

# WiseContact



*scan,  
edit,  
analyze*

**W**iseContact package combines the power of WiseImage software and special plug-in to solve the toughest pressure measurement problems. It can process monochrome, grayscale and color images of treads and imprints.

**W**iseContact bases on well-known Consistent Software technology to process raster images, the market best range of image processing, editing and enhancement tools. A fully customizable interface, direct support for Contex and Twain scanners, smart CAD-style selection and snap, sophisticated calibration, 2D vector editing, semi automatic vectorization (tracing) and batch processing (via script of commands) make this package a unique platform for various applications.

**T**he specially designed plug-in is used to analyze imprints and treads. WiseContact targets a number of industries, such as Tires Producers, Shoe Manufactures, Car and Aerospace Industries, etc. Powerful raster image processing and analysis provides users with ability to study pressure distribution between two mating surfaces. Assisted by WiseContact, design engineers will evaluate tires treads, fasteners, gaskets and seals. Ergonomists can develop improved automotive seating and healthy shoes. Production engineers adjust roller nip pressure to insure proper materials transport. And quality control personnel check the announced characteristics of products.

**O**pen Architecture will give system providers and third-party developers an ability to integrate WiseContact with other application and add specific features (scripts), so it can fit ever-growing list of applications.

# Features:

- ◆ Direct Contex and Twain scanners support
- ◆ Various raster image processing, editing and enhancement tools
- ◆ Automatic definition of tread/imprints source
- ◆ Processing of three types of images — Ink Footprint Impression, Carbon Copy Mat, Sensitivity Indicating Films
- ◆ Special edit tools — cropping, rotating, deskewing, etc.
- ◆ Three types of analysis: general calculation (results), distribution (statistics) and custom measurement
- ◆ Ability to analyze the whole image of an imprint or to specify rectangular/polygonal area on the image
- ◆ Calculation of gross area, contact area, imprint's width and length, contact/gross ratio
- ◆ Calculation tuning by two parameters — background level and reduction
- ◆ Point and arbitrary area pressure measurement with area, absolute/average pressure and pressure distribution calculation
- ◆ Saving of each tab content into a text file or clipboard
- ◆ Applying a tire tread image and measurement results into WiseContact multi layer raster document
- ◆ Print out of image and data

## **Consistent Software**<sup>®</sup>

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# Description of Tire Tread Analysis plug-in

## 1. Scanning

The user acquires a tire tread image from a scanner. It can be done directly from WiseContact with the commands Select Source and Acquire (Contex and Twain scanners). Alternatively a tire tread image can be loaded from a file. Scanning resolution (DPI) is determined by the accuracy required for further processing and analysis. 300-400 is an average sufficient resolution; in this case a raster pixel size will be equal to approximately 0.1x0.1 mm.

## 2. Processing

A special toolbar will appear immediately after starting the program. It will contain the following set of commands.



- ◆ Crop by Rectangle
- ◆ Rotate at 90 degrees
- ◆ Rotate at custom angle
- ◆ Deskew auto
- ◆ Brightness/ contrast
- ◆ Equalizer
- ◆ Blur
- ◆ Speckle/Hole remover
- ◆ Launch Tire Tread plug-in

The toolbar can be customized by a customer.

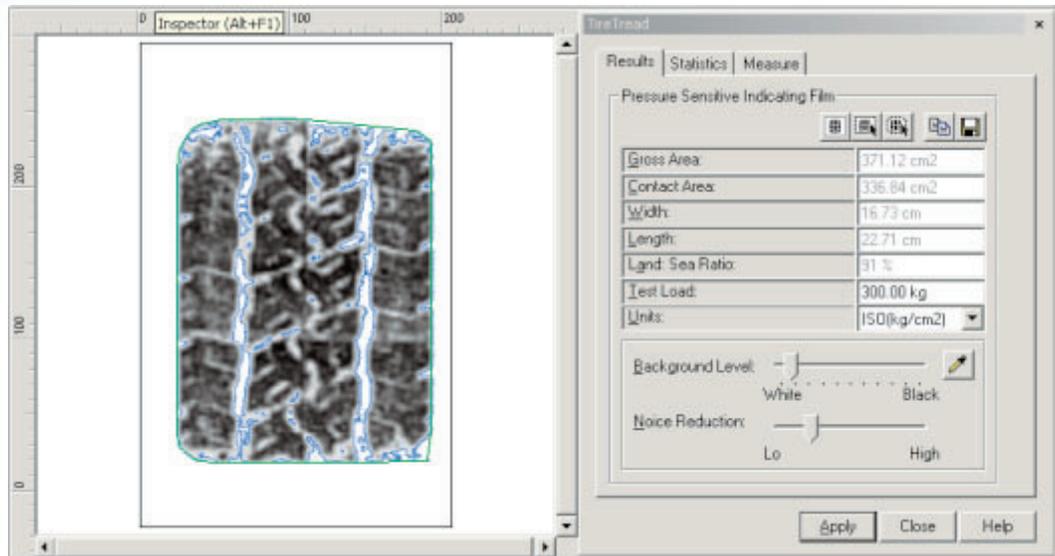
**Note:** *Brightness/Contrast and Equalizer tools should be used carefully as they may effect the pressure distribution.*

