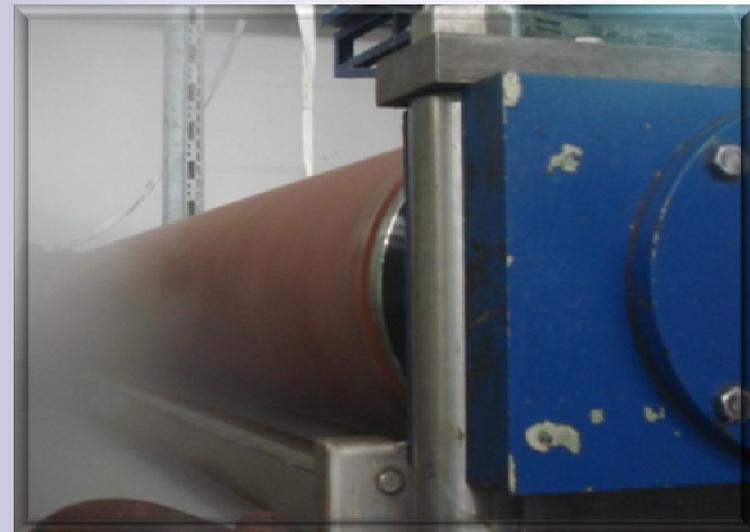




Energy Saving with FKM Non woven roller technology

德国福博士辊轴技术有限公司

节能型无纺布辊介绍



[www.fkmchina.com](http://www.fkmchina.com)



# Subject 目录

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- **FKM Introduction**
- **FKM 公司介绍**
- **Non Woven Roller application & Principles**
- **无纺布辊轴的应用和工作原理**
- **Energy saving analyse and calculation**
- **能源节省方案计算分析**
- **Save energy Projects development**
- **节能型项目拓展**



# FKM- Worldwide FKM-全球分布



## FKM-Germany, Duisburg

### FKM-德国，杜伊斯堡

Found in 1967, owned by  
Dr. Ulrich Freudenberg since 1998  
成立于1967年，从1998年开始为  
福博士所拥有

[www.fkm-walzentechnik.de](http://www.fkm-walzentechnik.de)

## FKM-USA, Illinois FKM-美国，伊利诺斯

Found in 2000 成立于2000年



[www.fkmusa.com](http://www.fkmusa.com)

## FKM-China, Kunshan FKM-中国，昆山

Start-up of operations: July 2007  
投产时间:2007年7月

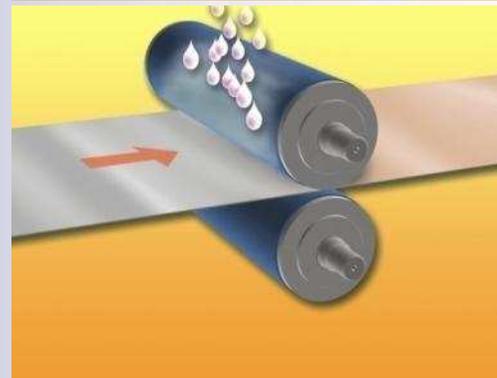
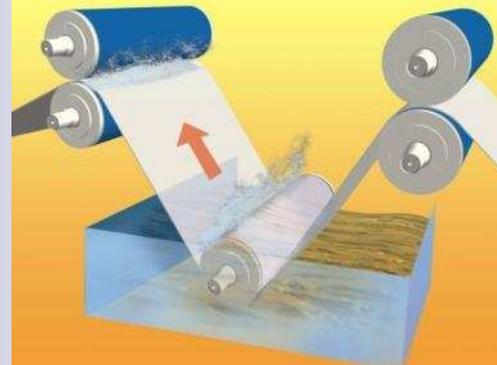
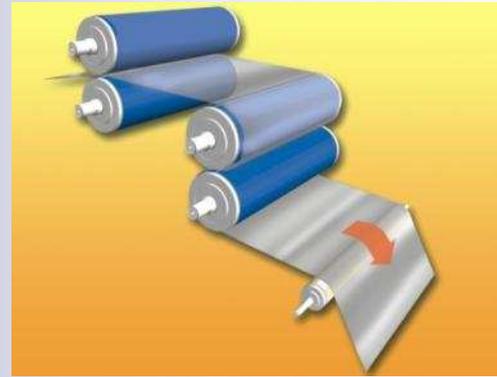


