



Nakagawa

Siemensring 66-68 • D-47877 Willich ☎ +49 (0) 2154 8834-0 📠 +49 (0) 2154 8834-66 ✉ info@nakagawa.de





**Dear Ladies and Gentlemen,
First of all a warm welcome to all of you.
Nakagawa is the contact partner for
SII and with this presentation my
colleague Mr. Pohlhaus and I would like to
talk about the following subjects.**



- 1. Short Introduction of Nakagawa's portfolio**
- 2. Thermopaper technology basics**
- 3. Thermo printer/paper past development and outlook**
- 4. Short introduction into self adhesive (pressure sensitive) technologies**
- 5. Marketing products with SII**
- 6. Discussion**



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Nakagawa worldwide





Our Targets are **Quality**

Top Quality Products

Top Quality Service

Top Quality Information & Communication



Thermopaper Technologie and Usage

The per capita usage of Thermo papers in Europe has doubled over the last years and has reached a level of approx. 5 sqm/per capita.

This growth is determined by differentiation in usage, the excellent bar code possibilities, easy to use and the low cost of ownership with the Thermo-Technology. Technically the high system reliability and the low maintenance rates are clear advantages compared to competitive technologies.



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Features	Direct Thermal	Thermal Transfer	Laser	InkJet	Dot Matrix Printer
Reliability	XX	X	X	X	X
Handling	XX				
Consumables	XX				
Maintenance Costs	XX		X		
Speed	X	X	XX		
Color		XX	X	XX	
Resolution	X	X	XX	XX	
Size of Printer	XX	X		X	X
Archiveability		XX	XX	X	X
Extreme Temp. Conditions	XX	X			
Printing Length/Flexibility	XX	XX			X
Noise	XX	XX	X		



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The following Tableau should give an Overview of the different Thermo Papers with their Resistance / Archivability.

	POS low resistant (5 years)	ECO low resistant (7 years)	ECO/POS high resistant (10 years)	Standard Top Coat high resistant (12 years)	Premium Top Coat very high resistant (15 years)
Original Print out					
Handcreme 15 hours.					
Water 15 hours					
Softeners 15 hours. (Roomtemp.)					

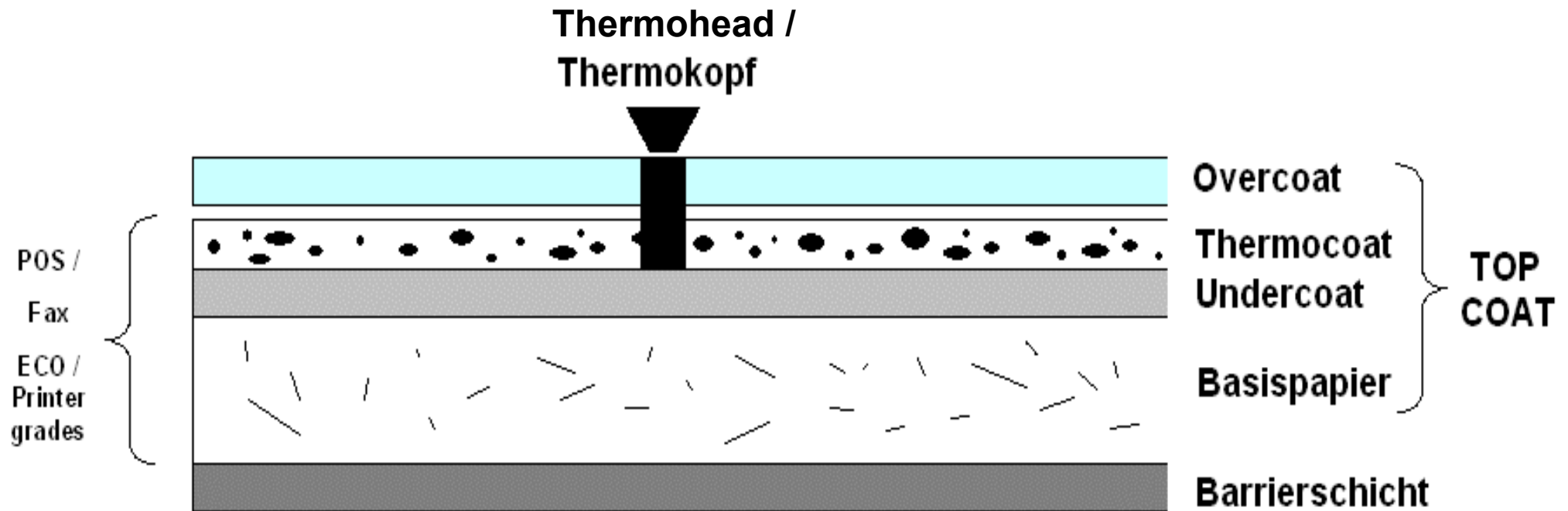


Areas of growth in usage are cash register rolls, self adhesive labels, Lotto receipts, tickets for transportation and entertainment, bank statements and other self service kiosks and different kinds of long term charts (medical, weather, earthquake watch).

