

Common provisions. General provisions

1 Purpose and scope

This chapter contains general provisions for the regulations on the *design, construction* and *maintenance* of railway installations. The regulations are linked to national and international standards where these are governed by statutes, norms and agreements or where they are appropriate. The chapter also contains general requirements for the design and construction of railway installations.

The regulations comprise the following main components:

Appendices, specific installations and products	INFORMATIVE	Specific to technical field
Preface	INFORMATIVE	Common to all technical fields
General provisions	NORMATIVE	Common to all technical fields
Definitions, abbreviations and symbols	NORMATIVE	Common to all technical fields
General technical requirements	NORMATIVE	Specific to technical field
Requirements for installation type or subsystems	NORMATIVE	Specific to technical field

The Technical Regulations mainly stipulate the qualitative and quantitative functional requirements of subsystems and components.

Appendices contain, for example, descriptions of type-approved installations and systems, as well as more elaborate and explanatory texts. Where type-approved installations and systems are designed, constructed or maintained, the appendices must be regarded as normative and the specification in the relevant appendix must consequently be complied with. Appendices (tables, instructions, procedures, data) specifically referred to in the regulations must also be complied with and may consequently be regarded as forming part of the normative regulations.

Explanatory text, textbook material, comments and essential definitions are marked in grey (like this section) and located where such material naturally belongs in the regulatory text.

1.1 Maintenance requirements **¶** General

The requirements must be regarded as triggering requirements for when measures have to be implemented.

Further, the regulations stipulate requirements for measures or the implementation of measures where this is natural and/or necessary for reasons of quality and safety.

The regulations also stipulate, to the necessary extent, the requirements for how quickly the exposed faults must be remedied. For particularly important areas, requirements are stipulated for operational measures that must be set in motion.

▶ Safety related requirements are specially marked (like this line).

The term 'safety' refers primarily to any of the main incidents defined in the Safety Manual:

- derailment
- train-on-train collision
- collision between train and object
- fire
- passenger injured on platform

- persons injured at level crossing
- persons injured on or by the track (also includes 'electrical safety')

All regulatory requirements are also marked as safety requirements.

2 Validity

The regulations are effective from the date of issue.

The regulations are subordinate to statutes and directives.

►a) In instances where the NNRA imposes more stringent requirements than the regulations, either specifically or through norms and standards, the NNRA's requirements must be complied with.

2.1 Exemption from Technical Regulations

Tabell 1 indicates which verbs are used and how these are to be understood.

Tabell 1: Authority to grant exemption

	Verb	Authority to grant exemption
Regulatory requirements	<i>must (in italics)</i>	Requirements that the NNRA itself does not have the authority to grant exemption from
Requirement	must	Technology
Recommendation	should	Infrastructure owner
Option/alternative solutions	may/can	Infrastructure owner

a)

1. In an application for exemption, the applicant must submit evidence and document theoretically, empirically, or through tests that, in spite of a failure to fulfil the requirements and recommendations, there is still an acceptable level of Reliability, Availability, Maintainability and Safety (*RAMS*). The same applies to the railway's infrastructure capacity and life-cycle costs.
2. An application for exemption must also be cleared with the infrastructure owner when the infrastructure owner is not the applicant/exemption case handler.

b) Before an application for exemption is granted or declined, the internal unit with the authority to handle the application must itself review and assess all the implications of an approved exemption.

c) A party applying for exemption from a 'must-requirement', cf. Tabell 1, must use a separate electronic application form available from the regulation's overview page.

Exemption applications will vary in relation to the degree of seriousness and complexity. The involvement of the infrastructure owner is, nevertheless, necessary in order to take into account all factors described in a (1). An involvement of this nature may include the infrastructure owner receiving copies of both the application and the response in the exemption application process, while other instances will require closer follow-up.

The provisions of the Technical Regulations are sometimes based on and/or elaborate upon requirements laid down in statutes or directives. It should be noted that an approved application for exemption from the Technical Regulations may come into conflict with statutory requirements or directives. The party responsible for formulating the application for exemption from the Technical Regulations is also responsible for quality assuring that the application may be granted without coming into conflict with statutes or directives.

2.1.1 Failure to fulfil maintenance requirements

Exemption most often relates to design and construction although in some instances it will relate to applications for alternative maintenance solutions.

Downgraded inspection routines, monitoring of condition development in the event of non-compliance with triggering requirements and delays in planned inspection routines must be reported in accordance with the requirements of the prevailing NNRA maintenance manual. Also refer to [Krav til forebyggende vedlikehold](#).

2.2 Exemption from statutes and directives

a) In the event of any failure to fulfil the requirements of regulatory statutes and directives, an application for exemption *must* be submitted to the relevant authority. Exemption applications *must* be submitted via the Director General or one of the Director General's appointed executives in charge of regulatory coordination in safety-related matters.

b) Applications for exemption from statutes and directives must also be approved by the Deputy Director General or the internal unit with the authority to handle internal exemption applications.

The majority of statutes and directives will provide information about the basis for applying for or granting exemption. This will generally appear in statutes/regulatory texts, in legislative histories or more detailed explanations/comments on the statutes/directives. An application must include, as a minimum, information referred to as 'evaluation criteria' in the statutes/directives/legislative histories/comments. However, provision is also made to highlight other evaluation criteria.

The Director of Infrastructure determines the procedure for and design of applications.

It should be noted that an approved application for exemption does not place a regulatory body under any obligation to grant exemption on a subsequent occasion if an identical or similar case were to arise. If an identical type of application had been previously approved, this is an *argument* for other applications to be handled similarly, but not more.

3 Requirements for Reliability, Availability, Maintainability and Safety (RAMS)

For new lines and substantially altered infrastructure, process standard [EN 50126] (1999) *must* be complied with.

