

# **ExxonMobil Chemical Company**

## **DB Manager**

### **User's Guide**

**Version 1.0**

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## **1. Introduction**

The Recipe Toolkit is a platform to transfer or download product or process specific data within a SQL database to process automation/information systems. In particular, these include the DCS and ExxonMobil Toolkit system implemented in Ignition. The two main users of the system are a contact engineer who is responsible for specifying the recipe data within the database and console operator responsible for the review and transfer data from the database to the DCS or Ignition. This guide covers the application for the contact engineer.

The Database Manager Application replaces a legacy application written in Visual Basic called *dbManagerPlus* (Refer to the ExxonMobil document [dbManagerPlus.doc](#) for details). The prior application utilized a database schema written for Microsoft Access. The prior schema has been updated into a more traditional relational design for use with Microsoft SQL Server. A migration utility is provided.

## **2. Contact Engineer Interface**

This section provides a description of the contact engineer interface for configuring the recipe database. The application is delivered in a stand-alone Ignition project named *dbmanager.proj*.

### **2.1 Overview**

The Recipe Toolkit Database Manager is an editor for the Recipe database. The database design follows a standard master-detail pattern. The editor allows access to both master and detail record types and enforces full relational integrity.

### **2.2 Launching**

The application is launched from the gateway home page, Figure 1, or from the client launcher, Figure 2. A desktop shortcut may also be configured (this is how contact engineers will connect at EM BR).

