SIEMENS

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Trade fair preview

Background paper

Siemens to supply new metro for Munich

At the end of 2010, the Stadtwerke München (Munich City Utilities-SWM) placed an order worth around EUR 185 million with the Rail Systems Division of Siemens AG to supply 21 new C2 metro trains worth about 185 million euros. At the same time, SWM took out two options on a further 46 metro trains, totaling 276 cars, which can be exercised until 2016 and 2020, respectively. The total volume of the order, including these options, is around 550 million euros. Siemens is building metro trains for Munich that are above all green and energy-efficient.

The order placed by SWM comprises 21 trains with 126 cars. These cars are based on the well-known design used for the previous generation of vehicles ("C-car"), which was developed by internationally renowned vehicle designer Alexander Neumeister. Siemens is thus able to build on the success of the previous metro car generation that has been in service since 2002. The proven system is combined with innovative technologies reflecting the latest developments in metro vehicles as marketed by Siemens under the name Inspiro. These technologies ensure a high degree of reliability and comfort.

Siemens is building metro trains for Munich that are above all green and energy-efficient, their reduced energy consumption attributable to a combination of different measures. When choosing the components, Siemens engineers were guided by environmental concerns. For example, the halogen lamps found in the predecessor vehicles have been replaced with LED lights, the carbodies are made entirely of a lightweight aluminum alloy and the materials used ensure up to 97 percent recyclability. In this way, the new metro trains will enhance the CO_2 balance in Munich, and assist both SWM / Münchner Verkehrsgesellschaft (Munich transport corporation-MVG) and the city in their efforts to further reduce the amount of energy consumed in the public transportation sector. Furthermore, the systems used require very little maintenance, which lengthens maintenance intervals and increases the availability of the metro fleet for the operator.

External changes in the 115-meter-long and 2.9-meter-wide vehicles include the front section, which features new LED lighting, and colored LED light strips in the edges of the doors to make

door opening and closing operations more easily recognizable. Video cameras, passenger TV and redesigned interior lighting using LED lamps all go toward providing an enhanced level of passenger comfort. Compared to the previous 80 km/h, the C2 type metro trains now ordered are designed for a maximum speed of 90 km/h. Other advantages of the train are its high capacity and – as a result of longer maintenance intervals – improved availability. The new cars have a redesigned passenger area and a new seating concept and, as a result, can carry more passengers than the older vehicles, with the C2 able to accommodate a total of 940 passengers. As separate cars have been eliminated, the train now offers passengers end-to-end accessibility.

Carrying more than one million passengers per day, the metro is the most widely used means of public transportation in Munich. The 21 new trains are to be delivered between 2013 and 2015. They will be deployed in MVG's metro network that covers a total of about 100 track kilometers. A shorter headway is to be introduced on some inner-city route sections in future. For instance, starting 2014, trains will run at 2-minute intervals instead of the previous 2.5 minutes. MVG will need seven new trains to achieve this. 14 trains will replace old rolling stock that has been in service for over 40 years and has now reached the end of its useful life. The new trains are being built in the Siemens plants in Vienna, Austria, and in Munich-Allach, Germany.

Technical data of the C2.11 metro for Munich

Train configuration	MC+M+M+M+M+MC
Wheel arrangement	Bo'Bo'+Bo'Bo'+Bo'Bo'+Bo'Bo'+Bo'Bo'+Bo'Bo'
Carbody material	Aluminum
Track gauge	1,435 mm
Length over couplers	approx.115,000 mm
Width of car	2,900 mm
Floor height above top of rail	1,100 mm above TOR
Wheel diameter max. / min.	850 / 770 mm
Weight empty / total weight	approx. 180,000 kg
Max. axle load	13.5 metric tons
Seats	220
Train capacity at 4 pass./ m^2	940
Passenger doors per car	6
Min. curve radius service line / depot	270 m / 70 m
Max. negotiable gradient	5 %
Maximum speed	90 km/h
Max. starting acceleration	1.3 m/s^2

Mean braking deceleration	1.2 m/s^2
Power supply	750 V DC / third rail

For more information about the metro trains, visit http://www.siemens.com/press/innotrans2012