



## ***VENTURI-QUENCHER VQC-hi®***

### **INNOVATION IN THE DIE-CASTING AIR TREATMENT**

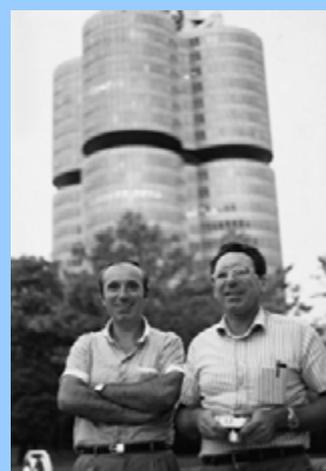
- SELF-CLEANING SYSTEM TO AVOID PLANT STOPS
- 20% REDUCTION OF THE INSTALLED POWER AND CO2 EMISSION
- 90% REDUCTION OF THE WASTE PRODUCTION
- CONSTANT TREATMENT EFFICIENCY

## **VENTURI-QUENCHER VQC-hi®**

### **OUR EXPERIENCE**

Ecochimica has **30 years experience in the air treatment sector**. We have a special focus on the production of quenchers, cooling towers, evaporators and chemical scrubbers as well as applications for several sectors (foundry, steelworks, incineration, chemical, pharmaceutical, glass industry, etcetera). Our plants can be found both nationally and internationally – please see the installations on our website: [www.ecochimica.com](http://www.ecochimica.com)

Innovation is important to Ecochimica. We are constantly involved in design and applied research, conducting laboratory tests, using pilot plants and creating patents, thereby obtaining a relevant **know-how**.



Our Founders

## **VENTURI-QUENCHER VQC-hi®**

# **OIL VAPOURS TREATMENT APPLIED RESEARCH**

### Environmental Protection

The increasing sensitivity to saving energy and to environmental conservation is encouraging change in the management of all kinds of companies. Obtaining **ISO14000 environmental certification**, as well as purchasing air collection and treatment plants (for noise, dusts and oil vapours) is becoming a necessary step; paying great attention to the costs – not only of the initial investment but also for that of plant management is a major factor of this growth.

### The legislative situation

The stricter norms which are now regulating the environmental emissions require **very efficient and reliable treatment systems**.

### The situation in the die-casting foundry

In the design of an air aspiration and treatment system for die-casting machines it is generally necessary to consider certain factors; for example the lack of space, **logistic problems** (because of the need of cranes passing to exchange the dies), robot movement, lubricant systems, etc. The **compactness of the air treatment system** is also important, as is an efficient aspiration system.

### Aspiration of Oily Vapours

In the treatment of oily vapours it is **essential** to have both a precise force of suction and an **aspiration hood** which is **correctly designed**. If the hood is too small, a partial leakage of the vapours may occur, resulting in an insufficient treatment of the air.

## **VENTURI-QUENCHER VQC-hi®**

### **Disadvantages of Traditional Treatment Systems**

Though **traditional filtration systems** (static and electrostatic filters) can be as efficient as ours, they are subject to **clogging** of the filtering media. This eventual problem forces the end users to adopt **expensive cleaning cycles** (manual or automatic), using water and requiring periodical **plant stops (thereby costing money)**.

### **How VQC-hi® was born Venturi-Quencher high- Efficiency**

Ecochimica, with the advantage of its 30 years experience, has studied a **specific innovative treatment system for die-casting foundries** to reduce energy consumption, waste water production, maintenance and consequential plant stops. This has been possible by studying the latest design improvements and attentively evaluating their pros and cons; we always consider the direct experiences of the treatment plant-users. In cooperation with universities and producers of die-casting machines, a dynamic team was created which brought in pilot plants to the foundries and tested them. **This is how the Venturi-Quencher, described below, was born.**

## VENTURI-QUENCHER VQC-hi®

### APPLIED RESEARCH

Ecochimica coordinates a working team, with a target to realize pilot plants cooperating with **die-casting machines producers, universities** and research laboratories to optimize the oil vapour treatment solution.



