GalvInfoNote	Understanding Coating Weight Designations for Zinc-Based Coatings on Steel Sheet
1.1	Rev 1.1 Mar-09

Introduction

One of the most confusing aspects of coated steel sheet products are coating weight designations and what they mean, particularly with respect to product performance. This article is intended to clarify this issue.

Coating Weight [Mass] Measurement Systems

Each coated steel sheet product has its own coating weight designation system, which is defined in the appropriate ASTM standard. For example, the most widely used ASTM metallic-coated sheet standard is A 653/A 653M, which covers hot-dip galvanized products. One of the coating weight designation systems in this standard uses descriptors such as G60, G90, etc. The "G" means the coating is galvanize (zinc), and the numbers refer to the weight of zinc on the surface of the steel sheet in inch-pound (English/Imperial) units. Taking G90 as an example, the coating weight on one square foot of sheet (total, both sides of the sheet) shall have a triple spot test (TST) average minimum of 0.90 ounces. If equally applied to both sides of the sheet, there would be a minimum of 0.45 ounces on each surface.

The other measurement system in widespread use today is the SI (Metric) system. The conversion from the inch-pound weight in ounces per square foot (oz/ft^2) to the SI mass in grams per square metre (g/m^2) is:

$1\ oz/ft^2 = 305.15\ g/m^2$

To convert from oz/ft^2 to g/m^2, multiply by 305.15

Example: G90 (0.90 oz/ft^2) = Z275 (275 g/m^2)

COATING WEIGHT MEASUREMENT

There is a very precise on-line technique for measuring coating thickness. The equipment required is expensive, uses sophisticated x-ray or radio-isotope fluorescence devices, and requires considerable expertise to operate. These gauges repeatedly sense the coating thickness on each surface, average a large number of readings, and then convert the results to the more familiar coating weight units. Laboratory versions of this equipment are also available. Refer to ASTM Test Method A754 for more information. These gauges require calibration based on weigh-strip-weigh testing.

If what we are interested in is the coating thickness, why do ASTM standards not use thickness measurements? The answer is simply that it is difficult to directly measure the thickness accurately. For example, a G90 coating contributes about 1.6 mils (0.0016 inches, or about 42 microns) to the total thickness of the coated sheet. For a coating equally applied to both sides of the sheet, this means there is about 0.0008 inches (21 microns) of zinc on each surface. To accurately determine the thickness of the coating, the coated thickness must be measured, the coating stripped off, and then the steel substrate thickness measured using a gauge capable of accurately reading to the nearest ten-thousandth of an inch. This is very difficult to do with good accuracy. On-line equipment is available that can nondestructively do this (see sidebar), but the most accurate manual method of determining the amount of coating present is to measure its weight [mass] on a given surface area using the "weigh-strip-weigh" technique. Weigh-strip-weigh refers to the procedure of weighing a standard size sample of the product using a very accurate scale, stripping the coating in an inhibited acid without removing any of the substrate, then reweighing the coupon to determine the weight [mass] loss. This is the original method of determining coating weight [mass], and, in fact, is still the referee and standard method used to check and calibrate nondestructive on-line and laboratory coating thickness gauges. There are weigh-strip-weigh procedures that can be used for all zinc-based coatings in commercial production today. For the most common products, these procedures are defined in ASTM Standard A 90/A 90M, and cover galvanized and galvannealed sheet, 55% aluminum-zinc alloy-coated sheet, and zinc-5% aluminum alloy-

coated sheet. There are special procedures required for other types of alloy coatings such as aluminized, and zinc-nickel alloy electroplated sheet. These are covered by other ASTM standards.

Designation System for Galvanized and Galvannealed Sheet Products

Galvanize – For galvanized sheet, common inch-pound coating weight designations (ordered as A 653) are, in oz/ft^2:

G30 G40 G60 G90 G115

These designations specify the minimum average TST, total both sides, tested per ASTM A 924/A 924M, e.g., G90 requires a minimum average TST of 0.90 oz/ft^2 total both sides. The specification stipulates that TST samples shall be taken from defined positions at the edge-center-edge of the as-coated sheet.