[EN 50126]:

- defines RAMS as the factors 'Reliability, Availability, Maintainability and Safety', as well as the interaction between these factors

defines a *process* for handling RAMS in a system's life cycle with associated functions

- enables the handling and control of conflicts between RAMS elements to be conducted effectively
- defines a systematic process for specifying RAMS requirements and demonstrating that these requirements have been fulfilled

4 Requirements for interoperability

Technical specifications for interoperability (TSI) are implemented in Norway through directives pursuant to the Interoperability Regulations. The various TSIs stipulate minimum requirements that must be fulfilled in order to ensure interoperability. The relevant TSI requirement will be fulfilled by designing, constructing and undertaking maintenance in accordance with the Technical Regulations. In some instances the requirements of the Technical Regulations will be more stringent than the TSI requirements, without restricting interoperability.

References are given below to appendices containing an overview of the parameter requirements of the various relevant TSIs and how these requirements are satisfied in the Technical Regulations.

TSI	Norwegian translation	Compliance list
Control, Command and Signalling (2012) ¹	Styring, kontroll og signal (2006) ¹	Samsvarsliste
Infrastructure Conventional (2011)	Infrastruktur Konvensjonelle baner (2011)	Samsvarsliste
Energy Conventional (2011)	Energi Konvensjonelle baner (2011)	Samsvarsliste
Safety in railway tunnels (2007)	Sikkerhet i jernbanetunneler (2007)	Samsvarsliste
Persons with reduced mobility (2008)	Personer med redusert mobilitet (2008)	Samsvarsliste
Infrastructure High Speed (2008)	Infrastruktur Høyhastighet (2008)	Samsvarsliste
Energy High Speed (2008)	Energi høyhastighet (2008)	Samsvarsliste
Rolling stock Loc&Pas Conventional (2011)	Rullende materiell lokomotiver og vogner (2011)	Not relevant
Rolling stock High Speed (2008)	Rullende materiell Høyhastighet (2008)	Not relevant
Freight Wagons (2007)	Godsvogner (2007)	Not relevant
Rolling stock Noise (2011)	Rullende materiell Støy (2011)	Not relevant
Telematic Applications for Freight (2005)	Telematikkprogrammer for godstraffikk (2005)	Not relevant
Operation and Traffic management (2011)	Drift og trafikkstyring (2011)	Not relevant

¹⁾ A new TSI for control, inspection and signalling is applicable in EU countries from 2012. As this TSI has not yet been implemented in the EEA agreement, the TSI from 2006 applies to conventional lines in Norway.

5 Compliance with requirements from the Regulations relating to Railway Infrastructure

The Regulations relating to Railway Infrastructure (Jernbaneinfrastrukturforskriften' 6 in Norwegian only) apply to railway infrastructure on the national rail network. The regulations stipulate national technical requirements for railway infrastructure ([Jernbaneinfrastrukturforskriften, kap.3](#)).

The appendix [Ivaretagelse av krav fra Jernbaneinfrastrukturforskriften](#) provides an outline of national technical requirements for railway infrastructure and where these requirements are satisfied in the Technical Regulations.

6 Duty of care

►a) Beyond the specific maintenance requirements stipulated in the regulations, it should also be noted that all employees have a general duty of care. This also applies to systems and components that do not fall within the relevant party's technical field.

A general duty of care includes:

1. A duty to remain vigilant with regard to conditions and the need to implement measures, for example:

- watching/listening/smelling for signs of malfunction and damage that is in the process of occurring or that may have already occurred
- temporary repair of damage where this is appropriate and possible
- lubricating and cleaning if required, even if this is not expressly stated in work orders
- conditioning/trimming of components that are seldom in use to prevent them from seizing
- re-tightening, small repairs, etc. This applies to both mechanical systems and components, and electrical terminations and connections
- watching out for error messages and alarms
- tidying and cleaning
- snow clearance, gritting, grass cutting
- replacement and replenishment of consumables (light bulbs, etc.)

2. Duty to notify the authority that personnel consider to be the appropriate authority in the event that faults or damage are detected that should be construed as a hazard that could result in accidents or major injuries being sustained.

7 Requirements for preventive maintenance

For generic work routines in respect of preventive maintenance, reference is made to the appendix to Chapter 4 in the maintenance regulations for each individual technical field.

►a) Preventive maintenance described in generic work routines is based on an RCM analysis and must be conducted in order to comply with the requirements and recommendations of the Technical Regulations.

►b) Changes to preventive maintenance (type and/or interval) marked with an H (for higher level of authority) must be approved by the Deputy Director General.

►c) Changes to preventive maintenance (type and/or interval) marked with an L (for lower level of authority) must be approved by the infrastructure owner.

d) When maintenance activities are being conducted, the NNRA's own procedures must be observed when such procedures are referred to in work routines or regulations.

For other installations, the supplier's own recommendations should be observed.

e) For systems and components subject to a supplier warranty, the supplier's maintenance instructions must be observed.

7.1 Time to repair faults

The amount of time designated to repairing damage and rectifying faults identified in installations should be prioritised according to the possible consequences of the individual damage or fault:

▣ a) Damage and faults that could cause personal injury or lead to an outbreak of fire must be rectified immediately.

b) Damage and faults that could result in reduced train operation or cause harm to the environment should be rectified as soon as possible. If the damage or fault could result in significant harm to the environment, the fault must be rectified immediately.

c) Damage and faults that could lead to a depreciation in value should be rectified at the first opportunity, based on a financial assessment.

Definition:

Immediately in this context means: Measures affecting train operation will be necessary until the fault is rectified.

As soon as possible in this context means: Normal train operation may continue; rectification of the fault is conducted in accordance with the detailed provisions of the individual technical field.

