less we can spread the concrete collars out 45 or 50 feet. For both Enwave and Cornell we also went with ductile iron stiffening rings every 15 feet at the deep end.”

## WELL TRAVELLED PIPE

The Sclairpipe actually travelled more than 489 kilometres from the extruding plant to the assembly site to the Toronto lakefront.

The pipe was extruded at the KWH Pipe plant in Huntsville, 215 kilometres north of Toronto. From there it was shipped in sections 307 kilometres to Belleville for assembly. Belleville provided the nearest “shel-

**THE DEEP LAKE COOLING SYSTEM HAS BEEN AN ACTIVELY DISCUSSED GOAL FROM LATE 80'S.**



**TODAY AND IN THE FUTURE ENWAVE WILL REPRESENT ENERGY CONSERVATION AND SAVINGS.**

tered area that was large enough to store and fuse the pipe,” said Jeff Starchuck, Project Engineer of the Marine Division of McNally Construction of Hamilton, Ontario. “We also needed a fairly large, secure and sheltered water lot to store the pipe over the winter. Recreational boating traffic on Lake Ontario being what it is, it’s difficulty to find an area out of the way of traffic and with sufficient shelter that is near Toronto,” he added.

“The first year we couldn’t get started until early June and we couldn’t carry on after November due to the build up of ice on the lake. So we sunk the pipes below the ice line in water off Belleville and brought them up again in the spring.

“Pipe sections were fused together to create nine 1.6 km lengths, plus 5 shorter lengths varying from 55 to 100 meters long. We also installed the concrete collars and ductile iron stiffening rings in Belleville.

“Then we towed the mile plus pipe lengths 182 kilometres to the Toronto lake-

front,” Mr. Starchuck concluded. “It was the longest pipe ever towed on Lake Ontario,” noted Kevin Loughborough.

**CHILLER SAVINGS**

One initial problem in selling Enwave building cooling was that the Ontario government had capped hydro rates at 4.3 cents per kilowatt hour in May 2002. But recent reports suggest these rates could jump by 30 to 53 percent when uncapped in 2006. Which will make Enwave a lot more attractive.

“There are real savings in not having to replace 37-year-old chillers,” says Kevin Loughborough. “The first of the three TD Centre towers (which soar to 54 floors) was under construction in 1964. The chillers haven’t been replaced since then. That’s 37 years since the building was opened and 25 years is the normally quoted life span for a chiller,” he added.

Andrew McCallin, Vice President of the Oxford Properties Group agrees that the savings, at present, lie in not having to re-

place chillers. Mr. McCallin figures he has already saved \$580,000 by not having to replace chillers at One University Avenue. “That’s a pretty compelling reason right there,” he says.

At the 1.6 million square foot Royal Bank Plaza the replacement of 26 year old chillers would “have costs us millions and we would have had to take the building apart and use helicopters to get the chillers off the roof,” Mr. McCallin said.

“Getting rid of chillers also allows us to rent out some prime penthouse space. At One University the extra 1,500 square feet translates into another \$30,000 of rentable space per year,” Mr. McCallin adds. He also notes that by signing a 20-year contract with Enwave he has a programme for further savings as energy prices increase.

One condo, the Tridel Element, which is not expected to be completed until 2006, has already signed up with Enwave and will be built without chillers. So today, and in the future, Enwave will represent energy conservation and energy savings.

**CHEMICAL SAVINGS**

Although predictions of 2/3 savings in water treatment chemicals have been suggested, “any potential chemical savings will be determined through continuous testing,” according to Gordon Mitchell, Senior Engineer with Toronto’s Works & Emergency Water and Wastewater Services Division of the City of Toronto.

“What we have is an excellent clear water source, it’s a great added benefit to the City,” he adds.

The \$170.5 million Enwave system will be used as an example project for The Federation of Canadian Municipalities. The Mitchell Partnership is currently working on models and verification.

While Toronto is unique in having centralized downtown heating and cooling, plus access to cold lake water; the Enwave/City water combination might well be possible for a number of other cities across Canada, the USA and elsewhere.

