Industrial Tires Wear Characteristics Test

performed on 08-10. August 2012 by

TÜV SÜD Automotive GmbH

for

Camoplast Solideal
Eddastraat 40/3, B-9042 Gent, Belgium

Automotive

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Report No. 76249593-2

Evaluation of tire wear, using an electrical fork lifter, on industrial resilient tires Solideal Xtreme Quick against competitor Continental SC20 SIT.

Tires:

23x10-12/8.0 mounted on front load axle.
18x7-8/4.33 mounted on rear steering axle.

Tested Criteria:

Tread wear of fork lift truck tires on a test track under heavy duty operating conditions.

Date of the Test:

August 8 to August 10, 2012

Test Location:

TÜV SÜD Automotive GmbH

Ludwigsfelder Str. 30 - 80997 München, Germany

Date: 2012-09-28

Our reference: AM-SER

Document:
Report No.: 76249593-2

This document consits of
9 Pages.

1. OBJECTIVE

Aim of the project is comparing the tread wear characteristics of industrial tires, specification Solideal Xtreme with competitor Continental SC20 under operating conditions. A test procedure using different tires on specified forklift trucks during heavy duty service operation has been built up.

2. SCOPE OF TESTS

The test tires and reference tires are run on the identical industrial vehicle (figure 1) and on a defined cyclic route at the test track located in Munich Allach. The route is driven in both cycle directions, clockwise (cw) and counter-clockwise (ccw).

Figure 1 – Loaded forklift at TÜV SÜD Test area Allach

3. TEST LOCATION

Test area at TÜV SÜD Automotive GmbH, Ludwigsfelder Str. 30, 80997 München, Germany

4. TEST TIRE POPULATION

4.1. Test Tire – Solideal Xtreme Quick

Front Axle: 23x10-12	Tire IDs:	- 12096 1 3956, Production week 14/12
		- 12097 1 3694, Production week 14/12
Rear Axle: 18x7-8	Tire IDs:	- 12076 8 5599, Production week 11/12
		- 12076 8 5401, Production week 11/12

4.2. Competitor Tire - Continental SC20 SIT

Front Axle: 250/60-12 (23x10-12)	Tire IDs:	- 200113, DOT 2812
		- 201755, DOT 2712
Rear Axle: 180/70-8 (18x7-8)	Tire IDs:	- 200075, DOT 2412
		- 200026, DOT 2412

All tires used for the test were new and bought in the free market.

5. TEST VEHICLE

Electrical fork lifter: make Still, type RX60-30 (Serial No. 516324B00255), 3000kg load capacity with the following axle load distributions:

Front/Rear axle load at maximum load: 7290kg/861kg

Front/Rear axle load without load: 2581kg/2570kg.

6. TEST PROCEDURES AND EQUIPMENT

6.1. Test Track

6.1.1. Pavement: asphalt, grey; flat surface.

6.1.2. Characteristics: the average macro-texture depth (TD) was measured according to the volumetric method (acc. to ISO10844 Annex A), made on four different positions evenly spaced along the route of the test track and the average value taken (figure 2).

Measured average texture depth result: 0,6 mm.

Figure 2 – Track roughness measurement

6.2. Test Manoeuvres

6.2.1. Operating condition

Change of driver to ensure constant driving during the whole session and additionally change of driving direction (clockwise, counter-clock-wise).

