

**INDUSTRIE
CHIMICHE
FORESTALI**

ENVIRONMENTAL REPORT

2018 - 2020

INDUSTRIE CHIMICHE FORESTALI S.p.A.

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Production plant Marcallo con Casone – MILAN – ITALY

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Introduction to the Environmental Report by the Managing Director

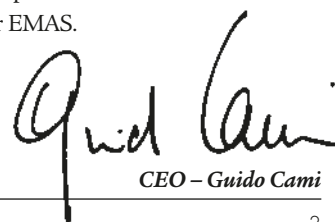
I am pleased to present Environmental Report 2018-20 for the **Industrie Chimiche Forestali S.p.A.** (ICF) in Marcallo con Casone (Milan), referred to data recorded in 2017. This updates the 2017 Report and introduces an important innovation. In fact, from 2017, with the acquisition of the company Adhesives Based Chemicals S.r.l. (ABC), a group member company that operates in the same site, ICF's environmental data have been combined with those of ABC S.r.l. The company, which already operated with certified quality systems for environment and safety, is now part of the single corporate framework, and thus contributes its environmental data to this Environment Statement. We are extremely pleased both for the results obtained by Industrie Chimiche Forestali S.p.A. in the course of these years for its environmental and market performance, and for the extension of the EMAS regulation also to the ABC Division. Respect for the environment and sustainable development have become matters of primary importance for the people who work at the plant. The first steps towards building an integrated company management system were taken in 1997, with the adoption of a Quality Management System in compliance with UNI EN ISO 9001 standard, an Environmental Management System in compliance with UNI EN ISO 14001 standard and EU Regulation n° 2017/1505, and a Safety Management System in compliance with OHSAS 18001/2007 standard. These guidelines are firmly established and have become strategic tools for ongoing improvement today, more than ever, also considering the merger with ABC as a Division. This document updates ICF S.p.A.'s 2017 Environmental Report, in compliance with requirements set forth in the EC Regulation for the Eco Management and Audit Scheme (EMAS) that the company has voluntarily adopted, confident that, in doing so, it will progressively enhance and extend the commitment made regarding environmental issues.

The chapters that follow deal with interesting topics such as:

- a brief introduction to our company with its 2 Divisions (ICF and ABC) and its activities;
- the environmental policy that is consistent with the company's strategic guidelines;
- the urban, geological, and territorial setting of the area occupied by the factory, highlighting its impact on the surrounding environment;
- a complete, detailed description of ICF S.p.A.'s plants, production processes and products, with an indication of their application on the market;
- the organisational structure with special reference to the responsibilities and activities of the environmental management departments;
- direct and indirect environmental aspects resulting from ICF S.p.A.'s activities, along with explanatory material presented as trend tables and graphs;
- the criteria adopted to evaluate the significance of the environmental aspects and impact;
- a description of the measures, equipment installed, and instruments used to limit and minimise environmental impact;
- a description of the programme and goals for improvement in the environmental field.

The final glossary will certainly be useful to understand technical and specialist terms and abbreviations used in the text. Participation in the Community EMAS System has called for the cooperation and involvement of all the plant's staff, who have taken some time out of their daily commitments for EMAS.

I would like to thank all the Forestali Team for this great job!



CEO – Guido Cami

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1. PRESENTATION OF THE COMPANY

Industrie Chimiche Forestali S.p.A. and its mission

Industrie Chimiche Forestali S.p.A. (hereinafter referred to as “ICF” or “The Company”) is an Italian corporation based in Via Kennedy 75, Marcallo con Casone (Milan).

ICF's corporate mission is centred on the activities described below:

- manufacture, transformation, independent or dealer-based sale of textile products, adhesives, resins, synthetic resins, plastic materials and wide-ranging chemical products for both industrial and other use;
- research, development and sale of technology, release of production licences, construction, installation, independent or dealer-based sale of systems and machines relative to its business sector.

ICF includes two divisions specialised in producing and selling:

FORESTALI DIVISION (hereinafter referred to as “FORESTALI”): adhesives, toe-puffs and stiffeners for the footwear industry, both solvent and water-based solvents for the leather goods and upholstered furniture sector.

Adhesive Based Chemicals DIVISION (hereinafter referred to as “ABC”): adhesives for the automotive, packaging and industrial sectors.

Industrie Chimiche Forestali S.p.A. (ICF) has been in business since October 2006. The product line has become the Forestali Department in the current corporate framework. Production activity is the same, while the name has changed: the previous company name was Forestali s.r.l., which has conducted business since 1918. Forestali has been the leading Italian company making components for the footwear industry. At the production site in Marcallo con Casone, the company especially carries out the research, production and marketing activities specified below:

- adhesives, primers, and activators;
- materials for toe-puffs, stiffeners, linings, reinforcing and soles.

The production of adhesives constitutes the most specifically chemical aspect of activities. Adhesives produced are marketed in the upholstered furniture sector with the Durabond brand, making and marketing solvent and water-based adhesives. In the leather goods sector it partners the most prestigious brands by making water-based adhesives and reinforcing for fillers.

Regarding the Forestali Division, ICF S.p.A.'s current market is ahead of the footwear sector, particularly for making adhesives and materials for toe-puffs, stiffeners, linings, reinforcing, and soles.

The major adhesives produced include:

- adhesives to be dissolved: polychloroprenes, with a natural rubber base or synthetic rubber base;
- water-based adhesives;
- synthesis adhesives: polyurethanes;
- primers and activators.

The Adhesive Based Chemicals Division conducts business in the sector of industrial adhesives for automotive and packaging applications. This production plant was established in 2005 and has been

located at the Marcallo con Casone site since then. In January 2017 Adhesive Based Chemicals S.r.l. was acquired and turned into an ICF S.p.A. division.

The production of adhesives in the ABC Division includes:

- synthetic polyurethane adhesives with and without solvent;
- polyurethane adhesives in an aqueous solution;
- nitrocellulose-based adhesives, nitrile rubber and nitrile butyl rubber;
- cleaner.

Industrie Chimiche Forestali S.p.A. also controls the commercial branch Forestali de Mexico S.A. de C.V. (an open-ended collective investment scheme) in Mexico.

It ranks high in international markets. To date it exports to more than 60 countries around the world, with more than 70% of its turnover being exported.

Market shares

The EU countries involved are Germany, France, Spain, Portugal, Poland, Hungary, Slovenia, and worldwide we have Mexico, United States, North Africa, Columbia, Japan, China, Taiwan, Vietnam, India, Pakistan, Bangladesh, Turkey, the Middle East and Eastern Europe (Russia, Ukraine).

ICF and EMAS

ICF applies a policy that covers Quality, the Environment, and Safety. In 1997 it achieved the goal of having its Quality System certified according to the UNI EN ISO 9001 standard. That same year, it consolidated its environmental commitment by taking part in the *Federchimica "Responsible Care"* project. Immediately after this, in 1998 ICF adopted an Environment Management System and obtained *environmental certification according to the UNI EN ISO 14001 standard*. In April 2009 it obtained certification for its Safety Management System in compliance with OHSAS 18001 standard. From 2014 Industrie Chimiche Forestali S.p.A. has applied a Model that is consistent with Legislative Decree 231/01. In order to make its commitment to the environment public and accessible to its clientele, the authorities, and anyone else enquiring about the same, it has complied with EMAS Community Directive 1836/93 since 2000, as Forestali. This was validated and registered under the number 100056 of 30/05/2001. This Environment Statement was drawn up according to *EC EMAS Regulation 2017/1505*.

The commitment in the environmental field takes concrete form with an ever more extensive study and production of *environment-friendly products* (water-based adhesives) that also comply with the criteria laid down by the *Community Regulation for Ecological Quality of Footwear 2002/231/CE*.

2. ENVIRONMENTAL POLICY

Diffusion of the Environmental Policy

The Environmental Policy for the Marcallo con Casone factory was drawn up in March 1998 and was subsequently updated over the years, up to this edition of 30 November 2017 signed by the Manager, and which also includes the Quality System.

The next page contains the full current text. All employees of Industrie Chimiche Forestali S.p.A. receive instructions concerning the Environmental Policy through specific classes and training meetings and other occasions designed to promote awareness.

The importance of the Quality and Environmental Policy

This policy is made known and distributed to outside operators working on the site, in compliance with the environmental criteria laid down and distributed to public auditing bodies. It is also published on the corporate website. It represents the starting point and point of reference to identify environmental objectives and programmes for annual improvement. At meetings called specifically for review purposes, the Management looks at the permanent validity of the Environmental Policy and evaluates its adequacy or the need for revision following any changes to either circumstances or activities.



The Quality and Environmental Policy Declaration

Industrie Chimiche Forestali S.p.A.'s priority goals are: Quality, Profitability, Safety and Protection of the Environment.

Implementation of a Quality and Environment Management System has been integrated into corporate management for lasting success, and developed to ensure:

- efficient use of resources;
- an evidence-based decisional process;
- keen focus on customer satisfaction, and on the needs and expectations of other relevant parties concerned. Industrie Chimiche Forestali S.p.A.'s mission is also to ensure efficient service and that products are always safe, environmentally-friendly and reliable. This is a crucial decision that must be understood and implemented by everybody, with the utmost involvement and participation, underpinned by the awareness of working for a common interest. Awareness that the quality of the product and service provided, and respect for the environment, have a decisive impact on the image and competitive position of Industrie Chimiche Forestali and, therefore, on its profitability, has led to the definition of a strategy centred on the following principles:

- *the product and service provided must always comply with the laws and regulations in force, with the needs of clients and with internal specifications;*
- *product and service quality must always be as promised, and consistent with client expectations to meet the demanded quality and do everything feasible to know and anticipate the client's needs;*
- *control of all operative phases must lead to the ongoing improvement of product quality and process efficiency, achieving energy saving and reducing the impact on the environment;*
- *education and training for all ICF personnel must be an ongoing commitment of the Management;*
- *significant environmental impact, emissions, waste, water discharges, energy consumption, noise, fire, use of hazardous substances and of raw materials, and product end of life must be kept under control to minimise their impact on the environment;*
- *transparent, collaborative relations must be maintained with both Public Authorities and citizens;*
- *modifications to the plants must be tested and evaluated to ensure that they do not jeopardise Safety and Environmental requirements;*
- *suitable procedures are adopted to deal with emergency situations in order to limit the resulting damage;*
- *the system's performance must be constantly evaluated, and suitable corrective actions must be taken to correct any deviations and to improve performance.*

Involvement and cooperation are essential requirements to achieve the goals defined and to please all parties concerned.



COO – Marcello Taglietti – Marcallo con Casone, 30th November 2017

3. DESCRIPTION OF THE ACTIVITY

3.1 – A short history

Industrie Chimiche Forestali: Yesterday

The Company was founded in 1918 under the name Industrie Chimiche Forestali (ICF) in Maccagno, in the Varese Province, to extract pyroligneous acid from wood. In the 1920s, it started making formaldehyde as a derivative of pyroligneous acid, first in Maccagno and then at the plant in Sesto S. Giovanni.

In the 1930s ICF's activities were stepped up by launching Società Italiana Resine SIR to make phenolic resins in Sesto S. Giovanni. In 1941 it started producing special impregnated fabrics for the footwear industry. In the 1950s it started making adhesives.

Having sold SIR, formaldehyde production continued in Maccagno and Sesto S. Giovanni until 1983, the year in which Industrie Chimiche Forestali stopped making basic chemicals and finally set about tackling the footwear sector. In 1984, the name and form of the company was changed from Industrie Chimiche Forestali to Forestali S.r.l., keeping the abbreviation ICF in the Company logo. In 1987 Forestali transferred production from the Sesto S. Giovanni plant to the new premises in Marcallo con Casone, in the province of Milan. On 31st December 1999 it ceased production at the Maccagno plant where it made toe-puffs and stiffeners.



Industrie Chimiche Forestali: Today

Currently the only production site in Marcallo con Casone manufactures, for the Forestali Division, toe-puffs and stiffeners for the footwear industry, and adhesives for the leather goods and upholstered furniture sector.

The Marcallo con Casone factory also includes the ABC Division, which produces industrial adhesives for automotive and packaging applications.

The future of Industrie Chimiche Forestali

The new challenges launched by the global market have seen ICF respond by paying special attention to environmental aspects, considered as added value for their own product and a corporate ethical standard to be complied with.

Hence the company has a dual commitment to design products that are increasingly environment-friendly, and to minimise its environmental impact on the territory by monitoring its own Environment Management System. Environmental improvement of production processes and products is a strategic objective for ICF to strengthen its competitive role and meet emerging social needs. Strategies have been launched to acquire new markets, and potential new partnership agreements are being studied, always consistently with the environmental goals set beforehand.

3.2 –The Marcallo con Casone plant

Geographic location, weather conditions

The Marcallo con Casone plant is located in the south-western area of the Province of Milan, just a few kilometres from the town of Magenta. It borders on the Regional Ticino Park and is about ten kilometres from the Ticino River.

This area is characterised by high intensity industry and infrastructures, along with a significant amount of agricultural activity that has survived to date.

The municipal area features moderate continental climate with hot and sultry summers and cold foggy winters. The mean annual temperature is about 13°C. Winter is characterised by an average monthly temperature in the range of 0°C-10°C. Spring features temperatures between 10°C and 20°C for about 2 months. Summer temperatures are over 28°C-30°C for three months, while autumn records temperatures in the range of 10°C-20°C. Wind speed is usually higher in spring and summer, but starts dropping in August, reaching the lowest levels in autumn and winter. In 2016 the wind dropped below mean values recorded over a ten-year period only in December, and peaked in May and June, but significant values over average were only recorded in January and August. Mean rainfall is 1,000 ÷ 1,100 mm/year, which occurs especially in spring and autumn. Rainfall can be classified as sub-coastal, intermediate between the Po Valley and the Apennines.

No exceptional natural weather events have been recorded for the past 20 years.

Zoning of the area and surrounding areas

The existence of numerous irrigation ditches and artificial irrigation canals, some no longer working, bear witness to the recent past during which agriculture exceeded the industrial sector.

Part of the Marcallo area is situated in “Parco del Gelso”, which belongs to the western sub-system and which also comprises PLIS4 in Alto Milanese, Rugareto, Bosco di Legnano, Roccolo, Rogge, Mulini and Basso Olona. Parco del Gelso has a surface area of about 1,043 ha and includes the municipalities of Marcallo con Casone, Mesero and S. Stefano Ticino. The area is basically flat farmland with a capillary irrigation structure that is well preserved and used to date, made up of a system of irrigation ditches derived from Villoresi and from the many resurgences, which are marked by woodland and by rows of trees that were once mulberry and are now locust trees and *Prunus serotina*. Besides these we find an important network of tree-lined paths of historical interest that link the many rural courts.

The farmland presents a poorly differentiated productive activity with considerable presence of sowable land (especially corn), sporadically mixed with poplar groves, while bovine breeding farms are widely present, especially to produce milk.

Communication network

It is located in an area with several infrastructures and communication routes, mainly State Road n°11 Padana Superiore about 300 m to the south, A4 motorway Milan – Turin about 1 km to the north, Milan – Turin State Railway line about 1 km to the south, intercontinental Milano-Malpensa airport (about 20 km away). Important additions to the infrastructures that directly involve the Municipality of Marcallo con Casone have been implemented in recent years, the most significant of these include the high-speed (Milan-Turin TAV) railway line and connection with the SS 336dir to the Milano-Malpensa airport.

The geological conformation of the area

The geological conformation of the area includes quaternary fluvio-glacial deposits that surface in a gravel and sand form, and recent post-glacial alluvial deposits on the Ticino River plain. The latter provides underground drainage for the region's upper water table.

Size of the production site

Factory premises cover about 60,000 sq.m., of which 22,000 sq.m. are indoor areas that are used for production and storage, and which house all production processes and warehouses of the 2 Divisions, namely Forestali and ABC.





Fig. 01 – Topographical map of the Municipality of Marcallo con Casone – Scale 1:16.000.