[www.fkmchina.com](http://www.fkmchina.com)



# Application of Non-woven roller 无纺布辊轴的应用

- Transport 传输
- Squeeze 挤干
- De-oiling 涂油





# Nonwoven Roller - Construction and Converting

## 无纺布辊轴 - 建造及转换

Die cutting 模具剪切

Pressing 压制

Surface finishing 表面处理



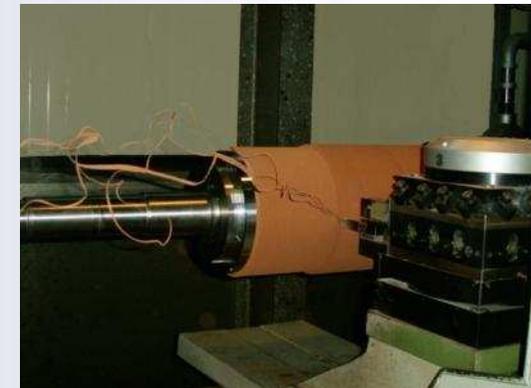
...from sheet to disk

...从片料至圆盘

.... to a roll...至轴芯

... with accurately defined Surface

...具精确的合格表面





# Principle of operation – “Pumping”

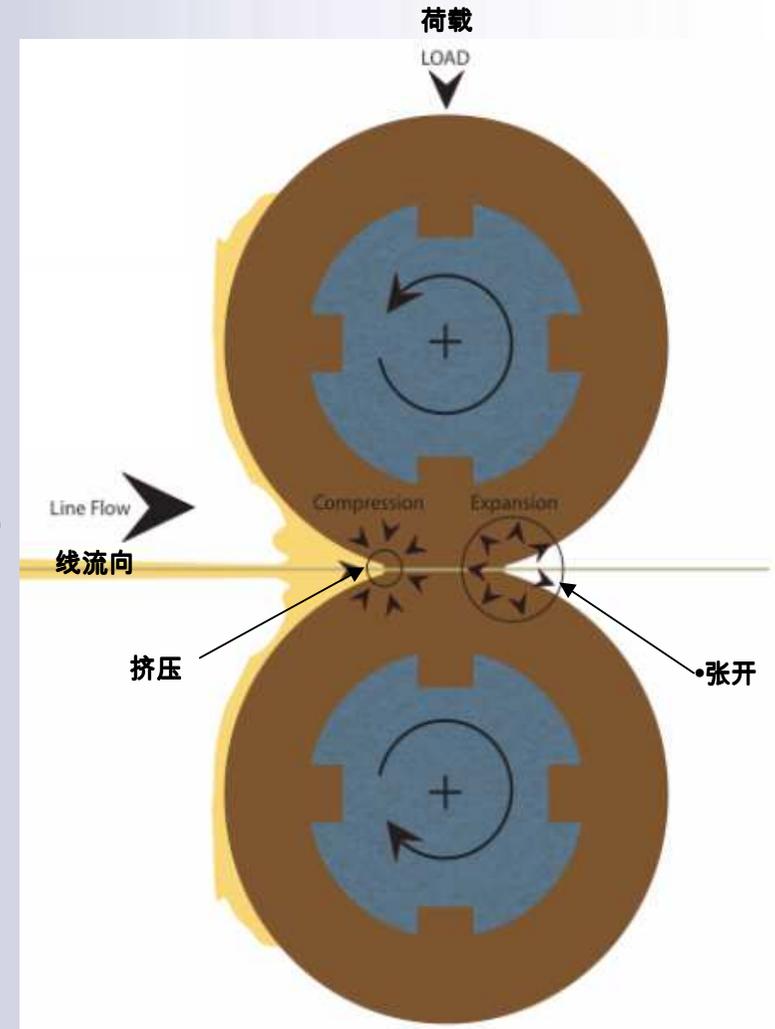
## 操作原理 – “泵注”

### Squeezing effect supported by vacuum

Under mechanical load void volume is reduced and air is evacuated from its cavities. As the roll turns the material in the nip is de-pressed, the void cavities open up and sucks liquid from the surface. This is similar to squeezing a sponge. The roll “pumps” in one direction.

