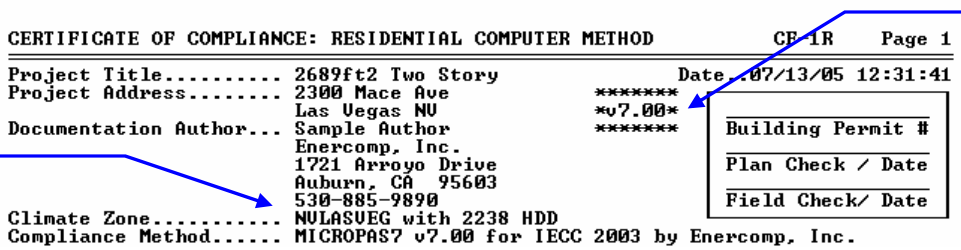
# MICROPAS

## MICROPAS7 IECC Version
## Highlights of what to look for on the C-1R Printout



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CERTIFICATE OF COMPLIANCE: RESIDENTIAL COMPUTER METHOD          CF-1R    Page 1

Project Title..... 2689ft2 Two Story                    Date..07/13/05 12:31:41
Project Address..... 2300 Mace Ave                      *******
                     Las Vegas NV                       *v7.00*
Documentation Author... Sample Author                   *******
                     Enercomp, Inc.                     ___________________
                     1721 Arroyo Drive                  Building Permit #
                     Auburn, CA  95603                  ___________________
                     530-885-9890                       Plan Check / Date
Climate Zone..... NVLASVEG with 2238 HDD                ___________________
Compliance Method..... MICROPAS7 v7.00 for IECC 2003 by Enercomp, Inc.  Field Check/ Date
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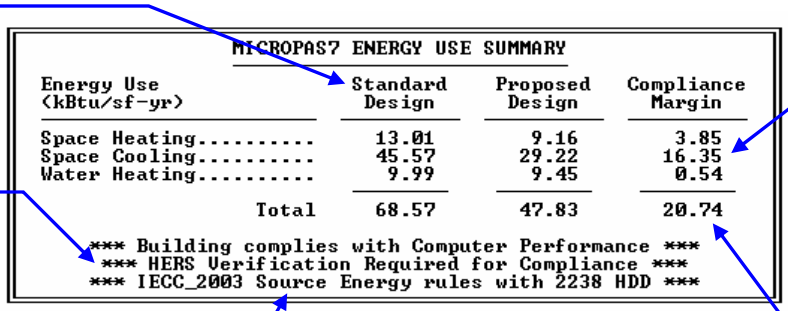
Version should be v7.00

Check to make sure in right location with the right number of heating degree days (HDD)

Specifies what standards are calculated. Should be IECC 2003



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                    MICROPAS7 ENERGY USE SUMMARY

Energy Use          Standard    Proposed    Compliance
(kBtu/sf-yr)        Design      Design      Margin
-------------------------------------------------------
Space Heating.....    13.01       9.16        3.85
Space Cooling.....    45.57      29.22       16.35
Water Heating.....     9.99       9.45        0.54
                    -------     -------     -------
                Total 68.57      47.83       20.74

*** Building complies with Computer Performance ***
*** HERS Verification Required for Compliance ***
*** IECC_2003 Source Energy rules with 2238 HDD ***
```

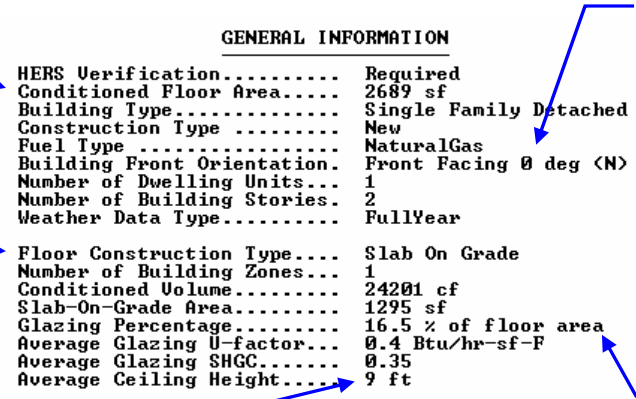
Building complies of proposed design is less than or equal to standard design

It's OK for individual margins to be less than zero—only the total has to be zero or greater

This message displayed if verified duct sealing or building air leakage is specified

Margin should be zero or greater to comply

Must be 'Source' (not Site) for Southern Nevada amendments



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                    GENERAL INFORMATION

HERS Verification.....  Required
Conditioned Floor Area.....  2689 sf
Building Type.....  Single Family Detached
Construction Type .....  New
Fuel Type .....  NaturalGas
Building Front Orientation.  Front Facing 0 deg (N)
Number of Dwelling Units...  1
Number of Building Stories.  2
Weather Data Type.....  FullYear

Floor Construction Type....  Slab On Grade
Number of Building Zones...  1
Conditioned Volume.....  24201 cf
Slab-On-Grade Area.....  1295 sf
Glazing Percentage.....  16.5 % of floor area
Average Glazing U-factor...  0.4 Btu/hr-sf-F
Average Glazing SHGC.....  0.35
Average Ceiling Height.....  9 ft
```