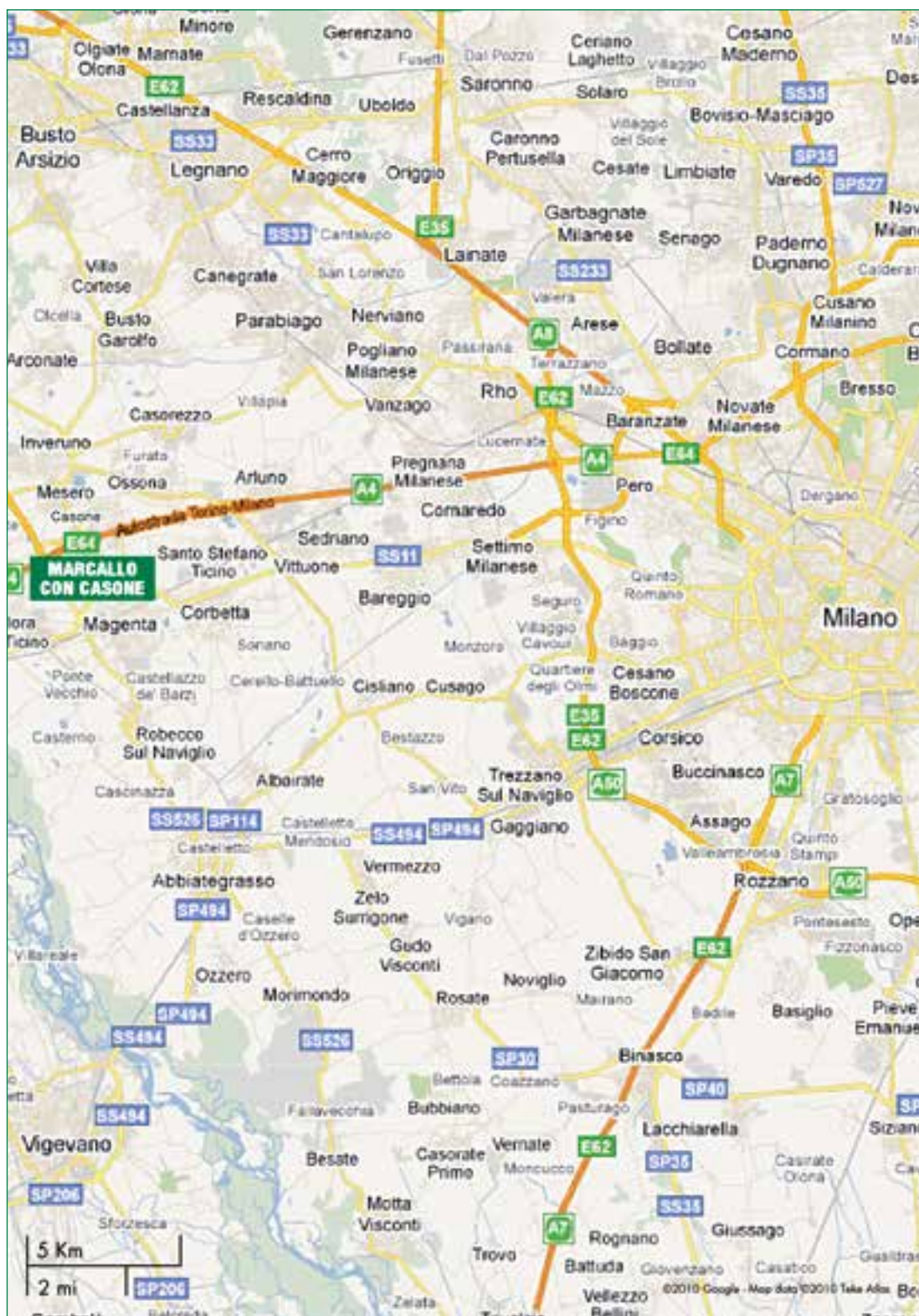


Fig. 02 – Territorial setting. Road map.



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3.3 – Plants and production processes

Production on site

ICF's production activities include:

- production of adhesives of the Forestali Division;
- production of fabrics for the footwear and the leather goods sector of the Forestali division;
- production of adhesives of the ABC Division.

PRODUCTION OF ADHESIVES FORESTALI DIVISION

The production of adhesives constitutes the most typically chemical aspect of activities performed at the Marcallo con Casone plant. Adhesives produced include:

- adhesives produced to be dissolved with solvents: polychloroprenes, with a natural rubber base or synthetic rubber base;

Adhesives produced to be dissolved with water:

- synthetic adhesives (polyurethanes);
- primers and activators.

Adhesives produced to be dissolved with solvents: polychloroprenes, with a natural rubber base or synthetic rubber base.

These are obtained by dissolving basic polymer components (polychloroprene or natural or synthetic rubber) in suitable solvents or in suitable batched mixtures of solvents. All operations are done cold, with stirring.

The polychloroprene basic polymer comes in solid chips. When dissolved various additives are added, such as hydrocarbon resins, rosin, and alkylphenols, to give the end product predetermined technological characteristics.



Adhesives produced to be dissolved with water

These are made by mixing the raw materials that are supplied in an aqueous solution, while stirring slowly, with small quantities of additives such as anti-foaming agents, anti-oxidants, and/or vulcanising catalysers.

Synthetic adhesives (polyurethanes)

These adhesives are mainly obtained from the synthesis of monomers in an ethyl acetate solution. Then, the polyurethane polymer is obtained by polymerising Diphenylmethane-4,4' – diisocyanate (MDI) with polyols and solvent (ethyl acetate) in the reactor, in an inert nitrogen atmosphere and at a controlled temperature of about 70°C (the reaction is exothermic).

The raw materials (MDI and polyols), which are highly viscous at ambient temperature, are oven heated prior to use. The intermediate product obtained is then placed in decanters where the multiple addition reaction continues at ambient temperature for a period of about 15 days. After this period has elapsed, the semi-finished product is placed back in the mixer, with the appropriate additives, and packaged in the various types of packaging. In some cases, the polyurethane adhesive is obtained by dissolving polyurethane polymer chips directly purchased from the supplier.

Primers and activators

The fabrication process is identical to that of adhesives to be dissolved: the quantity of resins and rubber contained in the formula change but the processing method remains the same.



Production of fabrics for the footwear sector and leather goods

The term “Fabrics” refers to particular items made for use in the footwear industry, like toe-puffs, stiffeners, linings, and reinforcing that are used as components to manufacture shoes. These are made in the “Fabrics” Department by means of a series of processes described below.

Impregnation: it involves loading a suitable polymer composition onto the support fabric, which varies depending on the product. This is done using a machine known as an Impregnator or Rameuse (Brückner type) in which the fabric passes through an impregnation bath (prepared in the Starches Department), and then through a heated, ventilated area for drying by removal of water. The product obtained is in the form of rolls or sheets. Preparation of the impregnation bath involves a homogenisation process by stirring in mixers.

Hot-melt spreading line: this line is set aside for hot-melt application onto products that require this treatment (impregnated or extruded fabrics). Application is done by melting the adhesive itself at temperatures between 160°C and 220°C and subsequent transfer to the spreading machine and on to the cooling calenders with final winding into rolls.

Powder spreading line: an “inseminator” (or powder spreader”) is used to apply powder products to the support fabrics. A spreader releases a defined quantity of powder to be applied to the support, which is conveyed into an oven kept at a temperature of 130°C-170°C causing the adhesive to melt. As it exits, the product passes through a water-cooled calender before being coiled into rolls once again.

Coextrusion line: this production process makes special types of toe-puffs and stiffeners with polymers or mixtures of polymers (rather than on an impregnated support) that have particular application characteristics: multilayer film of a polymer material. Coextrusion is performed in an independent line, complete with a polymer hopper feed and cooling and coiling calenders for the finished product.

PU spreading line: this line is set aside for PU type polymer application onto products that require this treatment (impregnated or extruded fabrics). Application is done by melting the adhesive itself in a single screw extruder at temperatures between 160°C and 220°C, and subsequent transfer to the tank that uses a blade (racla) to regulate PU polymer film thickness dose as per specifications. The treated fabric then passes through a cooling calender before being finally coiled into rolls.

Cutter line: toe-puffs and stiffeners are uncoiled from the take-up and cut into sheets that measure about 1 m by 1.4 m in height to be easily arranged on delivery pallets.

Coiling: small size rolls of lining or reinforcing are made, starting from large rolls.

PRODUCTION OF ADHESIVES ABC DIVISION

The production of adhesives in the ABC Division includes:

- synthetic polyurethane adhesives with and without solvent;
- polyurethane adhesives in an aqueous solution;
- nitrocellulose-based adhesives, nitrile rubber and nitrile butyl rubber;
- cleaner.

Synthetic polyurethane adhesives with and without solvent

These are polyurethane adhesives obtained by polymerising either polymeric MDI or pure MDI with polyols (polyethers or polyesters) with varying molecular weight. The synthesis requires up to 48 hours

and can be performed both with the solvent (ethyl acetate or acetone) and without it. These adhesives are produced inside stirring reactors at temperatures reaching a peak of 75°C for solvent-based reactions, and 85°C-90°C for those without solvent. The heat of the reaction is removed by circulating refrigerated water in semi-tubes on all reactors, and also by using reflux condensers. Batch processes are carried out in production reactors by performing both in-process and final checks, under the continuous supervision of the plant operator. When specifications are met, the finished product is filtered with bag filters and packaged in different formats in tanks, drums or buckets of various sizes.

Polyurethane adhesives in an aqueous solution

Water, a blend of amines and a pre-polymer of polyurethane are loaded in sequence, while stirring. Then vinyl resins, anti-foaming additives, surfactants and any semi-finished products from previous processing are added. After homogenisation and QC release, the product is filtered and discharged with a pneumatic pump into appropriate packages (drums, tanks).

Nitrocellulose-based adhesives, nitrile rubber and nitrile butyl rubber

These adhesives are produced in dedicated reactors. Production processes can be traced to the following product families:

- nitrocellulose solutions in organic solvents;
- nitrile rubber solutions in organic solvents;
- blends of the 2 previous families.

The former are made by adding, at ambient temperature, nitrocellulose damped with alcohol to a solvent (or a mixture of solvents), and then by adding a plasticiser, acrylic resins, acids and colouring, when required. The final product is discharged cold into its dedicated packaging. Products of the second category are obtained by adding nitrile rubber granules to a solution of solvents. It can be lightly heated (without exceeding 45°C) to easily dissolve the rubber, and then resins, plasticiser and other solvents can be added cold. Products in the third category are a mixture of the 2 previous ones where a solution of rubber and one with nitrocellulose are added in the given order while stirring. The solution is discharged at ambient temperature.

Cleaner

These are simple mixtures of solvents used as cleaning agents. After routine checks on raw materials, the ingredients are loaded and the mixture is homogenised by stirring at ambient temperature to obtain the desired performance and, after quality checks are carried out on the finished product, it is appropriately packaged.

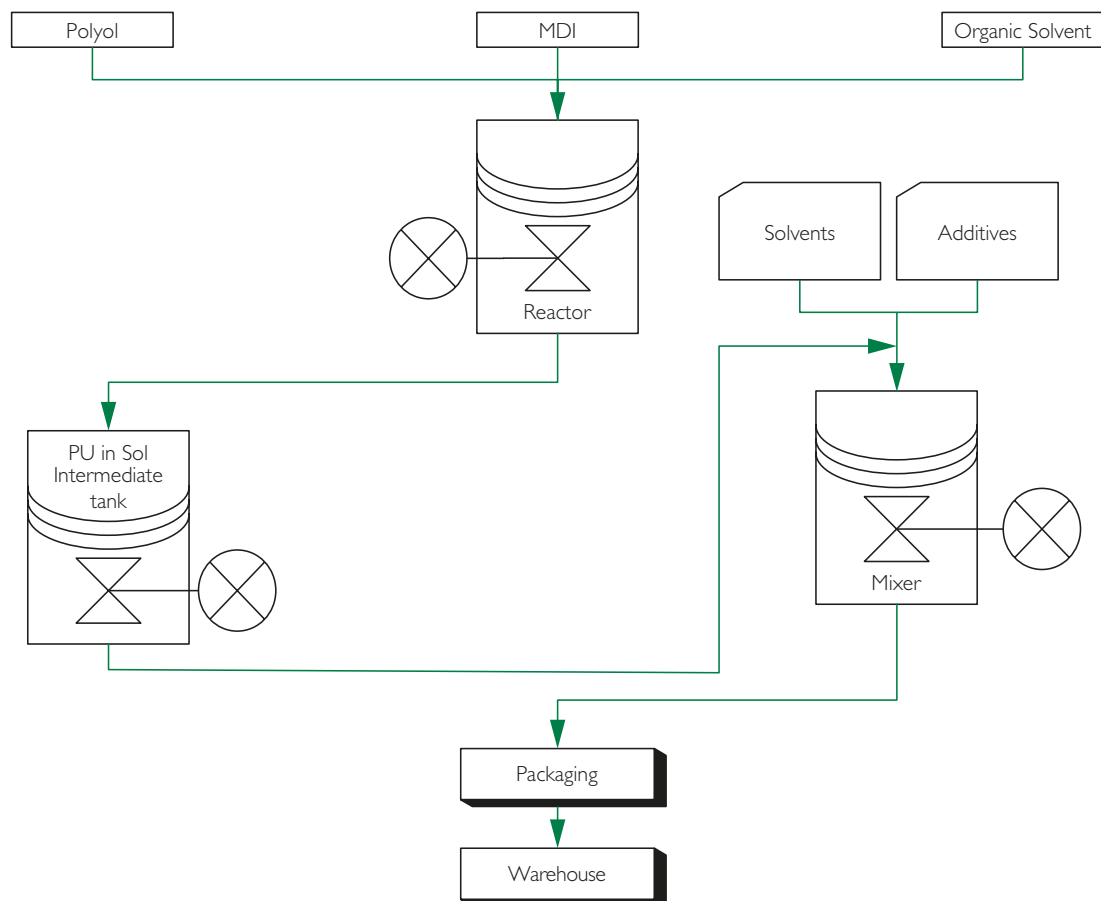
Processing and environment

All working phases are carried out using equipment and instruments (described in detail in Chap. 8 “Environmental efficiency”) to control and minimise both environmental impact and risk of injury. The points at which emissions are released into the atmosphere are monitored by Forestali Division: post-combustion plant, cryogenic system with solvent recovery, water scrubber, and sleeve filters. The ABC Division makes use of an active carbon system. (see Tables 14 and 15)

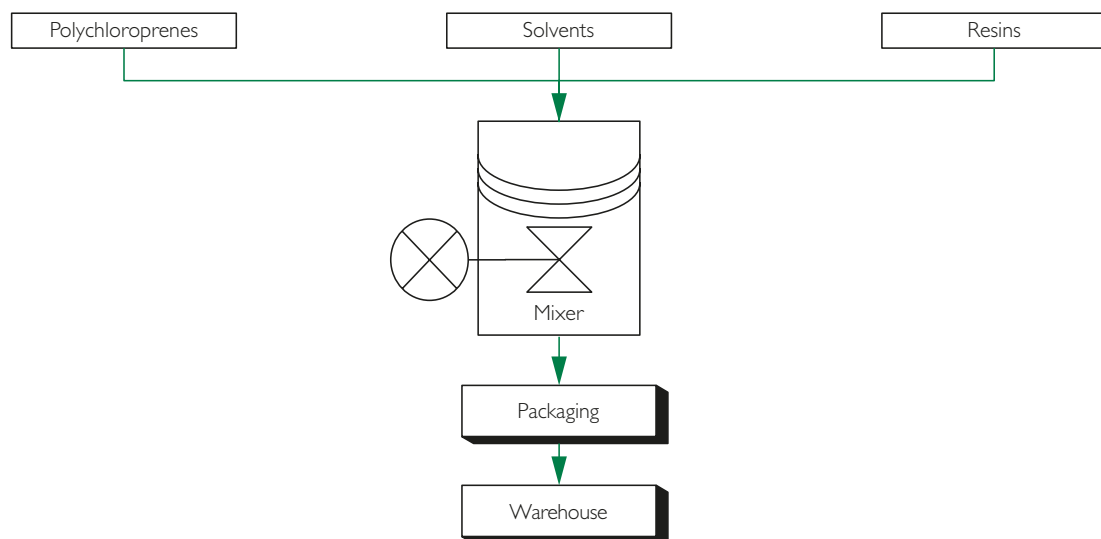
Washing water is collected in a dedicated tank and then treated in a primary plant before being reutilised as water for plant washing. All waste is suitably selected in terms of type and either recycled or disposed of. The processes described are shown in the block diagram below.

