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TEST RESIDENCE NUMBER 1

JUNE 1979

AN ENERGY EVALUATION  
OF THE SUN TWIN HEATING  
UNITS IN A RESIDENTIAL  
ENVIRONMENT

FOR: SUN TWIN CORPORATION

JOHN P. JONES, SR.

PRESIDENT

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## INTRODUCTION

The following analysis is presented to document the performance of the Sun Twin heating unit. A comparative analysis between an electric furnace and the Sun Twin heating unit is obtained through analysis of actual data collected from available sources.

Three engineering techniques are used in calculating the actual and theoretical loads to substantiate the validity of the comparative energy analysis data.

The data presented is based on the assumption that the residence before and after the installation was maintained at a uniform 70°F db temperature and that there was no change in the Owner's usage or occupancy style during that period. These assumptions are not verifiable since no actual temperature log or activity log was kept for comparative purposes. The Engineer's data presented is consistent with the above assumption.

SUMMARY RESULTS OF THE  
SUN TWIN INFRARED HEATER STUDY

The Sun Twin infrared heaters were tested in eight rural electric homes. Four of these homes had a five-year history with resistant baseboard heat using zone controls. The homes were located in degree day areas ranging from 7,000 to 10,000 degree days. Two test homes had an electric forced air furnace and one utilized a propane hot water system. Zone control baseboard heat has been claimed by the electrical industry as being one of the most efficient forms of non-storage electric heat systems on the market. Whole house forced air heating systems maintain a constant temperature in the house with less individual room control. Test house number 2, in the Mor-Gran-Sou service area, vividly points this out; when compared to the forced air electric furnace, Sun Twin heaters were 35% more efficient. When compared to electric baseboard heat. Sun Twin heaters were only 16% more efficient.

The Sun Twin heaters worked well until the temperatures dropped to -10° and lower. When wind chill factors hit -60° to -70° the existing heating systems needed to be turned on in order to maintain a comfort level in the home. This usually happened in the late evenings. In North Dakota there were approximately 62 days when the temperature remained below 0°.

**The Sun Twin heaters were 16% more efficient than electric baseboard, 35% more efficient than forced air electric furnaces and 56% more efficient than the propane hot water furnace.**

The method of testing the infrared heater was as follows: a five-year kilowatt hour/degree day history was collected on five homes in the rural electric service area. The homes chosen were owned by people who had not changed their living habits to any substantial degree.

In addition to the efficiency factors, the homeowners made these comments on the Sun Twin systems:

1. The portability of the unit was an advantage in that it could be moved from location to location.
2. The units could be plugged into a 115 volt 20 amp circuit. Each draws 12.5 amps.
3. A comfortable humidity level was maintained.
4. There was an even distribution of heat. In the test homes there was no more than a five degree differential between the ceiling and the floor.
5. The comfort level was satisfactory.
6. The homeowners liked the way the units looked.
7. The heaters were effective as an add-on room heating system.
8. Users liked to lie in front of the heater, and one homeowner put bread on top of the heater because it helped the bread rise evenly.

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## TEST REPORT of August 26 and 27, 1977

This report covers data recorded from operating four (4) different types of heating equipment. Each unit was operated individually to heat a room area of 503 sq. ft. and volume of 5,077 cu. ft. for a 30 minute period.

The test procedure on each unit was to pre-cool the room and to start the heater in operation at a room temperature of approximately 50° F. The heater was then operated at full capacity for 30 minutes, during which time General Electric Company took thermo-vision photographs and the temperature recorder was activated to record seventeen (17) sensing points.

The temperature sensing points were at 3 different elevations.

Points 1, 3, 7, 10, 12, and 15 were located one (1') ft. above the floor.

Points 2, 5, 8, 13, and 16 were located four (4') ft. above the floor

Points 3, 6, 9, 11, 14, and 17 were located eight (8') above the floor.

The thermo-vision photographs and recordings were taken and recorded at the time the heater was turned on, fifteen (15) minutes later, and thirty (30) minutes later which was the end of the tests. With the results indicated by the outline below:

### TEST #C - Gas Fired Wall Furnace, 29,000 BTU Input:

PHOTO	TIME	<u>TEMPERATURE SPREAD - 3 ELEVATIONS</u>
C-1	0 min.	50° to 52° F.
C-2	15 min.	56° to 73° F.
C-3	30 min.	67° to 85° F.

### TEST #D - Electric Forced Air Heater - 1650 Watts:

PHOTO	TIME	<u>TEMPERATURE SPREAD - 3 ELEVATIONS</u>
D-1	0 Min.	49° to 51° F.
D-2	15 min.	57° to 64° F.
D-3	30 min.	63° to 70° F.

### TEST #E - Baseboard Electric - 1500 Watts:

PHOTO	TIME	<u>TEMPERATURE SPREAD - 3 ELEVATIONS</u>
E-1	0 min.	49° to 51° F.
E-2	15 min.	55° to 62° F.
E-3	30 min.	60° to 67° F.

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TEST #F - Alpha I (Sun Twin STC-1500) Infrared Forced Air, 1640 Watts:

PHOTO	TIME	<u>TEMPERATURE SPREAD - 3 ELEVATIONS</u>
F-1	0 min.	49° to 53° F
F-2	15 min.	60° to 62° F.
F-3	30 min.	65° to 67° F.

We are scheduling additional tests in search of an explanation for the smaller temperature difference from floor to ceiling with the Alpha I Heater (Sun Twin STC-1500), as compared to the temperature of the three other heaters.

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