

Verify Schema Change Log of Changes Made for Greenhouse Gas to Light-Duty and Fuel Economy

Draft

Verify Schema Change Log of Changes Made for Greenhouse Gas to Light-Duty and Fuel Economy

Draft

Compliance and Innovative Strategies Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

Verify

Schema Change Log of Changes Made for Green House Gas to Light Duty and Fuel Economy

This document identifies XML schema modifications to the VERIFY Light Duty (LD) and Fuel Economy (FE) family of schemas to include Green House Gas (GHG) data elements. There are 2 basic types of modifications. Modifications that involve internal file structure, having no impact to the logical data model, were made to bring the new schema in sync with the current schema development paradigm per EPA XML data standard [GD2-E]. These changes involve only the location and organization of the schema components that comprise the logical data model and some changes to data type names. No data element names were changed in this process. Modifications that involve the addition of new schema components to included GHG data were also made. Because the current schema development paradigm for certain kinds of data validation has moved the validation to business rules, hence making the schema much less susceptible to data requirement changes, new GHG data elements have more generic data types. Because some of the GHG data elements have been reused from the original LD schemas, these LD data elements now also have more generic data types. This basically relaxes the schema validation of the LD instances of these data elements but also requires that any business rules written for data validation for the GHG instances additionally be applied to the LD instances as well.

Note that 3 LD schemas had no GHG modifications but also underwent the modifications to bring the schemas in sync with the current schema development paradigm. Also, 2 new schemas were developed for GHG data. As such, no change log is included in this document for these 5 schemas. Also note that modifications to annotations are not tracked.

LD Modified/New XML Files

EN_VER_LD_CertificateRequestSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CertificateRequestSubmissionRootElement_v0.86.xsd.)

EN_VER_LD_CTD_TestVehicleInformationSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CTD_TestVehicleInformationSubmissionRootElement_v0.85.xsd.)

EN_VER_LD_CTD_TestInformationSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CTD_TestInformationSubmissionRootElement_v0.85.xsd.)

EN_VER_LD_CTD_FuelPropertiesSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CTD_FuelPropertiesSubmissionRootElement_v0.85.xsd. This file was reorganized only. As such, there is no change log for this file.)

EN_VER_LD_CFT_DecisionInformationSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CFT_DecisionInformationSubmissionRootElement_v0.86.xsd.)

EN_VER_LD_CFT_SupplementalInformationSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CFT_SupplementalInformationSubmissionRootElement_v0.85.xsd.)

EN_VER_LD_CFT_ShiftScheduleSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CFT_ShiftScheduleSubmissionRootElement_v0.85.xsd. This file was reorganized only. As such, there is no change log for this file.)

EN_VER_LD_CD_CarlineSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CD_CarlineSubmissionRootElement_v0.85.xsd. This file was reorganized only. As such, there is no change log for this file, however, see the note about data type changes in EN_VER_LD_SharedDataElements_v0.9.xsd.)

EN_VER_LD_CD_EvaporativeFamilySubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CD_EvaporativeFamilySubmissionRootElement_v0.85.xsd.)

EN_VER_LD_CD_CertificationDataSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_LD_CD_CertificationDataSubmissionRootElement_v0.85.xsd.)

EN_VER_LD_FE_LabelSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_FE_LabelSubmissionRootElement_v0.85.xsd.)

EN_VER_LD_FE_CAFESubmissionRootElement_v0.9.xsd

(Replaces EN_VER_FE_CAFESubmissionRootElement_v0.85.xsd.)

EN_VER_LD_FE_InUseVerificationProgramSubmissionRootElement_v0.9.xsd

(Replaces EN_VER_IUVP_v0.85.xsd.)

EN_VER_LD_FE_FootprintSubmissionRootElement_v0.9.xsd

(New schema file. As such, there is no change log for this file.)

EN_VER_LD_FE_RoadLoadSubmissionRootElement_v0.9.xsd

(New schema file. As such, there is no change log for this file.)

EN_VER_LD_SharedDataElements_v0.9.xsd

(Replaces numerous data components files and contains new data element definitions. Only previously defined data elements whose data type changed are described below.)

EN_VER_LD_FE_SharedDataElements_v0.9.xsd

(Replaces numerous data components files and contains new data element definitions. Only previously defined data elements whose data type changed are described below.)

Individual XML Schema File Modifications

For new and modified data elements, the annotation following the data element name references the corresponding data element identifiers in the DR spreadsheet. Note that individual data elements may be used in more locations in the schemas than defined in the DR spreadsheet.

EN_VER_LD_CertificateRequestSubmissionRootElement_v0.9.xsd

The following data element change was made to ApplicationSpecificDetails[Type]:

- Data element PreModelYearReportIndicator [Y/N (LD-CR22)] was added with cardinality (0,1).

EN_VER_LD_CTD_TestVehicleInformationSubmissionRootElement_v0.9.xsd

The following data element changes were made to VehicleConfigurationDetails[Type]:

- Data element VehicleFuelCategoryIdentifier was deleted.
- Data element Fuel1Identifier was deleted.
- Data element Fuel2Identifier was deleted.
- Complex data element DriveSourceDetails was added with cardinality (1,unbounded).
- Data element DriveSourceIdentifier was moved to complex data element DriveSourceDetails.
- Data element MultipleFuelStorageMethodIdentifier [S/T (LD-VI11.2,EV3.6,TG7.6)] was added with cardinality (0,1).
- Data element MultipleFuelCombustionMethodIdentifier [S/T (LD-VI11.3,TG7.7)] was added with cardinality (0,1).
- Data element FuelCellIndicator [Y/N (LD-VI11.4,TG7.8)] was added with cardinality (0,1).
- Data element RechargeableEnergyStorageSystemIndicator [Y/N (LD-VI11.5,TG7.9)] was added with cardinality (0,1).
- Data element RechargeableEnergyStorageDeviceIdentifier [1 to 100 characters (LD-TG77,VI11.6)] was added with cardinality (0,1).
- Data element RechargeableEnergyStorageDeviceOtherText [1 to 30 characters (LD-TG78,VI11.7)] was added with cardinality (0,1).
- Data element OffBoardChargeCapabilityIndicator [Y/N (LD-VI11.8,TG8.3)] was added with cardinality (0,1).