BLOCK DIAGRAM 1:

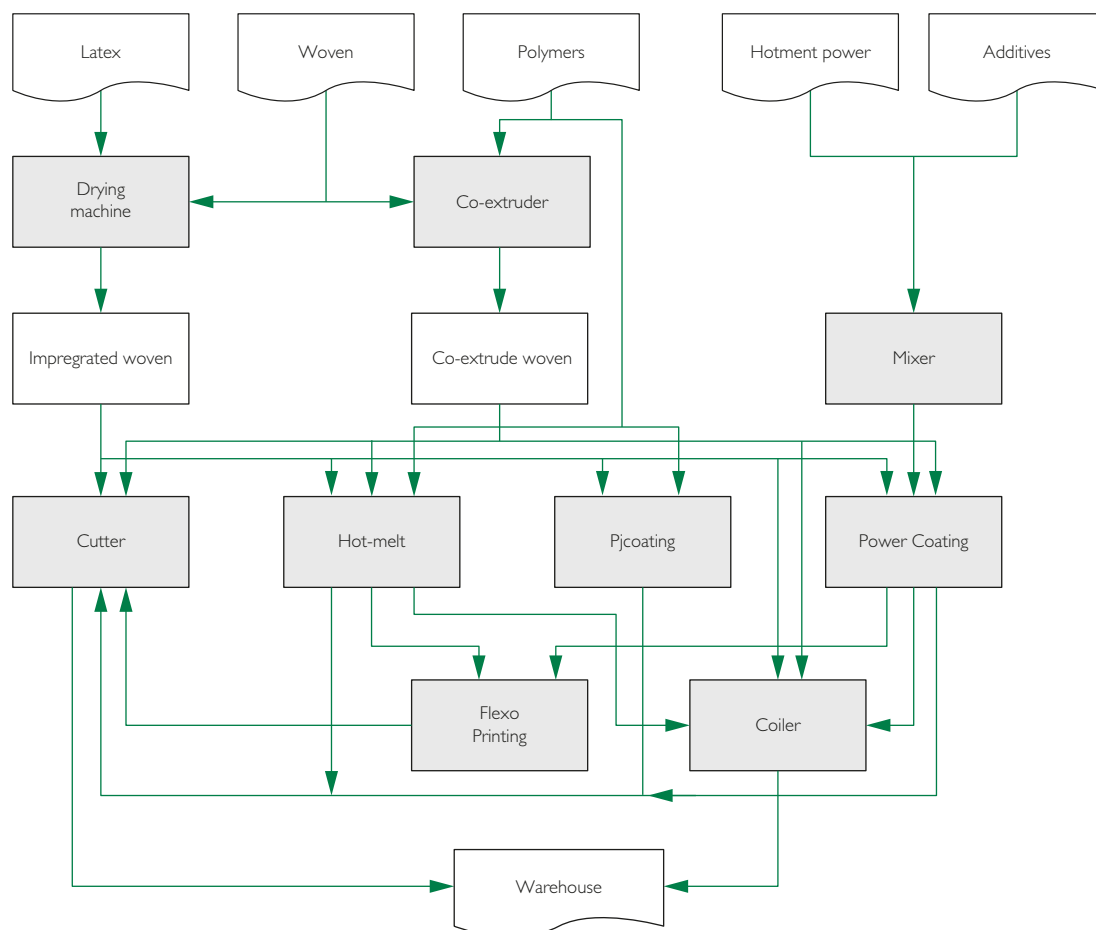
a) Production of synthetic polyurethane adhesives Forestali Division.



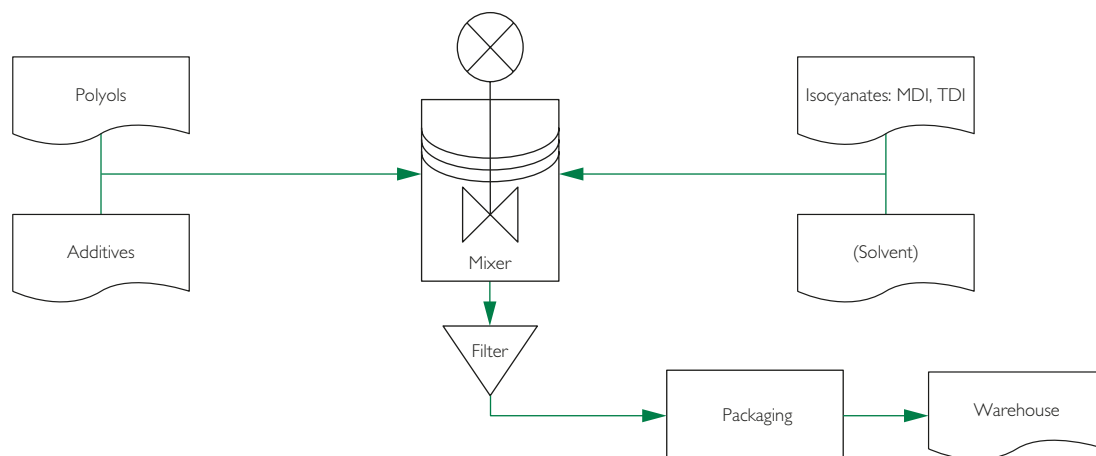
b) Production of polychloroprene adhesives Forestali Division.



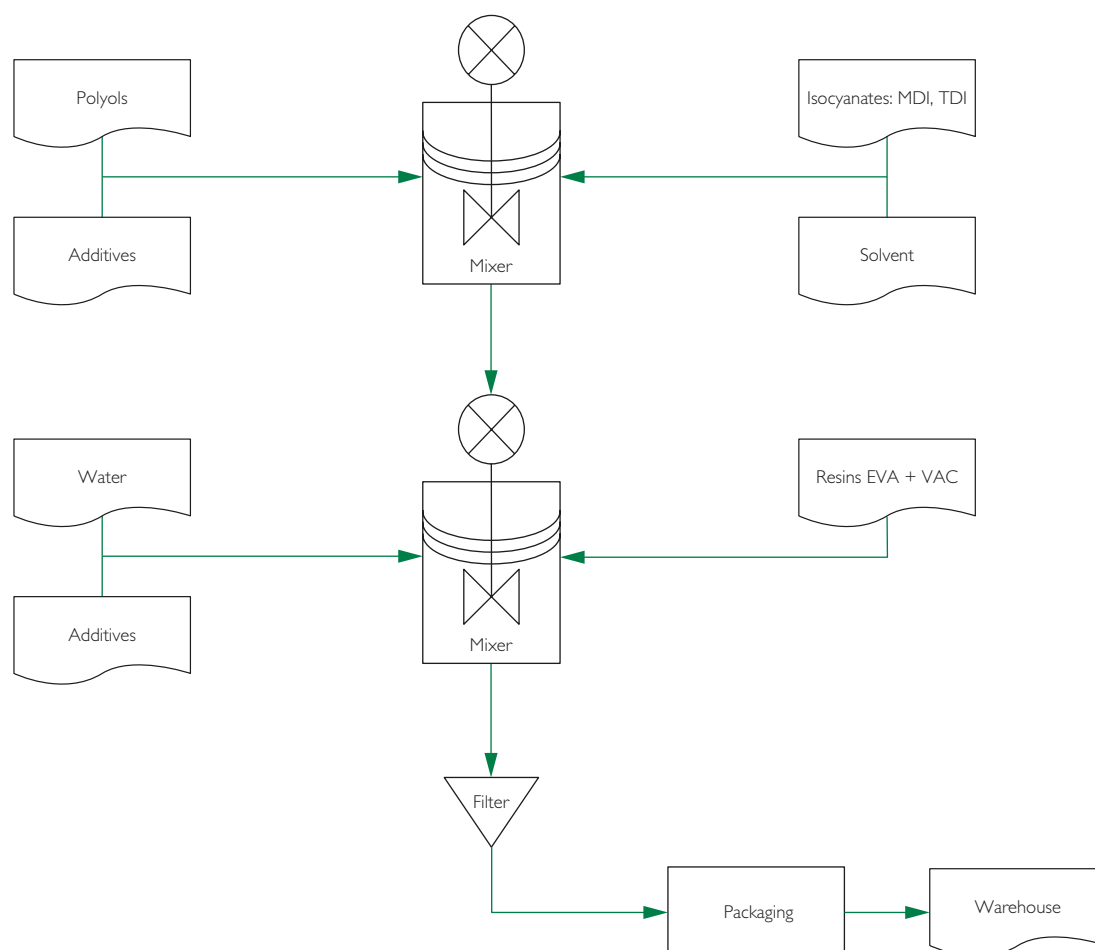
c) Production of toe-puffs and stiffeners Forestali Division.



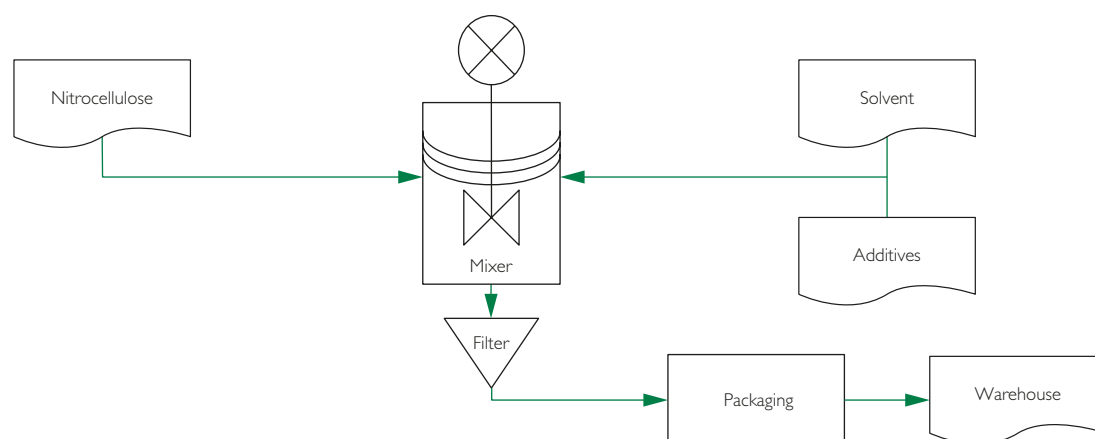
d) Production of synthetic polyurethane adhesives with and without solvent ABC Division.



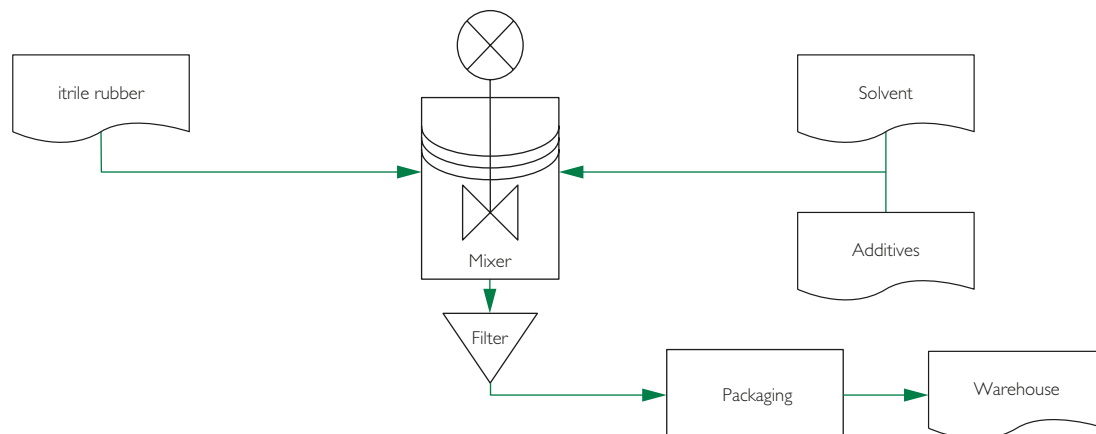
e) Production of polyurethane adhesives in aqueous solution ABC Division.



f) Production of nitrocellulose-based adhesives ABC Division.



g) Production of nitrile rubber adhesives ABC Division.



4. Industrie Chimiche Forestali S.p.A. Products

ICF Products of the Forestali Division are produced to suit the requirements of the sector in which they are to be used and their industrial applications: footwear, leather goods and upholstered furniture. Tables 01 and 02 show the products of the 2 Divisions and their industrial application.

4.1 – FOOTWEAR/LEATHER GOODS/UPHOLSTERED FURNITURE SECTOR FORESTALI DIVISION

Nature	Chemical / physical characteristics	Industrial application
Polyurethane Adhesives	High viscosity adhesives with excellent heat resistance and bonding performance. Heat reactivated.	Bonding of the bottom (sole – upper)
Polychloroprene Adhesives	Quick to moderately quick setting adhesives with excellent heat resistance.	Bonding of the bottom and joining (folds, lining, gluing cleaning soles, and constructing the heel).
		Bonding upholstered furniture (gluing foam polyurethane to a wooden frame)
		Bonding in the leather goods sector (residual)
Water-based adhesives	Polyurethane or neoprene water-based adhesives with excellent heat resistance	Bonding of the bottom (footwear sector)
		Gluing in the leather goods sector
Toe-puffs and stiffeners	Impregnated or extruded materials	They form the support of the toe-puff and heel of the shoe
Lining and reinforcing	Treated lining	Internal lining of shoes and reinforcing for footwear or leather goods

Tab 01

4.2 – FOOTWEAR/LEATHER GOODS/UPHOLSTERED FURNITURE SECTOR FORESTALI DIVISION

Adhesives for both the automotive sector and for flexible packaging possess special performance features to allow bonding of typical materials and substrates of these sectors.

Nature	Chemical / physical characteristics	Industrial application
Polyurethane Adhesives	Adhesives with and without solvent, at various levels of viscosity, that become heat resistant at the end of the reticulation process.	High performance bonding for typical materials/substrates of the Automotive and Flexible Packaging sectors.
Water-based adhesives	Miscellaneous chemical adhesives that can be applied either by spraying or with the roller system, and which are generally heat activated; some of these products are applied as a mixture with a second component, and acquire heat resistance.	High performance bonding for typical materials/substrates of the Automotive and Paper Plastification sectors.
Nitrocellulose-based adhesives and rubbers	Rubber and nitrocellulose solutions in solvents.	Industrial clips.

Tab 02

4.3 – RISKS ASSOCIATED WITH RAW MATERIALS AND FINISHED PRODUCTS OF THE FORESTALI DIVISION BEING ON SITE

Polychloroprene adhesives:

- MDI: irritant/noxious and suspected carcinogen; this substance must be handled consistently with instructions provided in the supplier's safety schedule, precisely using mask, safety glasses, gloves, and protective clothing;
- Organic solvents: flammable Cat.2 liquids, eye irritant and noxious; solvents are handled via dedicated lines from tanks to mixers.

The reaction between MDI and polyol generates a harmless polymer. Risks associated with handling polyurethane adhesives are: physical, as it is a flammable liquid; health hazard, as the product is a skin irritant, due to the use of solvents like ethyl acetate and acetone.

Polychloroprene adhesives:

- Organic solvents: inflammable of Cat.2, irritant/noxious and dangerous for the environment.

The risk associated with using polychloroprene adhesives is: physical, as it is a flammable liquid; health hazard, as the product is irritant and noxious; and environmental, as it is toxic for the environment.

Water-based adhesives:

- Aqueous polyurethane/polychloroprene polymer emulsion.

No risk associated with handling the raw materials and no risk when using the adhesive. Low environmental impact.

Toe-puffs and stiffeners:

Toe-puffs and stiffeners constitute the structural part that gives a shoe its shape: the extreme anterior and posterior part.

Made of impregnated fabrics, extruded and hot-melt or powder bonded, they meet the various performance needs that depend on the type of shoe (accident prevention, sports, classical shoe, etc.).

The effects obtained are: soft, elastic, agile, semi-rigid, and rigid.

Raw materials used are: fabric, non-woven fabric, aqueous solutions of natural and synthetic rubber,



inorganic contents, and heat-melt resins. All the raw materials are non-dangerous and similarly the finished product is entirely risk free in terms of handling.

Lining and Reinforcing

Lining and reinforcing are used to line the inside part of the shoe or to reinforce footwear or leather goods. Liners and reinforcing are bought, dyed, have adhesive added, and then marketed. ICF S.p.A. is the sole distributor for Italy of “Cambrelle” lining made by Dupont.

For this range of items too ICF S.p.A. ensures that the quality standard requested by suppliers and others is met in order to guarantee a high quality product for its clientele.

All products in the footwear sector, adhesives, toe-puffs and stiffeners, linings and reinforcing, comply with the Commission's Decision of 9 July 2009 that establishes the criteria for assigning the community mark for quality ecological footwear with reference to EC Regulation 66/2010 to attribute the ecological quality mark (Ecolabel).

All ICF S.p.A. products do not contain: chromium VI, arsenic, cadmium, lead, free formaldehyde, pentachlorophenol, and azoic dyes. This allows the footwear manufacturer to apply for the ecological marking to be affixed on their footwear, since all the raw materials used conform to community standards.

