25
Anniversary Edition
June 2004
13th year

Kurtz ... NEWS

KURTZ
ERSA GLOBAL CONNECTIONS

The customer and employee journal

- The first 225 years
- The history of machined trimming
- Foundry as system supplier
- EPS - a sure-fire success dish
- Soldering Technology - a never-ending story

Anniversary Edition 2004 with History

http://
www.kurtz.info
www.kurtz.de
www.ersa.com

Kurtz Industrial Technology Companies
1779 - 2004
225 YEARS

Fine Traditions and a Bright Future

From 1779 to 2004

The *Eisenhammer* forge at Hasloch was founded in 1779, and March 24th is considered as the Kurtz Group's official foundation day.

That was the day the counts of Wertheim issued the charter authorizing the building of the forge. For the German-speaking lands, it was a cultural golden age marked by the likes of Goethe, Schiller, Mozart, Beethoven, Haydn and Kant.

It was in 1779 that Lessing wrote his well-known play "Nathan der Weise" ('Nathan the wise'); it is a play of great relevance today, a sad testimony to how little mankind's religions have learned about peaceful co-existence in the course of the last 225 years.

On the level of industrial history, however, we have learned a thing or two about technology and production techniques. In 1779, there were no cars speeding along asphalt roads, nor were there aeroplanes breaking the sound barrier in the skies above.

Travellers conventionally went by stagecoach, or on horseback. Goods that had to be delivered to faraway customers were transported by water, or carried on wagons drawn by oxen. James Watt was working purposefully on the improvement of the steam engine he had invented, and all over Europe people hoped that industrialization would bring about a rise in standards of living. Everyday life was characterized by economic anxiety, illness and political insecurity.

Our origins – the fact that we started as pioneers in metal processing with a water-powered forge hammer in a very poor forest area such as the Spessart – give us confidence that working together at common economic and business goals is something which can be made to bear fruit.

All over the world, industrialization has brought about an overall rise in mankind's standard of living.

We can only hope that the new means of communication will help people not only to communicate with one another but also to understand one another better, so that world peace will provide a basis for the greater overall welfare of mankind.

This 25th edition of our customer and employee journal is entirely devoted to the Kurtz Group's 225th anniversary.

There are very few family businesses in industry today which can boast such a long tradition. We are fully aware of our great debt to our staff, our customers, our suppliers and all our business partners, and this awareness constantly spurs us on to maintain the intensity of our own work.

"Fine traditions and a bright future" - is our jubilee motto.

To borrow a phrase coined by the great reformer of the Prussian army Gerhard Johann von Scharnhorst (1756 – 1813), our intention is not to preserve the ashes but to keep the flame burning. For us, the flame is the exemplary entrepreneurial commitment shown by generation after generation of our family members.

We hope that this edition of Kurtz News will whet your appetite for further years of fruitful collaboration with the Kurtz Group.

All the best!

Content

Kurtz Industrial Technology Companies 1779 - 2004 225 YEARS

1779 Hereditary leasehold certificate for the iron hammer works

In **1779**, the Counts of Löwenstein Wertheim, Tobias and Heinrich Wenzel, approve the construction of the iron hammer works on the "Heiligenwiesen" in Hasloch - the birth of the Kurtz Group

1800 Johann Georg Kurtz takes over the iron hammer works

1830 Johann Philipp Kurtz joins the company

The addition of a grey-iron foundry in **1852** and the construction of a machine factory in **1860** set new accents. Mainly, cast parts for agricultural machines, railways and bridge construction are produced.

1835 Construction of the manor by the iron hammer works

1852 Foundry

The first 225 years

With energy and optimism

In a time such as ours, when so few things are destined to live to a ripe age, the fact that the Kurtz Group is now celebrating 225 years of company history – a veritably "biblical" age to have reached – is one which has to command our attention and profound respect.

But the fact that this group of firms has been owned and managed by members of one and the same family for more than 200 years is a truly exceptional entrepreneurial achievement, and one which deserves our highest admiration.

Given that all Germany, including remote areas as the Spessart, has repeatedly undergone far-reaching political, economic and technological changes in the course of the last two centuries, it certainly must have required remarkable enterpreneurial abilities and a very special kind of family spirit in all six Kurtz generations to see the present-day Kurtz Group through to celebrating this 225th anniversary as a persistently independent family business that is proud of its identity and looks to the future with confidence. And it is indeed a fact that the chronicle of the firm's history since 1779 is full of examples of market and technology adaptations being made at short notice to take account of epoch-making new circumstances.

In a business world governed by the "real time" mind-set, however, a sense of tradition and a successful company history is hardly enough to guarantee Kurtz success in the future. On the contrary, every new generation not only has to develop its own feeling for the challenges of the contemporary market and a sensitivity to the technological trends of its own time, but also to bring creativity, readiness to take risks, and real social awareness to the job in hand.

Particularly in recent times, the Kurtz Group's managerial troika – the three brothers, Rainer, Bernhard and Walter Kurtz – in association with all their many staff, have proved that they are well up to facing the challenges of our own turbulent times by carrying on in the fine tradition of the medium sized family firm. One by no means insignificant symptom of this is the great openness and immensely positive and forward-looking mood which characterizes the collaboration between the Kurtz Group Advisory Board, founded in 2002, and Kurtz shareholders and management.

On the occasion of this quite unusual birthday celebration, the Advisory Board believes that in spite of substantial external challenges, so long as the present positive dynamic in all the sectors of the enterprise is maintained, the path the Kurtz Group is currently treading will lead to many more successful years in the time to come.

We wish you the best of luck and God's blessing as you go.

Dr. Lorenz Raith
Chairman of the Advisory Board
Kurtz Holding GmbH & Co.

Dr. Lorenz M. Raith;
Born in 1938 in Roding/Bavaria
1958 A-levels in Straubing,
Studies mechanical engineering and economics in Munich
Starting in 1963, he worked for the economics ministry in Munich for 3 years
Worked for the Nestle group of companies for 5 years
Worked for Varta AG, Hanover, for 5 years
Worked for the INA group of companies (CEO), Herzogenaurach, for 22 years
Since 1999 he has been the owner of a consulting firm and has been a member of several supervisory and advisory boards

Future megatrends and markets

Earning money becomes the art of innovation

The following article is an excerpt of Dr. Jeanette Huber's speech given on the occasion of the festive evening of the Kurtz Group's 225th anniversary.

Social megatrends
Which forces will influence the life and consumption habits of the future? One key to this question is formed by social megatrends. The megatrend of ageing creates a historically new situation. But age is re-defined: At 50, the "second start" is due, professionally and privately. The "new oldies" are different from "the old ones" of the past, have different consumption habits and values.

Women will have a lasting influence on the 21st century. The growing female education potential and the increasing inclusion of women in the world of labour give rise to new social influence and power structures.

Individualism is also a megatrend. Affluence, democracy, global mobility and free access to information have resulted in new freedom for people. They give in less and less to their fate, but take the way their life goes into their own hands and become "self-determined organisers of life". Their life becomes more varied than some generations ago - but also with more risks.

Economical and technical megatrends
Traditional industrial production is changing more and more strongly to the economy of knowledge. Earning money becomes the art of innovation: new ideas, new products, new business models promise success. Thanks to the increasing importance of creativity, the role of people in companies is changing fundamentally. They change from a cost factor to human capital. German human capital is shrinking, ageing and is becoming more feminine. Companies which do not give elder people and women good places on their payrolls are missing out on a strategic competitive advantage.

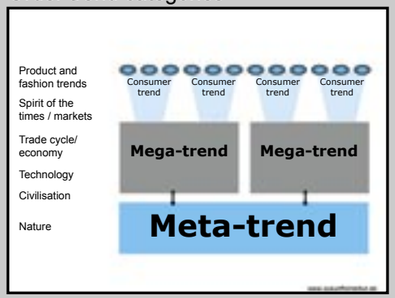
The driving forces of the economy are being displaced. Research and development, orientation to leading technologies are gaining in importance. Bio and nano-technologies are essential economic motors of the future. Information and communication technologies, extensive digitalisation, are taking over the role of "enablers".

"Co-opetition", working in networks, is replacing thinking in competitive categories. Innovation is increasingly being thought across the borders of companies.

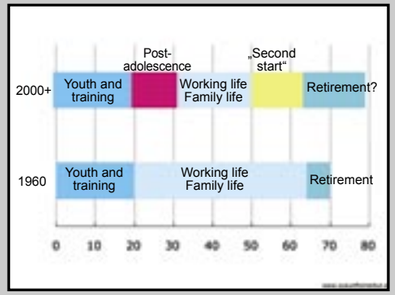
Morals and ethics are entering the corporate world. The "shareholder value" as a general amnesty for untruth, questionable market practices and personal enrichment is being questioned. We can prepare ourselves for the fact that products and services will be subjected to an ethical test by the consumers in future. Working conditions, fair trade relationships and ecological criteria will be a part of this checklist. The win-win society re-defines the role of the companies. Corporate citizenship puts committed social responsibility into the hands of the companies.

Jeanette Huber, who was born in 1953, is the co-owner of two medium-sized companies and speaker of the institute of futurology.
Beforehand she was managing director of a service enterprise in the Anglo-Saxon cultural area.
Leading function in the international consulting firm Gemini Consulting.
She started her career in the IT sector and worked there for 10 years.
Among others she also worked for Oracle, the market leader in databases.
Apart from futurology she is interested in long-term nature conservation and the management of national parks in Africa. In 1999 she published a book on this issue.

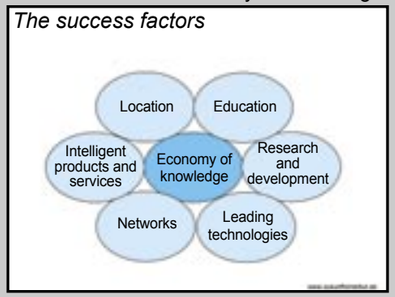
Order trend categories



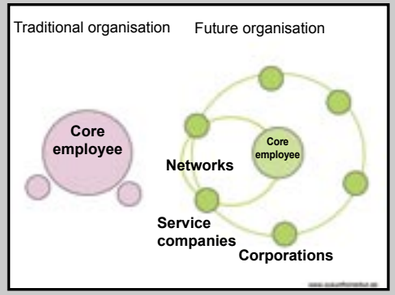
Two new sections of life



Innovation drives economy of knowledge



Networks for success



1857 Friedrich Kurtz and
1868 Karl Kurtz join the company

1860 Machine factory

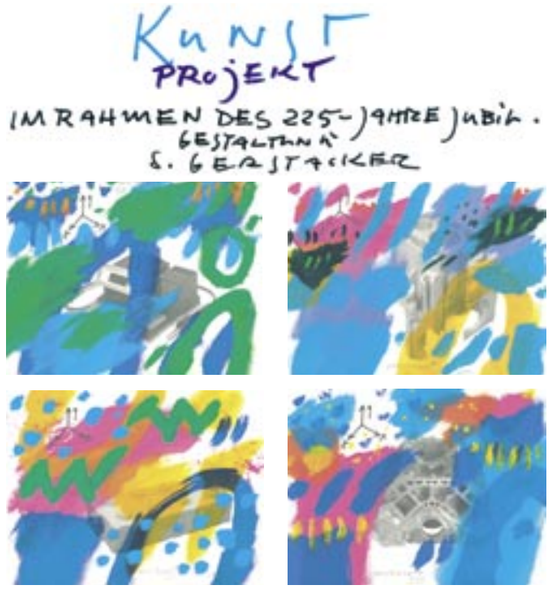
With the construction of the machine factory in **1860**, the range of products is extended. The demand by the market for mill and saw-mill devices is served better in this way.

1896 Foundation of "MGM Metall-Giesserei-Mannheim"

1903
1904 Ludwig Kurtz and Hugo Kurtz join the company

In **1900**, electric light is introduced in the iron hammer works by a "current against castings" mutual transaction with Siemens.
1903 New construction of the foundry with an extension in **1907**.

1907 Extension of the foundry



When Mr Walter Kurtz asked me a year ago if I would be interested in creating the artwork to mark the 225th anniversary of the founding of the Kurtz Group, I accepted the commission with great pleasure. I was well aware of the challenge that making an artistic contribution to this globally active industrial concern implied, especially for such an extraordinary occasion.

Mr Kurtz arranged an extensive visit to the company for me during the hot summer of 2003. Being shown the company's various operations from a professional perspective was a fascinating experience. I was particularly impressed by the staff, their capabilities and the precision and care with which they carried out their work. The entire Kurtz Group seemed to me a large, vibrantly alive organism, with each individual a very important part of the whole.

These manifold impressions inspired me to create these four pictures in my studio - one for each business area. The most cheerful, most colourful one is devoted to foam technology. Green and blue tones symbolise soldering, and the foundry machines are represented by strong shapes and colours, while the representation of the supply division symbolises the paths the products travel down and the means of transportation they use.

My chosen medium was oil paint over original photos on handmade 340 gram deckle-edged paper. The frame was designed in V2A-grade steel and assembled by Kurtz in exemplary fashion.
I would like to sum up this work, which I found so exciting, in a single sentence: The Kurtz Group's products set out with pace and dynamism into the world – and into the new millennium.

The role of art is not to represent the visible.
But rather to make the invisible visible – that which stands behind the object.
Paul Klee

Sabine Gerstacker, paintress, was born in Hirschberg/ Riesengebirge. She lives in Laufen by the Salzach, near the border to Austria.

Ms. Gerstacker studied in Münich, Salzburg and Perugia. She was awarded to the prize „Förderpreis des Münchner Kunstvereins"; the prize „Accademia Di Belle Arti" in Perugia. And the large-sized pictures and graphic arts series in public performance, such like Degussa-SKW, Viag, Technical University Münich-Weihenstephan, and The Administration School of Bavaria, are the excellent prized works as well. They are being exhibited from 7th June to the end of July in the administration building of Kurtz in Wiebelbach.

The question of the terroir

A small philosophy of wine

What combines a group of medium-sized companies in mechanical engineering with a wine estate? For example, tradition which has grown over the centuries. Or the innovations necessary to cope with the ups and downs in the economy. Quite certainly the location, the home which marks both of them, man and vine, the personalities and entrepreneurs as well as the wines which the location produces.

Unlike other cultivated plants, wine is a product of a unique location. Wine as I understand it originates on the vineyard. It is characterised by the location, the soil, the climate and the winegrower's hand. The sum total of these characterising features is called the "terroir".

In the wine cellar, we can only maintain and look after the quality which has been achieved. A young wine is a child in need of special care, which must be guided sensitively in its development. My philosophy is to produce dry, authentic Franconian wines which are a reflection of their landscape. The minerality of a wine is more important for me than artificial fruit and the authenticity of a wine more important than internationality.

This means that I support everything which furthers the uniqueness of a wine and refrain from everything which contradicts the idea of the terroir.

As the location plays a great part for us, I would like to describe it with the example of our "Homburger Kallmuth". This vineyard - I am talking about the part with a preservation order which provides the name - which we run in sole possession, is under nature preservation and has about 12 kilometres of dry walls running through it. Its geology and the unique location exposed to the sun turn it into a furnace in the summer. The wines from it are primarily Kallmuth and only secondarily Silvaner or Riesling. With these wines, it almost appears as if the kind of vine is only a medium for transporting the terroir. The minerality and the aromas of herbs and flint make these wines individual drops which cannot be exchanged. My objective is to support this in general and not to change it.

Authentic wines and authentic products, that is the basic recipe for success of our two companies.

Congratulations on the 225th anniversary from Robert Haller, wine estate manager, Fürst Löwenstein wine estate.

Robert Haller, 43, has been leading the vineyard Fürst Löwenstein, the vineyards in Franken and Rheingau, and the one in Tokai Hungary since 10 years.
He sets a special course on the typical vine characteristic of German traditional vineyards and was honoured with the prize of "the best vintner of 2004" from Gault Millau concerning his success.