VQC-hi® Venturi-Quencher  
high efficiency at metallurgy  
faculty – BS, Italy

#### Benefits of the Venturi-Quencher VQC-hi®

1. development of a **compact** treating system;
2. **self-cleaning** system, avoiding plant stops;
3. **20% reduction** of installed kW;
4. **90% reduction** of waste production;
5. **water recovery through condensation** of the cleaned oily vapours;
6. possibility to **re-use the treated detachant agent**;
7. **clogging** elimination;
8. constant treatment **efficiency**;
9. **reduction of** investment costs;
10. **high treatment efficiency**.

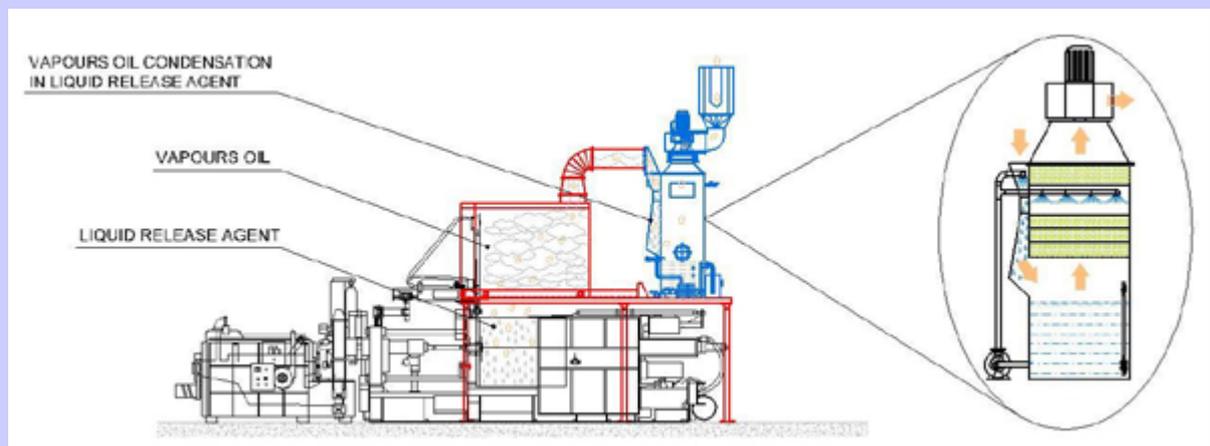
## VENTURI-QUENCHER VQC-hi®

### Venturi-Quencher VQC-hi® WORKING PRINCIPLE

The detachant liquid, sprayed on the hot die, evaporates and generates oil vapours.

**VENTURI-QUENCHER VQC-hi® series**, developed by Ecochimica, has been expressly developed to condense the oil vapours, generating a water and oil emulsion which is collected in the tank bottom, thereby avoiding both the problem of clogging as well as the consequential waste of time and money which are necessary for maintenance. As well, there is a continuous and automatic washing system.

The **VQC-hi®** is composed of **two treatment stages**:



#### 1. Vapour condensation:

The oily vapours contained in the air at the filter's inlet pass through a VENTURI QUENCHER set, which are specially designed and washed with anti-clogging nozzles, **causing the condensation of oil vapours.**

#### 2. Final filtration:

The air has a further final filtration through the tower's packing material. Then it is sent through a fan to the atmosphere.

