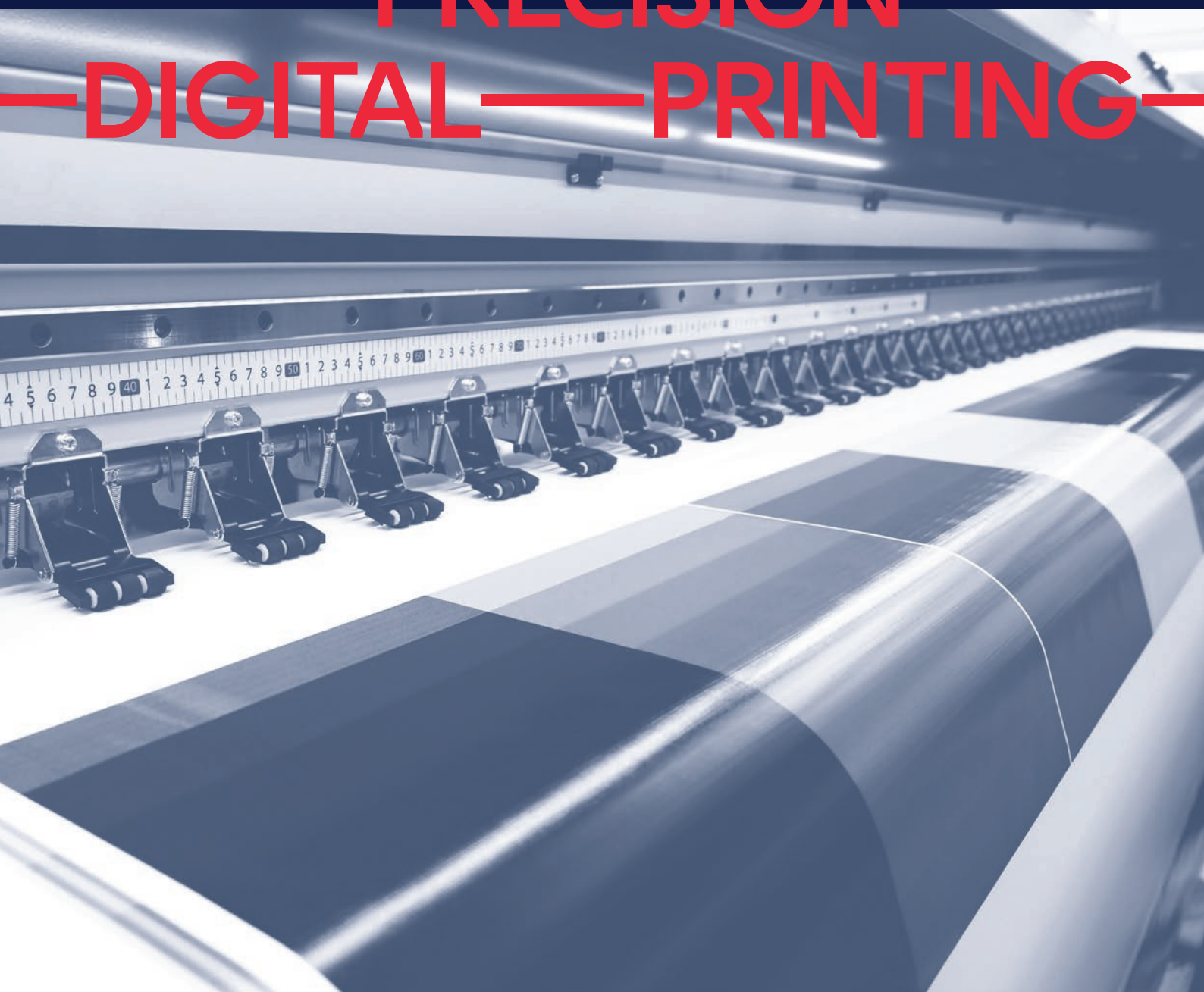
The unique properties of a steel belt conveyor open up new possibilities in digital printing including greater stability, faster press speeds and increased productivity.

STEEL BELTS FOR HIGH SPEED PRECISION DIGITAL PRINTING



MAXIMIZE PRINT PRODUCTIVITY WITH A STEEL BELT CONVEYOR

The unique properties of a steel belt-based conveyor make this technology the ideal solution for high speed, high precision digital printing applications.

