

**BIDDING DOCUMENTS  
FOR  
DESIGN, MANUFACTURE, SUPPLY, TESTING, COMMISSIONING AND  
TRAINING OF 378 NOS. OF STANDARD GAUGE CARS  
FOR MUMBAI METRO PROJECT**

**BID NO. MRS1**

**ADDENDUM NO. 7**

## 'MRS1' Bid document: Addendum No. 7

Part, Section, Clause, Description, Page, Location etc.	Amendments
<ul style="list-style-type: none"> <li>• Part-II: Supply Requirements,</li> <li>• Section-6C: ERTS</li> <li>• Clause 3.21.3(iv)</li> <li>• First Paragraph</li> <li>• Page 38 of 240</li> </ul>	<p><b><u>REPLACE</u></b></p> <p>“In case the actual weight of the train in tare condition exceeds the specified value as above, the Contractor shall be liable to pay the extra energy cost as a penalty, which shall be calculated on the basis of specified Specific Energy Consumption (SEC<sub>S</sub>) and Achieved Specific Energy Consumption (SEC<sub>A</sub>), whichever is higher (<b>under AW2 loading</b>) on pro rata basis. The amount payable as penalty by the Contractor on account of increase in tare weight of the train shall be INR 15.0 Lacs/ ton per train with achieved SEC value of <b>45 Wh/GTKM</b> (i.e. SEC<sub>S</sub>) or less. However, if achieved SEC is higher than <b>45 Wh/GTKM</b> then the amount payable as penalty will be increased from INR 15.0 Lacs/ ton per train on pro rata basis.”</p> <p><b><u>WITH</u></b></p> <p>“In case the actual weight of the train in tare condition exceeds the specified value as above, the Contractor shall be liable to pay the extra energy cost as a penalty, which shall be calculated on the basis of specified Specific Energy Consumption (SEC<sub>S</sub>) and Achieved Specific Energy Consumption (SEC<sub>A</sub>), whichever is higher on pro rata basis. The amount payable as penalty by the Contractor on account of increase in tare weight of the train shall be INR 15.0 Lacs/ ton per train with achieved SEC value of <b>47.5 Wh/GTKM</b> (i.e. SEC<sub>S</sub>) or less. However, if achieved SEC is higher than <b>47.5 Wh/GTKM</b> then the amount payable as penalty will be increased from INR 15.0 Lacs/ ton per train on pro rata basis.”</p>
<ul style="list-style-type: none"> <li>• Part-II: Supply Requirements,</li> <li>• Section-6C: ERTS</li> <li>• Clause 3.24: Specific Energy Consumption</li> <li>• First Paragraph &amp; Second Paragraph</li> <li>• Page 48 of 240</li> </ul>	<p><b><u>REPLACE</u></b></p> <p>“Tenderers shall note that ‘SPECIFIC ENERGY CONSUMPTION (SEC)’ to be verified in Line-2 (Dahisar East to Mandala and back) under conditions detailed hereafter in this clause shall not exceed <b>45 Wh/GTKM</b>, referred to as SEC<sub>S</sub>.</p> <p>This Specific Energy Consumption shall be total of two components viz. SEC for a 6 car train (with HVAC switched off) i.e. ‘SEC<sub>P</sub>’ value and SEC of HVAC for a 6 car train i.e. ‘SEC<sub>H</sub>’ value. These two values shall be declared by the contractor (SEC<sub>P-declared</sub> + SEC<sub>H-declared</sub>) during pre final design stage and the same shall be validated as detailed in this clause. The total declared SEC value i.e. SEC<sub>declared</sub> for a 6 car train as declared by the contractor i.e. SEC<sub>P-declared</sub> + SEC<sub>H-declared</sub> shall not exceed the SEC<sub>S</sub> i.e. <b>45 Wh/GTKM</b> as mentioned above.”</p> <p><b><u>WITH</u></b></p>