The complex data element DriveSourceDetails[Type] was added as follows:

- Data element DriveSourceIdentifier [1 to 10 characters (LD-TG7.1,VI10.5)] was added with cardinality (1,1).
- Data element FuelIdentifier [1 to 100 characters (LD-TG7.3,204,223,SI56.5,80,VI11.1,EV3.5)] was added with cardinality (1,unbounded).

The following data element change was made to EPAGeneratedTestVehicleDetails[Type]:

- Data element HybridVehicleIndicator [Y/N (LD-VI10.6,TG7.2)] was added with cardinality (1,1).
- Data element TotalRoadLoadHorsepowerValue [0.0 to 99.9 (LD-VI43.5,RL23)] was added with cardinality (1,1).

EN_VER_LD_CTD_TestInformationSubmissionRootElement_v0.9.xsd

The following data element changes were made to TestInformationDetails[Type]:

- Complex data element UrbanRangeTestDetails was deleted.
- Complex data element HighwayRangeTestDetails was deleted.
- Complex data element PHEVChargeDepletingTestInformationDetails was added with cardinality (0,unbounded).
- Complex data element FuelIdentificationDetails was added with cardinality (0,1).

The complex data element PHEVChargeDepletingTestInformationDetails[Type] was added as follows:

- Data element TestBagPhaseCount [1 to 99 (LD-TI18.1)] was added with cardinality (1,1).
- Data element RechargeEventVoltageMeasure [0.0 to 999.9 (LD-TI18.3)] was added with cardinality (0, 1).
- Data element RechargeEventEnergyMeasure [0.0000 to 999.9999 (LD-TI18.4)] was added with cardinality (0, 1).
- Data element CalculatedChargeDepletionRangeMeasure [Miles, 0.000 to 999.999 (LD-TI18.5)] was added with cardinality (0, 1).
- Data element ChargeDepletionRangeMeasure [Miles, 0.000 to 999.999 (LD-TI18.6)] was added with cardinality (0, 1).
- Data element EquivalentElectricRangeMeasure [Miles, 0.000 to 999.999 (LD-TI18.7)] was added with cardinality (0, 1).
- Complex data element PHEVChargeDepletingBagPhaseDetailsType was added with cardinality (1,unbounded).

The complex data element PHEVChargeDepletingBagPhaseDetailsType[Type] was added as follows:

- Data element TestBagPhaseNumber [1 to 99 (LD-TI18.2)] was added with cardinality (1,1).
- Complex data element EmissionTestDetails was added with cardinality (1,unbounded).

The complex data element EPAGeneratedChargeDepletingBagPhaseDetails[Type] was added as follows:

- Data element TestBagPhaseNumber [1 to 99 (LD-TI18.2)] was added with cardinality (1,1).
- Complex data element EPAGeneratedEmissionTestDetails was added with cardinality (1,unbounded).

The complex data element EPAGeneratedEmissionTestDetails[Type] was added as follows:

- Data element TestResultIdentifier [1 to 100 characters (LD-TG209,225,SI59,71,IT28,43,TI19)] was added with cardinality (1,1).
- Data element RoundedEmissionResultValue [0.0000000 to 9,999.9999999 (LD-TI38)] was added with cardinality (1,1).
- Data element CalculatedCertificationLevelValue [0.0000 to 999.9999 (LD-TI39)] was added with cardinality (1,1).
- Data element CertificationDispositionCode [P/F (LD-TI40)] was added with cardinality (1,1).
- Data element FuelEconomyMPGEquivalentValue [0.0000000 to 9,999.9999999 (LD-TI20.6)] with cardinality (0,1) was moved from EPAGeneratedTestInformationDetails[Type].

The following data element changes were made to TestDataDetails[Type]:

- Data element AnalyticallyDerivedTestIdentifier [12 characters (LD-TI13.6)] was added with cardinality (0,1).
- Data element AnalyticallyDerivedRoadLoadHorsepowerMeasure [0.0 to 99.9 (LD-TI13.7)] was added with cardinality (0,1).

- Data element AnalyticallyDerivedEquivalentTestWeightMeasure [0 to 99,999 (LD-TI13.8)] was added with cardinality (0,1).
- Data element AnalyticallyDerivedNVRatioMeasure [0.0 to 999.9 (LD-TI13.9)] was added with cardinality (0,1).
- Data element ManufacturerConfirmatoryTestIndicator [Y/N (LD-TI18.8)] was added with cardinality (0,1).
- Data element OriginalManufacturerConfirmedTestNumberIdentifier [12 characters (LD-TI18.9)] was added with cardinality (0,1).
- Data element ManufacturerRetestTestNumberIdentifier [12 characters (LD-TI22.1)] was added with cardinality (0,1).
- Data element FuelEconomyValueUnitIdentifier [1 to 20 characters (LD-TI20.5)] was added with cardinality (0,1).
- Cardinality of complex data element EmissionTestDetails was changed to (0,unbounded).

The following data element change was made to EPAGeneratedTestInformationDetails[Type]:

- Data element TestNumberIdentifier [1 to 12 characters (LD-TI1,DI17.5,TG202,202.5)] was added with cardinality (1,1).
- Data element TestFuelCategoryIdentifier [1 to 100 characters (LD-TI44)] was added with cardinality (1,1).
- Data element Test5CycleCategoryIdentifier [1 to 100 characters (LD-TI45)] was added with cardinality (1,1).
- Data element CarbonRelatedExhaustEmissionValue [0.0000000 to 9,999.9999999 (LD-TI19.5)] was added with cardinality (0,1).
- Data element FuelEconomyMPGEquivalentValue [0.0000000 to 9,999.9999999 (LD-TI20.6)] was added with cardinality (0,1).
- Complex data element EPAGeneratedChargeDepletingBagPhaseDetails was added with cardinality (0,unbounded).
- Data element OptionalCarbonRelatedExhaustEmissionValue [0.0000000 to 9,999.9999999 (LD-TI19.6)] was added with cardinality (0,1).
- Complex data element EPAGeneratedEmissionTestDetails was added with cardinality (0,unbounded).

