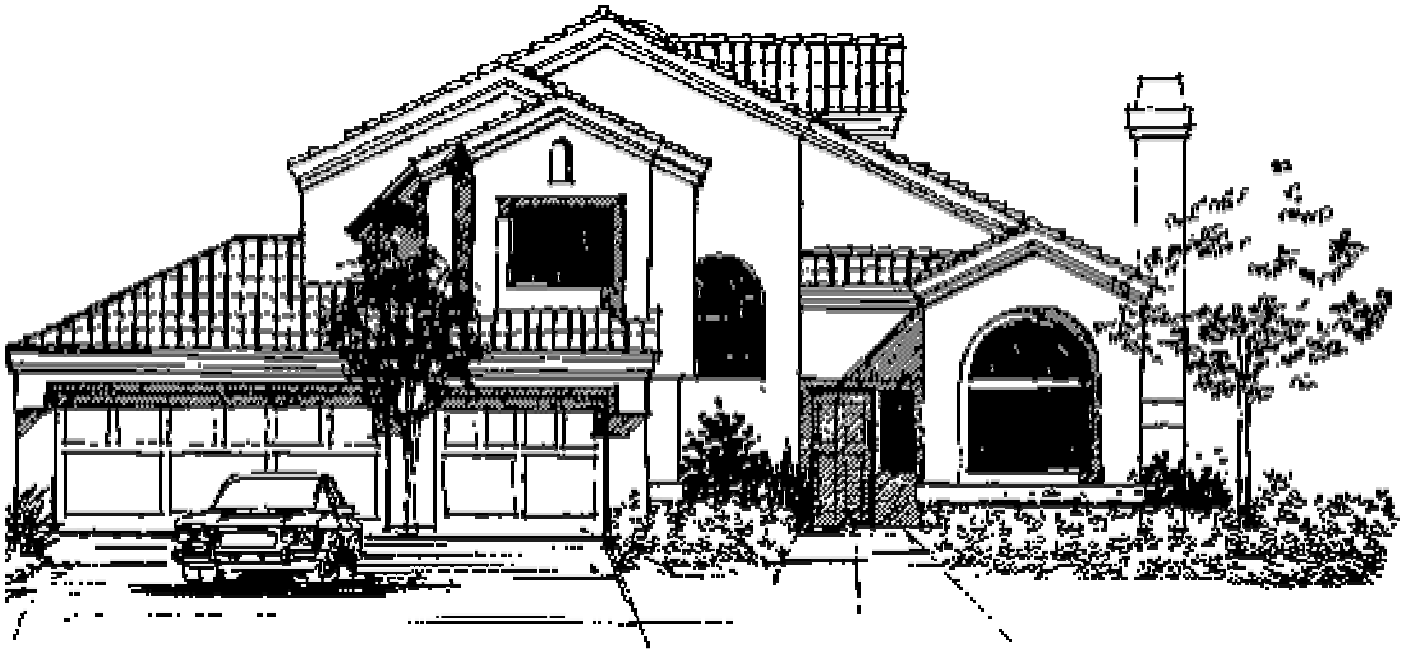
RESLOAD
5.5 PRO SUITE



DESIGNAIDE

H.V.A.C.INNOVATIONS
CONSULTING AND SOFTWARE.
ABN 52006468275
23A DENT STREET GLEN IRIS 3146.
PH / FAX 03 98855270---MOB 0418129347
berna84@bigpond.net.au

RESLOAD 5.5 PRO SUITE AU NOTES

BERN CONNELL 03 9885 5270
Berna84@bigpond.net.au

Automated heat load program by Bern Connell.

This program is based on the AREMA-CSIRO method and data, first accepted by the industry in 1981 and supported by.
AIRAH. – AREMA. – HCIAV. – MPA. - Gas and Fuel Co. AGA, and many manufacturers and contractors.
The program now provides options to use UPDATED CSIRO resistance values making the program compatible with ENERGY STAR RATING PROGRAMS and allows the advantage of extra insulation to be considered.

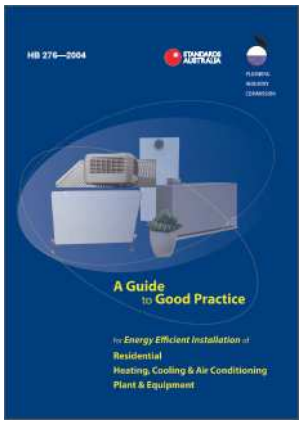
The program is self-initiating when Microsoft XL is installed on the computer being used.
Insert disk into floppy drive and open Windows Explorer. Activate floppy drive and double click onto RESLOD 5.5.
Accept the macro activation and enter. The program will then ask questions and require answers to be entered.
If an error occurs continue to enter data as requested until you see the directive to save and print. At this stage you can scroll to fields that require correcting or editing and see results immediately.

Remember to save to your own file # and drive and exit the system.
This program can be added to your hard drive if you so desire.

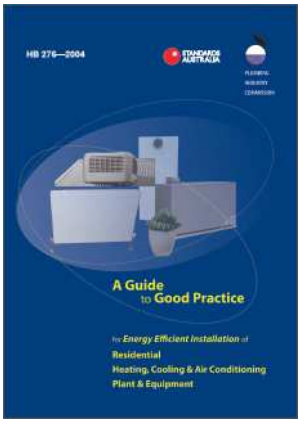
The following is a description of the methodology and data used and recommended for consideration when using this heat load program.

CSIRO / AREMA HEAT LOAD METHOD AND DATA

All care and diligence has been taken to ensure that the program is mathematically valid.
However, as users have to apply their best judgement
and experience for many of the inputs the author is not responsible for the interpretation, use and selection of systems or equipment.



I ALSO RECOMMEND THAT YOU OBTAIN THE Australian Standard publication HB276—2004



RESIDENTIAL LOAD SURVEY METHOD FACTOR BASIS

The flow of heat through a building structure may be calculated from:

Q - U.A.K

Where:

Q - Heat transmission (W)

U - Coefficient of heat transfer (W / m' K)

A - Area of surface (m')

K - Temperature difference across the building element (Kelvin)

The following information is concerned with the calculation of U for various building elements.

Overall Heat Transfer Coefficient (U) (W / m2 K)

The overall heat transfer coefficient, U is the rate of heat transfer through unit area of a building element when there is unit difference between the ambient air temperatures on either side of the element. It is calculated as the reciprocal of the sum of the resistances of the individual components of the elements.

For example

For a cavity wall section:

$U = 1 / R_{SI} + R_1 + R_A + R_2 + R_{S0}$

Where:

R_{SI} = 1/fsl - inside surface air film resistance

R_{S0} = 1/fso - outside surface air film resistance.

