Northern Facades. ISO Clip LEED Statement

ISO Clip by Northern Facades is a wall assembly component thermal bracket manufactured from G90 Galvanized or AZ55 Galvalume® strip/coil.

Galvanized and Galvalume® coil is a market commodity item sourced through reputable steel suppliers and resellers. The selection of supplier is based on stock availability of the coil in the correct specification at the time of order. While it is not possible to identify the exact percentage of recycled content for each coil, we are guided by the steel industry as outlined below[1] and attached documents.

The American Galvanizers Association has issued a Life Cycle Assessment and LEED statement on the recycled content of Galvanized steel and outlines how this relates to opportunities to gain LEED Credits as follows:

- Materials & Resources (MR) Credit 4: Recycled Content
- MR Credit 5: Regional Materials (If the fabrication facility and galvanizing facility are within a 500-mile radius of the project). ISO Clip is manufactured in Mississauga, Ontario, Canada, however by sourcing coil steel from stockists and re sellers we may not be able to readily identify the Galvanizing facility location.

Northern Facades offers these publicly available guide documents and this statement for information only to assist in your assessment of possible available LEED credits and in support of any application for credits.[1]

[1] The American Galvanizers Association – https://galvanizeit.org/

TALKING POINTS

HOT-DIP GALVANIZED STEEL IS GREEN

LIFE-CYCLE ASSESSMENT

Life-cycle assessment (LCA) is the study of the environmental impact of a process or product, and includes measurement of energy consumed and all emissions during raw material production and manufacturing of the final product through use and end-of-life (recycling/disposal). An LCA is an accurate and empirical evaluation of how 'green' something really is.

Costs During Production Phase

Hot-dip galvanized (HDG) steel is created when zinc is metallurgically bonded to steel to protect it from corrosion. Levels of energy consumption and air/fluid/solid emissions were measured during zinc production from worldwide sources[1] and during the actual galvanizing process.[2] This data was combined with analogous survey data collected from the steel industry[3] and after well founded system boundaries and technical specifications were applied, internationally renowned LCA experts Five Winds International and PE International compiled an LCA (*Figure 1*).

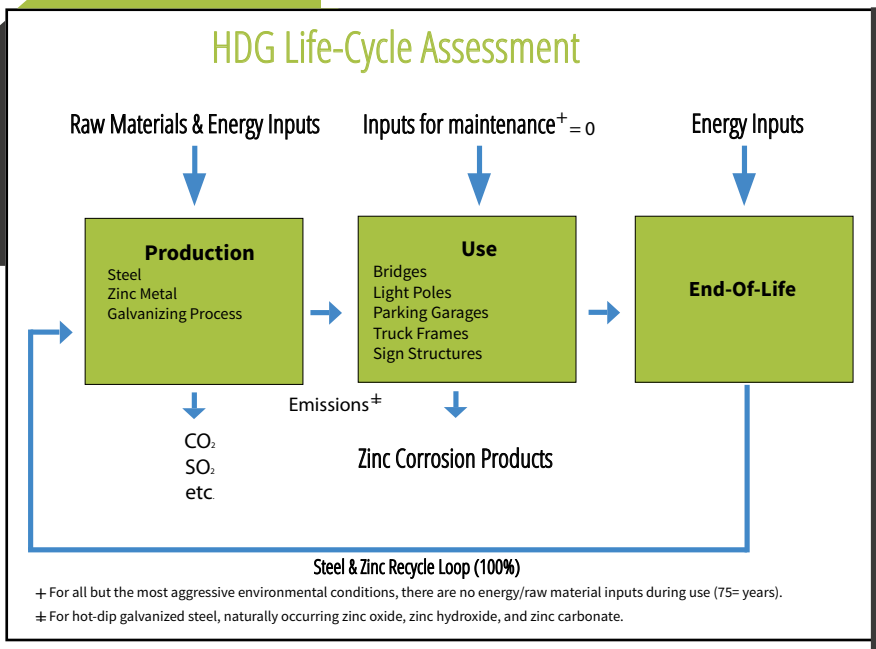

Figure 1

Hot-Dip Galvanizing Maximizes Taxpayers Investment in America

- Naturally occurring metals/elements
- Sustainable project lasting 75 +years
- No maintenance required during life
- No carbon footprint during use
- No emissions after initial production
- 100% recyclability at end-of-life

Four important criteria were identified and the values for each during the production phase (steel, zinc, and HDG) are shown in the table below.

Production Phase	Primary Energy Use[a]	Global Warming Potential (GWP) (CO_2 equiv.)	Acidification Potential (AP) (SO_2 equiv.)	Photo Chemical Ozone Creation Potential (POCP) (ethene equiv.)
1 Kg HDG Steel	25.9 MJ	1.801 kg	0.00615 kg	0.000824 kg
[a] 10^6 Joules (unit of energy)				

LIFE-CYCLE ASSESMENT CONTINUED

The energy consumption and environmental impact during the use and end-of-life phases are not as well understood and often not considered in the corrosion protection selection processes. To better understand the significance of those costs, a qualitative comparison of HDG steel to painted structural steel follows.