These different areas of usage need papers with quite different characteristics and features.



The basic Build Up of Thermo Papers:





The major Contents of the Thermo Coat are different Colorformers (Leuco Dyes), Co-reactants, Meltingpoint-regulators, and Binders.

Leuco Dyes are natural colorformers which do not reflect visible light when not developed.

After the development through the Co-reactant the molecular structure changes and the colorformer reflects (visible) light.
(In case of Thermo usually black).

The colorformers have the tendency to return to their original structure, and become invisible again. That is why all Thermo papers have a limited archivability.



Archivability / Resistance

In Europe papers with archivability of 5-25 years are produced and offered. In Japan papers with up to 99 years are offered.

The circumstances under which the archivability is tested are: 21°C; +/- 50% relative humidity, dark storage in softener free files, these are the standard paper storage conditions. Influences like UV-Sunlight, softeners, oil, fat, and water will shorten the archivability time, as they have a direct influence on the molecular structure, so that the image returns faster to “invisible”.

As basic rule one can say, the cheaper the used colorformer is, the less resistant the image is against the prescribed influences.



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Dynamic Sensitivity

Another very important technical factor is the so called „Dynamic Sensitivity“. The faster the paper is pulled through the printer, the less time has the paper to react and create the image.

That is one of the reasons why all Thermo printer manufacturers approve different papers, because only the correct paper will create an image which reaches the full image development on the thermo coating.



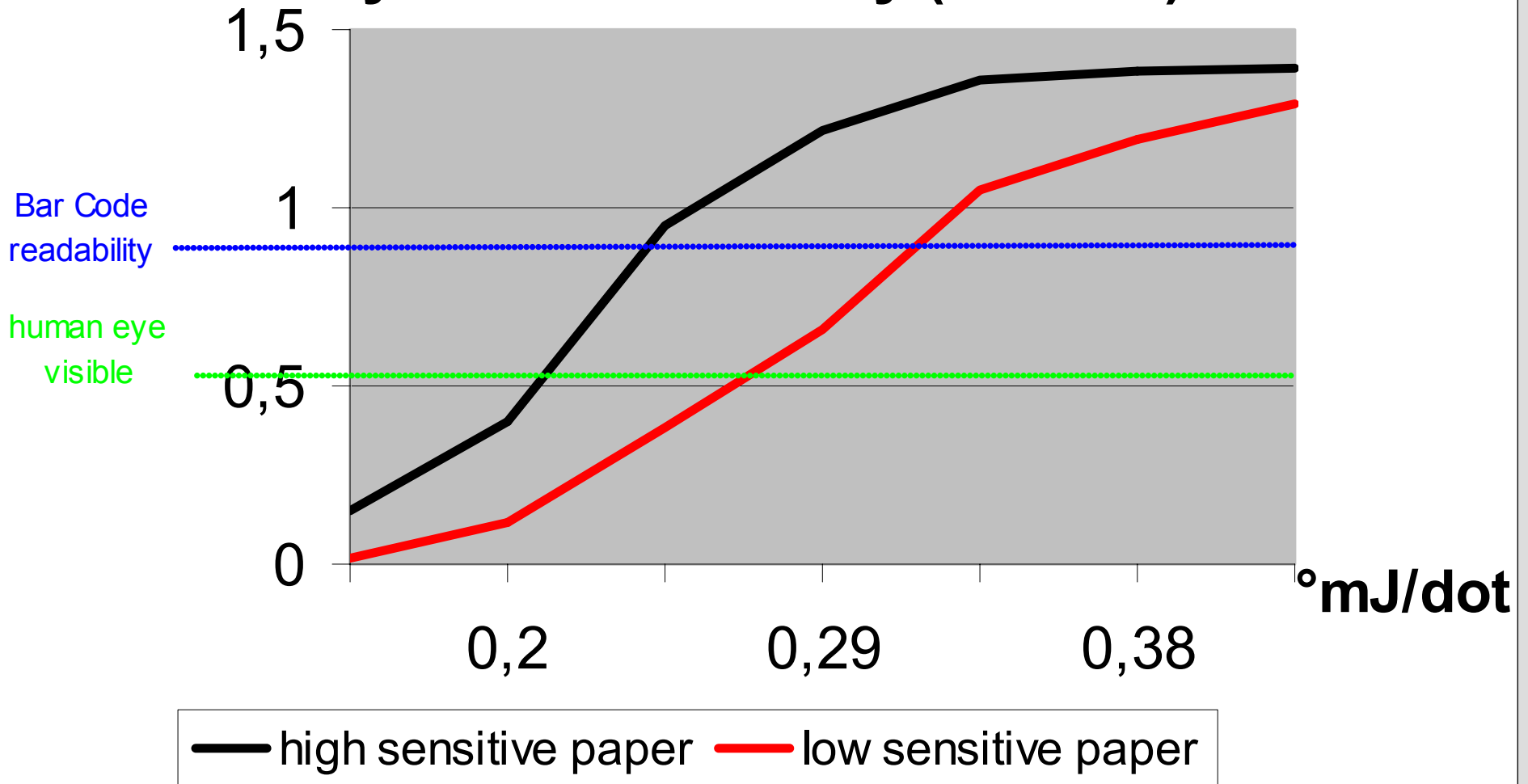
This factor is measured by the optical density. A full black image has an optical density of +1,3, a barcode is still readable at an optical density of 1; Human eye readability is still given at optical density of 0,6 (Grey).