R_A = 1/a - air space resistance

R_1 = xJk1 - inner wall resistance

R_2 = x2/k2 - outer wall resistance

F_{si} = inside wall surface film coefficient (W / m' K)

F_{so} = outside wall surface film coefficient (W / m' K)

A = air space coefficient (W / m2 K)

X_1, X_2 = a thickness of materials (metre)

K_1, k_2 = thermal conductivity of materials (W / m' K)

Example of BV wall options

Table 2: Brick Veneer wall Base “R” includes

1.	Outside air resistance.	.03
2.	110mm Brick Resistance.	.18
3.	150mm Space resistance	.16
4.	10mm plaster board resistance.	.059
5.	Inside air resistance.	.12
Total in table		**.549**
	Resultant “U” **1.821**	

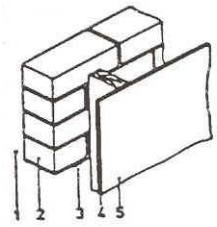


Table 2a: Added insulation

1.	Base wall resistance	.549
2.	110mm rock wool resistance	2.500
Total		**2.549**
Resultant “U”	**0.392**	

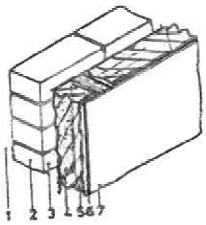
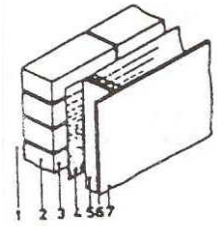


Table 2b: Added reflective surface on studs

1.	Base wall resistance	.549
2.	Foil on outside of frame resistance	1.060
Total		**1.609**
Resultant “U”	**0.622**	



These program includes Tables

- 1: **Base Floors R values - including surface and space R where applicable.**
- 1a: **Typical floor insulation products and R values**
- 1b: **Typical floor coverings**
- 2: **Base Wall R values - including surface and space R where applicable.**
- 2a: **Typical wall insulation products and R values**
- 2b: **Reflective surface on stud wall**
- 3: **Base ceiling types R values- including surface and space R where applicable.**
- 3a: **Typical ceiling insulation products and R values**
- 3b: **Reflective Sarking**

Glass:
A 'U' factor of 6.3 was adopted. See Glass Solar Load notes below.
Vented floor:
Various 'R' factors can be adopted SEE TABLES 1 / 1a / 1b for resistance values listed for progressive build up of total resistance. The program calculates the appropriate "U" factor. The summer gain was modified for average daily Change in ambient Temperatures.
Summer Resultant 'U' factor uses a temperature difference of half the design Kelvin.
Winter Resultant 'U' factor uses a temperature difference of the design Kelvin
Walls:
Various 'R' factors can be adopted SEE TABLES 2 / 2a / 2b for resistance values listed for progressive build up of total resistance. The program calculates the appropriate "U" factor. The summer gain was modified for average daily Change in ambient Temperatures.
Insulated Ceiling:
Various 'R' factors can be adopted SEE TABLES 3 / 3a / 3b for resistance values listed for progressive build up of total resistance. The program calculates the appropriate "U" factor. The summer gain was modified for average daily Change in ambient Temperatures.
Summer Resultant 'U' factor uses twice the design summer temperature difference.
Winter Resultant 'U' factor uses two-thirds the design temperature difference.
Partition:
For simplicity a 'U' factor of 1.9 was adopted at half the design temperature difference
Ventilation:
Based upon one fresh air change per hour.
Glass Solar Load:
The full potential gain was modified for the shifting sun effect during the daylight hours. This is perhaps the biggest difference between the Residential and Commercial procedures.

If conditions significantly vary from those outlined the estimator should seek guidance or consider reverting to a fully featured heat load formula or program.

This program makes provision for selecting each aspect with:

1. Normal Single Glass.
2. Double Glazing or glass bricks.
3. Internal Shades – No Shades – Outside Shades

Equipment Selection

It is stressed that the resultant answers from the use of this form are in terms of 'sensible' heat gain or loss. That is the work required to lower or raise the temperature of the air, to levels of comfort. Humidity is not directly controlled, as people are tolerant to a wide range of humidity levels providing temperatures are held in the range of 23°C to 26°C.

This program calculates Sensible Heat load only, as people in a residential situation are tolerant of humidity conditions provided that the dry bulb is held within 22 to 26 degrees DB.

The nominal Cooling is calculated by applying the Equipment Sensible to Total Heat ratio, SHR, as supplied by the equipment manufacturer.

Air Flow

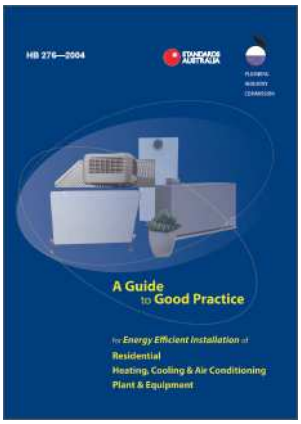
The airflow rate, l/S is calculated from the Minimum Supply air temperature that is entered. This entry will be from 10 to 15 degrees. Lower supply air temperatures may cause Ice formation on the evaporator coil.

Heat pump balance Graph.

The program allows 2 zones to be entered for both heating and cooling.
The load for each zone cooling and Heating are shown separately and totalled together for consideration.
Provision is made for entry of Standard Rating capacity cooling and Heating.
Standard Cooling entry is multiplied by Sensible Heat Ratio to disclose Sensible cooling capacity.
Standard heating capacity is applied across the ambient coordinate of the graph while the load of Zone 1 and Zone 1+2 are applied across the ambient coordinate providing a convenient graphical indication of the Balance points.
Balance point is the point where a given heat pump can provide sufficient heat to handle load. Below the balance point the given heat pump is unable to provide sufficient heat and an indication of the amount of supplemental heat required can be calculated.

REFERENCE TO AIRAH PUBLICATIONS

Designers will find that reference to AIRAH Design manuals such as the Technical Handbook and
Manual DA09,
Will provide valuable information and CSIRO Data.



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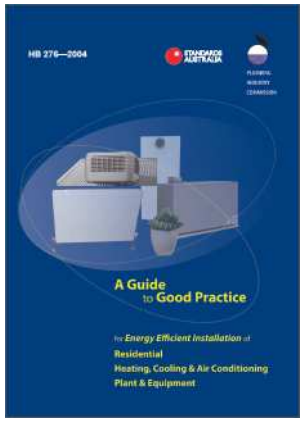
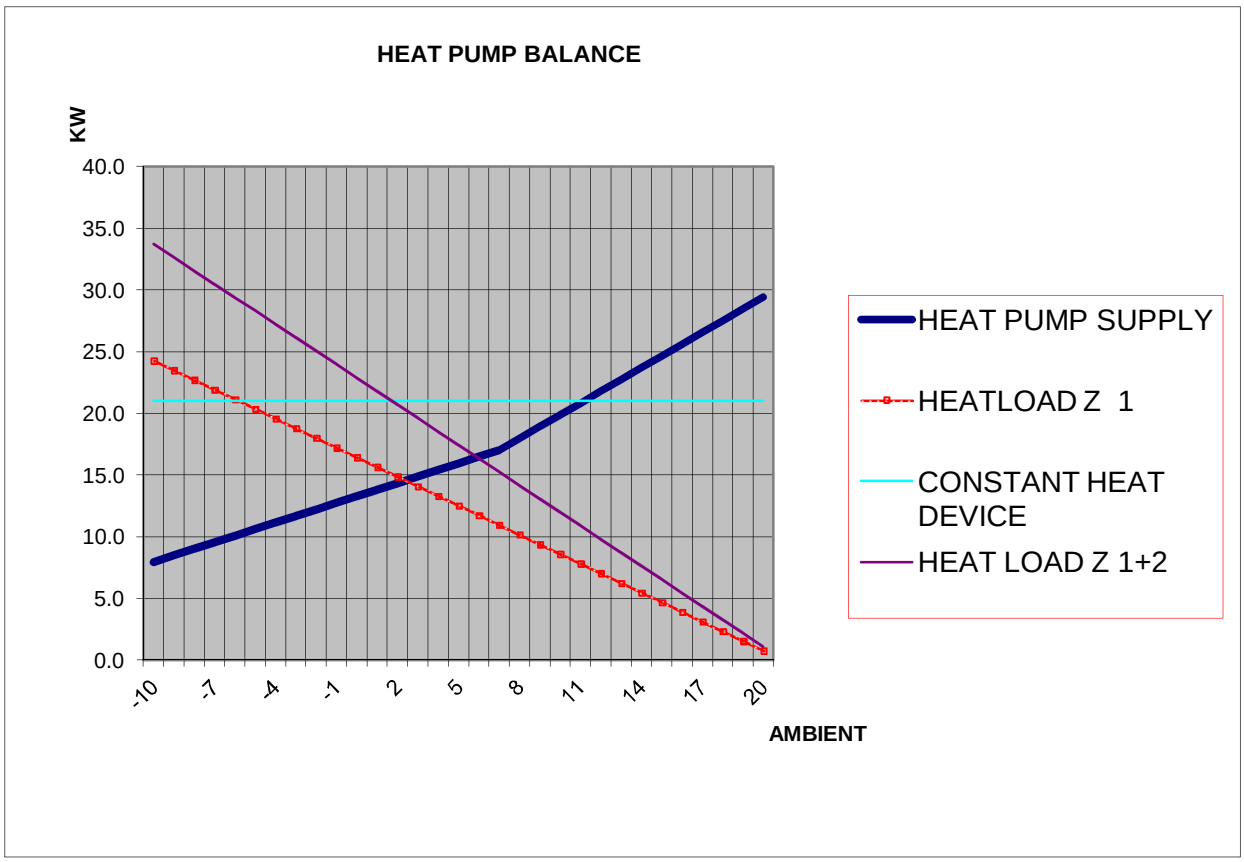