Signs in the economics, both from Thailand and surrounding areas, got KWH Pipe to evaluate the needs for more production capacity in Thailand. In 2003, KWH Pipe decided to act and relocate the production of Wiik & Hoeglund to a new factory at Amata City Industrial Estate in the Rayong Province. The relocation was finished in October 2004 and production started in November 2004 at the new plant located 145 km from Bangkok.

The area from the old plant has been almost tripled to about 128.000 m<sup>2</sup>. With new production lines for both the Weholite and the Wehoduo lightweight pipe systems the new factory becomes the largest in the KWH Pipe Group and Asia as well.

## MORE AND MORE COMPANIES HAVE SEEN PLASTIC AS THE NUMBER ONE CHOICE FOR ANY PIPING APPLICATION.

### KWH PIPE INTRODUCED PLASTIC PIPING TO THAILAND

High density polyethylene pipe or PE-HD pipe was first introduced into the Thai engineering market in 1980 when KWH Pipe entered and won the bidding for a relining project in central Bangkok. Pipes, welding machines, engineering and experts borrowed from Finland made the first project a success but not a sustainable long-term solution.

With an open mind and determination not to lose momentum, 3 years after in-

troducing PE-HD to the Thai market, KWH pipe was the first PE-HD pipe manufacturer in South-east Asia. The first factory in Thailand was located in Nawanakorn industrial park, which was the best industrial estate in 1983.

Launching an advanced and totally new product onto the market, enormous resources were needed to control product quality. Resin for the pipe had to be imported from Europe, the butt-fusion welding procedure, as well as welding machines had to be introduced and approved by authorities, consultants, contractors and engineers. In order to provide and serve a complete pipe system, WH Pipe was founded in 1984 with the primary purpose of educating and providing quality-welding work for PE-HD pipe.

Over the years since the introduction of plastic piping to the Thai market, acceptance and competition have both increased as more and more companies have seen the plastic as the number one choice for any piping application. As growth has continued for Wiik & Hoeglund, operations have expanded and been relocated twice in the late-eighties and mid-nineties to meet market demand.

Over the 22-year-long history of KWH Pipe in Thailand Wiik & Hoeglund has grown to be not only a pipe producer but a complete systems provider offering the market-knowledge, experience and cost efficient solutions.

### KWH PIPE IN ASIA

KWH Pipes units in Asia are found in Thailand and Malaysia. The head office for Asian operations is located in Bangkok, Thailand – home of Wiik & Hoeglund Public Co., Ltd. The market is served from one production unit in Thailand and from Foenede Plast (Malaysia) Sdn. Bhd. in Malaysia. In all the Asian operations employ 300 persons.

# KWH Pipe relocates in Thailand

**The head office for the Asian operations of KWH Pipe is located in Bangkok, Thailand. It is the biggest PE-HD pipe manufacturer in both capacity and in size of produced piping.**





KWH Pipe and Extron Engineering, member of the KWH Pipe Group, provide extensive support for customers who want to enter the pipe business.

Franchisees board a moving train

# Firm support for pipe manufacturers

**KWH Pipe Franchising is an excellent opportunity to become a pipe manufacturer in an area of the world where there are buyers of modern pipe materials.**

**K**WH Pipe, which is known around the world for its quality, provides extensive support for customers who want to enter the pipe business. In this way the new enterprise has the information and skills of a recognised pipe manufacturer at its disposal right at the start of its operations.

The Finnish company KWH Pipe is active all around the world. The company had already set its sights abroad as early as the 1960s. KWH Pipe has already been involved in licensing for about 30 years.

Good experiences throughout the world have prompted enthusiasm for developing new ideas. The latest business project makes it possible for KWH Pipe customers to become pipe manufacturing franchisees all over the world.

The market for plastic piping is growing throughout the world. Backing from an established company and well-known brand is an excellent opportunity for those whose ambition it is to set up a pipe production unit. It is hoped that the strategy will create new markets for already established manu-

facturers and generate synergy benefits for e.g. raw materials purchasing. Another aim is global growth for KWH Pipe's business.

#### **NEWS ON INDUSTRIAL FRANCHISING**

According to KWH Pipe Technology Business Area Director, Jari Mylläri, the new concept has sparked interest among clients who attended the many trade fairs last autumn. Franchising is a well-known form of business for consumer products, including clothes, pizza and fast-food chains but it is a new concept in industry.



