CENTRE FOR ENGINEERING & TECHNOLOGY
RANCHI

STANDARDISATION OF REPORTS, SPECIFICATIONS AND DRAWINGS

MANUAL

STEEL AUTHORITY OF INDIA LIMITED
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RANCHI - 834002

MAY 2020 CET/16/RN/0000/MAN/PR/01/R4

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1 BACKGROUND

1.1 CET, set up in 1983, is the design, engineering and consultancy unit of SAIL. In order to introduce uniformity and standardize all the documents prepared by CET, a booklet "Standardization of Reports, Specifications and Drawings" was brought out in March 1992. The booklet was published as a manual (generally referred as *Green Manual*) in April 1999 covering the following aspects:

- Contents of reports / specifications
- Format and layout of reports/ specifications
- Numbering of documents
- Standard abbreviations & codes

The manual was revised in March 2006 and October 2012. Subsequent to that, new types of reports/ additions/ modifications/ standardization to the various reports and documents being prepared by CET have taken place. In view of this, the manual has again been revised.

1.2 CET prepares various types of reports, specifications and drawings for SAIL plants and clients outside SAIL from project concept to commissioning.

1.2.1 Type of Reports

CET prepares the following reports for the clients in general. The purpose of preparation of these reports is given in subsequent paragraphs:

1) Approach Note
2) Feasibility Report
3) Board Note/ Draft Investment Proposal
4) Detailed Project Report
5) Mining Plan
6) Tender Evaluation Report
7) Scheme
8) Technical note
9) Study Report

1.2.2 Types of Specifications

CET prepares following Specifications for the clients in general and the purpose of preparation of such Specifications is given in subsequent paragraphs:

1) Tender Specification (TS)
2) Ordering Specification (OS)
3) General Technical Specification (GTS)
4) Contract Technical Specifications (Technical part of Contract Agreement)
5) Tender Document comprising Invitation to Tender (ITT) and Draft Agreement (For BOO/ O&M /consultancy contracts/ MDO)
6) Invitation to Tender (ITT)
7) Standard Bidding Document (SBD)
8) Expression of Interest (EOI)
9) Tender specification (*for disposal of equipment*)

1.2.3 Types of Drawings

1.2.3.1 These are structured sketches showing layout, details of process/ equipment/ network etc. for complete understanding of the subject by the user. On most of the occasions, the drawings are prepared and annexed with documents like reports and specifications.

Based on the usage, the drawings can be classified as below:

- Preliminary drawings given in reports (AN, FR, DPR etc.). These are stamped as "For Feasibility Report only" etc.
- Drawings included in the specifications (TS, OS etc.). These are prepared to exhibit the technical/ technological parameters and are stamped as "For Tender Purpose Only", "For Ordering Purpose only" etc.
- Basic engineering drawings which are conceptual drawings for a project issued to contractor for detailing.
- Detailed Engineering drawings are issued where CET does the detailing of drawings. These are stamped as "Released for Construction", "Released for Manufacturing" etc.
- Sometimes reference drawings are issued which are preliminary and for information only like, in case of preparing a quotation or budgetary offer.

1.2.3.2 Content wise classification (indicative) of various types of drawings prepared by CET is as below:

1) Technological drawings
2) Process & Instrumentation (PI) diagram
3) Electrical Single Line schematic drawings
4) General Layout drawing
5) General Arrangement drawing
6) Process/ Material flow chart
7) Erection/ Construction drawings
8) Architectural drawings
9) Manufacturing drawings
10) Fabrication drawings
11) System drawings
12) Implementation schedule

2 GUIDELINES FOR PREPARATION OF DOCUMENTS

2.1 GUIDELINES FOR PREPARATION OF REPORTS

(Latest template of reports to be referred from CET Portal)

The applicable chapters to be included in various reports prepared by CET are given in the matrix below. The sequence of chapters will be from top to bottom out of applicable chapters for a particular document.

Chapters to be included in various reports

SL	CHAPTER	AN	FR	DPR	SC	MNP*	TER**	DIP	SR
1.	Introduction				√				
2.	Summary		√	√					√
3.	Background	√	√	√					√
4.	Analysis	√							√
5.	Approach	√							
6.	Market Analysis & Product Mix								
7.	Market & Plant capacity			√					
8.	Material inputs & linkages			√					
9.	Location			√					
10.	Selection of alternatives		√						
11.	Project description		√	√	√				√
12.	Environmental Plan			√					
13.	Equipment Specifications Bill of Materials			√					
14.	Implementation Schedule Strategy		√						
15.	Project Implementation Schedule			√	√				√
16.	Capital Cost & Financial Analysis		√						
17.	Financial & economic aspects			√	√				
18.	Conclusions	√		√					
19.	Recommendations		√						√
20.	Annexures *(wherever applicable)*		√	√					
21.	Drawings*(wherever applicable)*		√	√					
22.	*Chapters to be decided on case to case basis*								

* Chapters to be included in Mining Plan are mentioned in paragraph number 2.1.9.

** For TER, refer to the **format uploaded in CET Portal**

Note: In the subsequent paragraphs, guidelines for preparation of documents are given viz. chapters, chapter-wise contents etc. The chapters of various documents will be as stated in the matrix or afterwards and these are described in subsequent paragraphs of this manual.

2.1.1 Approach Note (AN)

Approach Note is prepared to list out various approaches comprising number of alternatives to achieve the given target or specific parameters. It will include analysis of various aspects of existing and proposed downstream and upstream facilities. It includes the indicative cost of proposals considered as alternatives. In a broader sense this report helps the top management to take decisions for further course of action. It should be concise with or without layout drawings. An Approach Note shall include chapters on background, analysis, approach and conclusion.

AN Format uploaded on CET Portal to be used.

2.1.2 Feasibility Report (FR) (*FR format kept at CET Portal to be used*)

Feasibility Report aims at taking a cool, hard look at the defined need and to explore the possible alternate ways of meeting it and their implications. It gives sufficient information to enable the client to take the decision for investment. It is a basic document for obtaining approval of competent authority. It will broadly examine the economic alternatives taking the following into consideration:

2.1.9.1 Market and plant capacity

2.1.9.2 Material inputs

2.1.9.3 Location and site

2.1.9.4 Project engineering

2.1.9.5 Overheads

2.1.9.6 Manpower

2.1.9.7 Project implementation

The Feasibility Report will start with upshot of the project and thereafter will contain the following chapters:

2.1.2.1 Summary

In this chapter, the gist of the total report covering salient features of all chapters in chronological order should be given. This chapter should be very brief and at the same time provide enough information for proper understanding of problem/need, suggested alternative(s), financial viability and recommendation. It should also mention acknowledgement of the co-operation received.

2.1.2.2 Background:

The information to be provided in this chapter should take broadly the

following factors into consideration:

- Project initiation information
- Historical development of the proposal
- Prior studies and investigations performed in the field
- Relevant information to establish a logical link to arrive at the problem
- Bringing out constraints and analysis thereof
- Acknowledgement of the co-operation received

2.1.2.3 Selection of Alternatives

The information to be provided in this chapter should take broadly the following factors into consideration:

- Details of feasible alternatives with respect to technology and location
- Comparison among alternatives
- Selection of appropriate alternative with reasons for selection

2.1.2.4 Project Description

The information to be provided in this chapter should take broadly the following factors into consideration:

1) Detailed description of selected alternative
2) Layout
    - Description of layout
    - Description of layout drawings with provision for future expansion
3) Equipment
    - Description and broad specification of selected equipment
4) Civil & Structural Works
    - Site preparation and development
    - Buildings and foundations
    - Auxiliary/ service facilities
    - Availability and quality of construction material
    - Broad specifications mentioning standards wherever applicable
5) Utilities
    - Layout, piping and auxiliaries etc.
    - Installation details (underground and over ground)
    - Utility - balances
    - Power supply - source, network and distribution
6) Pollution Control Measures
    - Possible pollutants
    - Norms for pollution control
    - Measures to meet the norms
7) Manpower Planning
    - Manpower requirement
    - Plan/ deployment/ re-deployment of personnel

2.1.2.5 Implementation Schedule & Strategy

The information to be provided in this chapter should take broadly the following factors into consideration:

1) Implementation strategy

- Mode of implementation
- Mode of packaging
- Technology procurement
- Identification of executing agencies for implementation

2) Listing of activities and sequencing in bar chart showing the major activities so as to arrive at project implementation period

2.1.2.6 Capital Cost & Financial Analysis

The information to be provided in this chapter should take broadly the following factors into consideration:

1) Capital cost

i) Total capital cost estimation covering:

* Plant and equipment, technological structure, building structure, refractory
  - Basic / FOB cost
  - Erection charges
  - Freight & insurance
  - Taxes & duties.

* Civil works for:
  - Foundation of plant and equipment, structures
  - Buildings,
  - Road & railway works etc.
  - Taxes & duties.

* Engineering & construction comprising contractor's design & engg, supervision and owner's expenses for the project including consultant's fee.
* Technical know-how
* Others not included in above
* Contingency
* Margin money for working capital (for green field/ major expansion projects only)

* Phasing of expenditure and interest during construction (IDC) considering:
  - Phasing of expenditures as per implementation schedule
  - Debt equity ratio for financing the project
  - Interest rate on market borrowing

2) Financial Analysis

i) Total production cost, covering:
  - Cost of direct materials and inputs
  - Cost of direct manpower
  - Consumables

- Fuel & services
- Repair & maintenance
- Overheads

ii) Sales realisation including quality extra if any

iii) Cash flow analysis covering

- Interest on long term loan
- Depreciation
- Corporate tax/ MAT calculation
- Repayment period
- Interest on working capital
- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Sensitivity analysis

2.1.2.7 Recommendations

This chapter states whether the project is recommended or not recommended for implementation on the basis of technical feasibility and financial viability**.** The chapter should clearly list out all recommendations.

2.1.2.8 Annexures (wherever applicable)

Annexures containing information as enclosure to main text will be provided, wherever applicable. For numbering of Annexures, refer **Para 4.7**. Reference to any annexure in the report should be in bold letters.

2.1.2.9 Drawings (wherever applicable)

Drawing(s) will be enclosed with the report, wherever applicable. For numbering of drawings, refer **Para 3.2**. Reference to any drawing in the report should be in bold letters.

2.1.3 Detailed Project Report (DPR)

Detailed project report is generally prepared for a green field project involving large investment and for which feasibility report may have already been prepared and prima-facie investment decision has already been taken. The DPR describes in detail various facilities, inputs, outputs, equipment specifications, quantities of work and includes all general arrangement drawings so as to facilitate procurement and installation of units under various packages. The investment and financial indices are further refined to arrive at realistic techno-economic viability of the project. It will contain following chapters:

2.1.3.1 Summary

In this chapter, the gist of the total report covering salient features of all chapters in chronological order should be given. This chapter should be very brief and at the same time provide enough information for proper understanding of proposed scheme, financial viability and recommendation. It should also mention acknowledgement of the co-operation received.

