



RIFTEK
Sensors & Instruments

Equivalent Conicity Calculation Program

User's manual

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1. Introduction

Equivalent Conicity is a parameter that is used when investigating dynamic interaction between railways vehicle and track. The parameter describes behavior of contact between wheels and rails for straight and large radius parts of track.

2. Calculated parameters

The program calculates the next parameters:

- Contact points position.
- Rolling radiuses difference depending on displacement of wheel set.
- Contact angles and their difference depending on displacement of wheel set.
- Equivalent Conicity.

Calculations are made in accordance with EN 15302.

3. System requirements, installation and activation

3.1. Hardware and software requirements

The main requirements for using **Equivalent Conicity Calculation Program**:

- Operating system Windows XP and later.

3.2. Installation

Before starting the installation, read the following information.

Equivalent Conicity Calculation Program can be installed via two different ways:

- Downloading a standalone setup package (**EquivalentConicitySetup_offline.exe**). Please note: the package contains a version of Equivalent Conicity Calculation Program available on the publishing date.
- Setting up via the internet (**EquivalentConicitySetup_online.exe**). In this case setup will download and install the latest build of Equivalent Conicity Calculation Program.

Download links of the latest versions:

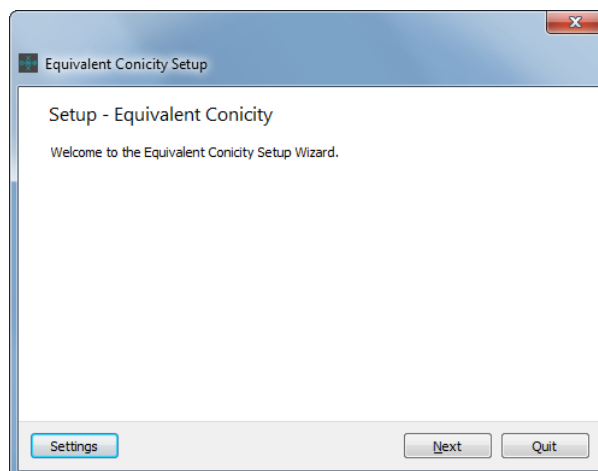
http://riftek.com/media/rit/repos/installers/EquivalentConicitySetup_online.exe

http://riftek.com/media/rit/repos/installers/EquivalentConicitySetup_offline.exe

Upon successful download please run downloaded executable (setup file **EquivalentConicitySetup_online.exe/EquivalentConicitySetup_offline.exe**) as administrator.

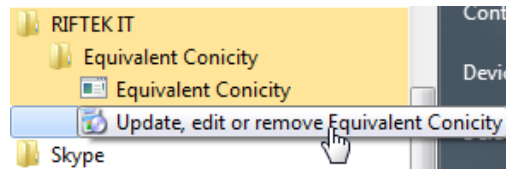
The installation is performed by the specially created installer.

When you run the installation, Welcome Window appears:



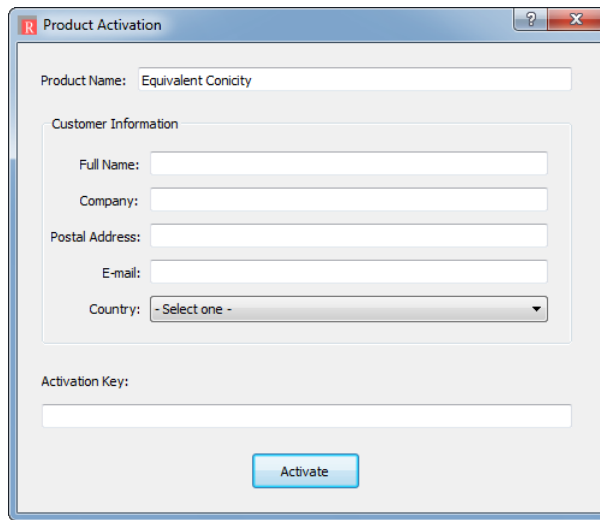
Click **Next** to continue with the installation and follow the guidelines in dialog boxes of the installer.

To **update** the program, you can use the tool, that was installed with Equivalent Conicity Calculation Program. It can be found in the list of installed programs:



3.3. Activation

Upon successful installation run the program and complete the Product Activation form:



Customer information:

Full Name - Customer's representative name.