Setting up a pipe production unit usually takes about a year – franchisees get straight into business.



Jari Mylläri thinks that in about 5 years there will be 10–15 enterprises operating around the world within the new concept.

“The basic concept is the same, but industrial franchising already differs from the outset due to the large investments involved. Even though KWH Pipe provides the franchisee with all the information they need, they must have the funding that is necessary for establishing a pipe production unit,” explains Jari Mylläri. KWH Pipe is also prepared to support its customers in arranging financing where funding is provided externally.

“In about five years’ time I can see 10–15 enterprises operating around the world within the new concept,” explains Mylläri looking to the future.

He predicts that a typical enterprise would have an annual turnover of about EUR 10–20 million.

### STRAIGHT INTO BUSINESS

Setting up a pipe production unit usually takes about a year at least. After this, the entrepreneur has the difficult job of making production flexible while at the same time trying to convince customers that their enterprise can be trusted.

“It takes about 3–5 years to learn about production and other matters. Franchising means that the franchisee can jump onto a moving train, i.e. they are handed a functioning business on a platter,” explains Jari Mylläri.

A contract with KWH Pipe guarantees the customer exclusive rights to a certain area. When it comes to small countries, this area could even extend into neighbouring states

and KWH Pipe guarantees not to set up any other contracts in the area.

“There is an old Finnish saying that pipes will not travel. There is no point transporting a pipe over 1,000 km as costs become too high,” says Mylläri stating a logistical fact.

Business means more than simply manufacturing pipes, but a whole new enterprise backed by KWH Pipe that already has expert knowledge of business management. Product selections are tailored to meet the needs of the area – requirements for pipe materials differ all over the world.

“To sum up, our plastic pipe products transport gases and liquids. Another product group is plastic films and sheeting that are used in the packaging industry,” explains Mylläri.

Basic products are pressure applications, gravity applications, drainage applications, relining, cable jacketing and conduits, environmental products and pre-insulated applications.

### FUTURE PRODUCTS ARE PART OF THE AGREEMENT

KWH Pipe provides considerable support. The franchising unit is assisted with its raw material acquisitions. When the volume of material acquisitions grows, then the parent company has more influence when negotiations are held.

Jari Mylläri points out that, “In addition to its basic products, innovations resulting from new product development will also be available to the new production unit. The franchisee is provided with the keys to the products of the future in addition to their current product range.”

Practical help is provided on technical matters and this means issues associated with production, manufacturing or installation. Support is also available for everyday marketing and customer relations. The wheel has already been invented; KWH Pipe provides the production unit with instructions on how to deal with problems.

Jari Mylläri also believes that the well-known KWH Pipe brand greatly benefits franchisees. In addition to the quality brand, KWH Pipe is also a well-known actor within

the sector and even the most demanding customer cannot fail to be impressed by its long reputation of reliable service. An unknown pipe manu-

facturer might be a risk when it comes to large pipe projects all over the world.

“Our quality control is in order and we have a good reputation. Reliability is essential in large projects as dismantling and replacing a faulty product is very expensive,” explains Mylläri.

The KWH Pipe concept does a lot more than just establish pipe manufacturers who produce quality products and vendors of modern systems. The traditional enterprise complete with its products solves problems and can meet a customer’s most demanding challenges.

“There is still a lot of building to be done in the world,” says Jari Mylläri.

### THE FRANCHISEE IS PROVIDED WITH THE KEYS TO THE PRODUCTS OF THE FUTURE.



In specified area there is no such thing as a standard product.

