TEST REPORT: Nr.156

Date: July 13, 2021

CHILLER EFFICIENCY PERFORMANCE WITH THE INTELLIGENT ADIABATIC CHILLER-BOOSTING SYSTEM **SMART COOLING™** PRO10 FOR DU AL QUDRA CHILLERS

Test Participants:

Condor Building Contracting Engineer: Sanal Kumar

Gerab Energy Engineer: Ali Soufan

Swiss Integrated Energy Technologies: Armands Mucenieks

Project name: DU Al Qudra

Location: Dubai, United Arab Emirates

Table of Contents

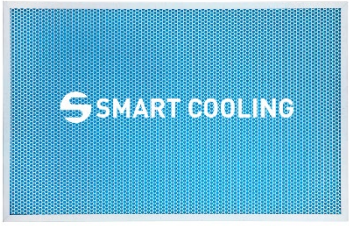
Introduction

Type of building: DU Al Qudra Broadcasting Center, Dubai, United Arab Emirates
Cooling units: air cooled water chiller McQuay ATS 160 (3 nos) & DAIKIN EWAD660 (1 no)
Chiller booster: **Smart Cooling™** PRO 10, adiabatic technology with condenser protection.

Chillers were retrofitted with the intelligent adiabatic **Smart Cooling™** system to reduce their electricity consumption and increase COP (Coefficient of Performance) efficiency.
The intelligent adiabatic **Smart Cooling™** system combines an adiabatic evaporative pre-cooling process and condenser protection with mechanical air filtration. The intelligent adiabatic **Smart Cooling™** system is mounted externally in front of the condensers of the cooling equipment. **Smart Cooling™** initiates the adiabatic process even before the mechanical cooling kicks in and the equipment receives a temperature-reducing fine mist of processed water that reduces the temperature of condensation within the cooling circuit.
Smart Cooling™ ensure 100% condenser protection from direct contact with water.

Main components

Smart Cooling™ comprises the following key components: protective membranes, water treatment and recirculation systems, high-pressure water pump, control unit, high-pressure nozzle panels, fasteners and fixings.
Protective membranes are installed outside the condenser and cover its entire surface, preventing water mist from coming into direct contact with the condenser.
Water filtration, purification and sterilization: the system purifies water from minerals and sterilizes water to prevent bacterial occurrence.
A high-pressure pump provides water pressure of up to 70 bar while a water recirculation system reintroduces non-evaporated water into the water purification and pump system. The control unit regulates the system according to real-time data sets such as chiller parameters, ambient air temperature and humidity to supply the adiabatic system with the appropriate amount of water.
A high-pressure nozzle provides water spray with 5- to 40-micron droplets.
A set of fasteners and fixings ensure the compatibility of the equipment with the chiller.





Measuring instruments:

An Eniscope Analytics energy monitoring equipment (BEST) was used to measure electricity consumption.

Equipment tested: **Air-cooled water chillers, McQuay ATS 160 (3 nos) & DAIKIN EWAD660 (1 no)**

Chiller without **Smart Cooling™** system

Chiller with **Smart Cooling™** system

Testing procedures

Testing has been carried out on the following chillers:

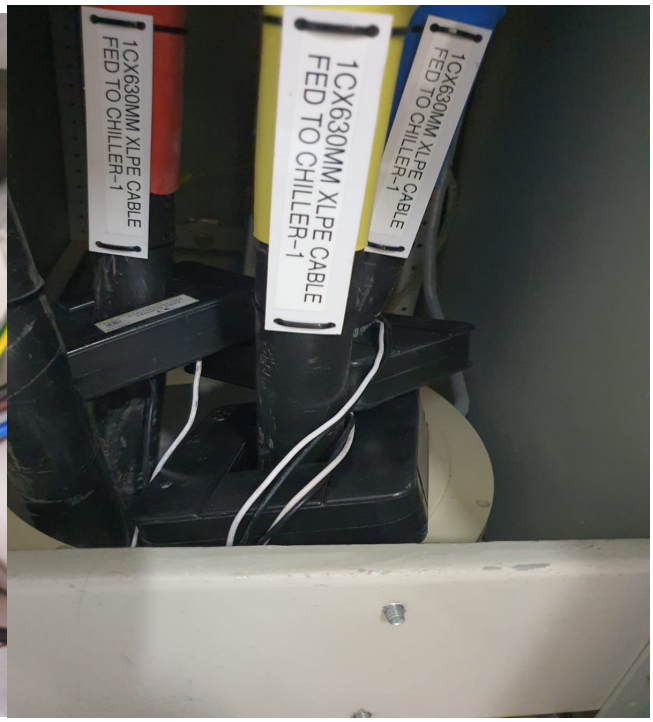
Chiller 1	McQuay ATS 160
Chiller 2	McQuay ATS 160
Chiller 3	McQuay ATS 160
Chiller 4	DAIKIN EWAD660