The key characteristics of all IPCO steel belts are their stability, flatness, straightness and durability. This has resulted in them becoming the conveying medium of choice across applications as diverse as precision film casting, board production and the processing of advanced composite materials. And the same combination of qualities means that IPCO steel belts can also bring improved productivity and print quality to today's high speed digital presses.

Designed, tested and proven to be more stable than plastic belts

The drive towards ever greater print productivity places new demands on conveyor belts: as press speeds increase, so too does risk of vibration and a reduction in quality. Stability is key to maximizing speed and maintaining quality, and IPCO steel belts have been proven to offer significant advantages in this respect compared with plastic belts.

Fraunhofer vibration analysis

Contract research company Fraunhofer Institute for Production Technology IPT was commissioned to investigate the performance of steel belts compared with plastic belts and the first module of this research, covering analysis of vibration, has been completed.

The tests looked at steel and plastic belts of the same size and perforation pattern and were carried out on the same conveyor system. The test procedure covered belt speeds from 30 m/min to 300 m/min.

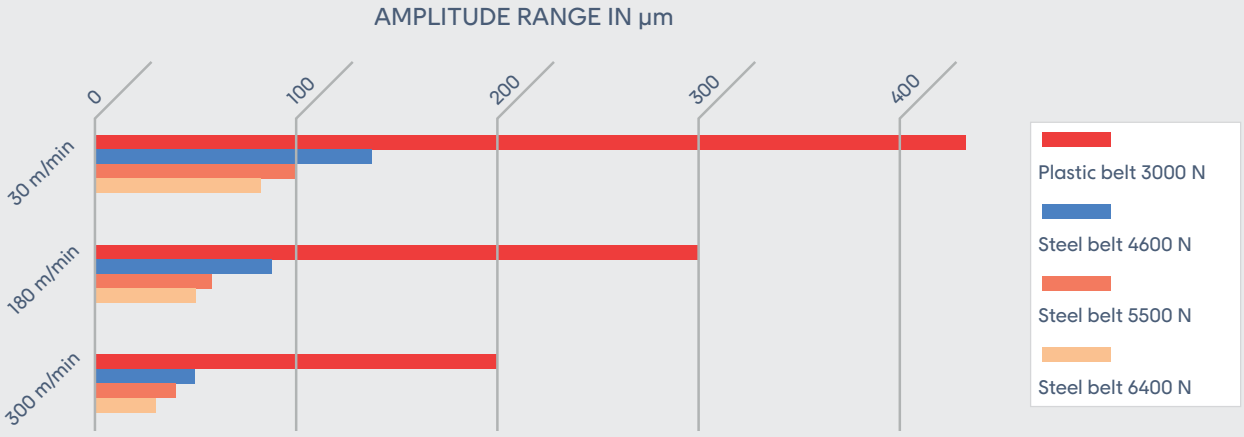
Belt type	Tension	Highest amplitude @ 30 m/min	Median amplitude @ 180 m/min	Lowest amplitude @ 300 m/min
Plastic	3000 N	~450 µm	~300 µm	~200 µm
Steel	4600 N	~130 µm	~90 µm	~50 µm
Steel	5500 N	~100 µm	~65 µm	~40 µm
Steel	6400 N	~85 µm	~50 µm	~30 µm

The steel belt was tested under three levels of tension (4600 N [25 MPa], 5500 N [30 MPa], 6400 N [35 MPa]); the plastic belt was tested at a standard tension force of 3000 N (~5 MPa).

Laser-based sensors were used to measure movement on the Y-axis (up and down) and these were positioned in pairs, either side of the belt, with two located near each drum and the third at the centre of the test line.

Conclusions:

- The vibration amplitude range of the conventional plastic printing belt was as much as 6x higher than that of the steel belt (depending on the tension of the steel belt).
- In addition to its inherent flexibility, the seam was a major cause of vibration in the plastic belt.
- For the test bench used in this study, vibration was highest at low speeds – and lowest at high speeds – for both plastic and steel belts.



The amplitude range is the peak-to-valley value of vibrations over the measured time. $A_{range} = [A_{max} - A_{min}]$

In tests carried out by Fraunhofer Institute for Production Technology IPT, the world's leading applied research organization, the vibration of a steel belt was shown to be as much as 6x lower than that of a plastic printing belt.

This exceptional performance means that the position of the print substrate is assured at all times, and press speeds can be maximised without compromising on quality.

