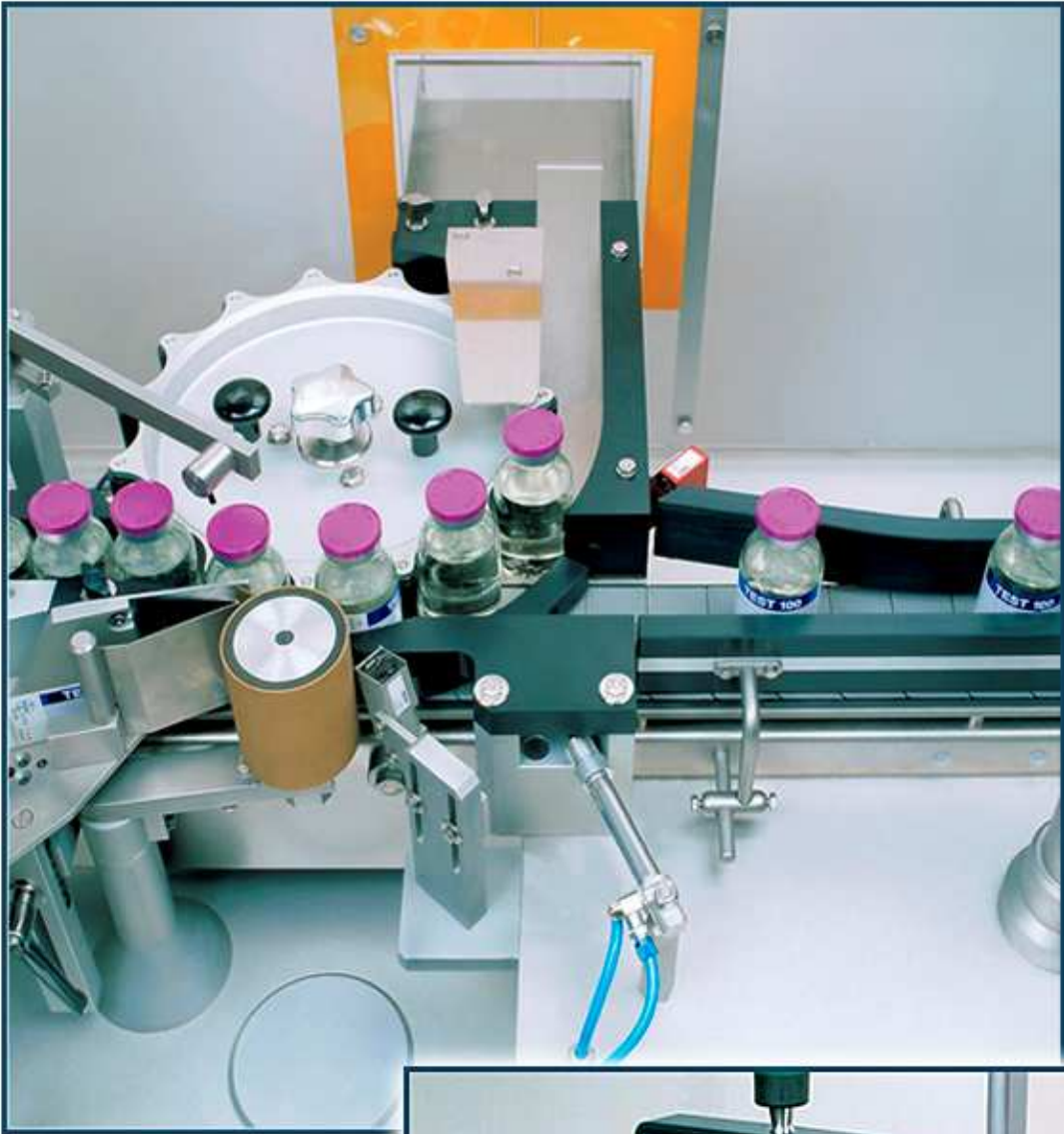




## ESF – Technical data

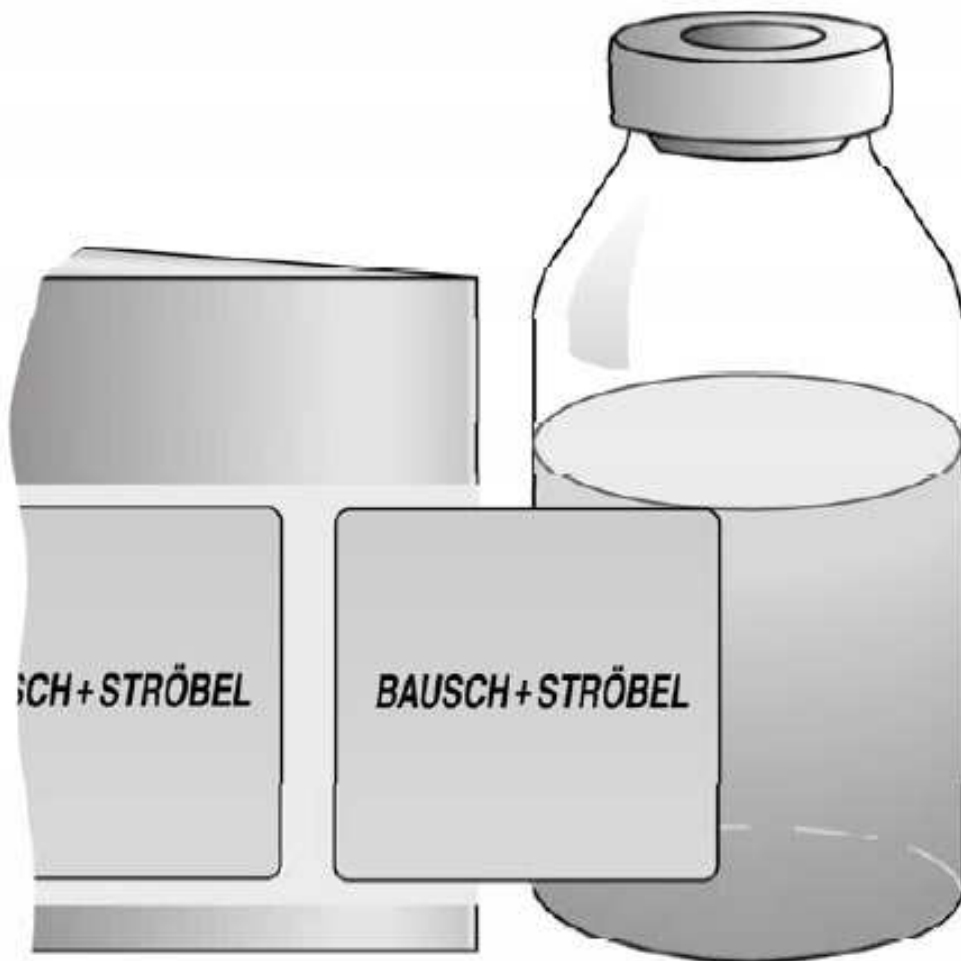
Machine types	ESF1001	ESF1015	ESF1020
Container diameter:	16 – 160 mm	16 – 86 mm	16 – 60 mm
Container height:	35 – 320 mm	35 – 240 mm	35 – 200 mm
Label height:	----- 15 – 80 mm -----		
Label length:	----- 30 – 150 mm -----		20 – 150 mm
Max. capacity:	12.000 / h	18.000 / h	30.000 / h
Machine weight:	350 kg	750 kg	800 kg
Dimensions: (length x width x height)	1,45x1,37x1,65 m	----- 2,40x1,20x1,85 m -----	



# **ESF1001/1015/1020**

Labelling machine for self-adhesive labels on bottles

ESF6070



Machine type	ESF1001, ESF1015, ESF1020	Technical Specification ESF6070
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## 1. General

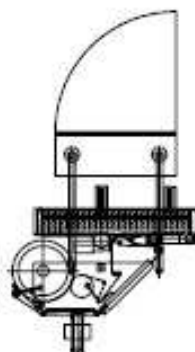
- This specification refers to the standard design of the machine.

### 1.1 Application

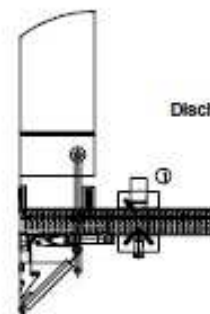
- The machines are used for labelling bottles and similar containers in the pharmaceutical industry.