The full development of the image potential of the paper is also important for the archivability, if the image is not fully developed, time of archivability will be lost.
(Graph Dynamic Sensitivity)



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OD Dynamic Sensitivity (Chart 1)





Static Sensitivity

Next to the Dynamic Sensitivity, Static Sensitivity is a characteristic of Thermo papers.

The Static Sensitivity is not as the Dynamic Sensitivity a “Quality” issue, it is just a performance issue for the user.

The Static Sensitivity only gives an indication at which temperature level the image will start to develop.

Presently almost all standard Thermo papers in Europe have a starting temperature of approx. 70°C, Papers with 90°C and 110°C starting temperature are available.



Lifetime of Thermo Printers

If the right paper with the correct printer setting is chosen, Thermo printers should have a lifetime for more than 100 km print out.

Papers with a too rough surface, wrong binders and wrong printing inks can reduce the lifetime of Thermoprintheads dramatically, as well as cutters can wear out very fast when non approved materials are used.



Thermo Papers and the Environment

All European Thermo papers can and should be recycled.

All the Thermo papers which are used by Nakagawa in Europe have the ISEGA approval for direct contact with food.

Most of our POS papers are produced under the Nordic environmental Label “SWAN” for paper production under low total emission values.

Our self adhesive label- and ticket materials are certified DIN 71.3 for the use with children’s toys.



It is Nakagawa`s aim and policy to offer all customers the “right” product under all above aspects for long term customer satisfaction.

Thermo printing-is the easy way to get variable data onto a sheet of paper, it is not the answer to all printing questions, but at the right application, with the correct product it is fast, reliable, cost effective and easy.

