



# **SUPERIOR PRODUCTS INTERNATIONAL II, INC.**

## **ATR TRANSPORTATION - BUSES IN FORLI, ITALY**

### **Testing of Super Therm<sup>®</sup>**

**Statuto Service S.r.l., Milan, Italy**

#### **ANALYSIS OF RESULTS**

Super Therm<sup>®</sup> applied on the roof of the bus significantly decreased the internal temperature of the bus, even when the doors of the bus were left open and despite the number and size of the windows.

Super Therm<sup>®</sup> improved the efficiency of the air conditioning system resulting in significant savings in time and energy in lowering the internal temperature of the bus to acceptable temperature levels (starting from a parked bus with the engine off).

The heat radiated from the ceiling of the coated bus was reduced by 13%. When considering the perception of temperature by the passengers, internal air temperature and seat surface temperature are not the only factors to take into account. Infrared heat radiated from the ceiling is important as well.

The lower temperature of the ceiling of the coated bus decreased the heat absorbed by the flow of cold air traveling inside the A/C ducts from the rear to the front of the bus. This resulted in lower and more uniform temperature within the bus.

From the measurements on day two, the uncoated vehicle required 20 minutes of engine running and air conditioning working at full power just to achieve the same internal air temperature of the coated bus with closed doors and no air conditioning.

#### **ECONOMIC AND OPERATIONAL CONSIDERATIONS**

Super Therm<sup>®</sup> can be applied by any reputable paint shop where standard painting work is performed.

Super Therm<sup>®</sup> will reduce fuel consumption by decreasing the wait time of the bus (with engine running) to reach acceptable internal temperatures before entering into service.

Super Therm<sup>®</sup> will reduce energy consumption and extend the life of the air conditioning system by providing the same level of comfort with the air conditioning system running at a lower regime.

Super Therm<sup>®</sup> will improve the comfort level of the bus during summer months resulting in more satisfied customers.

Super Therm<sup>®</sup> will also have a beneficial effect (even though not as evident) during winter months, as the conductive thermal resistance of the coating will reduce heat losses through the roof and decrease the heat radiated from the human body to the ceiling.



*Foto 1 - 2*  
*Applicazione Super Therm ed Enamo Grip sul tetto di un autobus.*

[www.advacote.com](http://www.advacote.com)

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*Foto 3 – 4*  
*Autobus (trattati e non) disposti nel piazzale per la rilevazione della temperatura interna.*

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**TABELLA 1 – SUMMARY OF WEATHER CONDITIONS**

DAY	TEST TIME	AIR TEMPERATURE	WEATHER CONDITIONS
1	4:00 PM	29.0 °C	Partly cloudy
2	2:30 PM	29.2 °C	Clear sky

**TABELLA 2 – MEASURED TEMPERATURES – ENGINE OFF – DAY ONE**

VEHICLE NUMBER	ROOF TEMP.	CEILING TEMP.	SEAT TEMP.	INTERNAL AIR TEMP.	COMMENTS
758	NR	38.3 °C	33.8 °C	32.5 °C	All doors open
000 (ST)	NR	33.5 °C	32.2 °C	31.5 °C	All doors open
763	43.0	39.7 °C	38.2 °C	35.5 °C	All doors closed
732 (ST)	30.0	34.0 °C	35.0 °C	34.5 °C	All doors closed

**TABELLA 3 – MEASURED TEMPERATURES – ENGINE OFF – DAY TWO**

VEHICLE NUMBER	ROOF TEMP.	CEILING TEMP.	SEAT TEMP.	INTERNAL AIR TEMP.	COMMENTS
763	54.0	45.5 °C	41.3 °C	39.5 °C	All doors closed
732 (ST)	34.0	35.7 °C	36.2 °C	34.6 °C	All doors closed

NR = not recorded

ST = coated with SUPER THERM

**TABELLA 4 – MEASURED TEMPERATURES – ENGINE AND A/C RUNNING – DAY ONE**

VEHICLE NUMBER	A/C TEMP. AT REAR OUTLETS AT TIME 0	A/C TEMP. AT FRONT OUTLETS AT TIME 0	INTERNAL AIR TEMP. AFTER 20 MINUTES WITH A/C RUNNING	A/C TEMP. AT REAR OUTLETS AFTER 20 MINUTES	A/C TEMP. AT FRONT OUTLETS AFTER 20 MINUTES
763	NR	NR	33.0 °C	19.5 °C	26.5 °C
732 (ST)	NR	NR	28.5 °C	18.0 °C	21.5 °C

**TABELLA 5 – MEASURED TEMPERATURES – ENGINE AND A/C RUNNING – DAY TWO**

VEHICLE NUMBER	A/C TEMP. AT REAR OUTLETS AT TIME 0	A/C TEMP. AT FRONT OUTLETS AT TIME 0	INTERNAL AIR TEMP. AFTER 20 MINUTES WITH A/C RUNNING	A/C TEMP. AT REAR OUTLETS AFTER 20 MINUTES	A/C TEMP. AT FRONT OUTLETS AFTER 20 MINUTES
763	39.5 °C	41.0 °C	34.6 °C	24.0 °C	27.5 °C
732 (ST)	35.0 °C	35.5 °C	32.4 °C	20.0 °C	23.5 °C

NR = not recorded

ST = coated with SUPER THERM

**TABELLA 6 – COMPARISON BETWEEN VEHICLES 763 AND 732 (ST)**

DESCRIPTION	VALUES IN °C	
	DAY 1	DAY 2
DIFFERENCE BETWEEN ROOF TEMPERATURES	13.0	20.0
DIFFERENCE BETWEEN CEILING TEMPERATURES	5.7	9.8
DIFFERENCE BETWEEN SEAT SURFACE TEMPERATURES	3.2	5.1
DIFFERENCE BETWEEN INTERNAL AIR TEMP. AT TIME 0	1.0	4.9
DIFFERENCE BETWEEN AVERAGE A/C TEMP. AT OUTLETS AFTER ONE MINUTE	NR	5.0
DIFFERENCE BETWEEN AVERAGE A/C TEMP. AT OUTLETS AFTER 20 MINUTES	3.3	4.0

NR = not recorded

ST = coated with SUPER THERM