

# VIRGIN WEST COAST MAINLINE TILTING TRAIN



ALSTOM and Fiat Ferroviaria have signed a 1.8 billion Euro contract with Virgin Rail Group for a new fleet of high speed tilting trains. The order is the single most important rail contract in the UK for many decades and the most advanced deal since British Rail privatisation. These new trains will form the centrepiece of Virgin's plans for delivering a radically improved service on the West Coast Trains franchise which runs key mainline services from Scotland, North West England and the Midlands to London.

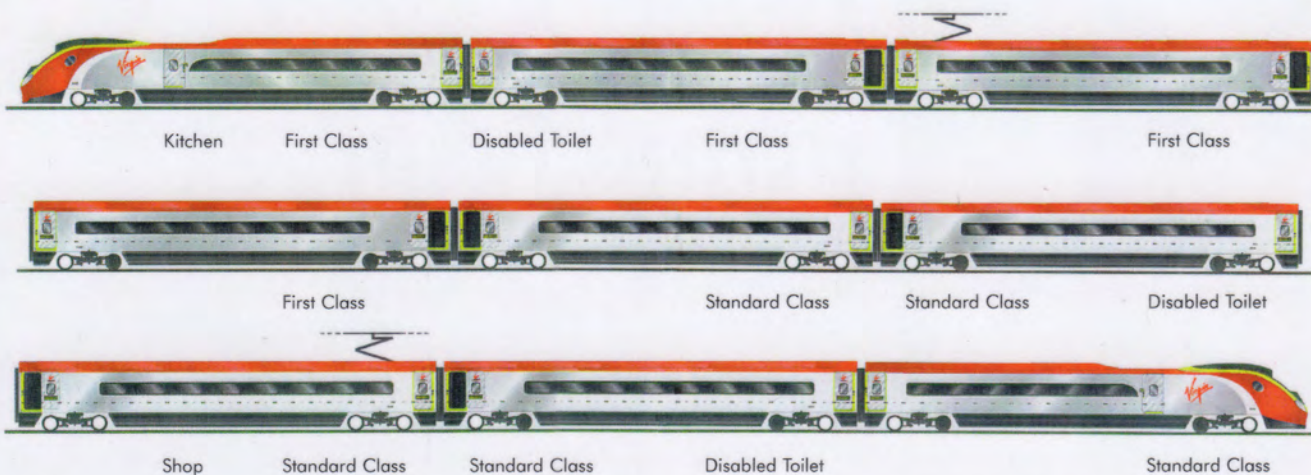
|                               |  |
|-------------------------------|--|
| <b>Contract Details:</b>      | New Train Build and Service Provision until 2012   |
| <b>Number of Trains:</b>      | 44 x 8 car and 9 x 9 car trains  |
| <b>First Delivery:</b>        | Autumn 2001  |
| <b>Last Delivery:</b>         | Autumn 2002  |
| <b>Journey Time Savings*:</b> | London - Birmingham 1 hr 40 mins down to 1 hr 15 mins<br>London - Manchester 2 hr 30 mins down to 1 hr 45 mins<br>London - Glasgow 5 hr 20 mins down to 3 hr 50 mins |
| <b>Service Frequency:</b>     | Doubled, e.g. every 15 mins to Birmingham, every 30 mins to Manchester   |
| <b>Passenger Comfort:</b>     | Significant ride quality improvement   |

\*Journey time savings are based on year 2005 (Infrastructure update)

**FiatFerroviaria**

**ALSTOM**





## TRAIN CONFIGURATION

- Powered axle
- Trailer axle

### Train characteristics

|   |  |
|---|--|
| <b>Track gauge</b>                            | 1432mm   |
| <b>Safety Case</b>                            | West Coast Mainline and diversionary routes                                  |
| <b>Distributed power</b>                      | 12 motored axles   |
| <b>Train length</b>                           | 8 car train, 193m<br>9 car train, 217m                                       |
| <b>External max. width of trailer car</b>     | 2730mm   |
| <b>Length of trailer car</b>                  | 23m  |
| <b>Train mass (tare)</b>                      | 8 car train, 414 tonnes<br>9 car train, 458 tonnes                           |
| <b>Maximum motor bogie axle load (tare)</b>   | 14.7 tonnes  |
| <b>Maximum trailer bogie axle load (tare)</b> | 13.8 tonnes  |
| <b>Bodyshell material</b>                     | aluminium  |
| <b>Tilt mechanism</b>                         | electric actuation   |
| <b>Seating capacity</b>                       | 8 car train, 145 first, 218 standard<br>9 car train, 145 first, 294 standard |
| <b>Air conditioning</b>                       | Cab and Saloons  |
| <b>Noise</b>                                  | Internal <65dBA<br>External <93dBA   |

### Electrical characteristics

|   |               |
|---|---------------|
| <b>Supply voltage</b>                         | 25kV 50Hz     |
| <b>Type of traction drive</b>                 | ONIX 800 IGBT |
| <b>Semiconductor cooling fan</b>              | Air           |
| <b>No. of motors per inverter</b>             | 2             |
| <b>25kV train bus line</b>                    | yes           |
| <b>No. of pantographs in service for 25kV</b> | 1 + 1 spare   |
| <b>Rheostatic braking</b>                     | yes           |
| <b>Regenerative braking</b>                   | yes           |
| <b>PMCF and inverter control</b>              | AGATE control |

### Performance

|                                |  |
|--------------------------------|--|
| <b>Max power at rail 25kV</b>  | 5.1MW  |
| <b>Starting effort at 25kV</b> | 204kN  |
| <b>Max commercial speed</b>    | 110 mph Autumn 2001<br>125 mph Autumn 2002<br>140 mph May 2005 |
| <b>Diagrams per day</b>        | 47   |
| <b>Reliability</b>             | 50.000 MBF   |

### Bogie characteristics

|                                       |   |
|---------------------------------------|---|
| <b>No. of motor bogies</b>            | 12 for 8 and 9 car trains               |
| <b>No. of trailer bogies</b>          | 4 for 8 car train,<br>6 for 9 car train |
| <b>Bogie wheelbase</b>                | 2700mm                                  |
| <b>Type of secondary suspension</b>   | single air bag                          |
| <b>Activate lateral suspension</b>    | yes ( in 2005 )                         |
| <b>Unsprung mass per motor axle</b>   | <2000kg                                 |
| <b>Unsprung mass per trailer axle</b> | <1750kg                                 |
| <b>Brake type on motor bogie</b>      | disc & electric                         |
| <b>Brake type on trailer bogie</b>    | disc                                    |
| <b>Distance between bogie centres</b> | 17000mm                                 |

### Other features

|   |                                  |
|---|----------------------------------|
| <b>Train management system</b>                        | yes,<br>monitoring & diagnostics |
| <b>Electronic seat reservation system</b>             | yes                              |
| <b>Audio and visual passenger information systems</b> | AGATE Media                      |
| <b>Wheelchair compatible doorways</b>                 | yes                              |
| <b>Toilets for disabled passengers</b>                | yes                              |
| <b>Identifiable priority seats</b>                    | yes                              |
| <b>At seat audio entertainment system</b>             | yes                              |
| <b>Shop facilities</b>                                | yes                              |
| <b>Pressure sealed vehicle</b>                        | yes                              |