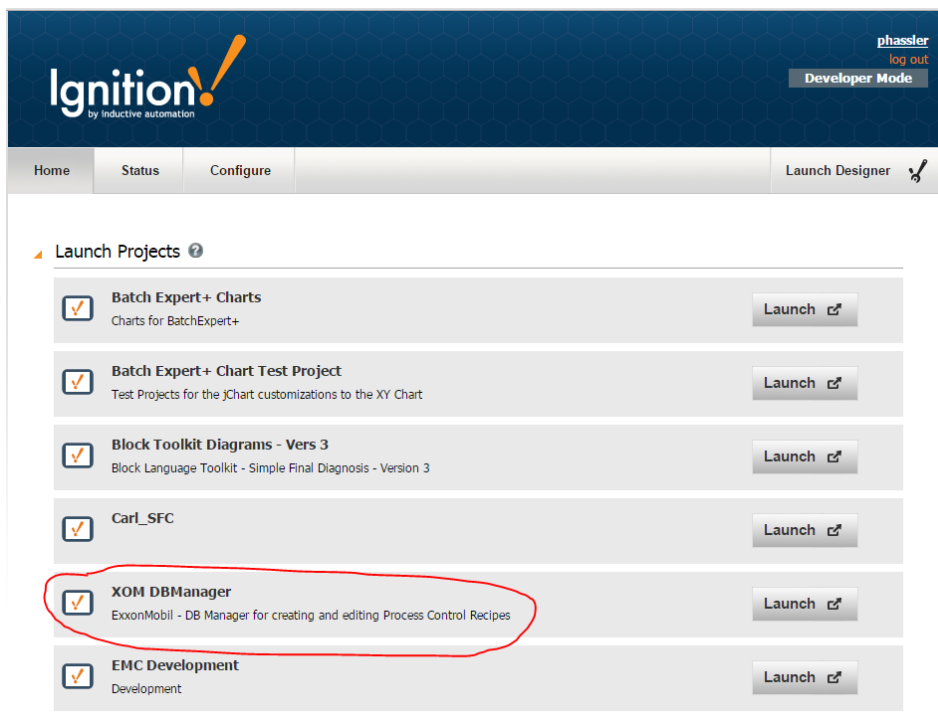


Figure 1 - Launching client from the Gateway Web Page

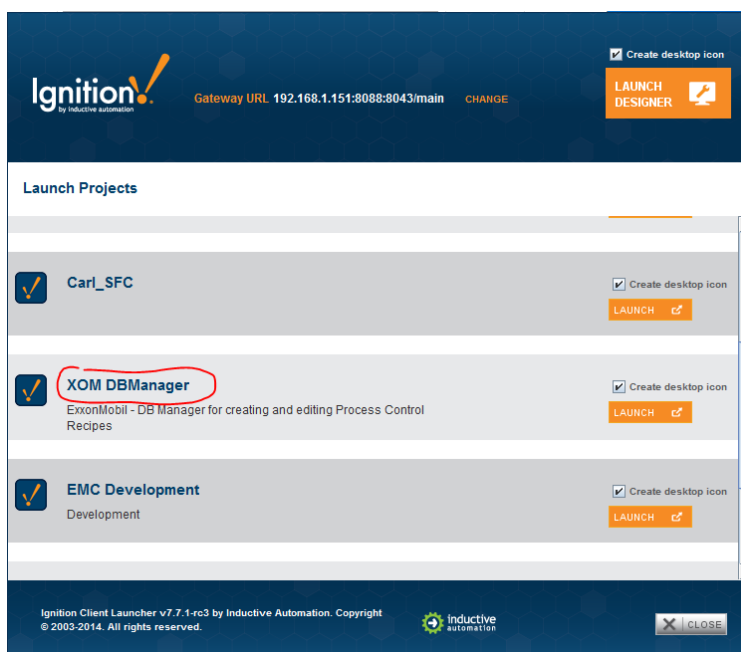


Figure 2 - Launching the Client from the Client Launcher

Once a connection is made, the login is displayed, a valid username and password is required.

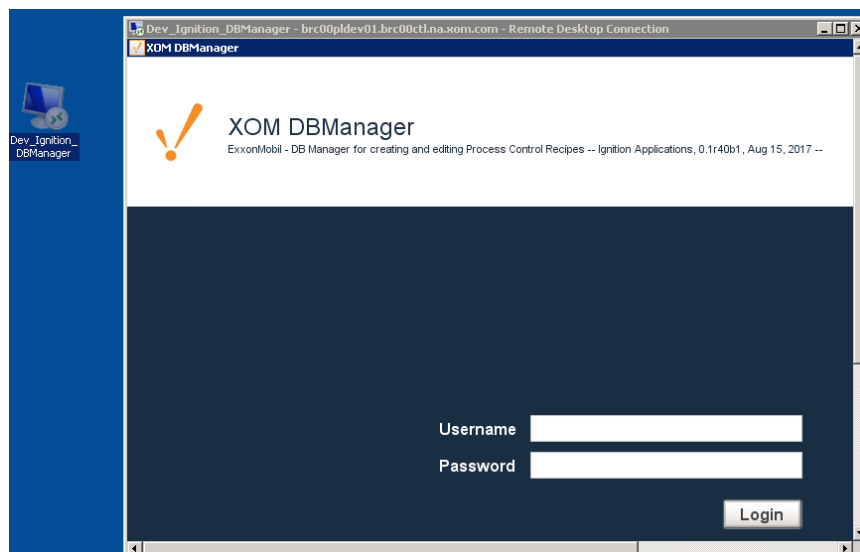
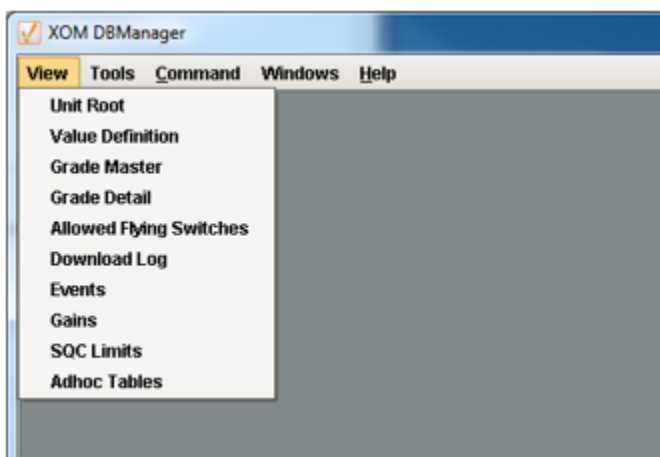


Figure 3 - Launching via a desktop shortcut/ DB Manager Login Screen

## 2.3 Main Menu

The navigation within the application is provided by a main drop down menu. The View and Tools menus are custom for the *DBManager* application. The Command, Windows, and Help menu are standard Ignition menus for logging out, closing windows, and accessing help. The common *DBManager* screens are all accessed from the View menu. The Migration utility from the old MS Access style tables is accessed from the Tools menu.



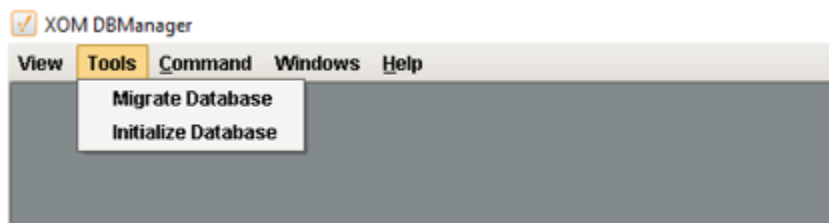


Figure 4 - Main Menu

## 2.4 Recipe Database / Family Definition

The DB Manager application can access multiple recipe databases. The Recipe Family Definition is used to define the recipe databases available from this gateway. The screen is shown below.

