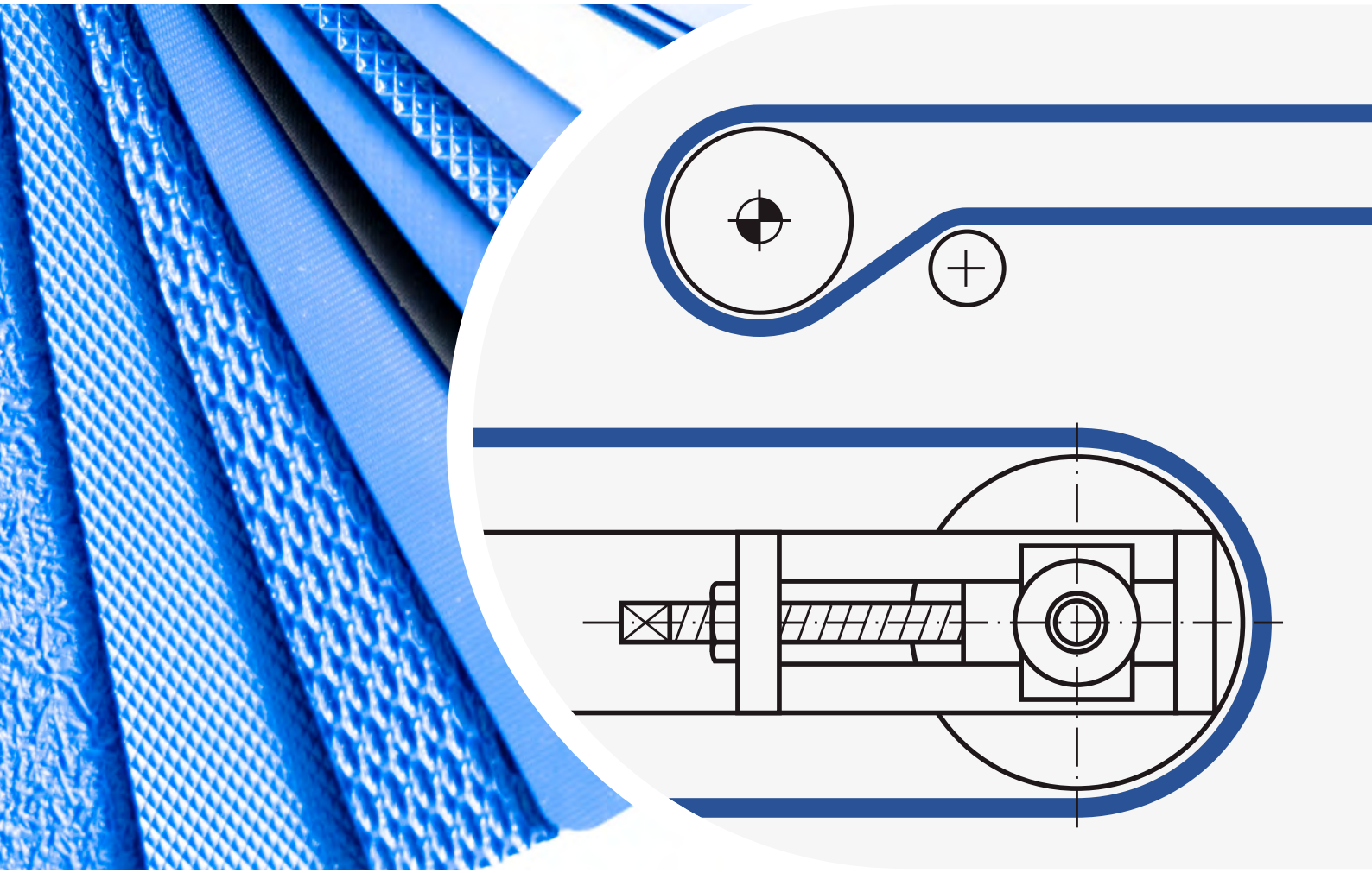
Habasit – Solutions in motion

habasit

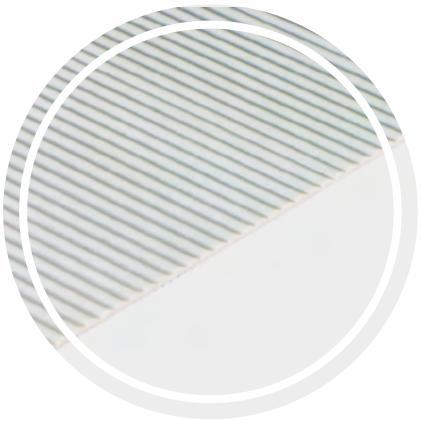
Habasit® Monolithic Elastic Belts

Engineering Guide



Belt concept

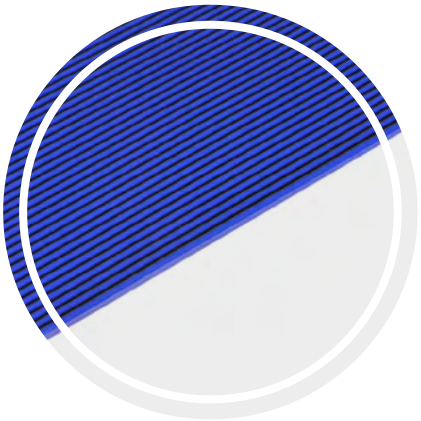
The Habasit® Monolithic Elastic Belts portfolio contains elastic and flexible belts specially designed to cope with different lightweight applications.



Due to the absence of any reinforcement fabric, it is impossible for any substance or liquid to ingress into the belt structure. The monolithic construction made of thermoplastic polyurethane ensures a long and hygienic service life.

The belts' elastic behavior makes installation easy using a simple tensioning process. This permits compact machine designs. In addition, the elasticity acts as a security element by reducing shocks in case of short-term overloads.

The belt materials provide good hydrolysis and chemical resistance, and excellent abrasion resistance. The different thicknesses and various surface structures cover a large variety of application requirements. Specific food-grade TPUs according to EU and FDA regulations have been developed for direct food contact.