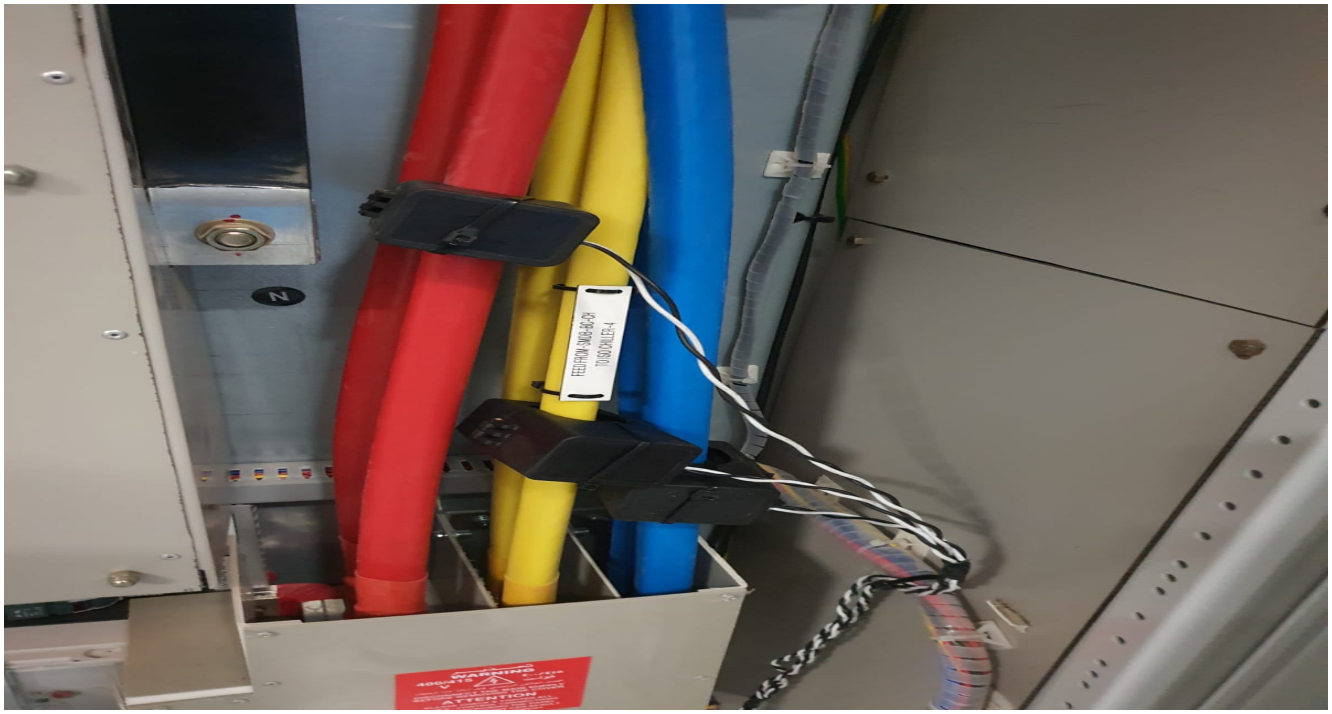
Testing period: 06/07/2021 to 06/14/2021 - adiabatic system **Smart Cooling™** switched OFF
Testing period: 06/21/2021 to 06/28/2021 - adiabatic system **Smart Cooling™** switched ON

Step 1

A data logger is installed on the subject HVAC equipment to collect all applicable real-time energy consumption and unit performance information. Data is collected by using an Eniscope Analytics temperature sensor.

Eniscope:





Temperature Sensors:

Condenser Air Inflow Sensor

Ambient Condition Sensor

Step 2

The **Smart Cooling™** system is switched OFF.

Step 3

During the period between 06/07/2021 and 06/14/2021, the test measured electricity usage data by chiller with the intelligent adiabatic **Smart Cooling™** system turned OFF. During this period the chiller consumed **44.520 MW/h** of electricity, while water consumption was **0 m^3** and the average temperature during the period was **35 °C.**