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

1921 1st Application for a patent by ERSA

1921 Ernst Sachs applies for a patent for the electrically operated series soldering iron.
This was the birth of ERSA.

1921 ERSA H1: electric soldering iron with 200 W

1927 ERSA at Manteuffelstraße in Berlin

1932 Take-over of Joachim und Sohn, Schweinfurt

1932 Construction of cardboard machines

1936 Otto Kurtz joins the company

Kurtz Industrial Technology Companies

Variety is our central competence! Long-term company strategies for the future markets!

Diversity is our forte

The Kurtz Group is made up of high-performing medium-sized industrial enterprises from a variety of fields with a large number of plants both in Germany and abroad. As a supplier we specialize in casting, shaping, separating, jointing and in machining of metals. We furthermore specialize in the fields related to our products, that is to say in the areas of soldering, processing of particle foam materials, handling and casting technology. Our engineering departments furthermore supply the complete process and production technology to a turn-key production plant supplier for particle foam, casting and soldering machine construction.

In other words – we specialize in diversity.

Our markets are just as many-faceted as our sales paths and production methods. In our 225-year-long history, the enterprise has always been managed with an eye to stability and long-term growth. A broad-based product portfolio with customers from a great variety of market sectors helps to balance out fluctuations related to individual branches and to the economy as a whole. High performance in the field of research and development reflect the long-term orientation of the general enterprise strategy, ensuring that we will remain competitive in the future, even in the face of pressure from countries with cheap labour.

The Kurtz Group follows a multi-trademark strategy. This is because both the ERSA and the KURTZ trademarks are very well-known in their respective fields, the former in soldering technology and the latter in machine construction for foam materials and casting. KURTZ is also well-known as a supplier in our customer target group.

The logo of the Kurtz Holding GmbH & Co. also provides a common identification sign for all the companies of the Kurtz Group. As a whole we constitute the Kurtz Group, or the Kurtz Industrial Technology Companies.

The KURTZ trademark — *The ERSA trademark* — *The logo of the Kurtz Group*

Business sector	Product range
Holding	• Management of the enterprise group • Servicing for the whole enterprise group
Supply sector	• Cast pieces (aluminium, iron, heavy metal) • Machined trimming • Sheet metal technology • Tool and model construction • Surface technology
Foam material machines	• Pre-expanders • Moulding machines • Blockmoulds • Cutting installations • Engineering for complete plants
Casting machines	• Low-pressure casting machines • Tilt-pouring machines • Gravity casting machines • Lost-foam-plants • Engineering for complete plants
Soldering technology	• Soldering machines • Soldering tools • Optical inspection systems

Table 1: The business sectors of the Kurtz Group

Organization in business areas

The great variety of products and process technologies is one of the great strengths of the Kurtz Group. In order to exploit this to the best possible advantage, the organizational structure of our group of enterprises has to maintain a very high and professional level of complex management. Our customers and their markets are our prime consideration as we formulate our strategy. Our customers also require clear and fast communication structures as they go about their daily business. Our priority is to be able to give optimal service to our customers, i.e., delivery in accord with their prefered deadline, in the quality they have asked for and for an appropriate price. In order to achieve this, the Kurtz Group is organized not by enterprises and locations, but by business areas. Our five business areas are presented in Table 1.

Corporate division	Functions
Public Relations	• Publicity work • Marketing services
Information/Organization	• Services in the IT field
Procurement	• Co-ordination of purchasing and logistics
Personnel and legal	• Personnel accounting for the locations at company headquarters • Co-ordination of personnel policy • Training and further training • Legal questions
Finances and controlling	• Accounts • Planning • Monitoring
Quality	• Organization of the enterprise and its procedures in accordance with ISO9001

Table 2: The central sectors of the Kurtz Group

Following the norms of quality assurance in accordance with ISO 9001, our business processes are divided up into the development, sales and manufacture of products of the respective business area. All the business areas follow a common strategy, namely that each one should be a leading player in a defined region. As our business areas concentrate on the exploitation of market niches, the size and growth of the respective business areas are predefined by the clearly defined market segment and its development pattern. Each of the various business areas, if it were operating on its own, would have the greatest difficulty in offering the competencies in development and the kind of the worldwide market presence which our customers expect from us. This is where the unique character of the Kurtz Group really begins to pay off. Because of our shared use of sales, development and production capacities we can achieve higher levels of performance than many of our competitors. We furthermore do all we can to maximize efficiency in the management and support processes in the Kurtz Holding GmbH & Co, following the general principle: "As much centralization as possible, and as much decentralization as necessary."

Efficient holding structure

It was this principle which in 1997 led to the decision to found a holding company, the Kurtz Holding GmbH & Co. In addition to the role it plays by virtue of its status

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

1939 In the "Iron Hammer Works"

1946 ERSA barracks: move from Berlin to Wertheim

1948 Residential and production building in Wertheim

1948 Hermann Kurtz joins the company

1949 Construction of the employee building

The post-war years are marked by construction activities: between **1949** and **1954** three six-family houses were built for employees. The foundry was enlarged from **1949 -1952**, the machine factory from **1950 - 1952**.

1949 **1950** Extension of the foundry and of the machine factory

according to company law (it is the holder of all the essential shares and interests), the KURTZ Holding is responsible for carrying out the central commercial functions, and for the strategic setting up and co-ordination not only of the various business areas but also of the global sales and service network. KURTZ Holding thus provides essential services for its own subsidiaries and is at the same time in charge of the overall strategy followed by the enterprise group as a whole.
The individual corporate divisions are presented in Table 2.

Communication networks
Since 2001 we have been working with the ERP software SAP R/3. This system has also been introduced to a large extent at our locations abroad, and helps to ensure global transparency and co-operation. The communication platform consists of a worldwide data network and a virtual private network.

This enables us – wherever it makes sense to do so – to transmit business data to customers and suppliers at home and abroad in digital form.

Management by delegated responsibility
One of our basic management principles is responsibility-sharing and the delegation of decision-making to the point where it can be carried out to the best effect. We try to put this principle into practice at all possible levels.

The shareholders of Kurtz Holding GmbH & Co. have set up an Advisory Board made up of business experts to monitor management and offer advice. The board of management of Kurtz Holding GmbH & Co. holds a meeting with the directors of the corporate divisions every two weeks, at which any deviations in the course of business from the overall business plan are discussed and corrective measures are decided upon.

The so-called „management circle“ of the Kurtz Group is an informal gremium made up of key executives from the Group, both from Germany and from abroad. Information is exchanged and strategic goals are discussed on a quarterly basis.

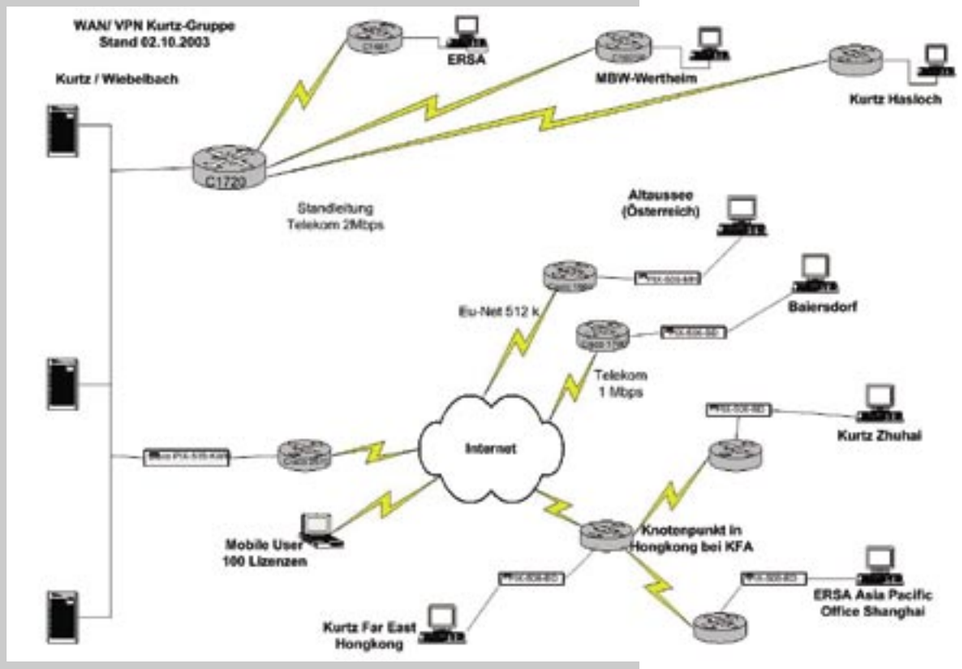
We always aim, in spite of the complexity of matters in hand, to make decisions swiftly but after due consideration. To achieve this, it is necessary to have a clear, hierarchically built management structure which is observed and respected by our staff at all levels.
For the purposes of daily business, the business areas with their respective profit centres are independent from the group organization, and are thus free to carry on their business without delays or unnecessary complications.

Every individual counts
In the final analysis an organizational structure is only a means to the end of doing business efficiently. What is really to thank for our success is the commitment of staff members on all hierarchical levels.

This is why we in the Kurtz Group are proud of the great number of committed staff members all making their day-to-day contribution to the improvement of company procedures and working with one another as good colleagues. This fact has given us strength in the past and we are determined to make this factor even more central to our successful company development as we move into the future.

Some features of our company have grown up historically in the course of its 225 years. We build on those features but also constantly subject our organization to rigorous testing and examination, so that we will continue to be well attuned to our markets and customers and thus equally successful in doing good business in the future.

This is why the Kurtz Group's fine traditions lead the company on to a bright future!



We are at home everywhere – worldwide
Global network guarantees optimal customer proximity

Globalization has become something of a buzz-word in politics, economics and sociology. For years now, there has been a constant increase in the transnational development of networks of all kinds - systems, society and market networks. New information technology enables us to build up our markets worldwide. Equally, for companies, globalization has inevitably brought about change on the social and cultural levels, and thus also challenges companies to adapt their policy accordingly.

Entirely new strategic and organizational answers have to be found to meet the far-reaching changes in the conditions governing the world market. From the purely sociological point of view, globalization brings with it the need for completely new concepts of state and society. More and more, the classical nation-state will lose its function as the principal political and social instrument of government within its own boundaries, and will have to make room for transnational bodies.

One such transnational body, economic and cultural in character, is the Kurtz Group. It is not for nothing that the Kurtz motto is: “At home everywhere – worldwide!”

But what do buzz-words such as worldwide presence, globalization, internationalization and world market actually mean for a medium-size-structured group of companies specializing in machine construction? Ultimately, they mean that our future success will depend on the extent to which we globalize as we rise to meet the challenges that face us now. The fact that there is a close relationship between our future and our past is also a key factor here. Our long traditions and close association not only with Germany but also with a particular locality mean that Kurtz is not at first sight a top candidate for “global player” status.

In fact, globalization at Kurtz was set under way at the beginning of the last century, when regions like the Ruhr or the ball-bearing town of Schweinfurt were considered out of the reach of a Spessart forge. And yet even then, the management made constant efforts to extend the Kurtz customer catchment area. Kurtz made a deal in the year 1900, for instance, in which they were to supply cast iron in return for electricity - the partner in question, Siemens, built Kurtz an electricity plant to meet the needs of the Eisenhammer.

The passage of the years saw constant extension of the Kurtz internationalization radius. Company policy formulations were very early on oriented towards markets

Kurtz Industrial Technology Companies
1779 - 2004
225 YEARS

1949 170th anniversary of the iron hammer works

As far back as the early 1950's, social aspects form the focal point of the activities.
The 170th anniversary of the company is celebrated in a fitting way, people get to know one another better at the company outing.

1949 Kurtz company outing

1949 Cardboard machines at Krause & Biagosch

1950 Invention of a warp let-off brake by Kurtz. It is patented and integrated into weaving looms.

1951 Start of production in Altaussee

1952 Foundry extension

which were becoming more and more international; these policy formulations subsequenty became real policy applications, which meant that the company was pre-programmed for growth.

The first step was the establishment of further production locations in the vicinity of the Eisenhammer. The range of products supplied by Kurtz was extended, the most important additions being in such fields as particle foam machines, casting machines and soldering technology. Diversification into market niches resulted in the step-by-step building up of an attractive product palette for the world market.

For Kurtz, being a global player means having a product range oriented towards international growth markets, and maintaining optimal proximity to the people who are right at the centre of our endeavours - our customers. On the one hand a clear “yes” to our production location in Germany / Europe, and on the other hand being present in all the world markets - that is the philosophy behind the success of the Kurtz Group.

One step in the implementation of this strategy on the sales side was the establishment of our first office in the USA in 1984. Since 1997 we have also had an assembly plant for particle foam machines there, which has in this period carried out general overhauls on more than 80 machines.

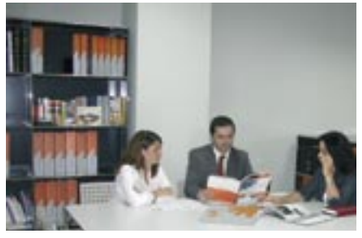
We made our start in Asia in 1987. Today we have sales and service offices in Hong Kong, Shanghai, Zhuhai, Shenzhen and Singapore.

On the European front we extended to France and Italy in 1990, and in 1995 we founded Kurtz South Africa.

The exploitation of synergy effects, in the field of infrastructure, for example, has made it possible for the group to internationalize consistently in all our fields. Our overall export quota is around 50 %, and in some sectors it is as high as 90 %.

Nowadays, the Kurtz Group has a network of sales and service offices covering and serving the whole world. Around the globe, our customers have 16 Kurtz plants and more than 100 Kurtz agents at their disposal.

This network enables the Kurtz Group to offer their customers 24-hour service, 365 days a year, right round the world. And this is ultimately what makes it possible for us to attract the big international customers, above all from the automobile, telecommunications, and packaging industries, which spread their production

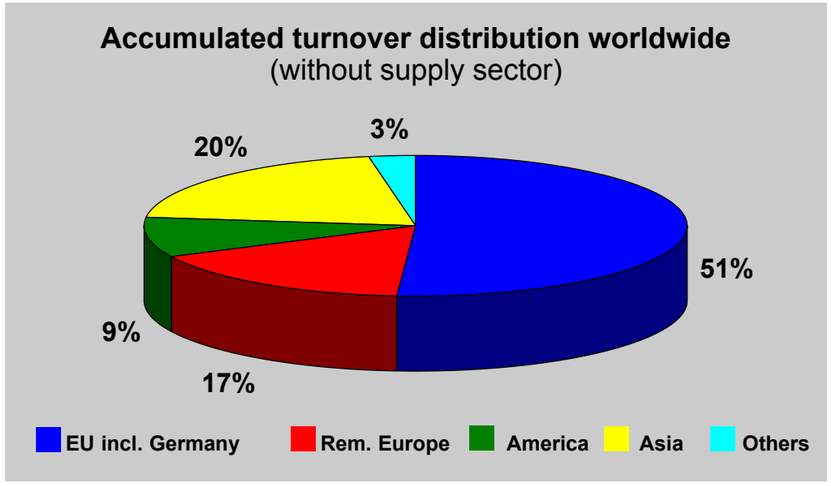


plants all over the world in order to service the various markets as fast and as economically as possible. Only systems suppliers who can offer speedy and qualified service are in the running as global players.

In the final analysis, it is our partners, whether our own branches or our representatives, who make the notion “Kurtz worldwide” a reality which stretches to the most distant parts of the world – whether the job in hand is the building of a light metal foundry in Kazakhstan or he soldering of 3 million electric plugs per year to serve as fully automatic connectors to a three-dimensional circuit board.

This is why we are proud to be able to say:

We are at home everywhere - worldwide!



1779 - 2004
Kurtz Industrial Technology Companies
225 YEARS

1952 “Centipede”

1952 In the construction of a sand processing plant, nailed wooden binders are used. The entire workforce carries the finished binders to the building site. The term “Hasloch centipede” was quickly born.

