Confidential Report

Rubber Chemical Consultants

Tire Fillers Market 2018

Past-Present-Future

(3rd Edition) CONTENTS

Page 1 of 103 (Full Report)	
Report Number:	RCCL160
Issue Date:	10 th September 2018
Prepared For:	General Release

1

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349



Report Scope

This market report covers the following items:

Tire Fillers: Carbon blacks (furnace, thermal and acetylene), precipitated silica (standard and highly dispersible), mineral fillers (clay types, calcium carbonate, ground coal), titanium dioxide and 'other' specialist types.

Excluded: Materials used as dusting agents or air release agents in tire production, retreading or component preparation.

Markets: Tire market segmented by main tire types. Also including tire bladders, curing envelopes, inner tubes, and retread compounds.

Geographies: Global split by RCCL defined regions: Africa, China, CIS, Europe, India, Middle East, North America, North Asia, South America and South Asia.

Time Frame: Years 2011 to 2030.

Market Volumes: Market volumes for 2011 to 2017 are determined and validated against historic usage patterns. Volumes for 2018 to 2030 are projected using stated modelling techniques. Market volumes are provided globally and regionally by filler type and by tire type.

Market Prices: Average weighted regional market prices are provided for each filler type and subtype.

Market Values: Market values for 2017 are estimated from weighted average pricing by filler type. Market values for 2023 and 2029 use 2017 prices with the projected yearly volume.

Report Objectives

The key report objectives are as follows:

- Provide an overview of tire fillers and their use.
- Provide an overview of the tire filler industry.
- > Analyse past, present and future market drivers for tire fillers.
- > Analyse and contrast 2017 tire filler market prices by region.
- > Analyse tire filler market volumes for 2011 to 2030.
 - By region, filler type and tire type.
- > Analyse tire filler market values for 2017, 2023 and 2029.
 - By region and filler type.

Purchase this report if you require a high level understanding of the tire filler market landscape covering the key filler types and subtypes.

If you require a detailed analysis for a specific filler type then consider purchasing one of RCCL's focused reports for furnace carbon blacks and precipitated silica.

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349



Note: Report contents may vary slightly.

Report Contents

- 1 Contents
- 2 Executive Summary (8 Pages)
 - 2.1 Scope
 - 2.2 Objectives
 - 2.3 Market Drivers
 - 2.4 Market Volumes
 - 2.5 Market Values
 - 2.6 Industry Outlook
- 3 Introduction (4 Pages)
 - 3.1 Definitions, Abbreviations and Nomenclature
 - 3.2 Scope
 - 3.3 Objectives
 - 3.4 Information Sources
 - 3.5 Assumptions

4 Methodology (10 Pages)

- 4.1 General Reporting Principles
- 4.2 Consumer-Up Analysis
 - 4.2.1 Key Parameters
 - 4.2.2 Consumer Plant Parameters
 - 4.2.3 Product Technology Parameters
 - 4.2.4 Market Parameters
- 4.3 Market Volumes for Tire Chemicals
 - 4.3.1 Consumer-Up Analysis
 - 4.3.2 Tire Parameters
 - 4.3.3 Tire Utilisations
 - 4.3.4 Reported Values
- 4.4 Market Values for the Tire Segment
 - 4.4.1 Regional Valuations
- 4.5 Data Validation
- 5 Tire Fillers Overview (4 Pages)
 - 5.1 Reinforcing Fillers
 - 5.1.1 Carbon Black
 - 5.1.2 Precipitated Silica
 - 5.2 Non-Reinforcing Fillers
 - 5.2.1 Clay Types
 - 5.2.2 Calcium Carbonate
 - 5.2.3 Ground Coal
 - 5.2.4 Titanium Dioxide
 - 5.3 Specialist 'Other' Fillers

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349



5.4 Alternative Materials

6 Key Manufacturers (6 Pages)

- 6.1 Carbon Black
 - 6.1.1 Furnace
 - 6.1.2 Thermal
 - 6.1.3 Acetylene
- 6.2 Precipitated Silica
- 6.3 Mineral Fillers
 - 6.3.1 Clay
 - 6.3.2 Calcium Carbonate
 - 6.6.2 Ground Coal
- 6.4 Titanium Dioxide
- 6.5 Others
- 6.6 Alternative Materials

7 Market Drivers (16 Pages)

- 7.1 Mobility Megatrends & Tire Industry Growth
 - 7.1.1 Historic & Projected Tire Unit Production by Main Tire Type
 - 7.1.2 Historic & Projected Tire Compound Demand
- 7.2 Tire Types
 - 7.2.1 PC & SUV
 - 7.2.2 Light Truck (LT)
 - 7.2.3 Truck
 - 7.2.4 Other Tire Types
- 7.3 Compound Costs
- 7.4 Material Developments
 - 7.4.1 Polymers
 - 7.4.2 Fillers
- 7.5 Tire Construction/Design
- 7.6 Compound mixing
- 7.7 Tire Building
- 7.8 Legislation & Environment
 - 7.8.1 Material Elimination
 - 7.8.2 Tire Labelling
 - 7.8.3 Sustainability