Design guide

Pulleys and rollers

Cylindrical-conical or crowned pulleys and rollers are commonly used to exert a self-tracking effect on the belt (Fig. 1).

The recommended crown heights:

d		h	
mm	*inch*	mm	*inch*
≤ 40	*< 1.6*	0.5 – 1.0	*0.02 - 0.04*
> 40 – 110	*> 1.6 - 4.4*	1.0	*0,04*
> 110 – 200	*> 4.4 - 7.8*	1.2	*0,05*
> 200 – 355	*> 7.8 - 14*	1.5	*0,06*

Conversion of crown height h to crown radius R:

$$R = \frac{h}{2} + \frac{b^2}{8h}$$

Pulley crowning (h) becomes ineffective when the arc of contact is below 30°. Cylindrical flanged pulleys should be used in these cases (e.g. rollers for carrying).

Flanged pulleys can only track the belt satisfactorily if the run-off risk is small, or if there are transverse forces with a short-term effect only.

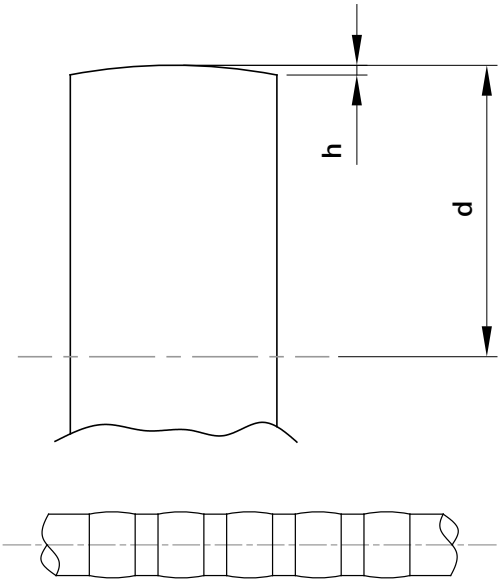


Fig. 1 Radially crowned pulley

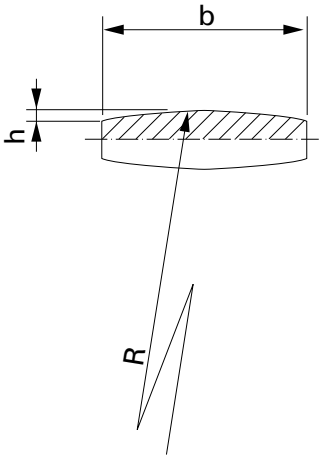


Fig. 2 Crown radius

Width of pulleys and rollers

Pulleys and rollers should be wide enough for the belt to make full contact with them over its entire width, even when it is not positioned in the exact center of the pulley.

