Product Acceptance Service

Guidance Note

Network Rail Safety Technical & Engineering

Contents

1 Purpose

The purpose of this document is to provide clear guidance on the management of the Product Acceptance service, practices to be followed, authorities and policy.

The document is to support the successful delivery of a professional, effective, and transparent Product Acceptance service.

Systems, sub-systems, modules, components, and equipment will be collectively referred to as 'Products' throughout this document.

2 Terms and definitions

Term	Definition
NRAP	Network Rail Assurance Panel
TSI	Technical Specification for Interoperability
CSM	Common Safety Method on Risk Evaluation and Assessment
DFR	Design For Reliability
RIDC	Rail Innovation and Development Centre
STE	Safety Technical and Engineering Directorate
IRIS	International Rail Industry Standard
RGS	Railway Group Standard
Hazard Record	The document in which identified hazards, their related measures, their origin and the reference to the organisation which has to manage them are recorded and referenced;
RIRL	Rail Industry Readiness Level
TRL	Technology Readiness Level
RRL	Reliability Readiness Level
ISO	International Organisation for Standardisation
SRP	System Review Panel
Opeational	Any product / plant / equipment or system used to directly control, monitor, support and power the railway. In case of uncertainty the Product Acceptance team or relevant STE or NRT Engineering function can be consulted.
Controlled Items	Items that require catalogue numbers for which Network Rail Engineering asserts control. For any items falling into this category, it is mandatory that the product acceptance process is followed as explained in **NR/L2/RSE/100/05** and this document.
Controlled "Limited Criticality" Items	Items that may be approved without further assessment on the basis that they are of low safety criticality and are proven to meet national standards (BSI's etc). These may be COTS products that are not going to be used in a way that differs from their originally intended use. These items require controlled catalogue numbers and may require entry into the product acceptance process and certification if the asset owning function determines the need (i.e. for setting conditions of use in operational infrastructure environments).
Uncontrolled Items	Items for which Network Rail Engineering asserts no control. Products in this category are low risk items that **do not** require acceptance. The issuing of uncontrolled numbers is managed by the Network Rail Catalogue Management Team within Route Services. *Note: numbers are applied for by NR employees via the istore site. .*
PADS	Parts and Drawings System. A database owned by SERCO. The data is managed by Network Rail Catalogue Management Team (NSC). This includes the creation and revision of controlled catalogue (PADS) numbers.
istore	Network Rail's online procurement site for the searching and ordering of "controlled or uncontrolled" products. *Note: This site is available to Network Rail employees only.*

3 Scope

This guidance document provides information relating to gaining acceptance of Critical Products that are:

a) a new or modified controlled product that, where relevant aligns with the Network Rail challenge statements, that have been evaluated against the Rail Industry Readiness Levels (RIRL's) where;

- technology readiness level (TRL) 6 is completed

- Reliability Readiness Levels (RRL) 7 is completed as outlined in NR/L2/RSE/0005.

b) a change of application of a controlled product *;

c) a change of manufacturer of a controlled product *;

d) a change of operational environment for a controlled product *;

e) a compatibility issue for Network Rail's infrastructure potentially caused by installation of a product not owned by Network Rail on the infrastructure.

have reached the appropriate readiness levels are assessed for Product Acceptance via the methods described in the Network Rail standards NR/L2/RSE/100/05 and NR/L2/RSE/100/07

Product Acceptance **does not** apply to the following which are outside of the Process scope:

1. civil engineering infrastructure, as defined in NR/L2/CIV/003, which includes:
   a. structures (including equipment and support structures);
   b. buildings and other civil engineering infrastructure that have been designed for a unique application;
2. non Network Rail owned trains and rolling stock;
3. depots, sidings and other facilities off the operational infrastructure.

NOTE   Network Rail equipment or products that are mounted on, or installed in, railway vehicles that Network Rail intends to use for its own purposes are included in the scope of this module.

* NOTE 2   All changes to products must be applied for as Change Requests (changes to already approved products) via the online application form. Typical changes include but are not limited to the following:
   - Changes or additions to the physical product.
   - Changes to how products are used if not covered by the scope of existing certification.
   - Changes to where products are used if not covered by the scope of existing certification
   - Any other changes that would require and change to a certificates scope, conditions, configuration details etc.
   - Changes to manufacturers
   - Extensions to certification that has expired.
   - Extensions to trials that require new certification.

Information on the types of products deemed critical and requiring approval, which are based on their risk to the business and currently defined in our guidance document: https://cdn.networkrail.co.uk/wp-content/uploads/2017/11/Guidance-note-How-to-decide-what-needs-product-acceptance.pdf. Please note that ths list is not exhaustive.

Products identified as requiring Product Acceptance are assessed via NR/L2/RSE100/05, this guidance note supports the management of the process.

For further guidance please email us at prodacc@networkrail.co.uk

4 Management

The Network Rail Safety Technical and Engineering Directorate (STE) is responsible for the management of the service.

