ROQUETTE

Offering the best of nature™

The perfect balance between softness and strength

VECTOR® IC for Tissue

VECTOR® IC is a liquid bio-polymer which has been developed specifically for use in the manufacture of tissue.
The base material comes from a renewable, natural source and is completely biodegradable.

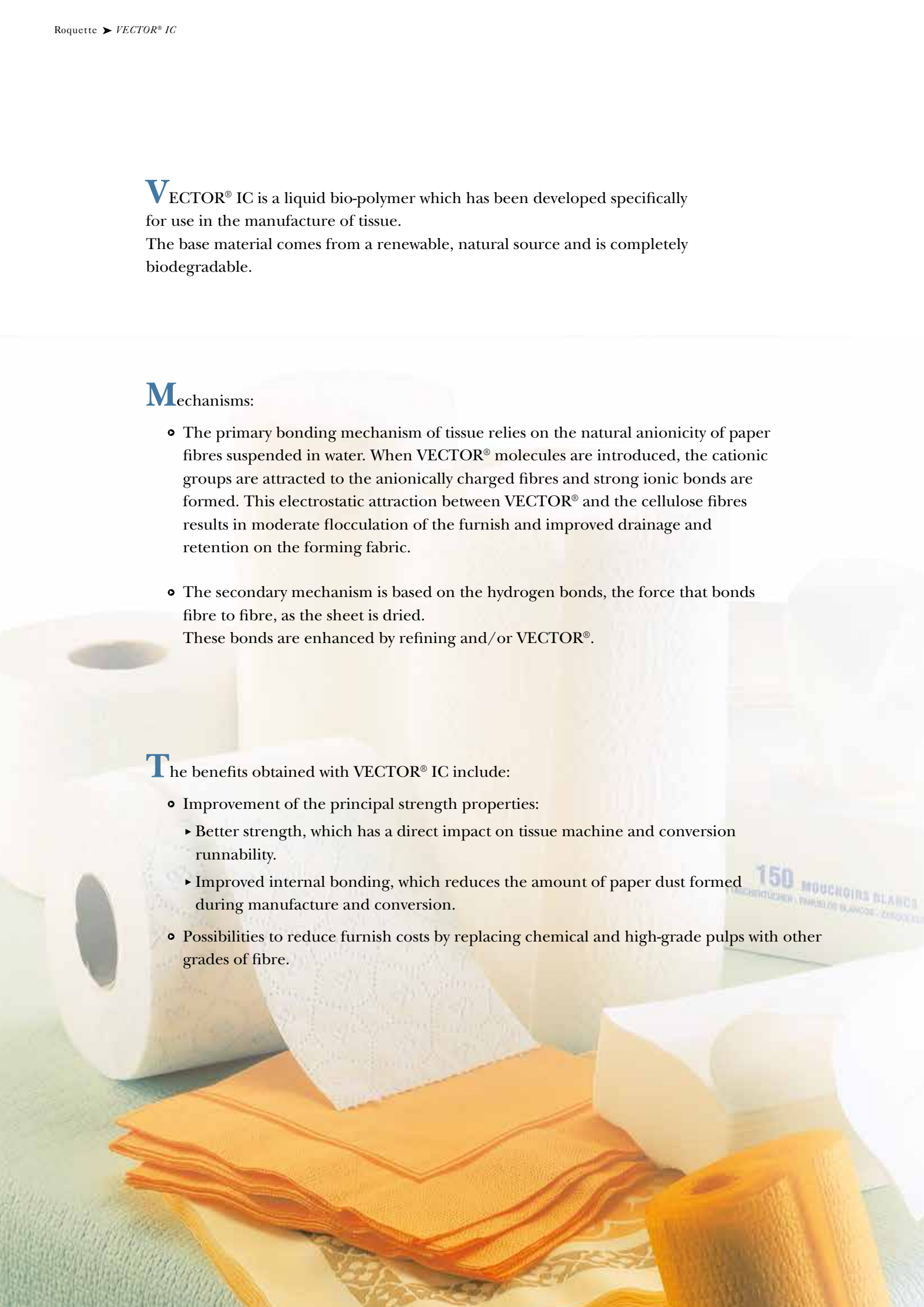
Mechanisms:

- The primary bonding mechanism of tissue relies on the natural anionicity of paper fibres suspended in water. When VECTOR® molecules are introduced, the cationic groups are attracted to the anionically charged fibres and strong ionic bonds are formed. This electrostatic attraction between VECTOR® and the cellulose fibres results in moderate flocculation of the furnish and improved drainage and retention on the forming fabric.

- The secondary mechanism is based on the hydrogen bonds, the force that bonds fibre to fibre, as the sheet is dried.
  These bonds are enhanced by refining and/or VECTOR®.