## VENTURI-QUENCHER VQC-hi®

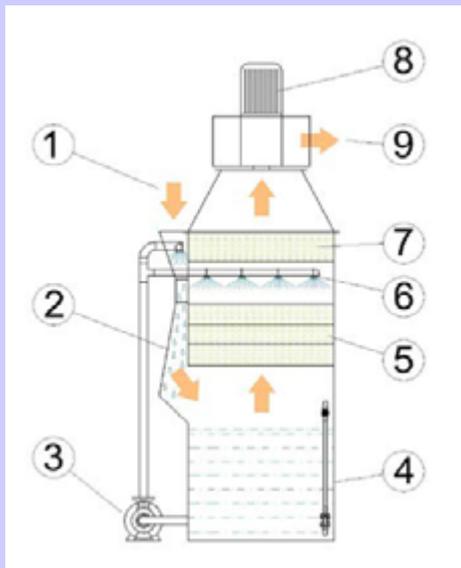
### VQC-hi® WORKING TECHNICAL DESCRIPTION

The oil vapours which are collected from the die-casting machine enter in the filter, passing through the first venturi-quencher stage (1). This has been expressly designed for their almost total condensation and purification through the washing liquid (2) which is sprayed in counter current at high pressure by a stainless steel pump (3) through special non-clogging nozzles (6), causing the condensation of the oil vapours.

An automatic water refilling system keeps the oil emulsion at the right working level. The oil emulsion which is contained in the lower tank (4) is periodically discharged according to the pollutant concentration. **Recovery of the treated detachant is possible.**

The air, which is now cleaned from the oil vapours, passes through a final filtration in the tower (5 and 7) after the treatment, and is then sent to the atmosphere (8) through a fan, containing a pollutant content in accord with the law limits.

In both the single machine venturi-quencher and in the centralized configuration, the cleaned air coming out of the venturi-quencher **can be re-circulated** – also partially – inside the plant.



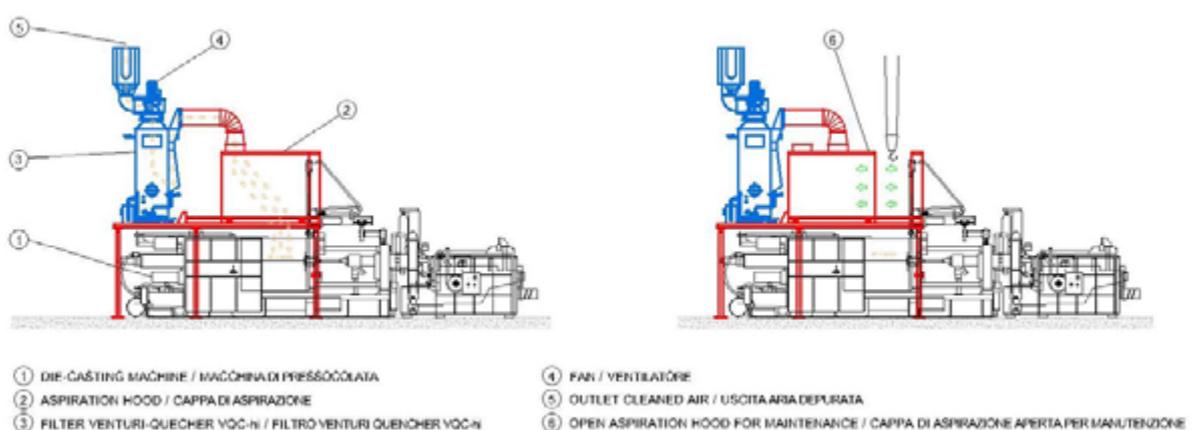
1. the air coming from the aspiration hood enters into the venturi-quencher;
2. in the venturi-quencher stage the condensation of the oil vapour occurs;
3. stainless steel pump for washing recirculation liquid;
4. the condensed vapours are collected in the washing liquid recirculation tank;
5. static filtration in the tower;
6. packing cleaning system through non clogging nozzles;
7. further and final filtration;
8. integrated fan;
9. final air output;

