

**qBal - v1.06**  
**User Manual**

## 1 Introduction

Qbal is a ballistic simulator for the practice of shooting. All details about the software can be found on the internet at: <http://mankonit.free.fr/qbal/>

## 2 Installation

### 2.1 Download

The software can be downloaded at the following address :

PC version : <http://mankonit.free.fr/qBal.zip>

Mac version : <http://mankonit.free.fr/qBalMac.zip>

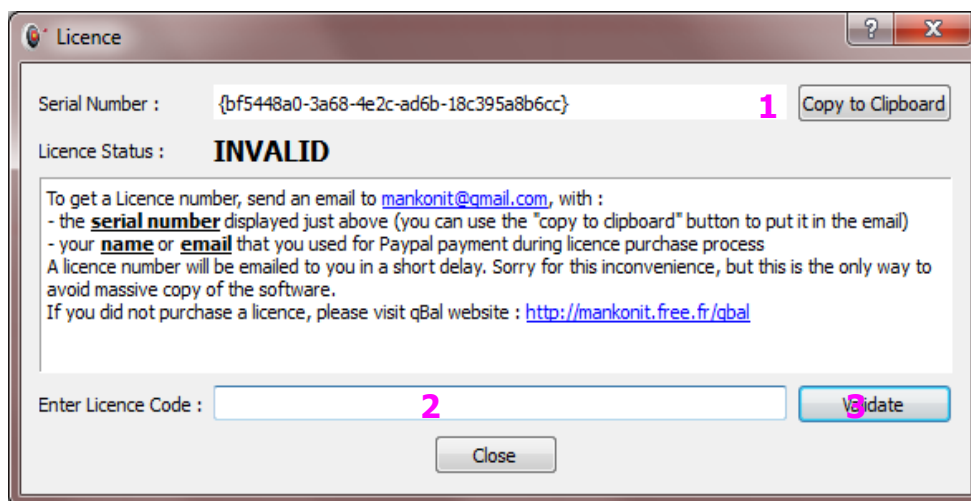
### 2.2 Support

For any question regarding qBal, you can send an email to : [mankonit@gmail.com](mailto:mankonit@gmail.com)

### 2.3 Software activation

Qbal is license protected. A license can be purchased on qBal's website : <http://mankonit.free.fr/qbal/>.

Running the software for the first time, the following window is displayed :



The procedure to activate your copy of qbal is as follows :

- Click the 'copy to clipboard' button (1)
- Write an email to [mankonit@gmail.com](mailto:mankonit@gmail.com), where you make a 'paste'. This should paste in the email the serial number. Send the email.
- In return, you will shortly receive with following format:

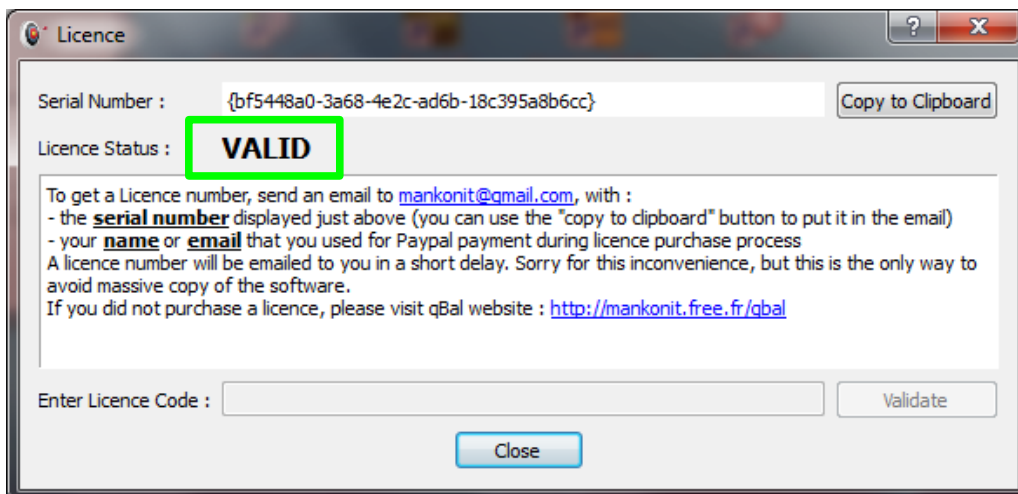
Hello

Here is your activation key :