Roles and responsibilities

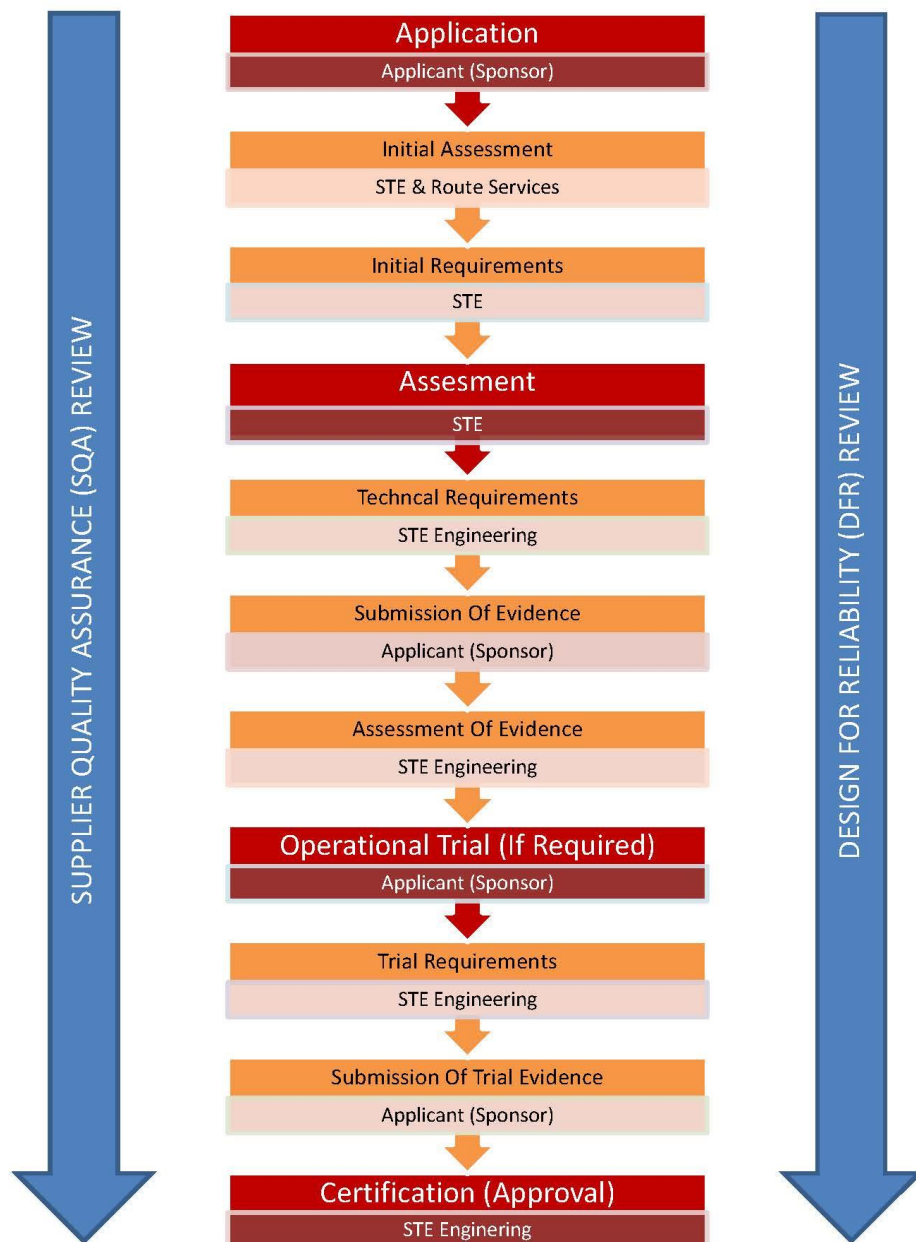| Role	Responsibilities
Applicant (Sponsor)	A suitable Network Rail employee who acts in a sponsorship capacity and demonstrates the business need for the product or change. The Applicant is accountable for submitting the initial product application, liaising with and requesting evidence from manufacturers against the generic and technical requirements and liaison with Route / Infrastructure Projects to arrange any operational trials required.
Catalogue Management Team	Responsible for the allocation of catalogue numbers and the entry and management of approved product details into the PADS (Parts and Drawings System) database and Network Rail catalogue (istore).
Category Manager	Responsible on behalf of the Category council to review the PA submission in terms of product and supplier alignment with the appropriate category strategy.
Duty Holder	Responsible for carrying out a particular duty under the applicable regulations.
Lead Reviewer	A competent Network Rail or independent engineer with delegated authority from the Professional Head of Asset discipline for setting the approval requirements, assessing, and recommending acceptance of the product.
Product Acceptance Process Specialist	Delegated authority from NRAP to decide on the criticality of and authorise and sign off the approval of products to be used in or on Network Rail infrastructure.
Product Development Panel	Responsible for reviewing evidence from projects/proposals and agreeing RIRL/TRL levels and the associated stage gate actions with projects. Reviews the project investment paper (if applicable at relevant stage gate) and provides recommendations to the R&T Board for endorsement.
Professional Head of Asset discipline	Delegated authority from NRAP to authorise and sign off the approval of products to be used in or on Network Rail infrastructure.
Route / Infrastructure Projects	Responsible for making infrastructure available for 'trials'.
System Review Panel	Delegated authority from NRAP to set and assess requirements for multi-discipline applications.
Supplier Quality Assurance	Responsible for identification of appropriate assurance controls to the products.

