



Mobile Source Observation Data

User Guide and Reference

Mobile Source Observation Database

User Guide and Reference

Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

NOTICE

*This technical report does not necessarily represent final EPA decisions or positions.
It is intended to present technical analysis of issues using data which are currently available.*

*The purpose in the release of such reports is to facilitate the exchange of
technical information and to inform the public of technical developments which
may form the basis for a final EPA decision, position, or regulatory action.*

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(Note: This section currently applicable only to EPA employees located in Ann Arbor, Michigan.)

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-

Background - Purpose

- Developed by the Assessment and Standards Division (ASD), formerly the Assessment and Modeling Division (AMD), of the U.S. EPA Office of Mobile Sources
- Purpose is to store data on observations of in-use mobile sources, including data formerly stored in AMD's Mobile Source Emission Factor (EF) Database
- Currently stores general-purpose emission factor data collected since 1982, will eventually store data collected for more specific purposes.
- General design enables storage of any mobile source observation data, e.g. emission tests, activity measurements, etc.
- This document is intended to provide enough information to understand and use the database.
- ASD is asking for your comments and questions.

Design Features

- Relational design has led to an economy of tables and fields. Most data is stored in only one place.
 - Low cost to implement
 - Tables easily linked together
 - Easy to understand:
 - Meaningful field names
 - Coded or “categorized” field values are mostly character form, and their legal values and meanings are explained within the database itself.
 - Documentation. Every table and field has a definition.
 - Contains information besides just “bare” test results
 - About the EPA, EPA-contracted, and other efforts, termed “work assignments”, that produced the data.
 - Driving schedules, diurnal temperature evaporative test cycles, etc.
 - About the fuels used.
 - Broad scope, e.g. contains engine as well as vehicle test data
 - Easy to maintain and adapt, design knowledge resides with EPA
 - Modern database design methods used, portable, and compatible with other modern tools
-

Design is an Elaboration of a Basic Idea that Observations of Mobile Sources Produce RESULTS

- Different kinds of mobile sources
 - Vehicles
 - Engines
- Different kinds of RESULTS
 - Procurement
 - Inspection
 - Owner's report
 - Repair
 - Tailpipe emission test
 - Running loss emission test
 - Evaporative emission test
 - On-Road emission measurements
 - Engine power MAP
 - Engine dynamometer emission test
 - Tank fuel measurement
 - Etc.
- Some added "Bells and Whistles"
 - Test work assignment information
 - Driving schedules
 - Fuel type information
 - Categorized or coded fields have translation tables
 - All tables have indexes to improve performance

The CAUSE Relationship between RESULTS

- Represents the fact that some RESULTS affect subsequent ones.
- Currently only PROCURE and REPAIR-type RESULTS are considered to have this effect.
- Currently all RESULTS, except Procurements, are related via the CAUSE attribute to the Procurement or Repair-type RESULT that most immediately affected it. Procurements have CAUSE = 0 which means "none".
- The CAUSE attribute can be used to distinguish post-repair observations from pre-repair observations.
- RESULTS which have different values of CAUSE either pertain to different mobile sources, pertain to different procurements of the same mobile source, or have intervening repairs, and so may not be comparable for some purposes.
- Not part of entity-relationship data model and not fully SQL searchable.

Replicate RESULTS

- Represent repeated observations of the same thing.
 - Are often performed to investigate the repeatability of measurements.
 - Are stored in the MSOD.
 - The PREV_REP and NEXT_REP attributes of RESULT link replicate RESULTS together in a forward chain (via NEXT_REP), and a backward chain (via PREV_REP).
 - PREV_REP and NEXT_REP chains end with a value of 0.
 - Not part of entity-relationship data model and not fully SQL searchable
 - To eliminate multiple replicates from query outcomes specify PREV_REP = 0 or NEXT_REP = 0 as a selection criteria.
-

Composite RESULTS

- A group of RESULTS can be considered a RESULT in its own right.
- In MSOD this is termed a "Composite RESULT" or a "RESULT Group".
- The RESULTGRP attribute joins individual RESULTS to the Composite RESULT they are a part of.
- Most RESULTS are not part of a Result Group and have RESULTGRP = 0.
- An example use of this feature is that the component portions of the Supplemental Federal Test Procedure (SFTP) are joined in this fashion to a Composite RESULT which contains the composite results of the SFTP.

Likely Next Implementation Steps

- Load data from additional historical and future test programs.
- Develop user interface aids. (A customized browser program is being developed for this database.)
- Migrate to more powerful, client/server, data base management system (DBMS)
- Convert the Tables to Visual FoxPro (VFP) format. (They are currently stored as FoxPro versio 2.6 tables which are essentially generic .DBFs.) VFP's distinct Null value could then be used to represent missing data.
- **User feedback is needed to make best decisions about what's needed!**

How to Begin Using the Mobile Source Observation Database

[Note: The production copy of the database is currently accessible only by employees with access to EPA's local area network at the National Vehicle and Emissions Laboratory at Ann Arbor, Michigan. Others may request a copy and adapt the following procedures to their software and data storage location.]

1. Start FoxPro 2.6 or Visual FoxPro

2. Enter the following commands:

```
SET DEFAULT TO H:\EMFACTOR\EF_PROTO
SET EXCLUSIVE OFF
```

3. Now you can:

- USE and query any single table
 - USE and query multiple tables
 - Take advantage of the categorized field translation tables
 - Etc.
- Documentation on all features of the relational database follows in this user guide.
 - Please do NOT store your work on H:\EMFACTOR\EF_PROTO
 - Open all tables SHARED. (This should be made the default by issuing the command SET EXCLUSIVE OFF)

Table Indexes

- Every table in the database has been indexed on its Primary Key in what FoxPro terms a “compound structural index” stored in a .CDX file. These are maintained automatically and will speed some operations automatically.
- To use for other purposes, however, such as to order records in a Browse window display, the indexes need to be explicitly invoked e.g.

USE RESULT ORDER TAG RESULT

Note that tagname of the primary key index matches tablename.

- Key expression(s) can be determined using FoxPro by
? KEY(1), ? KEY(2), etc.

Translation Tables or Legal Value Lists for Categorized Fields

- Document the database in a platform-independent fashion
- Help implement data quality by defining all legal values of categorized fields.
- Every categorized field, which includes most character-type fields in the database, has a “translation table” not shown in the entity-relationship diagrams which follow.
 - Name of table is same as name of field, truncated if necessary to eight characters.
 - First column of table is same as name of field.
 - Second column of table is typically Fieldname_N and can be used to express the category as a number e.g. to carry the category information into SPSS.
 - Third column of table is typically Fieldname_D and contains a character definition of the category value.
 - Additional columns are sometimes present for special purposes.
- The TEST_PRO table is an example of a field translation table, for the test procedure field.

Representation of Missing or Null Data

- In the current version of MSOD each field in each table has a specific null value. This value can be found in the table QC_SPECS which has a row for each field in the database. Some fields, such as primary key fields, are not allowed to assume their null value. The null value of categorized fields in MSOD is usually the character string "NULL" or, for three character fields, "NUL", and this value is not generally included in the translation table (legal value list) for the field. For character fields which function as comments, the null value is usually to fill the field with blank characters. For numeric fields the null value is either zero or, if this could be confused with real data, the largest number the field can store.
- EPA plans to convert the database soon to Visual FoxPro's table format, which has a distinct null value, usually represented in external documentation as .NULL., for fields of every data type. EPA's plans include converting all null data values to VFP's distinct null value when this conversion is made.
- Users should attach no meaning whatsoever to data values which are null. The value simply means that the data for this field is not present in the record which can occur for many reasons.

MEASTYPEs

- Information items that are only gathered occasionally and are not considered of central importance are stored one item per row in separate tables.
- These are sometimes also referred to as "Non-Core Measurements"
- Avoids having to create additional columns for data items only occasionally needed.
- Makes it easy to extend design to accommodate new items.
- The MEASTYPE table lists items which are handled in this fashion.
- Tables with names like xxxxMEAS and VEH_MISC contain such data.

Database Developers Need Your Ideas

- What user queries should be facilitated?
- What further user documentation is needed?
- Etc.?
- Jot Down Questions when they occur to you. Comments or questions can be sent to:

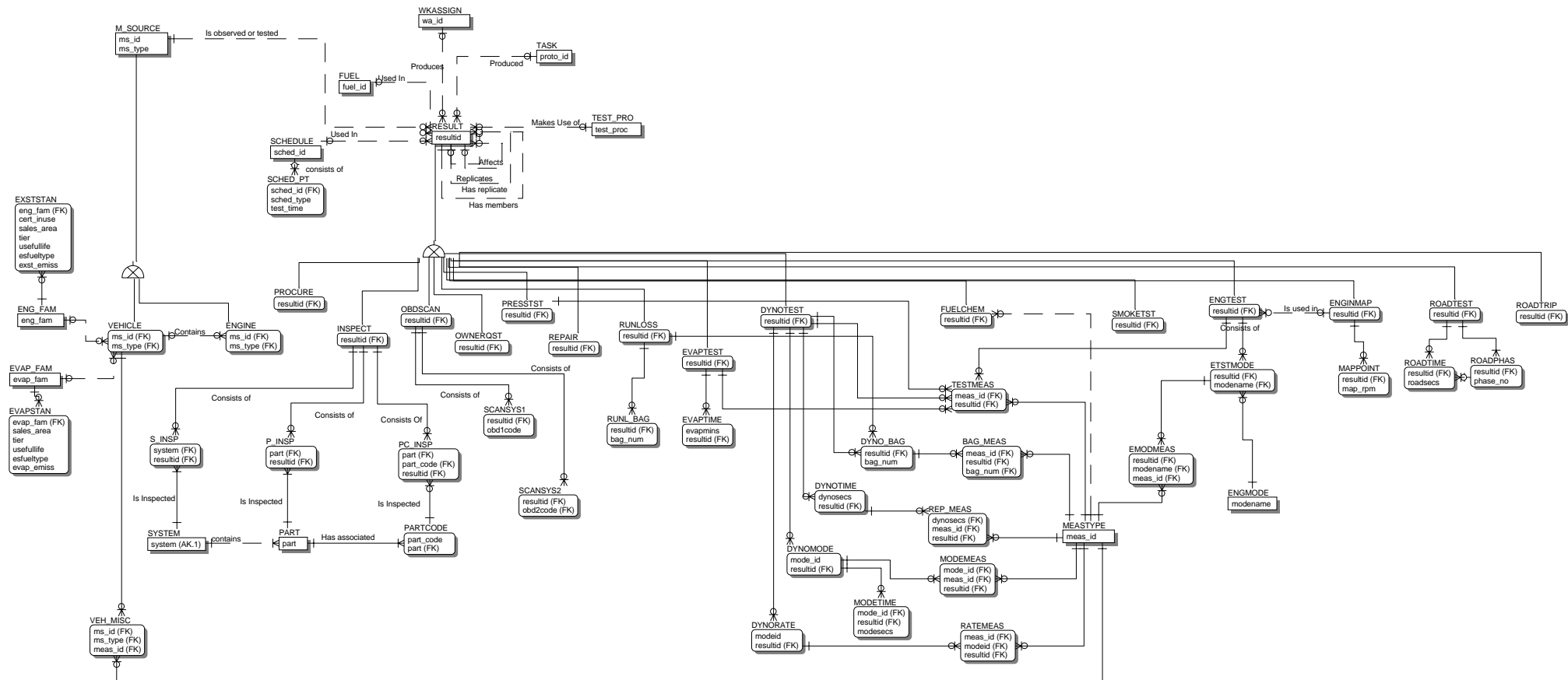
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Section 2: Top-Level Design Information

- "Logical-Level" Diagram Showing all Entities Currently Designed
 - More readable diagram showing top level entities, and their attributes.
 - Definitions for all Entities
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Mobile Source Observation Database - Implementation

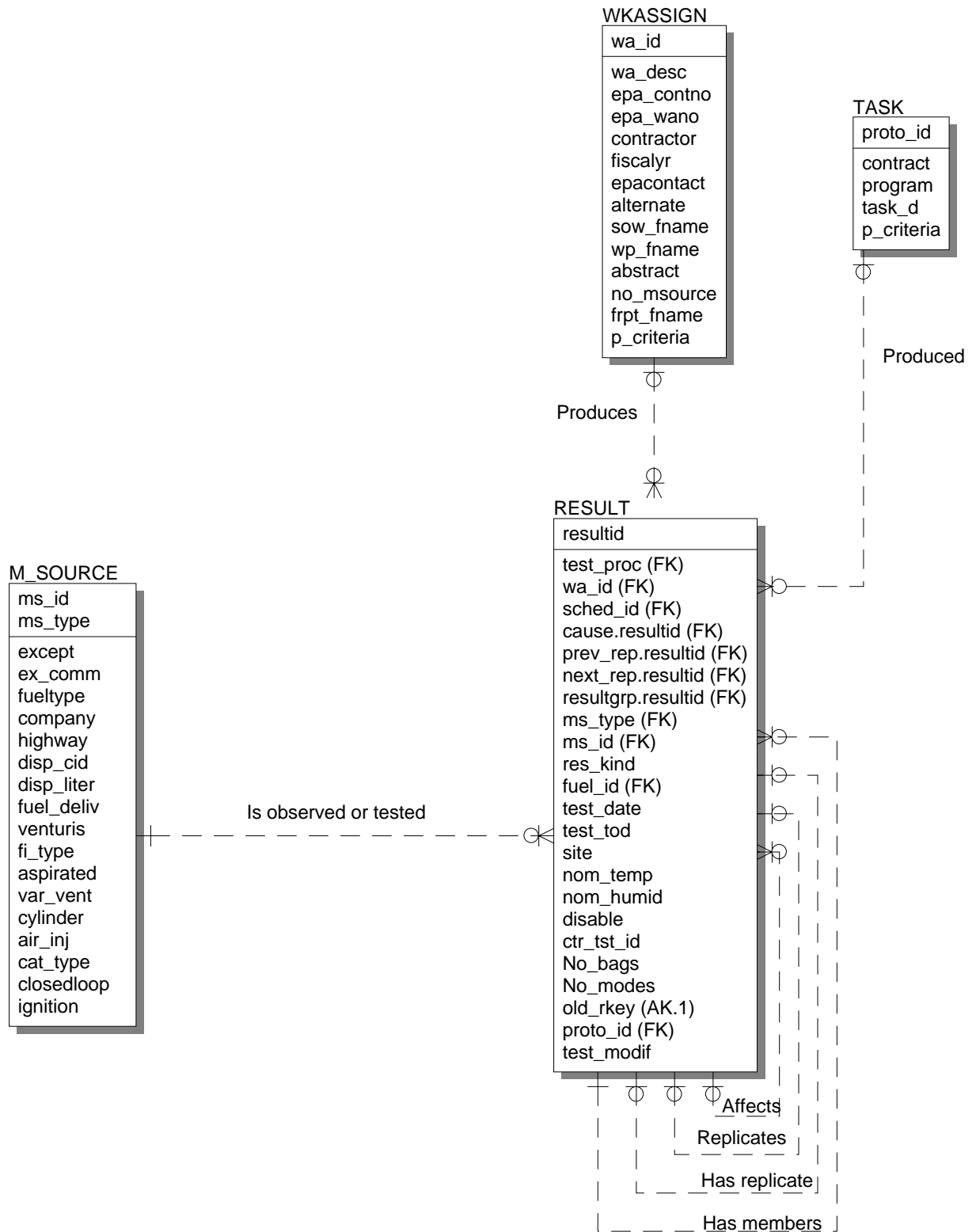
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Mobile Source Observation Database

Metadata Portion (Where did the Data Come From?)

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Simplified Entity Definition Report

Entity Name	Entity Definition
BAG_MEAS	Used to store a MEASTYPE measurement at the test bag level.
DYNO_BAG	One bag set of a DYNOTEST or RUNLOSS test. (A bag set usually results from two physical bags: one sample and one background, with the background measurements subtracted from the sample measurements to yield the bag set measurements). For DYNOTESTs having a single bag set the bag results are stored here, in addition to being the summary results for the test as a whole.
DYNOMODE	One "mode" of a possibly multimode DYNOTEST whose results are expressed in mass units. The set modes is defined at any point in time by the translation table for the MODE_ID attribute. Examples of a "mode" include IDLE, IDLE with engine running at 2500 rpm, etc.
DYNORATE	One "mode" of a possibly multimode DYNOTEST whose results are expressed in mass/time units. The set of possible modes is defined at any point in time by the translation table for the MODE_ID attribute. Examples of a "mode" include IDLE, IDLE with engine running at 2500 rpm, etc.
DYNOTEST	This result subtype stores the results of a vehicle chassis exhaust emission test, or in some cases a group of tests. This table stores information pertaining to the test, or test group as a whole. Note: The emission summary result fields in this entity are used only to summarize the results of bagged exhaust emission tests. This result subtype is identified in RESULT by RES_KIND = "DYNOTEST". The entity name DYNOTEST reflects the fact that a chassis dynamometer is used in most of these tests. The subtype includes exhaust emission tests for which a dynamometer could be used, but is not required, such as idle emission measurements. This subtype does not include "running loss" tests, which are performed on a chassis dynamometer, but which measure both exhaust and evaporative emissions.
DYNOTIME	A point in time during a DYNOTEST.
EMODMEAS	Used to store a MEASTYPE measurement at the engine test mode level.
ENG_FAM	Exhaust Engine Family. These engine families result from the Vehicle Emission Certification process.
ENGINE	An engine or motor used to power an M_SOURCE, exclusive of other components of the M_SOURCE such as its structural frame, wheels, etc. Additional Notes: 1. Since MS_TYPE = 2 for all instances of this entity the MS_TYPE field is not physically implemented in this table. 2. MS_ID will likely be the engine serial number for instances of this entity, though if some small engines do not bear unique serial numbers then another solution will have to be found for them. Sample Queries: To access ENGINE fields in conjunction with their RESULT information the following join condition would typically be used: WHERE RESULT.MS_TYPE = 2 AND RESULT.MS_ID = ENGINE.MS_ID
ENGINMAP	This result subtype stores an engine "MAP". Maximum available power or torque as a function of RPM. This result subtype is identified in RESULT by RES_KIND = "ENGINMAP".
ENGMODE	Steady-state mode used in engine testing on an engine dynamometer. Characterized by a speed, expressed as a percentage of one of several maximum speeds (rated, idle, or governed central speed, etc), and a load, expressed as a percentage of the mapped torque at that speed.
ENGTEST	This result subtype stores the results of an engine test performed on an engine dynamometer, exclusive of smoke opacity measurement. This subtype is identified by RES_KIND = "ENGTEST".
ETSTMODE	The results of one steady-state mode of an engine dynamometer test. (Only used to store steady-state results.)
EVAP_FAM	Evaporative Engine Family. These families are a product of the vehicle emission certification process.
EVAPSTAN	Evaporative Emission Standard. Used to store standards applicable to late model (1994 and later) vehicles. (Earlier standard information was simpler and is stored within the Vehicle Table itself.) The design of this table is very much influenced by the need to obtain this information from EPA's Certification and Fuel Economy Information System (CFEIS), for this reason this should be considered a "foreign" design whose attributes are not well integrated with the MSOD.
EVAPTEST	This result subtype stores the results of an evaporative emission test. This table stores information pertaining to the test as a whole. This result subtype is identified in RESULT by RES_KIND = "EVAPTEST". This subtype does not include "running loss" tests, which are performed on a chassis dynamometer and which measure both exhaust and evaporative emissions.
EVAPTIME	One point in time during an evaporative emission test.
EXSTSTAN	Exhaust Emission Standard. Used to store standards applicable to late model (1994 and later) vehicles. (Earlier standard information was simpler and is stored within the Vehicle Table itself.) The design of this table is very much influenced by the need to obtain this information from EPA's Certification and Fuel Economy Information System (CFEIS). For this reason this table design should be considered a "foreign" design whose attributes are not well integrated with the MSOD.

Entity Name	Entity Definition
FUEL	A kind of fuel used to power a mobile source during a particular test. Example instances: Diesel Fuel, Indolene, Tank fuel (whatever was present in the fuel tank when the vehicle was obtained), etc. While some kinds of fuel may be purchased or blended to nominal specifications for octane, volatility, alcohol content etc., e.g. "clean air act baseline fuel", instances of this entity are always a conceptual "kind" of fuel and not a physical batch of fuel.
FUELCHM	This result subtype stores the results of an analysis of the fuel being used in the mobile source. This result subtype is identified in RESULT by RES_KIND = "FUELCHM".
INSPECT	This result subtype is identified in RESULT by RES_KIND = "INSPECT". This result subtype is used to store the results of the emission component inspection often referred to as the M1 maintenance inspection, or just M1 maintenance. This top level subtype entity is used to store information about the inspection as a whole. This result subtype can also be used to store observational comments pertaining to a Mobile Source, even when no parts or systems are actually inspected.
KIND_OF_RESULT	This area contains information organized by particular kinds of RESULTS. We often refer to these as RESULT subtypes. Every process which records information about or which modifies a mobile source of air pollution such as a VEHICLE or ENGINE is considered to be some kind of a RESULT. So kinds of results include subtypes like PROCUREMENTs which are not normally considered test results. This is because information such as the procurement date and the odometer reading of the vehicle, etc. is recorded when the vehicle is obtained. Each row in the RESULT table includes the res_kind field, which identifies what kind of a RESULT it is.
M_SOURCE	A physical object which can move, and which produces outdoor air pollution. Historically interest has been in passenger cars and trucks designed to be driven on roadways, and the internal combustion engines used to power such vehicles. Future data will pertain to other types of mobile sources such as off-road vehicles, boats, farm and construction equipment, etc., and the engines used to power such equipment. Additional Notes: 1. EPA and the principal air- pollution-regulating statutes make a fundamental distinction between mobile and stationary sources of air pollution such as factories and power plants. 2. This entity is broken down into subtype entities based on MS_TYPE. Fields common to all or most types of mobile sources will be stored in this table. Fields particular to certain types of mobile sources will be stored in subtype tables. Sample Queries: To access M_SOURCE fields in conjunction with their RESULT information the following join condition would typically be used: WHERE RESULT.MS_TYPE = M_SOURCE.MS_TYPE AND RESULT.MS_ID = M_SOURCE.MS_ID Example Instances: Passenger cars, trucks, busses, farm tractors, locomotives, ships, airplanes, portable generators, and power lawnmowers are all M_SOURCES. A trailer is not (does not produce air pollution). A gasoline service station is not (can not move). A transportation activity such as "shipping" is not (not an object). A class of mobile sources such as "LDTs" (light duty trucks), about which we might collect for example population, activity, or usage data, is likewise not an M_SOURCE.
MAPPOINT	A single point within an engine map.
MEASTYPE	A type of numeric, "non-core", emission-related measurement. e.g. methane emissions in grams per mile, not usually performed. Note: This table does not store a result measurement, but information about a kind of measurement.
MODEMEAS	Used to store a MEASTYPE measurement at the test mode level.
MODETIME	A point in time within a DYNOMODE.
OBD2CODE	OBD2 scan code. Contains information about the code itself. e.g. its meaning.
OBDSCAN	This result subtype is used to store summary level information pertaining to a scan of a vehicle's on board diagnostic system. While both level 1 and level 2 on board diagnostic systems scans are supported by this data structure, data collected on level 1 systems prior to 1999 are stored as part of the vehicle inspection data. This result subtype is identified in RESULT by RES_KIND = "OBDSCAN". This table is used to store information pertaining to the scan as a whole.
OWNERQST	This result subtype stores information from the Owner's questionnaire, and, where collected, summary information from the fuel economy postcard survey. This result subtype is identified in RESULT by RES_KIND = "OWNERQST".
P_INSP	Emission component part inspection.
PART	Emission Component Part e.g. E101, etc. Other values represent the MIL light, OBD1, codes, etc.