Company - Customer's company name.

Postal Address - Customer's postal address.

E-mail - Customer's e-mail.

Country - Customer's country.

Activation Key - software activation key.

After completing the form, click **Activate**.

4. Data-in

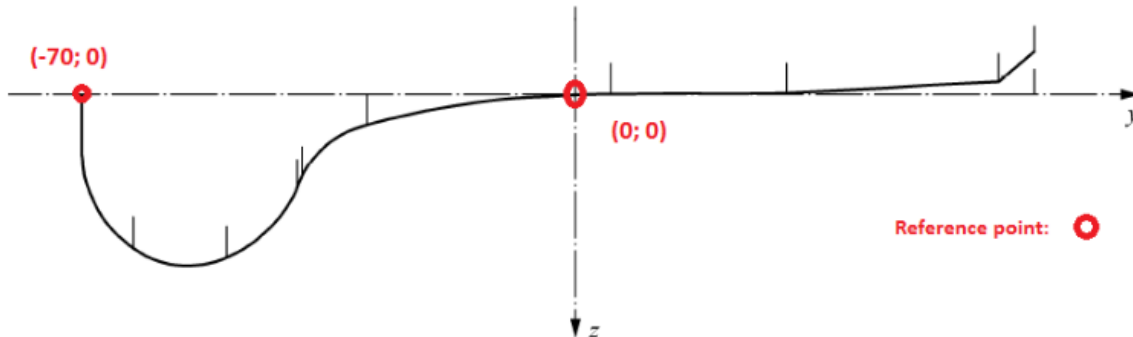
The program uses profiles of wheels and rails as a data-in. Table description of the profiles has to be placed in files with the next names:

Profile	File name
Left wheel profile	WheelL.csv
Right wheel profile	WheelR.csv
Left rail profile	RailL.csv
Right rail profile	RailR.csv

4.1. Coordinate systems

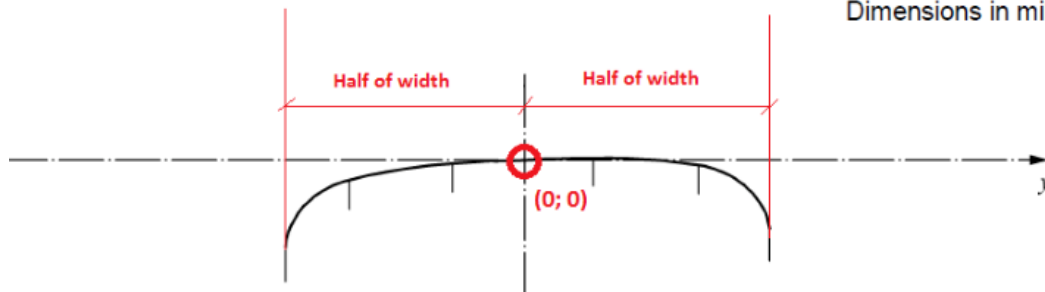
Wheel profile has to be described in coordinate system shown on the next picture:

Dimensions in millimetres



Coordinate system for rail profile description is shown below:

Dimensions in millimetres



Examples of profiles description:

Wheel		Rail	
...	...	...	...
-70	9,519	0	0
-69	15,844	1	-0,057
-68	18,351	2	-0,111
-67	20,196	3	-0,161
-66	21,685	4	-0,208
-65	22,936	5	-0,252
-64	24,011	6	-0,292
-63	24,947	7	-0,329
-62	25,747	8	-0,363
-61	26,392	9	-0,393
-60	26,909	10	-0,42
-59	27,314	11	-0,444
-58	27,619	12	-0,464
...	...	...	...