2.1.3.2 Background

- Historical development of the proposal

2.1.3.3 Market & Plant Capacity

1) Present availability
   - Location, capacity and production of existing units
   - Present import/ export
   - Features of the competition in direct product / substitute product

2) Present demand and end use patterns

3) Projected demand
   - Requirements as estimated
   - Demands estimates based on different techniques
   - Import/ export potential
   - Pattern and location of demand
   - Cyclic features of annual demand
   - Position of the product in project life cycle
   - Estimated market penetration by the product(s) to be produced

4) Anticipated production
   - Capacity build up and utilisation considered

5) Anticipated surplus/ shortfall

6) Marketing strategy
   - After sales facilities and services
   - Pricing, commission or discount on sales
   - Organisational set up of distribution and sales
   - Promotional efforts

7) Estimated sales revenue

8) Estimated sales and distribution cost

9) Regulatory policies

10) Selection of feasible normal plant capacity based on parameters of production programme and minimum economic equipment size.

11) Enumeration of plant capacity for the entire plant and for main departments.

2.1.3.4 <u>Material Input and Linkages</u>

1) Classification of material and inputs into :
   - Raw materials (Processed and semi-processed)
   - Processed industrial materials
   - Manufacturers
   - Auxiliary materials
   - Factory supplies
   - Utilities and services
   - Pollution control

2) Selection and description of all chosen materials and inputs
   - Qualitative properties
   - Quantities available
   - Sources, indigenous and foreign
   - Availability, schedule

- Unit cost

3) Selection of the optimum supply programme considering
   - Production programme
   - Availability of supplies
   - Characteristics of supply
   - Technology and equipment
   - Losses of raw materials inputs in transport and storage
   - Losses of semi-finished and finished products due to processing, distribution and storage
   - Replacement due to warranty services
   - Local conditions

4) Description of the selected supply programme stating for each input
   - Quantitative supply programme
   - Sources of supply
   - Delivery schedule
   - Storage measures and capabilities

2.1.3.5 Location

1) Description of location supported by a map, if required.

2) Choice of location considering :
   - Public policies
   - Material versus market orientation
   - Local conditions - Infrastructure, socio-economic environment

3) Selection of plant site considering
   - Cost of land and related expenditure
   - Local conditions - climate, site and terrain, transport facility, water and power supply, waste disposal, manpower, fiscal and legal regulations, living conditions
   - Public policies versus private interests
   - Site preparation and development
   - Site properties and conditions

2.1.3.6 Project Description

1) Detailed description of selected alternative
2) Layout
   - Description of layout
   - Description of layout drawings with provision for future expansion
3) Equipment
   - Description and broad specification of selected equipment
4) Civil & structural works
   - Site preparation and development
   - Buildings and foundations
   - Auxiliary/ service facilities
   - Availability and quality of construction material
   - Broad specifications mentioning standards wherever applicable

5) Utilities
   - Layout, piping and auxiliaries etc.
   - Installations (underground and over-ground) - details
   - Utility- balances
   - Power supply- source, network and distribution
6) Pollution control measures
   - Possible pollutants
   - Norms for pollution control
   - Measures to meet the norms
7) Manpower planning
   - Manpower requirement
   - Plan/ deployment/ re-deployment of personnel

2.1.3.7 Environmental Plan

Environmental plan includes various control schemes for pollution due to existing or proposed scheme for environmental protection keeping in view the statutory norm and regulations.

2.1.3.8 Equipment Specification And Bill of Materials

This chapter includes listing of all equipment classified in different categories and their respective specifications and weights mentioning applicable standards wherever required.

2.1.3.9 Project Implementation

1) Implementation strategy
   - Mode of implementation
   - Mode of packaging
   - Technology procurement
   - Identification of executing agencies for implementation
2) Listing of activities and sequencing in bar chart showing the major activities so as to arrive at project implementation period

2.1.3.10 Financial and Economic Aspects

1) Capital cost

Total investment cost covering:

i) Cost of pre-investment studies and preparatory investigations

ii) Cost of land - Acquisition and development

iii) Cost of buildings and other civil structures:
   - For main plant and equipment
   - For administrative purposes, laboratory etc.
   - For storage etc.
   - For residential purposes
   - For other facilities like sewerage, water tank, fencing etc.
   - Railway sidings

iv) Cost of plant and machinery
   - FOR/ FOB cost

- Sales tax, customs duty, agency commission, clearing and forwarding charges, excise, packing, insurance, freight and other duties
- Foundation and erection charges
- Stores and spares

v) Cost of technical know-how (consultancy fee)

vi) Cost of miscellaneous fixed assets:

- Furniture, office equipment, vehicles etc.
- Equipment, cabling etc. for power distribution
- Equipment, piping etc. for water distribution
- Laboratory equipment
- Workshop equipment etc.
- First aid equipment, fire fighting appliances etc.

vii) Pre-operative expenses

- Brokerage, commission, underwriting expenses for capital issue
- Interest and commitment charges during construction period
- Establishment, training, advertising, travelling and other related expenses
- Miscellaneous expenses, including insurance during construction period, start-up costs etc.

viii) Margin money for working capital

2) Financing of the Project

i) Sources of finance, covering:

- Promoter's contribution - Equity, preference share etc.

ii) Public subscriptions - Equity, preference shares

iii) Term loans - from financial institutions, from commercial banks

iv) Government assistance - Subsidy, loans, grants

v) Supplier's credit

vi) Others

3) Phasing of Expenditure

Details of proportions of the expenditure to be invested during different phases of the total period of installation and commissioning.

4) Financial Analysis

i) Details as given in the paragraphs "Capital Cost", "Financing of Project", "Phasing of Expenditure" and the information given below.

ii) Total production cost, covering:

- Cost of direct materials and inputs
- Cost of direct manpower - Labour, staff
- Plant overhead cost :
  - ◊ Manpower
  - ◊ Materials
  - ◊ Others like maintenance, insurance, rents, royalties, licence fee, communications etc.
- Administration overhead costs :
  - ◊ Manpower

- ◊ Materials
- ◊ Others like maintenance, rent, travel, property taxes, communications etc.

- Sales and distribution costs
  - ◊ Manpower
  - ◊ Others like sales commissions, packing and forwarding charges, handling charges, storage charges, advertising/ publicity costs, after sales service costs, communication, travelling and entertainment costs, cost of training salesmen, etc.
- Financial overhead costs and interests etc.
- Depreciation
- Evaluation of financial viability using :
  - ◊ Net Present Value (NPV)
  - ◊ Internal Rate of Return (IRR)
  - ◊ Payback period
  - ◊ Breakeven analysis
  - ◊ Sensitivity analysis

2.1.3.11 Conclusions

The chapter includes outcome of the study and investigation, viz. selected technology/ process, technical and technological feasibility, investment, expected benefits (technical and financial) and returns.

2.1.3.12 Annexures (*wherever applicable*)

Annexures containing information as enclosure to main text are to be provided, wherever applicable. For numbering of Annexures, **refer Para 4.7.** Reference to any annexure in the report should be in bold letters.

2.1.3.13 Drawings (wherever applicable)

Drawing(s) are to be enclosed with the report, wherever applicable. For numbering of drawings, **refer Para 3.2**. Reference to any drawing in the report should be in bold letters.

2.1.4 Draft Investment Proposal (DIP)

2.1.4.1 Sanction for a project is obtained in two stages viz. in-principle approval (Stage I) for floating tenders and final approval (Stage II) for actual sanction and placement of order after finalisation of bidder for execution of work. The project(s) are sanctioned by the sanctioning authority viz. CEO of the Plant / Unit, Chairman SAIL, Empowered Committee of Directors and Board of Directors based on delegation of powers.

To get approval for tendering (Stage I approval) and to obtain sanction (Stage II) for placement of order on the finalised bidder after tender evaluation, DIP is prepared for the plant and final investment proposal is submitted by the plant to the relevant approving/ sanctioning authority.

2.1.5 Mining Plan (MNP)

The mining plan is a statutory document under Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016. It is prepared and submitted for approval to Indian Bureau of Mines (IBM) for (i) grant of fresh mining lease or (ii) for renewal of mining lease. The mining plan is reviewed at an interval of every five years as per rule 17(2) of MCR 2016 or Rule 11 of Mineral Conservation and Development Rules (MCDR) 2017. The Review of Mining Plan is prepared and submitted for approval to IBM at an interval of every five years and contains the mining plan for the forthcoming five years. The chapters of mining plan / Review of mining plan are as per the universal format provided by Indian bureau of mines. The format is updated from time to time by IBM. As per the present IBM Manual on Appraisal of Mining Plan 2014, it comprises of the following chapters:

2.1.5.1 General

This chapter gives the general information like the name of applicant with address, status of the applicant, mineral(s) intended to be mined, name(s) of– qualified person(s) preparing the mining plan, name of prospecting agency and other relevant information.

2.1.5.2 Location And Accessibility

This chapter provides details of the applied / leased area with location map, showing leased area and access routes, marked on a Survey of India topographical map or a cadastral map or forest map as the case may be. However, if none of these are available, the area may be shown on an administrative map.

2.1.5.3 Details of Approved Mining Plan / Review of Mining plan, if any

i) Date and reference of earlier approved MP/SOM

ii) Details of last modifications if any (for the previous approved period) of approved MP/SOM, indicating date of approval, reason for modification

iii) Give review of earlier approved proposal (if any) in respect of exploration, excavation, reclamation etc.

iv) Status of compliance of violations pointed out by IBM

v) Details of any suspension /closure/ prohibitory order issued by any Government agency under any rule or Court of law

vi) In case the MNP is submitted under rule 17(3) of the MCR'2016 for approval of modification, specify reason and justification for modification under these rules are to be given.

2.1.5.4 PART-A

1.0 **Geology and Exploration**

i) Description of topography, drainage pattern, vegetation, climate, rainfall data of the area applied/mining lease area.

ii) Brief descriptions of Regional Geology with reference to location of lease/applied area.

iii) Detailed description of geology of the lease area such as shape and size of the mineral/ore deposit, disposition various litho-units indicating structural features if any etc.

iv) Name of prospecting /exploration agency, and Details of prospecting/exploration carried out mentioning the number of pits and trenches with their dimensions, spacing etc along and across the strike/ foliation with reference to geological plan and number of boreholes indicating type (Core/RC/DTH), diameter, spacing, inclination, Collar level, depth etc with standard borehole logs duly marked on geological plan/sections.

v) Details of samples analysis with complete chemical analysis for entire strata for all radicals from a NABL accredited Laboratory.

vi) The future programme of exploration with due justification .

vii) Detailed calculation of reserves/resources section wise and reporting the Reserves and Resources as per UNFC

viii) An updated surface geological plan, updated transverse sections at suitable intervals and longitudinal section showing geology of the deposits, an updated assay plan

2.0 **Mining**

ix) This chapter describes the existing as well as proposed method for excavation with all design parameters indicated on plans /section. It broadly includes the following:

i) Salient depiction of present as well as proposed mining methods.
ii) Year wise pit development plans and sections showing pit layouts, dumps, stacks of mineral reject, if any, proposed for the next five years.
iii) Year wise production plan proposed for the next five years along with grade. Blending proposal, if any, may be indicated.
iv) Year wise dump re-handling for recovery of minerals, if any.
v) Any change in proposed method of mining and development of machinery, together with reasons thereof.
vi) A list of mining machinery under use/ proposed along with projected norms of performance/ output for individual main items of equipment/machinery.
vii) Brief description of layout of mine workings, pit road layout, the layout of faces and sites for disposal of overburden/waste along with ground preparation prior to disposal of waste, reject etc. UPL or ultimate size of the pit is to be shown for identification of the suitable dumping site.
viii) Conceptual Mine planning up to the end of lease period taking into consideration the present available reserves and resources describing the excavation, recovery of ROM, Disposal of waste, backfilling of voids, reclamation and rehabilitation showing on a plan with few relevant sections.

