



<b>ANNEX1</b>						
<b>PROJECT GENERAL SPECIFICATIONS</b>						
<b>Rev</b>	<b>Description</b>	<b>Edited</b>	<b>Check</b>	<b>Iss'd</b>	<b>Appr'd</b>	<b>Date</b>
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## **1. PROJECT GENERAL SPECIFICATION**

Starting from target production capacity this chapter reports main data relevant to typical material efficiency and production yield of the production line proposed.

For more details see also attached process flow chart.

<b>Target production capacity</b>		<b>Note</b>
Good product	42 Ton / Day	
Products type	Rolls and Panels	According DIN 18165
Product density	10 – 100 kg/m <sup>3</sup>	Within 500-5200 g/ m <sup>2</sup>
Products thickness	20 – 260 mm	Within 500-5200 g/ m <sup>2</sup>
Products standard width	1200 mm	Cut 2 x 600 mm
Production range	See point 3.	

<b>Yearly production time</b>		<b>Note</b>
Workable hours	8400 hours	50 weeks x 168 hours
Maintenance and fiberiser changes stops	400 hours	8 hours / week
Unplanned stops	336 hours	4 % of workable hours
<b>Fiberising workable hours</b>	<b>7664 hours</b>	

<b>Hourly production capacity</b>		<b>Note</b>
Fiberising workable hours	7664 h	
Good production capacity	1750 kg / h	Equal 13400 MT/Y

<b>Production line dimensioning</b>		<b>Note</b>
Batch plant capacity	60 ton / 16 hours	Working on 2 shifts
Melter output capacity	42 ton / day	Up to 50 ton/day with thermal barrier
Fiberising machines capacity	14 -16 ton /day each	
Curing oven and line capacity	45-48 ton / day	
Curing oven and line speed range	5- 55 m/min	

## **2. PROCESS INPUTS**

This chapter list and describe main input to the process.

### **2.1. Raw Materials**

<b>Glass raw materials</b>		
Description		Specific consumption [ kg/ ton of good product ]
Sand		534
Feldspar sand		152
Dolomite		136
Rasorite		106
Calcium carbonate		46
Sodium carbonate		215
Internal cullet ( 8 % of total batch charged )		104
This batch formulation is according to STM-Technologies “Technical specification of the glass raw material. Obviously the final batch formulation and consumption will depend on the chemical composition of the available raw materials and on final chosen glass composition .		

<b>Binder raw materials</b>		<b>Considering 5% binder solid content</b>
Description (NN) = % of solid content		Specific consumption [ kg/ ton of good product]
Resin solution (42)		77
Urea pellet(100)		26.5
Amonium sulphate (100)		0.6
Ammonia solution (19)		2.6
Silane solution (2)		4
Mineral oil emulsion (47)		8.6
Water		734

<b>Other production material</b>	<b>Depending on final equipment</b>
Pre glued kraft paper	For faced products
Pre glued aluminium foils	For faced products
Glass tissue	For faced products
Polyethylene for packing	About 2.5 m <sup>2</sup> each roll or panel pack
Glue for roll packaging	15-20 g each roll pack
Spinners	180-200 hours /each depending on pull
Maintenance materials (oil, grease)	

## **2.2. Utilities**

This chapter lists the main utilities required for the plant. The following values do not take in account data of services relevant to the building like building conditioning, building lighting, workshops (and relevant equipments), sanitary, finished products handling / storage, and so on.

Moreover for the equipment not included in STM-Technologies scope of supply (see Annex 2), for which STM-Technologies supply includes specification or basic design information only, summary data have been calculated by taking in account specification of equipment commonly available in west European market ( p.i. compressors , pumps , etc. ).

### **2.2.1. Primary utilities**

<b>INDUSTRIAL WATER</b>	
Used for	Cullet chutes , circuit re fill for losses
Maximum temperature	30 °C
Maximum Hardness	20 ° French degrees
Consumption	< 4 m <sup>3</sup> /h ( for evaporation)

<b>NATURAL GAS</b>	
Used for	Gas Furnace, Forehearth, Fiberising and Oven
Heat Net Value	8500 k Cal / Nm <sup>3</sup>
Consumption	350 -380 m <sup>3</sup> / ton
Pressure ( stabilized )	0,2 – 1,5 bar

<b>ELECTRIC POWER</b>	
Used for	All equipment
Low voltage	400 Volt – 50 Hz -
Consumption	1,100- 1200 kW/ ton product

### **2.2.2. Secondary utilities**

Secondary utilities are services needed for technological equipment that are supplied by means auxiliaries plant components like compressors, water treatment plants.

<b>DEMINERALISED WATER</b>	<b>Closed circuit</b>
Used for	Machines&Bushing cooling, Gas Furnace equipment
Max temperature at using points	25 ° C
Pressure	6 Bar
Hardness	5 ° French degrees
Indicative flow rate ( closed circuit )	40 m <sup>3</sup> / h
<b>COMPRESSED AIR</b>	
Used for	Fiberising, all equipment , de-dusting ,instrumentation
Max temperature	20 ° C
Pressure	7 bar
Minimum flow rate	4000 Nm <sup>3</sup> / h
Other features	Dry
<b>EMERGENCY DIESEL POWER SUPPLY</b>	
Used for	Cooling water
Voltage	380 V – 50 Hz
Installed power	200 – 250 KVA

### **2.3. Building main requirement**

See attached layout.

### **3. PPROCESS OUTPUT**

#### **3.1. Good products**

The proposed production plant will be able to produce high quality glass wool products for thermal and acoustic insulation applications. The final products will fulfil all standards applied in Europe at present time (DIN18165 )

	Density [ kg/m <sup>3</sup> ]	Thickness [ mm ]	Width [ m ]	Length [ m ]	Sqm weight [kg/m <sup>2</sup> ]	Fibre diameter [micron]
<b>Rolls</b>	10-24	40 – 260	0.6 – 1.2	According to rolls	0.5 – 5.2	4 - 6
<b>Boards standards</b>	9- 50	20 – 260	0.6 – 0.6	1.20 - 1.25	0.5 – 3.0	4 - 6
<b>High density boards</b>	60 – 100	20 – 50	0.6 – 1.2	1.20 - 3.0	1.2 – 4.0	7 - 12

Width and Length dimensions are typical dimensions for European Market. Special dimensions are possible but manufacturability has to be verified by STM-Technologies.

#### **3.2. Wastes**

Considering wastes coming out from the process , part of them are sellable as special products ( blowing wool ) , parts of them have to be processed by specialised companies and finally parts of them ( p.i. as particulate and part of binder ) are expelled through smoke emissions.

#### **3.3. Smoke emissions**

The total smoke flow rate coming out from the process is 265,000 Nm<sup>3</sup>/hr and it is composed by :

Furnace	25,000 Nm <sup>3</sup> /hr	
Forming suction	130,000 Nm <sup>3</sup> /hr	
Curing oven	40,000 Nm <sup>3</sup> /hr	
Dust filtering + cooling	70,000 Nm <sup>3</sup> /hr	

The standard equipment used to clean the smokes are :

- Forming suction : Cyclon , Demyster , water washing
- Curing oven : Cyclon , Demyster , water washing
- Furnace and end line equipment: Bag filters

By using the above mentioned equipment the expected pollution values are:

- Particulate < 50 mg/Nm<sup>3</sup>
- Phenol + formaldeyede < 20 mg/Nm<sup>3</sup>