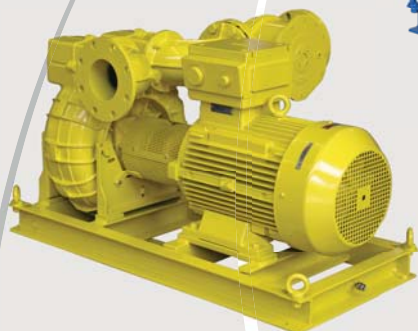
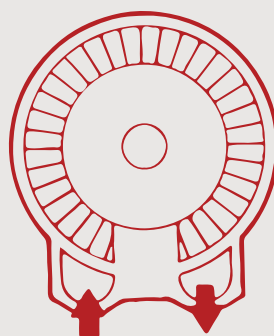


# REGENERATIVE BLOWERS FOR BIOGAS, LANDFILL AND NATURAL GAS



**MAPRO**BioGas  
Technology



ISO 9001 - Cert. n. 1835

MAPRO

# REGENERATIVE BLOWERS FOR COMBUSTIBLE GASES

Blowers for biogas, natural gas or combustible gases, in conformity to the 2014/34/EU European Directive (ATEX), for Zones 1 and 2, or, especially for US and Canada, in conformity to the requirements of Class I hazardous locations



## Features of construction

To extract or compress combustible gases, such as biological gas or natural gas, a complete range of gas-tight regenerative blowers has been designed, featuring a specific MAPRO® manufacturing technology, identified by the trademark:

**MAPRO**BioGas  
Technology

**This technology, whose main construction features are listed below, is applied also to the blowers fitted with NEMA motors in conformity to the requirements of Class I hazardous locations in the US and Canada.** Only the so-called “CLOSE COUPLED” version (see below) is not available with NEMA motors.

The MAPRO® regenerative blowers have been designed in order to fall within the Equipment-Group II as defined by the 2014/34/EU Directive, Category 2 both for the surrounding area conditions and for the internals of the machines.

Their main construction features are the following:

- casing and impellers made completely of spark proof aluminium alloy
- casing impregnated with Loctite
- casing halves sealed
- shaft sealing by special double-lip seals which do not require lubrication
- two-pole, type of protection “d”, flameproof electric motors, with specific marking Ex II 2 G, additional marking Ex-d IIB T3.

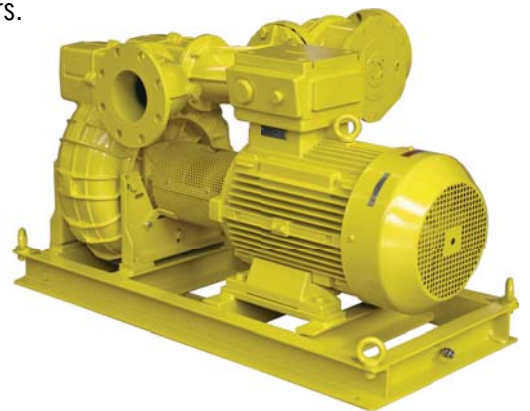
The simplest solution for the manufacturing of the machines is the so-called “CLOSE COUPLED” version (not available with NEMA motors) – i.e., a flange mounted electric motor is bolted to the blower casing; the impeller, which is dynamically balanced, is fitted directly onto the motor shaft extension.

Furthermore, machines with their own shaft and bearings and coupled to the electric motors via flexible shaft couplings or belt drives can be proposed.

In these cases, the safety drive guards are made from spark-free material.

If the area surrounding the equipment is classified as Zone 2, where, for the Group II, Category 3 equipments are accepted, the machine could be equipped with the type of protection “n” non-sparking motor, with specific marking Ex II 3 G, additional marking Ex-nA II T3.

In some particular cases, all the internal aluminium parts wetted by gas can be treated with anodic oxidation; the machine can be supplied with its own shaft and external bearing housings, so that the bearings are completely isolated from the gas handled; and it is also possible to fit lip seals in pairs, with a barrier fluid in between.

