



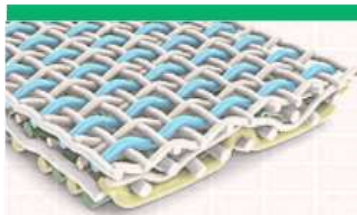
**wires & fabriks**

*... we bring life to paper*

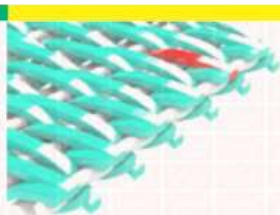
# EFFICIENT AND ENVIRONMENT FRIENDLY PAPER MAKING – VALUE ADDITION BY FORMING FABRIC AND CASE STUDIES

**Barathi G**

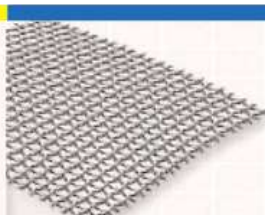
**Wires & Fabriks (S.A.) Limited, Jaipur**



**Forming Fabrics**  
Conveyer Belts  
Press Belts-ETP



**Dryer Screens**  
Spiral Screens



**Stainless Steel Mesh**  
Phosphor Bronze Mesh  
Pulp Fabrics



**Chemicals**



**Accessories**

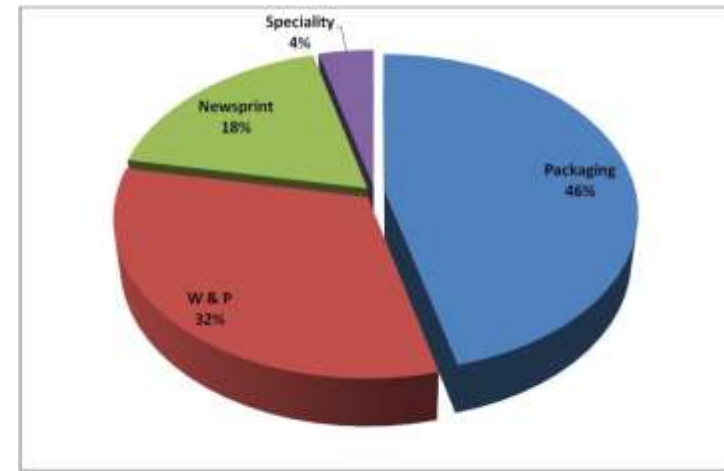


- ❖ Turn over >50,000 Crores
- ❖ 6<sup>th</sup> rank in Energy intensive industries in India
- ❖ 15<sup>th</sup> position among Top global paper producers.

- Share in globe paper production is about 2.6%
- Fragmented with over 750 paper mills and around 50 mills >50000 TPA.
- Capacity Utilization around 89%

❑ Market segmented as  
Packaging (46%),  
Writing & Printing (32%),  
Newsprint (18%) and  
Specialty (4%)

❑ Raw material used as  
Recycled (65%),  
Virgin (24%) and  
Agro-residue (11%).





In Lakh MT

S No	Paper grade	15 - 16	16 - 17	17 - 18	18 - 19 (P)	19 - 20(P)
1	Kraft	43.60	47.73	52.30	57.43	62.88
2	Writing & Printing	46.38	48.68	51.10	53.65	56.32
3	Paper Board	31.42	34.36	37.73	41.31	45.20
4	Specialty	2.09	2.13	2.17	2.21	2.25
5	Tissue	1.14	1.33	1.55	1.80	2.09
6	Newsprint	25.40	25.99	26.60	27.22	27.85
<b>Total</b>		<b>150.03</b>	<b>111.54</b>	<b>171.45</b>	<b>183.62</b>	<b>196.59</b>



\* Source : Care rating study

It is found the projected growth rate @ 10% in Kraft &Packaging grade whereas @5% in Writing & Printing segment.



## Competitive STRENGTH:

- + Large and growing domestic paper market
- + Know-how in non wood pulping and applications
- + Well developed printing industry
- + Local market knowledge



## Competitive Weakness:

- Fiber shortage -wood fiber and poor collection of waste paper
- Small and fragmented industry structure
- Attracting highly skilled manpower
- Infrastructure, high transportation cost
- High energy costs





## Competitive Opportunity:

- + Domestic market potential
- + Forest plantation potential
- + Integrates of combined wood and agro based papermaking
- + Government literacy program – increasing demand for printing/writing papers
- + Low labor costs (allow e.g. cost effective sorting of imported mixed waste)
- + Export potential



## Competitive Threats:

- Unpreparedness for international competition - both on price and quality
- Decline in capacity due to environmental pressures
- Decline in capacity as unable to compete at national and international levels with respect to quality and cost of products.