HEAT BALANCE GRAPH



This graph provides a visual indication of the heating device capability to heat the given structure throughout varying ambient temperatures. Devices with varying heat output as with Heat Pumps may require additional supplementary electric resistance elements to operate in extreme weather conditions, the graph shows a: the size required and b: at what ambient these will be required to be active.

SELECTIONS BASED UPON 'HORSEPOWER' SHOULD NOT BE USED

TABLE A – NUMBER OF AIR CHANGES PER HOUR (HEATING) EXTRACTED FROM AGA. AG706-1980

CEILING HEIGHT - m	2.4	3.0	3.6
Low Level (Floor & Wall Registers)	3 – 4	5 – 6	6 – 8
High Level (Ceiling Diffusers & High Wall Registers	5 - 6	7 - 8	8 - 10

TABLE B – RECOMMENDED AIR VELOCITIES EXTRACTED FROM AGA. AG706-1980

TYPE OF OUTLET	FACE VELOCITY – m/s
Supply Floor Register	1.5-3
Supply Ceiling Diffuser	2-4
Supply Low Wall Register	1-1.8
Supply High Wall Register	2-3.5
Return Air Grilles	1.5-2.5
Filters	1.5-2

USEFUL INFORMATION – DUCT VELOCITIES EXTRACTED FROM AGA. AG706-1980

APPLICATION	RECOMMENDED	MAXIMUM
Main Ducts	3.5-4.5	4-6
Branch Ducts	3	3.5-5
Radial Branches	3	5
Return Air Ducts	3	4.3

MAXIMUM RECOMMENDED AIRFLOW l/S FOR RESIDENTIAL USE

FLEX DUCT DIA.mm	FINAL BRANCH VELOCITY 2.5 M/s	INTERMEDIATE DUCT VELOCITY 3.5 M/s	MAIN DUCT VELOCITY 5 M/s
150	40	50	70
200	65	90	130
250	100	150	210
300	150	200	290
350	190	280	400
400	250	360	510
450	310	440	660
500	390	520	790
600	550	780	1250

DUCTS OVER 350 DIA ARE PRONE TO COLLAPSE AND ARE DIFFICULT TO TAPE

CONSIDER USING DUAL DUCTS TO ACHIEVE LARGE AIR QUANTITIES

PREPARED FROM DATA AND METHODS RELEASED BY AREMA and C.S.I.R.O.1981

Resload 5.5 PRO.
NEW FEATURES
The new version 5.5 PRO is set out with six individual work sheets for

1. RESLOAD 5.5 PRO - One Two or Three zone heating and cooling calculations.
Auto run Macro activation is Ctrl+Shift+Z
2. Heat Load Balance Graph and What If zone Graphs.
3. Location Index Tables.
4. Building material Resistance Tables.
5. HYDRONIC 5.5 PRO - 30 Room heating calculations with What If graphics.
Auto run Macro activation is Ctrl+Shift+X for first 15 rooms and Ctrl+Shift+Y for second 15 rooms if required.
6 Evapload 5.5 PRO Single zone Evaporative Cooling Calculations
Auto run Macro activation is Ctrl+Shift+Z

RESLOAD 5.5 PRO.

This Program is an upgrade to 2000 Resload 3.2 and all previous versions. With the advent of the National Energy Efficient House Star Rating Systems, the original Comload Data has been expanded to accommodate more locations and building method choices and especially choices of up-graded insulation products.

Location Choices:

The CSIRO Weather Data for over 600 Australian wide Stations is built into the database for convenient choice.

Building Product Choices include:

Base Floor Types 4 Plus provision for custom floor.
Prime Insulation Types 25 Plus provision for custom floor insulation.
Floor Covering Types

Base Wall Types 15 Plus provision for custom wall.
Prime Insulation Types 30 Plus provision for custom wall insulation.
Reflective Foil Application 1
Base Ceiling Types 4 Plus provision for custom ceiling.
Prime Insulation Types 31 Plus provision for custom ceiling insulation.
Reflective Foil Application 2

To cater for home renovations, merging old and new building structures, the program allows each Zone to have two (2) types of Floor, Wall and Ceiling.

Window Choices include:

Single Glass – Double Glass – Glass Block.
With a choice of / Internally Shaded – Non Shaded – Externally Shaded.

Zoning

The Program allows up to three (3) Zones
Typically
- Zone 1 = Day
- Zone 2 = Common
- Zone 3 = Night.

For first cost saving and economical running costs, especially with cooling systems, zoning a home is usually adopted and home occupation at different times of the day usually fall into Day / Common / Night configuration.
The program calculates the cooling and heating needs for all zones at 4PM Day and 9PM Night.
For comparison zones 1&2 and 2&3 and 1&2&3 are added together giving cooling and heating needs for all variations of application.

HYDRONIC 5.5 PROGRAL DETAILS

The program is designed for thirty [30] room manipulation with provision to name each room
The local weather data is selected from 600 Australian locations.
Global settings are requested:

1. Indoor setpoint temperature.
2. Default ceiling height
3. Default minimum fresh air changes/Hr.
4. System losses as %.
5. Heating water flow temperature.
6. Heating water return temperature.
7. Radiator kW/m^2.

Global settings may be individually set room by room to allow for different requirements in special areas.
Room by room adjustments include:

1. Room set-point temperature. Bedrooms / Sick rooms etc.
2. Fresh air changes / Hr. Sick rooms etc.
3. Room Ceiling heights where diffirent dimensions apply.

All input fields feed automatically wit macro acceptance. If than 30 rooms are required simply enter zero "0" for the idle rooms.

NOTE
Rooms 1A to 15A are initiated by Macro - **Ctrl+Shift+X .**
Rooms 1b to 15B are initiated by Macro - **Ctrl+Shift+Y** .
As progressive water flow is calculated the program can be used with the eventual layout calculated in piping order.