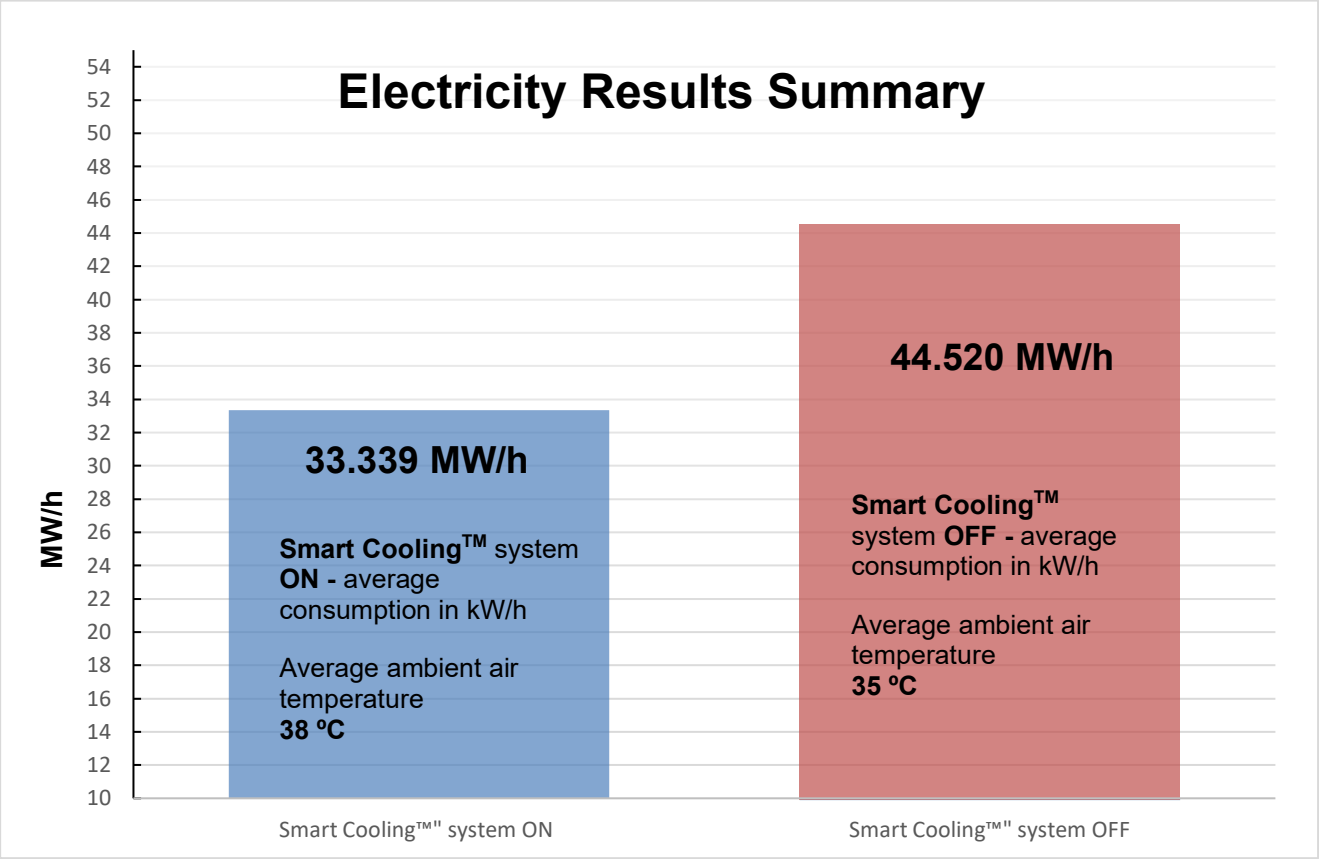
Step 4

The **Smart Cooling™** system is switched ON.

Step 5

During the period between 06/21/2021 and 06/28/2021, the test measured electricity usage by the chillers with the intelligent adiabatic system **Smart Cooling™** turned ON. During this period the chiller consumed **38.889 MW/h** of electricity, water consumption was **40 m³** and the average temperature during the period was **38 °C.**

Testing Results



Post-analysis of data monitoring shows the electricity savings generated by the **Smart Cooling™** system in 8 operating days is **5.631 MW/h** of electricity.

Within these 10 days, the customer saved **5631 kw/h of electricity**. At an electricity rate of AED 0.45 per kw/h, the total savings amount to AED 2,534.

To achieve this result, 54 m³ of water were used with water expenses 10 AED per m³. In total 400 AED were spent on water.