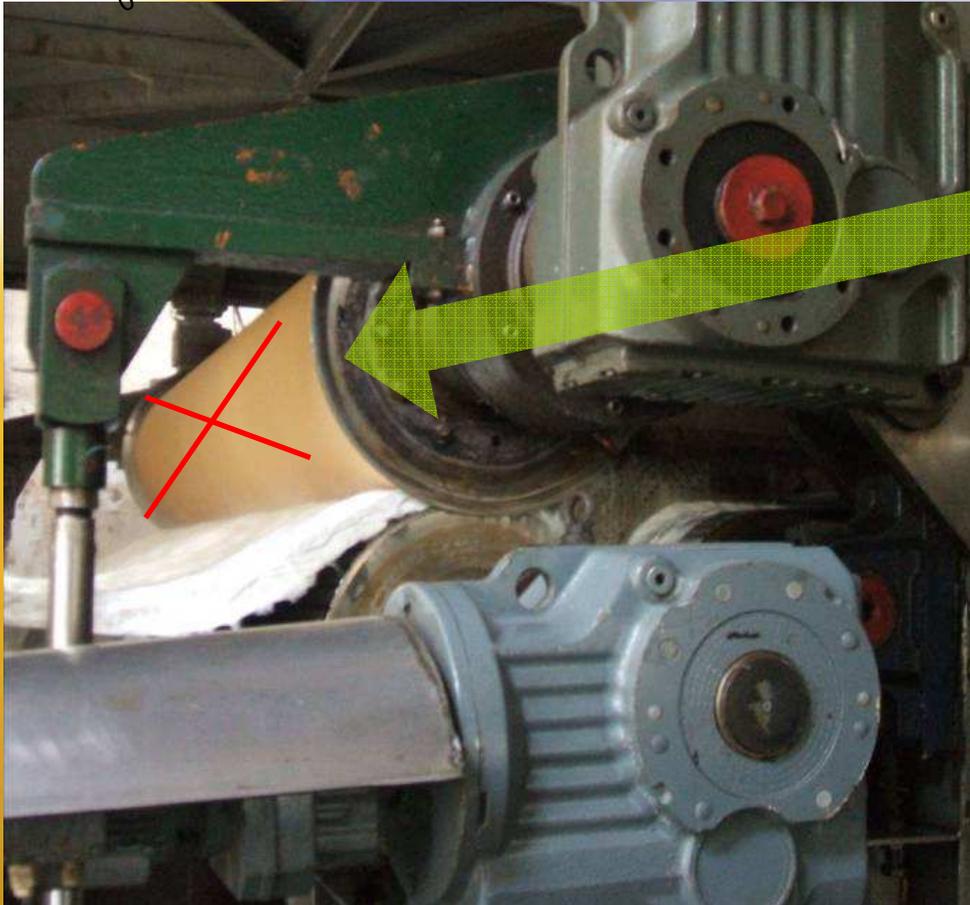
### 压挤效果被真空原理支配

在机械荷载下立体空间减少,空气从空隙中释放出来. 当辊轴转动时,轧口区由压缩到释放,立体空隙张开,并从表面吸取液体. 这种类似于压挤一块海绵. 辊轴往一个方向“泵注”液体.





## Energy saving application with Non woven roller 节能型无纺布辊的应用



Energy saving Non woven roller can replaces rubber roller in refining machine or padder of dyeing and finishing line.