There are designations for heavier coatings, such as G165 and G210, but these products are used for very specialized applications and are generally not available on thinner gauge sheet.

In SI units (ordered as A 653M), the comparable coating mass designations for galvanized sheet are, in g/m^2:

Z90 Z120 Z180 Z275 Z350

These designations specify the minimum average TST, total both sides, tested per A 924/A 924M, e.g., Z275 requires a minimum average TST of 275 g/m^2 total both sides.

In 2007 ASTM added the option of ordering single side, single spot test (SST) coating designations to A 653/A 653M. These are SI designations only (ordered to A 653M) and specify the minimum and maximum allowable coating mass per side for any SST. They take the familiar form of automotive coating designations (numeric characters first – signifying a per side requirement). No inch-pound designations are used since single side coatings are traditionally ordered in SI units only. Examples are:

60G 70G 90G

These designations specify the minimum and maximum SST value on each surface, e.g., 60G requires a minimum of 60 g/m^2 and a maximum of 110 g/m^2 of zinc on each surface for any SST.

When specifying single side single spot coatings, the designation for each surface must be shown, e.g., 60G60G.

Coating weight [mass] versus coating life – *For galvanized coatings in most applications and environments, the corrosion performance is an approximate linear function of coating weight (thickness). For instance, a G60 coating has twice the thickness of a G30 coating, and the life of the product (defined, perhaps, as the time to 5% rust) in a given environment is approximately twice as long. Similarly, a G90 coating is approximately 50% thicker than a G60 coating, and thus would be expected to perform 50% better (in terms of time to 5% rust). For a more thorough discussion on service life, see GalvInfoNote 3.1. Limits on maximum acceptable coating weights for an application are usually determined by other factors such as cost or formability. For a more thorough discussion of this topic see GalvInfoNotes 1.6 and 2.5.*

For other metallic-coated sheet products, the life versus coating thickness is typically not linear; thus determining the coating weight (mass) to use is not as simple as it is for galvanized coatings. Also, when these products are painted, the behaviour is even more complex. The subject of painted hot-dip products is addressed in GalvInfoNotes 4.1 and 4.2.

Zinc-Iron (Galvanneal) – The common inch-pound coating weight designations (ordered as A 653) for galvannealed sheet (zinc-iron alloy-coated) are, in oz/ft^2:

A25 A40 A60

As with galvanized product designators, A40 for example, requires a minimum average TST coating weight of 0.40 oz/ft^2, total both sides. While the coating contains approximately 8 to 10% iron, resulting in the density being slightly higher than a zinc coating and the coating thickness being slightly less than a G40 galvanize coating, the difference is too small to be of concern. The effect of density is discussed in the section on 55% Al-Zn coatings, and in the Appendix. Also, see GalvInfoNote 1.3 for a full explanation of hot-dip galvanneal coatings.

The SI equivalent coating mass designations (ordered as A 653M) for galvannealed sheet are, in g/m^2:

ZF75 ZF120 ZF180

ZF120, for example, requires a minimum average TST of 120 g/m^2 total both sides.

As with galvanize, the option of ordering zinc-iron coatings to single side, SST coating designations has been added to A 653/A 653M. Again, these are SI designations only (ordered to A 653M), specifying the minimum and maximum allowable coating mass per side for any single spot, and taking the familiar form of automotive coating designations (numeric characters first – signifying a per side requirement). No inch-pound designations are used since single side coatings are traditionally ordered in SI units only. Examples are:

45A 50A

These designations relate to the minimum and maximum SST value on each surface, e.g., 45A requires a minimum of 45 g/m^2 and a maximum of 75 g/m^2 of zinc-iron alloy on each surface for any SST.

