

## **Spunbond Nonwoven (S.Z.) Co. Ltd**

### **Visit to the Facility**

Date of Visit: 4 July 2006

### **General Information on the Facility**

Nature of Business: Manufacturing of non-woven fabric and associated products in Shenzhen  
Working Hours: Office : 8:30am – 12:30pm & 2:00pm – 6:00pm (Monday to Saturday)  
Production Workshop: 24 hours (7 days a week)  
Number of Staff: 160 (full-time)  
1-2 (part-time)  
Age of Building of the Facility: > 7 years  
Duration of Occupation of the Facility: Same as above

### **Description of Operation and Observations during the Visit**

Spunbond manufactures non-woven fabrics using the spunbonding process. Polypropylene (PP) granules or pellets are used as the raw material for the manufacturing process. The PP raw material is heated and extruded through a spinneret plate to form a curtain of continuous filaments. The curtain of filaments ('web') is laid down randomly on a moving web take-up belt. The web is then passed through a hot calendar, where it is thermally bonded, to form the non-woven fabric final product. The fabric produced is then wound up into rolls.

The total site area of the facility is about 14,500 m<sup>2</sup>. There are a total of six buildings within the site, including:

- two finished product storage buildings;
- a raw material storage building;
- a building housing the production workshop and offices;
- a transformer house; and
- a staff dormitory block.

#### Product Storage Buildings

The product storage building is a one-storey building. No ventilation system is provided in the building.

#### Raw Material Storage Building

The raw material storage building is a one-storey building. No ventilation system is provided in the building.

#### Production Workshop

A water cooling system with cooling towers on the roof is used to provide cooling of the heat generated from the process in the production workshop. A number of turbine vents and exhaust pipes are installed on the roof of the production workshop. The turbine vents are used for air ventilation of the production workshop. While the environmental impact assessment (EIA) document prepared in May 2006 for the facility states that the manufacturing process is not expected to generate any air emissions, odorous emission was detected at one of the exhaust pipes during the visit.

The operations of the facility are powered by electricity supplied through the grid. As the production of non-woven fabrics involves heating of the PP raw material and thermal bonding, the power demand is high and the electricity consumption is approximately 1.1GWh per month. A backup generator was observed onsite but it reportedly had not been operated for more than one year.

The thermal manufacturing processes raise the temperature in the production workshop. An innovative “water-cooled screen” system, which is a type of evaporative cooling system, is used to lower the air temperature in the workshop. A two-layer water-cooled screen is installed outside the windows of the production workshop. Water is sprayed on to the screen with sprinklers installed above the top edge of the screen. The water is collected at the collection sump at the bottom of the screen and is recirculated with a pumping system for reuse in the cooling system. The air outside the workshop windows can reportedly be cooled by about 3-5 °C after passing through the water-cooled screen.

#### Offices

A fresh air intake has been installed on the roof of the office building for supplying fresh air to the office. The fresh air intake reportedly operates for 10 minutes in the morning and 10 minutes after lunch on every working day. The office is served by split-type air conditioners.

#### Transformer House

No air conditioning system is provided to the Transformer House.

#### Staff Dormitory

The staff dormitory also houses the main kitchen of the facility. Diesel oil is used as the fuel for the kitchen stove and approximately 100 to 200 litres of diesel oil is reported to be consumed each day. The diesel-fired stove is used for less than 1 hour each for the preparation of breakfast, lunch, dinner and late night snack. The main air pollutants from diesel oil combustion are nitrogen oxides, sulphur dioxide and particulates. The exhaust from the stove is directed through a stack to the roof top of the dormitory block for discharge. A separate stack is used to direct the cooking fume from the kitchen to be discharged at the roof top of the dormitory block. An electrostatic precipitator (ESP) has been installed to treat the cooking fume prior to discharge. An electric boiler is used to supply domestic hot water for the dormitory block.

#### **Identification of Good Practice Adopted**

- Use of roof turbine vents helps to reduce the energy required to ventilate the production workshop.
- Use of water-cooled air-conditioning system, which is a more energy efficient system than air-cooled system.
- Use of the “water-cooled screen” is an innovative and low-energy demand for lower the temperature inside the production workshop.

#### **Areas for Improvement and Recommendations**

- While stringent control in the operation of the mechanical fresh air intake to the office serves to save energy, the air quality inside the office may be affected if insufficient fresh air is supplied to the enclosed office. CO<sub>2</sub> is a good indicator for the adequacy of fresh air supplied to the indoor environment in this case. Installation of CO<sub>2</sub> sensors in suitable locations within the office area, which are linked to the operation of the fresh air intake, is recommended to ensure a sufficient supply of fresh air to the office.
  - While the EIA document indicates that there should not be any major air pollutant emitted from the manufacturing process, odour was detected during the site visit. It is recommended that the potential source of odour be identified and removed to ensure the occupational health of workers within the facility.
  - Despite the cooling offered by water-cooled screen system, the effect is not sufficient and the temperature inside the production workshop is still high, especially during the summer. It is recommended that mechanical exhaust system be installed at the heat source to extract hot air, thereby avoiding accumulation of heat within the production workshop.
-



*Fresh Air Intake for the Office*



*Exhaust Pipes on the Rooftop of the  
Production Workshop*



*Backup Generators*



*Transformer House*



*Separate Stacks for Cooking Fume and  
Exhaust from the Diesel-fired Stove from the*



*Water-cooled Screen for the Production  
Workshop*