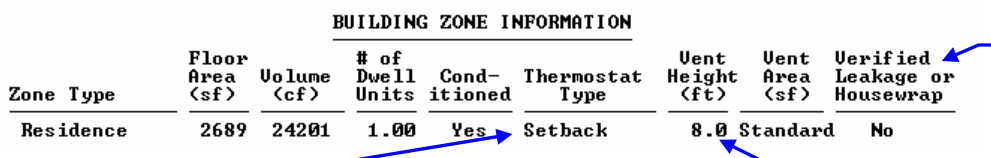
Where the front door faces. For subdivisions, Micropas does a "Cardinal" run where it runs North, East, South and West to show that it complies on all orientations under

Conditioned floor area should be compared to the plans

Identified as Slab-on-Grade when more than 50% of floor area is slab

Check to see that the average makes sense by looking at plans to determine typical ceiling heights

Glazing percentage is one of the biggest factors in determining compliance. Total window area from the plans should be compared with this percentage.



BUILDING ZONE INFORMATION

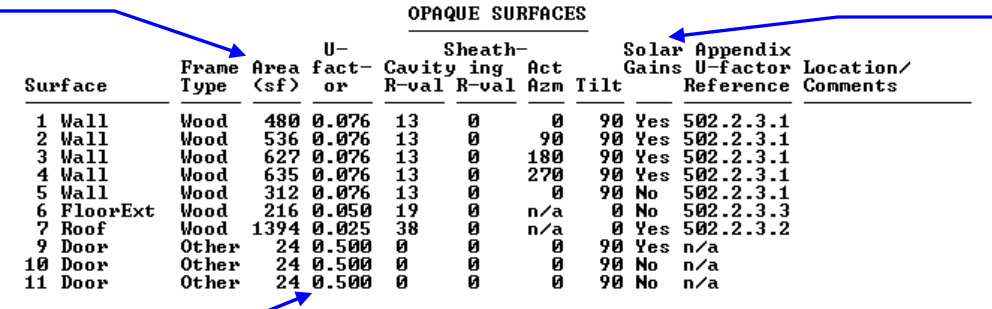
| Zone Type | Floor Area (sf) | Volume (cf) | # of Dwell Units | Cond-itioned | Thermostat Type | Vent Height (ft) | Vent Area (sf) | Verified Leakage or Housewrap |
|---|---|---|---|---|---|---|---|---|
| Residence | 2689 | 24201 | 1.00 | Yes | Setback | 8.0 | Standard | No |