# Experience provides the foundations for production

**KWH Pipe is taking on yet another business area – technology for the production of pipe fittings.**

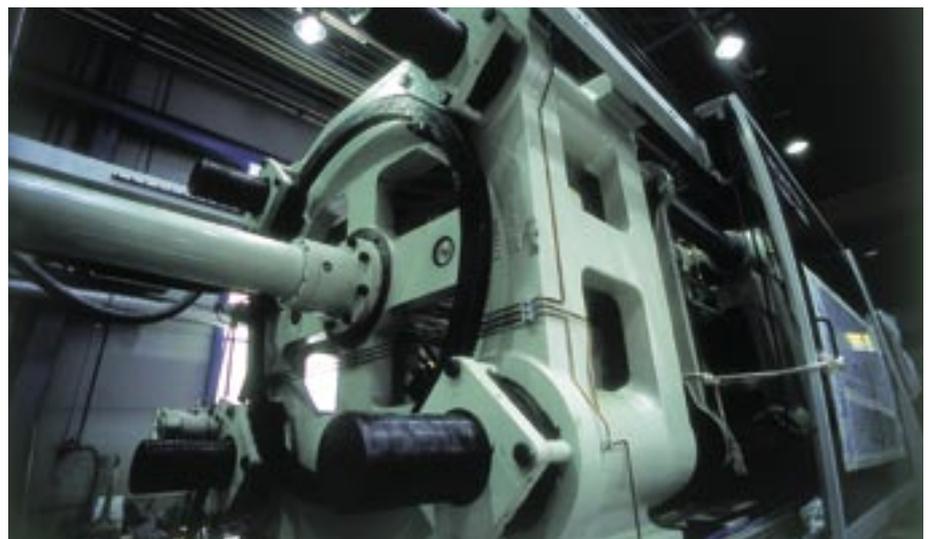
**Experienced professionals design injection moulds and automatic equipment for the company.**

**P**ekka Säävälä, Business Manager of Fitting Production Systems, joined KWH Pipe last September. At the same time, many fitting sector professionals and partners, with decades of experience in the sector became available to KWH Pipe.

"The most important tool in the production of fittings is experience. In this specified area there is no such thing as a standard product, all know-how is stored 'between the manufacturers' ears'. Products must be designed to meet the needs of each customer," says Säävälä of the batch order section in the pipe business.

As the head of this business area, Säävälä is responsible for the marketing and sales of fittings production systems and for organizing the production of equipment and moulds.

There are clients all over the world. Traditionally, Europe is the main customer base but new plastics technology mar-



kets are opening up all the time in the Middle East, South and Central America, Asia and NIS/ CIS states.

## **THE KEYWORD IS PROCESS SKILLS**

Production of injection moulds and automatic equipment is the sum of many factors.

"We do not only sell moulds but a whole complex process. For example, there are far more variables that affect the end result in fitting production than in pipe production."

The practice of producing moulds and automatic equipment requires the planning of the plastic product and equipment, choosing the right suppliers, monitoring the project, testing and training on how to use the equipment to be carried out with the customer.

The majority of deliveries take place on a turn-key basis, which means that process management is very important. There are no standard cases and each delivery is an individual issue. Old hands, who have experience of the markets in the sector, keep track of the variables.

"If you have a good design then a mould can be made in almost any workshop, but far more important is managing planning and production, knowing the variables and business areas in the production of fittings and putting the information into practice," explains Säävälä.

Producing the actual mould or automatic product only makes up about 20–30% of the entire process.

The first deliveries of moulds and automatic equipment will be made to customers in Australia and Italy in the spring.



# Rapid response calls for KWH Pipe!

**A broken steel pipeline caused a tank containing 16,000 tons of sulphuric acid to collapse at Kemira Kemi AB in Helsingborg, Sweden. KWH Pipe delivered the new piping in record time.**

In February, KWH Pipe Sweden received an order for 1,200 metres of 630 mm PE pressure piping from Kemira Kemi AB in Helsingborg, Sweden. A series of unexpected events, caused by a broken steel pipeline providing cooling water to the plant, had devitalised the ground and caused a tank containing 16,000 tons of sulphuric acid to collapse.

Fortunately no people came to harm in the event that proved the importance of having an action plan for unforeseen events and accidents. Although the acid could easily have caused damage to the immediate surround-

ings, thanks to the precautions taken by Kemira, the local fire brigade, the police, and a well planned storage area, the damages could quickly be limited and minimized. As a result the focus could relatively quickly be turned to taking measures to prevent similar incidents in the future.

Corrosion in the cooling piping at least partly caused the series of events, and it is most easily prevented by using non-corrosive piping instead. As KWH Pipe was contacted, the local unit in Sweden answered the call to deliver replacement plastic piping

at a very short notice.