The following data element change was made to FuelIdentificationDetails [Type]:

- Data element TestFuelTypeIdentifier [Enumeration of 29 identifiers (LD-TI19,FP4,IT15)] was added with cardinality (1,1)
- Data element BatchCalibrationEffectiveDate [YYYYMMDD (LD-FP5)] was added with cardinality (1,1)
- Data element BatchCalibrationIneffectiveDate [YYYYMMDD (LD-FP6)] was added with cardinality (0,1)
- Data element BatchCalibrationDate [YYYYMMDD (LD-FP7)] was added with cardinality (0,1)

EN_VER_LD_CFT_DecisionInformationSubmissionRootElement_v0.9.xsd

The following data element changes were made to DecisionInformationDetails[Type]:

- Complex data element ManufacturerSubmissionInformationDetails was deleted.

- Data element SubmissionCommentText [1 to 500 characters (LD-DI28)] was added with cardinality (0,1).

The following data element changes were made to EPAGeneratedDecisionInformationDetails[Type]:

- Data element RandomTestSelectionRate [0 to 99 (DI-33)] was added with cardinality (0,1).
- Data element RandomTestSelectionIndicator [Y/N (DI-34)] was added with cardinality (0,1).
- The cardinality of data element EPATestDecisionIndicator was changed from (0,1) to (1,1).
- Data element EPAConfirmatoryTestReasonCode [1 to 100 characters (DI-36)] was added with cardinality (1,1).
- Data element AssignedTestDate was moved to complex data element LODTestScheduleDetails.
- The cardinality of complex data element EPATestDetails was changed from (0,unbounded) to (1, unbounded).
- Data element SpecialTestInstructionText [1 to 1,000 characters (LD-DI39)] was added with cardinality (1,1).
- The cardinality of data element PrepCyclesNumber was changed from (0,1) to (1,1).
- Data element CertificationCommentText [1 to 1,000 characters (LD-DI44)] was added with cardinality (0,1).
- Data element ManufacturerReportSuppressionIndicator [Y/N (LD-DI45)] was added with cardinality (0,1).
- Complex data element LODTestScheduleDetails was added with cardinality (1,1).
- Complex data element RetestInformationDetails was added with cardinality (1,1).
- Complex data element LODQualityControlCheckDetails was added with cardinality (1,1).

The complex data element LODTestScheduleDetails[Type] was added as follows:

- Data element AssignedTestDate [YYYYMMDD (LD-TI6,DI46,IT12)] was added with cardinality (1,1).
- Data element TestDateAssignerName [1 to 50 characters (LD-DI47)] was added with cardinality (1,1).
- Data element TestDateAlternateAssignerName [1 to 50 characters (LD-DI48)] was added with cardinality (0,1).
- Data element TestDateAssignmentDate [YYYYMMDD (LD-DI49)] was added with cardinality (1,1).
- Data element LODCommentText [1 to 200 characters (LD-DI50)] was added with cardinality (0,1).

The complex data element RetestInformationDetails[Type] was added as follows:

- Data element RetestIndicator [Y/N (LD-TI22,DI51)] was added with cardinality (1,1).
- Data element RetestDecisionCommentText [1 to 500 characters (LD-DI52)] was added with cardinality (0,1).

- Data element RetestCertificationAnalystName [1 to 50 characters (LD-DI53)] was added with cardinality (1,1).
- Data element RetestCertificationDecisionDate [YYYYMMDD (LD-DI54)] was added with cardinality (1,1).
- Data element RetestDate [YYYYMMDD (LD-DI55)] was added with cardinality (1,1).
- Data element RetestDateAssignerName [1 to 50 characters (LD-DI56)] was added with cardinality (1,1).
- Data element RetestDateAssignmentDate [YYYYMMDD (LD-DI57)] was added with cardinality (1,1).
- Data element RetestReasonIdentifier [1 to 100 characters (LD-TI23,DI58)] was added with cardinality (1,1).
- Data element TestCompletionIndicator [Y/N (LD-DI59)] was added with cardinality (1,1).

The complex data element LODQualityControlCheckDetails[Type] was added as follows:

- Data element BasicCheckIndicator [Y/N (LD-DI60)] was added with cardinality (0,1).
- Data element CheckAssignerName [1 to 50 characters (LD-DI61)] was added with cardinality (0,1).
- Data element CheckCommentText [1 to 200 characters (LD-DI62)] was added with cardinality (0,1).
- Data element CheckEntryDate [YYYYMMDD (LD-DI63)] was added with cardinality (1,1).

EN_VER_LD_CFT_SupplementalInformationSubmissionRootElement_v0.9.xsd

The following data element changes were made to SupplementalInformationDetails[Type]:

- Data element EmissionStandardCommentText [1 to 1,000 characters (LD-SI67,TG220)] replaced EmissionsStandardCommentText.
- Data element NominalHybridBatteryVoltageValue [0 to 999 (LD-SI37.5)] was added with cardinality (0,1).
- Data element MaximumHybridBatteryCurrentValue [0 to 999 (LD-SI37.6)] was added with cardinality (0,1).

The following data element change was made to SupplementalTestProcedureDetails[Type]:

- Data element TestProcedureIdentifier [1 to 99 (LD-TG204.5,223.5,TI8,SI41.5,92,98,IT14)] replaced LODTestProcedureIdentifier.

