TOSS®

INDUSTRIEPRODUKTE

Spare parts and accessories for packaging machines

Our sites

Alten-Buseck (Giessen)

Freital (Dresden)

Preface

This catalogue contains information based on the experience we have gained over many years. Unfortunately, some competing suppliers have reproduced part of our publications for their own products. We leave it to you to form your own judgement about such behaviour.

The present catalogue contains component parts, assemblies and sub-assemblies used for processing thermoplastic films. For over 50 years we have been working on the improvement of the methods used in this field.

In this catalogue we have compiled all information needed to make a correct selection of replacement parts and for new designs. For clarity's sake the issues are treated briefly. If you require any further information, please do not hesitate to contact us.

Although film packaging machines obey only a few fundamental principles, the practical realisation and arising problems may be multi-faceted.
For this reason we offer detailed technical consulting on individual fields of application.

Our

EXPERIENCE

of yesterday

and the

PERFORMANCE

of today

is the

PROGRESS

of tomorrow!

Table of contents

How to place an order clearly and correctly?

stating: dimensions and material names
drawings and/or drawing numbers
article numbers

Your contact person

sales department Germany: phone: +49 (0) 64 08 / 90 91 - 126 / -147

sales department abroad: phone: +49 (0) 64 08 / 90 91 - 125 / -165

Which way to choose?

letter: TOSS GmbH & Co. KG
Dresdener Str. 4
35418 Buseck
phone: +49 (0) 64 08 / 90 91 -0 (reception desk)
facsimile: +49 (0) 64 08 / 43 55
e-mail: info@toss-gmbh.de
internet: http://www.toss-gmbh.de

We are at your disposal from Monday - Thursday from 8:00a.m. to 5:00 p.m. and Friday from 8:00 a.m. to 2:30 p.m.

Thermal impulse sealing

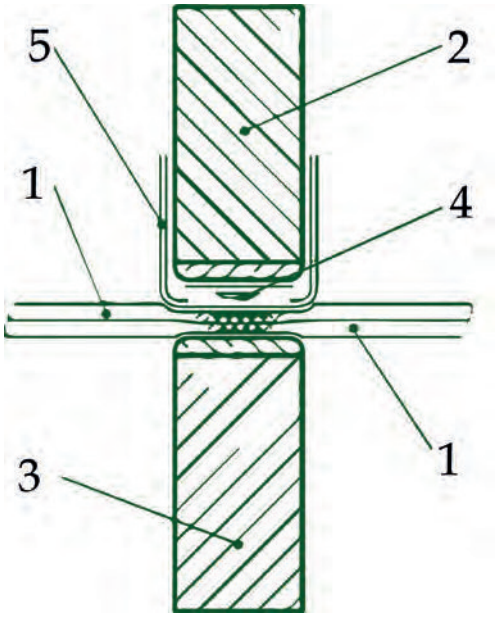
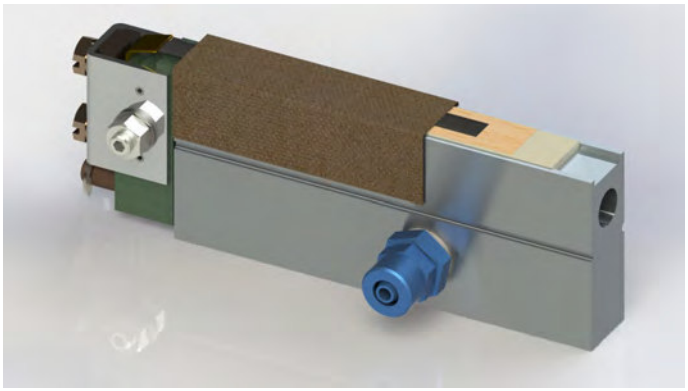


Fig: Thermal impulse sealing



Picture: Impulse bar

Two film layers (1) are placed between two jaws, a seal bar (2) and a counter jaw (3), which press them together. The heating element (4) is provided with a thermal and electrical insulation on the support's side and a non-stick coating (5) on the film's side. The counter jaw is also thermally and electrically insulated. An impulse of electrical current is passed through the heating element causing it and the film layers beneath it to heat. The heat causes the film layers to plastify, fusing them firmly together (= sealing). The most important influencing variables for this process are:

- **pressure**
- **temperature** and
- **time**

The sealing process is generally followed by a cooling time during which the plastified material is allowed to cure to its full strength.

The most important factor is the strength of the seal achieved by using this method. In contrast to the sealing of metallic materials, in this method only the transition area from the unheated zone to the heated zone has an influence on the result.

The more sudden the transition is made the worse will be the result. The pressure applied to the sealing jaws also forces the material out of the seal area. The softer the transition the stronger the seal.

This displacement effect, which in the strict sense is an unfavourable effect, is turned to account in the cutting seal method. The heating element is given a profile which forces the film material out of the seal area until the material is completely separated. The figures on page 13 show an overview of the different profiles and their respective sealing results.

Thermal impulse sealing (continued)

In principle, the impulse sealing method offers the widest range of possibilities which can be varied to achieve the desired results. However, this may not be necessary for all applications, or not possible due to high machine speeds.

In most cases the heating elements have a straight-lined design. But also even contours may be possible (form sealing bands). The resistance along the contour is constant to achieve the necessary heating.

Adherence to the sealing parameters is decisive for the final result. While this is relatively easy as regards pressure and time, keeping the necessary temperature of the heating element poses a problem. When using low-cost installations or working at low speeds a time control is still used today.

A defined flow of current is passed through the heating element for a set time. However, the actual temperature is not measured. Even so, this method provides satisfactory results.

Today, nearly all modern machines are equipped with an electronic temperature control. This control uses the heat conductor's characteristic of changing its electrical resistance in accordance with the temperature. This configuration eliminates the need for an additional sensor.

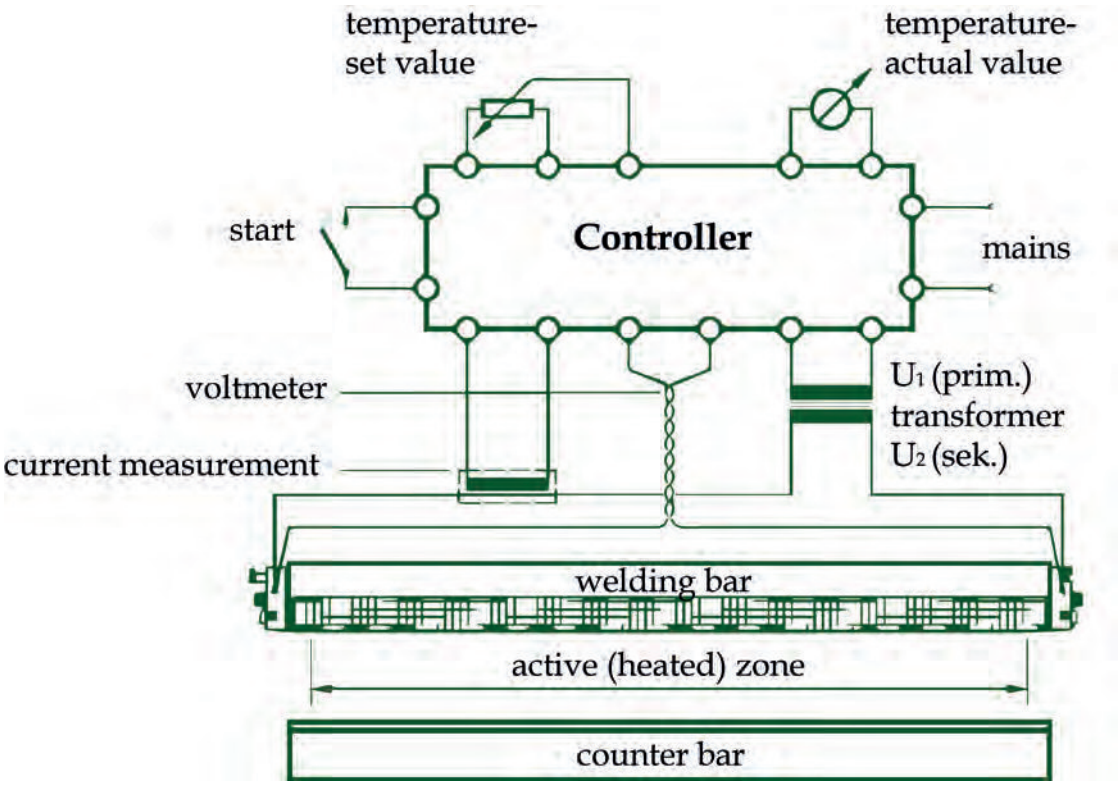


Fig.: Control circuit

Thermal impulse sealing (continued)

The electronic temperature control is used to produce sealing seam in a constant quality. The use of a temperature control is advantageous, especially when working with thick film materials, as the temperature can be kept constant over a preset period of time.

The method depends on the thermal conductivity of the film materials. If the heating of the sealing area took place slowly, the time control would lead to an overheating of the film which is in direct contact with the heating band.

If a temperature control is used, however, all materials will be heated up to the necessary temperature level only. The result of it is a longer service life as shown in the following diagram.