In anticipation of the contents of the Community Regulation, ICF S.p.A. has long demanded that suppliers provide high quality standards for the raw materials used for their production processes. Today ICF S.p.A. can give its Clients guarantees not only regarding quality but also concerning safety when using the product.



4.4 – RISKS ASSOCIATED WITH RAW MATERIALS AND FINISHED PRODUCTS BEING ON SITE IN THE ABC DIVISION

Raw materials

Isocyanates: class of chemical compounds that are toxic by inhalation, irritants, sensitising agents for the airways and for the skin and suspected carcinogens. They are generally liquid at TPS and are handled as specified in the MSDS of the respective suppliers, using localised suction devices and personal protection equipment.

Polyols: class of chemical compounds that are not hazardous or hazardous by ingestion. No special precautions are required to handle them.

Solvents: class of flammable and irritant chemical compounds to reduce product viscosity and allow application in client facilities.

Finished products

Polyurethane adhesives with and without solvent: reaction products between polyols and isocyanates with health hazard associated with the monomer fraction of isocyanate (see the danger of isocyanates) that has not reacted and with the presence, if any, of solvents. These products are not hazardous for the environment.

Water-based polyurethane adhesives: reaction products between polyols and isocyanates, they are generally not hazardous either for health or the environment.

Nitrocellulose-based adhesives, rubber or elastomeric resins: ready-to-use adhesives that are used to produce clips, whose danger is associated with the presence of flammable and irritant organic solvents.

Cleaners: Mixtures of solvents with high or low boiling points to clean cylinders and mechanical parts, whose health hazard is associated with the solvents used. These products are not hazardous for the environment.

Risks associated with using the raw materials to make adhesives in the 2 Divisions are updated to comply with Regulation 2015/1221 of 25 July 2015 that amends Regulation (EC) no. 1272/2008 of the European Parliament and Council on the classification, labelling and packaging of substances and of mixtures for standardisation with technical progress.

4.5 – FINISHED PRODUCT HANDLING

Finished products are packed into various packaging types:

- adhesives in cans of different shapes and sizes, and 200 L drums and 1,000 L tanks;
- toe-puffs and stiffeners in sheets (1 x 1.4 m);
- lining and reinforcing in 50 or 100 m rolls.

Internal handling is done using forklift trucks in a flame retardant version for adhesives. Loading onto vehicles and delivery is done using wooden pallets.

5. ORGANISATIONAL STRUCTURE

ICF S.p.A. has structured its human resources in the form of a classical organisation with a hierarchical organisational chart.

Specifically, personnel are organised into 4 areas of staff for the Managing Director and 2 BU areas. As regards commercial aspects, the 2 BU report to the Managing Director as he is the Sales Director. The entire operations sector includes HSE/QA/RA, Maintenance, QC/R&D, Production departments and CS/logistics warehouses report to the Operations Director

The structure is based on far-reaching operating autonomy for the various heads of department.

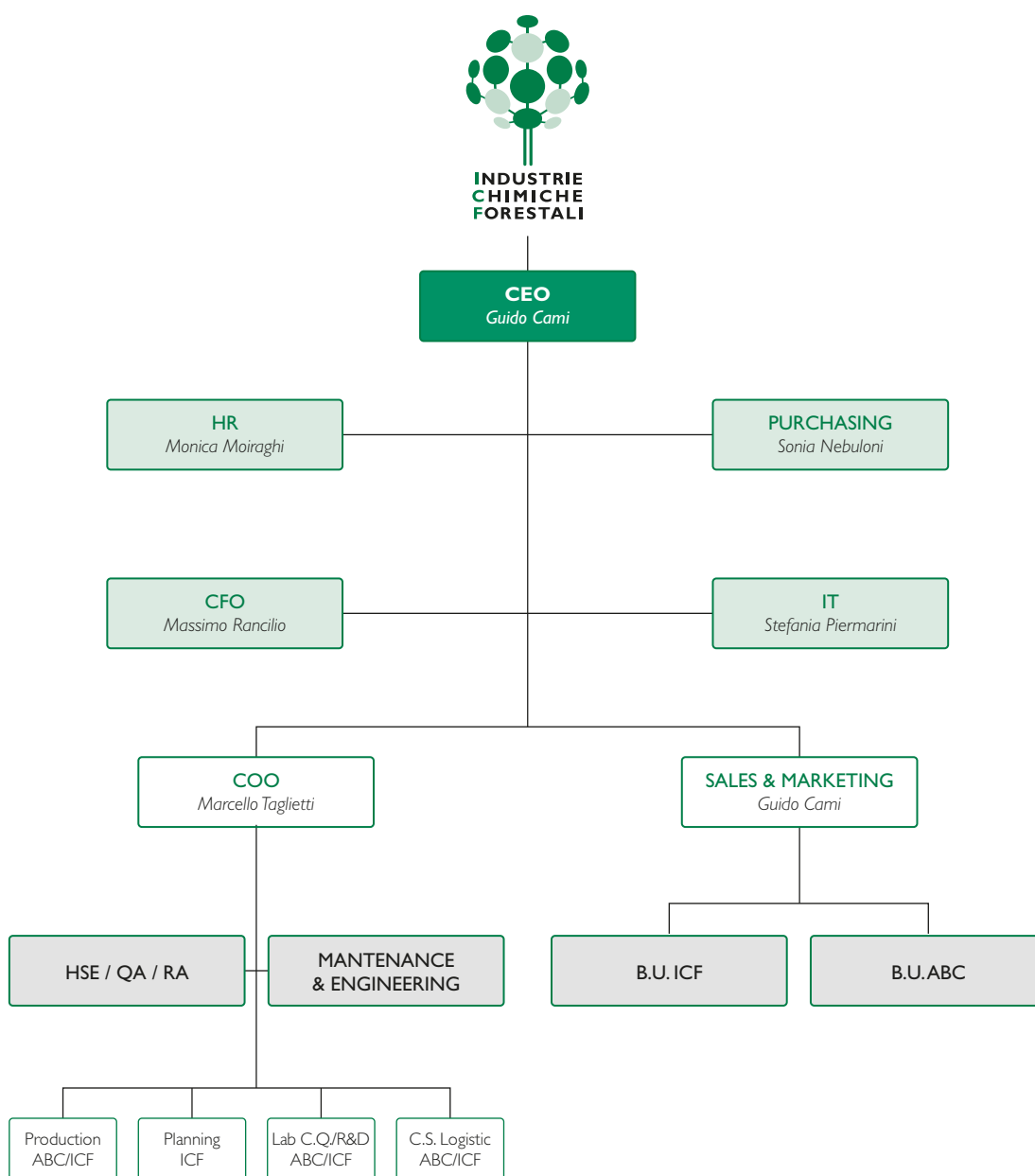


Fig. 04 – Organisational chart for Industrie Chimiche Forestali S.p.A.



6. ENVIRONMENTAL MANAGEMENT SYSTEM

Environmental Management Manual

The Company has set up and keeps an Environmental Management System (EMS) active according to the UNI EN ISO 14001/2015 standard, to ensure application of the Environmental Policy, updates to improvement goals, and the definition and development of environmental programmes.

Other EMS documents

The main reference document is the Quality and Environmental Manual, which contains the basic elements of the EMS, describes the general organisational criteria, the Environmental policy, and how it is applied to the various sectors of ICF S.p.A. activity, leaving operating details to related documentation, such as:

- a) operating procedures that describe the manner, conditions, and responsibilities to carry out activities in an environment-friendly way;*
- b) operating instructions for detailed, specific descriptions of activities;*
- c) user manuals for plants;*
- d) safety and emergency plans;*
- e) environmental records.*

Environmental management

For correct implementation, application, and guarantee of the EMS, ICF S.p.A. has mainly seen to the following aspects:

- top Management's constant commitment to maintaining and drawing up the behavioural and operational guidelines expressed by the Environmental Policy, the objectives, and Environmental Programmes established;
- a dedicated EMS Service tasked with coordinating, developing and keeping the EMS active, as well as the activities resulting from it;
- involve all departments in planning environmental activities and programmes, and in improving environmental performance;
- a procedural system for recording and managing applicable environmental standards, laws, and regulations, which ensures constant updating and communication of aspects that affect all the departments involved and guarantees the plant's conformity to the current provisions by means of periodic programmed audits;
- a procedural system for identifying the environmental aspects and impacts that result from the production site's activities, classifying them according to established significance criteria, and defining and planning improvement objectives and programmes;
- a procedural system to detect, record, and analyse any non-conformity and take suitable corrective and preventive actions;

- environmental information and training programmes for in-house personnel and contractors operating on the site as well as visitors;
- specific training courses in the field for all personnel that engage in activities that have a significant environmental impact, favouring attendance by employees, in the form of dedicated training opportunities and accepting requests in the environmental and safety field put forward by the same;
- a procedural system for receiving reminders coming from outside with an environmental facet and reporting to the certification body in case of disputes with the public administration or serious accidents;
- a documental system of in-house environmental procedures and provisions that regulate both system aspects and operating aspects;
- a system of procedures for evaluating and approving tender companies and companies that supply products and services, authorised disposal sites, and external laboratories;
- monitoring of environmental parameters and functioning of the plant in the manner and at the frequency established, and recording the same.
- audits planned and carried out by in-house personnel that are qualified to check correct application of the EMS and evaluate possible areas of improvement;
- periodic reviews of the EMS carried out by Top Management on the basis of information gathered to allow an overall evaluation of the adequacy of the Environmental Policy, environmental programmes and objectives and, therefore, of the EMS as a whole.

6.1 – DEFINING THE ORGANISATIONAL FRAMEWORK

The framework was defined by a joint effort involving various cooperate functions coordinated by the Management. Data collected have been processed and gathered in the framework of an Environmental Analysis. Data formalised at a later date in a specific document have been discussed and approved during a Management Review. The Environmental and Safety Operations Procedure SSA or “Context analysis and definition of the parties concerned” manages the criteria and analysis methods of the context and identifies the parties concerned.

The following frameworks have been examined: environmental and territorial setting, productive setting, institutional regulatory setting, social and cultural setting, scientific-technological setting, financial-insurance setting.

All contexts have been analysed and approved during a Management Review.

6.2 – IDENTIFYING THE PARTIES CONCERNED AND DEFINING THEIR APPLICATIONS

The parties concerned have been identified by the Management, along with their needs and expectations.

The results of this analysis are reported in Table 03 below, which links them up to context, reasons, needs and expectations.

Context	Relations	Interested parties	Reasons	Needs and expectations
Corporate	Responsibility	Stakeholders; Board of Directors; Surveillance Body; Employees; Trade Unions; Specialist and Local Employer Organisations	Std. deviations of the EMS that might entail business disruption	Capacity to manage identified risks and opportunities that might require investments. Compliance with applicable legal provisions and other voluntarily signed ones. Maintenance of high standards of the EMS
Competitive in the market	Representations	Dealers; Final clients; Raw material suppliers; services;	Std. deviations of the EMS that might entail business disruption	Inter-company partnerships on environmental themes
Scientific-technological	Influence	Downstream production line operators; scientific community; specialist associations	Research and development of green products might affect working methods downstream of the chain and improve the corporate image.	Research for new products with a low environmental impact, including product end of life aspects.
Institutional regulation	Controlling authority	Controlling public institutions: ARPA, ATS, Fire Brigade, Metropolitan City, Regional Administration, etc.; certifying agency; Surveillance Body;	Deviations from std. of the EMS that might entail sanctions or late authorisations	Compliance with legal provisions and voluntarily signed agreements
Environmental and territorial	Vicinity	Local Community; environmental associations	Deviations from std. of the EMS that might entail damage to the image	Maintenance of high environmental performance standards
Social and cultural	Influence	Consumer Association; Final clients; the Media; University; Global Community	Deviations from std. of the EMS that might entail damage to the image	Research for products with low environmental impact; Maintenance of high environmental performance standards
Financial-insurance	Responsibility	Investors; banks; insurance	Deviations from std. of the EMS that might entail damage to the image	Compliance with applicable legal provisions
Financial-insurance	Responsibility	Investors; banks; insurance	Deviations from std. of the EMS that might entail damage to the image	Compliance with applicable legal provisions

Tab 03

7. ENVIRONMENTAL ASPECTS OF THE ACTIVITY

7.1 – Criteria for evaluating the significance of direct and indirect environmental aspects and imp

ICF S.p.A. has identified and evaluated the significant direct and indirect environmental impact by means of significance criteria suitably chosen and dealt with in this chapter.

Each of the plant's activities, products, and services is analysed with the aim of identifying its environmental aspects and to evaluate its subsequent current or potential impact factors, on the environment inside and outside the factory, in relation to Operating Procedure ICF S.p.A. SSA02 "Identification and evaluation of environmental aspects and impact". Environmental aspects are then collected in the Register of environmental aspects for the Division (Forestali and ABC), and are yearly updated with every change implemented that might either concern the plant or the formulation.

A) Identification

The Manager of each Department, Service, or Operating Office, with the assistance of the HSE Department, shall use the "Identification and evaluation of significant environmental impacts" form to record all the environmental impact factors that originate or may originate from its activity.

The analysis of the factors must relate to all possible conditions within the activity, that is:

- normal operation;
- anomalous situations that can be reasonably foreseen;
- emergency situations.

B) Evaluation

The Manager of each Department, Service, and Operating Office, with the HSE's assistance, evaluates which important aspects are to be deemed "significant" based on the criteria listed below.

- significance criteria for Direct environmental aspects

Evaluation of the significance of direct environmental aspects defined in normal, abnormal and emergency conditions was performed using the following criteria:

legislative criteria - "L"

Takes into account compliance with Laws, Standards, Regulations and Provisions issued by the Local Authorities.

Environmental criteria - "A"

Takes into account the impact of the environmental aspect based on quantity, dangerousness, territorial extension and duration, in normal, abnormal or emergency conditions.

A1 Dangerousness of the impact

Evaluated based on the damage cause to the environment, considering the specific situation of ICF S.p.A.

A2 Extent of the environmental impact

Evaluated based on the physical extent of the area concerned by the impact.

A3 Duration of the impact

Evaluated based on the presence of the pollutant in the environment or on the duration of consumption of resources.

A4 Quantity of impact

Calculated based on the overall quantity of raw material or product rejection/waste. The weight is given based on kg, litre and kWh values presented by each impact.

P Probability of the impact

Takes into account the probability of the impact occurring or its incidence.

S Corporate image

Concerns the loss of corporate image following the environmental impact caused.

- Significance criteria of indirect environmental aspects

Evaluation of the significance of indirect environmental aspects defined by using the following criteria:

Controlling Capacity Criterion - "CC"

Takes into account the capacity of INDUSTRIE CHIMICHE FORESTALI S.p.A. to influence and control the impact considered

Vastity criterion - "V"

Takes into account the 'vastity' of a certain indirect impact in terms of stakeholders concerned. It results from the gravity of the impact multiplied by the estimated number of impacted stakeholders.

Management criterion of supplier/carrier/client - "G"

Takes into account the management capacity of the indirect environmental aspects defined in the LCP, which are direct aspects for the supplier/transporter/client/third party on the existence of a management system.

- Environmental risk index

Evaluation of the significance of direct and indirect environmental aspects is done by attributing to each environmental aspect an IRAD and IRAi index indicated in the formulations below:

$$\text{Direct environmental impact: IRAD} = 4L + P*(A1+A2+A3+A4) + S$$

Indices of IRAD ≥ 18 have been considered significant. If the component "Legislative Criterion L" is already a value ≥ 12 , even if the final result of the IRAD index remains ≤ 18 , the index is considered significant.

$$\text{Indirect environmental impact: IRAi} = CC+V+ 2G$$

Indices of IRAi ≥ 4 have been considered significant.

The result of this identification and evaluation process is approved by Top Management.

C) Recording significant environmental aspects

All environmental aspects evaluated are recorded in a register known as the “Environmental aspects register”.

This Environmental Aspects register is made up of an orderly collection of tables in the form given by the "Identification and evaluation of significant environmental impacts" form.

The Environmental aspects register is kept by the HSE Office.

D) Updating the register

Managers of Departments, Services, or the Operating Office are assisted by the HSE with updating the environmental aspects register at least once a year, and any changes made are documented on the basis of:

- amendments to legal provisions;
- reduction in aspects/impact subsequent to the improvement goals achieved;
- new aspects arising from changes to processes or start-ups of new plants/equipment;
- new knowledge in the field of ecology, health, and safety;
- new significance classifications as a result of new problems arising connected with the siting of the plant within the territory.

