

SMART COOLING™ PRO10 SYSTEM

The Town Centre

Test Participants:

Project name: **THE TOWN CENTRE** Location: **Dubai, UAE**

Customer: **Mohammad Jebril**

Contractor: **Carrier UTS**

Installer: **Gerab Energy Systems LLC**

Swiss Integrated Energy Technologies: **Luca Gallarate**

Table of Contents

Introduction:	3
Main components:	4
Measuring instruments:	5
Testing procedures	6
Electrical results summary:	7
Testing summary:	12
Conclusion:	13
Annex:	14

Introduction:

Type of structure: The Town Centre, Dubai, United Arab Emirates.

Cooling units: Air cooled water chiller **CARRIER 30GX26**.

Chiller booster: *Smart Cooling™ PRO 10*, adiabatic technology with condenser protection.

1-unit chiller retrofit was made to **reduce** the energy consumption of chillers and to **increase** chiller COP efficiency. Chillers were equipped with intelligent adiabatic pre-cooling system *Smart Cooling™ PRO 10*. Chiller booster *PRO 10*, based on pre-cooling of air before entering condensers using water evaporation technology – by spraying and vaporising a very fine water mist before entering the condenser (hot air comes into contact with the fine water mist, the temperature of the incoming air in the condenser is reduced).

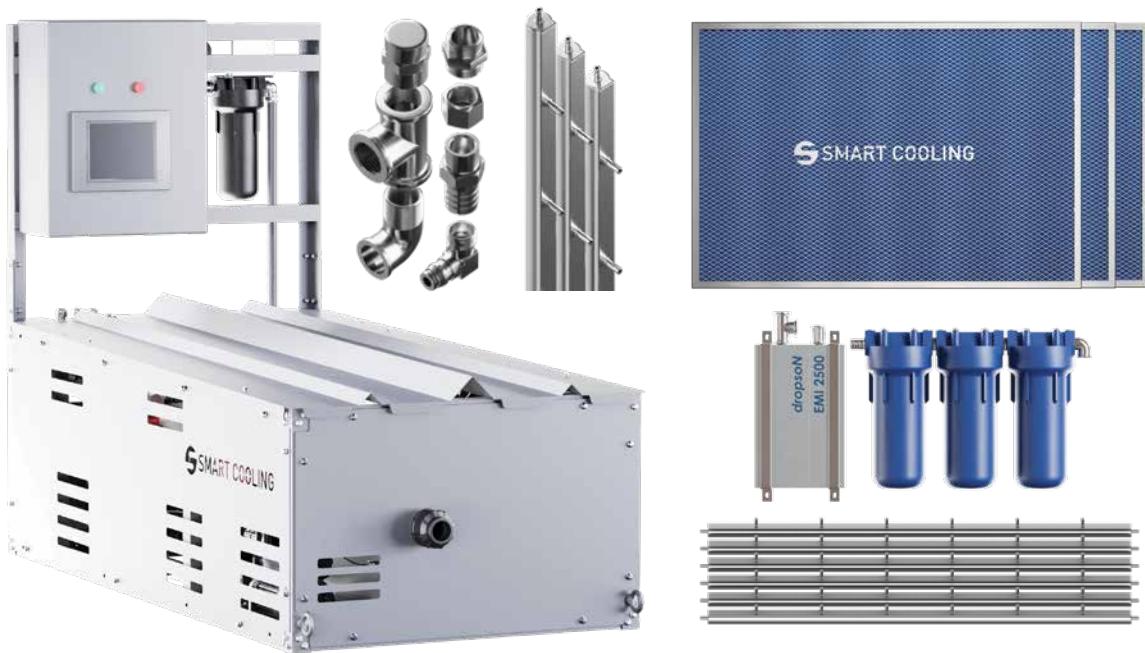
Smart Cooling™ ensures 100% condenser protection from direct contact with water.



Main components:

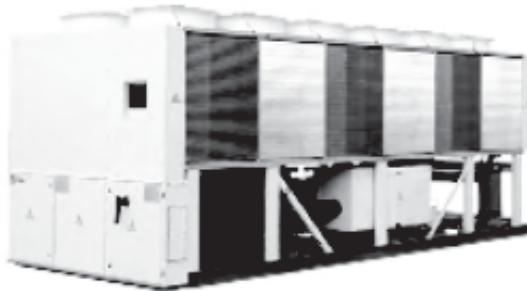
Smart Cooling™ comprises the following key components: protective membranes, water treatment and recirculation systems, high-pressure water pump, control unit, high-pressure nozzle panels, fasteners, and fixings.