## **VENTURI-QUENCHER VQC-hi®**

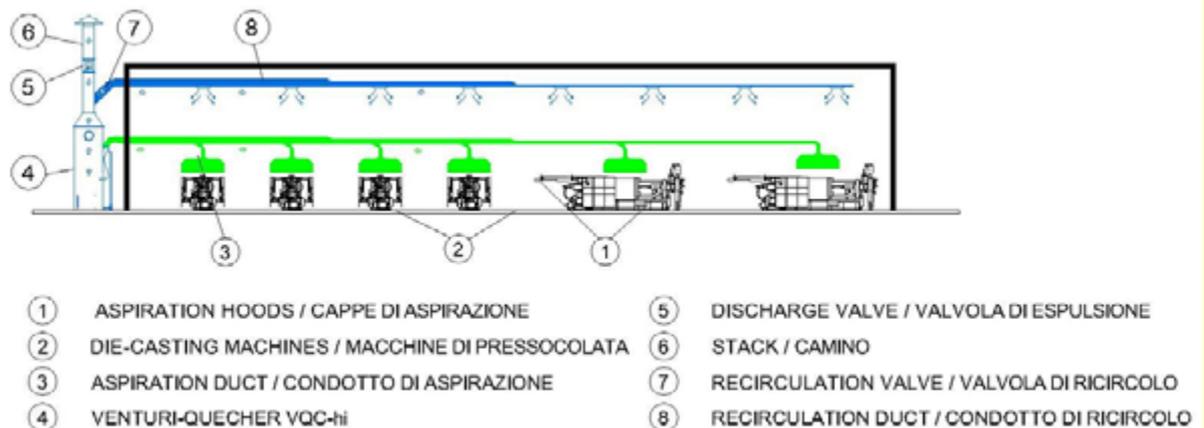
### **DIFFERENT VQC-hi® CONFIGURATIONS: SINGLE MACHINE OR CENTRALIZED**

The Venturi Quencher VQC-hi® can have two different configurations, explained here. According to the customer's needs Ecochimica can furnish **turn key solutions** (venturi-quencher, hoods and piping).

