

## Case Study



### RED-Rochester, LLC • Eastman Business Park

<b>Client</b>	RED-Rochester, LLC • Eastman Business Park
<b>Location</b>	Rochester, New York, USA
<b>Application</b>	District cooling network
<b>Sales</b>	H&V Sales Group, New York
<b>Phase 1</b>	Startup date: May 2, 2019
<b>Solution</b>	033 kW Smardt V-Class oil-free centrifugal chiller (WB600.5UG12.F2CDQB.F2CRQB.TS0)
<b>Phase 2</b>	Startup date: Winter 2020
<b>Solution</b>	11,254 kW Smardt V-Class oil-free centrifugal chiller (WB900.8UG12.F1BSOB.F1CEOB.TS0)



### The Client

Eastman Business Park (EBP), located in Rochester, New York is a 1,200-acre R&D and manufacturing campus with over 16 million square feet of multi-scale manufacturing, distribution, lab and office space. There are currently almost 110 companies onsite employing over 6,000 people, many of them responsible for the development of next-generation technologies in the areas of Energy Storage, Chemical Manufacturing, Roll-to-Roll Manufacturing and Photonics. The Park's immense manufacturing infrastructure—including the private utilities and onsite water and wastewater management system—is a competitive advantage for its high-use tenants.

RED-Rochester, LLC owns and operates EBP's utility infrastructure and offers a suite of 16 different utility services. RED's competitively priced utility services originate from harnessing the efficient tri-generation of electricity, steam and refrigeration from the combustion of a single source of fossil fuel in their new natural gas-fired boilers.

RED's utility offerings include: electricity, four different pressures of steam, chilled water, nitrogen, compressed air, potable water, industrial process water, demineralized water, high purity water, fire protection water, natural gas, and industrial wastewater treatment with precious metals recovery through a Title V/RCRA permitted multiple hearth incinerator.

### The Challenge, and Selecting Smardt

RED evaluated and considered several chiller technologies and manufacturers for this project. A magnetic bearing centrifugal chiller was desired for energy efficiency and reduced maintenance. Ultimately the decision was made based upon the total package of capacity and turndown, efficiency, reliability and redundancy.

Smardt is the only manufacturer capable of constructing a single 7,033 kW oil-free type machine. All others were limited to about 3,516 kW at the time. As such, the specified design was converted from two chillers to a single chiller with five compressors. At RED, the load is quite dynamic, and turndown is very important. Being able to operate this unit over a wide load range provided the flexibility of staging and running the entire system more efficiently, including the old steam chillers. Smardt's energy efficiency was above and beyond other magnetic bearing chillers over the entire operating range.

The V-Class oil-free centrifugal chiller can operate at extremely low condenser water temperatures to achieve world-class kW/TR values during wintertime operating conditions. Other manufacturers would have required costly additional features, tube enhancements, controls upgrades, etc. to approach the efficiencies offered by Smardt.

## Scope of Work and Solution Efficiency

The original scope of work was to install two 3,516 kW magnetic bearing centrifugal chillers to replace a single 8,400 kW steam turbine-driven centrifugal chiller. The new chillers would join two other existing 8,088 kW steam turbine-driven centrifugal chillers for a total plant capacity of 23,211 kW. However, the ability of Smardt to provide all 7,033 kW cooling capacity within a single chiller dramatically reduced overall installation costs while still offering similar redundancy and turndown of having multiple machines. Selecting a single chiller reduced overall floor space, piping, insulation, electrical and controls. It also eliminated the second set of chiller equipment including the chilled water pump, condenser water pump and flow meter. The final solution was a single 7,033 kW Smardt chiller with five Danfoss TurboCor® compressors. The chiller utilizes dedicated variable speed chilled water and condenser water pumps. The overall system is fully variable and operates 24/7/365, providing 43 °F chilled water to the business park customers.

## Performance Results from Owner

- Avg load: 4297 kW
- Max load: 8130 kW
- Avg condenser water temp: 63 °F
- Min condenser water temp: 45 °F (now 47 °F)
- Avg chiller efficiency: 0.346 kW/TR
- Best chiller efficiency: 0.141 kW/TR
- Avg COP: 10.2
- Best COP: 25.0
- CHW Supply temp deviation: ± 0.8 °F

## Customer Feedback

*"Smardt has a reputation for building robust and reliable machines."*

*"Our project team was able to visit with another customer in Grand Island, New York and view their installation."*

*"Being able to see the quality of the machine and speak with this customer was very beneficial towards making our decision. Also, the Danfoss TurboCor compressors are leading-edge technology and have a long history of performance and reliability."*

*"Finally, the redundancy offered by five independent compressors was very attractive to our site."*

*"The ability to continue operating the unit at a reduced capacity when a compressor may be out of service is extremely valuable to our operations and maintaining continuous chilled water supply to our customers."*

— Craig A. Avalone, P.E., CEM, LEED AP

Energy Manager  
RED-Rochester, LLC

## Phase 2

RED has been very pleased with the operation of the chiller in Phase 1 and has since sent a purchase order for a 11,254 kW Smardt V-Class chiller. The attractive ROI made it simple for RED to approve funds for the additional chiller upgrade.



### AMERICAS

#### Canada

**Smardt Chiller Group Inc.**  
1800 Trans-Canada Highway  
Dorval, Quebec H9P1H7  
T +1 514 426 8989  
E sales.na@smardt.com

#### USA

**Smardt Chillers Inc.**  
22 Colorado Street, Bldg 2815  
Plattsburgh, NY 12903  
T +1 518 324 5741  
E sales.na@smardt.com

#### Brazil

**Mecalor Solutions (licensed partner)**  
Rua da Bandeira, 219-Novo Mundo Park  
São Paulo, Brazil  
T +55 11 2188 1700  
E vendas@mecalor.com

### ASIA PACIFIC

#### Australia

**Smardt Chiller Pty Ltd**  
144 Colchester Road  
Bayswater North VIC 3153  
T +61 3 9761 7905  
E sales.au@smardt.com

#### China

**Guangzhou Smardt Chillers Manufacturing Co. Ltd**  
Mei Xing Industrial Park  
No. 30 Dong Zhong Road ETDD  
Guangzhou  
T +86 20 8205 7161  
E sales.cn@smardt.com

#### Guangzhou Smardt Chillers Manufacturing Co. Ltd, Nanjing Branch No. 2,

Hengxiang Road, Qixia Economic and Technological Development Zone, Nanjing, China  
T +86 25 8532 6977  
E sales.cn@smardt.com

#### TICA Smardt Hong Kong Ltd

11/F, The Bedford, 91-93 Bedford Road  
Tai Kok Tsui, Kowloon, Hong Kong  
T +852 2772 8448  
E hk.info@smardt.com

#### Singapore

**Smardt Chillers Pte Ltd**  
438A Alexandra Road #08-11  
Alexandra Technopark 119967  
T +65 6273 1120  
E sales.as@smardt.com

### EMEA

#### Germany

**Smardt-OPK Chillers AG**  
Bahnhofstraße 74  
D73240 Wendlingen  
T +49 7024 79429 0  
E sales.eu@smardt.com  
www.opk.de

#### United Kingdom

**Smardt Chiller UK**  
10A Burrell Way, Thetford,  
Norfolk IP24 3RW  
T +44 1842 824830  
E sales.uk@smardt.com

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