Resources

The resources allocated to the service shall be agreed within the relevant STE Engineering discipline.

STE will offer a service* to applicants seeking to gain approval for the use of a Product on or about Network Rail's infrastructure.

*provision of service is dependent on the applications meeting the reqiuirements of initial reviews and commercial category/ engineering strategy checks. Applications will be rejected if they do not include sufficient detail includinga robust business case, are not applied for by or on behalf of a suitable Network Rail individual prepared to act in a sponsorship capacity or are not at the required Rail Industry Readiness Level (RIRL).

5 Process

Application phase

The following table provides on overview of the main stages, tasks and responsibilities associated with the application and initial review stages of the Product Acceptance process.

Ref	Stage	Who	Tasks
1.1	Application	Applicant (Sponsor)	• Submits application via online application form* https://www.networkrail.co.uk/industry-and-commercial/research-development-and-technology/product-acceptance/product-acceptance-form/ *Also submits evidence via the form to demonstrate that the requirements of TRL6 and RRL7 of the RIRL's have been completed (usually at completin of RIRL5).*
1.2	Initial review	Product Acceptance Process Specialist	• Determines if the Product or change requires approval* • Determines if the Product or change is critical* • Determines or seek clarification that the Productor or change is at the required Rail Industry Readiness (RIRL) Level* • Determines the lead and any affected asset groups. • Determines if review by SRP is required* • Progresses the application for Category Management, Engineering and SQA review. • Issues Generic Acceptance Requirements to Applicant (Sponsor). *Seeks clarification from the Professional Head or Delegate, Lead Reviewer or SRP as required.*
1.3	Category Management Review	Category Manager (NSC)	• Determines via Category Management check, the business need and whether the Product is in line with any applicable policy; or strategy.
1.4	Initial Engineering Review	Professional Head of Asset Discipline or delegate or SRP.	• Determines whether the Product or change is in line with any applicable policy; or strategy with that discipline. • Determines the criticality level of the product or change. • Determines if the Product is an Interoperability constituent. • Allocates the Lead Reviewer.
1.5	Supplier Quality Assurance Review	Supplier Quality Assurance	• Determines whether a new manufaturer requires an SQA Audit.
1.6	Design For Reliability (DFR) Review	Professional Head of Asset Discipline or delegate, Design For Reliability Process manager or SRP.	• Determines whether a Design For Reliability assessment is required against the requirements of NR standard NR/L2/RSE/0005. • Determines the DFR Process route as per the requirements of NR standard NR/L2/RSE/0005

Assessment phase

The following table provides on overview of the main stages, tasks and responsibilities associated with the assessment stages of the Product Acceptance process.

Ref	Stage	Who	Tasks
2.1	Initiate assessment	Product Acceptance Process Specialist	• Requests that the Lead Reviewer sets the product specific engineering requirements. • Requests that Supplier Quality Assurance activities be carried out if required. • Requests that Design For Reliability activities be carried out if required • Notifies Professional Development & Training of the new Product.
2.2	Set requirements	Lead Reviewer	• Reviews the information provided. • Specifies product specific engineering requirements for approval. • Specifies the Design For Reliability route if required. • Provide requirements to Applicant (Sponsor). *(Affected Asset Groups shall also assign a Reviewer to set any approval requirements)*
2.3	Submission	Applicant (Sponsor)	• Liases with Manufacturer/s / Supplier/s to obtain evidence against generic and specific engineering requirements. • Produces a submission of evidence to demonstrate compliance against the generic and specific engineering requirements set.
2.4	Assessment	Lead Reviewer	• Review the submission for completeness. • Assesses the submission of evidence against all set requirements. *(Affected Asset Groups also assess the submission)*
2.5	Approval	Lead Reviewer	• Decides whether approval is to be granted or declined • Requests catalogue numbers from NSC Catalogue Management for items within the configuration deemed "controlled". • Drafts appropriate Approval Certification or provides advice on rejection.
3.7	Final review	Product Acceptance Process Specialist	• Reviews certification for completeness. • Updates database records • Obtains endorsement from Professional Head of Asset Discipline or delegate or SRP.
2.6	Professional Head approval	Professional Head of Asset Discipline or delegate or SRP.	• Authorises and "signs off" approval.
2.7	Delivery	Product Acceptance Process Specialist	• Issues approval certification (for trial or full approval) or rejection advice to the Customer. • Updates database records.

Operational trial phase

A trial may be required to assist in the assessment of a product or system's suitability, fitness for purpose, reliability, performance and to assist in the mitigation of safety risk.

