

**Reasoned document regarding comments of firm on the draft specification no. MP-0.08.00.116 (Mar-2021)
for Self-Propelled Tunnel Rescue Train uploaded on RDSO's website for a period of one month**

SN	Cl. no. of draft spec	Description	Comments of Windhoff	RDSO's remarks
1.	---	Abbreviation table	---	The abbreviation table has been added.
2.	1.3.2	Supply of lubricants, chemicals (required for fire extinguishing) and other consumables (except diesel) for the initial period of 12 months (running of approx. 1000 hours per year) from date of commissioning.	For delivery of the required quantity of extinguishing agents and other chemicals, it is necessary to specify the number of expected extinguishing operations in the specification)	Agreed to. Accordingly, the clause has been modified as: <i>"Supply of lubricants, extinguishing chemicals (to be sufficient for 14 extinguishing operations) and other consumables (except diesel) for the initial period of 12 months (running of approx. 1000 hours per year) from date of commissioning."</i>
3.	1.3.3	Supply of sets of special tools & testing instruments etc. which shall be required at Indian Railway's workshop for carrying out major overhaul and at maintenance depot for regular maintenance of the TRT cars	without lifting jacks and other workshop equipment)	Agreed to. Accordingly, the clause has been modified as: <i>"Supply of sets of special tools & testing instruments etc., other than the standard equipment (like lifting jacks and equipments normally available in the Workshops) which shall be required at Indian Railway's workshop for carrying out major overhaul and at maintenance depot for regular maintenance of the TRT cars."</i>
4.	1.4.4 b)	Number of days in service: Number of days under consideration, less the time taken out of service for following work: -Scheduled repairs (including overhauls in the workshops) -Operating maintenance (minor maintenance)	To add: Time for transporting the TRT to a workshop to perform repairs and maintenance)	Agreed to: Accordingly, the following has been added as clause 1.4.4 c): <i>"Time taken for transportation of TRT to Workshop for undertaking repairs and maintenance shall be on Indian Railway account."</i>
5.	1.5.2 b)	Complete vehicle dynamic simulation analysis of the TRT to assess the Stability/Riding behaviour & vehicle dynamic	(Windhoff: Taking into account the conditions for special vehicles	Agreed to. Accordingly, the clause has been modified as: <i>"Complete vehicle dynamic simulation analysis of the TRT taking into account the conditions for special</i>

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		performance on IR track conditions, duly conforming to the performance requirements stipulated in the Specifications and Standards.		vehicles, to assess the Stability/Riding behaviour & vehicle dynamic performance on IR track conditions duly conforming to the performance requirements stipulated in the Specifications and Standards.”
6.	1.5.2 b) ii)	Parameters as per EN 14363 on track having parameters decided on the basis of prevailing track tolerances of Indian Railway based on EN 14363:2016 methodology for first stage & dynamic performance assessment by simplified as well as normal method, Bogie rotational resistance, wheel off-loading on twisted track, Natural frequency of the suspension, etc.	Taking into account the conditions for special vehicles	Agreed to. Accordingly, the clause has been modified as: “Parameters as per EN 14363 taking into account the conditions for special vehicles on track having parameters decided on the basis of prevailing track tolerances of Indian Railway based on EN 14363:2016 methodology for first stage & dynamic performance assessment by simplified as well as normal method, Bogie rotational resistance, wheel off-loading on twisted track, Natural frequency of the suspension, etc.”
7.	1.5.5	Finite Element Analysis report for the under frame of each car as per EN 12663 or equivalent.	Taking into account the conditions for special vehicles. The Basic Vehicle for the TRT is the WINDHOFF MPV©. The design of the MPV follows the Commission Regulation (EU) No 1302/2014 Technical Specification for Interoperability relating to the ‘rolling stock — locomotives and passenger rolling stock’ (short: TSI Loc&Pas, Extracts see below) for OTM’s (On Track Machines) or mobile railway equipment. Some special requirement are given for the calculation of the strength of vehicle structures in Appendix C. The MPV is designed	Agreed to. Accordingly, the clause has been modified as: “Finite Element Analysis report for the under frame of each car as per EN 12663 or equivalent taking into account the conditions for special vehicles, excluded in hump and loose shunting.”

