"Are we measuring the right thing?"

"Most innovative offset product!

*Nip Control is moving the industry from external estimates to objective measurements inside the nip - where the offset process takes place*"
Outline

1. General on nips
2. Cylinder nips
3. Roller nips
4. Testimonials
5. Applications
**Pressure Indicator™**

- **320 Newton/cm² nip pressure**

**Roller Nip Indicator™**

- **3.5 mm nip width**

**Plate / Blanket**

**Blanket / Impression**

**Blanket / Blanket**

**Pressure Range**

- 60 - 750 Newton/cm²

**Measuring Range**

- 1.5 - 20 mm nip width

**NEW NANO TECHNOLOGY**
What is a process nip?

- The meeting point of rollers, ink, fountain solution, plate, blanket and finally the paper
- The nip is a combination of materials, chemicals ...and pressure
Why process nips?

1. Mix, create and move ink and water between the rollers
2. Transfer ink & water to the plate
3. Transfer the ink emulsion and water from the plate to the blanket and then the paper
4. Transporting the paper in web offset presses
CYLINDER NIPS

New!
End-user introduction of Pressure Indicator™ at IPEX 2010 in cooperation with Continental / ContiTech
Many Blanket Constructions

Blankets of the same thickness. Can they all give the same pressure?

Blankets from different manufacturers

Cylinder Nips
What’s measured in the cylinder nip today

Cylinder Nips (mm)

• Thickness of the plate or blanket & underpacking in relation to the bearer

• Press manuals discuss pressure load, but we do not measure pressure but millimeters

• The compressibility of the blanket, or the softness or hardness of the underpacking, is not considered
Pressure Indicator™

NEW NANO TECHNOLOGY

320 Newton/cm² nip pressure

Cylinder Nips
What does the instrument do?

Pressure Indicator™

- By entering the sensor blade into the nip, the instrument measures the pressure load inside the nip (Newton/cm²)
- Shows the highest pressure load in the display
- Measurement range between 60 - 750 N/cm²
  - plate and blanket
  - blanket to impression
  - blanket to blanket
- Instrument repeatability +/- 10 N/cm²

Cylinder Nips
What do we want to measure?

Peak pressure moves the dot from one substrate to another:
- plate to the blanket
- blanket to the paper
How does the instrument work?

Pressure Indicator™

Measures and registers thousands of times as the pressure sensitive area of the sensor blade moves through the nip.

Ex: 4 500 times in a 10mm nip

Pressure range:
- 200 - 750 N/cm²
- 60 - 750 N/cm² with Low Pressure Kit

Instrument repeatability:
- +/- 10 N/cm² (typical deviation)

Cylinder Nips
Blanket properties influencing nip pressure

- Surface hardness
- Surface structure

Blanket height + Compressibility + Type of surface rubber + Fabric properties + Tightening + Underpackings = Nip pressure that transfers the dot

Cylinder Nips
Advantages
Digital instrument Cylinder Nips
Pressure Indicator™

1. **Measures the process critical point of the nip**
   - Print quality & print consistency

2. **Easy to check process status when a problem occurs**
   (poor ink transfer / ink build-up / plate wear / web wander or breaks)
   - Parallel pressure level along the nip (operator – center - drive side)
   - Differences in pressure between printing units
   - Absolute pressure level

3. **Improved Productivity**
   - Process corridor defined
   - Trend analysis software "hansson nips" to support process control
It is the small 5 x 5 mm square in top of the sensor blade that is the pressure sensitive area and which measures pressure loads between approx. 60 - 200 N/cm².

Quick & easy to use
Just let the top of the sensor blade go through the nip, and you will see the pressure in Newton/cm².
ROLLER NIPS
Roller setting make a difference
Density variations - Newspaper printing

Comparison of two printed editions and 30 sequential copies

Bad settings of ink rollers cause large density variations

When ink rollers settings were adjusted, the density variations also were reduced

Roller Nips
What’s measured in the roller nip today

Roller Nip (mm)

- Contact strip between two static rollers meeting
- Changes in Shore A hardness is not considered
- Plastic strips occasionally used to try to feel the nip pressure
Roller nips
the shear forces get the job done!

1. The shear forces are created when two surfaces are moving with **different surface speed**

2. The emulsion is **created, processed** and **transported** by
   - shear forces
   - adhesion of ink to rollers
   - surface roughness

3. No contact between the rollers during production as a very thin liquid film of ink and water is between the rollers

4. If the pressure between the rollers is incorrect, the shear forces and the temperature are affected negatively

Source: Böttcher Rollers
Roller Nip Indicator™

3.5 mm nip width

Roller Nips
How does the instrument work?

**Roller Nip Indicator™**

1. All roller nips have a pressure curve ... and, this pressure curve mirrors the shear forces.
2. The pressure curve changes as rubber hardens with age.
3. When rubber gets harder, the pressman increases pressure to achieve original nip width in mm.
4. He achieves the nip width he wants ... but also higher nip pressure / pressure width.