Now in Paper industry, the requirements of paper makers to produce the paper at ***environmentally and efficiently by economically.***

- Market emphasis on improvement of Paper quality
- Improved Paper surface due to modern printing technologies on all paper grades
- Efficient usage of costly fibers
- More filler addition to reduce input cost and improve paper properties
- Lower basis weight and faster the machine speed.



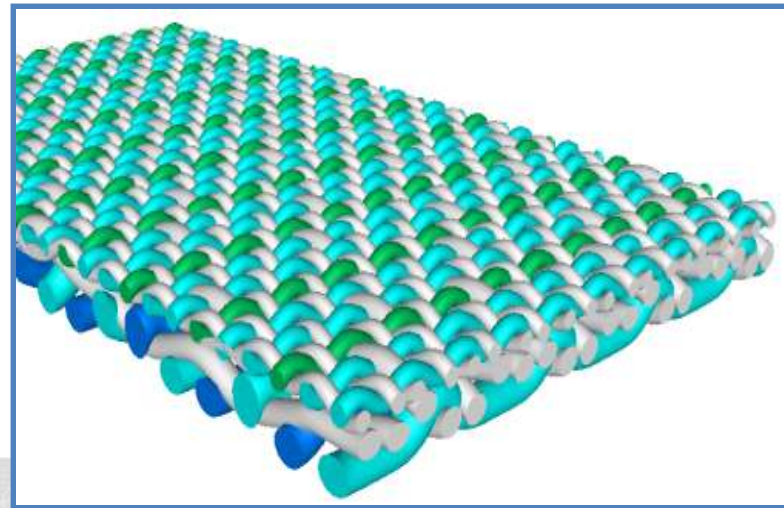


Fabric Property	Effect on Operation	Effect on Sheet quality	Effect on Cost
Drainage (Air Permeability, Drainage Index, Surface Open area)	Power consumption & Draws	Formation Off-couch dryness Speed of the machine	- Energy cost - Efficient cost
Fiber Support Index	Cleanliness in return run	Wire mark Sheet release Porosity	- Fiber cost
Maximum Frame length	First Pass Retention Clear back water system Clean run of machine	Improved two sidedness Less fluff/linting Improved total retention Less ETP load on drained fines and fillers	- Fiber cost - Efficiency cost - Energy cost of ETP operation