Testing Summary:

TEST RESULTS					
Smart Cooling™ Test Report DU AlQUDRA, Dubai, UAE					Electrical Consumption %
Status of **Smart Cooling™**	**OFF**		**ON**		**14,5%**
Test Duration	8 Days		8 Days		
	From	To	From	To	
	07.06.2021	14.06.2021	21/07/2021 to	28.07.2021	
Average Ambient Temperature "°C"	35 °C		38 °C		
Total Electrical Consumption "KWH"	44 520 KWH		38 889 KWH		
Average Electrical Consumption Per Hour "KWH"	232 KWH		203 KWH		
Total Water Consumption "m³"	0,0 m³		40,0 m³		

During the testing period the chillers operated as below:

Chiller Operation During The Test	
1 Chiller out of 4 Chillers Operates:	153 Hours
2 Chillers out of 4 Chillers Operate:	17 Hours
3 Chillers out of 4 Chillers Operate:	22 Hours
4 Chillers out of 4 Chillers Operate:	0 Hours
Test Duration 8 Days:	192 Hours

During the test, a single chiller was mostly in operation. Thus, the ROI Calculation is based on the **Daikin EWAD660MZP** chiller, as it is the chiller with the higher operational hours during the test period **(117 hours out of 192 hours)**.

ROI:

	kw/h	AED	Summary
Actual Chillers saving in 8 Days	5 631	0,45	2 534

	M³	AED	Summary
Actual Water Consumption in 8 Days	40	10	400

	kW/h	AED	Summary
Projected Chillers saving per season (240 days)	168 941	0,45	76 023

	M3	AED	Summary
Projected Water Consumption per season (240 days)	1 200	10	12 000

	QTY	AED	Total
Maintenance per year for 1 Chiller	1	6460	6 460

Net savings after all running costs for 1 Chiller		AED	57 563

Cost of 1 adiabatic **Smart Cooling™**, delivered & installed	**100 371,00**
ROI Period (in calendar years, after all running costs for 1 Chiller)	**1,74 year**

Reduction of CO2 Emissions for 1 Chiller	Ton	71

Note: For more details about test please refer to the supported document (Excel File).

Review Of Air Entering Condenser Coils

Temperature Sensor recording the temperature entering Condensers was installed on chiller Number 3						
	Ambient Condition		Temperature Entering Condensers	Chiller 3 Running Status	Smart Cooling Status	Temperature Drop
Date	Temp	Humidity				
Monday - 21/06/2021 00:00	33.1	14.1	31.3	OFF	OFF	
Monday - 21/06/2021 01:00	33.4	14.9	31.3	OFF	OFF	
Monday - 21/06/2021 02:00	32.4	25.8	30.9	OFF	OFF	
Monday - 21/06/2021 03:00	30.7	28.6	28.8	OFF	OFF	
Monday - 21/06/2021 04:00	30.8	34.8	28.8	OFF	OFF	
Monday - 21/06/2021 05:00	30.7	33.7	28.8	OFF	OFF	
Monday - 21/06/2021 06:00	30.8	23.0	28.8	OFF	OFF	
Monday - 21/06/2021 07:00	34.3	16.2	30.9	OFF	OFF	
Monday - 21/06/2021 08:00	37.9	25.4	37.3	OFF	OFF	
Monday - 21/06/2021 09:00	40.4	24.8	40.0	OFF	OFF	
Monday - 21/06/2021 10:00	43.4	21.5	27.7	ON	ON	16
Monday - 21/06/2021 11:00	45.9	17.8	40.4	OFF	OFF	
Monday - 21/06/2021 12:00	47.3	15.5	47.1	OFF	OFF	
Monday - 21/06/2021 13:00	47.9	13.8	48.0	OFF	OFF	
Monday - 21/06/2021 14:00	47.9	13.0	48.4	OFF	OFF	
Monday - 21/06/2021 15:00	47.6	19.1	48.1	OFF	OFF	
Monday - 21/06/2021 16:00	45.3	23.7	33.2	ON	ON	12
Monday - 21/06/2021 17:00	43.9	26.1	27.3	ON	ON	17
Monday - 21/06/2021 18:00	40.6	32.9	26.8	ON	ON	14
Monday - 21/06/2021 19:00	40.4	29.4	25.7	ON	ON	15
Monday - 21/06/2021 20:00	37.6	42.4	25.9	ON	ON	12
Monday - 21/06/2021 21:00	36.1	46.8	27.1	ON	ON	9
Monday - 21/06/2021 22:00	34.4	51.1	29.0	OFF	OFF	
Monday - 21/06/2021 23:00	33.3	59.7	30.0	OFF	OFF	
Tuesday - 22/06/2021 00:00	32.5	65.2	32.3	OFF	OFF	
Tuesday - 22/06/2021 01:00	31.2	67.9	30.0	OFF	OFF	
Tuesday - 22/06/2021 02:00	30.2	65.5	29.5	OFF	OFF	
Tuesday - 22/06/2021 03:00	29.6	66.0	29.2	OFF	OFF	
Tuesday - 22/06/2021 04:00	29.1	70.3	28.6	OFF	OFF	
Tuesday - 22/06/2021 05:00	28.1	68.9	26.8	OFF	OFF	
Tuesday - 22/06/2021 06:00	30.0	44.2	26.8	OFF	OFF	
Tuesday - 22/06/2021 07:00	34.0	29.4	30.9	OFF	OFF	
Tuesday - 22/06/2021 08:00	38.5	24.7	36.4	OFF	OFF	
Tuesday - 22/06/2021 09:00	40.7	23.0	40.6	OFF	OFF	
Tuesday - 22/06/2021 10:00	42.9	20.0	43.6	OFF	OFF	
Tuesday - 22/06/2021 11:00	44.8	18.2	46.0	OFF	OFF	
Tuesday - 22/06/2021 12:00	47.3	15.2	48.1	OFF	OFF	
Tuesday - 22/06/2021 13:00	48.2	13.5	48.5	OFF	OFF	
Tuesday - 22/06/2021 14:00	47.0	23.2	46.6	OFF	OFF	
Tuesday - 22/06/2021 15:00	45.3	30.2	32.1	ON	ON	13
Tuesday - 22/06/2021 16:00	43.3	34.1	29.0	ON	ON	14
Tuesday - 22/06/2021 17:00	43.7	28.2	27.0	ON	ON	17
Tuesday - 22/06/2021 18:00	41.7	23.4	28.2	OFF	OFF	
Tuesday - 22/06/2021 19:00	40.7	22.9	23.5	ON	ON	17
Tuesday - 22/06/2021 20:00	39.7	22.5	24.7	OFF	OFF	
Tuesday - 22/06/2021 21:00	38.9	23.1	36.0	OFF	OFF	

