

# ABACUS

## Specification



**TICKETS**      **Magnetic strip tickets and cards**  
**Barcode tickets and cards**

Version: 3.20

Identity no. DOCDE05010

**DESIGNA Verkehrsleittechnik GmbH**

Faluner Weg 3

24109 Kiel

Germany

Tel. +49 (0)431 5336 0

Fax +49 (0)431 5336 260

Email [info@designa.com](mailto:info@designa.com)

Web [www.designa.com](http://www.designa.com)

**COPYRIGHT**

© 2018 DESIGNA Verkehrsleittechnik GmbH  
All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means without the written permission of DESIGNA Verkehrsleittechnik GmbH.

**COPYRIGHT**

© 2018 DESIGNA Verkehrsleittechnik GmbH  
Urheberrechtlich geschützt. Jede Verwertung außerhalb der engen Grenzen des Urheberrechtsgesetzes ist ohne Zustimmung der DESIGNA Verkehrsleittechnik GmbH unzulässig. Dies gilt insbesondere für Vervielfältigungen, Übersetzungen, Mikroverfilmungen und die Einspeicherung und Verarbeitung in elektronischen Systemen.


<b>1</b>	<b>MATERIAL AND PROPERTIES .....</b>	<b>3</b>
1.1	Paper Tickets.....	3
1.2	Magnetic strip.....	3
<b>2</b>	<b>PAPER TICKETS - DIMENSIONS .....</b>	<b>4</b>
2.1	Magnetic strip technology .....	4
2.1.1	Magnetic strip tickets with side strip (standard).....	4
2.1.2	Magnetic tickets with central strip .....	5
2.1.3	Magnetic tickets with wide central strip (TCU 120, MCU 120, ODS 120, RBE 100) .....	6
2.1	Barcode Technology.....	6
<b>3</b>	<b>PAPER TICKETS – PRINTED AREAS .....</b>	<b>7</b>
3.1	Standard printed area .....	7
3.1.1	Magnetic strip technology.....	7
3.1.2	Barcode technology – Multicon MC 120 Barcode.....	9
3.1.3	Barcode technology – Multicon MC Barcode.....	10
3.2	Printed areas for configured ticket print .....	12
3.2.1	Magnetic strip technology.....	12
3.2.2	Barcode technology.....	13
3.3	Printed area for tickets with ticket holes.....	16
3.3.1	Magnetic strip technology: Hole-punch pincer and ticket punch.....	16
3.3.2	Barcode technology: Hole-punch pincer and ticket punch .....	16
3.3.3	Discounting with BDU 120 .....	18
3.4	Printed area for the batch number.....	20
<b>4</b>	<b>TICKET MAGAZINE .....</b>	<b>21</b>
<b>5</b>	<b>ABACUS PLASTIC CARDS .....</b>	<b>22</b>
5.1	Material/ Properties of the plastic cards.....	22
5.2	Material/ Properties of the magnetic strip.....	22
5.3	Correct handling of plastic cards .....	22
5.4	Dimensions of a plastic card .....	23
5.5	Mechanical flexibility test.....	23
<b>6</b>	<b>VERSION OVERVIEW .....</b>	<b>24</b>



# 1 Material and Properties

## 1.1 Paper Tickets

### Magnet strip and barcode technology

<i>Paper ticket material and properties</i>	
Material magnetic strip tickets	cardboard
Material barcode tickets 	type of paper: TP 1767 Mitsubishi thermo material is free of bisphenol
Material magnetic strip tickets with thermal coating	type of paper: TP 1767 Mitsubishi thermo material is free of bisphenol
Colour	white
Grammage	cardboard: 161g/m <sup>2</sup> -215g/m <sup>2</sup> thermo material: 175g/m <sup>2</sup>
Transparency (Opacity)	approx. 65%
Fibre direction	in output direction
Card edges	smooth and burr-free
Imprint	according to order, abrasion-resistant colour, non-sticky, non-conducting
Extension and shrinking	max. 0.25% lengthwise max. 0.70% in cross direction

## 1.2 Magnetic strip

### Only magnetic strip technology

<i>Magnetic strip material and properties</i>	
Magnetic oxide film	14micron
Coercivity (Hc)	24 x 10 <sup>3</sup> A/m (300 Oersted)
Saturation remanence (Brs.)	0.1Tesla (1000 Gaus)
Erasing field	80 x 10 <sup>3</sup> A/m (1000 Oersted)
Roughness depth	max. 1.3µm



## 2 Paper Tickets - Dimensions

Depending on the ticket technology used, the following paper tickets are available in the system ABACUS for parking management:

### 2.1 Magnetic strip technology

#### 2.1.1 Magnetic strip tickets with side strip (standard)

Standard paper ticket for magnetic strip technology in ABACUS systems (short term parker tickets, value/ time cheques):

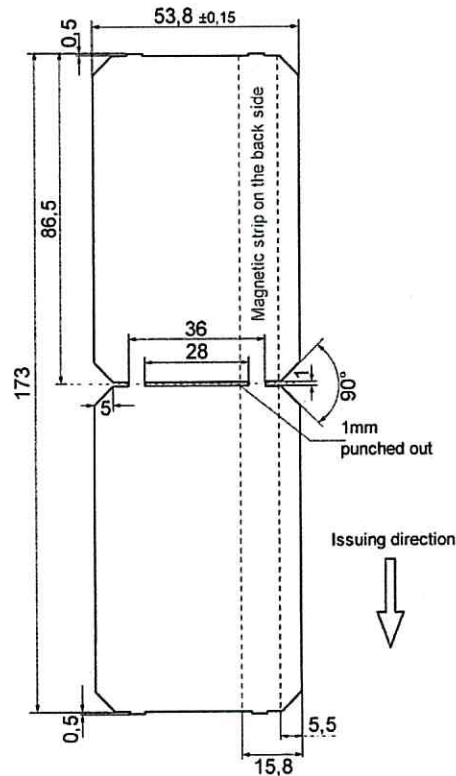


Fig. 1: Paper ticket with side strip, Dimensions in mm

**i** The 10.3 mm width of the magnetic strip shown in the figure above corresponds to the minimum width needed for the ticket print.

## 2.1.2 Magnetic tickets with central strip

Optional paper ticket for magnetic strip technology in ABACUS systems  
(short term parker tickets, value/ time cheques):