Costs During Use Phase

HDG steel requires no raw material or energy during the use phase whereas paint requires surface preparation and re-application, and the associated environmental cost P_1, P_2, P_3, and P_4, on a predetermined cycle ranging from every 12 to 20 years, as well as energy to transport labor and materials to the site. The following table provides the cost for HDG and identifies undetermined paint costs P_1, P_2, P_3, and P_4 during the use phase.

In addition, there are often significant indirect costs associated with paint maintenance such as exhaust from vehicles in traffic delays and particulate emission caused by surface-preparation blasting.

Production Phase	Primary Energy Use	Global Warming Potential (GWP) (CO_2 equiv.)	Acidification Potential (AP) (SO_2 equiv.)	Photo Chemical Ozone Creation Potential (POCP) (ethene equiv.)
1 Kg HDG Steel	0 MJ	0 kg	0kg	0kg
Painted Steel	P_1MJ	P_2kg	P_3kg	P_4kg

Costs During End-of-Life Phase

HDG steel at end-of-life is recycled into blocks/ingots of zinc and new structural steel. Because there is significant energy savings at the end-of-life, LCA credits HDG steel with 8.61 MJ for every kilogram recycled. The antithesis is paint which at end-of-life becomes a permanent part of the waste stream or is burning off as emissions.

End of Life	Primary Energy Use
1 kg HDG Steel [a]	-8.61 MJ

[a]Steel is the primary component and is 100% recyclable; however, the zinc in the galvanized coating is also 100% recyclable. Paint on the other hand, becomes a permanent part of the waste stream or emissions

Complete Life-Cycle Cost

Due to the LCA credit of 8.61 MJ/kg, during the end-of-life phase, the complete life-cycle primary energy use for HDG steel is actually less than the primary energy used in the production phase. And as indicated above, because there are no emissions during the use and end-of-life phases for HDG steel, the initial environmental cost is the final environmental cost.

Production Phase	Primary Energy Use[a]	Global Warming Potential (GWP) (CO_2 equiv.)	Acidification Potential (AP) (SO_2 equiv.)	Photo Chemical Ozone Creation Potential (POCP) (ethene equiv.)
1 Kg HDG Steel	17.3 MJ	1.801 kg	0.00615 kg	0.000824 kg

[b]Complete life-cycle energy use reflects production, use, and end-of-life credit

Summary

The durable corrosion protection of steel by coating it with naturally occurring zinc metal is unmatched in terms of its delivery of a safe, economical construction material requiring no maintenance for decades. Furthermore, because HDG steel is 100% recyclable, and requires no energy input and has no emissions during the use and end-of-life phases, hot-dip galvanizing is the most sustainable choice to protect our infrastructure from costly corrosion.

TALKING POINTS

HOT-DIP GALVANIZING TAKES LEED® WITH RECYCLED CONTENT

Project owners, designers, and architects have long recognized the structural and functional advantages of hot-dip galvanized steel. Increasingly, they are recognizing its environmental attributes, especially its high reclamation rate and recycled content. Recycling zinc, and the steel it protects from corrosion, is not only economically smart, but also conserves energy and reduces solid, liquid, and gaseous waste. Furthermore, it distributes the energy impact associated with the original mining and manufacturing of zinc and steel over infinite generations of hot-dip galvanized steel.

There are two measures of recyclability, percentage of recycling content and reclamation rate. Hot-dip galvanized steel rates highly on both measures, with approximately 70% of all steel and 30% of all zinc consumed made of recycled material. The primary reason more recycled zinc is not used is it is unavailable – it is so durable it is still in use! The reclamation rate, a measure of how often a product is actually recycled at the end of its useful life, is even higher for both, with virtually 100% of structural and plate steel and 80% of zinc recycled into new products.

The high interest in recycled material is primarily being driven by individual environmental awareness and the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) rating system. Currently, only the percentage of recycled content is considered in garnering LEED® points, and not the equally important reclamation rate.

LEED® and Hot-Dip Galvanizing (HDG)

By promoting the use of established, creative practices, standards, and technologies, the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) rating system envisions buildings improving economic return, environmental performance, and personal health. Following the update of the rating system to LEED® 2009, the American Galvanizers Association (AGA) has identified a number of areas where hot-dip galvanized steel may be able to contribute to your LEED® score.

Materials & Resources (MR) Credit 4: Recycled Content

MR Credit 4 has the objective to increase the use of building products like hot-dip galvanized steel that have high recycled content, thus reducing the impacts caused by extraction and processing of raw metal and ores. The following is required by LEED® 2009 for credits in this area:

Use materials with recycled content such that the sum of postconsumer recycled content plus ½ of the preconsumer content constitutes at least 10% or 20% based on cost, of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is as follows:*

- *10% – 1 point*
- *20% – 2 points*

**The recycled content value of a material assembly is determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.*

Recyclability of Hot-Dip Galvanized Steel

	Zinc	Steel[a]
Reclamation Rate	80%	100%
Recycling Rate	30%	70%

[a]For structural and plate steel typically produced from electric arc furnaces

Since hot-dip galvanized steel is both the material and the building product (zinc metallurgically reacts with iron in the steel becoming one product), the value of the steel building product is directly multiplied by hot-dip galvanized steel's recycled content.