To find 1,200 metres of 630 mm piping with the right pressure class in stock at such short notice would seem impossible for most piping companies. The strength of KWH Pipe in this case was being able to join forces between Sweden, Denmark, Finland and Poland to meet the emergency. Of the required piping, 800 metres was taken from stock and the remaining 600 metres was rapidly put into production at the Polish factory, which was able to fit it into production. The Finnish prefabrication unit made a big effort producing special fittings in almost no time at all. As a result Kemira Kemi received the new piping in record time and was able to take action to secure the operations of the storage facility and get the focus back on normal operations.

The success of the first, urgent part led to Kemira Kemi deciding to continue the cooperation with KWH Pipe and order another 1,500 metres of piping to replace old piping and secure safe and efficient operations in the future.

**THE EVENT SHOWED THE IMPORTANCE OF HAVING AN ACTION PLAN FOR UNFORESEEN ACCIDENTS.**

# New and innovative

a double pipe under the sea

**Efficient installation work was just one of the reasons why the district heating pipe to Hirvensalo laid by Turku Energia Oy nowadays runs along the bottom of the sea. The solution, which differs from traditional installation methods, also saved time and money. The amount of heat loss is small, too.**

Urpo Holma is Head of Development at Turku Energy and the structural sketch of the pipe in his office explains a great deal. The figures for the number of litres, metres and millimetres for the pipe structures, air and water in the drawing have changed many times as the design work has progressed. The first calculations have had to be crossed out as the sizes of the pipes have been more precisely specified with new dimensions.

“This kind of solution really did not happen off the cuff, but thanks to careful planning it turned out to be a great success,” says Holma.

The district heating pipe supplied by KWH Pipe was laid under Pitkäsalmi sound from Uittamo, Turku to the island of Hirvensalo. At one point, the nearby Hirvensalo bridge was earmarked as a possible route for laying the district heating pipe. Choosing this route would have added about an extra four kilometres to the pipe length compared with the present solution. The installation of the bridge section, under the bridge for a distance of 250 metres, would have been difficult. There would also have been more than enough work constructing time-consuming and expensive abutments together with other surface work. “The by-the-book solution, of course, would have been to use the bridge, but here at Turku Energia we decided to opt for something different. We

set about building a system of two pipes inside each other which could be submerged in the sea without weights,” explains Urpo Holma.

The new technique allowed for the shortest possible, straight-line route between the point of consumption and the main pipeline.

## A STRUCTURE THAT WITHSTANDS CORROSION

Installation at sea required jumping through regulatory hoops before work could begin. The project got underway in the autumn, because dredging is not allowed during the summer for environmental reasons. Submerging a pipe in the sea or a river is generally difficult because an insulated pipe needs to be substantially weighted to stay on the bottom. The double pipe used here was designed so that no extra weights were required.

The topmost part of the double pipe is the return pipe, which is a DN400 steel pipe with a 500 mm PE-casing pipe and polyurethane insulation. The flow pipe was lined inside the return pipe, and its structure is formed out of two steel pipes one inside the other: there is polyurethane insulation between the DN200 and DN300 steel pipes.

The structure is durable because only the steel surface of the outermost pipe is



exposed to corrosion from sea water should the polyurethane and PE casing be damaged. “The internal pipes are not exposed to external corrosion at all. The method has many benefits,” explains Urpo Holma.

In spite of what some people believe, thermal radiation in the pipe does not cause stress in the steel structure. In terms of the installation process, the small amount of steel stress makes the work easier, because the pipes are separate and the internal pipe is able to expand freely 15–17 centimetres at both ends if necessary. The stress in the innermost pipe is equivalent to the stress caused by thermal radiation resulting from a temperature change of about 20 degrees. The resulting stress is just a fraction compared with a normal single or twin pipe installation.

