

RAIL COACH FACTORY, KAPURTHALA		
Specification No.	Description	Date
Mech/MH/AR/4200/GM	Design, supply, installation, testing and commissioning of 30 KL Liquid Argon storage vessel, vaporizer and distribution pipe line system	05/03/2025

### 1. SCOPE OF SUPPLY:

- 1.1. The scope of this tender shall include design, supply, installation, testing and commissioning of Liquid Argon storage vessel, vaporizer and distribution pipe line system on turnkey basis (including all electrical works, earthing works and civil works).
- 1.2. The equipment/system installed must be of proven design, incorporating latest features and state of the art manufacturing technology.

### 2. PURPOSE:

Rail Coach Factory (Kapurthala), Punjab is a production unit engaged in production of Indian Railway Passenger Coaches. RCF is manufacturing light weight, stainless steel coaches under the new technology. TIG welding is now being proposed for welding of coaches in Shell Assembly Shop. Hence additional liquid Argon storage vessel and pipe line system for storage and distribution of pure Argon gas is required.

### 3. TURN KEY PROJECT:

Design, supply, installation, commissioning and prove out of the complete Liquid Argon cryogenic storage vessel, vaporizer with pipe line distribution network system including civil and electrical work on Turnkey basis as under: -

- 3.1 Installation of one Liquid Argon cryogenic vessel of capacity of 30 KL.
- 3.2 Installation of ambient air heated vaporizer of suitable capacity for converting liquid Argon to gaseous Argon.
- 3.3 Necessary line Isolation valves, line safety valves, pressure regulator designed as per vessel pressure to be provided for interconnection of new vessel, vaporizer and existing plant pipe lines.
- 3.4 Pressure reducing arrangement to be provided between vaporizer and buffer tank to control the output delivery pressure of gaseous Argon.
- 3.5 One no. buffer tank (available with RCF) is to be attached to the system between vaporizer and outlet to shop. Necessary isolation valves and pressure gauge to be provided by the tenderer for the buffer tank.
- 3.6 Laying of aluminium alloy pipe line for distribution of gaseous argon from storage plant to user shop.
- 3.7 System complete with flow regulation, pressure indication, safety relief valves and all other safety devices.
- 3.8 Load cell arrangement to be provided below vessel supports for measurement of vessel contents. The load cells should be weather proof and shall be suitably protected to withstand environmental conditions viz. flooding, rain, water, temperature variations from - 10 deg C to 65 deg C with humidity levels up to 100%. Weigh system to have digital output display (in Kg).
- 3.9 Road approach including decanting pump for evacuating liquid Argon from mobile road tanker.
- 3.10 All related Civil Engg. works in connection with installation of subject system to be carried out by the bidder including installation of liquid Argon vessel, vaporizers, buffer tank and pipe line structures. Foundation work for cryogenic vessel and vaporizer along with foundation drawing to be done in accordance to PESO.
- 3.11 Necessary approvals from concerned Govt. Authorities/ Statutory Bodies for the installation of the subject system shall be processed and taken by the bidder on behalf of RCF. Bidder shall take the license for installation of the system from Chief Controller of Explosive (CCOE)/PESO. License will be obtained by the bidder on behalf of RCF.

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- 3.12 Detailed engineering of the system including obtaining approval from third party and statutory authorities (for fabrication & installation) for drawing of pressure vessel for fabrication purposes shall be arranged by the bidder.
- 3.13 Preparation of installation drawings and getting the approval from department of Explosives by successful bidder.
- 3.14 Complete maintenance and periodical inspection of the equipment throughout warranty period shall be in the scope of successful bidder.
- 3.15 Documents pertinent to the system such as design, drawings, operations, manual/calibration certificate, RITES inspection certificates, PESO certificates, etc. shall be provided to consignee by the successful bidder.
- 3.16 Earth pit with G.I. strips for Argon storage vessel and vaporizer to be supplied and installed by the bidder.
- 3.17 Display boards, safety related display boards (laminated acrylic sheets) for the licensed premises to be prepared post obtaining of PESO license.
- 3.18 The complete system shall include below listed items/equipments for supply, installation, commissioning and prove out :

**Part-I : Supply, installation, commissioning and prove out Liquid Argon cryogenic storage vessel, vaporizer and accessories in the licensed premises**