- **Protective membranes** cover the condenser surface, preventing direct water contact.
- **Water system** purifies and sterilizes water to prevent mineral buildup and bacteria.
- **Pump** provides 70 bar pressure.
- **Control unit** regulates operation via real-time data (temperature, humidity, chiller parameters).
- **Nozzles** spray 5–40 µm droplets.
- A set of **fasteners and fixings** ensure the compatibility of the equipment with the chiller.



Measuring instruments:

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



Chiller with Smart Cooling™ system



Chiller without Smart Cooling™ system

- **Equipment tested:** Air-cooled water chillers, **CARRIER 30GX267**.

Testing procedures

Testing was conducted on chiller **No.1**.

Testing period: **2020/10/06 - 2020/10/12** adiabatic system *Smart Cooling™* switched **OFF**

Testing period: **02/2020/10/14 - 2020/10/20** 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*.



- **Step 2**

Smart Cooling™ system is switched **OFF**

- **Step 3**

During the period between **2020/10/06** and **2020/10/12**, the test measured electricity usage data by the chillers with the intelligent adiabatic *Smart Cooling™* system in operation.

During this period, the chiller consumed **28.17 MW/h** of electricity, while water consumption was **0 m³**, and the average temperature during the period was **30° C**.

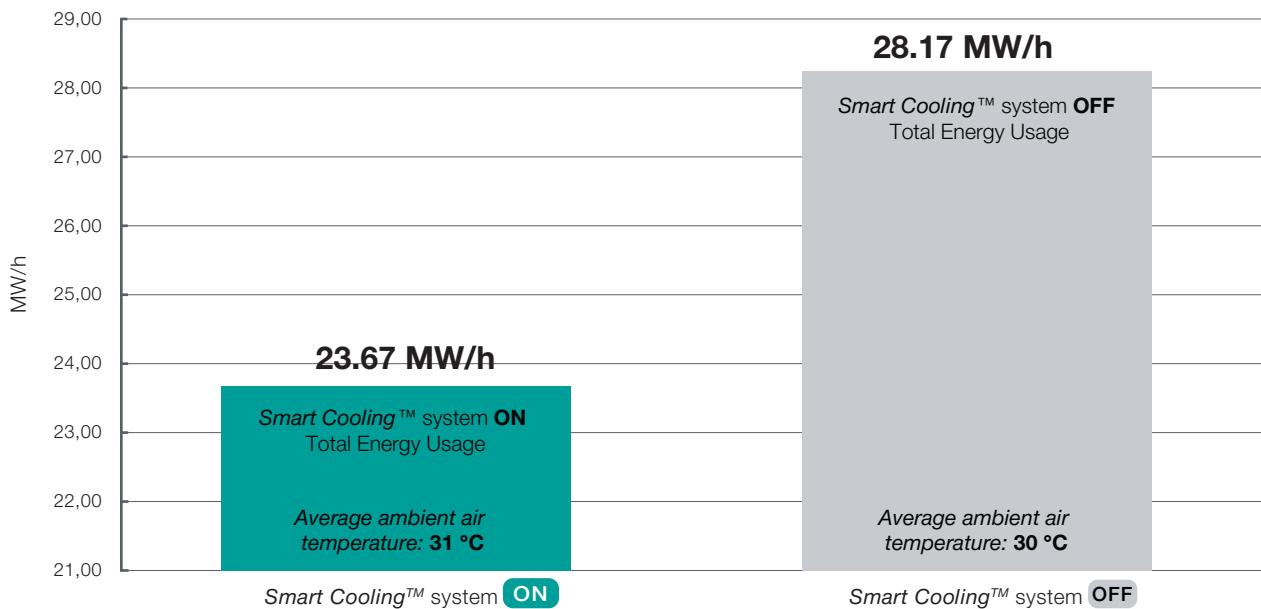
- **Step 4**

Smart Cooling™ system is switched **ON**

- **Step 5**

During the period between **06/23/2021** and **06/29/2021**, the test measured electricity usage data by chillers with the intelligent adiabatic *Smart Cooling™* system not in operation. During this period, the chiller consumed **295.236 MW/h** of electricity, while water consumption was **0 m³** and the average temperature during the period was **41° C**.

Electrical Results Summary



Post-analysis of data monitoring shows the electricity savings generated by the *Smart Cooling™* system in 7 operation days is **4.4 MW/h** of electricity.