When specifying single side, SST coatings, the designation for each surface must be shown, e.g., 45A45A.

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For galvanized and galvannealed sheet, the relationship between coating weight (mass) and thickness is as follows (based on zinc density of 446 1b/ft^3 or 7140 kg/m^3):

1 oz/ft^2 = 0.0017 in = 305.15 g/m^2 = 0.0427 mm (1)

Designation System for Electrogalvanized Sheet Products

For electroplated coatings (pure zinc and zinc-based alloy coatings), SI system (g/m^2) designators are most commonly used, although ASTM Standard A 879/A 879M for electrogalvanize was updated in 2004 to include the inch-pound [oz/ft^2] designator system. The reason for the initial use of SI designators is that many electroplated products were and still are used for automotive applications. Auto companies, who implemented worldwide coated sheet specifications some time ago, use only SI units.

For electrogalvanized sheet, common inch-pound coating weight designations (ordered as A 879) are, in oz/ft^2:

08Z 13Z 30Z

These designations relate to the minimum and maximum SST value on each surface, as defined in ASTM A 879/A 879M, e.g., 13Z requires a minimum of 0.13 and a maximum of 0.23 oz/ft^2 of zinc on each surface for any SST. Again, the numeric characters come first, signifying per side requirements.

When specifying, the designation for each surface must be shown, e.g., 13Z13Z.

For electrogalvanized sheet, common SI coating weight designations (ordered as A 879M) are, in g/m^2:

24G 40G 90G

These designations relate to the minimum and maximum SST value on each surface, as defined in ASTM A 879/A 879M, e.g., 40G requires a minimum of 40 and a maximum of 90 g/m^2 of zinc on each surface for any SST.

Again, the designation for each surface must be shown, e.g., 40G40G.

See GalvInfoNote 2.2 for an explanation of the electrogalvanizing process.

Keeping Designation Systems Straight

As hot-dip galvanized and galvannealed coatings saw more use by the automotive industry, it became the practice to manufacture these products to conform to single side, SST g/m^2 values; that being the requirement of automotive manufacturers. Products ordered for construction and other general end uses continue to be ordered to total both sides, TST, inch-pound designations. For hot-dip galvanize, as we have seen, ASTM uses "G" (prior to the numerals) in the designator for inch-pound coatings and "Z" for SI coatings – total both sides. On the other hand, for electrogalvanize "G" (after the numerals) means SI units and "Z" means inch-pound units.

The use of both dimensional units, and the reversal of "G" and "Z" between TST hot-dip, and single side, SST EG in ASTM specifications, certainly can lead to confusion in the marketplace. Table 1 below summarizes what the various designations mean in terms of single spot and triple spot requirements.

Table 1 Galvanized Sheet Designations Explained

Coating Designation Format	Product Type and Coating Requirements						
	Specification	Coating	Units	Coating Tests Required			
				Single Side		Total Both Sides	
				SST	TST	SST	TST
G*nn*	A 653 – Table 1	zinc - HD	oz/ft^2	NONE	Min	Min	Min
Z*nn*	A 653M – Table 1	zinc - HD	g/m^2	NONE	Min	Min	Min
A*nn*	A 653 – Table 1	zinc-iron - HD	oz/ft^2	NONE	Min	Min	Min
ZF*nn*	A 653M – Table 1	zinc-iron - HD	g/m^2	NONE	Min	Min	Min
***nn*Z*nn*Z**	A 879	zinc - EG	oz/ft^2	Min & Max	NONE	NONE	NONE
***nn*G*nn*G**	A 879M	zinc - EG	g/m^2	Min & Max	NONE	NONE	NONE
***nn*G*nn*G**	A653 M – Table S2.1	zinc - HD	g/m^2	Min & Max	NONE	NONE	NONE
***nn*A*nn*A**	A653 M – Table S2.1	zinc-iron - HD	g/m^2	Min & Max	NONE	NONE	NONE
***nn*G*nn*G**	Auto (typical) 1	zinc - HD & EG	g/m^2	Min & Max	NONE	NONE	NONE
***nn*A*nn*A**	Auto (typical) 2	zinc-iron - HD & EG	g/m^2	Min & Max	NONE *	NONE	NONE