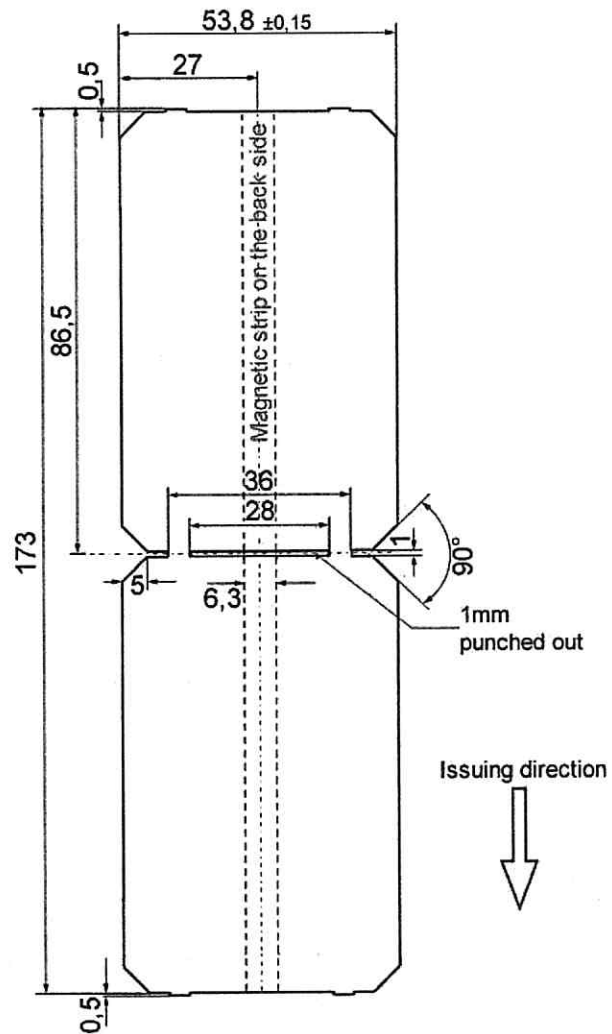


Fig. 2: Paper ticket with central strip, Dimensions in mm



**2.1.3 Magnetic tickets with wide central strip (TCU 120, MCU 120, ODS 120, RBE 100)**

If the discount devices TCU 120, MCU 120, RBE 100 and/ or optional ODS 120 in the ABACUS system a wide central strip is needed for the paper tickets. The discount information is written besides the data central strip:

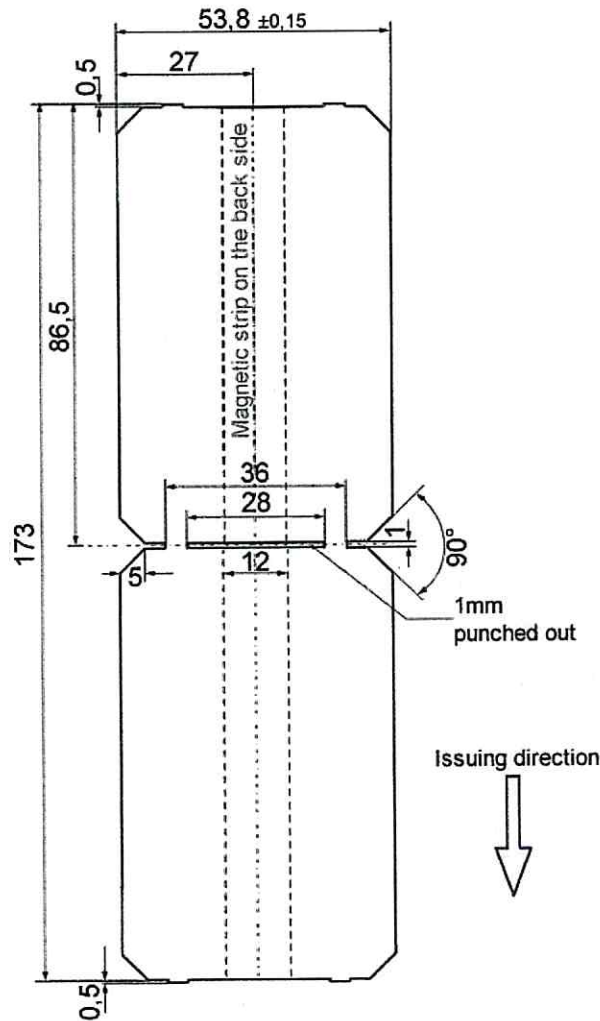


Fig. 3: Paper ticket with wide central strip, Dimensions in mm

**2.1 Barcode Technology**

**Barcode tickets**



**BARCODE**

The outer cut and dimensions for barcode tickets<sup>1</sup> are equivalent to the magnetic strip tickets displayed in the following.

<sup>1</sup> (Multicon MC 120 Barcode and Multicon MC Barcode)



## 3 Paper tickets – Printed areas

In the ABACUS system, the Multicon ticket printer prints different ticket information, e.g. entrance time, on the paper tickets for various processes. The standard position of the information on the ticket can be found in *chapter 3.1 Standard printed area*. In the system configuration, additional device-specific information for ticket printing and line positions can be defined individually for each device type. See *chapter 3.2 Printed areas for configured ticket print*.

- ⇒ Keep free the printed areas specified in the following to ensure the readability of this ticket information when creating the layout of your paper tickets.

### CAUTION

#### Readability of the ticket may be limited!

Individual printing can limit the readability of the ticket.

Therefore:

- Observe a tolerance of  $\pm 2\text{mm}$  for all printed areas.

### 3.1 Standard printed area

#### 3.1.1 Magnetic strip technology



The specified printed areas are valid for the Multicon MC 120 with matrix printer.

The entrance information of a short term parker ticket is always printed into line 1 at an entrance control terminal and the payment information is always printed into line 2 at an automatic or manual pay station.

Both lines together compose the standard printed area, which can differ for magnetic side strip and magnetic central strip tickets due to their different insertion directions.

### CAUTION

#### Readability of the ticket may be limited!

Individual printing can limit the readability of the ticket.

Therefore:

- Always keep free line 1 and additionally line 2 when creating individually the layout of your paper tickets, if the readability is desired.



**Line 1 and line 2 with magnetic side strip**

The side strip can be inserted into the Multicon with one insertion direction (magnetic strip down right):  
 The line 1 and line 2 are therefore always printed on the ticket's upper side.

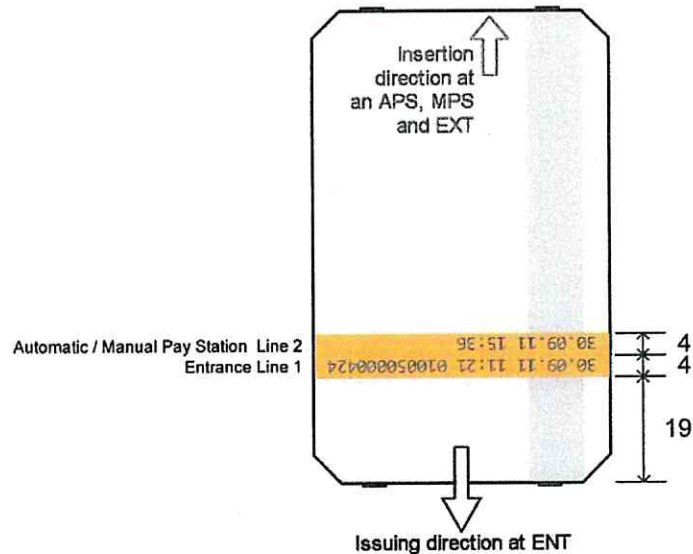


Fig. 4: Line 1 and line 2 with magnetic side strip, Dimensions in mm

**Line 1 and line 2 with magnetic side strip: Print upside down**

To ensure that the inserting direction of the ticket corresponds to the reading direction of the ticket, the print alignment for line 1+2 can be rotated 180°.<sup>2</sup>

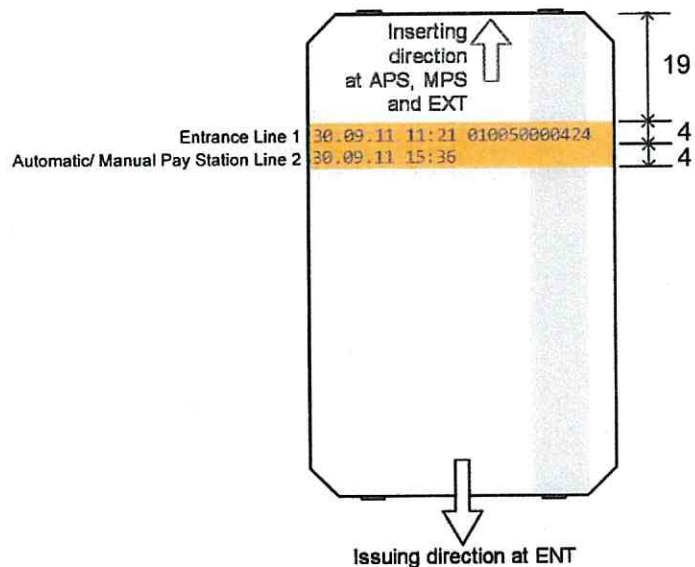


Fig. 5: Line 1 and line 2 with magnetic side strip using option "Print upside down"; Dimensions in mm

<sup>2</sup> This setting is carried out in the system configuration in the device properties of the Multicon (from Version 6.13) by your DESIGNA Service.