Entity Name	Entity Definition
PARTCODE	Numeric value representing a status or failure of an emission component system part.
PC_INSP	Emission component part code inspection.
PRESSTST	This Result Subtype stores the outcome of an evaporative system pressure check. In cases where an attempt was made to perform a pressure check, but it could not be performed, the reason for this is stored. This result subtype is identified in RESULT by RES_KIND = "PRESSTST".
PROCURE	The obtaining of an M_SOURCE for testing. Usually a series of tests is performed during the M_SOURCE's stay at a test facility. This result subtype is identified in RESULT by RES_KIND = "PROCURE". Historically AMD's emission factor testing program can be considered to have always "procured" a vehicle or engine prior to testing it, but it is not a logical requirement of the database that a PROCURE instance exist for every RESULT if no information of this nature is collected. e.g. Vehicles observed driving on the road would not have to be "procured".
RATEMEAS	Used to store a rate MEASTYPE measurement at the test mode level.
REP_MEAS	Used to store a MEASTYPE measurement at the test time point level.
REPAIR	A repair is a procedure performed on a Mobile_Source intended to improve its performance, which is assumed to affect all subsequent RESULTS on that Mobile Source. This result subtype is identified in RESULT by RES_KIND = "REPAIR".
RESULT	Any observation, measurement, or modification to an M_SOURCE including... Information pertinent to the procurement of the M_SOURCE. An outcome of any test procedure performed on an M_SOURCE, such as an exhaust emissions test or an evaporative emissions test. Observations of the M_SOURCE, e.g. a questionnaire about the M_SOURCE submitted by the owner. Repairs or modifications made to the M_SOURCE which could effect future measurements. Additional Notes: 1. This entity is broken down into an incomplete collection of dependent subtype entities based on its RES_KIND field. Additional result subtypes will be added as are needed.
ROADPHAS	A portion of a roadtest. This portion must correspond to a single, contiguous period of time within the time period of the complete test.
ROADTEST	This result subtype stores the results of a vehicle exhaust emission test performed during on-road driving. This table stores information pertaining to the test as a whole. This result subtype is identified in RESULT by RES_KIND = "ROADTEST". The entity name ROADTEST reflects the fact that the vehicle has been equipped with on board exhaust emission measurement instrumentation and that the emission measurements can therefore be made during actual use rather than in a laboratory.
ROADTIME	A point in time during a ROADTEST.
ROADTRIP	A trip travelled by an on-road vehicle. This result subtype is identified in RESULT by RES_KIND = "ROADTRIP". This result subtype is similar to a ROADTEST. The primary purpose of a ROADTEST is to measure exhaust emissions. The purpose of a ROADTRIP is to measure other aspects of the vehicle's usage or activity.
RUNL_BAG	The evaporative emissions for a portion of a "running loss" test, identified by "bag number" within the test.
RUNLOSS	This result subtype stores the results of a vehicle chassis running loss emission test. Like DYNOTESTs, these are performed on a chassis dynamometer and exhaust emission measurements are taken. Unlike DYNOTESTS, however: 1. Evaporative running losses are measured during portions of the test. 2. An attempt is made to heat or cool the vehicle's fuel tank as necessary to simulate the temperature pattern it would experience in on-road driving. This result subtype is identified in RESULT by RES_KIND = "RUNLOSS". This table is used to store results which pertain to the test as a whole; no attempt is usually made to summarize the emission results, exhaust or evaporative, for the test as a whole.
S_INSP	Emission component system inspection.
SCANSYS1	Individual scan code resulting from a scan of a level 1 on board diagnostic system.
SCANSYS2	Individual scan code resulting from a scan of a level 2 on board diagnostic system.
SCHED_PT	A time point in a SCHEDULE. Sample Queries: ..To use this table in conjunction with the SCHEDULE table the following join condition would be used. . where sched_pt.sched_id = schedule.sched_id Example Instances: 1) For schedule cdh226, the speed should be 23.5 mph at 20 seconds 2) for schedule rtd2, the temperature should be 83.9 F at 90 minutes.
SCHEDULE	Functional relation which gives values for one or more controlling test parameters, such as the speed a vehicle should be traveling, the temperature that a SHED should maintain, or the torque and rpm of an engine throughout the time of a test procedure.

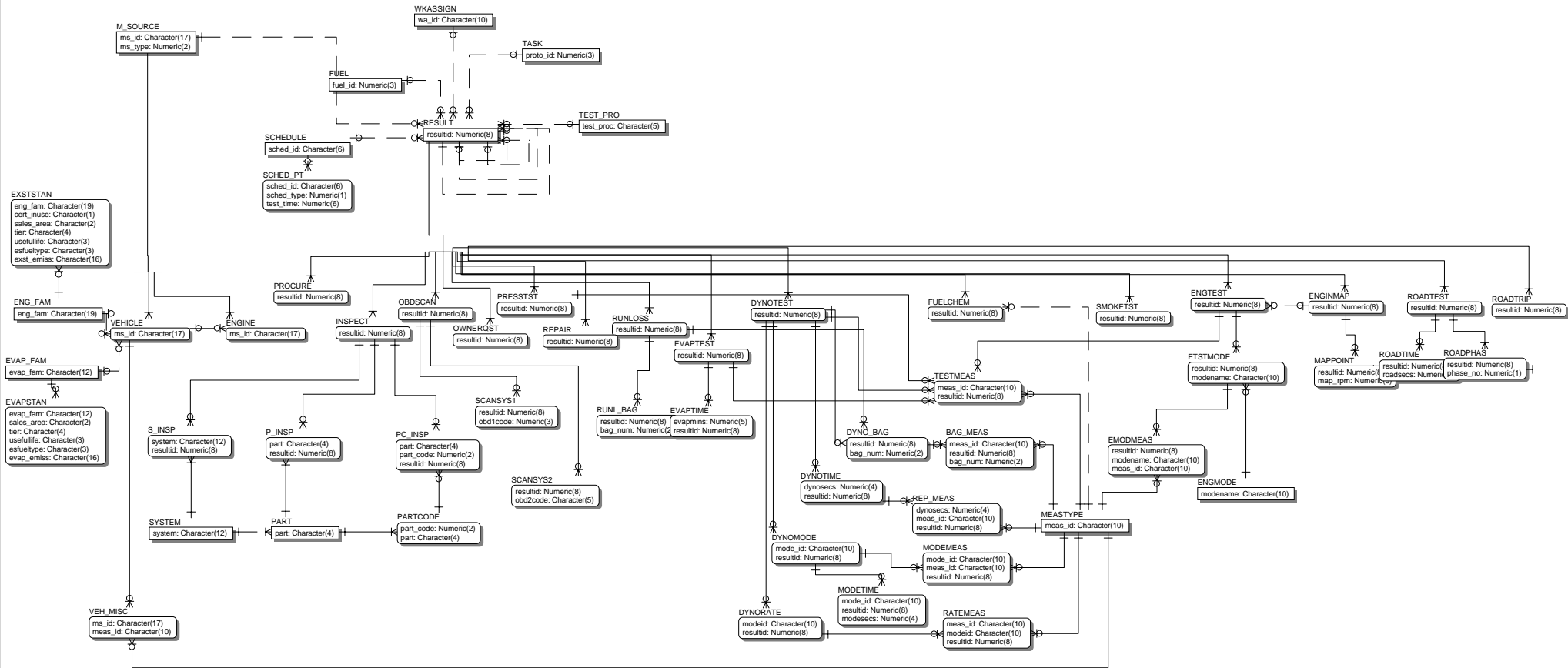
Entity Name	Entity Definition
	<p>Schedules are often also referred to as "cycles" though the Schedule term is considered preferable since there is nothing circular, regular or repeating about most test schedules.</p> <p>Additional notes: Only items pertaining to the schedule as a whole belong in this table. e.g. descriptions, average or maximum values of the entire schedule.</p> <p>Sample Queries: To use this table in conjunction with the RESULT entity the following join condition would be used where schedule.sched_id = result.sched_id</p> <p>Example Instances:</p> <ol style="list-style-type: none"> (1) EPA Urban Dynamometer Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks. (2) EPA Engine Dynamometer Schedules for Heavy-Duty Otto-Cycle engines. (3) Temperature schedules for evaporative emission tests.
SMOKETST	This result subtype stores the results of an engine smoke test. This subtype is identified by RES_KIND = "SMOKETST".
SYSTEM	Emission Component System e.g. "Induction", etc. "OBD", etc.
TASK	<p>Work effort which produced the RESULT as classified historically. Usually corresponded to a contract task or analogous internal effort.</p> <p>Note: The WKASSIGN entity was intended to subsume this TASK entity. Until WKASSIGN is fully populated, however, this TASK entity will be used to store more sparse information which is available from the "old database" about the work efforts which produced the older RESULTS.</p>
TEST_PRO	<p>Test procedure used to produce a RESULT.</p> <p>An example would be the Federal Test Procedure (FTP), though most other test procedures are not as completely defined.</p> <p>Note1: Historically this concept was termed "Test_Type" by AMD. Instances of this entity are an evolution of the domain of the former Test_Type field, though in some cases multiple Test_Type values have been combined into a single Test Procedure instance and visa versa.</p> <p>Note2: Conceptually Test Procedure is a different idea from Test Schedule. For example if two test procedures differ only in the Schedule used then ideally they should be considered the same Test Procedure. In practice, however, this has not been fully implemented because of the strong identity of some Test Procedures with Test Schedules and the lack of identification of true test "Procedures". Some grouping of Schedules into Test Procedures has been achieved, however, where identifiable groups of Schedules are involved, such as the "Facility" driving schedules for exhaust emission tests, or EPA's set of "Speed Correction" cycles.</p>
TESTMEAS	Used to store a MEASTYPE measurement at the summary test level.
TIMEMEAS	Used to store a MEASTYPE measurement pertaining to a particular time in a test.
VEH_MISC	Used to store a MEASTYPE measurement about a vehicle.
VEHICLE	<p>A motor vehicle, inclusive of its engine and chassis, having a unique (within this entity) vehicle identification number (VIN).</p> <p>Additional Notes:</p> <ol style="list-style-type: none"> 1. It may be necessary at some point to distinguish between light duty and heavy duty vehicles. If made such a distinction would probably be based on the vehicle certification regulations at CFR 40 Part 86 section 082-2. Most fundamentally if this distinction were made a light duty vehicle instance, if certified for compliance with air emission regulations, would be certified as an entire vehicle or "chassis", whereas a heavy duty vehicle instance, would have its engine certified. 2. Since MS_TYPE = 1 for all instances of this entity the MS_TYPE field is not physically implemented in this table. 3. MS_ID is the Vehicle's Identification Number (VIN) for instances of this entity. <p>Sample Queries: To access VEHICLE fields in conjunction with their RESULT information the following join condition would typically be used: WHERE RESULT.MS_TYPE = 1 AND RESULT.MS_ID = VEHICLE.MS_ID</p> <p>Example Instances:</p> <p>This entity includes motorcycles and off road vehicles.</p>
WKASSIGN	<p>A work assignment, whether contracted or performed in-house, which produces RESULTS. Often also referred to as a "test program".</p> <p>These efforts have often been performed by vehicle testing contractors under work assignment contracts. This entity represents a broader view of this fundamental construct.</p>

Section 3: Detailed Design Information

- "Physical-Level" Diagram showing all tables currently implemented
- More readable diagrams showing specific areas of the design and their attributes.
- Definitions for all columns
- Listings of some important tables.
- Relationship to "old" EF Database; Information not carried forward

Mobile Source Observation Database - Implementation

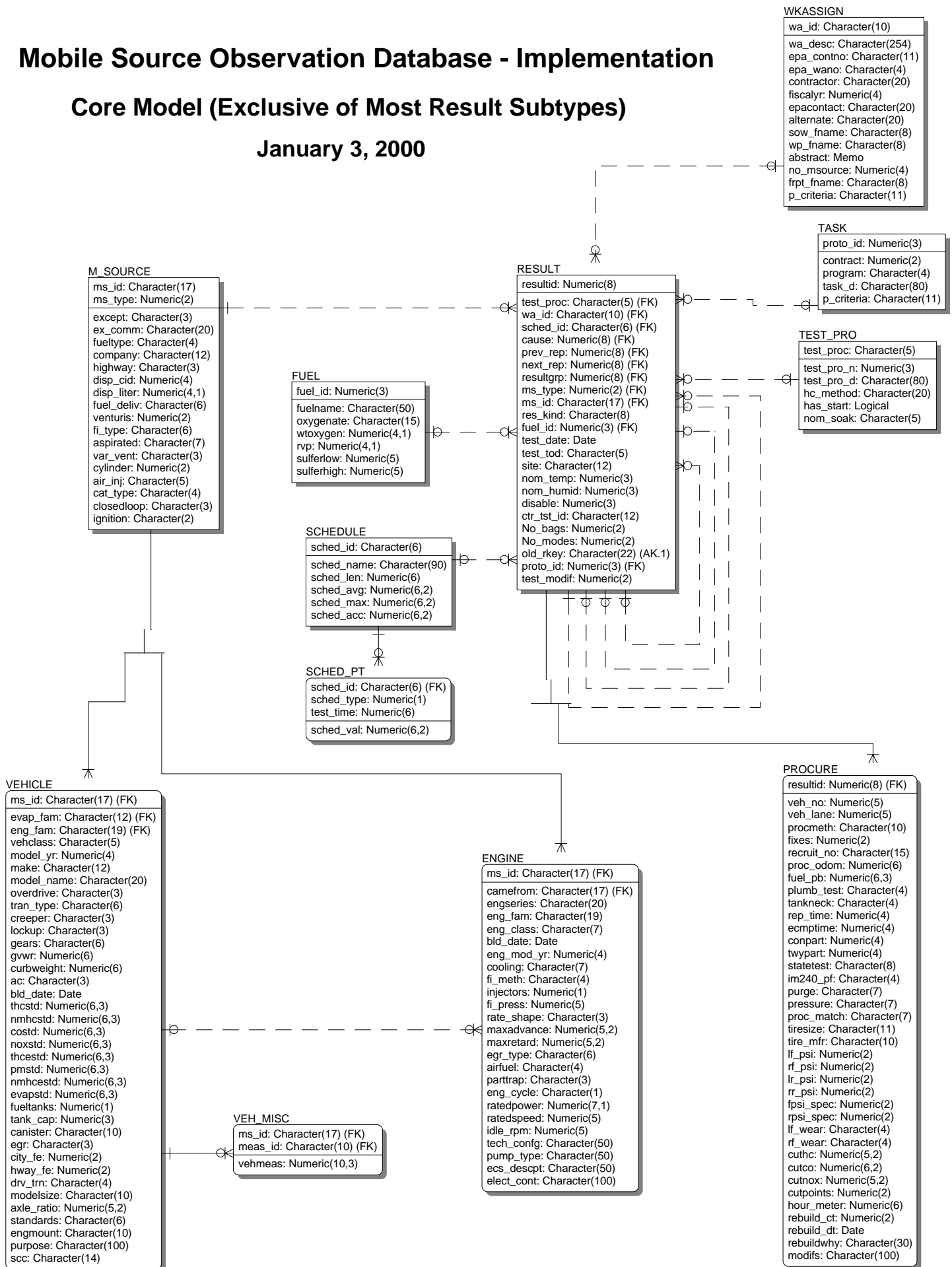
January 3, 2000



Mobile Source Observation Database - Implementation

Core Model (Exclusive of Most Result Subtypes)

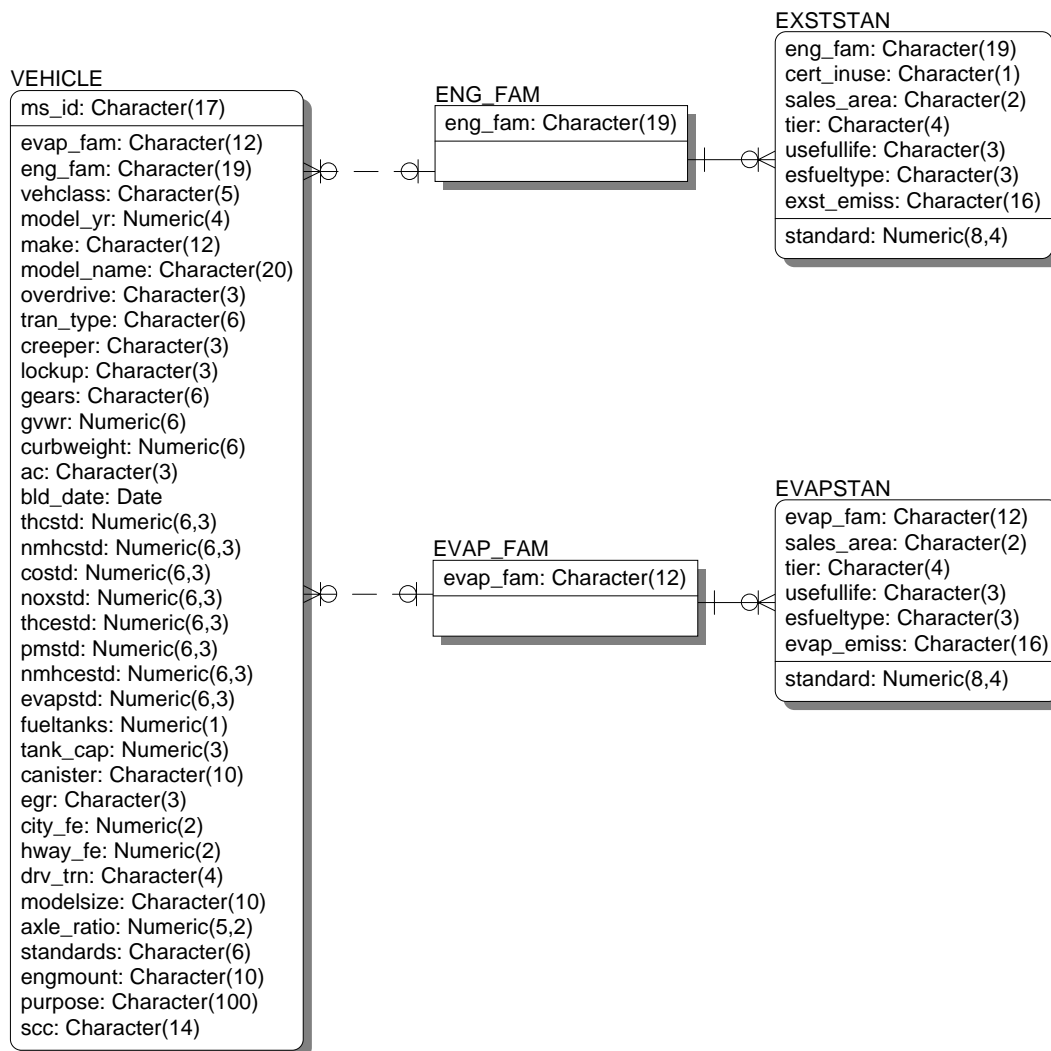
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Mobile Source Observation Database - Implementation

Vehicle Standards Portion

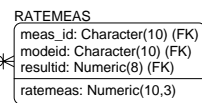
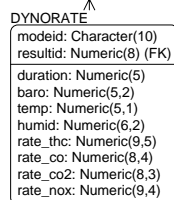
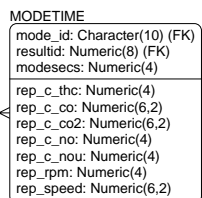
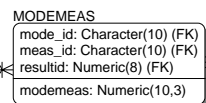
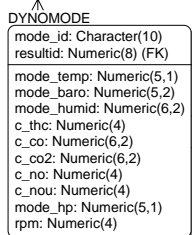
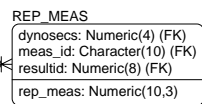
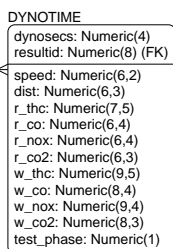
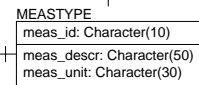
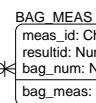
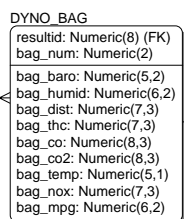
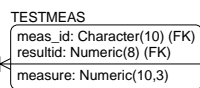
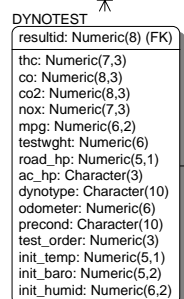
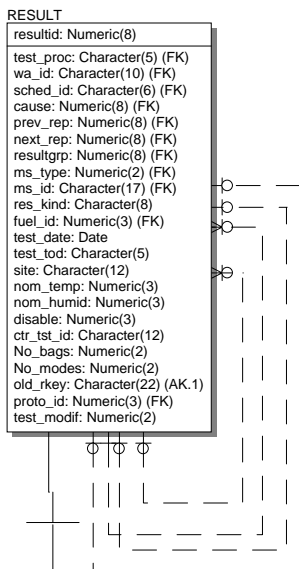
January 3, 2000



