

## CLASS 142 THERCO ALUMINIUM RADIATOR TRIAL

On Tuesday 22nd May vehicle 55707 of unit 142057 was fitted with a trial aluminium radiator supplied by Therco. The radiator has been designed to be a direct replacement of the original radiator retaining the original vehicle interfaces.

### Performance testing of the original radiator

The original radiator was visually examined prior testing and was generally clean with slight contamination present in the radiator fins in the corners of the matrix. The overhaul label on the radiator indicated that the radiator had been fitted to the vehicle for less than 6 months. The removable fine mesh grill was removed from the radiator prior to testing.

The engine was started and run on compressor speed up.

The radiator fan speed was measured and recorded to be **2,078rpm**.

Radiator air flow readings (m/s) were taken at 9 points on the radiator (as indicated below) and the following results recorded:

<b>7.8</b>	<b>9.4</b>	<b>8.7</b>
<b>7.3</b>	<b>9.4</b>	<b>7.5</b>
<b>6.2</b>	<b>7.6</b>	<b>7.3</b>

The radiator was then statically tested by performing a power test against the vehicle brake using throttle step 5. The following results were recorded:

Ambient Temperature at time of test: **18°C**

<b>Radiator Inlet Temperature °C</b>	<b>Radiator Outlet Temperature °C</b>	<b>Air Flow @ Radiator Centre M/S</b>	<b>Radiator Fan Speed (rpm)</b>
<b>75</b>	<b>57</b>	<b>11.2</b>	<b>3,332</b>
<b>80</b>	<b>60</b>	<b>11.6</b>	<b>3,344</b>
<b>85</b>	<b>75</b>	<b>11.6</b>	<b>3,364</b>
<b>90</b>	<b>82</b>	<b>11.6</b>	<b>3,343</b>
<b>94.4*</b>	<b>87.2</b>	<b>-</b>	<b>-</b>

Approximately **9 minutes** after testing started the engine reverted to idle due to operation of either the engine or transmission overheat thermostat and the test was ceased. The radiator inlet temperature at the point at which the engine reverted to idle was **94.4 °C**

### Performance testing of the trial aluminium radiator

The original radiator was exchanged with the new trial aluminium radiator and the performance test was repeated.

The engine was started and run on compressor speed up. The radiator fan speed was measured and recorded to be **2,112rpm**. Radiator air flow readings (m/s) were taken at 9 points on the radiator (as indicated below) and the following results recorded:

<b>6.6</b>	<b>7.2</b>	<b>7.1</b>
<b>6.1</b>	<b>7.0</b>	<b>6.7</b>
<b>7.1</b>	<b>7.4</b>	<b>7.3</b>

The radiator was statically tested by performing a power test against the vehicle brake using throttle step 5. The following results were recorded:

Ambient Temperature at time of test: **20°C**

<b>Radiator Inlet Temperature °C</b>	<b>Radiator Outlet Temperature °C</b>	<b>Air Flow @ Radiator Centre M/S</b>	<b>Radiator Fan Speed (rpm)</b>
<b>75</b>	<b>34</b>	<b>10.2</b>	<b>3,352</b>
<b>80</b>	<b>54</b>	<b>10.4</b>	<b>3,378</b>
<b>85</b>	<b>72</b>	<b>9.8</b>	<b>3,335</b>
<b>90</b>	<b>79</b>	<b>9.6</b>	<b>3,318</b>
<b>92.6*</b>	<b>82</b>	<b>9.6</b>	<b>-</b>

\*The test was ceased after approx **15 minutes**, as the rate of radiator inlet temperature increase was relatively low i.e. less than **0.3°C** per minute. The radiator inlet temperature at the point at which the test was ceased was **92.6°C**.

### Conclusion

The comparative test results demonstrate the superior cooling performance achieved by the aluminium radiator. Despite an additional 6 minutes of power testing with the aluminium radiator against the vehicle brake (at a slightly higher ambient temperature as well) the engine still did not revert to idle and the radiator inlet temperature was still **1.8°C** lower than the point at which the engine reverted to idle with the original radiator under test.

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