According to the International Zinc Association[1] (IZA), 30.2% or 3.2 million tons of the 10.6 million tons of zinc consumed each year are of recycled content. Of that 3.2 million tons, 1.5 million (14.6%) are post-consumer (end-of-life) and 1.7 million (15.6%) are pre-consumer (in-process sources such as skimmings, dross, and machined scrap). The Steel Recycling Institute[2] reports structural steel has post consumer recycled content of 56.9% and pre-consumer recycled content of 31.4%. For the average structural steel assembly of wide-flange beams, channels, angles, and plate with 250 ft^2/ton, the zinc coating is 1.8% of the hot-dip galvanized product by weight.

HDG TAKES LEED® CONTINUED

Thus, the combined recycled content is as follows:

Post-consumer recycled content hot-dip galvanized steel	Pre-consumer recycled content hot-dip galvanized steel
(1.8 x 14.6%) + (98.2 x 56.9%) = 56.1%	(1.8 x 15.6%) + (98.2 x 31.4%) = 31.1% 31.1% / 2 = 15.6%

With more than 70% (56.1% + 15.6%) recycled content value, HDG easily exceeds the 20% goals of MR Credit 4, and can even contribute an additional point for Exemplary Performance (ID Credit 1, Path 2).

Additional MR Credits HDG May Provide: MR Credit 5: Regional Materials

Because USGBC has now recognized the steel fabricator as a final point of assembly, hot-dip galvanized steel may also be able to provide credits under MR Credit 5. This would be determined on a job-by-job basis and awarded if the fabrication and galvanizing facility are within a 500-mile radius of the job-site. The requirement is:

Use materials or products that have been extracted, harvested, or recovered and manufactured within 500 miles of the project site for a minimum of 10% or 20%, based on cost, of the total materials value. If only a fraction of a product or material is extracted, harvested, or recovered and manufactured locally, then only that percentage (by weight) can contribute to the regional value. The minimum percentage regional materials for each point threshold is as follows:*

- *10% – 1 point*
- *20% – 2 points*

**Per USGBC, the steel fabricator is the final point of assembly and is therefore the manufacturer in terms of LEED® Local/Regional Materials credits (unless steel is delivered directly from the mill to the site).*

MR Credit 3: Materials Reuse

Similar to MR Credit 5, this would be evaluated on a job-by-job basis. There are a number of examples of material from one demolition site being reused on the existing site during reconstruction or used at another location. The LEED® 2009 requirement is:

Use salvaged, refurbished or reused materials, the sum of which constitutes at least 5% or 10%, based on cost, of the total value of materials on the project. The minimum percentage materials reused for each point threshold is as follows:

- *5% – 1 point*
- 10% – 2 points

Innovation in Design Credits

In addition to the Materials and Resources Credits already outlined, hot-dip galvanized steel may be able to contribute "bonus" points under Innovation in Design (ID) Credit 1. There are two paths for earning credit and depending on the job, HDG may contribute in both.

ID Credit 1: Innovation in Design: Path 1: Innovation in Design (1-5 points)

There are numerous possibilities here with sufficient explanation of how the use of hot-dip galvanized steel is adding to the overall environmental performance of the building.

Achieve significant, measurable environmental performance using a strategy not addressed in the LEED® 2009 for New Construction and Major Renovations Rating System.

Example: Material efficiency: utilizing hot-dip galvanized Architecturally Exposed Structural Steel (AESS) eliminates additional materials required for finishing as well as additional materials for future maintenance and/or the use of castellated beams (in a parking structure) provides the same strength with less material

Path 2: Exemplary Performance (1-3 points)

Exemplary performance point for MR Credit 4 is always achievable when utilizing HDG due to the 70% recycled content value. The additional exemplary point for MR Credit 5 or other areas would be on a job-by-job basis.

Achieve exemplary performance in an existing LEED® 2009 for New Construction and Major Renovations prerequisite or credit that allows exemplary performance as specified in the LEED® Reference Guide for Green Building Design & Construction, 2009 Edition. An exemplary performance point may be earned for achieving double the credit requirements and/or achieving the next incremental percentage threshold of an existing credit in LEED®.

- 1 point for MR Credit 4: Recycled Content (exceeding by an additional 10%)
- 1 point for MR Credit 5: Regional Materials (if exceeded by an additional 10%

[1] International Zinc Association, Zinc Recycling, 2004, p. 6-7

[2] Steel Recycling Institute, Steel Takes LEED® with Recycled Content, March 2009