Within these 7 days, the customer **saved 4491 kW/h of electricity**.

At an electricity rate of **AED 0.45 per kW/h**, the total savings amount to **AED 2020.5**

To achieve this result, **28 m³ of water were used**, with water expenses of AED 10 per m³. In total, **AED 280** were spent on water.

Smart Cooling™ ON				Smart Cooling™ OFF			
DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1		DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1	
	AMBIENT TEMPERATURE	WH	KWH		AMBIENT TEMPERATURE	WH	KWH
14.10.2020 00:00	28 °C	136946,8576	136,95	06.10.2020 00:00	24 °C	151381,5	151,38
14.10.2020 01:00	29 °C	126858,9458	126,86	06.10.2020 01:00	28 °C	131909,2	131,91
14.10.2020 02:00	26 °C	126720,7552	126,72	06.10.2020 02:00	22 °C	125313,7	125,31
14.10.2020 03:00	25 °C	123127,8003	123,13	06.10.2020 03:00	22 °C	113850,2	113,85
14.10.2020 04:00	27 °C	120225,7983	120,23	06.10.2020 04:00	23 °C	106940,7	106,94
14.10.2020 05:00	25 °C	120363,9889	120,36	06.10.2020 05:00	23 °C	103328,9	103,33
14.10.2020 06:00	25 °C	122180,4683	122,18	06.10.2020 06:00	23 °C	100188,2	100,19
14.10.2020 07:00	26 °C	124371,5155	124,37	06.10.2020 07:00	27 °C	116876,8	116,68
14.10.2020 08:00	26 °C	129822,7572	129,62	06.10.2020 08:00	27 °C	151224,5	151,22
14.10.2020 09:00	29 °C	151318,8772	151,32	06.10.2020 09:00	30 °C	168969,4	168,97
14.10.2020 10:00	33 °C	176054,7897	176,05	06.10.2020 10:00	32 °C	192524,6	192,52
14.10.2020 11:00	35 °C	192084,8961	192,08	06.10.2020 11:00	33 °C	215294,6	215,29
14.10.2020 12:00	37 °C	213366,2443	213,37	06.10.2020 12:00	34 °C	226915,2	226,92
14.10.2020 13:00	39 °C	216821,0086	216,82	06.10.2020 13:00	36 °C	208071	208,07
14.10.2020 14:00	39 °C	212280,7197	212,26	06.10.2020 14:00	37 °C	195351,2	195,35
14.10.2020 15:00	37 °C	218202,9144	218,20	06.10.2020 15:00	37 °C	206814,8	206,81
14.10.2020 16:00	37 °C	195263,2793	195,26	06.10.2020 16:00	36 °C	203517	203,52
14.10.2020 17:00	34 °C	186695,4638	186,70	06.10.2020 17:00	34 °C	175564,8	175,56
14.10.2020 18:00	33 °C	178542,22	178,54	06.10.2020 18:00	32 °C	198177,8	198,18
14.10.2020 19:00	32 °C	166381,4496	166,38	06.10.2020 19:00	33 °C	201632,6	201,63
14.10.2020 20:00	31 °C	170527,1668	170,53	06.10.2020 20:00	30 °C	184358,8	184,36
14.10.2020 21:00	31 °C	157813,8341	157,81	06.10.2020 21:00	30 °C	184872,9	184,67
14.10.2020 22:00	30 °C	132524,7593	132,52	06.10.2020 22:00	28 °C	176978,2	176,98
14.10.2020 23:00	29 °C	123127,8003	123,13	06.10.2020 23:00	28 °C	166299,8	166,30
15.10.2020 00:00	28 °C	121489,5134	121,47	07.10.2020 00:00	27 °C	148240,8	148,24
15.10.2020 01:00	29 °C	121054,9417	121,05	07.10.2020 01:00	29 °C	135363,9	135,36
15.10.2020 02:00	26 °C	107374,075	107,37	07.10.2020 02:00	28 °C	127669,2	127,67
15.10.2020 03:00	25 °C	101293,8898	101,29	07.10.2020 03:00	27 °C	124528,6	124,53
15.10.2020 04:00	25 °C	101984,8427	101,98	07.10.2020 04:00	27 °C	126098,9	126,10
15.10.2020 05:00	25 °C	110967,0299	110,97	07.10.2020 05:00	27 °C	115734,6	115,73
15.10.2020 06:00	26 °C	111934,3639	111,93	07.10.2020 06:00	26 °C	114835,4	114,64
15.10.2020 07:00	26 °C	122436,8475	122,44	07.10.2020 07:00	27 °C	113850,2	113,85
15.10.2020 08:00	27 °C	141230,7653	141,23	07.10.2020 08:00	28 °C	126255,9	126,26
15.10.2020 09:00	31 °C	94245,97061	94,25	07.10.2020 09:00	29 °C	170539,7	170,54
15.10.2020 10:00	35 °C	177574,888	177,57	07.10.2020 10:00	32 °C	209484,3	209,48
15.10.2020 11:00	38 °C	149245,8186	149,25	07.10.2020 11:00	33 °C	206188,6	206,19
15.10.2020 12:00	40 °C	154773,4415	154,77	07.10.2020 12:00	34 °C	209170,3	209,17
15.10.2020 13:00	41 °C	171218,1196	171,22	07.10.2020 13:00	35 °C	208385,1	208,39
15.10.2020 14:00	41 °C	165966,8779	165,97	07.10.2020 14:00	35 °C	216393,9	216,39
15.10.2020 15:00	39 °C	169836,2139	169,84	07.10.2020 15:00	34 °C	199748,2	199,75