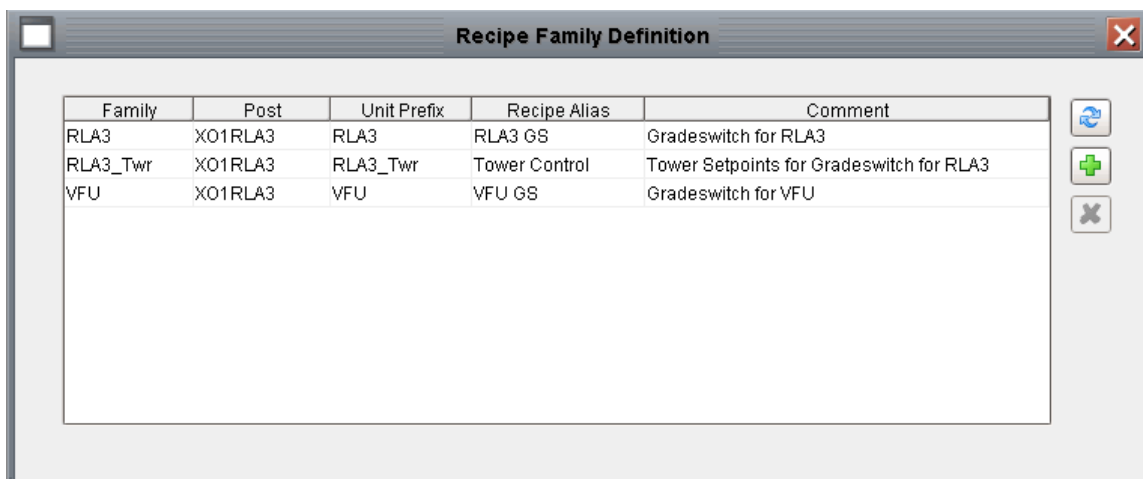
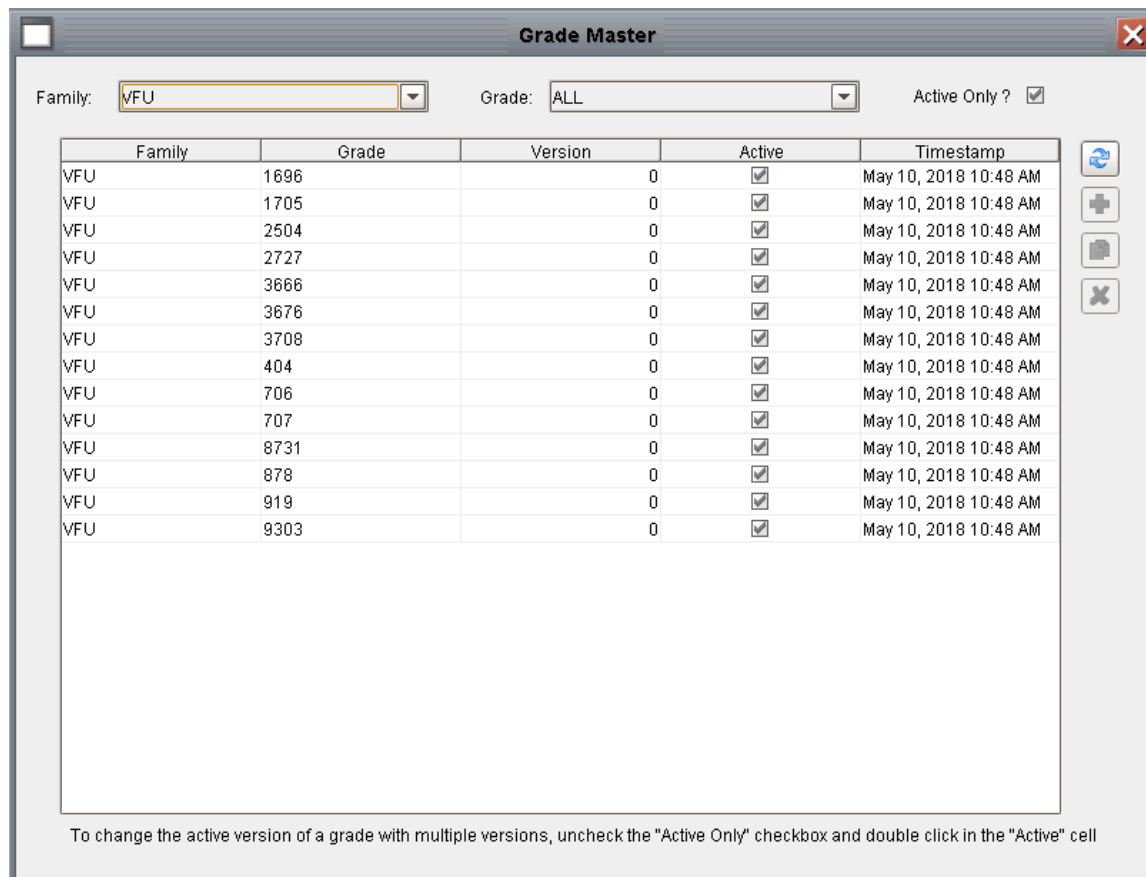


