

# Qualifications in Traction and Rolling Stock Engineering

Enabling Ex-Forces personnel to be ready  
for a second career in the Rail Industry



# Developing a highly-skilled talent pool in rail engineering

## What is NTAR?

**“All change” is a phrase that every rail passenger is used to hearing. But it’s now a phrase that has special resonance throughout the UK rail industry, as the move toward the ‘Digital Railway’ of the future gathers pace – just at the time when many of the industry’s workforce are approaching retirement age.**

Both government and industry alike recognise that this combination of technological and demographic pressure needs a very clear strategy. Only by addressing training and recruitment needs now can we ensure that the UK can draw upon a highly-skilled talent pool in rail engineering – and create a truly world-leading 21st century rail network.

With immediate needs on the timetable too, such as expansion of the workforce to maintain new fleets, the response to the challenge has been a unique and ambitious public/ private partnership between government agencies and private enterprise: the National Training Academy for Rail (NTAR).

NTAR, with its multi-million pound state-of-the-art facility based in Northampton, acts as both a UK flagship and an international Centre of Excellence for skills development and collaborative working in Traction and Rolling Stock: addressing a skills gap that would otherwise become a barrier to both maintaining and growing the workforce.

## Working with Ex-Forces Personnel

NTAR is working closely with industry and tri support services to develop a portfolio of training that can lead to a second career in the Rail industry. Assisting Ex-Forces personnel, and those preparing to leave the forces, to utilise the transferable skills and attributes gained whilst serving.

New Traction and Rolling Stock qualifications have been developed. The qualifications will be available for delivery in 2018 and eligible for ELCAS funding; enabling Ex-Forces personnel to be work ready, before they begin a career in the Rail industry. The qualifications are accredited at Level 3, a combination of theoretical and practical training.

## Qualifications developed and delivered in partnership with EAL

EAL is the specialist, employer-recognised awarding organisation for engineering, manufacturing, building services and related sectors. The origins of the organisation can be traced back through various predecessor bodies to the founding of the Engineering Industry Training Board (EITB) in 1964. As the organisation has evolved it has been committed to exploring new partnerships with industry and professional associations across the UK and internationally.

EAL is the only awarding organisation to invest in the industries it serves and the skills of those who work within them. The commitment to partnering with industry and focusing on core sectors provides unrivalled knowledge and understanding of employers’ skills needs. This results in qualifications that carry weight and respect with employers and deliver real career benefits for learners, employers and industry worldwide.

## Ex-Forces personnel

# EAL Level 3 Award in Traction and Rolling Stock Systems

The qualification has a Total Qualification Time of 55 hours of which 35 are Guided Learning. Learners should expect to spend around 20 hours outside of the course, studying and completing assessments.

# EAL Level 3 Certificate in Traction and Rolling Stock Systems

The qualification has a Total Qualification Time of 100 hours of which 70 are Guided Learning. Learners should expect to spend around 30 hours outside of the course, studying and completing assessments.

## Qualification

Both qualifications are accredited by OfQual at Level 3

### What are these qualifications?

These qualifications are intended to provide the introductory knowledge and practical skill requirements for the maintenance of Traction and Rolling Stock systems. They are suitable for new entrants into the industry who may need to update or convert their existing knowledge.

### What do they cover?

The contents of these qualifications cover the knowledge and practical skills required to progress in Traction and Rolling Stock engineering. This includes the different types of vehicles in fleets and the major systems and components on those vehicles.

### What could these qualifications lead to?

Rail Engineering Traction and Rolling Stock Technicians may work on site or in a depot or in a technical office. They will lead on, and carry out, Rail Engineering tasks. Their work will require an understanding of how traction units and carriages work as an integrated, complex system. Traction and Rolling Stock engineers maintain equipment, process and fault find systems failures.

### Key outcomes

The key outcomes are detailed in the following pages.

### Requirements

There are minimal entry requirements for this qualification; these are Level 2 Technical Certificate in Mechanical Engineering and or Level 2 Technical Certificate in Electrical or similar.

Learners must have the minimum levels of literacy and numeracy to comply with the health and safety aspects of the scheme, the completion of the learning outcomes and the external assessment.

## Location

Northampton

## Duration

7 Days or 15 Days

Dependent on experience

## Delivery Channel

Face to face

## Maximum Attendees

6

## Candidate Profile

These qualifications are aimed at new entrants to the rail engineering industry who wish to develop their knowledge to enable progression within their workplace. They could be learners who may have a prior knowledge and understanding of associated engineering and have the ability to achieve a Level 3 qualification, for example:

- Upskilling of career changers who may have existing technical engineering competence and knowledge at Level 3 and now wish to progress into Traction and Rolling Stock systems engineering

NTAR will consider, during delivery and assessment of the qualifications, the support, guidance and opportunities learners will need to enable them to meet the demands of the units.

Developed and delivered in partnership with





**Award**

# EAL Level 3 Award in Traction and Rolling Stock Systems

Unit content for the 7 day qualification

## ATRS3-001 Traction systems and diagnostics

### Unit purpose/ aims

This unit is intended to introduce learners to the various systems used on Traction and Rolling Stock units, the components of these systems and the diagnostic approach to fault finding on the systems.