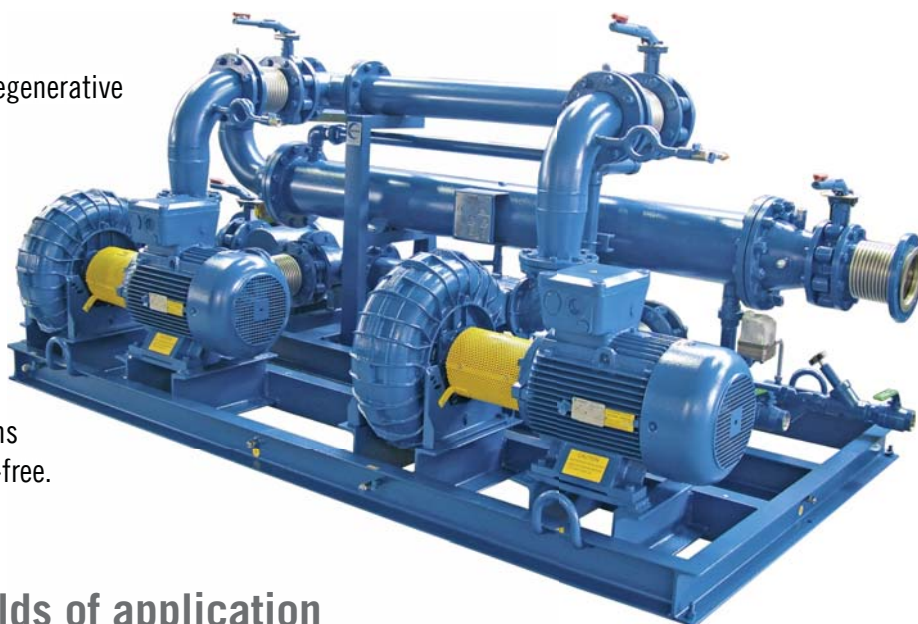


## Advantages

The main advantages of using regenerative machines are:

- easy installation
- low noise level
- no vibration
- pulsation free gas flow
- minimal maintenance.

Moreover no internal lubrication is necessary, and therefore the gas moving through the machine remains uncontaminated and completely oil-free.



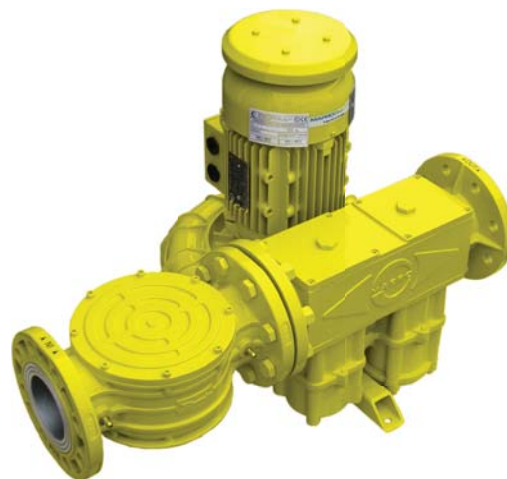
## The most common fields of application

- Landfill biogas recovery to feed torch, burner or gas engine
- Tank, plant or contaminated soil gas recovery to feed torch or burner
- Extraction of biogas from gasometer, natural gas from pipeline or gasometer, and burner or gas engine feeding.

## Machines with gas recirculation (by-pass)

When the gas has to feed a burner or when a variable gas flow is required, a “compact by-pass”, directly bolted to the machine and connecting outlet and inlet ports, is a simple and effective solution. A suitable overpressure relief valve is fitted inside the “compact by-pass”.

When the gas demand decreases, the outlet pressure increases, and, when the set pressure is reached, the overpressure relief valve starts to open and by-passes excess gas back to the blower suction. In case of low differential pressure, usually the “compact by-pass” is capable of handling the full capacity of the blower and thus the machine can continue to run even if the downstream gas demand is reduced to zero.



For higher differential pressures, where the use of a “compact by-pass” is not allowed because of the high temperature increase when the full capacity of the blower is by-passed back to the suction, the machine can be supplied with the overpressure relief valve fitted on an offtake at the outlet side.