Pulley width recommendations:

Belt width b0	Pulley width b
$b_0 \leq 100$ mm / *4 in*	$b = b_0 + 20$ mm / *0.8 in*
$b_0 > 100$ mm / *4 in*	$b = (1.08 \cdot b_0) + 12$ mm / *0.5 in*

Roller width recommendations:

$b = (1.2 – 1.3)\ b_0$

$b_{min} = b_0 + 5$ mm */ 0.2 in*

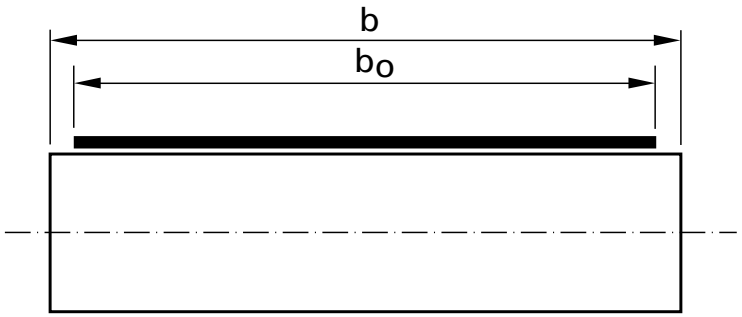


Fig. 3 Belt and pulley widths

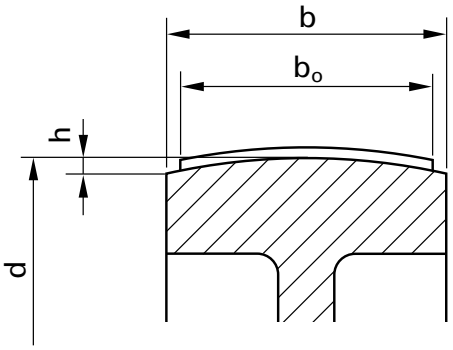


Fig. 4 Pulley measurements

Surface roughness

Habasit recommends a running surface roughness on driving pulleys and rollers of R_a = 1.6 µm (ISO 4288), equivalent to R_z = 6.3 µm (DIN 4768).

Belt support

Monolithic elastic belts are made of thermoplastic material and provide higher friction than fabric-based belts. To ensure a long lifetime for the belt it is recommended to reduce the friction against other sliding partners to a minimum. The edge of the support must be rounded and lower than the pulley surface (Δh = approx. 2 mm / *0.08 in*).

Whenever possible use sliding partners with PE, PP, or TriboPlus, or carrying rollers. If a stainless steel slider bed is necessary, we recommend using a slightly open structured steel sheet, like a checker plate.

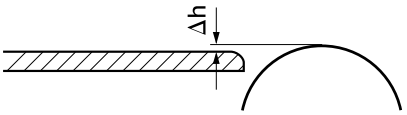


Fig. 5
Positioning of beveled slider bed

Belt tracking

Elastic belts are especially well suited for short but wide applications, where the belt width is equal to or larger than the conveying length. It is often sufficient to crown just one pulley or roller.

Lateral rollers can be used to track belts that run around cylindrical rollers (see #1 in Fig. 6). This kind of tracking is effective only if the belt is slightly tensioned (< 2%) and the edge strength of the belt is sufficient. For details see chapter “Installation”.

If several belts run parallel, the rollers can be placed on a support structure shaped like a rake (#2).