**AwLw0uLQTa20jgmc5spDpr6KU4mkiB76/cka1PicALauwUbT+oQZrLOPEw==**

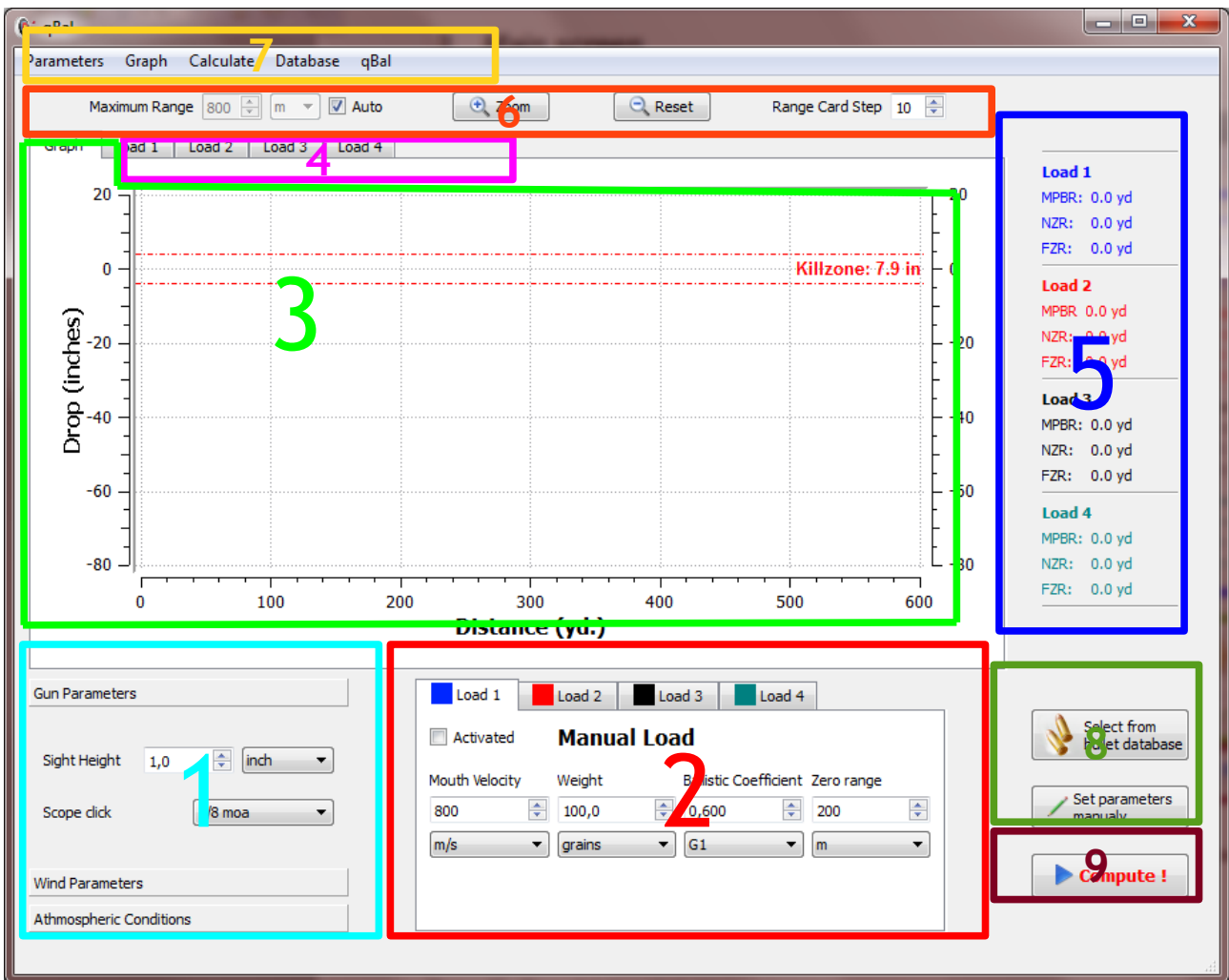
Regards  
MK

- Select the activation key (in **yellow** in the example). Not a single letter should be forgotten.
- Copy
- Go back in qBal program, in the license window. If the program was closed, just re-open it, and the license window will re-appear.
- Paste the license key in the 'Enter license number' zone (2)
- Click the 'Validate' button (3)
- The status of the license will then change to 'VALID', as shown on following window :



Then, you can close the window and start using qBal.

