

EPA/Manufacturer Test Data System (MTDS) Input Data Record Layout

Field name	R e c o r d T y p e	Transaction Type									P o s i t i o n	L e n g t h	D a t a T y p e	Valid Range/Entry Criteria
		A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c r o s s	R e p r o c e s s					
Input Record Type	T1	R	R	R	R	R	R	R	R	R	1-2	2	A	T1
Process Code	T1	R	R	R	R	R	R	R	R	R	3-3	1	A	For Add: 'A' or blank - '' For Modify: 'M' For Replace: 'R' For Delete: 'D' For Report: 'P' For Carry Over: 'C' For Carry Across: 'X' For Reprocess: 'S'
Manufacturer Code	T1	R	R	R	R	R	R	R	R	R	4-7	4	I	Note: See Appendix F Valid MANUFACTURER CODE
Test Number	T1		R	R	R	R	R	R	R	R	9-15	7	I	Note: EPA shall supply a valid EPA test number in the Add Transaction. 0000000 - 9999999 Valid test number format.
Model Year	T1	R	R	R	R		R	R	R	R	17-20	4	I	1970-2100
Vehicle Identification	T1	R	R	R	R		R	R	R	R	22-41	20	A	Valid VEHICLE ID
Vehicle Configuration Number	T1	R	R	R	R		R	R	R	R	43-44	2	I	00-99
Test Purpose	T1	R	R	R			R	R	R	R	46-47	2	I	01 - Emission Data 02 - Durability (Obsolete) 08 - Manufacturers' Development 26 - Independent Commercial Importer 31 - Fuel Economy 32 - Analytical Fuel Economy 33 - Certification and/or Fuel Economy for other years (Carry Over)

Transaction Type: R = Required M = Required X = Optional “ ” = Not Available
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		A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c c r o s s					R e p r o c e s
Test Procedure	T1	R	R	R					R	49-50	2	I	02 - CVS 75 - Later (EPA city test w/o canister loading) 03 - HWFE (Highway test) 10 - Idle CO 11 - Cold CO 15 - Spitback Test 21 - Federal Fuel 2-day Exhaust (w/can load) 23 - Federal Fuel 2-day Evaporative Test 24 - Federal Fuel Refueling Test (ORVR) 25 - Calif Fuel 2-day Exhaust (w/can load) 27 - Calif Fuel 2-day Evaporative Test 31 - Federal Fuel 3-day Exhaust 34 - Federal Fuel 3-day Evaporative Test 35 - Calif Fuel 3-day Exhaust 38 - Calif Fuel 3-day Evaporative Test 41 - Federal Fuel 2-day exhaust (heat fuel tank to load canister) 43 - Federal Fuel 2-day Evaporative Test (heat fuel tank to load canister) 44 - Federal Fuel Refueling Test (ORVR) (heat fuel tank to load canister) 45 - Calif Fuel 2-day Exhaust (heat fuel tank to load canister) 51 - Calif Fuel 50°F Exhaust Test 52 - Federal Fuel 50°F Exhaust Test 71 - CST -Idle Test (EPA Only) 72 - CST - Two Speed Idle Test 73 - CST -Loaded Test (EPA Only) 74 - CST - Preconditioned Idle Test (EPA only) 76 - CST- Preconditioned Two Speed Idle Test (EPA Only) 90 - US06 93 - Calif Fuel - Special 95° Exhaust Test (EPA Only) 94 - Calif Fuel - Special 115° Evaporative Test (EPA Only) 95 - SC03 96 - SC03 (AC1) 97 - SC03 (AC2)