S.no	Description	Unit	Qty
1	Liquid Argon cryogenic storage vessel, Capacity 30 KL, Pressure up to 23 Bar, Double walled construction with perlite and vacuum insulation (Make : Ferrox, VRV, Chart Linde, Air Liquide only)	Nos.	1
2	Vaporizer of capacity 1500 m <sup>3</sup> /hr, duty cycle 24 hrs, Ambient air heated (Make : Ferrox, VRV, Chart Linde, Air Liquide, IWI only)	Nos.	1
3	Decanting pump to decant liquid Argon from mobile road tanker to vessel	Nos.	1
4	Load cell system of suitable capacity with digital display	Nos.	1
5	Approved drawings from controller of explosives (PESO)	Lot	1
6	Foundation works for the Cryogenic Vessel and vaporizer along with foundation drawing & setting up of CCOE barricaded area	Lot	1
7	Earth pit with GI strip	Nos.	1

**Part –II : Supply, installation, commissioning and prove out of distribution pipeline network**

S.No	Description	Unit	Qty
1	1/2" downtake aluminium alloy ASTM T5-6060/6063 confirming to EN 755.2, EN 755.8 and EN 573.3 pipe (with fixing clips and associated fittings)	Mtr	780
2	2" header aluminium alloy ASTM T5-6060/6063 confirming to EN 755.2, EN 755.8 and EN 573.3 pipe (complete with jointer, cartridge and fixing clip)	Mtr	1570
3	2" full bore isolation valve (MOC : Stainless Steel)	Nos.	12
4	Stainless steel 1/2" threaded valve for downdrops (MOC : Stainless Steel/Brass/ non corrosive composite material)	Nos.	390

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5	Quick assembly bracket from 2" OD pipe to 1/2" OD downtake pipe with all studs and fittings	Nos.	130
6	Elbow for 1/2" downtake pipe	Nos.	260
7	Two port stud fitting/adaptor	Nos.	130
8	Wall bracket/port valve with one inlet (1/2") and two outlets (1/2")	Nos.	130
9	Pipe supporting weldable iron structure (	Ton	3
10	Pressure Regulator, isolation valves, miscellaneous hardware items for pipe line and interconnection of tank, vaporizer and receiver	Lot	1
11	Quick release assembly (MOC : SS304/SS316/Brass)	Nos.	260

#### 4. CIVIL WORKS:

- 4.1. The entire system shall be supplied on turnkey basis including civil works.
- 4.2. Foundation drawings of vessel, vaporizer along with layout drawing of the plant shall be in the scope of the successful bidder.
- 4.3. Foundation work for cryogenic vessel and vaporizer along with foundation drawing to be done in accordance to PESO by the bidder. Foundation must be designed of sufficient thickness suiting local soil conditions. PCC to be done around the entire vessel and vaporizer to prevent water seepage.
- 4.4. Barricading work of licensed premises to be done in accordance to PESO guidelines by the bidder. Existing fencing may be used. Foot foundation of fencing shall be done around the new boundaries.

#### 5. DESIGN CHARACTERISTICS:

##### 5.1. LIQUID ARGON STORAGE VESSEL

- 5.1.1. One vertically mounted double walled liquid Argon cryogenic storage vessel of capacity 30 KL, shall be installed.
- 5.1.2. The offered layout should be designed keeping in view the space requirement for movement/decanting of mobile road tanker to and from the Argon vessel.
- 5.1.3. Inner vessel of the storage tank should be fabricated from high grade steel adapting the latest manufacturing technologies. Safety standards mentioned /international standards followed shall be detailed in the offer.
- 5.1.4. The vessel shall be super insulated with low evaporation rate.
- 5.1.5. Pressure vessel should be of state of art design and with highest reliability and shall have practically zero down time.
- 5.1.6. To resist adverse impact of environment (air, water and pollution) on all the valves, the material of the valve should be of forged stainless steel only.
- 5.1.7. The vessel should be coated with protective white paint.
- 5.1.8. Maximum allowable working pressure, capacity, media and manufacturer name must be written on the vessel surface.