Figure 5 - Recipe Family Definition Screen

## 2.5 Grade Master Screen

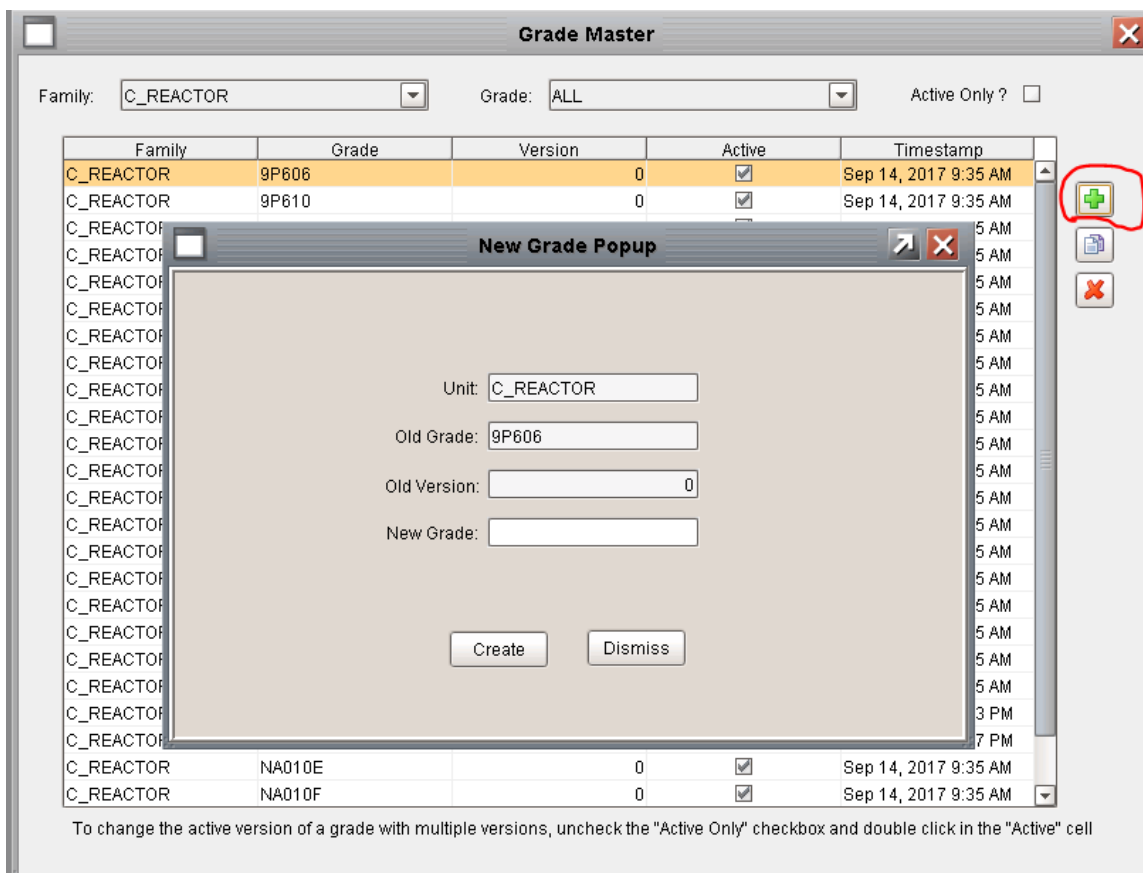
The Grade Master screen is used to view all of the grades in the recipe database. The grades can be filtered by family and version. All of the screens used in the application use the Power Table widget which allows columns to be resized, sorted, and hidden.