This program includes Auto Load FabricTables

- 1: Base Floors R values - including surface and space R where applicable.
- 1a: Typical floor insulation products and R values
- 1b: Typical floor coverings
- 2: Base Wall R values - including surface and space R where applicable.
- 2a: Typical wall insulation products and R values
- 2b: Reflective surface on stud wall
- 3: Base ceiling types R values- including surface and space R where applicable.
- 3a: Typical ceiling insulation products and R values
- 3b: Reflective Sarking

This program includes Auto Load Glass:

1. Normal Single Glass.
2. Normal Single Glass with heavy drapes drawn.
3. Double Glazing or glass bricks.
4. Double Glazing or glass bricks with heavy drapes drawn

Vented floor:
Various 'R' factors can be adopted SEE TABLES 1 / 1a / 1b for resistance values listed for progressive build up of total resistance. The program calculates the appropriate "U" factor.
Walls:
Various 'R' factors can be adopted SEE TABLES 2 / 2a / 2b for resistance values listed for progressive build up of total resistance. The program calculates the appropriate "U" factor.
Ceiling:
Various 'R' factors can be adopted SEE TABLES 3 / 3a / 3b for resistance values listed for progressive build up of total resistance. The program calculates the appropriate "U" factor.
Partition:
For simplicity a 'U' factor of 1.9 was adopted at half the design temperature difference
Ventilation:
Based upon one fresh air change per hour.
Reports:

1. Each room is listed with;
2. Final Watts.
3. Heating Water flow l/S
4. Radiator Surface areas M^2.
5. Total building is also graphed showing % of load, window, wall, floor, ceiling and ventilation

Total system
Boiler k/W
total heating water circulation ml/S
Total building W/M^2

EVAPLOAD 5.5 PRO.

This Program is an upgrade to 2000 Resload 3.2 and all previous versions. With the advent of the National Energy Efficient House Star Rating Systems, the original Comload Data has been expanded to accommodate more locations and building method choices and especially choices of up-graded insulation products.

Location Choices:

The CSIRO Weather Data for over 600 Australian wide Stations is built into the database for convenient choice.

Building Product Choices include:

Base Floor Types 4 Plus provision for custom floor.
Prime Insulation Types 25 Plus provision for custom floor insulation.
Floor Covering Types

Base Wall Types 15 Plus provision for custom wall.
Prime Insulation Types 30 Plus provision for custom wall insulation.
Reflective Foil Application 1

Base Ceiling Types 4 Plus provision for custom ceiling.
Prime Insulation Types 31 Plus provision for custom ceiling insulation.
Reflective Foil Application 2

To cater for home renovations, merging old and new building structures, the program allows each Zone to have two (2) types of Floor, Wall and Ceiling.

Window Choices include:
Single Glass – Double Glass – Glass Block.
With a choice of / Internally Shaded – Non Shaded – Externally Shaded.

Zoning

This program is applicable to one zone.
As evaporative cooling is easy to apply to the whole house zoning has been ignored.
If the house is 2 or more stories there is no input for the in between floor or ceiling as the cooling will be applied to all stories at the same time.

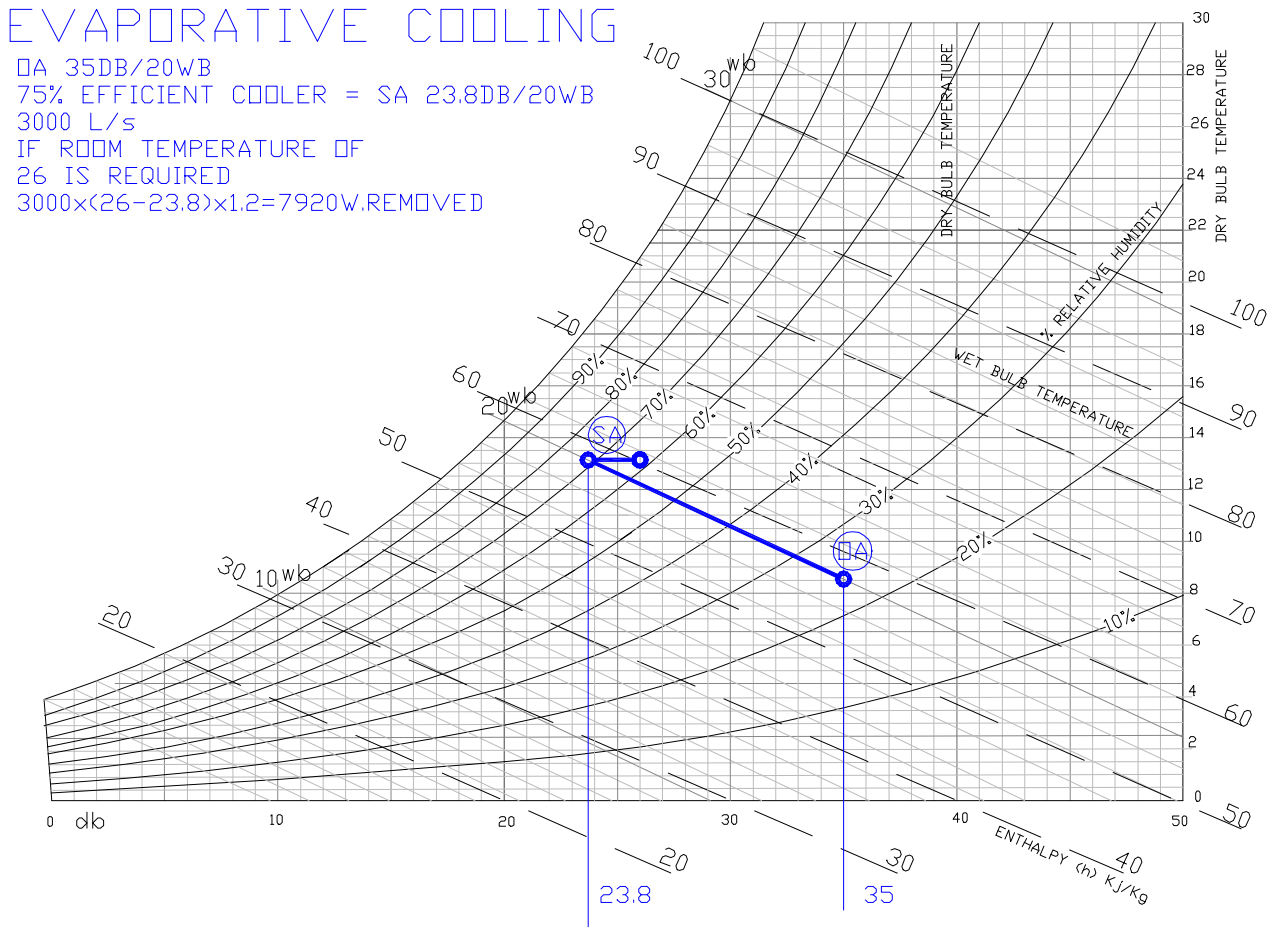
- Top stoty ceiling-roof area is 125 sq m are to be entered.
- Top story floor & Bottom story ceiling are to be ignored.
- Bottom floor 1s 125 sq mare to be added.
- If the bottom floor is larger than the top floor then there will be

extra roof-ceiling to be added

The walls are also special and the outside wall must be added for all floors.

EVAPLOAD 5.5 PRO

EVAPORATIVE COOLING PROCESS CALCULATION



This program returns the required air flow by calculating the evaporative cooling discharge temperature relative to the entered saturation efficiency of the selected evaporative cooler and the locality coincidental WB.
The resultant DB temperature is compared with the desired comfort DB temperature and room load to calculate the necessary air circulation.
The resultant air change rate per hour should fall within 25 to 35 changes per hour.