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5.1.9. Leading parameters of liquid Argon vessel are as below:

<b>Construction</b>	Double Walled (Cryogenic Vessel)
<b>Insulation</b>	Vacuum + Perlite Insulation
<b>Design Code</b>	PED / CE/ EN-13458-2
<b>Statutory authority</b>	PESO
<b>Max. Working Pressure</b>	Upto 23 Bar
<b>Working Temperature</b>	Upto - 196 deg. Celsius
<b>Inner Vessel</b>	Stainless steel
<b>Outer Vessel</b>	Blast cleaned Carbon steel with high-quality anti-Corrosion surface protection and a white polysiloxane finishing coat.
<b>Pipe work</b>	Stainless steel ASTMA312 TP304
<b>Valves</b>	Forged Stainless steel
<b>Gauges</b>	Suitable Pressure gauge and level indicator to be provided
<b>Gross Capacity (liters)</b>	30 KL
<b>Net Capacity (liters)</b>	More than 90% of gross capacity
<b>Foundation Design</b>	The Vessel shall be designed to comply with norms of CCOE, Nagpur. Load cell arrangement with digital display to be provided for monitoring weight of vessel content.
<b>Make of Vessel</b>	Ferrox, VRV, Chart Linde, Air Liquide only
<b>Connectivity</b>	The vessel to be interconnected by suitable stainless steel valves & piping with existing Argon vessels, vaporizer and decanting pump
<b>Decanting Pump</b>	Decanting pump of suitable capacity to evacuate liquid Argon from road tanker to vessel to be provided

## 5.2. VAPORIZER

One vaporizer for converting liquid Argon to gaseous Argon of suitable capacity shall be installed. Leading parameters of the vaporizer are as below:

<b>Type</b>	Ambient air heated
<b>Design</b>	Should be compatible with the fluid being handled and the design of the whole system (including vessel parameters).
<b>Duty Cycle</b>	24 hours of continuous operation
<b>Flow rate</b>	Up to 1500 m3/hr
<b>Foundation Design</b>	The foundation shall be designed in accordance to vaporizer weight.
<b>Make</b>	Ferrox, VRV, Chart Linde, Air Liquide, IWI only
<b>Connectivity</b>	The vaporizer to be interconnected by suitable stainlesssteel valves & piping with existing vessels line in addition to receiver.

## 5.3 DECANTING PUMP

Pump for evacuating of liquid Argon from mobile road tanker to static Argon storage vessel should be provided in the offer. Leading parameters of decanting pump are as below:

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<b>Design</b>	Should be compatible with the fluid being handled and the design of the whole system (including vessel parameters)
<b>Type</b>	Centrifugal
<b>Media</b>	Liquid Argon
<b>Electrical Supply</b>	415 V, Three phase, 50 Hz
<b>Connectivity</b>	Decanting pump to be connected to Argon vessel with necessary isolation valves and by pass loop

#### 5.4 DISTRIBUTION PIPE LINE SYSTEM

- 5.4.1 The objective of the pipeline distribution systems is to distribute pure Argon Gas from the storage vessel to various consuming points in the Shell Assembly shop of RCF.
- 5.4.2 The work shall comprise of the design, supply of materials, erection, testing, flushing and cleaning, corrosion protection, painting and commissioning of the complete system including civil & structural works.
- 5.4.3 The service pipelines for distribution would run overhead Inside/outside of shops at a height of approx. 6 to 8 mtrs starting from storage receiver to user shop and supported by Brackets/Hangers along periphery and inside the shop. Distribution system would be connected to the down take pipes running vertically on the columns/near consuming points up to a height of approx. 1.5 mtrs from ground level. All the pipelines including the down take pipes, right up to the points of interfacing with the equipments shall be provided by supplier. The height may vary depending upon site conditions. The gas pipeline distribution system shall be of instant to connect. It shall be full bore without diameter restriction for the fittings, in order to avoid high pressure drop.
- 5.4.4 The pipe line distribution system shall incorporate all safeguards and safety features stipulated by statutory and other. The workmanship shall be to the highest standards and as per sound engineering practice. The components used must be non-flammable with no propagation of flame.
- 5.4.5 It shall be clearly understood that the tenderer shall base his designs after a thorough study of site conditions, layout drawings and other relevant drawings. The bidder is advised to study the site, particularly with regard to the type, arrangement and configuration etc. of the civil engineering structures, alignment of the pipes and the nature of the work, etc. The existing structures that can be used to offer most economical solution.
- 5.4.6 Inside the shop floor areas, the pipelines shall be clamped on support brackets/Hangers to be fixed to the RCC/Steel columns/beams/roof girders etc. Outside the shop floor areas, the pipelines shall be similarly clamped on the brackets carried on support structures. Brackets inside the shop floor area shall be under the scope of work by bidder. In all these cases, the bidder shall provide suitable clamps and these clamps shall be secured to the support brackets/inserts by means of screw/bolts and nuts etc.
- 5.4.7 The contractor shall be responsible for the proper fabrication of all piping systems with regard to expansion and flexibility including the branch lines and connections to equipment.
- 5.4.8 Pipe supporting truss structure shall be made up of structural steel. These structures should be made of high tensile Steel. These structures shall be painted with approved paints.