1953 Ernst Sachs jun. (right) joins ERSA

1954 Enlargement of the cleaning room

1954 Company outing to the Loreley

After **175 years** car axles for wheels with iron binding or drag shoes are no longer needed. The iron hammer works diversify into the production of bell tongues.

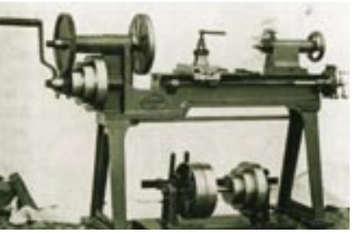
1954 Production of bell tongues in the iron hammer works

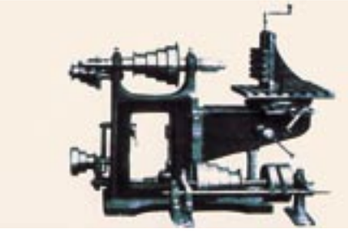
The history of machined trimming

From forge, anvil and blacksmith's hammer to CNC technology

The majority of the development of machined trimming was simultaneous with the Industrial Revolution in the 18th and 19th centuries, albeit with a distinct acceleration in the 20th century.

Until the 18th century, wood was the dominating work material. Metal processing was restricted to forge, anvil and to the blacksmith's hammer





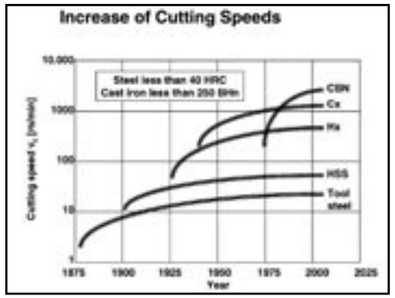
before a mechanical machine drive via transmission belts by steam engines, later by electricity, became available.

During the 19th century, a stormy development started in Europe and America with regard to production and machine parks. The introduction of standardised dimensions and replaceable spare parts laid the foundation for mass production. Universal milling and grinding machines were known as early as the mid-19th century. Turret lathes were introduced as quick changers for tools and both turret turning lathes and also automatic thread-cutting machines were very frequently seen in industrial countries around 1900.

The introduction of new working and cutting materials and the increasing cost pressure made the development of more stable and more efficient machines necessary.

The dramatic development of the possible trimming speed is shown in the below table. The futher development of machine tools facilitated a gigantic productivity progress in the course of the decades.

Apart from the further development of duplicating lathes and transfer lines the development of the first numerical controls began in 1950, at that time still based on tube technique.



WS: tool steel
HSS: high-speed steel
HX: sintered carbide uncoated
CX: sintered carbide coated
PKB: polycrystaline boron nitride

Source: Kennametal

The development at KURTZ:

In 1860, KURTZ started to concern itself with machining at the Iron Hammer Works in Hasloch. At the beginning, lathes were used, later boring machines, which still had a transmission drive. It was only later that machines with individual drives were gradually put into use. For machine and plant construction, KURTZ always needed machines with large travels of up to 6 m and turning diameters of up to 2 m.

In 1979, the first CNC lathe was bought. In the meantime, there are a number of CNC lathes, milling and boring centres in use at KURTZ. All of them are connected with one another via a network. Without any exceptions, programming is done in production preparation with a language similar to APT, from which processing programmes for the individual machines are generated automatically by means of post-processors.

The latest procurement for the anniversary is a processing centre from the firm of UNION with a travel of up to 4 m and an automatic tool changer for 60 tools.

KURTZ can look back on a long tradition in machined trimming . The same also applies for the UNION Werkzeugmaschinen company from Chemnitz, which celebrated its 150th anniversary last year.

The future of machined trimming

Rapid prototyping and laser technology

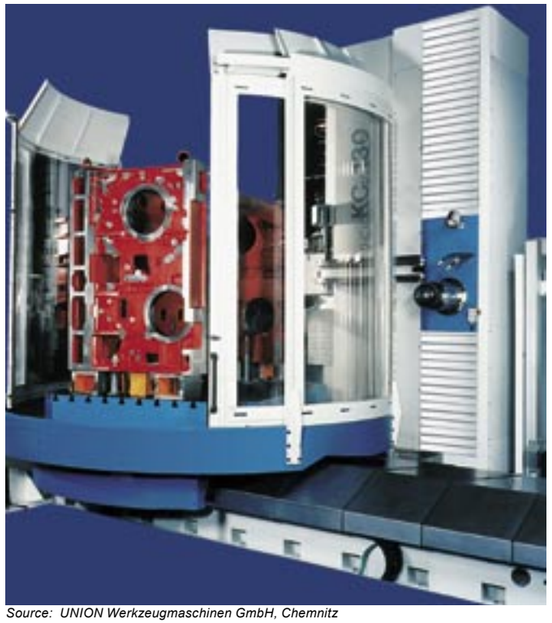
As a result of the lasting recession of the past years, companies in the mechanical engineering and supply industry have been placed under economic pressure.

Whereas technical capability and quality of the machine tools were the most important purchasing arguments for the buyers in the past, decisions to buy are made above all according to cost aspects at the present, and machine tool manufacturers have had to react to this development.

The development potentials for product innovation can be seen both in the area of new machine concepts for conventional processing and also through the application and implementation of innovative technologies such as high-speed and dry processing as well as processing after the hardening process. Naturally, the use of process combinations such as ultrasound-supported drilling, laser-supported milling or lathing of hard materials, abrasive hardening, laser hardening and lathing in a machine tool and the complete processing of complex workpieces in one clamping play an extremely important role.

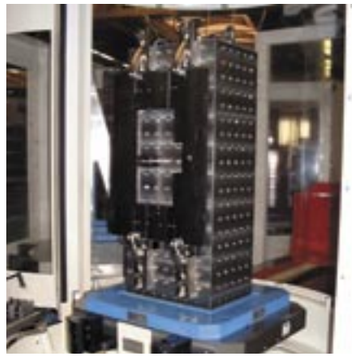
In addition, the increasing miniaturisation of components creates a distinctly larger requirement for machines for micro-processing. The latest developments also show that machine tools without the customary right-angled arrangement of the machine axes are feasible by a change in the kinematics of the machine, for example on the basis of Stewart platforms. This naturally also provides benefits for machine construction.

With a view to the future development potential, rapid prototyping, laser processing and various assembly and handling techniques result in new possibilities.



Source: UNION Werkzeugmaschinen GmbH, Chemnitz

Model of a camshaft produced from artificial resin by stereo lithography



Source: UNION Werkzeugmaschinen GmbH, Chemnitz

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

1955 ERSA at the Industrial Trade Fair in Hanover

1958 Addition of the machine factory

1960 ERSA production of soldering irons moves to the current company premises in Bestenheid.
The first soldering machine is sold in the German market.

1961 New ERSA administrative building

1961 Sales of FRY soldering machines in Germany by ERSA

After two years of planning in 1961/ **1962**, the foundry was rebuilt at its old location in a series of construction sections with only three weeks of interruption of operation.

1961 Drainage of the lake for the new building of the foundry

The history of sheet metal working

Process chain sheet metal as an all-including service

The German word "Blech" means both sheet metal, but also nonsense, something silly which is said. A word, then with a wide range of meaning. But in spite of the derogatory meaning this word can suggest in many German minds, it nevertheless primarily stands for technically high-quality industrial products.

However it took mankind a very long time from the humble beginnings of metal-working to that which we recognise today as modern sheet metal working.

By the year 0 A.D., working with iron, tin, lead, gold and silver already had a long tradition, which had begun about 10000 years previously with the processing of copper.

The majority of all metal-working techniques had been developed by 2500 B.C. Techniques used for shaping were hot and cold forging or beating, which developed into hammering and raising techniques. Annealing and grinding were known, necessary for the polishing and fine abrading used in the production of mirrors. A further technique was the piecing together of flat sheets of metal with lapped seams or rivets which were soldered.

After the discovery of smelting, battering was used to flatten the cakes of metal into sheets. Some form of battery continued to be necessary until the invention, in the late 17th century, of the rolling mill in which sheet metal was produced by mechanical means.

Approx. 200 years ago, as a result of technological developments during the Industrial Revolution, the rolling of sheet metals was developed. The starting block (slab) is pressed in stages between ever narrower rollers until the desired sheet metal thickness is achieved. This basic process has scarcely changed to this day.

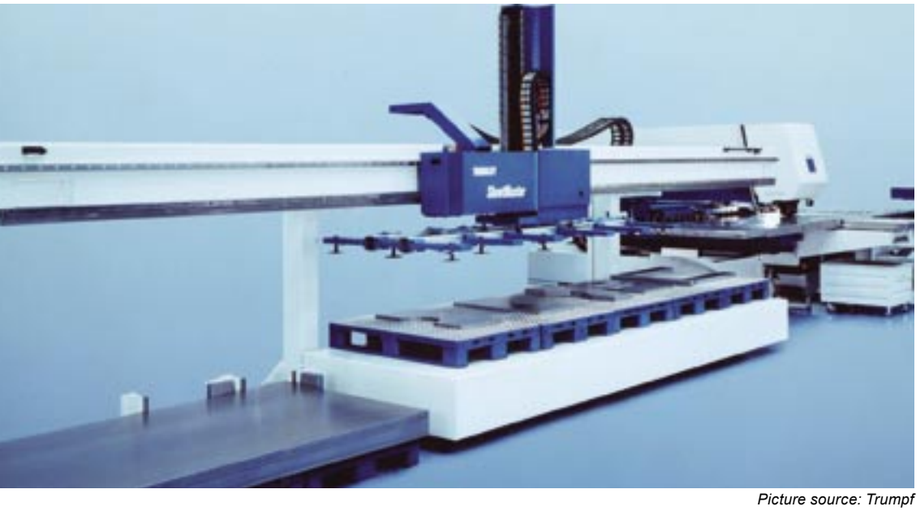
For a long time subsequent processing was carried out manually or later by conventional machines such as band shearers or simple presses.

Fig.: rolling mill from Leonardo da Vinci

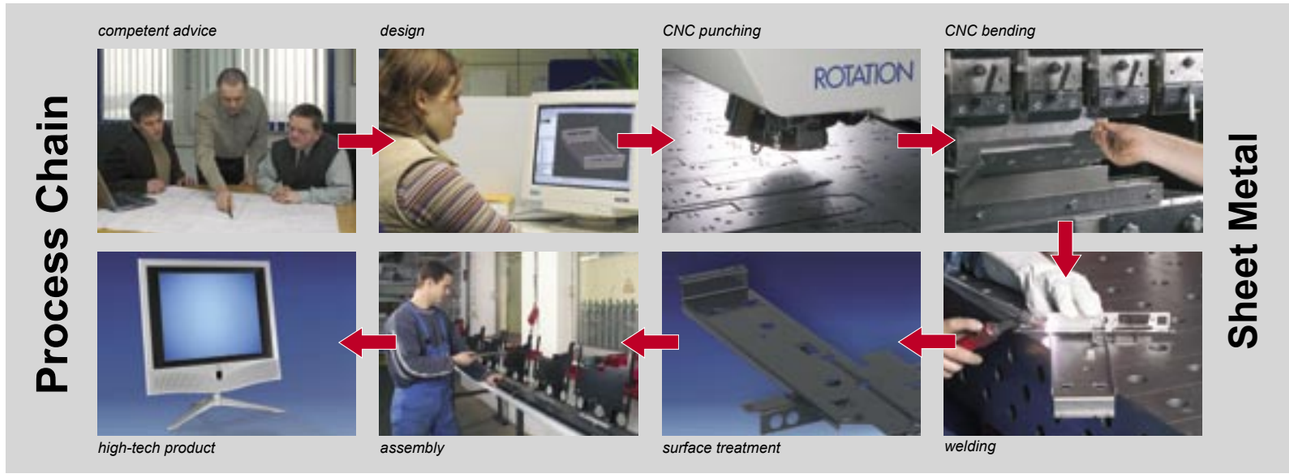
A later material processing revolution occurred with the use of lasers and modern CNC controls.

Nowadays general reference is made to the sheet metal processing chain.

This includes the areas – in principle inseparable – of design, programming and production. Optimally oriented towards one another, at the design stage account is already being taken of the demands of production with regard to feasibility and cost savings. The programming depends on the technology (stamping or lasers, material, material thickness, sheet dimensions, etc.), and at the production stage the best available machine technology is used. A unified,



Picture source: Trumpf



comprehensive database is very important here.

Seen in the context of the long period over which people have been working with metals and sheet metals, the few years in which the company MBW Metallbearbeitung Wertheim GmbH has been active appear short. However a look at the period from foundation in 1996 to today will reveal a considerable success story, accompanied by constant growth and enormous know-how.

The company's rich experience as contract producer of a wide range of products in almost all sectors where sheet metal parts are used extends from the electrical industry to building components and interior fitting, from the manufacture of instruments and control cabinets to rail vehicle parts. And MBW has all the latest production equipment and planning tools to carry out these jobs to the highest quality.

The future has already arrived in the field of sheet metal working. The trend is clearly in the direction of increased automation and greater flexibility, in particular the aspect of fewer units up to batch size "1" and the fact that manufacturing work by people will be augmented by the use of robots.

In order to achieve all this, the interlinking of all production stages is essential. Starting from a fully automated sheet metal storage system, the punching and laser machines are supplied with the raw material. Blanks and offcuts are separated as appropriate, with the blanks from stock being called as required and passed directly to the bending machines.

The latest efforts in some research centres are oriented, parallel to the processing centres involving machining, towards the development of sheet metal processing centres. Here, a laser cutting machine for the cutting and welding of flat and profiled materials is linked with a bending centre with tool changer, where the bending tools are changed over in just a few seconds. An industrial robot undertakes the parts handling during the bending process and the loading of the machine.

A CAD system and coordinating machine are integrated into the overall CIM chain. Programming is carried out off-line, leading to a reduction in stoppage times. These developments should in particular increase the competitiveness of smaller and medium-sized companies.

At MBW Metallbearbeitung Wertheim GmbH, which due to fast growth is reaching the limits of its present accommodation, an eye is constantly on the future and investment being made accordingly. Construction of a new production and administration building will begin during 2004.

1962 New building of the foundry

1962 Awards at the company party

In **1964**, Ernst Sachs is awarded the Rudolf-Diesel medal for pioneering performances in the field of engineering and natural sciences.

1964 Rudolf-Diesel Medal for Ernst Sachs

1966 Reconstruction of the model hall

1967 Company party at KURTZ

1968 Construction of ERSA's first own soldering machines

Casting – a more than 5000 year old art

Artistic shapes, hot models and tough cores

Casting is distinguished on the one hand by materials, in particular the two areas of non-ferrous metals and ferrous materials. On the other hand, various casting processes are known. For example, gravity die casting and low-pressure casting are parts of permanent mould casting. The moulding methods with lost patterns are green-sand moulding and the cold set moulding process.
At KURTZ, both non-ferrous and ferrous materials are cast and both casting processes are made use of.

Cast parts were produced already 5000 years ago, thus making the casting of liquid metals doubtless one of the oldest job profiles which we know. Casters are very proud of this tradition and celebrate the casters' festival of Saint Barbara in December; she is the patron saint of casters. Tradition and their reputation for social steadfastness are one side of the casters' coin. The other side of the coin shows a modern job profile which holds its indispensable ground also in our highly industrialized age.

Their job profile entails not only pouring the melt into the mould ready for casting, but also all the work connected with this work step. The metal or iron must be molten with technical knowledge of metallurgy and the mould, for example, is produced with moulding sand by duplicating the models. The same applies for the cores.

The insertion of the cores and the stipulation of the gate and feed system also demand a highly specialized knowledge about the casting technique requirements to produce first quality castings. This is the only way in which the casting can be produced functionally and without faults. Today's casters work with modern melting devices, with mechanised mould and core production systems and with model moulds made of plastic, metal or wood. Detailed knowledge about the materials and operating equipment used is just as necessary as the further processing of the unpacked casting. The profession of caster also includes the further treatment in the cleaning room and varnishing, right down to the processed, ready-to-fit casting.