Changing either unit efficiency or comfort temperature will cause total recalculation and return a new airflow and air change per hour rate.

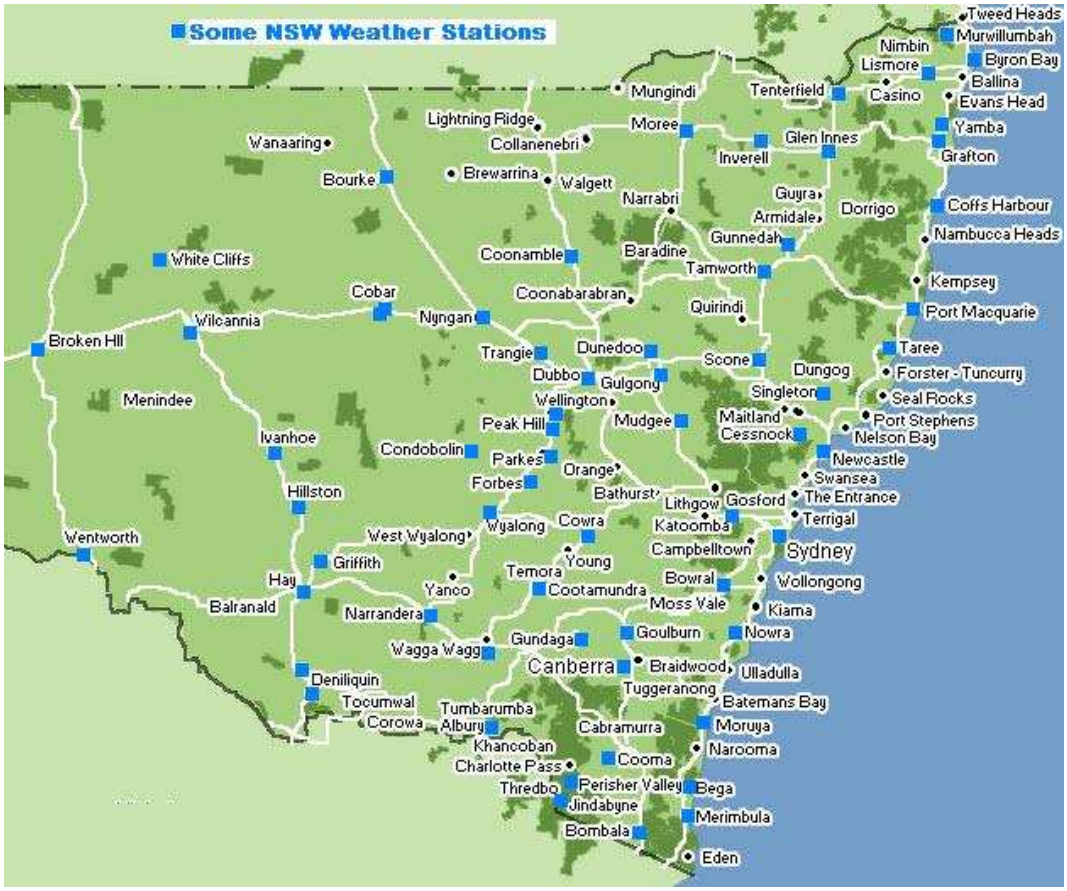
LOCATION MAPS

A.C.T.

1 CANBERRA AMO
2 CANBERRA CITY
3 CANBERRA FORESTRY
4 HONEYSUCKLE REEK
5 ORRORAL VALLEY
6 MANUAL ENTRY

NEW SOUTH WALES

8 ADELONG P.O.
9 ALBURY (PUMPING)
10 ALBURY (GRAMMAR)
11 ALBURY (HUME RES)
12 ALBURY AIRPORT
13 ARMIDALE
14 BANKSTOWN AMO
15 BARRABA P.O.
16 BATHURST
17 BATHURST GAOL
18 BEGA COMPOSITE
19 BELLINGEN
20 BOMBALA COMPOSITE
21 BOURKE P.O.
22 BOWRAL
23 BROKEN HILL AERO*
24 CAMDEN AIRPORT
25 CAMPBELLTOWN*
26 CAPE BYRON
27 CESSNOCK
28 COBAR MO
29 COBAR P.O.
30 COFFS HARBOUR MO
31 CONDOBOLIN P.O.*
32 COOMA
33 COONABARABRAN
34 COONAMBLE P.O.*
35 COOTAMUNDRA P.O.
36 COROWA
37 COWRA P.O.
38 COWRA AIRPORT
39 DEEPWATER P.O.*
40 DENILIQUIN
41 DENILIQUIN P.O.
42 DUBBO
43 DUNEDOO P.O.
44 FORBES*
45 FROGMORE
46 GLEN INNES
47 GOULBURN
48 GRAFTON
49 GREEN CAPE
50 GRENFELL
51 GRIFFITH CSIRO
52 GULGONG P.O.
53 GUNDAGAI
54 GUNNEDAH
55 HARDEN P.O. *
56 HAY P.O.
57 HILLSTON
58 INVERELL P.O.
59 IVANHOE P.O.*
60 JERRYS PLAINS P.O.
61 JERVIS BAY
62 KATOOMBA COMPOSITE
63 KEMPSEY
64 KIANDRA CHALET
65 KIRKCONNELL *
66 KULNURA (WILLIAM RD)
67 LEETON *
68 LISMORE (CENTRE ST)
69 LITHGOW COMPOSITE *
70 LIVERPOOL COUNCIL
71 LOSTOCK DAM SITE
72 LUCAS HEIGHTS (AAEC)
73 LUCAS HEIGHTS (AAEC)
74 MACQUARIE UNIV.
75 MARSFIELD
76 MARSFIELD (MACQUARIE UNIV.)
77 MARYVILLE HVRF
78 MARYVILLE HVRF
79 MERIMBULA AIRPORT
80 MERIMBULA AIRPORT
81 MOLONG P.O.
82 MOLONG P.O.
83 MONTAGUE ISLAND (LIGHTHOUSE)
84 MONTAGUE ISLAND (LIGHTHOUSE)
85 MOREE MO
86 MOREE P.O.
87 MOREE MO
88 MOREE P.O.
89 MORUYA HEADS
90 MORUYA HEADS
91 MOUNT VICTORIA
92 MOUNT VICTORIA
93 MUDGEE P.O.
94 MUDGEE P.O.
95 MURWILLUMBAH
96 MURWILLUMBAH
97 NALBAUGH *
98 NALBAUGH*
99 NARADHAN P.O.
100 NARADHAN P.O.
101 NARRABRI WEST P.O.
102 NARRANDERA
103 NARRANDERA P.O. *
104 NERRIGA COMPOSITE
105 NEWCASTLE
106 NORAH HEAD
107 NOWRA
108 NYNGAN P.O.
109 OBERON PRISON
110 ORANGE P.O.
111 ORANGE AIRPORT
112 ORCHARD HILLS
113 PARRAMATTA NORTH
114 PEAK HILL PO.
115 PERISHER
116 PORT KEMBLA
117 PORT MACQUARIE
118 PROSPECT DAM
119 QUANDIALLA PO.
120 RATHMINES AMO.
121 RICHMOND AMO.
122 SCONE PO.
123 SINGLETON ARMY
124 SMOKY CAPE
125 SYDNEY AIRPORT MO.
126 SYDNEY RO.
127 TABULAM MUIRNE
128 TAMWORTH AIRPORT
129 TARALGA PO.
130 TAREE RADIO STATION
131 TENTERFIELD PO.
132 THREDBO
133 THREDBO VILLAGE
134 TIBOOBURRA PO.
135 TOCUMWAL PO.
136 TULLAMORE PO.
137 TYALGUM COODGEE ST.
138 WAGGA AMO.
139 WALGETT PO.
140 WELLINGTON PO.
141 WENTWORTH FALLS*
142 WENTWORTH P.O.
143 WHITE CLIFFS P.O.
144 WILCANNIA P.O.*
145 WILLIAMTOWN AMO
146 WOLLONGONG
147 WOOLBROOK P.O.*
148 WYALONG P.O.
149 YAMBA STATION)
150 YARRAS
151 YASS COMPOSITE
152 YENDA*
153 MANUAL ENTRY