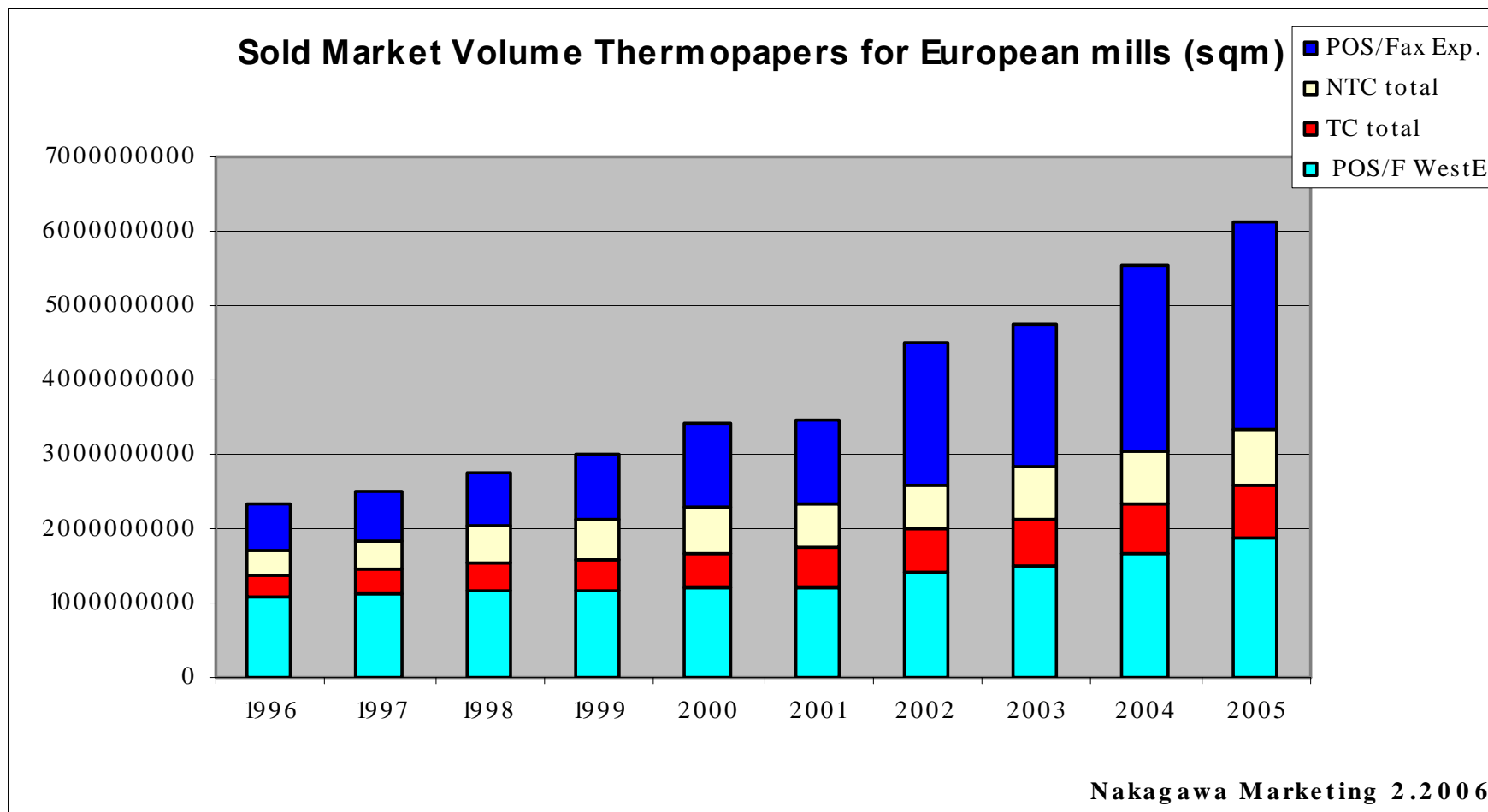


To summarize this first Part:

- 1) Thermo is a growing market.
- 2) Thermo is used in a lot of different applications.
- 3) The key technical points to understand are:
 - 3.1) Dynamic Sensitivity (Printer/Paper related)
 - 3.2) Thermoprint Head/Cutter lifetime (Printer/Paper related)
 - 3.3) Static Sensitivity (Use-related)
- 3.4) Resistance/Archivability (Use-related, how long, under which circumstances shall the print out be readable.)



Market Volumes and Outlook (Chart 2)