Notes: *nn* = numerals (2 or 3) specific to coating weight [mass]
HD = Hot-Dip
EG = Electrogalvanize
SST = Single Spot Test
TST = Triple Spot Test
* some auto manufacturers require a minimum TST

For additional clarification, see Table 2 below, which provides the requirements of selected coating weight [mass] examples for galvanized sheet made to ASTM specifications.

It is not easy to keep the terminology straight. Users should be aware that both units are in common use today, and are advised to pay close attention when ordering, knowing precisely what is meant by the terminology being used. See the Table 3 at the end of this article, which summarizes the designations used for most hot-dip products, and may be useful in keeping terminology clear.

Table 2 Selected ASTM Galvanized Sheet Designations – Requirements

Product Type	Example Designation	Requirement
Hot-Dip Galvanize (A 653/A 653M)	G90 (A 653, Table 1, in-lb)	TST[a] average 0.90 oz/ft^2 min – total both sides TST average 0.32 oz/ft^2 min – each side SST[b] 0.80 oz/ft^2 min – total both sides
	Z275 (A 653M, Table 1, SI)	TST average 275 g/m^2 min – total both sides TST average 94 g/m^2 min – each side SST 235 g/m^2 min – total both sides
	60G60G (A 653M, Table S2.1, SI)[c]	SST 60 g/m^2 min, 110 g/m^2 max – each side
Hot-Dip Galvanneal (A 653/A 653M)	A40 (A 653, Table 1, in-lb)	TST average 0.40 oz/ft^2 min – total both sides TST average 0.12 oz/ft^2 min – each side SST 0.30 oz/ft^2 min – total both sides
	ZF120 (A 653M, Table 1, SI)	TST average 120 g/m^2 min – total both sides TST average 36 g/m^2 min – each side SST 90 g/m^2 min – total both sides
	45A45A (A 653M, Table S2.1, SI)	SST 45 g/m^2 min, 75 g/m^2 max – each side
Electrogalvanize (A 879/A 879M)	13Z13Z (A 879, Table 1, in-lb)	SST 0.13 oz/ft^2 min, 0.23 oz/ft^2 max – each side
	40G40G (A 879M, Table 1, SI)	SST 40 g/m^2 min, 70 g/m^2 max – each side