In that case the flanged valve discharge could be piped-back to the blower suction through a by-pass pipe long enough to allow for the sufficient gas cooling.

On request, we can also offer machines equipped with a suitable gas cooler at the blower outlet, with overpressure relief valve fitted in an offtake at the cooler outlet, and with the complete “by-pass pipe” back to the blower suction side.

We can also offer automatic flow rate adjustment by means of pneumatic or electrically operated flow control valve, fitted in the by-pass line and controlled via the client process parameter “discharge gas pressure”.



## Machines controlled via frequency inverter

If the gas demand varies in time (such as for burner or engine feeding), we can supply blowers equipped with a motor intended for control via frequency inverter.

The rpm range of the blower (and therefore the output frequency of the frequency inverter) can be adjusted according to the foreseen operating conditions, and in particular to the expected differential pressure between blower discharge and suction.

The speed of rotation of the motor shall be controlled via the “discharge gas pressure” process parameter.



## Accessories

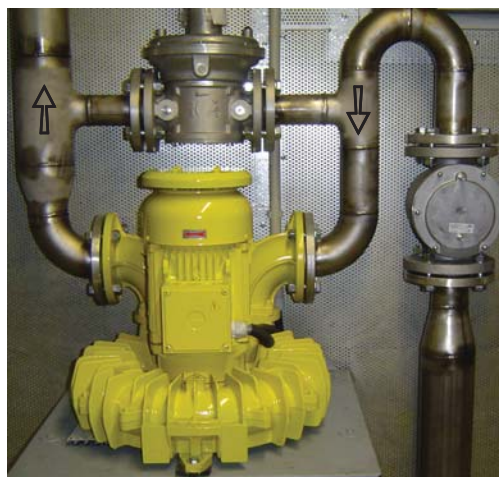
A complete range of accessories is available, including the following:

- gas-tight filters
- stainless steel flanged flexible connection bellows
- non return valves
- pressure gauges and thermometers
- explosion-proof pressure switches and temperature switches
- intrinsically-safe pressure and temperature transducers
- manual and automatic cut-off valves
- acoustic enclosures.