7.2 – Life cycle perspective

An LCA study on a toe-puff and stiffener production sample as coextruded product revealed that for the raw material component the GWP has a weight of about 95%; production phase 2 is 4.2%; distribution is not significant, while product use and end of life constitute a residual part of about 0.8%.

This study provides evidence that the major environmental impact is generated by raw materials used for the primary process. It is, therefore, crucial to receive from all raw material suppliers for toe-puffs and stiffeners an LCA study or the like to assess the weight, in the production process, of the incidence of the various raw materials used and to ascertain the feasibility of changing the formulations by privileging those with a low environmental impact.

Regarding the production of solvent-based adhesives, it must be said that they are made up, on average, by an 80% mixture of solvents and 20% of rubber, resins or polymers. Their function is based on the principle that when the solvent part has evaporated, the adhesive performs its function by anchoring the parts to be bonded. Hence it is obvious that, to be effective, they must lose 80% of the solvent contained, thus generating a considerable impact, if the process is not controlled.

An estimate of the various components mapped during adhesive production can be thus summarised:

- raw materials: 50%
 - production: 10%
 - packaging: 2%
 - distribution: not significant
 - product use and end of life: 38%
- (mean data: variable percentage that depends on the client's production process).

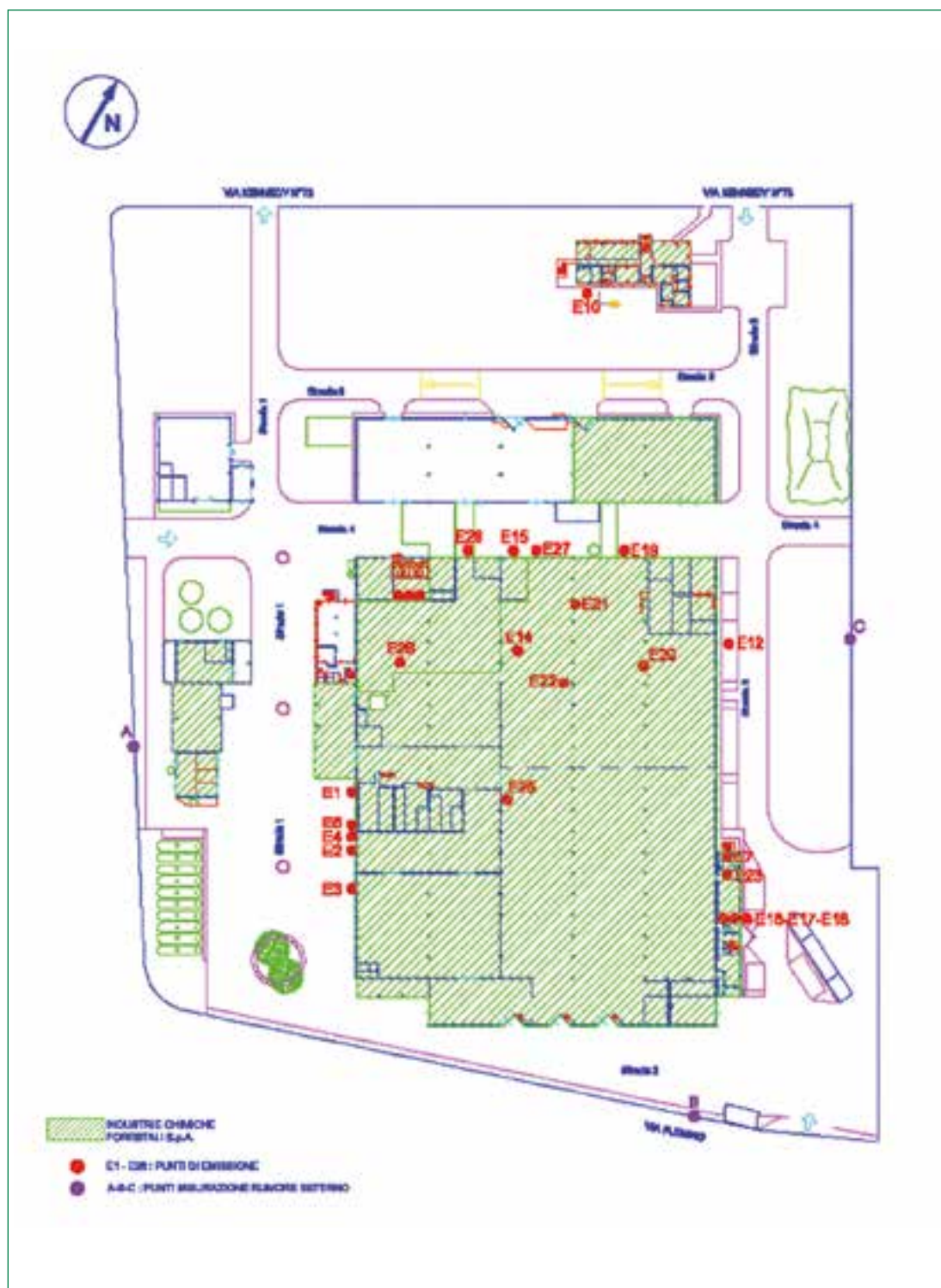


Fig. 05 – Plant layout showing emission points (Scale 1:1600)
Points A, B, and C are points for measuring outside noise

7.3 – Direct environmental aspects

All environmental aspects connected with the activity carried out under normal conditions, when starting up or stopping plants, and especially under emergency conditions, were taken into account and evaluated.

The following direct environmental aspects were found to be significant:

- emissions into the atmosphere and diffused emissions;
- water consumption and discharge (only regarding the production of starch and water-based adhesives);
- energy consumption;
- waste production;
- use of flammable substances;
- handling of hazardous substances;
- storage of hazardous substances for the environment > 200 t.

Other aspects, such as: noise, surface and underground areas, radioactivity from radiation sources, water consumption, water discharge and substances that are harmful to the ozone layer, are present but were found not to be significant. Environmental aspects like asbestos and PCB are not encountered in the Company.

EMISSIONS INTO THE ATMOSPHERE

Gas emissions of the FORESTALI DIVISION

All authorisation topics present in the FORESTALI DIVISION are authorised with Decree N° 12771 of 29 October 2017 issued by the Lombardy Regional Administration and effective for 8 years until 29 October 2025 as the Company possesses ISO 14001 and EMAS. With notice of 9 October 2014, the Milan Provincial Administration extended the effective period of Decree n° 12771.

There are 18 active emission points, of which: 8 relate to process emissions, 5 are from laboratory suction hoods, 2 from air change units, and 3 from heating systems. Of these the emissions from the laboratories, air change units, and heating systems are emissions of little significance according to Legislative Decree 152/06.

The process emission points are monitored according to an established programme and the pollutant values are measured periodically (at least once a year).

The results are kept available for the authorities tasked with inspections and have always been below the legal limits. The boiler emission points are checked annually by checking performance and fumes.

DIFFUSED EMISSIONS

The vents from tanks have a closed circuit when discharging from tanker trucks. In addition, measurements taken on the vents for all the tanks have not shown emissions of any significance. Each year a solvent handling plan is drawn up and this allows the Company to check for leaks for all diffused emissions generated when using solvents. The value for this item is always less than 3% at the amount of solvent used in the production process.

The gas emissions of production processes and of operating auxiliary plants are indicated below.

Process and service emissions

There are 18 active emission points, of which:

n° 8 process emissions: E1, E2, E3, E12, E15, E19, E20, E21;

n° 5 suctioned by laboratory hoods: E16, E17, E18, E23, E25;

n° 2 from air change units: E4, E5;

n° 3 from heating plants: E8, E9, E10;

n° 1 from flexographic printing plant: E22. (discharged)

n° 1 from E26 liquid sealing plant (not in use)

The following must also be mentioned:

n° 3 emissions that are not active anymore: E6, E11, E13

The vents from tanks have a closed circuit when discharging from tanker trucks. In addition, measurements taken on the vents for all the tanks have not shown emissions of any significance. Each year a solvent handling plan is draw up and this allows the Company to check for leaks for all diffused emissions generated when using solvents. The value for this item is always less than 3% at the amount of solvent used in the production process.

Emission N°	Emission Source	FLOW RATE (m³/h)	Pollutants	Scrubbers installed	Average concentration found mg/Nm³ (2015)	Average concentration found mg/Nm³ (2016)	Average concentration found mg/Nm³ (2017)	Emission limit values mg/Nm³
E1*	Adhesive mixers. Vents on mixers and storage tanks	4000 Only when loading	COT CO NOx	Post combustion	< 1.0 (CO) 10.3 (NOx) 6.9 (COT)	< 1.0 (CO) 16 (NOx) 15.6 (COT)	< 1.0 (CO) 11 (NOx) 23.3 (COT)	CO 100 max NOx 50 max COT 50 max
E2	Adhesive packing equipment	4600	VOC	-	15.4	102.18	122.1	150
E3	Adhesive mixers. Vents on mixers and storage tanks	<50	VOC	Liquid nitrogen cryogenic plant	16.7 (0.4 g/h)	6.6 (0.3 g/h)	31.7 (1.4 g/h)	Limit only as mass flow 100 g/h
E4	Adhesive packing department air extractor	7000	VOC	-	20.8	34.8	43.7	50
E5	Adhesive packing department air extractor	3000	VOC	-	14.3	12.0	27.5	50
E12	Impregnator/spreader	30000	COT Powders	Water scrubber	5.93 1.72	6.11 1.27	8.5 2.1	< 20 < 10
E15	Granule extruder loading hopper	2200	Powders	Sleeve filter	1.6	0.88	0.61	< 10
E19	Point spreading	2800	Powders COT	Sleeve filter	1.40 Not required anymore	0.81 Not required anymore	0.47	< 10 < 20
E20	Hot-melt spreading	1260	COT	-	18.9	3.84	18.0	< 20
E21	Coextruder	< 1000	COT	-	19.2	12.09	15.9	< 20

Tab 04 - Process emissions Forestali Division

In 2017 all the limits were complied with. The mass flow values for 2015 are shown in red, those for 2016 are in red and those for 2017 are in bold black print. Values are obtained by multiplying the flow rate by the mean yearly concentration.

The type of pollutant found in process atmospheric emissions includes:

- VOC coming from the adhesive production plant area.
- CO, CO₂, and NO_x from the heating systems and impregnator. As regards the boilers for the heating system, these are checked regularly according to Decree of the President of the Republic no. 74 of 16 April 2013. The impregnator (E12) is monitored, as per the authorisation, for COT and powders.
- The CO and NO_x pollutants are not prescribed by AIA/IPPC authorising decree.
- Powder coming from the powder spreader and CET.

Gas emissions of the ABC DIVISION

All authorisation topics present in the ABC DIVISION are authorised with Decree N° 12771 of 29 October 2007 issued by the Lombardy Regional Administration and effective for 6 years until 29 October 2013 as the Company possesses ISO 14001. In 2013 ABC initiated the renewal path as company with its own corporate entity and with Directors' Authorisation RG n° 11944 and Prot. 318587 of 23.12.15 of the Metropolitan City of Milano, which is authorised to operate until 23 December 2027. Though ABC has no independent corporate name since January 2017, it is conducts business with its AIA/IPPC authorisation. The process emission points are monitored according to a preset programme and the pollutant values are measured periodically (at least once a year). The results are kept available for the authorities tasked with inspections and have always been below the legal limits. The boiler emission points are checked annually by checking performance and fumes.

There are 17 active emission points in the ABC Division, of which:

- n° 3 significant emissions with E1 concerning the production process “production of solvent-based polyurethane adhesives” and E11-E12 regarding laboratory hoods with the use of CMR substances.
- n° 14 scarcely significant emissions (from E2 to E17) relative to laboratory hoods without the use of CMR substances, ovens and devices used for applicational and/or functional tests.

Emission N°	Emission Source	FLOW RATE (m³/h)	Pollutants	Scrubbers installed	Average concentration found mg/Nm³ (2015)	Average concentration found mg/Nm³ (2016)	Average concentration found mg/Nm³ (2017)	Emission limit values mg/Nm³
E1	Reactors for adhesive production	4700 Only for the raw material load and finished product discharge	VOC Isocyanates	Active carbon filters	76 (VOC) < 0.01 (Isocyanates)	84.80 (VOC) < 0.01 (Isocyanates)	60.9 (VOC) < 0.01 (Isocyanates)	150 (VOC) 0.1 (Isocyanates)

Tab 05 - Process emissions ABC Division

DIFFUSED AND FUGITIVE EMISSIONS - EMISSIONS FROM TANKS

N° 8 tanks are installed over ground, of which 4 are vertical (S1, S2, S3, S5) and 4 are horizontal (S4, S6, S7, S8), intended to store raw materials subjected to frequent handling. Tank vents release emissions freely into the atmosphere and must be deemed scarcely significant because the vapour tension of stored raw materials is negligible (< 1x10⁻⁶ KPa at 20°C for polymeric MDI).

Table 6 shows the values, expressed in tonnes, for atmospheric pollutants emitted, broken up by type. Table 7 shows the indicators for emissions and quantities of finished product. The VOC indicator is obtained as the

ratio in terms of quantity t emitted at points E1, E2, E3, E4, E5 of the Forestali Division and E1 of the ABC Division, and the quantity t of solvent-based adhesive produced by the 2 Divisions and expressed as %. The CO₂ indicator is the ratio between the number of t of CO₂ produced by CH₄ combustion in Rameuse burners and the number of toe-puffs and stiffeners for the impregnation produced %. Since.

Table 6 shows the values, expressed in tonnes, for atmospheric pollutants emitted, broken up by type. Table 7 shows the indicators for emissions and quantities of finished product. The VOC indicator is obtained as the ratio between the number of t emitted and the number of t of adhesive produced per 100. The CO₂ indicator is the ratio between the number of t of CO₂ and the number of t of toe-puffs and stiffeners produced per 100. The powder and ammonia indicators are deemed hardly significant. Since the production of toe-puffs and stiffeners is measured in sq.m., as an approximation 1000 sq.m. was taken as being equal to one t. The isocyanate indicator is the ratio in t of isocyanates issued from emission point E1 (ABC) and the quantity of isocyanate-based adhesives produced by the ABC Division.

Pollutant calculated in tonnes	2015	2016	2017
VOC	0.80	2.2	5.17
CO ₂ (total)	1020.6	990.7	1338.9
CO ₂ Rameuse	457.6	452.1	506.4
CO ₂ ABC			282.4
Powders	< 0.5	< 0.5	< 0.5
NCO			< 0.1

Table 6

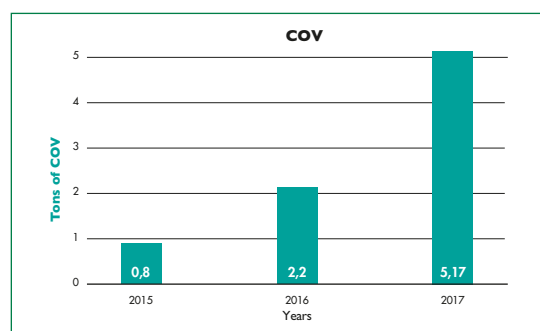
VOC and CO₂ *total* data from 2017 also contemplate those emitted by ABC that were counted separately until 2016. NCO data are typical of E1 emission at ABC. The increased consumption of CO₂ *Rameuse* can be attributed to an over 15% increase in production.

Emission indicators / product quantities	2015	2016	2017
VOC	0.009	0.030	0.025*
CO ₂ Rameuse	10.5	10.8	10.4
CO ₂ ABC			2.17**

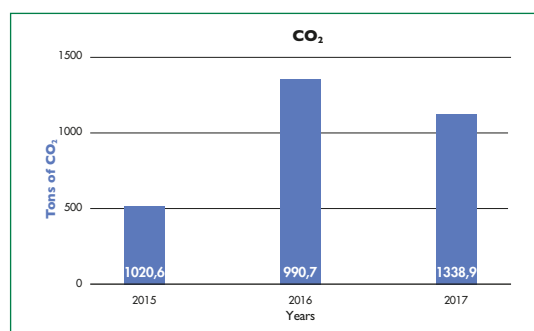
Table 7

* the data includes emissions and adhesives of both Divisions

** the data were calculated for the first time



Graph 1: the histogram shows VOC variations (expressed in tonnes) for the period 2015-2017.



Graph 2: the histogram shows CO₂ variations (expressed in tonnes) for the period 2015-2017.