Tuesday - 22/06/2021 22:00	37.7	25.8	35.3	OFF	OFF	
Tuesday - 22/06/2021 23:00	36.3	34.8	34.0	OFF	OFF	
Wednesday - 23/06/2021 00:00	35.9	42.9	28.2	ON	ON	8
Wednesday - 23/06/2021 01:00	34.7	47.0	26.2	ON	ON	8
Wednesday - 23/06/2021 02:00	33.7	51.1	26.0	ON	ON	8
Wednesday - 23/06/2021 03:00	33.2	49.5	25.2	ON	ON	8
Wednesday - 23/06/2021 04:00	33.0	42.1	24.1	ON	ON	9
Wednesday - 23/06/2021 05:00	31.8	41.4	23.0	ON	ON	9
Wednesday - 23/06/2021 06:00	31.8	37.3	22.5	ON	ON	9
Wednesday - 23/06/2021 07:00	34.4	33.2	23.2	ON	ON	11
Wednesday - 23/06/2021 08:00	39.2	22.5	26.7	ON	ON	12
Wednesday - 23/06/2021 09:00	41.5	19.3	27.6	ON	ON	14
Wednesday - 23/06/2021 10:00	43.4	17.5	24.1	ON	ON	19
Wednesday - 23/06/2021 11:00	45.8	15.4	24.9	ON	ON	21
Wednesday - 23/06/2021 12:00	47.0	14.7	23.7	ON	ON	23
Wednesday - 23/06/2021 13:00	47.3	13.9	23.7	ON	ON	24
Wednesday - 23/06/2021 14:00	48.0	12.8	23.4	ON	ON	25
Wednesday - 23/06/2021 15:00	48.5	14.9	22.7	ON	ON	26
Wednesday - 23/06/2021 16:00	48.5	19.2	26.5	ON	ON	22
Wednesday - 23/06/2021 17:00	45.5	19.4	26.2	ON	ON	19
Wednesday - 23/06/2021 18:00	45.1	19.0	25.6	ON	ON	20
Wednesday - 23/06/2021 19:00	42.1	19.4	34.5	OFF	OFF	
Wednesday - 23/06/2021 20:00	40.5	21.1	25.5	ON	ON	15
Wednesday - 23/06/2021 21:00	39.3	22.6	23.3	ON	ON	16
Wednesday - 23/06/2021 22:00	37.8	23.2	24.3	OFF	OFF	
Wednesday - 23/06/2021 23:00	36.1	24.8	29.9	OFF	OFF	
Thursday - 24/06/2021 00:00	34.9	25.5	33.2	OFF	OFF	
Thursday - 24/06/2021 01:00	33.8	27.2	21.1	ON	ON	13
Thursday - 24/06/2021 02:00	33.0	28.0	21.8	ON	ON	11
Thursday - 24/06/2021 03:00	31.6	29.2	20.7	ON	ON	11
Thursday - 24/06/2021 04:00	31.1	30.5	20.3	ON	ON	11
Thursday - 24/06/2021 05:00	30.6	31.7	20.6	ON	ON	10
Thursday - 24/06/2021 06:00	31.4	30.6	20.8	ON	ON	11
Thursday - 24/06/2021 07:00	34.7	27.0	21.2	ON	ON	13
Thursday - 24/06/2021 08:00	40.0	22.5	29.0	ON	ON	11
Thursday - 24/06/2021 09:00	42.3	19.0	29.3	ON	ON	13
Thursday - 24/06/2021 10:00	43.9	17.5	28.9	ON	ON	15
Thursday - 24/06/2021 11:00	45.4	15.0	26.1	ON	ON	19
Thursday - 24/06/2021 12:00	46.7	14.2	23.6	ON	ON	23
Thursday - 24/06/2021 13:00	48.2	12.2	23.3	ON	ON	25
Thursday - 24/06/2021 14:00	48.7	15.5	23.0	ON	ON	26
Thursday - 24/06/2021 15:00	47.1	21.2	27.5	ON	ON	20
Thursday - 24/06/2021 16:00	45.7	28.7	28.4	ON	ON	17
Thursday - 24/06/2021 17:00	41.1	37.0	28.1	ON	ON	13
Thursday - 24/06/2021 18:00	40.7	33.1	26.6	ON	ON	14
Thursday - 24/06/2021 19:00	38.7	34.5	27.8	OFF	OFF	
Thursday - 24/06/2021 20:00	38.1	34.5	25.6	ON	ON	13
Thursday - 24/06/2021 21:00	36.4	38.6	25.8	ON	ON	11
Thursday - 24/06/2021 22:00	34.8	40.6	27.3	OFF	OFF	
Thursday - 24/06/2021 23:00	33.5	43.3	24.8	ON	ON	9
Friday - 25/06/2021 00:00	32.3	45.3	25.5	OFF	OFF	
Friday - 25/06/2021 01:00	31.9	45.4	25.1	OFF	OFF	
Friday - 25/06/2021 02:00	31.5	47.4	26.8	OFF	OFF	
Friday - 25/06/2021 03:00	31.1	49.7	28.6	OFF	OFF	
Friday - 25/06/2021 04:00	30.7	50.0	28.3	OFF	OFF	