**Figure 6 - Grade Master Screen**

### 2.5.1 Creating a New Grade

A new grade can be created by pressing the top button to the right of the table. It will post a popup dialog where a new grade number may be entered.



### Figure 7 - Creating a New Grade



## 2.5.2 Creating a new Version of a Recipe for an Existing Grade

A new version of an existing recipe can be created by selecting an existing grade and pressing the middle button to the right of the table. The button is only enabled when a row is selected.

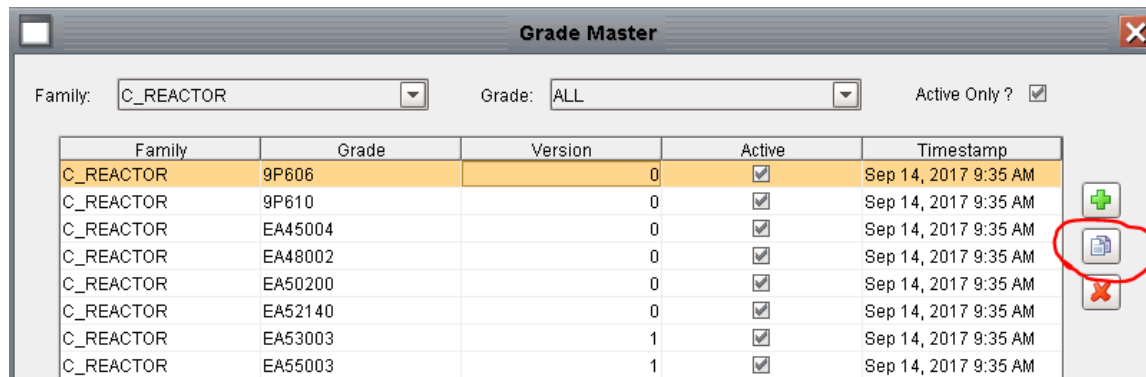


Figure 8 - Creating a New Recipe Version

The version field will automatically be incremented for the new version. The original version will remain the active version.

Family	Grade	Version	Active	Timestamp
C_REACTOR	9P606	0	<input checked="" type="checkbox"/>	Sep 14, 2017 9:35 AM
C_REACTOR	9P606	1	<input type="checkbox"/>	Sep 22, 2017 10:38 AM
C_REACTOR	9P610	0	<input checked="" type="checkbox"/>	Sep 14, 2017 9:35 AM
C_REACTOR	EA45004	0	<input checked="" type="checkbox"/>	Sep 14, 2017 9:35 AM

Figure 9 - New Version Showing Auto-Increment

## 2.6 Grade Detail Screen

The Grade Detail screen is used edit the recommended value and the optional low and high limits.

The screenshot shows the 'Grade Detail' window. At the top, there are three dropdown menus: 'Family' set to 'C\_REACTOR', 'Grade' set to '9P606', and 'Version' set to '0'. To the right of these is a checkbox labeled 'Active Only?' which is checked. Below these controls is a table with the following columns: Family, Grade, Version, Active, Description, Recomm..., LowLimit, and HighLimit. The table contains 20 rows of data, including 'Grade Name' and various physical and chemical properties like Melt Index, Density, Ash, Hydrocarbons, Swell, and AFCA ratios.

Family	Grade	Version	Active	Description	Recomm...	LowLimit	HighLimit
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	Grade Name	9P606		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>				
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Melt Index UL [gm/10 min]	6.7		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Melt Index Target [gm/10 min]	6.1		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Melt Index LL	5.6		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>				
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Density UL [g/cm3]	0.946		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Density Target [g/cm3]	0.944		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Density LL [g/cm3]	0.943		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>				
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Ash UL [wt%]	0.060		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>				
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Hydrocarbons [PPM]	1100		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>				
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Swell UL	NaN		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Swell Target	NaN		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Swell LL	NaN		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>				
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - AFCA to Isobutane (iC4o) Ratio UL [LB AFCA / ...	10.0		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - AFCA to Isobutane (iC4o) Ratio Target [LB AFC...	10.0		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - AFCA to Isobutane (iC4o) Ratio LL [LB AFCA / K...	3.0		
C_REAC...	9P606	0	<input checked="" type="checkbox"/>				
C_REAC...	9P606	0	<input checked="" type="checkbox"/>	C - Alkyl to Isobutane (iC4o) Ratio UL [LB Alkyl / ML...	NaN		