Triggers HERS verification if used

Usually setback except when zonal control credit is taken

Should be 2 ft for 1 story dwelling and 8 ft for 2 or more

Gross areas after windows and doors de-ducted



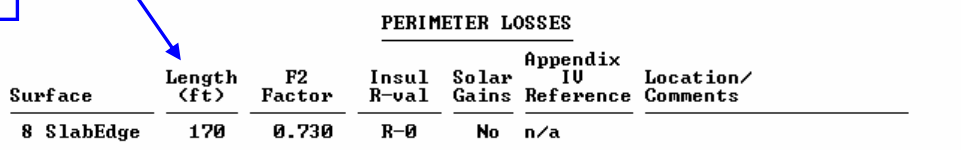
OPAQUE SURFACES

| Surface | Frame Type | Area (sf) | U-fact-or | Sheath-ing R-val | Cavity R-val | Act Azm | Tilt | Solar Gains | Appendix U-factor Reference | Location/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Wall | Wood | 480 | 0.076 | 13 | 0 | 0 | 90 | Yes | 502.2.3.1 | |
| 2 Wall | Wood | 536 | 0.076 | 13 | 0 | 90 | 90 | Yes | 502.2.3.1 | |
| 3 Wall | Wood | 627 | 0.076 | 13 | 0 | 180 | 90 | Yes | 502.2.3.1 | |
| 4 Wall | Wood | 635 | 0.076 | 13 | 0 | 270 | 90 | Yes | 502.2.3.1 | |
| 5 Wall | Wood | 312 | 0.076 | 13 | 0 | 0 | 90 | No | 502.2.3.1 | |
| 6 FloorExt | Wood | 216 | 0.050 | 19 | 0 | n/a | 0 | No | 502.2.3.3 | |
| 7 Roof | Wood | 1394 | 0.025 | 38 | 0 | n/a | 0 | Yes | 502.2.3.2 | |
| 9 Door | Other | 24 | 0.500 | 0 | 0 | 0 | 90 | Yes | n/a | |
| 10 Door | Other | 24 | 0.500 | 0 | 0 | 0 | 90 | No | n/a | |
| 11 Door | Other | 24 | 0.500 | 0 | 0 | 0 | 90 | No | n/a | |

Yes unless surface is fully shaded like for garage walls. Roofs over attics should be yes also.

U-values from appendix of 2003 IECC

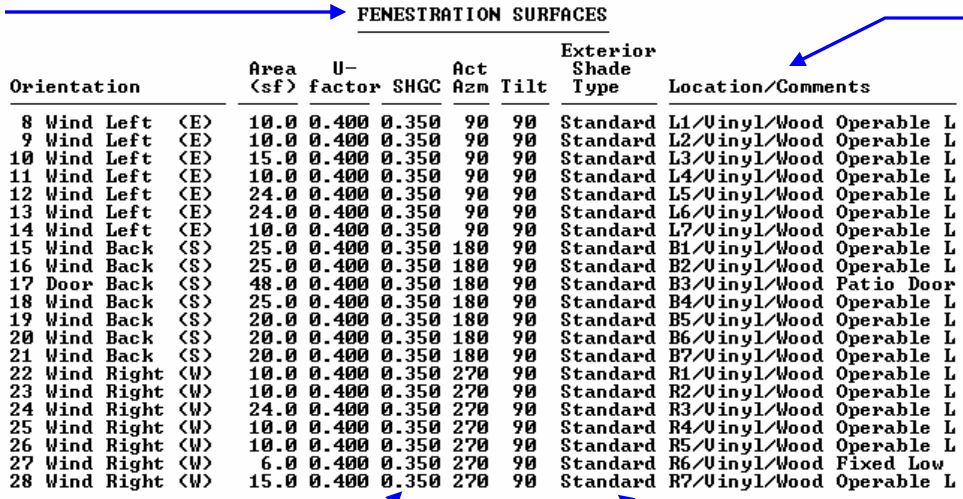
Note perimeter length not area



PERIMETER LOSSES

| Surface | Length (ft) | F2 Factor | Insul R-val | Solar Gains | Appendix IV Reference | Location/ Comments |
|---|---|---|---|---|---|---|
| 8 SlabEdge | 170 | 0.730 | R-0 | No | n/a | |

Glazing area, orientation and performance ratings are critical to compliance. Every job should have a least a few of the windows compared between the plans and the Micropas run to ensure accu-