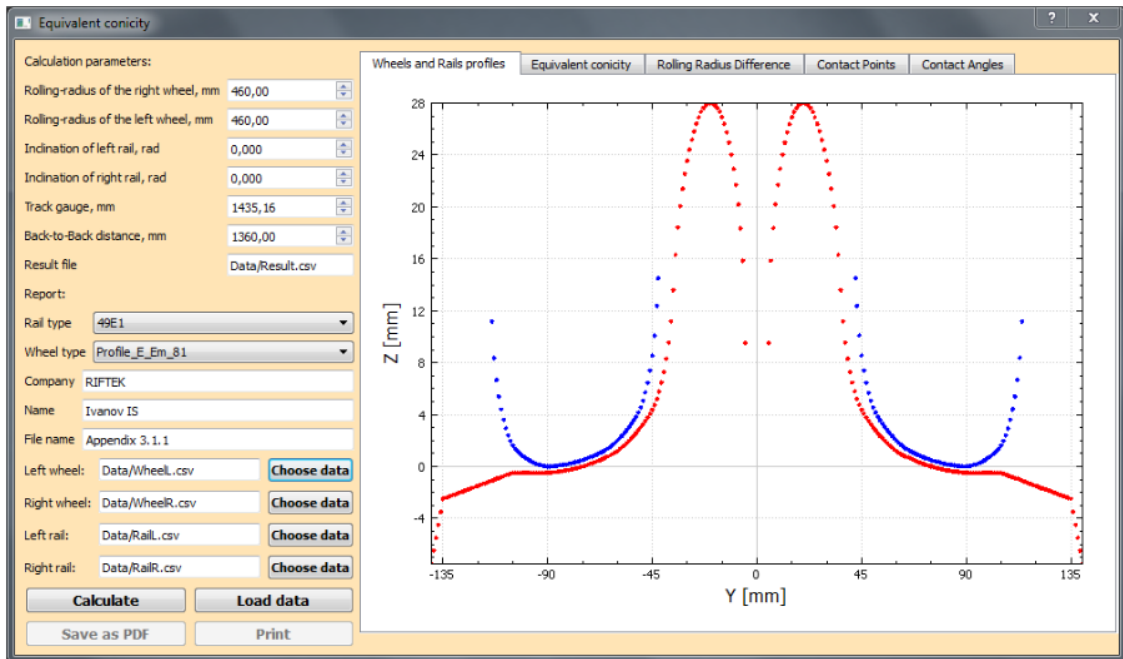
4.2. Data sources

The program can use the next data sources:

- Wheel profiles files obtained by Laser wheel profilometer IKP-5
<https://riftek.com/eng/products/~show/instruments/railway-devices/railway-wheel-profile-gauge-ikp>
- Rail profiles files obtained by Laser rail profilometer PRP
<https://riftek.com/eng/products/~show/instruments/railway-devices/rail-profile-measurement-gauge-prp>
- Any other profiles files, generated in accordance with the requirements of point 3.1.

5. Work with program

Once the program is started the main window emerges.