Smart Cooling™ ON				Smart Cooling™ OFF			
DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1		DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1	
	AMBIENT TEMPERATURE	WH	KWH		AMBIENT TEMPERATURE	WH	KWH
15.10.2020 16:00	38 °C	162926,6853	162,93	07.10.2020 16:00	33 °C	196351,2	195,35
15.10.2020 17:00	37 °C	153115,1548	153,12	07.10.2020 17:00	32 °C	196764,5	196,76
15.10.2020 18:00	35 °C	154911,6321	154,91	07.10.2020 18:00	31 °C	192053,5	192,05
15.10.2020 19:00	33 °C	147863,9128	147,86	07.10.2020 19:00	32 °C	204459,2	204,46
15.10.2020 20:00	32 °C	153391,5358	153,39	07.10.2020 20:00	30 °C	204302,2	204,30
15.10.2020 21:00	30 °C	148969,4374	148,97	07.10.2020 21:00	30 °C	195822,3	195,82
15.10.2020 22:00	30 °C	130572,4785	139,57	07.10.2020 22:00	29 °C	187185,4	187,19
15.10.2020 23:00	29 °C	130866,4724	130,87	07.10.2020 23:00	29 °C	179333,7	179,33
16.10.2020 00:00	28 °C	129760,9478	129,76	08.10.2020 00:00	29 °C	178077,4	178,08
16.10.2020 01:00	30 °C	122022,2757	122,02	08.10.2020 01:00	27 °C	170382,7	170,38
16.10.2020 02:00	28 °C	107926,8373	107,93	08.10.2020 02:00	27 °C	148397,8	148,40
16.10.2020 03:00	26 °C	111796,1734	111,80	08.10.2020 03:00	27 °C	131124	131,12
16.10.2020 04:00	25 °C	105163,0250	105,16	08.10.2020 04:00	26 °C	129867,7	129,87
16.10.2020 05:00	24 °C	115527,3188	115,53	08.10.2020 05:00	26 °C	117147,9	117,15
16.10.2020 06:00	25 °C	111105,2205	111,11	08.10.2020 06:00	25 °C	124214,5	124,21
16.10.2020 07:00	26 °C	113730,8414	113,73	08.10.2020 07:00	25 °C	133479,5	133,48
16.10.2020 08:00	28 °C	130451,9007	130,45	08.10.2020 08:00	26 °C	175250,8	175,25
16.10.2020 09:00	35 °C	152424,2017	152,42	08.10.2020 09:00	29 °C	208699,2	208,70
16.10.2020 10:00	36 °C	157675,4435	157,68	08.10.2020 10:00	30 °C	211211,7	211,21
16.10.2020 11:00	37 °C	163755,8287	163,76	08.10.2020 11:00	32 °C	220947,9	220,95
16.10.2020 12:00	39 °C	165414,1156	165,41	08.10.2020 12:00	33 °C	227388,3	227,39
16.10.2020 13:00	39 °C	179647,7446	179,65	08.10.2020 13:00	34 °C	245602,3	245,60
16.10.2020 14:00	40 °C	180597,4658	189,60	08.10.2020 14:00	34 °C	269628,7	269,63
16.10.2020 15:00	40 °C	185451,7486	185,45	08.10.2020 15:00	33 °C	222675,3	222,68
16.10.2020 16:00	39 °C	172323,6442	172,32	08.10.2020 16:00	33 °C	192210,5	192,21
16.10.2020 17:00	38 °C	156569,9189	156,57	08.10.2020 17:00	32 °C	179490,7	179,49
16.10.2020 18:00	35 °C	153806,1075	153,81	08.10.2020 18:00	31 °C	177292,2	177,29
16.10.2020 19:00	34 °C	147449,3411	147,45	08.10.2020 19:00	31 °C	177606,3	177,61
16.10.2020 20:00	31 °C	151595,0583	151,60	08.10.2020 20:00	31 °C	170068,6	170,07
16.10.2020 21:00	30 °C	145652,8637	145,65	08.10.2020 21:00	29 °C	163787,2	163,79
16.10.2020 22:00	28 °C	136946,8576	136,95	08.10.2020 22:00	28 °C	154051,1	154,05
16.10.2020 23:00	28 °C	131281,0441	131,28	08.10.2020 23:00	29 °C	150439,3	150,44