[a] – Triple Spot Test [b] – Single Spot Test

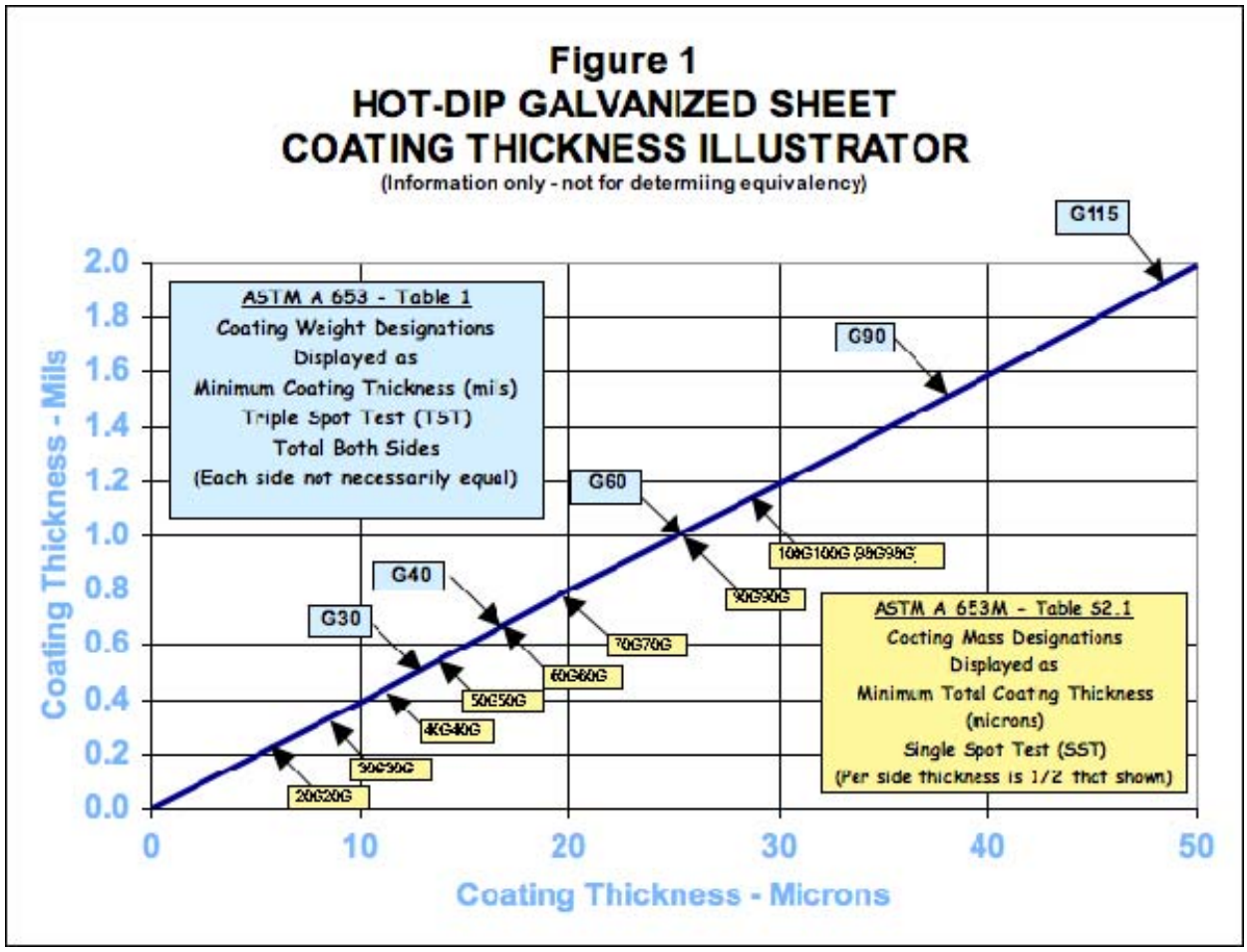
[c] – For information purposes, Table S2.1 in A 653M shows inch-pound values for the SI coating designations

Total Both Side TST versus Single Side SST Coatings

Because the ASTM total both sides, TST designators allow an uneven split of the coating (one side must have at least 40% of the specified minimum SST coating weight), it is not possible to precisely convert them to SST, single side designators since the latter specify exact minimums per surface. It is sometimes useful, however, to provide an approximate conversion based on the total coating thickness on both surfaces.

Figure 1 on the next page is a chart that allows this to be done, both in terms of coating designators and thickness of the total coating. For instance, it can easily be seen that a G60 coating has a minimum total thickness of about 1.0 mil, which is the very close to the total minimum thickness (25 microns) of a 90G90G coating. Remember, however, that a G60 coating is an average of 3 readings (TST) and can have an uneven split of the total coating thickness, while a 90G90G coating must have a minimum of 12.5 microns on each side for any single spot.

Figure 1 is a guideline only for estimating coating thickness in terms of the two systems and is not meant to suggest equivalency. Also, the values shown are specified minimums. Actual coatings are always a few percent thicker in order to guarantee the minimums.