Mobile Source Observation Database - Implementation

Chassis Exhaust Emission Test Result Subtype

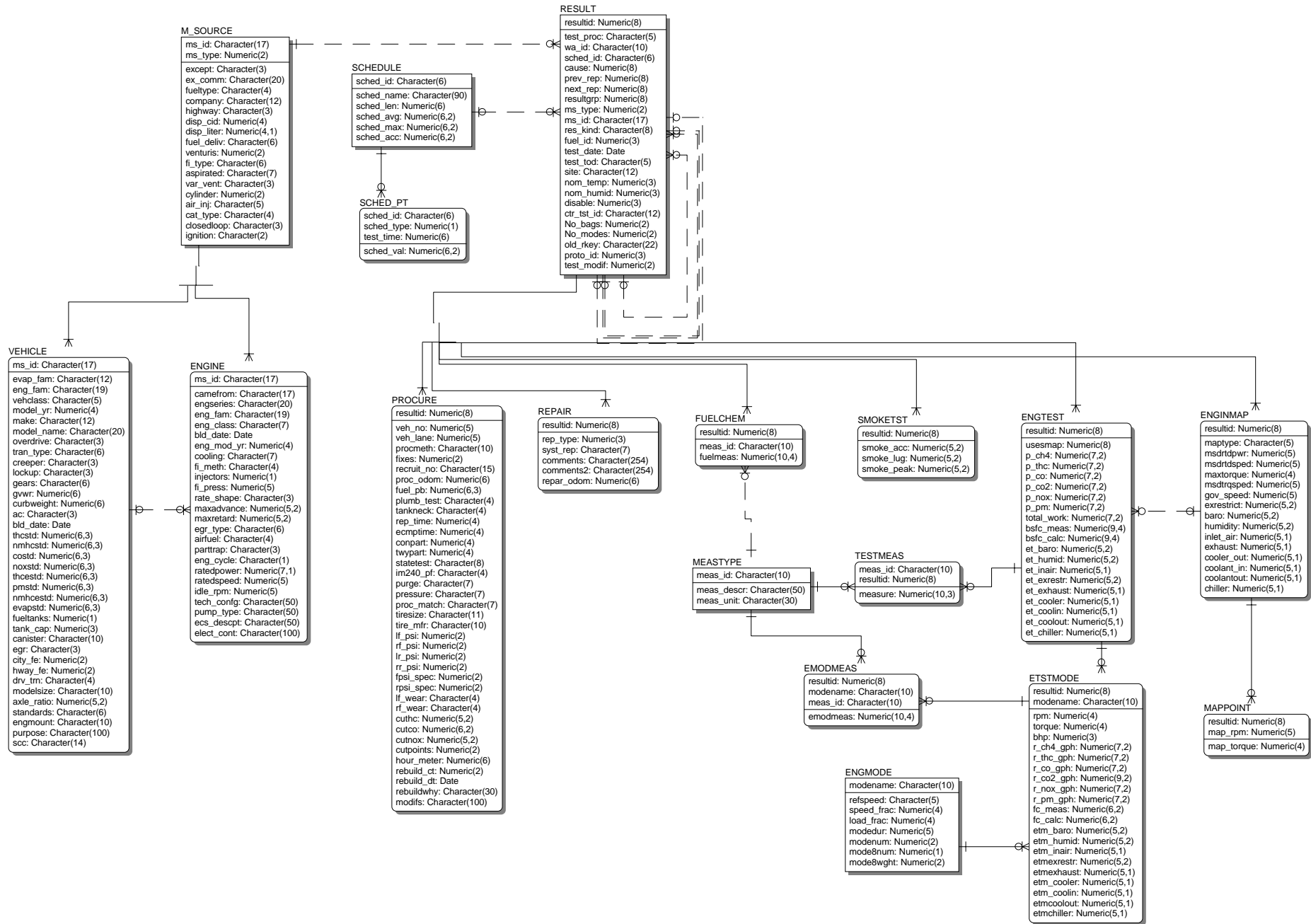
January 3, 2000



Mobile Source Observation Database - Implementation

Portions Relevant to Engine Testing

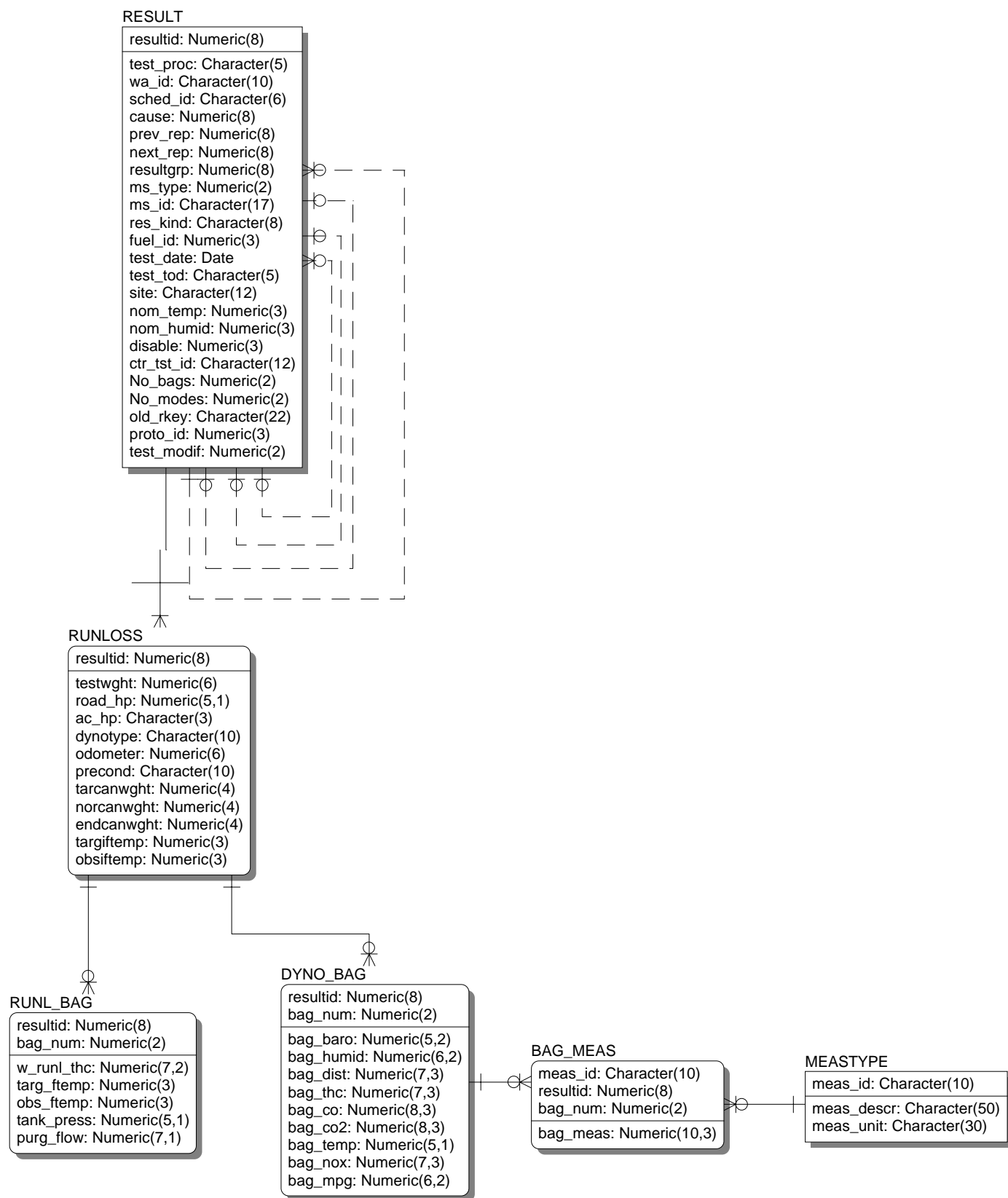
January 3, 2000



Mobile Source Observation Database - Implementation

Running Loss Emission Test Result Subtype

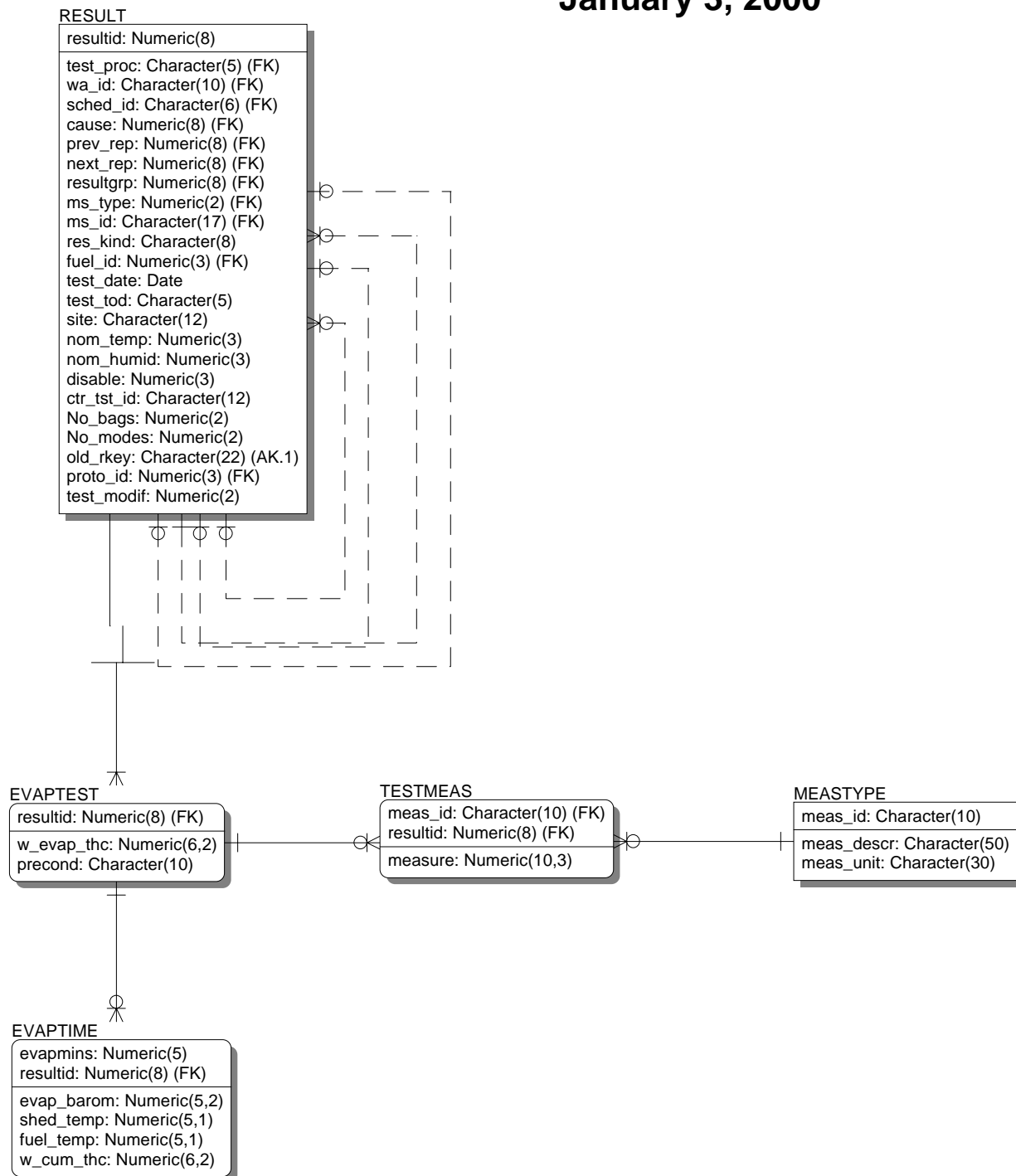
January 3, 2000



Mobile Source Observation Database - Implementation

Evaporative Emission Result Subtype

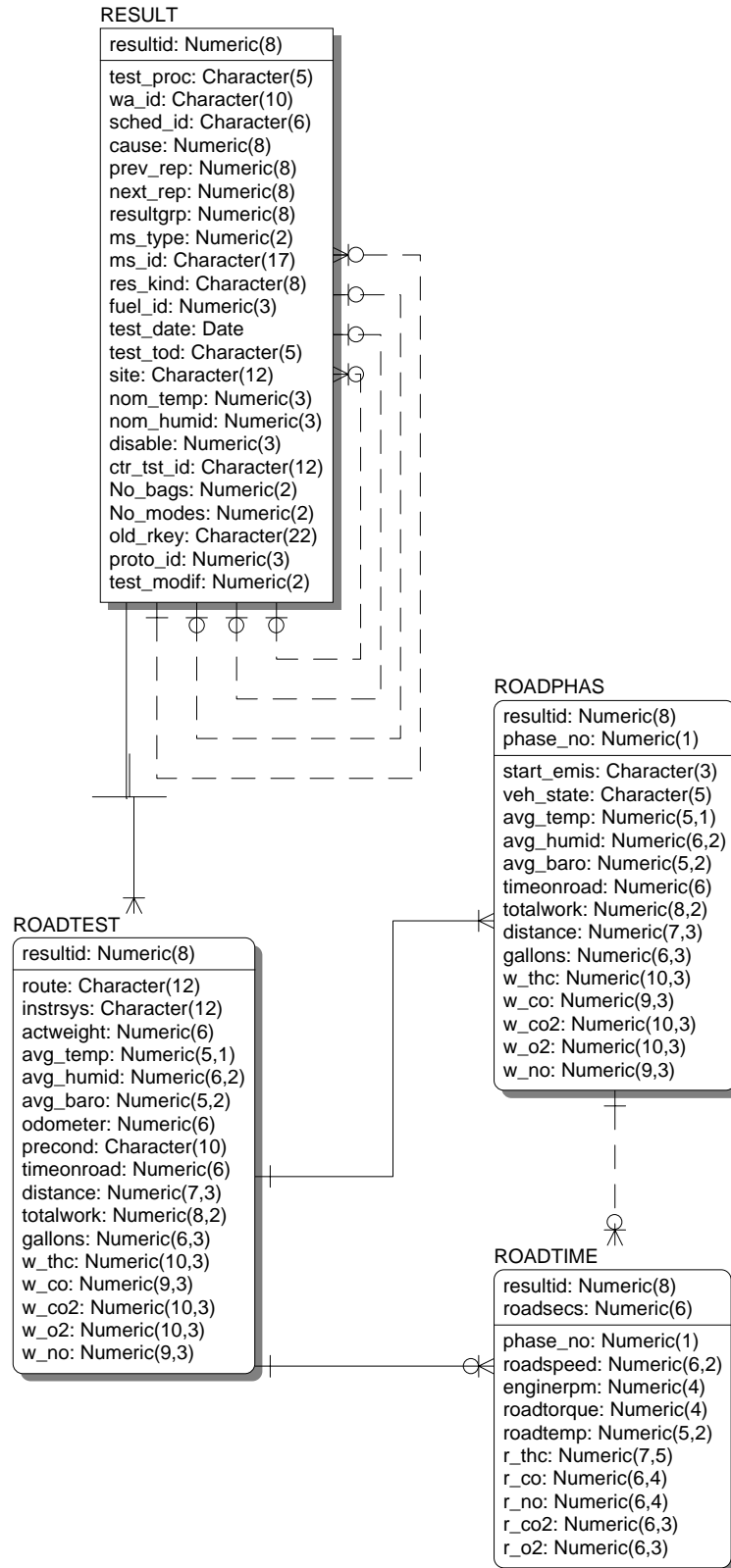
January 3, 2000



Mobile Source Observation Database - Implementation

On-Road Exhaust Emission Test Result Subtype

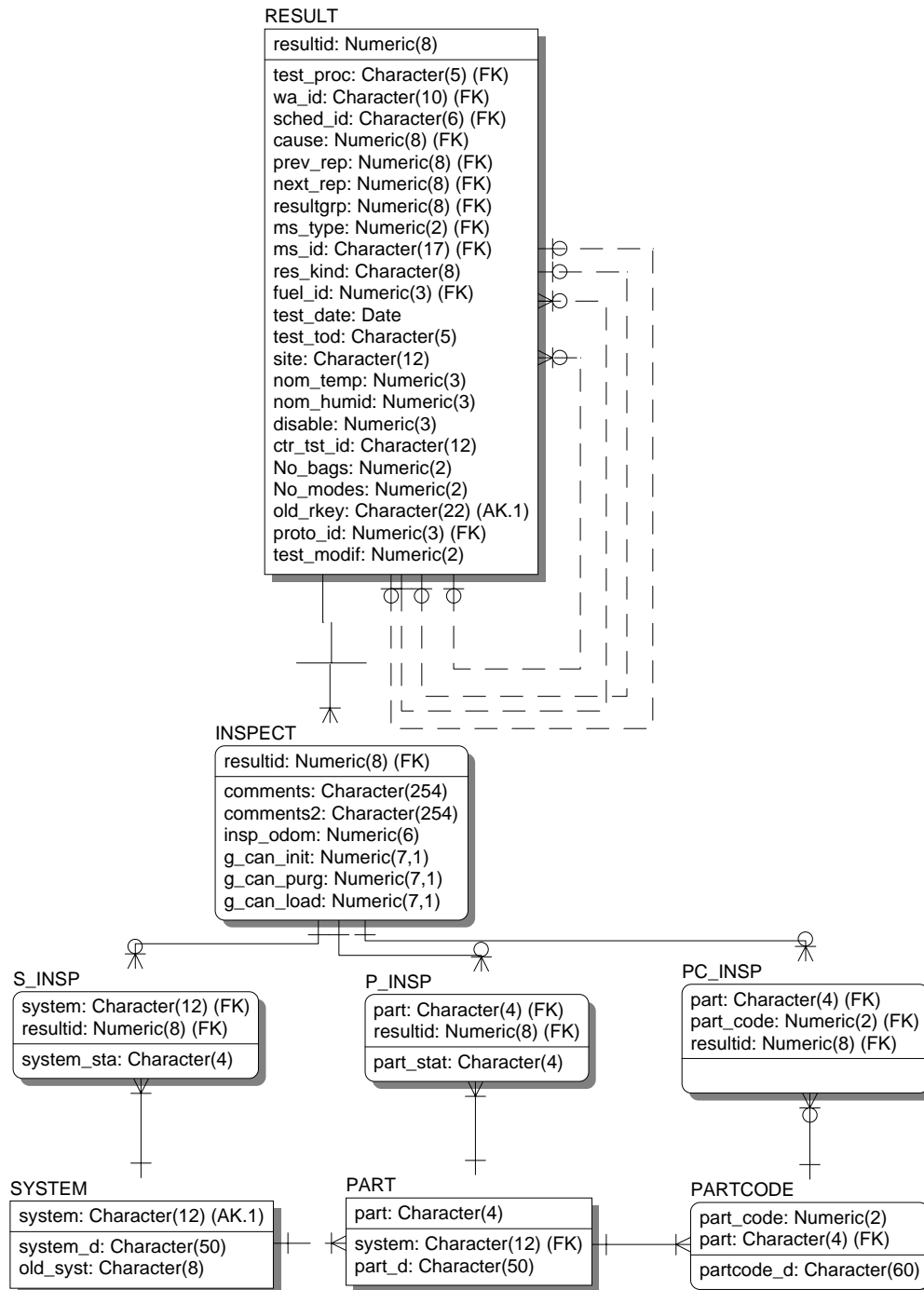
January 3, 2000



Mobile Source Observation Database - Implementation

Emission Component Inspection Result Subtype

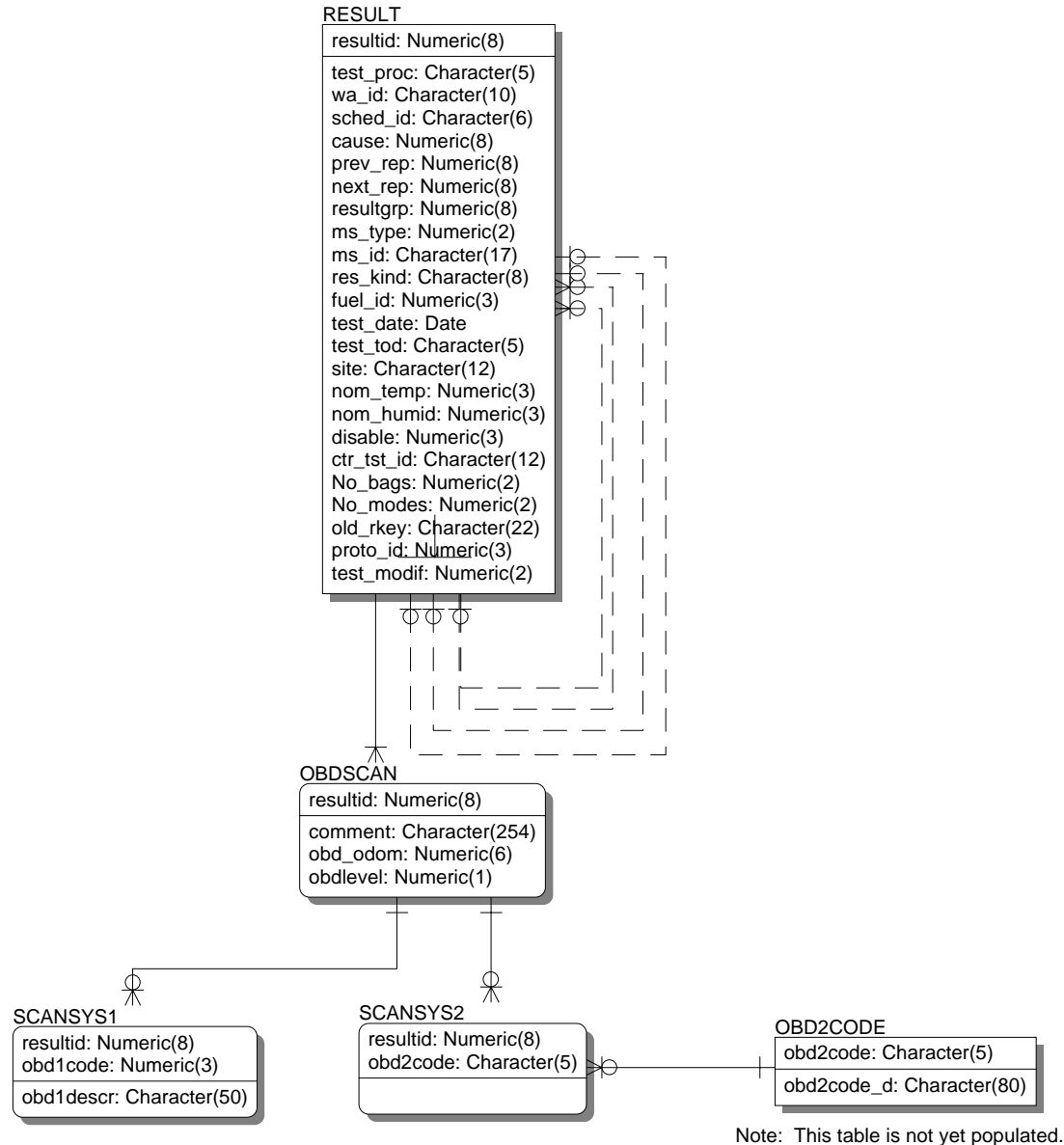
January 3, 2000



Mobile Source Observation Database - Implementation

On Board Diagnostic Scan Result Subtype

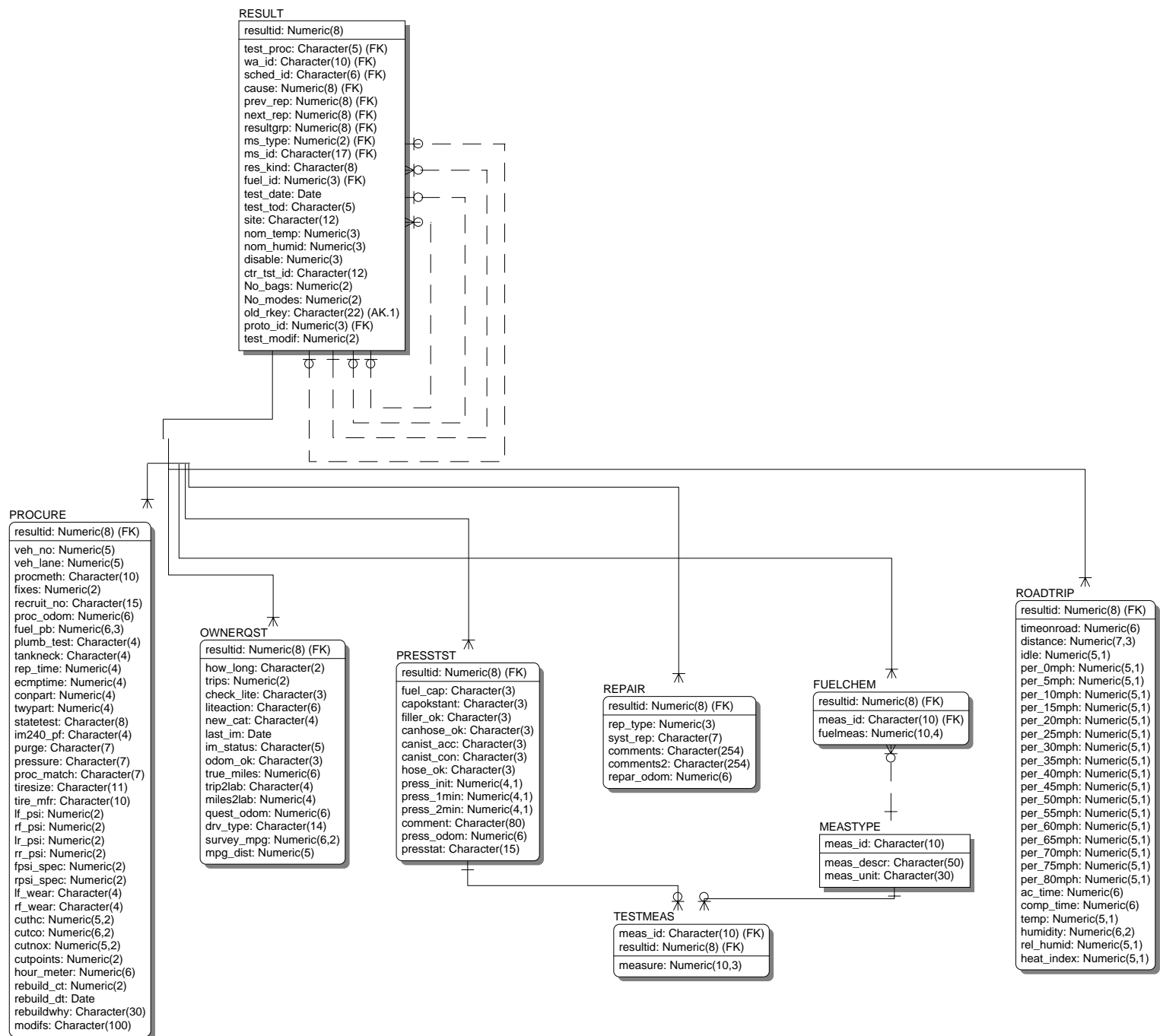
January 3, 2000



Mobile Source Observation Database - Implementation

Miscellaneous Result Subtypes

January 3, 2000



attribute definition report

Entity Name	Entity Attribute Name	Entity Attribute Definition
BAG_MEAS	bag_meas	Bag-level measurement.
	bag_num	Bag number.
	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
DYN0_BAG	bag_baro	Barometric pressure. Expressed in inches of mercury.
	bag_co	Carbon monoxide emissions.Expressed in grams per mile.
	bag_co2	Carbon dioxide emissions.Expressed in grams per mile.
	bag_dist	Distance travelled. Expressed in miles.
	bag_humid	Humidity.Expressed in grains of water per pound of dry air.
	bag_mpg	Fuel economy. Expressed in miles per gallon.
	bag_nox	Emissions of oxides of nitrogen.Expressed in grams per mile.
	bag_num	Bag number.
	bag_temp	Temperature, Expressed in degrees Fahrenheit.
	bag_thc	Total hydrocarbon emissions. Expressed in grams per mile.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
DYNOMODE	c_co	Carbon monoxide concentration. Expressed in percent.
	c_co2	Carbon dioxide concentration. Expressed in percent.
	c_no	NO concentration. Expressed in parts per million. Corrected for humidity via humidity correction factor.
	c_nou	NO concentration. Expressed in parts per million. Not corrected for humidity.
	c_thc	Total hydrocarbon concentration. Expressed in parts per million.
	mode_baro	Barometric pressure measured during test mode. Expressed in inches of mercury.
	mode_hp	Load horsepower.
	mode_humid	Humidity measured during test mode. Expressed in grains of water per pound of dry air.
	mode_id	Mode identification. Legal values defined by MODE_ID translation table.
	mode_temp	Measured ambient temperature during this test mode. Expressed in degrees Fahrenheit.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	rpm	Measured Engine RPM.
DYNORATE	baro	Barometric pressure during mode. Expressed in inches of mercury.
	duration	Length of test mode in seconds
	humid	Absolute humidity. Expressed in grains of water per pound of dry air.
	modeid	Mode identification. Legal values defined by MODE_ID translation table.
	rate_co	Total carbon monoxide emissions during mode. Expressed in grams per hour.
	rate_co2	Total carbon dioxide emissions during mode. Expressed in grams per hour.
	rate_nox	Total oxides of nitrogen emissions during mode. Expressed in grams per hour.
	rate_thc	Total hydrocarbon emissions during mode, Expressed in grams per hour.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	temp	Ambient temperature during mode. Expressed in degrees Fahrenheit.
DYNOTEST	ac_hp	Did dynamometer road load setting for this test include air conditioning load factor? YES, NO, or NUL.
	co	Carbon monoxide emissions. Expressed in grams per mile. (Composite bag result for the entire test)
	co2	Carbon dioxide emissions. Expressed in grams per mile. (Composite bag result for the entire test)
	dynotype	Type of dynamometer used. Legal values defined by DYNOTYPE translation table.

Entity Name	Entity Attribute Name	Entity Attribute Definition
DYNOTEST	init_baro	Barometric pressure measured at the beginning of the test. Expressed in inches of mercury. This will often have the null value of 0 since it was usually reported at the bag level.
	init_humid	Absolute humidity measured at beginning of test. Expressed in grains of water per pound of dry air. Often assumes null value of zero in this table, since it is often reported at the bag level.
	init_temp	Initial test temperature in degrees F. For bag tests this will often have the null value of 0, since it is reported at the bag level.
	mpg	Fuel economy. Expressed in miles per gallon. (Composite bag result for the entire test)
	nox	Oxides of nitrogen emissions. Expressed in grams per mile. (Composite bag result for the entire test)
	odometer	Approximate odometer reading of vehicle at beginning of test. Expressed in miles.
	precond	Type of preconditioning performed on the vehicle prior to the test. Legal values defined by PRECOND translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	road_hp	Dynamometer road load horsepower setting used for this test.
	test_order	A specialized field used to date only for facility cycle testing. Indicates the numerical position of individual tests in a sequence of tests run. Value of zero represents NULL.
	testwght	Dynamometer inertia weight setting used for this test. Expressed in pounds.
	thc	Total hydrocarbon emissions. Expressed in grams per mile. (Composite bag result for the entire test)
DYNOTIME	dist	Distance travelled in miles, cumulative from beginning of test phase.
	dynosecs	Time within dynamometer test, expressed in seconds, beginning of test has dynosecs = 0.
	r_co	Carbon monoxide emissions measurement. Expressed in grams per second.
	r_co2	Carbon dioxide emissions measurement. Expressed in grams per second.
	r_nox	Oxides of nitrogen emissions measurement. Expressed in grams per sec.
	r_thc	Total hydrocarbon emissions measurement. Expressed in grams per second.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	speed	Measured speed in miles per hour.
	test_phase	Phase of the test to which this measurement belongs. This might be used for example to divide a repeated measurement test into time periods corresponding to bag samples, even though no bag samples were taken.
	w_co	Carbon monoxide emissions emitted up to this time in the test phase. Expressed in grams.
	w_co2	Carbon dioxide emissions up to this time of the test phase. Expressed in grams.
	w_nox	Oxides of nitrogen, emitted up to this time in the test phase. Expressed in grams.
	w_thc	Total hydrocarbon emissions emitted up to this time in the test phase. Expressed in grams.
EMODMEAS	emodmeas	Engine test mode level measurement of this MEAS_ID
	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	modename	Name of engine test mode. Based on its reference speed, speed fraction, and load fraction. Legal values defined by ENGMODE translation table
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
ENG_FAM	eng_fam	Exhaust emission certification family to which this vehicle belongs.
ENGINE	airfuel	Air fuel mixture method. Values defined by AIRFUEL translation table.
	bld_date	Approximate date engine was manufactured.
	camefrom	Mobile source identifier. For vehicles their VIN would be used. For engines, their serial number, probably in conjunction with their manufacturer code.

Entity Name	Entity Attribute Name	Entity Attribute Definition
ENGINE	cooling	Type of after_cooling. Legal values defined by COOLING translation table.
	ecs_descpt	Description of emission control system.
	egr_type	Type of exhaust gas recirculation (EGR). Values defined by EGR_TYPE translation table.
	elect_cont	Description of electronic control.
	eng_class	Intended engine service class. (In conjunction with engine type (SI or CI), and model year, this field allows determination of the emission standards to which many engines were certified; for small spark ignition engines, displacement class, which can be determined from displacement, may be used instead.) Legal values defined ENG_CLAS by translation table.
	eng_cycle	Engine cycle. Legal values defined by ENG_CYCL translation table.
	eng_fam	Engine family for emission certification purposes. A value of "NONE" indicates the engine does not belong to an engine family, which in turn means that it was not certified.
	eng_mod_yr	Engine model year.
	engseries	Engine series or product line name.
	fi_meth	Method of fuel injection. Legal values defined by FI_METH translation table.
	fi_press	Fuel injection pressure. Expressed in kpa.
	idle_rpm	Idle rpm as declared by the oem.
	injectors	Number of injectors per cylinder.
	maxadvance	Maximum advance Expressed in degrees.
	maxretard	Maximum retard. Expressed in degrees.
	ms_id	Mobile source identifier. For vehicles their VIN would be used. For engines, their serial number, probably in conjunction with their manufacturer code.