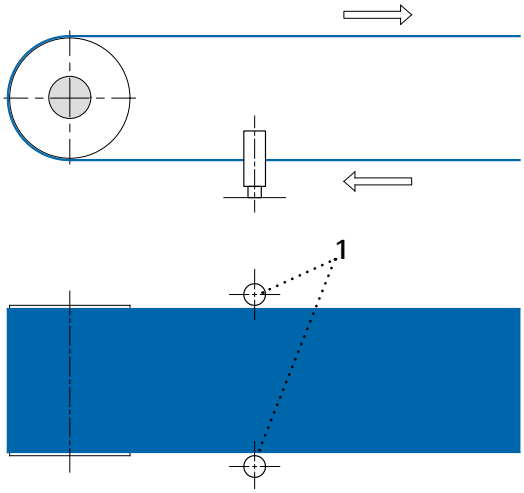


Fig. 6 Lateral tracking rollers

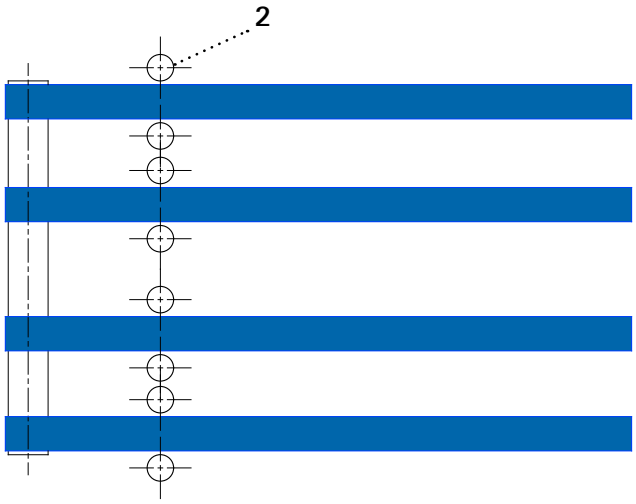


Fig. 7 Tracking option for a set of belts

Tensioning devices

The required contact pressure of the belt on the driving pulley is achieved by means of a belt tensioning device. The tensioning force and resulting shaft load are lower if the tensioning device is placed on the low-tension (slack) side of the driving unit.

A simple solution for tensioning is to use the tail pulley with a tensioning device that runs parallel to the belt's axis or the belt's running direction.

When the center distance between the head and tail pulleys may not be changed, e.g. with intermediate or transition conveyors, the tensioning device should be incorporated in the return side.

Tensioning pulleys can be adjusted manually but may also be fitted with pneumatic or hydraulic cylinders, or even electric positioning motors, to provide a fixed take-up position.

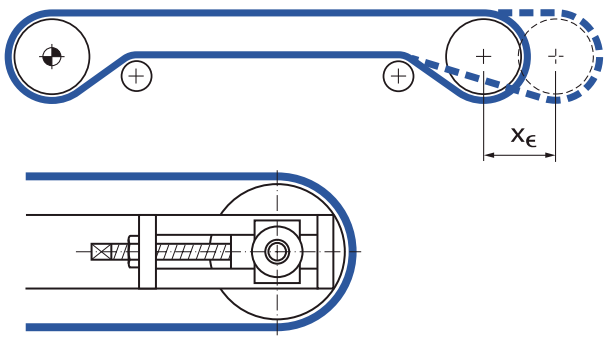


Fig. 8 Tensioned tail pulley

Belt fabrication length

The fabrication length of monolithic elastic belts is shorter than the installation length. Depending on the load to be conveyed, the belt tension must be considered accordingly.

Fabrication length = 'calculated' length / (1 + x%)

The 'calculated' length is determined by the conveyor design.

Belt length calculation for fixed shaft distances				
Tension	Belt length		Fabrication length	
	mm	*inch*	mm	*inch*
2%	1000	*40*	980	*38,6*
3%	1000	*40*	971	*38,2*
5%	1000	*40*	952	*37,5*

Installation

Belt calculation

Elastic belts are not designed for power transmission. Applications using elastic belt types do not require calculation due to low loads and the fact that almost no forces emerge.

The required motor power is mainly defined by the conveyor design involving bearing and gear box friction, and the energy consumption for belt bending over small pulleys.

Recommended tension

The approximate initial elongation depends on the load, but we generally suggest a value between 1% and 5%, preferably 2% to 3%.

Remark: Release the tension of belts when not in use (e.g. at the end of shifts, or over weekends).

Estimated weight of goods

	Shore A	Conveying length							
	m	0.5	1	1.5	2	2.5	3	3.5	4
	inch	*20*	*40*	*60*	*80*	*100*	*120*	*140*	*160*
Max. conveying load per belt width [N/mm]	70	0.45	0.45	0.44	0.44	0.43	0.42	0.42	0.41
	85/89	0.95	0.94	0.93	0.92	0.91	0.9	0.9	0.89
	92	1.26	1.25	1.24	1.24	1.23	1.23	1.22	1.21

Calculations based on a 1 mm thick belt according to the product data sheet (PDS) values for either the belt thickness or the body sheet thickness.
For thinner or thicker belts multiply by the respective factor.

Fabrication

Belt joining

Monolithic elastic belts are made endless using fusion welding. The preferred methods are Quickmelt (butt-end joint) and Microflex or Flexpoof (both are finger joints).

