TABLE 3-1. SYSTEM OPERATIONAL CHARACTERISTICS

VAL System Performance	
Design capacity for 1990	6400 passengers/h
Design capacity for 2000	15 000 passengers/h
Headway	60 s including maximum station dwell time of 30 s
Availability	24 h/day
Type service	Scheduled
Type network	Line haul
Traveling unit	2-car train
Interior noise	75 dBA
Exterior noise	72 dBA @ 60 km/h (7.5 m from track)
Vehicle Performance	
Average velocity	35 km/hr
Maximum velocity	80 km/hr
Cruise velocity	60 km/hr
Maximum grade capability	7% (with 50% of propulsion capacity available)
Normal acceleration/ deceleration	1.3 m/s^2
Maximum jerk	0.65 m/s^3
Emergency deceleration	1.8 to 2.4 m/s^2
Stopping precision in station	±30 cm
Degradation if guideway is wet	None
Ice and snow control	Heated cable in guideways
Vehicle design capacity	34 seated, 28 standees
Vehicle crush capacity	22 seated, 109 standees (8 passenger/m^2)
Stations	
Type	On-line
Type boarding	Level
Ticket & fare collection	Automatic
Security	TV surveillance

TABLE 3-1. SYSTEM OPERATIONAL CHARACTERISTICS (Cont.)

Stations (Cont.)	
Boarding and debarking capacity	With maximum dwell time of 30 s, maximum deboarding and debarking capacity of 17 000 passengers/h
Maximum wait time	1 minute peak hour 5 minutes off peak
Vehicle in-station nominal dwell time	14 seconds
Station spacing	~0.9 km
Individual Service	
Privacy	Multiple party
Transfers	None
Stops	All stations
Accommodations	Seated and standing
Security	Station TV surveillance Vehicle/station voice communications Roving security personnel
Instruction	Auditory and signs Route maps in vehicles
Passenger articles	Small packages and luggage
Comfort	Air distribution and heating
Cargo Capability	
Luggage	On floor next to passenger
Reliability and Safety	
Fail-safe features	Two levels of control redundancy w/o use of vital relays (velocity and position measurement)
Strategy for passenger evacuation	Through normal doors of vehicle following power rail shut-off
Stragety for removal failed train	Push with trailing train
System Lifetime	
Vehicle	30 yrs
Operational design life	30 yrs
System Mean Time Between Failure (MTBF)	Not Available

TABLE 3-1. SYSTEM OPERATIONAL CHARACTERISTICS (Cont.)

System Lifetime (Cont.)	
System recovery time after failure	Variable-usually 2 minutes
System availability	96-98% (Goals)
Two-vehicle train MTBF	2600 h, computed
Station equipment MTBF	1800 h, computed
Guideway MTBF	Not available
Command, Control and Safety System MTBF (per two-vehicle train)	2700 h, computed
Personnel Requirements	
Vehicles and stations are unmanned	Personnel are only required at the Central Control facility, the maintenance facility, and for performing security and administrative functions.
The VAL System Physical Description (Vehicle)	
Length, overall	12.5 m (25.6 m/train)
Total height, outside	3.25 m
Height, clear inside	2.045 m
Total Width, outside	2.06 m
Width, clear inside	1.836 m @ Seats 1.860 m @ Doors
Weight, empty	13 850 kg
Weight, crush	23 050 kg
Suspension	
Type	Vehicle supported by radial-tired wheels. Two pneumatic supports/axle.
Lateral guidance	Eight nitrogen-filled rubber tires
Sway (roll)	Shock absorbers
Propulsion and Braking	
Type and number of motors	Two dc series motors 750 V per vehicle

TABLE 3-1. SYSTEM OPERATIONAL CHARACTERISTICS (Cont.)

Propulsion and Braking (Cont.)	
Motor rating	120 kW
Type drive	One motor/axle driven through cardan shaft
Power collection	Power collector on axle and power rails on right-hand rail and/or left-hand rail of guideway
Type service brakes	Regenerative for high speed plus mech. disc for low speed
Type emergency brakes	Mechanical disc brakes
Emergency brake reaction time	400 ms
Switching	40 m radius turnout, 3 s switch time
Guideway	
Type	Reinforced concrete
Supports	Concreted when elevated
Super elevation	13%
Overall cross-section width	6 m double track includes passenger walkway
Overall cross-section height	Not available
Installation	
Vehicle dynamic envelope width (tangent sections)	2.35 m
Vehicle dynamic envelope height	3.32 m
Guideway structural weight	Not available
Maximum grade at site	7%
Minimum horizontal turn radius	30 m
Anti-icing Method	
Guideway	Heating cable buried in the track 220/380 V, 100 W/linear m
Guideway rail/power rail	Heating cable 30 W/linear m

TABLE 4-1. PLAN FOR CONSTRUCTION OF THE FIRST SECTION OF LINE 1 OF LILLE METRO

A. System Engineering

The April 1977 contract amendment granted to MATRA (as defined in Section 2.4) will be completed according to the following schedule:

June 1977	:	Invitation to bid on maintenance workshop.
July 1977	:	Begin fabrication of vehicle fleet.
September 1977	:	Beginning of work on the maintenance workshop building.
December 1978	:	Completion of maintenance workshop and test track.
End of 1978-Beginning of 1979	:	Preproduction tests on first vehicle.
May 1979	:	Delivery of first vehicle on-site. Beginning of manual test program.
July 1979	:	Beginning of automatic operation testing.
Mid 1980	:	Initial revenue operation on first 3.6 km section.
August 1981	:	Completion of vehicle delivery on-site.
Mid 1982	:	Beginning of line 1 revenue operation.

B. Civil Engineering (Guideway & Station Structure)

Construction of the guideway and stations will be directly contracted by the Lille Urban Community and will be completed as follows:

December 1977	:	Invitation to bid on the first guideway section (between the stations City Scientifique and Pont de Bois).
May 1978	:	Contract award for first guideway section.
Mid 1979	:	Completion of first guideway section.