	ms_type	General kind of mobile source: 1 = Vehicle 2 = Engine.
	parttrap	Is particulate trap used? "YES", "NO", or "NUL".
	pump_type	Type of fuel pump. (Not categorized.)
	rate_shape	Is rate shaping used? "YES", "NO", or "NUL"
	ratedpower	Rated horsepower of engine.
	ratedspeed	Rated rpm of engine.
	tech_confg	Description of technical configuration. (Not categorized.)
ENGINMAP	baro	Barometric pressure. Expressed in inches of mercury.
	chiller	Chiller water temperature. Expressed in degrees F.
	coolant_in	Engine coolant input temperature. Expressed in degrees F.
	coolantout	Engine coolant output temperature. Expressed in degrees F.
	cooler_out	Air temperature after intercooler. Expressed in degrees F.
	exhaust	Exhaust temperature, after emission controls. Expressed in degrees F.
	exrestrict	Exhaust restriction pressure. Expressed in inches of mercury.
	gov_speed	Governed central speed (rpm)
	humidity	Absolute humidity. Expressed in grains of water per pound of dry air.
	inlet_air	Engine inlet air temperature. Expressed in degrees F.
	maptype	Type of Engine Map. Legal values defined by MAPTYPE translation table.
	maxtorque	Measured peak torque. Expressed in foot pounds
	msdrtdpwr	Measured rated horsepower.
	msdrtdsped	Measured rated speed (rpm)
	msdtrqsped	Measured torque speed. Expressed in rpm.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
ENGMODE	load_frac	Fraction of the mapped load at this engine speed at which this mode is run. Expressed as a percentage.
	mode8num	Identifies which of the 8 modes of the heavy-duty engine certification test corresponds to this mode. Contains 0 if mode is not part of 8 mode certification test.
	mode8wght	If mode is included in the 8 mode certification test, contains the weighting factor used to calculate the summary result. Expressed as a percentage. The 8 percentages add to 100. Contains 0 if mode is not included in the 8 mode test.

Entity Name	Entity Attribute Name	Entity Attribute Definition
ENGMODE	modedur	Minimum duration of the mode. Expressed in seconds.
	modename	Name of engine test mode. Based on its reference speed, speed fraction, and load fraction. Legal values defined by ENGMODE translation table
	modenum	Mode number. Added for convenience, e.g. to facilitate exporting data to software such as SAS which expects keys to be numeric. Should be considered an arbitrary number, but the first 28 modes are numbered as in SWRI work assignment 2-2.
	refspeed	Reference speed. Identifies which of several speeds the speed aspect of the mode is based on. Legal values defined by REFSPEED translation table.
	speed_frac	Fraction of the reference speed at which this mode is run. Expressed as a percentage.
ENGTEST	bsfc_calc	Calculated brake-specific fuel consumption. Expressed in grams per bhp-hr.
	bsfc_meas	Measured brake-specific fuel consumption. Expressed in grams per bhp-hr.
	et_baro	Average barometric pressure during test. Expressed in inches of Hg. Not meaningful for multi-mode steady-state tests.
	et_chiller	Chiller water temperature. Expressed in degrees F. Not meaningful for multi-mode steady-state tests.
	et_cooler	Air temperature after intercooler. Expressed in degrees F. Not meaningful for multi-mode steady-state tests.
	et_coolin	Engine coolant input temperature. Expressed in degrees F. Not meaningful for multi-mode steady-state tests.
	et_coolout	Engine coolant output temperature. Expressed in degrees F. Not meaningful for multi-mode steady-state tests.
	et_exhaust	Exhaust temperature, after emission controls. Expressed in degrees F. Not meaningful for multi-mode steady-state tests.
	et_exrestr	Exhaust restriction pressure. Expressed in inches of mercury. Not meaningful for multi-mode steady-state tests.
	et_humid	Average absolute humidity during test. Expressed in grains of water per pound of dry air. Not meaningful for multi-mode steady-state tests.
	et_inair	Engine inlet air temperature. Expressed in degrees F. Not meaningful for multi-mode steady-state tests.
	p_ch4	Methane emissions. Expressed in grams per bhp-hr.
	p_co	CO emissions. Expressed in grams per bhp-hr.
	p_co2	CO2 emissions. Expressed in grams per bhp-hr.
	p_nox	NOx emissions. Expressed in grams per bhp-hr.
	p_pm	Total particulate emissions. Expressed in grams per bhp-hr.
	p_thc	Total HC emissions. Expressed in grams per bhp-hr.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	total_work	Total work performed in test. Expressed in bhp-hrs.
	usesmap	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
ETSTMODE	bhp	Brake horsepower.
	etm_baro	Average barometric pressure during engine test mode. Expressed in inches of Hg.
	etm_cooler	Air temperature after intercooler. Expressed in degrees F.
	etm_coolin	Engine coolant input temperature. Expressed in degrees F.
	etm_humid	Average absolute humidity during engine test mode. Expressed in grains of water per pound of dry air.
	etm_inair	Engine inlet air temperature. Expressed in degrees F.
	etmchiller	Chiller water temperature. Expressed in degrees F.
	etmcoolout	Engine coolant output temperature. Expressed in degrees F.
	etmexhaust	Exhaust temperature, after emission controls. Expressed in degrees F.
	etmexrestr	Exhaust restriction pressure. Expressed in inches of Hg.
	fc_calc	Calculated fuel consumption. Expressed in kg per hour.
	fc_meas	Measured fuel consumption. Expressed in kg. per hour.
	modename	Name of engine test mode. Based on its reference speed, speed fraction, and load fraction. Legal values defined by ENGMODE translation table
	r_ch4_gph	Methane emission rate. Expressed in grams per hour.

Entity Name	Entity Attribute Name	Entity Attribute Definition
ETSTMODE	r_co2_gph	Carbon dioxide emission rate. Expressed in grams per hour.
	r_co_gph	Carbon monoxide emission rate. Expressed in grams per hour.
	r_nox_gph	Oxides of nitrogen emission rate. Expressed in grams per hour.
	r_pm_gph	Total particulate emission rate. Expressed in grams per hour.
	r_thc_gph	Total hydrocarbon emission rate. Expressed in grams per hour.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	rpm	Measured engine rpm.
	torque	Measured torque. Expressed in foot-pounds.
EVAP_FAM	evap_fam	EPA standardized evaporative family name as defined in CFR40 Part 86
EVAPSTAN	esfueltype	Emission standards fuel type code. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Evaporative/Refueling Systems Information.
	evap_emiss	Evaporative emission name. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Evaporative/refueling Systems Information. Warning: Some emission names also embody information about the test procedure used to measure the emission.
	evap_fam	EPA standardized evaporative family name as defined in CFR40 Part 86
	sales_area	Sales area code. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Evaporative/Refueling Systems Information. Warning 1: Name of this attribute is somewhat misleading since not all values represent an "area" in a geographic sense. Concepts of authority (e.g. California vs US.) and emission level (e.g. NLEV or Clean fuel) partially determine the domain. Warning 2: Some domain values represent combinations of others.
	standard	Numerical emission standard. Warning: Engineering units vary among standard instances and are not defined in CMUG.
	tier	Tier code. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Engine Systems Information.
	usefullife	Useful life. Expressed as a three digit number, in character form, representing thousands of miles or "N/A"
EVAPTEST	precond	Type of preconditioning. Values defined by PRECOND translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	w_evap_thc	Total hydrocarbon emissions of test. Expressed in grams.
EVAPTIME	evap_barom	Barometric pressure. Expressed in inches of Hg.
	evapmins	Time of measurement. Expressed in minutes after start of test.
	fuel_temp	Temperature of vehicle's fuel. Expressed in degrees F.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	shed_temp	Temperature of SHED or air surrounding vehicle. Expressed in degrees F.
	w_cum_thc	Cumulative hydrocarbon emissions, since start of test. Expressed in grams.
EXSTSTAN	cert_inuse	Indicates whether standard is a "certification" (C) or "in-use" (I) standard.
	eng_fam	Exhaust emission certification family to which this vehicle belongs.
	esfueltype	Emission standards fuel type code. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Engine Systems Information.
	exst_emiss	Exhaust emission name. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Engine Systems Information. Warning: Some emission names also embody information about the test procedure used to measure the emission.
	sales_area	Sales area code. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Engine Systems Information. Warning 1: Name of this attribute is somewhat misleading since not all values represent an "area" in a geographic sense. Concepts of authority (e.g. California vs US.) and emission level (e.g. NLEV or Clean fuel) partially determine the domain.

