

## CLEANER.PRODUCTIONS

Production of garment with warp knitting vs. waterjet weaving



### Calculation:

example of the garment (pair of leisure trousers).

Fabric weight is 160g/m<sup>2</sup> for the finished fabric.

For one garment 2.0 m<sup>2</sup> of fabric are necessary (with the waste for cutting of 25% - it means 2.5 m<sup>2</sup> total fabric/piece).

Comparison of a small warp knitting workshop of 6 sets TM3 machines with a weaving factory to have the same production capacity. The total production output such a factory would be sufficient to produce approx. 10,000 pieces per day!

### 1. How much higher is the productivity

	1 set Waterjet Weaving per machine (600rpm)	1 set Warp Knitting per machine (2,000 rpm)
27 stitches/cm		
Working width	2,2 m	4,6 m
with of finished fabric	1,5 m	3,0 m (2 x 1,5m)
m <sup>2</sup> /day (efficiency 95%)	385 m <sup>2</sup> (density 32)	3206 m <sup>2</sup> (density 25.6)
no. of garment to be made/machine	154	1.283
Ratio of productivity	8,3	1

Since a reasonable production capacity for garment would be roughly 6,000 to 8,000 sets, we choose a factory with 6 sets of TM 3 as an example for this calculations.

With the given figures and a factory with 6 warp knitting machine the specific output quantity per day would be 7,700 pieces.

With a productivity advantage of 8.3 to 1 this means we need 50 water jet machines for the same production.



#### HIGHER PRODUCTIVITY

This warp knitting machines operate at an impressive level of efficiency – with a speed of 2.000 rpm, the TM 3 has a daily production rate of about 3206 sqm/d - one waterjet weaving machines produces only 12 % of a TM 3

## 2. How much higher is the energy consumption of waterjet weaving?

	Waterjet weaving	Warp knitting
Installed energy (kVA/machine)	3,7	13
Cons. in continuous process (kW/Mc)	1,7 (@ 600rpm)	5,3 (@ 2,000 rpm)
Total factory power consumption (kW)	85 (50 dets)	31,8 (6 sets)
Total daily energy cons. (kWh/day)	<b>2040</b>	<b>763,2</b>
Total daily energy cost. (RNB/day)	<b>1530</b>	<b>572,4</b>



### LOWER ENERGY CONSUMPTION

The total energy consumption to produce the same amount of fabric is 2,7 times less than with waterjet weaving.

## 3. What is the amount of waste water during fabric production?

(for 7,700 sets of garments 19,250 m<sup>2</sup> fabric are needed)!

	Waterjet weaving	Warp knitting
water usage per m <sup>2</sup> of fabric (kg/ m <sup>2</sup> )	4,3	0 - no water used!
water usage for 7,700 garments/day	<b>82.080</b>	0
water usage for 1 garment	10,7	0
sizing agent in the waste water (kg/day)	<b>9,625</b>	0



### NO WATER POLLUTION

No water pollution during the production process on TM 3 machines, this also means that no of the sizing agent PVA\* is drained. (\*Polyvinyl alcohol)

## 4. Less factory space is needed for warp knitting - conservation of space and higher GDP value / unit of space

	Waterjet weaving	Warp knitting
space requirement	900 m <sup>2</sup>	240 m <sup>2</sup>
weaving 18 m <sup>2</sup> , warp kn. 40 m <sup>2</sup>	50 sets	6 sets



### LESS FACTORY SPACE NEEDED

By using Warp Knitting instead of Waterjet Weaving less than one third of factory space is needed. This means a 3 times higher GDP value per square meter of factor space (for the same output as with waterjet weaving). It means also less amount of sealed industrial land surface, and less investment cost for purchasing the land!