6.2.2. Vehicle load

Machine weight: 5152 kg

Fork lift load: 2000kg

6.3. Test Procedure

6.3.1. Layout of test path established on the test track: see figures 3 and 4.

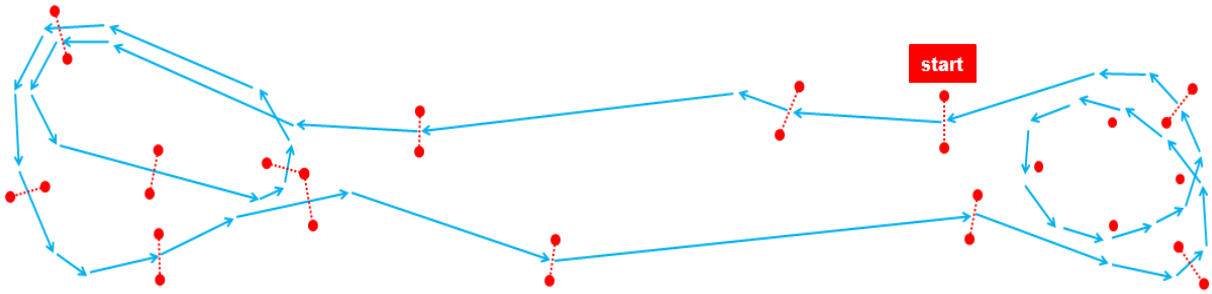

Figure 3 – Track at TÜV SÜD Test area Allach

6.3.2. Test distance / no. of cycles / test time

6 turns, each 20 cycles (laps of test course), length per turn (20 laps): 6450 ±50m;

Overall distance: 38,7 km.

Test time each cycle (20 laps): 40 ±1min; total operating time: 240 min

Figure 4 – Forklift truck running on the test track

6.4. Measuring Methods and Equipment

6.4.1 Ambient conditions

Ambient temperature measuring device: Weather Monitor II MC40614A82 (Serial LC41109A36)

Surface temperature measuring device: Ahlborn Therm 2280-8L (Serial No. 808555)

6.4.2 Tread wear (loss of tread mass)

Digital balance Sartorius F150S-D2 (Serial No. 10401290)

6.4.3 Distance and time: RaceLogic VBOX III GPS (Serial No. 030720)

Figure 5 – Measuring equipment VBOX III

7. AMBIENT CONDITIONS

Continental SC20 SIT

	at beginning 16:05h	at end
- Air temperature:	24,7°C	19,2°C
- Ground temperature:	36,8°C	27,0°C.

Solideal Xtreme Quick

	at beginning 15:25h	at end
- Air temperature:	26,6°C	20,1°C
- Ground temperature:	36,8°C	30,6°C

8. TEST EXECUTION

Each tire is weighted on the balance machine. The forklift is driven to the track for a distance of 450m to let the tires run in.
Ground and tire temperatures are measured to have comparable conditions. After that the forklift truck runs for 120 laps. At the end of every 20 laps the temperatures are measured, the direction of the track is changed in order to minimize the influence of the different driving styles. After 120 laps the tires are removed from the fork lift and unmounted from the rim, then cooled down overnight before they are weighted. After demounting weight of tires without rim is analyzed.

9. TEST RESULTS

Tread wear of industrial tires Solideal Xtreme Quick and Continental SC20 SIT in sizes 23x10-12 and 18x7-8 during heavy duty operation with a fork lift truck is measured as follows:

Measurement of weight of the single tires before and after the test.

Tire		Start [Kg]	Finish [Kg]	Weight Loss [g]	Relative Δ [%]
Xtreme	23x10-12	53,878	53,236	642	100
Conti SC20	23x10-12	44,438	43,575	863	134
Xtreme	18x7-8	21,828	21,750	78	100
Conti SC20	18x7-8	20,071	19,969	102	131

During the test procedure the tread wear (loss of tread mass) of the Continental SC20 is 34% higher than tread wear of the Solideal Xtreme on the front axle and 31% higher on the rear axle. The results of loss of tread mass in g are shown in figure 7.
Images of the tread areas of the tires after the test are shown in figure 6.