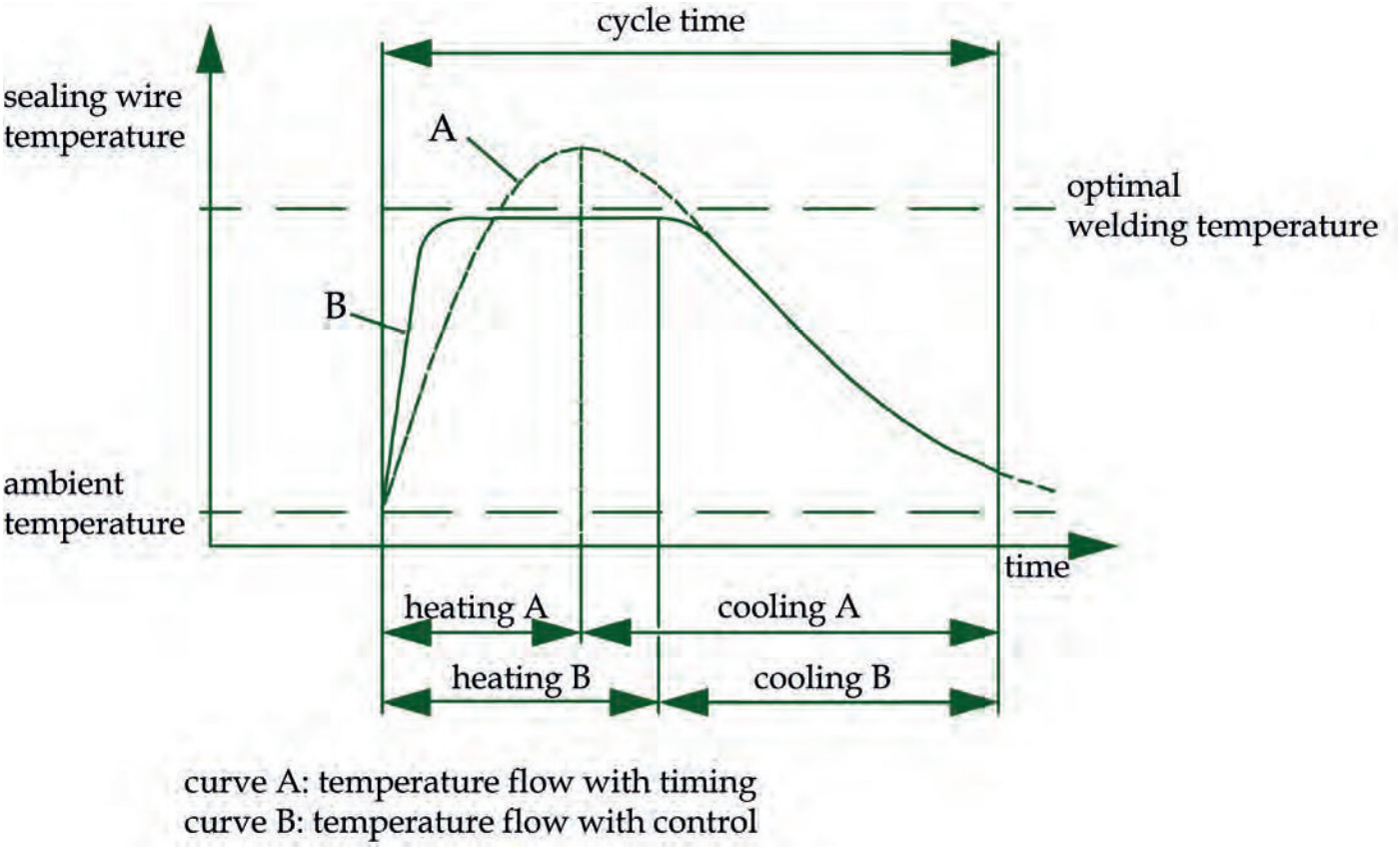


Fig.: Cycle impulse sealing method

Thermal contact sealing

Unlike the previously described method the temperature of the sealing tools is kept at a constant preset level (permanent heating).

It is true that this method is not suitable to process all types of film materials optimally, but in many aspects it is superior to the impulse sealing method. It is especially suitable for multilayered films (laminates) which can be processed on heavy-duty machines at high speeds.

Unlike the film sealing, only the layers facing each other are fused in this method. Unilayered films are mostly sealed-cut with a permanent heating. Here, too, using different speeds. Heating of the tools is carried out indirectly via heating cartridges.

In flat sealing the surface of the tools is often shaped for the optimum effect or for reasons of tightness.

All in all, permanently heated tools have a simpler design and are more robust in service. A disadvantage of this method is the high energy consumption and the unavoidable heating of neighbouring machine parts. In practice, the size of the tools is limited by possible.

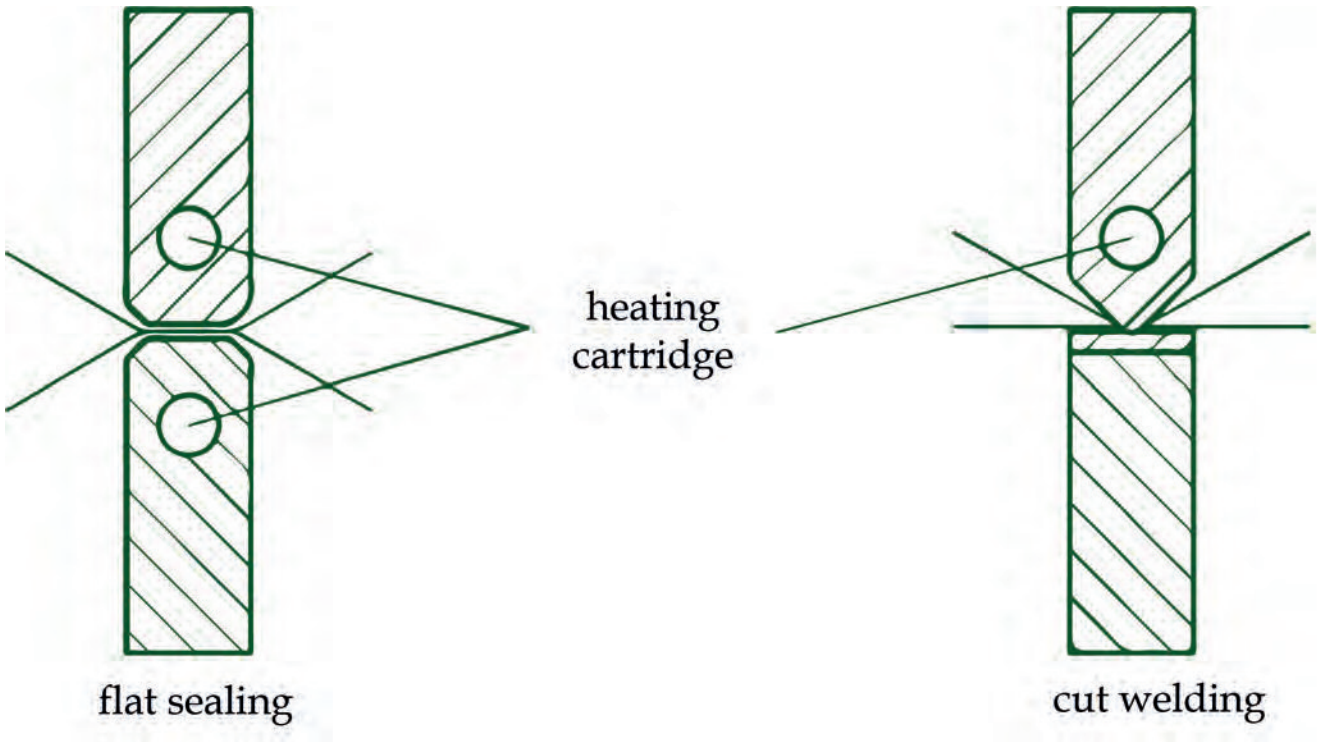


Fig.: Thermal contact sealing

Continuous sealing

The cycle times of film-processing machines have been constantly increased since the beginning of their development. The intermittent working method especially in longitudinal sealing on bag forming, filling and sealing machines represented a restriction in performance which made it necessary to develop new continuous working methods. Regardless of the speed, it is possible to produce sealing seam of any length using a relatively short band length. The working principle corresponds to the impulse sealing method described above. While the cycle is executed at a "fixed point" between fixed sealing bars with a heating up and cooling down process, in the continuous method the film passes through heated-up and cooled-down areas. Depending on the film type different design types are used in praxis:

Roll sealing

The film layers are in contact with circulating bands. The film layers are pressed together from the inside by a heated and a cold jaw pair. The circulating bands are driven at the same speed at which the film is transported. Consequently, no relative motion exists between the band and the film. The jaw pairs move along the inside of the band and must therefore be made of an appropriate material. With this device all sealing films can be fused. The jaw pairs and especially the circulating bands are wear parts, as they are exposed to continuous abrasion.

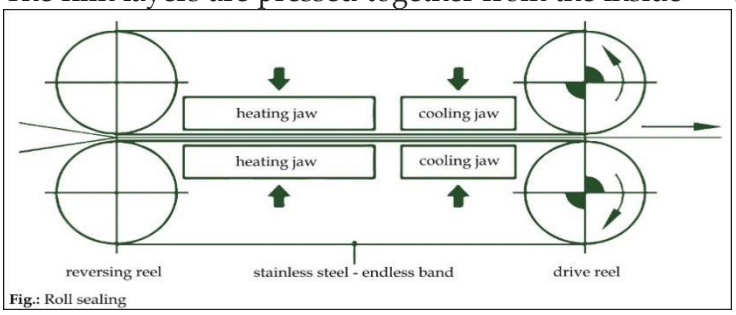


Fig.: Roll sealing

Hot air sealing

In this design type the heat is transmitted by heated air, i.e. it is contactless. The cooling zone is formed by a cold air nozzle. The mere contact of the film layer will be sufficient to perform a sealing. The system is almost free from wear and thus very easy to maintain. However, the working speed decreases as the film thickness increases. This is due to the limited heat transmission by way of hot air.

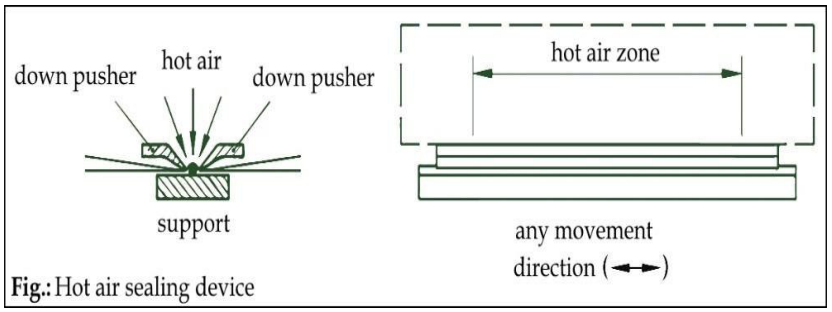


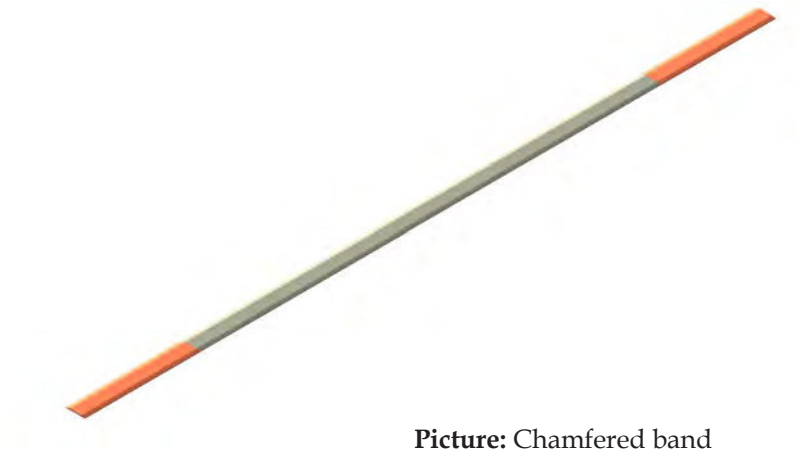
Fig.: Hot air sealing device

Sealing method	Film type (selection)				
	PE	PP	PA	PE/PA	Lamin. alum.
Impulse	+/+	+	O	+	O
Permanent heating	--/+	O/+	--	+	+
Roll sealing	+	+	+	+	+
Hot air	+	O	--	+	O

+/+ = sealing, separation + = very suitable O = limited suitable -- = unsuitable

Operating principle

During thermal-impulse method sealing zone is directly heated by a heating conductor. Profile shape, dimensions and material are selected in such a way that an optimum sealing result in combination with the tool will be achieved.



Picture: Chamfered band

Material

Different alloys, featuring specific characteristics, are available. These will have to be taken into account during designing process of a sealing unit.

Low resistant heating conductor alloy (=l.r. resp. Alloy 20K)
Most dimensions and profile cross sections are available from this material, with characteristics as follows:

- suitable for electronic temperature control
- tapered band is available from this material only
- bending-resistant, high rigid texture

High resistant heating conductor alloy (=h.r.)
This term means an exclusively nickel-chromium based alloy for a preferential use in manual impulse sealing units.

