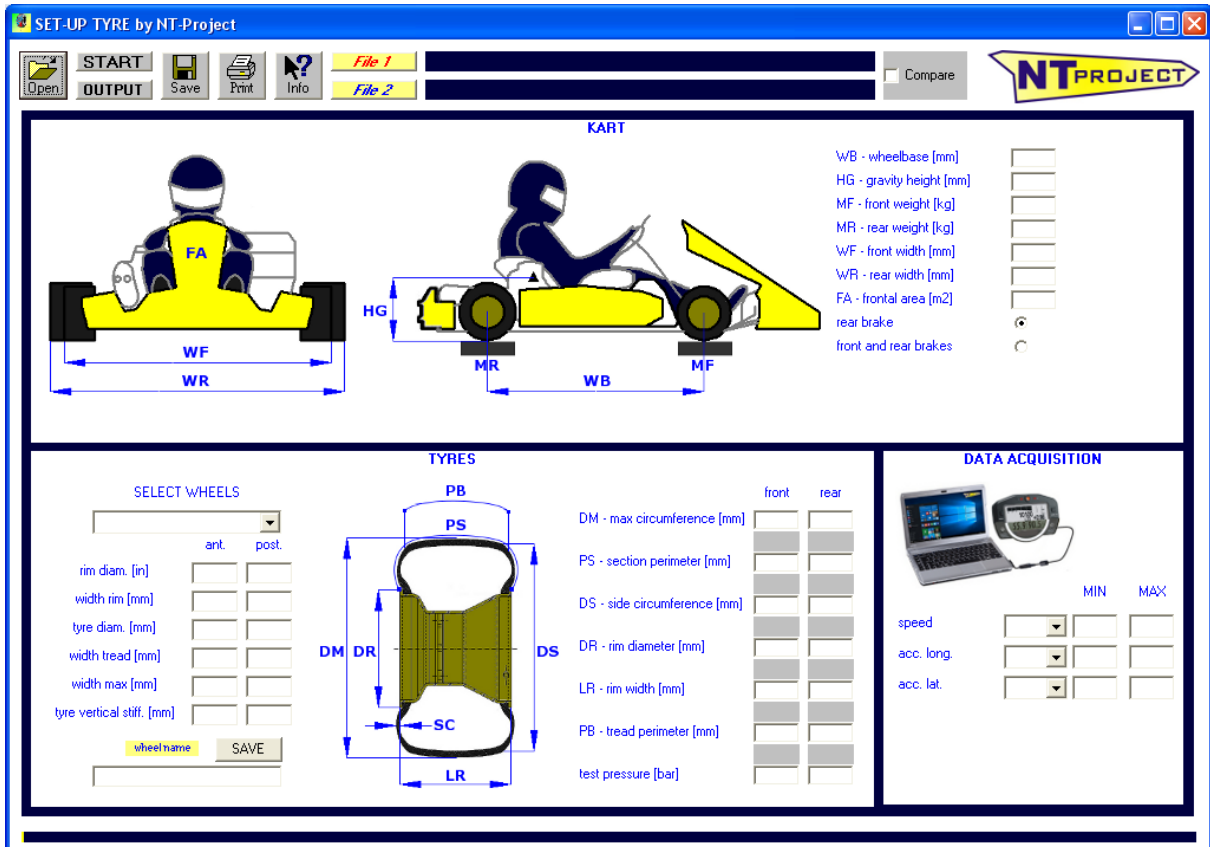


PRESENTATION SOFTWARE SET-UP TYRE

When opening the software appears this screenshot:



INPUT DATA

The INPUT tab is shared in three areas, one for the KART features, one for the TYRES features, and one for the informations obtained from the DATA ACQUISITION

KART

You must enter the following measures, showed also in the images.