Always refer to the latest official Habasit joining data sheet and operating instructions for the fabrication tool employed.

For details see the Habasit Product Portal.
https://portal.habasit.com/view/v_portal_tools

Fig. 9 Hot-pressing device PQ-xx03

Preferred joining system – Quickmelt
Quickmelt is our standard joining system for easy and quick fabrication as it produces a smooth and reliable splice. The welding area is uniform and easy to clean, like the rest of the belt surface.

Fig. 10 Prepared square-cut belt ends for Quickmelt

Alternative joining systems – Microflex
The Microflex finger splice has been developed specially for heavy duty and critical applications. It is suitable for all Habasit® Cleandrive positive drive, lug drive, and friction drive belts.

Fig. 11 Die-cut belt ends Microflex 15 x 10

Cleaning and disinfection

Cleaning and food safety

Our food-grade Monolithic Elastic Belts use high quality TPU grades. Please refer to the respective Document of Compliance (DoC) for each type, available from our website under "Regulatory": https://www.habasit.com/en/Support-and-Services/Regulatory.

Cleaning must follow standard and classical HACCP procedures. Refer to Habasit's online Chemical Resistance Tool (https://rims.habasit.com/) for more detailed information.

Cleaning agents	23 °C / *73 °F*	50 °C / *122 °F*	Remarks
Acid (weak)	●	○	Possible swelling, max. 3% concentration
Acid (strong)	○	×	Severe degradation
Alkaline (weak)	●	○	Possible swelling, max. 3% concentration
Alkaline (strong)	○	×	Severe degradation
Neutral	●	●	
Water	●	●	

● suitable/ recommended
○ limitation/ check
× not suitable/ not recommended

Acid cleaning agent (weak): Acetic, butyric, citric, lactic, oleic, phosphoric, stearic, sulphuric, etc. acids
Acid cleaning agent (strong): Nitric, hydrochloric, etc. acids
Alkaline cleaning agent (weak): Urea solutions, ammonium
Alkaline cleaning agent (strong): Caustic soda (NaOH), triethanolamine

Disinfecting agents

Cleaning agents	23 °C / *73 °F*	50 °C / *122 °F*	Remarks
Alcohol	●	●	Possible swelling
Chlorine	●	○	Possible swelling, < 1% concentration
Chlorinated solution (bleach, 3%)	○	×	Severe degradation
Chlorinated solution (bleach, 0.5%)	●	○	Possible discoloration
Chlorine dioxin	○	×	
Iodine	×	×	Severe degradation
Peroxy compound 33%	●		Possible discoloration
Ozone	●	●	
QAC	●	●	

Appendix

Material overview

Habasit offers a variety of belt material combinations. The table shows an overview of the current materials and portfolio offering.

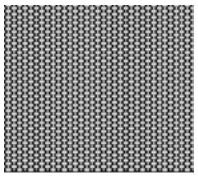
Other combinations, materials and colors are feasible on demand.

Non-food range			
Hardness	Shore A	55	65
Material		TPE	TPU
Color		Black – blue – green – natural – white	

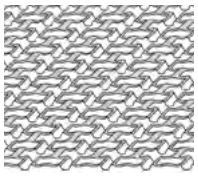
Food range						
Hardness	Shore A	70	85	89	90	92
Material		Polyester / Polyether				
Color		Black – blue – green – natural – white				

Surface overview

Habasit® Monolithic Elastic Belts are designed for a wide variety of surface structures as displayed below. Note that it is not always possible to apply deep embossing on both sides. For specific surface combination requirements, please contact your local Habasit representative.