### 3 Main screen



Zone 1 : Environmental and rifle parameters

Zone 2 : Ammunition and shoots parameters

Zone 3 : Result tab : plot view

Zone 4 : Result tab : table

Zone 5 : Results : optimal setting

Zone 6 : Scale and zoom

Zone 7 : Menus

Zone 8 : Ammunition selection from pre-loaded database

Zone 9 : Run simulation

## **4 Setup of general parameters**

### **4.1 Rifle parameters**

Gun parameters shall be entered in zone 1 :

- Sight height : distance between barrel and sight axis
- Scope click : angle of a scope click

### **4.2 Environmental parameters**

Environmental parameters are entered in zone 1 :

- Wind parameters
- Atmospheric conditions

### **4.3 Kill zone**

This is the diameter of the targeted zone, to get a hit. It will determine the Max Point Blanc Range, and thus the NZR / FZR.

The kill zone setting is made in the menus (zone7) → 'Parameters' menu → Set kill zone

### **4.4 Parameters auto save**

All gun and environmental parameters are automatically saved when the program is closed. They will be automatically restored next time qBal is started.

### **4.5 Manual save and restore of parameters**

In addition to the auto saved set of parameters, it possible to manually save in a file additional sets of parameters.

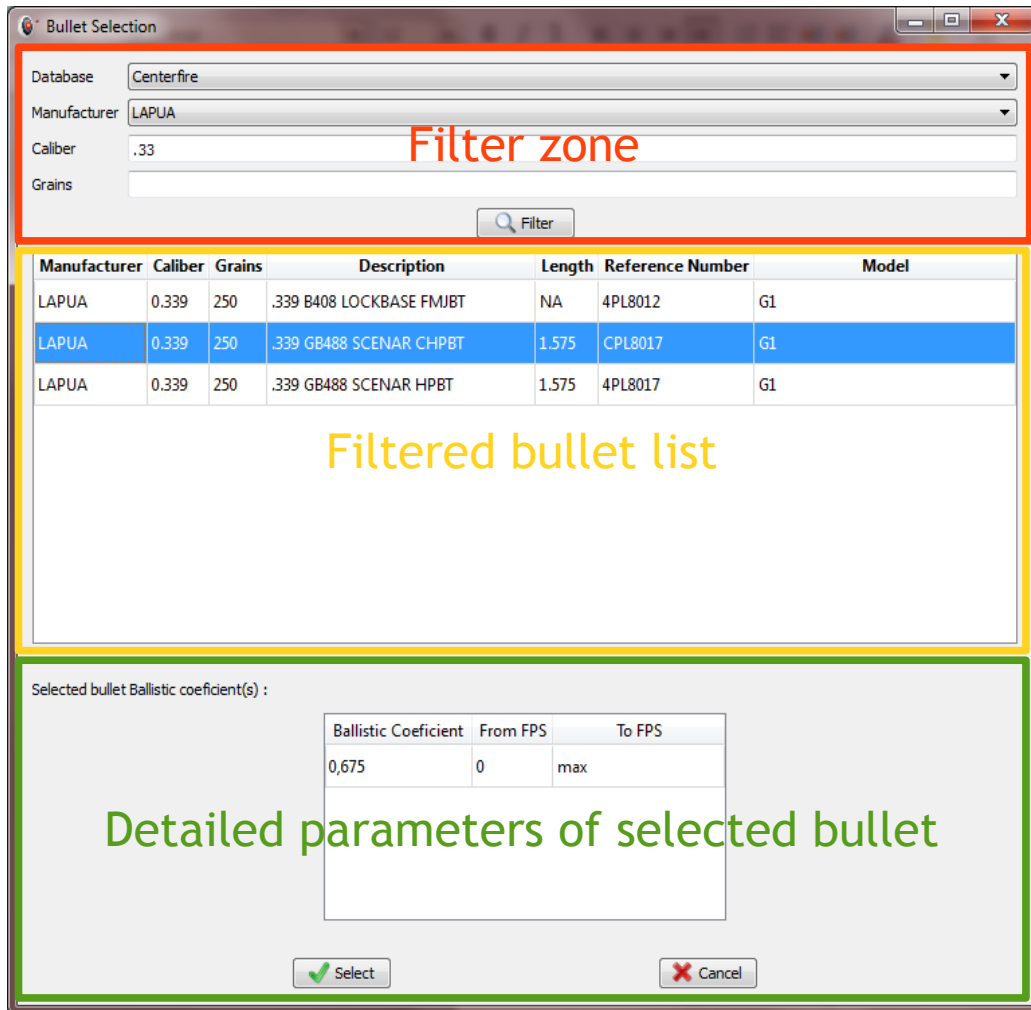
- To manually save a set of parameters : zone 7 → 'Parameters' menu → save parameters. The parameters are saved in '.qbl' file, that you shall place somewhere on your hard drive.
- To restore the set of parameters : zone 7 → 'Parameters' menu → Load parameters. Then, select the desired '.qbl' file.

