

SCOPE OF WORK AND TECHNICAL EVALUATION CRITERIA

Near-Infrared Spectroscopy System

Scope of Work and Technical Evaluation Criteria

1. Scope of Work

Item	Scope
1	Supply, deliver, and install one (1) NIR spectroscopy system as a full working system including manuals, software licenses, and applicable start-up kits at the Petroleum Sciences Section at the Rosherville Oil Laboratory. The scope includes on-site commissioning and staff training. On-site commissioning and staff training.

2. Specification of Product or Goods

Parameter	Requirement
Spectral range	Covers near-infrared region (e.g., 800–2500 nm or 12,000–4,000 cm ⁻¹)
Resolution	Suitable for liquid hydrocarbon analysis (≤ 10 nm or ≤ 8 cm ⁻¹)
Signal-to-noise ratio	Adequate for trace component prediction in transformer oil
Sample handling	Automated or semi-automated; capable of measuring liquid oils with minimal cleaning
Measurement time	≤ 1 minute per sample (including cell flush)
Software	Includes chemometric modelling (PLS, PCA, SIMCA) and spectral library search
Validation	Compliant with relevant ASTM or IEC standards for oil analysis (e.g., ASTM D8092)
Calibrations	Pre-loaded or user-developable models for transformer oil parameters (moisture, TAN, antioxidant, furans)
Power supply	Standard laboratory supply (100–240 V, 50/60 Hz)

Table 2: Product Specifications

3. Technical Evaluation Criteria

Requirements	Evidence required	Weight %	Scoring
Instrument specifications	Itemized compliance statement + manufacturer's datasheets	30%	Pass/Fail (if fails any critical spec, disqualified)
Detection prediction performance	/ Published or demonstrated prediction accuracy for	20%	- Excellent (10%): $R^2 > 0.95$ for all three - Good (5%): $R^2 0.90-0.95$

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Requirements	Evidence required	Weight %	Scoring
	moisture, TAN, antioxidant in transformer oil (RMSE or R ²)		Poor (0%): <0.90
Throughput automation	Sample measurement rate (samples per hour) and automation features	15%	≥60 samples/hour (15%) 30–59 samples/hour (7.5%) <30 samples/hour (0%)
Warranty support	Warranty period, response time, local spares, local technicians	15%	3 years + <48 hr + spares in RSA + ≥2 local techs (15%) 2 years or missing one item (7.5%) <2 years or poor support (0%)
Supplier experience (SA installations of similar NIR in oil/power lab)	Purchase orders / contracts with client details (redacted)	10%	≥3 installations (10%) 2 installations (6%) 1 installation (3%) 0 installations (0%)
Training program	On-site training syllabus (operation, maintenance, model building)	5%	- Comprehensive (≥2 days, including model building) (5%) - Basic operation only (2.5%) - None (0%)
Project timeline	Delivery & commissioning within stated weeks after PO	5%	≤8 weeks (5%) 9–12 weeks (2.5%) >12 weeks (0%)
Total		100	
THRESHOLD: 75%			

Table 3: Technical Evaluation Criteria (100%)

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