The mythology of casting is also made scientifically transparent nowadays thanks to computer-controlled solidification simulation and strength calculation. Nevertheless, the appeal of the tasks is repeatedly the analysis of the casting faults and putting the right possibilities of solution into practice for the production of a flawless casting. In this respect only the available technology has changed during the last 5000 years.

Alongside studies of casting techniques, the casting trade is passed on in the companies by the training of apprentices. At KURTZ, the trained professions of foundry mechanic and chill caster are offered every year. This includes basic knowledge of general mechanical engineering and, above all, training alternating between school and practice. The apprentices at KURTZ are given the opportunity of putting their knowledge into practice productively at an early stage.

True to our motto "Fine Traditions and a Bright Future" 5000 years of casting tradition combined with most modern technology are passed on to the future casters during their qualified training at KURTZ.

Foundry as system supplier

From product development up to serial casting from one source

Care and extension of existing business relationships and the further acquisition of new clients are part of the sales programme for our foundries.

"Why KURTZ?" - this is the question as a demarcation to competition.

The answer can be found in the comprehensive offer: service from the first product idea, daily optimisation of the casting processes, complete offer right down to the ready-to-assemble component, project and quality management concerned with casting.

In detail, this means for us:

Product development: 3D construction, FEM calculation, casting simulation, model and die construction.

Foundry technique: Aluminium casting in sand and dies (low-pressure casting), non-ferrous metal casting, grey cast-iron and nodular cast iron.

Final production: Heat and surface treatment, CNC processing, component assembly, logistics.

Why KURTZ?
More than a foundry!

With a total of more than 280 employees, engine, transmission and chassis parts, vacuum and hydraulic castings, components for sophisticated mechanical engineering and for the rail vehicle industry are produced at three locations.

KURTZ castings can be found in Audi, Bentley, DAF, DC, Ferrari, Harley-Davidson, MAN, Siemens medicinal and transport engineering, VAT, Weinig, ZF transmissions etc.

The area of our product development is increasingly developing. Not only is consultancy in casting technique a matter of course for us, but we also offer the entire casting construction according to interface definition or detailed constructions with calculations and die filling/ solidification simulation.

This service is increasingly used by our customers with regard to casting technique competence, process security of the series and minimisation of the development times. We always have functionality and optimal profitability in our sights.

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

1970 Fibre cement machine for Iran

Introduction of the in-house suggestions system in **1969**. Even small alterations have great results in the long term.

1971 New construction, sand processing

1971 Trip to visit the international foundry congress

1971 ERSA TC 70 mech. temp.-controlled soldering iron

1971 sees the start of production of machines for the processing of expandable polystyrene.
Today KURTZ is the world market-leader in this field.

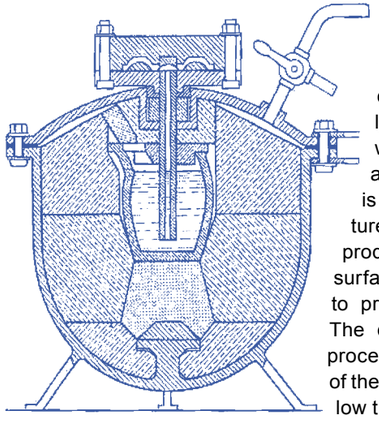
1971 First automatic shape moulding machine

Kurtz Foundry Machines

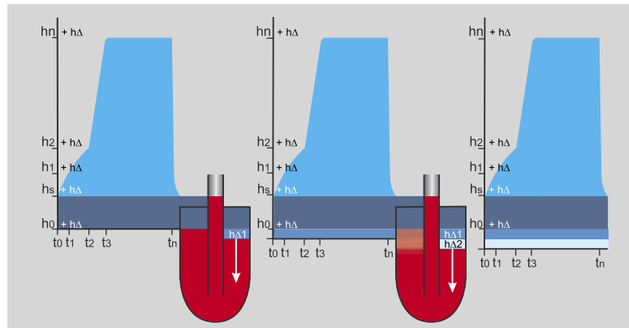
The low pressure die casting process

Low pressure – high quality for powerful motors and hot wheels

While copper/tin alloys and iron shaped whole eras of cultural development by their use in the manufacture of tools and weapons (Bronze Age from 2500 BC onwards; Iron Age from 7th century BC in Central Europe), aluminium can be characterised as a genuinely "modern" metal. The element was first isolated in 1828 by Wöhler, who reacted aluminium chloride with potassium to produce aluminium in white powder form. In 1854, Bunsen produced the metal for the first time by electrolysis.
This experiment was not reproduced in a technological setting until 1890 by the "Deutsche Edison Gesellschaft " (German Edison Company), which later became AEG. The first few grams of pure aluminium to be seen in public were presented at the Brussels World Exhibi-tion in 1897. At that time the metal was far more valuable than gold, free of alloys such as silicon, magnesium or copper. In its technical applications, though, of relatively minor importance. This was to change dramatically in the 20th century thanks to the development of metallurgical and technological processes. More recently, following the first oil crisis in the 1970s, reducing the weight of goods to be transported had become a matter of extreme importance as a means of saving energy. Aluminium and its alloys thus began their meteoric rise, and it would be unthinkable today to use any other material as the dominant light metal component in the aircraft, auto and rail transport (ICE) industries.



The die casting process became a highly automated one within the space of a few decades and is used to manufacture castings with a high production run, smooth surfaces and measured to precise specifications. The disadvantage of the process lies in the quality of the casting structure below the outer shell.



Gravity casting, which relies on the formula m x g x h (mass x gravity x height), and its variant, tilt casting, are other processes in current use.
Their disadvantage is that turbulence when filling the die (i.e. blistering of the melt in the presence of oxygen), and a reduced pouring pressure (gravity casting) limit the quality of the castings they can produce.

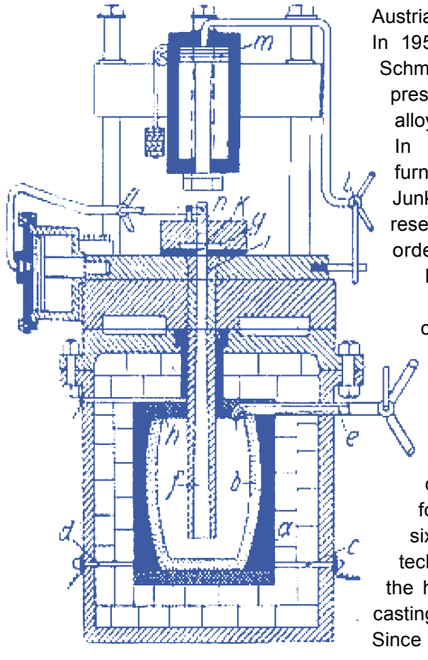
In contrast to the conventional, millennia-old casting process that involves pouring the melt into the die from above in a continuous stream, in low-pressure die casting the alloy melt is forced upward from a gas pressure tight holding furnace directly into the die through a feed tube. Gas pressure must be maintained until the casting has solidified to ensure a proper seal.

This can be achieved at a relatively low pressure of under 1 bar. To compare, pressure of 1 bar above gravity is equivalent to a column of liquid aluminium more than four metres high.

The oldest known work on the principle of low-pressure casting was written in 1910 by A.L.J. Queneau. The equipment it describes, which was used to produce aluminium and manganese bronzes, already exhibited all the main characteristics of today's production processes. Shortly thereafter, E.F. Lake described a casting machine with similar characteristics for lead and tin alloys, for which a patent application was submitted.

In 1924, Berlin-based AEG was granted a patent for setting a number of dies on a turntable and rotating them in sequence to link up with a feed tube from a low-pressure crucible for casting and solidification. In 1933 the same company patented a casting system that features an open pipe running parallel to the feed tube in which the melt rises and falls as the die is filled, and which can be topped up as required.

At this stage there is no record of the low-pressure process being used in mass production. Evidently the time was not ripe for a major technological advance until the start of World War II. This situation changed fundamentally once Great Britain entered the war, when English low-pressure foundries such as BIRMAL and ALUMASC began mass-producing ribbed aero engine cylinders with notable success.



In 1950, in Linz, J.Berger of Mandl & Berger adapted ALUMASC's then cutting-edge low-pressure technology, introducing it, with his own ideas and products, to Austria.
In 1954, the company Karl Schmidt also began low-pressure casting with Al-alloys in Neckarsulm.
In 1960, together with furnace builder Otto Junker, the company's research team won an order to fit a new low-pressure foundry with more than 40 casting installations for Chevrolet of the US.
They manufactured crank casings, cylinder heads and gear housings using sand casting techniques for the new air-cooled, six-cylinder Corvair – a technological milestone in the history of low-pressure casting.
Since the start of the 1970s, Mahle and Kolbenschmidt have gradually refined the manufacture of crank casings made from ultra-eutectic Al-Si-alloys.

The production launch of car wheel rims made from aluminium marked a further sharp upturn in fortunes for the low-pressure casting process. Dozens of small firms which at the time had no experience of aluminium casting began production with low-pressure equipment in an unprecedented design varienty. The wheels, initially viewed as a short-lived fashion object, generated a market boom that continues to this day.

Since 1972, the company of Hoffmann had made innovative use of the low-pressure technology to run a customer foundry. The Main-Spessart-based company cast specialised components made from self-hardening alloys on low-pressure machines of its own design. These were for many decades stocked through the catalogues of the Rheinfelden aluminium concern ALUSUISSE.

In 1982, Hoffmann was taken over by the Kurtz Group. Today it acts as Kurtz's die foundry and, together with our division

for foundry machinery, specialises in low-pressure technologies.

The advantages of the low-pressure process include low-turbulence filling from underneath the die and controlled solidification with air-tight feeding with a minimal melt circulation of below 10 percent. We can see proof of these advantages in a constantly expanding range of products: engine, gear and chassis components, parts for hydraulic systems and also helium pressure tight components for the vacuum industry.

Today, low-pressure casting is the process of choice for the economical production of components of the highest structural quality.

Sources: Based in part on a speech by Prof.Dr.F.Kahn to the Kurtz GmbH low-pressure casting symposium on 26.09.2002.

1971 New construction, assembly hall

1971 A look at the radiator winding room at ERSA

1973 ERSA is the co-founder of the Productronica, the world's largest specialised trade fair for electronics production

1974 Walter Kurtz joins the company

1975 New building and set-up new large cleaning room

1975 Enlargement of the office building

1977 Sale of the 100th automatic shape moulding machine

Kurtz Foundry Machines

From foundryman for foundrymen

Aluminium casting machines – a completely rounded piece of work: From rapid prototyping up to serial casting

„From Rapid Prototyping up to series casting“ is the motto according to which KURTZ has positioned and established itself on the market in the past few years.

Not only does KURTZ have machines on order for the low-pressure casting area, but machines were also supplied in the gravity casting area and in tilt casting this year.

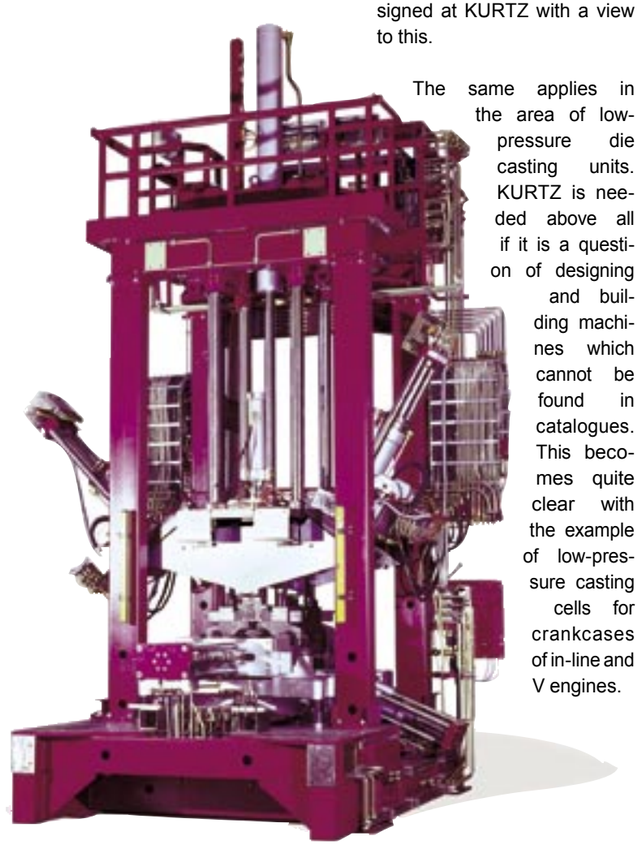
An example of tilt casting is the project for the firm of Alexpert. Two very large tilt casting machines with central hydraulics and controls were delivered to them. The only thing that these machines have in common with the standard machines at KURTZ are the first letters in the machine designation. Both machines were not only completely equipped, i.e. from all possible core pulls via cooling right down to easy-to-operate controls with recipe management, but also the die dimensions were of a different order of magnitude. An order for machinery tailor-made for the customer the realisation of which made the highest demands. A technical challenge which we were able to master in our team of experts.

To do justice to our motto of “Rapid Prototyping”, a low-pressure unit for the casting of prototypes into plaster and sand moulds was supplied to the firm of Grunewald in Bocholt.

Also this unit was designed and built according to the client’s requirements and wishes. Combined with the features and highlights of the KURTZ machines. In particular, these were operability and machine handling, such as holding-down appliance movable in all directions, holding-down appliance pivoted, machine panel mechanically movable, operation via hydraulic manual valves combined with KURTZ components such as furnace change system with mechanical couplings, teach-in controls for pre-pressure and degree of filling furnace and machine and furnace controls from KURTZ.
This unit is now the second KURTZ machine with Grunewald and completely distinguishes itself from the first one delivered in its finish and possibilities.
This also applies for all 10 units supplied in the proto-type area in the past 4 years, regardless of whether they are supplied to Becker CAD CAM CAST, Grunewald, Steinrücken, Daimler Chrysler, Zeus or BMW. No machine is like any of the others. Only BMW was supplied with two identical units.

Examples of further equipment features for such a unit are:
cooling technique (media trees), holding-down appliance with measuring technique for automatic detection of the mould height and conveying lines in front of and behind the unit with replacement panels, so that core packages can be prepared outside the unit.

KURTZ will continue to equip itself for this very interesting market, as there is no larger variety and demand than in casting in the RPT area.



These units designed by KURTZ have also been used in ceramic fine casting since this year, the same success and acceptance being expected. Alongside aluminium as a working material, magnesium is becoming more and more demanded in the RPT area. Various suggestions for solutions have already been designed at KURTZ with a view to this.

The same applies in the area of low-pressure die casting units. KURTZ is needed above all if it is a question of designing and building machines which cannot be found in catalogues. This becomes quite clear with the example of low-pressure casting cells for crankcases of in-line and V engines.

The joint success story of KS ATAG and KURTZ is also being continued this year. In the anniversary year, 4 low-pressure casting cells have been and will be supplied to KS ATAG in Neckarsulm.
This is one machine for the production of in-line 4-6 cylinder engines and three machines for V6-12 cylinder engines.

By the ende of 2004 KS will have received 18 Kurtz casting machines in total. The scope of delivery includes not only the machine, but also peripheries such as control place, tool changer, protective unit etc. On site, components provided by sub-suppliers are also fitted to the scope of delivery.
The objective is above all to keep the assembly time as short as possible so that the start of production can be quick.

Alongside KS ATAG, BMW AG is also a customer for low-pressure casting units for the production of in-line 6 cylinder crankcases in the anniversary year. In 2004, KURTZ is supplying a total of 5 machines with tool changing systems to Landshut. BMW also had the claim: design and construction of units tailor-made to match BMW’s requirements, coupled with the know-how of KURTZ as the supplier.

