HAZARDOUS SUBSTANCES AND CHEMICALS CRITICAL RISK CONTROL STANDARD TNCLOHSS-STD-0008

APPROVALS:

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1. INTRODUCTION

1.1 Purpose of the Standard

This Standard underpins the Tembo Nickel Company Limited (TNCL) safety vision that "Every person goes home safe and healthy every day" by proactively managing the risks associated with hazardous substances and chemicals. Working with hazardous substances and chemicals has been identified by TNCL as a Critical (potentially fatal) Risk.

The purpose of this Standard is to eliminate or minimise the potential for fatalities, injuries, environmental harm, and incidents arising from the production, importation, transportation, storage, handling, use, and disposal of hazardous substances and chemicals. The critical controls identified in this Standard are the minimum requirements that shall be in place and implemented, in conjunction with TNCL's risk management processes, to ensure that these risks are effectively controlled.

This Standard ensures that chemicals and other hazardous materials are managed in accordance with the Tanzanian Industrial and Consumer Chemicals (Management and Control) Act No. 3 of 2003 and its Regulations, the Occupational Health and Safety Act No. 5 of 2003, the Environmental Management Act (Cap. 191), the TNCL Environmental Policy, Environmental Management Plan (EMP), and Environmental Impact Statement (EIS). It is further aligned with international good practice, including the IFC Performance Standards and the World Bank Group Environmental, Health, and Safety (EHS) Guidelines.

This Standard and its supporting documents detail the minimum controls that shall be implemented and may be supplemented by site-level procedures, which may include local statutory or site-specific requirements based on infrastructure or specialised equipment. Where this Standard conflicts with any applicable law, regulation, or other corporate policy, the most stringent requirement shall apply while always maintaining compliance with legal obligations.

1.2 Scope of the Standard

This Standard applies to the whole TNCL project area, including all TNCL-controlled sites (Kabanga and Buzwagi), and to all TNCL employees, business partners, contractors, sub-contractors, and visitors involved in activities where hazardous substances or chemicals are produced, transported, stored, handled, used, or disposed of.

This Standard applies to all hazardous materials. Radioactive sources, sealed sources, and pharmaceuticals are managed under their dedicated standards (and the Atomic Energy Act, 2003), but their presence shall be considered when planning emergency response under this

Standard.

2. DEFINITION AND ABBREVIATIONS

2.1 Definition of Terms

Table 1: Definitions and Acronyms

Acronym / Term	Definition
Alarm	A stand-alone system for protecting people and facilities from exposure to hazardous materials.
CCMP	Chemicals Management Portal operated by the GCLA for registration, permits, and precursor returns.
Containment	A system or structure that confines a hazardous material and prevents its uncontrolled release to people or the environment.
EIS / EMP	Environmental Impact Statement / Environmental Management Plan.
ERP	Emergency Response Plan.
FIFO	First In, First Out (stock rotation principle).
GCLA	Government Chemist Laboratory Authority (Tanzania), the authority implementing the Industrial and Consumer Chemicals (Management and Control) Act.
GHS	Globally Harmonized System of Classification and Labelling of Chemicals.
HazMat	Hazardous Material – any solid, liquid, gaseous, chemical, or waste which, by reason of its quantity, concentration, or physical/chemical characteristics, is likely to be injurious to human health, life, or the environment. Includes hazardous chemicals, substances, and wastes regulated by the GCLA.
Hazardous Waste	Any waste which, by reason of its chemical reactivity, toxicity, infectiousness, explosiveness, corrosiveness, ignitability, or environmental hazard, is harmful to human health, life, or the environment.
HMIS	Hazardous Materials Identification System.

Acronym / Term	Definition
Industrial Chemical	Any chemical or product used or intended for use in an industrial process.
Interlock	A device or mechanism used to prevent undesirable conditions in plant or equipment that could lead to harm to people, property, or the environment.
MoC	Management of Change.
NFPA	National Fire Protection Association.
PPE	Personal Protective Equipment.
Precursor Chemicals	Chemicals used in the manufacture of narcotic drugs or psychotropic substances, as listed in the Seventh Schedule of the Industrial and Consumer Chemicals (Management and Control) Act and controlled under international drug-control conventions.
Restricted Chemical	A chemical for which most registered uses have been prohibited by the Board, but for which certain specific uses remain authorised.
SDS	Safety Data Sheet – an information sheet providing the identity, physical and toxicological data, health effects, first-aid, firefighting, handling, storage, exposure control, PPE, and disposal information for a substance (formerly MSDS).
Secondary Containment	Facilities, equipment, or safeguards external to and separate from primary containment that prevent the escape of hazardous materials beyond a controlled area.
Spill	The loss or discharge of hazardous materials or pollutants outside of containment.
TANROADS	Tanzania National Roads Agency.
TNCL	Tembo Nickel Company Limited.