在精炼机或染整线轧车中应用节能型无纺布辊替代橡胶辊



# Squeezing result comparison— viscose fiber industry

## 轧液效果比较—粘胶纤维行业

Condition: Production line with 45,000 Tons viscose output  
条件： 年产45,000吨的粘胶生产线

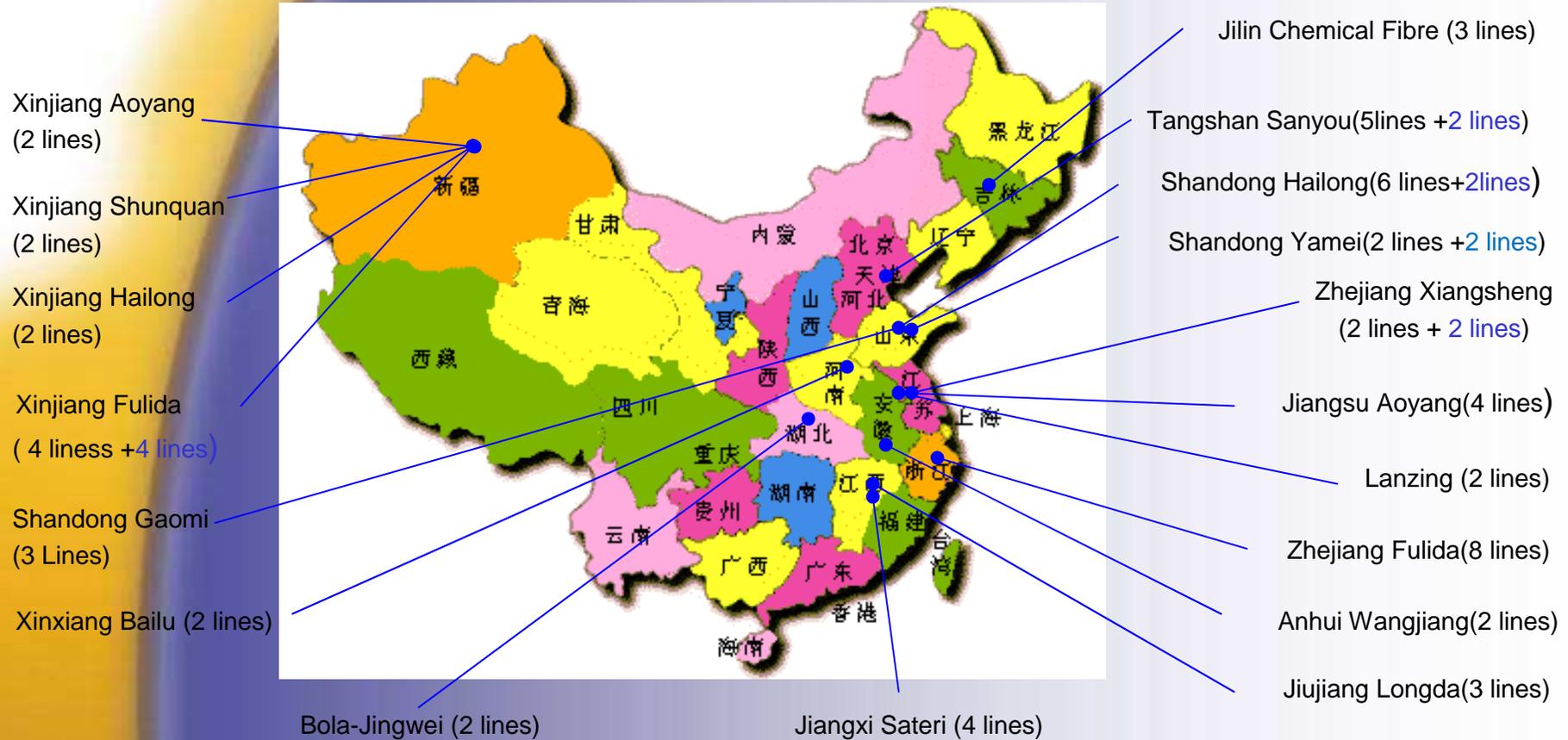
Rolls Type 辊轴类型	Residual moisture % 残余水分	Difference (Saving) 差别 (节约)
Rubber Rolls 橡胶辊	130%	10-20%
Non woven Rolls 无纺布辊	110-120%	

Steam saving: 6,750 Ton / year / line  
Money saving: EUR 0.135 Mio. / year / line

每条粘胶生产线,每年可省蒸汽6,750吨,折合欧元 135,000.00



# China viscose fiber market 中国市场粘胶短纤公司分布



70 viscose lines in China => total output 1.75 Mio. Ton / year.

10% moisture reduction => Steam reduction 0.2625 Mio. Ton / year => EUR 5.25 Mio.