## 2. Machine design

### 2.1 Machine model ESF 1001

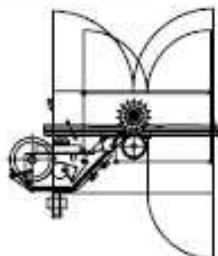


Ⓞ Reject discharge



Discharge configuration 1

### 2.2 Machine model ESF 1015

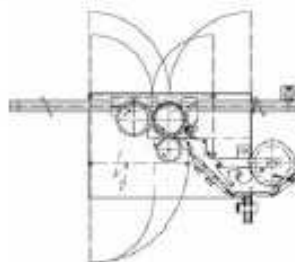


① Reject station



Discharge configuration 1

### 2.3 Machine model ESF 1020



Machine type	ESF1001, ESF1015, ESF1020	Technical Specification ESF6070
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## 2.4 Basic construction

- Machine base made of stainless steel (material: 1.4301 - AISI 316L) and aluminium AlMg3
- Infinitely variable drive by servomotor
- Machine guard made of transparent polycarbonate (ESF1015, ESF1020)

## 2.5 Transport system

### 2.5.1 Container supply:

- The containers are supplied from the machine upstream

### 2.5.2 Transport system ESF1001:

- Conveyor belt made of polyurethane
- Container spacing by separately driven roller
- Smoothing plate combined with smoothing belt for smoothing the labels on the containers

### 2.5.3 Transport system ESF1015:

- Conveyor belt with DELRIN slat belt, approx. 2900 mm long and 100 mm wide, including drive part and return part.
- Transport wheel with supported centring rollers
- Smoothing roller separately driven

### 2.5.4 Transport system ESF1020:

- Conveyor belt with DELRIN slat belt, approx. 2700 mm long and 100 mm wide, including drive part and return part.
- Infeed wheel with counter guides
- Transport wheel with counter guides and supported centring rollers
- Vacuum smoothing roller for smoothing the labels on the containers
- Discharge guides

### 2.5.5 Container discharge:

- Container discharge onto the conveyor belt

## 2.6 Labelling station

- Label dispenser, adjustable in height
- Drive of label web by servomotor
- Unwinding and rewinding of label web by speed controlled drives

## 2.7 Electrical installation

- Siemens touchscreen, type MP377
- Size-related data for at least 100 sizes can be maintained on the memory card.
- Electrical installation integrated in the machine base (ESF1015, ESF1020)
- Electrical installation integrated in the attached control cabinet (ESF1001)

Machine type	ESF1001, ESF1015, ESF1020	Technical Specification ESF6070
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### 3. Technical data

#### 3.1 Electrical design

##### 3.1.1 Programmable logic control

- Siemens, type S7

#### 3.2 Controls and monitors

##### 3.2.1 Monitors with display on the operating terminal

- System fault
- Protection switch triggered
- Overload transport wheel or main drive
- Emergency switch actuated
- Positioning time elapsed / exceeded
- Cover open
- Label web torn
- Overload container rotation (ESF1015, ESF1020)
- Monitor container registration
- Label web not positioned
- End of label roll
- Machine speed too high
- Container shortage at infeed (ESF1015, ESF1020)
- Container build-up at discharge (ESF1015, ESF1020)
- Safety circuit not activated
- Dispenser controller not ready
- Dispenser after-run too short
- Fault: stop signal at dispenser
- Change PLC CPU battery
- Fault operating terminal

##### 3.2.2 Input of size dependent machine and process data

- Machine capacity
- Vacuum smoothing roller air blowing (ESF1020)
- Rotation speed of containers (ESF1015, ESF1020)
- Dispenser parameters
- Spacing speed (ESF1001)
- Print checking (option)
- Printing time hot foil printer (option)

Machine type	ESF1001, ESF1015, ESF1020	Technical Specification ESF6070
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### 3.2.3 Electronic dispenser control

- The electronic dispenser control has a memory for the label length and regulates the label web transport according to the length of the label being processed
- Two label-related system for positioning the labels are available -  
for paper labels: photoelectric eye  
for transparent labels: ultrasonic label sensing  
for transparent and paper labels: ultrasonic label sensing

### 3.2.4 Programmed label length (reference run)

- The label length is also entered as a basic value and ensures that even if labels are missing on the label web, each label is dispensed at the precise position. This way double labelling is avoided and complete and precise processing on all printing, control and checking stations is ensured.

### 3.2.5 Equipment for repetition of the labelling process (option ba ESF1015)

- Automatic vacant position detector (ALE) to prevent a machine stop, if a missing label is detected on the label web by the following checking stations of the label dispenser, including consecutive fault control. After the missing label detected by the ALE has reached the dispensing edge, the transport wheel is stopped, an additional labelling process triggered and the transport wheel is automatically started again, thus reducing the machine output, but preventing containers from being rejected due to missing labels.