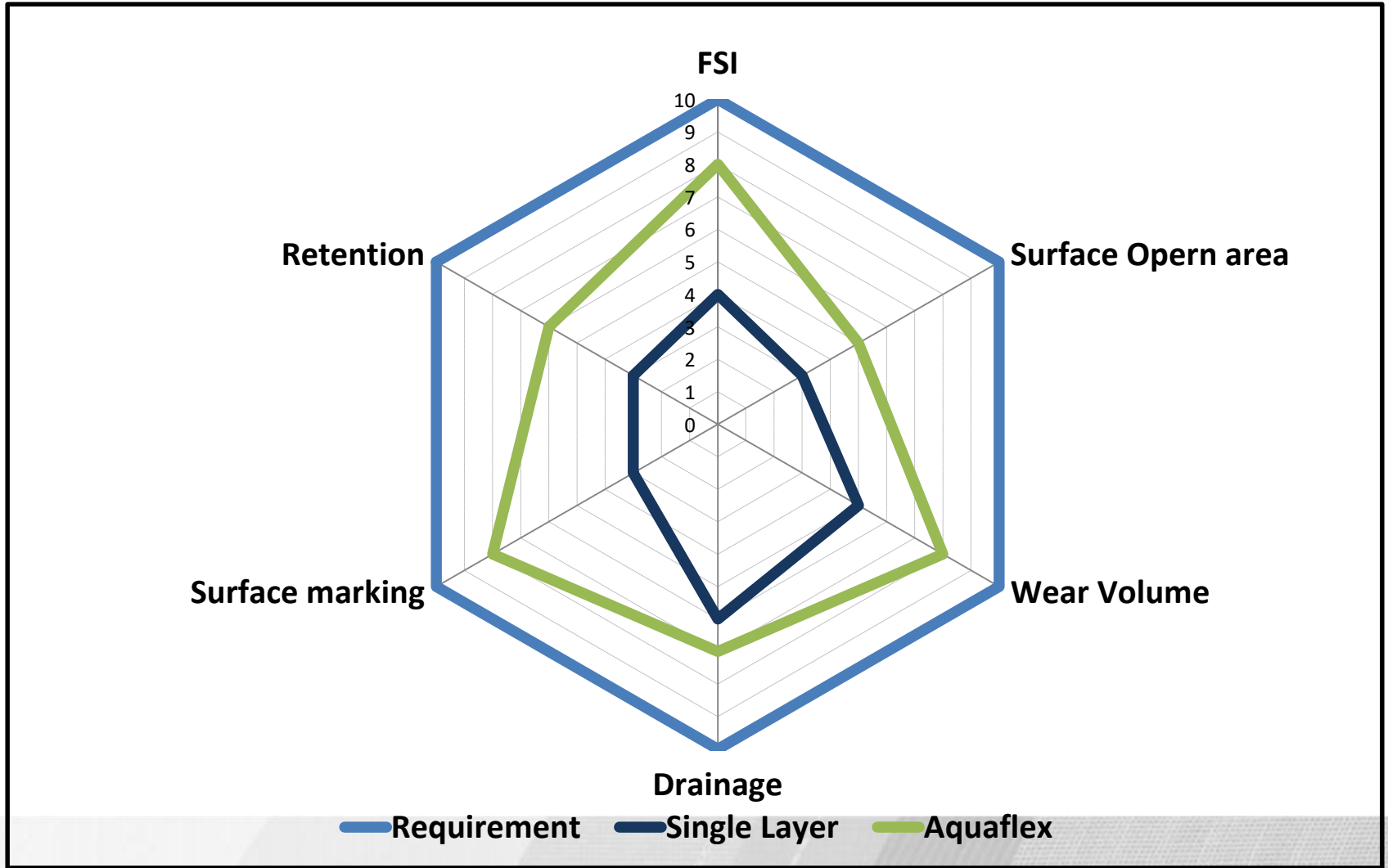


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New Forming fabric which should suits  
for Single Layer position Paper  
machines.....









(Drainage time in Sec)

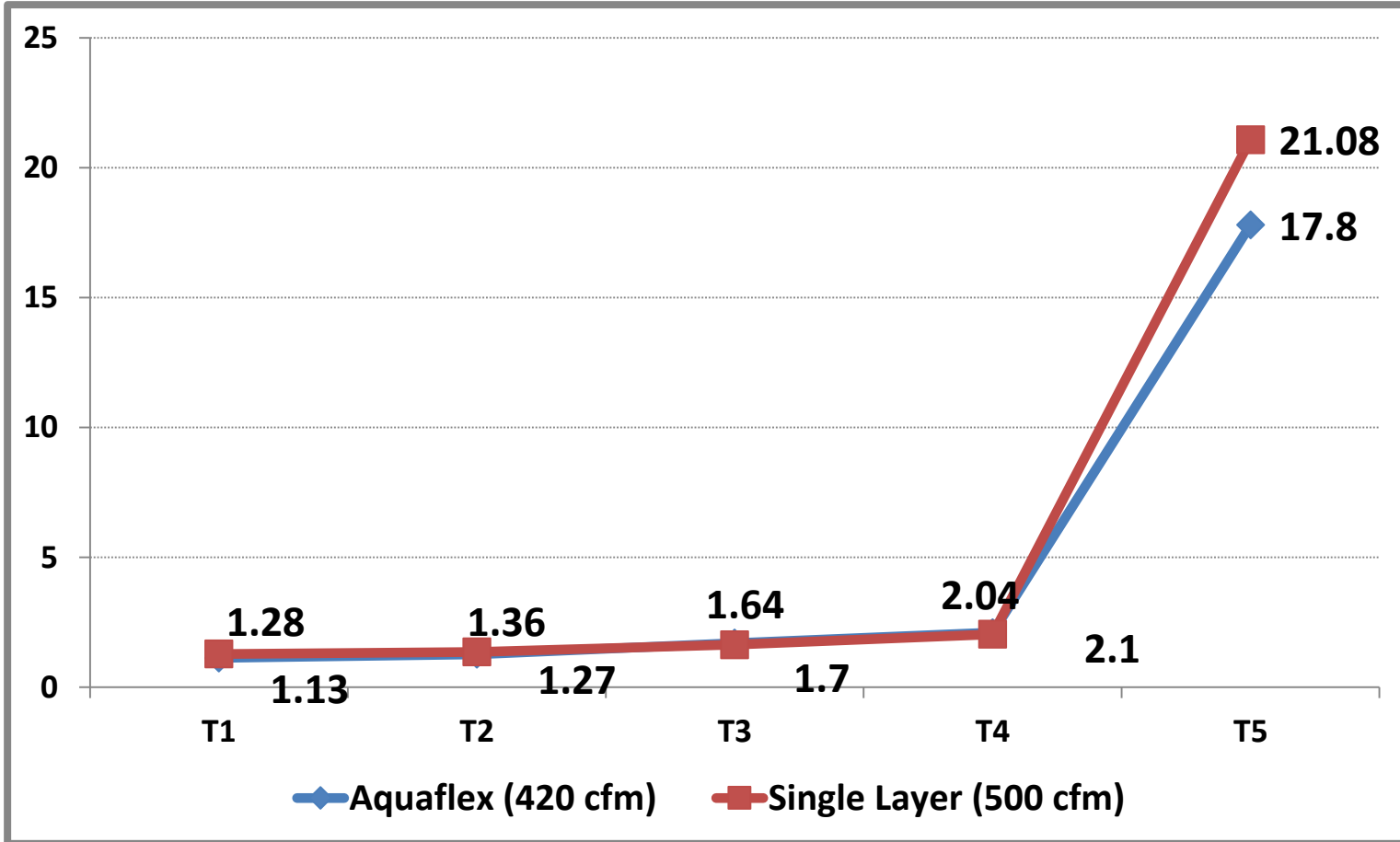
Product	T1	T2	T3	T4	T5
AQUAFLEX (420 cfm)	1.13	1.27	1.7	2.1	17.8
Single Layer (500 cfm)	1.28	1.36	1.64	2.04	21.08