Figure 10 - Grade Detail Screen

## 2.7 Value Definition Screen

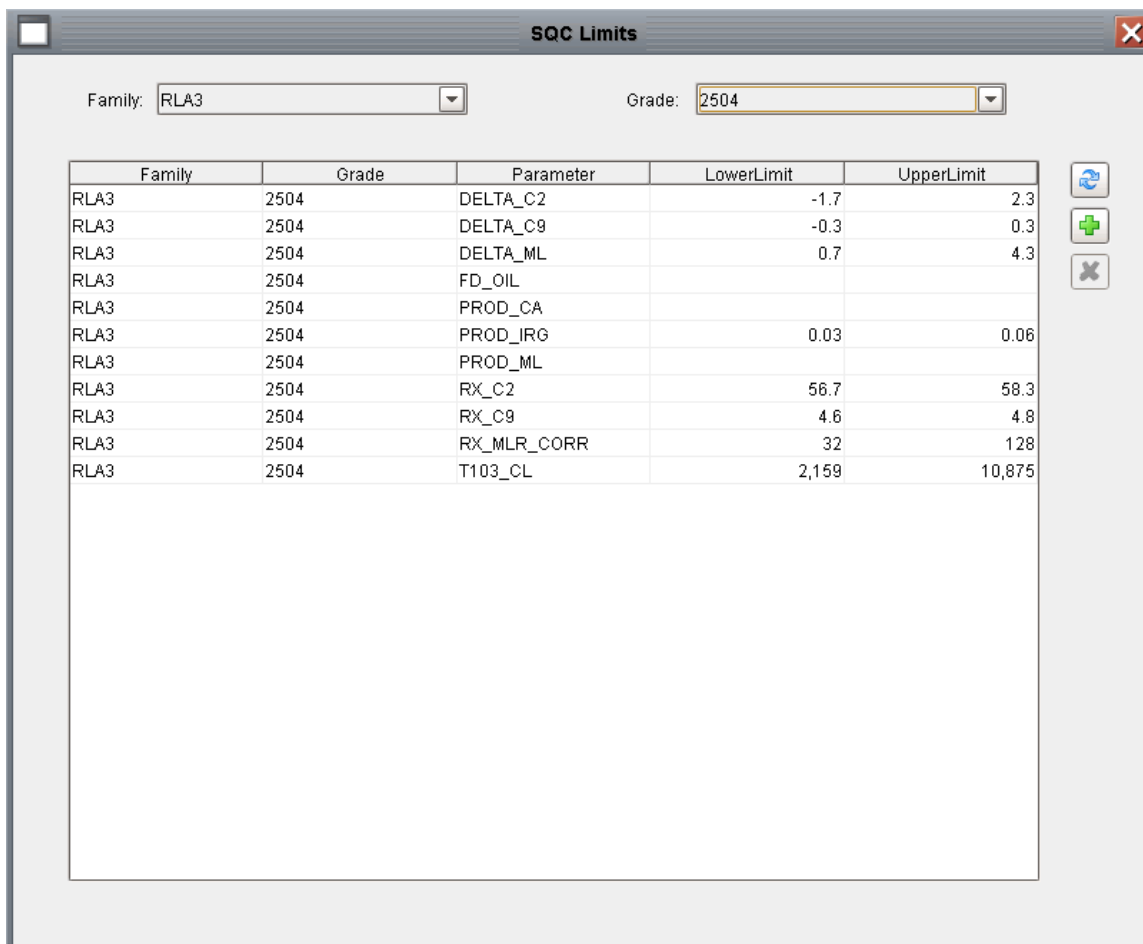
The Value Definition screen is used to define the structure of the recipe for a unit. The underlying concept here is that all of the recipes for a unit have the same structure. All of the recipes Grade Master screen is used to view all of the grades in the recipe database.

Family	Description	StoreTag	CompareTag	Type	ModeAttribute	ModeValue	Write Location	DType
C_REA...	Grade Name	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	String
C_REA...				CC				
C_REA...	C - Melt Index UL [gm/10 min]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - Melt Index Target [gm/10 min]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - Melt Index LL	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...				CC				
C_REA...	C - Density UL [g/cm3]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - Density Target [g/cm3]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - Density LL [g/cm3]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...				CC				
C_REA...	C - Ash UL [wt%]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...				CC				
C_REA...	C - Hydrocarbons [PPM]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...				CC				
C_REA...	C - Swell UL	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - Swell Target	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - Swell LL	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...				CC				
C_REA...	C - AFCA to Isobutane (iC4o) Ratio UL [LB AFCA / ...]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - AFCA to Isobutane (iC4o) Ratio Target [LB AF...	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...	C - AFCA to Isobutane (iC4o) Ratio LL [LB AFCA / ...]	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float
C_REA...				CC				
C_REA...	C - Alkyl to Isobutane (iC4o) Ratio UL [LB Alkyl / M...	CRG900.DT_RX_RE...	CRG900.DT_RX_RECI...	AE			EPKS10	Float

Figure 11 - Value Definition Screen

## 2.8 SQC Limits

The SQC Limit screen is used to configure the SQC limits. Not all recipe installations utilize the SQC Limit capability.