---

**Diagram:***

- **Nip pressure**
  - Black curve = New, flexible roller
  - A = Aging roller
  - B = The oldest and also the hardest roller

**Pressure width**

- Digital measurement
- Contact width
- Inked stripe

**Roller Nips**
Rollers - process consequences

- Increased roller nip pressure
  - Increased friction.
  - Shear forces are affected
- Increased heat generation
- Increased electricity consumption
- Lower ink viscosity
- Ink absorbs more water
- Pressman compensates
- Ink & water consumption increases
- Lower print quality
- Breaks down rubbers’s dynamic properties
- Shrinkage develops & less rubber flexibility
- Shorter roller life

Roller Nips
A Real Life Experiment
Böttcher Rollers

1. Two months of printing at typical roller settings (2-color press)
2. Optimized pressure settings for two months

Results

- 59% savings on energy
- 27 % savings on ink
- 15% savings on fountain solution
- … and better print quality!

www.bottcher.com/FAQ; section setting rollers
Advantages
Digital Instrument Roller Nips

1. Measures where the offset process takes place - inside the nip
   - Optimized print quality
   - Despite swelling, shrinkage or hardening of rollers correct nip pressure can be achieved

2. Trouble shooting & process control
   - Objective, standardized way to check parallel alignment, shrinkage or swelling regardless of operator
   - Correct roller setting with or without ink on rollers

3. Save time and increase productivity
   - Up to 50% time savings when setting rollers
   - Can be used by a single operator

4. Save on consumables
   - Electricity / Ink / Fountain solution / Rollers
Simple to use, sophisticated concept

Static sensor blade concept
1. Insert and position the sensor blade inside the nip
2. If needed, adjust the pressure load so correct digital value is seen in the display
3. Done

Semi-dynamic sensor blade concept
1. Let the press pull the sensor blade
2. Stopp the press when the two green "lines" have passed the nip.
3. Read the nip value

Note:
A digital nip width value is different from the ink stripe

and that is the benefit…!
Three different sensor blades to Roller Nip Indicator™

**ALL ROUND - STATIC SENSOR BLADE**
- Roller nips in offset, rotogravure and flexo.
- Infeed or draw roller nips within specification
- Coating and lamination nips.
- Recommended in applications where the rollers are clamped together (not inched).
- Shows nip width in millimeter or inches.

**SS 30001- STATIC SENSOR BLADE**
- Converting nips with very low activation force.
- Shows nip width in millimeter or inches.

**DYNAMIC SENSOR BLADE**
- Roller nips in offset, especially newspaper presses.
- Shows nip width in DNU (Dynamic Nip Units).

Maximum pressure load: Static sensor blades 200 N/cm². Dynamic sensor blade 15 N/cm².
Testimonials
Daily Print prints over 300,000 newspapers per day. The company has an older press with printing units from three different suppliers. In 2004 the press was totally rebuilt into "as new condition". Daily Print uses both the Roller Nip Indicator and the Pressure Indicator.

Thomas Sandström, Technical & Production Manager says:

“Our problem is and has been to achieve the same print quality in all the printing units. We therefore purchased one of the first Pressure Indicator instruments from Nip Control for checking of cylinder nips. The measuring instrument is of great help when we control the print settings and explore other print technical problems. We are very satisfied with the tool, and it is easy to measure inside the printing units without removing blankets and underpackings”.

Patrik Jonsson, printer and Anders Brännström, production leader and responsible for print technology.
"It is in the nips that the core offset process takes place. This is where the rollers, the ink, the fountain solution, the plate, the blanket and finally the paper meet determining print quality and cost”

Rolf Hansson, reponsible for printing technology education at the University of Dalarna, Sweden and printing consultant

Peter Johansson. Segment Manager Strålfors AB with business in seven countries and revenue of over €500 million:

“… This introductory training plus support from staff management on how to use the Pressure Indicator™ in routine checking of cylinder nips as well as the status of the blankets has been very positively received. The level of knowledge has increased and more printers now are engaging themselves in the steering and control of the printing process on their own press.”

Rolf Hansson Consulting executes full days educational sessions on nips.
The training include:
• Theory and discussions
• How to control nips
• Testing on press
• Evaluation and future steps
Introduction of measuring instrument *Pressure Indicator™* at Strålfors in Ljungby, Sweden in September 2010. Strålfors is owned by the Swedish/Danish Postal Services, with business in seven countries and revenues of over €500 million.

Peter Johansson: Segment Manager for printing of business communication and the gambling industry states:

“A requirement to be able to produce with high predictability and repeatability in a printing company is to ensure correct basic settings of the printing process.

To do so the measurement instruments, the Roller Nip Indicator™ (RNI) for roller nips and the Pressure Indicator™ (PI) for measurements of the pressure level of cylinder nips, are of excellent help.

Since a few years Strålfors Svenska AB in Ljungby uses the Roller Nip Indicator™. The equipment in the printing facility mainly consists of narrow web presses for direct mail and business forms.

The experience given from being able to control roller settings with the RNI were so positive that we decided it could be interesting to test if also cylinder settings and blankets could be controlled in a similar way.

Before implementing the Pressure Indicator™ in the print shop a full day’s training was organized with Rolf Hansson Consulting. The objective was to ensure that all involved pressmen had sufficient basic knowledge before this new way of calibrating and controlling a printing process was introduced. The focus was on the key parameters which can be controlled, as well the functionalities of the instrument. It was also important to find a method of working which all pressmen can agree upon to be able to create a positive exchange of knowledge and experience between the different shift and press teams.

The first half of the day was given to theory and discussions about the construction of a blanket and its function in the printing nip. A substantial amount of time was dedicated to the fact that blankets are designed differently, and thus will give show different printing properties, additionally affected by the underpacking. The remainder of the first half of the day focused on the construction of the instrument and its role in superior process control of the press. To be able to ensure high precision measurements, the instrument can be calibrated, and therefore a hand’s on training on how to handle the calibration tool was included. During the afternoon the Pressure Indicator then was tested on press on different press types, the results were discussed and evaluated.

This introductory training plus support from staff management on how to use the Pressure Indicator™ in routine checking of cylinder nips as well as the status of the blankets has been very positively received. The level of knowledge has increased and more printers now are engaging themselves in the steering and control of the printing process on their own press.