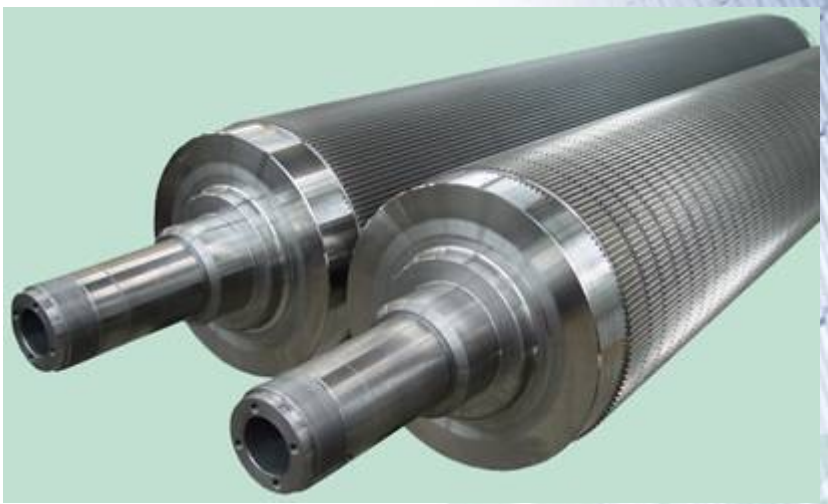
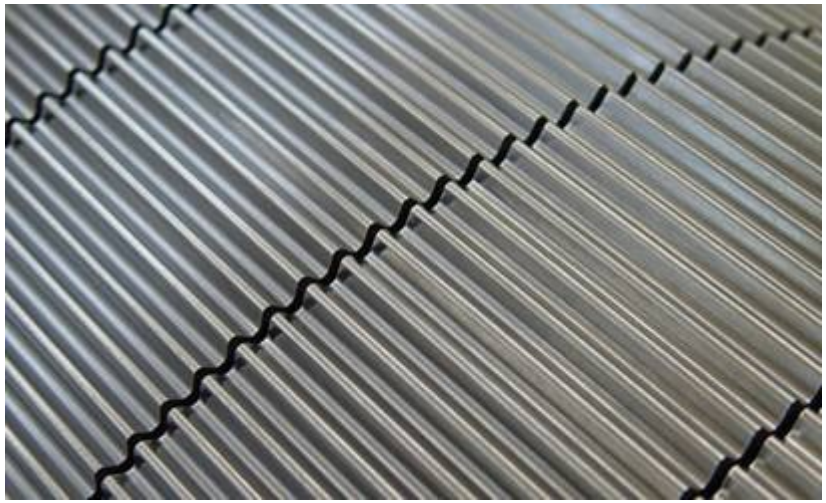
FRIESE North America Corrugating Rolls

Randy Banks & Christian Rodriguez/ FRIESE North America

FRIESE

Since 1992, FRIESE Corrugating Rolls has concentrated on growing with its customers, with a technological focus on quality, reliability and innovation.





FRIESE is a world leader in the manufacture of corrugating rolls, with sets in operation with over 400 corrugators in over 60 countries.