3.0 **Mine drainage**

Planning for the drainage from the mine considering environmental and ecological protection norms should be given in this chapter. Generally it

includes the following:

i) Minimum and maximum depth of water table based on observations from nearby wells and water bodies

ii) Maximum and minimum depth of Workings.

iii) Quantity and quality of water likely to be encountered,

iv) The pumping arrangements and places where the mine water is finally proposed to be discharged

v) Description of regional and local drainage pattern. Indicating the annual rain fall, catchments area, and likely quantity of rain water to flow through the lease area, arrangement for arresting solid wash off etc.

4.0 Stacking of Mineral Reject / Sub grade material and Disposal of Waste

The chapter provides information about planning of the above works. It covers the following:

i) Brief description of the nature and quantity of top soil, overburden / waste and Mineral Reject to be disposed off.

ii) The proposed dumping ground within the lease area

iii) The manner of disposal of waste, configuration and sequence of year wise buildup of dumps along with the proposals for protective measures, which covers the following:

a) Rate of yearly generation of wastes and proposals for disposal of waste for next five years.

b) Build-up of dumps from year to year to be shown in yearly plans and sections with description

c) Rate of yearly generation of sub-grade minerals with reference to threshold values and proposals for stacking for next five years.

d) Quantity and grade of sub-grade material available at the mine as on date duly supported by plans and sections and descriptive statement inclusive of the precautions adopted for storage.

5.0 Use of Mineral

The chapter should state the in-process and end use of the minerals to be explored and it includes the following:

i) Brief description about the requirement of end-use industry specifically in terms of physical and chemical composition.

ii) Requirement of intermediate industries involved in up gradation of mineral before its end-use.

iii) Detail about requirements for other industries, captive consumption, export, associated industrial use etc

iv) The precise physical and chemical specification stipulated by buyers

v) Brief details of the processes adopted to upgrade the ROM to suit the user requirements.

6.0 Processing of ROM and Mineral Reject

This chapter provides details about the processing / beneficiation methodology of ROM or mineral reject, beneficiation equipment, layout etc. and it includes the following:

i) Brief description of the existing / proposed nature of processing / beneficiation of the ROM or Mineral Reject, substantiated by beneficiation test work.

ii) Material balance chart with a flow sheet or schematic diagram of the processing plant

iii) Disposal method for tailings or reject from the processing plant along with Quantity and quality of tailings /reject proposed to be disposed, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailings dam.

iv) Brief about quantity and type of chemicals to be used in the processing along with its storage location plant.

v) Quantity (cum per day) of water required for mining and processing and sources of supply of water, disposal of water and extent of recycling. Water balance chart may be given.

7.0 Other

This chapter deals with site services and employment potential due to proposed mining activities.

8.0 Progressive Mine Closure Plan

Progressive mine closure" is a progressive plan, for the purpose of providing protective, reclamation and rehabilitation measures in a mine or part thereof and it includes the following:

8.1 Environment Base line information:

Baseline information with regard to the existing land use pattern, water regime, quality of air, ambient noise level, flora, climatic conditions, human settlements, public buildings, places of worship and monuments, any sanctuary is located in the vicinity of leasehold.

8.2 Impact Assessment:

Environmental Impact Assessment Statement describing the impact of mining and beneficiation on environment on the following:

- Land area indicating the area likely to be degraded due to quarrying, dumping, Roads, workshop, processing plant, tailing pond/dam, township etc.
- Air quality
- Water quality
- Noise levels
- Vibration levels (due to blasting)
- Water regime
- Acid mine drainage
- Surface subsidence
- Socio-economics
- Historical monuments etc.

8.3 **Progressive reclamation Plan**

To mitigate the impacts and ameliorate the condition, description of year wise steps proposed for phased restoration, reclamation of lands already/to be, degraded in respect of following items separately for 5 years period

- Mined-Out Land
- Tailings Dam Management
- Acid mine drainage
- Surface subsidence mitigation measures through backfilling of mine voids or by any other means and its monitoring mechanism.
- Dump management

8.4 **Disaster Management and Risk Assessment**

8.5 **Care and maintenance during temporary discontinuance**

8.6 **Financial Assurance:**

In accordance with Rule 22 of MCDR 2017, A financial assurance is required to be submitted to IBM by the holder of the mining lease for due and proper implementation of the progressive mine closure plan.

2.1.5.5 PART- B

1) **Certificates / Undertakings/ Consents:**

i) Consent letter/ undertaking/ certificate from the applicant.
ii) Certificate from Qualified Person (QP).

2) **List of the Plans and Sections**

3) **List of documents to be Annexed**

2.1.6 Tender Evaluation Report (TER) (TER Format kept at CET Portal to be used)

2.1.6.1 Technical Evaluation Report

Technical Evaluation Report analyses, compares the various technical offers and recommends the technically accepted offer(s) of all the eligible bidders out of all the offers received against a tender enquiry. It will briefly cover the following chapters:

1) Background
   - Brief history of the project
   - Tendering enquiries, tender documents details
   - Offers / Bids received
   - Tender discussions held and clarifications received from parties with the objective of bringing the parties at par.

2) Eligibility Criteria (EC)

This section mentions the Eligibility Criteria as uploaded/ given with the NIT for open tender.

3) Eligibility of Bidders on Technical Experience

This section analyses the documents submitted by the bidders towards meeting the technical eligibility criteria as given in Section 2. The analysis is given bidder wise and should cover all the experience points/ consortium features if any/ supporting documents provided by the bidders, for each of the bidders with a view to conclude/ infer the technical eligibility of the bidders for the present Tender.

4) Technical Evaluation of Bids

This section evaluates and concludes the compliance on the technical acceptability on offers of bidders w.r.t. the various services asked in the TS i.e., execution methodology, Scope of Work, Technical Specifications, Implementation Period/ Schedule, PGT and SIT, etc.

5) Conclusion/ Recommendation

This section makes conclusions/ recommendations based on the technical eligibility of the bidders and technical acceptability of the offers.

6) Information for tender committee of plant/ unit.

7) Special Issues (if any)

Under this clause, all such information like ambiguity in the documents received and any other important point requiring attention, otherwise not mentioned anywhere else in the TER, are to be mentioned for the tender committee of the plant to consider.

8) Comparative Statement as Annexure

A comparative statement of the offers, w.r.t. to the points/ parameters of evaluation is to be given for quick reference and observation of the similarity/ difference of the offers. The comparative statement will be in tabular form.

For format and guidelines refer latest Report Template kept at CET Information Portal

For any deviations from this format, prior permission is to be taken from the Competent Authority.

2.1.6.2 Commercial Evaluation Report: Commercial Evaluation Report analyses, compares the various commercial offers and recommends the commercially accepted offer(s) out of all the offers received against a tender enquiry. It also has same chapters (as paragraphs) as that of Technical Evaluation described above. The only difference being that, offers are compared from commercial point of view. However commercial evaluation of offers is not done by CET except tenders of its own.

2.1.6.3 Price Bid Evaluation Report: Price Bids are opened after the completion of technical evaluation and commercial evaluation process. The price bids of technically and commercially accepted offers are analysed, compared and a report is prepared.

2.1.7 Scheme

Scheme is prepared for low value AMR jobs of plants/ units. It is prepared generally whenever any engineering solution is provided for the problems/ constraints being faced by the client in their units. Generally, for a complete technological solution Scheme is not prepared. The chapters may include; a) Introduction, b) Project description, c) Implementation schedule and strategy, d) Capital cost, e) Recommendation, annexures and drawings. The format of scheme is similar to that of FR but with the difference that no alternatives are considered and secondly no financial analysis is made. The contents of background chapter of FR are kept in the introduction chapter of Scheme. Usually this is made where no techno-economics can be made or required and when the project is a technical necessity. Similar to FR, this document is used to take investment decision of small projects. The value of the projects under Scheme should be less than 20 crore.

2.1.8 Technical Note

Whenever any such type of assignment comes to us, when we are not in a position to provide immediately any feasible solution, but we want to convey our views/ opinions on the same to client. In such situation, Technical Note is prepared. This document is prepared to let the client be made aware of the present status of the facilities, the bottlenecks hampering production/ quality of product, etc. This document gives brief information regarding proposed facilities/ systems to remove the bottlenecks/ problems. There are no fixed chapters for the report but may include a) Background, b) Analysis, c) Suggested proposals, d) Brief description of the proposed project, e) Block cost of the proposal (s) and f) Conclusion and recommendation. It is not necessary that the above matters are written in separate chapters. Whole matter can be written in a single chapter under different sub-headings. Moreover, writer has the liberty to add/ modify the sub- headings as per requirement and the views/ opinion he wants to convey the client. If the technical note is accepted by the management, then FR for the same is prepared.

2.1.9 Study Report (SR)

Study Report is prepared to study the problems of existing assets/ facilities or assessment of new technologies for adoption/ retrofitting. These reports are for information only and not for taking investment decision. This is a structured document and includes block cost estimates without techno economics. This enables the client to take further investment decision. It will contain following chapters:

2.1.9.1 Summary

In this chapter, the gist of the total report covering salient features of all chapters in chronological order should be given. This chapter should be very brief and at the same time provide enough information for proper understanding of problem/ need, suggested alternative(s), block cost estimate and recommendation. It should also mention acknowledgement of the co-operation received.

2.1.9.2 Background

- Project initiation information
- Historical development of the proposal
- Prior studies and investigations performed in the field
- Relevant information to establish a logical link to arrive at the problem
- Bringing out constraints and analysis thereof

2.1.9.3 Analysis and Selection of Alternatives

- Details of probable alternatives with respect to technology and location
- Comparison among alternatives and selection based on major merits and demerits

2.1.9.4 Project Description

1. Brief description of selected alternative with location/ layout
2. Brief description of major equipment/ system
3. Broad assessment of civil & structural works
4. Assessment of availability / proposed facilities for utilities and power supply
5. Brief description of sources of pollution and proposed measure to control it
6. Broad assessment of man-power requirement and sourcing

2.1.9.5 Project Implementation

- Bar chart showing sequence of major activities over the project implementation period

2.1.9.6 Financial Aspect

- Block investment cost of the approximate expenditure.