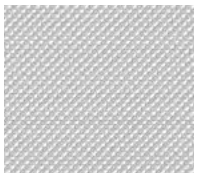
AR
Coarse textile



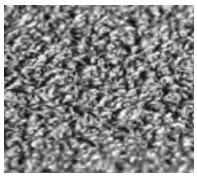
BW
Basket weave

M
Matt

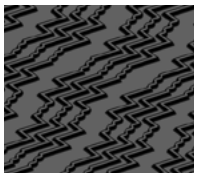
EH
Medium textile



FF
Fine textile

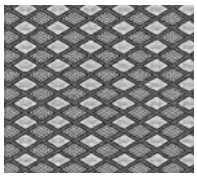


GR
Grit structure



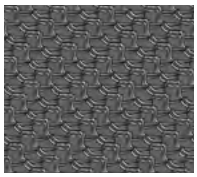
HB
Heartbeat

HP
Heavy penny



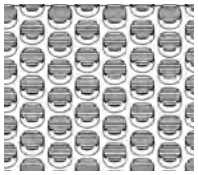
HQ
Harlequin

HT
Cone top

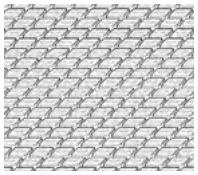


J Jink wave, sine wave

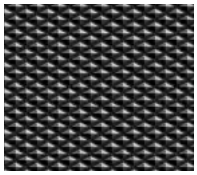
LG Longitudinal grooves



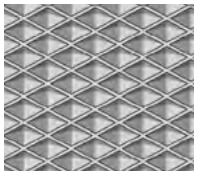
OP
Pimple



OS
Square



PN Inverted pyramid



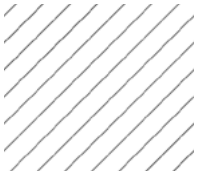
PP Rhomboid positive

S
Smooth

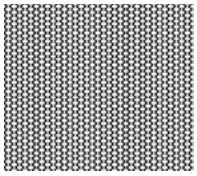
SF
Silk finish

SG
Smooth glossy

SR
Rib



TS Sawtooth profile



WG
Fine weave

Storage and handling

Unfavorable storage conditions or improper handling result in changes to the physical characteristics of synthetic belts. Improper storage conditions mainly affect the coefficient of friction and service life of the belts.

Storage location

The storeroom should be cool, dry, dust-free, and moderately ventilated. Belts and tapes may be stored outdoors only if they are covered and protected from the weather.

Temperature

Belts should not be stored at temperatures below -10 °C (*14 °F*) or above +25 °C (*77 °F*), except for very short periods of time.
When exposed to lower temperatures during storage or transport, belts may stiffen. Before putting them into operation or further processing, the belts should be conditioned at room temperature over a period of at least 48 hours. This is best carried out while the items are still in their packaging, to prevent the formation of condensation on the belt itself.

Heating

In heated storerooms, belts must be shielded from the heat source. There must be a distance of over 1 meter between a radiant heat source and an unshielded product. More distance from the heat source is necessary in rooms with forced-air heating systems.

Humidity

Storage in damp conditions should be avoided. Relative humidity of between 40% and 65% is recommended.

Lighting

Products must be protected from light, in particular from the direct rays of the sun and from strong artificial light with a high ultraviolet component.

Ozone

Belts should not be stored close to ozone-producing equipment, such as UV lamps, AC arc welding machines, laser printers, etc.

Chemicals

Solvents, fuels, lubricants, chemicals, acids, alkalis, and disinfectants should not be kept together with belts in the same storeroom.

Handling

Care must be taken that when belts are stored they are not subject to stress, i.e. with no excess tension, pressure, or other deformation, since stress can promote permanent distortions as well as the formation of cracks.

Contact between belts of different compositions or colors should be avoided.

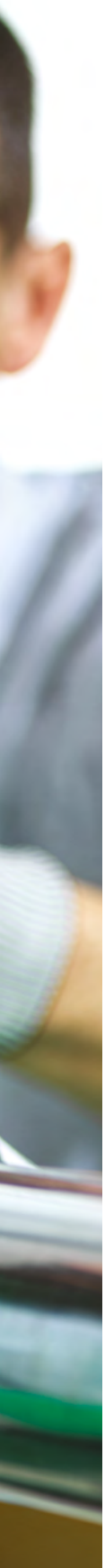
With long-term storage, ensure that recently received products are stored separately from products already in stock (first in, first out!).

Proper storage conditions in brief:

- Protect belts from sunlight/UV-radiation/ dust and dirt
- Store spare belts in a cool (recommended 15 °C / *59 °F* and 25 °C / *77 °F*) and dry place
- Store the belts - if possible - in their original packaging

Our services

Our commitment to our customers' success is what drives our continuous innovation and product and service improvements. We combine engineering expertise with dedication to reliability, to create lasting value for our customers.



Global leadership, local service
Habasit is your local partner with global reach. With 30 affiliated companies, each with its own inventory, fabrication, assembly, and service facilities, plus our worldwide network of partners, we react quickly and expertly to meet your most complex installation challenges.