FRIESE ADVANTAGE

FRIESE technology, including

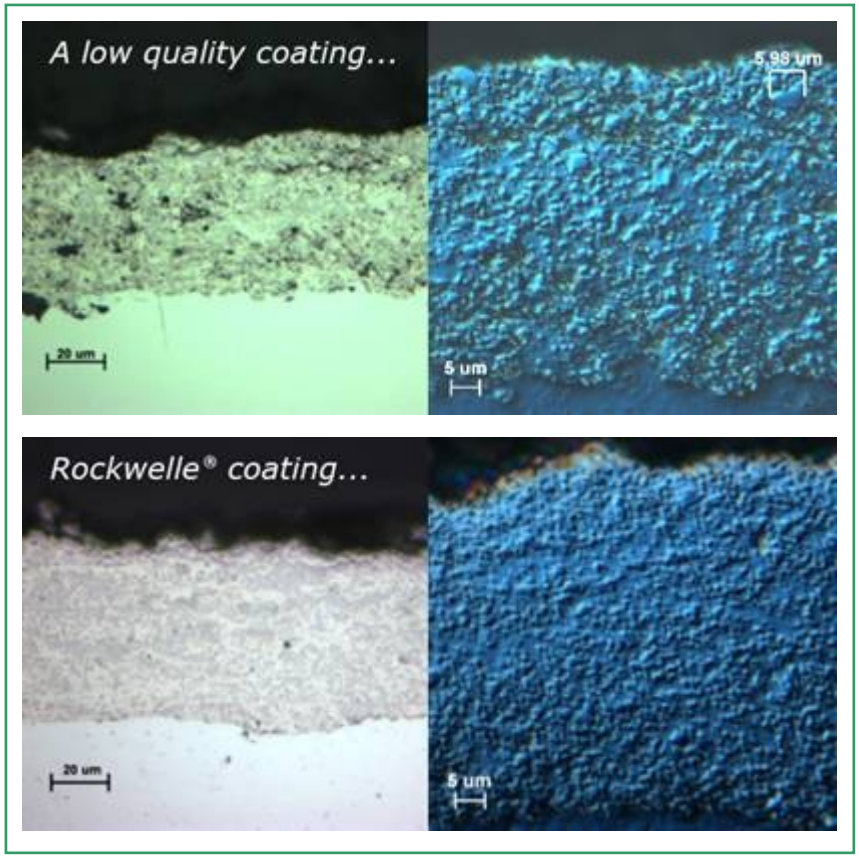
- *Rockwelle Tungsten-Carbide Coating*
- *RockProfile Optimized Flute Geometry*
- *CCS/Thermogrooves Controlled Condensate System*

combines to provide several distinct advantages over conventional corrugating rolls.

- ***Up to 5% stronger corrugated board***
- ***10-20% higher production speed***
- ***1-2% less waste and 2-5% reduced medium consumption***
- ***Consistent glue application***
- ***Low maintenance and service costs***

FRIESE TECHNOLOGY

Our competitors offer “tungsten carbide” coatings, but only FRIESE offers the specially-formulated ROCKWELLE coating.



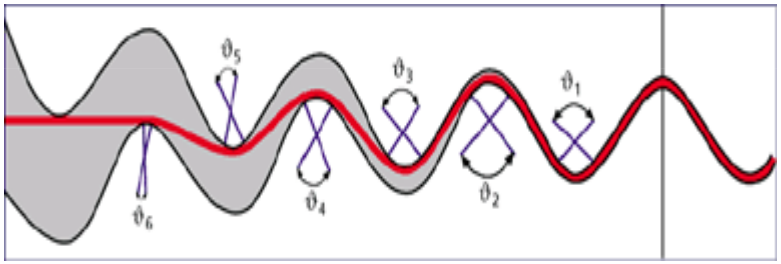
Rockwelle

Tungsten-Carbide Coating

- Surface smoothness comparable to chrome (Ra<0.2 µm)
- Twice as resistant as chrome to wear
- Lasts twice as long as chrome
- Keeps flute geometry stable through the lifetime of the roll

FRIESE TECHNOLOGY

Tension – Coefficient of Friction



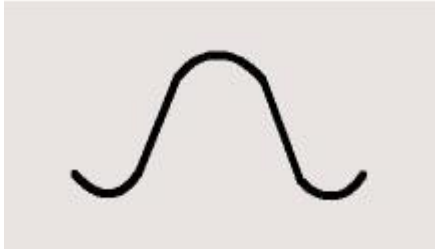
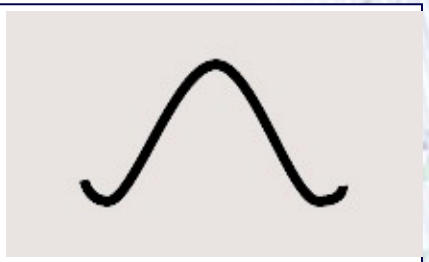
$$T = T_o \cdot e^{\mu\vartheta}$$

T = Web tension in the labyrinth
T_o = Web tension at the reel stand
μ = friction coefficient between surface and paper
ϑ = sum of the wrap angle in labyrinth

From the quality of the steel tubes, to the precision grinding, to the smoothness of the triple polished tungsten carbide, our engineers are able to “adjust” the flute tip radius calculations and flank radius calculations to lower the tension of the medium passing through the corrugating rolls. Less of the medium comes in contact with flute tip and flute flank so the medium is not damaged and retains more of its original strength. The lower the tension factor the stronger the board.