## Line 1 and line 2 with magnetic central strip

At the entrance, the line 1 is always printed on the ticket's upper side. During further processing, four insertion directions are possible for central strip tickets (magnetic strip on top or bottom/ both directions):

The line 2 can therefore be situated on the ticket's upper or back side:

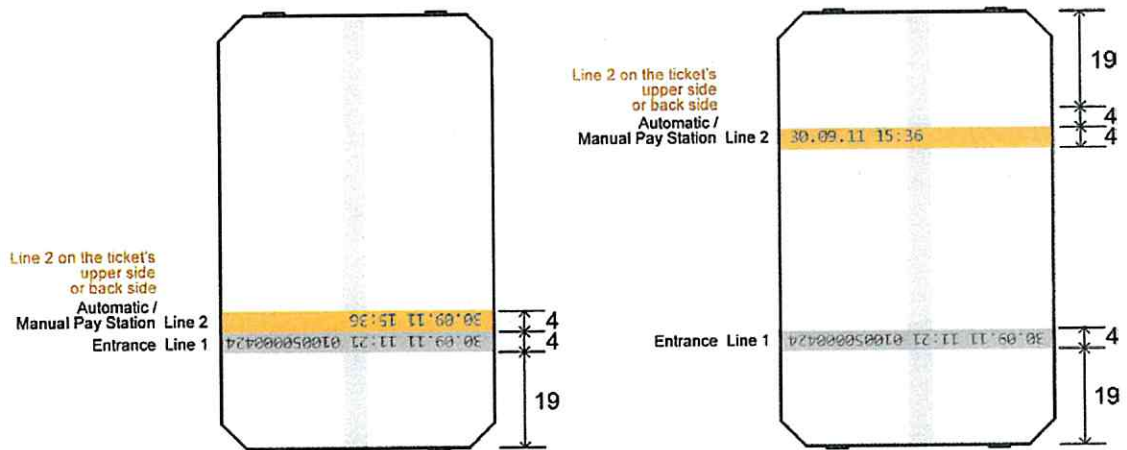


Fig. 6: Line 1 and line 2 with magnetic central strip; Dimensions in mm

When using Multicon versions 6.13. and higher, the second line is printed automatically directly below the first line (see figure on the left).

### 3.1.2 Barcode technology – Multicon MC 120 Barcode



Always keep the upper surface (thermo coated side) of barcode ticket free of any individual print. The lower surface can be fully printed whilst taking the *batch number* and the *ticket hole* into account.

#### Entrance line and pay station line with barcode tickets

- 1 Barcode entrance
- 2 Barcode pay station
- 3 Inserting direction at automatic/ manual pay station and exit
- 4 Entrance information in line 1 +2
- 5 Payment information in line 1

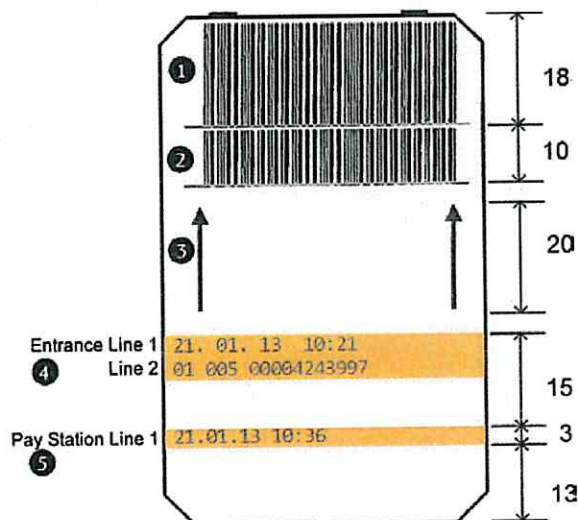


Fig. 7: Entrance and payment information on barcode ticket, Dimensions in mm

With short term parker tickets, the barcode for entrance is printed upon ticket issue at the entrance control terminal ① and the barcode for the



payment ② is printed at the automatic or manual pay station or at the exit control terminal.

The entrance information is printed in the entrance lines 1 and 2 ① and the payment information in the pay station line 1 ③. These lines are printed as shown on the lower half of the thermo coated side of the barcode ticket. Arrows ③ are printed on the ticket to ensure the customer inserts it correctly into the device for payment.

### 3.1.3 Barcode technology – Multicon MC Barcode

**i** On the upper side of barcode tickets (thermo-coated side), the lower part ③ can be printed with individual information. This printing is carried out by the printer. The lines with the entrance information in text field ① and the barcode field ② must generally remain free of individually printed information.

The underside can be individually and fully printed taking into account the *ticket punch* (see chapter 3.3) and the *batch number* (see chapter 3.4).

#### Entrance Lines

- 1 Entrance information
- 2 Barcode entrance
- 3 Individual printing possible, e.g. car park logo or text

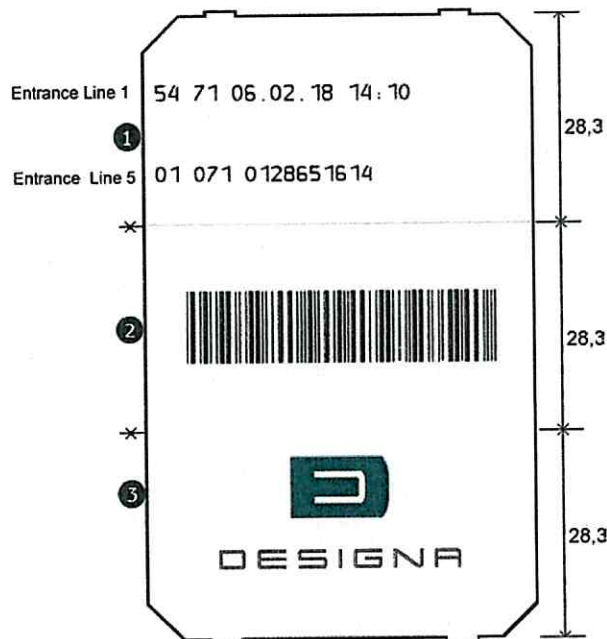


Fig. 8: Entrance information on barcode ticket (Multicon MC Barcode), dimensions in mm

With barcode tickets, the entrance information is printed in the upper text field of the thermo-coated side ①. With short term parker tickets, the entrance information is printed by default in lines 1 and 5 (a total of 7 text lines are available, also see chapter 3.2).

