

## Equipment details

Bodies:	Body shell of welded aluminium extrusions. Exterior painted in London Underground corporate red, white and blue livery.
Bogies:	Twin-transom flexible frame bogies without headstocks. Frame constructed from steel plate sections and steel castings, built by ADtranz. Rubber chevron primary and secondary suspension. Wheel diameter 770mm (new).
Couplers:	London Underground Automatic Wedgelock between units, semi-permanent bar between cars within a unit.
Traction system:	Alstom Onyx 3 phase AC drive using IGBT technology providing variable voltage and frequency supplies to four frame mounted 3-phase induction motors per motor car, each driving and individual axle through a flexible coupling and double reduction gearbox.
Compressors:	Westinghouse RCS rotary screw compressor driven by integral electric motor.
Brakes	Fully blended regenerative/rheostatic and e.p. friction tread brake with load control and slip/slide protection. Independent control circuits for emergency brake (energise to release) and service brakes (energise to apply). Spring applied, air released parking brake. One block per wheel, all wheels.
Auxiliary power supplies:	One IGBT auxiliary converter per unit. Provides 3-phase 415V, 50Hz to supply 3-phase and 240V single phase equipment and 52V dc for battery charging and control circuits.
Main lighting:	Fluorescent tubes fed by inverters from 50V dc – 26 tubes per motor car, 28 per trailer car and UNDM car.
Emergency lighting:	Four fluorescent tubes per car fed from a 52V battery and normally forming part of the main salon lighting.
Ventilation:	Electric heating and forced ventilation system with six ventilation fans per car, three of which have d.c. brushless motors fed from the 52V battery. Operators cab air conditioned.
Passenger Information:	Six automated LED scrolling visual display units per car. Automated audio station announcements and driver operable Public Address. Passenger alarm with talkback to driver.
Doors:	Pneumatically operated sliding doors, externally hung. Two double and one single per side (DM cars), two double and two single per side (trailers and UNDM cars)



# 1995 Tube Stocks

## Northern line



**Built by Alstom Transportation 1996-1999**  
**Entered service Northern line 1997-2000**  
**Refurbished from 2013**  
**Maintained by: Alstom under a PFI agreement.**

### Principal characteristics

Track gauge:	4ft 8½ ins/1435mm
Current system:	630V dc 3 <sup>rd</sup> and 4 <sup>th</sup> rail, floating earth.
Types of vehicle:	Driving Motor (DM) Trailer (T) Uncoupling Non-Driving Motor Car (UNDM)
Formation per unit:	Three cars, formed DM – T – UNDM
Formation per train:	Six cars formed DM – T – UNDM + UNDM – T – DM
Number of train:	106 six-car trains.
Operation:	Thales Transmission Based Train Control (T.B.T.C) automatic operation A.T.O./A.T.P. (Conventional O.P.O driving with Tripcock train protection until TBTC implementation is complete. Estimated completion 2014.)