	<p>“Tenderers shall note that ‘SPECIFIC ENERGY CONSUMPTION (SEC)’ to be verified in Line-2 (Dahisar East to Mandala and back) under conditions detailed hereafter in this clause shall not exceed <b>47.5 Wh/GTKM</b>, referred to as SEC<sub>s</sub>.</p> <p>This Specific Energy Consumption shall be total of two components viz. SEC for a 6 car train (with HVAC switched off) i.e. ‘SEC<sub>P</sub>’ value and SEC of HVAC for a 6 car train i.e. ‘SEC<sub>H</sub>’ value. These two values shall be declared by the contractor (SEC<sub>P-declared</sub> + SEC<sub>H-declared</sub>) during pre final design stage and the same shall be validated as detailed in this clause. The total declared SEC value i.e. SEC<sub>declared</sub> for a 6 car train as declared by the contractor i.e. SEC<sub>P-declared</sub> + SEC<sub>H-declared</sub> shall not exceed the SEC<sub>s</sub> i.e. <b>47.5 Wh/GTKM</b> as mentioned above.”</p>
<ul style="list-style-type: none"> <li>• Part-II: Supply Requirements,</li> <li>• Section-6C: ERTS</li> <li>• Clause 3.24 C: Penalty in case of NON-COMPLIANCE by the Contractor</li> <li>• Page 54 to 55 of 240</li> </ul>	<p><b><u>REPLACE</u></b></p> <p>“Contractor shall further note that in case the total achieved Specific Energy Consumption (SEC<sub>A</sub>) is higher than the specified Specific Energy Consumption (SEC<sub>s</sub>) value (i.e. <b>45 Wh/GTKM</b>), the penalty shall be imposed for the excess energy consumption.</p> <p>The Penalty (P) shall be calculated as under:</p> <p><b><u>C1.1 Penalty for Non-Compliance of total Specific Energy Consumption:</u></b></p> <p><b>P= [(SEC<sub>A</sub>-SEC<sub>s</sub>)]/1000 x E x W x RTD</b></p> <p>‘P’ : Calculated Penalty for non-compliance of “SEC<sub>s</sub>”</p> <p>‘SEC<sub>s</sub>’ : Specified Specific Energy Consumption i.e. <b>45 Wh/GTKM</b></p> <p>‘SEC<sub>A</sub>’ : Achieved total Specific Energy Consumption value [SEC<sub>P-A</sub> + {SEC<sub>H-A</sub> or SEC<sub>H-A-adjust</sub> (as applicable)}]</p> <p>SEC<sub>P-A</sub> : Achieved of SEC<sub>P</sub></p> <p>SEC<sub>H-A</sub> : Achieved value of SEC<sub>H</sub></p> <p>SEC<sub>H-A-adjust</sub> : Adjusted value of SEC<sub>H-A</sub> as per <b>C1.8</b> above</p> <p>‘NRT’ : Number of round trips considered per day (considered as ‘3’)</p> <p>‘T’ : Electricity Tariff per unit (considered as INR 7- per unit)</p> <p>‘NT’ : Total number of trains (considered as ‘63’ trains)</p> <p>‘L’ : Life of the stock in years (considered as ‘35’ years)</p> <p>‘D<sub>y</sub>’ : No. of days in revenue operation in a year (considered as 345 days)</p> <p>‘E’ : D<sub>y</sub> x NRT x L x T x NT = 345 x 3 x 35 x 7 x 63 = 15,975,225</p> <p>‘W’ : Gross weight of train under loading condition of 114 passengers/car (296.5 T)</p> <p>‘RTD’ : Round trip distance in line-2 i.e. 83.01 km</p> <p>Contractor shall note that no ‘bonus’ is payable for achieving specific energy consumption figures better than specified ones.</p> <p>For example, say the SEC values as achieved during validation are as follows:</p>

Achieved value of  $SEC_P$  i.e.  $SEC_{P-A} = 29 \text{ Wh/GTKM}$

AND

Achieved value of  $SEC_H$  i.e.  $SEC_{H-A} = 20 \text{ Wh/GTKM}$

So, the total measured SEC i.e.  $SEC_A = SEC_{P-A} + SEC_{H-A}$

$SEC_A = 29+20 = 49 \text{ Wh/GTKM}$

Therefore, the penalty amount for non-compliance of  $SEC_S$  shall be as follows:

$P = [(SEC_A - SEC_S)/1000] \times E \times W \times RTD$

$P = [(49-45)/1000] \times 15975225 \times 296.5 \times 83.01$

$P = \text{INR } 1,572,758,665$

### WITH

“Contractor shall further note that in case the total achieved Specific Energy Consumption ( $SEC_A$ ) is higher than the specified Specific Energy Consumption ( $SEC_S$ ) value (i.e. **47.5 Wh/GTKM**), the penalty shall be imposed for the excess energy consumption.