The barcode for the entrance is printed exactly in the middle of the short term parker ticket when the ticket is issued at the entrance control terminal ②. There is no further barcode printing for payment, since ticket printing with the Multicon MC Barcode only takes place if the ticket is fed via the rear feeding unit. Ticket printing via the insertion slot does not take place.

### Entrance lines and discount barcode

**i** If a discount using the discount barcode is intended for the barcode ticket, the ticket area on which the barcode for the discount is to be printed ②b must also remain free of individual printing.

- 1 Entrance information
- 2a Barcode entrance
- 2b Discount barcode
- 3 Individual printing possible, e.g. car park logo or text

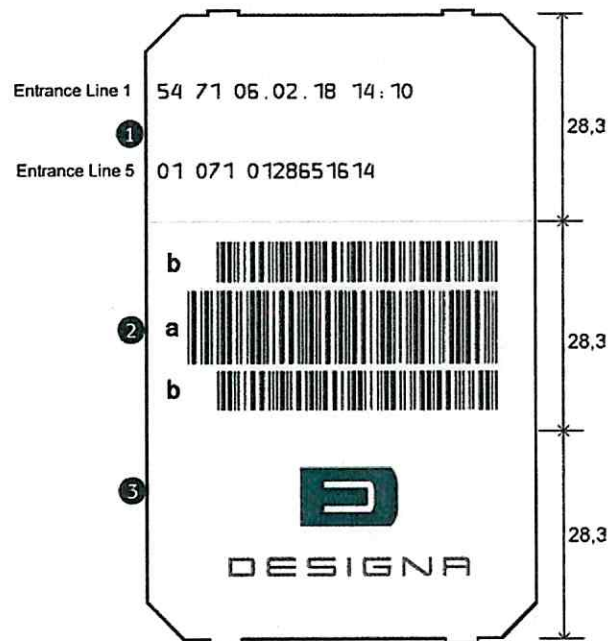


Fig. 9: Entrance and discount information on barcode ticket (Multicon MC Barcode), dimensions in mm



### 3.2 Printed areas for configured ticket print

For short term parker tickets, the printed areas for the parking information can be freely configured in the system configuration instead of the standard printed areas (see chapter 3.1).<sup>3</sup> This allows the car park operator to specify further device-specific content on the ticket and to determine the position of the individual lines. The configuration is carried out per device type.

Depending on whether magnetic strip or barcode technology is used in the ABACUS system, different numbers of lines are available for the variables of the configured ticket print:

#### 3.2.1 Magnetic strip technology

For magnetic strip technology and depending on the actual device, a total of 10 lines are available for the configured ticket print.

**i** When designing your paper tickets, keep the lines containing parking information (max. 10) free from individual printing if you want these lines to be readable.

#### Example: Line 1 to line 10 with side strip (Scale of 1:1 with DIN A4 format)

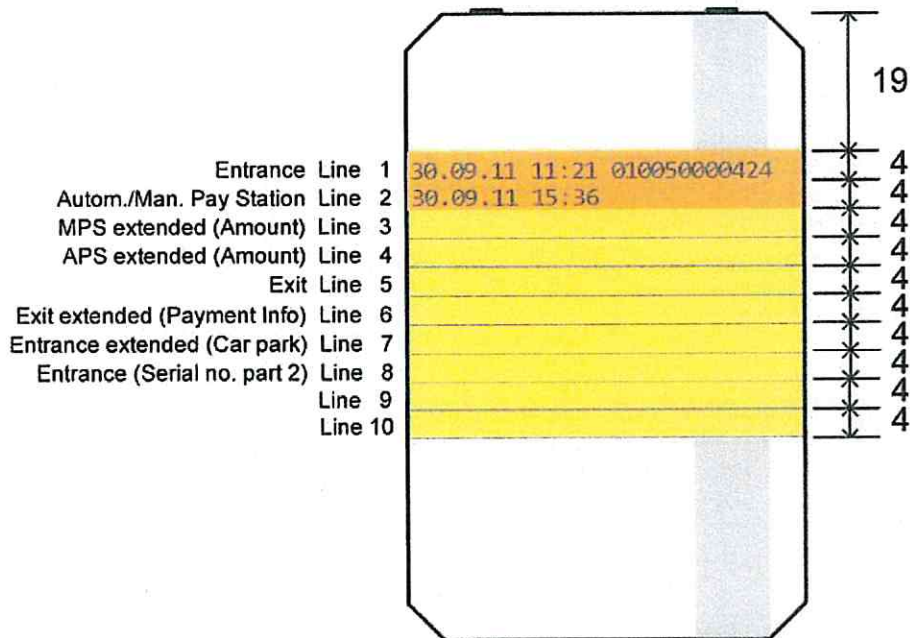


Abb. 10: Example: Line 1 to line 10 with side strip; Dimensions in mm

<sup>3</sup> ABACUS version x18 and higher

**Example: Line 1 to line 10 with central strip (Scale of 1:1 with DIN A4 format)**

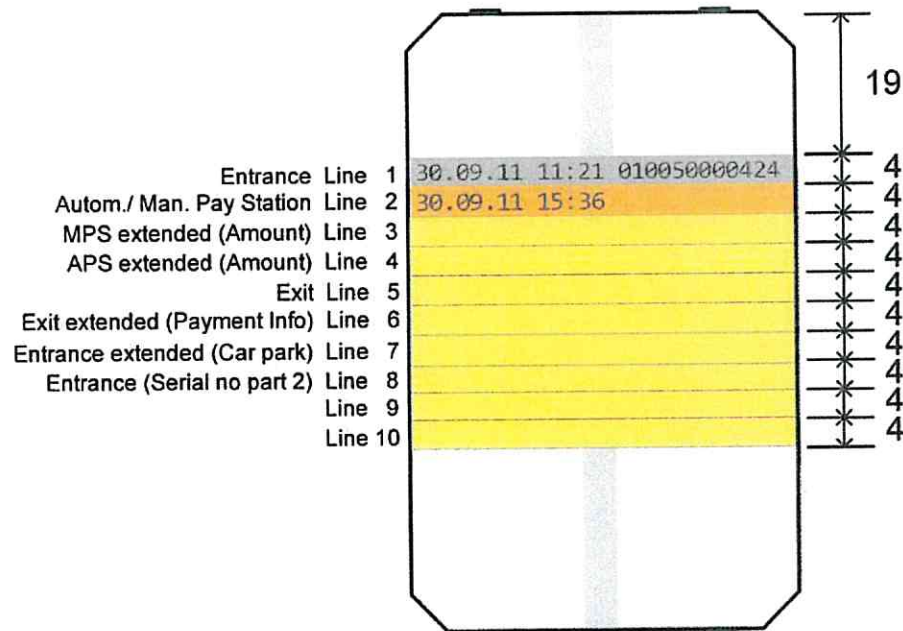


Abb. 11: Example: Line 1 to line 10 with central strip; Dimensions in mm

**i** Positioning of the line content is freely definable in the system configuration.<sup>4</sup>

Furthermore, a customer-specific, extended imprint can be set for some types of item in the WinOperate.<sup>5</sup> For this extended print the (max.) 10 lines can also be used (*also see the separate manual WinOperate*)

### 3.2.2 Barcode technology

When using barcode technology, a total of 7 lines can be configured for short term parker tickets.

**i** When designing your paper tickets, keep the lines containing parking information (max. 7) free from individual printing if you want these lines to be readable.

