



# Aspiration and dust filtration systems in plastic and rubber production lines

## Presentation of three realizations in elastomers and compounds production

### Application 1: rubber compounds production

The customer deals with the production and marketing of rubber compounds. This activity, like most of those carried out within this productive sector, involves the emission of specific pollutants such as dust, fumes and odors. For this reason it is very important to have appropriate plants, that can monitor emissions and reduce them.

### Gallery

In this specific situation, the company presented a problem of rubber powders and black smoke emissions from the four mixers used in the production process. Initially, the customer had a suction system composed of an electrostatic precipitator which, however, proved to be unsuitable to solve the specific problems arising from the processing of rubber.

**Tecnosida®** was contacted to improve the existing suction system, creating a plant in line with the customer's needs and compliant with current legislation.

### Aspiration and filtration of fumes and rubber powders

Following an appropriate technical inspection (a normal activity executed to assess the specific situation of the production line, of the equipments in use and to get technical data and measurements), Tecnosida® proposed the construction of a plant able to treat the emission flow. The plant consists of:

- extractor hoods in galvanized carbon steel for the direct suction of pollutants from mixers. In particular, in order to guarantee optimum aspiration, two types of hoods were used: an upper suction unit placed above machinery and equipped with side PVC strips; a side hood designed to convey the horizontal flow of the aeriform to the side of the capturing surface. The aspirated airflow is then conveyed, through appropriate pipes, to the treatment system (Dustdown® self-cleaning bag filter );
- Dustdown® self-cleaning bag filter for the separation and removal of powders emitted by mixers and aspirated by hoods. It is made of AISI 304 stainless steel and is equipped with a sedimentation chamber that allows the decanting of coarse powders.

The plant is also equipped with triboelectric probe, inverter and pressure stabilizer. The first, placed on the exhaust pipe, allows to monitor the emission of powders into the

atmosphere. Instead the inverter has been placed inside the electrical panel and allows to monitor the energy consumption of the suction system; while the pressure stabilizer, through the inverter, keeps the pressure constant.



Emissions analysis:

- Fumes temperature: 10 °C
- Pipe section: 0,63585 mq
- Fumes speed: 12,0 m/sec
- Real flow: 27469 mc/h
- Normalised flow: 26498 Nmc/h

POLLUTANTS	CONCENTRATION	CONCENTRATION LIMITS (mg/Nm <sup>3</sup> )
Dust	0,28 mg/Nmc	10
Dust	6,9 g/h	
Fluorinated organic compound	Absent	
Plasticizers	Absent	
Benzopyrene	Absent	
Sulfur	Absent	
VOC	9,6 mg/Nmc	
VOC	254,4 g/h	

## Application 2: elastomers production

Our customer is a company that, in various production plants, produces a wide range of elastomers: compounds in synthetic rubber (EPDM, NBR, CR, HNBR, ACM, AU, ECO, EU, CSM, AEM) and natural rubber ( NR, SBR, SN) both black and colored, silicon compounds and

fluorinated rubber. The company also produces customized solutions for the high-tech moulding industry.

The customer contacted us and requested the design, implementation and installation of a suction system able to manage three lines with variable operation and loading, equipped with various mixers with segregated (and non) functioning operation. The polluting load consists mainly of powders, some of which with binder behavior, and must be treated by a single centralized filter.

## Powders abatement from elastomer production

Tecnosida® accepted the request and performed a preliminary technical inspection to identify the critical points. They are linked to the high number of release points (over 20), the particular geometry of some production machines, the types of powders to be treated and the possibility of sudden changes in flow rate due to opening/ closing of some points of the production line.

The solution that was then proposed focuses on four points:

1. Dedicated design of collection points located on outlets, processing areas, dosing and weighing stations. The hoods have been specially sized according to the characteristics of the various machines and have been made of galvanized carbon steel sheet;
2. Integration of the line with mechanical winders electrically controlled equipped with flexible hoses and aspirators for the manual cleaning of specific areas;
3. Balancing and design of direct suction filter;
4. Dust filtration through the Dustdown® self-cleaning bag filter made of sturdy, profiled carbon steel sheet with stabilization circuit, dust collection hopper and special valve exhaust system to prevent product packing. Together with the filter, a special soundproof booth was provided for the soundproofing of the aspirator.



Tecnosida® plant has been realized in compliance with the BAT (D.MF.01) and has allowed to reduce emissions within the limits established by law, thus resolving the problem of the customer.

## Application 3: customized pipes production lines

The customer is an Italian company that operates in the rubber industry and deals with the production and marketing of customizable pipes and compounds.

This type of processing involves the emission of rubber powders, so the company decided to contact Tecnosida® requiring the construction of a plant able to solve their problem. The system must be placed at the service of the production machines: three mixers and a calender positioned in the dosing department and in the production of the compounds.

### Localized suction and filtration powders in rubber sector

Following careful technical inspections, Tecnosida® proposed the realization of an aspiration system consisting of localized suction systems and the Dustdown® self-cleaning bag filter. The localized suction represents the first stage of the abatement system, as it allows to capture pollutants directly at the source. It is composed of two extractor hoods placed at the service of an open mixer and a calender, two articulated and self-supporting suction arms made of aluminum and a series of vacuum cleaners for the capture and removal of dust from specific operating areas. These devices are very important to avoid dust dispersion and, consequently, to heal the working environment by protecting the health of the operators.

The flow of air aspirated by the devices described above is then conveyed and treated inside the Dustdown® filter. It is made of sturdy galvanized carbon steel sheet, is equipped with a 260m<sup>3</sup> filtering surface and is complete with a suction unit and other elements that guarantee optimal

operating efficiency. Furthermore, the filter is produced in compliance with the BAT of the DGR / 2913943-2003 relating to dust emission.



Tecnosida® realized the system in compliance with current regulations and paying the utmost attention to environmental protection. The electrical panel is in fact equipped with inverter for monitoring and reducing energy consumption; atmospheric emissions comply with limits established by the Italian Legislative Decree 152/2006.

Thirty years of experience in the sector has allowed us to create these turnkey plants designed specifically for the needs of our customers, meeting their approval and subsequent satisfaction for our work.

For more information please contact us: we will design the best solution according to your needs!