NORTHERN TERRITORY

155 ALICE SPRINGS AMO
156 ANGURUGU
157 AUVERGNE
158 BARROW CREEK
159 BRUNETTE DOWNS
160 CAPE DON LIGHTSTATION
161 CENTRE ISLAND
162 CURTAIN SPRINGS
163 DALY WATERS AMO
164 DALY WATERS
165 DARWIN AIRPORT
166 ELCHO ISLAND
167 FINKE POST OFFICE
168 GARDEN POINT
169 GOVE AIRPORT*
170 GUNBALUNYA*
171 JERVOIS*
172 KATHERINE
173 LARRIMAH COMPOSITE*
174 MANINGRIDA
175 MILINGIMBI AWS
176 MINJILANG*
177 NEWCASTLE WATERS
178 NHULUNBUY*
179 RABBIT FLAT
180 RINGWOOD
181 ROPER BAR STORE
182 TEMPE DOWNS*
183 TENNANT CREEK MO
184 TENNANT CREEK P.O.
185 WARRUWI
186 WAVE HILL
187 WONARAH
188 YIRRKALA MISSION*
189 YUENDUMU
190 MANUAL ENTRY

QUEENSLAND

191 ADAVALE P.O.
192 AMBERLEY AERO
193 ARCHERFIELD IRPORT*
194 BARALABA P.O.
195 BARCALDINE P.O.
196 BEAUDESERT
197 BIRDSVILLE
198 BLACKALL
199 BLACKALL P.O.*
200 BOLLON P.O.*
201 BOULIA P.O.*
202 BOWEN P.O.
203 BRISBANE AMO
204 BRISBANE R.O.
205 BULBURIN FORESTRY
206 BUNDABERG AERO
207 BUNDABERG P.O.
208 BURKETOWN P.O.*
209 BUSTARD HEAD
210 CAIRNS AMO
211 CALOUNDRA
212 CAMOOWEAL P.O.
213 CAPE CAPRICORN
214 CAPE CLEVELAND
215 CAPE MORETON
216 CARDWELL
217 CHARLEVILLE AMO
218 CHARTERS TOWERS
219 CLERMONT P.O. *
220 CLONCURRY AMO
221 COEN AERO
222 COEN P.O.
223 COLLINSVILLE P.O.
224 COOKTOWN AIRPORT
225 COOLOONGATTA AERO
226 COOLOONGATTA COMP.
227 CROYDON P.O.
228 CUNNAMULLA P.O.
229 DALBY P.O. *
230 DOUBLE ISLAND POINT
231 EMERALD P.O. *
232 FITZROY ISLAND
233 GAYNDAH P.O.
234 GEORGETOWN P.O.
235 GLADSTONE MO
236 GOONDIWINDI P.O.
237 HERBERTON P.O.
238 HERON ISLAND
239 HUGHENDEN
240 INGHAM COMPOSITE
241 INNISFAIL
242 JIMBOOMBA
243 KALPOWAR FORESTRY
244 KARUMBA FLYING BASE
245 KINGAROY P.O.
246 LADY ELLIOT ISLAND
247 LOCKHART RIVER
248 LONGREACH AMO *
249 LONGREACH P.O.
250 LOW ISLES
251 MACKAY MO
252 MARYBOROUGH COMP
253 MILES P.O.*
254 MITCHELL P.O. *
255 MONTO
256 MORETON
257 MOUNT GLORIOUS
258 MOUNT ISA AMO
259 MOUNT ISA MINES
260 MOUNT ISA P.O.
261 MOUNT SURPRISE
262 MOUNT TAMBORINE
263 NORMANTON P.O.
264 NORTH REEF *
265 OAKEY AERO
266 PALMERVILLE
267 PINE ISLET
268 QUILPIE P.O.
269 RICHMOND P.O.
270 ROCKHAMPTON AMO
271 ROMA P.O.
272 SANDY CAPE
273 SOMERSET DAM *
274 SOUTHPORT
275 ST GEORGE P.O.
276 ST LAWRENCE P.O.
277 STANTHORPE P.O.
278 SURAT P.O. *
279 TAMBO P.O.
280 TARMOOM P.O.
281 TEWANTIN P.O.
282 THARGOMINDAH P.O.
283 THURSDAY ISLAND MO
284 TOOWOOMBA
285 TOWNSVILLE AMO
286 TWIN HILLS P.O.
287 URANDANGIE
288 WARWICK
289 WEIPA COMPOSITE
290 WINDORAH P.O.
291 WINTON
292 MANUAL ENTRY