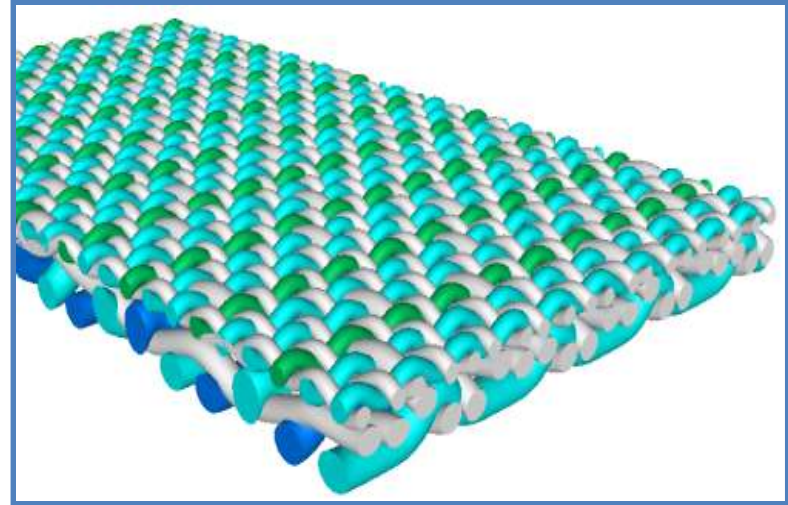
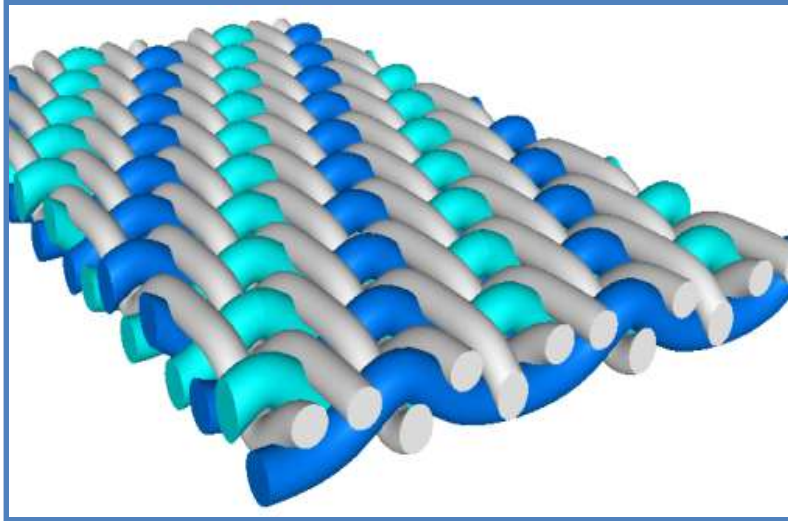
40 gsm sheets made with same consistency for measuring the time taken in seconds for standard Single Layer & New generation fabric (AQUAFLEX) designs.