Smart Cooling™ ON				Smart Cooling™ OFF			
DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1		DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1	
	AMBIENT TEMPERATURE	WH	KWH		AMBIENT TEMPERATURE	WH	KWH
17.10.2020 00:00	27 °C	126306,1835	126,31	09.10.2020 00:00	28 °C	155778,5	155,78
17.10.2020 01:00	28 °C	122851,4192	122,85	09.10.2020 01:00	28 °C	150598,3	150,80
17.10.2020 02:00	28 °C	110552,4582	110,55	09.10.2020 02:00	24 °C	133793,8	133,79
17.10.2020 03:00	25 °C	103842,9298	103,64	09.10.2020 03:00	24 °C	136483,2	136,48
17.10.2020 04:00	26 °C	106821,3127	106,82	09.10.2020 04:00	23 °C	122644,1	122,64
17.10.2020 05:00	25 °C	111934,3639	111,93	09.10.2020 05:00	24 °C	98774,85	98,77
17.10.2020 06:00	24 °C	110690,6488	110,69	09.10.2020 06:00	23 °C	107097,7	107,10
17.10.2020 07:00	25 °C	114698,1754	114,70	09.10.2020 07:00	24 °C	112279,8	112,28
17.10.2020 08:00	27 °C	131695,6158	131,70	09.10.2020 08:00	26 °C	147926,7	147,93
17.10.2020 09:00	29 °C	148969,4374	148,97	09.10.2020 09:00	29 °C	176193	176,19
17.10.2020 10:00	31 °C	157951,8247	157,95	09.10.2020 10:00	31 °C	179333,7	179,33
17.10.2020 11:00	34 °C	164861,3533	164,88	09.10.2020 11:00	33 °C	175878,9	175,88
17.10.2020 12:00	36 °C	170250,7856	170,25	09.10.2020 12:00	35 °C	182317,3	182,32
17.10.2020 13:00	39 °C	202449,1891	202,45	09.10.2020 13:00	35 °C	195665,3	195,67
17.10.2020 14:00	36 °C	181029,6503	181,03	09.10.2020 14:00	36 °C	172895,3	172,90
17.10.2020 15:00	35 °C	187248,2261	187,25	09.10.2020 15:00	34 °C	168812,3	168,81
17.10.2020 16:00	34 °C	180891,4597	180,89	09.10.2020 16:00	33 °C	166456,8	166,48
17.10.2020 17:00	33 °C	155878,9661	155,88	09.10.2020 17:00	32 °C	151538,5	151,54
17.10.2020 18:00	32 °C	148969,4374	148,97	09.10.2020 18:00	31 °C	144000,9	144,00
17.10.2020 19:00	32 °C	146205,626	146,21	09.10.2020 19:00	31 °C	145100,1	145,10
17.10.2020 20:00	31 °C	143994,5768	143,99	09.10.2020 20:00	29 °C	130495,9	130,50
17.10.2020 21:00	30 °C	141230,7653	141,23	09.10.2020 21:00	29 °C	133479,5	133,48
17.10.2020 22:00	30 °C	127964,4704	127,96	09.10.2020 22:00	28 °C	123743,4	123,74
17.10.2020 23:00	28 °C	130590,0912	130,59	09.10.2020 23:00	27 °C	114792,4	114,79
18.10.2020 00:00	28 °C	114974,5565	114,97	10.10.2020 00:00	27 °C	113850,2	113,85