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- 5.4.9 Pipelines offered must be seamless pipes. Material for pipe line must be corrosion resistant aluminum alloy ASTM T5-6060/6063 confirming to EN755.2, EN755.8 & EN573.3.
- 5.4.10 All pipes must be pre coated with protective paints/primer. The colour of pipe line must be CANARY YELLOW.
- 5.4.11 Pipes used must have close control on dimension from outside as well as inside, in order to provide leak free connection with the fittings.
- 5.4.12 Make of pressure gauges to be installed on pipe line shall be Wika, Mass, Micro, Pioneer, Delta, H Guru. Material of pressure gauges shall be Stainless steel.
- 5.4.13 Sufficient number of isolating valves, as may be necessary shall be incorporated in the pipe lines system for easy & quick isolation of sections. The location preferably shall be close to ladders for easy accessibility.
- 5.4.14 All down take pipes are to be takes down along the RCC/steel columns and the bidder shall provide necessary clamps and suitably secure them at minimum three points.
- 5.4.15 The down take pipes shall be taken from the main header line in such a way that no moisture should be passed to down take pipes. The down take connection shall be running vertically along the structure and two-way threaded needle flow control valve to be provided at the end.
- 5.4.16 Each down take shall have two port wall bracket having one input and two outlet points with 1/2" threaded needle control valves and Quick Release Coupling/assembly for usage.
- 5.4.17 Isolation valves to be located at accessible places for its operation during use/break down in main header line keeping in view of staff safety.
- 5.4.18 The gap between different main header pipes as well as different down take pipe should be sufficient for maintenance purpose.
- 5.4.19 Adequate steps should be taken to ensure that minimum required pressure is maintained at farthest point in the system by making loops.
- 5.4.20 Suitable valves shall be provided in the pipe line system for section isolation/equipment isolation. The valves provided shall be suitable for the service conditions in all respects and shall be selected and located considering easy operation and maintenance. Isolating valves are to be provided at the start and end of each main header pipe.
- 5.4.21 All valves to be provided at suitable location from operation & maintenance point of view.
- 5.4.22 Leading parameters for the pipe line distribution system are as below:

<b>Size</b>	Main header pipe line : 50 NB diameter Down take pipe line: 15 NB diameter
<b>Pipe line material</b>	Aluminium Alloy ASTM T5-6060/6063 confirming to EN 755.2, EN 755.8 and EN 573.3
<b>Maximum working pressure</b>	Up to 10 Bar
<b>Pipe line colour</b>	Canary yellow
<b>Header valves</b>	2" full flow isolating valves, threaded ends, Make: L&T, Audco, Parker Legris, Vanaz, Airtet, Air pipe, Flowjet
<b>Down take valves</b>	1/2" two way needle control valve, threaded ends, MOC : SS304 or Brass
<b>Line pressure gauges</b>	Stainless steel, 6" dial, Range 0-30 Kg/cm <sup>2</sup> , Bottom connection, Make : WIKA, Mass, Delta, Pioneer, Micro, H Guru

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5.4.23 Length of pipe lines required to be provided is as under: -

- (i) 50 NB Pipe line: - 1570 metre
- (ii) 15 NB Pipe line: - 780 metre

## **6. ATMOSPHERIC, CLIMATIC CONDITIONS & ELECTRICAL REQUIREMENTS:**

- 6.1. The ambient temperature in the region varies from 0°C to 50°C depending upon the seasonal changes over the year. The relative humidity may be as high as 100% during some parts of the year. The atmospheric conditions for major part of year are expected to be dusty.
- 6.2. The equipments/systems offered shall be capable to work under these atmospheric conditions without any adverse effect on their performance.
- 6.3. The whole plant set-up electrical/electronic system shall be designed for low tension power supply/feed of three phase 415 V +/- 10% & 50 Hz +/- 3%. For load cell weighing system and display, 230V +/- 10%, single phase, 50 Hz +/- 3% AC may be applicable. In case of any other specific requirements, the bidders shall clearly mention the utilities that RCF needs to provide.
- 6.4. The necessary incoming electrical supply shall be made available by RCF at a single point to the power panel which may be located within the operator's room. Beyond this, cabling work would be in the scope of tenderer.
- 6.5. Necessary separate earthing pits and earthing strips as per relevant IS Specification for safe working of electrical and electronic system and/or storage vessel shall be made by the tenderers under their scope of work. Cost of earth pits should be separately indicated.