#### **1. Single die-casting machine VQC-hi®:**



#### **2. Centralized VQC-hi® for several die-casting machines:**

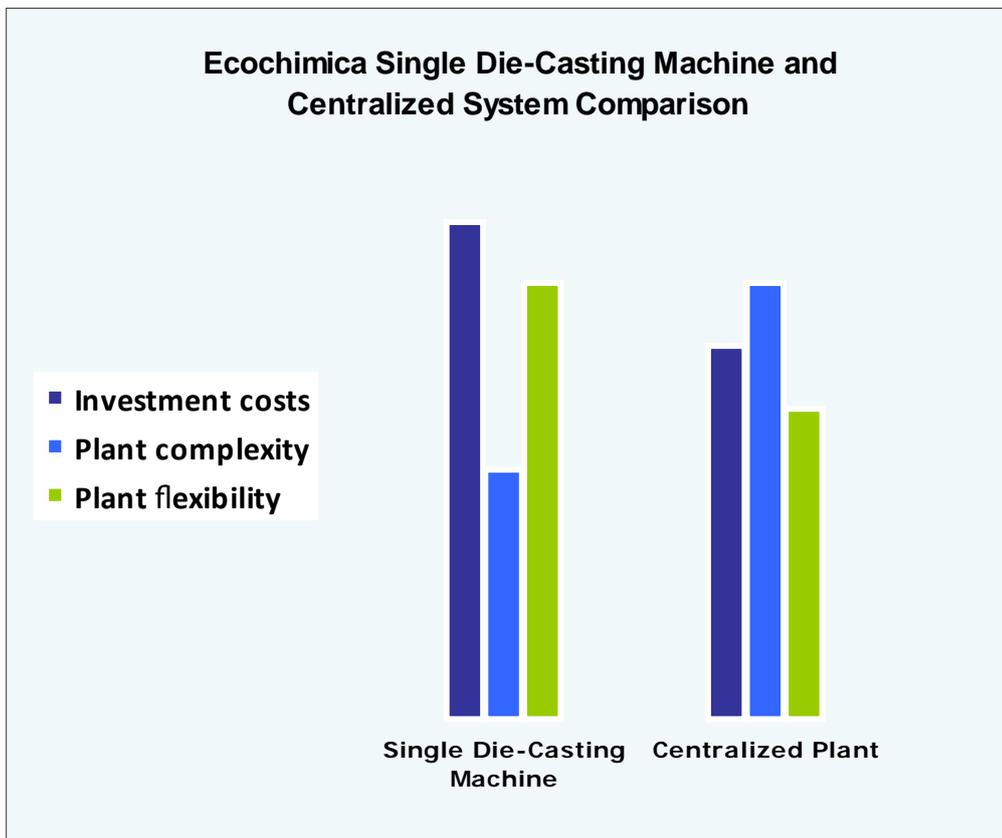


## **VENTURI-QUENCHER VQC-hi®**

### VQC-hi® PLANT SINGLE MACHINE OR CENTRALIZED?

The following scheme summarizes the main differences between the two installations, taking in consideration a foundry with at least 2-3 mid-size die-casting machines:

Single die-casting machine VQC-hi®	Centralized VQC-hi® for the whole foundry
Higher flexibility, also considering future lay-out changes	Modification of plant lay-out more difficult
Higher plant cost	Lower plant cost



## **VENTURI-QUENCHER VQC-hi®**

### **VENTURI-QUENCHER VQC-hi® BENEFITS**

Below is a summary of benefits of the Venturi-Quencher VQC-hi® System compared to static filters FCO® and electro-static filters F-EL®:

**LOW INVESTMENT COSTS**, in detail in the centralized solution.

**ABSENT ORDINARY CLEANING CYCLES**: the filter is auto-cleaning, as a difference with other types of filter, which require expensive clearing cycles.

**LOW ELECTRICAL POWER CONSUMPTION** compared to electrostatic filters, which have expensive clearing cycles for water heating.

**LOW WASHING SOLUTION CONSUMPTION**, recovering the water contained in the treated oil vapours through condensation. The washing solution in the tank is re-circulated and periodically discharged (usually not more than 2 times/year), compared to the static and electro-static filters, where the liquid is discharged at the end of every cleaning cycle and must subsequently be treated or disposed of.

**LOW FIRE RISKS.**

**PLANT RELIABILITY**: the R&D staff is constantly busy to make the plants more rational, reliable and simple.

**WASTE PRODUCTION REDUCTION** compared to the static and electro-static filters which require periodical cleaning cycles which require water.

**TREATED WATER RE-USE POSSIBILITY** from the foundry water treatment plant as refilling water for the Venturi Quencher;

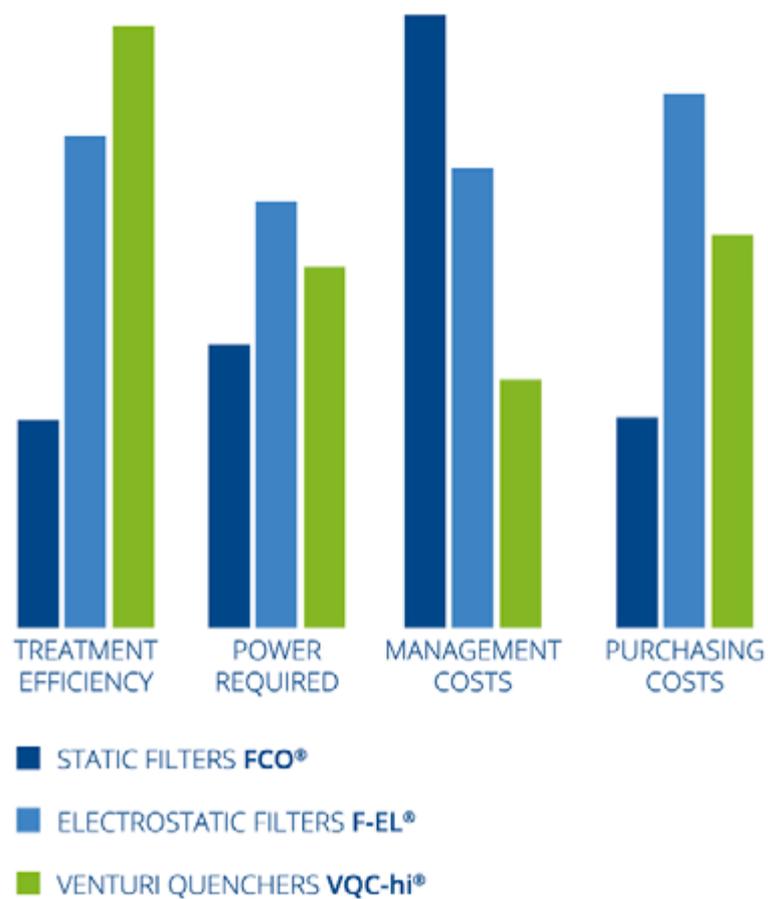
**CONSTANT TREATMENT EFFICIENCY** because the filter is auto-cleaning, so the customer doesn't have to worry about maintenance to respect emission limits.