WB - wheelbase [mm]	<input type="text"/>
HG - gravity height [mm]	<input type="text"/>
MF - front weight [kg]	<input type="text"/>
MR - rear weight [kg]	<input type="text"/>
WF - front width [mm]	<input type="text"/>
WR - rear width [mm]	<input type="text"/>
FA - frontal area [m2]	<input type="text"/>
rear brake	<input checked="" type="radio"/>
front and rear brakes	<input type="radio"/>

About the gravity height HG, it's possible to calculate it using the utility on our web-site http://www.ntproject.com/calculation_gravity_kart.php , else you can leave the field empty and will be used the standard value of 220 mm

About the frontal area FA, if isn't possible to measure it, you can leave the field empty and will be used the standard value of 0.5784 m2

TYRES

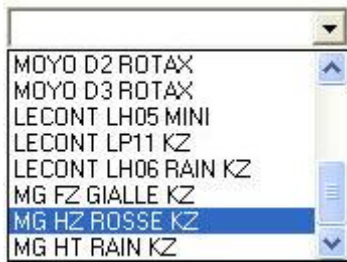
For the tyres data you can use the informations provided from the manufacturer in the homologation fiche.

SELECT WHEELS

	ant.	post.
rim diam. [in]	<input type="text"/>	<input type="text"/>
width rim [mm]	<input type="text"/>	<input type="text"/>
tyre diam. [mm]	<input type="text"/>	<input type="text"/>
width tread [mm]	<input type="text"/>	<input type="text"/>
width max [mm]	<input type="text"/>	<input type="text"/>
tyre vertical stiff. [mm]	<input type="text"/>	<input type="text"/>

wheel name

The data can be easily entered selecting your tyres from the list



However if you have a tyre not listed, or modified, you can enter the data manually.

The main data are all presents in the homologation fiche of the tyres

	front	rear					
rim diam. [in]	<input type="text"/>	<input type="text"/>					
rim width [mm]	<input type="text"/>	<input type="text"/>					
tire diam. [mm]	<input type="text"/>	<input type="text"/>					
thread width [mm]	<input type="text"/>	<input type="text"/>					
max width [mm]	<input type="text"/>	<input type="text"/>					
tire vert. stiff. [mm]	<input type="text"/>	<input type="text"/>	<table border="1"> <tr> <td>7</td> <td>Rigidité latérale et verticale (sous charge de 40 kg)</td> <td>Lateral and vertical spring stiffness (under load of 40 kg)</td> <td>2 - 17</td> </tr> </table>	7	Rigidité latérale et verticale (sous charge de 40 kg)	Lateral and vertical spring stiffness (under load of 40 kg)	2 - 17
7	Rigidité latérale et verticale (sous charge de 40 kg)	Lateral and vertical spring stiffness (under load of 40 kg)	2 - 17				

However often the data entered in the homologation fiche aren't very than the real features of the tyres, therefore you can make measurements manually.

TYRES		front	rear
	DM - max circumference [mm]	<input type="text"/>	<input type="text"/>
	PS - section perimeter [mm]	<input type="text"/>	<input type="text"/>
	DS - side circumference [mm]	<input type="text"/>	<input type="text"/>
	DR - rim diameter [mm]	<input type="text"/>	<input type="text"/>
	LR - rim width [mm]	<input type="text"/>	<input type="text"/>
	PB - tread perimeter [mm]	<input type="text"/>	<input type="text"/>
	test pressure [bar]	<input type="text"/>	<input type="text"/>



The main measures that you must perform are:

- maximum circumference of the tyre DM



To execute rightly the measure, you need of a string, and to measure the circumference in the middle of the tread

- section perimeter of the tyre PS



To execute rightly the measure, you need of a string, and to measure the perimeter of the section starting from the external edge of the rim

- side circumference of the tyre DS



To execute rightly the measure, you need of a string, and to measure the circumference of the tread just before that begins the tyre side.

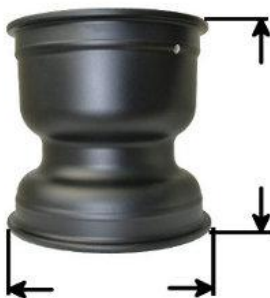
- section perimeter of the tread PB



To execute rightly the measure, you need of a string, and to measure the perimeter of the tread section starting from the end of the side-wall

Together with the tyre measures, you must enter also those of the rim:

- diameter DR and width LR



You must perform the external measures including the edges.