The following data element changes were made to EPAGeneratedSupplementalInformationDetails[Type]:

- Data element EquivalentTestWeightUnitIdentifier [1 character (LD-SI13)] was added with cardinality (1,1).
- Data element ModelCode [1 character (LD-SI14)] was added with cardinality (1,1).
- Data element VehicleTypeDescriptionText [2 characters (LD-SI15)] was added with cardinality (1,1).

- Data element ShiftScheduleDatabaseCode [1 character (LD-SI47)] was added with cardinality (1,1).
- Data element OdometerUnitsCode [M/K (LD-SI50)] was added with cardinality (1,1).
- Data element CorrectionFactorValue [0.0000 to 9.9999 (LD-VI17,SI51)] was added with cardinality (1,1).
- Data element CorrectionSignIdentifier [+/- (LD-VI18,SI52)] was added with cardinality (1,1).
- Complex data element EPAGeneratedExhaustEmissionCertificationLevelDetails was added with cardinality (1,unbounded).
- Complex data element EPAGeneratedEvaporativeEmissionCertificationLevelDetails was added with cardinality (1,unbounded).

The complex data element EPAGeneratedExhaustEmissionCertificationLevelDetails[Type] was added as follows: TestGroupName

- Data element TestGroupName [12 characters, optional . after 5th and before last (LD-TG2,CR4,DI7,VI5,SI55.5,IV6,GL13.5,126)] was added with cardinality (1,1).
- Data element EmissionStandardValue [0.0000 to 999.9999 (LD-TG211,SI61)] was added with cardinality (1,1).

The complex data element EPAGeneratedEvaporativeEmissionCertificationLevelDetails[Type] was added as follows:

- Data element EvaporativeRefuelingFamilyName [12 characters, contains model year code and displacement (LD-EV1,TG3,DI8,VI6,SI95,CR5,IV7)] was added with cardinality (1,1).
- Data element EvaporativeEmissionsStandardValue [0.0000 to 999.9999 (LD-TG226,SI74)] was added with cardinality (1,1).

EN_VER_LD_CD_EvaporativeFamilySubmissionRootElement_v0.9.xsd

The following data element changes were made to EvaporativeFamilyInformationDetails[Type]:

- Data element IntegratedORVRIndicator [Y/N (LD-EV3)] replaced IntegratedORVRIdentifier.
- Data element Fuel1Identifier was deleted.
- Data element Fuel2Identifier was deleted.
- Data element FuelIdentifier [1 to 100 characters (LD-TG7.3,204,223,SI56.5,80,VI11.1,EV3.5)] was added with cardinality (1,unbounded).
- Data element MultipleFuelStorageMethodIdentifier [S/T (LD-VI11.2,EV3.6,TG7.6)] was added with cardinality (0,1).

EN_VER_LD_CD_CertificationDataSubmissionRootElement_v0.9.xsd

The following data element changes were made to TestGroupIdentificationDetails[Type]:

- Data element VehicleFuelCategoryIdentifier was deleted.
- Data element Fuel1Identifier was deleted.
- Data element Fuel2Identifier was deleted.

- Data element GreenhouseGasExemptStatusIdentifier [1 to 100 characters (LD-TG216.7)] was added with cardinality (0,1).
- Complex data element DriveSourceDetails was added with cardinality (1,unbounded).
- Data element DriveSourceIdentifier was moved to DriveSourceDetails.
- Complex data element GreenhouseGasOfficialTestNumberDetails was added with cardinality (0,unbounded).
- Data element MultipleFuelStorageMethodIdentifier [S/T (LD-VI11.2,EV3.6,TG7.6)] was added with cardinality (0,1).
- Data element MultipleFuelCombustionMethodIdentifier [S/T (LD-VI11.3,TG7.7)] was added with cardinality (0,1).
- Data element FuelCellIndicator [Y/N (LD-VI11.4,TG7.8)] was added with cardinality (0,1).
- Data element RechargeableEnergyStorageSystemIndicator [Y/N (LD-VI11.5,TG7.9)] was added with cardinality (0,1).
- Data element OffBoardChargeCapabilityIndicator [Y/N (LD-VI11.8,TG8.3)] was added with cardinality (0,1).

The complex data element DriveSourceDetails[Type] was added as follows:

- Data element DriveSourceIdentifier [1 to 10 characters (LD-TG7.1,VI10.5)] was added with cardinality (1,1).
- Complex data element FuelIdentifierDetails was added with cardinality (1,unbounded).

The complex data element FuelIdentifierDetails[Type] was added as follows:

- Data element FuelIdentifier [1 to 100 characters (LD-TG7.3,204,223,SI56.5,80,VI11.1,EV3.5)] was added with cardinality (1,1).
- Data element PrimaryFuelMeteringSystemIdentifier [1 to 20 characters (LD-TG7.4,33)] was added with cardinality (0,1).
- Data element LeanBurnStrategyIndicator [Y/N (LD-TG7.4.1)] was added with cardinality (0,1).

The following data element changes were made to HybridCombustionEngineDescriptionDetails[Type]:

- Data element PrimaryFuelMeteringSystemIdentifier was deleted.
- Data element SecondaryFuelMeteringSystemIdentifier was deleted.
- Data element CamlessValveTrainIndicator [Y/N (LD-TG32.5)] was added with cardinality (0,1).
- Data element OilViscosityClassificationText [1 to 25 characters (LD-TG32.6)] was added with cardinality (0,1).

The following data element changes were made to HybridElectricVehicleFuelCellDetails[Type]:

- Data element RechargeableEnergyStorageDeviceIdentifier [1 to 100 characters (LD-TG77,VI11.6)] replaced EnergyStorageDeviceIdentifier.
- Data element RechargeableEnergyStorageDeviceOtherText [1 to 30 characters (LD-TG78,VI11.7)] replaced EnergyStorageDeviceOtherText.

