	SCOPE OF WORK (SOW)	TURBO GEN SERVICES (TGS)
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Industries (ERI) SOC Ltd.

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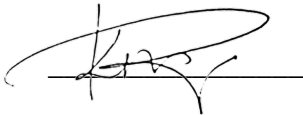
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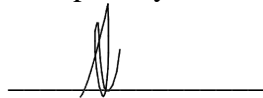


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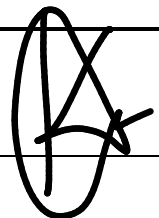
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1 Objectives

The objective of this document is to outline the requirement of dry ice and nitrogen to be supplied for ERI (TGS, Matla and Rosherville Works).

During refurbishment of turbine components, rapid cooling is often required during disassembly and reassembly of shrunk on components, and etc.

2 Scope of services

The scope of responsibility includes the supply of liquid nitrogen and dry ice to the following sites: Arnot, Duvha, Grootvlei, Matla, Hendrina, Camden, Kusile, Medupi, Koeberg, Kendal, Tutuka, Kriel, Lethabo, Matimba and ERI (TGS, Matla and Rosherville Works). This will assist in the disassembly and reassembly of shrunk on components.

3 Scope of Work (SOW)

3.1 Supply of liquid nitrogen and dry ice

Background

In certain process applications, it is useful to be able to quickly cool, chill or freeze material in a process. Liquid nitrogen and Dry ice can be added directly onto the material or components submerged into liquids to reduce the temperature of the product in further processing in the assembly or disassembly phases

The challenge faced with the continuous supply of any of the following essential consumables like the liquid nitrogen and dry Ice during the refurbishment projects of various components of Eskom sites (Arnot, Duvha, Grootvlei, Matla, Hendrina, Camden, Kusile, Medupi, Koeberg, Kendal, Tutuka, Kriel, Lethabo, Matimba and ERI (TGS, Matla and Rosherville Works) and external clients on planned shutdown and breakdown/emergency basis.

This scope of work is based on the minimum required quantity at the time of execution of a activity and provision should be made for a request of large quantities based on the multiple projects carried out across all Eskom sites and TGS works.

1 Supply of 2 off 20 kg liquid nitrogen

a. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

- i. Chemical Symbol :N₂
- ii. Molecular Weight 28,01
- iii. Boiling point @ 101,325 kPa -195,8°C
- iv. Density, liquid @ boiling point 803,6 kg/m³
- v. Relative density (Air = 1) @ 101,325 kPa 0,967
- vi. Latent heat of vaporisation @ boiling point 199,1 kJ/kg
- vii. Colour None
- viii. Taste None
- ix. Odour None

b. Nitrogen (liquid) N₂, In Liquid form. Inert type Gas.

2 Supply of boxes of dry ice 20 kg (415mm x 288mm x277mm inner dimensions)(517mm x 387mm x 319mm outer dimensions) or equivalent boxes

Physical Data

- i. Dry ice is the solid form of carbon dioxide (CO₂) at a temperature of -78.5 °C.
Quality Dry Ice per container is 20kg.20Kg dry ice

3.2 Safety

Supply of Liquid nitrogen:

Container to be use must be designed for cryogenic liquids; no other stopper or any other device is to be used with container that will prevent venting as the liquid nitrogen evaporates.

Supply of dry ice:

Container with inner dimensions of 415x288x227 and external dimension 517x387x319 filled with 16mm circular pellets.

3.3 KEY DELIVERABLES

The following deliverables are to be met by the service provider:

:

- No customer complaints
- Compliance to all ERI Work Instructions, processes, procedures, and standards
- No SHEQ incidents
- Deliveries provided on time, or earlier

3 PROCEDURE ADHERENCE REQUIREMENTS

The ERI TGS Quality Management System consists of various procedures and processes that are utilized to manage and control the level of quality of maintenance activities during an outage to an acceptable standard. These procedures and processes are employed during the planning and execution of maintenance activities with a focus of meeting the customer's requirements and enhancing their satisfaction. These procedures shall be adhered to by the service provider and will be made available on request by the service provider.

- Execution and Control of All Site Work (240-137025973)
- Quality Control
- PQP Workflow Assessment and Tracking for Outages (F-198)
- Technical Notification Work Instruction (240-94067868)
- Control of Blanks and Foreign Material Exclusion Covers (T-03)
- Rotor Lockable Components Inspections (E-67)
- Hydraulic Equipment Specifications, Operation and Maintenance Requirements (F-465)
- Compilation of Service Reports and Data Books (F-737)
- Lifting Machines and Lifting Tackle Safe Working Practices (E-19)
- Management and Control of Tools in a Tool Store or a Container (240-125904456)
- Correcting of Checksheets Engineering Instruction (X-1384391-033)
- Project Management Product/Process Quality Plan (240-130329202)
- Control of Non-Conforming Product/Service, Corrective and Preventive Action (240-103649507)
- Business Management System Audit (240-94027195)
- Coding of Business Management System Documentation (240-94027233)
- Development and Management of the Product/Process Quality Plan for Outages (240-142892057)
- Generator Clean Conditions Requirements Work Instruction (240-56178527)
- Turbo Gen Services - Outage Quality Control Cabin (240-142894278)
- Turbo Gen Services Rework Work Instruction (240-147200671)
- Flogging procedure (E-60)
- Safe operation of electrical equipment (TT-A-01)
- Plant Safety Regulations

3.4 Key Performance Indicators

The performance of the contractor will be evaluated on the KPIs in the table below:

Objective	Key Performance Indicator	Measure	Unit of Measure	Source of Evidence
Safety Sustainability	LTI Free days	LTI Free days	Days	To be provided by supplier
Due Date Performance	Due Date Performance	Average contracted days	Days	To be provided by supplier
No of Legal & Environmental Contraventions	No of Legal & Environmental Contraventions	Number of contraventions	Nr	To be provided by supplier
Zero Fatalities Excl 3rd party at fault	Zero Fatalities Excl 3rd party at fault	Number of fatalities	Nr	To be provided by supplier