Friday - 25/06/2021 05:00	30.9	41.6	28.2	OFF	OFF	
Friday - 25/06/2021 06:00	31.8	32.3	28.4	OFF	OFF	
Friday - 25/06/2021 07:00	34.5	28.4	32.1	OFF	OFF	
Friday - 25/06/2021 08:00	38.1	26.2	36.0	OFF	OFF	
Friday - 25/06/2021 09:00	40.7	22.5	40.0	OFF	OFF	
Friday - 25/06/2021 10:00	42.8	19.3	42.6	OFF	OFF	
Friday - 25/06/2021 11:00	44.9	15.9	35.8	ON	ON	9
Friday - 25/06/2021 12:00	47.0	12.9	25.8	ON	ON	21
Friday - 25/06/2021 13:00	48.2	12.2	47.8	OFF	OFF	
Friday - 25/06/2021 14:00	45.8	24.4	46.2	OFF	OFF	
Friday - 25/06/2021 15:00	44.4	27.5	45.0	OFF	OFF	
Friday - 25/06/2021 16:00	43.2	27.8	44.3	OFF	OFF	
Friday - 25/06/2021 17:00	41.3	33.8	41.6	OFF	OFF	
Friday - 25/06/2021 18:00	39.1	43.9	38.1	OFF	OFF	
Friday - 25/06/2021 19:00	35.5	55.4	34.4	OFF	OFF	
Friday - 25/06/2021 20:00	34.4	58.6	33.6	OFF	OFF	
Friday - 25/06/2021 21:00	33.4	61.4	32.0	OFF	OFF	
Friday - 25/06/2021 22:00	32.0	62.4	31.0	OFF	OFF	
Friday - 25/06/2021 23:00	31.3	64.4	30.0	OFF	OFF	
Saturday - 26/06/2021 00:00	29.9	65.4	28.5	OFF	OFF	
Saturday - 26/06/2021 01:00	29.2	65.6	28.2	OFF	OFF	
Saturday - 26/06/2021 02:00	28.5	65.4	27.2	OFF	OFF	
Saturday - 26/06/2021 03:00	27.5	66.2	26.4	OFF	OFF	
Saturday - 26/06/2021 04:00	27.4	64.7	26.4	OFF	OFF	
Saturday - 26/06/2021 05:00	27.3	62.3	26.0	OFF	OFF	
Saturday - 26/06/2021 06:00	29.1	43.6	26.7	OFF	OFF	
Saturday - 26/06/2021 07:00	33.6	28.1	30.1	OFF	OFF	
Saturday - 26/06/2021 08:00	37.4	23.9	36.2	OFF	OFF	
Saturday - 26/06/2021 09:00	40.1	22.6	39.7	OFF	OFF	
Saturday - 26/06/2021 10:00	42.1	21.7	42.6	OFF	OFF	
Saturday - 26/06/2021 11:00	44.2	19.0	44.8	OFF	OFF	
Saturday - 26/06/2021 12:00	45.6	16.7	46.1	OFF	OFF	
Saturday - 26/06/2021 13:00	46.7	15.5	47.1	OFF	OFF	
Saturday - 26/06/2021 14:00	46.4	16.2	47.5	OFF	OFF	
Saturday - 26/06/2021 15:00	45.5	14.4	46.9	OFF	OFF	
Saturday - 26/06/2021 16:00	44.4	17.6	45.2	OFF	OFF	
Saturday - 26/06/2021 17:00	42.9	19.2	43.3	OFF	OFF	
Saturday - 26/06/2021 18:00	41.1	22.6	40.4	OFF	OFF	
Saturday - 26/06/2021 19:00	38.2	30.4	36.9	OFF	OFF	
Saturday - 26/06/2021 20:00	36.3	32.1	34.9	OFF	OFF	
Saturday - 26/06/2021 21:00	34.6	31.1	33.4	OFF	OFF	
Saturday - 26/06/2021 22:00	33.6	29.7	32.4	OFF	OFF	
Saturday - 26/06/2021 23:00	32.5	27.3	31.0	OFF	OFF	
Sunday - 27/06/2021 00:00	31.5	26.1	30.4	OFF	OFF	
Sunday - 27/06/2021 01:00	31.9	24.2	30.8	OFF	OFF	
Sunday - 27/06/2021 02:00	31.9	23.1	31.1	OFF	OFF	
Sunday - 27/06/2021 03:00	31.5	25.9	30.5	OFF	OFF	
Sunday - 27/06/2021 04:00	32.6	28.5	31.4	OFF	OFF	
Sunday - 27/06/2021 05:00	33.7	28.2	32.8	OFF	OFF	
Sunday - 27/06/2021 06:00	33.9	31.8	33.6	OFF	OFF	
Sunday - 27/06/2021 07:00	34.9	33.5	34.3	OFF	OFF	
Sunday - 27/06/2021 08:00	36.7	31.8	36.3	OFF	OFF	
Sunday - 27/06/2021 09:00	38.9	28.9	38.9	OFF	OFF	
Sunday - 27/06/2021 10:00	40.8	25.3	41.2	OFF	OFF	
Sunday - 27/06/2021 11:00	43.0	22.0	43.7	OFF	OFF	