## **7. SPECIAL FEATURES:**

Special features incorporated into the system, if any, shall be indicated separately by the tenderer, clearly indicating the advantages of these features.

## **8. DEVIATIONS:**

The tenderers should certify that the plant offered fully meets the specifications. Various design features incorporated in the machine to fulfill different technical and performance requirements should be fully explained in the offer. The tenderer shall clearly indicate the details of the deviations and their implications.

## **9. APPROVAL OF DRAWINGS AND SUBMISSION OF PESO DOCUMENTS:**

- 9.1. The successful bidder shall prepare layout drawing of the plant premises in accordance to PESO guidelines for prior approval for amendment of PESO license. This layout of the system shall be submitted by Successful bidder within 30 days after issue of LOA for approval by the consignee along with other PESO application proformas.
- 9.2. This layout shall be approved by the consignee before installation.
- 9.3. After installation of the entire system, bidder shall again submit as built plant layout drawing and other proformas for approval of consignee and subsequent grant of amended PESO license.

## **10. INSPECTION, DISPATCH, INSTALLATION, COMMISSIONING AND TESTING:**

- 10.1 The inspection of the material shall be carried out by M/s RITES at firm's premises before dispatch of material. RITES inspection fees shall be borne by the successful bidder.

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- 10.2 Post material inspection, RITES inspection certificate shall be submitted by the successful bidder to the consignee.
- 10.3 The bidder shall make his own arrangements for safe and sound delivery of equipment and supplies at site. In case any insurance which could be done shall be arranged at their own cost. Any road clearances or statutory road permit to move the vessel is to be obtained by the bidder.
- 10.4 The bidder should normally dispatch the vessel and vaporizer only after the foundation is ready for installation and commissioning of the system on arrival and prior approval for amendment of license has been received from PESO.
- 10.5 The bidder would be required to carry out a joint check at consignee's end, along with the consignee, before unpacking is done, to avoid subsequent complaints regarding short shipment/transit damages. It is necessary that this joint receipt inspection be done immediately on receipt of the material consignee and bidder's representative to avoid commissioning delays due to short shipment/transit damages. **A Joint Receipt Inspection (JRI)** note shall be prepared by the consignee and bidder's representative after inspection as per **Annexure-A**.
- 10.6 **RESPONSIBILITIES OF CONSIGNEE:** The consignee shall be responsible for:
- Provision of adequate space to the successful bidder for complete installation of the system.
  - Necessary gate pass shall be issued for entry/exit of manpower, tools, machines, material as per rules.
  - Water, electricity & compressed air required for installation & commissioning and operation of the Liquid Argon storage vessel and pipe line system shall be provided free of cost to the successful bidder. Source power will be of good quality, uninterrupted and free of surge and compressed air will be free of moisture.
  - Wherever a road mobile crane has to be arranged by the successful bidder for material handling a clear approach for it up to the site shall be provided.
  - All necessary information required for processing the approvals from the concerned regulatory bodies like CCOE etc. shall be provided by RCF to the successful bidder.
- 10.7 **RESPONSIBILITIES OF THE BIDDER:** The bidder shall be responsible for:
- Design and construction of foundations as per soil conditions and statutory guidelines.
  - Unloading of the machine and all accessories on receipt and its movement to the site of installation including provision of road mobile crane.
  - Installation and commissioning of vessel, vaporizer complete with all accessories and pipeline distribution network.
  - The bidder shall place and keep on the works at all times qualified, efficient and competent staff to give necessary directions to his workmen and to see that they execute their work in sound and proper manner.
  - The bidder will submit a correct record to consignee showing the names of all the staff and workmen employed by him at railway premises.
  - The bidder or his staff and employee will observe rules & regulations of Rail Coach Factory, Kapurthala in regard to entry in the factory, safety and identification. bidder will also to meet all legal requirements while working in RCF premises.
  - Bidder shall ensure that staff employed by him wear all the necessary personal protective equipment and observe all safety precautions while working in RCF.