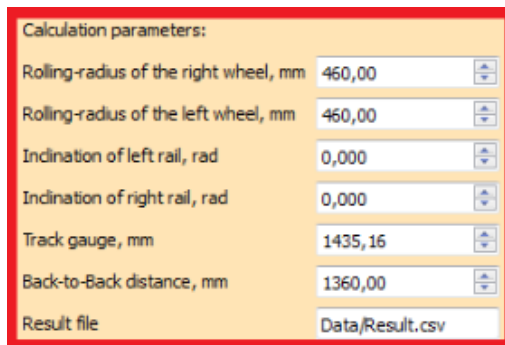


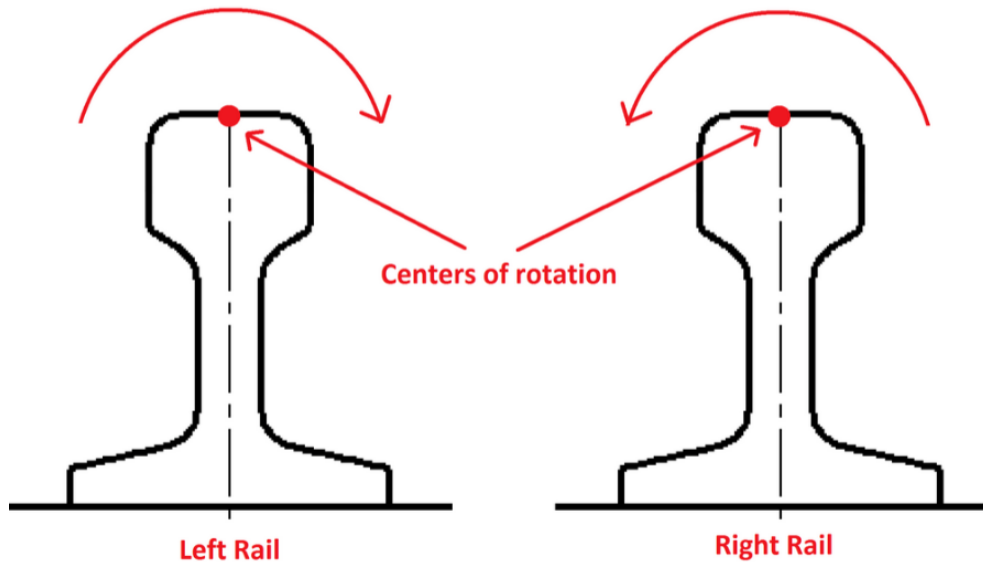
The tab **Wheel and Rail profiles** displays wheels profiles (red color) and rail profiles (blue color). Profiles files have to be placed in the **Data folder**, in the same directory with **Equivalent Conicity.exe** program.

5.1. Preparations for calculation

5.1.1. Parameters for calculation

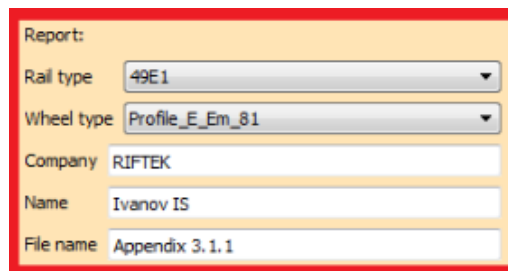
Parameters setting panel is placed in the left part of main window. It is necessary to fill corresponding fields with wheel set and track parameters. Rail inclination should match the illustration below. **Result file** parameter is a name of file with calculation results.





5.1.2. Parameters for protocols

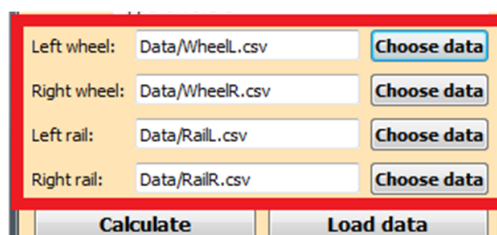
In the same panel is a group of parameters used only when generating reports:



5.1.3. Input data files

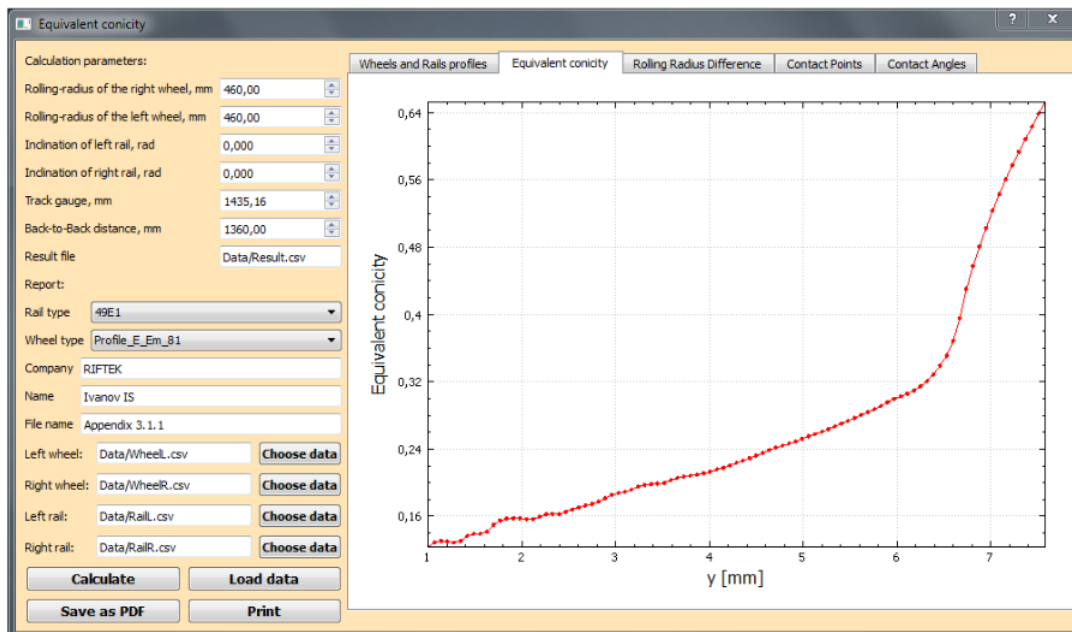
By default, the program uses profiles files placed in the folder **Data**, in the same directory with **Equivalent Conicity.exe** program

You can show other ways to files and download them into program by **Load** button.