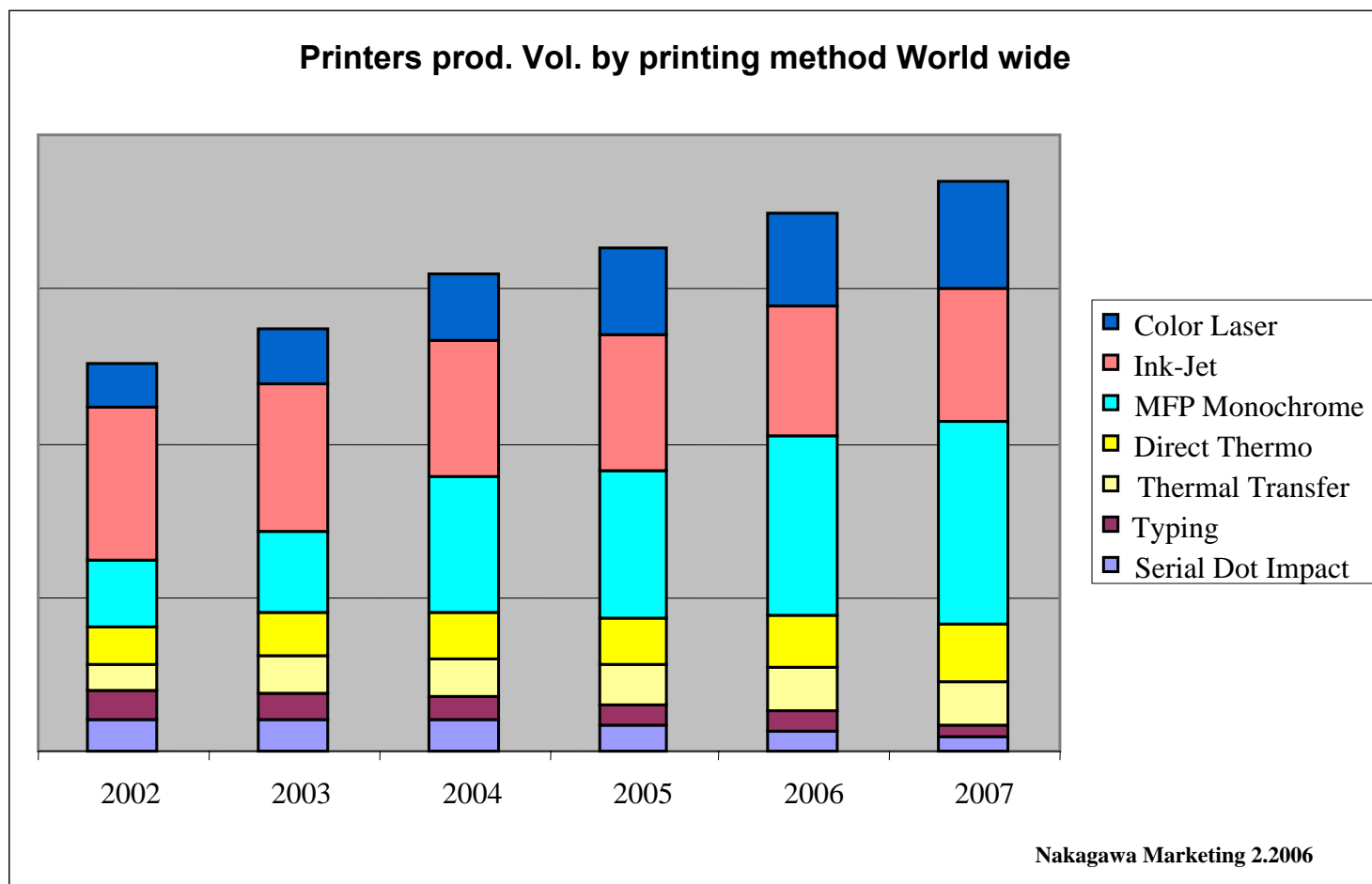
But now we should have a look what is driving the growth of the Thermo market.

Thermopaper is clearly not a “fashion” product, it is a technical feature paper for fast and reliable one colour variable data/barcode printing.

(Two colour Thermopapers are very, very niche.)



Chart 6 shows the Production Volumes of different Printing Methods Past and Planned until 2007.





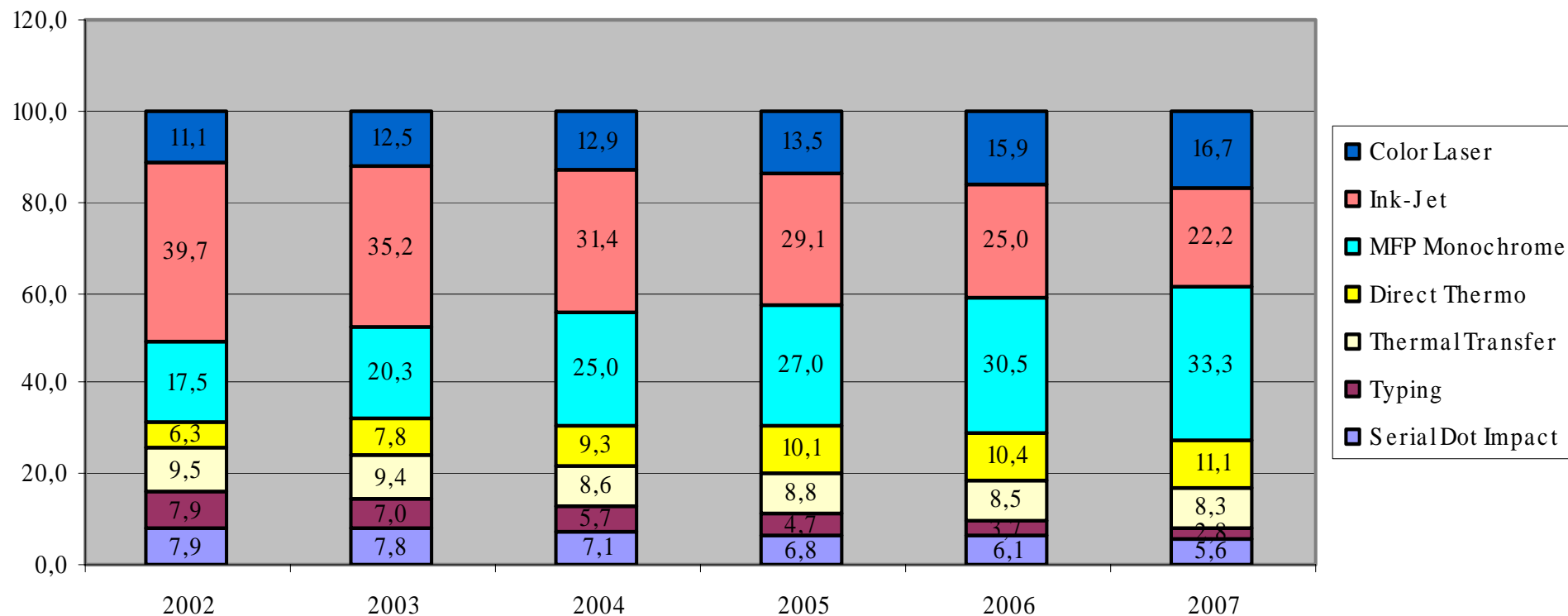
According to the next chart the printer market worldwide is growing. The methods Laser and Colour Laser show strong growth.