Sunday - 27/06/2021 12:00	44.6	20.0	45.5	OFF	OFF	
Sunday - 27/06/2021 13:00	45.7	18.2	46.2	OFF	OFF	
Sunday - 27/06/2021 14:00	45.9	17.2	47.0	OFF	OFF	
Sunday - 27/06/2021 15:00	46.0	17.1	47.1	OFF	OFF	
Sunday - 27/06/2021 16:00	45.0	17.4	46.8	OFF	OFF	
Sunday - 27/06/2021 17:00	43.9	17.9	44.1	OFF	OFF	
Sunday - 27/06/2021 18:00	42.4	17.8	42.4	OFF	OFF	
Sunday - 27/06/2021 19:00	40.2	18.4	39.1	OFF	OFF	
Sunday - 27/06/2021 20:00	37.6	21.7	36.7	OFF	OFF	
Sunday - 27/06/2021 21:00	35.8	24.0	34.7	OFF	OFF	
Sunday - 27/06/2021 22:00	34.5	25.9	33.8	OFF	OFF	
Sunday - 27/06/2021 23:00	34.8	28.3	33.8	OFF	OFF	
Monday - 28/06/2021 00:00	34.9	25.0	34.2	OFF	OFF	
Monday - 28/06/2021 01:00	33.4	26.6	32.3	OFF	OFF	
Monday - 28/06/2021 02:00	32.3	28.2	31.6	OFF	OFF	
Monday - 28/06/2021 03:00	31.7	29.9	31.0	OFF	OFF	
Monday - 28/06/2021 04:00	31.9	33.8	30.9	OFF	OFF	
Monday - 28/06/2021 05:00	32.4	40.5	32.1	OFF	OFF	
Monday - 28/06/2021 06:00	32.2	46.5	32.0	OFF	OFF	
Monday - 28/06/2021 07:00	32.8	46.6	32.5	OFF	OFF	
Monday - 28/06/2021 08:00	34.2	43.5	33.8	OFF	OFF	
Monday - 28/06/2021 09:00	36.0	39.6	36.0	OFF	OFF	
Monday - 28/06/2021 10:00	38.0	36.1	38.5	OFF	OFF	
Monday - 28/06/2021 11:00	40.1	32.3	41.3	OFF	OFF	
Monday - 28/06/2021 12:00	42.6	28.4	42.9	OFF	OFF	
Monday - 28/06/2021 13:00	44.2	25.4	44.1	OFF	OFF	
Monday - 28/06/2021 14:00	44.6	23.5	45.3	OFF	OFF	
Monday - 28/06/2021 15:00	44.7	24.3	45.3	OFF	OFF	
Monday - 28/06/2021 16:00	43.2	32.9	43.4	OFF	OFF	
Monday - 28/06/2021 17:00	41.8	34.9	41.6	OFF	OFF	
Monday - 28/06/2021 18:00	40.1	36.4	38.8	OFF	OFF	
Monday - 28/06/2021 19:00	37.7	42.5	37.0	OFF	OFF	
Monday - 28/06/2021 20:00	36.8	42.2	36.2	OFF	OFF	
Monday - 28/06/2021 21:00	36.1	41.4	35.5	OFF	OFF	
Monday - 28/06/2021 22:00	35.1	43.7	34.4	OFF	OFF	
Monday - 28/06/2021 23:00	33.8	46.3	33.3	OFF	OFF	