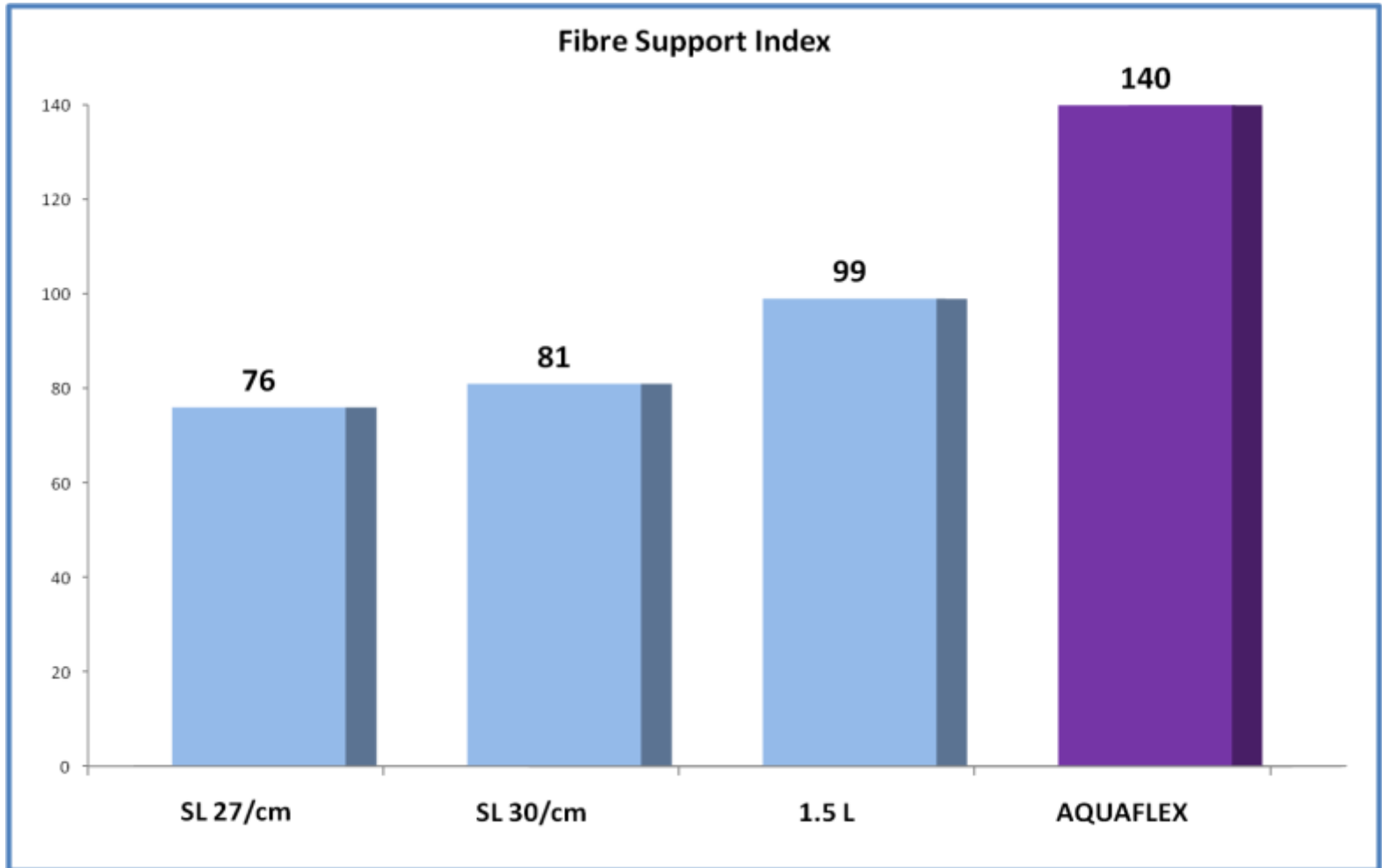
(Drainage time in Sec)





	5 Shed Single Layer	AQUAFLEX
Drainage Area %	29.9%	45.80 %
Fiber Support Index	76	140
Air Permeability, CFM	500	420







- ✓ Improved retention helps in efficient use of fibers,
- ✓ Increased off-couch dryness thus machine runnability improved,
- ✓ Clean run due to less plugging by improved mechanical retention,
- ✓ Good sheet release due to fine surface of fabric,
- ✓ High drainage capacity with short forming available time (with increased speed)
- ✓ Reduced solid lost thus reducing ETP load with better sheet properties.
- ✓ Less shower pressure required due to free drainage holes
- ✓ Less vacuum requirement and less drive power required of Wire part due to good drainage & less sheet sealing.
- ✓ Improved paper surface with less wire/drainage marking for better printability.