18.10.2020 01:00	29 °C	115112,7471	115,11	10.10.2020 01:00	28 °C	105527,3	105,53
18.10.2020 02:00	26 °C	102951,9767	102,95	10.10.2020 02:00	25 °C	101287,4	101,29
18.10.2020 03:00	26 °C	101570,071	101,57	10.10.2020 03:00	25 °C	98578,37	98,58
18.10.2020 04:00	25 °C	99635,40295	99,64	10.10.2020 04:00	24 °C	90137,94	90,14
18.10.2020 05:00	25 °C	107512,2656	107,51	10.10.2020 05:00	23 °C	89509,8	89,51
18.10.2020 06:00	26 °C	106544,9316	106,54	10.10.2020 06:00	22 °C	90766,08	90,77
18.10.2020 07:00	26 °C	117323,7963	117,32	10.10.2020 07:00	27 °C	95948,23	95,95
18.10.2020 08:00	29 °C	133768,4744	133,77	10.10.2020 08:00	26 °C	136777,3	136,78
18.10.2020 09:00	32 °C	145100,1014	145,10	10.10.2020 09:00	30 °C	169911,6	169,91
18.10.2020 10:00	34 °C	149660,3903	149,66	10.10.2020 10:00	32 °C	186871,3	186,87
18.10.2020 11:00	36 °C	156155,3472	156,18	10.10.2020 11:00	34 °C	193309,8	193,31
18.10.2020 12:00	38 °C	166381,4496	166,38	10.10.2020 12:00	35 °C	198648,9	198,65
18.10.2020 13:00	40 °C	180615,0786	180,62	10.10.2020 13:00	34 °C	171639	171,64
18.10.2020 14:00	39 °C	175383,8368	175,36	10.10.2020 14:00	37 °C	167399	167,40
18.10.2020 15:00	40 °C	165966,8779	165,97	10.10.2020 15:00	36 °C	171953	171,95
18.10.2020 16:00	37 °C	159333,7304	159,33	10.10.2020 16:00	34 °C	165043,5	165,04
18.10.2020 17:00	36 °C	154497,0603	154,50	10.10.2020 17:00	33 °C	140075	140,07
18.10.2020 18:00	34 °C	148278,4846	148,28	10.10.2020 18:00	31 °C	141174,2	141,17
18.10.2020 19:00	33 °C	147449,3411	147,45	10.10.2020 19:00	32 °C	123900,4	123,90
18.10.2020 20:00	31 °C	144685,5297	144,69	10.10.2020 20:00	29 °C	128140,3	128,14
18.10.2020 21:00	31 °C	138117,7142	138,12	10.10.2020 21:00	29 °C	119032,3	119,03
18.10.2020 22:00	30 °C	122713,2286	122,71	10.10.2020 22:00	28 °C	104114	104,11
18.10.2020 23:00	28 °C	111657,9828	111,66	10.10.2020 23:00	28 °C	103800	103,80
19.10.2020 00:00	27 °C	103366,5484	103,37	11.10.2020 00:00	27 °C	98617,82	98,62
19.10.2020 01:00	29 °C	106130,3599	106,13	11.10.2020 01:00	28 °C	91865,32	91,87
19.10.2020 02:00	26 °C	96457,01978	96,46	11.10.2020 02:00	26 °C	93278,64	93,28
19.10.2020 03:00	25 °C	93278,63661	93,28	11.10.2020 03:00	27 °C	91394,22	91,39
19.10.2020 04:00	24 °C	93002,25546	93,00	11.10.2020 04:00	27 °C	91080,15	91,08