## VENTURI-QUENCHER VQC-hi®

### FILTRATION TECHNOLOGIES COMPARISON

Ecochimica® systems comparison for oil vapours treatment.

*Comparazione tra sistemi ecochimica® per abbattimento vapori oleosi*



## VENTURI-QUENCHER VQC-hi®

# VENTURI-QUENCHER VQC-hi® OUTPUT ANALYSIS CERTIFICATE

**Dott. Luca TONELLO**  
CHIMICO  
Dedica l'ideale del Dato da Verificare (N° 770)  
RESPONSABILE TECNICO

Il presente certificato è valido e valido per il numero 533/100/01/01

Referto N. 04/LT/0424.1

Committente: ECOCHIMICA SYSTEM S.r.l.  
Via Zambon, 23 - CREAZZO (VI)

Campione: Membrana 548A  
Uscita Scrubber

Data accettazione: 19 ottobre 2004

**NEBBIE D'OLIO**

	Un. mis.	Valore
548A	mg/Nmc	2,1

Metodica di analisi: Gravimetria

Campione analizzato da Ecochem S.r.l.

Vicenza, il 21 ottobre 2004



ecochem srl  
Via L. Zamboni, 23 - 36100 Vicenza - Tel. 0444 911855 - Fax 0444 911900 - Cell. 339 8611020 - e-mail: luca.tonello@ecochemlab.com  
analisi chimiche - controlli ambientali - perizie tecniche - gestione impianti

## VENTURI-QUENCHER VQC-hi®

# DIE-CASTING FOUNDRY ECOCHIMICA INSTALLATIONS EXAMPLES



Centralized Venturi-quencher VQC-hi® plant



Aspiration hood from treatment of oil vapours for single die-casting machine



Venturi-quencher VQC-hi® for treatment of oil vapours from single die casting machine



Centralized aspiration system in assembly phase

# VENTURI-QUENCHER VQC-hi®

## DIE-CASTING FOUNDRY ECOCHIMICA INSTALLATION EXAMPLES



Centralized Venturi-quencher VQC-hi® plant



Centralized Venturi-quencher VQC-hi® plant

Chemical scrubber to treat fumes from furnace scorfication



Centralized Venturi-quencher VQC-hi® plant



Bag filter for furnace dust treatment

## VENTURI QUENCHER ABBATTIMENTO VAPORI OLEOSI DA PRESSOCOLATA

### VENTURI QUENCHER DIE-CASTING OIL VAPOURS TREATMENT



# VQC-hi®

#### TIPOLOGIA DI IMPIANTO:

Venturi Quencher

#### PRINCIPIO DI FUNZIONAMENTO:

Il liquido distaccante spruzzato sullo stampo caldo evapora generando dei vapori oleosi.