3. INTERPRETATION AND EXCEPTION

Any intended deviation from the requirements of this Standard shall be formally requested and approved through the following steps:

a) a detailed motivation is drafted, clearly describing why the requirements are inappropriate in the specific circumstances and/or how the associated risks can otherwise be mitigated;

b) a detailed, multi-disciplinary risk assessment is conducted, identifying the alternative control measures prescribed to adequately address the critical risk; and

c) formal approval is obtained from the General Manager (and, where environmental obligations are affected, the Environmental Manager), confirming that the alternative controls adequately control the risk and that any residual risk is understood and tolerable.

Exemptions shall specify a validity period and any restrictions or required actions and may not be granted. No exemption to this Standard can apply to, or override, any GCLA, OSHA, NEMC, or other statutory requirement. Completed exemption records shall be retained by the OHS and Environmental departments.

All questions, comments, and suggestions related to this Standard shall be communicated to the Document Controller. Responsibility for the interpretation of this document rests with the Custodian.

4. RISK

Inherent risks exist when working with hazardous substances and chemicals. These risks include, but are not limited to:

- exposure to chemicals and hazardous materials causing acute or chronic harm to human health;
- uncontrolled or uncontained spills and releases;

5. CRITICAL CONTROLS

The following critical controls have been identified for managing the risks of working with hazardous substances and chemicals. These controls shall be in place, verified, and maintained:

- labelling and hazard identification based on the Safety Data Sheet (SDS), GHS, and recognised secondary systems (NFPA / HMIS);

- labelling in place on all storage vessels, containers, tanks, and pipework, clearly identifying the material carried or stored and (for piping) the direction of flow;
- SDS readily available and accessible at the point of use;
- registration, permitting, and approval of chemicals (GCLA) prior to bringing them on site;
- correct selection and use of hazardous-materials Personal Protective Equipment (PPE);
- detection devices and alarms, maintained and calibrated;
- hazardous-materials energy isolation;
- integrity of hazardous-materials equipment, tanks, and containment;
- secondary containment and storage exclusion zones;
- interlock and fail-to-safe systems; and
- emergency response preparedness.

6. SAFE BEHAVIOURS

When working with hazardous substances and chemicals, all personnel shall:

- be trained, competent, and authorised before handling any hazardous material;
- only use hazardous chemicals for their intended and approved purpose;
- read and understand the contents of the relevant SDS;
- never handle or use a chemical that is unlabelled or labelled only in a language they do not understand;
- be familiar with the first aid and firefighting measures for the materials in use;
- understand the handling requirements, equipment, and alarm systems; and
- wear inspected and approved PPE.

7. ROLES RESPONSIBILITIES

Table 2: Roles and Responsibilities

Role	Responsibility
Environmental Department	Review new-chemical introduction requests and SDS; ensure chemicals are stored in original containers and per compatibility; conduct periodic inspections for compliance with the Industrial and Consumer Chemicals Act; keep records of type, location, quantity, and permits for hazardous waste; arrange external audits of chemical management; and submit monthly precursor chemical reports to the GCLA.
OHS Department	Develop and maintain the New Product / Product Approval process and ensure controls are defined before a chemical is permitted on site; coordinate HazMat training; advise personnel on exposures by work type; and include chemical spills in the site Emergency Response Plan.
Supply Chain Department	Purchase only chemicals approved and registered with the GCLA; obtain and share the SDS with the requestor prior to delivery; ensure transporters and drivers are trained and certified; verify deliveries are correctly packed and labelled; manage warehouse storage and compatibility; and apply Min/Max and FIFO stock control.
User / Other Departments and Contractors	Complete the new-chemical introduction permit with the SDS; follow all storage, use, handling, and disposal requirements; maintain SDS hard copies in work areas; and ensure personnel are adequately trained.
Area Supervisors	Ensure personnel are trained on the specific hazards, PPE, controls, ventilation/monitoring, backup, first aid, and emergency procedures before a task; ensure correct labelling (chemical, not trade, names); and report and investigate all chemical incidents and unsafe conditions to closure.
Employees / Contractors / Visitors	Do not handle any chemical without adequate training; do not use unlabelled chemicals or those labelled in an unfamiliar language;

