

PERFORMANCE EVALUATION REPORT; COOLING PLANTS

Delegation : Manresa N / Reference: 33271672/13

Inspection Report No: 01 Date : 03/10/13

Applicant : Sodexo Facilities Management , Inc.

it is recommended that you print out the original report and this translation and follow them side by side as this translation contains no pictures, signatures, certification stamps or charts

location :Almirall , SA
NII , km 593
08740 - Sant Andreu de la Barca

Date of Inspection: 05/09/13 to 03/10/13
Chiller performance verification Almirall Report October 1

TÜV Rheinland Ibérica
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Chiller performance verification Almirall Report October 2

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1. Report Definition

TÜV Rheinland Ibérica Inspection, Certification & Testing , SA , has proceeded to conduct performance evaluation two chillers to verify the This can increase by incorporating a product, which , according to the distributor itself, improves the performance thereof.

2. Procedure Performance

The checks have been carried out on alternate days . Initially 09 September 2013 , it has verified the performance of the plants without the Incorporation of the specified product to determine the initial value of performance thereof.

Later in the chiller 1 has joined the product to evaluate, and has ceased operation during the time estimated by the dealer for was achieved proper operating conditions

On October 5, 2013 , we proceeded to verify the performance of the chiller 1, wherein is included the new product, and , on the ground chiller 2 to determine the possible variations in performance due to climatic variation .

a) Applicable Legislation

Government Decree 1027/7 , by which approves the RITE

b) Standards utilized

none

c) other documentation

Internal Procedure 6 - FI3.202.11

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? ?

3 . Features Chillers

Below shows the characteristics of the chillers evaluated :

Chiller Plant 1

Brand TRANE
Model ERTAA217 ABANPRCN1E000111001000
Manufacturing number EKC 0934
Year of installation 1992
Motor size (kW) 562.5 kW
Minimum performance (Manufacturer) EER = 2.71
Refrigerant type R404a
Refrigerant Charge (kg) 62 (C1) +62 (C2)

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Chiller Plant 2

Brand TRANE
Model ERTAA217 ABANPRCN1E000111001000
Manufacturing number EKC 0935
Year of installation 1992
Motor size (kW) 562.5 kW
minimum performance
(Manufacturer)
EER = 2.71
Refrigerant type R404a
Refrigerant Charge (kg) 62 (C1) +62 (C2)

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April . Results Obtained

Below are the results of the values obtained during Tests :

Verification 1st (05/09/13)

Chiller Plant 1

Brand TRANE
Model ERTAA217 ABANPRCN1E000111001000
Manufacturing number EKC 0934
Year of installation 1992
Motor size (kW) 562.5 kW
Minimum performance (Manufacturer) EER = 2.71
Refrigerant type R404a
Refrigerant Charge (kg) 62 (C1) +62 (C2)
Data measured in chiller 1 (no product)
Ferro pipe Material
Pipe diameter 170 mm
Aigua Fluid
Condensing fluid temperature (air / water) 27.5 ° C
Temperature drive (external contact probe) 13.58 ° C
Return Temperature (Probe external contact) 16.75 ° C
Differential Thermal 3.17 ° C
Liquid flow rate (m3 / h) 112.8 m3 / h
Voltage (V) (measured value) 389 V
Consumption (A) (measured value) 294.7 A
cos 1
As Thermal Power (kW) 368.4 kW
Total power (kW) 198.32 kW
Performance chiller 1
Initial Performance (Manufacturer , Draft) EER = 2.71
Yield in EER = 1.85

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Verification 1st (05/09/13)

Chiller Plant 2

Brand TRANE
Model ERTAA217 ABANPRCN1E000111001000
Manufacturing number EKC 0935
Year of installation 1992
Motor size (kW) 562.5 kW
Minimum performance (Manufacturer) EER = 2.71

