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<b>Document title:</b> Directorate Operating Manual of Motive Power			



भारत सरकार  
रेल मंत्रालय

**GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS**

**MP-DM-4.2.2-1  
Directorate Manual of Motive Power Directorate**

**1.0 AMENDMENT HISTORY: -**

S. No.	Amendment date	Version	Reason for amendments
1.0	20-12-10	1.0	First issue under new documentation system
2.0	18-11-16	2.0	Revised & updated

चालन शक्ति निदेशालय  
अनुसंधान अभिकल्प और मानक संगठन  
लखनऊ-226 011

**MOTIVE POWER DIRECTORATE  
RESEARCH DESIGNS & STANDARDS ORGANISATION  
LUCKNOW - 226 011**

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## 2.0 Brief profile of the Directorate and Scope:

### 2.1 Directorate Profile

Motive Power Directorate is engaged in designs and standards works related with diesel-electric and diesel-hydraulic locomotives. Important accomplishment ranges from Indigenisation of a large number of diesel locomotive components, establishment of special maintenance code in areas with reliability problems, evolving and adopting standards. The main activities of the directorate are as under:

- Design and development of diesel-electric and diesel-hydraulic locomotives, 700 HP diesel hydraulic multiple units, 700 HP & 1400 HP diesel electric multiple units, 1600 HP DEMU, BG, MG & NG rail buses, 140 ton diesel hydraulic breakdown cranes, re-railing equipments and rescue devices.
- Design and development of mechanical assemblies, bogies, under- gear, brake-gear, under frame and superstructure for diesel electric locomotives.
- Development and standardisation of locomotive systems, spares / components and sub-assemblies.
- Technical investigation into operational and maintenance problems of Railways.
- Providing technical consultancy to Railway Management and other Public Sector Undertakings in matters connected with Diesel Traction.
- Acquisition and assimilation of state-of-the-art technology in the field of diesel locomotives and accident management equipments, e.g. 5500/6000 HP locomotive, 140 T Break down Crane.
- Development and Indigenisation of locomotive equipments / spares / components.
- Nodal directorate for issue of speed certificates for all types of rolling stock.

The DM is applicable to all activities / processes of the Motive Power directorate, in accordance with the ISO 9001:2008 Quality Maintenance Standard. Apex level ISO documents shall be followed whether it is described in this DM or not.

### 2.2 Facilities and Resources:

Motive Power Directorate has

- Well equipped Technology Center with CAD/CAE/PDM Workstations and software like Unigraphics (NX7), Adams Rail, Hypermesh, Radioss MSC Nastran, MSC Fatigue, Team Center 3D modeling and FEM analysis.
- RAMLOT Centre.
- STOP simulation package.
- Runtrain simulation software.
- IR diesel power website
- MP knowledge portal

### 2.3 Organization Setup:

EDSMP / Sr. EDSMP are the head/ in-charge of the Directorate. The directorate is organised into various groups headed by Dir / Jt. Dir i.e. Brake (BK), Engine (Eng), Electric Controls (EC), Electric Machines (EM), Engine System (ES), Hydraulic (HYD), Loco design (LD), Speed certificate (SC) and Vehicle Dynamics group (VDG). The organization chart of

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the Motive Power Directorate is available in work instruction MP-WI-5.5.1-1 maintained by OS/MP.

### 3.0 Quality Management System:

The directorate follows chapter 4 of RDSO Quality Manual QO-QM-4.2.2-1 along with quality directives documents no. QO-D-4.2.3-1 and QO-D-4.2.4-1. In addition, the Directorate Manual MP-DM-4.2.2-1 of Motive Power Directorate is applicable.

The DM is issued and changed with the approval of Sr. EDSMP / EDSMP. Directorate Manual for Motive Power Directorate is a controlled document. The soft copy of the latest revision of DM in the PDF format is available on ISO Cell website under Motive Power Directorate for downloading/printing/viewing within the directorate / RDSO.

### 3.1 Control of Documents

A) **Issue:** The soft copy of controlled documents in the PDF format will be uploaded on ISO Cell website under Motive Power Directorate headings for downloading/printing/viewing within the directorate / RDSO as and when they issue or undergo any revision.

SSE (Design)/ Central Record/MP shall maintain a folder for keeping 'MASTER COPY' marked on first page of all such documents and shall maintain a register to keep record of issue of 'MASTER COPY', whenever issued.