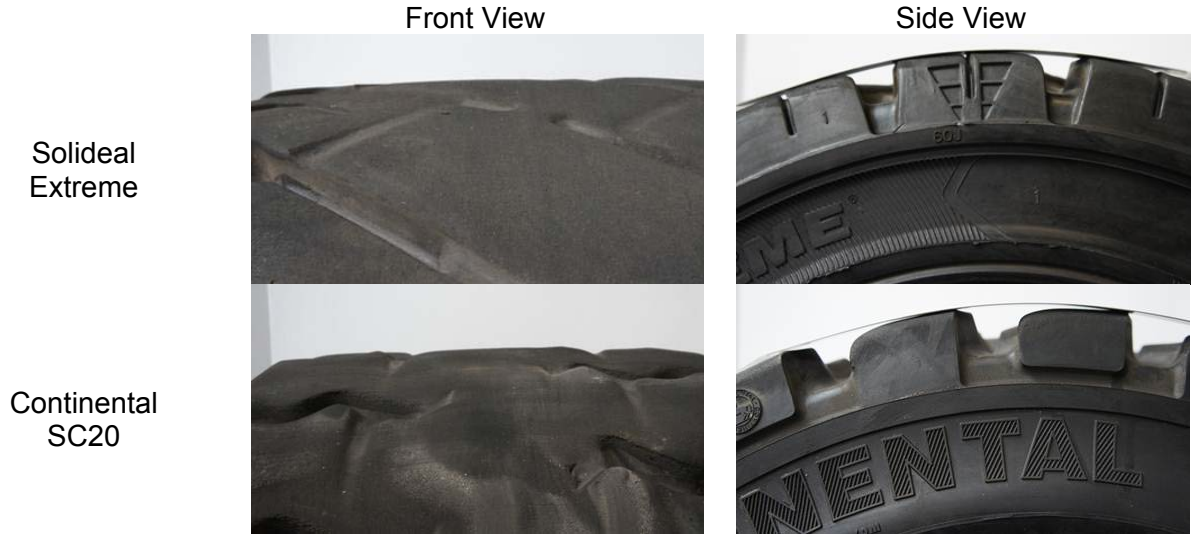

Figure 6 – Images of the tread areas of the tires after the test

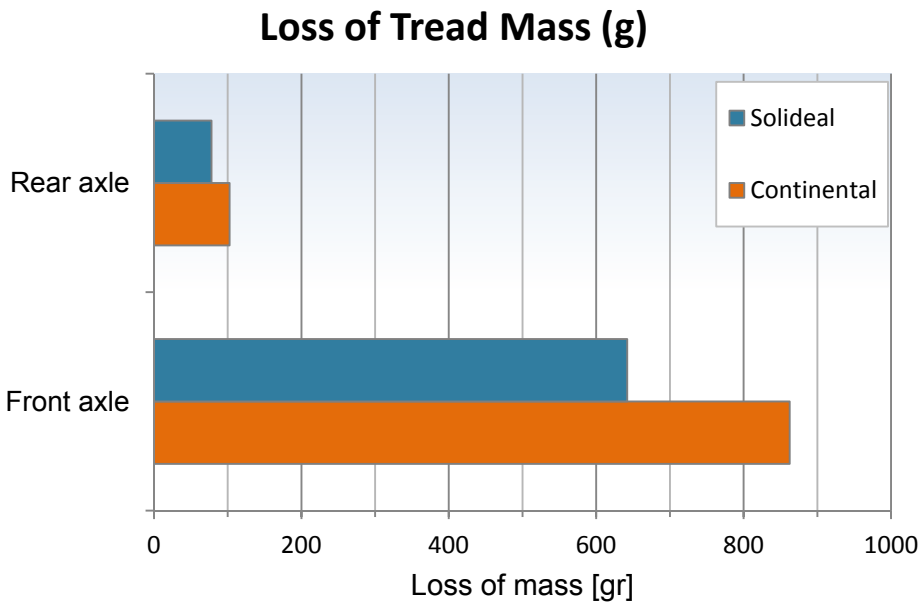

Figure 7 – Results of tire tread mass loss measurement (absolute)

This test report consists of 9 pages.

Garching, 28. September 2012

TÜV SÜD Automotive GmbH
Safety and Electronics
Tires and Wheels

F. Speyerer

Florian Speyerer
(Project Manager)