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	R e c o r d T y p e	A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c r o s s	R e p r o c e s				
High Altitude	T1	X	X	X						52-52	1	A	<i>Note:</i> Default is 'N'. Y, N
Test Date	T1	R	X	X						54-61	8	D	Valid calendar date. (MMDDYYYY)
Technical Disposition Code	T1	X	X	X						63-63	1	A	1 - Valid 2 - Void 3 - Minor Void Blank - None * - Clears existing field
Certification Disposition Code	T1	X	X	X			X	X		65-66	2	A	01 - Pass 02 - Fuel Economy Only 03 - Fail 04 - Void 05 - DF not available 06 - Evaporative results only 07 - After Shipment 08 - Zero mile test 09 - Highway NOx fail blank - No disposition * - Clear Existing field
Fuel Economy Disposition Code	T1	X	X	X			X	X		68-69	2	A	01 - Used for Fuel Economy 02 - Not used for Fuel Economy 03 - "Reasonable," but not used for fuel economy 04 - Not reviewed, not used for fuel economy 07 - Awaiting confirmatory testing 08 - Manufacturer's confirmatory test, used for fuel economy 09 - Manufacturer's confirmatory test, not used blank - No disposition * - Clear Existing field
Calculate Deterioration Factors	T1	X	X	X						71-71	1	A	<i>Note:</i> Applies only to Durability Vehicle Tests. Default to 'N'. Y, N

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Field name	Transaction Type									Position	Length	Data Type	Valid Range/Entry Criteria
	R	A	M	R	D	R	C	C	R				
Record Type													
Retest	T1	X	X	X						73-73	1	A	Note: Default is 'N'. Y, N
Aged Emission Components Usage	T1	M	X	M						75-77	3	A	Enter the age of the emission control system components (in thousands of miles) or 'NA' as in the following examples: NA - Normal 4k emission or fuel economy data vehicle was used 50 - 50k aged components used on test vehicle 100 - 100k aged components used on test vehicle 120 - 120k aged components used on test vehicle 150 - 150k aged components used on test vehicle
CERT/In-Use	T1	X	X	X						79	1	A	'C' - Cert (default) 'I' - In-Use '2' - Cert '3' - Cert '4' - Cert Codes '2', '3' or '4' may be used to handle special cases as in testing with aged components where results from testing with full useful life aged components fail to meet 50K standards.
Input Record Type	T2	R	R	R						1-2	2	A	T2
Test Lab Site Code	T2	R	X	X						4-5	2	I	01-99
Test Analysis Site	T2	X	X	X						7-10	4	A	Note: Evaporative Tests - No Entry. Text
Dyno Site	T2	X	X	X						12-15	4	A	Note: Evaporative Tests - No Entry. Text
Evaporative Enclosure Site	T2	X	X	X						17-20	4	A	Text

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Field name	R e c o r d T y p e	Transaction Type								P o s i t i o n	L e n g t h	D a t a T y p e	Valid Range/Entry Criteria
		A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c r o s s	R e p r o c e s				
Odometer Reading	T2	R	X	X						22-29	8 (7,1)	R	000000.0-999999.9
Units (Odometer)	T2	R	X	X						31-31	1	A	M - Miles K - Kilometers
Reason for Confirmation	T2	X	X	X						33-34	2	I	<i>Note:</i> This data element is applicable to EPA performed tests and should only be submitted with EPA test data. 01 - Random audit 02 - Failure at manufacturer 03 - Cert level equals standards 04 - FE >= leader 05 - FE up by 1 or more 06 - New vehicle, no data 07 - FE correlation offset 08 - Defeat device evaluation 09 - Replacement of failed vehicle 10 - Potential gas guzzler 11 - Potential I/M concerns 99 - Other reason
Fuel Batch Id	T2	R	R	R						36-41	6	A	<i>Note:</i> Not required where VI Fuel Type is Diesel or the test is an Evap test. Not required for Evaporative test. Text
Fuel Calibration Number	T2	R	R	R						43-46	4	I	<i>Note:</i> Not required where VI Fuel Type is Diesel or the test is an Evap test. Not required for Evaporative test. 0001-9999