The benefits obtained with VECTOR® IC include:

- Improvement of the principal strength properties:
  - Better strength, which has a direct impact on tissue machine and conversion runnability.
  - Improved internal bonding, which reduces the amount of paper dust formed during manufacture and conversion.
- Possibilities to reduce furnish costs by replacing chemical and high-grade pulps with other grades of fibre.



- Reduction in refining input resulting in:
  - Increased tissue bulk and softness.
  - Improved drainage and reduced drying energy giving higher productivity.
- Improved fines retention, with both virgin and recycled fibre furnishes.
- Improved drainage due to the action of VECTOR® itself (independent of changes in refining) which also leads to greater productivity.

Characteristics of VECTOR® IC 27216

Dry Solids	Brookfield Viscosity	Typical Nitrogen content (dry solids basis)	Typical pH
27%	4000 mPa.s	0.35% - 0.40%	6 - 7

Handling and Use

1. Dilution and Dosing

VECTOR® IC 27216 comes in the form of a vicious, concentrated liquid. It can be dosed using either a volumetric pump or a metering pump but it has to be diluted to around 1% dry solids before introduction into the furnish to ensure a good distribution onto the fibres.

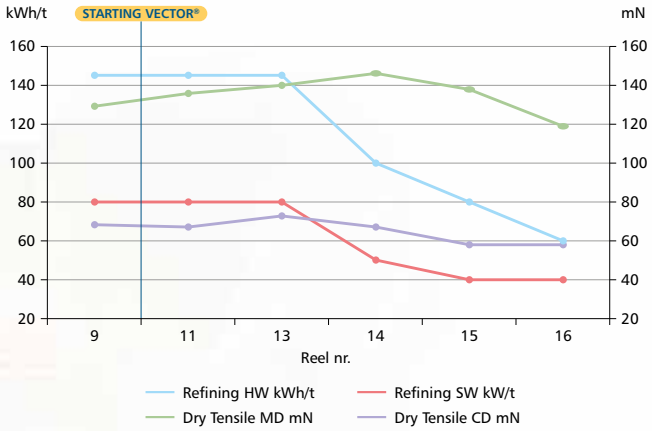
2. Addition Points

General addition point for strength is in thick-stock; for strength and retention in thin stock. If a wet-strength resin is required, VECTOR® should be added first. Roquette technical service team can assist in determining the optimum addition point.

3. Addition Levels

VECTOR® IC is normally added at a level of around 7-20 kg (comm.)/tonne of paper, depending on the desired objectives and the furnish.

Refining energy savings



Premium tissue quality:
- 1100 m/min
- Grammage: 17 gsm
- Virgin fibres

VECTOR® IC 27216 - 3.2 kg_{dry}/t; after the fan pump

Result:
- 50% reduction in HW refining energy
- 38% reduction in SW refining

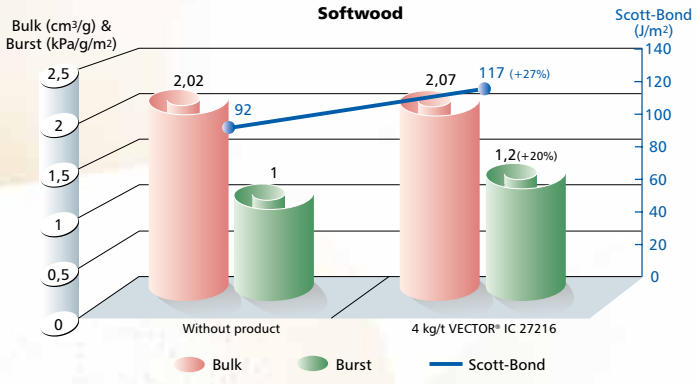
Options:
- Improved productivity
- Save energy and costs
- Improve quality/softness

Refining energy savings, Improved retention and drainage

Item	Before Trial	After Trial	Difference
Power of Refiner	180 KW + 149 KW	180 KW	↓ 45%
Dosage of WSR	4.2 kg/t paper	3 kg/t paper	↓ 28%
Hood temp in dry/ wet part	180°C + 165°C	155°C + 150°C	↓ 11%
Wire Retention	56%	65%	↑ 16%

- Tissue type: 15 gsm Napkins
- Machine: Crescent former
- Speed: 1350 m/min
- Raw Material: 20% NBKP + 50% LBKP + 30% Recycled
- Dosage of VECTOR® IC 27216: 4 kg dry/t paper
- Addition point: machine chest

Reduce dusting



- Burst: + 20%
- Scott-bond: + 27%

- Tissue type: Towel
- Grammage: 16 gsm
- Speed: 1400 m/min
- Furnish: DIP
- 4 kg/t VECTOR® IC 27216 in machine chest

VECTOR® IC , bio-polymer, increases internal strength without reducing softness. Dusting is reduced during production and converting

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