## 3. Tire Tread Plug-in

After the image has been cleaned up and processed, Tire Tread Plug-in (TTP) can be selected. It contains three tabs: Results, Statistics, and Measure. These tabs may be named according to the customer requirements.

## 4. Image Type Definition

After starting TTP, WiseContact will automatically define the image type (three options) and displays the source name — Ink Paper Footprint for monochrome images, Carbon Copy Mat for grayscale images and Pressure Sensitive Film for color palette images (8-bit or true color indexed).



## 5. Area Selection

To start analyzing the tire tread parameters one of three buttons should be selected:

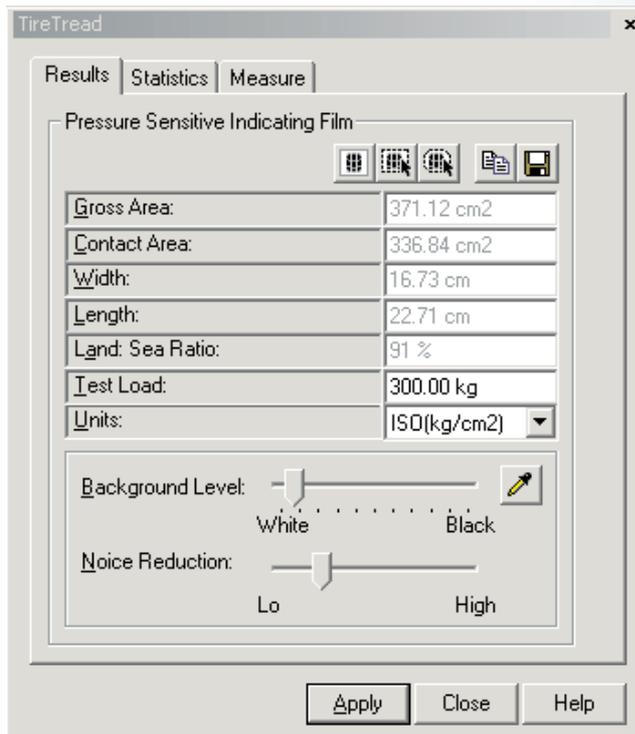


- ◆ Analyze the whole image.
- ◆ Specify a rectangular area on the image to analyze.
- ◆ Specify an arbitrary (polygonal) area on the image to analyze.

## 6. Results (Calculation)

After the area was specified, the tire tread analyze will be started and all required parameters will be calculated. For Carbon Copy Mat and Pressure Sensitive Indicating Films a tire tread will be converted to Rainbow palette image. When the Results tab is selected, the main program pane displays the initial image with the outlining contour of the tread made by the program so that the calculation results can be verified. This tab displays the following tire tread parameters:

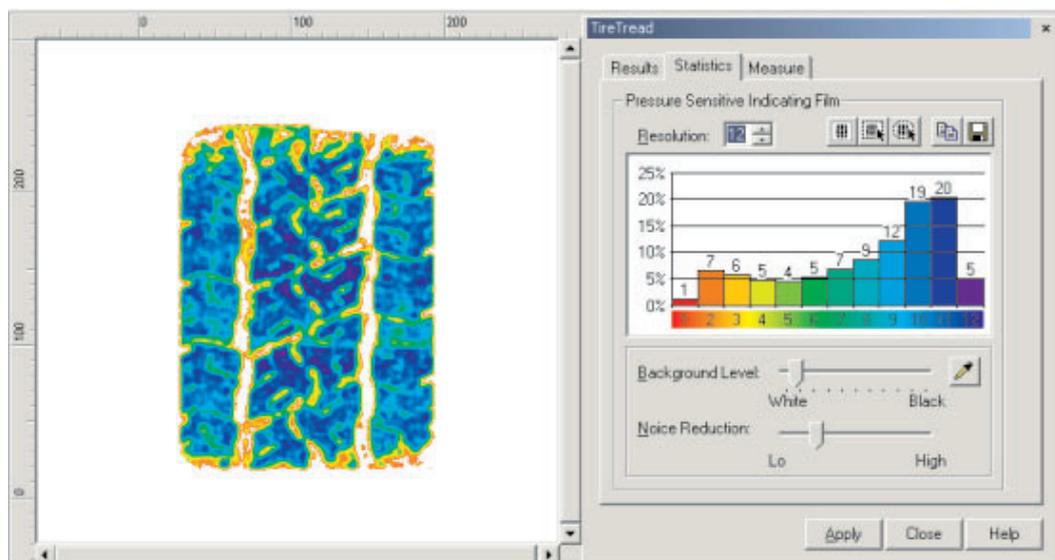
- ◆ Gross Area — overall tire footprint area inside the outlining contour.
- ◆ Contact Area — overall contact area calculated upon black and gray points of the tire footprint.
- ◆ Width/Length — horizontal and vertical sizes of the tire footprint calculated upon the outlining area size.
- ◆ Land: Sea Ratio: — ratio of Contact / Gross areas.
- ◆ Test Load is a user-entered field; this value means a load (kg) applied to the tire when the tire footprint is taken. This value can be used for calculation of absolute pressure per area unit in each point or a specified area of the tire tread.
- ◆ Operator can change Units for Test Load and Pressure (ISO or U.S.).



**Note:** Two parameters have been added to make the tire tread calculation more precise. First, the Background level parameter can help to exclude white background on a grayscale or color image. This value is specified as percentage 0-100% and further converted by the program to the true background value. The greater this value, the fewer dark pixels will be taken into calculation. Once this value is changed, the program automatically recalculates all tire tread parameters and the image will be changed as well, so the required can be adjusted value easily. Second, the Noise Reduction parameter is also specified as percentage and will allow the program to exclude low-sized objects (speckles), which appear after scanning from calculation. Once this parameter is changed, all tire tread parameters will be recalculated.

