

# SUCCESSFUL DELIVERY OF CONTINUOUS MANUFACTURING PLANT TO FLAMMA GROUP



The Flamma Group, based in Italy, recently commissioned a state-of-the-art, continuously operating, partially modular synthesis plant for pharmaceutical intermediates. This advanced facility adheres to the stringent standards of cGMP and ATEX (Atmosphères Explosibles) compliance, ensuring the highest levels of safety and quality in production.

| Modules   | Specifications  |
|---|---|
| 2 SS Dosing Lines (I)   | 80 to 360 ml/min  |
| 1 SS Dosing Line (I)  | 300 to 1500 ml/min<br>PTFE, FFKM                                    |
| Reactor Module SiC with pressure control and outlet selection | Corning G4, 2 plates<br>10 to 100°C<br>15 bar max<br>SS, PTFE, FFKM |

### Features

Electrical in-line pre-heater <100°C  
ATEX II 2G IIC T4  
Dimensions: 3.4 x 1.3 x 2.1 m (W x D x H)  
Weight: 1.6 tons (without thermostats)

The plant includes three stainless steel liquid dosing lines, meticulously engineered for flow rates from 80 to 1500 ml/min. These lines converge within the Corning® G4 reactor, where primary reactions and quenching occur. Dual thermostats provide precise temperature control at various reaction stages, enhancing synthesis efficiency and versatility. The plant's modular design allows the integration of reactor modules tailored to specific reaction conditions, enabling diverse pharmaceutical production and rapid adjustments for evolving manufacturing needs.

Flamma Group uses this facility to produce a complex small peptide on a tens-of-tons-per-year scale. The final step of this process involves alcohol oxidation to an aldehyde, an exothermic reaction previously performed with a toxic, costly reagent that generated significant waste and posed solvent recovery challenges. With MicroInnova's improvements, this step now takes place in a dedicated flow plant, yielding a 15% increase in output, a 20% reduction in raw material costs, a 65% decrease in cycle time, and a 40% reduction in waste. Additionally, the e-factor dropped by 39%, and solvent recovery is now more efficient.

The success of this project underscores the strength of the collaboration between the [Flamma Group](#) and [MicroInnova](#). It exemplifies the transformative potential of flow chemistry and process intensification, driving efficient, sustainable production for a more eco-friendly future.

MicroInnova's team of expert engineers stands ready to provide comprehensive solutions, whether designing a turnkey plant from the ground up or retrofitting existing production systems to enhance safety or increase capacity. Their expertise ensures that each project is executed with precision and meets the highest standards of engineering excellence.

Our experts are looking forward to your inquiries about our plant systems!

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