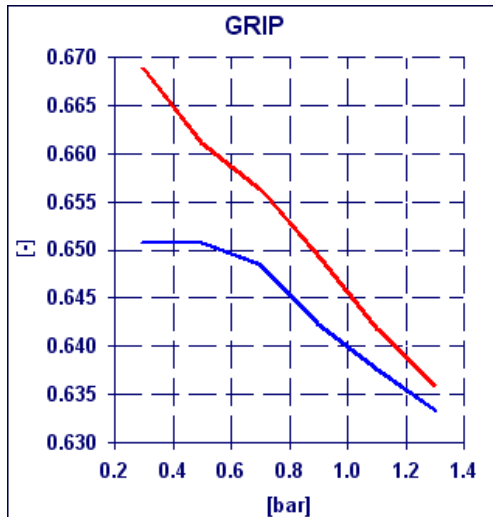
At the end you must enter the inflation pressure that you want testing. In the results the the tyre performances will be calculated at this inflation pressure.

DATA ACQUISITION

		MIN	MAX
speed	<input type="text"/>	<input type="text"/>	<input type="text"/>
acc. long.	<input type="text"/>	<input type="text"/>	<input type="text"/>
acc. lat.	<input type="text"/>	<input type="text"/>	<input type="text"/>

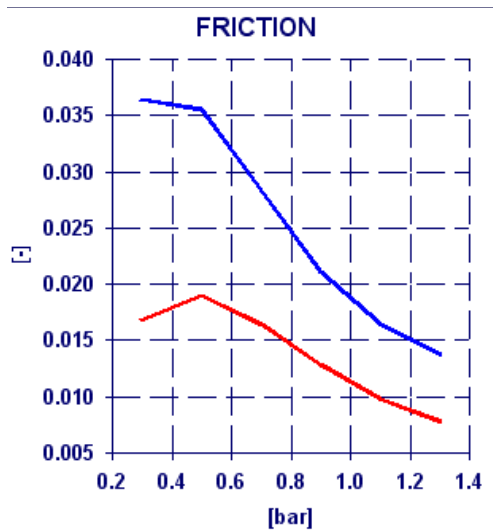
To understand the conditions where will work the tyre changing the track, you can enter the data acquired for speed, longitudinal acceleration, and lateral acceleration. You must indicated the minimum and the maximum values.

results



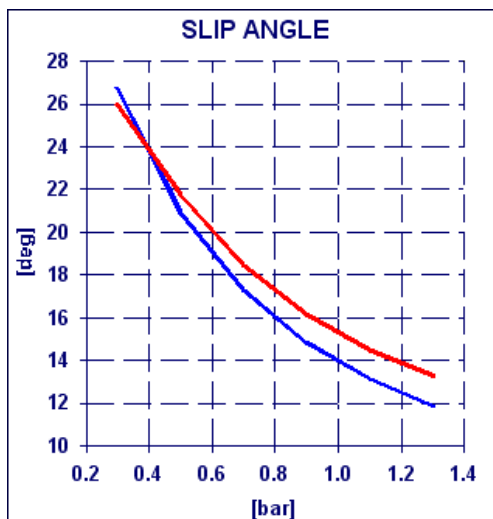
The graph shows how changes the grip index of the front tyres (red), and of the rear tyres (blue), changing the inflation pressure.

Greater will be the value, greater will be the grip that the tyre can provide.



The graph shows how changes the rolling coefficient of the front tyres (red), and of the rear tyres (blue), changing the inflation pressure.

Greater will be the value, greater will be the power lost to win the rolling of the tyre.



The graph shows how changes the slip angle of the front tyres (red), and of the rear tyres (blue), changing the inflation pressure.

