Frigel
Intelligent Process Cooling

PRESS RELEASE

FOR IMMEDIATE RELEASE:

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Frigel, A Worldwide Leader in Process Cooling and Temperature Control, Launches the New Ecodry System 4.0.

The first integrated, "process-synchronized" cooling solution for the plastics industry.

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Frigel proved to be the process cooling pioneer by introducing the Ecodry System for the plastics industry. This revolutionary concept integrates high performance mold cooling units (**Microgel™**) connected to each mold with a closed circuit adiabatic central cooling system (**Ecodry**) for overall plant heat dissipation (replacing old cooling tower technology). Microgels are super-compact units specifically designed to significantly reduce cooling cycle time in molding applications and combine, in one machine, a water cooled chiller with one or two booster pump high precision heated temperature control zones.

For the last two decades, this technology has completely changed the way plastics processors approach their cooling and mold temperature control needs. As a result, this technical solution has achieved outstanding results for the industry by increasing productivity, drastically reducing running costs and minimizing environmental impact and has been successfully proven on more than 8000 installations worldwide.

Because of this, Frigel has become a worldwide leader and Ecodry System has become the standard cooling solution for the plastics industry.

THE INNOVATION: PROCESS-SYNCHRONIZED COOLING – THE NEW ECODRY SYSTEM 4.0

Now, Frigel takes Ecodry System to the next level.

The new approach is based on full digital connectivity between mold temperature control and molding machine that, together with several innovative engineering improvements, brings plastics cooling and temperature control into the future – the Industry 4.0 revolution.

From complex automotive injection molded parts to high speed thin wall packaging, this new "Process-Synchronized Cooling" approach covers all cooling demands in plastics molding with unbeatable

performance improvements, cycle time reduction and cost savings, together with outstanding reductions of environmental impact.

The system is based on two technologies:

1. Process-synchronized mold temperature control units – a complete, wide operating temperature range from 5˚C (41˚F) up to 200˚C (392˚F) – **Microgel**, **Turbogel** and **Thermogel**

It's all about delivering: the right temperature, with the right flow, in the right place, and, now, "at the right time".

A complete range of mold temperature control units that covers every specific molding application: number of zones and temperature ranges, heating, cooling and pumping requirements for each zone of a mold.

Now digitally-synchronized with the molding machines and automatically operated by them, processors can research the best cooling parameters and cycling sequence of heating and/or cooling for each zone of a mold that maximizes quality and throughput for each product.

These parameters may be recorded and then restored whenever the line manufactures the same product.

2. Central adiabatic water cooling system – **Ecodry**

To complete the Ecodry System, all the cooling units installed at each mold are connected to a central adiabatic water cooling system installed outdoors, in order to reject the heat extracted from processes to ambient. This modular system – an alternative to old style open circuit evaporative cooling towers – consists of closed circuit adiabatic fluid coolers that can keep the coolant temperature even lower than the ambient temperature.

Additionally, this central system can also provide direct cooling for all other requirements, such as hydraulic machine cooling, resin dryers, air compressors, etc.

PERFORMANCE:

The new Ecodry System 4.0 brings overall performance to a higher level in plastics processing. In most applications the net result can be cycle time reductions up to 50%, with improved part quality, along with even higher resulting electrical power savings.

A) Increased productivity:

"Process-synchronized cooling" guarantees that each mold always runs with shortest cooling time, consistently producing high quality molded parts at the highest throughput. This is due to two main reasons:

1. Maximum flexibility. Thanks to the complete range of units available, there is no limitation for settings of coolant temperature from 5 to 200˚C (41 to 392˚F) and flow rate delivered to each mold zone for all kinds of plastics applications.
2. Perfect repeatability. The serial communication and synchronization capabilities assure precise temperature control of the mold with no interference from other work cells, while the processing equipment always runs steadily at the highest throughput.

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B) Reduced operating costs:
The Ecodry System 4.0 achieves remarkable running cost savings when compared to traditional central systems: power savings (up to 30%), water savings (up to 95%) and maintenance & safety cost savings (up to 90%).