Role	Responsibility
	review and understand the SDS; wear the correct PPE; and report all spills and unsafe conditions.
Training Section	Provide chemical/HazMat awareness in area inductions; deliver periodic competency-based training (hazard recognition, SDS, labels/placards, safe handling, storage/transport, spill and emergency response, exposure limits, PPE, symptoms, and first aid) at intervals not exceeding 24 months, with annual refreshers; and train personnel in NFPA, HMIS, and HazMat classification.
Document Controller	Maintain version control, distribution, and records of this Standard.

8. HAZARDOUS MATERIAL CONTROL

8.1 General Requirements

Sites shall identify, assess, and comply with all applicable laws, regulations, and other obligations relating to hazardous materials management for both TNCL and its contractors and suppliers. As a minimum:

- all new hazardous materials shall be cleared and registered with the GCLA, and permitted through the Supply Chain Department, prior to purchase and importation;
- personnel who use or handle hazardous materials shall wear the prescribed PPE and shall be trained on the material before exposure;
- an SDS shall be available and accessible to all personnel in the work area;
- emergency contact information shall be posted at visible locations wherever hazardous materials are used; and
- chemical or hazardous-material containers shall not be re-used for storing items intended for human consumption.

8.2 Storage Facilities, Design, and Asset Integrity

The basis of design of any facility or process – permanent or temporary – that transports, produces, stores, uses, or disposes of hazardous substances shall be reviewed (preferably with the vendor), amended as necessary, and documented using a process risk-assessment tool such as HAZOP, HAZID, or an equivalent. A Management of Change (MoC) shall be triggered for any new facility, location, or modification, addressing materials selection, site conditions, transport, production, storage, containment, handling, use, and disposal.

As-built design drawings (P&IDs,) process flow diagrams, layout drawings, and isometrics) shall be updated to reflect these reviews and shall include a consequence-analysis study that feeds into the site Emergency Response Plan. Sites shall maintain an asset-management programme of regular inspection, testing, and preventive maintenance of tanks, pressure vessels, piping, railings, and gratings, tracking structural-degradation mechanisms, together with a calibration programme for instruments and equipment.

Special requirements for tanks, containment, and containers:

- ensure tanks and containers are fit for purpose, properly enclosed, free from defects, and positioned to allow inspection;
- keep secondary containment free of water, spillage, and sediment, removing liquids and sediment by methods based on regulatory requirements and risk; and
- secondary containment shall contain a minimum of 110% of the volume of the largest tank within the containment area.

8.3 Detection Devices and Alarms

Detection devices and alarms shall be maintained in good condition, including calibration and inspection. Where devices are not functioning, additional controls shall be put in place to monitor exposure until they are repaired or replaced. Sites shall maintain mechanisms to monitor and report spills (type, volume, concentration, and consequence level), provide personal detection devices where required, and apply Management of Change to new detector installations and alarm-trigger-level changes.

8.4 Chemical Approval, Inventory and Safety Data Sheet

Each site shall follow the Product Approval Process for all new chemicals brought on site, including those for testing or short-duration contractor use. The process shall involve all departments that need to be aware of the chemical – at minimum the Environmental and OHS (Industrial Hygiene) functions – so that controls are implemented before the chemical arrives. A new chemical shall not be brought on site without prior approval and GCLA registration; bringing an unauthorised chemical on site is grounds for removal from site.

An inventory of hazardous materials shall be maintained by the Supply Chain Department, with copies provided to the Environmental and OHS departments, recording as a minimum the chemical name, hazard level and HazMat classification, storage location, date received, quantity available, and expiry date. In addition:

- SDS shall be maintained in an accessible database (and as current hard copies where electronic access is not available), in English and Kiswahili;

- SDS shall be retained for as long as the chemical is known to be on site;
- for chemicals produced on site, an SDS shall be created and updated within three months of becoming aware of significant new hazard information;
- for chemicals brought to site, the manufacturer or supplier shall provide the SDS, which shall be replaced promptly if found to be inaccurate; and
- consumer products used in a manner consistent with normal consumer use, and raw material being mined or processed, do not require a separate SDS unless mixed into a hazardous mixture.

