

Additional information for the proposed JCM methodology:

"Energy efficiency improvement through the introduction of energy efficient looms in the textile industry of Bangladesh"

1. Overview of the proposed methodology

Unlike conventional looms (i.e. rapier Looms), air jet looms utilize compressed air to insert the weft yarn. With this mechanism, the air jet looms are capable of higher-speed operation. As a result, the air jet looms achieve higher productivity compared to the conventional looms. As such, the increased productivity achieved by introduction of air jet looms brings energy consumption reduction at textile factories.

2. The most prevalent loom type in the textile industry in Bangladesh

Among various loom types such as rapiers, projectile, air jet, and water jet available in the textile industry worldwide, the rapier loom has been the most prevalent loom type in the textile industry in Bangladesh. Considering the fact that most looms in Bangladesh are imported, it can be said that the "Import of looms in Bangladesh" sourced from International Textile Machinery Shipment Statistics (ITMF) ¹ is a good indicator of the recent share of loom types in the country. Based on the ITMF's statistics, as of 2014, the most prevalent loom type among the textile industry in Bangladesh is the rapier loom. As shown in the Table 1 and Figure 1, the rapier looms occupy over 90 % of imported loom in 2014 in Bangladesh. On the other hand, the share of air jet looms in the total import of looms in Bangladesh in 2014 was only 9 %. As such, the statistics suggests that the rapier looms are being used most prevalently among the textile industry in Bangladesh.

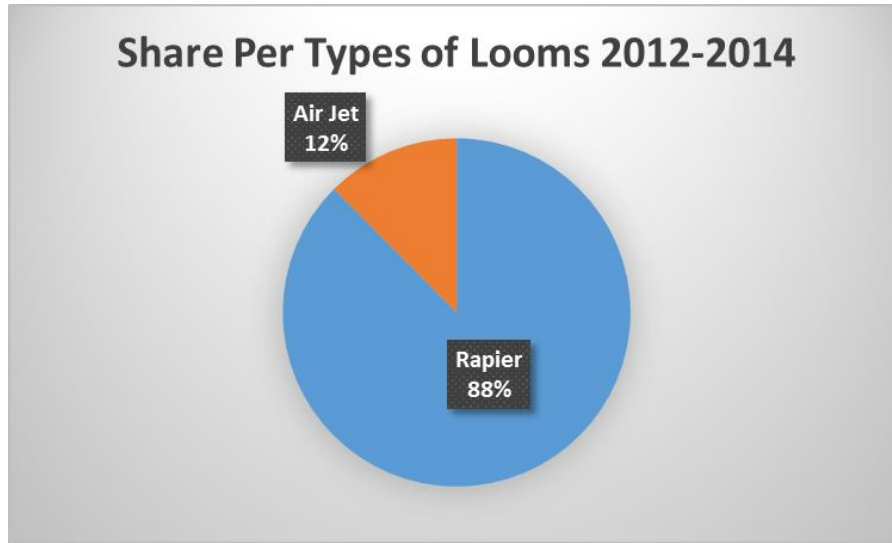
Table 1: Import of Looms in Bangladesh (2012 – 2014)

Year	2012		2013		2014	
	Units	Share	Units	Share	Units	Share
Rapier	1,428	89%	2,227	79%	4,945	91%
Air Jet	172	11%	588	21%	465	9%
Other	0	0%	0	0%	0	0%
Total	1,600		2,815		5,410	

Source: International Textile Machinery Shipment Statistics (ITMF)

¹ <http://www.itmf.org>

Figure 1: Import Share of Different Types of Looms in Bangladesh (2012 – 2014)



Source: International Textile Machinery Shipment Statistics (ITMF)

As suggested by the statistics shown above, the rapier loom is identified as the technology for calculating reference emissions under the proposed methodology.

3. Determination of the Energy Saving Coefficient (ESC)

The proposed methodology intends to establish the reference emissions as the product of the monitored electricity consumption of the project looms, the ratio of the energy intensity of the reference rapier looms and the project air jet looms, and the CO₂ emission factor of the electricity consumed by the project air jet looms. The proposed methodology designates "Energy saving coefficient" (ESC) to represent the energy intensity ratio of the project air jet looms and the reference rapier looms. The ESC is established using the following equation:

$$ESC = \left(\frac{WS_{PJ}}{WS_{REF}} \right) \left/ \left(\frac{PC_{PJ}}{PC_{REF}} \right) \right.$$

Where:

- ESC : Energy saving coefficient [fraction]
- PC_{REF} : Power consumption by the motor of the reference rapier loom [kW]
- PC_{PJ} : Power consumption by the motor of the project air jet loom [kW]
- WS_{REF} : Weaving speed of the reference rapier loom [rpm]
- WS_{PJ} : Weaving speed of the project air jet loom [rpm]

The Table 2 shown below lists various fabric types commonly woven in Bangladesh, and also lists the ESC values calculated based on the information sourced from loom manufacturers.

Table 2 : List of fabric produced in Bangladesh and ESC values

No.	Fabric width X weft density	Fabric composition	WS_{PJ}/WS_{REF}	PC_{PJ}/PC_{REF}	ESC
1	6,299	Poplin	1.60	0.47	3.43
2	5,354	Canvas	1.70	0.52	3.29
3	4,157	Oxford	1.80	0.55	3.27
4	3,528	3/1 Twill	1.80	0.55	3.27
5	3,780	3/1 Twill	1.70	0.52	3.29
6	6,299	2/1 Twill	1.70	0.52	3.29
7	5,417	2/1 Twill	1.70	0.52	3.29
8	4,031	2/2 Twill	1.80	0.55	3.27
9	3,528	Dobby	1.44	0.49	2.93
10	6,173	2/2 Twill	1.70	0.52	3.29
11	5,039	Poplin	1.80	0.55	3.27
12	5,039	Dobby	1.44	0.49	2.93
					(Minimum) 2.93

In order to adopt a conservative default value for the ESC, the minimum ESC was selected as the default value in the proposed methodology. Accordingly, the default ESC is set as **2.93**.