#### B) Change, Review & Approval:

1. If any controlled document requires change / review, the change authority shall maintain change/approval record and submit approved copy of the new version for issue to Dir/MP dealing ISO as well as to SSE (Design) / Central Record. After issue of new Version, SSE (Design) / Central Record-MP keeps the change/approval record along with the obsolete copy for record in a folder.
2. The revised controlled copy in the PDF format will also be uploaded on ISO Cell website under Motive Power Directorate as mentioned above.
3. All directors will see the new document on Motive Power Directorate segment of ISO Cell website and email the acknowledgement to concerned SSE/JE dealing with ISO for confirmation that the new document has been seen by them. They shall also understand changes themselves and, if required, will ensure that their subordinate officials also have become familiar with this document.
4. All master copies are available with SSE (Design) / Central Record-MP.

C) **Communications:** Email shall be used effectively for both internal and external communications. However, for important documents and actions, formal letters and paper documents shall be preferred. Email shall not be used in lieu where the office procedures require a signed document.

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### 3.2 Control of Records

Records to be maintained in accordance with Master list of quality records MP-M-4.2.4-1.

### 4.0 Management Responsibility:

The directorate follows chapter 5 of Quality Manual QO-QM-4.2.2-1. In addition, the Directorate Manual MP-DM-4.2.2-1 of Motive Power Directorate is also applicable.

#### 4.1 Quality Objectives of Motive Power Directorate:

The quality objectives of the directorate are listed in document No. MP-M-5.4.1-1. Master list of quality objective. This list is revised annually by Dir/MP dealing with ISO in consultation with other Directors / Joint Directors and with the approval of directorate head.

#### 4.2 Directorate review:

The directorate review is done once in six months. The records of the directorate's review meeting are maintained by Dir- Jt. Dir/ dealing with ISO in file SD.ISO.DRM.

### 5.0 Resource management:

The directorate follows chapter 6 of Quality Manual QO-QM-4.2.2-1. In addition, the Directorate Manual MP-DM-4.2.2-1 of Motive Power Directorate is also applicable.

The training needs of staff are identified annually and a record of the same is being maintained by the concerned group in-charge. The coordinator JD/Dir. is responsible for organising training as per training needs. The compliance of training schedule is reviewed on six monthly basis by the director In charge. The record of training needs is maintained by concerned director/ Joint director.

### 6.0 Product Realization

The directorate follows chapter 7 of Quality Manual QO-QM-4.2.2-1. In addition, the Directorate Manual MP-DM-4.2.2-1 of Motive Power Directorate is also applicable.

#### 6.1 Design and Development

In addition to QO-G-7.3-1 Design & Development, following shall apply:

1. Responsibility: The responsibility shall be of concerned group in-charge with specific approval of Sr. EDSMP/EDSMP
2. Control of Design and Development changes
  - (a) Drawings, specifications, calculation sheets, Maintenance instructions, modification sheet, instruction bulletins, test program, miscellaneous report, investigation report and DIC (Design Input catalogue) are Design documents. Central record section shall be responsible for the allotment of number of these documents.

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- (b) Power record, vehicle record, specification section and Vehicle dynamics group loco record constitute central record sections.
- (c) Numbering of drawings and design documents) shall be as per Work Instruction MP-WI-7.3-1 maintained by central record sections.
- (d) Unit supervisor of central record section concerned shall be responsible for the control and release of design documents.
- (e) Number to a design document shall be allotted by unit supervisor of central record section. Record of these numbers shall be maintained by the supervisor concerned of central record section.
- (f) Master list of Design documents shall be kept in central record section and updated once in a year in the month of December. The list shall be updated to include all design documents received up to December of calendar year. Unit supervisor of central\_record section shall ensure that correct copy of design document is only issued.
- (g) Design reports and related correspondence shall be kept in sectional file related to project/subject. Final Design documents shall be sent to central record section.
- (h) Unit supervisor of central record section shall be responsible for the safe custody of records. He shall ensure that superseded documents are kept separately and marked as SUPERSEDED.
- (i) Drawings shall be approved / amended as per Work Instruction MP-WI-7.3-2 maintained by central record sections. MP-RF-7.3.1, Format for Alteration of drawing shall be filled before amendment of drawings.
- (j) Specification, Maintenance Instructions and any amendment thereof shall be approved by Sr. EDSMP / EDSMP and work Instruction MP-WI-7.3-2 shall be followed maintained by central record sections.
- (k) Validation of design may involve, lab test such as fatigue testing and field trials such as oscillation trials, emergency braking distance trials, dynamometer trials or other instrumented tests/trials. A test/ trial scheme shall be prepared for such trials /tests by concerned unit officer and sent to the agency executing the trials/tests.
- (l) Speed certificate for all kinds of rolling stock for conducting oscillation trials, Coupler force & EBD trials etc. shall be issued as per Work Instruction MP-WI-7.2.3-1 maintained by speed group.
- (m) Drawing and specifications are being sale online by QA-Mech. Dte.
- (n) Procedure for maintaining back up of publications & drawing issued by MP Dte is given under MP-WI-7.3-3 issued by Dir/MP-LD.
- (o) Procedure for testing of material and preservation of test samples in RDSO is given under Work Instruction MP-WI-7.1-1.