The reduction in VOC emission indicators can be attributed to an overall improvement in production processes that also include ABC, a Division that has the ultimate plants available on the market. Regarding CO₂ *Rameuse*, burner efficiency has improved.

WATER SUPPLY AND DISCHARGES

Processing carried out at the Marcallo con Casone factory require scarcely significant amounts of water. The most important use relates to service activities like washing plants, while use as a raw material in the processes is very limited, and is confined to the production of water subjected to osmosis, which is used for water-based adhesives and water in the starch production network.

Water is supplied to the entire factory mainly through the municipal water supply system and through a well.

The table below shows the amounts of water collected in the 2015-2017 three-year period.

An internal well with a potential of 120-150 m³/h provides the water required for the fire-fighting tank and to water the flower beds in the corporate premises.

Water consumption in m ³	2015	2016	2017
Office potable water	322	375	313
Plant potable water (washing, production and ablutions)	15754	13414	12451
Internal bore-hole water (fire-fighting system)	1175	1012	1324
Total	17251	14801	14088

Table 08

Water uses at ICF S.p.A.

Water consumed is used mainly for:

- preparing aqueous starch suspensions (as a raw material) Forestali Division;
- Use of water in water-based adhesives of the 2 Divisions;
- For heating in the 2 Divisions;
- Washing plants in the 2 Divisions;
- As drinking water and for toilets in the 2 Divisions.

Water used as a Raw Material for starch suspensions does not exceed 1,000 m³/year. About 1000 m³/year of water is used for washing plants. A total volume of about 35 m³ for cooling is kept in a closed circuit with a top up of about 10% every 3 months.

Water discharges

Polluted waste water only comes from plant washing operations. This is taken to a primary treatment system where it is purified using lime and aluminium polychloride. The plant has the capacity to treat up to 2000 l/h. After treatment, waste water is further treated with an osmosis process, and then stored

in tanks and used for plant washing. Toilet water flows into that used to wash open squares and into water used for industrial purposes, and is channelled to the consortium's collector of the purifier based in Robecco sul Naviglio, which is, in turn, connected to a final urban water purifying plant managed by the Consortium of Magentino. Cooling waters used to cool machines in the fabrics department, and machines in the adhesives department contain ethylene glycol in a concentration that suffices to avoid freezing pipes, which are especially located outdoors, in the cold season. Glycol levels are regularly checked and integrated, if necessary. Rain water from the first rainfall, collected from roofs and external paved and asphalted areas is collected in the premises' sewer system, and from there to the Magentino Consortium's sewer system for purification.

Hence, discharge points are:

SC 1 on via Kennedy receives:

- Blackwater from the office building, from bathrooms on the western side of the site;
- Water from the first rainfall in areas nos. 1, 2, 3 and 4.

SC 2 on via Fleming receives:

- Blackwater from the warehouse service;
- Water from the first rainfall in areas nos 7 and 8.
- Water from the following points: **SC2a** made up of cooling water from the evaporation tower, **SC2b** cooling water from the evaporation tower, **SC2c** waste water subjected to osmosis, **SC2d** post-burner dampener overflow, **SC2e** discharge of post-burner condensate.

SC 3 on via Fleming receives:

- Blackwater from changing rooms and bathrooms on the eastern side;
- Water from the first rainfall in areas nos. 5 and 6.

Water balance

Industrie Chimiche Forestali S.p.A. does not use large amounts of water for its production processes, with the exception of the preparation of starch, of water-based adhesives and for plant washing. Table 2 -2 shows the amount of water used in the company, in percentage:

USE	Toilets	Fire-fighting irrigation	Use of raw materials	Washing	Evaporation tower +E12	Prod. of osmotic water	Empty pump	Other uses
USERS								
Office building	100%							
Well		100%						
Factory	10%	0	10%	15%	20%	5%	5%	35%

Table 09

WASTE PRODUCTION

Waste Production - Forestali Division

In the Forestali Division the storage areas are defined by AIA Decree of 29 October 2007 and by the subsequent renewal that did not change either quantities or location. Waste management is thus organised. The Maintenance Secretariat check waste stocks in all authorised storage areas and reports the estimated or weighed quantities in the respective loading and discharging registers. Some waste is collected on a weekly basis; hence, on receiving the goods, the appointed staff, as indicated by the Production Manager, start operating and inform the waste disposal site about the need to collect the bin or the press-container with the waste. For other waste, when stocks record a complete load, the waste disposal site is informed and collection is organised. All waste, even small quantities, is suitably disposed of at least once a year.

Waste-related forms are almost completely filled out in advance by the disposal site or by staff appointed to receive goods. Management of loading and discharging registers is assigned to the Maintenance Secretariat that also managed the SISTRI part for hazardous waste. All forms with the related 4 copies are filed by the Maintenance Secretariat.

MUD and data on waste to be entered in the AIDA Vispo application are entered by HSE.

Type of waste (tonnes)	CER Code	2015	2016	2017
Waste from composite materials	040209	291.4	279.3	319.4
Spent carbon	061302*	0	1.03	0
Sludge	070212	73.4	54.6	29.8
Obsolete adhesives	080409*	30.9	45.2	59.6
Water-based adhesives	080410	44.3	2.8	7.1
Sludge of adhesives ABC Division	080412	0	0	0
Washing water	080416	369.3	604.6	673.2
Waste from fume purification	110118*	1.0	1.97	2.1
Oily emulsions	120109*		0	0
Mineral oil discharges	130205		0	0
Other engine oils	130208*	0.5	0	0
Paper and cardboard	150101	43.6	37.3	42.7
Plastic Packaging	150102	15.6	13.5	18.0
Wooden packing	150103	10.2	12.7	24.7
Waste from a number of packaging types	150106	106.9	108.3	85.4
Absorbent materials containing hazardous materials	150202*	5.0	5.9	4.4
Packaging containing residue of hazardous substances (pollutants)	150110*	24.2	21.6	28.2
Oil filters	160107*	0.09	0.14	0
Cartridges and toners	160216	0.07	0	0.16
Organic waste containing hazardous substances	160305*			0.34
Copper bronze brass	170401			0.16
Iron and steel	170405	52.8	14.8	20.7
Other insulation materials either containing or made up of hazardous substances	170603*			0.1
Fluorescent tubes	200121*	0.13	0	0.21

Table 10

ENVIRONMENTAL INDICATORS Forestali Division

Waste production can be related to the production of toe-puffs and stiffeners produced by the Forestali Division. The indicators identified are as follows: Non-hazardous waste is also associated with the production of toe-puffs and stiffeners with CER codes: 040209. Non-hazardous waste is also associated with adhesive production, with CER codes 080409* + 061302*. The indicators used are expressed in percentage and are, precisely: the sum of CERs indicated above in kg per kg of adhesive produced per 100. Toe-puffs and stiffeners: the sum of CERs indicated above expressed as kg per sq.m of toe-puffs and stiffeners produced per 100. 1 sq.m of toe-puffs and stiffeners is equal to approximately 1 kg.

Waste indicators	2015	2016	2017
Kg CER 080409* + 061302*/ kg solvent-based adhesives *100 (Forestali Division)	0.65%	0.93%	1.1%
Kg CER 040209/sq.m toe-puffs and stiffeners *100 (Forestal Division)	16,9%	22,5%	21,0%
Kg CER 150110 in R/kg CER 150110 *100 (Forestali Division)			95.7%

Tab 11

Comments: the indicator for the production of adhesive waste underwent a slight increase due to obsolete warehouse material being disposed, while the indicator for toe-puffs and stiffeners has slightly improved. The third indicator that has been recently added was first calculated in 2017.

Waste Production - ABC Division

In the ABC Division the storage areas are defined by Director's Decree of the Metropolitan City of Milan n° 318587 of 23.12.2015. Waste management is thus organised. The Maintenance Secretariat check waste stocks in all authorised storage areas and reports the estimated or weighed quantities in the respective loading and discharging registers. Some waste is collected on a weekly basis; hence, HSE checks the weekly stocks and takes action for the waste to be collected. For other waste, when stocks record a complete load, the waste disposal site is informed and collection is organised. All waste, even small quantities, is suitably disposed of at least once a year.

Waste-related forms are almost completely filled out in advance by the disposal site or by staff appointed to receive goods. Management of loading and discharging registers is assigned to the Maintenance Secretariat that also managed the SISTRI part for hazardous waste. All forms with the related 4 copies are filed by the Maintenance Secretariat. Notes entered in the form for all ABC Division waste state: waste produced by ABC Division. MUD and data on waste to be entered in the AIDA Vispo application are entered by HSE.

Type of waste (tonnes)	CER Code	2015	2016	2017
Other organic solvents	070204*	174.8	196.1	196.8
Other funds and reaction residue	070208*	-	-	14.8
Obsolete hazardous adhesives	080409*	19.5	25.6	21.0
Obsolete non-hazardous adhesives	080410	-	12.6	7.9
Packaging in mixed materials	150106	23.7	33.4	68.9
Packing contaminated by hazardous substances	150110*	126.6	137.1	142.1
Absorbent substances, filtration materials, rags, etc.	150202*	4.6	4.9	5.9
Organic waste containing hazardous substances	160305*	-	0.8	1.5
Chemical laboratory substances	160506*	0.4	0.8	0.9
Spent active carbon for fume treatment	190110*	5.0	5.4	5.5

Tab 12

ENVIRONMENTAL INDICATORS ABC DIVISION

Waste production can be related to the production of adhesives. The indicators identified are as follows:

Waste indicators	2015	2016	2017
Kg of CER 070204*/kg of adhesives *100 (ABC Division)	2%	2%	2%
Kg CER 150110 in R/kg CER 150110 *100	90%	87%	87%

Table 13

The production of CER 070204* is a stable indicator that is confirmed over the years, while it undergoes a slight reduction in the quantity disposed in R of CER 150110*.

USE OF FLAMMABLE SUBSTANCES

The Company has drawn up an Emergency Plan that is on site, and made it known to all the employees. It covers all sources of risk and especially the fire risk since the production process involves extensive quantities of inflammable materials (organic solvents).

Plans are displayed in all workplaces showing escape routes and a marker to identify the current position. Each workstation has a telephone directory with the external emergency numbers (fire brigade, Hospital, Emergency Services). All fire-fighting equipment is periodically checked. The Company closed the CPI renewal path on 21 December 2017. A survey to be conducted by the Provincial Unit of the Milan Fire Brigade Service is pending.

An in-house corporate fire-fighting and emergency assistance team has been set up with 30 members, of which 15 are also trained to provide first aid.

Every three months the fire-fighting team holds practical and theory sessions. A fire drill is held every six months during which personnel are evacuated and all personnel are involved.

Since the adhesive production department and adhesives stores are most exposed to a risk of fire due to the type of products handled or stored, they are equipped with:

- A flameproof electrical system
- Flameproof forklift trucks
- An infrared flame detection system
- A flooding and sprinkler fire-extinguisher system
- Spark-free tools to be used in these areas.
- Working clothes that do not generate static electricity (natural fibres like cotton and wool).

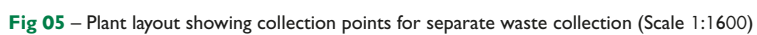
All fire-fighting equipment is periodically checked according to a Company plan.

The assessment survey has been updated, pursuant to Heading XI of Legislative Decree 81/08 on explosive atmospheres in March 2017.

The document prepared once again confirms a risk of explosion in the adhesives department, which was already known and is monitored especially in zone 2 and small areas of zone 1.

Biodiversity

The total premises cover 60,000 sq.m. With total building volume of 130,000 m³. The indoor surface is 18,800 sq.m., of which 1,700 sq.m. is a waterproofed outdoor area. Hence, only 32% of the area is occupied by industrial buildings and an office building, leaving more than 68% of vegetation around the company.



HANDLING OF HAZARDOUS SUBSTANCES

Hazardous raw materials used by the Forestali Division

The main substances and solvents used in production processes of the Forestali Division are shown below, with an indication of commercial or chemical name, hazard classification, and risk phrases. Consumption values concern the 2015 -17 three-year period.

Name	Hazard symbol and risk phrases H	Tonnes 2015	Tonnes 2016	Tonnes 2017	Storage method
Ethyl acetate	Flammable liquid Cat. 2 H225, H319, H336, EUH066	755	786	778.5	25 m ³ underground tank n° 8A, 25 m ³ underground tank n° 9A, 50 m ³ underground tank n° 10,
Acetone	Flammable liquid Cat. 2 H225, H319, H336, EUH066	1850	1822	1842	50 m ³ underground tank n° 7, 25 m ³ underground tank n° 9B,
Butandioil 1,4	Acute toxicity cat.4 H302, H336	3,1	3.9	4.1	200 litre drums
Dichloromethane	May cause cancer Cat. 2 H351	312	239	282.7	12 m ³ tank above ground
Diphenylmethane 4,4' diisocyanate (MDI)	Sensitizing Cat.1 May cause cancer Cat. 2 STOT Cat. 2 H334, H351, H372	22,1	25.4	28.3	200 litre drums
Naphthenic and aliphatic hydro carbons	Flammable liquid Cat.2 Fatal if swallowed Harmful to aquatic life Cat. 2 H225, H304, H336, H411	1067,2	1022.5	1103.9	N° 1 x 50 m ³ underground tank n° 4
Isohexane	Flammable liquid Cat.2 Fatal if swallowed Harmful to aquatic life Cat. 2 H225, H304, H336, H411	408,4	434.5	442.7	50 m ³ underground tank n° 2,
Methylethylcheton (MeK)	Flammable liquid Cat. 2 H 225, 319, 336, EUH066	314,1	337.8	370.8	50 m ³ underground tank n° 6,
Perchloroethylene	May cause cancer Cat. 2 Harmful to aquatic life Cat, 2 H351, H411	5,5	5.3	7.4	3 m ³ tank above ground
Tetrahydrofuran	Flammable liquid Cat. 2 May cause cancer Cat. 2 H225, H319, H335, H351 EUH019	18	7.5	6.1	200 litre drums
Toluene	Xn, F Harmful, flammable R11, R20	1470,5	1159.6	1396.0	Underground tanks n° 3, n° 5
Trichloro-s-tirazine-2,4,6-trione	Flammable liquid Cat. 2 Fatal if swallowed Reprotoxic Cat.2 H225, H304 H361d, H373	1,4	1.2	1.7	60 kg drums
N Methyl pyrrolidone	Reprotoxic Cat 1B H360D	3,05	3.8	3.8	200 litre drums

Table 14

Hazardous finished products of the Forestali Division

Dangerous preparations of the Forestali Division are entirely confined to the type of solvent-based adhesives. All other products, such as toe-puffs and stiffeners, linings and reinforcing, and water-based adhesives do not present risks for the final user and, therefore, do not present risk phrases and caution notices. They do not belong to the type of products labelled according to the CLP Regulation.

For adhesives in solvent, the large sub-division is between polyurethane adhesives and neoprene adhesives.

Since polyurethane adhesives are a mixture of a polyurethane polymer in acetone and ethyl acetate, their associated pictogram will be “Flammable liquid” and “Eye irritant” and the hazard indications will be: H225, H319. Neoprene adhesives, which are far more complex in terms of solvent mixture, can contain: acetone, ethyl acetate, toluene, isohexane, cyclic hexane and methylene hydrochloride; hence, the cases are complex and can be traced to at least 2 large categories.

The former resembles polyurethane adhesives, the second contains pictograms: “Flammable liquid”, “Eye irritant” and “Aquatic pollutant”. Hence, the related H phrases will be: H225, H319, H411.



Hazardous raw materials used by the ABC Division

The main substances and solvents used in ABC Division production processes are shown below, with an indication of commercial or chemical name, hazard classification, and risk phrases. Consumption values concern the 2015 -17 three-year period.