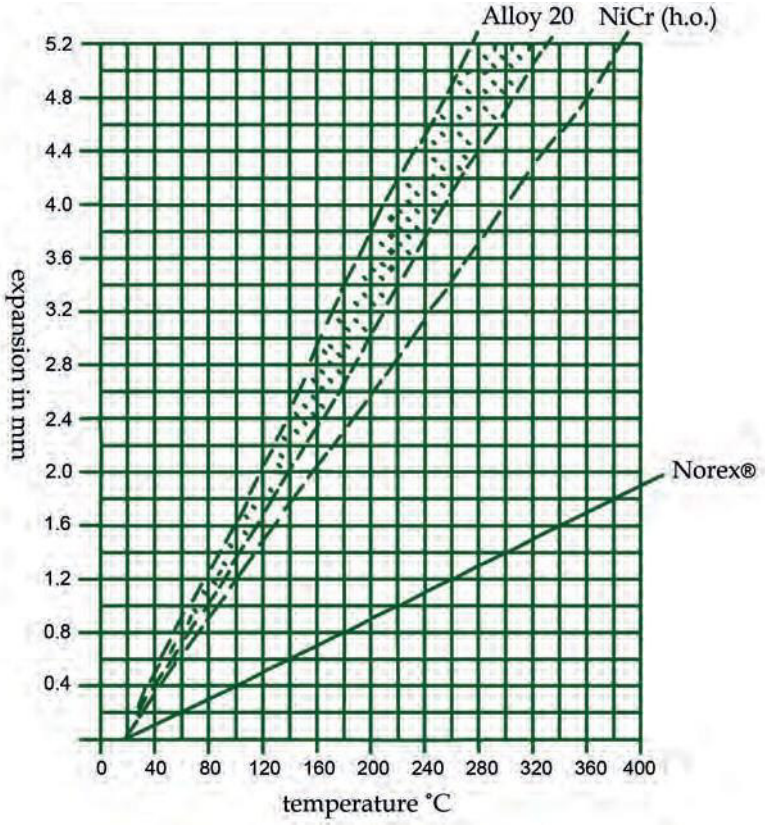
- higher specific resistance
- not suitable for electronic temperature control
- very soft texture

NOREX® heating conductor alloy
Like all metals, heating bands tend to expand during heating processes. This expansion will have to be compensated by appropriate clamping devices, as otherwise damage or premature band breakage will occur.
Clamping devices cannot always be used due to e.g. limited space conditions. Clamping is principally not possible when long-dimensioned form sealing bands are used. Norex® heating bands are the solution for such applications. Due to a more limited thermal expansion compared to other materials, clamping devices become unnecessary, or a very much simplified form can be used.

Besides, NOREX® offers characteristics as follows:

- suitable for electronic temperature control
- lowest specific resistance compared to above mentioned alloys
- soft texture

Physical properties of established heating element alloys



Expansion in length per 1 m

Specific resistance at 20 °C:	TOSS Alloy 20 (L.R.)	$0.88\Omega * mm^2 * m^{-1}$
	NiCr (H.R.)	$1.12\Omega * mm^2 * m^{-1}$
	Norex®	$0.46\Omega * mm^2 * m^{-1}$

Temperature coefficient of resistance (mean value between 20 - 200 °C):

TOSS Alloy 20 (L.R.)	$+0.8....1.1 * 10^{-3} 1/_{Deg.}$
NiCr (H.R.)	$+0.05 * 10^{-3} 1/_{Deg.}$
Norex®	$+3.5 * 10^{-3} 1/_{Deg.}$

Profile shape

Profile shape is affecting pressure distribution within sealing zone. Depending on the shape, certain effects can be created, such as flat seals or cut seals. Available standard profiles with their preferred applications are listed below.

Which sealing seam is achieved when using:

chamfered band

- these types of band produce a sealing in accordance with the used band width

hollow band

beaded band

- like t-profile, but softer separation

double-seam band

- two parallel welding seams
- increased security of vacuum- and liquid packages

round wire

- separation
- narrow seam

semicircular profile

- separation
- seam is somewhat wider
- side forming and
- fastening possible

oval profile

- separation like with semicircular profile
- seam is somewhat wider
- for back welding

t-profile

- this form produces sharp seam separation, the sealing of two sides of the seam depending on the width of the band

Standard heating band cross sections / types

Form	designation	dimensions in mm		resistance		application	remark
		width	thickness	low	high		
	flat band	1 - 25	0.1 – 0.5	x	x	normal sealing	heavy seam edge weakening
	chamfered band	2 – 15	0.1 – 0.5	x		normal sealing	little seam edge weakening
	hollow band	2 – 12	all thickness	x	x	vacuum packages	little bar pressure needed
	double seam band	4, 6, 8 and 10	0.15 – 0.25	x	x	liquids	particularly strong seam
	beading band	2, 4, 6, 8 and 10	0.10 – 0.25	x	x	cutting sealing	normal separation in the seam
	sealing effect band	6 - 15	0.10 – 0.20	x	x	composite sealing	seam profile similar to grooved sealing
	super band	6 and 8	n/s	x		normal sealing	smooth transitions between seams
	t-profile	2.3; 2.8; 4 and 6	on request: skewed/hollow	x		cutting sealing	sharp separation in the seam
	triangular profile	1.8	0.8	x	x	cutting sealing	for thick films, best seam
	cutting wire, one side	1.8; 2.3 and 3.4	-	x		seam / cutting	one-sided cutting sealing
	semicircular profile	1.5 x 0.75 and 1.75 x 0.87		x		cutting sealing	for thick films
	oval profile	1.5 x 0.75 and 2.5 x 1.40		x		contact sealing	very narrow, strong seams
	cutting wire	Ø 0.3 - 2		x	x	cutting sealing	narrow seam, less strength
	FILOFLEX	Ø 0.3 - 2		x		cutting sealing	better durability, high flexibility
	twisted	Ø 0.7 - 2		x	x	perforated seam	tear-off seam easy to produce
	contoured bands	all forms and dimensions		x		contoured sealing	for impulse and permanent heating
	continuous bands	all widths and lengths		-	-	continuous seams	with all coatings

All bands are also available in specified lengths with copper-plated or silver-plated ends including all special connections such as plug-type and screwed parts, eyes, etc.
Continuous steel bands are available in all required lengths and widths, PTFE coatings for every application.
We also produce complete sealing bars, impulse units, special-purpose sealing systems.
In addition, we are able to deliver all necessary insulating materials for sealing systems as well as any **PTFE coating** required.

Super impulse band

The super impulse band is especially suitable for tight and strong sealing seams, e.g. on liquid packages, vacuum packages, heavy packages, for polyamide films which are difficult to seal, etc.

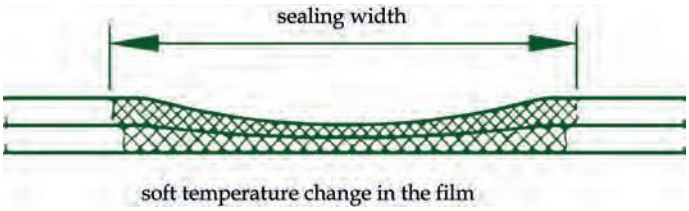


Fig.: Cross section sealing seam with super band

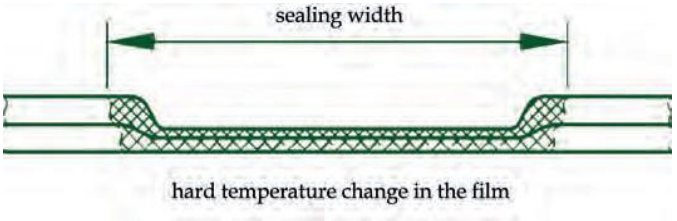
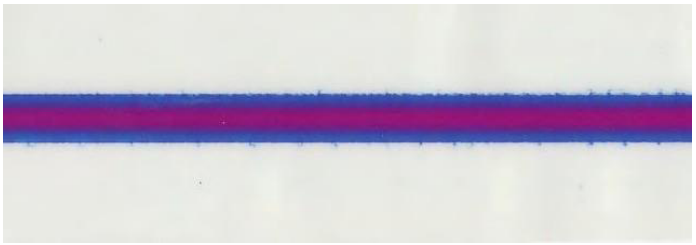
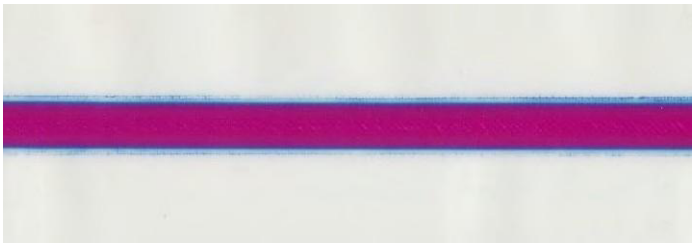


Fig.: Cross section sealing seam with flat band

Available in lengths of up to approximately 1.5 m and sealing widths of approximately 2 to 5 mm.



Picture: Temperature allocation super band



Picture: Temperature allocation flat band

Deliverable in lengths up to 1.5 m length. Weld width of about 2 - 5 mm.

Dimensions

Adjustment to thickness of to be sealed material is normally managed by dimension of profiles.
Determination is made according to experience values. The principle is as follows:

Thin film —► small profile cross section
Thick film —► large profile cross section

Due to its mass, a large profile cross section is cooling down slowly. As in most cases cooling process requires considerable more time than heating process, a limited dimensioning is always reasonable.

Flat bands, hollow bands, chamfered bands, beaded bands, low resistance, per meter

Dimensions	mm²	mΩ/m
1.00 x 0.15	0.150	5867
1.00 x 0.30	0.300	2933
1.50 x 0.15	0.225	3911
1.50 x 0.30	0.450	1956
2.00 x 0.10	0.200	4400
2.00 x 0.12	0.240	3667
2.00 x 0.15	0.300	2933
2.00 x 0.20	0.400	2200
2.00 x 0.25	0.500	1760
2.00 x 0.30	0.600	1467
2.00 x 0.40	0.800	1100
2.20 x 0.12	0.264	3333
2.20 x 0.20	0.440	2000
2.25 x 0.40	0.900	978
2.50 x 0.15	0.375	2347
2.50 x 0.20	0.500	1760
2.50 x 0.25	0.625	1408
2.50 x 0.30	0.750	1173
2.50 x 0.35	0.875	1006
2.50 x 0.40	1.000	880
2.50 x 0.50	1.250	704
3.00 x 0.08	0.240	3667
3.00 x 0.10	0.300	2933
3.00 x 0.12	0.360	2444
3.00 x 0.15	0.450	1956
3.00 x 0.20	0.600	1467
3.00 x 0.25	0.750	1173
3.00 x 0.30	0.900	978
3.00 x 0.35	1.050	838
3.00 x 0.40	1.200	733
3.00 x 0.50	1.500	587
3.20 x 0.10	0.320	2750
3.50 x 0.10	0.350	2514
3.50 x 0.20	0.700	1257
3.50 x 0.25	0.875	1006
3.50 x 0.30	1.050	838
3.50 x 0.35	1.225	718
3.50 x 0.40	1.400	629
4.00 x 0.05	0.200	4400
4.00 x 0.10	0.400	2200
4.00 x 0.15	0.600	1467
4.00 x 0.20	0.800	1100
4.00 x 0.25	1.000	880
4.00 x 0.30	1.200	733
4.00 x 0.35	1.400	629
4.00 x 0.40	1.600	550
4.00 x 0.50	2.000	440
4.00 x 0.60	2.400	367
4.50 x 0.15	0.675	1304