Entity Name	Entity Attribute Name	Entity Attribute Definition
		Warning 2: Some domain values represent combinations of others.
	standard	Numerical emission standard. Warning: Engineering units vary among standard instances and are not defined in CMUG.
	tier	Tier code. Values are defined in the CFEIS Manufacturers' User Guide (CMUG), Appendix D (Input data records), Engine Systems Information.
	usefullife	Useful life. Expressed as a three digit number, in character form, representing thousands of miles or "N/A"
FUEL	fuel_id	Numeric code uniquely identifying the general type of fuel used. Sometimes referred to as the "gross fuel type".
	fuelname	Name of fuel.
	oxygenate	Oxygen enriched chemical.
	rvp	Nominal vapor pressure of this kind of fuel.
	sulferhigh	Upper bound sulfur content specification. Expressed in parts per million.
	sulferlow	Lower bound sulfur content specification. Expressed in parts per million.
	wtoxygen	Weight of oxygen in this type of fuel.
FUELCHM	fuelmeas	Test level fuel measurement.
	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
INSPECT	comments	Inspection comments, first portion.
	comments2	Inspection comments, second portion.
	g_can_init	Weight of evaporative emission canister as vehicle was received. Expressed in grams. If vehicle has multiple canisters weight entered is total of all canisters present. Zero if null.
	g_can_load	Weight of evaporative emission canister after full loading. Expressed in grams. If vehicle has multiple canisters weight entered is total of all canisters present. Zero if null.
	g_can_purg	Weight of evaporative emission canister after canister purge. Expressed in grams. If vehicle has multiple canisters weight entered is total of all canisters present. Zero if null.
	insp_odom	Approximate odometer reading, in miles, at time of mechanics M1 emission component inspection. Zero represents NULL. (This item not collected prior to FY98).
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
KIND_OF_RESULT		
M_SOURCE	air_inj	Represents what method, if any, is used to introduce supplemental air into the exhaust stream. Legal values defined by AIR_INJ translation table.
	aspirated	Indicates how engine is aspirated. Legal values defined by ASPIRATE translation table.
	cat_type	What type catalyst, if any, is present on the mobile source. Legal values defined by CAT_TYPE translation table.
	closedloop	"YES" indicates a "closed loop" configuration in which the exhaust sensing is used to help control the fuel combustion process. "No means this is not done on the vehicle.
	company	Mobile source manufacturer. Is designed to align with the MFR_ fields in CFEIS. Has extended translation table in which COMPANY_N will contain the same numeric code as CFEIS for this manufacturer. Legal values defined by COMPANY translation table. NONROAD manufacturers will also be included in the COMPANY table.
	cylinder	Number of cylinders or rotors.
	disp_cid	Nominal Engine displacement. Expressed in cubic inches.
	disp_liter	Nominal engine displacement. Expressed in liters.
	ex_comm	Used if except is true. Comment as to why vehicle is exceptional.
	except	YES if something is exceptional about this mobile source that would make it an outlier for most analysis. (e.g. engine has been replaced, etc.)
	fi_type	Type of fuel injection. Legal values defined by FI_TYPE translation table.

Entity Name	Entity Attribute Name	Entity Attribute Definition
M_SOURCE	fuel_deliv	Kind of fuel delivery system. Legal values defined by FUEL_DEL translation table.
	fueltype	Type of fuel mobile source is designed to use. Legal values defined by FUELTYPE translation table.
	highway	Yes if mobile source is intended for highway use. No for non-road mobile sources.
	ignition	Ignition type of engine in mobile source. Legal values defined by IGNITION translation table.
	ms_id	Mobile source identifier. For vehicles their VIN would be used. For engines, their serial number, probably in conjunction with their manufacturer code.
	ms_type	General kind of mobile source: 1 = Vehicle 2 = Engine.
	var_vent	YES if size of carburator venturis is designed to vary. Otherwise NO. (or NUL). Intend to convert to a logical type field when good tool is available.
	venturis	Number of venturis. Not meaningful for fuel injected mobile sources.
MAPPOINT	map_rpm	Speed. Expressed in rpm.
	map_torque	Torque. Expressed in foot pounds
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
MEASTYPE	meas_descr	Measurement description.
	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	meas_unit	Engineering units applicable to this measurement type.
MODEMEAS	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	mode_id	Mode identification. Legal values defined by MODE_ID translation table.
	modemeas	Mode level measurment of this MEAS_ID
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
MODETIME	mode_id	Mode identification. Legal values defined by MODE_ID translation table.
	mode_speed	Measured speed. Expressed in miles per hour.
	modeseecs	Identifies point in time within a Mode of an chassis exhaust emissions test. Expressed in seconds.
	rep_c_co	Second-by-second measurement of carbon monoxide concentration. Expressed as a percentage.
	rep_c_co2	Second-by-second measurement of carbon dioxide concentration. Expressed as a percentage.
	rep_c_no	Second-by-second measurement of nitric oxide (NO) concentration, corrected for humidity. Expressed in parts per million.
	rep_c_nou	Second-by-second measurement of nitric oxide (NO) concentration, not corrected for humidity. Expressed in parts per million.
	rep_c_thc	Second-by-second measurement of total hydrocarbon concentration. Expressed in parts per million.
	rep_rpm	Second-by-second measurement of engine speed. Expressed in revolutions per minute.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
OBD2CODE	obd2code	Character string code resulting from a scan of a level 2 on board diagnostic system.
	obd2code_d	Meaning of a particular level 2 on board diagnostic code.
OBDSCAN	comment	Comment associated with scan of vehicle's on board diagnostic system.
	obd_odom	Approximate odometer reading, in miles, at time of OBD scan. Zero represents NULL value.
	obdlevel	Type of on board diagnostic system. Level 1 systems are present on many older vehicles and produce 2 digit numeric codes particular to the vehicle manufacturer and model year. Level 2 system produce 5 character codes some of which have industry standardized significance. Legal values defined by OBDLEVEL translation table.

Entity Name	Entity Attribute Name	Entity Attribute Definition
OBDS CAN	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
OWNERQST	check_lite	Response to question: "Has the 'check engine' light or any other warning light ever come on while you were driving your vehicle?" Responses are coded as "yes", "no", or "nul"
	drv_type	"Type of driving" as indicated on the fuel economy postcard survey. Characterized driving during period of fuel purchases as to degree of city versus highway driving. Legal values defined by DRV_TYPE translation table.
	how_long	Response to question: "How long ago did you purchase the vehicle to be tested?" Legal values defined by HOW_LONG translation table.
	im_status	Response to question: "Did your vehicle pass or fail the inspection?" Legal values defined by IM_STAT translation table.
	last_im	Response to question: "Date of last city or state emissions inspection?" {99/99/99} if never inspected.
	liteaction	Response to question: "What did you do after the light came on?" Legal values defined by LITEACT translation table.
	miles2lab	Response to question: "Approximate mileage to get here today?"
	mpg_dist	Distance, in miles, over which fuel economy was measured in the fuel economy postcard survey.
	new_cat	Response to question: "Has the catalytic converter ever been replaced on this vehicle?" Coded as YES, NO, NONE or NULL.
	odom_ok	Response to question: "Does the odometer indicate the true number of miles on your vehicle?" Values coded as YES, NO, or NUL.
	quest_odom	Approximate odometer reading at time vehicle owner questionnaire was filled out. Zero if NULL. This item only began to be collected in FY98.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	survey_mpg	Fuel economy calculated from the fuel economy postcard survey. Expressed in miles per gallon.
	trip2lab	Response to question: "How did you get here today?" Legal values defined by TRIP2LAB translation table.
	trips	Response to question: "On a typical day, how many trips are made with this vehicle?"
	true_miles	Response to question: "If no, what are the true miles?" (0 indicates missing or that ODOM_OK = YES.)
P_INSP	part	Identification of emission component usually a field name from the emission component worksheet e.g. E101.
	part_stat	Status of this emission component part. Legal values defined by PART_STA translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
PART	part	Identification of emission component usually a field name from the emission component worksheet e.g. E101.
	part_d	More full description of the emission component.
	system	Identification of an emission component system.
PARTCODE	part	Identification of emission component usually a field name from the emission component worksheet e.g. E101.
	part_code	Numeric code which can be used to describe the status of an emission component.
	partcode_d	Full description of what the part_code means
PC_INSP	part	Identification of emission component usually a field name from the emission component worksheet e.g. E101.
	part_code	Numeric code which can be used to describe the status of an emission component.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
PRESSTST	canhose_ok	Did canister and hose look ok? "YES", "NO", or "NUL".
	canist_acc	Was the canister accessible? "YES", "NO", or "NUL".

Entity Name	Entity Attribute Name	Entity Attribute Definition
PRESSTST	canist_con	Was the cannister connected to the fuel tank? "YES", "NO", or "NUL".
	capokstant	Did gas cap pass the Stant test? "YES", "NO", or "NUL".
	comment	Comment.
	filler_ok	Did filler neck look ok? "YES", "NO", or "NUL".
	fuel_cap	Fuel cap present? "YES", "NO", or "NUL".
	hose_ok	Were the canister hoses ok, in terms of not being frayed? "YES", "NO", or "NUL".
	press_1min	Pressure reading after one minute. Expressed in inches of water. Null value is 99.9.
	press_2min	Pressure reading after two minutes. Expressed in inches of water. Null value is 99.9.
	press_init	Initial pressure reading. Expressed in inches of water.
	press_odom	Approximate odometer reading at time of pressure test. Expressed in miles . Zero represents NULL value. (This information item was not collected prior to FY98.)
	presstat	Indicates whether evaporative system pressure check could be performed and if not, categorizes reason why. Legal values defined by PRESSTAT translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
PROCURE	conpart	Cost of conventional parts in U.S. dollars. If multiple repairs were conducted this field represents the total cost of these parts.
	cutco	Recruitment "cut point" or threshold value for carbon monoxide emissions. Expressed in terms of grams/mile as measured by an IM240 test. Null value of this field is zero.
	cuthc	Recruitment "cut point" or threshold value for hydrocarbon emissions. Expressed in terms of grams/mile as measured by an IM240 test. Null value of this field is zero.
	cutnox	Recruitment "cut point" or threshold value for oxides of nitrogen emissions. Expressed in terms of grams/mile as measured by an IM240 test. Null value of this field is zero.
	cutpoints	Information pertaining to the set of IM240 emission "cutpoint" values which governed this procurement. These emission cutpoint levels do not generally correspond to the emission standards to which the vehicle was certified. Legal values defined by CUTPOINT translation table.
	ecmptime	Time required to perform the emission components inspections on this vehicle. Expressed in minutes.
	fixes	Identifies minor corrections made to the mobile source to enable testing. These things, such as fixing post catalyst exhaust leaks or brakes would not be expected to affect emission results, but may affect lab test to l/m lane test comparability for those vehicles that were tested in l/m lane before being recruited to the test laboratory. This field was added to the database to accomodate historical data and is nul (0) for most records. Legal values defined by FIXES translation table.
	fpsi_spec	Front tire pressure specification. Expressed in pounds per square inch.
	fuel_pb	Used to represent the lead content of fuel in vehicle tank as received. Expressed in grams per gallon.
	hour_meter	Hours of operation (usually available only for off-road mobile sources). Null value is Zero.
	im240_pf	Indicates whether a recruited vehicle passed or failed an EPA-conducted IM240 test. Legal values defined by IM240_PF translation table.
	lf_psi	Left front tire pressure. Expressed in pounds per square inch.
	lf_wear	Left front tire wear description. Legal values defined by LF_WEAR translation table.
	lr_psi	Left rear tire pressure. Expressed in pounds per square inch.
	modifs	Description of significant post-OEM additions or modifications.
	plumb_test	Whether or not lead was detected on the vehicle exhaust tailpipe with plumbtesmo paper. Values are "PASS", "FAIL", and "NULL"
	pressure	Results of evaporative system pressure check procedure. Legal values defined by PRESSURE translation table.
	proc_match	Relationship between originally specified procurment criteria and vehicle actually recruited. Legal values defined by PROC_MAT translation table.

Entity Name	Entity Attribute Name	Entity Attribute Definition
PROCURE	proc_odom	Approximate odometer reading at time of vehicle recruitment. Expressed in miles.
	procmeth	Procurement method. Legal values defined by PROCMETH translation table.
	purge	Contains results of evaporative system purge check procedure. Legal values defined by PURGE translation table.
	rebuild_ct	Number of times mobile source was rebuilt, generally applicable only to engines. Null value is 99.
	rebuild_dt	Date of last rebuild.
	rebuildwhy	Purpose or reason for last rebuild.
	recruit_no	This field would be rarely used for analysis purposes. Vehicle recruitment number. Previously known as "Recall_Number" in some datasets this is the "vehicle recruitment control number" which can be used to link back to paper record recruitment information outside of this database such as the recruitment class. In historical data where "Recall Number" was not available" this field will contain the 4 character "vehicle run number" assigned by the recruitment contractor, which was rarely used.
	rep_time	Time required to perform repairs on this vehicle. Expressed in minutes. If multiple repairs were performed this represents the total time required.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	rf_psi	Right front tire pressure. Expressed in pounds per square inch.
	rf_wear	Right front tire wear description. Legal values defined by RF_WEAR translation table.
	rpsi_spec	Rear tire pressure specification. Expressed in pounds per square inch.
	rr_psi	Right read tire pressure. Expressed in pounds per square inch.
	statetest	Indicates whether the vehicle recruited passed or failed a state IM test. Legal values defined by STATETES translation table.
	tankneck	Whether the fuel tank inlet restrictor, if present, was damaged. Legal values defined by translation table. Values are "YES", "NO", "NA" or "NULL".
	tire_mfr	Tire manufacturer.
	tiresize	Tiresize. Expressed as a character string. There is no translation table for this field and data may not be well coded.
	twypart	Cost of three way catalyst parts in U.S. dollars. If multiple repairs were conducted this field represents the total cost of these parts.
	veh_lane	Number historically used to identify procurment of a vehicle from an I/M lane (as compared with VEH_NO which identified a physical vehicle.) Vehicles were recruited for a series of tests, typically a purge-pressure, IM240 and FTP.
	veh_no	Vehicle number historically assigned sequentially by recruitment contractor.
RATEMEAS	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	modeid	Mode identification. Legal values defined by MODE_ID translation table.
	ratemeas	Mode level measurment of this MEAS_ID
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
REP_MEAS	dynosecs	Time within dynamometer test, expressed in seconds, beginning of test has dynosecs = 0.
	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	rep_meas	Repeated measurement.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
REPAIR	comments	Repair description - first portion. 50 character field.
	comments2	Repair description - second portion. 50 character field.
	rep_type	Type of repair performed. Legal values defined by REP_TYPE translation table.
	repar_odom	Approximate odometer reading at time repair was made. Expressed in miles. Zero represents NULL value. This informatin item was not collected prior to FY98.

Entity Name	Entity Attribute Name	Entity Attribute Definition
REPAIR	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	syst_rep	System(s) affected by the repair. Legal values defined by SYST_REP translation table.
RESULT	cause	A foreign key back into RESULT. Identifies the most immediately preceding RESULT instance (e.g. a PROCURE or REPAIR on this mobile source instance) affecting the outcome of this one. A departure from the relational model.
	ctr_tst_id	Identification number assigned to the RESULT by a test contractor. (Hopefully uniquely identifies RESULT instances within a given contractor.) Not used for analytical purposes. But could help locate contractor's records pertinent to this RESULT.
	disable	Indication of any special conditions or "disablements" performed on the mobile source for particular tests. A value of zero indicates that no special condition or disablement to the vehicle was performed. Positive values indicate a particular disablement or set of disablements. Legal values defined by DISABLE translation table.
	fuel_id	Numeric code uniquely identifying the general type of fuel used. Sometimes referred to as the "gross fuel type".
	ms_id	Mobile source identifier. For vehicles their VIN would be used. For engines, their serial number, probably in conjunction with their manufacturer code.
	ms_type	General kind of mobile source: 1 = Vehicle 2 = Engine.
	next_rep	A foreign key back into RESULT. Identifies any most immediately following RESULT instance which is a replicate (repeat) of this one. A departure from the relational model.
	No_bags	Number of bags involved in this RESULT. Data for individual bags is stored in the BAG_DATA table.
	No_modes	Number of test modes involved in this result. Data for individual chassis test modes is stored in the DYNOMODE table; data for individual engine dynamometer test modes is stored in the ETSTMODE table.
	nom_humid	Nominal absolute humidity at which test was to be conducted. Expressed in grains of water per pound of dry air.
	nom_temp	Nominal temperature at which test was to be conducted. Expressed in degrees Fahrenheit.
	old_rkey	Old result key in previous database. This field is intended for data administrator use only. It contains sufficient information to uniquely locate a result-type record in the old database as follows: Site code - 3 columns Program - 4 columns Contract - 4 columns (upper two columns sometimes used for other special key info, e.g. nom-speed in STSTEF98.) Veh_no - 5 columns Test_seq - 3 columns Test_type (test procedure) - 2 columns Lane/lab indicator (Larry Landman) - 1 column
	prev_rep	A foreign key back into RESULT. Identifies any most immediately preceding RESULT instance for which this RESULT is a replicate (repeat). A departure from the relational model.
	proto_id	Task number. Field has this name because thought at one point was to call these "protocols".
	res_kind	RESULT kind. Used to identify which subtype this result belongs to. Overall intent is to aggregate RESULT instances into as few different subtypes as practical. E.g. all vehicle dynamometer tests may be one subtype, all SHED tests another. Legal values defined by RES_KIND translation table.
	resultgrp	May be used to relate a RESULT to another RESULT of which it considered a part. This relationship was originally established to relate the FTP, US06 and SC03 portions of the SFTP to the SFTP summary calculations (All four being considered DYNOTESTs.) The SFTP is considered the Result Group and the FTP, US06 and SC03 are considered to belong to this Result Group.

Entity Name	Entity Attribute Name	Entity Attribute Definition
RESULT	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	sched_id	Schedule identification.
	site	Location where test was conducted. Legal values defined by SITE translation table.
	test_date	Result date.
	test_modif	Identifies any minor deviation from normal test procedure indicated by "test_proc". Legal values defined by TEST_MOD translation table.
	test_proc	Identifies the specific test procedure used. A more detailed classification than RES_KIND. Based largely upon values of TEST_TYPE in earlier design. Conceptually distinct from the driving or operational schedule used.
	test_tod	Time of day of the start of the result. Stored as a 5 character string HH:MM.
	wa_id	Work Assignment (or equivalent for TSD) name.
ROADPHAS	avg_baro	Average barometric pressure during the test phase. Expressed in inches of mercury.
	avg_humid	Average absolute humidity of ambient air during the test phase. Expressed in grains of water per pound of dry air.
	avg_temp	Average ambient air temperature during the test phase. Expressed in degrees Fahrenheit.
	distance	Total distance traveled during the test phase. Expressed in miles.
	gallons	Gallons of fuel consumed during the test phase.
	phase_no	Numerically identifies the phase or portion of the test.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	start_emis	Indicates whether the vehicle start emissions are included in the test phase. Possible values are "YES", "NO" and "NUL".
	timeonroad	Duration of the exhaust measurement period of this test phase. Expressed in seconds.
	totalwork	Total amount of work performed by the vehicle during the test phase. Expressed in brake horsepower hours.
	veh_state	State of the vehicle at the start of the road test phase. Legal values defined by VEH_STAT translation table. A blank value of the field is its NUL value.
	w_co	Total carbon monoxide emissions emitted during the test phase. Expressed in grams.
	w_co2	Total carbon dioxide emissions during the test phase. Expressed in grams.
	w_no	Nitric oxide (NO) emissions during the test phase. Expressed in grams.
	w_o2	Total oxygen emissions during the test phase. Expressed in grams.
	w_thc	Total hydrocarbon emissions emitted during the test phase. Expressed in grams.
ROADTEST	actweight	Actual weight of the vehicle, including driver, fuel, passengers, and cargo, during the test. Averaged if necessary. Expressed in pounds.
	avg_baro	Average barometric pressure during the test. Expressed in inches of mercury.
	avg_humid	Average absolute humidity of ambient air during the test. Expressed in grains of water per pound of dry air.
	avg_temp	Average ambient air temperature during the test. Expressed in degrees Fahrenheit.
	distance	Total distance traveled during the exhaust measurement period. Expressed in miles.
	gallons	Gallons of fuel consumed during the test measurement period.
	instrsys	Onboard exhaust emission measurement system with which the vehicle has been equipped for this test. Legal values defined by INSTRSYS translation table.
	odometer	Approximate odometer reading of vehicle at beginning of test. Expressed in miles.
	precond	Type of preconditioning performed on the vehicle prior to the test. Legal values defined by PRECOND translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.

Entity Name	Entity Attribute Name	Entity Attribute Definition
ROADTEST	route	Route traveled by the vehicle during the test measurement period. Legal values defined by ROUTE translation table.
	timeonroad	Duration of the exhaust measurement period of this test. Expressed in seconds.
	totalwork	Total amount of work performed by the vehicle during the test measurement period. Expressed in brake horsepower hours.
	w_co	Total carbon monoxide emissions emitted during the test measurement period. Expressed in grams.
	w_co2	Total carbon dioxide emissions during the test measurement period. Expressed in grams.
	w_no	Nitric oxide (NO) emissions during the test measurement period. Expressed in grams.
	w_o2	Total oxygen emissions during the test measurement period. Expressed in grams.
	w_thc	Total hydrocarbon emissions emitted during the test measurement period. Expressed in grams.
ROADTIME	enginerpm	Engine revolutions per minute.
	phase_no	Numerically identifies the phase or portion of the test.
	r_co	Rate of carbon monoxide emissions. Expressed in grams per second
	r_co2	Rate of carbon dioxide emissions measurement. Expressed in grams per second.
	r_no	Rate of nitric oxide (NO) emissions. Expressed in grams per second.
	r_o2	Rate of oxygen emissions measurement. Expressed in grams per second.
	r_thc	Rate of total hydrocarbon emissions. Expressed in grams per second
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	roadsecs	Time within road exhaust emission test, expressed in seconds, beginning of test has roadsecs = 0.
	roadspeed	Vehicle speed. Expressed in miles per hour.
	roadtemp	Ambient temperature. Expressed in degrees Fahrenheit.
	roadtorque	Engine output torque. Expressed in foot pounds.
ROADTRIP	ac_time	Total time the vehicle's air conditioning was turned on by the vehicle operator. Expressed in seconds.
	comp_time	Total time the vehicle's air conditioning compressor was running. Expressed in seconds.
	distance	Total distance traveled during the trip. Expressed in miles.
	heat_index	Heat index of ambient air associated with this trip. Expressed in equivalent degrees Fahrenheit.
	humidity	Absolute ambient air humidity associated with this trip. Expressed in grains of water per pound of dry air.
	idle	Percentage of time at idle
	per_0mph	Percentage of time spent traveling at speed greater than 0 but less than 5 miles per hour.
	per_10mph	Percentage of time spent traveling at least 10 miles per hour but less than 15 miles per hour.
	per_15mph	Percentage of time spent traveling at least 15 miles per hour but less than 20 miles per hour.
	per_20mph	Percentage of time spent traveling at least 20 miles per hour but less than 25 miles per hour.
	per_25mph	Percentage of time spent traveling at least 25 miles per hour but less than 30 miles per hour.
	per_30mph	Percentage of time spent traveling at least 30 miles per hour but less than 35 miles per hour.
	per_35mph	Percentage of time spent traveling at least 35 miles per hour but less than 40 miles per hour.
	per_40mph	Percentage of time spent traveling at least 40 miles per hour but less than 45 miles per hour.
	per_45mph	Percentage of time spent traveling at least 45 miles per hour but less than 50 miles per hour.
	per_50mph	Percentage of time spent traveling at least 50 miles per hour but less than 55 miles per hour.