Name	Hazard symbol and risk phrases H	Tonnes 2015	Tonnes 2016	Tonnes 2017	Storage method
Ethyl acetate	Flammable liquid Cat. 2 H225, 319, 336/53	973.7	1121.6	930.2	50 m ³ underground tank n° 10,
Acetone	Flammable liquid Cat. 2 H225, 319, 336, EUH066	121.3	112.3	87.7	50 m ³ underground tank n° 7, 25 m ³ underground tank n° 9B
Phosphoric Acid	Skin Corr. 1B H314	4.6	5.5	6.2	Polythene drums
ESAE solvent	Flammable liquid Cat. 2 H411, H304, H319, H315, H225, H361f, H336, H373	17.5	20.2	21.4	Metal drums
Polymeric MDI	Toxic by inhalation Cat. 4 H315, H317, H319, H332, H334, H335, H351, H373	4552	5263	5440	30 m ³ S1, S4 tanks above ground
Pure MDI	Toxic by inhalation Cat. 4 H315, H317, H319, H332, H334, H335, H351, H373	474	555.5	653.9	Metal drums
TDI	Toxic by inhalation Cat. 1 H315, H317, H319, H334, H351, H412, H330, H335	33.7	39	42	Metal drums
Mixture of isomers of pure MDI	Toxic by inhalation Cat. 4 H315, H317, H319, H332, H334, H335, H351, H373	82.7	69.2	67.1	Metal drums
Polymeric MDI with function 2.4	Toxic by inhalation Cat. 4 H315, H317, H319, H332, H334, H335, H351, H373	24.7	31.6	35.8	Metal drums
Polyester in ethyl acetate	Flammable liquid Cat. 2 H225, H319, H336, EUH066	35	40.9	22.4	Metal drums
Nitrocellulose in IPA	Flammable solid Cat. 1 H228, H319, H336	30	29	22.5	Cardboard drums

Table 15

Hazardous finished products of the ABC Division

Dangerous preparations of the Adhesive Based Chemicals Division are polyurethane adhesives with and without solvent, nitrocellulose-based adhesives, nitrile rubber, nitrile butyl rubber and cleaners. Solvent-free polyurethane adhesives present the pictogram for “Health hazard” because they are harmful if inhaled, they cause severe eye and skin irritations and are suspected carcinogens of category 2. Hazard indications are as follows: H334, H351, H373, H332, H315, H319, H317, H335. For polyurethane adhesives in solvent, the “flame” pictogram is added with hazard phrase H225 for flammable liquid.

Nitrocellulose-based adhesives, nitrile rubber and nitrile butyl rubber and cleaners are, instead, flammable liquids that belong to category 2 and they present the following hazard indications: H225, H319, H336.

Safety schedules are available for all the hazardous substances supplied by the supplier to provide the updated information required for handling them.

WORKING ENVIRONMENT

Safety data sheets, for both hazardous and non-hazardous substances, are kept in the corporate first aid room, and are in the possession of the Company Doctor and the HSE. An extract from the schedules for hazardous substances is also available in the departments. The Company Doctor has launched a health plan to monitor any exposure by operators at risk. The working environment is checked each year at the various workstations for chemical pollutants, particularly: volatile organic substances, powders and isocyanates. Table 16 shows an extract from the environmental monitoring carried out in various moments in 2017.

Workstation	Pollutant	Value measured mg/m ³	TLV-TWA limits mg/m ³	Sampling data
Production Polyurethanes Forestali Division	Isocyanates	< 0.006	< 0.01	11 August 2017
Production Polyurethanes Forestali Division	Acetone	12.1	1210	11 August 2017
Production of chloroprene products Forestali Division	Acetone	4.5	1210	21 March 2017
Production of chloroprene products Forestali Division	Toluene	8.2	188	21 March 2017
Packaging adhesives Forestali Division	Acetone	17.6	1210	21 March 2017
Powder spreading machine Forestali Division	Total powders	0.13	10	21 March 2017
Production Polyurethane ABC Division	Isocyanate	< 0.003	< 0.01	21 March 2017
Production Polyurethane ABC Division	Ethyl acetate	4.1	1400	21 March 2017
Production Polyurethane ABC Division	Powders	0.18	10	21 March 2017

Table 16

ICF S.p.A. sees to minimising contact with and exposure to hazardous substances with the help of Personal Protective Equipment (PPE) such as: gloves, goggles, shoes, dust mask, anti-solvent mask, working clothes. Evaluations of safety and accident indices are shown on page 45.

Various training sessions have made it possible to achieve a degree of sensitivity to and knowledge of the symbols and risk phrases, and caution advice among those involved in production. Both biological monitoring (blood tests for operators) and the number of incidents related to this aspect show that the preventive method adopted is correct.

STORAGE OF HAZARDOUS SUBSTANCES FOR THE ENVIRONMENT > 200 tons

ICF S.p.A. Is also under the application field of the new Legislative Decree 105/2015 as “lower threshold facility” that does not call for drawing up of an external emergency plan. ICF S.p.A. is in the area of being subject due to it exceeding the 200 tonne storage quantity for solvents and finished products that pose a danger to the environment (H411). Duties included:

- Reporting to the Environment Ministry, Lombardy Region, Milan Province, Marcallo con Casone Municipality, Prefect of Milan, Provincial Fire brigade Headquarters, and industrial risk assessment committee.
- Drawing up a preliminary safety report according to art 1 of Lombardy Regional Law of 23rd November 2001.
- Adaptation of the Company’s Environmental and Safety Policy.

All reports and documents prepared were sent to the surveillance bodies by registered post with return receipt on 2nd March 2006 (deadline laid down by Legislative Decree 238/05, 6th March 2006). In October 2016 the Technical Evaluation Schedule and Information Schedule on risks of significant incidents for the citizens and workers were updated. Table 10 lists the incident scenarios identified and the related frequency of occurrence. ICF S.p.A. has implemented permanent training on these aspects for operators in the Adhesives department and a preventive plant maintenance programme. Evacuation drills are held on a half yearly basis.

Zone	Description	Worst case scenario
Area of tanks buried with flammable solvents	Detachment/breakage of semi-rigid solvent discharge pipe from ATB	Event 1: risk of pool fire
Production of solvent-based adhesives BU Forestali decanter for adhesives PU	Collapse of decanter for adhesives PU	Event 2: risk of pool fire
Packaging of solvent-based adhesives BU Forestali	Catastrophic breakdown of tank 10m3	Event 3: risk of pool fire Negligible risk
Solvent-based adhesives warehouse BU Forestali	Collapse of mobile receptacle (forking, tilting accident involving methyl cyclohexane)	Event 4: risk of pool fire Negligible risk
Solid raw materials warehouse BU Forestali	Breakage of bag with dangerous powder for the environment	Event 5: does not cause a significant accident
Internal square and roads	Handling of TDI drums with loss of content	Event 6: risk of dispersion by gravity
Adhesive Production BU ABC	Reactor collapse and fire	Event 7: risk of pool fire Negligible risk
BU warehouse ABC	Breakage of tank with solvent-based adhesives during handling	Event 8: risk of pool fire Negligible risk
Adhesive Production PU BU Forestal and ABC	Fugitive reaction	Event 9: event not deemed credible
Adhesive Production BU Forestal and ABC.	Internal explosion in the reactor or mixer to form a flammable mixture	Event 10: does not cause a significant accident
ACL 90 Plus fuel storage room	Violent reaction due to decomposition	Event 11: does not cause a significant accident

Table 17

The accidents mentioned above have an environmental impact at the site, and their range does not extend outside corporate premises.

ENERGY CONSUMPTION

Electricity is consumed for all the services in the plant, especially the production process. Energy consumption data are given below, expressed in kw/h relative to the years 2015, 2016, 2017. These data are compared with production data broken down for adhesives, toe-puffs and stiffeners and ABC Division adhesives. Methane is used to operate Rameuse and in the thermal power station, which comprises 2 boilers, 1,200,000 and 550,000 kcal/h, respectively, of which the former is reserved for industrial use and the latter is reserved for office heating; a third boiler, 300.000 kcal/h, always fuelled by methane, is only used on Saturday and Sunday. The details of consumption indicated in tep according to the following conversion factors is reported below.

	2015			2016			2017		
Total productive consumption	Kwh	% prod.	% tot.	Kwh	% prod.	% tot.	Kwh	% prod.	% tot.
Fabrics Dept.	1793541	45.99	39.23	1752126	42.63	38.63	1850251	40.65	38.54
adhesives dept.	589035	15.11	12.88	657739	16.00	14.50	667463	14.67	13.90
Water-base dept.	3186	0.08	0.07	8198	0.20	0.18	8546	0.19	0.18
ABC Division	541784	13.89	11.85	714011	17.37	15.74	753049	16.55	15.69
common consumption	972046	24.93	21.26	977871	23.79	21.56	1272039	27.95	26.50
Total I	3899592	100	85.29	4109945	100	90.61	4551348	100	94.81
Total overall consumption, including non-productive consumption	4572380			4535855			4800484		

Table 18

TOTAL CONSUMPTION	2015	2016	2017
MC	617941	628201	694140
% of RAM consumption	38.39	37.31	37.83
% of ABC consumption	14.37	18.22	21.09
% of burner consumption	4.95	3.50	3.14
& of other consumption	47.24	44.47	41.08

Table 19

In terms of energy consumption, it is quite evident that the production of toe-puffs and stiffeners in the Fabrics Department absorbs a high quantity of energy, compared to the production of adhesives, both in the Forestali and ABC Divisions. Therefore, to measure an energy consumption indicator per product unit, the electricity and methane gas used were converted into tep (equivalent tons of petroleum through the equivalence stated in Table 20).

Product	Equivalence in tons of product
Methane gas	1 mc = 82×10^5 tep
Electricity	1 KWh = 2.3×10^4 tep

Table 20

Productive electricity consumption in tep	2014	2015	2016	2017
Consumption	890.3	896.9	954.3	1,104.1*
% increase on an annual basis	-	0.74	6.40	15.7

Methane gas consumption in tep	483.9	506.7	515.1	569.2*
% increase on an annual basis	-	4.7	1.6	10.5
Total consumption	1374.2	1403.6	1469.4	1,673.3*
% increase on an annual basis	-	2.1	4.7	13.8

Table 21

* 2017 data include ABC consumptions that were not considered before

Production	2014	2015	2016	2017
Adhesives Total in t Forestali Division	7735.2	8419.3	8070.5	8337.8
% increase on an annual basis	-	8.8	-4.1	3.3
Toe-puffs and stiffeners in sq.m.	4,431,300	4,345,000	4,060,000	4,857,000
% increase on an annual basis	-	-2.2	-4.0	7.84
Adhesives in kg ABC Division	9,224	10,436	12,096	12,976
% increase on an annual basis				7.3

Table 22

Energy balances

The above tables indicating energy consumption of methane and production data of the 2 Divisions allow to associate energy data and production data, thus obtaining energy consumption values per product unit.

Methane gas is used to feed Rameuse burners (impregnator) to produce overheated water for ABC Division production, for the oxidative afterburner at the point of emission E1 in the production of adhesives to the solvent of the Forestali Division. The remaining part of consumption is intended for heating in the workplace. Hence a gas consumption indicator can be obtained for the various product types. Table 23 shows indexed methane consumption for 2015-17.

Indexed methane gas consumption	2014	2015	2016	2017
Consumption RAM/toe-puffs & stiffeners (tep/1000 sq.m.)	0.047	0.045	0.047	0.044
Consumption ABC Division/adhesives (t)				0.009

Table 23

The indexed consumption of methane gas has improved in 2017 due to burner efficiency. The same data referred to CO₂ Rameuse is indicated also in Table 7 on page 42.

Indexed consumption referred to EE consumption per product unit can be obtained from the energy consumption measured on the various machines used in the production process. Table 24 shown indexed EE Consumption

Indexed electricity consumption	2014	2015	2016	2017
Electricity consumption /toe-puffs & stiffeners (tep/1000 sq.m.)	0.09	0.09	0.09	0.09
Consumption adhesives Forestali Division	0.01	0.01	0.02	0.02
Consumption ABC Division/adhesives (t)				0.013

Table 21

Data recorded over a period of several years reveal indicators that are stable in time and, hence, a production process that does not present energy peaks in the various years measured, thus indicating stability. This does not mean that improvements to be implemented by the corporate Management cannot be underscored.

7.4 – Indirect environmental aspects

Alongside the direct environmental aspects for which ICF S.p.A. exercises total control, the indirect aspects were also taken into consideration and analysed as called for by the EMAS Regulation. The criteria identified for evaluating the significance of the indirect environmental aspects are defined in section 7.1 by the IRA index. This index indicates the Company's capacity to control the indirect environmental aspect. Also the indirect environmental aspects identified are connected with the environmental activities and conduct of: raw material supplies, downstream users.

In particular the following significant indirect environmental aspects have been evaluated:

- transportation;
- packaging;
- emissions: final use by the Client;
- waste: end of product life cycle.

These generated the following improvement objectives respectively: improvement and rationalisation of deliveries, harmonising of environmental and safety procedures, involvement of maintenance operators in the company in the fire-fighting team, and using packing to be returned, with only the inner polythene bag being disposed of. LCA studies with the supplier, changes and integration of Specifications for the client.

As regards management of the activities referred to above, ICF S.p.A. has drawn up specific procedures to evaluate the degree of attention, the conduct of the individual suppliers / contractors in general in relation to the environment, and especially whether these parties have adopted an environmental management system or not.

They are instructed and informed on the means used at ICF S.p.A. to work with respect for the environment, safety and health at work that they are required to conform to for all their areas of responsibility. ICF S.p.A. checks the risks in the company by asking contractors to inform it of risks connected with their specific activities, and provides them with an extract of the risks to be found in the company.

7.5 – Reference laws and compendium of data for non significant environmental aspects

The principal laws that are applicable to ICF S.p.A.'s activities are:

Pollution of the atmosphere

- *Lombardy Regional Government Decree N° 7/4178 of 06/04/2001, Legislative Decree 152/06 "Environmental standards".*

The Company obtained an AIA with Decree N° 12771 of 29 October 2007 expiring in 2015 and extended to 29 October 2023 for the various emission points that, where necessary, are controlled by suitable scrubbers (see Table 02 on page 25). From time to time the Company checks the emissions and the plant management conditions. The Company also prepares a solvent managing plan that takes into account provisions for any checks by the competent authorities. About 4,000 kg of solvents are recovered each year from the company's cryogenic plant, which are mixed and reused in the production process.

Water discharges

- *Legislative Decree 152/06 "Environmental standards", Legislative Decree 152/99 "Draft laws on industrial water discharges" and subsequent amendments, and Lombardy Regional Law N° 62 of 1985.*

ICF S.p.A. is subject to this standard because it discharges industrial water and so it has obtained the relevant authorisation from the competent body. This authorisation is included in the AIA.

A.I.A. (Integrated Environmental Authorisation) I.P.P.C.

Legislative Decree 152/06, Legislative Decree 46/2014

The company has carried out the resulting processes provided for by the decree by completing the online format of the Lombardy Region's application and submitted the same by 28/02/2006 along with the technical attachments to: The Lombardy Region, Milan province, and Marcallo con Casone Municipality. On 30th April 2006 it had a public notification published in the "Il Giorno" newspaper in compliance with art 5, 7th comma of Legislative Decree 59/05, as per the notification received from the Lombardy Regional Administration on launching AIA/IPPC procedures. During November the Company received Authorisation Decree N° 12771 of 29th October 2007. A document of the Milan Provincial Administration of 09.10.2014 extended the duration of the authorisation to 29 October 2023.

Soil pollution

- *Ministerial Decree 471/99 (Legislative Decree 152/06) "Reclamation of polluted sites", Lombardy Regional Law N° 62 of 1985, and current Lombardy Region Health Regulation.*

The Company set up devices to eliminate the risk of polluting the soil as a result of accidental spillage, since all production areas are indoors and paved.

The 10 underground tanks are clad with a double lining and gap filled with nitrogen, and subjected to weekly pressurised checks for leaks in the lining, as well as annually for corrosion. All drainage takes place

in separated areas, with any spillage being collected in a specific tank. The other 22 tanks above ground that contain raw materials and finished products (adhesives) are located within the covered, paved areas and are separated by walls (containment basins). Each year outside laboratories analyse the industrial bore-hole water (for fire-fighting use), and this has not shown any pollution taking place. Specific checks are carried out for the presence of organic solvents and chlorinates. The June 2016 analysis showed a value for organic solvents and chlorinates that was at the limit of the instrument's reading range.

Administrative liability of companies

– *Legislative Decree no. 231 of June 8, 2001: "Discipline of administrative liability of legal entities, companies and associations".*

The company has implemented a model that is consistent with Legislative Decree 231/01.

Waste

– *Legislative Decree 152/06 "Environmental standards".*

The Company produces non-hazardous waste almost exclusively (more than 88%). Plastic and paper are sent for recycling. Hazardous waste takes the form of spent carbons, polluted packaging that is rehabilitated and recovered, and any adhesives returned by clients that cannot be recycled in production.

Packaging

– *Legislative Decree 152/06 "Environmental standards".*

Raw materials packaging:

The main types of packaging include:

25 kg paper bags, 1 m³ cardboard boxes, iron drums, and cellophane big bags.

Clean packaging is compacted and sold to others for recycling, while dirty packaging includes "multi-material packaging" waste or "packaging polluted by hazardous substances".