FRIESE TECHNOLOGY

RockProfile is designed individually for each machine for each plant

	C-Flute conventional	C-Flute ROCKPROFILE
		
Pitch	7,90 mm	7,90 mm
Height	3,60 mm	3,60 mm
Take-up ratio	1,428	1,407
FCT	100	103,2
Fluting paper consumption	100	98,5

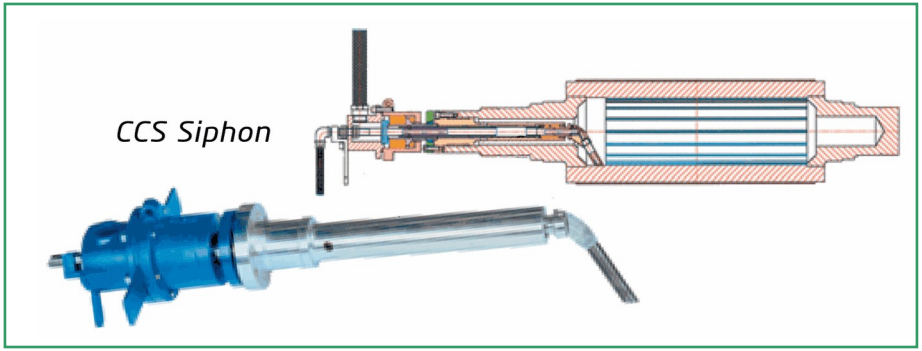
FRIESE TECHNOLOGY

CCS/Thermogrooves

Controlled Condensate System

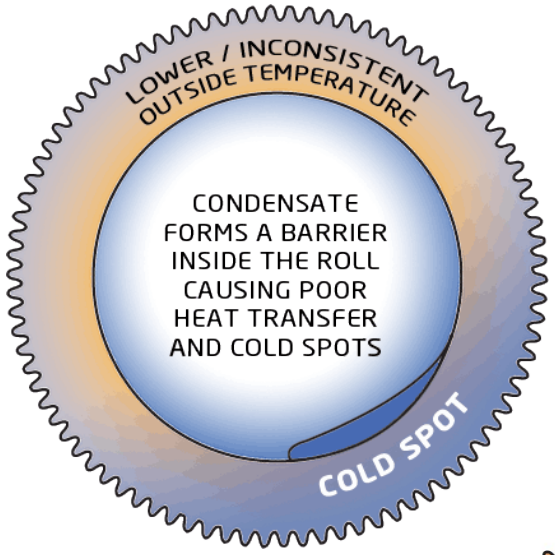
Conventional corrugating rolls build up a condensate barrier inside that inhibits heat transfer, lowers outside surface temperatures and causes cold spots.

FRIESE Corrugating Rolls equipped with longitudinal **THERMOGROOVES** collect condensate which is siphoned out by the **Controlled Condensate System (CCS).**

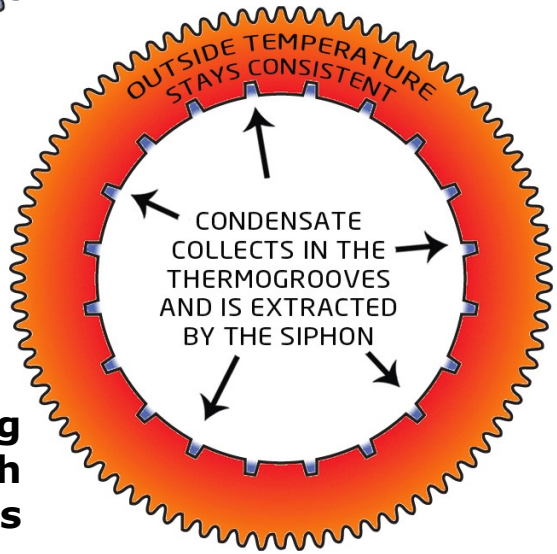


More complete condensate removal ensures better heat transfer and higher roll surface temperatures for greater productivity.