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			<p>according to the Chapter C.1 "machines not permitted to be loose shunted or hump shunted: Category F-II. EN 12663: The main modification is: The acceleration in x-direction according to the specification referenced in Annex J-1 (Remark: EN 12663), index 7, Table 13 or to the specification referenced in Annex J1, index 102, Table 10 shall be ± 3 g.</p>	
8.	1.5.9	Supporting documents in respect of underslung equipment for mounting strength as per EN 12663 or equivalent.	<p>Taking into account the conditions for special vehicles. Reason is same as given against clause 1.5.5. The calculation of the strength criteria is described in the TSI Loc & Pas Appendix C: The acceleration in x-direction according to the specification referenced in Annex J-1 (Remark: EN 12663), index 7, Table 13 or to the specification referenced in Annex J1, index 102, Table 10 shall be ± 3 g.</p> <p><input type="checkbox"/> This criterion is also applied to the module frames and to the fastening of the underslung components.</p>	<p>Agreed to.</p> <p>Accordingly, the clause has been modified as:</p> <p>Supporting documents in respect of underslung equipment for mounting strength as per EN 12663 or equivalent taking into account the conditions for special vehicles, excluded in hump and loose shunting."</p>
9.	1.7.2	The Supplier when submitting proposals on designs for approval of the RDSO shall draw specific attention to any deviation or departure from the specification involved in his	In the interest of a short delivery time and in coordination with RDSO, the supplier must be enabled to order certain components from sub-suppliers at a very early stage of order processing. These affected	<p>Not agreed to. Procurement of components is not advisable without design approval from RDSO/IR.</p> <p>Efforts will be made for expediting design approval by IR, subject to prompt response of supplier to IR</p>

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		proposal or drawing. Manufacture of the prototype shall be started by the Supplier only after the said "design approval" is granted by Indian Railways.	components are to be coordinated between the client and the contractor (examples: brake components, wheel sets, gearboxes, etc.).	queries.
10.	3.1.4	TRT shall be capable of accelerating from 0 to 40 km/h with minimum average acceleration of 0.4m/s ² and from 0 to 100 km/h with minimum average acceleration of 0.18m/s ² .	-----	New clause to specify the overall performance of TRT.
11.	---	Provision of Kitchen / Pantry (pointed out by one of the Railway Unit)	<p>To date there has been no need for rescue trains for a small kitchenette. Usually snacks are shrink-wrapped and small water bottles are stored. In the DCP 2, a small kitchen unit made of stainless steel approx. 100x60cm can be provided / used during the standby phase (provided that the container is actively ventilated)</p> <p>Small refrigerator Sink (water and waste water tank), controllable via foot pump Microwave max. 2 hotplates</p> <p>The kitchen unit will be placed in the main room instead of part of the bench. The water and wastewater tanks can be placed in the storage compartment of the bench.</p>	<p>New clause no. 4.2.11 has been added as under:</p> <p><i>"A small kitchen unit (container type) of approximate 1 m x 0.6 m size shall be provided inside the main room of DPC-2 (Rescue car). The container shall be actively ventilated and made of stainless steel. The following shall be provided in the kitchen:</i></p> <ul style="list-style-type: none"> <i>i. Small refrigerator of minimum 240 litre capacity</i> <i>ii. Microwave oven</i> <i>iii. 2 hotplates</i> <i>iv. Sink / washbasin</i> <i>v. Water and waste water tank</i>