BENEFITS

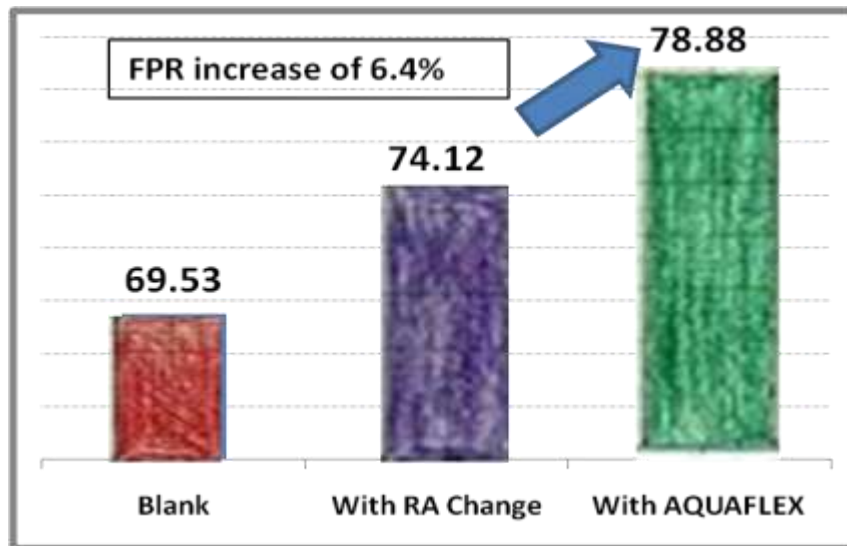




## Customer A:

Fourdrinier machine making 44 to 90 GSM with 360 m/min. speed with Recycled furnish where previously single layer was used.

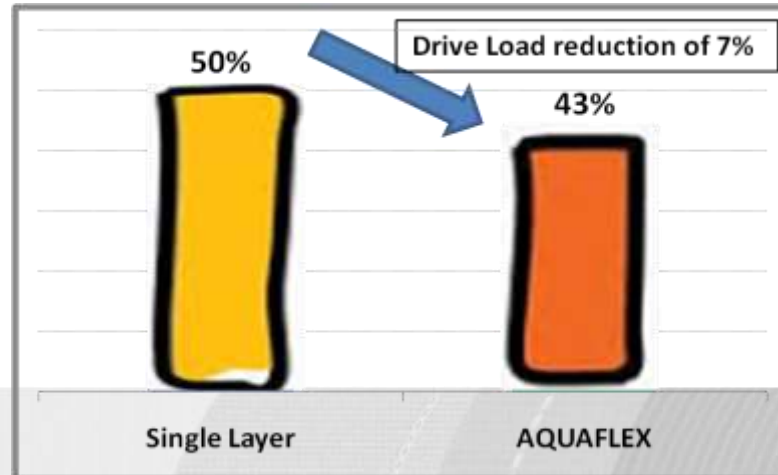
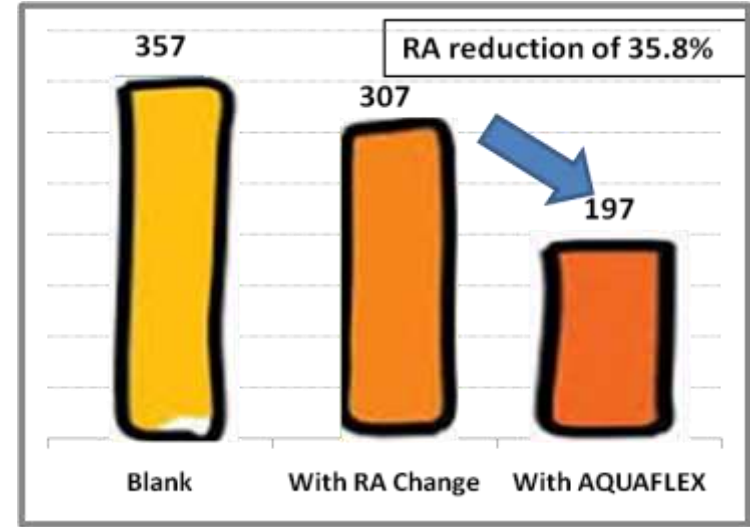
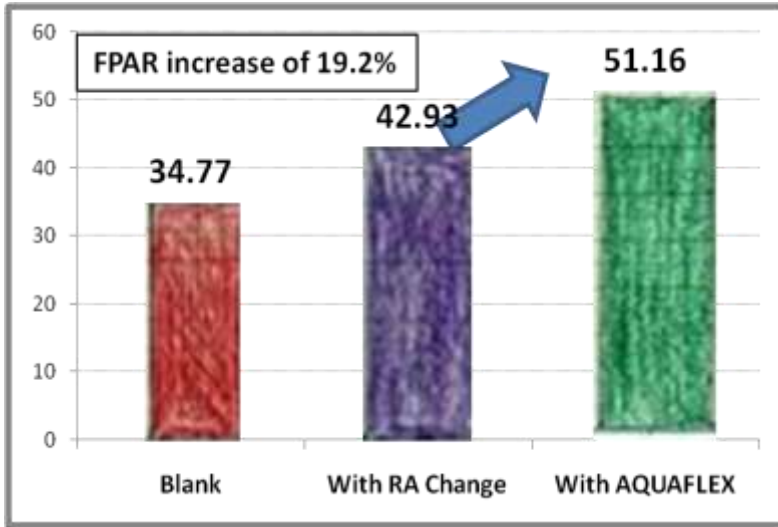
**Objective:** Improved retention and drive load reduction