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		A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c r o s s					R e p r o c e s
VI Fuel Type	T2	R	R	R						48-49	2	I	06 - Unleaded (at EPA 96 RON) 09 - Diesel (at EPA #2 Diesel) 17 - Leaded (at EPA Ind 15) 22 - Special Unleaded 91 RON (for Defeat Device Testing only) Ref. VPCD-97-01 23 - Carb Phase II Gasoline (CERT) 24 - Cold CO Regular (Cert) 25 - Cold CO Premium (Cert) 26 - Cold CO Regular (Tier 2) 27 - Cold CO Premium (Tier 2) 31 - Methanol (Cert M10) 33 - Methanol (Cert M85) 37 - E10 (10% Ethanol 90% EPA Unleaded Gasoline) 38 - E85 (85% Ethanol 15% EPA Unleaded Gasoline) 39 - Ethanol (Reserved for CERT - not CFEIS) 40 - Hydrogen (Reserved for CERT - not CFEIS) 41 - CNG (CERT) 42 - LPG (reserved for CERT) (Not CFEIS) 43 - E10 (10% Ethanol 90% CAL Phase II Gasoline) 44 - E85 (85% Ethanol 15% CAL Phase II Gasoline) 61 - Tier 2 Unleaded (at EPA - 96 RON and 15-45 ppm Sulfur)
Input Record Type	T3	R	R	R						1-2	2	A	T3
Average Code	T3	X	X	X						4-4	1	A	<i>Note:</i> Applies only to Durability Tests. 1-9, A-Z
Ambient Temperature	T3	X	X	X						6-10	5 (4,1)	R	<i>Note:</i> No entry needed for Evaporative Tests or Test Purpose 32 (Analytical FE) Tests. 000.0-999.9

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Field name	Transaction Type										Valid Range/Entry Criteria		
	R e c o r d T y p e	A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c r o s s	R e p r o c e s s	P o s i t i o n		L e n g t h	D a t a T y p e
Ambient Temperature Units	T3	X	X	X						12-12	1	A	<i>Note:</i> No entry needed for Evaporative Tests or Test Purpose 32 (Analytical FE) Tests. F - Fahrenheit C - Celsius Default is 'F'
Barometric Pressure Value	T3	X	X	X						14-19	6 (5,2)	R	<i>Note:</i> No entry needed for Evaporative Tests or Test Purpose 32 (Analytical FE) Tests. 000.00-999.99
Barometric Pressure Units	T3	X	X	X						21-24	4	A	<i>Note:</i> No entry needed for Evaporative Tests or Test Purpose 32 (Analytical FE) Tests. INHG - Inches of Mercury KPA - Kilopascals Default is 'INHG'
NOx KH	T3	X	X	X						26-31	6 (5,4)	R	<i>Note:</i> No entry needed for Evaporative, Cold CO, Light Truck Idle CO or Short Tests. 0.0000-9.9999 NOx Humidity Correction Factor
Test Group Code	T3	X	X	X						33-39	7	A	<i>Note:</i> No entry needed for Cold CO, Light Truck Idle CO or Short Tests. Required for evaporative tests. Use the same code on evaporative and city tests which were tested in a same test sequence. If city test has been entered in the CFEIS without a group code, use the city test number as the group code when entering the evaporative test.
Quick Check	T3	X	X	X						41-45	5 (4,2)	R	<i>Note:</i> Enter Coastdown Time (seconds) on Test Procedure 03 (Hwy.). 00.00-99.99 Coastdown Time of test vehicle (average of three coastdowns).
Wait Time	T3	X	X	X						47-48	2	I	<i>Note:</i> Short Test only (25-30 minutes idle). 01-99 (Number of minutes.)
Warm Up	T3	X	X	X						50-51	2	I	<i>Note:</i> Short Test only. 01-99 1 = Partial UDDS (505 seconds). 2 = Full UDDS. 3 = Cold CO Test.