#### Multicon MC 120 Barcode

For barcode tickets (Multicon MC 120 Barcode), 7 lines are available in the lower ticket area, which can be printed with entrance, pay station and additional device-specific information.

<sup>4</sup> ABACUS Version x18 and higher

<sup>5</sup> ABACUS Version x15 and higher

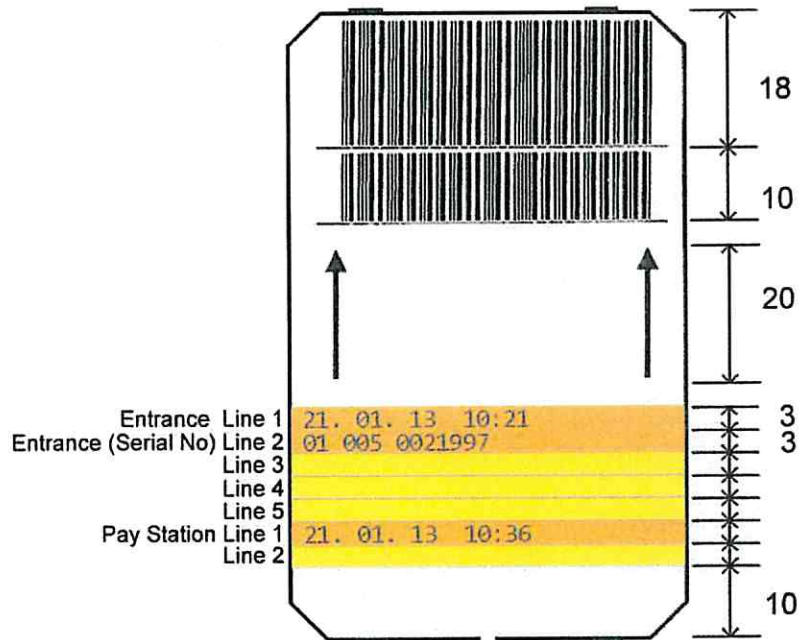


Fig. 12: Example: Configured ticket print for short term parker ticket (with Multicon MC 120 Barcode)



Positioning of the line content is freely definable in the system configuration.<sup>6</sup>

### Multicon MC 120 Barcode

For barcode tickets (Multicon MC 120 Barcode), 7 lines are available in the upper ticket area, which can be printed with entrance and additional device-specific information.

<sup>6</sup> ab ABACUS Version x18



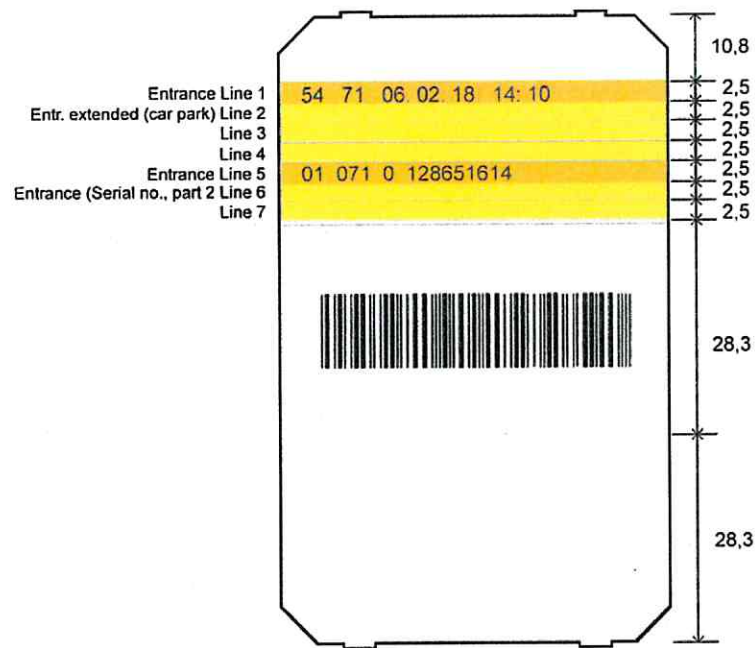


Fig. 13: Example: Configured ticket print for short term parker ticket (with Multicon MC Barcode)



Positioning of the line content is freely definable in the system configuration.<sup>7</sup>

Furthermore, a customer-specific, extended imprint can be set for some types of item in the WinOperate.<sup>8</sup> For this extended print the (max.) 7 lines can also be used (also see the separate manual WinOperate).

<sup>7</sup> ab ABACUS Version x18

<sup>8</sup> ABACUS Version x15 and higher

### 3.3 Printed area for tickets with ticket holes

In ABACUS systems discounts can be granted via ticket holes. The system detects the punched hole and charges a reduced tariff according to a payment type (GID).

#### 3.3.1 Magnetic strip technology: Hole-punch pincer and ticket punch

The hole needs to be placed within the whole grey marked area. Precise placement markings in the layout, however, facilitate the use of the ticket-punch for the staff.

- 1 Punching area for hole-punch pincer
- 2 Extended punching area for hole-punch table device
- 3 Ticket hole of hole-punch pincer \*
- 4 Ticket hole of hole-punch table device (kombi hole)

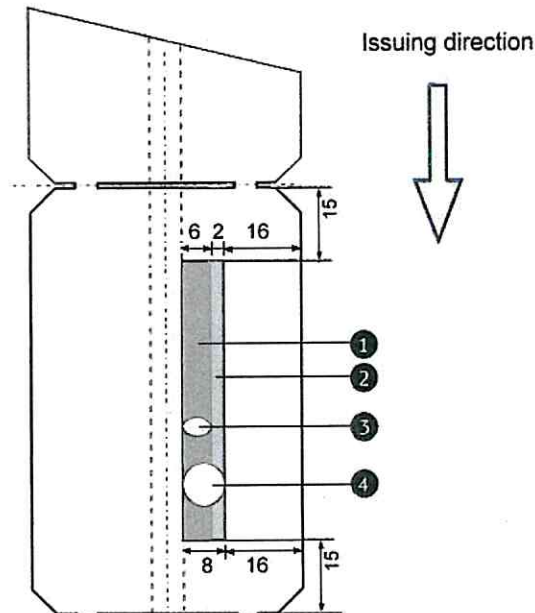


Fig. 14: Punching area for ticket holes (magnetic strip), Dimensions in mm

#### 3.3.2 Barcode technology: Hole-punch pincer and ticket punch

##### Multicon MC 120 Barcode



The hole needs to be placed in the middle of the ticket so that all printed barcodes can still be read by the reading device.

- 1 Ticket hole of hole-punch pincer \*
- 2 Ticket hole of hole-punch table device (kombi hole)

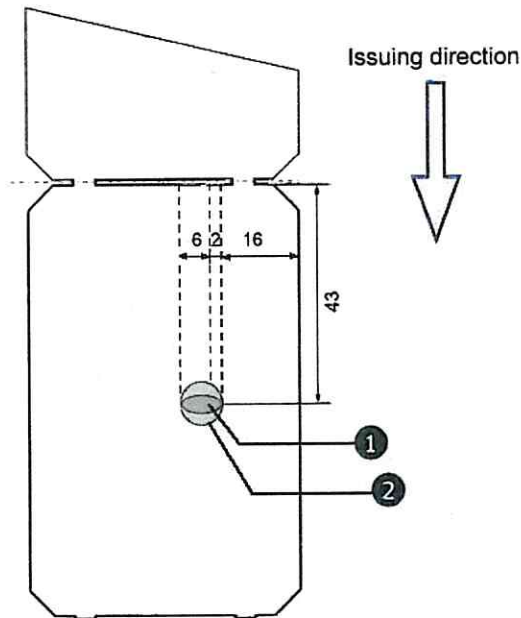


Fig. 15: Punching area for ticket holes (MC 120 Barcode); Dimensions in mm

### Multicon MC Barcode



When positioning the hole, make sure the barcode is not damaged so that it can still be read by the reading device.