Entity Name	Entity Attribute Name	Entity Attribute Definition
ROADTRIP	per_55mph	Percentage of time spent traveling at least 55 miles per hour but less than 60 miles per hour.
	per_5mph	Percentage of time spent traveling at least 5 miles per hour but less than 10 miles per hour.
	per_60mph	Percentage of time spent traveling at least 60 miles per hour but less than 65 miles per hour.
	per_65mph	Percentage of time spent traveling at least 65 miles per hour but less than 70 miles per hour.
	per_70mph	Percentage of time spent traveling at least 70 miles per hour but less than 75 miles per hour.
	per_75mph	Percentage of time spent traveling at least 75 miles per hour but less than 80 miles per hour.
	per_80mph	Percentage of time spent traveling 80 miles per hour or more.
	rel_humid	Relative ambient air humidity associated with this trip. Expressed as a percentage of maximum.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	temp	Ambient air temperature associated with this trip. Expressed in degrees Fahrenheit.
	timeonroad	Duration of the trip. Expressed in seconds.
RUNL_BAG	bag_num	Bag number.
	obs_ftemp	Observed fuel tank temperature. Expressed in degrees Fahrenheit.
	purg_flow	Purge air flow volume during this portion of the test. Expressed in liters.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	tank_press	Fuel tank pressure. Expressed in pounds per square inch.
	targ_ftemp	Target fuel tank temperature. Expressed in degrees Fahrenheit.
	w_runl_thc	Total hydrocarbon evaporative emissions, (for this portion of the test). Expressed in grams. Often termed "running loss" emissions.
RUNLOSS	ac_hp	Did dynamometer road load setting for this test include air conditioning load factor? YES, NO, or NUL.
	dynotype	Type of dynamometer used. Legal values defined by DYNOTYPE translation table.
	endcanwght	Observed canister weight at end of test. Expressed in grams.
	norcanwght	Normalized canister weight. Expressed in grams
	obsiftemp	Observed initial fuel tank temperature. Expressed in degrees Fahrenheit.
	odometer	Approximate odometer reading of vehicle at beginning of test. Expressed in miles.
	precond	Type of preconditioning performed on the vehicle prior to the test. Legal values defined by PRECOND translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	road_hp	Dynamometer road load horsepower setting used for this test.
	tarcanwght	Target canister weight. Expressed in grams
	targiftemp	Target initial fuel tank temperature. Expressed in degrees Fahrenheit.
	testwght	Dynamometer inertia weight setting used for this test. Expressed in pounds.
S_INSP	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	system	Identification of an emission component system.
	system_stat	Status of the emission component system. Legal values defined by SYSTEM_S translation table.
SCANSYS1	obd1code	Numeric code resulting from a scan of level 1 on board diagnostic system.
	obd1descr	Narrative explaining significance of individual code resulting from scan of a level 1 on board diagnostic system.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.

Entity Name	Entity Attribute Name	Entity Attribute Definition
SCANSYS2	obd2code	Character string code resulting from a scan of a level 2 on board diagnostic system.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
SCHED_PT	sched_id	Schedule identification.
	sched_type	Schedule type. Legal values defined by SCHED_TY translation table.
	sched_val	Value of the scheduled test parameter at this time in the schedule.
	test_time	Number of seconds from the beginning of the schedule.
SCHEDULE	sched_acc	Maximum acceleration. A calculated summary value which is meaningful only for schedules which have a single schedule type. More generally the maximum value of the slope or first derivative of the schedule. Calculated as the maximum difference between two successive schedule points divided by the number of seconds between successive schedule points.
	sched_avg	Average value of schedule parameter. A calculated summary value which is meaningful only for schedules which have a single schedule type.
	sched_id	Schedule identification.
	sched_len	Number of seconds in schedule. Not necessarily the number of schedule points.
	sched_max	Maximum schedule value. A calculated summary value which is meaningful only for schedules which have a single schedule type.
	sched_name	Complete schedule name.
SMOKETST	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	smoke_acc	Smoke opacity during acceleration portion of test. Expressed as a percentage of light blocked.
	smoke_lug	Smoke opacity during lugging portion of test. Expressed as a percentage of light blocked.
	smoke_peak	Smoke opacity during peak operation portion of test. Expressed as a percentage of light blocked.
SYSTEM	old_syst	Name of field describing this emission component "system" in the old database.
	system	Identification of an emission component system.
	system_d	More lengthy description of the emission component system.
TASK	contract	A number intended to identify the contract, as historically classified, to which a Task belongs.
	p_criteria	Procurement criteria. A categorical attribute with two valid entries: GENERAL or CONDITIONAL. GENERAL pertains to projects where vehicles were accepted for testing without additional, vehicle-condition-specific criteria. For example, a task might intend to recruit 1997 model year light-duty trucks with less than 6,000 pounds gross vehicle weight. If the first truck meeting these criteria and willing to be tested is accepted for testing, then the procurement would be considered GENERAL. (Rejecting vehicles for testing safety reasons is not considered as an additional criteria.) Most EPA test data is usually not procured in a purely random manner. Vehicle class criteria (i.e., model year) is commonly used as a criteria to limit the scope of the procurement and maximize the data sample in the areas of interest. This "non-random" procurement is normally not a problem as long as the analysis of the data is stratified by the vehicle class criteria. CONDITIONAL refers to tasks which included additional, vehicle-condition-specific criteria in addition to any vehicle class criteria. The additional criteria is based on the condition of the vehicle (i.e., mileage, emission level, vehicle owner, etc.) and not the vehicle as manufactured (i.e., fuel injection, catalyst type, model year, etc.). Users should refer to the text of the work assignment which recruited the vehicle to determine the precise conditions used for recruitment.
	program	Test program, as historically classified, to which the Task belonged. This data element formed the "SUFFIX" portion of tablename in an older, non-relational, implementation of this database.

Entity Name	Entity Attribute Name	Entity Attribute Definition
TASK	proto_id	Task number. Field has this name because thought at one point was to call these "protocols".
	task_d	Brief task title or description.
TEST_PRO	has_start	True for test procedures which measure exhaust emissions and which include one or more engine starts. False otherwise.
	hc_method	Hydrocarbon emission measurement method normally used when this test procedure is conducted. e.g. Propane equivalent or hexane equivalent.
	nom_soak	Categorical field characterizing the amount of soak time prior to any engine starts included in the test procedure. Meaningful only for exhaust emission test procedures that include an engine start (HAS_START = .T.). Legal values defined by NOM_SOAK translation table.
	test_pro_d	Brief description of the test procedure.
	test_pro_n	Unique number associated with a test procedure.
	test_proc	Identifies the specific test procedure used. A more detailed classification than RES_KIND. Based largely upon values of TEST_TYPE in earlier design. Conceptually distinct from the driving or operational schedule used.
TESTMEAS	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	measure	Test level measurement.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
TIMEMEAS	evapmins	Time of measurment. Expressed in minutes after start of test.
	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	resultid	Unique number sequentially assigned to each RESULT instance (including all RESULT subtype instances) as it is entered into this database. Number has no other significance.
	time_meas	
VEH_MISC	meas_id	Measurement type identification. Legal values defined by MEASTYPE translation table.
	ms_id	Mobile source identifier. For vehicles their VIN would be used. For engines, their serial number, probably in conjunction with their manufacturer code.
	ms_type	General kind of mobile source: 1 = Vehicle 2 = Engine.
	vehmeas	Vehicle measurement.
VEHICLE	<unknown>	
	ac	Is vehicle equipped with air conditioning? YES, NO, or NUL Intend to change to logical type field when good tool is available.
	axle_ratio	Axle ratio.
	bld_date	Approximate date the vehicle was manufactured. Usually collected to nearest month only with day set to 15.
	canister	Type of canister on vehicle. Legal values defined by CANISTER translation table.
	city_fe	Represents the city fuel economy rating in miles per gallon from the fuel economy guide.
	costd	Carbon monoxide standard level to which vehicle was certified. Expressed in grams per mile.
	creeper	Indicates whether vehicle has creeper gear.
	curbweight	Curb weight in pounds. For on-road vehicles this has a precise definition. For other mobile sources, e.g. non-road vehicles, the unadjusted actual weight of the mobile source is used.
	drv_trn	Represents drive train. Legal values defined by DRV_TRN translation table.
	egr	Does vehicle have exhaust gas recirculation? YES, NO, or NUL.
	eng_fam	Exhaust emission certification family to which this vehicle belongs.
	engmount	Orientation of engine as mounted in the vehicle. Legal values defined by ENGMOUNT translation table.

Entity Name	Entity Attribute Name	Entity Attribute Definition
VEHICLE	evap_fam	EPA standardized evaporative family name as defined in CFR40 Part 86
	evapstd	Evaporative emissions standard to which vehicle was certified. Expressed in grams per mile.
	fuel tanks	Number of fuel tanks on vehicle.
	gears	Number of forward gears in vehicle transmission. Legal values defined by GEARS translation table.
	gvwr	Gross vehicle weight rating in pounds.
	hway_fe	Represents the highway fuel economy rating in miles per gallon from the fuel economy guide.
	lockup	Indicates whether vehicle has lockup transmission.
	make	Vehicle make e.g. Buick, as distinct from vehicle manufacturer, GM. Legal values defined by MAKE translation table.
	model_name	Model name.
	model_yr	Model year.
	modelsize	Represents the EPA Fuel Economy Guide model size category for the vehicle. Legal values defined by MODELSIZ translation table.
	ms_id	Mobile source identifier. For vehicles their VIN would be used. For engines, their serial number, probably in conjunction with their manufacturer code.
	ms_type	General kind of mobile source: 1 = Vehicle 2 = Engine.
	nmhcestd	Non-methane hydrocarbon equivalent standard to which vehicle was certified. Expressed in grams per mile.
	nmhcestd	Non methane hydrocarbon standard level to which vehicle was certified. Expressed in grams per mile.
	noxstd	Oxides of nitrogen standard level to which vehicle was certified. Expressed in grams per mile.
	overdrive	Indicates whether vehicle has overdrive gear.
	pmstd	Particulate matter standard to which vehicle was certified. Expressed in grams per mile.
	purpose	Purpose or use of the mobile source. Addition of this field was motivated by the need to describe the function of non-road vehicles and equipment and will likely be blank for othermobile sources.
	scc	Source classification code.
	standards	Identifies set of emission standards applicable to this vehicle. This field is collected only for older data where there were only a few different standards in existence. Field is not adequate to characterize emission standards applicable to later model year vehicles. Legal values defined by STANDARDS translation table.
	tank_cap	Total fuel tank capacity to nearest gallon. (Includes all tanks.)
	thcestd	Total hydrocarbon equivalent standard to which vehicle was certified. Expressed in grams per mile.
	thcestd	Total hydrocarbon standard level to which vehicle was certified. Expressed in grams per mile.
	tran_type	Transmission type. Legal values defined by TTRNTRAN translation table.
	vehclass	Vehicle class. Legal values defined by VEHCLASS translation table.
WKASSIGN	abstract	DAMT final report for this work effort.
	alternate	Alternate EPA contract person, initially the alternate work assignment manager, responsible for the work assignment and who can be contacted for additional information about it.
	contractor	Name of contractor.
	epa_contno	EPA Contract Number of the contract to which the work assignment belongs.
	epa_wano	Work assignment number, as it appears in EPA contracts function. e.g. "2_05"
	epacontact	EPA contract person, initially the work assignment manager or WAM, responsible for the work assignment and who can be contacted for additional information about it.
	fiscalyr	Fiscal Year of work assignment.
	frpt_fname	Name of file containing contractor's final report.
	no_msource	Number of mobile sources the work assignment is intended to procure or test.

Entity Name	Entity Attribute Name	Entity Attribute Definition
WKASSIGN	p_criteria	<p>Procurement criteria. A categorical attribute with two valid entries: GENERAL or CONDITIONAL.</p> <p>GENERAL pertains to projects where vehicles were accepted for testing without additional, vehicle-condition-specific criteria. For example, a task might intend to recruit 1997 model year light-duty trucks with less than 6,000 pounds gross vehicle weight. If the first truck meeting these criteria and willing to be tested is accepted for testing, then the procurement would be considered GENERAL. (Rejecting vehicles for testing safety reasons is not considered as an additional criteria.)</p> <p>Most EPA test data is usually not procured in a purely random manner. Vehicle class criteria (i.e., model year) is commonly used as a criteria to limit the scope of the procurement and maximize the data sample in the areas of interest. This "non-random" procurement is normally not a problem as long as the analysis of the data is stratified by the vehicle class criteria.</p> <p>CONDITIONAL refers to tasks which included additional, vehicle-condition-specific criteria in addition to any vehicle class criteria. The additional criteria is based on the condition of the vehicle (i.e., mileage, emission level, vehicle owner, etc.) and not the vehicle as manufactured (i.e., fuel injection, catalyst type, model year, etc.). Users should refer to the text of the work assignment which recruited the vehicle to determine the precise conditions used for recruitment.</p>
	sow_fname	Name of file containing the SOW for this work assignment. Additional filing conventions at any point in time, would be combined with this information to find the actual document. The SOW is not as likely to be updated as the project progresses as the workplan and the work assignment report.
	wa_desc	Longer, descriptive name of the work assignment.
	wa_id	Work Assignment (or equivalent for TSD) name.
	wp_fname	Name of file containing the contractor's approved work plan for this work assignment. Filing conventions in effect at a given point in time, in combination with this file name, would allow one to find the document.

Listings of Some Important Tables

- Listing of All Category Translation Tables (Legal Value Lists)
- Work Assignments (WKASSIGN)
- Test Procedures (TEST_PRO)
- Test Schedules (SCHEDULE)
- Kinds of Fuel (FUEL)
- Disablements (DISABLE)
- Test Procedure Modifications (TEST_MOD)
- Special Measurements (MEASTYPE)
- Chassis Test Modes (MODE_ID)
- Engine Dynamometer Test Modes (ENGMODE)

Listing of Category Tables in MSOD

01/04/2000

Fieldname	Tablename	Categtable	Categfield
<hr/>			
AIRFUEL	ENGINE	AIRFUEL	AIRFUEL
AIR_INJ	M_SOURCE	AIR_INJ	AIR_INJ
ASPIRATED	M_SOURCE	ASPIRATE	ASPIRATED
CANISTER	VEHICLE	CANISTER	CANISTER
CAT_TYPE	M_SOURCE	CAT_TYPE	CAT_TYPE
COMPANY	M_SOURCE	COMPANY	COMPANY
COOLING	ENGINE	COOLING	COOLING
CUTPOINTS	PROCURE	CUTPOINT	CUTPOINTS
DISABLE	RESULT	DISABLE	DISABLE
DRV_TRN	VEHICLE	DRV_TRN	DRV_TRN
DRV_TYPE	OWNERQST	DRV_TYPE	DRV_TYPE
DYNOTYPE	DYNOTEST	DYNOTYPE	DYNOTYPE
DYNOTYPE	RUNLOSS	DYNOTYPE	DYNOTYPE
EGR	VEHICLE	YESNO	YESNO
EGR_TYPE	ENGINE	EGR_TYPE	EGR_TYPE
ENGMOUNT	VEHICLE	ENGMOUNT	ENGMOUNT
ENG_CLASS	ENGINE	ENG_CLAS	ENG_CLASS
ENG_CYCLE	ENGINE	ENG_CYCL	ENG_CYCLE
FIXES	PROCURE	FIXES	FIXES
FI_METH	ENGINE	FI_METH	FI_METH
FI_TYPE	M_SOURCE	FI_TYPE	FI_TYPE
FUELTYPE	M_SOURCE	FUELTYPE	FUELTYPE
FUEL_DELIV	M_SOURCE	FUEL_DEL	FUEL_DELIV
FUEL_ID	RESULT	FUEL	FUEL_ID
GEARS	VEHICLE	GEARS	GEARS

Fieldname	Tablename	Categtable	Categfield
HOW_LONG	OWNERQST	HOW_LONG	HOW_LONG
IGNITION	M_SOURCE	IGNITION	IGNITION
IM240_PF	PROCURE	IM240_PF	IM240_PF
IM_STATUS	OWNERQST	IM_STAT	IM_STATUS
INSTRSYS	ROADTEST	INSTRSYS	INSTRSYS
LF_WEAR	PROCURE	LF_WEAR	LF_WEAR
LITEACTION	OWNERQST	LITEACT	LITEACTION
MAKE	VEHICLE	MAKE	MAKE
MAPTYPE	ENGINMAP	MAPTYPE	MAPTYPE
MEAS_ID	BAG_MEAS	MEASTYPE	MEAS_ID
MEAS_ID	EMODMEAS	MEASTYPE	MEAS_ID
MEAS_ID	FUELCHER	MEASTYPE	MEAS_ID
MEAS_ID	MODEMEAS	MEASTYPE	MEAS_ID
MEAS_ID	RATEMEAS	MEASTYPE	MEAS_ID
MEAS_ID	REP_MEAS	MEASTYPE	MEAS_ID
MEAS_ID	TESTMEAS	MEASTYPE	MEAS_ID
MEAS_ID	VEH_MISC	MEASTYPE	MEAS_ID
MODEID	DYNORATE	MODE_ID	MODE_ID
MODEID	RATEMEAS	MODE_ID	MODE_ID
MODELSIZE	VEHICLE	MODELSIZ	MODELSIZE
MODENAME	EMODMEAS	ENGMODE	MODENAME
MODENAME	ETSTMODE	ENGMODE	MODENAME
MODE_ID	DYNOMODE	MODE_ID	MODE_ID
MODE_ID	MODEMEAS	MODE_ID	MODE_ID
MODE_ID	MODETIME	MODE_ID	MODE_ID
NOM_SOAK	TEST_PRO	NOM_SOAK	NOM_SOAK
OBDLEVEL	OBDSCAN	OBDLEVEL	OBDLEVEL

Fieldname	Tablename	Categtable	Categfield
PART	PC_INSP	PART	PART
PART	P_INSP	PART	PART
PART_CODE	PC_INSP	PARTCODE	PART_CODE
PART_STAT	P_INSP	PART_STA	PART_STAT
PRECOND	DYNOTEST	PRECOND	PRECOND
PRECOND	EVAPTEST	PRECOND	PRECOND
PRECOND	RUNLOSS	PRECOND	PRECOND
PRESSTAT	PRESSTST	PRESSTAT	PRESSTAT
PRESSURE	PROCURE	PRESSURE	PRESSURE
PROC METH	PROCURE	PROC METH	PROC METH
PROC_MATCH	PROCURE	PROC_MAT	PROC_MATCH
PROTO_ID	RESULT	TASK	PROTO_ID
PURGE	PROCURE	PURGE	PURGE
P_CRITERIA	TASK	P_CRITER	P_CRITERIA
P_CRITERIA	WKASSIGN	P_CRITER	P_CRITERIA
REFSPEED	EMGMODE	REFSPEED	REFSPEED
REP_TYPE	REPAIR	REP_TYPE	REP_TYPE
RES_KIND	RESULT	RES_KIND	RES_KIND
RF_WEAR	PROCURE	RF_WEAR	RF_WEAR
ROUTE	ROADTEST	ROUTE	ROUTE
SCHED_ID	RESULT	SCHEDULE	SCHED_ID
SCHED_TYPE	SCHED_PT	SCHED_TY	SCHED_TYPE
SITE	RESULT	SITE	SITE
STANDARDS	VEHICLE	STANDARD	STANDARDS
START_EMIS	ROADPHAS	YESNO	YESNO
STATETEST	PROCURE	STATETES	STATETEST
SYSTEM	S_INSP	SYSTEM	SYSTEM

Fieldname	Tablename	Categtable	Categfield
SYSTEM_STA	S_INSP	SYSTEM_S	SYSTEM_STA
SYST_REP	REPAIR	SYST_REP	SYST_REP
TEST_MODIF	RESULT	TEST_MOD	TEST_MODIF
TEST_PROC	RESULT	TEST_PRO	TEST_PROC
TRAN_TYPE	VEHICLE	TRAN_TYP	TRAN_TYPE
TRIP2LAB	OWNERQST	TRIP2LAB	TRIP2LAB
VEHCLASS	VEHICLE	VEHCLASS	VEHCLASS
VEH_STATE	ROADPHAS	VEH_STAT	VEH_STATE
WA_ID	RESULT	WKASSIGN	WA_ID