Thermo and TTR are still planned with smaller growth rates, Serial Dot Matrix and Typewriting are strongly shrinking.

Ink-Jet will keep the production volumes, but lose share due to the strong growth of Laser / Colour Laser (chart 8).



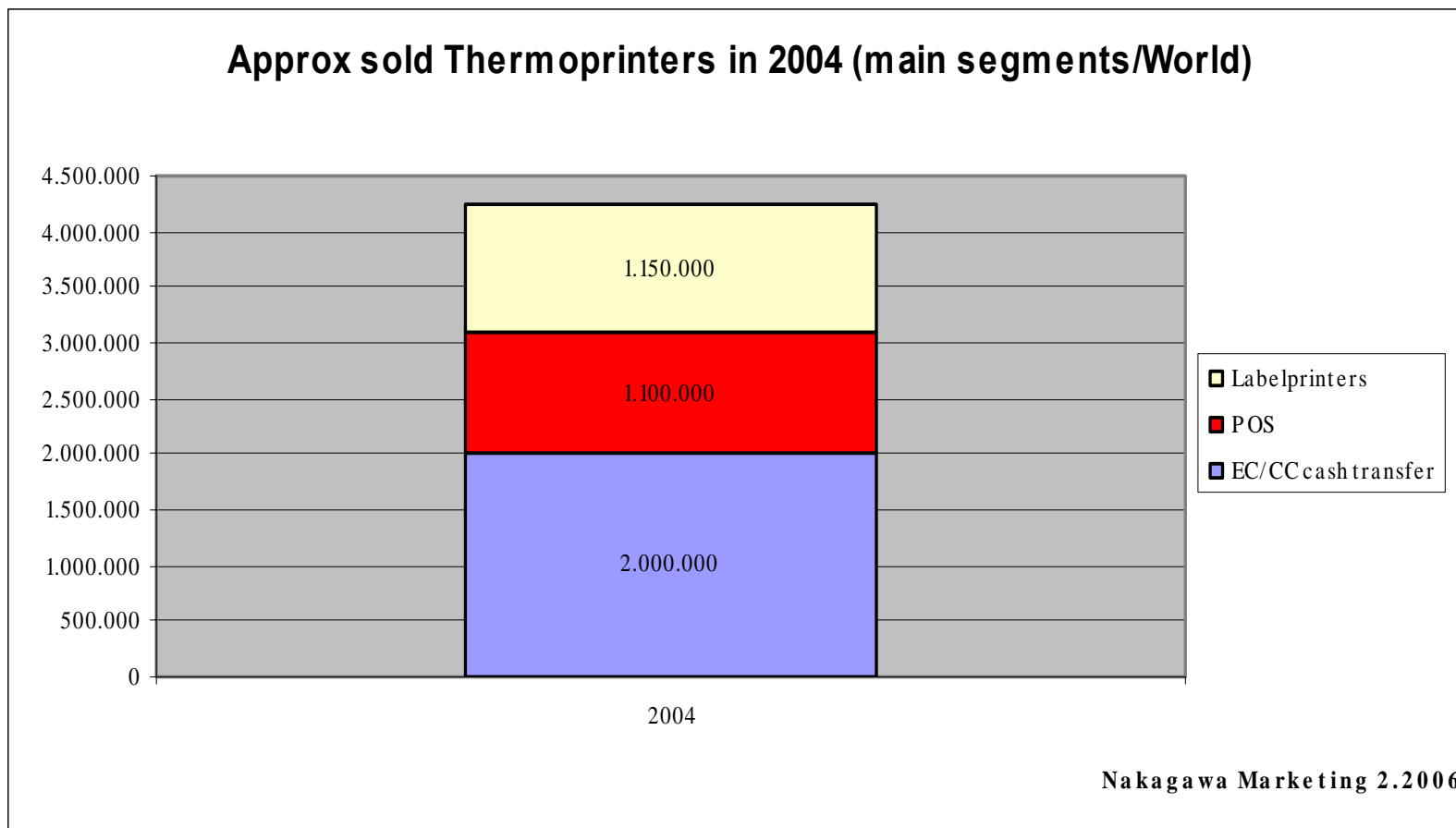
WW produced Printers Past and Planned in % of total (Chart 7).