8 Market Pricing (5 Pages)

- 8.1 Carbon Black
 - 8.1.1 Furnace
 - 8.1.2 Thermal
 - 8.1.3 Acetylene
- 8.2 Precipitated Silica
 - 8.2.1 Standard
 - 8.2.2 Highly Dispersible
- 8.3 Mineral Fillers

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349

Page 5 of 9 Final Contents RCCL160



- 8.3.1 Clay Types 8.3.2 Calcium Carbonate
- 8.3.3 Ground Coal
- 8.4 Titanium Dioxide
- 8.5 Other Filler Types

9 Market Volumes (27 Pages)

- 9.1 Global Volumes
 - 9.1.1 Volume by Filler Type
 - 9.1.2 Volume by Tire Type
 - 9.1.3 Crumb & Reclaimed Rubber

9.2 Regional volumes

- 9.2.1 All Types
- 9.2.2 Carbon Black Types
- 9.2.3 Precipitated Silica Types
- 9.2.4 Mineral Types
- 9.2.5 Titanium Dioxide
- 9.2.5 Other Filler Types
- 9.2.6 Crumb & Reclaimed Rubber

10 Market Values (11 Pages)

- 10.1 Global Market Values
 - 10.1.1 All Types
 - 10.1.2 Value by Filler Type
 - 10.1.3 Carbon Black Types
 - 10.1.4 Precipitated Silica Types
 - 10.1.5 Mineral Types
 - 10.1.6 Other Materials
- 10.2 Regional Market Values
 - 10.2.1 All Types
 - 10.2.2 Carbon Black Types
 - 10.2.3 Precipitated Silica Types
 - 10.2.4 Mineral Types
 - 10.2.5 Titanium Dioxide
 - 10.2.6 Other Filler Types
- 11 Concluding Comments (1 Page)
- 12 Appendices
 - 12.1 Market Segmentation and Sub Segments
- 13 Additional Documentation

Report Figures (28 Figures)

Figure 2.1 - Tire Filler Market Drivers Overview

Figure 2.2 - Global & Regional Tire Filler Market Volumes - All Filler Types 2011 to 2029

Rubber Chemical Consultants Ltd \mid 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349

Page 6 of 9 Final Contents RCCL160

Rubber Chemical Consultants Ltd Tire Precipitated Silica Industry & Markets 2018



- Figure 2.3 Global Carbon Black Market Volumes by Type 2011 to 2029
- Figure 2.4 Global & Regional Furnace Carbon Black Volumes 2011 to 2029
- Figure 2.5 Global Precipitated Silica Market Volumes by Type 2011 to 2029
- Figure 2.6 Global & Regional STS Market Volumes 2011 to 2029
- Figure 2.7 Global & Regional HDS Market Volumes 2011 to 2029
- Figure 2.8 Global Mineral Filler Market by Type 2011 to 2029
- Figure 2.9 Global & Regional Mineral Filler Market Volumes 2011 to 2039
- Figure 2.10 Global & Regional Market Values All Fillers 2017, 2023, 2029
- Figure 2.11 Global Market Values by Filler Type 2017, 2023, 2029
- Figure 4.1- 'Consumer-Up' Market Analysis
- Figure 4.2- Consumer Plant Parameters
- Figure 4.3 Product Technology Parameters
- Figure 4.4- Market Utilisation Parameters
- Figure 4.5 Extended Model for Tire Segment
- Figure 6.1 2017 Global Furnace Carbon Black Manufacturing Capacity
- Figure 6.2 2017 Global Non-Furnace Carbon Black Manufacturing Capacities
- Figure 6.3 2017 Global Precipitated Silica Manufacturing Capacity
- Figure 7.1 Compound Demand by Region for PC, SUV, LT & TR Tire Types 2011 to 2029
- Figure 7.2 Global Compound Demand by Tire Type 2011 to 2029
- Figure 7.3 Current and Future Tire Labelling Schemes
- Figure 8.1 2017 Average Weighted Prices by Filler Type
- Figure 9.1 Filler Demand by Filler Type 2011 to 2029
- Figure 9.2 Global Filler Demand by Tire Type 2011 to 2029
- Figure 9.3 All Filler Types Demand by Region 2011 to 2029
- Figure 10.1 Market Value by Filler Type 2017, 2023, 2029
- Figure 10.2 Market Value by Region for All Filler Types, 2017, 2023, 2029

Report Tables (122 Tables)