SOUTH AUSTRALIA

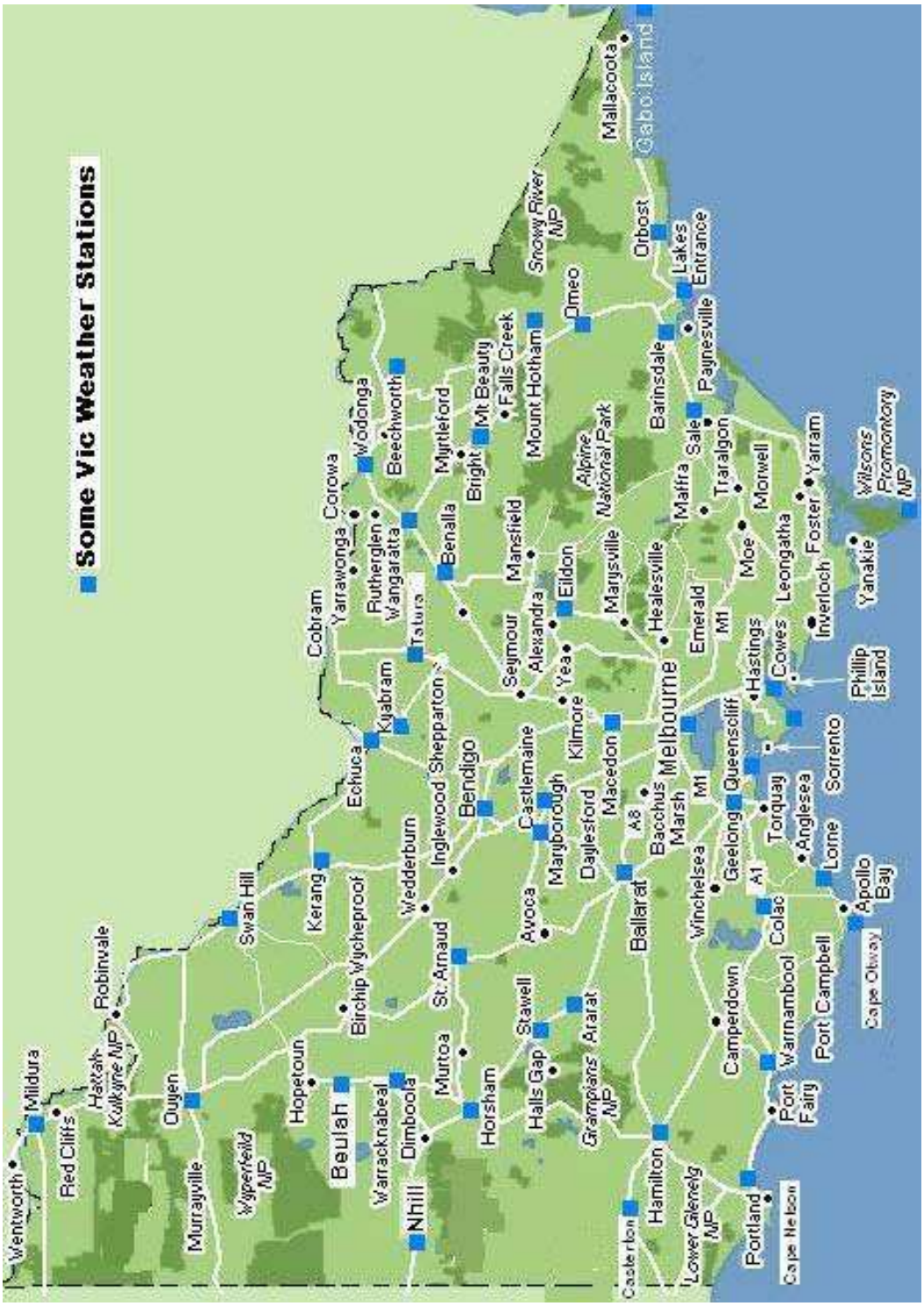
293 ADELAIDE (W TCE)
294 ADELAIDE AIRPORT
295 ADELAIDE R.O.
296 ALTHORPE ISLAND
297 ANDAMOOKA
298 BELAIR (KALYRA)
299 BERRI P.O.
300 CAPE BORDA
301 CAPE NORTHUMBERLAND
302 CAPE WILLOUGHBY
303 CEDUNA AMO
304 CLARE P.O.
305 CLEVE P.O.
306 COOBER PEDY
307 COOK HOSPITAL COMP.*
308 ELLISTON P.O.
309 ERNABELLA*
310 FOWLERS BAY
311 GEORGETOWN P.O.
312 HAWKER P.O.
313 KADINA P.O.
314 KAPUNDA P.O.
315 KEITH P.O.
316 KIMBA P.O.
317 KINGSCOTE P.O.*
318 KYANCUTTA P.O.
319 LAMEROO P.O.
320 LEIGH CREEK AERO
321 LOXTON
322 LUCINDALE P.O.*
323 MAITLAND P.O.
324 MARALINGA
325 MARREE*
326 MINNIPA*
327 MOOMBA
328 MT BARKER P.O.
329 MT GAMBIER AERO AMO
330 MURRAY BRIDGE P.O.
331 NARCOORTE P.O.*
332 NEPTUNE ISLAND*
333 NONNING
334 NURIOOTPA V-CULTURAL
335 OODNADATTA AMO
336 PARNDANA EAST
337 PENFIELD*
338 POLDA BASIN
339 PORT AUGUSTA P.O.
340 PORT AUGUSTA PO
341 PORT LINCOLN P.O.
342 PORT PIRIE BHAS SITE
343 RENMARK P.O.
344 ROBE P.O.*
345 ROSEWORTHY
346 SNOWTOWN P.O.*
347 STIRLING
348 STIRLING P.O.
349 STRATHALBYN P.O.*
350 STREAKY BAY P.O.
351 TARCOOLA P.O.
352 TROUBRIDGE SHOAL
353 TURRETFIELD
354 VICTOR HARBOUR P.O.
355 WHYALLA
356 WOOMERA AMO
357 YONGALA P.O.
358 YUNTA
359 MANUAL ENTRY

TASMANIA

360 BICHENO COMPOSITE*
361 BUSHY PARK
362 BUTLERS GORGE
363 CAMBRIDGE AERO AMO
364 CAMPBELL TOWN
365 CAPE BRUNY
366 CAPE SORELL
367 CRESSY RESEARCH
368 DEAL ISLAND*
369 DEVONPORT
370 DEVONPORT EAST
371 EDDYSTONE
372 ERRIBA
373 FLINDERS ISLAND
374 DEVONPORT
375 EDDYSTONE POINT
376 ERRIBA
377 FLINDERS IS. AIRPORT
378 GROVE RESEARCH
379 HASTINGS CHALET*
380 HOBART AIRPORT AMO
381 KING I. (CURRIE P.O.)
382 KINGSTON*
383 LAKE LEAKE CHALET
384 LAUNCESTON (TI TREE)
385 LAUNCESTON (ELPHIN)
386 LAUNCESTON AIRPORT
387 LOW HEAD
388 MAATSUYKER ISLAND
389 MARRAWAH
390 MAYDENA
391 MOUNT WELLINGTON
392 NEW NORFOLK
393 OAKLANDS P.O.*
394 ORFORD P.O.*
395 PALMERS LOOKOUT
396 PALMERSTON
397 PREOLENNA
398 QUEENSTOWN*
399 QUOIBA
400 REDPA
401 RISDON
402 SAVAGE RIVER
403 SCAMANDER (NTH)
404 SCOTTSDALE
405 SCOTTSDALE (KRAFT)
406 SHANNON HEC
407 SMITHTON COMPOSITE
408 ST HELENS P.O.*
409 STANLEY P.O.
410 STRATHGORDON
411 SWANSEA
412 TASMAN
413 WARATAH P.O.
414 WYNYARD*
415 MANUAL ENTRY

VICTORIA

416	ARARAT P.O.
417	ARARAT PRISON
418	BAIRNSDALE COMPOSITE
419	BAIRNSDALE P.O.
420	BALLAN
421	BALLARAT COMPOSITE
422	BEECHWORTH
423	BENALLA*
424	BENDIGO PRISON
425	BEULAH P.O.
426	BLACKWOOD
427	BOGONG
428	BONEGILLA
429	CAPE NELSON
430	CAPE OTWAY
431	CAPE SCHANCK
432	CASTERTON/MCCALLUM
433	CASTLEMAINE PRISON
434	CHARLTON P.O.*
435	COLAC
436	COLAC SHIRE OFFICE
437	CORRYONG
438	DONALD WATER TRUST
439	EAST TARWIN
440	ECHUCA
441	ESSENDON AIRPORT AMO
442	EUROA*
443	GABO ISLAND
444	GEELONG (NORLANE)
445	GELLIBRAND RIVER*
446	HAMILTON COMPOSITE
447	HORSHAM COMPOSITE
448	KERANG P.O.
449	KYABRAM
450	KYNETON
451	LAKE EILDON
452	LAKES ENTRANCE
453	LAVERTON AERO AMO
454	LEMNOS
455	LISMORE P.O.
456	LORNE
457	MACEDON FORESTRY
458	MANGALORE COMPOSITE*
459	MARYBOROUGH
460	MELBOURNE AIRPORT
461	MELBOURNE R.O.
462	MILDURA AIRPORT AMO
463	MOUNT BEAUTY
464	MOUNT DANDENONG
465	MOUNT HOTHAM *
466	NHILL COMPOSITE
467	OLSENS BRIDGE
468	OMEO
469	ORBOST
470	OUYEN PO.
471	POINT HICHS
472	POINT LONSDALE
473	PORTSEA *
474	POWELLTOWN*
475	QUEENS CLIFF*
476	RUBICON SEC
477	SALE EAST RMO
478	SERVICETON
479	SPRING CREEK
480	ST.ARNAUD FORESTRY
481	STAWELL COMPOSITE
482	STONY POINT
483	STRATHBOGIE
484	SWAN HILL PO.
485	TATURA
486	WANALTA
487	WANGARATTA
488	WARRACKNABEAL
489	WARRAGUL
490	WARRAMBINE
491	WARRNAMBOOL
492	WILSONS PROMONTORY
493	WODONGA
494	WON WRON
495	WONTHAGGI
496	WOODS POINT
497	YALLOURN
498	MANUAL ENTRY