The Penalty (P) shall be calculated as under:

### C1.1 Penalty for Non-Compliance of total Specific Energy Consumption:

$P = [(SEC_A - SEC_S)/1000] \times E \times W \times RTD$

‘P’ : Calculated Penalty for non-compliance of “**SEC<sub>s</sub>**”

‘**SEC<sub>s</sub>**’ : Specified Specific Energy Consumption i.e. **47.5 Wh/GTKM**

‘**SEC<sub>A</sub>**’ : Achieved total Specific Energy Consumption value [ $SEC_{P-A} + \{SEC_{H-A}$  or  $SEC_{H-A-adjust}$  (as applicable)]]

**SEC<sub>P-A</sub>** : Achieved of  $SEC_P$

**SEC<sub>H-A</sub>** : Achieved value of  $SEC_H$

**SEC<sub>H-A-adjust</sub>** : Adjusted value of  $SEC_{H-A}$  as per **B 2.11** above

‘**NRT**’ : Number of round trips considered per day (considered as ‘3’)

‘**T**’ : Electricity Tariff per unit (considered as INR 7- per unit)

‘**NT**’ : Total number of trains (considered as ‘63’ trains)

‘**L**’ : Life of the stock in years (considered as ‘35’ years)

‘**D<sub>y</sub>**’ : No. of days in revenue operation in a year (considered as 345 days)

‘**E**’ :  $D_y \times NRT \times L \times T \times NT = 345 \times 3 \times 35 \times 7 \times 63 = 15,975,225$

‘**W**’ : Gross weight of train under loading condition of 114 passengers/car (296.5 T)

‘**RTD**’ : Round trip distance in line-2 i.e. 83.01 km

Contractor shall note that no ‘bonus’ is payable for achieving specific energy

	<p>consumption figures better than specified ones.</p> <p>For example, say the SEC values as achieved during validation are as follows:          Achieved value of SEC<sub>P</sub> i.e. SEC<sub>P-A</sub> = <b>29 Wh/GTKM</b>          AND          Achieved value of SEC<sub>H</sub> i.e. SEC<sub>H-A</sub> = <b>19.5 Wh/GTKM</b>          So, the total measured SEC i.e. SEC<sub>A</sub> = SEC<sub>P-A</sub> + SEC<sub>H-A</sub>          SEC<sub>A</sub> = <b>29+19.5 = 48.5 Wh/GTKM</b></p> <p>Therefore, the penalty amount for non-compliance of SEC<sub>S</sub> shall be as follows:          P = [(SEC<sub>A</sub> - SEC<sub>S</sub>)/1000] x E x W x RTD  <b>P = [(48.5-47.5)/1000] x 15975225 x 296.5 x 83.01</b>  <b>P = INR 39,31,89,666</b></p>
<ul style="list-style-type: none"> <li>• Part-II: Supply Requirements,</li> <li>• Section-6C: ERTS</li> <li>• Clause 11.2.13</li> <li>• Page 135 of 240</li> </ul>	<p><b><u>REPLACE</u></b></p> <p>“The HVAC unit shall have optimized cooling capacity control for quickly reaching and maintaining the comfort conditions with low power consumption, depending on ambient conditions and the number of commuters inside the car. <b>In any case, the cooling capacity shall not be less than 55 kW per unit in summer ambient conditions.</b>”</p> <p><b><u>WITH</u></b></p> <p>“The HVAC unit shall have optimized cooling capacity control for quickly reaching and maintaining the comfort conditions with low power consumption, depending on ambient conditions and the number of commuters inside the car.”</p>