8.5 Labelling and Placarding

All containers of hazardous material (including bulk tanks and silos) shall be labelled with either the manufacturer's original label or a GHS label, following the criteria of the GCLA, OSHA, and recognised secondary systems (NFPA / HMIS). A manufacturer's label is acceptable where it provides chemical identification cross-referenced to the SDS and inventory; is prominently displayed, legible, and accurate, in English and Kiswahili; displays appropriate hazard warnings; and identifies the manufacturer or responsible party.

- where a chemical is transferred to a secondary container, that container shall also be labelled per GHS / HMIS;
- piping systems containing hazardous chemicals and compressed gases shall be labelled and colour-coded with the chemical name and direction-of-flow arrows, applied near valves, flanges, changes of direction, branches, wall/floor penetrations, and at sufficient intervals on straight runs;
- hazardous-waste containers shall be labelled per GHS and the site Hazardous Waste Management Plan, and kept closed except when adding or removing material;
- labels shall be removed or changed when a container is re-used or its contents change; and
- where labelling is incomplete, an implementation plan with risk-based prioritisation and a completion timeline shall be developed.
- process and automatic plant control systems, incorporating fail-to-safe design, to eliminate or reduce personnel exposure; where automatic control is impracticable, risk assessment shall identify operational controls.

Bunded (Secondary Containment Area)

Area supervisors shall ensure that trapped rainwater does not compromise bund capacity (bunds shall be roofed where practicable); bunds are free of rubbish and combustibles; collection sumps are kept clear using dry methods; sump drain valves are locked closed and signed “Drain valve to be kept closed and locked at all times”; and bund walls are free of cracks or fractures.

Table 3: Secondary Containment Requirements

Requirement	Specification
Impermeability	The bund shall be impermeable and chemically resistant to the substances stored.
Capacity	Greater than 110% of the volume of the largest storage vessel or interconnected system, and at least 25% of the total volume stored.
Recovery	Graded or fitted with a sump to allow recovery of spilled liquid.
Jetting	Designed so that jetting from any vessel or fitting is captured within the bunded area.
Compatibility	Designed so that chemicals are stored according to compatibility.
Control	Managed so that the effective capacity of the bund is maintained at all times.

8.6 Hazardous Materials Energy Isolation

- Isolate and clean storage and distribution systems (tanks, pipes, pumps) before working on them;
- Use a double block and bleed arrangement, or a system providing an equivalent level of isolation;
- Secure and lock isolation points to prevent accidental or intentional operation, and maintain the functionality of the isolation system;
- Maintain a list of a system’s required isolations to confirm all energy sources are identified and isolated;
- Obtain department manager (or designee) approval for any live work; and
- Use barricading or exclusion zones to keep non-essential personnel out of the work area.

8.7 Labelling and Placarding

A hazardous materials management plan shall be developed to minimise the risk associated with transport, unloading, transfer, storage, handling, use, and disposal. The plan shall include as-built designs, training needs and responsibilities, maintenance/monitoring/inspection/testing, spill mitigation, loading and offloading procedures and PPE, and an emergency response plan. Qualified personnel shall review storage and distribution-system integrity through risk-based inspection and testing at least annually. Key daily tasks include**:**

- Inspecting containers, vessels, and transfer equipment (instruments, hoses, couplings, seals, valves, gauges) before use;
- Confirming, using level/volume/mass indicators, that the volume being transferred will fit the receiving container;
- Ensuring alarms and overflow-prevention devices are in use;
- Informing potentially affected personnel before transferring or handling hazardous materials;
- Using barricades to exclude unauthorised people from transfer areas;
- Keeping spill kits available at appropriate locations;
- Making immediate repairs to damaged, weathered, or deteriorated containment; and
- Documenting inspections, including interstitial-space checks (remote leak detection) for double-walled tanks or piping.