Dimensions	mm²	mΩ/m
4.50 x 0.25	1.125	782
4.80 x 0.30	1.440	611
4.80 x 0.35	1.680	524
4.80 x 0.40	1.920	458
5.00 x 0.10	0.500	1760
5.00 x 0.15	0.750	1173
5.00 x 0.20	1.000	880
5.00 x 0.25	1.250	704
5.00 x 0.30	1.500	587
5.00 x 0.35	1.750	503
5.00 x 0.40	2.000	440
5.00 x 0.50	2.500	352
6.00 x 0.10	0.600	1467
6.00 x 0.12	0.720	1222
6.00 x 0.15	0.900	978
6.00 x 0.20	1.200	733
6.00 x 0.25	1.500	587
6.00 x 0.30	1.800	489
6.00 x 0.35	2.100	419
6.00 x 0.50	3.000	293
8.00 x 0.08	0.640	1375
8.00 x 0.10	0.800	1100
8.00 x 0.15	1.200	733
8.00 x 0.20	1.600	550
8.00 x 0.25	2.000	440
8.00 x 0.30	2.400	367
8.00 x 0.40	3.200	275
8.00 x 0.50	4.000	220
8.50 x 0.15	1.275	690
10.00 x 0.10	1.000	880
10.00 x 0.15	1.500	587
10.00 x 0.20	2.000	440
10.00 x 0.25	2.500	352
10.00 x 0.30	3.000	293
10.00 x 0.40	4.000	220
10.00 x 0.50	5.000	176
11.00 x 0.30	3.300	267
12.00 x 0.10	1.200	733
12.00 x 0.15	1.800	489
12.00 x 0.20	2.400	367
15.00 x 0.25	3.750	235
15.00 x 0.50	7.500	117
15.50 x 0.50	7.750	114
16.00 x 0.15	2.400	367
20.00 x 0.15	3.000	293
20.00 x 0.25	5.000	176
25.00 x 0.15	3.750	235
25.00 x 0.20	5.000	176

special dimensions on request

Cutting wire / special profiles, low-resistance, per meter

Cutting wire Ø	mm²	mΩ/m
0.30	0.0707	12447
0.40	0.1257	7001
0.50	0.1963	4483
0.60	0.2827	3113
0.70	0.3848	2287
0.80	0.5027	1751
0.90	0.6362	1383
1.00	0.7854	1120
1.10	0.9503	926
1.20	1.1310	778
1.50	1.7671	498
2.00	3.1416	357

t-profile	mm²	mΩ/m
2.30	0.8708	1010
2.80	1.0602	830
4.00	1.4194	620
6.00	2.3158	380
Cutting profile single-sided	**mm²**	**mΩ/m**
1.80	0.7364	1195
2.30	0.8224	1070
3.4	1.3173	668
semicircular wire		
1.50 x 0.75	0.8831	996
1.75 x 0.87	1.2020	732
oval wire		
1.50 x 0.75	0.8831	996
2.40 x 1.40	2.6376	334

Filoflex®, low-resistance

Ø in mm	mm²	mΩ/m
0.35	0.0800	11000
0.60	0.2404	3661
0.70	0.3188	2760
0.80	0.4211	2090
1.00	0.6519	1350

Ø in mm	mm²	mΩ/m
1.25	0.9888	890
1.50	1.4426	610
1.60	1.6296	540
2.00	2.2564	390

Flat band, high-resistance, per meter

Dimensions	mm²	mΩ/m
1.00 x 0.15	0.1500	7467
1.50 x 0.10	0.1500	7467
1.50 x 0.20	0.3000	3733
2.00 x 0.10	0.2000	5600
2.00 x 0.125	0.2500	4480
2.00 x 0.15	0.3000	3733
2.00 x 0.20	0.4000	2800
2.00 x 0.25	0.5000	2240
2.25 x 0.20	0.4500	2489
2.50 x 0.10	0.2500	4480
2.50 x 0.125	0.3125	3584
2.50 x 0.15	0.3750	2987
2.50 x 0.20	0.5000	2240
2.50 x 0.25	0.6250	1792
2.50 x 0.30	0.7500	1493
3.00 x 0.10	0.3000	3733
3.00 x 0.15	0.4500	2489
3.00 x 0.20	0.6000	1867
3.00 x 0.25	0.7500	1493
3.00 x 0.30	0.9000	1244
3.00 x 0.40	1.2000	933
3.00 x 0.50	1.5000	747
3.00 x 0.60	1.8000	622

Dimensions	mm²	mΩ/m
3.50 x 0.20	0.7000	1600
3.50 x 0.30	1.0500	1067
4.00 x 0.10	0.4000	2800
4.00 x 0.15	0.6000	1867
4.00 x 0.20	0.8000	1400
4.00 x 0.25	1.0000	1120
4.00 x 0.30	1.2000	933
4.00 x 0.40	1.6000	700
4.00 x 0.50	2.0000	560
4.50 x 0.10	0.4500	2489
4.50 x 0.25	1.1250	996
5.00 x 0.10	0.5000	2240
5.00 x 0.15	0.7500	1493
5.00 x 0.20	1.0000	1120
5.00 x 0.30	1.5000	747
5.00 x 0.40	2.0000	560
6.00 x 0.10	0.6000	1867
6.00 x 0.15	0.9000	1244
6.00 x 0.20	1.2000	933
6.00 x 0.30	1.8000	622
8.00 x 0.10	0.8000	1400
8.00 x 0.20	1.6000	700

Cuttingwire,high-resistance,permeter

Cutting wire Ø	mm²	mΩ/m
0.30	0.0707	15842
0.40	0.1257	8910
0.50	0.1963	5706
0.60	0.2827	3962
0.70	0.3848	2911
0.80	0.5027	2228

Cutting wire Ø	mm²	mΩ/m
0.90	0.6362	1760
1.00	0.7854	1426
1.10	0.9503	1179
1.20	1.1310	990
1.50	1.7671	634
2.00	3.1416	357

Special dimensions on request

Norex® heating element

dimensions flat band	mm²	mΩ/m
3 x 0.2	0.6000	767
5 x 0.2	1.0000	460
6 x 0.2	1.2000	383
8 x 0.2	1.6000	288
10 x 0.2	2.0000	230
12 x 0.2	2.4000	192
15 x 0.2	3.0000	153

cutting wire Ø	mm²	mΩ/m
1.0	0.7854	586
1.2	1.1310	407
1.5	1.7671	260

triangular profile	mm²	mΩ/m
1.8	1.0648	432

Special profiles on request

Contoured bands are available in a thickness of 0.2 mm.

Surface treatment of heating band ends

The heating bands generate the necessary heat to seal the films thanks to their electrical resistance. If the heat dissipation is not constant - as it is the case, for instance, near the connections – the result will be a local overheating. The most frequent cause for a premature band rupture is such overheating.
The surface treatment is applied to reduce the electrical resistance of the connections in order to avoid extreme temperature rises. The methods for the application of the coating and its thickness must be adapted to the heating band cross section which helps prolong the service life considerably. Coatings that are of poor quality or too thin may only serve decorative purposes.

The following methods may be applied:

- **silvering**
  - proven method since the beginning of packaging machinery engineering
  - thickness cannot be controlled, basic resistance is higher than that of copper

- **copper plating**
  - standard, suitable for almost all applications
  - partial copperplating possible (zebra bands)
  - thickness can be controlled depending on indivi dual application

- **copper plating + nickel coating**
  - no corrosion in hostile environments or during long storage periods
  - standard type for contoured sealing bands

- **copper plating + plated gold**
  - excellent bonding at the bar heads, therefore very precise reference and actual temperature values in combination with electronic control units.
  - for best seam quality applications

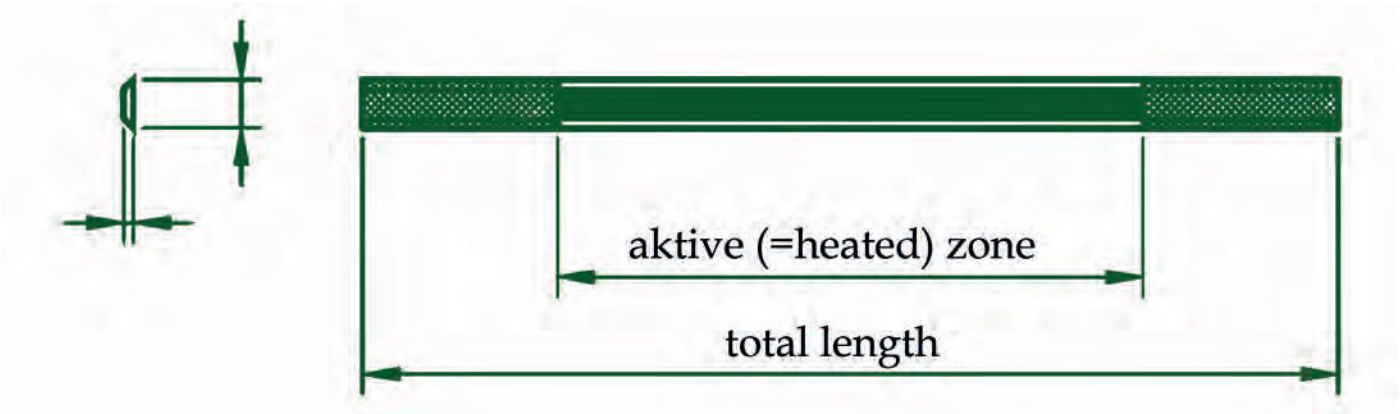


Fig.: impulse band

Contacting

Electrical connection is of crucial importance to sealing quality and service life of the impulse heating element. Being a wear part, a quick and simple replacement depending on requirements must be possible.