In such projects, closest co-operation with the customers and “outside companies” is the prime obligation, starting with the concept phase and accompanying the partners right down to acceptance. The objective for everyone must be to produce good castings within a short period without losing sight of the quality of the unit design and finish.

But all these examples are not to give the impression that KURTZ can only attend to special tasks. A further example is that 10 type AL-13-13 SR casting machines are being supplied to China this year for the production of wheel rims. It is extremely pleasing that these machines are not only being supplied to a new customer, but also to a customer whom we have already supplied. This unambiguously shows that KURTZ is also in a position to build up long-term partnerships over a long distance. The signs are also good that KURTZ will receive an order for 15 machines for the Middle East in the near future. Precisely this is the key for the extremely competent appearance on the market by KURTZ.

Our capability and flexibility, our know-how and demand for quality are acknowledged world-wide.

Kurtz Industrial Technology Companies 1779 - 2004 225 YEARS

1978 Renovation of the iron hammer works’ building

1979 Federal Order of Merit for Otto Kurtz

1979 200th anniversary of the KURTZ company

1979 200th anniversary of the KURTZ company

Kurtz grants first licence to Japan and is represented in the USA. Globalisation starts.

1980 Bernhard Kurtz joins the company

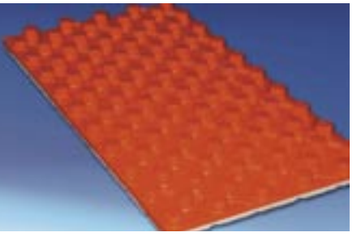
1982 Construction of the first vacuum blockmould

A sure-fire success dish from the petro-chemical witches‘ kitchen

Expandable polystyrene conquers the world – the most lightweight of all synthetic materials

From the petro-chemical witches‘ kitchen: “Take two parts of polystyrene, fill the whole lot up with air, season generously with ingenuity and imagination – and your sure-fire success dish is ready“: expanded polystyrene.

Expanded polystyrene became famous overnight on 30 September 1964, when, far away from the centres of European technology, this most lightweight of all synthetic materials was used to lift a livestock transport ship in Kuwait harbour in the most difficult circumstances. A spectacular achievement!



The photographs went swiftly all around the world - pictures in which a synthetic foam took all the limelight. Expanded polystyrene is packaged air, incredibly light, but robust. At the first processing stage, it takes the form of innumerable feather-light little balls. These were forced into the storage chambers of the sunken cargo ship. They pushed out the water and it was their buoyancy and lightness that helped the ship, lying on its side, to right itself and come up to the surface again.

Walt Disney’s Donald Duck had tried a similar trick with ping-pong balls back in 1949, but that is another story.

The 1964 rescue operation in Kuwait harbour used 70 tons of expanded polystyrene, which delivered about 2,500 tons of upward lift. That was enough to raise the floundering freight-ship and bring it back to the surface.

Spectacular, you will agree. But not as spectacular as expanded polystyrene itself. The invention of this particle foam ushered in a new era in synthetics - the foam materials era.

Unlike stone and steel, synthetics can be foamed, polystyrene particularly well, as can be seen from expanded polystyrene. Plastics are in themselves light materials, but foam materials are even lighter and fully capable of opening up new markets in:

- insulation against the cold and against heat
- sound-absorption and soundproofing
- packaging “made to measure”

They made possible shaped bodies in absolutely unprecedented quality, which revolutionized construction and packaging technology.

The path to success trodden by the inventor of expanded polystyrene was paved with obstacles and difficulties. The basic idea of expanded polystyrene is nevertheless comparatively simple – styrol, a petro-chemical product, is polymerized into polystyrene, a polymer in bead form. In the process, a blowing agent, usually pentane, is added (6%), which dissolves in the polystyrene.

Packed in metal containers, the granulate is transported to the processor, who puts it into the so-called pre-expander, where the application of steam has a twofold effect on it, softening up the polystyrene beads and also activating the pentane dissolved in them.
The pentane evaporates and inflates the round bead particles. In an intermediary phase, the blowing agent disperses from the polystyrene – now expanded, or pre-expanded - and air takes its place. The expanded polystyrene is now “packaged

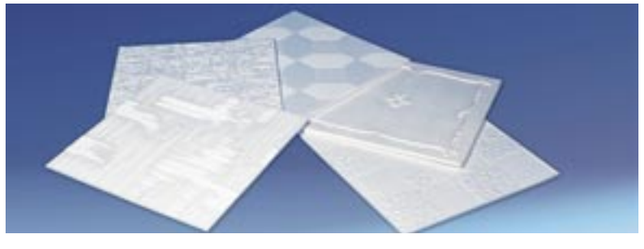
air”, which is not only capable of lifting ships (see above), but also fills soft furniture and can be used for countless applications in almost all fields of industry.

But a foam bead still does constitute a foam material. A foam material only comes into being in a second phase. A mould, that is to say a “negative” of the shape which is to be produced, is filled with pre-expanded beads.
The mould has numerous little inlet nozzles with narrow slits through which steam can be injected. The heat of this steam-blast softens up the polystyrene beads for a second time, and the air they contain expands, pressing them against each other and against the wall of the mould. The beads fuse and in the moulded shape produced it is still possible to distinguish the individual foam particles – the end product is a foam material, or more exactly, a particle foam material.
There is practically no end to the shapes, colours and uses of parts produced in this way:

- insulation panels for buildings, insulating against cold, heat and sound
- decorative elements for thehome, office, stage and film

and then, as far as and further than your imagination can take you:

- countless different moulded shapes required for packaging, games, sports, shipbuilding, the construcion industry – and for every imaginable kind of technology.



On 28 February 1950, BASF wrote itself into the technological history books with the “material that foams are made of”. But it needed more than just a raw material producer to bring about world success; This required contributions from the builders of pre-expanding machines, of steam-blast equipment and especially from the developers of the moulds machines.

Expanded polystyrene is a clever material, and it acts as a catalyst for further smart ideas – material development, machine development, process technology and any number of product ideas have contributed to its market success.

KURTZ recognized this potential and established a direct link between the success of expanded polystyrene and their own firm’s success story. It was back in the year 1971 that KURTZ committed itself to this material. The full range of machines was on offer by 1982, and in the LTH process developed a unique, energy-saving concept for shape moulding. This meant energy-saving on a product which simply by virtue of its insulating qualities contributes to huge energy savings world wide every year – a triumph for sustainable development and expanded polystyrene.

With a variant of the expanded polystyrene process it is possible to process polyethylene and polypropylene into elastic foam materials which are particularly well suited for use in the automobile industry. And whenever there’s some foaming going on, then you can be sure that minds at KURTZ, true to form, will be positively foaming with ideas.

Prof. Dr. Ing. Anton Weber, an experienced chief of Market and Application Development of the BASF AG.
His main business areas including: Plastics in
Shipbuilding
Automotive engineering
Electric engineering
Packaging
Honorarprofessor of University Kaiserslautern in Plastics Engineering.

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

1982 The Kurtz range of products is extended by the take-over of the Hoffmann aluminium foundry in Wiebelbach.
Until the present, the location has developed into the headquarters of the group of companies.

1982 Aluminium casting

1982 Rainer Kurtz joins the company

Diversification of the machine construction programme in 1983 by the inclusion of blockmoulds, pre-expanders and foundry machines in the range of products.

1983 Pre-expander series KV 600-1000

1983 Bavarian Order of Merit for Otto Kurtz

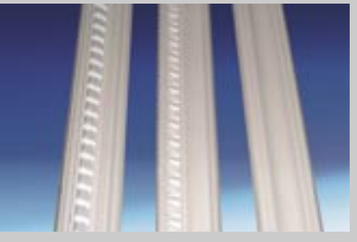
1983 Fire destroys the soldering factory at ERSA

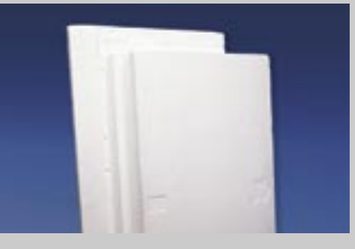
Foam, sweet foam ....

EPS applications with no end in sight

There was no end to the crowds of visitors to the BASF stand at the 1952 Düsseldorf Plastics and Rubber Trade Fair, all eager to lay their hands on "the lightest ship in the world". The foam material which this bath-tub fleet was made of was expanded polystyrene; under the trade name given to it by BASF, "Styropor", it was in the following decades to become a byword for its low weight and excellent heat insulation qualities, and for its reliability as protective packaging for fragile or otherwise delicate goods.

More than half a century after it was invented, expandable polystyrene – round granules polymerized out of styrene monomers and other additives – is still a bestseller. Around 2.5 million tons of this very light material are currently processed for use in a wide variety of fields per year. But, you may ask, how are the small, hard, glassy beads turned into a feather-light foam?





The father of EPS, Fritz Stastny, was conducting experiments at the beginning of the fifties with mixtures out of liquids with low boiling-points (such as monostyrene and polystyrene) and other ingredients in a multiplicity of different combinations. And then quite by mistake, one sample was left too long in the drying cupboard and yielded astounding results – overnight, out of the shoe polish tin which had been used to hold the samples had grown an inhomogeneous skein of low-density foam, jauntily sporting the tin's lid on its head like a cap. A matter of only a few weeks later, on 28 February 1952, a general patent had been taken out on the production of polystyrene foam.

And yet the newly-developed material did not become such a great success overnight. The first application targeted was as an insulating material for high-frequency cables, but this did not come to anything for reasons of cost. It took time for people to start thinking about the potential of foam material, and at first it was its use as a material for lifebuoys that literally came to its rescue and carried it over the treacherous waters that have to be negotiated before a product has found its feet in the open market.

The polystyrene beads now have longstanding siblings – as early as the seventies, it proved possible to use polyolefins to produce tough but elastic particle foam materials with considerably higher resistance to deformation when subjected to changes in temperature. The expandable polyethylene that was the result of this discovery was used for numerous applications in the field of high-quality packaging. It was expandable polypropylene that succeeded in making the breakthrough into the automobile industry, where the beads (usually black in colour to offer protection against UV radiation) protect drivers, passengers and mechanical parts from injury and damage in the case of a crash.

Most recently, EPS has been demonstrating its usefulness in a new outfit – in a noble grey tone, it offers double the insulation provided by EPS in its classic form. The addition of graphite or aluminium particles reduces the amount of infra-red radiation that can get through the foam material. And this is not the only development which makes us confident that the little beads will remain a growth commodity in many markets worldwide.

Does EPS packaging have a future?

From those who are moulding the future ...

What reaction does one get when one asks this question of an EPS processor in Germany?

"**How** is it supposed to have a future?

What customers are left to us?

Where have the big customers all gone?

How many electronics enterprises do we still have in Germany?

And how many enterprises in Germany will still be producing electro-machines for house and home in five years' time?

And how are we expected to survive with prices at the level they are now?

And have you considered the fact that other materials such as corrugated cardboard, paperfoam or pulp are in some instances taking the place of EPS-packagings?"

Can one really blame people for giving this answer, if this is how they think? But are there not other ways of looking at the problem?

Is it really the case that EPS packaging is being used less and less, or is it just that it is being used elsewhere?

And is the pressure on the prices not caused by some producers trying to raise or defend their sales by offering discounts on volume, instead of aiming to increase turnover and profits through sparing a thought for the processes involved and combining this with savings in the customers' process costs?

Do other materials such as corrugated cardboard really constitute competition?

Does a volume of about € 3,500 million for packaging in corrugated cardboard as compared with about €100 million for EPS packaging really constitute competition, or is it not rather the case that these two products are complementary, constituting in combination a "system solution" for the customer?

Is there such a thing as an EPS packaging which is not surrounded by some other material such as corrugated cardboard, plastic foil or the like?

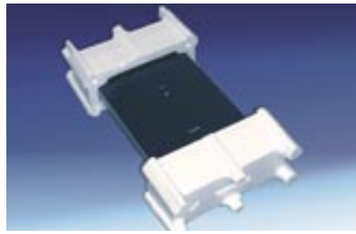
Are there not demands and applications which can only be met and fulfilled by EPS packaging?

How would it be if those concerned would concentrate on the applications for which EPS is most suited. And if they were to offer these applications in the region of the world in which the users really want them? Complemented and combined with materials which give the packaging additional qualities, in combination with an analysis of the packaging process resulting in a "system solution"?

Wouldn't that be real customer orientation? For is it not the customer who decides if what we produce is of value, or if it is not just a blind service which he has to pay for – or possibly decides not to pay for?

Is it then possible to give a conclusive and unambiguous answer to the question, "Does EPS packaging have a future?"

Or is it not rather the case that all involved – those who are moulding the future and those who are preserving monuments from the past – should reflect upon these questions and answer them for themselves?



Oliver Philipp
Born on Novermber 29 1963 in Stuttgart.
Education : Dipl. Betriebswirt (BA), Then worked as national sales manager in two different offices.
worked six years at Storopack Molded Parts, worked as managing director at the last station, is responsible for the business in Germany
worked as Management and Sales Trainer at Gustav Käser Training International for 4 years; working as National Sales Director SCA Packaging Germany since January this year.

1984 The foundation of the first foreign branch in the USA starts the set-up of a world-wide sales network for the group of companies.

1984 Foundation of KURTZ North America Inc.

1984 Take-over of MGM Metall-Giesserei-Mannheim

With the take-over of MGM Metallgiesserei-Mannheim GmbH in **1984**, the supply area in the Kurtz Group completes its range of casting offers with grey iron and sphero casting, aluminium casting and non-ferrous metal casting.

1985 New ERSA production and administrative building

1985 Move of the machine factory to Wiebelbach

1988 Foundation of KURTZ Far East in Hong Kong

Solutions for the EPS industry

Blockmoulds and robots made in Austria‘s Steiermark

The history of Kurtz Altaussee GmbH dates back to the year of 1951. In this year, the firm of “Dipl.-Ing. Franz Wieser“ moved from the Russian occupied part of Vienna to Altaussee, where it was possible to start economic activities under the American occupying power. In the following years, screws and, to an ever increasing extent, bicycle dynamos were produced.

As early as 1958, the firm of Wieser processed expandable polystyrene. Floaters were produced for fishermen’s nets. Likewise, polystyrene was used for insulation of the refrigerators produced in Altaussee from 1960 onwards.

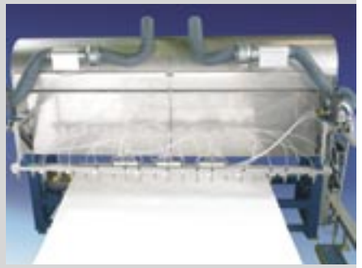
In the years after this, Altaussee dedicated itself more and more intensively to the processing and the production of expandable polystyrene. In 1960, the first blockmould was built, the raw material itself even being produced from 1962 to 1967.

In 1982, the enterprises of the Dipl.-Ing. Franz Wieser company got into economic difficulties. In the problematic situation, five former employees proved entrepreneurial courage and acquired the company in the course of the first management buy-out in Austria. Under the name of “Wieser Maschinenbau GmbH”, they managed to develop the company into a leading manufacturer of machines and plants for the block processing industry.

The most important milestone for the development of Kurtz Altaussee is however the year of 1990. At that time, KURTZ acquired the majority of the shares in the company, thus advancing to the world’s largest manufacturer for particle foam machinery. For the first time, EPS processors were able to buy all their machines from one address. In a short time, new production locations were set up and new generations of machines developed. With the first automatic wire adjustment ready for series, patented long stroke technology and the introduction of robots for handling and further processing of panels, trends in the EPS industry were repeatedly set.

The company adapted to the currently difficult situation in the building industry, to which most of KURTZ Altaussee’s customers still belong, some time ago. Through the cooperation with a local mechanical engineering company, not only have the fixed costs been reduced, but also the flexibility considerably increased. With new developments in robot and gluing technique, customers have been offered solutions for the tasks of the future.

