

# Copeland Digital Scroll Compressor Solutions for Process Chiller Applications

## Background

Process cooling plays a vital role in various industrial applications, including plastic molding, pharmaceuticals, and food processing. These sectors demand precise temperature control and enhanced operational efficiency to ensure consistent production of high-quality products.

## Challenge

Standard chillers equipped with fixed-speed compressors lack the ability to adjust their output (modulation), limiting their capability to support precise temperatures and energy efficiency. While chillers fitted with variable speed compressors achieve more precise temperatures and higher efficiencies, their 40% higher cost compared to regular chillers puts them out of reach for most end users. To overcome this, a more cost-effective solution with same level of precise temperature and efficiency as a variable speed compressor is necessary.

## Copeland Solution

Copeland Digital Scroll technology emerges as the answer, bridging the gap between performance and operating cost. It delivers precise temperature control through mechanical modulation, reducing the cost premium associated with variable speed technology.

## Digital Scroll Product Range

	5G	Quest	NGQ/Summit Digital
HP	3-5 HP	6-8 HP	9-15 HP
R410A Digital Model (3-15 HP)	ZPD34-ZPD54K5/KS	ZPD61-91KC	ZPD104-182KC
R22/407C Digital Model (3-10 HP)	ZRD36-48KC	ZRD49-81KC	ZRD94-125KC
Source Plant	Asia	Asia	Asia/USA

## Benefits

**28%**  
Energy Savings

Designed  
and Developed  
by Copeland

**Up to  
13 months  
ROI**

**10%-100%**  
Mechanical  
Modulation  
Capability

**Easy  
Installation  
and Setup**



This makes it a compelling and accessible alternative for the process chiller industry. The Copeland Digital Scroll solution offers a complete package, including pre-tested third-party controller and user-friendly HMIs for ensured compatibility and ease of use.

## Features

3-15 HP Digital Scroll single compressor range; tandem ready option available

- Simple system design with no oil return issues
- Does not require drive for modulation
- Does not require high starting current during cycling
- No EMI issues
- Quick and easy product development
- Only compressor drop in needed with few changes in system controller

## Results

Significant energy savings from using Digital Scroll technology translate to a remarkable return on investment (ROI) achievable in under 13 months. This increased affordability opens doors for broader adoption across the process chiller industry, empowering end users to achieve significant advantages with precise temperature control:



### Improved operational efficiency:

Increased production uptime, reduced operations cost



NABL Accredited 5 & 20 HP - Copeland India psychrometric labs in Karad

Parameters	Base	Fixed Compressor				Digital Compressor			Benefits of Digital in Terms of KWHr			
	Ambient (°C)								% Load Based on Ambient			
	39 °C	32 °C	26 °C	20 °C		32 °C	26 °C	20 °C	100% (39°C)	32% (39°C)	26% (39°C)	20% (39°C)
Constant Water Flow Rate 2,300 LPH; Varying Water In/Out Delta												
Water In °C	12.2	12.2	12.1	12.2		12.1	12	12				
Water Out °C	9	8.6	8.2	8		9.1	9.6	10.7				
Cooling Capacity(kW)	8.6	9.7	10.5	11.3		8.1	6.6	3.5				
Avg Power ( kW)	5.9	5.2	4.8	4.3		4.2	2.9	1.8				
Energy KWHr	5.8	5.2	4.8	4.4		4.1	2.9	1.8	Base	22%	40%	59%
COP	1.5	20%+	47%+	73%+		33%+	53%+	27%+				
Total KWHr		20.2				14.6			28%			

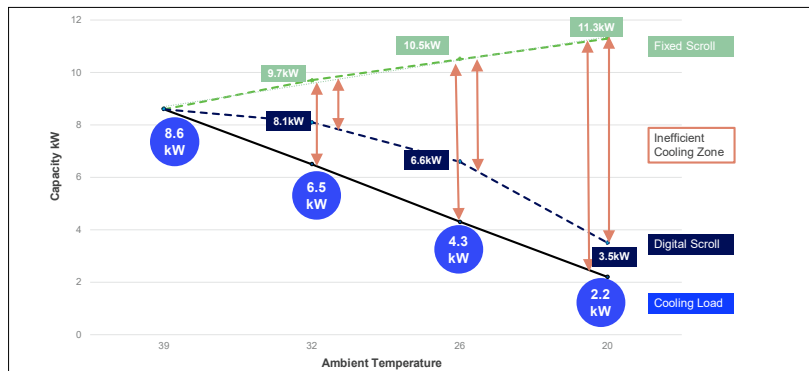
\* Test Based On Key Parameters Of IS16590

The Digital Scroll Process Chiller offers 28% energy savings compared to fixed speed in a controlled psychrometric lab environment. However, actual field performance shows 10-12% energy savings versus standard chillers.



### Enhanced product quality with precise temperature:

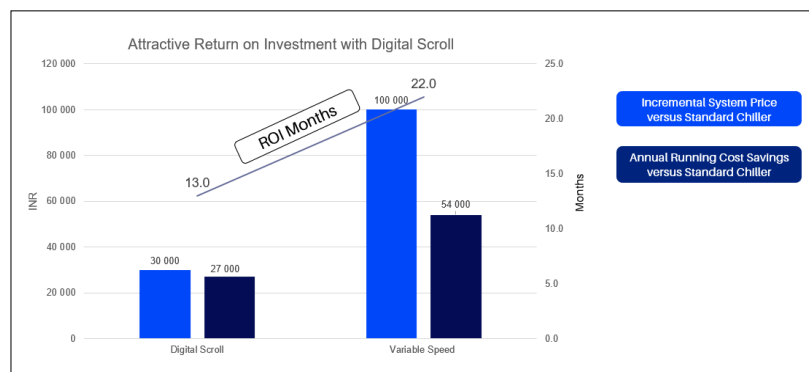
Consistent temperatures minimize deviations, leading to reduced scrap rates and higher-quality products.



Digital Scroll Compressor offers precise cooling by matching capacity to the varying load. This feature is delivered through a 10% -100% mechanical modulation capability.



### Digital Process Chiller ROI is less than 13 months



\* These test results are preliminary findings, and actual performance may differ.

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