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Chart 8 gives a closer look into the Main Thermoprinter Markets.





There are much more Applications, where Thermo-Printers are used, like:

- LOTTO (Germany installed base 28000)
- KIOSK/BANK STATEMENT PRINTERS
 - BATTING SLIP PRINTERS
 - CHART PRINTERS
 - DIGITAL TACHOGRAPH (EU)
- EVENT and TRANSPORTATION TICKETS
- ... AND AND AND...



Summary and Outlook

- The installation growth of Thermoprinters world wide is driving the paper consumption growth.
- For foreseeable time (5 years) we still expect growth for Thermo, in installation and paper consumption.
- The growth in the developing countries seems to be quite higher than in developed countries thermo technology, as technology is presently “the most convenient POS and label technology, reliable, quiet and “easy to use”.



- The most critical factor for the POS market is presently the low archivability of some European Thermopapers as the superstores sell also valuable goods with 2 years warranty.
- With some POS Thermopapers the receipts are after a fortnight worn near the body in a leather wallet no longer readable.
- So it is important for a total customer satisfaction that the “right” quality is used.



4. Short Introduction into Self Adhesive Labelling (Pressure Sensitive).

The pressure sensitive market in West Europe is about 4.0 Billion sqm of self adhesive materials.

Approximately 17% i.e. 750 Million sqm are direct thermo self adhesive products.

In Europe the split between Thermo Topcoated and Non Topcoated is almost 50% each (in the US the split is still approximately 80% Topcoated and only 20% Non Topcoated).

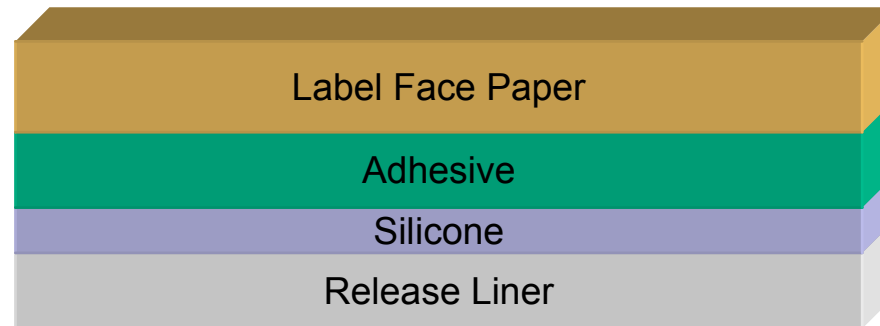
Most of these self adhesive thermo- label papers are on permanent adhesives followed by removable adhesives.

In areas like deep freeze, extra permanent, repositionable, only small quantities of thermo label papers are used.



Self Adhesive Labels Basics (Pressure Sensitive Adhesives)

The Basics are, that pressure sensitive adhesives have a pasteuse (cremy/liquid) structure.





Key Technical Elements are:

- Tack: the force with which the adhesive bonds to the surface (is measured as standard with steel and glass).
- Initial Tack: the same immediately after adhering the label to the surface.
- Shear: the tendency of the adhesive to depart from the surface.
- Removability: for removable adhesives.
- Release Value: the force which is needed to lift the label from the backing paper.



