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ISO 9001:2008

No. NML-SNP/MER-ABHI/42-20

Date: 05.02.2021

CORRIGENDUM

Sub: Tender for Battery Dismantling and Powder Separation Setup

Ref: 1) Enquiry No. NML-SNP/MER-ABHI/42-20 dated 20.01.2021
2) Tender ID No. 2021_CSIR_67638_1

The following amendment(s) is / are hereby made in respect of the reference cited above :

With reference to the above procurement, it is informed that the technical specifications have been revised as per Annexure-I. The bid may be submitted as per the revised technical specifications. All other terms and conditions will remain unaltered.

05.02.2021

(N.K. Singh)
Controller of Stores & Purchase

Enclosure: Annexure-I (Revised specifications)

CSIR-National Metallurgical Laboratory ★ Govt. of India ★ Jamshedpur-831007

Annexure-1

Battery Dismantling and Powder Separation Setup

1. The used/waste lithium batteries (LIB) would be shredded and the shredded materials would be fed into a crusher that breaks the positive and negative plates inside the battery. The shredded material would enter the process of crushing, air separation, magnetic separation, grinding, classification and screening to individually separate black powder, copper and aluminium fractions. The Tentative illustration of proposed 100-150kg/hspent LIB dismantling setup is provided in **Fig.1**.

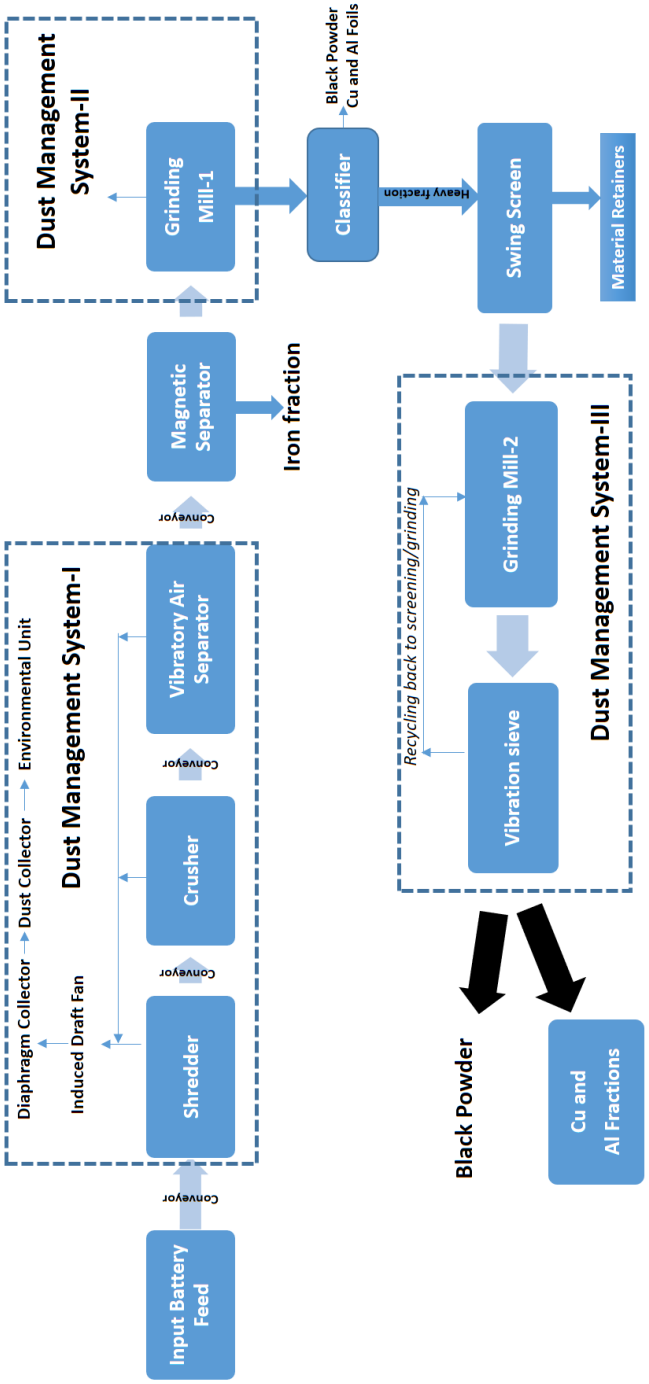

Fig.1: Tentative Illustration of Proposed Battery Dismantling and Powder Separation Setup

