

# Flamma

GROUP

MME on International Bioeconomy dialogues



Regione  
Lombardia



**Flamma Innovation presents VIPCAT:**  
Value Added Innovative Protocols for  
Catalytic Transformations

AUTHOR :

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DATE :

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Flamma is a privately-held Italian company founded in **1950** in Bergamo, Italy.

Flamma is a CMO that manufactures active ingredients and advanced intermediates for the pharma and biotech industries.



## Where is Flamma located?

The Flamma Group consists of three sites for manufacturing:

- Flamma SpA - cGMP facility located in **Chignolo d'Isola (BG), Italy**.
- Flamma Isso is a cGMP facility located in **Isso (BG), Italy**
- Flamma Honkai is a non-cGMP facility located in **Dalian, China**

Sales offices are located in **Italy** (Bergamo), **France** (Paris) and the **USA** (Boston).

## MISSION

We operate in the Life Sciences market as key and fully integrated partner developing and manufacturing Active Ingredients and complex molecules.

## VISION

We want to be a first choice partner for development and manufacturing of high quality APIs within the pharmaceutical supply chain to the patient. We want to be recognized for our competence, dynamism, reliability, innovation ,capability and technology.



- 1950**      **Established** in Bergamo. Italy
- 1996**      Moved to **new headquarters** in Chignolo d'Isola. Italy
- 2001**      **New pilot plant** begins along with new R&D and QC labs in Italy
- 2001**      Started Chinese operations with **Gongan Flamma** Biochemicals.
- 2006**      **Flamma S.a.S.** (Paris) opens
- 2008**      **New APIs manufacturing** unit started
- 2010**      **Flamma USA** opens
- 2012**      Acquired Isso facility & renamed **Flamma Isso**
- 2016**      **FLAMMA INNOVATION FOUNDED**



# ORGANIZATION CHART



**FABBRICA LOMBARDA AMMINOACIDI  
(ITALY)  
HOLDING**

**FLAMMA L.L.C.  
(USA)**

Marketing & Sales Office

**FLAMMA S.A.S.  
(FRANCE)**

Marketing & Sales Office

**FLAMMA S.p.A.  
(ITALY)**

**Headquarters**  
cGMP pilot & plant,  
QA/QC

**FLAMMA HONKAI  
(CHINA)**

non-cGMP plant  
cGMP pilot & plant  
cGMP Kilo lab, R&D,  
QA/QC

**(FLAMMA ISSO ITALY)**

cGMP production plant  
cGMP Kilo lab, QA/QC

**FLAMMA INNOVATION  
(ITALY)**

R&D group

## Headcount ( Dec 2017)

**Employees** **496**

Flamma Italy/France/USA 288

Flamma China 208



## Production Capacity

**Reactors capacity** **450 m<sup>3</sup>**

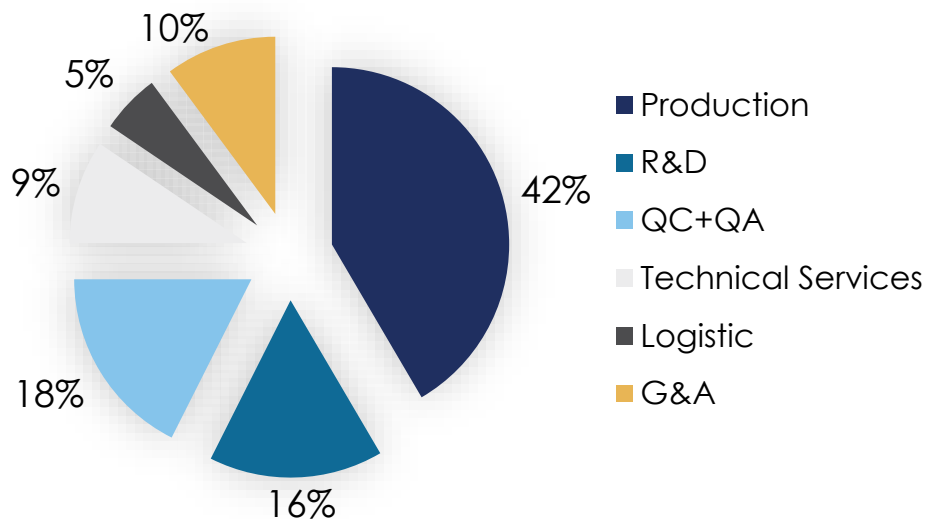
Flamma Italy 250 m<sup>3</sup> → 120 m<sup>3</sup> Chignolo d'Isola + 130 m<sup>3</sup> Isso