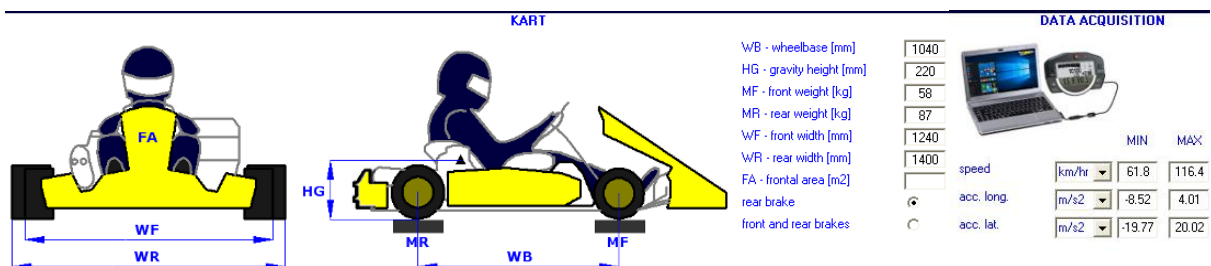
The calculation is performed in the condition with the greater lateral force that on corner the tyre must provide.

The values of the carcass stiffness are important not as absolute values, but to understand the difference of the structure that have the different tyres, and above all to see if there are structural differences between two set of the same tyre model.

The three graphs are fundamentals to choose of the best inflation pressure to use in the different conditions and needs.

To help the mechanic and the technician to make these choices the software SET-UP TYRE performs anyway other specific calculations.

ADVISED PRESSURES



In fact in function of the kart features, and of the acquired data, the software calculates the load conditions on each wheel in the different driving conditions (braking, acceleration, and corner)

In function of these loads the software calculates the inflation pressure that allows to obtain the best grip in the different driving conditions.

	PRESSURE MAX GRIP [bar]		
	BRAKING	ACCELERATION	CORNER
FRONT	0.50	0.50	0.70
REAR	0.50	0.50	0.70

The software simulates in the behavior in 5 different inflation pressures (0.5-0.7-0.9-1.1-1.3) therefore the indication will be the best between these, from the graphs you can anyway understand if the optimal can be a value intermediate between the pressures simulated.

Since that the loads change in the different driving conditions, the advised pressures will be different, will be then the technician to make the final choice in function of the track, or the driving style of the driver, favoring one phase over the others from time to time.

The software calculates also the behavior using the pressure to have the maximum grip for the corner condition (M.G.C.).

	PRESSURE M.G.C [bar]
Front SLIP ANG [deg]	19.44
Rear SLIP ANG [deg]	15.90
TRIM [deg]	understeer
	3.54
FRONT GRIP	0.641
REAR GRIP	0.672
LOSS POWER [CV]	1.25

Using these pressures you can therefore easily to see:

- front and rear slip angle in the middle of the corner;
- trim conditions (oversteer / understeer) in the middle of the corner;
- front and rear grip level;
- power on average lost to win the rolling resistance.

If in the input data you've entered the inflation pressures that you want testing

	FRONT	REAR
test pressure [bar]	<input type="text" value="0.5"/>	<input type="text" value="0.5"/>

the software will calculate the behavior also at these pressures

	PRESSURE M.G.C [bar]	TEST PRESSURE [bar]
Front SLIP ANG [deg]	19.44	24.29
Rear SLIP ANG [deg]	15.90	20.86
TRIM [deg]	understeer	understeer
	3.54	3.42
FRONT GRIP	0.641	0.637
REAR GRIP	0.672	0.663
LOSS POWER [CV]	1.25	1.28

Therefore it will be extremely easy to make the best choices on the inflation pressures, both to satisfy the needs of driving of the driver in function of the chassis features, both to improve the corner speed (increase the grip) or the straight speed (reduce the rolling and slip angle losses), in function of the track and engine features.