In the medium term, KURTZ Altaussee has set itself the



objective of not only being the first address in the EPS industry, but also of becoming an important partner for the timber and furniture industry in the area of handling. The commissioning of a plant for the handling of doors was successfully completed some time ago, and the lively demand from this area shows that solutions from KURTZ Altaussee will also be demanded in future by this industry.

Soldering Technology - a never ending story

For more than 5000 years

Man had scarcely learned how to use metals for his purposes when the desire to join them arose in him. Many of the pieces of jewellery, tools and weapons we know from the Bronze Age were given their utility and beauty by soldering.

Today, it is difficult to say who first discovered how to “glue” metals. One thing is certain, the goldsmiths of ancient Egypt knew how to join gold more than 5,000 years ago. Their colleagues in Troy were also master solderers long before the ancient Teutons could even dream of such handicraft.

Soldering “came of age” when tin was discovered as a soldering metal. After all, that was 4,000 years ago. From then on, the world’s soldering technology was on its way upwards. It first spread around the Mediterranean. The Cretans showed it to the Etruscans, who then taught it to the Romans, Tunisians, Spaniards, followed by many others, including the less developed cultures of the time - the Swiss, Bohemians, Hungarians, Teutons and Scandinavians.

The art of soldering was improved and sophisticated from culture to culture, generation to generation.

Looking back, the most impressive achievements can be attributed to the ancient Romans. They soldered 400 km long water pipes made of lead with seams which could withstand 18 Atm (!), and conjured up stoves and tubs made of bronze, not to mention the arts of their goldsmiths and armourers.

The last century, in particular, not only witnessed an increased improvement in the craftsmen’s soldering skill, but also our understanding was refined in respect to the scientific interactions which take place during soldering.

Consequently, soft soldering developed into an independent field of production engineering in the electronics industry. It combines the disciplines of mechanics, chemistry, physics and metallurgy to an equal extent.

Ernst Sachs, founder of ERSA (a name comprised of the beginning letters of his first and last names) contributed to this. In 1921, more than 80 years ago, he developed the first electric and mass-produced soldering iron for industry.
With two hand specimens of his products patented in the year of foundation, he made his way to the Leipzig Autumn Fair in 1922, in order to present

the first electric soldering iron developed to series maturity to the world. He came across a great echo from home and abroad and was given his first orders. Ernst Sachs managed his young company with great personal commitment, inventive fantasy and entrepreneurial farsightedness. Permanent further development of the range of products and extension of the production were forwarded with the willingness to take risks.

Ernst Sachs had set up his first production location in a rented workshop in Berlin Lichterfelde West. As early as two years after the foundation, though, he had to move to a larger workshop on Marienfelder Straße. Finally, in 1927, the first ERSA factory was built as a residential and factory building at Manteuffelstraße 10 a in Berlin. As a protection against the influences of war, production was moved to Teuplitz in Lower Silesia in 1943. After the end of the war, the Berlin factory had been hit by bombs, the factory in Teuplitz occupied by Soviet troops. Ernst Sachs fled with his family to Baden-Württemberg, where his father came from and where he found a modest place to live for himself and his family.

After the Second World War, Ernst Sachs had to build

Kurtz
Industrial Technology Companies
1779 - 2004
225 YEARS

1988 Demolition of the old cleaning area

1988 Construction of a new smelting house in Hasloch

1989 Change in the foundry from cupola to electric furnaces

1989 1st participation at the GIFA in Düsseldorf

With the take-over of Wieser Ges.m.b.H in **1990**, KURTZ provides the complete range of products for the processing of particle foams.

1990 Take-over of Wieser Ges.m.b.H in Altaussee

1990 Foundation of KURTZ France and KURTZ Italia

ERSA up from nothing for a second time. He was helped by the fact that he had already found acknowledgement with customers and suppliers and also in particular his employees as a result of his personality. He also got help from 1953 onwards from his son, Ernst Sachs jun. It was he who gave ERSA the alignment from a manufacturer of soldering devices to a system provider and problem-solver for the electrical engineering industry.

The re-start was marked by the deprivations of the post-war period. But as early as 1948, they were able to move from a provisional building to a new residential and factory building. In 1961, the soldering iron factory was opened at the current location in Wertheim-Bestenheid, one year later the administrative building. These buildings were then repeatedly extended and adapted to the permanently changing requirements made of workplace design and environmental conditions as well as the range of products.

Alongside various “simple” 220 Volt mains soldering irons, temperature-controlled soldering irons were produced, and a little later also the first soldering stations. They excelled above all by the fact that a large soldering output with an excellent readjustment capacity was possible despite a small and light design of the soldering iron.

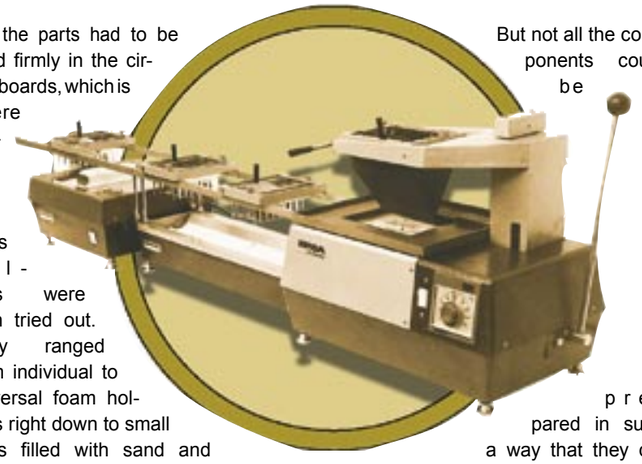
But new dimensions also resulted from the ambitious corporate area of welding machines. Since the early 1960’s, ERSA had been acting firstly as a representative for the first soldering machines built by the English firm of FRY. By agreement with FRY, the machines were supplemented by ERSA and adapted to the customers’ wishes before ERSA built soldering machines of its own after the expiry of the English patents.
At the start, the liquid solder was sent through the solder tank like a wave in machine or wave soldering. Later, the circuit boards were pulled across the solder bath. The fitted circuit boards entered the soldering line and were moistened with fluxing agent by means of brush, foam or spray fluxers in order to obtain a flawless soldering quality. The fluxing agent had to be dried in a subsequent drying line in order to avoid a swirling of the solder by the remaining residue of the fluxing agent solvents.

Due to the flammable solvent, these pre-drying lines were a permanent source of damage for the fluxing agent, with the result that many soldering machines were equipped with integrated fire-extinguishing devices.

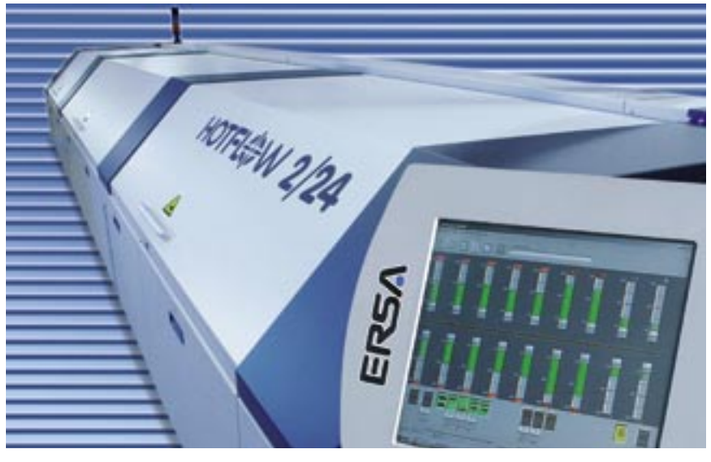
These first circuit boards, which were completely tin-plated, absorbed a lot of soldering tin. Here, the solder tracks were printed on by a so-called solder stop print (made of a varnish resistant to the soldering temperature), which only left the areas to be plated free, like a template.

Naturally, things were still not that simple with circuit boards, and years were needed to rule out other problems as well. The components inserted into the circuit boards (by hand) were subjected to the pressure of the following solder in the solder wave and were easily flushed out of the holding bores under certain circumstances.

So, the parts had to be fixed firmly in the circuit boards, which is where various holders were then tried out. They ranged from individual to universal foam holders right down to small bags filled with sand and corn, although attention naturally had to be paid to the fact that the construction elements were not damaged by the heat build-up which resulted.

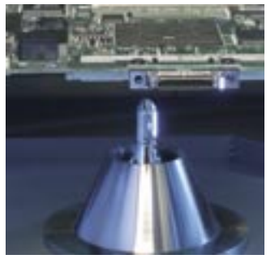


A further possibility was a purposeful preparation of the elements, pressing a bead into each element connecting wire, a so-called “pig’s tail”, in order to achieve engagement of the components.



But not all the components could be prepared in such a way that they did not need afterworking; so the parts had to be re-cut, i.e. their connection length shortened. But this, for its part, meant a mechanical strain in most cases and thus the risk of damage to the soldering point. To prevent this, a general cutting before soldering, for example, by individual cutting panels, a very expensive solution, or a subsequent trimming of all the ends by a trimming wheel had to be done.

A considerably better mechanical control of the components was achieved by through hole plated circuit boards, with not only the soldering point on the soldering side of the circuit board, but also the casing and soldering of the component wire in the component bore and the soldering point on the equipping side being added.
But this was not the only advantage of the through hole plated circuit boards. It was now also possible to increase the number of connections by a second circuit level on the equipping side of the circuit board. The further development later led to multi-



layer circuit boards and also to flexible circuits, with which a number of circuit boards or components could be connected instead of conventional wiring.

ERSA reacted to the permanent increase in demand and the speedy development in the soldering machine business with the building of the machine factory in 1985. Only 10 years later, it was no longer sufficient, and after renting a number of buildings in the meantime, prefabrication was spun off. Another five years later – ERSA is Europe’s largest manufacturer of soldering systems in the meantime – a new production hall was again taken into production.

The share of wave soldering machines as the “pioneers” amongst soldering machines has dropped from what used to be 100 to about 20 - 25 % of the ERSA machine production. So-called reflow soldering systems, which melt electronic components onto circuit boards by means of soldering paste under defined circumstances, have taken over from them in modern mass production. Their share, 35 - 40 %, is on a similarly high level to that of the ERSA selective soldering machines. The latter represent the latest in machine soldering technology, replacing manual soldering of wired elements on electronic components which have already been reflow soldered. This is of great importance, above all under the aspect of reproducibility and wage costs, and accordingly gave selective soldering machines the greatest growth rates in the past few years.

Kurtz Industrial Technology Companies 1779 - 2004 225 YEARS

1991 First issue of “Kurtz News”

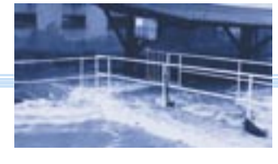
1993 Take-over of ERSA GmbH

With the integration of ERSA GmbH in **1993**, the Kurtz Group obtains a footing in the electronics industry and can thus compensate fluctuations in the economy caused by the branch in a better way.

1994 Triumph of the ERSA Hotflow series

1994 ERSA SO-NO-Clean

1994 GIFA in Düsseldorf



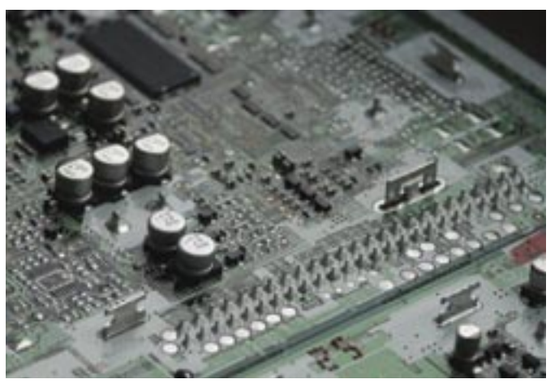
1995 Flooding at the iron hammer building

Lead-free soldering – status quo

Leadfree Bleifrei DESIGNED FOR ERSA

With the publication of the Directives 2002/96/EC on waste electrical and electronic equipment (WEEE) and 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROS) in the EU news bulletin on 13 February 2003, the date from which certain substances will be prohibited is now set. Thus the member states' governments are now required to pass the necessary national laws by August 2004 to ensure that the directives are realized.

As of 1 July 2006 the elements lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl (PBB) and biphenyl ether (PBDE) will be prohibited and electric or electronic equipment and assemblies containing these substances must no longer be offered on the market.
This means that, in many cases, manufacturers of electronic products will have to say goodbye to the established soft solders which are based on tin and lead. Furthermore, the directives mentioned above will not only affect the lead-free soldering technology, but everyone else as well who is involved in whatever way in the production of electrical and electronic equipment.
It does not seem possible to simply replace the SnPb solder with a lead-free alloy. The available alternative solders do all have higher melting



temperatures, for a few exceptions which are only interesting for niche applications. Due to the higher process temperatures of the lead-free process, not only all soldering systems but also the components used will face more difficult conditions.

Reflow soldering technology
Apart from the change-over of components and PCBs to the lead-free process, SMD production also increasingly focuses on the reflow soldering process. The melting temperatures of the relevant lead-free solders range from 217°C to 221°C (423°F to 430°F).
On the other hand, maximum processing temperatures for many SMD components are 230°C to 240°C (446°F to 464°F). Considering this narrow temperature range it becomes immediately obvious how small the process window for lead-free reflow soldering really is. Artificially increasing the process window by raising the peak temperature in the reflow zone to 260°C (500°F) should be scrutinized closely, as this may damage components.
As a consequence of the tight process window, temperature differences found on the PCB must be reduced to a minimum, to guarantee the

same process parameters for all soldering joints of an assembly.
The design of the heating unit of a reflow soldering system plays a major role when it comes to the reduction of temperature differences, a main criterion in reflow equipment performance. Due to the tried and tested ERSA Multijet-Technology being used in the HOTFLOW 2 line of reflow

systems, the optimized heat transfer provides an absolutely constant cross-belt-temperature profile. The process air is transferred via small nozzles, completely eliminating cross-currents in the process zone (cross boundary layer).
The total number of top and bottom heating modules of the new HOTFLOW 2 generation of equipment was considerably increased to provide for maximum flexibility in temperature profile composition. The peak zone has the flexibility to consist of up to four top and bottom heating modules, accommodating all present and future profile requirements.
The design of the convection modules and of the entire system was based on an MTTR (Mean-Time-To-Repair) of 15 minutes; and the convincing service concept of the HOTFLOW 2 makes it an especially maintenance-friendly and easily accessible system. The Multijet nozzle plates can be removed and replaced without any tools in just a few minutes. The same remarks also apply to servicing the condensation management system, found in the preheat area and prior to the cooling zone at the end of the heated tunnel.

Wave soldering technology
For wave soldering, there is a clear distinction between process demands and demands on the equipment, since the parameters' interactions are much more severe than in reflow soldering. The lead-free wave soldering process affects all modules of a wave system:

Fluxer
Spray fluxers are currently the best available technology, and therefore they are also the optimum solution for lead-free processes. If VOC-free fluxes are to be used, attention must be paid to material compatibility. There are VOC-free, no-clean fluxes on the market which are extremely corrosive, requiring that the complete fluxer unit be manufactured out of stainless steel.

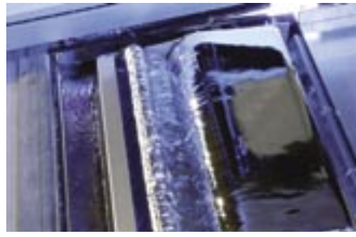
Preheating
The ideal configuration of the preheating length is subject to the PCB layout. Since ERSA wave soldering systems are of modular design, the customer can choose between medium- and short-wave infrared emitters and convection heaters.

Solder module
Many lead-free solders are considerably more aggressive to the metals and stainless steels currently used in the manufacture of solder baths than the established SnPb solders. This fact poses a serious problem with regard to the solder module. Lead-free solders, for example, wet ordinary stainless steels, causing leaching of the iron into the solder which results in the destruction of those parts of the solder bath that are in direct contact with the solder. ERSA solved this problem by using superior materials and passivating their surfaces in several steps. This prevents the solder from reacting with the surface.