中国市场有超过70条粘胶短纤线在运行,总产量约为1,750,000吨纤维.如使用FKM节能型辊,每年可减少蒸汽消耗 262,500 吨,可节省费用: 5.25 百万欧元.

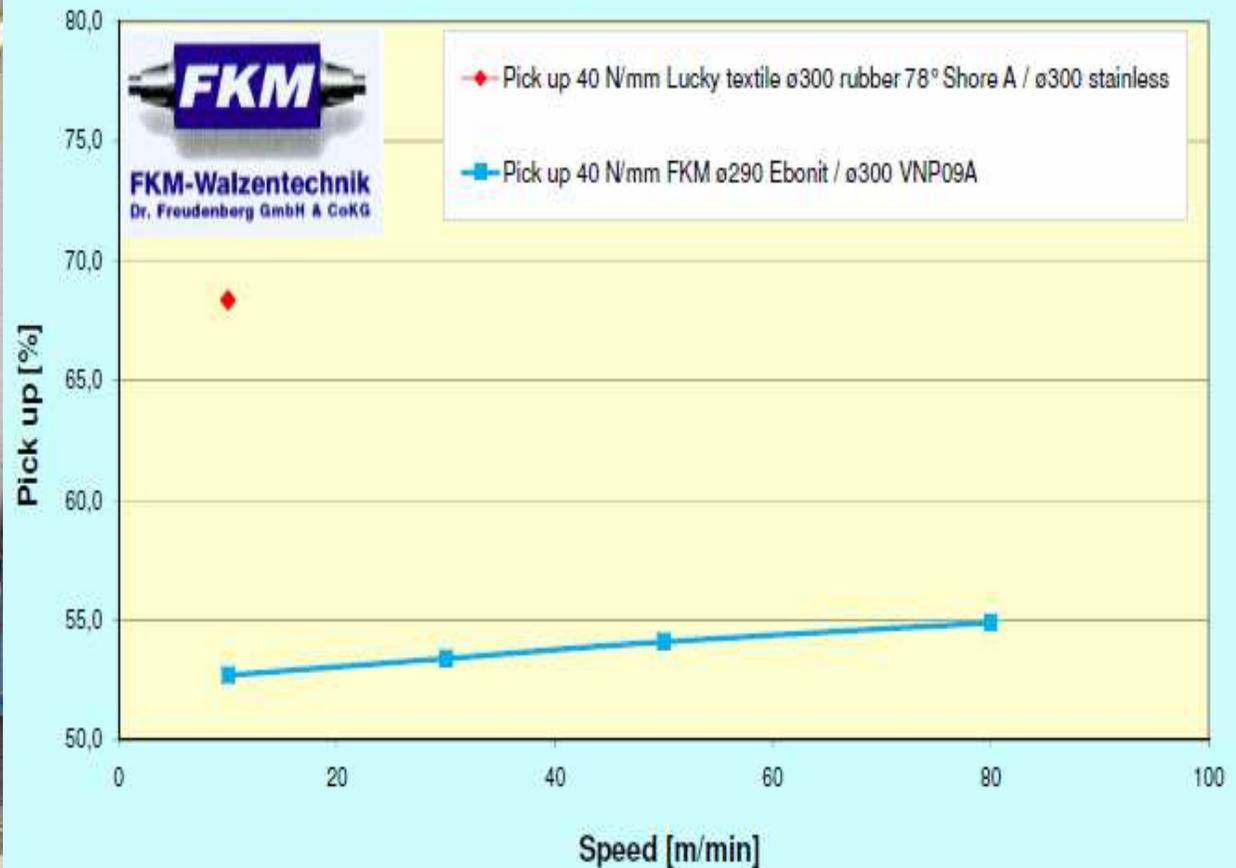


# Squeezing result comparison— Dyeing and finishing industry 轧液效果比较—印染和后整理行业



Pick up<sub>absolute dry</sub> (Medium water 25 °C) sample H2, Lucky textile

100% Co plain 285 g/m<sup>2</sup> Pick up 68.36% at Lucky textile with rubber roller