Finished product packaging:

The types and quantities of packaging used for finished products in 2015, 2016, and 2017 are shown in the table below and expressed in kg as per the CONAI communication.

Type of packing	2015	2016	2017
Plastic	10400	9800	10100
Iron	68100	65000	65200
Tin straps	583200	570000	584100
Cardboard	24300	24600	26400
Wooden pallets	26900	25100	27300

Tab 25a - Forestali Division Packaging

Type of packing	Package Nos.		
	2015	2016	2017
Metal buckets	13935	15223	12883
Metal drums 60 L	5654	9389	10343
Metal drums 200 and 217 L	8412	8877	8709
IBC metal/wooded pallet	7581	8767	9906
Buckets in PE or PP	1356	1847	474
Metal jars	6181	14162	11448

Tab 25b - ABC Division Packaging

Electromagnetic fields

– Law 36/2001, Decree of the President of the House of Ministers of 8/7/2003.

On 24/07/03 the low frequency (50 Hz) electromagnetic fields were measured, with a view to characterising the working areas located near the power lines used to convey electricity that pass in the immediate vicinity of the plant.

The maximum value found in the goods receiving yard, was about 500 times lower than the legal limit as an electrical field and about 40 times lower than the legal limit for magnetic induction.

– Law 447/95 “Draft Law on acoustic pollution”, Prime Minister’s Decree 14/11/1997, Decree 16/03/1998, Lombardy Regional Law no. 13 of 10/07/2001 “Provisions on acoustic pollution”.

As regards external noise, it should be pointed out that the factory is located in an area zoned as an “industrial zone” with daytime and night-time limits of 70 and 65 dB(A), respectively. The Marcallo con Casone Municipality decided noise zoning for the municipal area in Council deliberation n° 47 of 30th September 2005, confirming the emission limits for exclusively industrial areas of the Decree of President of the House of Ministers of 14/11/1997. The company works on 3 shifts. The measurements taken in 2017 produced the following results:

CLASSIFICATION OF MEASUREMENT AREA AND SOURCE DESCRIPTION						ANALYSIS OF THE MEASURES					
TR	POSITION	COORDINATES MEASURING POSITION	NOTES REFERRING POSITION	MAIN SOUND SOURCES	EXTRA-SITE ACUSTIC COMPONENTS	L _{Aeq} dBA	L50%ile dBA	L90%ile dBA	C.TOTALI (DM90)	Freq TP	C. IMPULSIVE (DM98)
D	1	489.625 E - 5035.855 N	N - E	Plant E12 RAW		61,2	61,1	60,7	NO		NO
D	2	489.625 E - 5035.930 N	S - E	Plant E12 RAM + internal handling		61,9	59,8	59,8	NO		NO
D	3	489.406 E - 5035.930 N	W	Heating system ICF E11	Transit of vehicles	56,8	54,7	54,0	NO		NO
N	1	489.617 E - 5036.005 N	N - E	Plant E12 RAW		59,7	59,7	59,3	NO		NO
N	2	489.625 E - 5035.855 N	S - E	Plant E12 RAW		59,3	59,3	58,7	NO		NO
N	4	489.667 E - 5035.826 N	S - E	Plant E12 RAW		44,9	44,7	44,1	NO		NO
N	6	489.681 E - 5035.739 N	S - E	Plant E12 RAW		41,0	40,7	39,7	NO		NO

Tab 26 - Noise levels at the boundary



Fig 06

– *Legislative Decree 81/08, Heading VIII, Chapter 1 & II “Noise in working environments”.*

Every three years (most recent in April 2015) ICF S.p.A. has the noise on the premises mapped. Most of the workstations have sound levels below 80 dB(A). Areas were highlighted with exposure exceeding 80 dB(A) near the end of the impregnation line and adhesive area when the cranes are being used. Sound levels of 85 dB(A) are only exceeded with the ARA3 packaging machine. Training sessions are held for all production operators. Soundproofing of some parts of machines was done, resulting in a reduction in the noise pollution. Operators have been equipped with appropriate PPE. The Company health plan includes hearing checks.

Vibrations

– *Legislative Decree 81/08 Heading VIII, Chapter III.*

ICF S.p.A. does not use machinery that gives rise to vibrations. The only source of vibrations is the use of forklift trucks for handling raw materials and finished products inside the departments, but that occasionally also travel on asphalted roads on the production site. ICF S.p.A. has therefore seen to measuring the vibrations caused by using the forklift truck in May 2015. The values shown that were related to the various tasks never exceed the reference limits for vibrations in the body and on the hand and arm.

Safety

– Legislative Decree 81/08, Heading IX, Chapter 1 “Hazardous substances”.

The Company has seen to preparing a Risk Assessment and Probability of occurrence with the resulting removal of reduction of the principal sources of danger by means of technological innovation on the one hand and organisational and procedural aspects on the other. A chemical risk assessment was also carried out in May 2013, supported by environmental monitoring and personal device measures, which highlighted an exposure risk that for Adhesive production was “*High for safety and significant for health*”, and for Fabric Production was “*Low for safety but significant for health*”. No risk exists for the offices. The health plan was subsequently draw up.

Tables 27a and 27b show the frequency and gravity indices.

Year	N° injuries	N° days lost	Total N° of employees
2015	0	0	78
2016	2	57	82
2017	3	141	120

Year	Hours worked	Frequency index	Gravity index
2015	139134	0	0
2016	138765	14.4	0.41
2017	197060	15.2	0.71

Table 27a and 27b - number of injuries and injury indices.

In 2017 one of the 3 accidents was a commuting accident that generates absence from work of over 40 days, aggravating the accident indices for 2016.

Transporting goods

– Directive 94/55/CE updated to the fifth technical update by the Ministerial Decree of 02/08/2005 by the Transports and Infrastructures Ministry.

Transporting of hazardous finished products and receiving of hazardous raw materials is done in compliance with the ADR standard, updated in 2017.

When hazardous raw materials are received, checks are carried out on: quantity, quality and delivery notes.

Outgoing finished products are transported by transport companies authorised to transport hazardous goods. A safety consultant was appointed for hazardous goods as per Legislative Decree 35/10 in September 2010, and they prepare a report each year that they send to the employer. During 2017 no incidents occurred involving ICF's goods.

Vehicular traffic

The number of vehicles entering and exiting the Company in 2017 was about 2200 units.

Radioactivity

– *Legislative Decree 230/95 “Radiation Protection”.*

Within the Company there is a radioactive source, which consists of the thickness measuring device fitted on the coextruder machine. The radioactive source consists of the Stronzio 90.

ICF S.p.A. has duly reported possession of this source to the Labour Inspectorate.

It is checked annually by a radio-protection study (qualified expert).

The results show exposure 10 times lower than the legal limits for workers not exposed.

Substances that are harmful to the ozone layer and which enhance the greenhouse effect

– *Ministerial Decree N° 147 of 15/02/06 “Regulation and repair of leaks of substances that are harmful for the stratospheric ozone layer according to (CE) Regulation N° 517/2014”.*

The Company houses refrigeration plants that contain R22 (HCFC) fluids a total quantity of kg. A plant booklet was set up with annual checks by a competent technician. R407 refrigerant fluids are also on site and are subject to periodic checks.



8. ENVIRONMENTAL EFFICIENCY

ICF S.p.A. has set up all the measures necessary and installed equipment and/or instruments to keep the internal and external environmental impacts to a minimum.

To contain emissions into the atmosphere

- A water scrubber has been installed for purifying the fumes coming from the impregnator, to damp down the pollutants: VOC, NO_x and powders produced following work done by the machines referred to above. This plant has an hourly capacity of 26000 m³/h for 16 hours 5 days a week, and guarantees higher damping down performance of 80%.
- Sleeve filters have been installed to damp down the powders comprising mainly inert powders on coextruder-loading hoppers and for resins from powder spreading. These plants' performance stands at 95% and they process a capacity of 2200 and 2800 m³/h, respectively, guaranteeing damping down of 95% of incoming powders. The powders collected are reused in the production process.
- An afterburner is installed to limit VOC emissions in the vicinity of the mixers in the adhesives department. The plant guarantee 90% damping down of the pollutants treated. The mixers' vents are connected to a liquid nitrogen cryogenic scrubber plant that guarantees 99% recovery of VOC, equal to 80 kg of solvent mixtures per week.
- An active carbon damper system has been installed to reduce emissions from ABC Division production. This system is regularly renewed to ensure in line emissions with AIA/IPPC authorisation.

Industrial waste:

- A 40 m³ containment tank is used to collect all the process water resulting from washing the plants, with subsequent treatment in the pre-treatment plant and reutilised as washing water.

To contain the quantity of waste disposed of:

- A campaign is in place for recovering and recycling paper, cardboard, and plastic. In 2017 this resulted in about 43 tonnes of paper and cardboard and 18 tonnes of plastic being recovered that would otherwise have been sent for disposal at dumpsites.
- Returnable tanks and drums are used for transporting adhesives, dedicated by product and client. This system is used to transport about 500 tonnes/year with a saving of about 3000 drums with a 170 kg capacity.

To contain exposure to noise:

Some parts of the impregnator have been soundproofed, which made it possible to reduce the noise in the workplace at the end of the line by 3-4 dB(A).

Organisational types of actions (shifts) have significantly lowered equivalent exposure to noise on a weekly basis.

9. ENVIRONMENTAL PROGRAMME

All environmental goals of the 2016-2018 three-year period have been completed.

The following improvement works were carried out to protect the environment in the 2016-2018 three-year period:

- reduced consumption of drinking water from wells year 2016
- EE reduction to light up production departments by using LED replacements: -5%. Year 2017
- improved waste indices: - 7% production of toe-puffs and stiffeners; Year 2017
- reduction in fugitive emissions: partly implemented with a 10% reduction for the year 2017.

Overall the works done came to 1.5 % of the Company's turnover in the 3 year period in question.

Updating of ICF S.p.A.'s Environmental Programme for the 2018-2020 period is dealt with below.



THREE-YEAR ENVIRONMENTAL PROGRAMME 2018-2020

Objective	Environmental aspect	Programming	Responsability and resources	Deadline	Objective indicator
Optimising energy resources	Optimise the use of energy resources for production-related aspects	Verify feasibility of starting an Energy Certification path for compliance with ISO 50001 standard	Maintenance manager	December 2019	-10% energy indices of production
Hazardous substances	Replacement of hazardous substances with other non-hazardous ones	Continue the research project to replace hazardous substances, particularly those entailing an environmental risk	Research & Development Manager	2018-20	Formulate at least 20% of the products sold with low environmental at the end of the three-year period.
Improve end of product life cycle communications	Build client awareness on the correct use and disposal of products (adhesives)	Start of Sales Fact Sheet review with integrations	R&D Manager	End of 2018	Review of at least 50% of the Sales Fact Sheets
Raw material impressions (rubber solvents)	Study of LCP on adhesives	Data collection from suppliers for informative purposes	HSE and Buying	End of 2019	Collect documents to start using and study LCP on adhesives
New mixers	Improve production and safety aspects, and reduce the emissions released	Request to authorise and install new mixers with a loading hopper.	Maintenance manager	End of 2018	5% reduction of fugitive emissions

10. VALIDITY OF ENVIRONMENTAL DECLARATION

This Environment Statement, with data updated to December 2017, relates to the second update of the fourth renewal of the EMAS registration of the Marcallo con Casone production site.

In accordance with CE Regulation 1221/2009 ICF S.p.A. will update the Environmental Declaration annually from 2019.

Each Environmental declaration is a controlled document with its own issue date.



11. ACCREDITED ENVIRONMENTAL AUDITOR

The Accredited Environmental Auditor that validated this Environment Statement, in terms of the EMAS Regulation is **CERTIQUALITY** via G. Giardino 4, Milan, Accreditation N° IT-V -0001.

The NACE code based on which the Environment Statement is validated: NACE Code 20.52 for companies in the chemical sector, makers of glues and adhesives.

For further information, clarifications, or anything else relating to this document, contact Dr. Antonio Sassi, or Eng. Vincenzo Farina HSE Office of:

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GLOSSARY

(Definition of technical terms used in Industrie Chimiche Forestali's Environmental Declaration)

Pyroligneous Acid: a mixture of natural organic acids extracted from wood, comprising mainly acetic acid and other (superior homologue) acids of an organic nature.

Hot melt adhesives: adhesives that are melted by heating obtained from the granular extruder.

Polychloroprene Adhesives: adhesives obtained by dissolving polychloroprene rubber.

Polyurethane Adhesives: adhesives obtained from the synthesis of two types of chemical products like isocyanates and polyols.

Environment: the context within which an organisation works, including the air, water, land, natural resources, flora, fauna, human beings, and the interrelations between these.

Environmental aspect: the element of an organisation's activity, product, or service that can interact with the environment. A Significant Environmental Aspect is an environmental aspect that has a significant environmental impact.

ATEX: community directive on risk assessment for explosive atmospheres.

Environmental Audit: A process of systematic, documentary checking to determine and evaluate, with objective evidence, whether an organisation's Environmental Management System conforms to the criteria defined by the organisation itself for auditing the Environmental Management System and to inform Top Management of the results of this process.

CO: Carbon Monoxide. A polluting emission resulting from combustion with a shortage of oxygen.

CO₂: Carbon Dioxide. A polluting emission

resulting from total combustion of an organic substance with an excess of oxygen.

Coextruder (extruder): equipment that makes it possible to obtain fabric for toe-puffs formed by 2 layers of polymer material, with fabric between them.

Dual life: double life.

Validation of the Environment Statement: an act by means of which an Environmental Auditor accredited by a suitable Body, examines the Environment Statement, with a positive outcome.

CLP: community regulation 1207/2008 on labelling, classification, and packaging of chemical products.

Co-rotating: Rotating in the same direction.

COT: total organic carbon

dB(A): measurement of the sound level in the human ear obtained as the result of a ponderation curve A (range of the frequencies that can be perceived by the human ear).

Dissolver: a receptacle fitted with blades or helixes that mix, homogenise, and dissolve the solid parts of an adhesive.

EMAS (Environmental Management and Audit Scheme): EU Regulation 2017/1505.

Granule extruder: a complex piece of equipment that makes it possible to obtain granular substances starting from mixable polymers.

Hot melt: resins that melt when heated, applied in the molten state to the fabric using a flat head extruder.

If: injury frequency index

Ig: injury gravity index

Environmental Impact: any modification of the environment, either negative or beneficial, total or partial, resulting from an organisation's activities, products or services.

Flash point: the temperature at which the vapours of a substance ignite in the presence of naked flames.

MDI: methylenediisocyanate. A substance used for synthesis of polyurethane adhesives.

Nm3: normal cubic metre. Gas volume at 0°C and a pressure of 1 Atm (atmospheric pressure).

NOx: Nitrous Oxides. A polluting emission resulting from combustion of methane gas.

Environmental Policy: A declaration made by an organisation, containing its intentions and principles in relation to its overall environmental performance, which provides a reference scheme for the activities to be carried out and to define the objectives and mileposts in the environmental field.

Polyols: complex organic substances used for synthesis of polyurethane adhesives.

Environmental Programme: Description of the company's specific objectives and activities in relation to better protection of the environment for a specific site, including a description of the

measures adopted or planned to attain these objectives and, if applicable, the deadlines set for applying these measures.

PU: hot-melt polyurethane polymer

Responsible Care: A Federchimica programme to promote constant attention within the association to ongoing improvement in safety and the protection and healthiness of the environment.

Environmental Management System (EMS): The part of the general management system that includes the organisational structure, planning activities, responsibilities, practices, procedures, processes, and resources for processing, implementing, pursuing, reviewing, and keeping the environmental policy active.

Tack: the stickiness of an adhesive.

TEP: equivalent petroleum tonnage. A unit of measurement in the International Metric System used to express consumption for electricity and methane gas. The conversion table is:

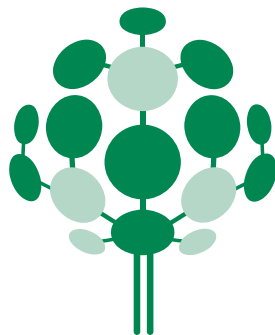
$$1 \text{ kWh E.E. medium/high voltage} = 2,3 \times 10^{-4} \text{ tep}$$

$$1 \text{ Nm}^3 \text{ methane gas} = 82 \times 10^{-5} \text{ tep}$$

TNT: Fabric non fabric.

UVCE: Unconfined Vapour Cloud Explosion.

Wh: Watthour: hourly electricity consumption for 1 W of power.



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