FENESTRATION SURFACES

| Orientation | Area (sf) | U-factor | SHGC | Act Azm | Tilt | Exterior Shade Type | Location/Comments |
|---|---|---|---|---|---|---|---|
| 8 Wind Left (E) | 10.0 | 0.400 | 0.350 | 90 | 90 | Standard | L1/Vinyl/Wood Operable L |
| 9 Wind Left (E) | 10.0 | 0.400 | 0.350 | 90 | 90 | Standard | L2/Vinyl/Wood Operable L |
| 10 Wind Left (E) | 15.0 | 0.400 | 0.350 | 90 | 90 | Standard | L3/Vinyl/Wood Operable L |
| 11 Wind Left (E) | 10.0 | 0.400 | 0.350 | 90 | 90 | Standard | L4/Vinyl/Wood Operable L |
| 12 Wind Left (E) | 24.0 | 0.400 | 0.350 | 90 | 90 | Standard | L5/Vinyl/Wood Operable L |
| 13 Wind Left (E) | 24.0 | 0.400 | 0.350 | 90 | 90 | Standard | L6/Vinyl/Wood Operable L |
| 14 Wind Left (E) | 10.0 | 0.400 | 0.350 | 90 | 90 | Standard | L7/Vinyl/Wood Operable L |
| 15 Wind Back (S) | 25.0 | 0.400 | 0.350 | 180 | 90 | Standard | B1/Vinyl/Wood Operable L |
| 16 Wind Back (S) | 25.0 | 0.400 | 0.350 | 180 | 90 | Standard | B2/Vinyl/Wood Operable L |
| 17 Door Back (S) | 48.0 | 0.400 | 0.350 | 180 | 90 | Standard | B3/Vinyl/Wood Patio Door |
| 18 Wind Back (S) | 25.0 | 0.400 | 0.350 | 180 | 90 | Standard | B4/Vinyl/Wood Operable L |
| 19 Wind Back (S) | 20.0 | 0.400 | 0.350 | 180 | 90 | Standard | B5/Vinyl/Wood Operable L |
| 20 Wind Back (S) | 20.0 | 0.400 | 0.350 | 180 | 90 | Standard | B6/Vinyl/Wood Operable L |
| 21 Wind Back (S) | 20.0 | 0.400 | 0.350 | 180 | 90 | Standard | B7/Vinyl/Wood Operable L |
| 22 Wind Right (W) | 10.0 | 0.400 | 0.350 | 270 | 90 | Standard | R1/Vinyl/Wood Operable L |
| 23 Wind Right (W) | 10.0 | 0.400 | 0.350 | 270 | 90 | Standard | R2/Vinyl/Wood Operable L |
| 24 Wind Right (W) | 24.0 | 0.400 | 0.350 | 270 | 90 | Standard | R3/Vinyl/Wood Operable L |
| 25 Wind Right (W) | 10.0 | 0.400 | 0.350 | 270 | 90 | Standard | R4/Vinyl/Wood Operable L |
| 26 Wind Right (W) | 10.0 | 0.400 | 0.350 | 270 | 90 | Standard | R5/Vinyl/Wood Operable L |
| 27 Wind Right (W) | 6.0 | 0.400 | 0.350 | 270 | 90 | Standard | R6/Vinyl/Wood Fixed Low |
| 28 Wind Right (W) | 15.0 | 0.400 | 0.350 | 270 | 90 | Standard | R7/Vinyl/Wood Operable L |

User can use this field to match names on window schedule when available

Windows must be labeled with either NFRC or default values. Field check should always include verifying labels

Unless a product like shade screen is specified, this should be 'Standard'. Micropas always uses a standard drape for compliance

These surface numbers match the fenestration surface number. If a window isn't listed, it does not have an overhang modeled

**OVERHANGS**

| Surface | Area (sf) | Window Width | Window Height | Overhang Depth | Overhang Height | Overhang Left Extension | Overhang Right Extension |
|---|---|---|---|---|---|---|---|
| 1 Window | 6.0 | n/a | 7 | 5 | 1 | n/a | n/a |
| 2 Window | 6.0 | n/a | 7 | 5 | 1 | n/a | n/a |
| 4 Window | 6.0 | n/a | 3 | 1 | 1 | n/a | n/a |
| 5 Window | 6.0 | n/a | 3 | 1 | 1 | n/a | n/a |
| 6 Window | 6.0 | n/a | 3 | 1 | 1 | n/a | n/a |
| 13 Window | 24.0 | n/a | 8 | 1 | 1 | n/a | n/a |
| 14 Window | 10.0 | n/a | 8 | 1 | 1 | n/a | n/a |
| 19 Window | 20.0 | n/a | 5 | 1 | 1 | n/a | n/a |
| 20 Window | 20.0 | n/a | 5 | 1 | 1 | n/a | n/a |
| 21 Window | 20.0 | n/a | 5 | 1 | 1 | n/a | n/a |

Micropas can also model fins. Fins are parts of a building that project out like a garage that can provide some shading. Not required to be modeled and infrequently used

Most compliance jobs only model simple overhangs where only the window height, overhang depth and overhang height is needed.