Applicants shall first consider conducting trials on non-operational infrastructure or within a simulated environment. Trials on the operational infrastructure shall only be considered if demonstrable evidence cannot be obtained from testing or trialling within a simulated or non-operational environment.
The Professional Head of Asset discipline or delegate or the System Review Panel shall decide whether operational trials are required.

No trial shall be carried out on Network Rail infrastructure until the relevant trial acceptance certificate has been issued. Items cannot be used and should be removed from the infrastructure after the expiry date of a certificate has passed.

NOTE 1 The Lead Reviewer may recommend an operational trial to the Professional Head of Asset discipline following the review.
NOTE 2 Trials are not a substitute for the documented justification against the acceptance requirements.

The following table provides on overview of the main stages, tasks and responsibilities associated with the assessment stages of the Product Acceptance process.

Ref	Stage	Who	Tasks
3.1	Authorisation	Professional Head of Asset Discipline or delegate or SRP.	• Authorises Trial.
3.2	Trial requirements	Lead Reviewer	• Specify requirements and success criteria for the trial. • Draft Trial Certificaion
3.3	Endosement	Professional Head of Asset Discipline or delegate or SRP.	• Endorses Trial Certification.
3.4	Trial Arrangement	Applicant (sponsor)	• Arrange trial with Project/ Route.
3.5	Trial	Route/ Project	• Undertake trial in operational service.
3.4	Trial report	Applicant (sponsor)/ Route/ Project	• Route/Applicant/Project to produce a trial report providing evidence that the trial requirements have been met.
3.5	Assess trial report	Lead Reviewer	• Lead reviewer assess' the trial report and if satisfied recommends approval.
3.6	Approval	Lead Reviewer	• Decides whether approval is to be granted or declined. • Drafts appropriate Approval Certification or provides advice on rejection.
3.7	Final review	Product Acceptance Process Specialist	• Reviews certification for completeness. • Updates database records • Obtains endorsement from Professional Head of Asset Discipline or delegate or SRP.
3.8	Professional Head approval	Professional Head of Asset Discipline or delegate or SRP.	• Authorises and "signs off" approval.
3.9	Delivery	Product Acceptance Process Specialist	• Issues approval certification (for trial or full approval) or rejection advice to the Customer. • Updates database records..

6 Review by System Review Panel

The approval of infrastructure schemes or high risk systems, products and complicated multi-disciplinary new and novel system or product applications are dealt with in accordance with Network Rail Standard NR/L2/RSE/100/07. This standard is owned by the Network Rail Assurance Panel (NRAP). For most infrastructure schemes and systems requiring assessment, NRAP delegates this to System Review Panels (SRP).

If at initial stages it is agreed that an SRP review by panel is required, the approval process described in NR/L2/RSE/100/07 is to be followed with a NRAP authorised person appointed as Chairperson of the panel, with panel membership comprising competent and independent individuals from each affected asset group.

In order to reach a conclusion, the Chairperson shall seek to achieve a consensus of members present at the meeting.

If a consensus cannot be achieved, the final decision shall be taken by the Chairperson.

The Chairperson of each panel is accountable to NRAP.
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In addition to panel members, additional expert advice on specific issues may be called upon.

For further guidance relating to System Review Panels, please email us at prodacc@networkrail.co.uk

Whole life cost

The Product Acceptance process may consider whole life cost in its assessment of a Product.

7 Examples of items that require approval

The following list provides examples of the categories products and types of items that typically require Product Approval, please note that this list is not exhaustive and advice may be required to determine whether your product requires approval.

Signalling Applications

- Signals (mechanical, filament and LED colour light).
- Control Systems (lever frame, panel, VDU, ground frames/ panels)
- Interlockings (mechanical, relay, electronic, disconnection boxes)
- Apparatus Housing (location cases, equipment buildings.
- Train Detection (track circuit, axle counters, treadles)
- Point End (mechanical, clamp lock, machine, HPSS)
- Train Protection (AWS, TPWS,ATP)
- Train Describers (mechanical, electronic)
- Signalling Power Supplies (transformers, UPS, battery, power cables)
- Infrastructure Specific Relays/ Boxes (large plug in, BR930, sub-iniature cradle, shelf type, DCPI)
- Event Logging and Condition Monitoring Systems.
- Line side Signage to Support Signalling (operational and non-operational signage).

Level Crossing Applications

- Control Systems (manually controlled, automatically controlled, passive/ user worked)
- Barriers (manually controlled barriers, automatic barriers)
- Signalling and Communication (road traffic lights, pedestrian warning lights, audible warnings, crossing CCTV cameras, telephones, panel indicators, panel monitors)
- Track Bed (surface, deck, track, drainage, road markings, trespass guards, fencing, rail signage, crossing signage, gates and stiles, vegetation management, CCTV lifting equipment, lighting, electrical supplies)
- Buildings and Civils (lighting and columns, CCTV columns)
- Highway Authority (road signage)

Electrification & Power Applications

- HV Switchgear AC (oil filled, vacuum, SMOS, air, .vacuum GIS).
- HV Cables (solid/ XLPE, oil filled/ paper).
- Contact Systems (OLE and components, CRE and components)
- HV Transformers (standard, auto, booster)
- DC Electrification (oil filled, vacuum, vacuum GIS, transformers/ rectifiers, LV cables)
- Electrical points and Conductor Rail Heating (systems and components, cabling)
- Tools and equipment (live line, non live line)
- Power Supplies (systems, cables, switchgear and transformers, power generation).
- Miscellaneous (electrical equipment enclosures, monitoring and control).