Connections

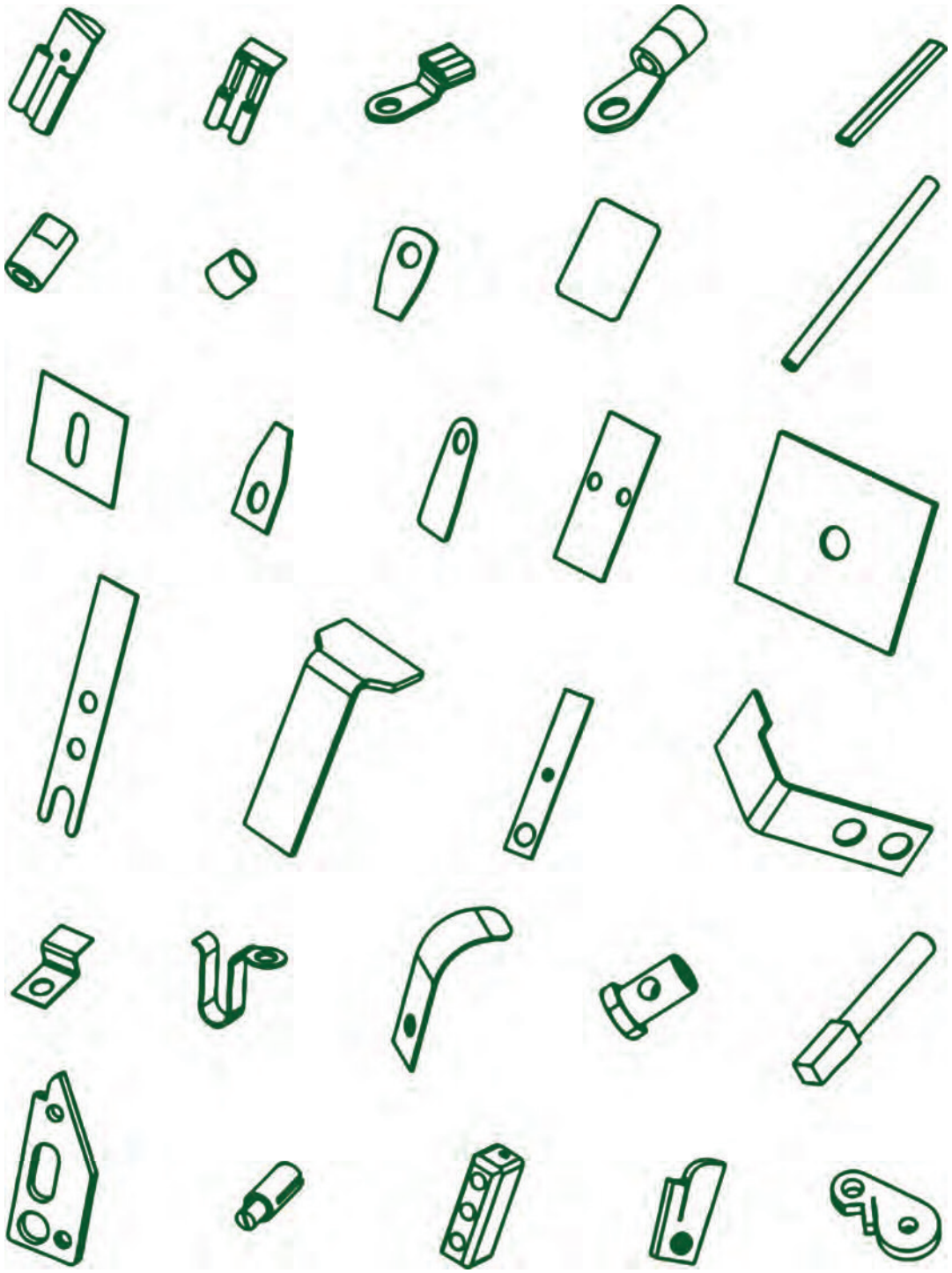


Fig.: examples for terminals

Heating bands in special forms and types

Duo-therm heating bands / type embossing: When sealing gusseted films by the thermal impulse method a problem arises inevitably:
The sealing parameters cannot be set optimally for both the two-layer area and the four-layer area at the same time.
The measures that must be taken then are not suitable for all cases.

As the sealing times and pressures are the same for all areas, the only way to treat films of different thickness is to adjust the temperature.
Duo-therm bands have a smaller cross section for three and four-layers than for two film layers. Consequently, they reach higher temperatures and seal the material securely, while the other areas are not overheated.

Original closing with logo: In the seam area plasticized film allows marking with text, logos or symbols. For this purpose the anvil Silicone strip must be engraved accordingly. Embossed seam shows even small letters with good contrast and readability. The end user can easily identify, that this pouch had been sealed by an OEM or authorised company. Such method is e.g. very popular for packaging bank notes.

Hollow wires: These wires can be used for flat and cut-off sealing. For this purpose the desired profile is rolled by us according to your specifications. The shaping can also be used as guide, e.g. circular arc section. The advantage of this profile is the smaller cross section and the lower electrical current compared to solid profiles. Inside cooling of the heat conductor with compressed air is also possible. Available from Ø 1 mm on.

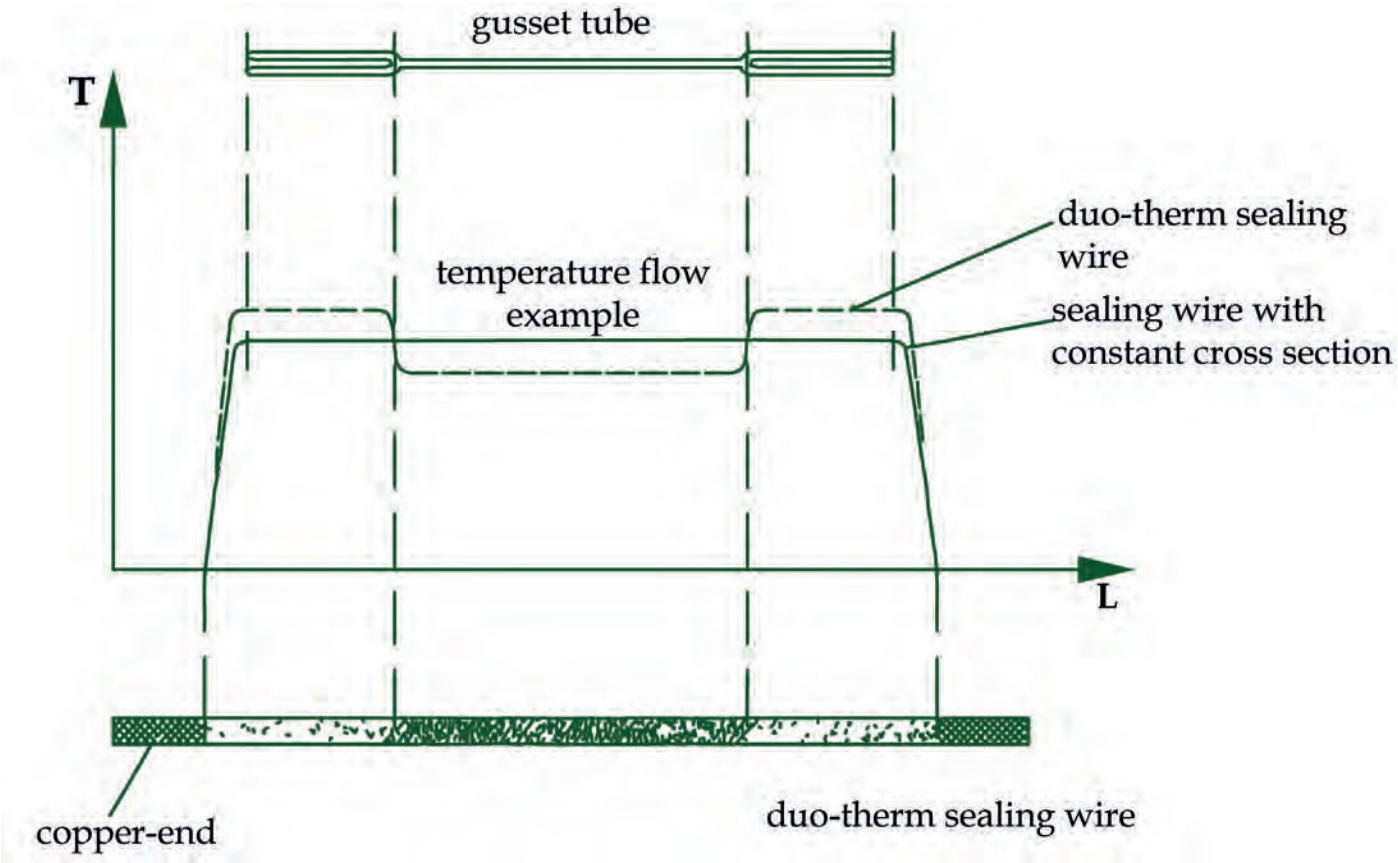


Fig.: sealing of gusset films

Contoured sealing bands

Most applications involving film sealing are limited to straight seams.
Conventional packages such cans and cartons are increasingly being replaced by special bag shapes. In many cases the film bags constitute a lining for the products to be packed which allows appropriate disposal and prevents expensive cleaning. The adaptation of the bag form to the shape of the product to be packed is realised by the contoured sealing method, i.e. the seams are round or rectangular, polygonal or angular.
While high frequency sealing methods are suitable for PVC films, they cannot be used for PE films. The ultrasonic sealing method is partially suitable as it is conditioned by the dimensions of the seam contour.
The heat-contact sealing is an appropriate method for compound film sealing. When processing PE films, however, the seams often do not meet the requirements.

Apart from straight heating bands also contoured sealing bands can be used. The advantages are obvious:

- cost-effective, simple tools,
- in principle, all types of shapes and forms are possible,
- no pre-heating necessary (unlike with permanent heating),
- exact and direct temperature control at the sealing point is possible.

We should be glad to help you in designing countoured sealing bands including the necessary tools.

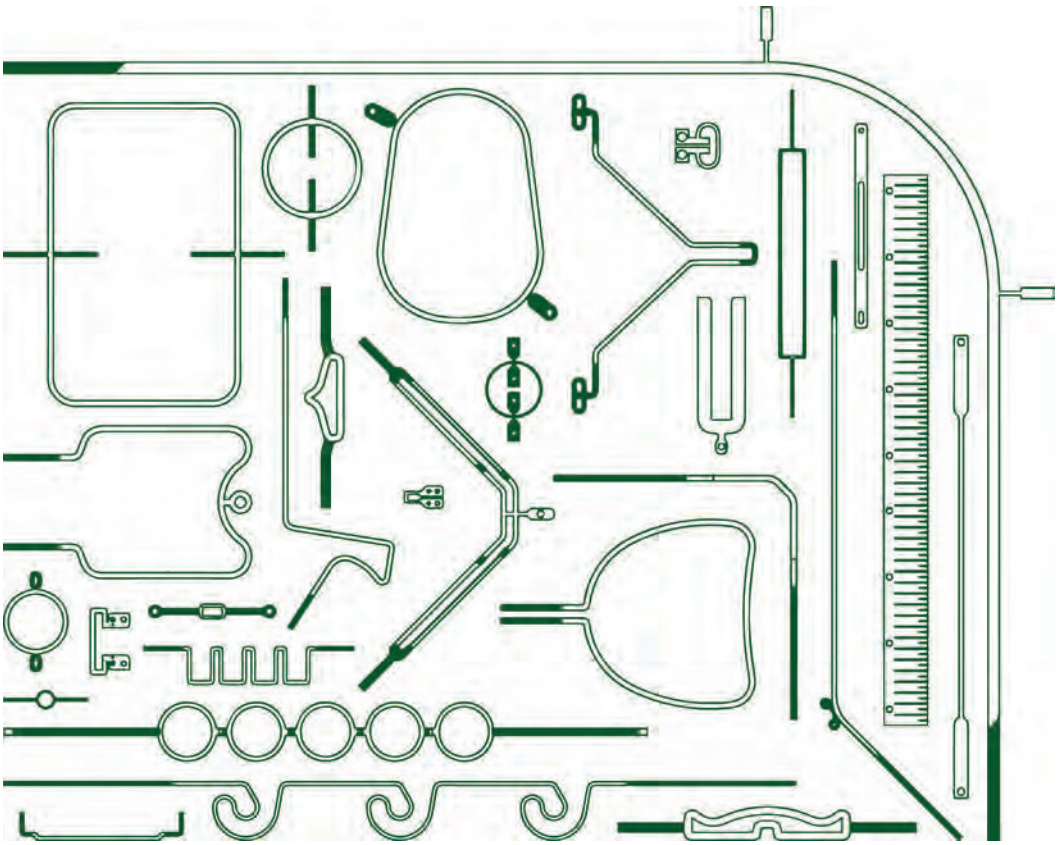


Fig.: examples of contoured sealing bands

PTFE glass fabric films

We offer a wide range of different coating qualities for covers and supports used for film sealing or for general applications where sliding and/or non-stick properties are required.