The screenshot shows the "SQC Limits" window. At the top, there are two dropdown menus: "Family" set to "RLA3" and "Grade" set to "2504". Below these is a table with five columns: "Family", "Grade", "Parameter", "LowerLimit", and "UpperLimit". The table contains ten rows of data. To the right of the table are three buttons: a refresh button (circular arrow), a plus button (green cross), and a minus button (grey X).

Family	Grade	Parameter	LowerLimit	UpperLimit
RLA3	2504	DELTA_C2	-1.7	2.3
RLA3	2504	DELTA_C9	-0.3	0.3
RLA3	2504	DELTA_ML	0.7	4.3
RLA3	2504	FD_OIL		
RLA3	2504	PROD_CA		
RLA3	2504	PROD_IRG	0.03	0.06
RLA3	2504	PROD_ML		
RLA3	2504	RX_C2	56.7	58.3
RLA3	2504	RX_C9	4.6	4.8
RLA3	2504	RX_MLR_CORR	32	128
RLA3	2504	T103_CL	2,159	10,875

Figure 12 SQC Limit Screen

## 2.9 Adhoc Tables

The DBManager application has made allowances for spontaneous creation of new data structures that are required for new control strategies. By following simple database table guidelines the user interface shown below to maintain the data without any modifications to the DB manager application.

Grade		Cost
405	1,231	14,500
106	1,539	12,000
302	1,400	11,500
305	1,100	15,000

Figure 13 - Adhoc Table User Interface

The following steps describe how to create tables that will work within the Ad-Hoc user interface:

1. Manually create the table using the SQL Server Management Studio in the XOM database. The first column of the table **MUST** be Id and it must have a system generated key.