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- viii. The bidder shall keep adequate spare parts and necessary tools available all the time at site so that maintenance work is not delayed on this account.
  - ix. The statutory fees to the department of explosives for obtaining approval will be borne by the bidder.
  - x. Bidder while carrying out side work at site will ensure that there is no disruption/stoppage of existing system in RCF. If any work requires such disruption, it will be done in off duty hours or Sunday / holiday with prior intimation to RCF.
- 10.8 The successful bidder should complete installation & commissioning of the entire system within **10 months** from the date of issue of LOA.
- 10.9 All fabrication/erection work covered by this specification shall be subject to inspection by consignee and successful bidder shall advise consignee promptly at various stages of erection for inspection.
- 10.10 Entire pipe lines, accessories, fitting etc. after erection in the field are to be tested for performance.
- 10.11 Test pressure shall be maintained until the entire section under test has been examined for leaks. Defects revealed shall be rectified and the sections retested.
- 10.12 The contractor shall arrange to provide for the duration of tests. All such instruments and gauges as would be necessary for conducting the test shall be calibrated. Calibration certificate may be produced at the time of commissioning.
- 10.13 If the result of the tests of the system performance falls short of the required prescribed standards, the contractor shall bear all expenses for improving the performance of the system by necessary rectification/replacement of equipment/materials and carry out another acceptance test.
- 10.14 The test pressure shall not be below those stipulated in ASME B31.1 viz., 2 times the working pressure of the passing through gases and for compressed air OR as per the standard followed by manufacturer whichever is higher.
- 10.15 The pipe line system for the shop shall be subjected to pneumatic test after assembly. There shall not be any pressure drop for the first 02 hours except that arising out of temperature variations.
- 10.16 Successful bidder shall submit all necessary PESO documents/certificates viz. SMPV (U) Rule 18, Rule 33, Rule 13 etc.
- 10.17 The supplier shall demonstrate machine performance for successful commissioning at consignee's works.
- 10.18 The M&P shall be deemed to be "commissioned" at the consignee premises on the date when it is tested and and meets the specified capabilities/functions according to the technical specifications. For testing of the system, amended PESO license for operating of the plant is to be submitted by the successful bidder. A **Joint Commissioning Note (JCN)** to this effect shall be made as per the format at **Annexure-B**.
- 10.19 After issue of JCN, the performance of the system shall be watched by the consignee for a period of one month before the issue of final completion certificate. If some minor breakdowns are noticed after the issue of JCN, these shall be attended as per warranty obligations and suitable extension of the warranty period.

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#### 11. TECHNICAL LITERATURE:

- 11.1 The successful bidder shall supply 2 copies of technical literature of equipments including Electrical and Electronic equipments. The circuit diagram and pipe line layout diagram shall also be supplied by successful bidder. Any other literature, if required for proper function of the system shall also be supplied by bidder to consignee.
- 11.2 Bidder should also submit detailed part list of all spares including its make and manufacturer for both Electrical & Mechanical spares including its make and manufacturer for both electrical and mechanical spares. List of bought out item to be submitted along with make and model.
- 11.3 All technical data regarding safe handling of cryogenic Liquids, drawings/layout of the installation and to provide necessary training for safe operation of equipment.
- 11.4 Documents pertinent to the system such as operations manual/calibration certificate etc. shall be provided to RCF, Kapurthala, by successful bidder.
- 11.5 All documents necessary for obtaining approval of statutory authorities i.e. Chief Controller of Explosions/PESO, all designing documents as well as certificates shall be supplied by the successful bidder.

#### 12. TRAINING:

Technical experts of the manufacturer during commissioning of machine will fully and adequately train operators/ maintenance staff nominated by the consignee regarding complete operation, comprehensive preventive maintenance and basic breakdown maintenance.