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		Add	Modify	Replace	Delete	Report	Carry-Over	Carry-Access	Reprocess				
Restarts	T3	X	X	X						53-53	1	A	<i>Note:</i> Short Test only. 0-6 (Engine Off/Restart Cycles)
Precondition Type	T3	X	X	X						55-55	1	A	<i>Note:</i> Short Test only. U - Unloaded L - Loaded
Humidity	T3	X	X	X						57-63	7	R	000.000 to 999.999 Humidity in grains per pound of dry air
Input Record Type	T4	R	R	R						1-2	2	A	T4 (Enter this record for first test of Fuel Batch Calibration only.)
Fuel Batch Calibration Effective Date	T4	X	X	X						4-11	8	D	<i>Note:</i> Not required for Diesel. Valid calendar date. (MMDDYYYY)
Fuel Batch Calibration Ineffective Date	T4	X	X	X						13-20	8	D	<i>Note:</i> Not required for Diesel. Valid calendar date. (MMDDYYYY)
Fuel Batch Calibration Date	T4	X	X	X						22-29	8	D	<i>Note:</i> Not required for Diesel. Valid calendar date. (MMDDYYYY)
Carbon Weight Fraction NMHC	T4	X	X	X						31-35	5 (4,3)	R	0.700-0.900 Natural gas - CWF _{NMHC}
Carbon Weight Fraction HC	T4	X	X	X						37-41	5 (4,3)	R	0.700-0.900 Natural gas - CWF _{HC/NG} LPG - Range to be determined later
Exhaust Carbon Weight Fraction	T4	X	X	X						43-47	5 (4,3)	R	0.800-1.000 (Methanol) Methanol - CWF _{exHC} 0.800-1.000 (Methanol blend) Methanol blend - CWF _{exHC} 0.800-1.000 (California Phase II) California Phase II - CWF _{exHC} 0.000-1.000 California Phase II - CWF _{exHC}

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		A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c c r o s s	R e p r o c e s				
Fuel Methanol Volume Fraction	T4	X	X	X						49-53	5 (4,3)	R	0.000-1.000 (Methanol) Methanol 0.000-1.000 (Methanol blend) Methanol blend
Fuel Density	T4	X	X	X						55-60	6 (5,3)	R	Units are grams/cu. ft. for gaseous fuels. 1.000-40.00 (Natural gas) Natural gas - D _{NG} Natural gas (dual fuel) - D _{NG} , D _{alt}
Fuel Specific Gravity	T4	X	X	X						62-66	5 (4,3)	R	0.719-0.770 (Gasoline) Gasoline - SG California Phase II - S _{gblend} 0.844-0.882 (Diesel) Diesel - NOT REQUIRED 0.790-0.800 (Methanol) Methanol - SG 0.740-0.790 (Methanol blend) Methanol blend -SG 0.723-0.750 (California Phase II) California Phase II - S _{gblend} LPG - Range to be determined later

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Field name	Transaction Type								Position	Length	Data Type	Valid Range/Entry Criteria	
	R	A	M	R	D	R	C	C					R
	ec	ad	od	re	de	re	ca	ca	re				
	ord	d	ify	pl	lete	port	ary	ary	proc				
	Type			ce		O	A	cross	ess				
						ver	cross	ss					
Fuel Net Heating Value	T4	X	X	X						68-73	6	I	Units are BTU/Pound 018284-019000 (Gasoline) Gasoline - NHV Gasoline (dual fuel) - NHV, NHV _{pet} , NHV _g 018300-019100 (Diesel) Diesel(single fuel) - NOT REQUIRED Diesel (dual fuel) - NHV _{pet} 008000-009000 (Methanol) Methanol (single fuel) - NOT REQUIRED Methanol (dual fuel) - NHV _{alt} 008000-018000 (Methanol blend) Methanol blend (single fuel) - NOT REQUIRED REQUIRED Methanol blend (dual fuel) - NHV _{alt} , NHV ₅₀ 020000-040000 (Natural gas) Natural gas (single fuel) - NOT REQUIRED Natural gas (dual fuel) - NHV _{alt} 017000-019000 (California Phase II) California Phase II - NHV _{blend} 008000-018000 (Other alcohol) Other alcohol (not CFEIS, dual fuel) - NHV _{alt} , NHV ₅₀ 018284-019000 (Gasoline) Gasoline - NHV California Phase II - NHV _{blend} LPG - Range to be determined later