Telecommunications Applications

- Transmission System (transport layers optical and copper, LAN/WAN node/ data network)
- Network Management (hardware, software)
- Trunk Cabling (copper, fibre, immunisation, cable routes)
- Operational Voice Comms (concentrators, public emergency telephone systems, voice recorders, operator MMI, CSR/RETB/NRN/ORN, radio spot scheme, BSS, NSS, cab mobile, GSM-R handheld, FTS, tunnel and lineside telephone systems)
- Sub-surface Station Management Control (customer information system, public address, surveillance CCTV)
- Train Dispatch (DOO CCTV, DOO mirror)
- Power Supply (power supply chargers, earthing, UPS, rectifier, inverter, battery)

Plant Applications

- On Track Plant OTP (MEWPS, RRV, rail lifters, sleeper layers, mobile flashbutt welders, rail clippers, powered trolleys, access platforms, excavation machines, track access systems, grinders, cranes, rollers, dozers, multipurpose vehicles)
- On Track Machines OTM (tampers, rail cutting machines, ballast cleaners, tilting wagons, multipurpose vehicles)
- Manually Propelled Powered Equipment (rail clippers/ clip removers, track jacks, rail grinders, rail stressing equipment, rail straighteners/ benders, welding machines, rail head cleaners, sleeper replacers, rail thimbles)
- Manually Propelled non Powered Equipment (hand trolleys, rail skates)
- Non Rail Mounted Plant or Machinery (chippers, dozers, cranes, scaffold, mowers, lifting beams)
- Tools and Equipment (rail saws, track measuring devices TMD's, detection systems. Cable locators, total stations, rail stressing equipment, testing and diagnostic equipment, data loggers and condition monitoring equipment, generators, train/ track warning systems, grinders, communication systems)
- Non Powered Tools and Equipment (lifting accessories, tension meters, insulated hand tools)

Track Applications

- Plain Line (rail, sleepers, ballast, formation)
- Drainage (drainage, formation)
- Monitoring Systems (temperature, inspection)
- Tools (gauges)
- Welding (track welding processes, welding peripherals)
- Miscellaneous (lubricants, grease distribution units)

S&C (Switches & Crossings) Applications

- S&C (rail, bearers, crossings, half sets sleepers, ballast, formation)
- Drainage (drainage, formation)
- Monitoring Systems (temperature, inspection)
- Tools (gauges)
- Welding (track welding processes, welding peripherals)
- Miscellaneous (lubricants, grease distribution units)

8 Rail Industry Readiness Levels (RIRL's)

Applications should only be submitted for Product Acceptance when the Products or Systems have been fully developed and have reached RIRL 6.

Rail Industry Readiness Levels: Reference Alignment — A level can only be claimed once COMPLETED — Version 1.6