The following data element changes were made to SupplementalFederalTestProcedureCalculationDetails[Type]:

- Data element CompositeCOOptionIdentifier [Y/N (LD-TG216.9)] replaced CompositeCOOption.
- Data element FTPTestNumber was moved to complex data element GreenhouseGasDetails.
- Data element US06TestNumber was moved to complex data element GreenhouseGasDetails.
- Data element SC03TestNumber was moved to complex data element GreenhouseGasDetails.

The complex data element GreenhouseGasOfficialTestNumberDetails[Type] was added as follows:

- Data element FuelIdentifier [1 to 100 characters (LD-TG7.3,204,223,SI56.5,80,VI11.1,EV3.5)] was added with cardinality (1,1).
- Data element WeightFactorValue [0.0000 to 9.9999 (LD-TG7.5)] was added with cardinality (0,1).
- Data element ManufacturerCalculatedCombinedTestGroupCertificationLevelNumber [0 to 9,999 (LD-TG8.4)] with cardinality (0,1) was removed.
- Data element FTPTestNumber [12 characters (LD-TG217)] was added with cardinality (0,1).
- Data element US06TestNumber [12 characters (LD-TG218)] was added with cardinality (0,1).
- Data element SC03TestNumber [12 characters (LD-TG219)] was added with cardinality (0,1).
- Data element ColdCOTestNumberText [1 to 12 characters (LD-TG219.1)] was added with cardinality (0,1).
- Data element HighwayTestNumberText [1 to 12 characters (LD-TG219.2)] was added with cardinality (0,1).
- Data element ManufacturerCalculatedCombinedTestGroupCarbonRelatedExhaustEmissionCertificationLevelNumber [0 to 9,999 (LD-TG8.4)] was added with cardinality (0,1).
- Data element ManufacturerCalculatedCombinedTestGroupOptionalCarbonRelatedExhaustEmissionCertificationLevelNumber [0 to 9,999 (LD-TG8.4.1)] was added with cardinality (0,1).

The following data element change was made to EPAGeneratedCertificationDetails [Type]:

- Data element EmissionStandardValue [0.0000 to 999.9999 (LD-TG211,SI61)] was added with cardinality (1,unbounded).
- Data element EvaporativeEmissionsStandardValue [0.0000 to 999.9999 (LD-TG226,SI74)] was added with cardinality (0,unbounded).
- Data element HybridVehicleIndicator [Y/N (LD-VI10.6,TG7.2)] was added with cardinality (1,1).
- Data element CompositeHCNMAAndNOXValue [0.0000 to 9,999.9999 (LD-TG219.6)] was added with cardinality (0,1).
- Data element CompositeCOValue [0.0000 to 9,999.9999 (LD-TG219.5)] was added with cardinality (0,1).

- Data element CompositePMValue [0.0000 to 9,999.9999 (LD-TG219.7)] was added with cardinality (0,1).
- Complex data element EPAGeneratedGreenhouseGasDetails was added with cardinality (0,unbounded).
- Complex data element EPAGeneratedExhaustEmissionCertificationLevelDetails was added with cardinality (1,unbounded).
- Complex data element EPAGeneratedEvaporativeEmissionCertificationLevelDetails was added with cardinality (1,unbounded).
- Data element TestCategoryIdentifier [1 to 100 characters (LD-TI43,TG203)] was added with cardinality (1,unbounded).

The complex data element EPAGeneratedGreenhouseGasDetails[Type] was added as follows:

- Data element FuelIdentifier [1 to 100 characters (LD-TG7.3,204,223,SI56.5,80,VI11.1,EV3.5)] was added with cardinality (1,1).
- Data element CityLitmusValue [0.0 to 999.9 (LD-TG219.3.1)] was added with cardinality (0,1).
- Data element CityLitmusThresholdValue [0.0 to 999.9 (LD-TG219.3.2)] was added with cardinality (0,1).
- Data element HighwayLitmusValue [0.0 to 999.9 (LD-TG219.4.1)] was added with cardinality (0,1).
- Data element HighwayLitmusThresholdValue [0.0 to 999.9 (LD-TG219.4.2)] was added with cardinality (0,1).
- Data element CombinedTestGroupCertificationLevelNumber [0 to 9999 (LD-TG8.5)] with cardinality (1,1) was removed.

Data element CombinedTestGroupCertificationLevelDiscrepancyNumber [0 to 9999 (LD-TG8.6)] with cardinality (1,1) was removed.

The complex data type EPAGeneratedEmissionCertificationLevelDetailsType was added as follows. This data type was assigned to the complex data elements EPAGeneratedExhaustEmissionCertificationLevelDetails and EPAGeneratedEvaporativeEmissionCertificationLevelDetails:

- Data element RoundedEmissionResultValue [0.0000000 to 9,999.9999999 (LD-TI38,TG212.9,228)] was added with cardinality (1,1).
- Data element CalculatedCertificationLevelValue [0.0000 to 9,999.9999 (LD-TI39,TG213,229)] was added with cardinality (1,1).
- Data element CertificationPassFailIndicator [P/F (LD-TG213.5,230)] was added with cardinality (1,1).

The complex data type EPAGeneratedCombinedTestGroupCertificationLevelDetailsType was added as follows. This data type was assigned to the complex data element EPAGeneratedCombinedTestGroupCertificationLevelDetails:

- Data element CombinedTestGroupCarbonRelatedExhaustEmissionCertificationLevelNumber [0 to 9999 (LD-TG-8.5)] was added with cardinality (0,1).
- Data element CombinedTestGroupCarbonRelatedExhaustEmissionCertificationLevelDiscrepancyNumber [0 to 9999 (LD-TG-8.6)] was added with cardinality (0,1).

- Data element CombinedTestGroupOptionalCarbonRelatedExhaustEmissionCertificationLevelNumber [0 to 9999 (LD-TG-8.5.1)] was added with cardinality (0,1).
- Data element CombinedTestGroupOptionalCarbonRelatedExhaustEmissionCertificationLevelDiscrepancyNumber [0 to 9999 (LD-TG-8.6.1)] was added with cardinality (0,1).