With barcode tickets created using the Multicon MC Barcode, it is recommended to position the hole above or below the barcode:

- 1 Area for ticket punch
- 2 Area for ticket punch

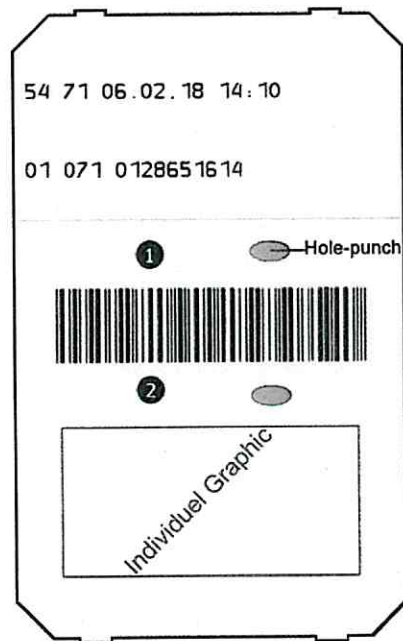


Fig. 16: Examples for punching areas for ticket punch (MC barcode)

### 3.3.3 Discounting with BDU 120



With BDU 120, only barcode tickets of the Multicon MC 120 Barcode can be discounted.

The BDU 120 (Binary Discount Unit) is a discounting device that can be used for both barcode tickets and magnetic strip tickets.<sup>9</sup> After inserting the short term parker ticket into the discount unit, the discount information is punched into the ticket by actuating the lever.

The punching process and position of the hole is based on a binary code and contains the discount level. The punch area is located in the middle of the ticket and discounting can be carried out from all sides of the ticket.

- 1 BDU 120 ticket hole: the diameter of the individual hole is 2 mm

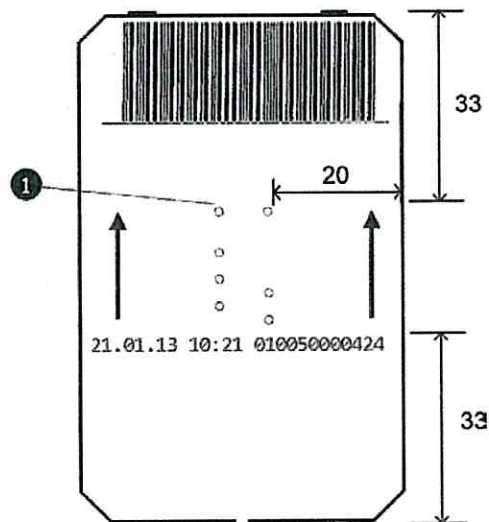


Fig. 17: Ticket punch with BDU 120  
Example: barcode ticket; Maße in mm

<sup>9</sup> The discount unit BDU 120 can be used for barcode tickets (Multicon MC 120 Barcode) and magnetic strip tickets from Multicon Version 6.05 and 6.14 respectively.

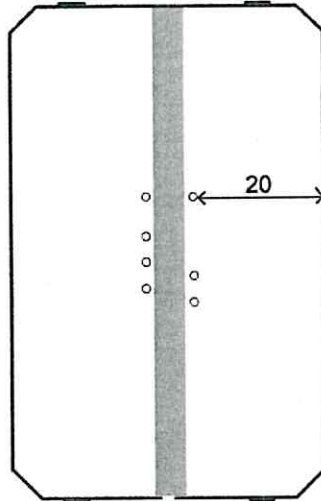


Fig. 18: Ticket punch with BDU 120  
Example: magnetic strip ticket (central strip 6,3 mm) <sup>10</sup>

<sup>10</sup> When using magnetic strip tickets with a wide central strip (12 mm), there should be no further magnetically coded discount information



### 3.4 Printed area for the batch number

A 14 digit batch number is printed onto all tickets which are ordered via DESIGNA or our suppliers. The batch number is needed for administrative issues in case of claim requests.

**i** Always keep free this area when creating the layout of your paper tickets or chose a colour for the batch number which is readable in your layout, if the readability is desired. The alignment of the batch number must correspond to the reading direction of the ticket.

- 1 Batch number
- 2 Customer specific ticket number (optional)

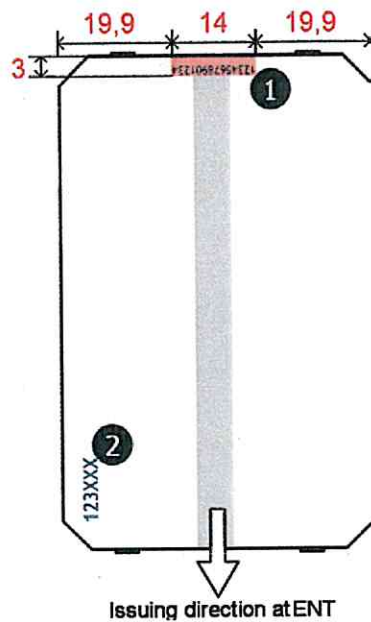


Fig. 19: Printed area of the batch number; ex. magnetic strip ticket

The *batch number* ① is printed with the illustrated standard position (below in the middle; here magnetic middle strip):

If necessary, this position can also be freely chosen for your layout.

This is also the case for an optional, customer specific ticket number ②, numbering the tickets consecutively.

## 4 Ticket magazine

### CAUTION

- Always stock the ticket magazines standing upright and dryly at a stable temperature (Recommended: ambient temperature).

A ticket magazine with 5000 tickets can be used at the entrance devices of the ABACUS system (ENT 120, In and In+ Blue Edition).

Optionally, the device ENT 120 and In+ can be equipped with a second ticket magazine (also see separate operating instructions ENT 120).