WA_ID	EPA_CONTNO	EPA_WANO	CONTRACTOR	FISCALYR	NO_MSOURCE	WORK_ASSIGNMENT_DESCRIPTION
AAMA_A					3534	AAMA in uses vehicle FTP test data used for Mobile
78TO81LDVS	68-03-3024		EG&G	1981	300	A Study of Emissions from Light Duty Vehicles in S
NEW_TEC_DC	68-03-3202	1	EG&G	1984	80	Inspection and Maintenance of New Technology ehic
NEW_TEC_MD	68-03-3222	1 & 2	EG&G	1985	107	Inspection and Maintenance of New Technology Vehic
WAIVER_VEH	68-03-3222	3	EG&G	1986	43	Incremental Emission Benefits of Repairing I/M Wai
IM_VARIABL	68-03-3222	4	EG&G	1986	103	I/M Test Variability (Task 45)
OBD_TYPE_I	68-03-3436	1	EG&G	1987	27	Comparison of On-Board I Diagnostics to Tailpipe I
AFTER_MRK	3380/3436	?&2	EG&G	1987	24	TESTING FOR EFFECTIVENESS OF NEW AFTERMARKET CATA
RUNLOSS_Y	68-C9-0041	2-01	ATL	1992	36	CONTINUED EFFORTS TOWARDS "FUEL, CYCLE, TEMPERATUR
RUNLOSS_Z	68-C9-0041	2-02	ATL	1992	28	CONTINUED EFFORTS TOWARDS "FUEL, CYCLE, TEMPERATUR
AC_ACTIV_A	68-C2-0125	1-01	ATL	1994	19	Study of In-Use Air-Conditioner Operation in Phoen
IM+HAMMOND	68-C3-0370	0-5	ATL	1994	2175	Operation of an Enhanced I/M Lane in Indiana
IM+SBEND	68-C3-0370	0-6	ATL	1994	121	Laboratory Testing of IM-Lane Recruited Vehicles i
RWHS_01	68-C5-0006	0-02	ATL	1995	180	Real World Hot Soak Testing - First Work Assignmen
RWHS_02	68-C5-0006	0-07	ATL	1996	6	Real World Hot Soak Testing - Second Work Assignme
RWHS_03	68-C5-0006	0-11	ATL	1996	15	Real World Hot Soak Testing - Third Work Assignmen
LDV_A	68-C5-0006	1-06	ATL	1997	25	25 LDVs/LDTs MY1991+ exhaust emissions using FTP a
LDV_AC_A	68-C5-0006	1-03	ATL	1997	62	LDVs/LDTs on 14 different driving cycles with both
HIMILE_A	68-C5-0006	1-04	ATL	1997	25	25 LDVs/LDTs with high mileage (>100,000 miles) be
EVAP_A	EPA	97-2	NVFEL	1997	4	4 LDTs and 1 LHDT with evaporative emission tests
CYCLES_A	EPA	97-1	NVFEL	1997	44	LDVs and LDTs on 14 different driving cycles with
GRANT97_NY			NYSTATE	1997	35	Characterization and Control of HD Diesel Vehicle
LHDT_LDT	68-C5-0006	2-05	ATL	1998	46	Task 1: 26 LHDTs tested on 8 facility cycles & FT
OBD_A	68-C5-0006	2-10	ATL	1998	48	55 OBD Equipped MY96+ that failed IM240 in AZ are
CRCE_24_1G	NONE	NONE	CDPHE	1998	171	Measurement of Exhaust Particulate Matter Emission
CRCE_24_1C	NONE	NONE	CDPHE	1998	24	Measurement of Exhaust Particulate Matter Emission
CRCE_24_2G	NONE	NONE	CE-CERT	1998	109	Measurement of Primary Particulate Matter Emission
CRCE_24_2C	NONE	NONE	CE-CERT	1998	39	Measurement of Primary Particulate Matter Emission
GRANT98_CO	X-		CIFER	1998		To Determine the Emissions Benefits and Costs of a
LDV_AC_B			GM	1998	1	One EPA'S LDV (correlation vehicle) sent to GM's R
TIER_1	EPA	98-1	NVFEL	1998	35	35 LDVs/LDTs (15 lLDVs/20 LDTs) Having Tier 1 emi
LHDT_A	EPA	98-2	NVFEL	1998	10	10 LHDTs (40 originally planned) on 8 driving cy
LHDT_EVAP	EPA	98-3	NVFEL	1998	4	LHDTs with evaporative emission tests at 3 differe
98N2OA	EPA	98-4	NVFEL	1998	23	Nitrous Oxide (N2O) Study on Tier 1 LDVs, LDTs, a
NONROAD_1	68-C5-0077	2-02	SWRI	1998	10	10 HDEs (agricultural/construction) tested on nonr

WA_ID	EPA_CONTNO	EPA_WANO	CONTRACTOR	FISCALYR	NO_MSOURCE	WORK_ASSIGNMENT_DESCRIPTION
CRCE_24_3G	NONE	NONE	SwRI	1998	61	Measurement of Primary Particulate Matter Emission
CRCE_24_3C	NONE	NONE	SwRI	1998	7	Measurement of Primary Particulate Matter Emission
NONR_RECMA				1999	0	Study on nonroad recreational vehicles/engines (SI
GRANT99_NR	X-			1999		Methods for Estimating Construction Equipment Acti
LHDT_C	68-C5-0006	3-11	ATL	1999	18	18 LHDTs (GVWR 8,500 - 14,000 lbs) on 99efset plu
CE_CERT_B	CX827312010		CECERT	1999	7	Investigation of Exhaust Emissions from LHDVs (Die
CE_CERT_A	CX827312010		CECERT	1999	1	Correlation of Diesel Truck In-Use Emission Test P
LHDT_B	EPA 99-3		NVFEL	1999	2	12 LHDTs (GVWR 8,500 - 10,000 lbs) on 99efset plu
LHDT_EVAPB	EPA 99-1		NVFEL	1999	0	10 LHDTs (GVWR 8,500 - 14,000 lbs) with evaporati
LDV_EVAPB	EPA 99-2		NVFEL	1999	0	30 LDVs (15 LDVs and 15 LDTs) with evaporative emi
LDV_T1SA	EPA 99-4		NVFEL	1999	0	10 Tier 1 (LDVs and LDTs) on 99efset plus 8 differ
NONROAD_2	68-C-98-158	0-01	SWRI	1999	8	Development of Excavator emission duty cycle;
ROVER_A	68-C-98-158	0-03	SWRI	1999	8	Study on determine the viability of gathering onbo
LHDDT_A	68-C-98-158	0-02	SWRI	1999	6	Testing 6 vehicles (GVWR8,501-19,500 lbs) over 10
NONROAD_3	68-C-98-169	0-03	SWRI	1999	10	EPCD's 10 nonroad engine dyno tests on nonroad fue
CDHOT_PM_A	68-C9-0041	0-1	ATL	2000	600	The testing of 600 in-use vehicles at Phoenix IM 1
TIER_1_B	68-C-99-241	0-03	ATL	2000	15	Testing 15 gasoline vehicles/trucks/SUVs over diff
TRUCK_DF00	68-C-99-241	0-07	ATL	2000	23	The re-recruitment and re-testing of 23 previously
HD_PM_FAIL	68-C-98-169	0-13	SWRI	2000	1	Investigation of Exhaust Emissions on Induced PM F
LHDDT_B	68-C-98-158	1-01	SWRI	2000	8	Testing 8 diesel vehicles (GVWR8,501-19,500 lbs) o

TEST_PROC TEST_PRO_N TEST_PRO_D

IDLEI	3	Mechanic's Idle Inspection - usually prior to FTP
FTP	5	Federal Test Procedure
BL_1A	6	1 Hour Breathing Loss Evap Test - Gas Cap Left On
BGID	7	Bag Idle Test
50MPH	8	50 MPH Cruise Mode Test
HFET	9	Highway Fuel Economy Test
4MID	10	Four Mode Idle Test (Idle, Idle @2500, Idle again, Idle in Drive
L2M	11	Loaded 2 mode test, idle and 30mph.
RSID	17	Restart Idle Test Data (as defined by 40 CFR 85-2210)
SPEED	20	EPA Speed Correction Cycle Test (Any of Several, e.g. LSP1-3 or SC12, SC36)
NYCC	22	New York City Cycle Test
BGDR	23	Bag Idle-in-Drive Test
C226	24	Colorado Dept. of Health 226 Second Test
XSI	31	Extended special idle test; Involves 24 steps; Data stored at MODETIME level.
ST0HS	33	Hot start ST01
ST0HR	34	Hot Running ST01
MLA4	46	Running loss evap/exhaust emission test, based on repeated runs of LA4 Schedule
MNYCC	50	Running loss evap/exhaust emission test, based on repeated runs of NYCC Schedule
MHFET	51	Running loss evap/exhaust emission test, based on repeated runs of HFET Schedule
IM24	52	IM240 Test Data
UFTP	53	Uncut Federal Test Procedure
IM24B	56	IM240 Test - Restricted Range of Test Weight Values
C226B	58	Colorado Dept of Health 226 Second Test - Restricted Range of Test Weight Values
505HS	62	Hot Start 505
FLA4	63	Facilty cycle LA4
3REST	64	3 Hour Resting Loss Evap Emissions Test (Follows 1 Hour Hot Soak)
IM387	65	IM387 Test Results (3 bag IM240)
ATD	66	Ambient temp diurnal evap test , shed temp const. , vehicle begins 24 deg cooler
4HD	67	Four Hour Diurnal Test
HSOAK	68	1 Hour Hot Soak Evap Test
CASPD	70	California Speed Correction Cycle Test (any of 10 driving schedules)
US06	81	High Speed 4th Bag of FTP
LA9HR	93	California unified cycle test , conducted as a 1 bag test , without start
ST01	96	Engine Start cycle test
505HR	97	First bag of FTP - engine on
ASM	98	Acceleration Simulation Mode Test Procedure
FACIL	100	Roadway Facility Cycle Test

TWOSP	101	Two Speed Idle Test
2SOAK	102	2 Hour Hot Soak Evap Test
48RTD	103	48 Hour Real Time Diurnal
IRTD	104	Interrupted 24 hour real time diurnal
HSLA4	105	Hot Start LA4, LA4 is first two bags of FTP
BL_1B	106	1 Hour Breathing Loss Evap Test - Canister As Recd
24RTD	107	24 Hour Real Time Diurnal
STEAD	108	Steady State Driving
33RTD	109	33 Hour Real Time Diurnal
72RTD	110	72 Hour Real Time Diurnal
IMIDL	111	Official State I/M Idle Emissions Test
IM2MO	112	Official State I/M 2 Mode Idle Emissions Test (Idle@2500 plus Idle)
ASMTK	113	ASM Performed On LHDTs With Emissions Averaged On Last 10 Seconds Of Each Mode
IM2LO	114	Official State I/M 2 Mode Loaded Emissions Test (30mph plus idle)
XRSID	117	Restart Idle Test - No Exhaust Measurements Taken
38RTD	118	38 Hour Real Time Diurnal
XIM24	152	IM240 Test - No Exhaust Measurements Taken
ACSUR	184	Air conditioning activity survey as performed in WA_ID = "AC_ACTIV_A"
DROVE	185	Vehicle with on-board exhaust instruments, driven on chassis dynamometer
SROVE	186	Vehicle with on-board exhaust instruments, driven on schedule-like road route
RROVE	187	Vehicle with on-board exhaust instruments, driven on road route
CRLOS	188	Vehicle Certification Running Loss Emissions Test
HD_DT	189	Heavy Duty Diesel Transient Test as def by 40 CFR Part 86
USMOK	190	U.S. Smoke Cycle Test, as def by 40 CFR 86.884, Subpart I
SMOKI	191	opacity smoke test procedure as def by ISO 8178-9
SIACC	192	Snap-Idle Acceleration test procedure as def by SAE J-1667
40MOD	193	40 mode, steady state engine dyno test. (1 idle, 3 E3 marine, 36 load matrix)
8M_C1	194	8 mode, steady state engine certification test as defined in CFR
28MOD	195	28 mode, steady state engine dyno test as def. by Contract 68-65-0077, Task 2-2
NONR2	196	Engine dyno transient test as defined by Contract 68-65-0077; amended Task 2-2
NONR1	197	Engine dyno transient test as defined by Contract 68-65-0077; orig. Task 2-2
PRESC	198	Evap system pressure check - Done at fuel cap.
PREST	199	Evap System Pressure Check - Done at fuel tank.
SC03	200	SC03 Air Conditioning Simulation as specified in 40 CFR 86.160-00 thru 161-00
SC03A	201	SC03 AC1 Air Conditioning Simulation as specified in 40 CFR 86.160-00 to 162-00
SC03B	202	SC03 AC2 Air Conditioning Simulation as specified in 40 CFR 86.160-00 to 162-00
SFTP	203	Calculation (only) of composite SFTP emissions as specified in 40 CFR 86.164
5MILE	204	Chassis dynamometer test using West Virginia 5 Mile Route
CBD	205	Chassis dynamometer test using the Central Business District Schedule
HD_DR	206	Heavy Duty Diesel Transient Test with driving schedule "routinized"

SCHED_ID	SCHEDULE DESCRIPTION
20_40	drive first half at 20 miles per hour, second half at 40 mph steady state d
20_MPH	20 mile per hour steady state driving
30_MPH	30 mile per hour steady state driving
3LA4	three LA4 schedules, run in succession
40_MPH	40 mile per hour steady state driving
45_MPH	45 mile per hour steady state driving
50_MPH	50 mile per hour steady state driving
55_MPH	55 mile per hour steady state driving
5HWFET	five HWFET schedules, run in succession
5MILE	West Virginia 5 Mile Route
60_MPH	60 mile per hour steady state driving
65_MPH	65 mile per hour steady state driving
6NYCC	six NYCC schedules, run in succession
SCHED_ID	EXP_2
70_MPH	70 mile per hour steady state driving
75_MPH	75 mile per hour steady state driving
80_MPH	80 mile per hour steady state driving
85_MPH	85 mile per hour steady state driving
90_MPH	90 mile per hour steady state driving
95_MPH	95 mile per hour steady state driving
AGRIC	agricultural tractor cycle
ARB02	ARB weighted aggressive driving(non-FTP) cycle
ART-AB	level of service A & B arterial/collector simulation inventory cycle(24.8mp
ART-CD	level of service C & D arterial/collector simulator inventory cycle(19.2mph
ART-EF	level of service E & F arterial/collector simulation inventory cycle(11.6mp
BAKHO	backhoe-loader cycle
CAART1	california arterial1(14.35mph)
CAART2	california arterial2(24.05mph)
SCHED_ID	EXP_2
CAART3	california arterial3(34.22mph)
CACYC1	california freeway speed correction1(60.09mph)
CACYC2	california freeway speed correction2(53.37mph)
CACYC3	california freeway speed correction3(40.89mph)
CACYC4	california freeway speed correction4(31.35mph)
CACYC5	california freeway speed correction5(23.92mph)

CACYC6	california freeway speed correction6(16.50mph)
CACYC7	california freeway speed correction7(9.11mph)
CBD	Central Business District
CDH226	colorado department of health(22.32mph)
CRAWL	crawler tractor cycle
CRLOS	light duty vehicle certification running loss emission test schedule
CY106	shed temperature pattern - nominally constant at 106 degrees F.
CY6084	real time diurnal temperature pattern - range 60 to 84 degrees Fahrenheit
SCHED_ID	EXP_2
CY7296	real time diurnal temperature pattern - range 72 to 96 degrees Fahrenheit
CY8210	real time diurnal temperature pattern - range 82 to 106 degrees Fahrenheit
CY84	shed temperature pattern - nominally constant at 84 degrees F.
CY8484	real time diurnal temperature pattern - temperature range 72 to 96 degrees
CY96	shed temperature pattern - nominally constant at 96 degrees F.
DIURB2	temperature rise for 1 hour diurnal evap emission test at elevated tempera
DIURB3	temperature rise for 1 hour diurnal evap emission test at elevated tempera
DIURBL	standard temperature rise for 1 hour diurnal (or breathing loss) evaporativ
F505	bag 1 of federal test procedure(25.55mph)
FTP	federal test procedure(19.53mph), also referred to as the UDDP schedule
FWY-AC	level of service A through C(free flow) freeway simulation inventory cycle(
FWY-D	level of service D freeway simulation inventory cycle(52.9mph)
FWY-E	level of service E freeway simulation inventory cycle(30.5mph)
FWY-F	level of service F freeway simulation inventory cycle(18.6mph)
SCHED_ID	EXP_2
FWY-G	level of service G freeway simulation inventory cycle(13.1mph)
FWY-HI	high-speed freeway cycle(63.18mph)
HWFET	highway fuel economy test(48.14mph) -control cycle
IM240	inspection/maintenance 240(29.38mph)
IM386	inspection/maintenance 386(31.31mph)
LA4	Bags 1 and 2 of the FTP, also referred to as the UDDP schedule
LA92	california unified cycle(areawide driving simulation inventory cycle
LOCAL	urban local facility driving simulation inventory cycle(12.9mph)
LSP1	low speed 1(2.51mph)
LSP2	low speed 2(3.54mph)
LSP3	low speed 3(4.11mph)
NA	No schedule is applicable to this RESULT
NONFRW	areawide non-freeway cycle(19.35mph)
NYCC	(new york city cycle(7.04mph)
SCHED_ID	EXP_2

RAMP	freeway ramp simulation inventory cycle(34.58mph)
REM01	EPA weighted "FTP-like" cycle
REP05	EPA weighted aggressive driving(non-FTP) cycle
RTLHSP	RUBBER TIRE LOADER HIGH SPEED TRANSIENT DUTY SCHEDULE
RTLHTQ	RUBBER TIRE LOADER HIGH TORQUE TRANSIENT DUTY SCHEDULE
RTL_T1	RUBBER TIRE LOADER TYPICAL 1 DUTY SCHEDULE
RTL_T2	RUBBER TIRE LOADER TYPICAL 2 DUTY SCHEDULE
SC03	SFTP air conditioning compliance cycle(EPA and ARB)
SCC12	speed correction cycle12(11.67mph)
SCC36	speed correction cycle36(36.47mph)
SSLHSP	SKID STEER LOADER HIGH SPEED TRANSIENT SCHEDULE
SSLHTQ	SKID STEER LOADER HIGH TORQUE TRANSIENT DUTY SCHEDULE
SSL_T1	SKID STEER LOADER TYPICAL 1 DUTY SCHEDULE
SSL_T2	SKID STEER LOADER TYPICAL 2 DUTY SCHEDULE
SCHED_ID	EXP_2
ST01	EPA start cycle - first 1.4 miles of SC03
UDDS_D	URBAN DYNAMOMETER DRIVING SCHEDULE FOR HEAVY DUTY VEHICLES
UNCFTP	uncut federal test procedure(21.25mph)
UNIF01	EPA unified cycle
US06	SFTP aggressive driving compliance cycle(EPA and ARB)
WELHSP	ARC WELDER HIGH SPEED TRANSIENT DUTY SCHEDULE
WELHTQ	ARC WELDER HIGH TORQUE TRANSIENT DUTY SCHEDULE
WEL_T1	ARC WELDER TYPICAL 1 DUTY SCHEDULE
WEL_T2	ARC WELDER TYPICAL 2 DUTY SCHEDULE
X_CAV	EXCAVATOR SCHEDULE

FUEL_ID	FUELNAME	OXYGENATE	WTOXYGEN	RVP	SULFERLOW	SULFERHIGH
0	Tank (Whatever came with vehicle)		99.9	99.9	99999	99999
1	Low RVP Test Gasoline	none	0.0	6.3	99999	1000
2	Low RVP Test Gasoline	none	0.0	6.7	99999	99999
3	Low RVP Test Gasoline	none	0.0	6.9	99999	99999
6	Unleaded Test Gasoline (96 RON) (CFR 86.113-91(a))		0.0	9.0	0	1000
9	Diesel Fuel		99.9	99.9	800	1200
10	California Phase II Gasoline	MTBE	2.0	7.0	99999	40
11	California Diesel	none	99.9	99.9	99999	500
16	Unleaded Test Gasoline (11.7 RVP)	none	0.0	11.7	99999	99999
18	Gasohol (8.8 RVP)	ethanol	3.4	8.8	99999	99999
22	Unleaded Test Gasoline (10.5 RVP)	none	0.0	10.5	99999	99999
30	Non-Oxygenated Baseline Fuel - 7.7. RVP	none	0.0	7.7	99999	99999
31	Oxygenated Baseline Fuel, 8.7 RVP, 10% ethanol splash-blended into Fuel_Id 30	ethanol	3.4	8.7	99999	99999
32	Gasahol (10 % ethanol) , RVP = 7.7	ethanol	3.4	7.7	99999	99999
33	Gasoline with MTBE, RVP = 7.7	MTBE	99.9	7.7	99999	99999
43	Clean Air Act Baseline Gasoline	none	0.0	8.8	304	354
44	Federal Phase II Gasoline	MTBE	2.0	7.0	130	140
45	Oxygenated Test Gasoline	MTBE	3.0	9.0	99999	99999
46	Oxygenated Test Gasoline	MTBE	99.9	9.0	99999	99999
48	Phase I Low Sulfur Gasoline	MTBE	2.3	8.8	99999	99999
49	Phase I Gasoline	MTBE	2.0	8.0	99999	99999
50	Low T-90 Unleaded Gasoline	none	0.0	8.7	99999	99999
51	Gasohol (9.0 RVP)	ethanol	3.4	9.0	99999	99999
60	Unleaded Test Gasoline (96 RON) 50-80 PPM SULFUR	none	0.0	9.0	50	80
61	Unleaded Test Gasoline (96 RON) 140-160 PPM SULFUR	none	0.0	9.0	140	160
62	Unleaded Test Gasoline (96 RON) 330-370 PPM SULFUR	none	0.0	9.0	330	370
63	Unleaded Test Gasoline (96 RON) 620-680 PPM SULFUR	none	0.0	9.0	620	680
64	Oxynol 50 MeOH, EtOH		2.6	9.1	99999	99999
65	Oxynol MeOH, TBA		2.7	8.8	99999	99999
66	Unleaded Test Gasoline (7.0 RVP)	none	0.0	7.0	99999	99999
67	Unleaded Test Gasoline (11.0 RVP)	none	0.0	11.0	99999	99999
69	Commercial Fuel Used by Southwest (id EM-616-F)	none	0.0	9.2	99999	99999
70	High RVP Gasoline		99.9	14.6	99999	99999
71	Special gasoline, with T40 point = 160 deg F		99.9	10.4	99999	99999
72	Special gasoline, with T40 point = 160 deg F		99.9	9.0	99999	99999