## 3.3 Type designation of printing and checking units (option)

Description	Type	Make
Hot foil batch number printer (foil: black colour)	Super Compact 50/30 - FRO 305 m	Allen
Thermal transfer printer	NX2	Allen
Vision system	VisioRead BW	Vision Automation
Packaging control system	ARGUS wt30	Laetus
Camera for simultaneous inspection of batch/batch number, expiry date etc.	iCAM 080PAL	Laetus
Label code camera for pharmacode	2D-Cosi	Laetus
Label code reader for bar codes	LLS	Laetus
Label code camera for bar codes	COCAM 700	Laetus
Label code reader for pharmacode "lengthwise + crosswise" (not red code)	CLV	Sick
Colour sensor to detect colour characteristics on containers	CS	Sick
Luminescence scanner	LUT 3-650	Sick

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#### 4. Requirements for self-adhesive labels and label web

##### 4.1 General requirements

- |   |                             |  |
|---|-----------------------------|--|
| - Gap between labels:                   | min. 2 mm                   |  |
| - Material thickness of paper labels:   | approx. 60 g/m <sup>2</sup> |  |
| - Material thickness of plastic labels: | min. 0,036 mm               |  |
| - Label height:                         | 15 - 80 mm                  |  |
| - Label length:                         | 20 - 150 mm                 |  |
- 
- |   |                  |                   |
|---|------------------|-------------------|
| - <u>Tolerance values for label production:</u> |                  |                   |
|   | <u>crosswise</u> | <u>lengthwise</u> |
| - Label print to label print                    | ± 0,1 mm         | 0,25 mm           |
| - Label print to die cut edge                   | ± 0,25 mm        | 0,5 mm            |
| - Die cut edge to die cut edge                  | ± 0,15 mm        | 0,25 mm           |
| - Die cut edge to label web edge                | ± 0,5 mm         |                   |
| - Width of label web                            | ± 0,5 mm         |                   |
- 
- The labels have to consist of one piece all the time.
  - Rectangular labels with rounded corners are standard. The label material consists of a single layer of plastic or paper and is connected with the label web over the whole area. Other types of labels have to be checked for their processibility!
  - The labels have to peel off the label web, when the label web is drawn over a round material with a diameter of 3 mm. The belt wrap of the label web is 180°.
  - There must be no residues of adhesive between the labels as well as on the rear side of the label web. Such residues of adhesive cause the risk that the labels on the label roll stick together with the rear side of the label web and that they get pulled off during the unwinding process. Besides, sediments might build up on the deflection rollers and the separation edge and could then cause malfunctions.
  - The label web must not be die cut. The tearing resistance of a die cut label is perhaps not sufficient.
  - At a tension load of 15N per cm of the label web width the extension of the label web must not exceed 1%. A lengthwise increase of the label web during advance of the label belt deteriorates the positioning accuracy of the print applied by the printing unit.
  - The type and quality of the label web should remain constant in order to minimise adjustment works which are required because of the material characteristics. This should also be considered especially, if the material is purchased at various suppliers.
  - The label rolls should be wound up firmly and steadily enough. Handling label rolls which are not wound up tightly enough is more difficult and the label web can become wrinkled during the unwinding process.
  - Splices in the label web should be avoided as far as possible and must only occur on the web alone, i.e. between the labels. The adhesive tape must only be applied to the rear side of the label web. The tolerance values for label production have to be adhered to.
  - Recommendation for processing: At 10°C to 30°C and a relative air humidity of 50 %.



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## 4.2 Additional requirements on the control of label advance

### 4.2.1 Control of label advance by light sensor

- A light sensor is mainly used for paper labels.
- This label material must have a distinct transparency difference between label and label web. The gap between the labels is used in this case for control.
- There must be no imprint or water mark on the web in the gaps between the labels.
- Joints should be made with transparent adhesive tape, otherwise the adhesive tape must not protrude into the gap between the labels.