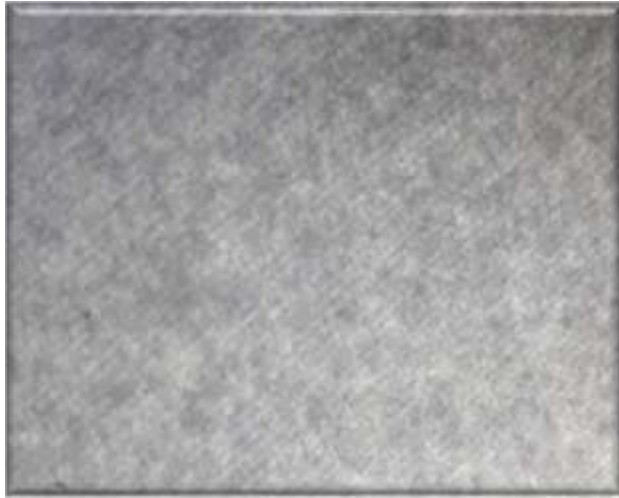
**First Pass Retention improvement**

## Results:

- ✓ **Higher First Pass Retention from 74.12 % to 78.88%. (+6.4%)**
- ✓ **Higher First Pass Ash Retention from 42.93% to 51.16% (+19.2%)**
- ✓ **Higher FPR yields less cost of fiber, high couch solids and thus less steam consumption.**
- ✓ **These improvements with reduced dosage of Retention aid chemicals.**
- ✓ **Drag load reduction by 7%**
- ✓ **Good printability by mark-free paper.**







Paper made with Single Layer –  
Surface marking



Paper made with **AQUAFLEX**– No  
marking

### Cost Benefit Analysis:

- ❖ Fiber saving due to Fiber retention – ***Reduced cost of fibers***
- ❖ Reduction in Retention aid chemicals – ***Reduced cost of chemicals***
- ❖ Drive load reduction – ***Reduced Energy cost***
- ❖ Improved off-couch solids– ***Increased productivity by speed up the machine***
- ❖ Quality improvement of end product

**Customer B:**

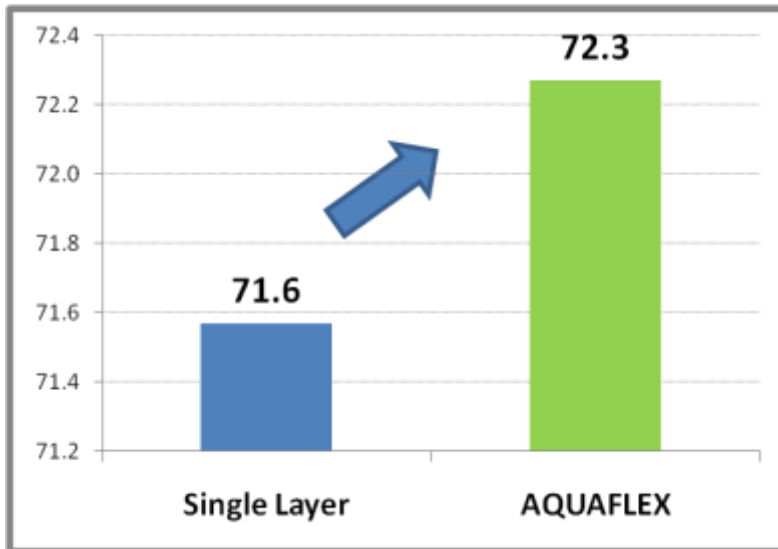
Fourdrinier machine making 44 to 90 GSM with 360 m/min. speed in Recycled furnish