## 5 Run a simulation

### 5.1 With a projectile from database

- Activate at least one of the shoot 4 tabs : Zone 2 → select one of the tabs → Check the 'Activate' check box
- Open the projectile database : Zone 8 → Click 'Select from bullet database'

This opens the bullet selection window :



- Filter bullet with desired parameters
  - Type of cartridge :
    - Centerfire
    - Rimfire
    - Airgun pellet
    - Custom projectile
  - Manufacturer

- Bullet diameter. In inches (0.223, 0.308, ...)
- Bullet weight in grains
- Click 'Filter' button
- Select a line from the filtered list of projectile
- Click 'Select' button on the bottom of the window
- The shoot tab, in zone 2, is then filled with parameters of the selected projectile
- Set the projectile mouth velocity : Zone 2 →  $V_0$
- Set the zeroing range : zone 2 → Zero Range
- Run the simulation : Zone 9

## **5.2 With a manually parameterized projectile**

- To switch back to manual mode for the selected shoot tab : Zone 8 → 'Set parameters manually'
- Entry of parameters (ballistic coefficient, bullet weight) is then manual.
- Run the simulation : Zone 9

## **5.3 Simultaneous simulation of several shoots**

To Simultaneously simulate various projectiles and compare the trajectories, simply configure each of projectiles in the tabs of the zone 2. Up to 4 can be simulated simultaneously.

For a shot to be taken into account in the simulation, you must check the 'Enabled' check box which is located in the corresponding tab.

Each shot is assigned a color, which appears at the top of the tab. The trajectory of the projectile is of the same color.

## **6 Result plot**

After you run the simulation (with button in zone 9), the result plot is displayed in zone 3.

### **6.1 Setting the simulation max range**

The maximum simulation distance can be selected automatically or manually set (Zone 6 → 'Maximum range').

### **6.2 Unit system selection**

The choice of unit system affects the result curve and the range cards. Two systems of units are available:

- Metric
- U.S.

Moreover, it is possible to represent the drop and drift curves as MOA. To do this, select the option 'MOA' in the 'Graph' menu → Unit

### **6.3 Interaction between simultaneous shoots**

Several interaction modes between the active shoots are available. You can select one of them in the menu 'Parameters' → Multi-shoot behavior.

Three interaction modes are available :

- Independent shoots : in this mode, the shoots ave no link. The zeroing ranges are set independently ons from the others, in each shoot tab (zone 2)
- Same zero range : when choosing this option, you have to select one of the shoots as the 'master shoot'. All zeroing ranges for other active shoots will be the same as the zero range of the master shoot.
- Same angle : in this mode, all active shoots will be shot with the same scope adjustment as the master shoot. This corresponds to the situation where you change the ammunition while keeping the same scope adjustment. It allows to answer the question “what would happen if I change my ammo without touching anything on my rifle ?”

### **6.4 Plot selection**

Flowing quantity can be plot :

- Drop
- Velocity
- Drift
- Energy
- Time of flight

To select the desired plot quantity, go in the 'Graph' menu (zone 7), and select the desired quantity.



## **6.5 Plot cursor**

A click on the plot area will display a cursor that allow you to precisely know the value at a precise range.

## **6.6 Zoom**

To activate zoom mode, click the 'Zoom' button on zone 7. Then, you can zoom an area of the plot by selecting the area with the mouse.

To deactivate zoom mode, just click again the 'Zoom' button.

To reset the plot scale, simply click the 'Reset' button on zone 7.

## 7 Range cards

The numbers are the same as the plots, presented in tables.