Designation System for 55% Aluminum-Zinc Alloy-Coated Sheet

Steel sheet with a 55% aluminum-zinc alloy coating (55% Al-Zn alloy-coated) is in common use today throughout the construction and other industries. It, too, has very specific coating designators. Fortunately, there are only a few designators, but that doesn't mean there is no confusion about the meaning. The designation systems for coating weight and coating mass are given in ASTM Standard A 792/A 792M.

The four inch-pound coating weight designations (ordered as A 792) are, in oz/ft^2:

AZ50 AZ55 AZ60 AZ70

These designations specify the minimum average of a TST, total both sides, tested per A 924/A 924M, e.g., AZ50 requires a minimum average TST of 0.50 oz/ft^2 total both sides.

These designators are comparable to those used for galvanized sheet in that the dimensions are oz/ft^2. But, one has to be aware that the designation AZ60 is not equivalent to a G60 coating with respect to the thickness of the coating. Here is where the issue of density comes into play. The coating on 55% Al-Zn alloy coated sheet has about 55% aluminum and 45% zinc. Actually, the coating has a small addition of silicon, but for purposes of this discussion the silicon is not important. Since aluminum is less dense than zinc (a given volume weighs less than the same volume of zinc), an AZ60 coating is thicker than a G60 galvanize coating. See the section on theoretical weight [mass] in the Appendix to understand how differences in coating density affect the coated sheet.

Because 55% Al-Zn alloy coating and a galvanize coating behave quite differently with respect to corrosion processes, it is not possible to try to draw a performance equivalency curve. There is no answer

therefore to the question: What 55% Al-Zn alloy coating is equivalent in performance to a G90 coating? The major use of 55% Al-Zn alloy coated sheet is for construction industry building panels, and for this application the most common coating weights are AZ50 and AZ55. As the differences in performance between these two designators are subtle, ask your supplier which coating thickness they recommend for your application.

For 55% Al-Zn alloy-coated sheet there is also a SI coating mass designator system (ordered as A 792M). The SI equivalents to AZ50, AZ55, AZ60 and AZ70 are, in g/m^2:

AZM150 AZM165 AZM180 AZM210

These designations specify the minimum average of a TST, total both sides, per A 924/A 924M, e.g., AZM150 requires a minimum TST of 150 g/m^2 total both sides.

Since 55% Al-Zn alloy coated sheet is produced only by the hot-dip process, there is no additional terminology or specification related to the manufacture of an electroplated product. Also, there are no SST, single side designations for this product.

For 55% Al-Zn alloy coated sheet, the relationship between coating weight [mass] and thickness is as follows (based on a density of 234 lb/ft^3 or 3750 kg/m^3):

$$\mathbf{1\ oz/ft^2 = 0.0032\ in = 305.15\ g/m^2 = 0.0813\ mm} \qquad \mathbf{(2)}$$

See GalvInfoNote 1.4 for a complete description of 55% Al-Zn alloy-coated sheet.

Designation System for Zinc-5% Aluminum Alloy-Coated Sheet

A third type of zinc-based coating that has not seen much use for sheet products in the United States, but is recognized by ASTM, is zinc-5% aluminum alloy-coated (Zn-5% Al alloy-coated) sheet. Zn-5% Al alloy-coated sheet has a coating that consists of 95% zinc and 5% aluminum, and small amounts of other elements to improve processing and product characteristics. The designation systems for coating weight and coating mass are given in ASTM Standard A 875/A 875M.

The common inch-pound coating weight designations (ordered as A 875) are, in oz/ft^2:

GF30 GF45 GF60 GF75 GF90

For Zn-5% Al alloy-coated sheet, since the coating contains about 95% zinc, and thus has nearly the same density as zinc, a GF90 coating is approximately equivalent in thickness to a G90 galvanized coating.