Except when there is unusual amounts of exposed slab such as all tile floors, most compliance jobs will have only a single slab surface and no other mass

**SLAB SURFACES**

| Slab Type | Area (sf) |
|---|---|
| Standard Slab | 1295 |

**HVAC SYSTEMS**

| System Type | Number of Systems | Minimum Efficiency | EER | Verified Refrig Charge or TXV | Verified Adequate Airflow | Verified Fan Watt Draw | Maximum Cooling Capacity |
|---|---|---|---|---|---|---|---|
| Furnace | 1 | 0.800 AFUE | n/a | n/a | n/a | n/a | n/a |
| ACSplit | 1 | 13.00 SEER | No | No | No | No | No |

13 SEER is the federal minimum allowed to be manufactured for use in United Statesbeginning January 23, 2006. This will be a large compliance credit.

These credits not specifically recognized by 2003 IECC. Micropas does not allow them for compliance.

Special above code N-HERS (Nevada-HERS) version does allow these credits.

Micropas calculates loads in accordance with ASHRAE 2001 Handbook Chapter 28

**HVAC SIZING**

| System Type | Total Heating Load (Btu/hr) | Sensible Cooling Load (Btu/hr) | Design Cooling Capacity (Btu/hr) | Verified Maximum Cooling Capacity (Btu/hr) |
|---|---|---|---|---|
| Furnace | 45487 | n/a | n/a | n/a |
| ACSplit | n/a | 37042 | 45265 | n/a |

Sizing Location..... LAS VEGAS
Winter Outside Design..... 27 F
Winter Inside Design..... 70 F
Summer Outside Design..... 106 F
Summer Inside Design..... 75 F
Summer Range..... 25 F

Loads are calculated by zone and provide some guidance on the total size needed to meet the loads in the home

Loads are only one of the criteria affecting the selection of equipment. Other relevant design factors must be considered by the HVAC system designer

**DUCT SYSTEMS**

| System Type | Duct Location | Duct R-value | Verified Duct Leakage | Verified Surface Area | Verified Buried Ducts |
|---|---|---|---|---|---|
| Furnace | Attic | R-6 | Yes | No | No |
| ACSplit | Attic | R-6 | Yes | No | No |

Only verified duct leakage is specifically recognized by 2003 IECC. Micropas does not allow the others for compliance.

Typical values for a storage type water heater. This section expands when more complicated systems like hydronic space heating systems area specified

WATER HEATING SYSTEMS

| Tank Type | Heater Type | Distribution Type | Number in System | Energy Factor | Tank Size (gal) | External Insulation R-value |
|---|---|---|---|---|---|---|
| 1 Storage | Gas | Standard | 1 | 0.60 | 50 | R- n/a |

This section is displayed anytime there is a feature specified in the calculations that is not a typical construction practice.

SPECIAL FEATURES AND MODELING ASSUMPTIONS

*** Items in this section should be documented on the plans, ***
*** installed to manufacturer specifications, and verified ***
*** during plan check and field inspection. ***

This building incorporates HERS verified Duct Leakage.

Separate messages are printed for each special feature

If a HERS feature is specified, the field check should include review of the verification diagnostic test

This section is printed anytime there is a feature specified that requires verification.

HERS REQUIRED VERIFICATION

*** Items in this section require field testing and/or ***
*** verification by a certified home energy rater under the ***
*** supervision of an approved HERS provider using approved ***
*** testing and/or verification methods. ***

This building incorporates HERS verified Duct Leakage. Target leakage is calculated as 6% of fan flow. If the measured CFM25 is above the target, then corrective action must be taken to reduce the duct leakage and then must be retested. Alternatively, the compliance calculations could be redone without duct testing. If ducts are not installed, then HERS verification is not necessary.

Separate messages are printed for each HERS verification feature