Conclusion:

Test results data shows that the intelligent adiabatic **Smart Cooling™** system decreased the chiller electricity consumption by 14.5 %, on average, during 24 operational hours.

Armands Mucenieks
July 13, 2021

Annex

Riels instruments srl
Viale Spagna, 16
35020 Ponte San Nicolò (PD) - ITALY
Ph. +39 0498961771 | info@riels.it

RIF600 | Clamp-on Ultrasonic Meter Calibration Report

Pipe diameter	DN80	Date	15/12/2018
Ambient temperature	29°C		
Standard Device before test	Normal	Model:	RIF600W
Standard Devide After Test	Normal		
Test result	Qualified		
Measured Medium	Water		
Accuracy	1%		
Signal Strength	UP: 90		
	DOWN: 90		
Standard device name	Static volumetric method/standard Meter Method Water Flow/Standard Device		
Standard device accuracy	0,20%		

Test	Standard Meter flow		Temperature	Pressure	Tested Meter Flow		Basic Error		Repeatability	
Point	m3/h		°C	Mpa	m3/h		%		%	
Point 1	101,52	101,47	25,0	0,300	102,27	102,10	0,739	0,759	-0,147	0,147
	101,47		25,0	0,300	102,07		0,591			
	101,42		25,0	0,300	101,97		0,542			
Point 2	71,27	71,27	25,0	0,300	71,75	71,75	0,673		-0,146	
	71,19		25,0	0,300	71,65		0,646			
	71,34		25,0	0,300	71,86		0,729			
Point 3	26,32	26,36	25,0	0,300	26,51	26,55	0,722		-0,132	
	26,36		25,0	0,300	26,56		0,759			
	26,39		25,0	0,300	26,58		0,720			

Verification Based on JJG 1030-2007 < Ultrasonic flowmeter verification procedures >
Scale Factor=1

Riels instruments srl
Viale Spagna, 16
35020 Ponte San Nicolò (PD) - ITALY
Ph. +39 0498961771 | info@riels.it

RIF600 |Test Report misuratore di portata ad ultrasuoni clamp on

Diametro tubazione	DN80	Date	15/12/2018
Temperatura ambiente	29°C		
Dispositivo standard prima del test	Normale	Model:	RIF600W
Dispositivo standard dop il test	Normale		
Risultato del test	Qualified		
Liquido	Acqua		
Accuratezza	1%		
Potenza dei segnali	UP: 90		
	DOWN: 90		
Tipo di dispositivo standard	Metodo volumetrico statico/Misuratore di portata volumetrico		
Accuratezza del dispositivo standa	0,20%		

Test	Misuratore standard		Temperatura	Pressione	Misuratore testato		errore base		Ripetibilità	
Punti	m3/h		°C	Mpa	m3/h		%		%	
Punto 1	101,52	101,47	25,0	0,300	102,27	102,10	0,739	0,759	-0,147	0,147
	101,47		25,0	0,300	102,07		0,591			
	101,42		25,0	0,300	101,97		0,542			
Punto 2	71,27	71,27	25,0	0,300	71,75	71,75	0,673		-0,146	
	71,19		25,0	0,300	71,65		0,646			
	71,34		25,0	0,300	71,86		0,729			
Punto 3	26,32	26,36	25,0	0,300	26,51	26,55	0,722		-0,132	
	26,36		25,0	0,300	26,56		0,759			
	26,39		25,0	0,300	26,58		0,720			

Verification Based on JJG 1030-2007 < Ultrasonic flowmeter verification procedures >
Scale Factor=1