8 Access control

▣ a) Access to rooms containing technical equipment must only be granted to authorised personnel.

The infrastructure owner authorises access to such rooms. Other parties may only access rooms containing technical equipment when accompanied by authorised personnel.

9 Personal safety

9.1 Movement, work and activity on and close to the track

▣ a) In respect of building and construction work, all work must comply with the prevailing provisions regarding activity on and close to operational lines, ref. [HMS-håndboka].

9.2 Electrical safety

▣ a) In respect of building and construction work, persons must be protected from hazards that may arise as a consequence of coming into direct or indirect contact with live components.

▣ b) Persons must be protected from hazards that may arise as a consequence of coming into contact with parts of technical installations that have accidentally become live (indirect contact).

Regarding the contact hazard resulting from the effect of the power supply return circuit, the requirements of [EN 50122-1] should be observed. Norwegian directives such as [FEL] and [FEF] also apply.

10 Approval of technical systems and components

▣ All safety critical equipment must at all times be in a condition that satisfies safety requirements.

10.1 Procurement

- ▶a) Systems and components that may impact safety or that are critical to operations must be approved by the Technology staff.
- b) Technical specifications issued by the NNRA for systems and components must be complied with.
- c) When changing to new components and systems, only components and systems approved by the Technology staff may be used where this is required.

The requirements for the approval of technical systems and components are stipulated in the regulations for each individual technical field.

10.2 Traceability

- ▶a) Selected components/systems that are integral to the NNRA's permanent technical installations and that have a significant bearing on safety and accessibility must be marked and registered so that the components can be traced.
- b) Upon installation of components/systems that require traceability, the required information must be registered in the central infrastructure database.

There are three main types of traceability:

1. Traceability from the manufacturer/supplier

1. Components/systems should be labelled with:

1. Manufacturer's name
2. Production year (and date, where applicable)
3. Component type/number
4. Unique numbering/identification of the component/system (serial number, etc.)

2. Based on the labelling, the supplier must have a system in place for the identification of components/systems and provide information about essential technical production data (for example, material certificate, concrete mould no., crucible no.) for such components, where required.

2. Location traceability

Based on the component's/system's labelling, it must be possible to identify where in the installation the components/systems have been fitted.

3. Traceability in operation and maintenance

Historical data for the selected infrastructure components/systems that has a bearing on operation and maintenance (for example, registered faults, uptime, traffic loads, number of operations) must accompany the component/system through its entire life cycle.

For traceability requirements in respect of individual technical fields, reference is made to Chapter 4 of the maintenance regulations.

10.3 Re-use of components/systems

- ▶a) Components/systems that have a bearing on safety which are removed from operation before being put back into operation must be examined or inspected in accordance with the prevailing

maintenance instructions.

10.4 System modifications

▣a) System modifications must be approved by the Technology staff.

'System modifications' refer to modifications to:

- structures/technology
- operating systems
- software
- control and monitoring structure
- radio frequencies

10.5 Calibration of measuring instruments

▣a) Maintenance that requires the use of measuring instruments must be conducted with calibrated instruments. The supplier's requirements for maintenance and calibration must be complied with. The instrument must be labelled with the date of the last calibration.

11 Environmental requirements

11.1 General requirements

a) Installations must be designed to work safely and in accordance with functional requirements under all the environmental conditions the installations have been designed to withstand. For telecommunications and signalling systems in particular, this is determined by European standard [EN 50125-3].

b) Equipment and components must be protected so that they cannot be damaged during transportation, storage, installation and operation as a consequence of environmental factors.

c) Equipment and components must be maintained in such a way as to prevent the emission/discharge of environmentally harmful substances.

d) The requirements of the Environmental manual must be fulfilled. Environmental aspects relevant to the planning, design and construction of infrastructure, as well as the operation and maintenance of infrastructure, appear in Chapter 3.1 of the Environmental manual.

11.2 Electro-magnetic environment

Electromagnetic compatibility is about how various electrical systems and components affect each other, both via direct connection when components are found in the same system (for example, overharmonic currents) and via indirect connection across systems through induction and radio frequency interference.

In respect of railway-technical installations, the requirements specified in particular product standards [EN 50121] apply.

a) All equipment must have an immunity against industrial environments, specified in [EN 61000-6-2] [2].

b) Radiation from equipment must not exceed the level that is accepted for the residential

environment, specified in EN 61000-6-3 [3].

c) In respect of railway-technical installations, the requirements specified in [EN 50121] apply.

1. Signalling and telecommunications systems must comply with the requirements of electromagnetic immunity and radiation specified in the norms [EN 50121-1] and [EN 50121-4].
2. Railway installations should not impact the environment surrounding the railway beyond the specified emission requirements [EN 50121-2].
3. The railway power supply system and switching stations and transformers in the overhead contact line network should satisfy emission and immunity requirements in accordance with [EN 50121-5].

12 Documentation

12.1 Designing

a)

1. The design basis must be sufficiently detailed and contain the necessary information to ensure that the installation can be constructed in accordance with the prevailing requirements.
2. The design basis must stipulate which requirements documents (directives, regulations, standards and specifications) form the basis of the design. The version of the various requirements documents being used must be stipulated.
3. A list of all exemptions from the requirements documents must appear in the design basis. Failure to fulfil a requirement must be clarified with the respective exemption authority before construction work commences. A list of all non-conformity including required documentation in respect of approval of non-conformity must appear in the final documentation.

b) The design basis must stipulate which pre-requisites form the basis of the design. An assessment and quality assurance must be undertaken to ensure that the given pre-requisites are correct so that it is possible to actually construct the installation in accordance with the design basis.

c) The documentation's structure must be in line with the relevant norms within the technical field.