Energy savings (up to 30%)
The new system based on synchronized mold temperature control units, results in high energy savings due to the following 3 main reasons:

1. Synchronized cooling:
   All the mold temperature control units, being serially connected to the molding machines, will automatically stop when production is stopped, saving both refrigeration and pumping energy consumption.
2. Intelligent use of chilled water:
   The new concept allows the use of chilled water only where and when it is needed and running at the temperature required by each specific mold. For all molds requiring high coolant temperature, no chilled water is needed. So, cooling can be provided directly from the central adiabatic cooling circuit connected to the machine-side units, with minimum energy consumption.
3. Free-cooling opportunities:
   The main concept is to use ambient air cooling instead of refrigeration whenever the ambient temperature is low enough. For this purpose, every **Microgel** has an automatic free-cooling feature. The coolant returning from process will be diverted to the adiabatic coolers to be rejected to the ambient air with minimum energy consumption. As a result, the refrigeration compressors will be stopped during cold ambient conditions.

Water Savings (up to 95%)
This concept uses a central adiabatic cooling system for heat rejection of the entire thermal load of the facility. This technology evaporates a small amount of water only during short periods of time whenever ambient temperature is above 30°C (86˚F). The “on demand” intelligent software operates the adiabatic mode only when needed. Otherwise, the system runs completely dry.

Maintenance & Safety Cost Savings (up to 90%)
The refrigeration units are made of relatively small chillers, which require low expertise to maintain or repair. The chillers are built with leak-free refrigeration circuits, which makes them almost maintenance-free. Operating with innocuous gases, they do not require any specific safety infrastructure, saving all involved costs, including safety insurance policies. On the other hand, the central adiabatic system is a close loop circuit that provides excellent heat transfer with clean, maintenance-free coolant, avoiding scale accumulation and minimizing the need for massive ongoing water treatment typical of cooling towers.

C) Total modularity:
This modular “plug & play” concept has many additional advantages compared to traditional systems. It is easily expandable at any time, which allows the installation of the precise capacity needed at every stage of facility growth. Thanks to its modularity, it is also extremely easy to gradually implement even in existing plants, one unit at a time, requiring a low level of expertise to engineer, install and operate. Eventually, it could be partially or totally relocated, if necessary. An additional advantage of this new concept is that it allows processors to know the “cost of refrigeration per line and per product”, because each unit can measure and record the specific energy consumption for each product – kW/kg (kW/lb).

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SUSTAINABILITY:
The Ecodry System achieves outstanding results in terms of environmental impact reduction.

A) REDUCED CARBON FOOTPRINT – up to 50% less
Thanks to its unbeatable energy efficiency and free-cooling opportunities

B) ALMOST NO WATER FOOTPRINT – up to 95% less
Thanks to the internationally patented **Ecodry** adiabatic cooling heat rejection technology

C) LOWEST RISK OF EMISSIONS
The system utilizes innocuous refrigeration gas with the lowest GWP available today and is divided into several separate small circuits. So, the risk of emissions in the case of leakage is reduced to a minimum. Additionally, it does not dispose of any water treatment chemicals as evaporative cooling towers do (i.e. "bleed-off").

For more information, please visit: frigel.com

About Frigel Group:
Frigel is a market leader in intelligent process cooling. The Frigel group includes the following companies:
Frigel Firenze S.p.A,
Frigel North America Inc.,
Frigel Asia Pacific Company Ltd,
Frigel Intelligent Cooling Systems India Pvt. Ltd.,
Frigel Latino America Ltda,
Frigel Eastern Europe Sp. Z O. O
and Frigel GmbH.
It also has a worldwide network of agents and distributors.

The production plants are located in all continents:
Europe in Florence (Headquarter) and Padua (Green Box),
America (USA and Brazil),
Asia (Thailand and India). It also has a worldwide network of agents and distributors.

Frigel manufactures and markets intelligent, integrated, cooling systems, made of a variety of components, such as the Ecodry adiabatic liquid cooler, Microgel, Industrial, Modular and Multistage chillers and chiller/temperature control units, as well as a full array of pumping and filtration equipment, all designed and engineered to fit specific applications, such as plastic molding, beverage processing, oil & gas and other processes.

Frigel develops and customizes internally all microprocessor and PLC-based controls for all its products and solutions. Its products and technology have been proven at more than 8000 manufacturing installations worldwide. Customer productivity, efficiency and environmental sustainability are at the forefront of any solution developed by Frigel.

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