

= SL79 =

SL79 is a class of 40 articulated trams operated by the Oslo Tramway of Norway . The trams were a variation of the Duewag trams that had been developed by the German manufacturer since the 1950s . The six @-@ axle vehicles are unidirectional with four doors on the right side . The trams can seat 77 passengers three and four abreast , with an additional 91 people able to stand . Power output is 434 kilowatts (582 hp) , provided by two motors on the two end bogies , that supplement a central unpowered Jacobs bogie located under the articulation . The trams are 23 @. @ 0 metres (75 @. @ 5 ft) long and 2 @. @ 5 metres (8 ft 2 in) wide . They are capable of 80 kilometres per hour (50 mph) and have standard gauge .

They were built in two series , the first of 25 units delivered in 1982 ? 84 , and the second of 15 units delivered in 1989 ? 90 . The first 10 units were built by Duewag , while the last 30 were built in Norway by Strømmen . They were numbered 101 through 140 . The two series vary slightly in specifications . The trams were ordered in 1979 after the 1977 decision to not close the tramway , after the SM53 were finished delivered in 1958 . The SL79 mainly serves on lines 11 , 12 and 19 . Except those with an advertising livery , the trams are painted a light blue .

= = History = =

In 1960 , the Oslo City Council decided to gradually close the tramway . New trams had been delivered in 1958 , and it was decided that lines would only be closed as trams were naturally retired . At the time Oslo Sporveier had 421 vehicles . By 1974 , the company had 163 vehicles , of which 100 were powered trams , 43 were trailers and 20 were working trailers . Following the energy crisis in the 1970s , the political climate changed , and in 1977 the city council decided to not close the tramway anyway . Between 1978 and 1981 , ten tram vehicles were bought from the Gothenburg Tramway .

In the 1950s , Duewag started to develop an articulated variation of its four @-@ axle Großraumwagen , based on articulation technology used by trams in Rome . This design was delivered to many tramways , particularly in Germany . In 1977 and 1978 , Oslo Sporveier tested a Duewag GT8S (3052) tram from Rheinbahn . In 1979 , Oslo Sporveier ordered ten vehicles from Duewag , with planned delivery in 1982 . In addition , fifteen units would be license @-@ built by Strømmens Verkseted , with delivery the following year . All the motors were built by the Norwegian company Norsk Elektrisk & Brown Boveri (NEBB) . The trams built in Germany were transported to Oslo by railway . The first vehicle was delivered on 13 April 1982 and put into service on 2 July . The last German @-@ built tram was put into service on 13 September . The German trams were numbered 101 through 110 . Oslo was the third tramway in the world to take into use thyristor controlled motors on the main part of their fleet of trams , after the systems in Helsinki , Finland , and Hanover , Germany .

The first Norwegian @-@ built tram was delivered on 16 February 1983 and put into service on 9 March . The last unit was put into service on 10 January 1984 . The Strømmen trams were numbered 111 through 125 . There were few problems in the start , although the pantographs had technical problems and there were occasional power failures in the overhead wires due to out @-@ of @-@ date rectifiers not being able to handle the increase power usage . Trams no . 101 through 113 were put into service on Line 9 on the Lilleaker Line and the Ekeberg Line , replacing the Class E. The remaining trams of the first series were put into service on Line 1 , on the Sinsen Line and the Briskeby Line , as well as Line 7 , on the Ullevål Hageby Line and the Sinsen Line . On Line 9 , that included both the tramway 's light rail sections , only SL79 @-@ trams were used , while lines 1 and 7 used a mix of SL79 and SM53 @-@ trams .

Fifteen additional trams were built by Strømmen as series two . The first vehicle was delivered on 4 August 1989 and was taken into service on 11 October , while the last was put into service on 27 August 1990 . These were numbered 126 through 140 . From 7 September 1990 to 1 February 1991 , tram 140 was used on the tramway in Chemnitz , Germany . Following this delivery , all lines of the tramway used SL79 , although there were still many other trams needed to supplement the

new trams . During the summer of 1995 , tram no . 137 was used on the Djurgården Line of the heritage tramway in Stockholm , Sweden . Due to a labor dispute about privatizing the operation of the tramway and the Oslo Metro , the ownership of all trams and metro trains , including the SL95 , were transferred to the municipally owned limited company Oslo Vognselskap in 2007 .