Key benefits

- High speed
- High resolution
- High precision
- Virtually vibration-free

Stability is key to maximizing speed and maintaining quality, and IPCO steel belts have been proven to offer significant advantages.

IPCO steel belts for wide format digital printing

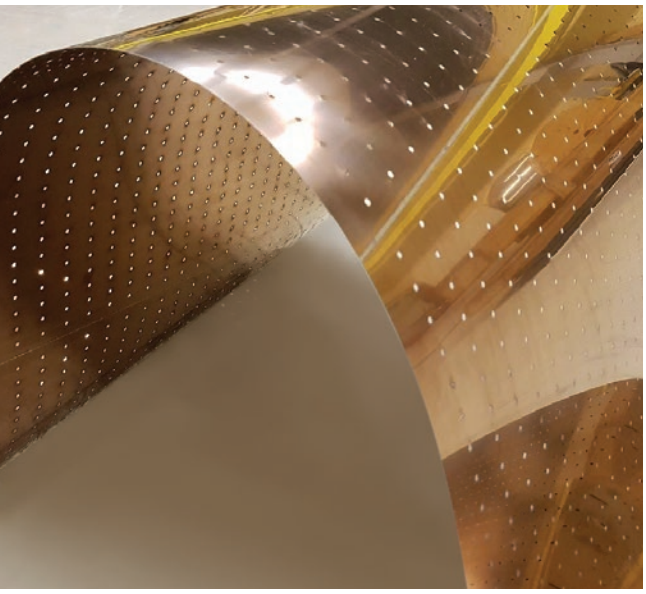
Precision engineered at our factory in Sweden, IPCO steel belts can be manufactured to virtually any length and width, in thicknesses from 0.4 mm upwards.

We can produce them in solid form or punched with perforations of any size, shape or pattern, for use with vacuum systems. And every belt undergoes stringent testing to ensure that it meets the highest standards of flatness and straightness, and is consistent in terms of thickness down to a matter of microns.

Durable, reilable and easy to clean
While choosing a steel belt conveyor for a digital press can deliver major benefits in terms of stability and the ability to achieve high quality results at higher speeds, it can improve productivity in ways other too.

The strength and stability of stainless steel means the risk of downtime is minimal. This durability means an extended working life compared with other belt materials, dramatically reducing the need for replacement belts.

Steel is also inherently more cleanable than other materials – even UV inks are easily removed– and our steel belt grade 1650SM can be heated to speed evaporation of water and solvents.



IPCO steel belt punched with perforations for use with a vacuum system.

Shelf-ready retail packaging.

Shrink-wrapped packaging for soft drinks.

Precision printing for large furniture board.

The use of stainless steel also means outstanding tensile strength. So, as well as being easy to service and ultra-resistant to damage, an IPCO steel belt will not stretch, thus ensuring precise, predictable positioning throughout its lifetime.

- Precision engineered for flatness/straightness.
- Inherent stability of stainless steel.
- High tensile strength resists stretching.
- Solid steel or perforated for vacuum systems.
- Manufactured in Sweden to strict quality standards.

High precision, high speed large format printing for FMCGs (Fast Moving Consumer Goods) with shelf appeal.

Ideal solution for a wide range of substrates

Steel belts are suitable for use across a range of digital print applications, from large format corrugated packaging to high quality, full colour branded materials designed for shelf impact. This flexibility extends to substrates too, enabling fast, high precision printing on everything from folding carton and corrugated to furniture board and ceramic tiles.

- Corrugated board.
- Consumer packaging (carton board).
- Multipack retail (shelf-ready) packaging.
- Thick plastic film/wrap.
- Furniture board and edge banding.
- Ceramic tiles.

An IPCO press belt will not stretch, ensuring precise, predictable positioning now and in the future.

Steel belts offer unparalleled stability for high precision digital printing.

System expertise and support beyond the steel belt

Our experience in the use of steel belts in different industries is without parallel. We produced and installed the world's first steel belt in 1901 and have been behind many of the advances made in this technology over the last 100+ years.

Today, IPCO belts are used in the production of everything from films as thin as 10 µm to construction board materials such as OSB, and can be found in F1 wind tunnels, laboratory clean rooms and Siberian oil refineries.