- on rolls, basic material qualities 0.08 – 0.13 – 0.15 – 0.25mm, „extra smooth“ and antistatic
- customized cover sheeting for sealing bars (KB-Band / Fasson band)
- punched parts

KB-band - Fasson band -Cover-strip

Impulse band area should be free from any adhesive substances, as adhesives are subject to thermal decomposition. Basic cover of impulse bars (KB-Band) is of PTFE-glass fabric with lateral, subsequently attached adhesive tapes.

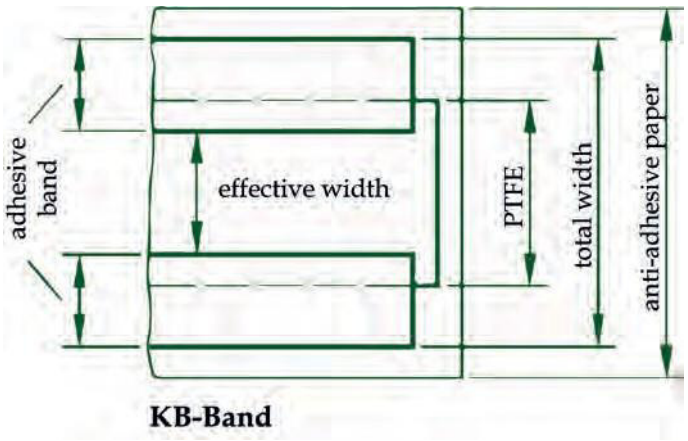
Mostly suitable are tape qualities with paper, PP- or cotton fabric body. On contrary, for Fasson band will be used double-sided adhesive tapes.

More advantageous is the use of self-adhesive PTFE glass fabric, with partially removed adhesive in the center part (Cover-Strip). Bonding and temperature resistance are generally better, even on aluminum bars.

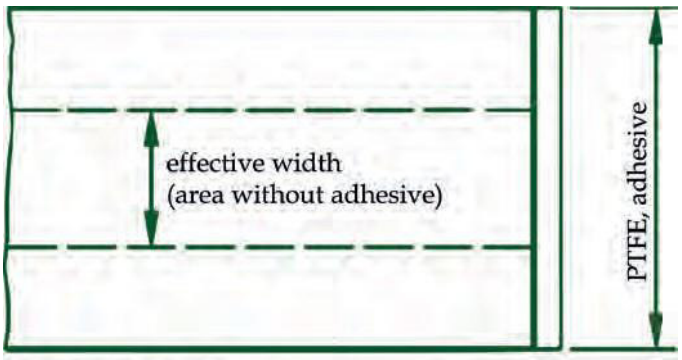
We offer PTFE glass fabric bands of all dimensions with adhesive-free areas for impulse sealing equipment, to prevent incrustations of adhesive and, as a result, improved sealing seams.

Cover-Strip . . . better durability
Cover-Strip . . . better sealing results
Cover-Strip . . . less machine downtime

The impulse band may expand without damaging or creasing the glass fabric.



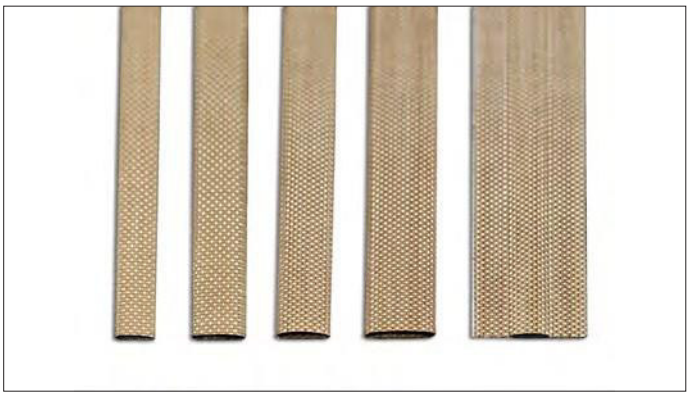
KB-Band



COVER-STRIP
PTFE glass cloth with area without adhesive

PTFE glass fabric tubes

For special applications:
such as on high-speed machines it is of advantage to use the impulse bands inside a PTFE-tube.
This tube is produced from flat PTFE material.
Heating band will simply have to be inserted into tube.
Double tube film layer (bottom side - overlapping seal area) assures insulation against support bar.
Benefit: Rapid cooling-down of heating band.



Pictures: PTFE glass fabric tubes in different sizes

The small dimensions of this version are very suitable when have to be installed near cutting knives. No problems will occur with adhesive residues during changing-over procedure.
PTFE-glass fabric tubes are available from our stock in all standard dimensions. For basic materials are used PTFE glass fabrics with thicknesses of 0.08 – 0.13 – and 0.15 mm.

PTFE coating systems

Application ranges of our coatings are impulse sealing bands, stainless steel continuous bands and sealing dies. On the basis of our experience we will recommend a type corresponding to communicated operation conditions.

Coating version “PTFE black I” is a premium quality 2-layer system for technical applications. Fluoropolymer-based source material contains additional fillers and pigments, thus ensuring a favorable relation between non-stick effect and resistance to abrasive wear.

Total coating thickness amounts to 20 - 25µ. We specify a maximum operation temperature of 220°C. Higher temperatures will result initially in softening of coating along with increased wear (up to 250°C). Higher temperatures will lead to thermal decomposition.

Version “PTFE green” is of similar structure. Pigmentation not only is a decorative feature, but in application it will deliver differing results regarding service life and non-stick effect.

Coating versions “PTFE black II” as well as “brown” are so-called 3-layer systems. Their only difference is pigmentation, which will cause specific characteristics in combination with films. In addition to primer and intermediate layer a finishing layer of pure PTFE is applied. Such a surface is resulting in a maximum non-stick effect.

Due to a lack of stabilizing fillers surface of coating is softer. Coating thickness amounts up to max. 35µ.

PTFE coating systems (continued)

In abrasive applications these coatings naturally result in a shorter service life.

Both of these 3-layer systems are FDA certified for direct contact with foodstuff. Regarding their behavior at high temperatures the same notes apply as mentioned above.

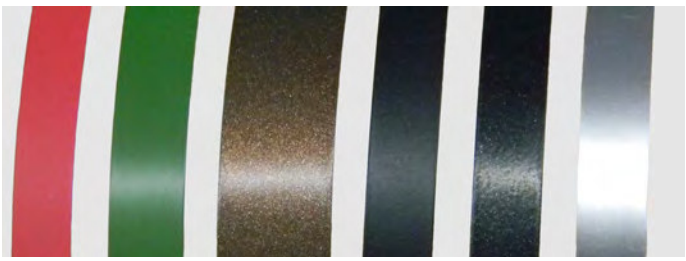


Fig.: Examples of PTFE coatings and uncoated metal surface

Coated bands or bands covered with non-stick films

Coated bands are recommended for heavy-duty machines.
The direct heat transmission between band – coating – film allows to achieve considerably shorter impulse times. In addition, you can use smaller band cross sections which have a positive effect on the cooling of the seams, i.e. the machine performance can be increased.

Finally, the absence of the PTFE tape accelerates the replacement of the impulse band thus reducing the ma-chine stoppages.

The coating of the heating bands or wires enables the heat to be transmitted optimally to the film which leads to short heating up and cooling down times. Moreover, the maintenance of the sealing bar is kept as easy as possible. When developing a new design the heating band can be mounted next to the cutter which reduces the film consumption.

All impulse bands can be coated with PTFE on request. Apart from the round wires often used for angular sealing systems we offer continuous coated flat- and special profiles as an innovation.
Depending on the application PTFE coatings with adapted properties can be delivered, i.e. pronounced non-sticking properties or a special capacity of resistance to wear.
Due to the limited temperature stability of PTFE the use of electronic temperature controller is absolutely necessary.

Please note:
When replacing a normal band with PTFE tape coating by our coated band, it is absolutely necessary that you set the temperature to a lower value , as otherwise the coating might be burnt.
The heating band materials (wires, bands, special profiles) can be coated by us with PTFE using the multi-layer technique either fix length or continuous.

Silicone bands - hoses - strings - special profiles

A modern material to meet the most demanding technical requirements

Fields of application:

- mechanical engineering
- packaging machinery
- automotive industry
- sealing equipment
- medical equipment
- electrical industry

Advantages:

- extraordinary temperature stability
- weatherproof and non-aging
- generally recognized as safe
- hardly inflammable
- vibration reducing
- ozone proof

Dimensions standard extrusions

profiles	lowest dimension (mm)	upper dimension (mm)
	2	35
	2 x 2	30 x 30
	1 x 4	10 x 100
	1 x 0.5	25 x 10
	on request	on request

Special sizes on request

Quality:

Hardness:	20° to 80°Shore
Tensile strength:	5.0 to 11.0N/mm²
Temperature stability:	-60° to +200°C

Available colours:

Standard type:	transparent
On request:	acc. to RAL colours

We also deliver special profiles made according to your specifications as well as plates and profiles in siliconized cellular rubber.

Self-adhesive with a temperature stability up to 200 °C.

Insulation - heating bandsupports

Technical data	Siglaha®	Durit®	Durit 500
available thickness (mm)	0.5 - 10	1 - 5	0.4 - 10
used temperature [°C] (guide value)	250	350	500
compression strength[N/mm²]	160	25	400
thermal conductivity [W/mK]	0.30	0.40	0.26

Siglaha, Durit and silicone rubber can be coated with a **heat resisting (200°C)** adhesive.
All **format parts** are produced according to drawings.
Silicone impregnated glass fabric hoses available in all diameters.
Glass fabrics with silicone coating, thickness of 0.15 and 0.25mm.
As an alternative to silicone: format parts, plates, profiles and foamed qualities from **Fluor-elastomer** (short-term peak-resistance up to **300°C**).