Comparison results

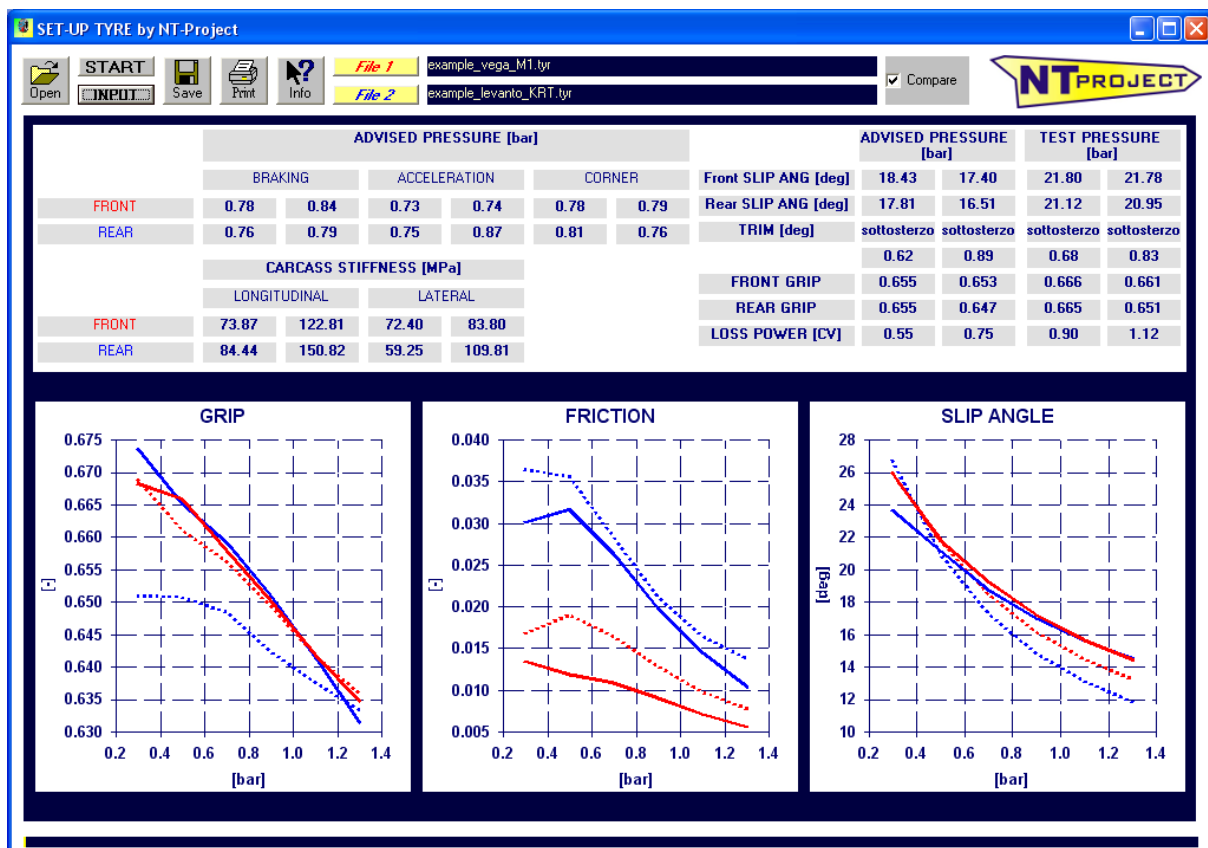
The software allows to compare the results of two files saved.

To compare two results, after the calculation and saved the results, you must open the first file that you want compare from the button "Open" or the button "File1", and the second file from the button "File2". At this point check the box "Compare"



Going in the OUTPUT tab, in the first column you'll have the results of the File1, and in the second column the results of the File2.

In the graphs, the solid line is for the File1, and the dashed line for the File2.



Open and save data file

The data can be saved in a file * .tyr through the "SAVE" button.



The stored data can be easily retrieved through the button "OPEN" and even if they were saved to the output through the OUTPUT button is possible to instantly review the results.



Print

At the end of the calculation you can print the results obtained through the PRINT button.



01/01/2023
SET-UP TYRE
NT-PROJECT di Tabacchi Omar