FUEL_ID	FUELNAME	OXYGENATE	WTOXYGEN	RVP	SULFERLOW	SULFERHIGH
73	Gasohol (11.8 RVP)	ethanol	3.4	11.8	99999	99999
74	Special gasoline (with MTBE, 12.2 RVP)	MTBE	99.9	12.2	99999	99999
75	Special gasoline (10 RVP)	none	0.0	10.0	99999	99999
76	Gasohol (9.8 RVP)	ethanol	3.4	9.8	99999	99999
77	Oxygenated Test Gasoline	MTBE	99.9	9.5	99999	99999
78	Diesel(0.034WT% SULFUR)40 CFR86.1313-94(b)(2) Type 2-D	none	99.9	99.9	300	500
79	Non-Road Grade Diesel (high sulfur)	none	99.9	99.9	500	5000
80	Base formula fuel	none	0.0	8.7	99999	99999
81	Low RVP Fuel	none	0.0	8.0	99999	99999
82	Low Sulfur Fuel	none	0.0	8.7	99999	99999
83	Low Sulfur, Low RVP, Low T90 Fuel	none	0.0	8.0	99999	99999
84	Baseline Fuel, 32% aromatics, 1.5% benzene	none	0.0	8.7	99999	99999
85	Formula Fuel with Ethanol	ethanol	99.9	8.1	99999	99999
86	Formula Fuel with MTBE	MTBE	99.9	8.1	99999	99999
87	High T50 Fuel with MTBE	MTBE	99.9	8.1	99999	99999
88	High T90 Fuel with MTBE	MTBE	99.9	8.1	99999	99999
89	MTBE, Heavy Ends, Predominately Aromatics	MTBE	99.9	8.1	99999	99999
90	MTBE, High T90, Cutting out Heaviest 10%, float olefin and aromatic level.	MTBE	99.9	8.1	99999	99999
91	MTBE, Low Olefins (2% max)	MTBE	99.9	8.1	99999	99999
92	MTBE, Low Olefins, (2% max), Low Sulfur (65ppm)	MTBE	99.9	8.1	99999	65
93	Low RVP, MTBE, Low Olefins, Low Sulfur	MTBE	99.9	7.0	99999	99999
94	Calif. Phase II, low RVP and Sulfur, Olefins 5-7%, Aromatics 20-25%, From ARCO		99.9	7.0	99999	50
95	Low RVP, With MTBE, Low Olefins, Low Sulfur	MTBE	99.9	7.0	99999	9999
96	Diesel 40 CFR86.1313-94(b)(2) Type 2-D		99.9	99.9	300	500
97	ULTRA LOW DIESEL TYPE 2 , 1.1 PPM SULFUR(EM-2866-F)		0.0	0.0	0	10

DISABLE	DISABLE_N	DISABLE_D
0	0	NO DISABLEMENT
1	1	FUEL CAP REMOVED
2	2	EVAP CANISTER REMOVED
3	3	FUEL CAP AND EVAP CANISTER REMOVED
4	4	CATALYST REMOVED
5	5	AIR CONDITIONING TURNED ON
6	6	WET TIRES
7	7	TEST WEIGHT = $ETW + 1/3 (GVWR-ETW)$
8	8	TEST WEIGHT = $ETW + 2/3 (GVWR-ETW)$
9	9	TEST WEIGHT = GVWR
10	10	TEST WEIGHT = $ETW + 1/2 (GVWR-ETW)$
11	11	EGR DISABLED
12	12	AIR PUMP REMOVED
13	13	CATALYST AND AIR PUMP REMOVED
14	14	AIR PUMP DISABLED
15	15	EVAP CANISTER ISOLATED OUTSIDE SHED
16	16	OXYGEN SENSOR DISCONNECTED
17	17	OXYGEN SENSOR DISCONNECTED, LEAD SHORTED
18	18	COOLANT TEMPERATURE SENSOR DISCONNECTED
19	19	THROTTLE POSITION SENSOR DISCONNECTED
20	20	EVAP CANISTER DISCONNECTED/OPEN

TEST_MODIF	TEST_MOD_D
0	None
1	Auxiliary Fan Used
2	Old EOD Drain Hosing Used
3	20% Fuel Fill
4	60% Fuel Fill
5	80% Fuel Fill
6	Tested at much less than curbweight
7	Solar Loading Used (CFR 86.161-00)

MEAS_ID	MEAS_DESCR	ENGINEERING UNITS
API_GRAVIT	Degrees API	Degrees API
AROMATICS	Aromatic Content	%volume
BENZENE	Benzene Content	%volume
BHPH	Work performed	Brake horsepower-hour
C000050000	Formaldehyde	Milligrams/Mile
C000050328	Benzo(a)pyrene emissions	Micrograms/Mile
C000053703	Dibenz(a,h)anthracene	Micrograms/Mile
C000056553	Benz(a)anthracene emissions	Micrograms/Mile
C000075070	Acetaldehyde	Milligrams/Mile
C000193395	Indeno(1,2,3-c,d)pyrene	Micrograms/Mile
C000205492	Benzo(b)fluoranthene emissions	Micrograms/Mile
C000207089	Benzo(k)fluoranthene emissions	Micrograms/Mile
C000218019	Chrysene emissions	Micrograms/Mile
C007664417	Ammonia	Milligrams/Mile
CETINDEX	Cetane Index	
CETNUM	Cetane number	
CHOKEMEAS	Choke notch setting observed	Notches lean (-), On index (0), or Rich (+); -99=s
CHOKESPEC	Choke notch setting specified	Notches lean (-), On index (0), or Rich (+); -99=s
CLOUDPOINT	Cloudpoint	deg. F
C_O2	Oxygen concentration	Percent
DENSITY	Density @ 60 deg F	g/cm-03 @ 60 deg F
DURATION	Duration of Test	Seconds
E000050000	Formaldehyde	Grams
E000075070	Acetaldehyde	Grams
E007664417	Ammonia	Grams
FINLCANWGT	Final weight of vehicle's evap canister	grams
FLASHPOINT	Flashpoint	deg. F
INITCANWGT	Initial weight of vehicle's evap canister	grams
METHANE	Methane (CH4) Emissions	Grams/Mile
N2O	Nitrous Oxide (N2O) Emissions	Grams/Mile
NOXU	Oxides of Nitrogen, Uncorrected for Humidity	Grams/Mile
OLEFIN	Olefin Content	%volume
OXYGENATE	Oxygenate Content	%volume
PMEC_DRI	Elemental Carbon by Thermal Reflectance (DRI)	Milligrams/Mile
MEAS_ID	MEAS_DESCR	ENGINEERING UNITS

PMHC_DRI	Organic Carbon by Thermal Reflectance (DRI)	Milligrams/Mile
PMHC_SAE	Organic fraction of particulate matter SAE 872136	Milligrams/Mile
PMIO_SAE	Inorganic fraction of particulate matter SAE 872136	Milligrams/Mile
PMSO_SAE	Sulfate fraction of particulate matter SAE 872136	Milligrams/Mile
PMT_CFR110	Total particulate matter per CFR86.110-94	Milligrams/Mile
PM_<10.0u	Particulate less than 10.0 microns in diameter	Milligrams/Mile
PM_AG	Silver in Particulate	Milligrams/Mile
PM_AL	Aluminum in Particulate	Milligrams/Mile
PM_AU	Gold in Particulate	Milligrams/Mile
PM_BA	Barium in Particulate	Milligrams/Mile
PM_BR	Bromine in Particulate	Milligrams/Mile
PM_CA	Calcium in Particulate	Milligrams/Mile
PM_CD	Cadmium in Particulate	Milligrams/Mile
PM_CL	Chlorine in Particulate	Milligrams/Mile
PM_CU	Copper in Particulate	Milligrams/Mile
PM_FE	Iron in Particulate	Milligrams/Mile
PM_GA	Gallium in Particulate	Milligrams/Mile
PM_HG	Mercury in Particulate	Milligrams/Mile
PM_K	Potassium in Particulate	Milligrams/Mile
PM_LA	Lanthanum in Particulate	Milligrams/Mile
PM_MG	Magnesium in Particulate	Milligrams/Mile
PM_MN	Manganese in Particulate	Milligrams/Mile
PM_MO	Molybdenum in Particulate	Milligrams/Mile
PM_NA	Sodium in Particulate	Milligrams/Mile
PM_NI	Nickel in Particulate	Milligrams/Mile
PM_NITRATE	Nitrates in Particulate	Milligrams/Mile
PM_P	Phosphorus in Particulate	Milligrams/Mile
PM_PB	Lead in Particulate	Milligrams/Mile
PM_PD	Palladium in Particulate	Milligrams/Mile
PM_S	Sulfur in Particulate	Milligrams/Mile
PM_SB	Antimony in Particulate	Milligrams/Mile
PM_SI	Silicon in Particulate	Milligrams/Mile
PM_SN	Tin in Particulate	Milligrams/Mile
PM_SR	Strontium in Particulate	Milligrams/Mile
PM_TI	Titanium in Particulate	Milligrams/Mile
PM_Y	Yttrium in Particulate	Milligrams/Mile
PM_ZN	Zinc in Particulate	Milligrams/Mile
PM_ZR	Zirconium in Particulate	Milligrams/Mile

PPM_SULFUR	Sulfur in Fuel by ASTM D 2622	Parts Per Million	
PSIA_RVP	Vapor Pressure by Appendix E Method 3	PSIA	
PURGE_RATE	Rate of airflow to evaporative emissions canister	Liters/Minute	
PURGE_STAT	1= PERFORMED; 2= INNACCESSIBLE; 3= EQUIPMENT DOWN		CATEGORIZED
PURGE_VOL	Volume of air going to evaporative canister	Liters	
P_PMHC_SAE	Organic fraction of particulate matter SAE 872136	Milligrams/BHP	
P_PMIO_SAE	Inorganic fraction of pariculate matter SAE 872136	Milligrams/BHP	
P_PMSO_SAE	Sulfate fraction of particulate matter SAE 872136	Milligrams/BHP	
RPMSPEC	Engine idle speed specification	Revolutions per minute	
R_METHANE	Methane Emission Rate	Grams/Hour	
SATURATES	Saturated Hydrocarbon Content	%volume	
MEAS_ID	MEAS_DESCR	EXP_3	
SOAK_MINS	Soak time, (time since engine turned off)	MINUTES	
SPECIFIC_G	Specific Gravity @ 60 Degrees	Specific Gravity	
T10	Temperature -- 10% Recovery	deg. F	
T50	Temperature -- 50% Recovery	deg. F	
T90	Temperature -- 90% Recovery	deg. F	
T95	Temperature -- 95% Recovery	deg. F	
TANK_LEVEL	Fuel tank fill level (100=FULL)	Percent	
TIMING	Initial Engine Timing (with Vacuum Disconnected)	Degrees before(+) or after (-) TDC	
TIMING2	Initial Engine Timing (with Vacuum Connected)	Degrees before (+) or after (-) TDC	
TIMINGSPEC	Initial timing specification	Degrees before (+) or after (-) TDC	
T_EP	Temperature -- End Point --100% Recovery	deg. F	
T_IBP	Temperature -- Initial Boiling Point --0% Recovery	deg. F	
VISCOSITY	Viscosity at 40 Degrees C	Centistokes	
V_ETHANOL	Ethanol by OFID	Volume Percent	
MEAS_ID	MEAS_DESCR	EXP_3	
V_MTBE	MTBE by OFID	Volume Percent	
V_TAME	TAME by OFID	Volume Percent	
WT%_O2	Weight Percent Oxygen	Weight Percent	

MODE_ID	MODE_ID_N	MODE_ID_D
ASM_5015	1	ASM Test Procedure - 50% Load at 15 mph.
ASM_2525	2	ASM Test Procedure - 25% Load at 25 mph.
IDLE	3	Idle in Neutral
IDLE_DRIVE	4	Idle in Drive, Assumes Automatic Transmission
IDLE_2500	5	Unloaded idle at 2500 rpm
IDLE_AGAIN	6	Repeated Idle in Neutral, Needed for 4 Mode Tests
50MPH	7	Steady speed driving at 50 miles per hour
30MPH	8	Steady speed driving at 30 miles per hour
IDLE_25X04	14	Unloaded idle at 2500 rpm; following 15 minute soak; step 4 of TEST_PROC = "XSI"
IDLE___X05	15	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 5 of TEST_PROC = "XSI"
IDLE___X07	17	Idle in Neutral; following 505 cycle; step 7 of TEST_PROC = "XSI"
IDLE_25X08	18	Unloaded idle at 2500 rpm; following 30 secs of idle; step 8 of TEST_PROC = "XSI"
IDLE___X09	19	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 9 of TEST_PROC = "XSI"
IDLE_25X11	21	Unloaded idle at 2500 rpm; following engine restart; step 11 of TEST_PROC = "XSI"
IDLE___X12	22	Idle in Neutral; following 30 secs of idle at 2500 rpm; steps 12-13 of TEST_PROC="XSI"
IDLE_25X14	24	Unloaded idle at 2500 rpm; following 30 mins of idle; step 14 of TEST_PROC = "XSI"
IDLE___X15	25	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 15 of TEST_PROC = "XSI"
IDLE_25X17	27	Unloaded idle at 2500 rpm; following engine restart; step 17 of TEST_PROC = "XSI"
IDLE___X18	28	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 18 of TEST_PROC = "XSI"
IDLE_25X19	29	Unloaded idle at 2500 rpm; following 60 secs of idle; step 19 of TEST_PROC = "XSI"
IDLE_25X21	31	Unloaded idle at 2500 rpm; previous step varies; step 21 of TEST_PROC = "XSI"
IDLE___X22	32	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 22 of TEST_PROC = "XSI"
30MPH___X23	33	Loaded (7 HP) cruise at 28-32 mph; following 1 min of idle; step 23 of TEST_PROC = "XSI"
IDLE___X24	34	Idle in Neutral; following 30 secs of 30mph cruise; step 24 of TEST_PROC = "XSI"

MODE_ID	MODE_ID_N	MODE_ID_D
ASM_5015	1	ASM Test Procedure - 50% Load at 15 mph.
ASM_2525	2	ASM Test Procedure - 25% Load at 25 mph.
IDLE	3	Idle in Neutral
IDLE_DRIVE	4	Idle in Drive, Assumes Automatic Transmission
IDLE_2500	5	Unloaded idle at 2500 rpm
IDLE_AGAIN	6	Repeated Idle in Neutral, Needed for 4 Mode Tests
50MPH	7	Steady speed driving at 50 miles per hour
30MPH	8	Steady speed driving at 30 miles per hour
IDLE_25X04	14	Unloaded idle at 2500 rpm; following 15 minute soak; step 4 of TEST_PROC = "XSI"
IDLE__X05	15	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 5 of TEST_PROC = "XSI"
IDLE__X07	17	Idle in Neutral; following 505 cycle; step 7 of TEST_PROC = "XSI"
IDLE_25X08	18	Unloaded idle at 2500 rpm; following 30 secs of idle; step 8 of TEST_PROC = "XSI"
IDLE__X09	19	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 9 of TEST_PROC = "XSI"
IDLE_25X11	21	Unloaded idle at 2500 rpm; following engine restart; step 11 of TEST_PROC = "XSI"
IDLE__X12	22	Idle in Neutral; following 30 secs of idle at 2500 rpm; steps 12-13 of TEST_PROC="XSI"
IDLE_25X14	24	Unloaded idle at 2500 rpm; following 30 mins of idle; step 14 of TEST_PROC = "XSI"
IDLE__X15	25	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 15 of TEST_PROC = "XSI"
IDLE_25X17	27	Unloaded idle at 2500 rpm; following engine restart; step 17 of TEST_PROC = "XSI"
IDLE__X18	28	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 18 of TEST_PROC = "XSI"
IDLE_25X19	29	Unloaded idle at 2500 rpm; following 60 secs of idle; step 19 of TEST_PROC = "XSI"
IDLE_25X21	31	Unloaded idle at 2500 rpm; previous step varies; step 21 of TEST_PROC = "XSI"
IDLE__X22	32	Idle in Neutral; following 30 secs of idle at 2500 rpm; step 22 of TEST_PROC = "XSI"
30MPH__X23	33	Loaded (7 HP) cruise at 28-32 mph; following 1 min of idle; step 23 of TEST_PROC = "XSI"
IDLE__X24	34	Idle in Neutral; following 30 secs of 30mph cruise; step 24 of TEST_PROC = "XSI"

MODENAME	REFSPEED	SPEED_FRAC	LOAD_FRAC	MODENUM	MODE8NUM	MODE8WGHT
100R100	RATED	100	100	1	1	15
100R075	RATED	100	75	2	2	15
100R050	RATED	100	50	3	3	15
100R025	RATED	100	25	4		
100R010	RATED	100	10	5	4	10
090R100	RATED	90	100	6		
090R075	RATED	90	75	7		
090R050	RATED	90	50	8		
090R025	RATED	90	25	9		
090R010	RATED	90	10	10		
075R100	RATED	75	100	11	5	10
075R075	RATED	75	75	12	6	10
075R050	RATED	75	50	13	7	10
075R025	RATED	75	25	14		
075R010	RATED	75	10	15		
060R100	RATED	60	100	16	5	10
060R075	RATED	60	75	17	6	10
060R050	RATED	60	50	18	7	10
060R025	RATED	60	25	19		
060R010	RATED	60	10	20		
050R100	RATED	50	100	21		
050R075	RATED	50	75	22		
050R050	RATED	50	50	23		
050R025	RATED	50	25	24		
050R010	RATED	50	10	25		
100I000	IDLE	100	0	26	8	15
100I100	IDLE	100	100	27		
100G100	GCS	100	100	28		
100R085	RATED	100	85	29		
075R085	RATED	75	85	30		
060R085	RATED	60	85	31		
050R085	RATED	50	85	32		
025R100	RATED	25	100	33		
025R085	RATED	25	85	34		
025R075	RATED	25	75	35		

025R050	RATED	25	50	36
025R025	RATED	25	25	37
025R010	RATED	25	10	38
010R100	RATED	10	100	39
010R085	RATED	10	85	40
010R075	RATED	10	75	41
010R050	RATED	10	50	42
010R025	RATED	10	25	43
010R010	RATED	10	10	44
091RE82	RATED	91	82	45
080RE63	RATED	80	63	46
063RE40	RATED	63	40	47

Relationship to “old” Emission Factor (EF) Database; Information not carried forward

- “Old” AMD Emission Factor (EF) Database is located at
I:\PROJECT\EMFACTOR\EF_FOXPRO
 - Contains data collected from 1972 - 1998 for a variety of purposes
 - Data stored in approximately 500 essentially-separate tables.
 - Tables named by “Prefix” indicating a type of data, and “Suffix” indicating a test program.
 - Explained further in top-level user document: EFREADME.TXT
 - Data from EF82, EF90, EF98, IM89, IM90, IM91, IM92, NOX_ EV95, API_, EF80, IM83, OF93, RL88, MI82, and IM80 programs already loaded into MSOD. SP96 and SP86 programs being loaded.
 - Some data items from old database not being carried into the MSOD:
 - Long form owner questionnaire (QEST) data items, except those included in short form (QST_)
 - Vehicle driveability observation data (DRV_)
 - Propane gain test result data (PROP)
 - IM240 Test Results performed after repairs for which repair description is lacking.
 - Vehicle Preconditioning (PREC) data for IM240 Tests.
 - 4M24IM89, and 4M24IM91, (which duplicates other data).
 - Data with TEST_SEQ values of 27, 28, and 30 from IM89 Program
 - FTP_RL88 and CAL_EF80 which contained questionable or duplicate data
 - Non-EPA Users can request copy of “old” database on CD-ROM.
-

Section 4: Some Example SQL Queries

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*****
*
*           EXAMPLE QUERIES FOR MOBILE SOURCE OBSERVATION DATABASE
*****
*
*  1.  ALL FTP TESTS OF FORD PRODUCTS
*
SELECT MS.MS_ID, MS.COMPANY, RES.TEST_PROC, DT.THC ;
  FROM M_SOURCE MS, RESULT RES, DYNOTEST DT ;
  WHERE MS.MS_ID = RES.MS_ID AND MS.MS_TYPE = RES.MS_TYPE ;
  AND RES.RESULTID = DT.RESULTID;
  AND RES.TEST_PROC = "FTP" AND MS.COMPANY = "FORD"
*
*
*  2.  "AS RECEIVED"  FTP TESTS
*      DEPEND DIRECTLY ON A PROCUREMENT
*      HAS NO PREVIOUS REPLICATE
*      DONE AT STANDARD TEMPERATURE
*      WITH VEHICLE NOT DISABLED
*      ON STANDARD FUEL
*
SELECT RES.RESULTID ;
  FROM RESULT RES, RESULT PRES ;
  WHERE PRES.RESULTID = RES.CAUSE AND PRES.RES_KIND = "PROCURE";
  AND RES.PREV_REP = 0 AND RES.NOM_TEMP = 75 AND RES.DISABLE = 0;
  AND RES.TEST_PROC = "FTP" AND RES.FUEL_ID = 06
*
*
*  3.  CALCULATION OF NON-METHANE HYDROCARBON EMISSION RESULTS
*      AT SUMMARY TEST  LEVEL
*
SELECT DT.RESULTID, DT.THC, TM.MEASURE AS CH4, (DT.THC - TM.MEASURE) AS NMHC ;
  FROM DYNOTEST DT, TESTMEAS TM ;
  WHERE DT.RESULTID = TM.RESULTID AND TM.MEAS_ID = "METHANE" ;
  AND DT.RESULTID = 5277
*
*
*  4.  JOINING TOGETHER BAG LEVEL AND SUMMARY LEVEL RESULT INFORMATION
*
SELECT DB.RESULTID, DB.BAG_NUM, DT.THC, DB.BAG_THC ;
  FROM DYNOTEST DT, DYNO_BAG DB ;
  WHERE DT.RESULTID = DB.RESULTID ;
  AND DB.RESULTID = 5277;
  ORDER BY DB.BAG_NUM
*
*
*  5.  JOINING M_SOURCE, VEHICLE AND RESULT TO
*      SELECT VEHICLES WITH HIGH MILEAGE
*
SELECT M.MS_ID, R.RESULTID, P.PROC_ODOM ;
FROM M_SOURCE M, RESULT R, PROCURE P ;
WHERE M.MS_ID = R.MS_ID AND ;
R.RESULTID = P.RESULTID AND P.PROC_ODOM > 100000

```

Section 5: How to Request a CD-ROM Copy of MSOD

- Send an email message to mobile@epa.gov
- Make reference to MSOD in subject line of message
- Include your name, affiliation, and mailing address in your message
- Limit requests to one copy per office.
- While EPA has made considerable effort to assure the validity of the data in this database, the Agency is not responsible for the validity of conclusions reached by others using the data. New records are added continuously to the data sample, though EPA cannot guarantee that all currently relevant data is included in the database.
- Because additions and changes are being made to the database, those using it regularly may wish to request an updated copy every year or so.