### 4.2.2 Control of label advance by capacitive sensor

- When a capacitive sensor is used, even labels without a control mark can be processed
- The imprint and optical transparency is irrelevant as the sensor registers the difference in material thickness between the label web only and the label web together with the label. This registration is done by using a capacitive measuring principle (The change of an electric field is evaluated.).
- Total thickness of the label material max. 0,2 mm
- Material thickness at splice position: max. 0,2 mm
- Material thickness label: min. 0,045 mm  
If the label height is less than 24mm, the sensitivity of the sensor is lower. The a.m. material thickness is perhaps not sufficient.
- Thickness of applied printing ink: max. 0,005 mm
- Relative permittivity of the label material: min. 2,5
- The complete length of the label has to adhere to the label web.
- An uneven (wavy) label web can impair the function.
- Labels and label imprint must not have any electrically conductive substances.
- Label splice positions must be located under the label.
- The adhesive tape used for the joint must not protrude over the edges of this label and should be as thin as possible.
- Switching errors might occur at the splicing positions!

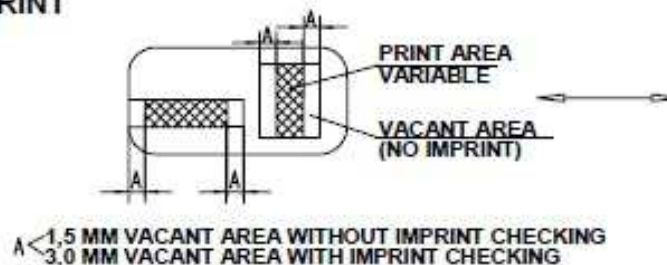
### 4.2.3 Control of the label advance with an ultrasonic sensor

- If an ultrasonic sensor is used, labels without additional eye marks can be processed, too. The print as well as the optical transparency are arbitrary because the sensor detects the different material thicknesses of the single label web and the label web with label. Labels and label imprints may contain electrically conductive components.
- Total thickness of the label material: max. 1,0 mm
- Thickness of material at the splicing position: max. 1,0 mm
- The label web has to lie against the guide component of the sensor with a slight tension to achieve a high indexing precision. An uneven (e. g. corrugated) label web can affect the functioning.
- Label splicing positions must be below the label. The adhesive strip used for the splicing must not protrude over the edges of this label and should be as thin as possible. Faulty operations at splicing positions cannot be excluded!

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#### 4.3 Requirements for the use of imprint checking stations

##### BATCH IMPRINT

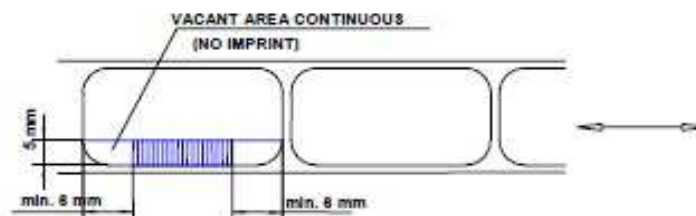


- If a variable label print is designed, the requirements for the corresponding checking stations will have to be considered in addition.

#### 4.4 Requirements for the use of a luminescence scanner

- The container to be labelled and the label web must show no luminescence.
- The label needs to have a continuous, luminescent stripe in transport direction with a width of at least 15 mm. A luminescence on the whole label area is even better. If transparent plastic labels are used, the luminescent coating can also be on the rear side of the labels, e.g. in the adhesive. However, the luminescent coating must not be covered by prints on the labels, e.g. coloured fields. The degree of luminescence has to be at least 6 according to the Laetus luminescence scale.
- If the degree of luminescence is more than 7, the width of the luminescent area can be less than 15mm. The necessary area can only be determined during trials.
- The luminescence of labels (especially of transparent plastic labels) can be reduced when the labels are applied to the containers. If possible, the degree of luminescence should be checked on a labelled container.
- The luminescent coating has to be abrasionproof enough, so that it is not transferred to the smoothing roller or the container guide rollers.


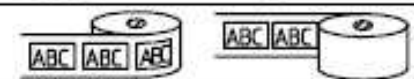

#### 4.5 Requirements for the use of code readers



- If a code is designed, the requirements for the corresponding code reader will have to be considered in addition.