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Field name	Transaction Type										Position	Length	Data Type	Valid Range/Entry Criteria
	R	A	M	R	D	R	C	C	R					
	ec	ad	od	re	de	re	ca	ca	re					
	ord	d	d	pl	le	po	ar	ar	pr					
	Typ		ify	ace	te	rt	-	-	o					
	e						O	A	c					
							ver	cross	ces					
Fuel Blend Carbon Weight Fraction	T4	X	X	X							75-79	5 (4,3)	R	0.835-0.886 (Gasoline) Gasoline - CWF 0.864-0.873 (Diesel) Diesel - NOT REQUIRED 0.3745-0.3745 (Methanol) Methanol - CWF 0.3745-0.880 (Methanol blend) Methanol blend - CWF 0.839-0.844 (California Phase II) California Phase II - CWF _{blend} 0.650-0.770 (Natural Gas) Natural Gas - CWF _{NG} 0.835-0.886 (Gasoline) Gasoline - CWF California Phase II - CWF _{blend} LPG - Range to be determined later
Weight Fraction CO2	T4	X	X	X							81-85	5 (4,3)	R	0.000-0.300 Natural Gas - WF _{NG}
Input Record Type	TR	R	R	R							1-2	2	A	TR
Unrounded Emission Result Name	TR	M	X	X							4-19	16	A	HC-TEV - Total evaporative hydrocarbon emission loss HC-TEV-2D - Enhanced evap 2-day total evaporative hydrocarbon emission loss HC-TEV-3D - Enhanced evap 3-day total evaporative hydrocarbon emission loss METHANE - Methane OMHCE-TEV-2D - Enhanced evap 2-day total evaporative organic material hydrocarbon equivalent emission loss

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Field name	Transaction Type										Length	Data Type	Valid Range/Entry Criteria	
	R e c o r d T y p e	A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c r o s s	R e p r o c e s s	P o s i t i o n				
Unrounded Emission Result Name (Continued)	TR	M	X	X							4-19	16	A	OMHCE-TEV-3D - Enhanced evap 3-day total evaporative organic material hydrocarbon equivalent emission loss HC-RL - Running loss HC HC-TOTAL - Total exhaust hydrocarbon CO - Carbon monoxide CO2 - Carbon dioxide NOX - Oxides of nitrogen PM - Particulate emissions HC-NM - Non-methane hydrocarbon emissions CO-IDLE - Idle CO CO-COLD - Cold CO HC-ST2500 - Short test 2500 RPM HC CO-ST2500 - Short test 2500 RPM CO HC-STLM - Short test loaded mode HC (EPA only) CO-STLM - Short test loaded mode CO (EPA only) HC-STI - Short test idle HC CO-STI - Short test idle CO OMHCE - Exhaust Organic material hydrocarbon equivalent OMNMHCE - Exhaust Organic material non-methane hydrocarbon equivalent HC-ORVR - Total ORVR hydrocarbon emission OMHCE-ORVR - Total ORVR organic material hydrocarbon equivalent emission loss NMOG - Non-methane organic gas. NMOG emission values for 1999 and later should be adjusted by the RAF and methane RAF if appropriate, but should not include the DF Unadjusted NMOG values should be entered for Tier 2 certification and any applicable RAF should be entered in 'EG' record of ESI HC-TOTAL-EV - Total evaporative hydrocarbon emissions loss (2-hour evap test)