Refrigerant type R404a
Refrigerant Charge (kg) 62 (C1) +62 (C2)
Data measured on two chiller
Ferro pipe Material
Pipe diameter 170 mm
Aigua Fluid
Condensing fluid temperature (air / water) 29.7 ° C
Temperature drive (external contact probe) 14.63 ° C
Return Temperature (Probe external contact) 18.00 ° C
Differential Thermal 3.37 ° C
Liquid flow rate (m3 / h) 117,44 m3 / h
Voltage (V) (measured value) 386.3 V
Consumption (A) (measured value) 276.45 A
cos 1
As Thermal Power (kW) 424.8 kW
Total power (kW) 184.57 kW
Performance chiller 2
Initial Performance (Manufacturer , Draft) EER = 2.71
Yield in EER = 2.3

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2nd Verification (10/03/13)

Chiller Plant 1

Brand TRANE
Model ERTAA217 ABANPRCN1E000111001000
Manufacturing number EKC 0934
Year of installation 1992
Motor size (kW) 562.5 kW
Minimum performance (Manufacturer) EER = 2.71
Refrigerant type R404a
Refrigerant Charge (kg) 62 (C1) +62 (C2)
Data measured on one chiller plant (With Product)
Iron pipe Material
Pipe diameter 170 mm
Water Fluid
Condensing fluid temperature (air / water) 25.7 ° C
Temperature drive (external contact probe) 15.12 ° C
Return Temperature (Probe external contact) 18.24 ° C
Differential Thermal 3.12 ° C
Liquid flow rate (m3 / h) 118.6 m3 / h
Voltage (V) (measured value) 388.3 V
Consumption (A) (measured value) 288.1 A
cos 1
As Thermal Power (kW) 443.5 kW
Total power (kW) 193.53 kW
Performance chiller 1
Initial Performance (Manufacturer , Draft) EER = 2.71
Yield in EER = 2.29

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2nd Verification (10/03/13)

Chiller Plant 2

Brand TRANE
Model ERTAA217 ABANPRCN1E000111001000
Manufacturing number EKC 0935
Year of installation 1992
Motor size (kW) 562.5 kW
Minimum performance (Manufacturer) EER = 2.71
Refrigerant type R404a
Refrigerant Charge (kg) 62 (C1) +62 (C2)
Data measured on two chiller
Ferro pipe Material
Pipe diameter 170 mm
Water Fluid
Condensing fluid temperature (air / water) 24.9 ° C
Temperature drive (external contact probe) 12.33 ° C
Return Temperature (Probe external contact) 15.13 ° C
Differential Thermal 2.8 ° C
Liquid flow rate (m3 / h) 129.6 m3 / h
Voltage (V) (measured value) 391.6 V
Consumption (A) (measured value) 280.66 A
cos 1
As Thermal Power (kW) 464.9 kW
Total power (kW) 190.16 kW

Performance chiller 2

Initial Performance (Manufacturer , Draft) EER = 2.71
Yield in EER = 2.44

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May . Measuring equipment

The equipment used in the verification of income , have been the following :
- Flow + Temperature Probes .

Make / Model: Fluxus / Flexim F601

Team No. : 5182-5183-5184

- Electrical Tester

Make / Model: Metrel / Eurotest 61557

Equipment No. : 3113/2518

- Thickness Gauge

Make / Model: PosiTector / UTG

Team No. : 3040

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June . Conclusion .

According to the values obtained in the different tests conducted on alternative dates , the measured performance in chiller 2, in which no product has been added , shows an increase of 6.08% possibly due to climatic variation experienced .

On the other hand , as to the values obtained in the alternative tests performed in the chiller 1 , which, if added to the product indicated , these show an increase in the yield of 23.78% .Therefore , determine that the chiller 1 , excluding climate variability gain , increased due to the incorporation the evaluated product, is **valued at 17.7 %**. Note that the specified value of profit, has been verified in a as specific conditions , unable to determine the variability of this in seasonal assembly , and could not predict the effect on the refrigerator circuit itself.

Manresa , to October 3, 2013

Sincerely ;

Josep Ramon Medina González

Thermal Installations Inspector

accredited in Refrigeration

TÜV Rheinland Ibérica Inspection, Certification & Testing , SA