Selective soldering technology
In countries with high labor costs, hand soldering of through-hole components added after the reflow process has become a highly unprofitable undertaking. To reduce these costs while at the same time increasing the quality level, the selective soldering process, with its high repeatability and low defect level, is the process of choice.
To cover this product range, ERSA has developed the VERSAFLOW product line: From it, customers can select the most economic solution for their applications.

The VERSAFLOW systems fully meet the demands for short cycle times and/or flexibility. Process control and process data recording are features of this computer controlled system.

Similar to what we know from wave soldering, the process



window for lead-free selective soldering is very small. Preheating and soldering temperatures can optimally be adjusted to ensure a gentle thermal conditioning of the assembly.

The solder baths are made of the same materials as those of the wave soldering systems, ensuring trouble-free use of lead-free solders in the selective soldering

1991 KURTZ at the K'91 plastics trade fair

1992 LTH technology patented

With the LTH technology, KURTZ once more sets a milestone in the technology of particle foam processing in 1992.

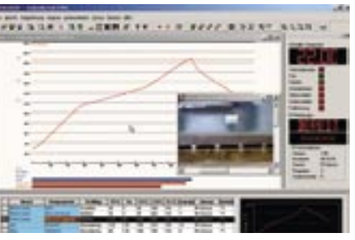
1992 MGM take-over of the Storopack foundry

1995 75th anniversary of ERSA GmbH

With the outsourcing of the prefabrication of ERSA GmbH in **1996** MBW Metallbearbeitung Wertheim GmbH is founded. The complete process chain of sheet metal processing is now part of the product range.

1996 Foundation of MBW Metallbearbeitung Wertheim

processes. Various nozzle shapes are available, covering an extensive range of applications. Since the VERSAFLOW solder nozzles can quickly be exchanged, the system can easily be readied for a product change, without loss of productivity.



Rework
The award winning IR 550/ PL550 A Rework System is the only "True Closed-Loop Control System" worldwide to use the actual component temperature to drive the profile during the reflow process! The lowest temperature lead-free selective reflow is thus guaranteed
The IR 550 A with its patented IRS, acquires the component temperature without delay by way of its non-contact infrared sensor, thus allowing optimum soldering process control.

The increased temperature range and the narrow process window required for lead-free soldering generate new demands on reflow equipment.
The IR 550 A supplies sufficient energy for lead-free soldering of even the largest and heaviest PCBs.

Proper heating and cooling gradients are achieved with uniform and safe heat distribution from the top and bottom side IR radiators. Because no nozzles are required, an open view of the component and it's solder joints allow for the IRS to deliver accurate temperature control and the RPC to deliver optimal process control!

The addition of the RPC Reflow Process Camera makes this system complete and almost foolproof. A fully mobile and adjustable 72x motorized zoom camera with integrated LED ring light allows the operator maximum control of the process.
When the selective reflow process reaches its defined peak, integrated top and bottom side active cooling takes place in order to guarantee the optimal cooling gradient (approx. 2-4°C/ sec) required by lead-free.

Lead-free hand soldering – complete control is the key to success
Hand soldering represents a real challenge for lead-free soldering technology due to the higher process temperature and the smaller process windows.

The current limitations of soldering iron design can be seen through the need to use excessively high set temperatures which compensate for the iron's lack of heat recovery.
While these problems could be tolerated up until now, lead-free will change the scenery.

Conclusion
In all soldering processes, solder joints must be produced under exactly determined conditions to guarantee reliable connections. Lacking this reliability and repeatability characteristics, soldering defects may occur which are difficult to detect during a visual inspection procedure or in a functional test.

Yet, the defects could lead to a premature failure of the product. A strategic approach must be taken to evaluating each and every soldering process from a quality, productivity, and operational cost standpoint. From a business standpoint, cost and implementation planning for the changeover to LF operations should begin as soon as possible. From a process standpoint, starting early and leaving at least a 3 to 6 month learning curve window is strongly recommended.

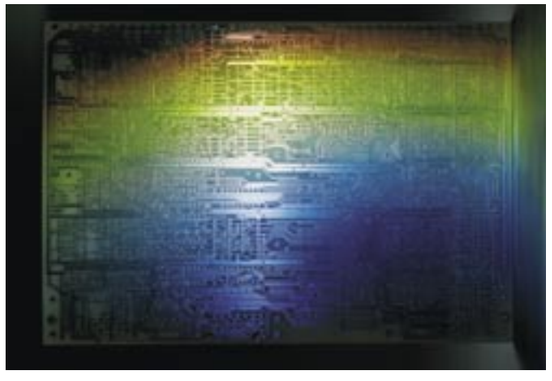
What is „Green Electronics"?

The term "green" is generally used as a synonym for "environmentally friendly", i.e. free of ecological reservations. Bringing electronic products closer to this objective is done by pursuing a number of approaches independent of one another.

The demands made of environmentally friendly components is marked by life cycle engineering, i.e.

- avoidance of toxic basic materials or those impairing the environment
- constructions marked by reusability, recycling capacity, composting capacity or good thermal recoverability (combustion without noxious waste gases with a good heat value)
- production with the lowest possible use of material and energy consumption (this also entails consideration in construction).

The Montreal Protocol of 1992 led to a ban on polychlorinated hydrocarbons (CFC) and thus to a ban on intensively used cleaning agents of soldered electronic components. These synthetic materials have a very high ozone-damaging potential; they were used as cleaning agents, propellants in aerosol cans and coolants in cooling systems. The technology of electronics production reacted to this, in particular in Europe, with the introduction of no-clean fluxing agents. In this way, not only was the material ban implemented, but also a process step was saved, both ecologically and also economically a sensible move. This was counteracted by a greater risk of soldering errors because the activation of fluxing agent was reduced, i.e. the requirements made of process control increased.

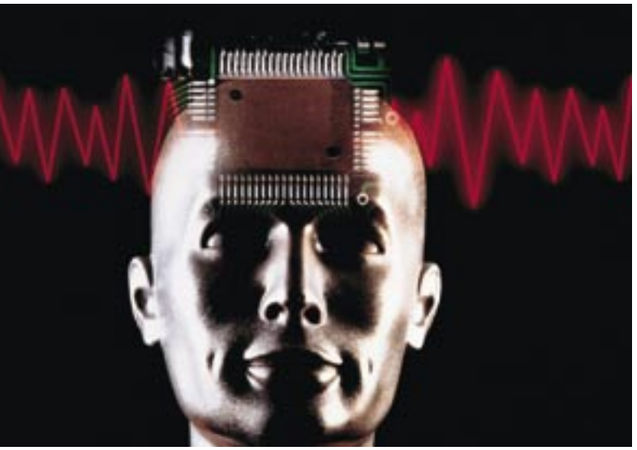


The introduction of environmental management systems, in particular the principles of the eco-balance to ISO 14040, has integrated thinking about environmental compatibility of products and production processes within the meaning of the LCA (Life Cycle Assessment) into operational practice. Eco-balances are put into practice by companies with a great public effect, in order to advertise for the environmentally beneficial products and production methods of a company (e.g. degussa elements04, science newsletter 04-2003). The ZVEI (Zentralverband der Elektronikindustrie, Central Association of the Electronics Industry) took a stand on the effects of eco-balancing on electronics production in a publication (ZVEI stand on eco-balancing of products, 1997). In it, there is emphasis that the German electrics industry is pursuing the objective of reducing the environmental loads connected with the production and the use of products, conscious of its responsibility for the protection of the environment. At least one of the demands from the ZVEI was probably fundamentally ignored in the further EU legislation concerned with electrical and electronic products – the ZVEI paper demands: "Political decisions cannot be derived from eco-balances of electrical engineering products alone. Assessments are only to be done with a view to the objectives of the eco-balance".

The statutory framework for electronic products and the circulation of materials has been stated since the introduction of the ELV (2000/ 53/EC End of Life Vehicles), WEEE (2002/96/EC Waste Electrical and Electronic Equipment) and RoHS (2002/ 95/EC The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment). The list of substances banned includes lead, mercury, cadmium, chromium hexavalent compounds, polybrominated biphenyls and polybrominated diphenyl ethers. If one looks at the list, the ban on lead gives one the impression that, if at all, only a rudimentary observation of eco-balances was carried out in the production of the list and that alternatives were hardly considered.

The toxicity of lead in the human body is undisputed.

In the 1970's and 1980's, paints containing lead and anti-knock additives in motor vehicle fuels containing lead were banned; studies in the USA clearly show that the lead content in the blood of the population distinctly dropped on average from 1970



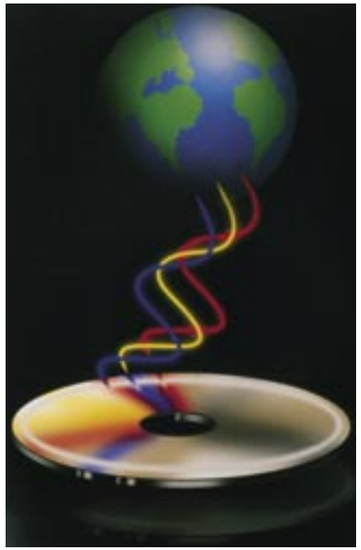
to 2000 (K. Sexton et al., American Scientist 2004). The ban on lead for petrol and paints is good for the population. Unlike these products, the amounts of lead from electronic products does not enter the environment in a fine distribution. The fact that lead from waste tips with electronic scrap enters ground water can be refuted on the basis of school chemistry. A lead load on employees in electronic production has not been proven. The share of solder spots in electronics only makes up for about 0.5% of the annual consumption of lead. The alternative SAC (Sn-Ag-Cu) alloys mainly being aimed for contain distinctly more tin and silver. Because recycling hardly puts Sn back into circulation, an increased mining expenditure is necessary. This results in increased destruction of jungles in tin open-cast mining, e.g. in Malaysia. The melting point and, as a consequence, the working temperature of lead-free solders are higher, which means higher energy consumption in the soldering process. An eco-balance study of the IKP of Stuttgart University (N. Warburg) showed distinctly worse figures for SAC compared with Sn-Pb-Ag soldering paste. The factors of primary energy consumption, greenhouse potential, human toxicity potential and acidification potential were assessed taking the production of the soldering paste, soldering and inert gas into account. Interestingly, the eutectic Sn-Pb solder comes off best in practically all the categories in this assessment. In all cases, the share of silver leads to a severe deterioration: the only "genuine" lead-free alternatives within the meaning of this holistic ecological balancing are tin-zinc, tin-copper and tin-bismuth solder alloys. From this point of view, further pursuing the application engineering trials of tin-zinc alloys for soldering is to be recommended.

The PBB and PBDE flame retarders, which contain bromide, exhale from the polymers at room temperature; in combustion, they form highly toxic furanes and dioxins ("Seveso poison"). Dutch and Swedish studies show the increase of these materials in mothers' milk and in the fatty tissue of whales, which proves the propagation of these synthetic materials in the environment (A. Grote, Neue Züricher Zeitung, 14.04.1999). Therefore, they have no longer been in use in construction elements and circuit boards for a long time as a result of a self-obligation by industry. As a substitute, TBBA (tetrabromide bisphenole A), which contains bromide, is used; the share is more than 10% in epoxy and phenol resin. TBBA also exhales into the environment from plastics, albeit in considerably smaller amounts; the recycling problem has also not been solved for TBBA (Stephan W. Eder, Gertrud Aßmann, Information Umwelt, Dec. 1998, see www.hamm-chemie.de/k9/k9te/bromhaltige_flammschutzmittel.htm). A genuine alternative has yet to be developed, plastics with flame retarders on a phosphor basis do not reach the necessary resistance. An increased absorption of moisture increases the risk of delamination in the soldering process in these materials, which can lead to conductive electrolytes in the polymer at room temperature. Non-toxic additives such as aluminium oxide have not yet been developed enough or are not compatible with the production processes in use and are therefore currently not competitive from an economic point of view. The same applies for higher-quality plastics with lower moisture absorption: the higher price prevents customer interest.

A transitional way out is the processing of temperature-sensitive components by means of selective soldering methods. The older technologists remember hot-bar soldering at the start of surface assembly technique. This is doubtless a step back with regard to automation and throughput, but possibly really only a transition until the coating and casting masses have "caught up". This is where things are going round in circles. Many component manufacturers would like to carry out sample solderings and therefore inquire hundreds to thousands of lead-free process-compatible

construction elements; however, the element manufacturers are waiting for the orders in millions of units before the change to new materials and constructions is worth thinking about.

The change towards water-based fluxing agents makes sense from the view of the environment, health and workplace load – alcohol has a greenhouse effect on the one hand and on the other a risk potential through flammability, e.g. if drops of alcohol fall onto the heating elements of the pre-heater or onto the surface of the solder bath: the workplace load of the employees is also lower if there is no longer any alcohol in the air. However, even more heat is needed, here in the pre-heating, in order to evaporate the



film of water safely before entry into the soldering wave. Wave soldering machines for lead-free production with water-based fluxing agents therefore need a convection module in the pre-heating line at all costs.

At present (May 2004), the soldering heat resistance of the construction elements remains a problem; in some cases, the conversion dates are postponed by half a year at a time, in others there is no solution in sight: For example, construction elements are on the border in soldering with tin-lead solder alone. Alongside hot-bar soldering, laser soldering and spot soldering with a selective mini-wave to go gentle on temperature-critical SMT construction elements ought to be considered more strongly. And it is worth looking at alternative, lower-melting soldering alloys once more, just as a few work groups do. The technological reference of the lead-free conversion has a clearly positive effect all told: many new interest groups have formed, exchanging their experience and with the participants mutually benefiting one another. And this has become urgently necessary after all the years of thinning off by early retirement regulations, outsourcing and compelled saving. Good products, a high yield, avoidance of errors by design and procedural instructions for robust products doing justice to manufacture as well as emp-

loyees who have a sense of responsibility because they have been trained well, also mean environmentally conscious action by avoidance of "production scrap". Design can do a lot for the "green" aspect, along the lines of "consider not only assembly, but also dismantling", but also the participation in work groups concerning themselves with the pad design.

Postscript:
Perhaps, at least the favourably priced circuit boards can be reinforced not with hard paper, but with edible paper one day in a matrix of glutamate with removable strip conductors of aluminium foil, to which the SMD construction elements are glued with a jelly filled to be electrically conductive, with the result that the circuit can be unwound and eaten after use. The intelligent construction elements with a green dot can then be given to the public-law disposal companies, who can then use them for recycling, road building or an alternative life as a work of art, sorted by manufacturer and residue service life on the basis of the information stored on them.

Dr. Thomas Ahrens,
Fraunhofer ISIT, Itzehoe

1999 GIFA Duesseldorf

With the invention of the ERSASCOPE in **1999**, ERSA made one of the most important innovations in the area of non-destructive inspection - numerous prizes and awards prove this.

1999 In-house fair at KURTZ

2000 MBW at the Suedblech

2000 Opening of the new assembly hall at ERSA

2000 First ERSA technology forum

2001 KURTZ at the K'2001

Every individual counts

Commitment, imaginative ideas and motivation

The staff of the Kurtz Group are one of the enterprise's most important assets. Their commitment, imaginative ideas, motivation, indefatigable industry, and loyalty to the company constitute a fundamental element in the success of the Kurtz Group. If the staff is to fulfil its tasks to the best possible degree, then the goals that they are given should be clear and realistic, with management playing an important supervisory role. Staff also have potential as planners and as such are to be involved in the planning process. "Flat hierarchies", a positive attitude towards decision-making, delegation, responsibility transferral, and the general requirement of commitment to teamwork are all important elements which contribute to meeting the many challenges the company faces.

The overall company goals are taken into account by management when they set specific performance targets, and are then reflected in the setting of concrete, measurable and comprehensible task goals. Management does not simply deliver tasks and goals to staff but also has two further major priorities, cooperation with all those involved in the production process, and the personal development of the staff themselves. The point of departure for personnel policy is the personnel planning system, which is geared to providing for perceived needs; personnel management establishes the number of vacancies with their respective job descriptions, and uses this information to determine the measures necessary for ongoing staff development. In 2004 this process is being carried out in the Kurtz Group with the support of the recently installed SAP-System. In future, this will facilitate a quicker and more exact balancing of job descriptions and staff potential.