Smart Cooling™ ON				Smart Cooling™ OFF			
DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1		DATE & TIME	AMBIENT CONDITION	ELECTRICAL DATA CHILLER 1	
	AMBIENT TEMPERATURE	WH	KWH		AMBIENT TEMPERATURE	WH	KWH
19.10.2020 05:00	24 °C	90238,44401	90,24	11.10.2020 05:00	25 °C	91080,15	91,08
19.10.2020 06:00	26 °C	91896,73088	91,90	11.10.2020 06:00	25 °C	97989,68	97,99
19.10.2020 07:00	26 °C	116218,2717	116,22	11.10.2020 07:00	28 °C	101915,5	101,92
19.10.2020 08:00	28 °C	129208,1855	129,21	11.10.2020 08:00	27 °C	130809,9	130,81
19.10.2020 09:00	31 °C	137837,8105	137,64	11.10.2020 09:00	29 °C	151381,5	151,38
19.10.2020 10:00	33 °C	163341,257	163,34	11.10.2020 10:00	31 °C	157191,8	157,19
19.10.2020 11:00	35 °C	163203,0684	163,20	11.10.2020 11:00	34 °C	159881,4	159,88
19.10.2020 12:00	37 °C	177989,4577	177,99	11.10.2020 12:00	33 °C	142744,6	142,74
19.10.2020 13:00	38 °C	191532,1338	191,53	11.10.2020 13:00	34 °C	193152,7	193,15
19.10.2020 14:00	39 °C	183793,4618	183,79	11.10.2020 14:00	36 °C	272455,3	272,48
19.10.2020 15:00	39 °C	178233,1729	179,23	11.10.2020 15:00	34 °C	274810,8	274,81
19.10.2020 16:00	38 °C	166381,4496	166,38	11.10.2020 16:00	33 °C	269942,7	269,94
19.10.2020 17:00	36 °C	153529,7263	153,53	11.10.2020 17:00	33 °C	248429	248,43
19.10.2020 18:00	34 °C	151180,4886	151,18	11.10.2020 18:00	31 °C	227700,4	227,70
19.10.2020 19:00	33 °C	145929,2448	145,93	11.10.2020 19:00	31 °C	230684	230,88
19.10.2020 20:00	32 °C	144547,3391	144,55	11.10.2020 20:00	30 °C	235709,1	235,71
19.10.2020 21:00	30 °C	143027,2428	143,03	11.10.2020 21:00	29 °C	214666,5	214,87
19.10.2020 22:00	28 °C	129899,1384	129,90	11.10.2020 22:00	29 °C	203517	203,52
19.10.2020 23:00	28 °C	127411,7081	127,41	11.10.2020 23:00	28 °C	208542,1	208,54
20.10.2020 00:00	27 °C	114559,9848	114,56	12.10.2020 00:00	27 °C	207599,9	207,80
20.10.2020 01:00	26 °C	114421,7942	114,42	12.10.2020 01:00	27 °C	205087,4	205,09
20.10.2020 02:00	25 °C	108894,1713	108,89	12.10.2020 02:00	26 °C	201004,5	201,00
20.10.2020 03:00	24 °C	108755,9808	108,76	12.10.2020 03:00	26 °C	195822,3	195,82
20.10.2020 04:00	25 °C	99911,7841	99,91	12.10.2020 04:00	27 °C	196450,5	196,45
20.10.2020 05:00	24 °C	89409,30057	89,41	12.10.2020 05:00	25 °C	192995,7	193,00
20.10.2020 06:00	25 °C	97838,92551	97,84	12.10.2020 06:00	26 °C	206343,7	206,34
20.10.2020 07:00	24 °C	113454,4602	113,45	12.10.2020 07:00	25 °C	98303,75	98,30
20.10.2020 08:00	28 °C	125200,6589	125,20	12.10.2020 08:00	27 °C	191946,7	191,95
20.10.2020 09:00	31 °C	138296,0973	138,30	12.10.2020 09:00	30 °C	221795,9	221,80
20.10.2020 10:00	33 °C	150351,3432	150,35	12.10.2020 10:00	32 °C	248052,1	248,05
20.10.2020 11:00	36 °C	159610,1115	159,61	12.10.2020 11:00	33 °C	245584,8	245,58
20.10.2020 12:00	37 °C	153529,7263	153,53	12.10.2020 12:00	34 °C	247837,5	247,84
20.10.2020 13:00	38 °C	157122,6812	157,12	12.10.2020 13:00	37 °C	248604,8	248,80
20.10.2020 14:00	39 °C	153867,9189	153,67	12.10.2020 14:00	36 °C	251506,8	251,51
20.10.2020 15:00	36 °C	152838,7735	152,84	12.10.2020 15:00	36 °C	249157,6	249,16
20.10.2020 16:00	35 °C	146620,1977	146,62	12.10.2020 16:00	34 °C	232712,9	232,71
20.10.2020 17:00	34 °C	140539,8125	140,54	12.10.2020 17:00	33 °C	214333,6	214,33
20.10.2020 18:00	32 °C	136532,2859	136,53	12.10.2020 18:00	32 °C	210187,9	210,19
20.10.2020 19:00	32 °C	135564,9519	135,56	12.10.2020 19:00	32 °C	204660,2	204,66
20.10.2020 20:00	29 °C	138328,7633	138,33	12.10.2020 20:00	30 °C	206180,3	206,18
20.10.2020 21:00	29 °C	139157,9068	139,16	12.10.2020 21:00	29 °C	185866,3	185,87
20.10.2020 22:00	26 °C	129069,9949	129,07	12.10.2020 22:00	28 °C	151456,9	151,46
20.10.2020 23:00	26 °C	127688,0892	127,69	12.10.2020 23:00	27 °C	149798,6	149,80

