REVISED TECHNICAL SPECIFICATIONS FOR REFRIGERATED CENTRIFUGE(CRYOFUGE)

1. Purpose:
    a. Large volume floor standing refrigerated centrifuge for separation of components from whole blood
2. Design and operation:
    a. Stable, sturdy all-steel design with stainless steel rotor chamber, should be easy to clean corrosion resistant paintings.
    b. Provision of both drain and condensed water collection container.
    c. Microprocessor controlled.
    d. Programmable memory with temper proof program saving facility, with parallel saving of at least 100 programs.
    e. CFC free refrigerant.
    f. Various formats of Swing-out rotors with metal buckets and with wind shields that should be able to accommodate at least the following:
        i. Sixteen or more 350ml and/or 450ml single, double, triple, quadruple/quintuple blood bags with SAGM and empty satellite bags with In Line filter system
    g. Removable plastic adapters to hold single/double/triple/quadruple blood bags with partition in every bucket.
    h. Insert with hook adapter to spin buffy coat or small volume of blood and balancing weights for inserts.
    i. Automatic lid lock.
3. Speed and force:
    a. Maximum speed at least 4,000 rpm to 4500 rpm
    b. Maximum RCF (Relative Centrifugal Force) for blood bags: 6000g-6500g
    c. Acceleration and deceleration profiles should be independently adjustable with at least nine brake levels and option for free coasting
4. Speed variation: microprocessor controlled rotor speed to within 10rpm of set value.
5. Temperature control
    a. Range at least: -20°C to +40°C
    b. Adjustable in 1°C intervals.
    c. Microprocessor controlled rotor temperature within 1°C of set temperature regardless of centrifuge speed
6. Programmable centrifugation time: 0 min-99hr with minimum resolution of 1 minute
7. Digital display for time should have display resolution of at least 2 digits, speed/RCF display resolution of 4 digits and time display resolution of 3 digits.
8. Should incorporate alarms for imbalance detection, lid interlock, over temperature, rotor over speed.
9. Motor imbalance detection: automatic shutdown of centrifuge if rotor load is out of balance with appropriate indicator.
10. Power requirement: 220/240 volts, 50Hz. Single phase AC supply.
11. The equipment shall be suitable for operation from 0 to 40°C at 90% relative humidity. Electronic circuitry shall be tropicalized for this ambient condition.
12. Noise level within 60 decibels

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13. The equipment should come with customized castor for changing location.
14. Protection of data: in event of power interruption or complete failure, data should remain stored indefinitely.
15. Should have a provision for external connectivity.
16. It shall have a security lock to prevent unintentional switch off and also unauthorized opening of the equipment.
17. Automatic line voltage corrector /voltage stabilizer.
18. A line voltage corrector of appropriate rating(10KVA or as per the requirement of equipment) should form part of standard configuration
19. Copper wound single phase automatic line voltage corrector conforming to IS: 9815(PLI)/94 with latest amendments or equivalent international standards fitted with a voltmeter and switch to indicate output/input voltage.
20. Input voltage: 140-280V, 50Hz, output voltage: 220 V$\pm$10%
21. Input output voltmeter and amperemeter. Protection for high low voltage cut off, overload and short circuit protection.
22. Equipment should be supplied with 2 meter cord at input and fitted with plugs of appropriate rating.
23. Make of the line voltage corrector shall be indicated.
24. Certifications:
    a. Product certification: European CE Class II A or US FDA/BIS certified
    b. Quality certification: SO 9001
    c. Electrical safety: Equipment meets electrical safety specifications such as that of IEC/EN 61010-1
25. Additional requirements:
    a. All equipments should specify qualifications for design, installation, operation and performance.
    b. Validation and calibration reports should have traceability to applicable national and international standards.
    c. Complete with comprehensive set of spare parts and accessories including: Double pan balance, Balancing weights and plates, plastic inserts and spacers and hooks for adjusting to different types and sizes of bag/tubing/filter designs, and a suitable capacity voltage stabilizer should be supplied free of cost with the system.
    d. Vendor will be responsible for IQ-OQ-PQ of the equipment.
    e. The make, rating, model, description, specifications, price quantity of each item should be furnished separately.
    f. Necessary catalogues, technical write up in English should be attached with the offer both in hard and electronic copies.
    g. Performance, efficiency, other factors as applicable should be furnished.
    h. Demonstration and continued comprehensive training for lab staff and support services till familiarity with the system.
    i. Should provide electronic and hard copies of User Manual(English),Service manual(English)
    j. Should provide a set of equipments for calibration (eg. Tachometer) and routine Preventive Maintenance as per manufacturer documentation in service/technical manual

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k. Should provide Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.

l. Satisfaction certificate from blood banks of at least 2 reputed Govt. Medical institutes would be preferred.

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