The further training processes provide staff members with qualifications and competencies both for present and for future tasks, raise levels of efficiency, improve communication, strengthen staff members' general sense of responsibility for their job, eliminate obstacles to motivation and discover hidden potential capacities. After a given training course has been completed, the subsequent performance rates are checked to see where there is room for improvement and prepare for appropriate action in the future.

The importance accorded to further training in the Kurtz Group is fully equalled by that accorded to basic training. For us, training is an investment for the future. The Kurtz Group has constantly intensified its commitment to training in all of the individual enterprises, bringing about increases both in the quantity of youngsters being trained and in the quality of their training. Kurtz's trainee quota of around 10% of the entire staff, and wide range of 18 training courses – for industrial mechanics, management experts, engineers, to name only a few - makes it a leader among medium-sized companies.

That efficient personnel policy results in a tightening up of the ties which Kurtz staff feel to the companies of the Group and is evident from the participation levels in the many out-of-work activities, inter-works sporting events such as handball and football tournaments, and races of all kinds, from cycling to long-distance running, and from skiing and snowboarding to boat-races. Add company parties and excursions, and the Kurtz Works Chorus, and you have - more or less – the full picture!

An investment in the future

Apprentices in the Kurtz Group

The success of the Kurtz companies would not be possible without the qualification and motivation of our employees.

With their technical know-how and commitment, they make an essential contribution to the group's development.

Permanent support and further development of this potential is the objective of the instruction and further training of our employees in many of the job profiles represented in the Kurtz Group. In-house employee training means an important investment in the future and the foundation of our economic success.

Training as an investment in the future.

The Kurtz Group has been concerning itself with this task to an increasing extent and with particular intensity for some time.

With an apprenticeship quota of about 10 % of the workforce and a wide range of offers for 18 trained professions from industrial mechanics via graduates in business management down to engineers, Kurtz is at the top of the list of small and medium sized companies.

Technical and personal support of more than 80 apprentices is possible because highly qualified trainers dedicate themselves to this task at Kurtz with great commitment. To start with, information to school-leavers is in the foreground, in order to support the correct selection of apprenticeships by the applicants. For this purpose, we open our gates on the one hand and, on the other, actively give information in schools and with our own offers at apprenticeship fairs. The good reputation which the Kurtz companies enjoy in their surroundings as a result of this means that we can always select from particularly qualified applicants.

The further development of trained professions itself is done as a part of membership of associations and training boards.

We we also have the principle of practical training across company borders at the locations in Wertheim, Kreuzwertheim and Hasloch in the firms of Kurtz Holding GmbH & Co Beteiligungs KG, Kurtz GmbH, ERSA GmbH and MBW GmbH, thus guaranteeing optimal use of all training resources.

So it is no surprise that apprentices frequently complete their apprenticeships with top performances and are awarded prizes. We are proud of the fact that we take on almost all of our apprentices in a firm employment relationship as a rule. A second apprenticeship following onto the first one is also not a rare occurrence. Qualified training and a permeable corporate hierarchy additionally offer good possibilities of promotion in the Kurtz companies.

Making use of the potentials of the possibilities of training on offer and of the applicants for apprenticeships forms a good foundation for the further qualification of our future employees. In today's high technology world of employment the half-life of knowledge is only a few years and so the continuous further qualification of our employees is a firm and essential part of our company philosophy.

The objective of our personnel policy is high qualification and motivation of our employees, who are available to solve our customers' tasks with technical know-how and commitment.

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

2000 The Kurtz Group at the "Kaffelstein" run

2001 Installation of the 100th Versaflow

With the introduction of SAP R/3 in **2001** the Kurtz Group can exchange process data and communicate with all the customers worldwide. The introduction at foreign locations is done successively.

2001 Introduction of SAP

2001 Training trade fair with the district administrator Mr. Grein

The Kurtz Group is now a leader in the area of low-pressure casting technology. With the motto "From foundryman for foundrymen", casting machines and cast products are offered in low-pressure technology.

2002 1st low-pressure die casting colloquium

Generations commited to Kurtz

“I spent more time in and with my firm than with my wife ...“

At the latest at some point in the second half of one’s career, we all start giving a thought or two to how life is going to look when we are no longer part of the active working world. The closer the end-date comes, the more we feel it as a threat, and the more apprehensive we become about the moment which Schiller dramatized so evocatively in his play “Fiesco” (“The Genoese Conspiracy”): “The Moor has done his job. The Moor may go.”

In many companies, that is the point at which it is simply all over. But not at Kurtz. Some families have had one or more family members on the Kurtz staff continuously for as long as four generations; in that case, the company is a permanent part of the family’s everyday life. One of the many good customs practised at Kurtz is that of inviting former staff members to company parties and celebrations – what is more, a good number of them accept the invitation and attend the events.

These celebrations have in their turn led to our putting on at least one meeting per year specifically for former staff members, and the management takes the opportunity to keep the “old boys” up-to-date by delivering a short report of the state of play in the Group as a whole.

This is usually followed by a tour of a new or altered part of the works, or a visit to another factory. This kind of contact is welcomed, and helps to answer the perennial questions, such as “How is the company doing?”, or “How are my old colleagues these days?”

Group photos have an important place in the whole procedure; participants exchange photos, and they are passed around at the next meeting.

This frequently gives rise to comments on who is missing from the photo, and the inevitable question as to whether so-and-so is absent just this once or perhaps will never attend again.

One former staff member put his feelings for the company into words as follows: “When I retired, I did a few sums and worked out that I had spent more time in and with my firm than with my wife. The firm treated me well; once, when things weren’t going so well, I didn’t find myself put out onto the street, as would have been the case in a lot of other firms. Now that I am retired, I still want to remain loyal to the firm. Where I can support Kurtz in public, then I will do so.”

The Kurtz board of management welcomes all the initiatives taken by former staff members, and is fully aware that these also have an important knock-on effect in the firm’s favour. Former staff members should know that they do not go unnoticed at the Open Day and at staff parties, and that their presence is very much appreciated.

Kurtz Industrial Technology Companies 1779 - 2004 225 YEARS

In 2002 the managing directors of Kurtz Holding GmbH & Co. appoint an advisory board to advice and control the management.

2002 Award of the SMT Vision Award

2002 In-house fair at KURTZ

2003 ERSA lead-free technology congress in Kreuzwertheim

2003 Red Dragon Cup, Kurtz participated

In just under 10 years, MBW Metallbearbeitung Wertheim GmbH has developed into a flourishing enterprise.
This is why the production capacities are to be extended in 2004.

2003 MBW celebrates 5 years of partnership with atg

The iron hammer works - a hobby for generations

“You have riding horses, we have a traditional iron hammer works“

When asked by a business acquaintance why the forge hammer was still in operation, Otto Kurtz, who unfortunately died last year aged 90, said: “You have riding horses, we have a traditional iron hammer works.“

To him, keeping this unique technical and cultural monument was essential. However, it was never his intention to maintain the hammer works as a lifeless museum.

No, it was supposed to work and that was what it did. He inherited this attitude from his father, Hugo Kurtz, who still remembered when the hammer earned its pennies with every stroke.

And so it went without saying for Hugo Kurtz that his grandchildren, today’s owners Walter, Bernhard and Rainer Kurtz were taken along to help with the work on sealing the sluice-gates, as the loss of every drop of water limited the effectiveness of the old forge hammer and its turbines.

And so it is that the iron hammer works in the heart of the Spessart, the most extensive continuous forested region in western Germany, is to this day of special significance. Care is taken to ensure that the operation of the forge hammer is maintained, although at present it is leased to Mr Armin Hock, a former employee of Kurtz GmbH.

The maintenance of the complete plant with upper water channel, hammer building and inner workings demands personal dedication, as the majority of the plant and machinery in the building is no longer available on the open market.

A few examples show that it is essential to become immersed in old technologies. Who today understands anything about the incoming angle of the water at different slide valve settings?

Who still knows how a wooden bellows with quadratic cylinders and pistons is sealed? Where can the originally-used goat hide leather of the right thickness be obtained?

The alternative, plastic, has proved itself to be useless as a sealing material in a very short time.

The challenges linked to the maintenance of this monument are innumerable.

But the satisfaction is incredible, especially in view of the large numbers of visitors who come every year, thankful for the unique opportunity of being able to experience a lost and forgotten craft.

Anyone from many of the numerous departments of the Kurtz Group who has attended a brainstorming meeting in the old Iron Hammer Works’ hospitality room will know how this relaxed atmosphere inspires creativity.

Fine Traditions and a Bright Future Indeed!

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

2003 Otto Kurtz dies at the age of 90

2003 Kurtz Group is certified to DIN ISO 9001:2000

Certification of the Kurtz Group to **DIN ISO 9001:2000** means a further milestone in the direction of a globally active group. The international subsidiaries are integrated in succession.

2003 Foundation of KURTZ Zhuhai Manufacturing

2004 Culture partnership with the Town of Wertheim

2004 Anniversary art exhibition "art and culture at Kurtz"

2004 225 year Anniversary of the Kurtz Group

Kurtz

Industrial Technology Companies

Central competence variety
The Kurtz Group – highly capable medium-sized industrial companies from the most diverse sectors of industry with factories in Germany and abroad.

The roots of our group of companies date back to the original forge hammer works founded in Hasloch am Main in 1779.
In 2004, the year of the company's 225th anniversary, Kurtz presents itself as an internationally active group employing more than 1,000 people.

Global alignment
Global means world-wide presence for the Kurtz Group. There are branches in the USA, in China, Singapore and South Africa, but also in France and Italy.

16 locations and more than 100 representations form a world-wide network which enables a 24-hour service 365 days a year.

Market leadership
Under the brand name of KURTZ, the group of companies is the world market leader in the area of machines for the processing of particle foams and technology leader in the area of low-pressure casting machines.

In the supply area, own foundries in grey cast-iron, aluminium and non-ferrous heavy metal casting are run and ready-to-fit components of sheet metal are offered.

The brand name of ERSA stands for Europe's largest manufacturer of soldering systems and is the world's market leader in the area of selective soldering and inspection.

2003 figures
Group turnover: € 135 million
Employees world-wide: 1,000
(800 around the location Wertheim / Kreuzwertheim / Hasloch)
Apprenticeship quota: > 10%
Share of exports: approx. 50%

Business sectors

Supply sector
- Grey cast-iron, aluminium, non-ferrous heavy metal castings
- Sheet metal technology
- Machining
- Surface treatment
- Tool / model construction
- Engineering services

Particle foam machinery
- Pre-expanders
- Shape moulding machines
- Handling systems
- Blockmoulds
- Machines for the production of sound insulating material
- Cutting systems
- Milling systems
- Gluing stations

Foundry machines
- Gravity die casting machines
- Low-pressure casting machines
- Tiltable gravity die casting machines
- Rapid prototyping
- Lost foam
- Control systems
- Foundry accessories

Soldering technology
- Hand soldering tools
- Soldering systems
- Rework-/inspection systems

Kurtz Holding GmbH & Co.
Headquarter
Industriegebiet Wiebelbach
D-97892 Kreuzwertheim
Tel. +49(0) 93 42 / 80 70
Fax 80 74 04
e-mail: info@kurtz.de

KURTZ GmbH
Sales, Engineering, Service,
Industriegebiet Wiebelbach
D-97892 Kreuzwertheim
Tel. +49 (0) 93 42 / 80 70
Fax 80 74 04
e-mail: info@kurtz.de

Plant Hasloch • Iron Foundry
D-97907 Hasloch/Main
Tel. +49 (0) 93 42 / 80 50
Fax 80 51 79
e-mail: info@kurtz.de

MBW Metallbearbeitung Wertheim GmbH
Otto-Schott-Str. 19
D-97877 Wertheim
Tel. +49 (0) 93 42 / 9 63 60
Fax 96 36 55
e-mail: info.mbw@kurtz.de

Plant Baiersdorf
Erlanger Str. 9
D-91083 Baiersdorf
Tel. +49 (0) 91 33 / 7 78 10
Fax 77 81 25
e-mail: info.mbw@kurtz.de

MGM Metall-Giesserei-Mannheim GmbH
Ohmweg 21-29
D-68199 Mannheim
Tel. +49 (0) 6 21 / 84 49 10
Fax 8 44 91 55
e-mail: kurtz.mgm@t-online.de

ERSA GmbH
Leonhard-Karl-Str. 24
D-97877 Wertheim
Tel. +49 (0) 93 42 / 80 00
Fax 80 01 00
e-mail: info@ersa.de

KURTZ Altaussee GmbH
EPS-Technology
Puchen 214 • A-8992 Altaussee
Tel. +43 (0) 36 22 / 71 17 10 •
Fax 7 11 90
e-mail: office@kurtz.at

ERSA Inc.
1779 Pilgrim Road
Plymouth, WI 53073, USA
Tel. +1 / 92 08 93 37 72
Fax 92 08 93 33 22
e-mail: info@ersainc.com

KURTZ North America Inc.
1779 Pilgrim Road
Plymouth, WI 53073, USA
Tel. +1 / 92 08 93 17 79
Fax 92 08 93 15 62
e-mail: KNA@excel.net

KURTZ Far East Ltd.
ERSA Asia Pacific
Suite 3505, 35/F
China Resources Building
26 Harbour Road • Wan Chai,
Hong Kong
Tel. +8 52 / 23 31 22 32
Fax 27 58 77 49
e-mail: kurtz@kfe.com.hk

KURTZ Shanghai Ltd.
ERSA Shanghai
Room 601 • 6th Fl. Beethoven
Placa • No. 1158 • Chang Ning
Road • Shanghai • 200051 China
Tel. +86 21 / 52 41 60 00
Fax 52 41 99 18
e-mail: kurtz@kurtz.com.cn

KURTZ South East Asia Priv. Ltd.
25 International Business Park
02-106 German Centre,
Singapore 609916
Tel. +65 65 62 92 05
Fax 65 62 92 06
e-mail: kurtzsea@singnet.com.sg

KURTZ Zhuhai Manufact. Ltd.
Qin Shi Road • Qin Shi Industrial
Zone • Sanzao Science and
Industry Park • Zhuhai High-tech
Industrial Development Zone
Sanzao • Zhuhai 519040 • China

KURTZ France S.A.R.L.
Vente, Assistance Technique, S.A.V.
8, rue des Moulissards
F-21240 Talant
Tel. +33 (0) 3 80 56 66 10
Fax 3 80 56 66 16
e-mail: kurtz.france@wanadoo.fr

KURTZ Italia S.R.L.
Via Carlo Cassola 59
I-21028 Travedona Monate (VA)
Tel. +39 03 32 / 97 80 35
Fax 97 81 35
e-mail: kurtzita@tin.it

KURTZ South America Ltda.
c/o Intertécnica
Rua Alexandre Schlemm, 19/902
89.202-180 Joinville, Brasil
Tel. +55 (0) 47 / 4 22 28 19
Fax 4 22 80 54

KURTZ Systems Africa (Pty) Ltd.
Sales, Service, Consulting
P.O. Box 184
Zimbali Coastal Estate
30 Club Drive • Dolphin Coast
4404 Republic South Africa
Tel. +27 (0) 32/ 5 38 12 00
Fax 5 38 12 01
e-mail: kurtz@mweb.co.za

www.kurtz.info
www.kurtz.de
www.ersa.de
www.ersa.com

1779 - 2004 Kurtz Industrial Technology Companies 225 YEARS

Imprint:
Responsible: Walter Kurtz
Layout: Corporate Division PR

Frankenstr. 2
D - 97892 Kreuzwertheim / Germany
Tel. +49 (0) 93 42 / 8 07-0
e-mail: info@kurtz.de