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12.	4.1.1 & 4.2.1	Self-powered by an underslung diesel-hydraulic transmission system (details in clause 6.4 and 6.5)	Hydraulic transmission or powershift transmission with hydraulic converter	Not agreed to. Hydraulic transmission has been mentioned in the specification. This includes hydrostatic as well as hydrodynamic. The power shift transmission with hydraulic converter is a hydrodynamic transmission and already covered in hydraulic transmission. The same should match with diesel engine to be supplied. Hence, mentioning only "hydraulic transmission" is considered sufficient.
13.	4.1.9 & 4.2.8	Water / Foam cannon mounted on front / roof (details in clause 5.1)	Acc. to Annexure-10 of draft spec: only one water cannon is to be supplied, in 5.1 the water cannon for the powerful water cannon for roof mounting is described, please delete "front".	Agreed to. The clause has been modified accordingly.
14.	4.1.18	Complete Electrical load of DPC-1 shall be provided by a hydraulic driven underfloor generator (driven by main power packs of DPC-1)	especially in the case of shuttle traffic	Agreed to. The clause has been modified as follows: "In case of shuttle (independent) movement of DPC-1, its complete Electrical load shall be provided by a hydraulic driven underfloor generator (driven by main power packs of DPC-1)"
15.	4.1.22 & 4.2.22	One winch on rescue platform having load lifting capacity of atleast 250 kg.	on each side	The clause has been modified as follows: "One winch on rescue platform, on each side, having load lifting capacity of atleast 250 kg."
16.	4.2.10	Spray Water Curtain to protect driver's cab from front and sides against excessive heat at incident site (details in clause 5.3)	at the front of the cabin	Agreed to. The clause has been modified as follows: "Spray Water Curtain to protect driver's cab from front, against excessive heat at incident site (details in clause 5.3)"
17.	4.2.18	Complete Electrical load of DPC-2 shall be provided by a hydraulic driven underfloor generator (driven by main power packs of DPC-2)	especially in the case of shuttle traffic	Agreed to. The clause has been modified as follows: "In case of shuttle (independent) movement of DPC-2 and MC, the complete Electrical load of DPC-2 shall be provided by a hydraulic driven underfloor generator (driven by main power packs of DPC-2)"

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18.	4.4.10	Outlet connections of the water tanks to be trace heated and insulated with 25 mm aluminum foil / sheet covered foam to avoid freezing.	That means 25mm thickness in total (Isolation material + aluminum foil)?	Agreed to The clause has been modified as follows: "Outlet connections of the water tanks to be trace heated and insulated with aluminum foil / sheet covered foam, total thickness of atleast 25 mm, to avoid freezing."
19.	4.4.26	A suitable heavy-duty shelf for stretchers	Please change this point completely. Such a shelf is not foreseen. The space inside of the machine platform is fulfill with the engine and the pumps and other firefighting equipment. We can place 2 foldable stretchers in the storage container for breathing air.	The clause modified as: 2 foldable stretchers in the storage container for breathing air.
20.	6.3.4	Each container also to have a siren and a flashlight on the outside to indicate audibly and visually fire alarm of the relevant container	flashlight colour?	The clause has been modified as: "Each container also to have a siren and a flashlight (as per Indian Railways Standard) on the outside for attracting attention in case of operation of the fire alarm of the respective container."
21.	6.5, 6.5.1, 6.11.4	Hydraulic Transmission	Hydraulic or powershift transmission with hydraulic converter system)	Not agreed to. Hydraulic transmission has been mentioned in the specification. This includes hydrostatic as well as hydrodynamic. The power shift transmission with hydraulic converter is a hydrodynamic transmission and already covered in hydraulic transmission. The same should match with diesel engine to be supplied. Hence, mentioning only "hydraulic transmission" is considered sufficient.
22.	6.5.1	The hydraulic transmission including equipments used in the TRT to comply with the requirements of EN 14033 or equivalent International Standards. The Supplier shall submit a hydraulic circuit diagram.	Hydraulic circuit diagram or a functional diagram which can be used to demonstrate the mode of operation of the power unit	The clause has been modified as under: "The hydraulic transmission including equipments used in the TRT to comply with the requirements of EN 14033 or equivalent International Standards. The Supplier shall submit a hydraulic circuit diagram or a functional diagram demonstrating the mechanism of operation of transmission system."