Also, clear traceability must be ensured in all documents from the final documentation back to the source documentation. All documentation must include a description of how traceability is ensured.

d) The designing unit must issue a Declaration of Conformity confirming that the installation has been designed in accordance with prevailing requirements and conditions.

1. The design basis must be sufficiently detailed and contain the necessary information to ensure that the installation can be constructed in accordance with the design basis.

f) The design basis must include a sufficient calculation basis which documents that the planned installation fulfils the prevailing requirements.

g) The design basis must contain requirements regarding which special requirements documents (directives, regulations, standards and specifications beyond the mandatory documents) the unit responsible must comply with when constructing the installation.

h) The design basis must be fully formulated and approved before construction work commences.

12.2 Construction

At any given time, updated technical documentation on all technical systems and components being utilised *must* be available. Therefore, prior to the start of construction work, the unit responsible must have a sufficient basis upon which to construct the installation in accordance with the available documentation following completion of the design of the installation. This documentation must confirm that systems and components comply with the prevailing international and national standards.

b) Any exemption from design plans must be clarified with the relevant approval authority before implementation. A list of all requirements that have not been fulfilled, including the required exemption documentation, must appear in the final documentation.

c) For all contracts, final documentation must be submitted. In addition, all documentation generated during the course of the contract period must be stored by the supplier for a particular time frame, specified in the contract. The supplier is not permitted to destroy the documentation without the express consent of the construction client (or operating organisation, where applicable). Final documentation, as described here, constitutes the part of the total documentation that it is assumed will be handed over to the construction client when the installation is taken over, at the latest.

d) The acting unit should issue a Declaration of Conformity* confirming that the installation has been constructed in accordance with design plans and other applicable requirements that the acting unit must observe.

* For installations covered by [FEL] or [Ekoforskriften], a Declaration of Conformity must be issued.

e)

1. The content of the final documentation must be agreed with the construction client.
2. The installation owner must verify that all required documentation is available and updated to reflect how the installation has been constructed at the point of takeover and that the documentation is stored and properly maintained during the service life of the installation.
3. The necessary random checks must be conducted in order to document that the completed work is in accordance with the specified degree of accuracy, as well as within the prescribed requirements.

12.3 Maintenance

12.3.1 General

▶a) Upon takeover of the installation, the infrastructure owner *must* ensure that all required documentation is available and updated to reflect how the installation has been constructed.

▶b) In the event of any alteration to installations, installation documentation must be updated as necessary.

For each technical field, requirements have been stipulated regarding which type of documentation must be updated, as well as the extent to which how quickly the updating must be conducted.

The requirements for technical documentation are based on [Sikkerhetsforskriften] which states that: **The infrastructure manager must be in possession of updated technical documentation for all systems, parts and components. The documentation must be able to confirm that systems, parts and components comply with the national and international standards that form the basis of infrastructure design and construction. The documentation must specify the conditions and restrictions relating to the design of the infrastructure.**

c) All requirements that have not been fulfilled in accordance with prevailing requirements documentation (directives, regulations, standards and specifications), including required documentation in respect of exemption, must be continuously updated.

d) All data that is required to be registered in BaneData must be continuously updated, and no later than one month after maintenance has been carried out.

12.3.2 Information regarding faults and defects

a) If faults and/or defects in the documentation are uncovered, the respective infrastructure owner must be informed. The infrastructure owner must then ensure that the documentation is revised.

b) If faults/defects are discovered in system components or associated documentation, NNRA Infrastructure must be informed in order for the documentation to be revised.

12.3.3 Version management and amendment approval

a) Proposals for new/amended system documentation must be submitted to the Technology staff for approval and updating.

b) Installation documentation must be approved and stored by the infrastructure owner if it does not require central approval/filing.

The requirements for central approval of installation documentation are specified in the regulations for the individual technical fields.

c) The infrastructure owner must have routines in place for version management of documents, drawings, software and equipment for the installations that are to be maintained.

d) The infrastructure owner must have routines in place for alterations to software and functionality in equipment modules/subsystems.

12.4 Requirements for the management and design of technical documentation

All technical documentation relevant to the operation and maintenance of NNRA infrastructure must be managed through the NNRA document management system. Documentation must be formulated in accordance with approved templates, where available. Documentation must be available in a digital format in accordance with the NNRA's IT platform.

Templates/figures in this section are available in production format in the appendix to Chapter 2.

12.4.1 Requirements for the design of technical drawings

12.4.1.1 Dimensions and layout of drawing sheets

Drawings should be designed in accordance with [NS EN ISO 5457] with the exception of certain types of drawing for which the dimension and layout are determined in a separate template. In such instances the template for the relevant drawing type must be used. For drawing types that are not described in a template, Table 2 shows a list of desired drawing dimensions for long formats

Table 2 Desired dimensions of long drawings

Format Measurements in mm

A4 x 3 297 x 630

A4 x 4	297 x 841
A4 x 5	297 x 1051
A4 x 6	297 x 1261
A4 x 7	297 x 1471
A4 x 3	420 x 891
A4 x 4	420 x 1189
A4 x 5	420 x 1486

12.4.1.2 Letters and numbers

Letters and numbers on drawings must be applied in accordance with [NS EN ISO 3098-5].

12.4.1.3 Standard colours and line thickness

The NNRA has one common pen setting, JBV-standard.ctb. The intention is for all technical fields to use this pen setting. In special instances it may be necessary to use different pen settings. This is only permitted when it is necessary for reasons of legibility and must be documented. Refer to [Vedlegg f: JBV-standard pennoppsett](#).

