

**Distributed Power, Required TPC Data Formats
Specific Input Values w/ Examples**

Required TPC Input Data by Vehicle Type	Program Default Value	Notes	Vehicle A	Vehicle B	Vehicle C	Vehicle D	Vehicle E	Vehicle F	Vehicle G	Vehicle H
C is the coefficient of air resistance		Davis Equation used in Amtrak's TPC;								
W is the weight of the car in tons		5. Suggested maximum cant deficiency value.								
V is the velocity in miles per hour		6. Power Factor curve at maximum propulsion in 2 mph increments								
A is the vehicle cross-section in square feet		7. Propulsion System Efficiency curve at maximum propulsion in 2 mph increments								

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Required TPC Input Data by Vehicle Type	Program Default Value	Notes	Vehicle A	Vehicle B	Vehicle C	Vehicle D	Vehicle E	Vehicle F	Vehicle G	Vehicle H
Lead Vehicle Data (per unit, each unit to be accounted for):			Populate the appropriate cells below for the corresponding vehicle above.							
Tractive effort curve, pounds force at 2 mph increments (note the data point position as previous or following MPH increment, or mid-point between) 11 kV 25 Hz Operation	-	See "Acela Tractive Effort" for example.								
Power Factor curve at 2 mph increments (note the data point position as previous or following MPH increment, or mid-point between) 11 kV 25 Hz Operation										
Propulsion System Efficiency curve at 2 mph increments (note the data point position as previous or following MPH increment, or mid-point between) 11 kV 25 Hz Operation										
Weight, tons	-									
Length, ft	-									
Horsepower (annotation purposes only), Gross w/ HEP Load (train electrical power)	-									
Number of axles	-									
Weight per axle, tons	-									
Dynamic/electric brakes (y/n)	-									
Percent of empty weight in rotation	5%									
Cross-sectional area, sq. ft. (see additional requests, below)	-									
Coefficient of flange resistance	0.030									
Coefficient of air resistance (lead vehicle)	0.0024									
Coefficient of air resistance (trailing vehicle)	0.00034									
Auxiliary Power Demand - Full AC Load (kW)	-									
Auxiliary Power Demand - Full Heat Load (kW)	-									
Trailing Vehicle Data (per unit):										
Weight, tons (based on fully loaded Trainset at 80kg per passenger)	-									
Length, ft	-									
Number of axles	-									
Total Weight per axle, tons										
Passenger load, tons (based on fully loaded Trainset at 80kg per passenger)										
Percent of empty weight in rotation	5%									
Cross-sectional area, sq. ft. (see additional requests, below)	-									
Coefficient of flange resistance	0.030									

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Coefficient of air resistance	0.00034									
Auxiliary Power Demand - Full AC Load (kW)	-									
Auxiliary Power Demand - Full Heat Load (kW)	-									
General Resistance Data:										
Constant of inertial resistance	1.3									
Constant of journal resistance	29									
Braking Data:										
Deceleration limit in mph/sec	-									
Note 1: The data must be supplied in English units as specified.										
Note 2: The data must be supplied on a "by unit" basis if there are significant differences between cars.										
All inputs for the Basic (or Modified Basic) Davis Equation (for reference)										
R = I + J/w + bV + CAV²/W where,										
R	is the resistance in pounds per ton	Offeror to provide:								
I	is the Constant of inertial resistance	1. Tractive effort curve in 2mph increments;								
J	is the Constant of journal resistance	2. A level, tangent track simulation to MAS for verification purposes;								
w	is the weight per axle in tons	3. Suggested curve rolling resistance equations/coefficients if different than the AREMA Standard of 1 degree curve being equivalent to +0.04 percent grade used in Amtrak's TPC;								
b	is the coefficient of flange resistance	4. Suggested train aerodynamic/rolling resistance equations/coefficients if different than the Davis Equation used in Amtrak's TPC;								
C	is the coefficient of air resistance	5. Suggested maximum cant deficiency value.								
W	is the weight of the car in tons	6. Power Factor curve at maximum propulsion in 2 mph increments								
V	is the velocity in miles per hour	7. Propulsion System Efficiency curve at maximum propulsion in 2 mph increments								
A	is the vehicle cross-section in square feet	8. Vehicle cross-sectional diagram for lead vehicle to verify Frontal Area computation.								
Note: Unless otherwise provided with alternate information, the TPC will be run with the, "Program Default Values."										