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## 6.2 Vendor development:

### a) **Procedure for Development of Vendors for Supply of Safety & Critical Items of Diesel Electric Locomotives**

Guidelines for Vendor registration / approval & item specification no. MP-G-7.1-1 & master list of Qualifying Quantity for Part I approval and Qualifying Quantity & Qualifying Periods for Part II Approval of items controlled by MP Directorate no. MP-M-7.1-1 shall apply along with Guidelines for indicative time frame no. MP-G-7.1-2.

### b) **Procedure for development of vendors for supply of other important items or newly developed products of diesel electric locomotives:**

The directorate shall develop at least one source and advise Production Units/ Railways for multi sourcing. No vendor list is issued for these items. The sources, when developed, shall be advised by a letter to concerned Railways/ Production Units.

## 6.3 Control of Monitoring and Measuring Devices:

ISO document no. QO-G-8.2.3-1 shall apply. The master list of measuring instrument MP-M-7.6-1 is maintained by Engine group. SSE (Design)/ Engine have to ensure that the instruments are sent to Engine Development / NABL approved laboratory Directorate one month before the due date of calibration.

## 7.0 Measurement Analysis & Improvement:

The directorate follows chapter 8 of Quality Manual QO-QM-4.2.2-1. In addition, the Directorate Manual MP-DM-4.2.2-1 of Motive Power Directorate is also applicable.

### 7.1 Customer Satisfaction:

Customer of MP Dte has been identified as the CMPE/Diesel of Zonal Railways and CMEs of the Production Units. Regular feedback is collected from the customers on the performance of the designs and developments. The failure data from Railways is collected and analysed and suggestions given to Railways to reduce failures. A Customer Complaint Register no. MP-RF-8.3-1 is being maintained to maintain the customer complaints & timely feedback.

### 7.2 Internal Audit:

ISO document no. QO-D-8.2.2-1 shall apply.

### 7.3 Control of Non Conforming Product:

ISO document no. QO-D-8.3-1 shall apply.

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#### 7.4 Continual Improvement:

Continual improvement is carried out by review of Quality objectives and it is discussed in Directorate review meeting. Based upon the feedback from the customers, upgradation and revision of specification and drawing is being carried out.

#### 7.5 Corrective Action:

ISO document no. QO-D-8.5.2-1 shall apply.

#### 7.6 Preventive Action:

ISO document no. QO-D-8.5.2-1 shall apply.

#### 8.0 Abbreviations:

RDSO	RESEARCH DESIGNS & STANDARDS ORGANISATION
EDSMP	EXECUTIVE DIRECTOR STANDARDS / MOTIVE POWER
Sr. EDSMP	SENIOR EXECUTIVE DIRECTOR STANDARDS / MOTIVE POWER
Dir	DIRECTOR
JD	JOINT DIRECTOR
DD	DEPUTY DIRECTOR
ADE	ASSISTANT DESIGN ENGINEER
SSE	SENIOR SECTION ENGINEER
JE	JUNIOR ENGINEER
ES	ENGINE SYSTEM
Eng	ENGINE
EM	ELECTRICAL MACHINES
BD	BOGIE DESIGN
LD	LOCO DESIGN
HYD	HYDRAULIC
VDG	VEHICLE DYNAMICS GROUP
OS	OFFICE SUPERINTENDENT
MP	MOTIVE POWER
Dte	DIRECTORATE
BK	BRAKE
EC	ELECTRICAL CONTROLS
HOD	HEAD OF DEPARTMENT
SOP	SCHEDULE OF POWER
DLW	DIESEL LOCOMOTIVE WORKS
DIC	DESIGN INPUT CATALOGUE
Doc	DOCUMENTATION
Spec	SPECIFICATION
CAD	COMPUTER AIDED DESIGN
QSP	QUALITY SYSTEM PROCEDURE
DMU	DIESEL MULTIPLE UNIT
FEM	FINITE ELEMENT METHOD
MR	MANAGEMENT REPRESENTATIVE
ALCO	AMERICAN LOCOMOTIVE COMPANY
SPART	SELF PROPELLED ACCIDENT RELIEF TRAIN