Data sheet PTFE glass fabrics

Non-adhesive:

type	nominal thick-ness	nominal weight g/m²	temperature stability in °C	coating thickness in % of total weight	breaking strength N/mm in length-wise direction
A 108/8	0.073	135	260	64	7
A 116/13	0.115	240	260	55	10
A 116/15	0.128	272	260	60	10
A116/15 extra smooth	0.138	296	260	63	10
A 128/25	0.215	455	260	55	20

Self-adhesive: ***according to ASTM D 1000**

type	adhesive	adhesive thickness µ	temperature stability in °C	coating thick-ness in % of total weight	breaking strength N/mm in length-wise direction	minimal peelingforce* N/cm
AP 08/8	silicone	40	200	64	7	3.0
AP 16/13	silicone	50	200	55	10	3.9
AP 16/15	silicone	50	200	60	10	3.9
AP 16/15 extra smooth	silicone	50	200	63	10	3.9
AP 28/25	silicone	65	200	55	20	4.3
AP16/13 acrylate	acrylate	50	180	55	22	3.5

Remarks: Adhesive PTFE-tapes must not be exposed to direct sunlight.
Optimum storage conditions at 20°C ±5°C at 45-74% humidity. Adhesive coatings have got a shelf life of six months from delivery. Subject of modifications. Errors excepted.

Impulse sealing bars

I.

Simple type with plug type connection 6.3 mm
Cross section of bars 8 x 40 mm

II.

Like I., but with plug-in connection 9.5 mm
Cross section of bars 12 x 40 mm

III.

Plug-in connection with double clamping
Cross section of bars 8 x 40 mm or 12 x 40 mm

IV.

Plug-in connection with double clamping
Cross section of bars 15 x 30 mm

V.

Tough design for plug-in connection with double clamping
Cross section of bars 15 - 20 x 40 mm

VI.

Compensation head with needle bearing for bars up to 2000 mm
Cross section of bars 15 x 30 mm

VII.

Heavy design, needle bearing
Cross section of bars 20 x 60 mm

8mm-compensator

12mm-compensator

15mm-compensator

15mm-compensator with needle bearing

Jaw sets

The jaw sets are transversal sealing tools featuring cutters, which are used to seal either on one side only or on both sides, i.e. they can be heated on one side only or on both sides.

Blast air cooling or water cooling are available as options.
In addition, sensing strips for jaw closing protection can be delivered.

The active sealing areas range between 300 and 2200 mm.

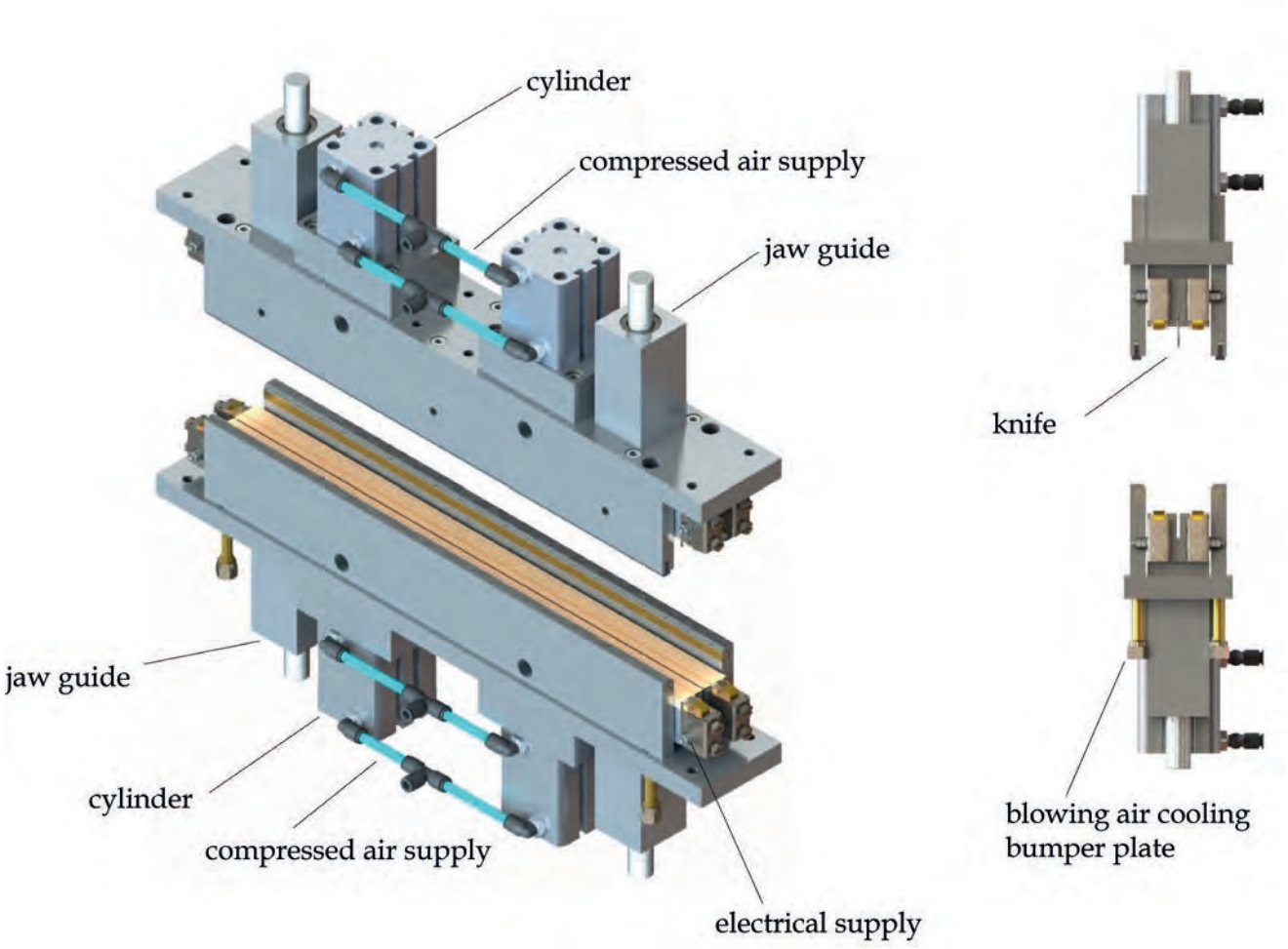


Fig.: Common jaw set with knife and air cooling

Continuous sealing

Standard type with continuous bands made of stain- less steel.

Use: Bag forming, filling and sealing machines vertical / horizontal, empty bag machines

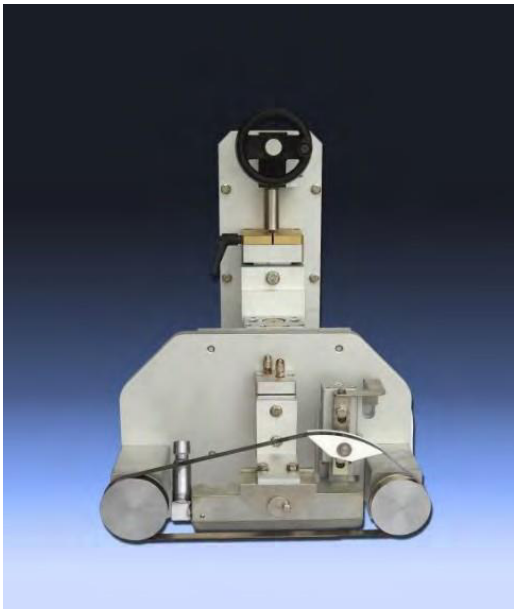
Field of application: compound film by preference

Seam width: 4 – 20 mm **Working**

Speed: up to 40 m/min

Options: cooling stretch

We produce continuous bands made of stainless steel for nearly all longitudinal sealing devices available on the market. Available thickness from 0.08 - 0.25, width and lengths according to specifications.
PTFE non-stick coating on request.



Picture: Continuous sealing

Hot air sealing device (European/US-Patent)

Use: Bag forming, filling and sealing machines vertical/horizontal, continuous and intermittent working method possible.

Field of application: PE and compound films

Seam width: 2 – 3 mm

Working speed: max. 30m/min

Heat-up time: approximately 1 s

Picture: Hot air sealing type HLS-220-F, central air exit, large enclosure

Picture: Hot air sealing type HLS-170-F, lateral air exit, smallest enclosure

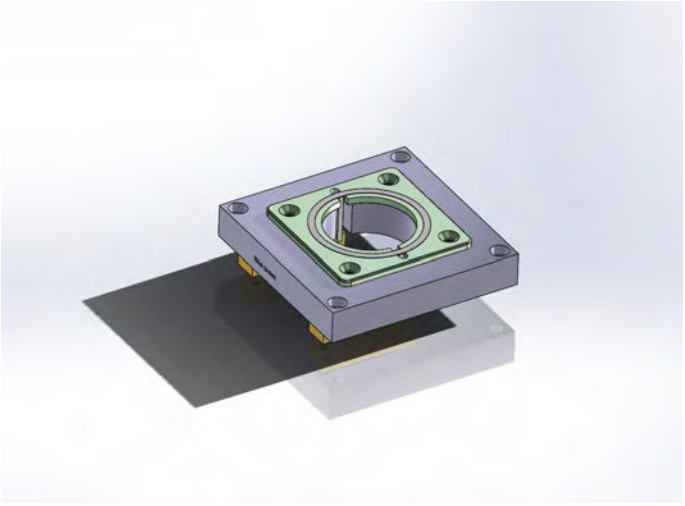
Cooling unit for packaging machines

Water chiller type 508 T09 for cooling impulse jaws and cooling bars. Compact design with integrated chiller and circulating pump.

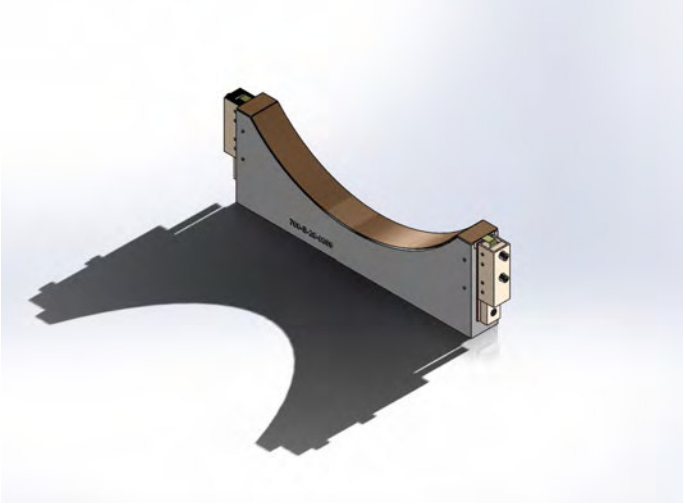
Refrigerating capacity: 590 W at 20 °C ambient temperature and 20 °C cooling water
Tank capacity: 3.8 l

Picture: Water chiller

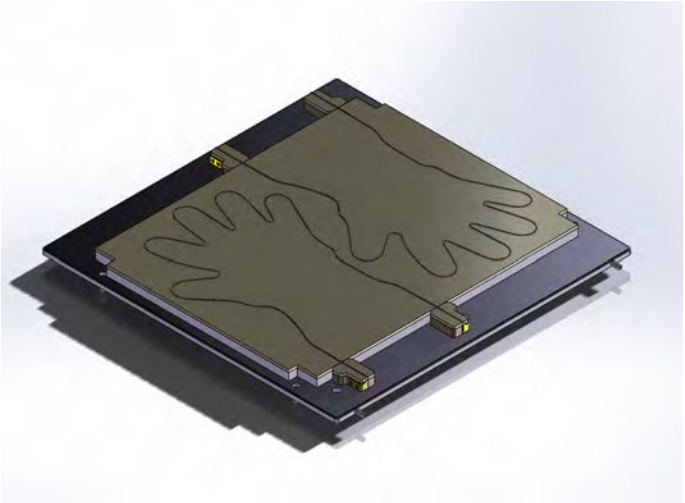
Special tools for thermal impulse sealing (examples)



With ring-shaped **sealing dies** flanges or valves can be sealed into film containers, almost any shapes can be realized.