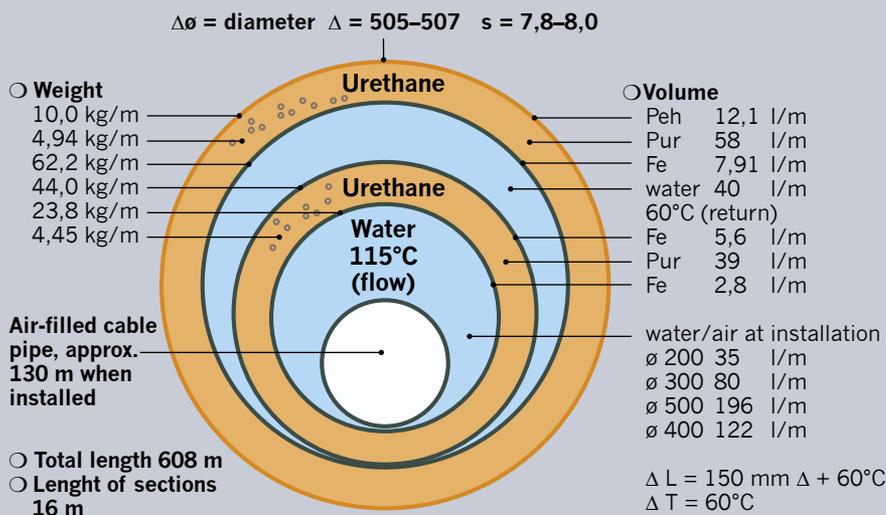
## ENOUGH WATER, BUT NO ICE

The double pipe package was successfully laid on the bottom of the sea in mid-January, although Mother Nature tried her hardest to play tricks on the project. “Firstly, the sea

A fire engine, dredger and a diver were present when the pipeline was installed; in the picture the diver can be seen lowering himself through the hole in the ice to observe the pipe being laid on the seabed.



## CROSS-SECTION OF AN UNDERWATER PIPE



resolutely refused to freeze over. It would have made things a lot easier if it had been possible to walk over the ice to get to the site. On top of that, because the sea didn't freeze over there was a lot of traffic in the

shipping lane that otherwise would not have been there".

According to the charts there were two operators' cables in the area running in the same direction as the channel. "Rather

surprisingly we found a total of six cables, some of which belonged to the Defence Forces. Fortunately they came to light in our surveys before the dredging work." The combined pipe was laid without a hitch on the sea bed under the cables which only had to be loosened a little.

The other surprise from Mother Nature was a rise in the sea level of 1.2 metres higher than normal. The water level remained persistently 70 cm higher than normal at the end of January. The trenches were full of water so the pipes that were to be laid were supported on timbers until the sea level dropped.

## ARCHIMEDES' PRINCIPLE TO THE RESCUE

The installation, which went according to plan, only took a week altogether. On site at the height of the actual installation work were four cranes, three excavators, a vehicle belonging to the fire department, a dredger and a diver who checked that the pipe was being pulled under the cables. Holma is grateful to KWH Pipe for the company's grasp of the project; the deliveries arrived on time and the pipes were good.

Firstly, around Christmas time, the outer pipe for the project was laid in sections totalling around 304 metres. The overall length of the pipeline is 608 metres. The internal pipe was inserted in the outer pipe in similar sized units by pushing them in with the help of the excavator. "It wasn't an easy job, because the pipe is not, of course, absolutely straight. And in any case, the right amount of water and air in the pipe had to be calculated, too. Archimedes' principle was put to the test in practice," laughs Holma.

Although the installation solution for Hirvensalo was Urpo Holma's idea, he was not interested in patenting the invention. "I thought a more profitable solution for the national economy would be to let everyone use the idea rather than patenting it."

He is satisfied with his special project. "These dredging and underwater projects don't come about every year, although I have had some experience recently with cooling pipelines. 1985 was the last time a similar technique was used, when we laid a slightly different type of pipe under a river."

# Project Services at your Service



## Initiatory services

Project development  
Project financing  
Risk assessment



## Design

Design and Optimizing of systems



## Products

Solid wall pipes Ø OD 630 - 1600 mm  
Weholite structured wall pipes  
Ø DN/ID 280 - 3000 mm



## Contracting

Main contractor  
Sub-contracting  
Renovation



## Services

Welding  
Supervision  
Consulting



## Special Production

Long Length  
Mobile Production



## International Pipe Specialist

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