	RIRL 1 Conception	RIRL 2 Opportunity Develop't	RIRL 3 Proof of Concept	RIRL 4 Industry Specification	RIRL 5 Prototype	RIRL 6 Operational Transition	RIRL 7 Initial Deployment	RIRL 8 Roll Out	RIRL 9 Whole Life Mgmt
Technology Readiness	**TRL 1 Idea** Technology idea is conceived and developed using desktop and laboratory research	**TRL 2 Invention** Experimentation and desktop modelling used to verify veracity of technology in line with anticipated usage	**TRL 3 Proof of Concept** Proof of concept is ascertained using robust and repeatable processes; **TRL 4 Development** Technology is validated against high level requirements in a laboratory and/or experimental environment	**TRL 5 Validation** Technology is validated against user requirements in a representative environment	**TRL 6 Demonstration** Performance of pre-production assets / system is demonstrated in an oper'y representative environment	**TRL 7 Qualification** Production standard assets are qualified for use in an operational environment	**TRL 8 1st of Class** First of Class asset deployed for operational usage under commercial conditions	**TRL 9 Production** Repeated and repeatable technology deployment in conjunction with managed asset development / evolution	
Manufacturing Readiness		**MRL 1 Basic Principles** Basic Manufacturing Implications have been identified	**MRL 2 Concepts and Feasibility** Manufacturing concepts and feasibility have been detm'd and processes have been id'd; **MRL 3 Proof of Manufacturability** A manufacturing proof-of-concept has been developed	**MRL 4 Pre-Production** Capability exists to produce the technology in a laboratory or prototype production environment	**MRL 5 Component Production** Capability exists to produce prototype components in a prod'n relevant environment	**MRL 6 Production Integration** Capability exists to produce integrated system or subsystem in a production relevant environment; **MRL 7 Production Facility** Capability exists to produce systems, subsystems or components in a production representative environment	**MRL 8 Low Rate Production** Low rate initial production is underway	**MRL 9 Full Rate Production** Full/volume rate production capability has been demo'd	
Integration Readiness		**IRL 1 Interface** Interface requirements between component / system elements have been established; **IRL 2 Interaction** Required mode and content of interaction between component / system elements has been established	**IRL 3 Compatibility** Quantitative interaction between component / system elements is demonstrable and repeatable; **IRL 4 Quality and Assurance** Successful and repeatable interaction between component / system elements meets quality and assurance requirements	**IRL 5 Control** Action / reaction through the control chain is demonstrated and manageable within required operational parameters; **IRL 6 Communicate** Performance and associated communication / stimulation within / by the operational environment delivers required functionality	**IRL 7 Verification and Validation** Performance in a represent've operational environment is repeatable, verifiable and validated to req'd standards		**IRL 8 1st Of Class** Whole system deployed under commercial arrangements for operational usage; **IRL 9 Proven** Repeated and successful low-risk deployment of integrated system for operational usage		
System Readiness		**SRL 1 Thinking** Mind picture supported by notes and discussions developed to share thinking; **SRL 2 Rich Picture** Rich picture depicting system elements and interaction of those elements	**SRL 3 Framework Architecture** Structured depiction and robust definition of the system and its associated components	**SRL 4 Interfaces** Qualitative and evidential definition of intra and inter system interface requirements; **SRL 5 Detailed Architecture** Robust system architecture and associated models able to explore evolving system properties	**SRL 6 Integration** Integration of system elements in an appropriate environment producing a functioning system for evaluation; **SRL 7 Pre-Production** Qualified production standard system elements available for test, verification and validation		**SRL 8 1st of Class** First commercial deployment of whole system in an operational environment	**SRL 9 Series Production** Repeated and repeatable quality whole system deployment in expanding operational usage	
Software Readiness	**SwRL 1 Basic Principles** Basic principles described, software concepts researched and documented, appropriate languages reviewed	**SwRL 2 Conception** Approaches to deliver software derived functionality outlined and algorithm testing commenced	**SwRL 3 Proof of Concept** Quantitative and/or Qualitative analysis of software approach confirms proof of concept for critical functionality	**SwRL 4 Laboratory Validation** Software code and functionality validated in a laboratory environment	**SwRL 5 Relevant Environment Validation** Software code and functionality validated in a simulated / safe but realistic operational environment; **SwRL 6 Relevant Environment Demonstration** Software code and functionality demonstrated in a simulated / safe but realistic operational environment	**SwRL 7 Operational Environment Demonstration** Software code and functionality demonstrated in a real operational environment (beta standard)	**SwRL 8 Software Qualification** Software code and functionality qualified and certified to appropriate operational standards (first release)	**SwRL 9 Operational Software** Software in operational service and under formal change management control	
Demand Readiness	**DRL 1 Demand Identified** Something is missing	**DRL 2 Demand Verified** Identification of a specific need; **DRL 3 Function Identified** Identification of the expected functionalities for the product/new service	**DRL 4 Function Tested** Quantification of the expected functionalities; **DRL 5 Forecasted Usage** Identification of the systemic capabilities	**DRL 6 Specified Requirement** Translation of the functionalities into needed capabilities	**DRL 7 Product Resource** Definition of the necessary sufficient competences and resources; **DRL 8 Expert Resource** Identification of the Experts possessing the competencies		**DRL 9 Market Penetration** Building the adapted answer to the expressed need on the market		
Reliability Readiness	For RRL steps, refer to Network Rail Design for Reliability Standard – NR/L2/RSE/0005	**RRL 1 Requirement Definition** Completed all DFR process steps up to 8.1.9	**RRL 2 Preliminary Design** Completed all DFR process steps up to 8.2.6; **RRL 3 Design Assessment** Completed all DFR process steps up to 8.3.9; **RRL 4 Installation & Commissioning Process Assessment** Completed all DFR process steps up to 8.4.4; **RRL 5 Manufacturing Process Assessment** Completed all DFR process steps up to 8.5.9		**RRL 6 Component (or sub-system) Testing** Completed all DFR process steps up to 8.6.6; **RRL 7 System Testing** Completed all DFR process steps up to 8.7.6; **RRL 8 Manufacturing Process Testing** Completed all DFR process steps up to 8.8.8	**RRL 9 Installation & Commissioning Validation** Completed all DFR process steps up to 8.9.7; **RRL 10 Trial Performance Validation** Completed all DFR process steps up to 8.10.7		**RRL 11 In Service Performance Validation** Completed all DFR process steps up to 8.11.8	
Market Readiness	**MrRL 1 Theoretical Opportunity** Early ideas to satisfy an emerging or existing market need	**MrRL 2 Route to Market (Initial)** Ideas shared and route to exploitation; route to market outlined; **MrRL 3 Business Case (draft)**		**MrRL 4 Market Testing** Informal market engagement and commercial structures implemented	**MrRL 5 Route to Market** Route to market planned and all stakeholder needs identified	**MrRL 6 Commercial Arrangements** Commercial, funding and exploitation arrangements formalised; work share agreed	**MrRL 7 Market Engagement** End user and supply chain stakeholders engaged to refine the market offering and to support demonstration	**MrRL 8 Delivery** Commercial delivery commenced, marketing translates to sales / selling	**MrRL 9 Market Maintenance** Sustained selling, with feedback used to develop offering evolution / development