2.1.9.7 Recommendation

On the basis of the study, the project is recommended or not recommended for obtaining in-principle approval.

2.1.9.8 Annexures **(*wherever applicable*)**

Annexures containing information as enclosure to main text will be provided, wherever applicable. For numbering of Annexures, refer para 4.7.

2.1.9.9 Drawings **(wherever applicable)**

Drawing(s) will be enclosed with the report, wherever applicable. For numbering of drawings, refer **para 3.2**. Reference to any drawing in the report should be in bold letters.

2.2 GUIDELINES FOR PREPARATION OF SPECIFICATIONS

The specifications shall mean "complete description of the requirements" related to execution and completion of the project. The requirements may be general as well as technical. The purpose of specification is to:

1) inform in writing all the requirements - general as well as technical to all the tenderers.
2) inform to the tenderers to submit their offers on uniform basis excepting the price.
3) discuss with the tenderers for any deviations in the technical or commercial offers before the submission/opening of the prices.
4) evaluate the technical and commercial offers submitted by the tenderers.

2.2.1 **Tender Specification (TS) (**TS Format kept at CET Portal shall be used)

Tender Specification is a part of Tender Document and deals mainly with the technical details of a project. TS can be for various types of jobs, e.g., turnkey jobs, non-turnkey jobs and supply items (Custom built equipment or parts). Depending on the type of TS, various types of documents are appended to the

TS for inviting tenders. In case of turnkey TS, Standard Bidding Document (SBD) is appended. For non-turnkey TS, General Conditions of Contract (GCC) of plants are appended. Hence while writing the TS, it is necessary to keep in view the chapters or contents of SBD or GCC which are having common points with the TS. For example, in SBD, the chapters of SCC & GCC have contents which are also covered in some parts of the TS. GCC is also contained in SBD for turnkey contracts. But the GCC appended for non-turnkey and supply contracts are separate and formulated by plants, though many contents in both the documents are same. For a clear understanding, SBD and other bidding documents may please be referred.

Thus TS is used for inviting tenders alongwith other documents as described above. It is prepared to specify qualitative and quantitative technical parameters for supply, erection, commissioning, disposal, dismantling etc as the nature of job may be. However, for any of the above type of jobs, Tender Specification will have following chapters:

2.2.1.1 Introduction

- Brief about the plant and its existing facilities relevant to the subject specification.
- Brief about the need or requirement of the project, and the nos. of packages through which the complete job is to be implemented.
- Intent of specification.
- Reference to other related documents
- Refer TS format kept at CET portal for detail instruction/ guideline.

2.2.1.2 Scope of Work

- Broad scope of work for all areas (e.g. Stock House, Skip bridge etc) and disciplines (Civil, Mechanical, Electrical, etc. under above areas) in an integrated manner. The scope of work indicated should not be contradictory to scope/ specifications mentioned elsewhere in the document. The mode of execution of project like turnkey or non-turnkey will be clearly spelt out by bringing out the extent of designing, manufacturing, supply including commissioning spares, civil work involved, fabrication of structures, erection, testing and commissioning, dismantling, disposal etc. in the tenderer's scope.
- Battery limits
- All standard schedules like Site visit, requirement of commissioning spares, operational and maintenance spares (optional /take off price basis), Initial fills & Lubricants, Special tools & tackles etc.
- Delivery period (supply specification), Construction schedule (civil/ structural work), Implementation period (for complete system /sub systems) etc.
- Employer's obligations, if any.
- Exclusions & deviations if any from the TS
- Requirement of drawings and technical documents.
- Training requirement of employer's personnel (foreign/Indian) & related man-days of training

- Refer TS Format kept at CET Portal for detail instruction/guideline.

2.2.1.3 Technical Specification

- Location of the plant and basic site conditions (Climatic conditions/ Meterological data).
- Basic design conditions - General design conditions necessary for the information of the tenderer e.g. brownfield/ green field conditions, augmentation, expansion of the existing facilities etc. Description of the existing and proposed facilities – Design standard & general details covering complete technological requirements of process/equipment like type, rated capacity, quantitative parameters and qualitative parameters. Reference to Layout Drawing/ GA drawings, wherever necessary.
- Specifications for dismantling work, if required.
- Specifications for Civil/ Structural/ Mechanical/ Utilities/ Refractory. Broad technical parameters / nos. of items/ volume or weight or quantity of work to be given (Annexures) for estimation. This will include drawings/ data to be submitted, specifications for equipment/supply items, preferred makes of various equipment, site work involved with quantities, inspection procedure/acceptance criteria at various stages etc. Drawings to be enclosed for clarity of work wherever required.
- Specifications for Electrics / Instrumentation & Automation. Broad technical parameters / nos. of items etc for estimation. This will also include Drawings/data to be submitted, Specifications for Electrical requirements like power supply, power consumption, illumination, instrumentation, automation, Specifications of such equipment /supply items, preferred makes of various equipment, site work involved with quantities, inspection procedure/acceptance criteria at various stages etc.
- Technical information / parameters given to the bidders are to be enclosed as "Annexures". Information sought from bidders to be called "Schedules**"**
- In all cases, wherever available BIS/ IPSS code number should be given for standardisation of equipment/ systems.

1) While preparing and integrating the above chapter on Technical Specification, the following should be kept in mind in order to improve the quality of contents of the chapter :
   - Same information should not be repeated at many places and in various chapters
   - For ease of reference, technical parameters should be mentioned in bullet form / tabular form and not in paragraphs. (Back up design calculations/references are not to be appended in the TS and should be kept in respective assignment files. Subsequent changes while approving/issuing design/ drawings should be compared/ recorded in the assignment files.) Specifications / Standards (material as well as dimensional) should be complete for all items in the bill of materials of drawings.
   - IS codes should always be indicated with latest year
   - Drawing number should always be indicated with revision status
   - Technical parameters should not contradict to each other at different places
   - The Specifications / scope / battery limits should be complete and specific instead of vague.

- Matching of paragraphs (same sequence should be followed, if referred elsewhere)
- Any drawing/ data to be furnished by client which could not be made available to CET till the time of submission of TS should be clearly mentioned in a letter to the client so that necessary action can be taken by them.
- Standard terminology as is given in GCC are to be used. For example for tender floated by the Plant, Plant should be called as "Employer" and tenderer may be called as "Bidder". After acceptance of the bid, the successful bidder may be called as "Contractor"
- It should be ensured that any cross references within TS should be correct (e.g. some information is referred to be given in a particular paragraph but either that paragraph does not exist or wrongly numbered. This should be checked.)
- The page numbers mentioned in list of Contents should match with actual pages in each chapter etc.

2.2.1.4 Commissioning and Performance Guarantee

This chapter should include the pre-conditions, if any, for conducting PG test, duration of conducting the PG test and the performance guarantee parameters, acceptable limits with LD clauses. The general and commercial conditions of PGT are given in SBD or GCC as the case may be. Hence they are not to be included in this chapter. Only relevant testing procedures, if any and PG parameters are to be written in this chapter.

The technical parameters with permissible deviations which will form the basis for acceptance of the plant and equipment and need to be informed to the tenderers in advance so that they can take necessary action and quote accordingly. An illustrated example is given below:

Sl	PG Parameters	Guaranteed Value	Acceptable value with LD	LD in % of Contract price (excluding taxes & duties)
1	Discharge temperature of cooled sinter ^{0}C	100 (max)	110 (Max)	1 % for every increase of 2^{0}C or part thereof.
2				
3				

Refer TS Format kept at CET Portal for detail instruction/guideline.

2.2.1.5 Annexures (*wherever applicable*)

Annexures containing information (like feedback data, acceptable makes etc.) as enclosure to main text to be provided, wherever applicable. For numbering of Annexures, refer Para 4.7. Reference to any annexure in the TS should be in bold letters.

2.2.1.6 Schedules (*wherever applicable*)

Schedules will contain format with technical parameters for seeking information from vendors, wherever applicable. For numbering of schedules, refer **Para 4.8.** Reference to any schedules in the TS should be in bold letters.

2.2.1.7 Drawings (wherever applicable)

Drawing(s) to be enclosed with the report, wherever applicable. For numbering of drawings, **refer Para 3.2**. Reference to any drawing in the OS should be in bold letters.

2.2.1.8 Guidelines for numbering of packages for multi-package project is given in **Annexure – 2.2.1.9-1**

2.2.2 Ordering Specification (OS)

Ordering Specification is prepared for inviting quotations for such bought out items which are either standard products or for which complete technical details are available. Ordering specification will have following chapters:

2.2.2.1 Scope of work

2.2.2.2 Technical Specification (consisting of) :

- Specification for Bought Out Items – This will include specifications of supply items, drawings / data to be submitted, preferred makes of various equipment, etc material specification :
- General arrangement drawings
- Design standard & general details
- Inspection procedure/acceptance criteria at various stages
- Delivery requirement bill of materials

2.2.2.3 Annexures (*wherever applicabl*e)

Annexures containing information (like feedback data, preferred makes etc) as enclosure to main text to be provided, wherever applicable. For numbering of Annexures, refer **para 4.7**. Reference to any annexure in the OS should be in bold letters.

2.2.2.4 Drawings (wherever applicable)

Drawing(s) are to be enclosed with the report, wherever applicable. For numbering of drawings, refer para **3.2.** Reference to any drawing in the OS should be in bold letters.

2.2.3 Tender Documents for Consultancy Contracts & BOO/ O&M Contracts/

MDO route

2.2.3.1 Sometimes CET prepares Bidding Document/ Tender Document for specialised jobs like consultancy contracts, BOO/ O&M contracts etc. as per specific requirement of Plants/ Units. The Tender Document comprises of two parts i.e. Invitation to Tender (ITT) and Draft Agreement.

2.2.3.2 The purpose of ITT is to inform all the prospective bidders about the intended tender and invite their technical, commercial and price bid offers. The ITT also contains information which helps tenderers to know about manner of submission of tender, instruction regarding filling up the tender, prescribed price format and other relevant information. ITT generally contains following chapters:

- Tender data table
- Invitation to tender
- Instructions to tenderers
- Tender evaluation criteria

Annexures like Form of Tender, Price Format, standard format for bank guarantees etc.

2.2.3.3 Draft Agreement consists of scope of work, commercial terms and conditions

and standard Annexures. Technical Specifications and battery limits form part of Draft Agreement as annexure. This Draft Agreement forms the basis of final contract which is signed with the successful tenderer after incorporating mutually agreed modifications/points, if any.

2.2.3.4 Bid Documents for MDO:

MDO (Mine Developer and Operator) contract is a long term contract which may include entire gamut of activities right from land acquisition, R&R, mine planning to development and operation of mine and ore extraction and transportation up to the identified owner's loading point on behalf of the mine owner who holds the mining lease. In return, the mine owner pays a contractually agreed fixed mining fee.

