

Bridgestone Corporation

CSR Report 2011 "CO₂ Reduction Goals" basis of actual calculation

1. Scope of Calculation

The scope of calculation covers the lifecycle (raw material purchasing, manufacturing, logistics and after-use phases) of Bridgestone Group's major products.

2. Reference Standards

- WBCSD/WRI : A Corporate Accounting and Reporting standard (March 2004)
- WBCSD/WRI : Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Second Draft, November 2010)
- WBCSD/WRI : Product Accounting & Reporting Standard (Second Draft, November 2010)
- Japan Rubber Manufacturers Association : Tire inventory analysis trial (1998)

3-1. Basis of calculation for CO₂ Emission from Company Operations

With respect to CO₂ calculation for operations, reference was made to standards listed in above item2, and calculations were based on most recently available measured data.

However, in certain cases and especially for those CO₂ emissions occurring outside our Company control (indirect emission), estimations were necessary and are fully and transparently reported and explained. To improve its accuracy, calculation will be continuously subject to revision and refinement for improving data accuracy and results reliability.

(1) Raw material purchasing phase

CO₂ emission for 'Tire Business' and 'Chemical and Industrial Products Business' are calculated by multiplying the amount of our group's procured raw material by specific CO₂ emission factors for each of them.

Figures for other operations are estimated from raw material composition and sales of major products.

(2) Manufacturing phase

Energy (fuel, electricity, heat /steam) consumed during product manufacturing at our group's production sites is multiplied by CO₂ emission factors for each energy type in order to accurately calculate the CO₂ emissions amount from the manufacturing phase.

CO₂ emission factors may vary on the basis of location of production sites and energy type. Here below are reported some database references where these factors are taken from.

- GHG Protocol, Calculation Tool for Direct Emissions from Stationary Combustion, Version 3.1 (2007 WBCSD/WRI)
- CO₂ Emissions from Fuel Combustion (2009 IEA)
- Law Concerning the Promotion of the Measures to Cope with Global Warming (2009 Ministry of Environment, Japan)

(3) Logistics phase

The logistics phase includes both ground and marine transportation of tires.

CO₂ emissions for ground transport are calculated by adapting scenarios from Japan Rubber Manufacturers Association's tire inventory analysis trial (1998) to our group's logistics data.

CO₂ emissions for marine transport are calculated based upon data related to weight and transportation distance. CO₂ emission rates for other operations are estimated from typical scenarios.

(4) After-use phase

CO₂ emissions from the after use phase are estimated from our group's product disposal amounts (based on our group's raw material procurement amounts) and are multiplied by CO₂ emission factors relevant to product after-use phase.

3-2. Customers in-use phase basis of calculation for tires and rolling efficiency

The tire rolling efficiency values of tires in customers use phase has been calculated and is currently limited to tires for passenger cars, trucks and buses. The calculation uses tire rolling efficiency values of selected model tires and actual sales results of the tire category from which model products were selected to calculate the results of our group's tire rolling efficiency.

4. Special notification

In response to objective reviews and suggestions following the news release of April 30, 2010 regarding “Bridgestone’s CO₂ Reduction Goals Reflect Dedication to the Environment”, CO₂ calculation methods have been updated for accuracy improvement. In line with CO₂ emission calculation updates, target year (2005) achievements have also been changed.

Major changes in calculation method are shown below.

Target		Details of change
Tire	Raw material purchasing phase Logistics phase After-use phase	For some raw material items, estimates were changed to actual measurements.
	Manufacturing phase	Applicable CO ₂ emission factors were changed.
	Logistics phase	Marine transportation was estimated and added (previously, only ground transportation was available)
Chemical and industrial Products	Raw material purchasing phase After-use phase	Changed from the method of estimating the amount of procured raw material from model products’ raw material composition to collecting actual procurement results for each raw material.

The calculation for our group’s target is based on specific conditions.

- The calculation methodology is determined and documented by Bridgestone Corporation and is based upon recognized standards.
- Most Bridgestone emission sources are included in current calculations, however additional sources may be included in future calculations, as data gathering methodologies and capabilities improve.
- The calculation methodology may be adjusted periodically due to the changes in accepted standard methodologies or improved business information including CO₂ calculation method and emission reduction measures.