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## 5. Machine data

ESF		1001	1015	1020
<b>Cylindrical containers</b>				
Min. container diameter	(mm)	16	16	16
Max. container diameter	(mm)	160	86	60
Min. container height	(mm)	35	35	35
Max. container height	(mm)	320	240	200
<b>Rectangular bottles</b>				
Min. container length	(mm)	30		
Max. container length	(mm)	160		
Min. container width	(mm)	30		
Max. container width	(mm)	200		
Min. container height	(mm)	35		
Max. container height	(mm)	320		
Set output (Qest.) according to DIN 8743	(pc./h)	12.000	21.000	30.000
Min. label height	(mm)	15	15	15
Max. label height	(mm)	80	80	80
Min. label length	(mm)	30	20	20
Max. label length	(mm)	150	150	150
<b>Label roll</b>				
Core diameter	(mm)		76	
Max. outside diameter	(mm)		400	
Winding direction - ESF1001/1015 (Label web wound with labels on the inside or outside of the roll - text end first)				
Winding direction - ESF1020 (Label web wound with labels on the inside or outside of the roll - start of text first)				
Winding direction when the labelling machine is linked to a ESE9752 label splicer (only with labels on the outside)				
Min. distance from container bottom to label	(mm)	2	2	2
Max. labelling height (from bottom edge of container to upper edge of label)	(mm)	105	90	130
Max. tray width at the discharge single lane	(mm)	300	-	-
Connected load machine	(kw)	~ 2	~ 2,5	~ 2,5
Working height	(mm)	~ 900 ± 30		
Noise level <sup>1</sup>	dB(A)	~ 74	~ 76	~ 77
Vacuum (at 150 mbar abs.) <sup>2</sup>	(l/h)	-	-	~ 40000
Compressed air connection	(bar)	~ 6		
Compressed air consumption <sup>3</sup>	(l/h)	~ 500	~ 1800	~ 1200
<b>Machine dimensions</b>				
Length	(mm)	~ 1300	~ 2900	~ 2700
Width	(mm)	~ 1550	~ 1500	~ 1250
Height	(mm)	~ 1650	~ 2000	~ 2000
Net weight of machine	(kg)	~ 350	~ 750	~ 800

<sup>1</sup> average value of the machine series, measured according to DIN 45635 Part 1 and part 28 during production conditions

<sup>2</sup> Consumption values in l/h as per DIN/ISO 2533

<sup>3</sup> Consumption values in l/h as per DIN/ISO 2533, incl. hot foil batch number printer

Machine type	ESF1001, ESF1015, ESF1020	Technical Specification ESF6070
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Subject to technical modifications

## 6. Capacity\*

- The following capacity indications are approximate values and based on the use of DIN containers as well as the standard machine version.

ESF		1001	1015	1020
Container diameter in mm	Label length in mm	Max. capacity in pcs/h (infinitely variable)		
16	40	6.000	18.000	24.000
22,5	60	12.000	18.000	30.000
24	45	12.000	21.000	30.000
30	45	12.000	20.000	26.000
46	100	10.000	10.000	20.000
68	120	8.000	7.000	-
86	120	6.000	6.000	-
95	150	4.000	-	-

\* depending on the machine equipment (e.g. thermal transfer printer, vision system, reject discharge), a capacity reduction might occur - capacity testing is required!

## 7. Options

- Extension of the labelling height to max. 160 mm (ESF1001, ESF1015)
- Hot foil batch number printer
- Ink ribbon cassette and galley for hot foil batch number printer
- Thermal transfer printer with accessories  
(Reference value calculation - capacity range: only after receipt of the original labels with the layout of print)
- Label code reader to inspect the bar code - type pharmacode -
- Station for checking "batch imprint on label" by photocell
- Vision system to inspect the imprint data on the label  
(Reference value calculation - capacity range: only after receipt of the original labels with the layout of print)
- Luminescence scanner to check that the container has been labelled
- Equipment for automatic removal of labels with faulty print/code using a vacuum wheel and a take-up reel (ESF1015)
- Equipment for avoiding unlabelled containers when a label is missing on the label web (ESF1015)
- Reject discharge (ESF1001)
- Reject station (ESF1015)
- Machine data logging system (MDE) for documentation of production data, incl. printer
- Wire numbering
- Adaptation of the supply voltage with mains isolation transformer
- Qualification package 1
- Qualification package 2
- Qualification package 3

Machine type	ESF1001, ESF1015, ESF1020	Technical Specification ESF6070
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## 8. Abbreviations

- AISI American Iron and Steel Institute
- CPU Central Processing Unit
- DIN Deutsches Institut für Normung, (≅ German Institute for Standardization)
- ESA Labelling machine for self-adhesive labels on bottles
- EN Europäische Normung (≅ European Standardization)
- IEC International Electrotechnical Commission
- MDE Machine data logging system

Subject to modification