- Table 2.1 Summary Market Values by Filler Type and Subtype 2017, 2023, 2029
- Table 3.1 Definitions, Abbreviations and Nomenclature
- Table 4.1- Future Year Projections
- Table 4.2 Tire Parameters
- Table 5.1 Clay Types Used in Tire Compounding
- Table 6.1 Top 10 Furnace Carbon Black Manufacturers by Production Capacity 2011 to 2030
- Table 6.2 Top 10 Precipitated Silica Manufacturers by Production Capacity 2011 to 2030
- Table 6.3 Selection of Key Clay Manufacturers and Distributors
- Table 6.4 Selection of Key Calcium Carbonate Manufacturers and Distributors
- Table 6.5 Selection of Key Ground Coal Manufacturers and Distributors
- Table 6.6 Selection of Key Titanium Dioxide Manufacturers and Distributors
- Table 6.7 Powdered Rubber Manufacturers
 - Table 7.1 PC + SUV Tires Global Production 2011 to 2030

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349

Page 7 of 9 Final Contents RCCL160

Rubber Chemical Consultants Ltd Tire Precipitated Silica Industry & Markets 2018



Table 7.2 - PC Tires Global Production 2011 to 2030 Table 7.3 - SUV Tires Global Production 2011 to 2030 Table 7.4 - SUV Tires Global Production 2011 to 2030 HP+UHP vs Other Subtypes Table 7.5 - SUV Tire Production 2011 to 2030 China vs Europe Table 7.6 - LT Tire Global Production 2011 to 2030 Table 7.7 - TR Tire Global Production 2011 to 2030 Table 7.8 - Global Tire Compound Demand All Tire Types 2011 to 2030 Table 7.9 - Tire Filler Related Developments 2016 Table 8.1 - 2017 Regional Weighted Average Delivered Price for Furnace Carbon Black Table 8.2 - 2017 Regional Weighted Average Delivered Price for Carcass Furnace Carbon Black Table 8.3 - 2017 Regional Weighted Average Delivered Price for Tread Furnace Carbon Black Table 8.4 - 2017 NAFTA Regional Weighted Average Delivered Price for Thermal Carbon Black Table 8.5 - 2017 Regional Weighted Average Delivered Price for Acetylene Carbon Black Table 8.6 - 2017 Regional Weighted Average Delivered Price for STS Table 8.7 - 2017 Regional Weighted Average Delivered Price for HDS Table 8.8 - 2017 Regional Weighted Average Delivered Price for Clay Types Table 8.9 - 2017 Regional Weighted Average Delivered Price for Calcium Carbonate Table 8.10 - 2017 Regional Weighted Average Delivered Price for Ground Coal Table 8.11 - 2017 Regional Weighted Average Delivered Price for Titanium Dioxide Table 8.12 - 2017 Regional Weighted Average Delivered Price for Other Filler Types Table 9.1 - Global Tire Filler Volumes All Filler Types 2011 to 2030 Table 9.2 - Global Tire Filler Volumes by Main Filler Type 2011 to 2030 Table 9.3 - Global Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.4 - Global Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.5 - Global Tire Mineral Volumes by Mineral Type 2011 to 2030 Table 9.6 - Global Tire Filler Volumes by Tire Type (All Filler Types) 2011 to 2030 Table 9.7 - Global PC Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.8 - Global PC Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.9 - Global PC Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.10 – Global PC Tire Mineral Volumes by Mineral Type 2011 to 2030 Table 9.11 - Global SUV Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.12 - Global SUV Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.13 - Global SUV Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.14 - Global SUV Tire Mineral Volumes by Mineral Type 2011 to 2030 Table 9.15 - Global Truck Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.16 - Global Truck Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.17 - Global Truck Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.18 - Global Truck Tire Mineral Filler Volumes by Mineral Type 2011 to 2030 Table 9.19 - Global Industrial Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.20 - Global Industrial Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.21 - Global Industrial Tire Precipitated Silica Volumes by Silica Type 2011 to 2030