### 1: Understand different train vehicle types and the major systems used

#### Assessment criteria:

- Identify the different vehicle types within a train operating company (TOC) fleet
- Locate the components of the major systems and equipment used on train vehicles
- Describe the functions of the major systems and equipment used on train vehicles

### 2: Understand how schematic drawings are used in diagnosing faults

#### Assessment criteria:

- Interpret schematic drawings of a train vehicle electrical system to facilitate simple fault finding
- Interpret schematic drawings of a train vehicle pneumatic system to facilitate simple fault finding

### 3: Understand how train management systems are used in diagnosing faults

#### Assessment criteria:

- Use train management systems to diagnose train status and system faults
- Use laptop and diagnostic software to investigate and eliminate system faults
- Describe limits of own actions and authority relating to replacements of components



## Certificate

# EAL Level 3 Certificate in Traction and Rolling Stock Systems

## Unit content for the 15 day qualification

### CTRS3-001 Current collection and electrical systems

#### Unit purpose/ aims

This unit is designed to give learners an overview of train electrical systems including current collection components and the train line systems with a view to achieving fault finding within those systems.

#### 1: Understand overhead line current collection systems

##### Assessment criteria:

- Locate current collection equipment on overhead line electric trains
- Locate the key electrical control circuits on overhead line electric trains
- Explain how train control electric circuits work on overhead line electric trains
- Identify electrical control circuits on an overhead line schematic diagram

#### 2: Understand 3rd and 4th rail current collection systems

##### Assessment criteria:

- Locate current collection equipment on 3rd and 4th rail electric train systems
- Locate the key electrical control circuits on a 3rd and 4th rail train
- Explain how 3rd and 4th rail control electric circuits work
- Identify electrical control circuits on a 3rd and 4th rail schematic diagram

Units 2 – 6 are shown on the following page



## CTRS3-002 Train systems and schematic drawings

### Unit purpose/ aims

This unit is intended to enable the learner to understand the role of schematic drawings in identifying systems and components and carrying out fault finding on trains.

### 1: Understand how schematic drawings are used to identify train components and systems

#### Assessment criteria:

- Describe the different conventions used on schematic drawings to describe components, systems and layouts
- Interpret schematic drawings associated with train systems and components
- Identify the purpose of the main components identified on schematic drawings

### 2: Use schematic drawings to identify train components, systems and carry out fault finding

#### Assessment criteria:

- Use schematic drawings to locate train components and systems
- Use schematic drawings to carry out fault finding techniques on a single train system

## CTRS3-003 Train saloon (HVAC) systems

### Unit purpose/ aims

This unit is intended to introduce the Heating, Ventilation and Air Conditioning (HVAC) systems used in providing passenger comfort in the saloon vehicle of specific fleets. It covers the legal requirements of dealing with refrigerant and safety precautions when working on HVAC equipment. It also covers how to test a system using an external laptop and how to identify faults in the system.

### Summary of learning outcomes

- 1 Understand the main components and how they work within a HVAC unit
- 2 Test a HVAC system and identify faults

## CTRS3-004 Train radio and cab safety systems

### Unit purpose/ aims

This unit is intended to support the learner in understanding the location, function and critical nature of radio and cab safety systems and how to carry out testing on the systems in respect of train into service requirements.

### 1. Understand the location, function and critical nature of radio and cab safety systems

#### Assessment criteria:

- Describe the function of components in respect of radio and cab safety systems
- Explain the critical nature of radio and cab safety systems in the safe operation of a train

### 2. Understand the testing of radio and cab safety systems

#### Assessment criteria:

- Locate all components in respect of radio and cab safety systems
- Carry out the testing of all components of radio and cab safety systems in respect of train into service requirements

## CTRS3-005 Traction and Rolling Stock braking systems

### Unit purpose/ aims

This unit is intended to introduce learners to the brake systems on traction units and carriages. The unit covers integrated products, air supply, brake control, Wheel Slide Prevention (WSP), ancillary equipment and the Brake Control Unit (BCU) maintenance tool.

### 1: Understand the main components that combine into traction or rolling stock braking systems

#### Assessment criteria:

- Identify the main components of the braking systems on a train bogie
- Identify the main components of the braking systems on a train carriage/ cab
- Identify the main components of the train regenerative braking systems

### 2: Understand the operating principles of traction or rolling stock braking systems

#### Assessment criteria:

- Describe the operational principles of the braking systems on a train bogie
- Describe the operational principles of the braking systems on a train carriage/ cab
- Describe the operational principles of the train regenerative braking systems

### 3: Understand the operating principles of brake control

#### Assessment criteria:

- Carry out a practical brake test on a traction or rolling stock vehicle in line with relevant maintenance procedures

## CTRS3-006 Exterior and saloon door systems

### Unit purpose/ aims

This unit enables the learner to develop their knowledge of the maintenance and installation of railway vehicle doors. Learners will carry out fault finding activities and produce reports on the activities carried out.

### 1. Understand the operation and set up of train exterior and saloon door systems

#### Assessment criteria:

- Explain the operating principles of electrical and pneumatic, exterior and saloon door systems
- Describe the components, materials and operational requirements of exterior and saloon door systems
- Describe the electrical control methods used for the operation of exterior and saloon door systems
- List the safety devices fitted to exterior saloon doors and describe the operation of these devices
- Explain the term 'wrong side failure' and any implications that such a failure would have on the exterior saloon door systems

### 2. Carry out fault finding on exterior and saloon door systems

#### Assessment criteria:

- Undertake fault finding on exterior and saloon door systems
- Report results of fault finding within limits of own authority

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