Table 3 *Standard pen settings*

Colour no.	Colour on screen	Colour on paper	'Lineweight'
1	1 (red)	7 (black)	0.70
2	2 (yellow)	7 (black)	0.25
3	3 (green)	7 (black)	1.00
4	4 (cyan)	7 (black)	0.18
5	5 (blue)	7 (black)	0.50
6	6 (magenta)	7 (black)	1.20
7	7 (white/black)	7 (black)	0.35
8	8 (dark grey)	8 (dark grey)	0.10
9	9 (light grey)	9 (light grey)	0.01
10	10 (red)	1 (red)	0.18
80	80 (green)	3 (green)	0.18
90	90 (green)	3 (green)	0.25
100	100 (green)	3 (green)	0.50
110	110 (green)	3 (green)	0.70
230	230 (red)	1 (red)	0.25
240	240 (red)	1 (red)	0.50
242	242 (red)	1 (red)	0.70
All other colour numbers		'Use object colour'	'Use object lineweight'

12.4.1.4 Use of symbols

In respect of schematic drawings for which the NNRA has imposed requirements regarding the design of railway-specific symbols, such symbols must be used. Refer to [Felles bestemmelser/Definisjoner, forkortelser og symboler/Symboler](#). In respect of symbols for which the NNRA has imposed no requirements or which are not railway-specific, such symbols must be designed in accordance with the accepted standards of the relevant technical field, where available.

12.4.1.5 Title blocks and templates for technical drawings

The NNRA's standardised title block for drawings must be used. Refer to Figur 1. In respect of projects, the title block Figur 2 must be used. The location of title blocks must be in accordance with [NS EN ISO 5457], usually on the lower right-hand side of the drawing. Title blocks and the revision line may be found in appendices 2a, 2b and 2c to this chapter and may be downloaded from the respective appendix.

2A	2B	2C	2D	2E	2F
Rev.	Revisjonen gjelder	Dato	Tegnet av	Kontrollert av	Godkjent av
1A		Målestokk:	Fritekst 1	3D	
1B			Fritekst 2	3E	
1C			Fritekst 3	3F	
1D		Produzent	3G		
		Prodtegnunr.	3H		
		Erstatning for	3I		
		Erstattet av	3J		
 Jernbaneverket		Tegningsnummer:		Rev:	
		5A		5B	

Figur 1: Title blocks for technical drawings

2A	2B	2C	2D	2E	2F
Rev.	Revisjonen gjelder	Dato	Tegnet av	Kontrollert av	Godkjent av
1A		Målestokk:	Fritekst 1	3D	
1B			Fritekst 2	3E	
1C			Fritekst 3	3F	
1D		Produzent	3G		
		Prodtegnunr.	3H		
		Erstatning for	3I		
		Erstattet av	3J		
4A		Tegningsnummer:		Rev:	
4B		4C		4D	
 Jernbaneverket		Tegningsnummer:		Rev:	
		5A		5B	

Figur 2: Title blocks for technical drawings in projects

12.4.1.5.1 Field clarification:

Installation documentation

1A. Line name/section of line/installation type/object type are specified here.

1B. Section of line/location/station are specified here.

1C. Kilometre numbers (if relevant)/free text are specified here.

1D. Free text/drawing type/technical field are specified here.

System documentation

1A. Installation type and system or free text are specified here.

1B. Component or free text are specified here.

1C. Free text/drawing type are specified here.

1D. Free text/drawing type are specified here.

Common:

2A. Amendments to the drawing with consecutive revision numbering (000, 001, etc.) are specified here.

2B. The purpose of the publication/revision is specified here.

2C. Dated on the day the drawing/revision was prepared.

2D. Signed by the party responsible for preparing the drawing/revision.

2E. Signed by the party responsible for checking the drawing/revision.

2F. Signed by the party responsible for approving the drawing/revision.

3A. The scale of the drawing is specified here.

3B. The horizontal scale of the drawing is specified here.

3C. The vertical scale of the drawing is specified here.

3D. Field for free use.

3E. Field for free use.

3F. Field for free use.

3G. The company name of the external drawing producer is specified here.

3H. The external producer's drawing number is specified here.

3I. Replaces: refers to the number of a previous drawing that has been cancelled or phased out.

3J. Replaced by: refers to the number of a new drawing that replaces this drawing.

5A. The NNRA's drawing number is specified here.

5B. The revision number from field 2A is entered here.

Only applies to the following project templates:

4A and 4B. Project name/logo.

4C. The project's drawing number is specified here.

4D. The project's revision number from field 2A .

12.4.1.5.2 Requirements for the completion of fields

- Fields 1A-1D must be completed so that they collectively describe the drawing's content to a satisfactory extent.
- In field 2B the revision 000 must never be removed. The latest revision must always be at the top.
- Fields 2E-2F must be signed in accordance with the NNRA's authority matrix.
- In field 2C the date must be specified as follows: DD.MM.YY.
- In fields 2A-2F, as a minimum, the last three revision numbers and revision history must appear in the revision field upon submission to the operational archives. The latest 'as built' revision number in the project specified in fields 2A-2F and 4D then corresponds to the revision number specified in field 5B upon submission to the operational archives.
- All use of fields 3D-3F must be approved by NNRA, Infrastructure, Technical, so that the document management system is able to ensure that the fields are registered.


The NNRA drawing number in field 5A must be allocated via the NNRA's document management system.

12.4.2 Title block and templates for other technical documentation

Document templates for Word should be used and are available in production format. Refer to [Felles bestemmelser/Generelle bestemmelser/Mal for dokumenter](#)


12.4.2.1 Title blocks for other technical documentation

Title blocks for documents are located on the front of the document templates.