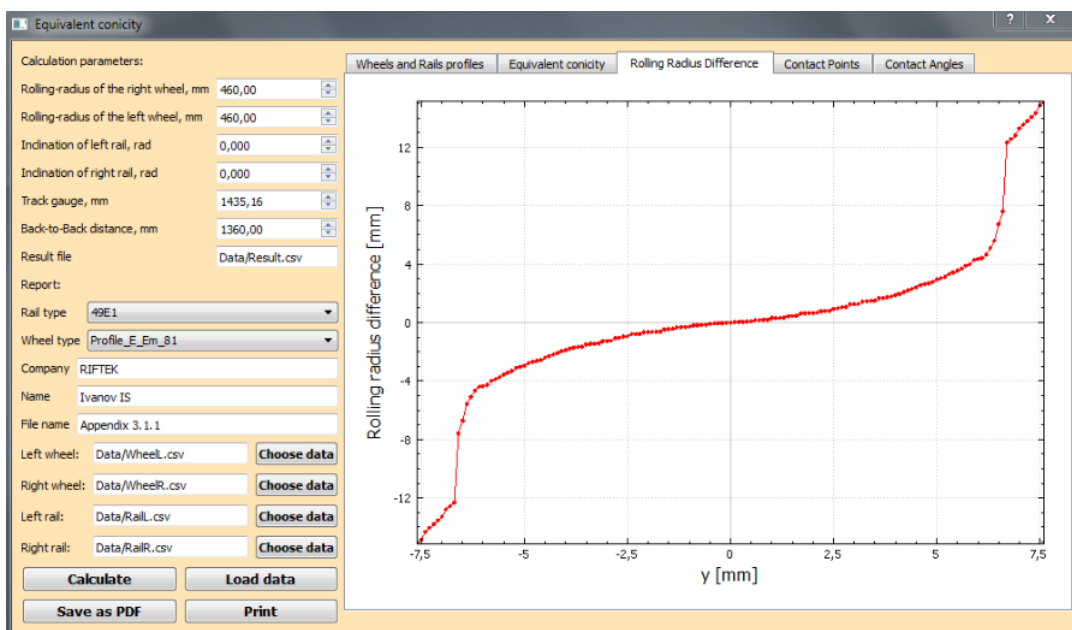


5.2. Calculations

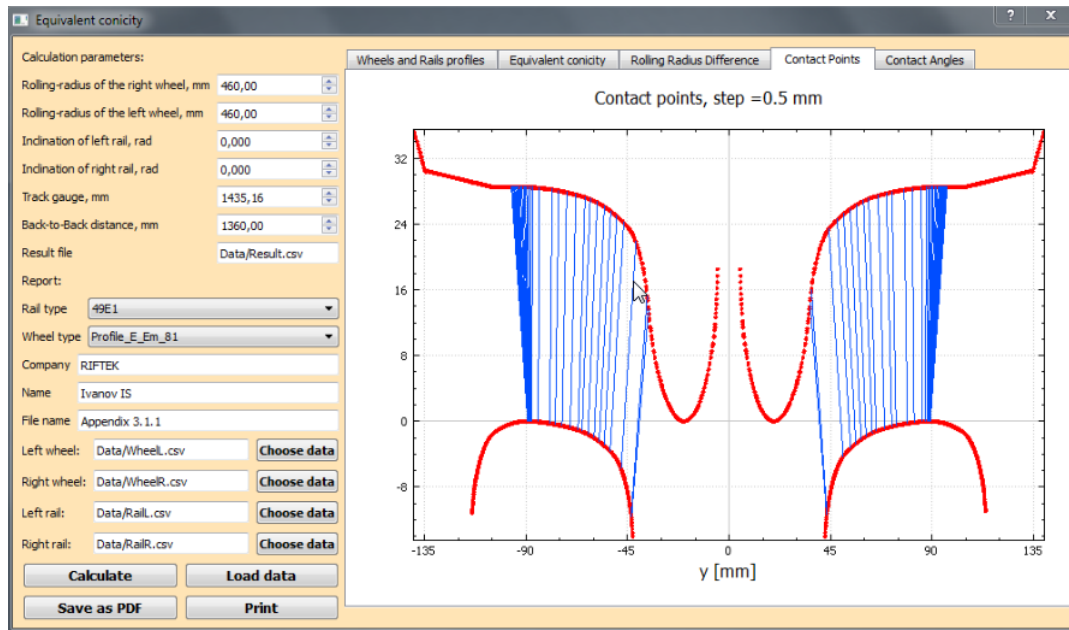
On completing of preparation according to point 4.1. click **Calculate** button. The calculation results are displayed in the respective tabs:



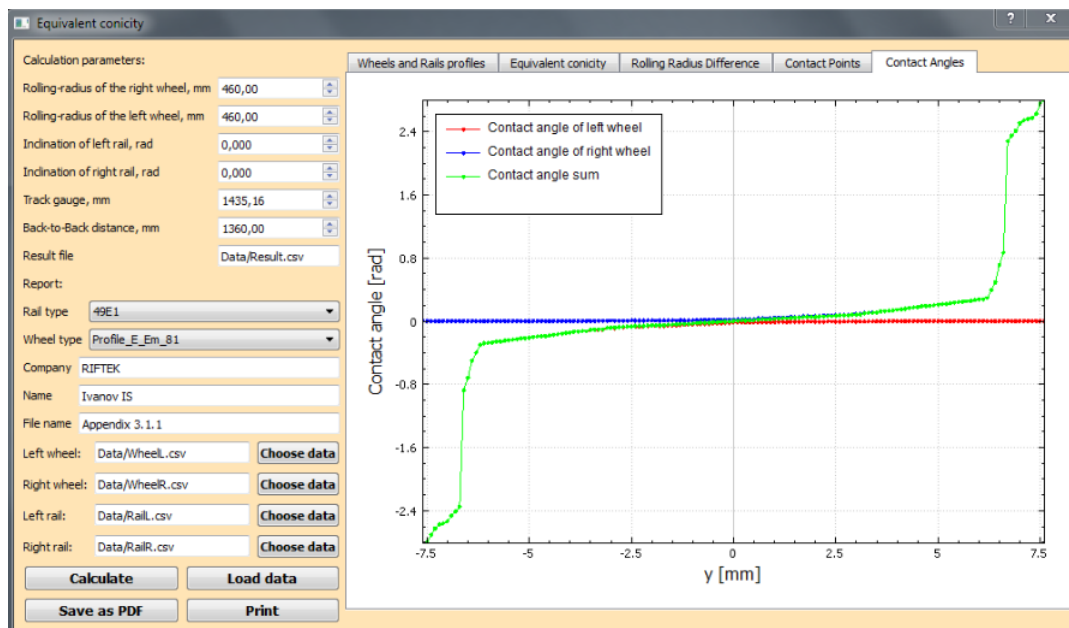
Equivalent conicity



Rolling radius difference relative to the wheelset displacement



Contact points between wheels and rails



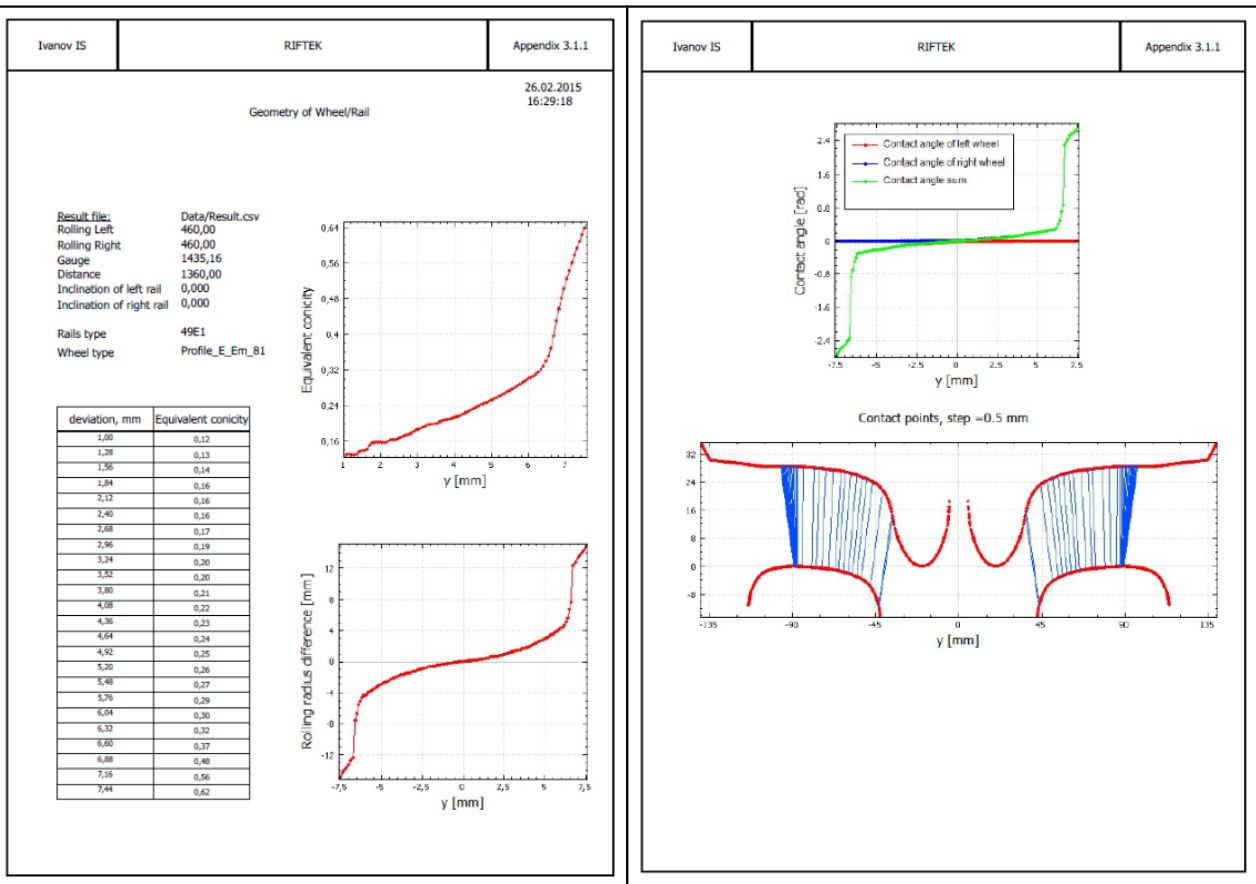
Left and right contact angles and difference between angles relative to wheelset displacement

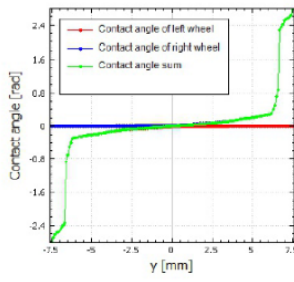
5.3. Protocols

To save results, click the **Save as PDF** button, select the path and the file name.

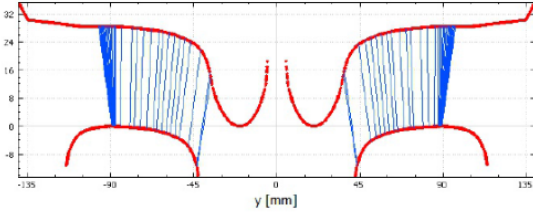
To print protocols, click **Print**.

Examples of protocols:


Ivanov IS
RIFTEK
Appendix 3.1.1



Contact points, step = 0.5 mm



6. Technical support

Technical support is provided through:

- E-mail support@riftek.com
- Skype: riftek_support

When contacting technical support please inform the version of the Equivalent Conicity Calculation Program, and explain the problem.

The RIFTEK staff supports customers according to the Equivalent Conicity Calculation Program license.