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349

Page 8 of 9 Final Contents RCCL160

Rubber Chemical Consultants Ltd Tire Precipitated Silica Industry & Markets 2018



Table 9.22 - Global Industrial Tire Mineral Filler Volumes by Mineral Type 2011 to 2030 Table 9.23 - Global Light Truck Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.24 - Global Light Truck Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.25 - Global Light Truck Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.26 - Global Light Truck Tire Mineral Filler Volumes by Mineral Type 2011 to 2030 Table 9.27 - Global Agri Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.28 - Global Agri Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.29 - Global Agri Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.30 – Global Agri Tire Mineral Filler Volumes by Mineral Type 2011 to 2030 Table 9.31 - Global Aero Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.32 - Global Aero Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.33 - Global Aero Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.34 - Global MC/SCTR Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.35 - Global MC/SCTR Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.36 - Global MC/SCTR Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.37 - Global MC/SCTR Tire Mineral Filler Volumes by Mineral Type 2011 to 2030 Table 9.38 - Global OTR Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.39 - Global OTR Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.40 - Global OTR Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.41 - Global OTR Tire Mineral Filler Volumes by Mineral Type 2011 to 2030 Table 9.42 - Global Bicycle Tire Filler Volumes by Filler Type 2011 to 2030 Table 9.43 - Global Bicycle Tire Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.44 - Global Bicycle Tire Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.45 - Global B-E-T Filler Volumes by Filler Type 2011 to 2030 Table 9.46 - Global B-E-T Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.47 - Global 'Other' Tire Type Filler Volumes by Filler Type 2011 to 2030 Table 9.48 - Global 'Other' Tire Type Carbon Black Volumes by Carbon Black Type 2011 to 2030 Table 9.49 - Global 'Other' Tire Type Precipitated Silica Volumes by Silica Type 2011 to 2030 Table 9.50 - Global 'Other' Tire Type Mineral Filler Volumes by Mineral Type 2011 to 2030 Table 9.51 - Global Recycled Rubber Volumes 2011 to 2030 Table 9.52 - Global Recycled Rubber by Type 2011 to 2030 Table 9.53 - Regional Tire Filler Volumes for All Filler Types 2011 to 2030 80 Table 9.54 - Regional Tire Volumes for All Carbon Blacks Types 2011 to 2030 Table 9.55 - Regional Tire Volumes for Furnace Carbon Black 2011 to 2030 Table 9.56 - Regional Tire Volumes for Thermal Carbon Black 2011 to 2030 Table 9.57 - Regional Tire Volumes for Acetylene Black 2011 to 2030 Table 9.58 - Regional Tire Volumes for All Precipitated Silica Types 2011 to 2030 Table 9.59 - Regional Tire Volumes for STS 2011 to 2030 Table 9.60 - Regional Tire Volumes for HDS 2011 to 2030 Table 9.61 - Regional Tire Volumes for All Mineral Types 2011 to 2030 Table 9.62 - Regional Tire Volumes for All Clay Types 2011 to 2030

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349

Page 9 of 9 Final Contents RCCL160

Rubber Chemical Consultants Ltd Tire Precipitated Silica Industry & Markets 2018



Table 9.63 - Regional Volumes for Calcium Carbonate 2011 to 2030 Table 9.64 - Regional Volumes for Coal 2011 to 2030 Table 9.65 - Regional Volumes for Titanium Dioxide 2011 to 2030 Table 9.66 - Regional Volumes for Other Filler Types 2011 to 2030 Table 9.67 - Regional Recycled Rubber Volumes 2011 to 2030 Table 9.68 - Regional Crumb/Powder Rubber Volumes 2011 to 2030 Table 9.69 - Regional Reclaimed Rubber Volumes 2011 to 2030 Table 10.1 - Global Market Value All Filler Types 2017, 2023, 2029 Table 10.2 - Global Market Value by Filler Type 2017, 2023, 2029 Table 10.3 - Global Market Value by Carbon Black Type 2017, 2023, 2029 Table 10.4 - Global Market Value by Precipitated Silica Type 2017, 2023, 2029 Table 10.5 - Global Market Value by Mineral Type 2017, 2023, 2029 Table 10.6 - Regional Market Values for All Filler Types 2017, 2023, 2029 Table 10.7 - Regional Market Values for All Carbon Black Types 2017, 2023, 2029 Table 10.8 - Regional Market Values for Furnace Carbon Black 2017, 2023, 2029 Table 10.9 - Regional Market Values for Thermal Black 2017, 2023, 2029 Table 10.10 - Regional Market Values for Acetylene Black 2017, 2023, 2029 Table 10.11 - Regional Market Values for All Types of Precipitated Silica 2017, 2023, 2029 Table 10.12 - Regional Market Values for STS 2017, 2023, 2029 Table 10.13 - Regional Market Values for HDS 2017, 2023, 2029 Table 10.14 - Regional Market Values All Mineral Types 2017, 2023, 2029 Table 10.15 - Regional Market Values for Clay Types 2017, 2023, 2029 Table 10.16 - Regional Market Values for Calcium Carbonate 2017, 2023, 2029 Table 10.17 - Regional Market Values for Ground Coal 2017, 2023, 2029 Table 10.18 - Regional Market Values for Titanium Dioxide 2017, 2023, 2029 Table 10.19 - 'Other' Filler Types Market Values 2017, 2023, 2029 Table 12.1 – Tire Segment's Types and Subtypes

Additional Documentation

This report has an accompanying Excel Workbook with summary data in an easy to use format.

Rubber Chemical Consultants Ltd | 9, Harman Road, Sutton Coldfield, West Midlands, B72 1AH UK registered company; Company No: 06863349