

**PERFORMANCE UPGRADE DATA****Data Relates to an FDYQ160**

	<b>R0.4 (20mm Evap)</b>	<b>R0.7 (25mm)</b>	<b>R1.0 (50mm)</b>	<b>R1.2 (75mm)</b>
<b>Loss At 42°C</b>	5.66	4.48	3.20	2.84
Kg CO <sup>2</sup> /Hr	1.98	1.6	1.13	1.03
°Extra/Hr Running Cost	99.7	78.9	56.4	50
<b>Loss at 50°C</b>	7.17	5.67	4.05	3.60
Kg CO <sup>2</sup> /Hr	2.5	1.97	1.41	1.22
°Extra/Hr Running Cost	126.3	99.8	71.3	63.4
<b>Loss at 58°C</b>	8.68	6.87	4.91	4.35
Kg CO <sup>2</sup> /Hr	3.0	2.35	1.69	1.5
°Extra/Hr Running Cost	152.9	121	86.5	24
<b>Plus 5% Leakage</b>	9.46	7.65	5.69	5.13
Kg CO <sup>2</sup> /Hr	3.3	2.63	1.97	1.78
°Extra/Hr Running Cost	156.6	134.7	100.2	90.3
<b>Plus 10% Leakage</b>	10.23	8.42	6.46	5.90
Kg CO <sup>2</sup> /Hr	3.57	2.9	2.25	2.07
°Extra/Hr Running Cost	180.2	148.3	113.8	103.9

**Condenser Air Recirculation**

Capacity is reduced by 1% for every 1°C rise in outside air temperature, ie: a rise from 35 to 45°C equates to a 10% loss in capacity (1.55kw) or at a COP of 2.7 it will use 575 watts more of electricity to maintain the same inside temperature.

**Hang Duct**

Will reduce external static pressure by about 50pa and increase the airflow and capacity to heat or cool by 17.5% (2.71kw) and use 1.0kw less of electricity.

**Duct Size**

Using the smaller duct size increases the duct velocity from 3.5m/s to 5.0 this increasing the pressure drop by 100% and reducing the airflow and capacity by 21% (3.26kw) and will increase power consumption by 1.2kw.

**Filter**

Reducing the size of the RA filter reduced its air cleaning efficiency and increases its noise, but does not significantly effect the operation of the running of the system until it clogs up and burns out the fan motor etc.

### **Zoning**

Zoning will reduce the running costs by the % age of the house that is shut off and the % age of the unit that is no longer used.

### **Whirly Birds**

Whirly Birds will reduce the ceiling space temperature by up to 8°C only about 20% reduction in losses.

### **Fresh Air**

Fresh air systems will save 1500w of power.

### **Electricity**

	Previous	April 09	July 09
Charges	12.67 <sup>c</sup>	15.32 <sup>c</sup>	17.61 <sup>c</sup>
Running costs	70.4 <sup>c</sup> /hr	85.1 <sup>c</sup> /hr	97.8 <sup>c</sup> /hr
Increase		14.7/hr	27.4/hr
Increase percentage		21%	38.9%

1kw = 0.94 kg of CO<sup>2</sup>

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## **References**

### **Duct losses**

Refer Airah article Soapbox cc Brian Abbott.

### **Condenser Air Recirculation**

Refer standard air conditioning factors Peter Taylor

### **Hang Duct**

Refer westaflex test sheets for friction losses and FDYQ160 fan curve.

### **Duct Size**

As per westaflex test sheets

### **Filters**

From SW Hart 10mm filter @ 1.8m/s is 16pa, 10mm filter @ 2.5 m/s is 21pa In a duct system an increase in 5pa is negligible on fan curve.

### **Whirly Birds**

CSIRO status a max of 8°C reduction using whirly birds.

### **Fresh Air**

The unit will be running at its lowest ie 6.2kw capacity = 2.3kw of power. Fan only uses 290w plus controls power usage.

**Carbon Planet Consultants**                      **1kw = 0.94 kgCO<sup>2</sup>**