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23.	6.9.11	The driver's cab / driver stands must be ventilated with a slight overpressure (in case of contaminated external atmosphere) independently of the outside air. Sufficient air supply must be carried for a minimum of 4.5 hours, taking into account a cab door being briefly opened twice per hour.	Windhoff Proposal: Delete Driver Stand: because the driver stands are only used in case of shuttle traffic, in case of contaminated atmosphere the driver can use his breathing mask (as with control consoles between DPC1 and FF-Car	Agreed to. Accordingly, <i>Driver stand has been deleted from this clause.</i>
24.	----	Head light, Marker light and Tail lamp	<p>The description of the signal lighting (head lamp, tail lamp and marker lamp) is missing.</p> <p>Head lamps (1) A head lamp is designed and assessed without any limitation concerning its area of use. (2) A head lamp shall comply with requirements concerning the colour and the luminous intensity defined in clause 4.2.7.1.1. These requirements shall be assessed at IC level.</p>	<p>Head Light, Marker Light & Tail Lamps in case of splitting of vehicles would be required. Accordingly, details have been added (as new clauses) as per existing safety criteria:</p> <p>Head Lights: (CI 6.13.3)</p> <p>The front end of each Driving cab / driving stand i.e. both ends of DPC-1, FF car (towards DPC-1), Equipment car (towards MC), MC (towards EC), DPC-2 (free end). shall be provided with high intensity, long distance, dimmable twin beam LED headlight with suitable waterproof enclosures conforming to IP 65, in accordance with Indian Railway practice and having following features:</p> <p>a)The headlight units shall be pre-focused, capable of giving minimum 3.2 lux at a distance of 305 meters. The beam spread shall be symmetrical and angle of beam shall not be less than 7 degrees.</p> <p>b)The design of the headlights shall permit for easy</p>

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			<p>Marker lamps (1) A marker lamp is designed and assessed without any limitation concerning its area of use. (2) A marker lamp shall comply with requirements concerning the colour and the luminous intensity defined in clause 4.2.7.1.2. These requirements shall be assessed at IC level.</p> <p>Tail lamps (1). A tail lamp shall be designed and assessed for an area of use: fixed lamp or portable lamp. (2) A tail lamp shall comply with the requirements concerning the colour and the luminous intensity defined in clause</p>	<p>replacement of luminaire from cab.</p> <p>c)Arrangements shall be provided for dimming the headlight output whenever required</p> <p>Marker Lights: (CI 6.13.4) Two twin marker lights with suitable waterproof enclosures conforming to IP 65 and window toughened front glass shall be provided on both ends of DPC-1, FF car (towards DPC-1), Equipment car (towards MC), MC (towards EC), DPC-2 (free end). These shall have following features:</p> <p>a) Each twin marker light shall provide one white and one red array.</p> <p>b) If the marker lights are mounted with the twin lenses side by side the red lens or array shall be towards the outside of the car. If the marker lights are mounted with the twin lenses one on top of the other, the red lens or array shall be on the top.</p> <p>c)The marker lamp shall have a nominal light output of 40 lux at 1 meter.</p> <p>Tail lamp: (CI 6.13.5) LED type tail lights with suitable waterproof enclosures conforming to IP 65, shall be provided on both ends of DPC-1, FF car (towards DPC-1), Equipment car (towards MC), MC (towards EC), DPC-2 (free end). These shall have following features:</p>