#### 13. WARRANTY OBLIGATION:

- 13.1. Plant/equipment offered should be warranted against defective design, material, workmanship etc. for period of 24 months from the date of commissioning.
- 13.2. The warranty period would cover comprehensive maintenance of the entire system. All the spares required for attending maintenance of the system during warranty period shall be in the scope of tenderer.
- 13.3. The plant shall at all times give contractual output and accuracy. Any deficiency or breakdown for a total of 01 hour or more for a day would be treated as failure for the day, for the purpose of extending warranty period.
- 13.4. The tenderer shall ensure that, in case a failure is reported by a consignee, qualified service engineers shall visit the site within 24 hours from the date of complaint on calendar day's basis. The period of 24 hours (excluding date of complaint) after the failure reported shall be treated as grace period, which will not count towards breakdown time for up to one failure per month and a maximum of 3 failures per quarter. In case the number of failure exceeds one failure per month or three during any quarter of warranty, grace period of only one day will be permissible for such additional failure. Complaints shall be lodged by consignee by fax, phone, e-mail, WHATSAAP MESSAGE or per bearer at address given by the tenderer.
- 13.5. Maximum permissible down time till the machine is restored back to the contractual output and accuracy levels, in any quarter of the year during the warranty period, shall be 150 hrs. To ensure this, a record of breakdown (duly signed by shop in-charge) in hours on quarterly basis should be maintained by the consignee and joint report with the contractor shall be made for each breakdown attention. At the end of first and second year of

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warranty, these details of breakdown hours during warranty period should be reported as per performance appraisal report. The firm will then request consignee for release of WBG annexing the performance appraisal report and the breakdown details mentioned above.

13.6. Penalty will be levied on the machine supplier, for breakdown period on working days basis (excluding holidays) after discounting for the grace period. Penalty will be calculated as percentage of Warranty Bank Guarantee (WBG) charges and will be applied as under.

Breakdown period	Applicable penalty
Up to 150 hours in each quarter and not exceeding 500 hours annually	Nil
Exceeding 150 hours - up to 200 hours in any quarter and not exceeding 500 hours annually	5 % of WBG amount
Exceeding 500 hours - up to 750 hours annually	10% of WBG amount
Exceeding 750 hours - up to 1000 hours annually	25% of WBG amount
Exceeding 1000 hours annually	Encashment of WBG besides other action like noting adverse performance of the bidder and / or agent for future tenders and their offer in the subsequent tenders will not be considered for placement of any order

#### 14. PAYMENT TERMS & CONDITIONS:

- 14.1. 80% of the contract value shall be released after installation, commissioning and testing of the machine.
- 14.2. Balance 20% of the contract value shall be released after submission of bank guarantee for an amount 10% of contract value as warranty security and clearance of all pending issues noted in Joint Commissioning Note.

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## ANNEXURE- A

**JOINT RECEIPT INSPECTION NOTE**

Date.....

Sub: Receipt of consignment for machine.....

Ref: RCF/KXH Contract No.....

1	Name of consignee/Railway	
2	Machine name	
3	Quantity	
4	Name of supplier	
5	Consignment of the machine received on	
6	The foundation & associated works essential for "Safe Installation of Machine" are ready	

It is certified that the consignment of the machine has been received complete and in good condition as per specification shown in the contract.

**Tentative plan for installation and commissioning of the machine is as under:**

1	Date of clear site provided	
2	Contract	Turnkey/Non-turnkey
3	<b>Status of readiness of foundation:</b>	
3(a)	Already constructed on	
3(b)	Under construction & likely date of its completion	
3(c)	Construction yet to be started from and likely date of its completion	
4	Status of availability of electrical power, water and compressed air etc	Available/Notavailable
5	Likely date for start of erection/installation	
6	Likely date for switch-on the machine	
7	Likely date of completion of commissioning of the machine	

**Representative of firm  
Designation**

**Representative of consignee  
Designation  
(Minimum Gazetted level)**

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**ANNEXURE-B****JOINT COMMISSIONING NOTE****Date:** .....**Sub:** Commissioning of (name of machine).....**Ref:** RCF/KXH AT No.....

1	Name of consignee/Railway	
2	Machine name	
3	Quantity	
4	Name of supplier	
5	Machine received on	

6. All the parameters of the machine are found okay. The proving test on the machine was conducted from ..... to ..... and machine is working satisfactorily.

7. Machine has finally been commissioned on..... . The machine has been handed over for regular use and kept under one month observation to watch its performance.

8. Following minor deficiencies (if any) found during joint observation trials are to be attended/rectified by the firm during one month observation and before release of balance 20% payment to the firm:

- a.
- b.
- c.

**Representative of firm**  
**Designation**

**Representative of consignee**  
**Designation**  
**(Minimum Gazetted level)**