8.8 PPE Requirements for Exposure to Hazardous Materials

- select and use the correct PPE according to the SDS, procedure, or risk assessment, with correct PPE signage displayed and maintained in storage and use areas;
- undertake fit testing where respirator use is required;
- inspect PPE, including respirators, before use to confirm good condition;
- train personnel how to inspect, clean, maintain, and use PPE; and
- periodically inspect and maintain all PPE, safety, and emergency equipment (including spill kits), documenting faults and rectifying defects.

8.9 Transportation of Hazardous Substances and Chemicals

Transport of hazardous materials by TNCL, contractors, and sub-contractors shall comply with all relevant legislation, including the Tanzanian road-transport requirements (TANROADS), the Industrial and Consumer Chemicals (Management and Control) Act, 2003 and its Regulations, and the UN Recommendations on the Transport of Dangerous Goods, as a minimum. The site Hazardous Materials Management Plan shall ensure that:

- clear lines of responsibility for safety, security, release prevention, training, and emergency response are formalised in written agreements between producers, distributors, and transporters;
- transporters implement appropriate emergency-response plans and capabilities;
- drivers delivering chemicals on site are trained and certified in HazMat and spill management;
- deliveries are inspected on receipt to confirm good condition, proper containers, and correct labelling; and
- a hazardous-material manifest and supporting documentation, compliant with local legislation, accompany the consignment where required.

8.10 Disposal of Hazardous Substances and Chemicals Material

- No person shall dispose of hazardous waste (expired or obsolete chemicals or other hazardous materials) at TNCL other than as authorised;
- All hazardous waste shall be stored in accordance with the Industrial and Consumer Chemicals (Management and Control) Act, 2003 and its Regulations and disposed of only upon authorisation and recommendation from the GCLA;
- Depending on the chemical type and volume, disposal methods may include the tailings storage facility, engineered landfill, high-temperature incineration, or encapsulation via the paste backfill plant, as approved;
- Empty and used containers shall be stored in designated areas for disposal or recycling, without mixing incompatible residues; and
- To minimise expired or obsolete chemicals, any department or contractor producing them shall raise an incident report to enable root-cause analysis.

8.11 Chemical Shelf Life and Precursor Chemicals

All chemicals purchased by TNCL or its contractors shall have a shelf life of at least two years to minimise the incidence of expired or obsolete chemicals on site. Stored chemicals shall be inspected regularly by the end user and the warehouse, and any approaching or exceeding shelf life without justification shall be returned to the manufacturer or distributor (where possible), recycled, or disposed of per GCLA recommendations.

All precursor chemicals listed in the Seventh Schedule of the Industrial and Consumer Chemicals (Management and Control) Act, 2003 that are purchased or used at TNCL shall be properly recorded and tracked, with monthly returns submitted to the GCLA via the Chemicals Management Portal (CCMP).

9.EMERGENCY RESPONSE PREPAREDNESS

Each site shall have hazardous-material spill and emergency-response protocols in place, including equipment (first-aid kits, eyewash, safety showers, spill response) and trained personnel to respond, including activation of any interlock. Emergency response shall be triggered by any fire, major spill, leak, contamination, or misuse of a hazardous material that may threaten life, property, or the environment, with the response scaled to the size, type, and location of the incident. As a minimum, annual tabletop or live drills shall test the protocols and be documented with improvement actions. Other key elements include:

- testing showers and eyewash stations before work, confirming signage and a green light are in place;
- training personnel on spills and hazardous materials, and considering radiation and other special sources in response planning;
- communicating every spill to the area supervisor, then controlling, containing, and cleaning it up; with spill response following the Incident and Investigation Procedure;
- appointing site representatives to notify regulatory authorities (GCLA, NEMC, OSHA) and stakeholders as required; and
- conducting a post-event review after every emergency to identify and close gaps.

Facilities with a significant hazardous-materials risk shall maintain a risk-based Emergency Response Plan that includes, as a minimum: response procedures matched to the materials

and the consequence analysis; emergency equipment and facilities (oxygen, antidotes, showers); means of escape; clearly marked emergency isolation valves; emergency response teams appropriate to the risk; safe refuge and assembly areas; an emergency communication plan including surrounding communities; spill, fire, explosion, and burns response equipment; arrangements with external emergency services; impact-minimisation measures; and recovery and certified safe-disposal procedures.