- Each active ammunition (one tab in zone 2) has its own range card that you can display by a tab in zone 4.
- The range cards use the same unit system as the plot, selected by 'Graph' menu → units
- You can print a range card by using the button 'Print range card' above the table

The screenshot shows the qBal software interface. At the top, there are menu options: Parameters, Graph, Calculate, Database, and qBal. Below the menu, there are input fields for Maximum Range (800 m), Auto, Zoom, Reset, and Range Card Step (10). The main area is divided into four load tabs: Load 1, Load 2, Load 3, and Load 4. A pink box highlights a 'Print Range Card' button above a table. To the right of the button, the text 'Print the card' is written in pink. The table contains the following data:

Range (yd)	Drop (in)	Drop (moa)	Drop (clicks)	Drift (in)	Drift (moa)
10	-0.4	-3.8	-31	0	0
20	0.2	1	8	0	0
30	0.7	2.2	18	0.1	0.3
40	1.1	2.6	21	0.1	0.2
50	1.6	3.1	24	0.2	0.4
60	1.9	3	24	0.3	0.5
70	2.2	3	24	0.4	0.5
80	2.5	3	24	0.5	0.6

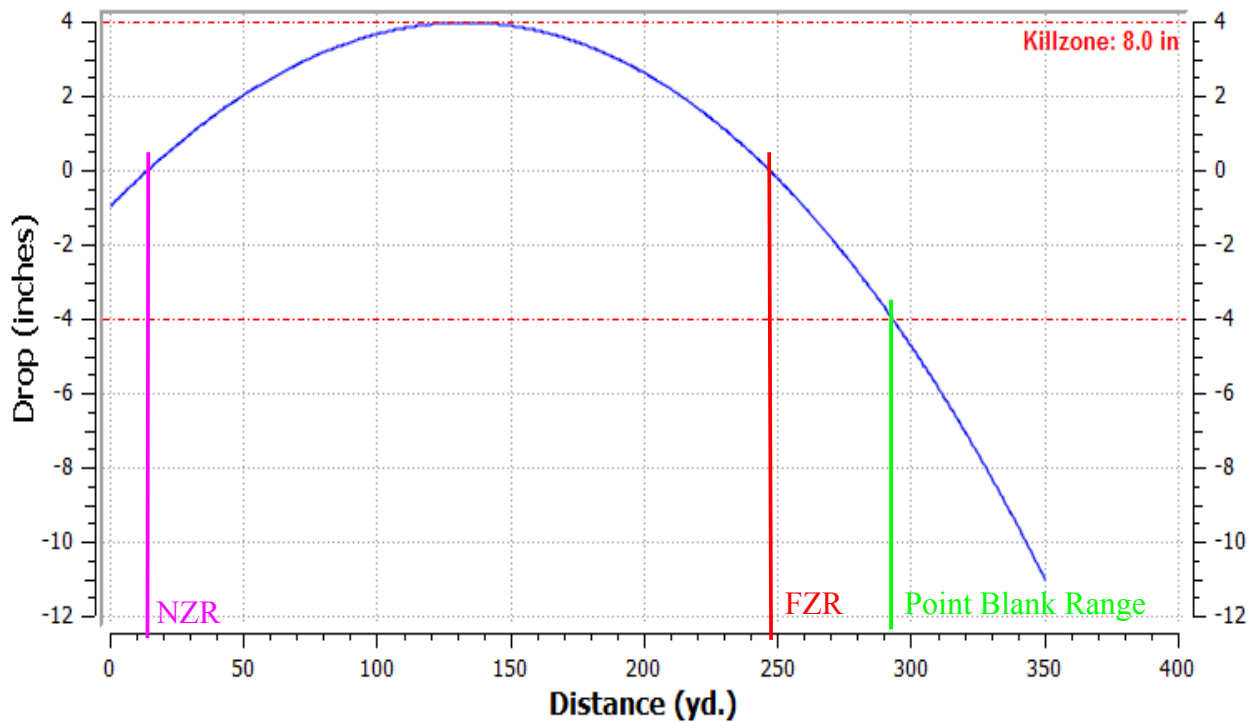
Below the table, there are several control panels: Gun Parameters (Sight Height: 1,0 inch, Scope click: 1/8 moa), Wind Parameters, Atmospheric Conditions, and a load selection panel with four tabs (Load 1, Load 2, Load 3, Load 4). The Load 2 tab is active, showing parameters for LAPUA .339 GB488 SCENAR CHPBT: Mouth Velocity (800 m/s), Weight (250,0 grains), Ballistic Coefficient (G1), and Zero range (200 m). On the right side, there are buttons for 'Select from bullet database', 'Set parameters manually', and 'Compute !'. A sidebar on the right displays ammunition data for Load 2 (MPBR: 0.0 yd, NZR: 0.0 yd, FZR: 0.0 yd) and Load 3 (MPBR: 0.0 yd, NZR: 0.0 yd, FZR: 0.0 yd).