Bid documents consists of

1. Request for Proposal (RFP) or Request for Qualification (RFQ) or Instruction to Bidders or Invitation to Bid

This document comprises primarily of broad objective of tender, broad scope of work, qualification requirements and other conditions of tender.

2. Mining Services Agreement (MSA)

This document details

- Detailed scope of work
- Obligations of MDO and owner of lease
- Details of payments along with escalation/de-escalation
- Key performance indicators and related penalty/bonus
- Termination of contract

2.2.4 Expression of Interest

This document is prepared when sufficient numbers of vendors are not known to us to be able to carry out the proposed project in hand. It is similar to floating open tender to elicit offers. In this case, the capable vendors submit their willingness to quote for the proposed project. Based on their willingness, formal tender is floated as usual to get their offers. Generally, the Expression of Interest (EOI) format sometimes varies from case to case basis. However, broadly, the following chapters are there in an EOI. a) Broad overview, b) Objective and purpose of EOI, c) Scope of Bidder, d) Site condition, e) Methodology of project execution, f) Input from the concerned SAIL plant, g) Eligibility criteria, h) Information regarding the Bidder required alongwith EOI, i) Submission of EOI application, j) Address for correspondence, k) Issue of EOI document, l) Submission of EOI application.

2.2.5 Standard Bidding Document (SBD) - (applicable for turnkey package)

SBD is attached with Invitation for Bids for turnkey package. Information/ data of the package are to be filled up in the Bid Data Sheet of the SBD.

2.2.5.1 SBD consists of two parts:

1) Section-I comprising Invitation for Bids (IFB), Special Conditions of Contract, Integrity Pact wherever applicable.

2) Section-II: comprising Instructions to bidders, Form of Contract Agreement along with Appendices, GCC along with Annexures, Safety Code for Contractors

The documents of Section-II is up-loaded permanently on SAIL website www.sailtenders.co.in under the head "Standard Documents" and only documents as per Section-I are prepared and issued with Notice Inviting Tender (NIT) by Plants.

2.2.6 Technical Specifications (*for disposal of equipment/ facilities*)

It is used to invite offers for disposal of the complete plant/shop/specific equipment/ facilities. It will have following chapters:

2.2.6.1 Introduction

- The intent of specification
- Brief introduction about company, plant, shop and equipment alongwith brief description of production process and material flow
- Reasons for disposal of plant/ shop/equipment, as applicable
- Demand of products and/ or alternate uses of plant/ shop/ equipment to create awareness in prospective purchasers.

2.2.6.2 Technical Specification

- Scope of offer for disposal (including documents/ drawings to be handed over) indicating battery limits and exclusions.
- Capacity of plant/ shop/ equipment (consisting of)
  - ◊ Original capacity/ present capacity
  - ◊ Input material requirement
  - ◊ Output material (quality and dimensional characteristics)
- Requirement of consumables
- Productivity of main processing units/ equipment
- Technical specification of all equipment to be disposed off

2.2.6.3 Special Instruction to Tenderers (SIT)

- The instructions which are not covered in the chapter on technical specifications but are common to various areas and necessary for smooth and successful execution of the project are given in this chapter. These instructions should not be very general in nature but should be relevant to the item(s) in question in order to highlight the major points only.

3 NUMBERING OF DOCUMENTS

3.1 NUMBERING OF DOCUMENTS, REPORTS AND SPECIFICATIONS

- Various documents issued by CET for different types of assignments shall be numbered as follows :

CET/ Customer Code/ Source Code/ Sl. No. of assignment no./ Type of document / Discipline / Serial no. of document (in 2 digits) / Revision no.

Example **:**

CET/05/RN/1319/TS/EE/11/R=0
CET/05/RN/1178/FR/ST/01/R=0

- Customer code, code for type of document, discipline code and source code are as follows :

Customer Codes

01	Bhilai Steel Plant	15	Rashtriya Ispat Nigam Ltd.(RINL)
02	Bokaro Steel Plant	16	Centre for Engineering & Technology (CET) , Ranchi
03	ISP, Burnpur	17	Other than SAIL
04	Durgapur Steel Plant		
05	Rourkela Steel Plant	18	Govt. Of India
06	Alloy Steel Plant (ASP) , Durgapur	19	(Reserved for future)
07	Salem Steel Plant	20	Corporate Office
08	Common SAIL Plants & General	21	(Reserved for future)
09	Visveswaraya Iron & Steel Plant (VISP), Bhadravati	22	Growth Division
10	Research and development centre for iron and steel (RDCIS) , Ranchi	23	Bokaro Power Supply Co(P) Ltd (BPSCL)
11	Central Marketing Organisation (CMO) , SAIL	24	SAIL Refractory unit (SRU)
12	Chandrapur Ferro Alloys Plant (CFP)	25	Colliery Division
13	Management Training Institute (MTI) , Ranchi	26	Central Coal Supply Organisation (CCSO)
14	Raw Material Division (RMD) , SAIL	27	SAIL & Tata Mining (S & T mining)
		28	SAIL Refractory Co. Ltd. (SRCL)

Type of document: Code should be given as per standard abbreviation specified in this document.

Discipline Codes

ME	Mechanical
EE	Electrical
IT	Computer & Information Technology
CA	Process Control & Automation
CE	Civil
SE	Structural
UT	Utilities
RM	Raw Materials

CC	Coal Coke Chemicals
RM	Raw Material
IR	Iron & Sinter
ST	Steel
RF	Rolling Mills
PR	Projects
RE	Refractory

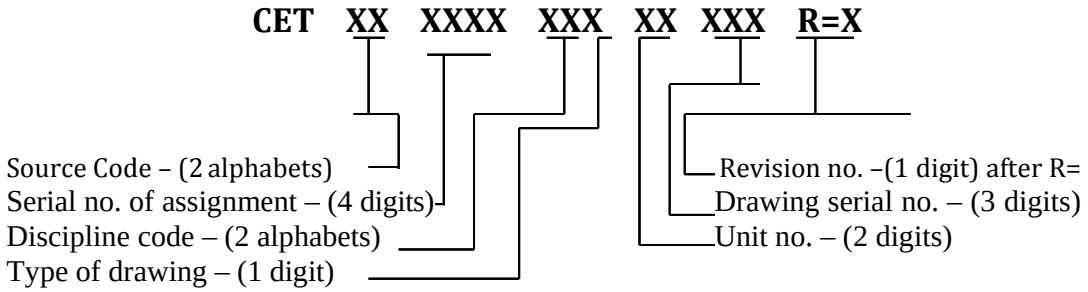
Source Codes

RN	Ranchi
BH	Bhilai Sub-centre
BK	Bokaro Sub-centre
RK	Rourkela Sub-centre
DP	Durgapur Sub-centre
BU	Burnpur Sub-centre
ND	Delhi Unit

- Discipline codes are meant only for numbering the documents and Drawings and should not be used as standard abbreviation.
- The revision status should always be indicated. First report will be R=0.
- Documents generated in CET, not pertaining to any assignment number, should also be numbered but the number to be given may be decided on case to case basis.
- Reference to any document in the report/ specification should be in bold letters.

3.2 NUMBERING OF DRAWINGS

- Various drawings issued by CET for different types of assignments shall be numbered as follows :



a) The "/" (slash) used between codes is to be discontinued. Only a gap is to be left in its place. While referring in text form, the drawing number is to be written with necessary gaps.

b) Source code shall be as per Sl. 5 below and assignment no. shall be as in practice now.

c) Discipline codes shall be as given in Sl. 6 below:

d) Codes for type of drawing shall be given in Sl. 7 below and written after discipline code without a gap.

e) Unit code shall be assignment specific and shall be decided by TF in case to case basis.

f) For FR/ TS etc. (i.e. for reports and specification before implementation stage), 2 digits of the unit number shall be 00. Specific unit number is to be given in implementation stage only.

Examples :

A. Numbering of a Technological Layout drawing prepared by Steel section for assignment no. 05/FR/1178 (Feasibility Report).

CET RN 1178 ST2 00 001 R=0

Explanation : ST2 denotes Steel section and Technological Layout drawing. 00 denotes unit no. which is not allotted since the assignment is for FR preparation. 001 is the serial no. of drawing.

B. Numbering of a fabrication drawing prepared by Structural section for assignment no. 02/DE/1262.

CET RN 1262 SE2 05 002 R=0

Explanation : SE2 denotes Structural section & fabrication category drawing. Unit no. 05 may denote "Vessel Repair Platform" (as decided by TF and should be specific for this assignment) and 002 is drawing serial number.

- If the Drawing is for study and/ or data bank purpose only and is not a part of any assignment, the assignment number code should be shown as 0000. Other things shall remain same as that in the assignment Drawings.
  Example – CET RN 0000 ME1 00 001 R=0.
- Reference to any drawing in the report shall be in bold letters.

5. Source Codes shall be as follows :

RN	Ranchi
BH	Bhilai sub-centre
BK	Bokaro sub-centre
RK	Rourkela sub-centre
DP	Durgapur sub-centre
BU	Burnpur sub-centre
ND	Delhi unit office

6. Discipline Codes shall be as follows:

Discipline	Code
Civil	CE
Coal, Coke & Chemical	CC
Computer & Inform. Technology	IT
Electrical	EE
Iron & Sinter	IR
Mechanical	ME
Projects	PR
Process Control & Automation	CA
Raw Materials	RM
Refractories	RE
Rolling Mills	RF
Steel	ST
Structural	SE
Utilities	UT

Discipline codes are meant only for numbering the documents and drawings and should not be used as standard abbreviation.

3.3 NUMBERING OF GENERAL TECHNICAL SPECIFICATION (GTS)

- Numbering of GTS should be as follows :

CET/ GTS/ DISCIPLINE CODE/ SERIAL NO. OF GTS - 2 DIGITS/ REVISION NO.

Example : CET/ GTS/ M/ 01/R=1
CET/ GTS/ E/ 01/R=0

3.4 NUMBERING OF FILES AND LETTERS

- Numbering of General Files should be as follows :

CET-ZONE CODE (SECTION CODE IF ANY) / FILE SERIAL NO.

Example : CET-15(4)/10/ : CET-17(7)/108/

- Each volume should have date of start, date of closure and cross reference to other volumes on the cover.