With **contoured sealing bars** cylindrical parts can be sealed into a film tube.
Depending on diameter, 2 or 4 jaws are necessary for covering of total spread.



Flat contours, also non-symmetric, can be arranged on **tool plates**. Several contours at one time are possible, too. A parallel running of several sealing processes will result in reduced production times for complex bags.

PIREG® temperature controller (thermal impulse sealing)

Temperature controllers for film sealing are working „sensorless“ on the rheostatic control principle. By now the devices include the most advanced and developed technology. Their control characteristics allow high dynamics in combination with a repeatability of ±1°C. They may be used within a wide range of applications besides film sealing.

There are variable types of devices available for many different applications in packaging machines and film sealing units. Introduction of the microprocessor-controlled generation established many useful additional functions to provide maximum benefit for the user:

Fig.: temperature controller PIREG-C

- direct connection to PLC of machine by analogue or digital interfaces
- selective error diagnosis
- automatic parameter setting / calibration
- temperature coefficients of different heating conductor alloys adjustable
- fully automated band calibration in combination with a suitable thermo element and measuring device possible

Controllers with integrated controls are available for applications without PLC. These are suitable for example for the use in film sealing units (individual solution), or for retrofitting of older machines as only little efforts will be required for updating the existing machine control.

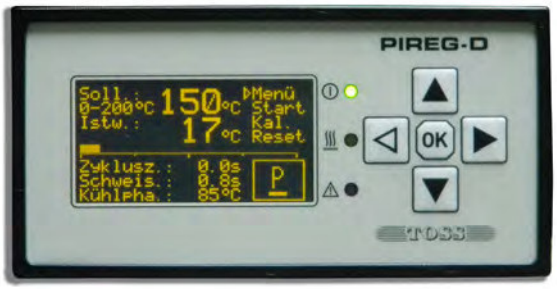


Fig.: PIREG-D controller

- LC-graphic display & LED-status indication
- integrated process control resp. further control functions for individual functions
- setting of all parameters by a well-structured and easy-to-use menu navigation
- validatable
- password protection levels (machine operator /machine setter /machine manufacturer)
- 5-fold recipe memory
- memory: factory setting (machine)
- memory: factory setting (manufacturer)
- 2x free parametrisable relay contacts, each 1x signal- and alarm contact
- display of cycle time

All process-related parameters are readable at a glance. Great importance was attached to simple operation. We offer our assistance for dimensioning an application.

Draw-off belt

We offer suitable draw-off belts for almost every tubular bag packaging machine. Standard coating is a hard-wearing natural rubber featuring an especially high friction coefficient.

For high performance we offer draw-off belts from an even more resistant material. Cuttings and vacuum holes can be manufactured according to near picture or according to a technical drawing.

Fig.: Draw-off belt

For a better adjustment to the profile of filling-tube teeth on inner side will be partially milled off. An especially high traction is provided by the so-called vacuum belts, which are attracting the film by negative pressure. These will be used for films with high levels of friction resp. high forming forces occurring at the forming shoulder. Manufacturing according to drawing, sample or most common designs.

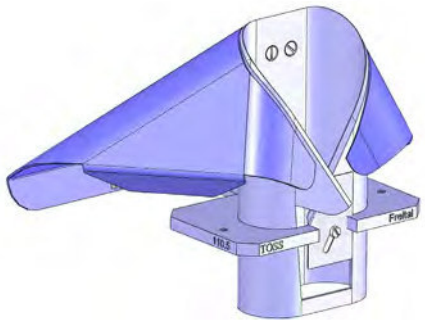
Continuous bands made of stainless steel

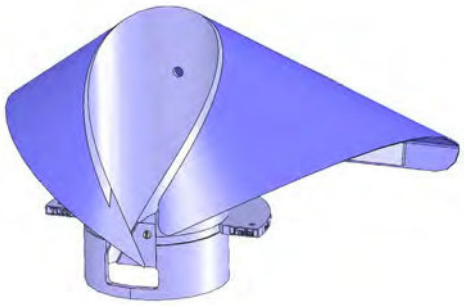
Continuous sealing units operating on the off-loading principle require a circulating band for heat transfer. Service life of continuous bands from PTFE glass fabric is not sufficient with this application.
Therefore continuous bands from special stainless steel are used with tubular bag machines. If required, bands can be fitted with a PTFE coating (see page 24) in order to prevent adhering of film material or printing ink.

Picture: Continuous band

Continuous bands made of stainless steel are produced order-related in following thicknesses:
0.08 – 0.10 – 0.12 – 0.15 – 0.20 – 0.25 mm
Common dimensions are between widths of 3 – 5 mm and lengths of 200 – 6000 mm for special applications.

Forming collars and forming sets





Forming collars as an essential component of vertical tubular bag packaging machines are created by a staff of long-term experience in forming-collar manufacturing using the latest CNC-controlled technology. For construction of these forming collars we use in-house developed modelling programs, which enable realization of collar shapes out of the ordinary. As a standard model we offer forming collars from stainless steel and corrugated steel plate to reduce friction during use.

Fig.: loverlap seam on left bag edge for edge folding

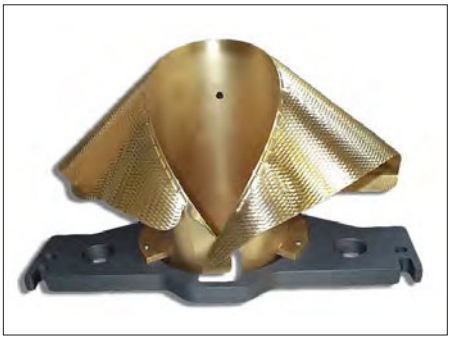


Fig.: forming collar with small feed angle of 25°

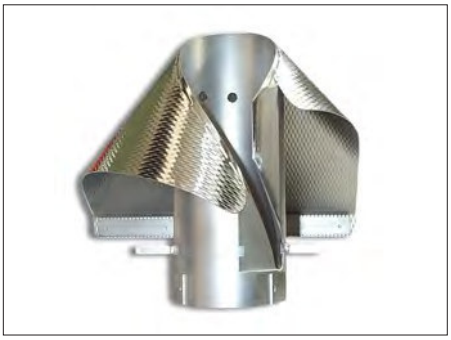


Fig.: forming collar for skewed fin seam, tight

Fig.: forming collar with cutting for conveyor belt

Fig.: great forming height with feed angle of 60°

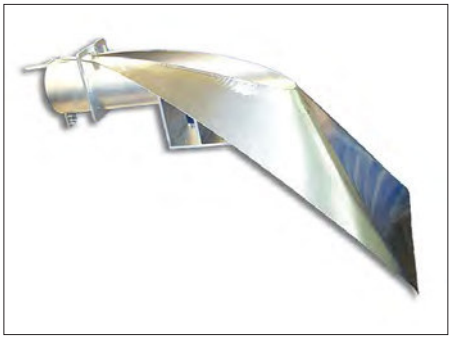


Fig.: great feed angle of 120°

Shapes of forming collars are determined by the application: round, rectangular or polygonal shape. Upon request our forming collars will be coated with Titaniumnitride, Chromiumnitride or DLC-protection against wear and tear and for longer endurance.
CNC-controlled manufacturing of forming collars even allows a cost-effective single-piece production of forming collars for rather unusual applications from the perspective of a manufacturer of packaging machines.

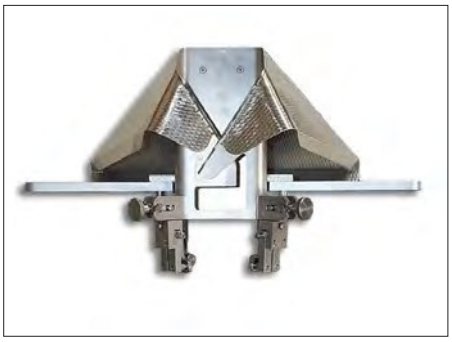


Fig.: edge embossing at a rectangular forming collar

Fig.: standard funnel, from cornered to round

Fig.: chutes, from round to cornered, removable by bayonet lock

We supply complete forming sets or components, such as chutes, spreaders, filling tubes, traverses and gas flushing units. Forming sets with lateral edge folding for shaped bags resp. for subsequent edge sealing are also part of our product range.

We supply to users of tubular bag packaging machines from any manufacturer. All relevant details for design and calculation of forming collar geometry are collected by means of questionnaire resp. determined by samples, photos, drawings etc.
Combination of optimal shape and surface quality results in film forming during a long service life of forming collar/forming set. High-gloss finished surfaces of packaging films will not be affected, ensuring a high quality appearance of the completed bag.

Fig.: forming set with funnel

Fig.: forming set with chute, forming collar TiN-coated

Fig.: forming set with embossed edges

Head Quarter

D -35418 Alten-Buseck
Danziger Strasse 15
Internet: www.toss-gmbh.de

TOSS®
GmbH & Co. KG
Verpackungssysteme

phone.: +49 (0) 64 08 / 90 91-0
fax: +49 (0) 64 08 / 43 55
mail: info@toss-gmbh.de

D -35418 Alten-Buseck
Dresdener Strasse 4
Internet: www.toss-gmbh.de

TOSS®
GmbH & Co. KG
INDUSTRIEPRODUKTE

phone.: +49 (0) 64 08 / 90 91-0
fax: +49 (0) 64 08 / 43 55
mail: info@toss-gmbh.de

D -35418 Alten-Buseck
Dresdener Strasse 4
Internet: www.toss-gmbh.de

TOSS®
GmbH & Co. KG
PNEUMATIC

phone.: +49 (0) 64 08 / 90 91-0
fax: +49 (0) 64 08 / 43 55
mail: info@toss-gmbh.de

USA

Nazareth, PA 18064
539 South Main Street
Internet: www.tossheatseal.com

TOSS®
Machine Components
USA

phone.: +1/ 610 759 88 83
fax: +1 / 610 759 17 66
mail: info@tossheatseal.com

Dresden

D -01705 Freital (Dresden)
Dresdener Strasse 313
Internet: www.toss-gmbh.de

TOSS®
GmbH & Co. KG
Verpackungssysteme Freital

phone.: +49 (0) 3 51 / 64 71-0
fax: +49 (0) 3 51 / 6 49 14 49
mail: freital@toss-gmbh.de

D -01705 Freital (Dresden)
Dresdener Strasse 313
Internet: www.hmw-gmbh.de

HMW
HAINSBERGER METALLWERK GmbH

phone.: +49 (0) 3 51 / 64 71-0
fax: +49 (0) 3 51 / 6 49 14 49
mail: freital@hmw-gmbh.de

Berlin

D -10961 Berlin
Blücherstrasse 22
Internet: www.w-tautz.de

WALTER TAUTZ
GmbH & Co. KG

phone.: +49 (0) 30 / 694 18 66
fax: +49 (0) 30 / 694 94 27
mail: info@w-tautz.de