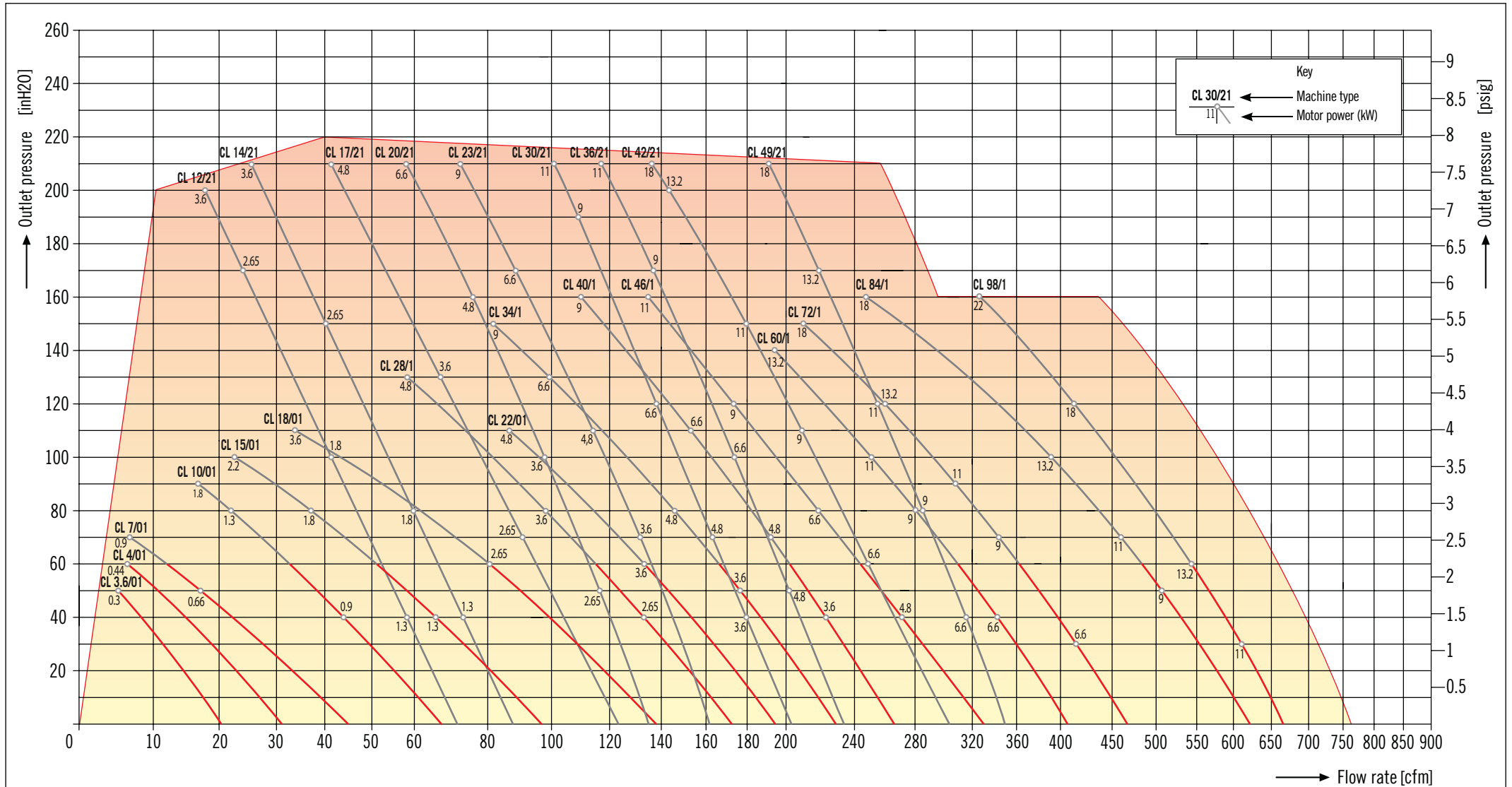
For more details on regenerative blowers for combustible gases, more specifically for biogas, please contact MAPRO® Sales Department.



## Some installation



# Regenerative blowers for biogas - Range of duty



The performance curves “flow rate - outlet pressure” and the “motor powers” shown in the literature, are given, as an indication only, **at fixed rpm (60Hz – 3500rpm)** and for a biogas with specific weight 0.071 lb/ft<sup>3</sup> at 29.92 inHg (abs) and 32°F. The suction pressure is assumed at 4 inH2O and the inlet temperature at 95°F.

The part of the curves in red colour refers to the pressure range in which the blowers fitted with a “compact by-pass” could be used. Yet, this range could be even more reduced depending on the machine working time with the full capacity by-passed back to the blower suction. Please contact MAPRO® Sales Department for every specific case.





"Vesuvio" Factory: Regenerative blowers and exhausters



"Fermi" Factory: Rotary compressors

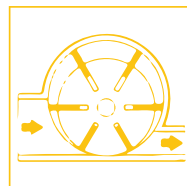


"Cinisello" Warehouse: Goods dispatch

## Other fields of application for MAPRO® products

- Aeration of waste water • Bath agitation •
- Suction of welding fumes • Drying process •
- Vacuum filtration • Fluid bed applications •
- Foundries • Plastic forming • Food industry •
- Paper converting industry • Electronic industry •
- Pharmaceutical industry • Textile industry •
- Equipments for dentist's surgery • Air knives •
- Filter's cleaning • Machines for wine-making industry •
- Bottling machines industry •
- Printing press industry • Handling by suction cups •
- Palletization systems •
- Silk-screen printing industry • Pneumatic conveyance •
- Plating industry • Vacuum cleaning systems •
- Labelling machines •
- Packaging machines • Fish farming oxygenation •
- Glasswork industry • Wood industry •
- Chemical petrochemical industry • Leather tanning industry

## Other MAPRO® products



Sliding vane rotary compressors and vacuum pumps for air and gases



In the logic of continuous improvement, this catalogue is subject to revision. Please contact our Sales Department for information on the version in force.



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