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			<p>4.2.7.1.3. These requirements shall be assessed at IC level. (3) For portable tail lamps, the interface for attachment on the vehicle shall be in accordance with the Appendix E of the TSI 'freight wagons'</p> <p>The position and the specific features of the lights depend on the regulations of the country in which the vehicle will be used. The specific requirements for the Indian Railway are still missing in the specification of the TRT. It must be similar to this picture below (WDM3A loco of TKD shed). We cannot use the European TSI</p>	<p>a) Tail light shall be steady red on one side and flashing amber on the other side.</p> <p>b) The tail light shall be amber in colour flashing at a rate of 55-65 flashes per minute in operation.</p> <p>c)The clear visibility of tail light in clear daylight shall not be less than 1.6 kilometers along the longitudinal axis and 100 meters at 6 degree angular displacement from longitudinal axis</p>
25.	6.14.1	TRT shall be provided with HVAC systems using R 407C refrigerant or any other eco-friendly HFC refrigerant having zero ozone depletion potential and A1 safety category as per ASHRAE or Equivalent standards.	or R134a	Agreed to. R134a refrigerant included in this clause.
26.	6.14.4	Capacity of heating /cooling " shall be	Please insert "Transportation, Medical and Rescue Containers	Agreed to. Accordingly, " <i>Transportation, Medical and Rescue Containers</i> " have been included in this clause.
27.	8.3.1	Center buffer coupler (CBC) of AAR 'E/F' type with transition gear generally to RDSO Drg. No. SK.DL.- 62724 (attached as Annexure-VII) with high capacity side buffers to RDSO Drg. No. SK.DL. – 4561 (attached as Annexure-VIII) shall be provided	<p>Windhoff can provide AAR-couplers between all cars.</p> <p>IR can decide whether a UIC screw coupling or an AAR center buffer coupling should be used at this point. For reasons of uniformity of the frame design, we would prefer a continuous</p>	<p>The clause has been modified to suit IR requirements of coupling with all types of existing stocks as under:</p> <p>"Center buffer coupler (CBC) of AAR 'H' type with transition gear generally to RDSO specification no. MP-0.41.00.05 (Rev-02) March-2020 (attached as Annexure-VII) or latest with high capacity side</p>

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		on Free ends of the Transportation car (DPC-1) & Rescue car (DPC-2), between DPC-1 & FF car and between MC & EC to enable hauling and towing of TRT with IR rolling stocks, as well as splitting of TRT.	coupling system for the entire train (that means AAR-coupler), even the price of the coupling itself is rather higher. For the design of the transition system, we must take into account the spring travel of the coupling.	buffers to RDSO specification no. MP-0.41.00.03 (attached as Annexure -VIII) or latest and RDSO Drg. No. SK.DL. – 4561 (attached as Annexure-IX) shall be provided on both ends of all cars.”
28.	8.3.3	Screw coupling to be in accordance with UIC / ERRI 100 M 3211 0001 (adapted to auxiliary coupling).	UIC 520. In principal the answer is: Yes, it is possible to provide screw coupling on free ends of DPC-1 and DPC-2, if the specification is not basically different from AAR_H Coupler with transition Screw coupling (Example see below). Please insert the specification in the final spec. in addition to Annexure-VII.	The clause has been modified to suit IR requirements of coupling with all types of existing stocks as under: “Transition screw coupler shall conform to RDSO spec no. MP-0.41.00.01 Rev-01 Apr'03 (attached as Annexure-X) or latest and drg no. SK-DL-2494 (attached as Annexure-XI).”
29.	9.6.2	One compressor set shall be provided in each DPC and shall provide stand-alone compressed air requirement for the same.	The capacity of the compressor unit(s) of the train is designed to the maximum train length of 5 vehicles (20 axles) or to the length of the longest part of the train after separation (4 vehicles with a maximum of 16 axles)	Agreed to. Accordingly, the para has been modified as under: “One compressor set shall be provided in each DPC. The capacity of each compressor shall be designed for the maximum train length of 5 cars (20 axles), so that in case of failure of one DPC, the movement / functioning of TRT is not affected”