

Life Cycle Assessment

Life Cycle Assessment, Environmental Product Declarations and Minimising Product Use Emissions

Next to a continuous effort to optimise our production processes to minimise our energy use and CO₂ emissions associated with manufacture, Tata Steel also facilitates its customers in making their products more sustainable. For doing so, Tata Steel make extensive use of life cycle assessment (LCA) to advise its customers in the design of their products made from our steel. For over 15 years we have been supplying life cycle data on our products and during this time we have grown our expertise in the field of LCA, which has been internationally recognised. In 2017, Tata Steel won its fourth award for Excellence in LCA, which was awarded by the World Steel Association at their annual General Assembly.

In terms of manufacturing data, we now have detailed life-cycle inventories (LCIs) for over 85% of our product range in a 'cradle to gate' format. These take account of the entire resource and emissions footprint for the respective products, covering the extraction of raw materials, transportation and manufacture. The manufacturing stage of a steel product is just one part of the product life cycle. To evaluate the complete life cycle, it is also important to consider the use and end-of-life phases of the product. If a product is lighter, or more durable, then this has the potential to reduce emissions in the use phase. Steel also plays an important part in the circular economy and when a vehicle or building reaches the end of its useful life, the steel can be reused or recycled, which helps reduce the environmental impacts of the product as it avoids the need to manufacture new steel.

Since 2008, Tata Steel have been publishing life cycle environmental information for a number of our construction products in the form of Environmental Products Declarations (EPD). An EPD is an internationally recognized communication tool for conveying potential environmental impacts associated with a product, across the product life cycle, and in 2017 Tata Steel became the first steel manufacturer to develop an approved EPD Programme for construction products. This allows us to produce EPDs in accordance with the relevant standards (ISO14025 and EN15804).

In many instances, we have also built sector specific models which look at the full life cycle of the end-product (*e.g.* of a car or a building) which also includes fabrication, assembly, use and end-of-life. Our own product development is also geared towards developing steel grades and steel products that are able to improve the sustainability performance of our customers. These approaches have led to the development of many products which specifically address energy-efficiency issues within end-user markets. For example, our range of advanced high-strength steels make cars lighter and more fuel efficient. Life cycle studies have shown that approximately three quarters of all vehicle emissions occur in the use phase and therefore there is now a significant focus on vehicle mass reduction and alternative powertrain technologies to improve fuel economy. For both of these cases, the technological solutions for reducing emissions should be analysed by taking a life cycle perspective, to avoid an unintended increase of CO₂ emissions in material production and end-of-life. Steel has an important role to play here because new grades of Advanced High Strength steel have been developed which allow vehicle light weighting without compromising on manufacturing emissions. Tata Steel have been at the forefront of the Future Steel Vehicle project, led by WorldAutoSteel, in which its concept car, based on a battery electric vehicle platform, uses the latest steel technology and has a body that is 35 per cent lighter than conventional steel grades, plus a five star safety rating. These results were achieved at no additional overall cost and with no increase in the environmental impact of its production, compared to using materials other than steel to achieve the same standards.

As well as supporting our customers, we also actively support the development of national and regional assessment schemes through dialogue and the provision of life cycle inventory data. For example, we have been directly involved in the European Commission's Product Environmental Footprint (PEF) pilot for metal sheet.