WESTERN AUSTRALIA

499 ALBANY ECLIPSE ISLE
500 ALBANY AMO
501 AUGUSTA
502 BENCUBBIN
503 BEVERLEY
504 BRIDGETOWN
505 BROOM AMO
506 BROOM LA GRANGE
507 BROOM CAPE LEVEQUE
508 BULLSBROOK*
509 BUNBURY
510 BUSSELTON CAPE NAT
511 BUSSELTON PO.
512 CARNARVON
513 COLLIE
514 CORRIGIN
515 CUE
516 CUNDERDIN
517 DALWALLINU
518 DERBY PO.
519 DERBY COOLAN ISLAND
520 DERBY COCKATOO ISL
521 DONNYBROOK PO.
522 DWELLINGUP
523 ENEABBA
524 ESPERANCE PO.
525 ESPERANCE M.O.
526 EUCLA
527 FITZROY CROSSING
528 FORREST AMO.
529 GERALDTON
530 GILES
531 GOLDSWORTHY
532 HALLS CREEK AMO.
533 HALLS CREEK
534 HAMELIN POOL
535 HYDEN COMPOSITE
536 JARRAHWOOD
537 JURIEN
538 KALBARRI
539 KALGOORLIE
540 KALUMBURU M PLAT
541 KALUMBURU
542 KARRATHA DAMPIER SALT
543 KATANNING
544 KILLERBERRIN
545 KANUNURRA
546 KURI BAY
547 LAKE GRACE
548 LANCELIN
549 LAVERTON YAMARNA
550 LAVERTON PO.
551 LEARMOUTH
552 LEONORA
553 MANDORA
554 MANDURAH PARK
555 MANJIMUP
556 MARBLE BAR
557 MARDIE
558 MEEKATHARRA
559 MEEKATHARRA PO.
560 MENZIES DIEMALS
561 MENZIES PO.
562 MERRIN SHIRE
563 MOUNT MAGINET
564 MT BARKER
565 MULLEWA
566 NAREMBEEN
567 NEWMAN MUNDIWINDI
568 NEWMAN PO.
569 NORSEMAN
570 NORTHAM MURESK
571 NORTHAM COMPOSITE
572 NYANG STATION
573 ONGERUP
574 ONSLOW AMO.
575 ONSLOW PO.
576 PEMBERTON
577 PERTH AIRPORT
578 PRETH REGION OFFICE
579 PINGELLY
580 PORT HEADLAND
581 PORT HEADLAND AMO
582 RAVENSTHORPE
583 RAWLINNA
584 REOBOURNE
585 ROTTNEST
586 SANDSTONE CASHMERE
587 SANDSTONE YEELIRRIE
588 SERPENTINE
589 SHARK BAY
590 SOUTHERN CROSS
591 THREE RIVERS
592 TROUGHTON ISLAND
593 WAGIN
594 WANDERING SHIRE
595 WILUNA
596 WITTENOOM
597 WONGAN HILLS
598 WYNDHAM
599 YALGOO PO.
600 YALGOO MURGOO
601 YORK
602 MANUAL ENTRY
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A HISTORY OF THE AREMA LOAD ESTIMATION PROGRAMS

The Members of the Unitary Section of AREMA, chaired by Ian Frith (Dunn Airconditioning) proposed that there was a need for a simple calculation procedure for estimating the Air Conditioning requirements of Residential Buildings. This was in 1978.
A small committee headed by Denis Joseph (Lennox IXL P/L) and Mike Wooldridge and Don Pescod (Building Research Division - CSIRO) was formed to consider the project and prepare recommendations. This became known as RESLOAD.
Supporting AREMA Members included CARRIER, CLARKE-DAIKIN, CROCKFORD & ROBERTSON, DUNN(Airtemp), EMAIL, LENNOX, LUKE AND POPE.

The CSIRO produced load factors that could be used and the results from applying these were compared with those that some participants found from using their own procedures. If 1.0 was the Load from using the proposed method, variations were between 0.56 and 1.17.
CSIRO had compared the results from their suggested program with their rigorous TEMPER program and found the proposed values acceptable. Models were run under a wide variation of Climate - Darwin to Melbourne and Perth to Brisbane for instance.
RESLOAD was accepted by the SECV and the AGL and was included in a booklet produced by AREMA, AIRAH and the Heating & Cooling Industry as an aid to the buying public.

The AREMA Unitary Section under the Chairmanship of Rob. Dunn, then voted for the creation of an Australian orientated Load Estimation procedure for Light Commercial Buildings, following on the general acceptance of that created for Australian Residences. (RESLOAD)
The values and procedures are those referred to as COMLOAD1 in the programs created by HVAC Innovations of Glen Iris.
The Instruction sheet stated that " The Solar Heat Gains are the maximum occuring between the months of December to March at 35 South Latitude." This limitation was accepted as most installations were within these limits, give or take a few degrees of Latitude.
A number of AREMA Unitary Section Members adopted this procedure and distributed Survey sheets in pad form under their Banner with acknowledgements to AREMA and the CSIRO.
As the AC business expanded North, AREMA decided to make COMLOAD1 more relevant to these lower latitudes and to also take advantage of Solar Research done by John Spencer of the CSIRO. This revised procedure is COMLOAD2. Denis Joseph was commissioned to undertake these revisions.
Revised Solar Gains were proposed 1992 and agreed to by John Spencer. Latitude dependant tables were calculated, using ASHRAE algorithms and based upon the CSIRO Solar Gain Data printed in the AIRAH 1989 Handbook.
Opportunity was taken at this time to take into account varying "delay" factors due to the percentage of Glazing to Total Wall Areas as the use of greater Glass ratios was becoming popular. Simply put, the greater the degree of Glass, the quicker the response. Variations were based upon ASHRAE Research Report 548 and transmissions factors, as in the ASHRAE Fundamentals Handbook of that time. The principles of change were discussed with Mike Wooldridge.
Improvements included variable factors for haze created by moisture laden atmospheres, in line with the research by Rao and Seshadri (Building Research Institute- India). The variation of Dew Point with altitude was discussed with the Bureau of Meteorology. This resulted in calculating the Clearness Numbers for various Climates in accordance with the ASHRAE recommendations.

At least two Major Suppliers of Packaged AC Equipment have adopted COMLOAD2 as the basis of their own Load Estimation programs for use by Designer / Contractors.

Subsequent developments
In 2002 Bern Connell HVAC Innovations Consulting and Software applied Resistance tables from "FIRST RATE" house energy rating software manual to provide homogeneous data with both programs.

2004 THE MASTER PLUMBING ASSOCIATION, PLUMBING INDUSTRY COORPORATION, AND AUSTRALIAN STANDARDS ASSOCIATION INCLUDED RESLOAD METHODS IN THE AUSTRALIAN STANDARD DOCUMENT HB276--2004