Comprehensive technical support
from belt selection to design assistance
Extensive knowledge of our customers' processes lets us guide you from application analysis to selecting the optimal solution. We offer online calculation and belt selection tools, as well as on-site engineering assistance and equipment design, to make sure you get the best solution.

Process optimization and everyday efficiency
Innovation comes from understanding our customers' daily challenges. Habasit is more than a belting company. Our experts can provide belt condition monitoring, regular inspections, analysis, and surveys at your sites, to keep your lines running smoothly and fully optimize your equipment and production processes.

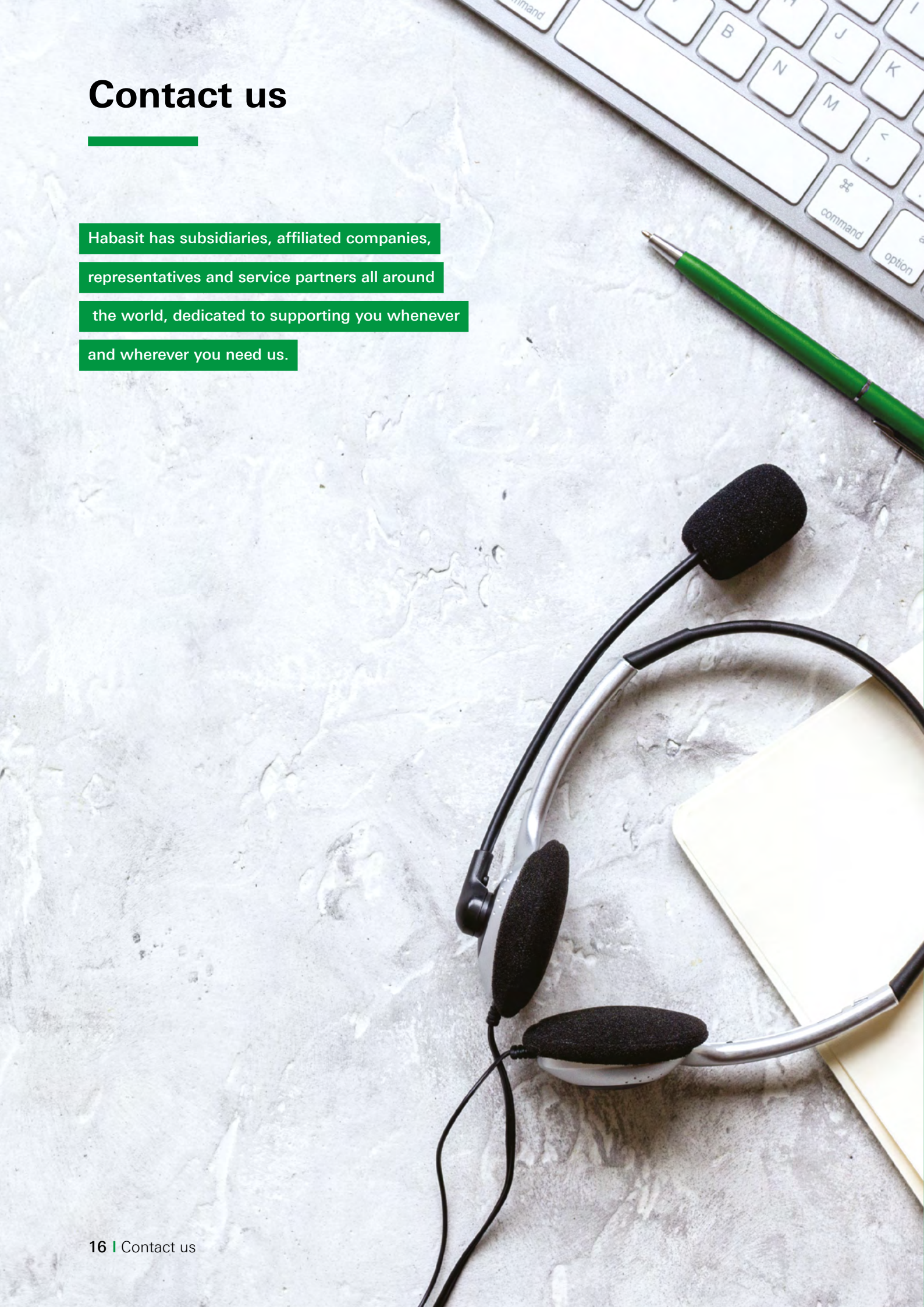
Sharing knowledge and making business easy
Habasit offers training programs and support tools to ensure optimal use of our products, with training on fabrication, installation, assembly, maintenance and belt repair either at a Habasit site or your own location. Orders, shipping and tracking can be managed via our Customer Care team, or directly online.