EN_VER_FE_LabelSubmissionRootElement_v0.9.xsd

The following data element change was made to TransmissionClassDetails[Type]:

- Data element ModelTypeDescriptionText [1 to 30 characters (LD-GL78.2)] was added with cardinality (0,1).

The following data element changes were made to LabelDetails[Type]:

- Data element ChargeDepletingLabelCalculationApproachIdentifier [1 to 100 characters (LD-GL79.2)] was added with cardinality (0,1).
- Data element ChargeSustainingLabelCalculationApproachIdentifier [1 to 100 characters (LD-GL79.3)] was added with cardinality (0,1).

The following data element change was made to FuelUsageAndEconomyDetails[Type]:

- Data element ManufacturerCalculatedGasGuzzlerMPGValue [0.0 to 999.9 (LD-GL173.1)] was added with cardinality (0,1).

The following data element change was made to ModelTypeDetails[Type]:

- Data element ActualModelSalesAreaIdentifier [2 characters (LD-GL106.2)] was added with cardinality (1,unbounded).

The following data element changes were made to CalculatedBaseLevelDetails[Type]:

- Complex data element CalculatedUnadjustedUnroundedBaseLevelDetails was added with cardinality (0,1).
- Complex data element CalculatedFiveCycleAdjustedUnroundedDetails was added with cardinality (0,1).

The complex data elements CalculatedUnadjustedUnroundedBaseLevelDetails and CalculatedFiveCycleAdjustedUnroundedDetails, both with type FuelEconomy4ValueDetailsType, were added as follows:

- Data element CityFuelEconomy4Value [0.0000 to 999.9999 (LD-GL91,94,111,113.5,116.5,114,153,159,176,179,182,185)] was added with cardinality (0,1).
- Data element HighwayFuelEconomy4Value [0.0000 to 999.9999 (LD-GL92,95,112,113.6,115,116.6,154,160,177,180,183,186)] was added with cardinality (0,1).

- Data element CombinedFuelEconomy4Value [0.0000 to 999.9999 (LD-GL93,96,113,113.7,116,116.7,155,161,178,181,184,187)] was added with cardinality (0,1).

The complex data elements ManufacturerCalculatedRoundedAdjustedModelTypeDetails was changed to FuelEconomy3ValueDetailsType and changes were added as follows:

- Data element CityFuelEconomyValue [0.0000 to 999.9999 (LD-GL91,94,111,113.5,116.5,114,153,159,176,179,182,185)] was added with cardinality (1,1).
- Data element HighwayFuelEconomyValue [0.0000 to 999.9999 (LD-GL92,95,112,113.6,115,116.6,154,160,177,180,183,186)] was added with cardinality (1,1).
- Data element CombinedFuelEconomyValue [0.0000 to 999.9999 (LD-GL93,96,113,113.7,116,116.7,155,161,178,181,184,187)] was added with cardinality (1,1).

The following data elements changes were made to the FuelEconomyLabelDetails[Type]:

- Data element FuelEconomyLabelCommentText was added with cardinality (0,1).

The complex data element ManufacturerCityLabelDetails[Type] was modified to have the cardinality (0,0) and changes to data elements were added as follows:

- Data element MilesPerGallonLowerRangeNumber[0 to 999 (FE-GL168, 170, CRR)] was modified to have cardinality of (1,1).
- Data element MilesPerGallonUpperRangeNumber[0 to 999 (FE-GL169, 171, CRR)] was modified to have cardinality of (1,1).

The complex data element ManufacturerHighwayLabelDetails[Type] was modified to have the cardinality (0,0) and changes to data elements were added as follows:

- Data element MilesPerGallonLowerRangeNumber[0 to 999 (FE-GL168, 170, CRR)] was modified to have cardinality of (1,1).
- Data element MilesPerGallonUpperRangeNumber[0 to 999 (FE-GL169, 171, CRR)] was modified to have cardinality of (1,1).

Manufacturer Submission Details[Type] was removed from schema.

EN_VER_FE_CAFESubmissionRootElement_v0.9.xsd

The following data element changes were made to FuelEconomyCAFEDetails[Type]:

- Data element FinalModelYearProductionNumber was deleted.
- Data element ManufacturerBaselineAverageUnroundedUnadjustedValue was deleted.
- Data element ManufacturerAverageUnroundedUnadjustedValue was deleted.
- Data element ManufacturerBaselineAverageRoundedAdjustedValue was deleted.
- Data element ManufacturerAverageRoundedAdjustedValue was deleted.
- Data element OfficialMilesPerGallonValue was deleted.
- Complex data element ManufacturerTruckDetails was added with cardinality (0,1).
- Complex data element ManufacturerDomesticPassengerVehicleDetails was added with cardinality (0,1).
- Complex data element ManufacturerImportedPassengerVehicleDetails was added with cardinality (0,1).

The complex data element ManufacturerTruckDetails[Type] was added as follows:

- Data element OfficialProductionCount [1 to 9,999,999 (LD-CA50,51,52)] was added with cardinality (0,1).
- Complex data element BaselineTruckDetails was added with cardinality (0,1).
- Complex data element FinalTruckDetails was added with cardinality (0,1).
- Data element OfficialMPGValue [0.00 to 9999.9 (LD-CA88,89,90)] was added with cardinality (0,1).

The complex data elements ManufacturerDomesticPassengerVehicleDetails and ManufacturerImportedPassengerVehicleDetails, both with type ManufacturerVehicleDetailsType, were added as follows:

- Data element OfficialProductionCount [1 to 9,999,999 (LD-CA50,51,52)] was added with cardinality (0,1).
- Complex data element BaselineVehicleDetails was added with cardinality (0,1).
- Complex data element FinalVehicleDetails was added with cardinality (0,1).
- Data element OfficialMPGValue [0.00 to 9999.9 (LD-CA88,89,90)] was added with cardinality (0,1).