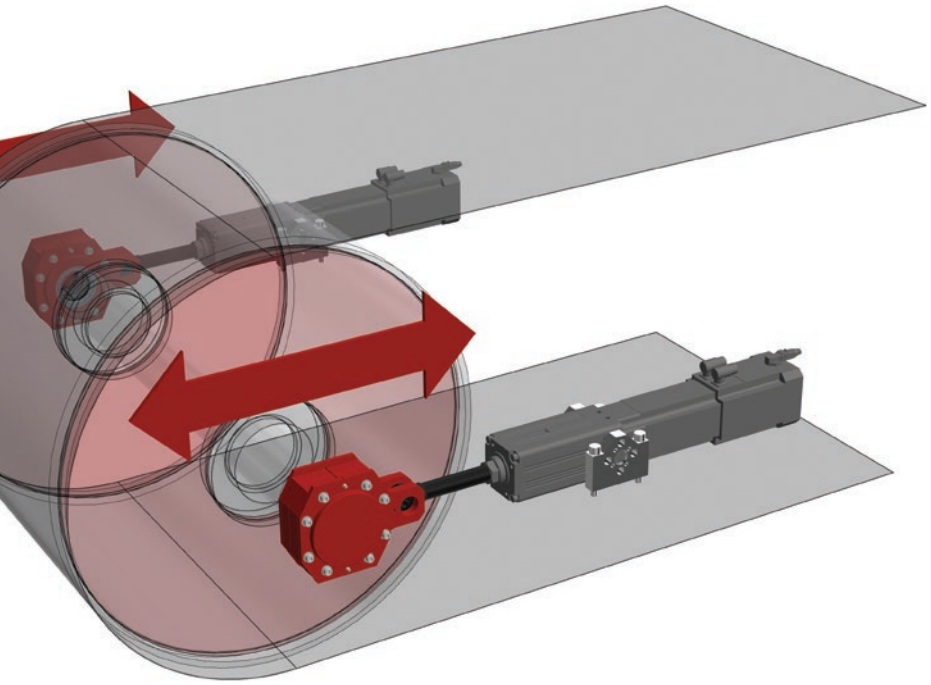
This level of understanding puts us in a unique position to support you. Our application team can work alongside your engineers to develop the right solution for your digital press, and our global service team can provide practical support anywhere in the world.

- Worldwide service capability.
- New installations and belt replacements.
- Conveyor redesign for upgrade to steel belt.
- Technical support and consultancy.
- Preventative checks and recommendations.

In-depth understanding of steel belt-based conveyor systems

Our primary expertise lies in the manufacture, installation and service of steel belts, and for some markets this is as far as our involvement goes. For others, particularly those where steel belts offer performance improvement compared with other conveyor materials, we work in partnership with machine builders and provide ancillary conveyor equipment to deliver an integrated solution.

Our long experience in partnering with OEMs and providing ongoing support to end users means our Special Engineering team has a unique understanding of how a belt behaves in a conveyor system and how it interacts with the many other component parts that make up the system.



Our HPT delivers the most tightly controlled tracking of all our steel belt tracking solutions – accurate to +/- 0.1 mm.

High Precision Tracking

One of the most important components of a steel belt-based conveyor is the tracking system, used to correct the lateral movement of steel belts under different environmental, loading and running conditions. We manufacture and supply tracking solutions for steel belts used in a wide range of applications, including printing and other high speed environments.

Digital presses present a unique challenge in terms of operating speeds and our High Precision Tracking system has been specifically designed to meet the challenges of this demanding application.

Delivering the most tightly controlled tracking of all our steel belt tracking solutions – accurate to +/- 0.1 mm – the HPT combines electric actuation cylinders with contact free optical sensors to deliver rapid system reaction times and correct belt positioning. The HPT also serves as a precise tensioning system thanks to its integrated load cells. The proprietary electronics package provides precision tracking and tensioning in one compact package.

Technical specifications	
Tracking principle	Dual action drum skew
Actuation	Electric cylinders
Sensors	Optical
Belt edge sensing	Contact free
Belt width (range)	600 to 2000mm (2000 mm+ by special order)
Max. belt speed	Up to 300 m/min
Operating temperature	from -20 to +40 °C
Tracking accuracy	+/- 0.1 mm
Installation	Integrated into end station design
Key benefits	• Tight control of belt positioning. • Quick reaction time. • Integrated load sensors for precise belt tensioning/ tracking.

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