RIRL 9 Whole Life Mgmt: Ongoing Continuous Improvement & Reliability Growth

9 Interoperability

Network Rail has a duty to comply with the Railways Interoperability Regulations 2011 (and subsequent amendments) referred to as RIR2011.

This is a European Commission initiative to promote a single market in the Rail sector. The Legislation aims to remove technical barriers to the supply of equipment and the running of trains between member states.

Interoperability is the ability of a system or a product to work with other systems or products without special effort on the part of the customer. Interoperability is made possible by the implementation of standards.

The Railways (Interoperability) Regulations 2006 (RIR) came into force on 1 April 2006 and incorporates the European Directives on railway interoperability into UK Law (Directives 96/48/EC, 2001/16/EC and 2004/50/EC). The Regulations replaced the previous 'High Speed' Regulations (of 2002). They provide a process for the authorization and placing in service of interoperable railway subsystems.

The Purpose of the Directives

- This is to allow common technical standards, Technical Specifications for Interoperability (TSI's) to be applied across Europe's Railways. This is to establish a common European verification and authorisation process for placing new, upgraded or renewed infrastructure into service; and to provide a process for putting certain rail components known as interoperable constituents onto the rail market, without duplication of process in each Member state.

- RIR extends the assessment and authorisation process provided by the High-speed regulations to the conventional rail part of the Trans-European Network (TEN).

Nb - Changes to the infrastructure not subject to authorisation under RIR need to be managed under the provision of ROGS.

How do I know which items of equipment are (or should be) interoperability constituents?

- Interoperability constituents are listed in the applicable TSIs Technical Specifications for Interoperability (TSIs).

- In addition, manufacturers can declare an assembly of listed interoperability constituents as an interoperability constituent. This could be useful where listed interoperability constituents are routinely used together in a defined combination, and by verifying and declaring that combination as sort of "super" interoperability constituent, the workload associated with verification at the sub-system level is further reduced.

- Apart from the point immediately above, there is no freedom to "invent" new types of interoperability constituents that are outwith the listed definitions in the TSIs. This does not, of course, prevent a manufacturer from developing and marketing all sorts of constituents – but he cannot declare them to be interoperable if they are not within the scope of the listed definitions in the TSIs.

Further information is regarding ICs and TSIs available via the Office Of the Rail Regulator (ORR) website here:

 http://orr.gov.uk/what-and-how-we-regulate/health-and-safety/regulation-and-certification/interoperability

10 How to apply for Product Acceptance

To apply for a new item or for a change request* to an existing item, the Network Rail applicant must complete our online application form which is available via the NR corporate website and can be found via the following link:

https://www.networkrail.co.uk/product-acceptance/

The applicant will need to provide justification by demonstrating monetary, safety and / or performance benefits to Network Rail.

The applicant will receive an email notification when we have processed your application successfuly. This will include your unique Product Acceptance reference number and details of the next approval steps.

For further guidance please email us at prodacc@networkrail.co.uk

* Change Requests should be submitted for the following:
- *a change to the product configuration (to the actual product or its application)*
- *a change of manufacturer*
- *requests for products to be approved outside of already approved geographic locations*

This list is not exhaustive and guidance should be sought prior to making an assumption regarding whether the change needs approval.

11 Further guidance

Catalogue Numbers

"**Operational**" means any product / plant / equipment used to directly control, monitor, support and power the railway. In case of uncertainty the Product Acceptance team or relevant Engineering function shall be consulted. Safety Critical items that are required for use on the operational railway are required to be assessed via the Product Acceptance process and will be allocated Controlled catalogue numbers.

"**Controlled**" means catalogue numbers for which Network Rail Engineering asserts control.
For any items falling into this category, it is mandatory that the product acceptance process is followed as explained in **NR/L2/RSE/100/05** and this document.

"**Uncontrolled**" means catalogue numbers for which Network Rail Engineering asserts no control. Products in this category are low risk items that **do not** require acceptance. The issuing of uncontrolled numbers is managed by the Network Rail Catalogue Management Team.

How to find an approved product

There are more than 85,000 products already accepted for use* on our infrastructure.