## 8 NZR/FZR/Point Blank Range

- NZR = optimal Near Zero Range
- FZR = optimal Far Zero Range

The NZR / FZR / Point Blank parameters corresponds to the condition where the bullet leaves the Kill Zone at the greatest range possible. So, this rifle adjustment is the best you can get with a given weapon and ammunition.

When zeroing range is set at the FZR, the trajectory corresponds to the following schema :

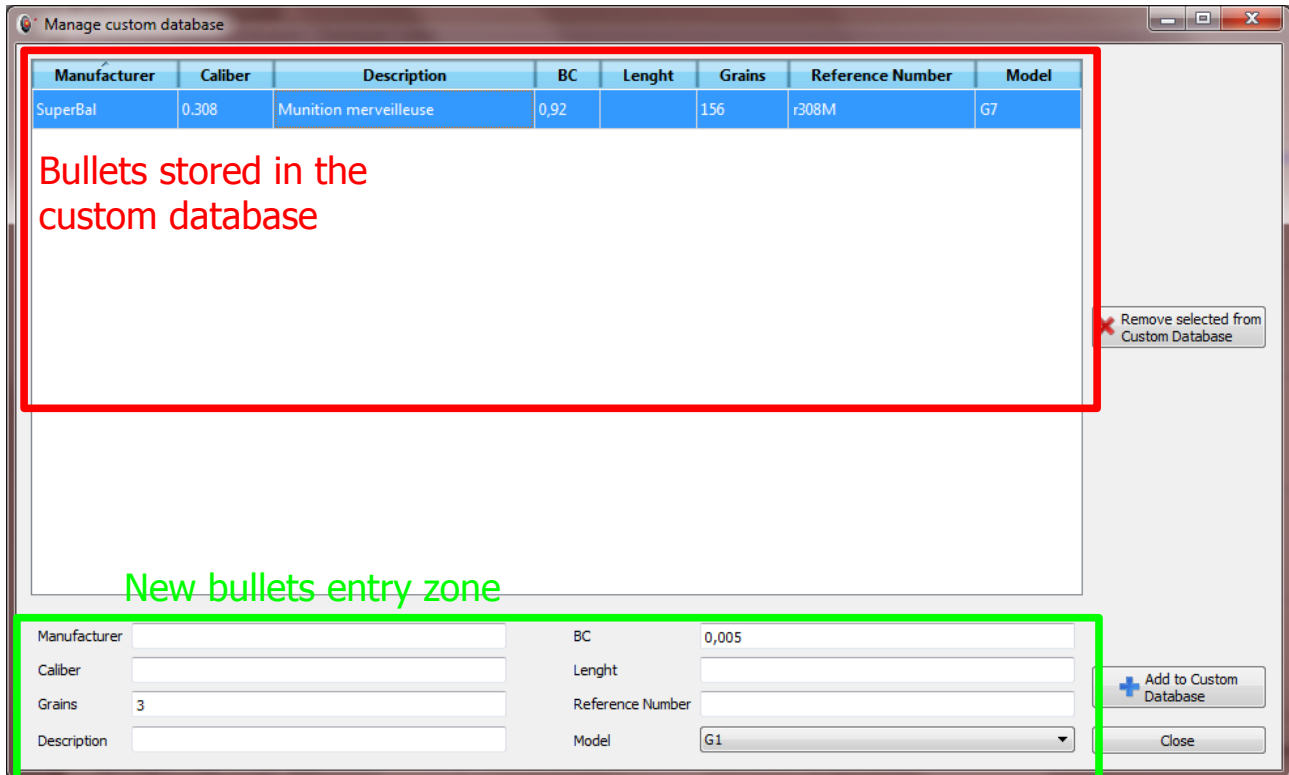


NZR / FZR / Point Blank are automatically calculated when the simulation is ran. They are displayed in zone 5.

## 9 Using the custom database

The custom database allows you to store ammunitions that are not included in the default databases that are included in the software.

The custom database management windows is displayed with the 'Database' manu (zone 7) → manage custom database.



### 9.1 Add a bullet in the custom database

To add a bullet in the custom database :

- Enter its parameters in the bottom area
- Click 'Add to Custom Database'

### 9.2 Remove a bullet from the custom database

To remove a bullet from the custom database :

- Select the bullet in the upper area
- Click 'remove selected from Custom database' button