# Staple Nonwoven

# Fabrication Trial Plan

# Information needed before the Trial Plan

**Step 1: Select the configuration desired**

|  |  |  |
| --- | --- | --- |
| **Pilot Line Configuration** | **Pilot Line With (m)** | **Selected** |
| **Carded web only** | **1.0** | □ |
| **Roller top sample carded web only** | **0.25**  | □ |
| **Carded cross lapped, needled fabric**  | **1.5** | □ |
| **Carded cross lapped, thermally bonded fabric** | **1.4** | □ |
| **Scanfeed, thermally bonded fabric** | **1.0** | □ |
| **Scanfeed, needled fabric** | **1.0** | □ |

**Step 2: Specify the fiber**

The staple lab can blend up to 4 different fibers

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fiber Type [homo/bico]** | **Fiber material [Polymer A/Polymer B]** | **Manufacturer** | **Fiber size [denier]** | **Fiber length [mm]** | **Fiber ID [No.]** |
|  |  |  |  |  | **1** |
|  |  |  |  |  | **2** |
|  |  |  |  |  | **3** |
|  |  |  |  |  | **4** |

**Step 3: Specify fiber blend and fabric attributes**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Weight****[g/m2]** | **Fiber 1 [%]** | **Fiber 2 [%]** | **Fiber 3 [%]** | **Fiber 4 [%]** |
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**Step 4: Specify pre-needling parameters**

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| --- | --- | --- | --- | --- |
| **Unit** | **Needle Boards [No.]** | **Needles/m****[Max: 5,000]** | **Stroke Freq. [RPM)****[Max: 1,200]** | **Penetration Depth [mm)****[Range: 4-9]** |
| **Trützschler Needle Loom ENL** |  |  |  |  |

**Step 5: Specify needling parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit** | **Needle Boards [No.]****[**Up to 4; two up/two down] | **Needles/m****Max: 10,000]** | **Stroke Freq. [RPM)****[Max: 1,200]** | **Penetration Depth [mm)****[Range: 4-9]** |
| **Asselin A.50-RL Needle Loom** |  |  |  |  |

From these, the punch density can be calculated. Note that the punch density is a function of stroke frequency, the line speed, number of needles per meter and of course the number of passes through the needle loom.

The relation is defined as:

$N=\frac{d×f×p}{v×10,000}$

where

*N* = Punch Density

*d* = Needles/m

*f* = Stroke frequency

*p* = number of passes

An example is shown below:

**Step 6: Specify thru-air temperature**

# Maximum temperature (Max: 230 C):

# The Trial Plan

**Start-up Procedure:**

* Start the process with the fibers selected
* Adjust process until desired webs are produced at the desired throughput (m/min or kg/h/m)

**Run the Trial Matrix:**

Fabric roll length (m):

Fabric width (m):

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample Name** | **Weight****[g/m2]** | **Fiber 1 [%]** | **Fiber 2 [%]** | **Fiber 3 [%]** | **Fiber 4 [%]** | **Punch Density [Stiches/cm2]** | **Oven Temp [C]** |
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