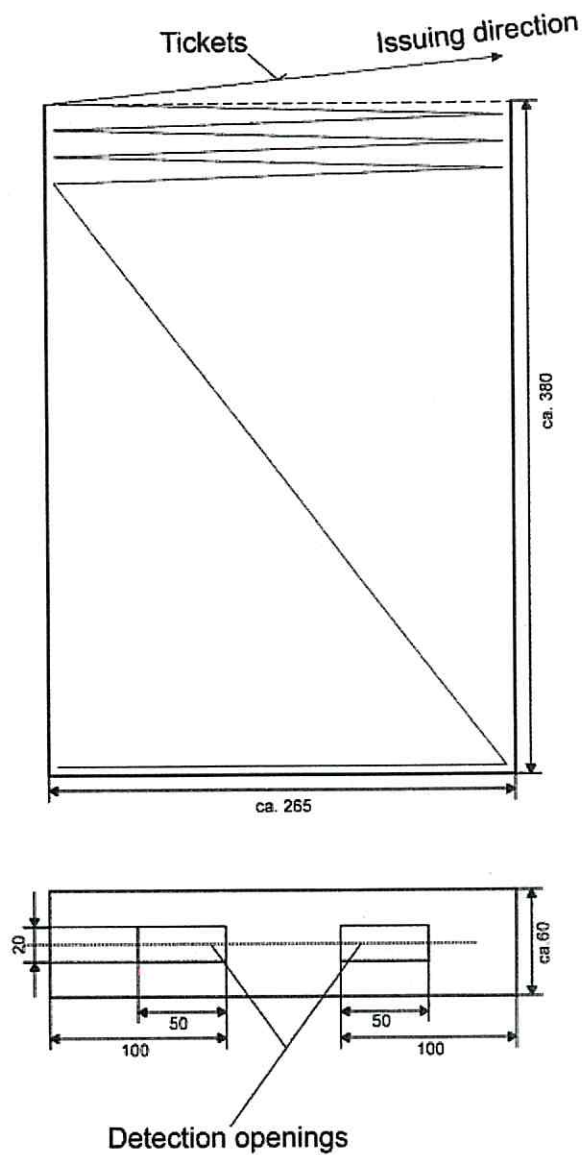


Fig. 20: Ticket magazine



## 5 ABACUS Plastic Cards

### 5.1 Material/ Properties of the plastic cards

#### Magnetic strip and barcode technology

<i>Plastic card properties</i>	
Material	Polyvinylchloride (PVC), laminated
Dimensions	85.60 x 53.98mm (according to ISO 7810)
Thickness	0.76mm +/-0.08mm
Card edges Radius	smooth and burr-free 3.18°
Surface	glossy
Application temperature	-20°C to 64°C
Imprint	offset or silkscreen (under the overlay) abrasion-resistant colour, non-sticky, non-conducting
Options	Signature panel

### 5.2 Material/ Properties of the magnetic strip

#### Only magnetic strip technology

<i>Magnetic strip properties</i>	
Magnetic oxide film	14micron
Coercivity (Hc)	24 x 10 <sup>3</sup> A/m
Saturation remanence (Brs.)	0.1Tesla (1000Gaus)
Erasing field	80 x 10 <sup>3</sup> A/m
Roughness depth	max. 1.3µm

### 5.3 Correct handling of plastic cards

- Do not expose cards to aggressive solvents (e.g. cleaning solvents, thinner, ethyl alcohol) (plastic embrittles).
- Do not keep cards in soft PVC sheaths or in purses (evaporating softeners and leather tanning agents).
- Do not expose cards to extreme low or high temperatures or constant variation in temperature (allowed max. temperature range for standard PVC cards is approx. +60°).
- Do not store cards in direct solar radiation (fading colours, deformation).
- Do not expose cards to extreme deformation (e.g. constant bending of the cards).
- Protect magnetic cards against magnetic fields (e.g. magnetic print heads, some electronic devices as e.g. radios or loudspeakers).



## 5.4 Dimensions of a plastic card



### BARCODE

The outer dimensions for barcode plastic cards are equivalent to the magnetic strip plastic card displayed in the following.

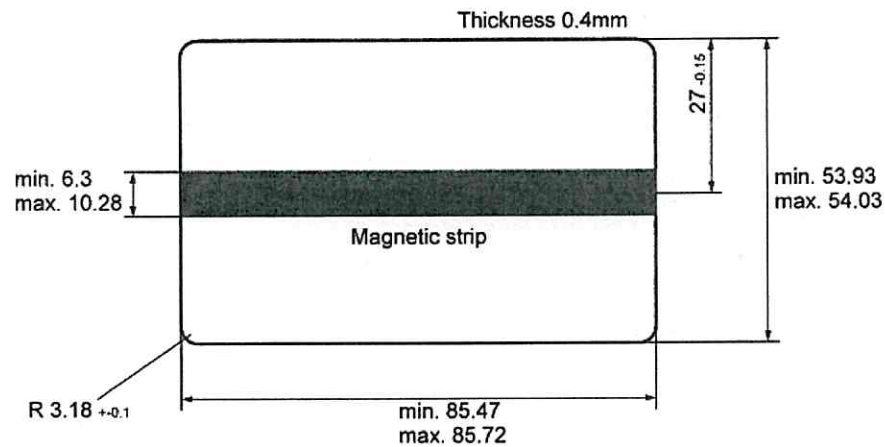


Fig. 21: Dimensions of a plastic card with central strip, Dimensions in mm

## 5.5 Mechanical flexibility test

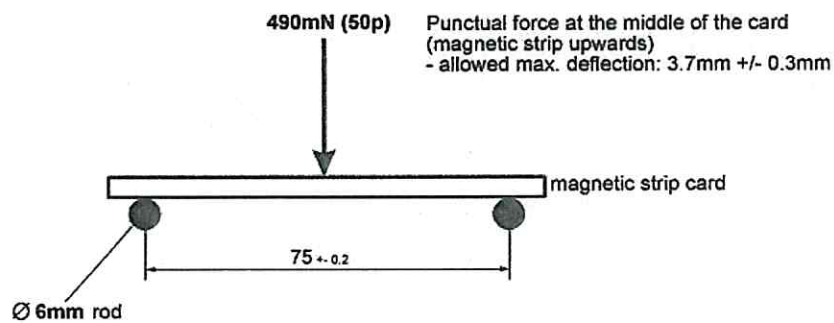


Fig. 22: Mechanical flexibility test



## 6 Version overview

**Version 3.10 01/2016 (KS)**

Documentation updated

**Version 3.20 10/2018 (KS)**

Documentation updated

**Subject to technical changes.**

The parking system ABACUS is continuously advanced and improved. Please contact your DESIGNA Service about changes and additions to these operating instructions.

## Specification for thermal paper for SIEMENS pay and display machines

The paper used in Siemens pay and display machines must conform to the following specification. The printers we use are coordinated to this specification. Deviations from this specification may damage the printer.

As we cannot rule out deviations from the specification when other manufacturers' paper is used, we will not assume any liability for functioning of the printing system or of the overall pay and display machine system when other manufacturers' paper is used.

### Characteristics

1. Thermal paper is made from wood-free, fundamentally chlorine-free bleached cellulose.
2. Thermal paper conforms to the ISEGA approval for direct contact with foodstuffs and is therefore not toxic or hazardous in relation to dermatological, oral and allergenic toxicity.
3. Thermal paper can be used for at least five years if the storage conditions are met (20-22 °C 40-60 % relative humidity, no direct sunlight (UV) over a prolonged period of time. The prolonged influence of high temperatures, softeners and light reduces the contrast of printed letters. Direct contact with chemicals such as alcohols, ketones, esters, greases and acids must be avoided.
4. Use, storage and disposal of the paper do not involve any hazards for the environment.
5. The product conforms to DIN EN 71.3 (heavy metal content in children's toys).
6. The thermal paper is distinguished by the following factors:
  - Smooth surface
  - Anti-stick effect, by means of sliding substances such as stearates and microparaffins
  - Low content of "aggressive" ions such as sodium, potassium and chlorine. The following ion values are guaranteed:

Na	< 500 ppm
K	< 100 ppm
Cl	< 300 ppm

7. All unprinted rolls feature a continuous Siemens logo printed in blue on the right-hand margin (viewed from above, front).
8. When the register control function is used, the paper features identifying marks with a size of 3mm in height and 8mm (+/- 0.5 mm) in length on the right-hand margin of the front side. The degree of blackening of the marks must amount to at least 1.2 density (measured according to Mc Beth). As far as the definition of the ticket layout is concerned, attention must also be paid to ensuring that no further elements are pre-printed in the entire area of the marks.
9. Packed in boxes of five rolls each