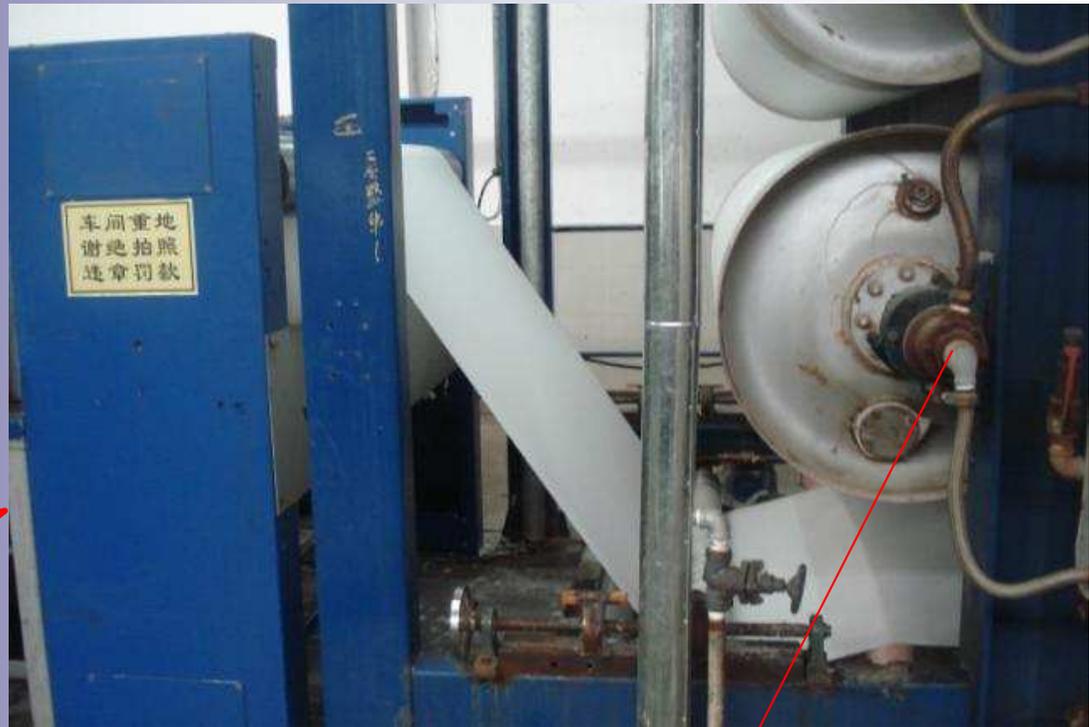
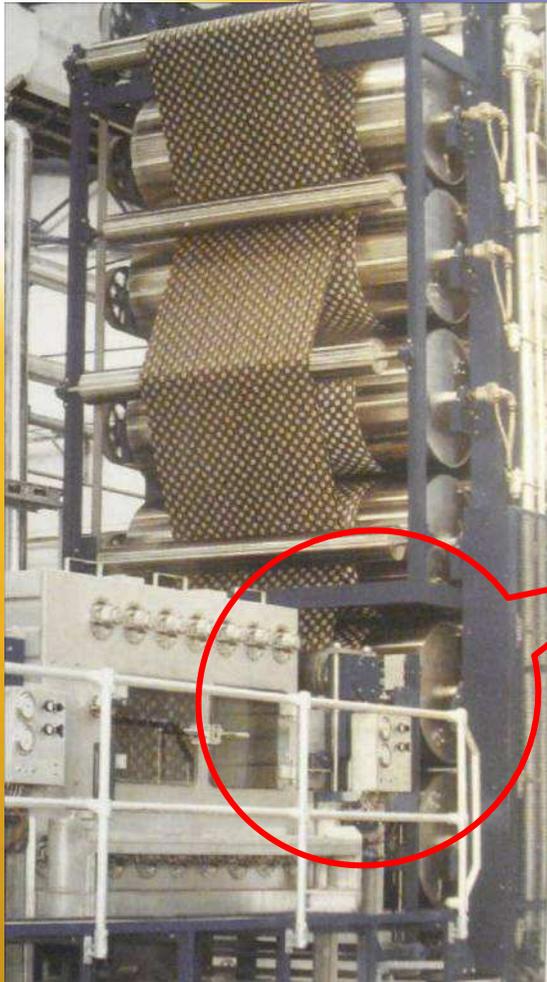