**Objective:** Improved First pass retention

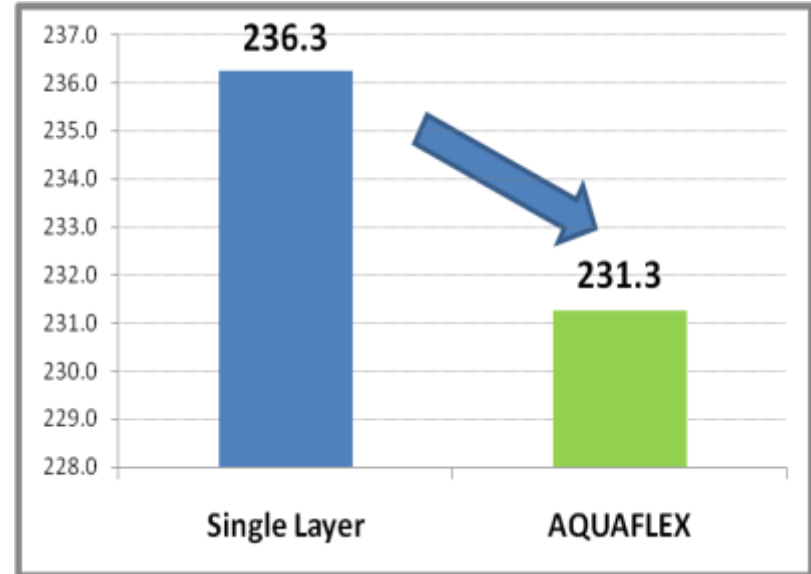
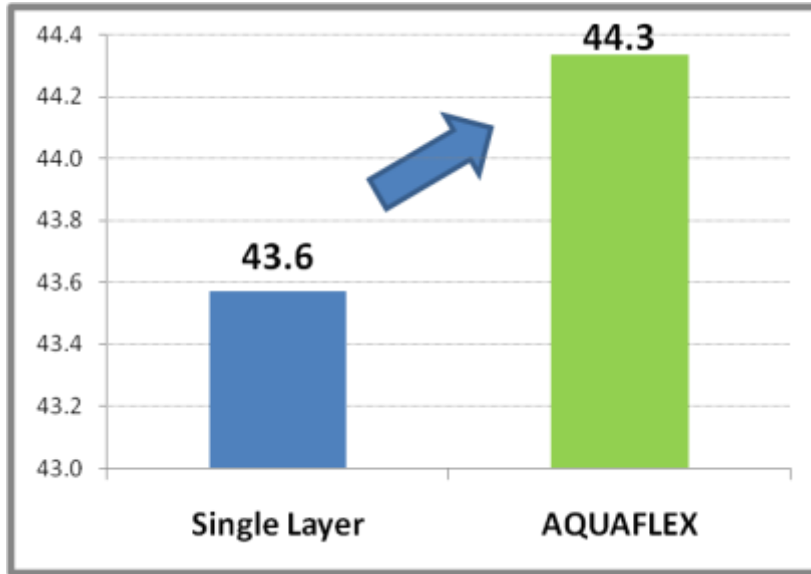
Reduced back water ppm

Reduced Drive load

Improved formation by controlled initial drainage

**Results:**

- ✓ **Improved First Pass Retention & First Pass Ash retention**
- ✓ **Higher FPR yields less cost of fiber, high couch solids and thus less steam consumption.**
- ✓ **Improvement in FPR with same dosage of Retention aid chemicals.**
- ✓ **Drive load reduction**



## Results :

- ✓ Off-couch dryness increased
- ✓ Wire part drive load reduced in all basis weight
- ✓ Solid lost reduced due to controlled initial solid lost.



Paper makers can produce paper in **efficiently and environmental friendly** by **reducing cost** of Operation and **Quality improvement** in the final paper making with the help of improvement in technology through 3 E's – Efficiency, Environment and Energy.

The new forming fabric design will help in

- ✓ Improved First pass fiber & ash retention for improved paper finish and reduce the fiber cost
- ✓ Reduce Energy cost by reduced drive load & steam cost by increasing off-couch solids
- ✓ Improvement in machine runnability by reduced stickies with required drainage capacity to match with Single Layer forming fabric
- ✓ Reduce solid lost in forming section to reduce ETP load and clean back water system
- ✓ Necessity has come to improve quality and reduce cost of operation for success in competitive way to fulfill the demand of growth of Quality paper in India.



**CONCLUSION**



**For your Attention**