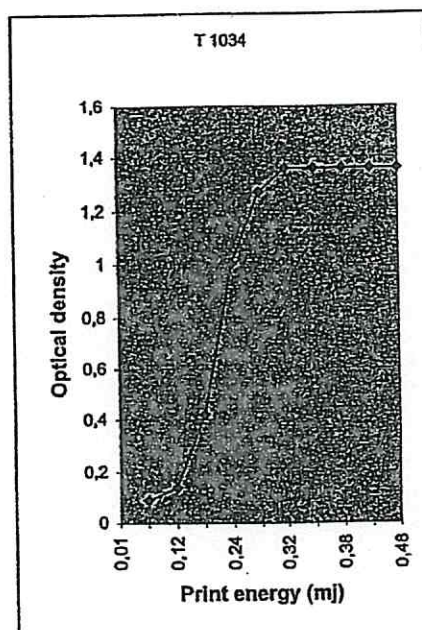
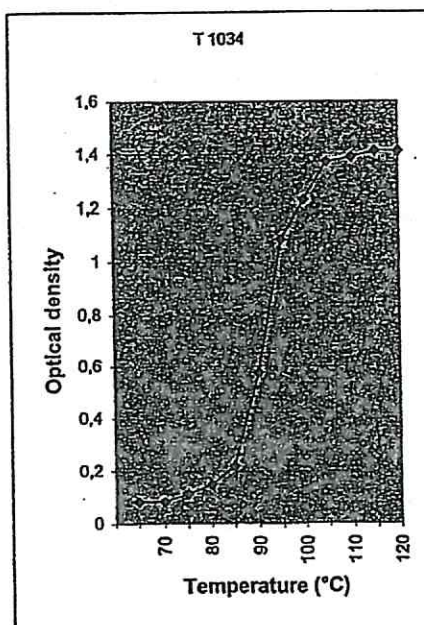
**Physical characteristics**

Weight	70 g/m <sup>2</sup> +/- 10 %
Thickness	79 μ +/- 10 %
Surface smoothness	At least 300 Bekk
Rear smoothness	At least 75 Bekk
Reaction colour	Black
Saturation	1.36
Opacity (lack of transparency)	91% Scan 3

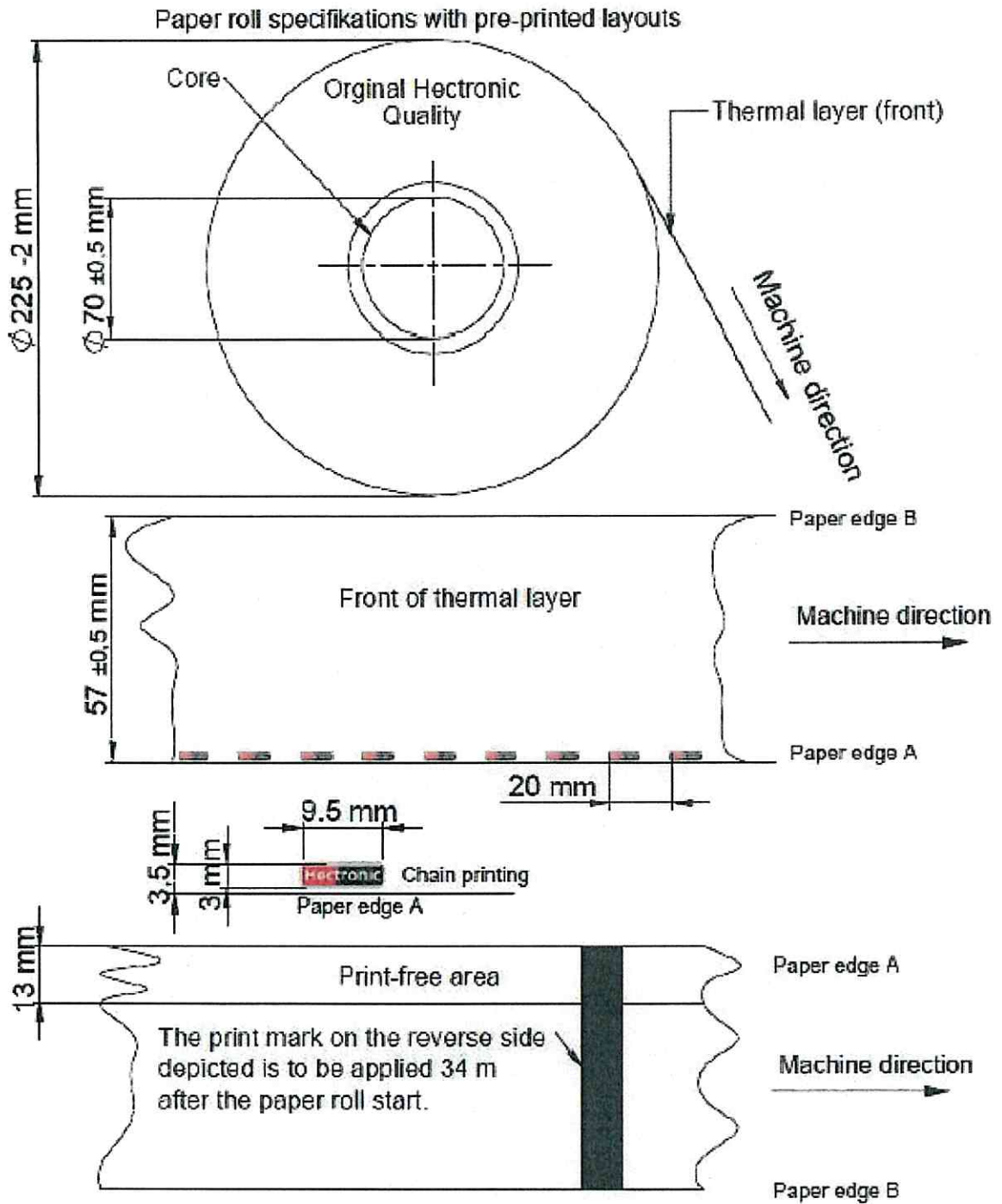
**Geometric characteristics**

Outside diameter	max. 210mm
Shell	70mm +/-0.5 mm, min. 5mm wall thickness (paperboard)
Paper/roll width	57mm +/- 0.2mm
Roll length	350m +/- 1 %

**Characteristics**



# Paper Specifications



Type of paper: thermal paper  
 Paper colour: white  
 Length of paper: 400 m  
 Core material: cardboard  
 Application: Parking ticket machine  
 Antistatic: The paper needs to be antistatic.

NB: There must be no splices within the roll.

## Description:

The thermal paper is athermal paper with medium sensitivity and good resistance to heat and moisture. The printed image is back. The thermal paper is free of bisphenol.

## Paper qualities:

Grammage		$73 \pm 5 \text{ g/m}^2$	ISO 536
Thickness		$82 \pm 5 \text{ }\mu\text{m}$	ISO 534
Smoothness	os	$> 200 \text{ s}$	ISO 5627
Brightness	os	$> 85 \%$	ISO 2470
Tear resistance	MD	$> 4,4 \text{ kN/m}$	ISO 1924-3
	CD	$> 2,2 \text{ kN/m}$	ISO 1924-3

## stability of surroundings:

Image stability  
when stored correctly  $> 10 \text{ Year}$