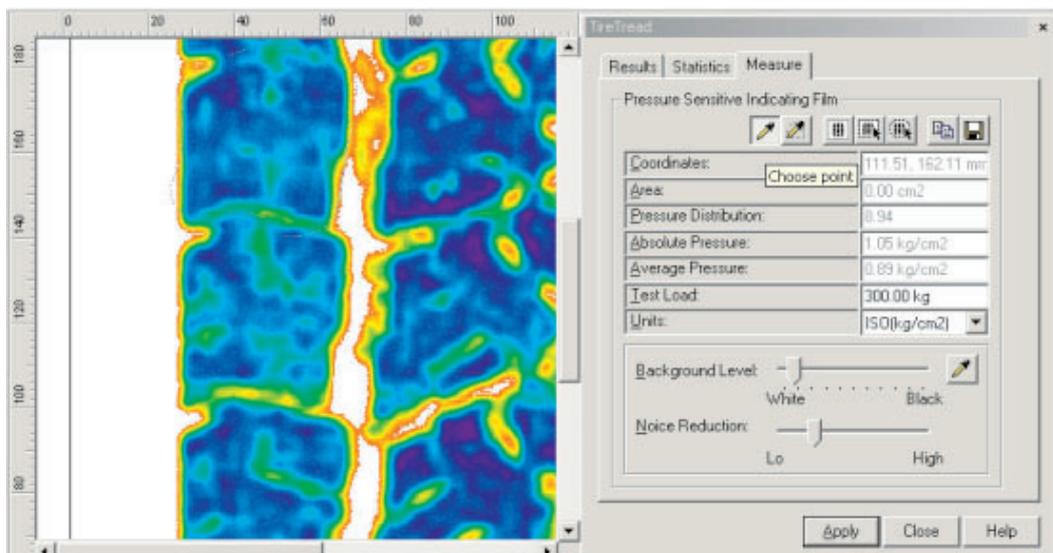
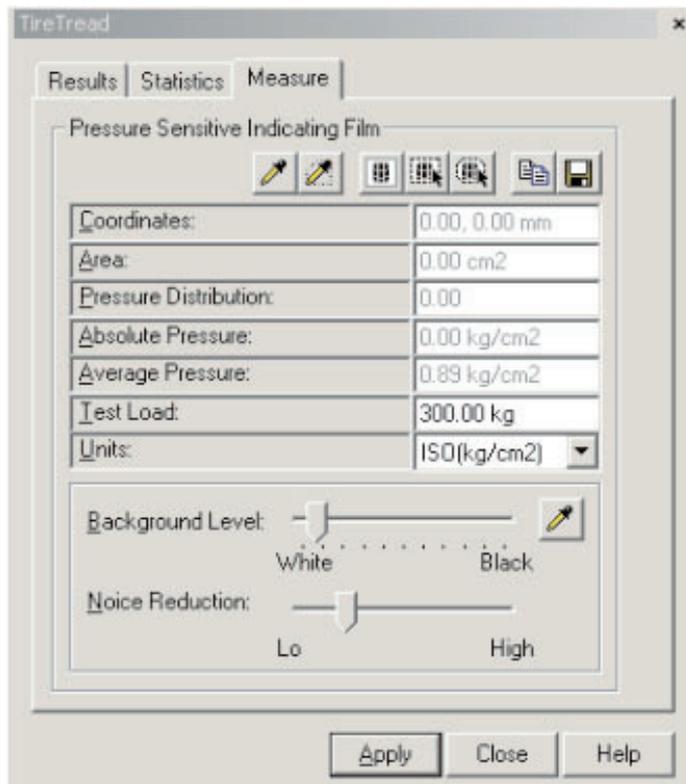
## 7. Statistics (distribution)

The Statistics tab contains the Pressure Distribution graph. As soon as a user switch to this tab, the image in the main view will be presented in Rainbow Palette. A number of color range levels can be set within 2 — 16.



## 8. Pressure Measuring

The Measure tab allows measuring pressure in each point or in a specified area of the tire tread image. To measure pressure in a point the  button should be selected and a point on the image have to be specified. While moving the cursor over the image the values of Coordinates (X, Y) and Relative Pressure are being changed. The Absolute Pressure value will be calculated only if Test Load is specified; this value shows the pressure per area unit ( $\text{kg}/\text{cm}^2$ ) in a given point. To measure pressure in any area, a polygon on the image using the  button should be specified. WiseContact will calculate Area, Pressure Distribution and Absolute Pressure for the area specified. The Average Pressure parameter shows the average pressure for the whole tire footprint, if the Test Load is specified.



## 9. Saving of the Results

The contents of each tab can be saved to a file or copied to Clipboard, using buttons . The contents of the Results and Measure tabs will be saved to a text file \*.txt under a specified name in the format:

### For Results:

*Gross Area:* 300.00 cm<sup>2</sup>  
*Contact Area:* 270.00 cm<sup>2</sup>  
*Width:* 150.00 cm  
*Length:* 200.00 cm  
*Land: Sea Ratio:* 90.00 %  
*Exerting Force:* 350 kg