- Chemically what happens, is that the molecules adhere to the surface where they are applied too. For the adhesion the surface tension of the material where the label is applied is important. Not all surfaces are suitable for example, Teflon is created that nothing adheres.
- Further materials which are difficult for pressure sensitive adhesives are:
 - carpets, tyres, siliconized surfaces, rubbers which contain softeners, oily surfaces...



PERMANENT ADHESIVES

The major adhesives are permanent adhesives.

There are two standard basic types with layers of 16-20my of adhesives.

- Hot melt adhesives
- Dispersion acrylic adhesives

We use hotmelt adhesives as they give wider adhesion performance especially to recycled cardboards which sometimes contain softeners.

Dispersion Acrylics are easier to convert and have a wider temperature range, but have a less wide surface spectrum to adhere too.



Deep freeze adhesives are only needed when the goods have already been deep frozen, are taken out of the freezer.

Then at the surface immediately the ice will start to turn to water, and the adhesives must creep through the water, so thicker layers of special adhesives are needed.



As long as goods are labeled before they are put into the deep freezer standard permanent adhesives can be used.

For difficult surfaces there are sometimes still solvent based acrylics taken (extra permanent adhesives).

With these specialities in Thermo printing we have to be careful as they have thicker layers (25-30my) which may cause edge bleeding and this may adhere to the Thermohead and ruin the printer.



REMOVABLE ADHESIVES

With removable adhesives the surface is even more important. There is no adhesive which will be removable on every surface!!!!

Again we use as standard the hotmelt based removable, this will work good to excellent on approx 80% of the different surfaces, like, glass, paper, cardboard, steel. It may cause difficulties on lacquered book covers, plastics like CD cases, and some other materials. On these materials they tend to become permanent.

If we know that the label shall be used for such materials, we will offer an acrylic removable (acrylic removables tend to fall off from softener containing corrugated boards).

So we recommend as follows:

For larger volumes pretests with samples should be done.

If you give us the information to which surface the removable label shall be applied we will recommend the best solution.



RELEASE VALUE

The release value defines the force which is needed to lift the Label from the backing paper.

We work with a tight release, so that labels will not fly off by themselves.



Further Products

**We are working together with Carrie and all the SII Team
on further new product lines.**

Standard Lines:

Name Tags

Tickets

File Folder Labels

**Non Self Adhesive Reels for Tags in 60g and 80g
Top Coated and Non Top Coated**



Customized and Security Labels and Tags

- We will offer through SII customized printed standard and non standard labels with a approx. 3-4 lead time.
- For these we will need a PDF with the printing motiv from you. The one up cost for the first order will be approx. 100,00,- Euro per clichée (per color). So for a 2-color printjob 200,00,- Euro as one up cost plus the printed label cost.
- For extra sizes the tool cost would come additionally and there the cost are depending on various technical factors between 100,00,- and 400,00,- Euros.
- We also are able to offer labels and tickets with hologramms (hologramms should always be on the side of the reel as they ruin Thermoheads when they are in the printing area).
- Another security feature is possible with UV printing inks.



Please pass all your inquiries through SII to us

The enclosed inquiry form shall help you and us
to structure the inquiry.

We will offer to SII and they will offer to you.



Inquiry to SII

Company Name:	
Country	
Postcode/City:	
Street:	
Phone No.:	
Fax-No.:	
E-Mail-Adress:	

Project Name / Reference No.: _____



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Please offer the following:

- Standard Seiko Smart Label
- Other Product

Product Code: _____

- Removable Adhesive or
- Unprinted
- Printed 1 2 3 4 Colour

- Special Adhesive for: _____

Pantone no's: _____

- Non Standard / New Label
- Unprinted
- Printed 1 2 3 4 Colour

Width x length: _____

Pantone no's: _____

- Tag Heavy Grade
- Unprinted
- Printed 1 2 3 4 Colour

Width x length: _____

Pantone no's: _____

- POS Voucher Reel 60-90 g/sqm
- Unprinted
- Printed 1 2 3 4 Colour

Width x length: _____

Pantone no's: _____



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- Synthetic Thermo
- White

Clear

Width x length: _____

-
- Unprinted
 - Printed

1 2 3 4 Colour

Pantone no's: _____

-
- Specialities (Hologramm/Watermark)
 - Unprinted
 - Printed

Width x length: _____

1 2 3 4 Colour

Pantone no's: _____

Inquired Number of

Reels: _____

Labels/Tags/Vouchers: _____

The customer wants to have a solution for:

For printing inquiry PDF

- enclosed
- to follow
- We will send a printed company logo, please make a PDF

Date / Contact Person Name



- Thank you for your attention