# Energy saving FKM无纺布辊能源节省

Calculation of energy costs when vaporizing water of a textile web				
	Pick Up 1	Pick Up 2		
Grammage dry [g/m <sup>2</sup> ]	285			Pick up1 => Rubber roller
Working width [m]	1.60			Pick up 2=> Non woven roller
Pick Up after Squeezer [%]	<b>68</b>	<b>52</b>		
Line speed [m/min]	70			
Line force Squeezer [N/mm]	40			
Price per ton of steam at 5 bar [€/ton]	20.00			
Days of production per year [days]	250			
Water in textile [g/m <sup>2</sup> ]	195	148		
Water in textile [g/m]	312	236		
Vaporization costs for 1kg water [cent/kg]			3.00	
Drying costs per m <sup>2</sup> [cent/m <sup>2</sup> ]	0.584	0.443		
Drying costs per running meter [cent/m]	0.935	0.708		
	<b>Cost / day [€]</b>	<b>Cost/ day [€]</b>	<b>Difference /day [€]</b>	<b>Difference per year [€]</b>
Drying costs per 1 working shift - 8 h [€]	314.22	237.91	76.30	19,075.39
Drying costs per 2 working shifts - 8 h [€]	628.43	475.83	152.60	38,150.78
Drying costs per 3 working shifts - 8 h [€]	942.65	713.74	228.90	57,226.18



LUCKY Operator said: After using FKM Non-Woven roller, LUCKY can saves 30% steam in drying process  
乐祺操作员说:应用FKM无纺布辊轴后,可节省蒸汽30%



After Use FKM Non-Woven roller, Lucky operator switch off 1/3 steam dryer drum.

应用FKM无纺布辊后,乐祺操作员关闭1/3烘干烘筒的阀门



# China Dyeing and Finishing (D&F) market

## 中国市场印染后整理公司分布



More than 176 D&F companies  
In Shandong province

More than 368 D&F companies  
In Jiangsu province

More than 480 D&F  
companies  
In Zhejiang province

More than 610 D&F companies  
In Guangdong an Fujian  
province

2000 D&F Companies in China => total output 49.3 billion meter/year.

10% moisture reduction=> Steam reduction 2.37 Mio. Ton => EUR 47.4 Mio.

中国市场印染后整理公司超过两千家,总产量约为493亿米印染布.每年将节省蒸汽2,370,000吨,节省欧元47.4百万.



## Energy saving Projects development 节能项目拓展

Work together with  
China Dyeing and  
Printing Association 同  
中国纺织印染协会合作

- Attend 2009 Shanghai save energy seminar
- Present FKM Non woven roller technology to CDPA

Work together with  
Zhejiang Dyeing and  
Printing Association 同  
浙江省纺织印染协会合  
作

- Present FKM Non woven roller technology to ZJ DPA
- Attend 2009 Hangzhou save energy seminar
- Visit top 10 Zhejiang textile companies with ZJ DPA

Work together with  
ZhengZhou Textile  
Machinery Co., Ltd  
同郑州纺织机械股份有  
限公司合作

- Visit customers with ZZTM together, customers request ZZTM equips FKM Non woven rollers with ZZTM refining machine
- Visit ZZTM and present FKM Non woven roller.



## Energy saving Projects development 节能项目拓展

Visit Dyeing  
& Finishing  
companies  
拜访印染客户

- Present FKM Non woven roller advantage
- Build reference company in South China Lucky Group
- After FKM has energy saving reference companies, Zhejiang YATAI group and other customers want to try out the new technology roller
- Many companies are interested and will visit FKM reference company.

Visit viscose  
fiber  
companies  
拜访粘胶客户

- Present FKM Non woven roller advantage
- Build reference company in North China Tangshan Sanyou Group
- Many companies requested Zhengzhou Textile machinery Co., Ltd equip FKM Non woven into refining machine.
- Many companies are interested and will visit FKM reference company



**End of the Presentation**  
**介绍完毕**

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**Thank you for watching!!!**  
**谢谢观赏!!!**