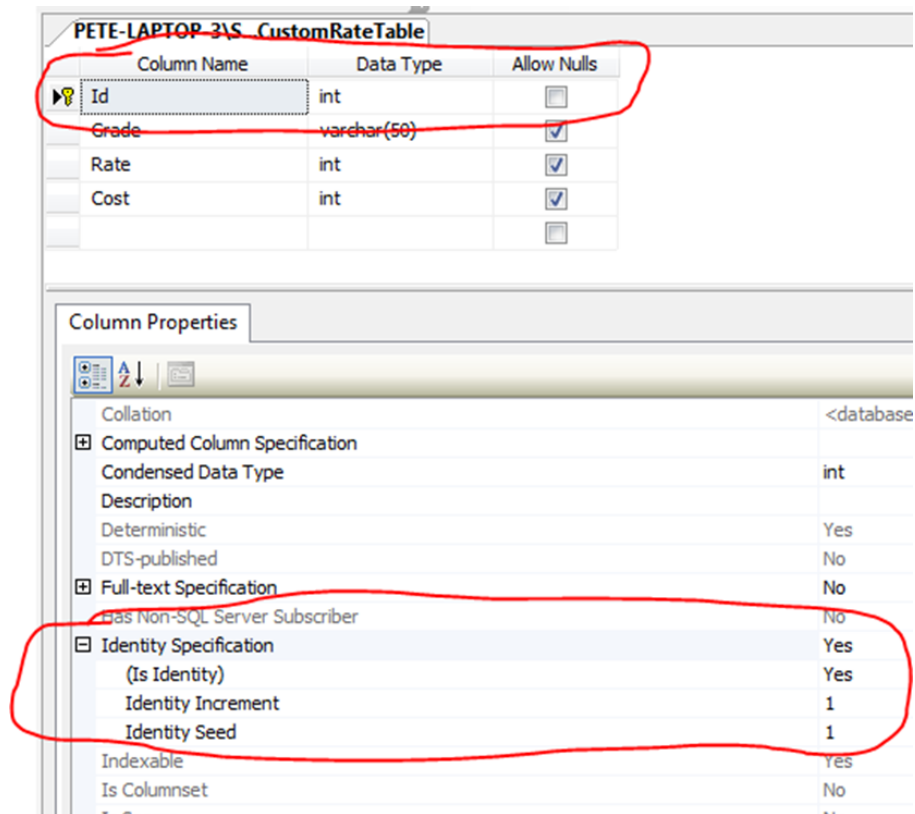
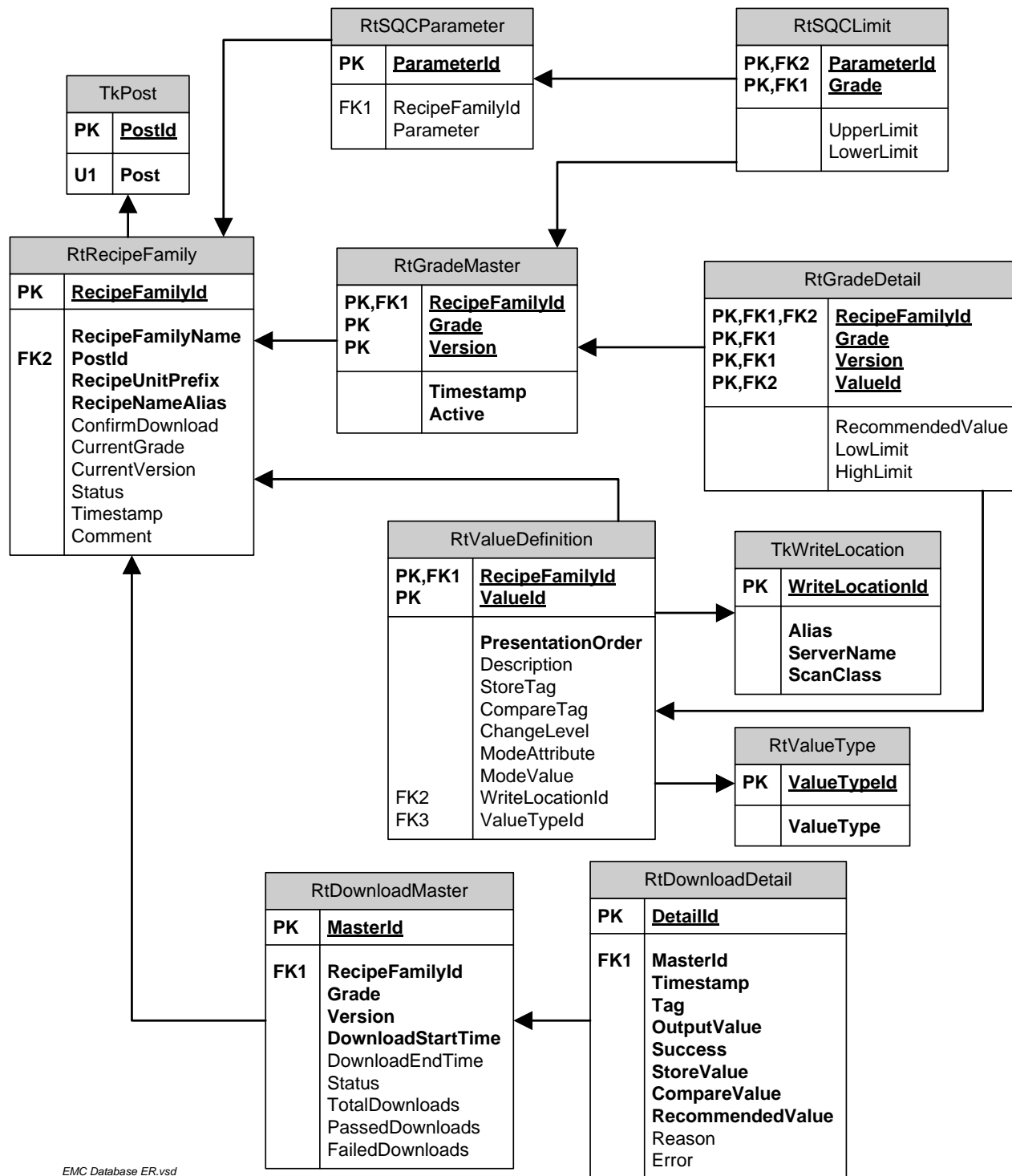


Figure 14 - Adhoc Table Design Considerations

2. Insert the name of the table into RtAdhocCatalog

### 3. Recipe Database Schema

An Entity Relationship diagram for the core recipe tables is shown below. Refer to the XOM Database Design specification for complete details on the database schema.



EMC Database ER.vsd