- Numbering of Assignment Files should be as follows :

CET-ZONE CODE (SECTION CODE IF ANY) / SL. No. of ASSIGNMENT NO. / FILE SERIAL NO. FOR THIS ASSIGNMENT

Example : CET-15(4)/900/4 ; CET-13(3)/1262/11

- Each volume should have date of start, date of closure and cross reference to other volumes on the cover.
- Each individual section will maintain a "List of Files". The lists will have the following information :-

S l. No.	File No.	Title/Description of the file	Custodian of the file	Location / Remarks

- Zone Codes/ Section Codes: The present practice of zone code and section code are well established in CET will be followed in future for ease and convenience. Following are the various codes:

CET-1	Executive Director	CET-20-30	Reserved for future
CET-2 to 10	Reserved for GMs. at Ranchi	CET-31	Bhilai Sub-centre
CET-11	Raw Materials, Coal, Coke & Chemical	CET-32	Bokaro Sub-centre
CET-12	Iron and Sinter	CET-33	Burnpur Sub-centre
CET-13	Steel and Rolling Mills	CET-34	Durgapur Sub-centre
CET-14	Civil, Structural & Layout	CET-35	Rourkela Sub-centre
CET-15	Mechanical, Electrical, Instrumentation & Automation		
CET-16	Utilities	CET-37	Unit Office, New Delhi
CET-17	Project Division	CET-38	Vacant
CET-18	Business Excellence		
CET-19	Business Development		

- Section codes reserved for Sr.T.A. / P.S.O.'s :

Example :- CET-1(1) T.A. to E.D. ; CET-1(2) P.S.O. to E.D.

- Section Codes: these codes may be allotted within the section as per requirement (Zone code will be same).

Examples :

CET-11(3)	Coal , Coke and Chemical	CET-15(4)	Mechanical
CET-11(4)	Raw Materials	CET-15(5)	Instrumentation & Automation
CET-12(3)	Iron Making	CET-16(3)	Utilities & Services excluding refractories
CET-13(3)	Steel Making	CET-16(4)	Refractories
CET-13(4)	Rolling Mills	CET-17(4)	CTE Section
		CET-17(5)	PFC Section
CET-14(4)	Common for Structural, GL & Public Health	CET-18	Business Excellence
CET-14(5)	Civil	CET-17(7)	Contracts & Commercial Section
CET-14(6)	Structural	CET-17(8)	Technical Services Section
CET-15(3)	Electrical		

- Zone/ Section Codes for Personnel , Finance and Administration sections

and IPSS Secretariat :

CET/FIN/	Finance Section
CET/PER/TRG/	Training section in Personnel Department
CET/PER/	Personnel Department
CET/ADMN/	Administration Section
CET/IPSS/	IPSS secretariat.

- File Volume Numbers : No volume no. is required to be given on a newly opened file . When a file is full of papers, it should be marked Vol.-I and second file having the same title and same number should be opened. This file should be marked Vol-II. Similarly more volumes may be opened as need arises. (However this "Vol. No." should not be used in the letter numbers).
- Numbering of the letters should be as follows :

CET-ZONE CODE (SECTION CODE IF ANY) / FILE NO. / YEAR (OPTIONAL) / DESPATCH NO.

Example:

CET-11(1)/1//98/36 ; CET-15(4)/1564/654

4 FORMAT AND LAYOUT OF REPORTS AND SPECIFICATIONS

A) FORMAT AND LAYOUT OF REPORTS - Refer latest Report Template from CET portal

B) FORMAT AND LAYOUT OF SPECIFICATIONS

4.1 TRACEABILITY OF DOCUMENTS

- Individual sheets of a document will have Header and Footer as below : (Header and Footer for Content, Annexure and Schedule have been described separately)

Header : SAIL bilingual logo on right hand side top on odd numbered pages and left hand side top on even numbered pages, so that while printing the final document on both sides, the header will always appear on the outer edge. However, where final printing will be on one side of page only, the header should appear only on right hand side top (outer edge). Size of the header should be 1 cm as follows:

Footer : (Font size 10, all in capitals)

CLIENT'S ABBREVIATION DOCUMENT NO. WITH REVISION STATUS
PROJECT ABBREVIATION PAGE CHAPTER NO. . #

Example :

BSL CET/02/RN/1262/FR/1/01/R=0
VACUUM REFINING IN SMS-II PAGE 1.1

4.2 STANDARD PAGE LAYOUT (Please refer CET portal)

4.3 STANDARD LAYOUT FOR 'CONTENTS' PAGES (Please refer CET portal)

4.4 LAYOUT OF COVER PAGE AND INTERLEAF (Please refer CET portal)

- Layout of cover page and inside cover should as per report template uploaded in CET Portal. Margins and font formatting should be as follows :

Item	Specification
Paper size	A4
Top Margin	2.5 cm
Bottom Margin	2.0 cm
Left Margin	3.0 cm
Right Margin	2.0 cm
Font size in document	As explained in Annexure-
Font format	All bold and centred

- Interleaf between chapters is not mandatory and will, generally, be not provided. However, it can be provided in voluminous documents and will be decided on case to case basis by TFL. The interleaf will contain the title of chapter in capitals, font size 16, bold and centred (both vertically and horizontally).

4.5 PRESENTATION OF INFORMATION - PARAGRAPHS

- The contents of document should be paragraphed in a **hierarchical** manner.
- Numbering of different paragraphs should be in uniformity to the numbering system explained below :

Level	All Capitals	Bold	Underline	Alignment	Font Size
Level - 1 heading	Yes	Yes	No	Left	14
Level - 2 heading	Yes	Yes	No	Left	12
Level - 3 heading	No (Words to begin with Caps i.e. Title case)	Yes	No	Left	12
Level - 4 heading	No (Title case)	No	Yes	Left	12
All headings beyond Level-4	No (Title case)	No	No	Left	12

Example:

4 **TECHNICAL SPECIFICATIONS** (Level - 1)

4.1 **TECHNOLOGICAL PROCESS EQUIPMENT** (Level - 2)

4.1.1 **Basic Oxygen Furnace (BOF)** (Level - 3)

4.1.1.1 Lance Cooling System (Level - 4)

- Numbering of paragraphs and sub-paragraphs within the first tab of width 2.0 cm should be left aligned and limited to level - 4 (Example 3.1.2.5).
- For subsequent identification of sub-paragraphs, numerals at first hanging indent and small roman numbers (eg. i, ii, etc.) at subsequent hanging indent should be used. Such numerals and roman numbers should be followed by right hand bracket enclosure (eg. 1) , 2) , iii) , ix) etc.). Beyond that, Bullets (eg. • , ⇒ , ■ , ◆ etc.) should be used for identifying sub-paragraphs.

Example :

4.1.1.4 Lance Cooling System

1) Water for cooling

i) Inlet water temperature
- Maximum -
- Minimum -

ii) Outlet water temperature
⇒ Peak -
⇒ Mean -

- Description under each heading should start from next line and at respective indent.
- After the heading no colon (:) or semi-colon (;) should be used.
- Where no heading is used, the text should start from first indent.
- All paragraphs should be justified.
- Different type of information / data should not be given in running text in a paragraph. Separate paragraphs should be used for different type of information.
- For one particular type of information if there are various data, same should be presented in enumerated form like in Tabular or in Bulleted form. Use of bullets may also start from level-3 paragraphs but contents in bulleted form should be limited to one sentence only, as far as possible.

4.6 PRESENTATION OF INFORMATION - TABLES

- Any information in tabular fashion furnished in the main body of the Report shall be termed as "Table".
- Table should have a heading which shall be in normal font type and size, all capitals, bold, underlined and centred.

Example:

PRODUCTION OF LIQUID STEEL

- Reference to a table elsewhere in the document should be in bold letters with heading of the table and respective clause number.

4.7 PRESENTATION OF INFORMATION - ANNEXURES

- All information, to be furnished as enclosure to the main text of the document, will be termed as Annexure. This includes letter from client and other "as received" reproducible information. "Appendix" word should not be used.
- Annexure should have a heading which shall be in normal font type and size, all capitals, bold, underlined and centred.

Example :

PRODUCTION OF BILLETS

- Each Annexure shall be numbered. The number should be in same font type and size, all capitals, bold and right aligned. System of numbering is as follows :

ANNEXURE - clause no. - Sl. No.

Example :

ANNEXURE - 3.1-1
ANNEXURE - 5.4.5-1

- If there are more than one Annexures under one paragraph (Level-2), these should be numbered serially (eg. 3.1-1, 3.1-2, 3.1-3 etc.). This serial number is valid only for that particular clause. Serial number of a Annexure under different clauses should start again from 1.
- Reference to an Annexure elsewhere in the document should be in bold letters.
- Header (on the outer edge) for Annexure pages should be as below :

- Page numbering of the Annexure should be given in the Footer. Footer for Annexure should be as follows : (Font size 10, all in capitals)

Client's abbreviation	ANNEXURE - no.	Document no. with revision status
Project abbreviation	PAGE # (Serial no.) of # (Total pages in content)	

Example :

BSL	ANNEXURE - 2.9-1	CET/02/RN/1262/TS/T/01/R=3
VACUUM REFINING IN SMS-II	PAGE 1 of 3	

- Sometimes information is re-produced in "as received" form, eg. Letter from client etc. Such annexures should atleast be given the heading and page number.

4.8 PRESENTATION OF INFORMATION - SCHEDULES

- All formats prepared by CET and furnished in a document as enclosures, to receive information / data from the tenderer will be termed as Schedule.
- Schedule should have a heading which shall be in normal font type and size, all capitals, bold, underlined and centred.

Example :

DATA SHEET FOR PRESSURE SAND FILTER

- Each schedule shall be numbered. The number should be in same font type and size, all capitals, bold and right aligned. System of numbering is as follows :

SCHEDULE - Clause no. - Sl. No.

Example :

SCHEDULE - 3.1-1
SCHEDULE - 5.4.12-1

- If there are more than one schedules under one paragraph (Level-2), these should be numbered serially (eg. 3.1-1, 3.1-2, 3.1-3 etc.). This serial number is valid only for that particular Level-2 clause. Serial number of a schedule under different clause should start again from 1.
- Reference to any schedule in the Report should be in bold letters.
- All schedules should have space for signature of the tenderer, name, designation and seal of the company at the end.
- No header should be given in a schedule.
- Page numbering of the schedule should be given in the footer. Footer for schedule should be as follows : (Font size 10, all in capitals)

Client's abbreviation	SCHEDULE - no.	Document no. with revision status
Project abbreviation	PAGE # (Serial no.) of # (Total pages in content)	

Example :

BSL	SCHEDULE - 3.1.22-1	CET/02/RN/1262/TS/T/01/R=3
VACUUM REFINING IN SMS-II	PAGE 1 of 3	

4.9 LAYOUT FOR GENERAL TECHNICAL SPECIFICATION (GTS)

- Layout for GTS should be as follows :

Item	Specification
Paper size	A4
Top Margin	3.0 cm
Bottom Margin	3.0 cm
Left Margin	3.5 cm
Right Margin	2.0 cm
First Tab	2.0 cm
Subsequent Tabs	1.0 cm
Header at	1.0 cm
Header size	1.0 cm
Footer at	1.8 cm
Footer font size	10
Footer Font type	Same as in document
Font size in document	10
Font type	Optional, but should be uniform everywhere in document
Font size for heading	12
Line Spacing in a paragraph	Single

Spacing after a paragraph	6 pts. ; but in bullets etc. spacing should be single line.
Final document printing	In case the printing is on both sides of paper, Mirror margins should be “ON”.