2A	2B	2C	2D	2E	2F
Rev.	Revisjonen gjelder	Dato	Utarb. av	Kontr. av	Godkj. av
1A 1B 1C 1D	3A	Ant. sider	Fritekst 1d	3B	
			Fritekst 2d	3C	
			Fritekst 3d	3D	
		Produsent	3E		
		Prod. dok. nr.	3F		
		Erstattet for	3G		
		Erstattet av	3H		
 Jernbaneverket		Dokument nr.		Rev.	
		5A		5B	



Figur 3: Title blocks for technical documentation

2A	2B	2C	2D	2E	2F
Rev.	Revisjonen gjelder	Dato	Utarb. av	Kontr. av	Godkj. av
1A 1B 1C 1D	3A	Ant. sider	Fritekst 1d	3B	
			Fritekst 2d	3C	
			Fritekst 3d	3D	
		Produsent	3E		
		Prod. dok. nr.	3F		
		Erstattet for	3G		
		Erstattet av	3H		
4A		Dokument nr.		Rev.	
4B		4C		4D	
 Jernbaneverket		Dokument nr.		Rev.	
		5A		5B	



Figur 4: Title blocks for technical documentation in projects

12.4.2.1.1 Field clarification:

Installation documentation

1A. Line name/section of line/installation type/object type are specified here.

1B. Section of line/location/station are specified here.

1C. Kilometre numbers (if relevant)/free text are specified here.

1D. Free text/drawing type/technical field are specified here.

System documentation:

1A. Installation type and system or free text are specified here.

1B. Component or free text are specified here.

1C. Free text/document type are specified here.

1D. Free text/document type are specified here.

Common:

2A. Amendments to the document with consecutive revision numbering (000, 001, etc.) are specified here.

2B. The purpose of the publication/revision is specified here.

2C. Dated on the day the document/revision was prepared.

2D. Signed by the party responsible for preparing the document/revision.

2E. Signed by the party responsible for checking the document/revision.

2F. Signed by the party responsible for approving the document/revision.

3A. The number of pages the document contains is specified here.

3B. Field for free use.

3C. Field for free use.

3D. Field for free use.

3E. The company name of external document producers is specified here.

3F. The external producer's document number is specified here.

3G. Replaces: specifies the number of a different document that this document replaces.

3H. Replaced by: refers to the number of a different document that replaces this document.

5A. The NNRA's drawing number is specified here.

5B. The revision number from field 2A is entered here.

Only applies to the following project templates:

4A and 4B. Project name/logo.

4C. The project's drawing number is specified here.

4D. The project's revision number from field 2A .

12.4.2.1.2 Requirements for the completion of fields

- Fields 1A-1D must be completed so that they collectively describe the document's content to a satisfactory extent.
- In field 2B the revision 000 must never be removed. The latest revision must always be at the top.
- Fields 2E-2F must be signed in accordance with the NNRA's authority matrix.
- In field 2C the date must be specified as follows: DD.MM.YY.
- In fields 2A-2F, as a minimum, the last three revision numbers and revision history must appear in the revision field upon submission to the operational archives. The latest 'as built' revision number in the project specified in fields 2A-2F and 4D then corresponds to the

- revision number specified in field 5 upon submission to the operational archives.
- All use of fields 3B-3D must be approved by NNRA, Infrastructure, Technical, so that the document management system is able to ensure that the fields are registered.

The NNRA document number in field 5A must be allocated through the NNRA's document management system.

12.5 Documentation content

The requirements for the technical content of documentation in respect of individual installations are stipulated in Chapter 4 of the Construction Regulations for the individual technical field.

Data that has been handed over in the final documentation must be registered in the central infrastructure database registers, where such registers are available.

12.6 Exemption from Technical Regulations

In addition to the installation specification, requirements that have not been fulfilled in accordance with the regulations must also be specified here. All exemptions must be documented under this item. Any departure from standardised implementation must be described and documented in calculations/drawings.

13 Drawings specific to technical fields

This section imposes requirements on the actual design of drawings prepared for the various technical fields.

13.1 Guidelines for preparing system documentation for overhead contact line systems

13.1.1 Return circuit diagram

In respect of the introduction of axle counters or jointless track circuits, the return circuit will be much simpler than the conventional track circuits currently in use. Thus, there will be no requirement for separate return circuit diagrams for such sections of line. It will be possible to introduce axle counters at the same time as AT systems and there is also no requirement for separate return circuit diagrams for these installations.

13.1.1.1 Reference material

An updated track insulation plan from the signal must form the basis of the preparation of return circuit diagrams. The track insulation plan must be copied into the template for return circuit diagrams. A correctly sized template must be chosen.

13.1.1.2 Adaptation

The diagram must be arranged in such a way that the direction towards Oslo is on the left of the diagram. Kilometres will then increase towards the right of the diagram. If the track plan deviates from this arrangement it must be reversed. The following signal symbols must be deleted from the return circuit diagram: control centre, signal cabinet, signals, track circuits and any dimensions.

13.1.1.3 Drawings

For the preparation of return circuit diagrams, standard template drawings and symbols must be used. Refer to [Vedlegg g: Tegningsmaler og symboler for EK-tegninger](#). The standard layer structure and colour standard/pen settings must be in accordance with [Felles bestemmelser/Generelle bestemmelser/Lagstruktur](#). The correct layer for the insertion of objects and symbols must be chosen. The distance between the rails for one track must be 9 mm. The distance between two tracks must be at least 18 mm. This distance may increase at intervals of 9 mm.

13.1.1.4 Layer structure

If new layers are required, the names of the layers must adhere to the following layer structure: technical field/category, detail.