2. The desired function of each unit required as per the sequence in Fig.1 is mentioned below:

Sl. No.	Unit operation	Qty	Control Parameters and Specifications
i.	Belt Conveyor	3	a) Material of belt: Rubber b) For conveying materials to unit operations c) Diameter of Transmission drum: 200-220mm d) Diameter of support drum: 80-90mm e) 1 No. of additional motor compatible to Belt conveyer as an essential spare
ii.	Shredder	1	a) Blade MOC: Tungsten carbide b) Acceptable feed size: cylindrical size battery with Φ 18 - Φ 50 mm, 350 mm or less diagonal width for rectangular size of battery c) Suitable blade thickness to shred the batteries to below 25 mm d) 1 No. of additionalmotor compatible to Shredder as an essential spare
iii.	Crusher	1	a) Cavity volume: 0.1-0.2m^3 b) Acceptable Feed size: below 25mm c) Crush the battery below 10 mm d) 1 No. of additionalmotor compatible to Crusher as an essential spare
iv.	Vibratory Air Separator	1	a) Separate plastic, fluff, membrane fractions b) Suitable sieves (Material: SS304) c) 1 No. of additionalmotor and1 No. of additional Fan compatible to Vibratory Air Separator as an essential spare
v.	Material collector	2	a) Diameter: 850mm (±50mm) b) Straight Section Height: 800mm (±50mm) c) Cone Part Height: 1300mm (±50mm) d) Feed Flange diameter: DN 200 e) MOC: plain carbon structural steel
vi.	Dust Management System (DMS)	1	DMS-1 a) For collection of dust during shredding, crushing and vibratory air separator b) Material of bag: Polyester fibre c) Number of bags: minimum 48 d) Solenoid valve based system for release of the collected dust with Timer e) Provision for manual mode operation f) Salt based Gas collector for trapping gaseous emission (<0.05% Fluoride) g) 1 No. of additional motor and 1 No. of additional Fan compatible to DMS-1unit as an essential spare
		1	DMS-2 a) For collection of fractions during grinding-1 b) Material of bag: Polyester fibre c) Number of bags: minimum 48 d) Solenoid valve based system for release of the collected dust with Timer e) Provision for manual mode operation f) 1 No. of additional motor and1 No. of additional Fan compatible to DMS-2unit as an essential spare
		1	DMS-3 a) For collection of fractions during grinding-2 b) Material of bag: Polyester fibre c) Number of bags: minimum 64 d) Solenoid valve based system for release of the collected dust with Timer

			e) Provision for manual mode operation f) 1 No. of additional motor and 1 No. of additional Fan compatible to DMS-3unit as an essential spare
vii.	Belt Conveyor with magnetic separator	1	a) For conveying of material and separation of iron based components b) Material of belt: Rubber c) Intensity of magnet: 1200-1800G Permanent magnet d) Diameter of Transmission drum: 200-220mm e) Diameter of support drum: 80-90mm f) 1 No. of additional motor compatible to Belt conveyer with magnetic separator as an essential spare
viii.	Grinding Mill-1	1	a) Acceptable Feed size: below 10mm b) For grinding of non-magnetic material to below 1.5 mm c) Cavity Volume: 0.3-0.4m^3 d) Diameter of piercing shaft: 15-25mm SS304 e) Blade MOC: NM 500 f) 1 No. of additional motor compatible to Grinding Mill-1 as an essential spare
ix.	Air Classifier	2	a) Acceptable feed size: below 1.5mm b) For separating heavy fraction from light fraction after grinding-1 c) Cavity Volume: 0.8-0.9 m^3 d) Cavity diameter: 700-900mm e) Equipped with Variable air flow for operation of air classifier f) 1No. of additional Blower compatible to Air Classifier as an essential spare
x.	Swing Screen	1	a) To separate copper and aluminium mid-size foils from black powder b) 2Nos. SS304 screen (one each of 0.84mm and 0.074mm) c) Diameter of each screen: 1000mm (±50mm) d) Provision to collect three different size fractions e) 2 nos. of screens of each size as essential spares
xi.	Grinding Mill-2	1	a) For grinding materials post swing screen to below 0.3mm b) Cavity Volume: $\geq$0.1m^3 c) MOC of Shaft: SS304 d) MOC of Blade: NM 500 e) Equipped with 1 no. of material collector f) 1 No. of additional motor compatible to Grinding Mill-2 as an essential spare
xii.	Rotary Vibratory Screen	1	a) To separate fine copper and aluminium fraction from black powder b) SS304 screen size (aperture): 0.074 mm c) Diameter of screen: 800mm (±50mm) d) Provision for feeding coarser fraction to Grinding Mill-2 e) 1 No. stand-by motor f) 2 nos. of compatiblescreens as essential spares
xiii.	Air Blower	4	a) Equipped with Blower to generate controlled air pressure for transport of lighter material (Air Flow: 785-15455m^3/h) b) 2 nos. of blower fans compatible to Air Blower as essential spares
xiv.	Power Distribution System	1	Central control panel should be provided for controlling all process operations with individual unit control switches, by-pass aided electronic arrangement, which includes all necessary safety features as per process requirement.