- Heading for GTS should be in normal font, all capitals, bold and centre aligned.
- Header for GTS should be same as given under paragraph “Traceability of documents”.
- Footer for GTS should be as follows :

General Technical Specification Title	PAGE # of # (total pages)	CET/GTS/Discipline code/xx/R=x

Example:

General Technical Specification Motors	PAGE 1 of 10	CET/GTS/E/01/R=0

5 ABBREVIATIONS

- A list of standard abbreviations is given below. These abbreviations can be used in the reports/ specifications/ drawings without giving the expanded form.

5.1 STANDARD ABBREVIATIONS & CODES

The following abbreviations and codes will be considered as standard as these are either based on IS standards or are widely known in the steel industry. These abbreviations and codes can be directly used without giving explanation.

SL	FULL EXPRESSION	ABBREVIATION
1.	Acceleration	a
2.	Alloy Steels Plant	ASP
3.	Alternating Current	a.c.
4.	American Iron & Steel Institute	AISI
5.	American National Standards Institute	ANSI
6.	American Petroleum Institute	API
7.	American Society of Mechanical Engineers	ASME
8.	American Society of Testing Materials	ASTM
9.	Ampere	A
10.	Angular Velocity	ω
11.	Apparent porosity	AP
12.	Approach Note	AN
13.	Argon Oxygen Decarburisation	AOD
14.	Asphalt Concrete	AC
15.	Atmosphere	atm
16.	Atto (10^{-18})	a
17.	Basic Oxygen Furnace	BOF
18.	Bath Agitation Process	BAP
19.	Bhilai Steel Plant	BSP
20.	Bill of Materials	BOM
21.	Biological Oxygen Demand	BOD
22.	Blast Furnace	BF
23.	Blooming & Billet Mill	BBM
24.	Boiling Point	BP
25.	Bokaro Steel Plant	BSL
26.	Brake Horse Power	BHP
27.	Breadth	b
28.	Break Even Point	BEP
29.	Brinell Hardness Number	HB
30.	Brinell Hardness Number (A Scale)	HRA
31.	Brinell Hardness Number (B Scale)	HRB
32.	Brinell Hardness Number (C Scale)	HRC
33.	British Standards	BS
34.	British Thermal Unit	Btu
35.	Bulk Density	BD
36.	Bureau of Indian Standards	BIS
37.	Calorie	cal

SL	FULL EXPRESSION	ABBREVIATION
38.	Calorific Value	Cv
39.	Cast Iron	CI
40.	Centi (10^{-2})	c
41.	Centimeter	cm
42.	Central Coal Supply Organisation	CCSO
43.	Central Fuel Research Institute	CFRI
44.	Central Govt. Sales Tax	CST
45.	Central Ground Water Board	CGWB
46.	Central Marketing Organisation	CMO
47.	Central pollution Control Board	CPCB
48.	Central Public Works Department	CPWD
49.	Central Raw Materials Bedding & Storage Yard	CRMBSY
50.	Central Water Commission	CWC
51.	Centre for Engineering & Technology	CET
52.	Centre Line	C/L
53.	Centre of Gravity	c.g.
54.	Chandrapur Ferro-Alloys Plant	CFP
55.	Cold Rolled	CR
56.	Cold Rolled Grain Oriented	CRGO
57.	Cold Rolled Non-grain Oriented	CRNO
58.	Cold Rolling Mill	CRM
59.	Coloumb	C
60.	Composition Adjustment by Sealed Argon Bubbling and Oxygen Blowing	CAS-OB
61.	Continuous Billet Mill	CBM
62.	Continuous Casting Machine	CCM
63.	Cost inclusive of Insurance & Freight	CIF
64.	Cubic Meter	m^3
65.	Cycles Per Second	cps
66.	Day	d
67.	Deca (10)	da
68.	Deci (10^{-1})	d
69.	Decibels	db
70.	Degree Centigrade	^0C
71.	Degree Fahrenheit	^0F
72.	Degree Kelvin	^0K
73.	Degree Rankine	^0R
74.	Dense Bituminous Concrete	DBC
75.	Density	ρ
76.	Detailed Engineering	DE
77.	Detailed Project Report	DPR
78.	Diameter	ϕ
79.	Direct Current	d.c.
80.	Direct On Line	DOL
81.	Directly Reduced Iron	DRI
82.	Discounted Cash Flow	DCF
83.	Distribution Box	DB
84.	Durgapur Steel Plant	DSP
85.	Dyne	dyn

SL	FULL EXPRESSION	ABBREVIATION
86.	Earnest Money	EM
87.	Efficiency	η
88.	Electric Arc Furnace	EAF
89.	Electric Overhead Travelling Crane	EOT Crane
90.	Electric Resistance Welding	ERW
91.	Electro Magnetic Stirring	EMS
92.	Electro Slag Remelting (Refining)	ESR
93.	Elevation	EL
94.	Energy Optimising Furnace	EOF
95.	Environment Impact Assessment	EIA
96.	Environment Management Plan	EMP
97.	Equal to	=
98.	Exa (10^{18})	E
99.	Excise Duty	ED
100.	Expenditure During Construction	EDC
101.	Farad	F
102.	Feasibility Report	FR
103.	Femto (10^{-15})	f
104.	Ferro-Chrome	Fe-Cr
105.	Ferro-Manganese	Fe-Mn
106.	Ferro-Niobium	Fe-Nb
107.	Ferro-Silicon	Fe-Si
108.	Ferro-Tungsten	Fe-W
109.	Ferro-Vanadium	Fe-V
110.	Figure	Fig
111.	Final Acceptance Test	FAT
112.	Finished Floor Level	FFL
113.	Flow Rate	q
114.	Flow Rate - Cubic Feet per Second	cusec
115.	Foot	Ft / ’
116.	Force	F
117.	Foreign Exchange	FE
118.	Freight on Board	FOB
119.	Freight on Rail	FOR
120.	Frictional Horse Power	FHP
121.	Gallon	gal
122.	Gallon Per Minute	gpm
123.	Gas Constant	R
124.	General Arrangement Drawing	GA Drg
125.	General Condition of Contract	GCC
126.	General Layout Drawing	GL Drg
127.	General Technical Specification	GTS
128.	Geological Survey of India	GSI
129.	German Standards	DIN
130.	Giga (10^{9})	G
131.	Gram	g
132.	Greater Than	>
133.	Ground Level	GL
134.	Hardware	H/W

SL	FULL EXPRESSION	ABBREVIATION
135.	Heat (Quantity)	Q
136.	Heat Resistant Concrete	HRC
137.	Hecto (10^2)	h
138.	Height	ht
139.	Henry	H
140.	Hertz	Hz
141.	High Tension	HT
142.	Horse Power	hp
143.	Hot Metal	HM
144.	Hot Rolled	HR
145.	Hot Strip Mill	HSM
146.	Hour	h
147.	Impedance	Z
148.	Inch	in / ”
149.	Indian Electrical Manufacturers Association	IEMA
150.	Indian Electricity Codes	IEC
151.	Iisco Steel Plant	ISP
152.	Indian Railway Standard	IRS
153.	Indian Road Congress	IRC
154.	Indian Standard Angle	ISA
155.	Indian Standard Medium Channel	ISMC
156.	Indian Standard Metric Beam	ISMB
157.	Indian Standards	IS
158.	Inductance	L
159.	Inductive Reactance	X_L
160.	Inside Diameter	ID
161.	Inter Plant Standard for Steel Industry	IPSS
162.	Interest During Construction	IDC
163.	Internal Combustion Engine	IC Engine
164.	Internal Rate of Return	IRR
165.	International Standards Organisation	ISO
166.	International System of Units	SI
167.	Japanese Industrial Standard	JIS
168.	Joule	J
169.	Kilo (10^3)	k
170.	Kilo Pascal	kPa
171.	Kilo-calorie	kcal
172.	Kilogram	kg
173.	Kilogram Force Metre	kgf-m
174.	Kilo-joule	kJ
175.	Kilometre	km
176.	Kilometres Per Hour	kmph, km/h
177.	Kilo-Newton	kN
178.	Kilovolt Ampere	kVA
179.	Kilovolts	kV
180.	Kilowatt	kW
181.	Kilowatt Hour	kWh
182.	Kinematic Viscosity - Stokes	St
183.	Kinetic Energy	K.E.

SL	FULL EXPRESSION	ABBREVIATION
184.	KORF Oxygen Refining Furnace	KORF
185.	L „Institute De Recherché De la Siderurgia	IRSID
186.	Laboratory	Lab
187.	Ladle Furnace	LF
188.	Lesser Than	<
189.	Letter of Credit	LC
190.	Letter of Intent	LOI
191.	Limited Tender Enquiry	LTE
192.	Linz Donawitz Converter	LD
193.	Litre	l
194.	Litres Per Minute	lpm
195.	Litres Per Second	lps
196.	Logarithm	log
197.	Low Tension	LT
198.	Lumen	lm
199.	Lux	lx
200.	Machine	m/c
201.	Management Information System	MIS
202.	Mass	m
203.	Maximum	max
204.	Mean Sea Level	MSL
205.	Mega (10^{6})	M
206.	Mega Volt Ampere	MVA
207.	Megapascal	MPa
208.	Megawatt	MW
209.	Melting Point	MP
210.	Memorandum of Understanding	MOU
211.	Merchant Mill	MM
212.	Metalliferrous Mines Rules	MMR
213.	Meter Gauge	MG
214.	Metre	m
215.	Micro (10^{-6})	µ
216.	Mild Steel	MS
217.	Mile Per Hour	mph
218.	Mill Floor Level	MFL
219.	Milli (10^{-3})	m
220.	Millimetre of Mercury	mmHg
221.	Millimetre of Water Column	mm H_2O
222.	Million Tonnes	Mt
223.	Million Tonnes Per Annum	Mtpa
224.	Mines & Quarries	M&Q
225.	Miniature Circuit Breaker	MCB
226.	Minimum	min.
227.	Minute	min / ’
228.	Minutes of Meeting	MOM
229.	Modulus of Elasticity	E
230.	Modulus of Rigidity	G
231.	Modulus of Rupture	MOR
232.	Moment of Inertia	I