A list of pre-defined template layers is shown in Tabell 2

Tabell 2: Layer structure for return circuit diagram

Layer name	Comments	Colour	Line type
Overhead contact line components	All symbols from the symbol library must be entered into this layer	2(yellow)	CON
Overhead contact lines 018	Line for reference and km (provided by the template)	4(cyan)	CON
Overhead contact line return wire, earth	The layer is set up with a separate type of line	4(cyan)	Return wire, earth
Overhead contact line return wire, air	The layer is set up with a separate type of line	4(cyan)	Return wire, air
Overhead contact line track, insulated rail (thick)	The insulated rails must be drawn into this layer	5(blue)	CON
Overhead contact line track, earthed rail (thin)	The earthed rails must be drawn into this layer	4(cyan)	CON
Overhead contact line track	The track(s) must be entered into this layer	4(cyan)	CON
Overhead contact line text, km and references	Layer for text to km and references	2(yellow)	CON
Overhead contact line text, station name	Layer for station text	2(yellow)	CON

- kilometres must be specified, with a text height of 2.5 mm, vertically on all components
- stations and stops must be specified, with a text height of 2.5 mm, as shown in the template
- references to next station must be entered, with a text height of 2.5 mm on the top of each end of the drawing
- symbols for main approach signals and block signals must be located with the *foot* facing the direction of travel. In the insulated overlap section, the *foot* must be located in the centre of the field. In other instances, the *foot* must be located at the relevant kilometre

13.1.2 Circuit diagram

13.1.2.1 Reference material

Templates for circuit diagrams must be used for reference purposes. It is important to select the correct format.

13.1.2.2 Drawings

Circuit diagrams must be prepared using standard template drawings and symbols. Refer to [Vedlegg g: Tegningsmaler og symboler for EK-tegninger](#). The standard layer structure and colour standard/pen settings must be in accordance with [Felles bestemmelser/Generelle bestemmelser/Lagstruktur](#). The diagram must be arranged in such a way that the direction towards Oslo is on the left of the diagram. Kilometres will then increase towards the right of the diagram. The correct layer for the insertion of objects and symbols must be chosen.

13.1.2.3 Layer structure

If new layers are required, the names of the layers must adhere to the following layer structure: technical field/category, detail. A list of pre-defined template layers is shown in Tabell 2

Tabell 3: Layer structure for circuit diagram

Layer name ! Comments	Colour	Type of line
Overhead contact line bridging feeder in the ground	The layer is set up with a separate type of line	4(cyan) CABLE 2
Overhead contact line bridging feeder, air	The layer is set up with a separate type of line	4(cyan) CABLE
Overhead contact line components	All symbols from the symbol library must be entered into this layer	2(yellow) CON
Overhead contact lines 018	Line for reference and km (provided by the template)	4(cyan) CON
Overhead contact line track	The track(s) must be entered into this layer	4(cyan) CON
Overhead contact line text, km and references	Layer for text to km and references	2(yellow) CON
Overhead contact line text, station name	Layer for station text	2(yellow) CON
	<ul style="list-style-type: none">• kilometres must be specified, with a text height of 2.5 mm, vertically on all components• stations and stops must be specified, with a text height of 2.5 mm, as shown in the template• references to next station must be entered, with a text height of 2.5 mm on the top of each end of the drawing• symbols for main approach signals and block signals must be located with the <i>foot</i> facing the direction of travel. In the insulated overlap section, the <i>foot</i> must be located in the centre of the field. In other instances, the <i>foot</i> must be placed at the relevant kilometre	

Templates and symbols may be downloaded from [Vedlegg 2.g](#).

13.1.3 General plan

13.1.3.1 Reference material

The general plan template must be used for reference purposes.

13.1.3.2 Drawings

The general plan must be prepared using a standard template drawing and symbols. Refer to [Vedlegg g: Tegningsmaler og symboler for EK-tegninger](#). The standard layer structure and colour standard/pen settings must be in accordance with [Felles bestemmelser/Generelle](#)

[bestemmelser/Lagstruktur](#). Oslo must always be on the left with increasing kilometres on the right. The correct layer for the insertion of objects and symbols when blocks are to be imported must be chosen.

13.1.3.3 Layer structure

If new layers are required, the names of the layers must adhere to the following layer structure: technical field/category, detail. A list of pre-defined template layers is shown in Tabell 4.

Tabell 4: Layer structure for general plan

Layer name ! Comments	Colour	Type of line
Overhead contact line components	All symbols from the symbol library must be entered into this layer	2(yellow) CON
Overhead contact lines 018	Line for reference and km (provided by the template)	4(cyan) CON
Overhead contact line track	The track(s) must be entered into this layer	4(cyan) CON
Overhead contact line text, km and references	Layer for text to km and references	2(yellow) CON
Overhead contact line text, station name	Layer for station text	2(yellow) CON

- kilometres must be specified, with a text height of 2.5 mm, vertically on all components
- stations and stops must be specified, with a text height of 2.5 mm, as shown in the template
- references to next station must be entered with a text height of 2.5 mm on the top of each end of the drawing

13.2 Guidelines for the preparation of track/superstructure drawings

13.2.1 Primary schematic track plan

In respect of the preparation of a primary schematic track plan, the guidelines specified in appendix h to this chapter must be followed. The symbol library for primary schematics may be downloaded from appendix h. Refer to: [Vedlegg h: Eksempel på grunnleggende skjematikk og symboler](#).

13.3 Guidelines for the preparation of bridge and substructure drawings

13.3.1 Bridge protocol sketch

Templates for the bridge protocol sketch in, respectively, A4 and A3 formats may be downloaded from the appendix list to this chapter. Refer to [/trv.jbv.no/PDF/Felles%20bestemmelser-PB/Vedlegg/Nedlastinger/mal-bruprotokollskisse-A3-A4.zip](#) Vedlegg u: Maler for bruprotokollskisser]

= Normative references

The regulations include dated and undated references to normative documents. References are in the form of links to appropriate locations. For some technical fields, the publications are listed in separate appendices to Chapter 4. For dated references or publications marked with revision

numbers, the specified version applies. For references that are not dated or marked, the latest version of the publication that is referred to applies.