Flamma Honkai 170 m<sup>3</sup> → 70 m<sup>3</sup> (cGMP) + 100 m<sup>3</sup> (non-cGMP)

**Production output** 360 MT

**R&D facilities** Three fully staffed R&D labs (one at each site)

## BDG 2018



The **R&D group at Flamma Innovation** now consists of **43 people** over the **2** sites in Lombardy region (Chignolo, Isso). Three specialty groups have been added to expand Flamma Innovation capabilities:

- Solid State group
- LC/MS group
- Calorimetry group





**HIGHLY VALUE ADDED INNOVATIVE PROTOCOLS FOR  
CATALYTIC TRANSFORMATIONS**

***Description:***

*Development of new high atom economy synthetic and enzymatic approaches aimed at the synthesis of fine chemicals and Active Pharmaceutical Ingredients (APIs).*

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VIPCAT will extend its influence in the field of

- *Synthesis of aromas and fragrances,*
- *Active pharmaceutical ingredients and*
- *New synthetic resins.*



*Istituto di Chimica del  
Riconoscimento Molecolare*



**POLITECNICO**  
MILANO 1863



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Title	Project leader	Admissible Investment	Contribution
VALUE ADDED INNOVATIVE PROTOCOLS FOR <b>CATALYTIC</b> TRANSFORMATIONS	FLAMMA INNOVATION S.R.L.	€ 5.533.491,03	€ 3.072.638,14

Flamma Innovation s.r.l. ranked 23° with finale score of 90/120

**Specialisation area: Eco-Industria**

**Subject CV1:** Sustainable Catalytic Processes for Industrial Applications

## DURATION OF THE PROJECT

October 3<sup>rd</sup>  
2016

Grant  
agreement

End:  
September 2020

17 Mo

30 Mo

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## Development opportunity

- Development of new **organometallic reagents**
- Development of new **biocatalytic reactions**
- Development of new technology for **enzyme immobilization**
  
- Implementation of the **solid state** chemistry and analyses
- Implementation of the **flow-chemistry technology and industrialization**

### WP1

Aroma chemistry

### WP2

Synthesis of  
Generics and  
Intermediates

### WP3

Development of  
immobilized  
enzymes

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# Catalysis



## Development of new organometallic reagents:

- Carbon-carbon and carbon-heteroatoms bond
- Stereoselective cyclopropanation

## Biocatalytic systems:

- Selective reduction of carbonyl compounds
  - Immobilization of enzyme
- 
- Increase of cost efficiency
  - Benign environmental profile in manufacturing pharmaceuticals

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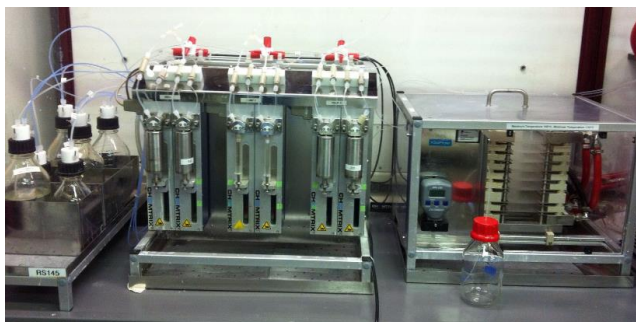


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# Flow Chemistry



- Shorter reaction time
- Less Batch variability
- Excellent heat and mass transfer
- Improved safety in reaction with rapid kinetics
- Lower cost solvent and material consumption
- Numbering-up is more straightforward than scaling up

Continuous flow technology

## **Kiloflow from Chemtrix**

- Pilot-size pyrolysis equipment for continuous process

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# Solid State Studies



## Solid state and reaction calorimetry:

DSC, Calorimeter, PVM probes, FBRM probe, XRPD, Laser particle size detector

- *Obtain generic APIs of the desired crystalline form*
- *Overcome problems such as low filterability, poor drying efficiency, poor reactivity of solid raw materials*
- *Increase of process performance, reduced cost and waste*

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**HIGHLY VALUE ADDED INNOVATIVE PROTOCOLS FOR  
CATALYTIC TRANSFORMATIONS**

***IMPROVE THE COMPETITIVENESS OF LOMBARDY  
CHEMICAL INDUSTRY BY EMPLOYMENT OF MORE COST  
EFFECTIVE AND SUSTAINABLE PROCESSES***

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GROUP

[flammagroup.com](http://flammagroup.com)





Bergamo  
Italy



Paris  
France



Boston  
United States



Dalian  
China



Thank You  
Grazie  
谢谢  
Merci