The complex data elements BaselineTruckDetails and FinalTruckDetails, both with type TruckDetailsType, were added as follows:

- Data element Unrounded4Value [0.0000 to 99.9999 (LD-CA56,72)] was added with cardinality (0,1).
- Data element Rounded1Value [0.0 to 99.9 (LD-CA62,78)] was added with cardinality (0,1).

The complex data elements BaselineVehicleDetails and FinalVehicleDetails, both with type VehicleDetailsType, were added as follows:

- Data element UnroundedUnadjusted4Value [0.0000 to 99.9999 (LD-CA6,6,7,7,9,8,2,57,58,73,74)] was added with cardinality (0,1).
- Data element UnroundedAdjusted4Value [0.0000 to 99.9999 (LD-CA64,65,80,81)] was added with cardinality (0,1).
- Data element RoundedAdjusted1Value [0.0 to 99.9 (LD-CA6,3,7,8,8,5,68,69,84,85)] was added with cardinality (0,1).

The following data element changes were made to ReformedStandardCalculationDetails[Type]:

- Data element ReformedModelTypeDetails was deleted.
- Data element FinalModelYearProductionDetails was added with cardinality (1,unbounded) and a Unique Constraint on ManufacturerDivisionCode and CarlineCode.

The complex data element FinalModelYearProductionDetails[Type] was added as follows:

- Data element ManufacturerDivisionCode [1 to 99 (LD-CL3,TG30,IV10,GL11,126.5,CA125,FT3)] was added with cardinality (1,1).

- Data element CarlineCode [1 to 999 (LD-CL4,TG302,IV11,GL12,CA126,FT4)] was added with cardinality (1,1).
- Data element FinalModelYearProductionNumber [1 to 9,999,999 (LD-CA20)] was added with cardinality (1,unbounded).

The following data element change was made to CalculationDetails[Type]:

- Data element EPAManufacturerCode [3 characters (LD-CL1,TG1,300,EV19,CR1,FP1,DI1,VI1,TI3,SS4,SI1,IV2,IV-DR2,IT2,IT-DR2,GL2,10,125.5,CA0,25.1,124,FT1,RL1.1)] was added with cardinality (1,1).

The following data element change was made to BaseLevelDetails[Type]:

- Cardinality of BaseLevelIndexNumber [1 to 99 (LD-GL109,CA25.5)] was changed to (1,1).

The following data element changes were made to SubConfigurationDetails[Type]:

- Data element SubConfigurationFinalModelYearProductionNumber was moved to SubConfigurationSalesDetails.
- Data element SaleAltitudeCode [A/L/H (LD-GL125)] was deleted.
- Data element TestGroupName was moved to SubConfigurationSalesDetails.
- Complex data element SubConfigurationSalesDetails was added with cardinality (1,unbounded).

The complex data element SubConfigurationSalesDetails[Type] was added as follows:

- Data element EPAManufacturerCode [3 characters (LD-CL1,TG1,300,EV19,CR1,FP1,DI1,VI1,TI3,SS4,SI1,IV2,IV-DR2,IT2,IT-DR2,GL2,10,125.5,CA0,25.1,124,FT1,RL1.1)] was added with cardinality (1,1).
- Data element ManufacturerDivisionCode [1 to 99 (LD-CL3,TG30,IV10,GL11,126.5,CA125,FT3)] was added with cardinality (1,1).
- Data element CarlineCode [1 to 999 (LD-CL4,TG302,IV11,GL12,CA126,FT4)] was added with cardinality (1,1).
- Data element TestGroupName [12 characters, optional . after 5th and before last (LD-TG2,CR4,DI7,VI5,IV6,GL13.5,126,CA34,RL4)] was added (relocated from SubConfigurationDetails) with cardinality (1,1).
- Data element SubConfigurationFinalModelYearProductionNumber [1 to 999,999 (LD-CA32)] was added (relocated from SubConfigurationDetails) with cardinality (1,1).

The following data element changes were made to EPAModelTypeFootprintDetails[Type]:

- Data element FootprintIndexNumber was deleted.
- Data element FootprintAreaMeasure was deleted.

The following data element changes were made to EPAGeneratedFuelEconomyCAFEDetails[Type]:

- Complex data element BaselineAverageDetails was deleted.
- Complex data element AverageDetails was deleted.

- Complex data element BaselineAveragePassengerVehicleDetails was deleted.
- Complex data element AveragePassengerVehicleDetails was deleted.

The following complex data elements and their associated data types were deleted:

- BaselineAverageDetails
- AverageDetails
- BaselineAveragePassengerVehicleDetails
- AveragePassengerVehicleDetails

EN_VER_FE_InUseVerificationProgramSubmissionRootElement_v0.9.xsd

The following data element changes were made to VehicleInformationDetails[Type]:

- Data element TransmissionTypeIdentifier [1 to 100 characters (LD-TG307,VI36,IV23,GL67)] replaced LightDutyTransmissionTypeIdentifier.
- Data element TransmissionTypeOtherText [1 to 30 characters (LD-IV24,GL68)] replaced LightDutyTransmissionTypeOtherText.
- Data element VerifyCarlineName [1 to 20 characters (LD-IV12)] was updated with cardinality (0,1).
- Data element InUseTestDriveCode [Enumeration of 8 identifiers (LD-IV44)] replaced TestDriveCode.

XML Shared Data Element and Data Type File Modifications

Numerous data element and data type files were merged into a single shared component file for LD applications and a single shared component file for FE applications per EPA XML data standard [GD2-E]. Only previously defined data elements whose data type changed are described below. All data elements described above as “added” were defined in one of these files.

EN_VER_LD_SharedDataElements_v0.9.xsd

The following data elements had their data type modified. As such, this modification has an impact to each schema that the associated data element is used in. The annotation following the data element name references the corresponding data element identifiers in the DR spreadsheet. Note that some data elements may be used in more locations in the schemas than defined in the DR spreadsheet.