Committed to innovation beyond the obvious
Because our customers' challenges and needs are always changing, we are constantly investing in the research and development of new products and solutions not only for today, but also for tomorrow.

Habasit is a member of EHEDG
Our dedicated belting solutions aim to support the highest standards of hygienic equipment design.

Contact us

Habasit has subsidiaries, affiliated companies, representatives and service partners all around the world, dedicated to supporting you whenever and wherever you need us.



Australia
Habasit Australia Pty Ltd.
Silverwater, Sydney
+61 1300 945 455
habasit.com.au

Austria
Habasit GmbH, Wiener Neudorf
+43 1 690 66
habasit.at

Belgium & Luxembourg
Habasit Belgium N.V., Zaventem
+32 27 250 430
habasit.be | habasit.lu

Brazil
Habasit do Brasil, Barueri - SP
+55 11 4789 9022
habasit.com.br

Canada
Habasit Canada Ltd., Oakville
+1 905 827 41 31
habasit.ca

China
Habasit East Asia Ltd.
Fotan, Shatin, N.T., Hong Kong
+852 2145 0150
habasit.com.hk

Habasit (Shanghai) Co. Ltd.
Shanghai
+8621 5488 1218
habasit.com.cn

Denmark
Habasit AB, Vejle, Denmark
+45 23 26 56 57
habasit.com

France
Habasit France S.A.S., Mulhouse
+33 3 89 33 89 03
habasit.fr

Germany
Habasit GmbH, Eppertshausen
+49 6071 969 0
habasit.de

India
Habasit India Private Limited,
Coimbatore
+91 422 666 78 00
habasit.in

Italy
Habasit Italiana SpA
Customer Care: 0438 911333
For int. calls: +39 0438 911444
habasit.com

Japan
Habasit Nippon Co., Ltd, Tokyo
+81 120 07 6339
habasit.co.jp

Korea (Republic of)
Habasit Korea Ltd.,
Seongnam City
+82 31 737 9370
www.habasit.co.kr

Mexico
Habasit México, Zapopan
+52 33 3824 2358
habasitmexico.com

Netherlands
Habasit Netherlands BV, Nijkerk
+31 332 472 030
habasit.nl

New Zealand
Habasit New Zealand Pty Ltd.
Auckland
0800 000 070
habasit.co.nz

Norway
Habasit Norge AS, Kleppestø,
+47 23 96 0725
habasit.com

Poland
Habasit Polska Sp. z o.o.
Czeladź
+48 32 639 02 40
habasit.pl

Romania
Habasit Belting SRL
Timisoara
+40 256 704 500
habasit.ro

Russia
OOO Habasit Ltd.
Moscow Region
+7 495 966 1566
habasit.ru

Singapore
Habasit Far East Pte Ltd.
Singapore
+65 6862 5566
habasit.com.sg

South Africa
Habasit South Africa Pty Ltd.
Gauteng
+27 10 001 6770
habasit.co.za

Spain
Habasit Hispánica S.A.
Barberá del Vallés
+34 937 191 912
habasit.es

Sweden
Habasit AB, Hindås
+46 301 226 00
habasit.se

Switzerland
Habasit GmbH, Reinach
+41 61 577 51 00
habasit.ch

Taiwan
Habasit (Taiwan) Ltd.
New Taipei City
+886 2 2267 0538
habasit.com.tw

Turkey
Habasit Kayis San.
Ve Tic. Ltd. Sti., Istanbul
+90 444 70 43
habasit.com.tr

Ukraine
Habasit Ukraine LLC., Kyiv
+38 044 290 88 99
habasit.ua

United Kingdom & Ireland
Habasit UK Ltd., Elland
+44 333 207 6570
habasit.co.uk

USA
Habasit America
Suwanee, Georgia
+1 800 458 6431
habasitamerica.com

Notes

Sketches

Information provided herein does not constitute
legal representations or warranties and may change without notice.

Please refer to the specifications/disclaimers
provided in the respective product data sheets.

Habasit International AG
Römerstrasse 1
CH-4153 Reinach, Switzerland
+41 61 715 15 15
+41 61 715 15 55
habasit.com

6454BRO.MON-en1224HQR