Il **VENTURI-QUENCHER della serie VQC-hi®**, sviluppato da Ecochimica, è stato appositamente studiato per condensare i vapori oleosi attraverso un doppio stadio di abbattimento, generando un'emulsione di acqua e olio che si raccoglie nel fondo della vasca, senza avere problemi di intasamenti ed evitando il conseguente dispendio di tempo e denaro necessario per la manutenzione. Entrambi gli stadi adottano un sistema di lavaggio continuo e automatico.

I vapori oleosi captati dalla macchina di pressocolata entrano nell'impianto di abbattimento passando attraverso il primo stadio venturi-quencher appositamente progettato e dimensionato per la loro pressoché totale condensazione e depurazione. Il liquido di lavaggio viene spruzzato in controcorrente ad alta pressione da una elettropompa inox, attraverso degli speciali ugelli inintasabili. Un sistema automatico di reintegro acqua mantiene ad un livello di lavoro ottimale il liquido di lavaggio, che viene periodicamente scaricato a seconda della quantità dell'emulsione oleosa condensata, con possibile recupero del distaccante abbattuto.

L'aria subisce poi una filtrazione statica nel secondo stadio, attraversando la torre e viene quindi inviata in atmosfera, tramite un ventilatore, con un contenuto di inquinanti nel pieno rispetto dei limiti di legge. L'aria depurata in uscita dal venturi-quencher può essere ricircolata - anche parzialmente - all'interno dello stabilimento, sia nel caso del venturi-quencher dedicato per singola macchina di pressocolata che nel caso di impianto centralizzato.

#### PLANT TYPE:

Venturi Quencher

#### WORKING PRINCIPLE:

The detaching liquid which is sprayed on the hot die evaporates and generates oil vapours.

The **VENTURI-QUENCHER VQC-hi®** developed by Ecochimica has been expressly studied to condensate the oil vapours through a double treatment stage, generating an emulsion of oil and water which collects itself in the tank bottom, without clogging problems and avoiding consequent waste of time and money which is necessary for maintenance. Both the systems can adopt a continuous and automatic washing system.

The oil vapours sucked from the die-casting machine enter into the treatment plant passing through the first venturi-quencher stage, which has been especially designed to condensate and clean them almost totally. The washing liquid is sprayed in counter current and at an high pressure by an inox pump, through some special non-clogging nozzles. An automatic water refilling system maintains the washing liquid to its best working level, which is periodically discharged according to the condensed oil emulsion quantity, with possible recovery of the treated detaching agent.

The cleaned air has then a final filtration in the second stage, passing through the tower and is then sent to the atmosphere through a fan with a pollutant content according to the law limits. The cleaned air at the venturi-quencher output can be re-circulated - also partially - in the facility, both in the single machine and in the centralized plant configuration.

## ECOCHIMICA HISTORY

LA STORIA DI ECOCHIMICA

Ecochimica was born in the 70s and has 40 years experience in the environmental sector. Ecochimica has made numerous installations worldwide for the most important foundries companies; it designs and realizes customized plants in order to satisfy specific customer requirements, and it supplies also assistance and scheduled maintenance both of its own plants and third part plants.

*Ecochimica è nata negli anni '70 e vanta un'esperienza di 40 anni nel settore ambientale. Ecochimica ha realizzato numerosi impianti in tutto il mondo per le più importanti aziende del settore della fonderia; progetta e realizza impianti su misura per soddisfare al meglio le specifiche richieste del cliente e fornisce anche assistenza e manutenzione programmata sia per i propri impianti sia per impianti di terze parti.*

## ECOCHIMICA WORLDWIDE

ECOCHIMICA NEL MONDO



FAGOR

Hua Dong Teksid  
Automotive Foundry

SIEMENS

Teksid



nemak



FLYGT

ITT Industries  
Engineered for life

INN.TEC

BÜHLER



ITALPRESSE  
Macchine e impianti per la pressatura  
Equipement for high pressure die casting



fisep  
PROSPERITÀ E SOSTENIBILITÀ A CALORE

KELVIN ALUKAS  
TECHNOLOGIE DLA ODLEWNICTWA

spinko sp. z o.o.