The NNRA's regulations and management system

[Teknisk regelverk](#) Refer to [Felles bestemmelser/Forord](#)

[previously 1B-Ve] The NNRA's process-based management system ⅈ Maintenance manual

Ministry of Transport and Communications

[Regulations on electronic communications - in Norwegian only] [Forskrift av 16. februar 2004 nr. 401 om elektronisk kommunikasjonsnett og elektronisk kommunikasjonstjeneste](#) (Regulations on electronic communications)

The Norwegian Railway Authority

[Safety Regulations - in Norwegian only] [Forskrift om krav til jernbanevirksomhet på det nasjonale jernbanenettet \(sikkerhetsforskriften\)](#)

[{Interoperability Regulations - in Norwegian only] [Forskrift om samtrafikkevnen i det konvensjonelle jernbanesystemet](#)

[Railway Infrastructure Regulations - in Norwegian only] [Forskrift om nasjonale tekniske krav m.m. for jernbaneinfrastruktur på det nasjonale jernbanenettet](#)

[Train Operation Regulations - in Norwegian only] [Forskrift om togframføring på det nasjonale jernbanenettet \(togframføringsforskriften\)](#) .

Technical specifications for interoperability (TSI)

[TSI-drift-høyhastighet](#)

[TSI-drift og trafikkstyring](#)

[TSI-Energi-høyhastighet](#)

[TSI-Infrastruktur-høyhastighet](#)

[TSI-Rullende materiell-høyhastighet](#)

[TSI-Sikkerhet i jernbanetunneler](#)

[TSI-styring, kontroll og signal](#)

[TSI-styring, kontroll og signal høyhastighet](#)

[TSI-støy](#)

[TSI-telematikkprogrammer for godstrafikk](#)

The Norwegian Directorate for Civil Protection and Emergency Planning (DSB)

[FEL] [Forskrift om elektriske lavspenningsanlegg](#)

[FEF] [Forskrift om elektriske forsyningsanlegg](#)

[FSE] [Forskrift om sikkerhet ved arbeid i og drift av elektriske anlegg](#)

[FKE] [Forskrifter om kvalifikasjoner for elektrofagfolk](#)

The Norwegian Electrotechnical Committee

[NEK 400] Norwegian electrotechnical norms, electrical low voltage installations

[NEK EN 50122-1] Railway applications - Fixed installations -- Part 1: Protective provisions relating to electrical safety and earthing.

CEN/CENELEC European Standards (EN)

- [EN 60000-6-2] Electromagnetic compatibility (EMC) ⌘ Generic standards - Immunity for industrial environment
- [EN 61000-6-3] Electromagnetic compatibility (EMC) - Generic standards - Emission standard for domestic, commercial and light industry
- [EN 50121] Railway applications - Electromagnetic compatibility
- [EN 50122-1] Railway applications - Fixed installations ⌘ Part 1: Protective provisions relating to electrical safety and earthing
- [EN 50124-1] Railway applications - Insulation coordination - Part 1: Basic requirements - clearances and creepage
- [EN 50125-2] Railway applications - Environmental conditions for fixed equipment ⌘ Part 2: Fixed electrical installations
- [EN 50125-3] Railway applications - Environmental conditions for fixed equipment ⌘ Part 3: Equipment for signalling and telecommunications
- [EN 50126] Railway applications ⌘ The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)
- [EN 50128] Railway applications - Communications, signalling and processing systems ⌘ Software for railway control and protection systems
- [EN 50129] Railway applications - Communications, signalling and processing systems ⌘ Safety related electronic systems for signalling
- [EN 15528] Railway applications - Corresponding load limits for railway vehicles and payloads for freight wagons
- [EN 13674-1] Railway applications ⌘ Track - Vignole railway rails 46 kg/m and above

IEC (International Electrotechnical Commission)

[IEC 60913] Electric traction overhead lines

14 Appendices

[Vedlegg a: Tittelfelt for teknisk tegninger](#)

[Vedlegg b: Tittelfelt for teknisk tegninger i prosjekter](#)

[Vedlegg c: Revisjonslinje for tittelfelt, tekniske tegninger](#)

[Vedlegg d: Mal for dokumenter](#)

[Vedlegg e: Mal for dokumenter i prosjekter](#)

[Vedlegg f: JBV-standard pennoppsett](#)

[Vedlegg g: Tegningsmaler og symboler for EK-tegninger](#)

[Vedlegg h: Eksempel på grunnleggende skjematikk og symboler](#)

[Samsvar mellom Teknisk regelverk og TSI styring, kontroll og signal konvensjonelle baner](#)

[Samsvar mellom Teknisk regelverk og TSI Infrastruktur konvensjonelle baner](#)

[Samsvar mellom Teknisk regelverk og TSI Energi konvensjonelle baner](#)

[Samsvar mellom Teknisk regelverk og TSI sikkerhet i jernbanetunneler](#)

[Samsvar mellom Teknisk regelverk og TSI personer med redusert mobilitet](#)

[Vedlegg o: Samsvar mellom Teknisk regelverk og TSI styring, kontroll og signal høyhastighet](#)

[Samsvar mellom Teknisk regelverk og TSI Infrastruktur høyhastighetsbaner](#)

[Samsvar mellom Teknisk regelverk og TSI Energi høyhastighet](#)

[Vedlegg u: Maler for bruprotokollskisser](#)

[Ivaretagelse av krav fra Jernbaneinfrastrukturforskriften](#)