Suggestions have been made to extend the trams with another center section , adding another axle and articulation , but these plans have been rejected by the company . Such a center section would be low @-@ floor and give much easier access for strollers and wheelchairs , and allow the whole tram network to have step @-@ free access . As of 2008 , it was estimated that the SL79 @-@ series has about ten more years of service before it needs to be replaced . No plans have been made for new trams to be ordered .

= = Operations = =

The SL79 make up 40 of the 72 trams in the system , supplementing the newer SL95 . Following the delivery of the SL95 low @-@ floor trams in 1999 and 2000 , Oslo Sporveier has a pure articulated fleet . The newer series has a greater turning radius , heavier axle load and is two @-@ directional . The radius and axle load of the SL95 makes it impossible for it to operate around Majorstuen , requiring lines 11 , 12 and 19 to use SL79 @-@ units . With the 1999 @-@ extension of the Ullevål Hageby Line to Rikshospitalet , the tramway received its first terminus without a balloon loop , making it necessary for lines 17 and 18 to be served only by SL95 units . These also serve line 13 , since it is a continuation of the service along the Sinsen Line from Majorstuen . The SL79 operate on the Briskeby , Ekeberg , Frogner , Gamleby , Grünerløkka ? Torshov , Kjelsås and Vika Lines . Each service has a ten @-@ minute headway , giving a five @-@ minute interval on section that are served by two lines .

= = Specifications = =

The SL79 is an articulated tram built exclusively for the Oslo Tramway in two series with different specifications . The trams were designed by Duewag , who also built 10 units in Düsseldorf , Germany . Fifteen additional units plus the fifteen trams in the second series were built Strømmen outside Oslo . The motors for the first series was delivered by Duewag , while the second series was built by Asea Brown Boveri at their Norwegian subsidiary NEBB . The trams have a steel frame and are 22 @, @ 180 millimeters (873 in) long and 2 @, @ 500 millimeters (98 in) wide . Without payload the trams weigh 32 @, @ 800 kilograms (72 @, @ 300 lb) .

Each tram has a total capacity of 162 riders , of which 71 can be seated . Seating is at three or four abreast . Series two was delivered with vandal @-@ proof seats that proved uncomfortable and were replaced . The floor is 880 millimeters (35 in) above the tracks . The trams have four doors on the right side . The first series also have a single door on the left side , and the back right door was made single to match this . On series two , there are four double doors on the right side and none on the left side . SL79 was the first tram to be delivered with color @-@ coded destination signs . By 2007 , all the trams had had their rolling signs replaced by LED @-@ type signs .

The trams have three standard gauge bogies , each with two axles , of which the front and back bogies are powered . The bogies have air suspension and hollow @-@ axle gear boxes from Thyssen . The wheels have a diameter of 680 millimeters (27 in) . The distance between the bogies is 7 @, @ 700 millimeters (300 in) . Each of the two NEBB 4ELO 2054 B thyristor monomotors have a power output of 217 kilowatts (291 hp) , giving the vehicle a power output of 434 kilowatts (582 hp) at 750 V. Maximum speed is 80 km / h (50 mph) . Acceleration in the range 0 to 40 km / h (0 to 25 mph) is limited to 1 @. @ 3 meters per second squared (4 @. @ 3 ft / s²) . Primary braking is achieved from the dynamic brake , that is capable of 1 @. @ 3 m / s² (4 @. @ 3 ft / s²) retardation with regeneration , allowing the braking power to be fed back to the overhead wires . In addition , there are disc brakes capable of 3 @. @ 0 m / s² (9 @. @ 8 ft / s²) .

Except those with an advertising livery , the trams are painted a light blue . The first series was delivered with a deeper blue color than has been tradition with Oslo Sporveier trams , but all have

since been repainted to match the standard livery . Prior to the delivery of the second series , a single tram was painted deep red to match the buses and the T1000 trains used on the Oslo Metro . Due to negative feedback from the riders , the historic color was kept .