10.COMPETENCE AND TRAINING

A competency-based training programme shall be in place at each site for all personnel working with hazardous substances, comprising theoretical and practical assessment and annual refresher training, with re-training at intervals not exceeding 24 months. HazMat awareness shall form part of new-hire and area inductions. General training shall include, as a minimum:

- a review of the site's chemical / hazardous-material management programme;
- the location and use of the chemical inventory, and how to interpret it;
- the site standardised labelling system and how to complete a chemical label from an SDS; and
- the general physical and health hazards of chemicals in the work area, including unwanted reactions.

Each employee shall also receive task-specific information and training for the chemicals they may encounter during routine and non-routine work, including storage requirements and release-prevention controls; detection methods; physical and health hazards; protective measures (safe work practices, respirators or self-rescuers for egress, emergency and evacuation procedures, and where to find the SDS); and spill containment, response, and reporting. Site emergency-rescue teams shall include hazardous-material scenarios in their training plan and practise rescue procedures with relevant workers.

11.CRITICAL CONTROL VERIFICATION

Critical controls shall be verified through routine field verifications, premises inspections, and internal and external audits. All chemical and hazardous-material storage premises shall be inspected monthly by the Environmental team for conformity with the Industrial and Consumer Chemicals (Management and Control) Act, 2003 and its Regulations. Verification questions include:

Competency: Has the worker been trained, authorised, and do they understand the components of working with hazardous materials?

Identification of chemicals: Do employees understand the hazards of the chemicals they handle? Do they know where to find the SDS? Are they wearing the correct PPE?

Handling and storage: Do team members know the procedure for an unknown substance? Is the chemical compatible with its container? Are containers and pipes labelled and legible, with direction of flow shown? Is the transfer area accessible with containment in place? Has the delivery been verified and is the driver following safe practice? Are substances segregated per SDS requirements?

Controlled access and emergency response: Are physical controls and legible signage in place to prevent unauthorised access? Are substances stored in designated locations? Do employees understand exclusion zones and evacuation procedures, how to activate the emergency call, immediate first-aid measures (e.g. eyewash/shower duration), and the monitoring and alarm systems for their area?

12.SYSTEM EVALUATION

This standard shall be reviewed at least after two years by members of (**list department responsible**) and presented to the Standard Committee for approval, or when organizational changes take place or required as part of internal and external audits. The TNCL Document Controller will monitor compliance with the document control system on an ongoing basis.

13. DISTRIBUTION

List physical locations which require a controlled copy of this document.

Table 4: Distribution

Copy	Controlled Document Folder Location
Master	Controlled Documents Central Filing System

14. CONTRAVENTION

Any breach of this standard shall be regarded as refusal/failure to carry out a lawful instruction and will be dealt with as per the disciplinary procedure.

15. DOCUMENT CHANGE PROCESS

The document change process starts when the document custodian identifies a need to make changes within the document. The document custodian/ owner shall complete the document change request form, sign it off, and submit it to the Document Controller.

The Document controller shall issue the controlled word copy of the document to the respective document custodian/owner so that changes may be made. The document custodian/owner shall resubmit the updated document to the document controller so that the document can be controlled and updated within the Filing system ready for use by the end users.

15.1 Reason for Change

Table 5: Reason for Change

A	As a result of incidents	F	Change in training requirements
B	As a result of the audit findings	G	Results of risk assessments
C	New / changes in governance documents	H	Change due to spelling or grammatical error
D	Changes in legislation	I	New document format
E	Changes in technology	J	To integrate special instruction into the document control system

15.2 History of Change

Table 6: History of Change

Date of Change	Revision No	Revised Item (paragraph Number reference if required)	Reason Code	Name of Reviewer

16. RECORD CONTROL

Table 7: Record Control

Document Title:	Document ID:	Responsible for Maintenance:	Responsible for Filling:	Location of Storage:	Retention Period:	Method of Disposal:
Hazardous Substances and Chemical Critical Risk Control	TNCL-OHSS-STD-0008	Document Controller	Document Controller	Department	Hard Copy two Years	Hard copy shared file electronic

17. DECLARATION

I hereby declare that I have taken part in the discussion of this standard, and I understand its contents and do commit that I shall ensure compliance hereto:

	Name and surname	Company Number	Designation / Role	Signature	Date Signed
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