- Data type for CalculatedCertificationLevelValue [0.0000 to 9,999.9999 (LD-TI39,TG213,229)] was changed to Decimal8Point4NonNegativeType.
- Data type for CarlineClassCode [1 to 100 characters (LD-CL5)] was changed to NormalizedString100CharType.
- Data type for DriveSourceIdentifier [1 to 100 characters (LD-TG7.1,VI10.5)] was changed to NormalizedString100CharType.
- Data type for DurabilityGroupEquivalencyFactorValue [0.1 to 9.9 (LD-TG13)] was changed to Decimal2Point1PositiveType.
- Data type for EPATestFuelTypeCode [1 to 100 characters (LD-DI38.5)] was changed to NormalizedString100CharType
- Data type for EPATestProcedureCode [1 to 100 characters (LD-DI38)] was changed to NormalizedString100CharType

- Data type for FuelIdentifier [1 to 100 characters (LD-TG204,223,SI56.5,80,VI11.1,EV3.5,TG7.3)] was changed to NormalizedString100CharType.
- Data type for LightDutyTransmissionTypeIdentifier [1 to 100 characters (LD-TG307,VI36)] was changed to NormalizedString100CharType.
- Data type for NVRatioValue [0.0 to 999.9 (LD-VI34)] was changed to Decimal4Point1NonNegativeType.
- Data type for RetestReasonIdentifier [1 to 100 characters (LD-TI23,DI58)] was changed to NormalizedString100CharType.
- Data type for TestCategoryIdentifier [1 to 100 characters (LD-TI43,TG203)] was changed to NormalizedString100CharType.
- Data type for TestFuelTypeCode [1 to 100 characters (LD-DI19)] was changed to NormalizedString100CharType.
- Data type for TestProcedureIdentifier [1 to 999 (LD-TG204.5,223.5,TI8,SI41.5,92,98,IT14)] was changed to Integer3DigitPositiveType.
- Data type for TestResultIdentifier [1 to 100 characters (LD-TG209,225,SI59,71,IT28,43,TI19)] was changed to NormalizedString100CharType.
- Data type for TransmissionTypeIdentifier [1 to 100 characters (LD-TG307,VI36,IV23,GL67)] was changed to NormalizedString100CharType.
- Data type for OptionalCarbonRelatedExhaustEmissionValue [0.0000000 to 9,999.9999999 (LD-TI19.6)] was added as Decimal11Point7NonNegativeType.
- Simple type for CharOneToFourStringType [1 to 4 character string type] was added.
- Element name for CombinedTestGroupCertificationLevelDiscrepancyNumber [1 to 9,999 (LD-TG8.6)] was changed to CombinedTestGroupCarbonRelatedExhaustEmissionCertificationLevelDiscrepancyNumber [1 to 9,999 (LD-TG8.6)].
- Element CombinedTestGroupOptionalCarbonRelatedExhaustEmissionCertificationLevelDiscrepancyNumber [0 to 9,999 (LD-8.6.1)] was added as Integer4DigitNonNegativeType.
- Element name for CombinedTestGroupCertificationLevelNumber [1 to 9,999 (LD-TG8.5)] was changed to CombinedTestGroupCarbonRelatedExhaustEmissionCertificationLevelNumber [1 to 9,999 (LD-TG8.5)].
- Element CombinedTestGroupOptionalCarbonRelatedExhaustEmissionCertificationLevelNumber [0 to 9,999 (LD-8.5.1)] was added as Integer4DigitNonNegativeType.
- Element name for ManufacturerCalculatedCombinedTestGroupCertificationLevelNumber [1 to 9,999 (LD-TG8.4)] was changed to ManufacturerCalculatedCombinedTestGroupCarbonRelatedExhaustEmissionCertificationLevelNumber [1 to 9,999 (LD-TG8.4)].
- Element ManufacturerCalculatedCombinedTestGroupCarbonRelatedExhaustEmissionCertificationLevelNumber [0 to 9,999 (LD-8.4.1)] was added as Integer4DigitNonNegativeType.
- Data type for ShiftScheduleIdentifier [1 to 4 characters (LD-SS1,SI46)] was changed to CharOneToFourStringType.
- Data type for ShiftSchedulePreparationIdentifier [1 to 4 characters (LD-SI49)] was changed to CharOneToFourStringType.

- Element InUseTestDriveCode [Enumeration of 8 identifiers (LD-IV44)] was added as InUseTestDriveCodeType.
- Element SaleAltitudeCode [A/L/H (LD-GL125)] was deleted.

EN_VER_LD_FE_SharedDataElements_v0.9.xsd

The following data elements had their data type modified. As such, this modification has an impact to each schema that the associated data element is used in. The annotation following the data element name references the corresponding data element identifiers in the DR spreadsheet. Note that some data elements may be used in more locations in the schemas than defined in the DR spreadsheet.

- Data type for FuelUsageIdentifier [1 to 100 characters (LD-GL89,110.5,188,CRR)] was changed to NormalizedString100CharType.
- Data type for LabelCalculationApproachIdentifier [1 to 100 characters (LD-GL79)] was changed to NormalizedString100CharType.
- Data type for Hybrid5CycleCalculationApproachIdentifier [1 to 100 characters (LD-GL79.1)] was changed to NormalizedString100CharType.
- Data type for TestProcedureIdentifier [1 to 999 (LD-TG204.5,223.5,TI8,SI41.5,92,98,IT14)] was changed to Integer2DigitPositiveType.
- Data type for TestResultIdentifier [1 to 100 characters (LD-TG209,225,SI59,71,IT28,43,TI19)] was changed to NormalizedString100CharType.
- Data type for TransmissionTypeIdentifier [1 to 100 characters (LD-TG307,VI36,IV23,GL67)] was changed to NormalizedString100CharType.