The catalogue of accepted products is available on the PADSnet website at:
https://www.padsnet.co.uk/

PADS** (Parts and Drawings System) is owned by SERCO and the data is managed by the Network Rail Route Services Catalogue Management team. This includes the creation and revision of PADS numbers.

iStore is Network Rail's online procurement site where you can search for and order products. This site is available to Network Rail employees only via the connect portal.

If you have any queries relating to catalogue numbers or PADSnet, please contact the Catalogue Management team, Route Services) at cataloguequeries@networkrail.co.uk
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Applicants are required to check PADS, prior to the submission of an application for acceptance, to establish whether suitably approved products are already approved for use.

**PADS is not an approval process. Items are registered in PADS after successfully gaining approval via the NR Product Acceptance process.

Grandfather Rights

The Professional Head of Asset discipline or delegate may grant "Grandfather Rights" to products, equipment or systems if:
  a) they were in use on the network on 1 April 1994;
  b) they were approved, or taken into use, by the British Railways Board (or predecessor body);
  c) they have not subsequently been withdrawn for safety or other reasons;
  d) they have not had any significant change to design or manufacture;
  e) the standards to which the product was originally designed or manufactured have not changed;
  f) they are being used for an application equivalent to that for the original use.
Manufacturers or Applicants should not assume that "Grandfather Rights" apply to their products.
To determine whether "Grandfather Rights" apply, manufacturers or Applicants shall provide supporting evidence to Network Rail in writing.
Any physical changes to a product, equipment, or system accepted under "Grandfather Rights" shall invalidate Network Rail product acceptance.

In these cases, the product or system shall be subject to the product acceptance and change process mandated by this module.

Products accepted by Railtrack shall normally be considered as accepted by Network Rail.

Transfer of manufacture

Product acceptance cannot be transferred between manufacturers, manufacturing sites, or countries unless approved by the Network Rail Professional Head of Asset discipline or delegate.

To gain approval for transfer, the outgoing manufacturer shall provide supporting evidence in writing to prodacc@networkrail.co.uk.

The Professional Head of Asset discipline or delegate will then review the evidence provided.

The supporting evidence must include the following:

a) the transfer of patents;
b) design authority;
c) skill base;
d) tooling;
e) fitness for purpose;
f) safety integrity;
g) reliability;
h) processes for assuring the competence of the workforce required to operate   or maintain the product.

These risks are non-exhaustive and additional evidence may be requested by the Professional Head of Asset discipline or delegate.

The Professional Head of Asset discipline or delegate shall approve or decline the application.

The Product Acceptance Process Specialist shall amend all necessary records and issue certification as directed.

Change of company name

Changes in company name shall be advised by the manufacturer to the Product Acceptance Process Specialist in writing to prodacc@networkrail.co.uk.

The manufacturer will nee to provide evidence evidence that there is no change to:

a) the manufacturing site;
b) patents;
c) design authority;
d) skill base;
e) tooling;
f) fitness for purpose;
g) safety integrity;
h) reliability.

These risks are non-exhaustive and additional evidence may be requested by the Professional Head of Asset discipline or delegate.

The Professional Head of Asset discipline or delegate shall approve or decline the request.

The Product Acceptance Process Specialist and Catalogue Management team will amend all necessary records and issue certification if required* for new products.

*Note: Certificates should reflect the name of the manufacturer at the time of approval, therefore certification is not normally amended with new manufacturer details for items that have already been approved.

Network Rail Standards

There are a number of ways for suppliers, principal contractors and subcontractors to access Network Rail standards and the standards awareness briefing report:

Online: SAI Global – a new digital format available for hand-held devices at: http://www.i2isolutions.net/networkrailproducts. Call SAI Global for more details on 01344 636300

Online: IHS Network Rail Standards Online at: http://uk.ihs.com/products/rail/index.htm. Call IHS Customer Services on 01344 328039 for login details.

Hard copy: To buy individual standards, call IHS Customer Services on 01344 328039 or emeastore@ihs.com.

Weather Resilience

Adverse and extreme weather events already significantly impact the reliability of our assets and the performance and safety of the railway. Climate change is shifting the past weather patterns and will affect their frequency and severity influencing when and how badly we suffer these impacts. To maintain the safety and reliability of the railway into the future we have to ensure that our methods of assessing and managing the risk from weather events look at both the current and future risks. This includes the design and testing of the component products that make up our rail system.

For products vulnerable to weather (e.g. temperature, humidity or water ingress) the environmental requirements shall set specifications which account for expected climate changes during the product's operational lifespan. The change factors to use in setting specifications should be sourced from NR/GN/ESD23. Queries regarding this and/or comments from suppliers regarding the available parameters should be sent to the SustainableDevelopment@networkrail.co.uk mailbox. Additional background on climate change can be found at The Met Office.

'Triage'/guidance table

Product vulnerability	Weather resilience and climate change consideration in product design
No weather vulnerabilities	No
Vulnerable to one or more weather events/types, but expected operational lifespan is less than 10 years	Product design should account for current weather impacts
Vulnerable to one or more weather events/types, expected operational life span in beyond 10 years	Product design should account for current weather impacts and future impacts under climate change