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Field name	Transaction Type										Length	Data Type	Valid Range/Entry Criteria	
	R	A	M	R	D	R	C	C	R	P				
Record Type														
Unrounded Emission Result Name (Continued)	TR	M	X	X							4-19	16	A	OMHCE-TOTAL-EV - Total evaporative organic material hydrocarbon equivalent (2-hour evap test) emissions loss OMHCE-RL - Organic material hydrocarbon equivalent running loss SPITBACK - Spitback NOX-HWY - Highway Nox (California) HCHO - Formaldehyde H3C2HO - Acetaldehyde HCHO-COLD - Cold test formaldehyde HC-TOTAL-COLD - Cold test total hydrocarbon NOX-COLD - Cold test oxides of nitrogen CO2-COLD - Cold test carbon dioxide MFR FE - Manufacturer-derived fuel economy 50-HC - 50° Test total hydrocarbons 50-CO - 50° Test carbon monoxide 50-NOX - 50° Test oxides of nitrogen 50-NMOG - 50° Test Non-methane organic gas (NLEV, CFF, California). NMOG emission values should be adjusted by the RAF, but should not include the DF. 50-HCHO - 50° Test formaldehyde New emission names applicable to SFTP HC-TOTAL-US06 - Total hydrocarbon for US06 CO2-US06 - Carbon dioxide for US06 HC-NM-US06 - Non-methane hydrocarbon for US06 NOX-US06 - Nitrogen oxide for US06 CO-US06 - Carbon monoxide for US06 PM-US06 HC-TOTAL-SC03 - Total hydrocarbon for SC03 CO2-SC03 - Carbon dioxide for SC03 HC-NM-SC03 - Non-methane hydrocarbon for SC03 NOX-SC03 - Nitrogen oxide for SC03 CO-SC03 - Carbon monoxide for SC03 PM-SC03

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Field name	Record Type	Transaction Type								Position	Length	Data Type	Valid Range/Entry Criteria
		Add	Modify	Replace	Delete	Report	Carry-Over	Carry-Across	Reprocess				
Unrounded Test Result	TR	M	X	X						21-32	12 (11,7)	R	0000.0000000-9999.9999999
Input Record Type	TC	R	R	R						1-2	2	A	TC
Test Comments	TC	X	X	X						3-80	78	A	<i>Note:</i> Multiple comment input records permitted. 'Replace' deletes old comments and adds new comments, while 'Modify' adds additional input comments to previously stored comments, if any. Text
Input Record Type	TF	R	R	R	R	R				1-2	2	A	TF
Process Code	TF	R	R	R	R	R				3-3	1	A	For <i>Add</i> : 'A' or blank - '' For <i>Replace</i> : 'R' For <i>Delete</i> : 'D' For <i>Report</i> : 'P' For <i>Reprocess</i> : 'S'
Manufacturer Code	TF	R	R	R	R	R				4-7	4	I	<i>Note:</i> See Appendix F Valid MANUFACTURER CODE
Model Year	TF	R	R	R	R	R				9-12	4	I	2001-2100
FTP test number (for composite calculation)	TF	R	R	R	R	R				14-20	7	I	test number of FTP test procedure used for NMHC+NOX and optionally for CO
Vehicle Configuration number	TF	R	R	R	R	R				22-23	2	I	Vehicle configuration number of test vehicle used for FTP test (above)
US06 test number (for composite calculation)	TF	R	R							25-31	7	I	test number of US06 test procedure used for NMHC+NOX and optionally for CO
Vehicle Configuration number	TF	R	R							33-34	2	I	Vehicle configuration number of test vehicle used for US06 test (above)

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		A d d	M o d i f y	R e p l a c e	D e l e t e	R e p o r t	C a r r y - O v e r	C a r r y - A c r o s s	R e p r o c e s				
SC03 test number (for composite calculation)	TF	X	X							36-42	7	I	test number of SC03 test procedure used for NMHC+NOX and optionally for CO (if applicable)
Vehicle Configuration number	TF	R	R							44-45	2	I	Vehicle configuration number of test vehicle used for SC03 test (above)
EOT Input Record Type Code	ZZ	R	R	R	R	R	R		R	1-2	2	A	ZZ - End of Transaction

Transaction Type: R = Required M = Required X = Optional “ ” = Not Available
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