FRIESE TECHNOLOGY



Conventional Corrugating Roll



FRIESE Corrugating Roll equipped with CCS/Thermogrooves

CCS/Thermogrooves

Controlled Condensate System

- no "banana" effect after production stops
- no "running-in" period after flute changes
- better heat transfer at higher speeds
- no maintenance or adjustment for the life of the rolls
- no modifications to your existing steam system

FRIESE SERVICE

FRIESE's comprehensive service begins with the complimentary

P.A.C.E (Profile Analysis and Comparison Estimate) Report

which outlines how FRIESE corrugating rolls can improve your corrugated board quality and plant productivity.

The rolls are produced utilizing the most modern and technologically advanced grinding machines and equipment, which permits us to manufacture to fine tolerance, within a few microns (µm).

PACE: (Profile Analysis and Comparison Estimate)

Fosber Smart / C flute

		Actual	Tungsten		
			option I	option II	option III
corrugating roll diameter	in mm	**540 / 325**	**542,5 / 325**	**542,5 / 325**	**542,5 / 325**
fluting height	in mm	3.63	3.70	3.63	3.55
fluting height	inch	0.143	0.146	0.143	0.140
pitch	in mm	8.08	8.31	8.31	8.31
number of teeth		210 / 128	205 / 123	205 / 123	205 / 123
tension factor	in %	100.0	85.4	82.2	79.4
tension		7.81	6.67	6.42	6.2
take-up factor		**1.409**	**1.396**	**1.385**	**1.373**
fluting paper saving	in %	0.0	0.9	1.7	2.5
mechanical strength					
ECT-value	in %	100.0	100.9	100.7	100.3
BCT-value	in %	100.0	101.8	100.7	99.2
FCT-value	in %	100.0	96.4	99.2	102.3

PACE: *(Profile Analysis and Comparison Estimate)*

Vanguard 600M / B flute

		Actual	Tungsten		
			option I	option II	option III
corrugating roll diameter	in mm	**406 / 406**	**407 / 407**	**407 / 407**	**407 / 407**
fluting height	in mm	2.49	2.60	2.50	2.40
fluting height	inch	0.098	0.102	0.098	0.094
pitch	in mm	6.44	6.60	6.60	6.60
number of teeth		198	194	194	194
tension factor	in %	100.0	97.0	89.0	81.2
tension		6.64	6.44	5.91	5.39
take-up factor		**1.319**	**1.323**	**1.302**	**1.282**
fluting paper saving	in %	0.0	-0.3	1.3	2.8
mechanical strength					
ECT-value	in %	100.0	100.6	100.3	100.0
BCT-value	in %	100.0	102.8	100.5	98.2
FCT-value	in %	100.0	92.6	99.2	106.7

PACE: *(Profile Analysis and Comparison Estimate)*

BHS Bandleader/ C9 Profile

		C_9		Friese Rockwelle		
				I	II	III
corrugating roll diameter	in mm	**500 / 325**		**500 / 325**	**500 / 325**	**500 / 325**
fluting height	in mm	3.61		3.7	3.6	3.5
pitch	in mm	8.300		8.300	8.300	8.300
number of teeth		189 / 123		189 / 123	189 / 123	189 / 123
tension factor	in %	100.0		105.0	97.0	90.1
tension		6.25		6.56	6.06	5.63
take-up factor		**1.385**		**1.399**	**1.38**	**1.361**
fluting paper saving	in %	0.0		-1.0	0.4	1.4
mechanical strength						
BCT-value	in %	100.0		101.7	99.7	97.8
FCT-value	in %	100.0		96.4	101.4	106.8
ECT-value	in %	100.0		100.4	99.8	99.27

FRIESE SERVICE

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