2. The end product specifications obtained from Battery Dismantling and Powder Separation Setup shall be evaluated as per purity and recovery mentioned below:

2.1.	**Type of Battery that should be processed:** LCO, LMO, NCA, NMC								
2.2.	**% Purity of Fractions wherever applicable (By chemical analysis)**	Anode and Cathode Powder	≥90% Li, Co, Mn, Ni and <5% Al, Cu	Aluminium	≥70% Al	Diaphragm/ Polymer	≥90% C	Copper	>95% Cu
2.3.	**% Recovery of Fractions wherever applicable (By weight)**	Anode and Cathode Powder	≥90%	Aluminium	≥70%	Diaphragm/ Polymer	≥90%	Pile head and iron shell	>90%
		Copper	>95%	Plastic	>95%	Any other	>95%		

3. **Capacity:**100-150kg/h
4. General structure of the total unit should have anti-corrosion treatment
5. **Maximum permissible equipment noise:**Below 85dB (Within 3 m circular radii)
6. All unit operations should be operating in continuous mode with appropriate control systems in place. By-pass provisions should be provided in the control panel for individual unit operations.
7. Inclusion of all necessary control switches and safety switches for smooth operation
8. All the necessary electrical and control cabling should be provided by the vendor. All selected electrical components (viz., motors, ID fans, panels) should be designed and supplied as per process requirement. All downstream cabling, water distribution and Air distribution needs to be done by the vendor.
9. Plant GAD (General Arrangement drawing) along with space requirement, Plant control details along with control philosophyand total connected load should be provided to CSIR-NML by selected bidder for approval after order placement.Before shipment of consignment, the selected bidder shall demonstrate the operation of complete systemby physical/free of costonlinedemonstration.
10. All Civil work and structural requirement should be provided by vendor for effective installation and commissioning.
11. **Warranty:**1yearcomprehensive
12. **AMC:**2years non-comprehensive for entire setup should be quoted with the bid separately
13. **List of Spares for future use:**Vendor should mention list and price of all spares for the complete unit in the technical offer.
14. **Scope of CSIR-NML:**
    i. Single point water supply will be provided.
    ii. Single point Power supply[415 V (Fluctuations from +10% to -15%); Frequency: 50Hz (±5%); AC 3 phase] will be provided. Connected KVA/KW rating needs to be informed to CSIR-NML.
15. **Basis of Price Evaluation-** Price as per Technical Specifications + Warranty of 1 year from date of successful commissioning + Cost of 2 years non-comprehensive AMC+ dedicated training on site + Essential spares mentioned at Sl. No. 2 (i– xiii) Table under "Control Parameters and Specifications".

16. **Qualification criteria**:

i. Vendors or Principals who have demonstrated expertise in manufacturing/supply of LITHIUM-ION BATTERY DISMANTLING AND ELECTRODE POWDER SEPARATIONSET UP to research laboratories, PSUs or government agencies or private industries, are eligible. Also, vendors should have completed at least 1 successful commissioning of the LITHIUM-ION BATTERY DISMANTLING AND ELECTRODE POWDER SEPARATIONSET UP in India or abroad in last 5 years. Vendorsshould furnish list of previous suppliesalong with the relevant purchase order and commissioning document/certificates.

17. **Technical Acceptance Criteria**

i. Vendor should be able to demonstrate successful commissioning of the complete setup with minimum100kg/hfeed using LIBs provided by CSIR-NML. The parameters like size of fractions after each unit operation, followed by analysis of purity and recovery of products as detailed in Sl. No. 2.1.-2.3 should be physically demonstrated.

ii. All the design and parameters mentioned above for shredding, crushing, vibratory air separator, belt conveyor, magnetic separator, grinding mills and sieve separation with spares shall be matched upon receipt of order and on completion of commissioning.