

Part 1 Energy Efficiency

NRB 1-2 Air-conditioning System

Actual Assessment Submission

Site Verification Submission

Criteria	Credit Available	Credit Claimed
(a) Water Cooled Chilled-Water Plant	20	
OR		
(b) Air Cooled Chilled-Water Plant / Unitary Air-Conditioners	20	
(c) Air Distribution System	8	
(d) Provision of permanent measuring instrument	2	
(e) Verification of central water cooled chilled-water plant instrumentation	1	
(f) Provision of variable speed controls	1	
(g) Sensors or automatic control devices to maintain concentration of carbon dioxide <700ppm	1	

Strategies:

Documentary Evidences:

Order of documents to be submitted accordingly and clearly labeled.

	Actual Assessment	Submitter	Assessor
<i>1-2(a) and (b)</i>			
1.	Detailed calculations of the overall improvement in equipment/system efficiency of the air-conditioning plants/ units showing the design cooling system capacity and the system efficiency (including individual equipment efficiency).	<input type="checkbox"/>	<input type="checkbox"/>
2.	Calculation and technical data of the designed system efficiency of chillers at part load condition.	<input type="checkbox"/>	<input type="checkbox"/>
3.	Technical product information of all air-conditioning and system which included chillers, chilled water pumps, condenser water pumps, cooling towers.	<input type="checkbox"/>	<input type="checkbox"/>
4.	Schematic drawings showing the air-conditioning system.	<input type="checkbox"/>	<input type="checkbox"/>
5.	Schedules of the air-conditioning system.	<input type="checkbox"/>	<input type="checkbox"/>
<i>1-2 (c)</i>			
1.	Detailed calculations of the overall improvement for air distribution system.	<input type="checkbox"/>	<input type="checkbox"/>
2.	Technical product information of all AHUs, FCUs, and etc.	<input type="checkbox"/>	<input type="checkbox"/>
3.	AHUs and FCUs schedule and schematic drawing	<input type="checkbox"/>	<input type="checkbox"/>
<i>1-2(d) Provision of permanent measuring instrument</i>			
1.	Instrument's calibration certificates from accredited laboratory or batch calibration certificates from manufacturer.	<input type="checkbox"/>	<input type="checkbox"/>
2.	Schematic drawing showing the location of the digital power meters, flow meters and temperature sensors.	<input type="checkbox"/>	<input type="checkbox"/>

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| 3. | Summary of instruments, standard and measurement accuracy to be presented in the prescribed format. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. | Technical specification of the digital power meters, flow meters and temperature sensors. | <input type="checkbox"/> | <input type="checkbox"/> |
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1-2(e) Verification of water-cooled chilled water plant instrumentation

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| 1. | Computation of the percent heat balance that is the total heat gain and total heat rejected must be within $\pm 5\%$ for 80% of the sampled credits over the normal building operations hours accordance with AHRI550/590. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. | Detailed calculations of the overall uncertainty of measurement of the resultant chiller plant efficiency in kW/RT to be within $\pm 5\%$ of the true value based on instrumentation specification. | <input type="checkbox"/> | <input type="checkbox"/> |
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1-2(f) and (g)

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| 1. | Extracts of the tender specification showing the requirements to incorporate these control devices. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. | Plan layouts showing the locations and the types of control devices used to regulate fresh air intake. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. | Technical product specification of the control devices | <input type="checkbox"/> | <input type="checkbox"/> |
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Site Verification	Submitter	Assessor
<i>1-2(a) and(b)</i>		
1. Detailed calculations of the overall improvement in equipment/system efficiency of the air-conditioning plants/ units showing the design cooling system capacity and the system efficiency (including individual equipment efficiency).	<input type="checkbox"/>	<input type="checkbox"/>
2. Calculation and technical data of the designed system efficiency of chillers at part load condition.	<input type="checkbox"/>	<input type="checkbox"/>
3. Technical product information of all air-conditioning and system which included chillers, chilled water pumps, condenser water pumps, cooling towers and its purchase and delivery orders.	<input type="checkbox"/>	<input type="checkbox"/>
4. As-built schematic drawings showing the air-conditioning system.	<input type="checkbox"/>	<input type="checkbox"/>
5. As-built schedules of the air-conditioning system.	<input type="checkbox"/>	<input type="checkbox"/>
6. Photographic evidences	<input type="checkbox"/>	<input type="checkbox"/>
7. Test and commissioning report of the air conditioning system	<input type="checkbox"/>	<input type="checkbox"/>
8. Describe any deviations or changes to the AA submission.	<input type="checkbox"/>	<input type="checkbox"/>
<i>1-2 (c)</i>		
1. Detailed calculations of the overall improvement for air distribution system.	<input type="checkbox"/>	<input type="checkbox"/>
2. Technical product information of all AHUs, FCUs and its purchase and delivery orders.	<input type="checkbox"/>	<input type="checkbox"/>
3. As-built schedule and schematic drawing for the AHUs and FCUs	<input type="checkbox"/>	<input type="checkbox"/>
4. Describe any deviations or changes to the AA submission.	<input type="checkbox"/>	<input type="checkbox"/>

1-2(d) Provision of permanent measuring instrument

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| 1. Instrument's calibration certificates from accredited laboratory or batch calibration certificates from manufacturer. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Summary of instruments, standard and measurement accuracy to be presented. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Data logging for the flow, power meter and temperature sensors | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Describe any deviations or changes to the AA submission. | <input type="checkbox"/> | <input type="checkbox"/> |

1-2(e) Verification of water-cooled chilled water plant instrumentation

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| 1. Computation of the percent heat balance that is the total heat gain and total heat rejected must be within $\pm 5\%$ for 80% of the sampled credits over the normal building operations hours accordance with AHRI 550/590. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Operating system efficiency during building operations hours | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Describe any deviations or changes to the AA submission. | <input type="checkbox"/> | <input type="checkbox"/> |

1-2(f) and (g)

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| 1. As-built plan layouts showing the locations and the types of control devices used to regulate fresh air intake. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Product catalogue and its purchase / delivery order of the control devices and CO2 sensor | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Photographic evidences during installation. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Describe any deviations or changes to the AA submission. | <input type="checkbox"/> | <input type="checkbox"/> |