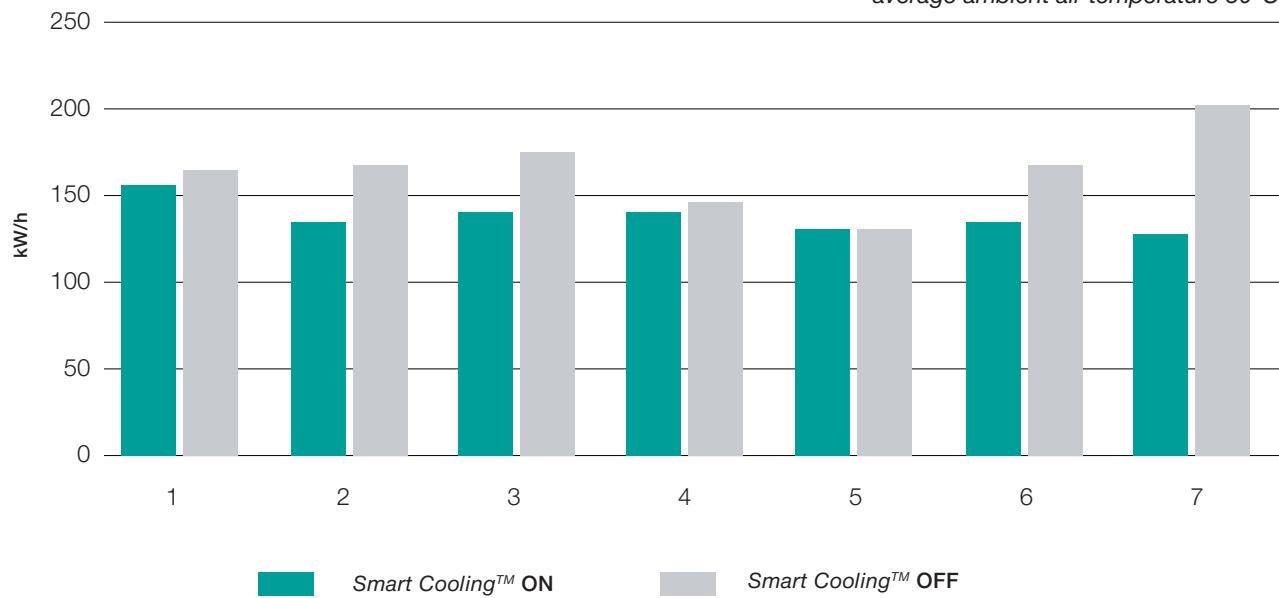
Testing Summary

Smart Cooling™ Test Report for Chiller 1

SC Status	SC OFF	SC ON
Operating Date	14/10/2020 – 20/10/2020	06/10/2020 – 12/10/2020
Average Ambient Temperature (°C)	31.09	29.63
Total Electrical Consumption (MWh)	23.67	28.17
Average Electrical Consumption (kWh)	140.92	167.65
Total Electrical Saving per 7 days (kWh)	4491.36	
Total Electrical Saving per 1 day (kWh)	561.42	
Electrical Consumption Reduction (%)	15.95%	

Electrical Data 7 Days Comparison

*average ambient air temperature 30°C



Conclusion:

Test results data shows that adiabatic equipment *Smart Cooling*™ in average increasing chiller performance by **15.95%** during 7 operational days.

Ali Soufan



December 26, 2020

Annex:



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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	0,591	-0,147	0,147
	101,47		25,0	0,300	102,07		0,542			
	101,42		25,0	0,300	101,97		0,673			
Point 2	71,27	71,27	25,0	0,300	71,75	71,75	0,646	0,759	-0,146	0,147
	71,19		25,0	0,300	71,65		0,729			
	71,34		25,0	0,300	71,86		0,722			
Point 3	26,32	26,36	25,0	0,300	26,51	26,55	0,759	-0,132		
	26,36		25,0	0,300	26,56		0,720			
	26,39		25,0	0,300	26,58					

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