### For Measure:

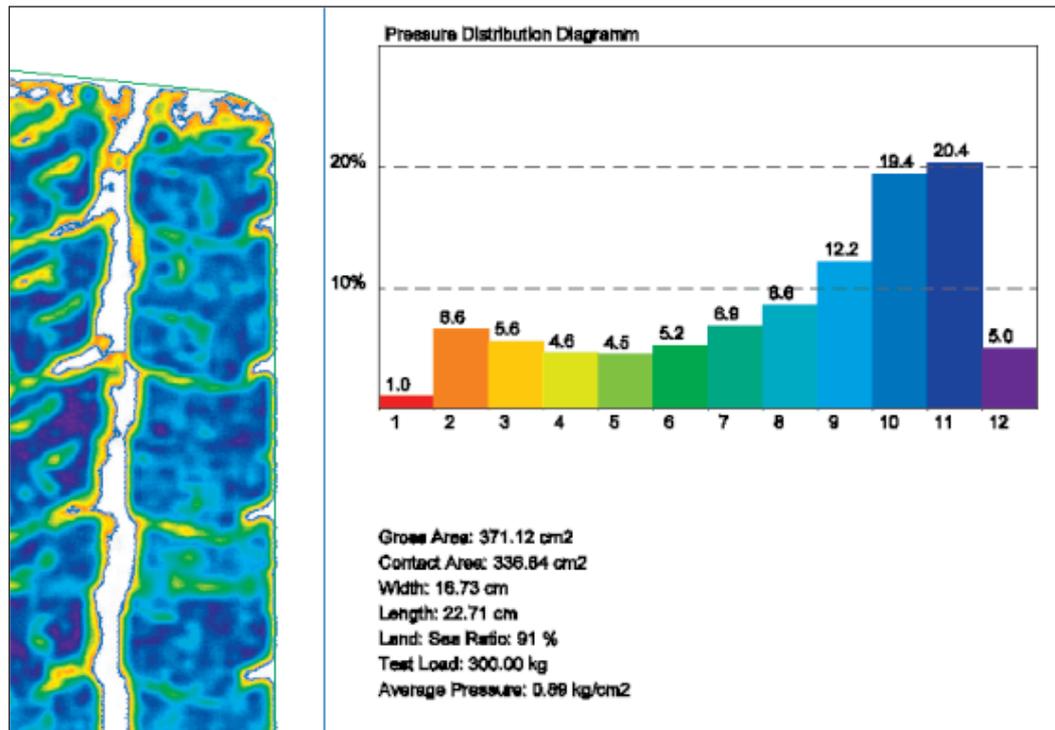
*Coordinates:* 50.0, 60.0  
*Area:* 270.00 cm<sup>2</sup>  
*Relative Pressure:* 5.47  
*Absolute Pressure:* 1.56 kg/cm<sup>2</sup>  
*Average Pressure:* 1.1 kg/cm<sup>2</sup>  
*Exerting Force:* 350 kg

The program in the same format will do copying to the Clipboard.

For the Statistics tab, the contents of the graph will be saved as numerical values of the columns to a text file and as a text to Clipboard.

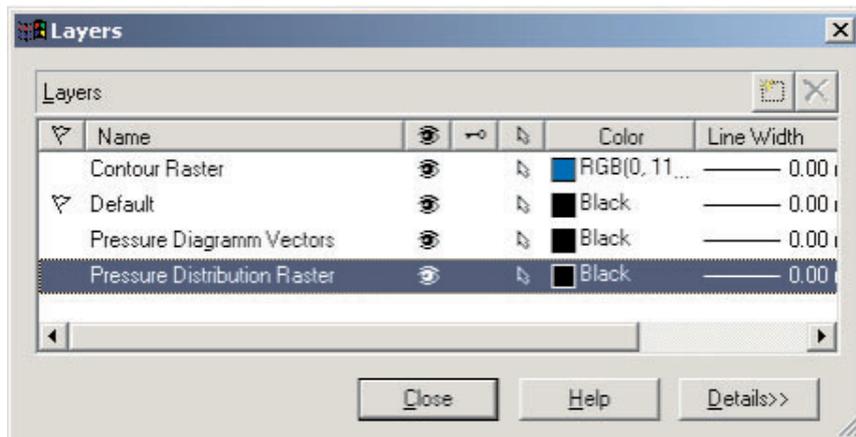
## 10. Applying to Raster File

To save a color image, a graph or measurement results the Apply button (located at the bottom of the dialog) should be pressed. The image and data will be inserted in a WiseContact document on appropriate layers.



## 11. Layering

When Apply button is clicked WiseContact creates Layers set. A color image will be inserted in a WiseContact (WiseImage) document on the Pressure Distribution layer; a graph — on the Statistics layer to the bottom-right of the image; and the text — on the Results layer to the top-right of the image.



**Note:** Contour Raster layer contains monochrome raster image showing contours of the processed tire tread. Pressure Diagram Vectors layer contains all vectors data: Bound tire contour, Diagram, Measure texts. Pressure Distribution layer contains Color image showing Pressure Distribution value in each image point. Blue colors show high level of pressure and red color — low level.

## 12. Printing

The data can be printed out using standard WiseContact command. To print an image, a graph and/or measurement results the desired layers should be turned on and the Print command should be launched.