SL	FULL EXPRESSION	ABBREVIATION
233.	Motor Control Centre	MCC
234.	Moulded Case Circuit Breaker	MCCB
235.	Nano (10^{-9})	n
236.	National Electrical Manufacturer Standard	NEMA
237.	National Lubricating Grease Institute	NLGI
238.	Net Positive Suction Head	NPSH
239.	Net Present Value	NPV
240.	Newton	N
241.	Newton metre	Nm
242.	Nominal Bore	NB
243.	Non Destructive Test	NDT
244.	Non Turnkey Project	NTK
245.	Normal Cubic Metre	Nm^3
246.	Normal Temperature & Pressure	NTP
247.	Not to Scale	NTS
248.	Notice Inviting Tender	NIT
249.	Ocean Freight & Insurance	OF & I
250.	Ohm	Ω
251.	Oil Circuit Breaker	OCB
252.	Open General Licence	OGL
253.	Open Hearth Furnace	OH
254.	Ore Handling Plant	OHP
255.	Ounce	oz
256.	Outside Diameter	OD
257.	Over Current Relay	OCR
258.	Over Voltage Relay	OVR
259.	Parts Per Million	ppm
260.	Pascal	Pa
261.	Performance Guarantee Test	PGT
262.	Permeability	μ
263.	Personal Computer	PC
264.	Peta (10^{15})	P
265.	Pico (10^{-12})	p
266.	Pig Iron	PI
267.	Pitch Circle Diameter	PCD
268.	Plain Cement Concrete	PCC
269.	Poise	P
270.	Poly Vinyl Chloride	PVC
271.	Potential Energy	P.E.
272.	Pound	lb
273.	Pound Per Square Inch	psi
274.	Pound Per Square Inch (gauge)	psig
275.	Pound Per Yard	lb/yd
276.	Pound Sterling	£
277.	Power Factor	pf / cos
278.	Prandtl number	Pr
279.	Preliminary Acceptance test	PAT
280.	Programmable Logic Controller	PLC
281.	Project Report	PR

SL	FULL EXPRESSION	ABBREVIATION
282.	Quality Control	QC
283.	Quantity	Qty.
284.	Radian	rad
285.	Radius	r
286.	Rail & Structural Mill	RSM
287.	Refractories Under Load	RUL
288.	Reheating Furnaces	RH Fces.
289.	Reinforced Cement Concrete	RCC
290.	Relative Humidity	R_H
291.	Research and Development Centre for Iron & Steel	RDCIS
292.	Return on Investment	ROI
293.	Revolution Per Minute	rpm
294.	Revolution Per Second	rps
295.	Reynolds Number	Re
296.	Rourkela Steel Plant	RSP
297.	Ruhrstahl Heraeus	RH
298.	Ruhrstahl Heraeus Oxygen Blowing	RH-OB
299.	Rupees	Rs
300.	Rupees in Crore	Rs in Cr.
301.	Rupees in Lakh	Rs in Lakh
302.	Russian Standard	GOST
303.	SAIL Combined Blowing	SCB
304.	SAIL Micro Alloy	SAIL MA
305.	Sales Tax	ST
306.	Second	s / ”
307.	Secondary Steel Making	SSM
308.	Security Deposit	SD
309.	Silicon-Manganese	Si-Mn
310.	Single Line Diagram	SLD
311.	Software	SW
312.	Specific Heat at Constant Pressure	Cp
313.	Specific Heat at Constant Volume	Cv
314.	Specific Volume	v
315.	Sq. meter	m^2
316.	Stainless Steel	SS
317.	Standard Wire Gauge	SWG
318.	Statistical Quality Control	SQC
319.	Steel Melting Shop	SMS
320.	Study Report	SR
321.	Switch Fuse Unit	SFU
322.	Take Over Point	TOP
323.	Temperature	Temp
324.	Tender Evaluation	TE
325.	Tender Specifications	TS
326.	Tera (10^{12})	T
327.	Thermal Conductivity	k
328.	Thickness	thk
329.	Three Phase	3 ph / 3
330.	Tonne (Metric ton)	t

SL	FULL EXPRESSION	ABBREVIATION
331.	Tonnes Per Annum	tpa
332.	Tonnes Per Day	tpd
333.	Tonnes Per Hour	tph
334.	Totally Enclosed Fan Cooled	TEFC
335.	Totally Enclosed Forced Ventilated	TEFV
336.	Totally Enclosed Tube Ventilated	TETV
337.	Twin Hearth Furnace	THF
338.	Ultimate Tensile Strength	UTS
339.	US Dollar	$
340.	Variable Voltage Variable Frequency	VVVF
341.	Velocity	v
342.	Vickers Pyramid Hardness	HV
343.	Viscosity Grade	VG
344.	Viscosity Index	VI
345.	Visvesvaraya Iron and Steel Company Limited	VISL
346.	Volatile Matter	VM
347.	Volt-Ampere	VA
348.	Volts	V
349.	Watt	W
350.	Watt Hour	Wh
351.	Weber	Wb
352.	Wire Rod Mill	WRM
353.	Work Order	WO
354.	Wound Rotor	WR
355.	Yield Strength	YS
356.	Yotta (10^{24})	Y
357.	Zetta (10^{21})	Z

Note : Chemical formulae : The symbols for chemical elements and nuclides shall be written in roman (upright). The symbol is not followed by full stop except for normal punctuation. e.g. Mg, Al_2O_3

5.2 NON-STANDARD ABBREVIATIONS & CODES

- The following abbreviations and codes will be termed as non-standard as these are known in relevant areas / disciplines but not widely understood by all in the steel industry. These abbreviations and codes can be used for the purpose of uniformity but will need to be written in full expanded form while using for the first time in any document.

SL	FULL EXPRESSION	ABBREVIATION
1.	Acceptance of Tender	A/T
2.	Aluminium Conductor Aluminium Cored	AAC
3.	Aluminium Conductor PVC Insulated Flat Steel Armoured PVC Sheathed Cable	AYFY
4.	Aluminium Conductor PVC Insulated Round Steel Wired Armoured PVC Sheathed Cable	AYWY
5.	Aluminium Conductor Steel Reinforced	ACSR

SL	FULL EXPRESSION	ABBREVIATION
6.	Annual Maintenance Contract	AMC
7.	Banded Haematite Jasper	BHJ
8.	Banded Haematite Quartzite	BHQ
9.	Bank Guarantee	BG
10.	Barsua Iron Ore Mines	BIM
11.	Blast Furnace Gas	BFG
12.	Broad Gauge	BG
13.	Brought Forward	B/F
14.	Caking Index	CI
15.	Carried Forward	C/F
16.	Cement Concrete	CC
17.	Cement Mortar	CM
18.	Centre to Centre	C/C
19.	Circuit	Ckt
20.	Circuit Breaker	CB
21.	Coal Crushing Strength	CCS
22.	Combination Fuse Switch	CFS
23.	Compact Strip Production	CSP
24.	Creusot Loire Uddeholm	CLU
25.	Cross Linked Polyethylene	XLPE
26.	Current Transformer	CT
27.	Damp Proof Course	DPC
28.	Ethylene Propylene Resins	EPR
29.	European type Water Closet	EWC
30.	Extra Deep Drawing	EDD
31.	Full Load	FL
32.	Hard Groo Index	HGI
33.	High Carbon ASTM A 616 Gr. 60 Steel	HICAR
34.	High Power Electric Arc Furnace	HPEAF
35.	High Pressure Mercury Vapour	HPMV
36.	High Pressure Sodium Vapour	HPSV
37.	High Rupturing Capacity	HRC
38.	High Speed Steel	HSS
39.	High Strength Low Alloy (Steel)	HSLA
40.	Hot Briquetted Iron	HBI
41.	Indian type Water Closet	IWC
42.	Iron Clad Triple Pole	ICTP
43.	Iron Clad Triple Pole and Neutral	ICTPN
44.	Liquid limit	LL
45.	Liquidated Damage	LD
46.	Minimum Oil Circuit Breaker	MOCB
47.	Non Return Valve	NRV
48.	Optimum Moisture Content	OMC
49.	Ore Beneficiation Plant	OBP
50.	Process & Instrumentation Diagram	P & I Diag
51.	Profitability Index	PI
52.	Random Rubble Masonry	RRM
53.	Raw Materials Handling Plant	RMHP
54.	Raw Materials Storage Yard	RMSY
55.	Raw Materials Yard	RMY

SL	FULL EXPRESSION	ABBREVIATION
56.	Raw Ore Stock Piling Yard	ROSY
57.	Reactance	X
58.	Reactive Volt Ampere	VAR
59.	Reactivity Index	RI
60.	Reference Level	RL
61.	Run of Mine	ROM
62.	Silicon Controlled Rectifier	SCR
63.	Squirrel Cage Induction Motor	SCIM
64.	Sublance Dynamic Control	SDC
65.	Submerged Arc Welding	SAW
66.	Sulphur Hexa-Fluoride	SF6
67.	Triple Pole Neutral	TPN
68.	Vacuum Arc Degassing	VAD
69.	Vacuum Arc Recarburisation	VAR
70.	Vacuum Circuit Breaker	VCB
71.	Vacuum Degassing	VD
72.	Vacuum Induction Degassing	VID
73.	Vacuum Induction Melting	VIM
74.	Vacuum Oxygen Decarburisation	VOD
75.	Vacuum Oxygen Decarburisation Converter	VODC
76.	Vacuum Oxygen Heating	VOH
77.	Vacuum Oxygen Refining	VOR
78.	Vacuum Slag Cleaning	VSC
79.	Variable Cost	VC
80.	Variable Cost per Tonne	VC/t

Note : The above lists are not exhaustive. Besides the above abbreviations and codes, any other abbreviation and code which will be repetitively used in the Report can also be used but should always be written in full expanded form while using for the first time in any document.

Numbering System for Packages / Sub- Packages

For ease of identification, generally a package number is given to each Tender Specification of a project when implemented through multi–packages. During pre-ordering stage, sometimes it is required to break a package into sub-packages to take care of certain specific requirement of client or to take care of market situation / response. Accordingly, Tender Specifications of sub packages are also issued by CET with a sub-package number. Further when sub-packages are created, the package numbering of the sub-package should have reference of the parent package of which it is a part. In case the package numbering of a project is organized in a systematic manner, it will help in day to day work during the implementation of the project.

Package numbering system is explained with an example below.

Typical Packaging for "Rebuilding of Coke-Oven Battery" (As per PMS)

Package Name	Type of Package	Package Number	Sub-package Name	Sub-Package Number
Main Package (Battery Proper)	Turnkey	TK-01		
Oven Machines	Turnkey	TK-02		
Works Package	Item Rate	WP -03		
Silica Refractory	Supply	SP-04		
Fireclay Refractory	Supply	SP-05	Fireclay & Mica Insulation Bricks & Insulation Mortar	SP-05A
			Fireclay Bricks & Fireclay Mortar	SP-05B
			Fireclay Checker Bricks	SP-05C
			Fireclay Bricks for Oven Sole	SP-05D

In case a sub-package (For example) SP-05 A) is further broken into packages, then their numbering may be considered like SP-05Aa, SP-05Ab, SP-05Ac, etc. In case Package SP-05Aa is further broken into packages then their numbering will be as SP-05Aa(i), SP-05Aa(ii), etc.

Note :

1. In CPFR projects, if a plant is following a specific numbering system for all the projects under CPFR, and CET is handling a part of it, then the numbering system followed by plant will supersede the above numbering system.
2. Packaging should be finalized in consultation with plant. If a package is broken at the tendering stage to meet certain requirement, then it should be treated as sub-package.
3. Package numbering should be in descending order like turnkey Package / Design, Supply Erection & Commissioning Package (TK), Works Package / Item Rate contract package (WP) & Supply Packages (SP)
4. Document Numbering of the package shall be as per ISO procedure.
5. Revision status of any sub-package being issued for the first time shall be R=0.