The equivalent SI coating mass designations (ordered as A 875M) are, in g/m^2:

ZGF90 ZGF135 ZGF180 ZGF235 ZGF275

As with 55% Al-Zn alloy-coated sheet, Zn-5% Al alloy-coated sheet is made only by the hot-dip process so there are no designator systems that involve per side terminology.

For Zn-5% Al alloy coated sheet, the relationship between coating weight [mass] and thickness is as follows: (based on a density of 427 $1b/ft^3$ or 6840 kg/m^3)

$$\mathbf{1\ oz/ft^2 = 0.00175\ in = 305.15\ g/m^2 = 0.0446\ mm} \qquad \mathbf{(3)}$$

Summary

This article explains the complexities of coating designation systems and hopefully provides a better understanding of why it is important to be sure that you and your supplier are speaking the same language. Table 2 gives examples of some of the designators discussed above. See GalvInfoNote 1.5 for a further explanation of ASTM specifications for coated steel sheet products.

Table 3 Designators for Zinc-Based Coatings on Steel Sheet - SUMMARY

Product	Example of Common Coating Designations		Coating Weight inch-pound oz/ft^2	Coating Mass SI g/m^2
	inch-pound	SI		
	Total Both Sides - Minimum Triple Spot Average			
ASTM A 653/A 653M Galvanize	G90	Z275	0.90	275
ASTM A 653/A 653M Galvanneal	A40	ZF120	0.40	120
ASTM A 792/A 792M 55% Al-Zn alloy-coated	AZ55	AZM165	0.55	165
ASTM A 875/A 875M Zn-5% Al alloy-coated	GF75	ZGF225	0.75	225
ASTM A 1046/A 1046M Zn-Al-Mg alloy-coated	ZM90	ZMM275	0.90	275
	Single Side++ - Minimum Single Spot			
ASTM A 653M Galvanize	N/A*	60G	0.20	60
ASTM A 653M Galvanneal	N/A*	45A	0.15	45
ASTM A 879/A 879M Electrogalvanize	13Z	40G	0.13	40
Automotive Specified Galvanize	N/A*	100G	N/A*	100
Automotive Specified Galvanneal	N/A*	45A	N/A*	45

* Not Applicable

++ Single side designators are used to specify the coating mass for each side and are written, for example, 60G60G, or in the case of differential coating masses, 90G60G.

Appendix

X.1 Theoretical Weight [Mass] per Unit Area

Because the densities of zinc-based hot-dip coatings are lower than the density of steel, the weight per unit area of coated sheet is less than uncoated sheet of the same thickness. This small difference can be of importance when large volumes of coated sheet are being consumed. The adjustment in weight [mass] varies as a function of the thickness of both the steel substrate and the coating, and the coating type. For example, 0.013" G90 sheet is about 1.2% lighter than cold rolled sheet of the same thickness. This difference lessens for thicker sheet and/or thinner coatings. Using the density of the various coatings, and the actual typical thickness when applied, a **"Coating Factor"** can be calculated for each coating type and designation. To arrive at the theoretical weight [mass] per unit area of sheet, the Coating Factor is subtracted from the weight [mass] of uncoated sheet of the same thickness. The Coating Factor is actually the difference in weight [mass] between the coating metal and steel of the same thickness as the coating metal. **Knowing these factors is important in being able to closely track the sheet area obtained per unit weight [mass] of coated sheet product.**

Theoretical Weight

The formula for calculating the Theoretical Weight of galvanized sheet in lb/ft^2 is:

$$TW = t \times 40.833 - CF \qquad (4)$$

Where: TW = Theoretical Weight in lb/ft^2

t = actual sheet thickness in inches (40.833 is the weight in lbs of 1 ft^2 of 1" thick steel)

CF = Coating Factor in lb/ft^2

For example; galvanized sheet 0.020 inches thick with a G90 coating has a coating factor of 0.006 lb/ft^2, based on the relationship in (1) and a typical actual G90 coating weight of 0.96 oz/ft^2. Therefore:

$$\mathbf{TW = 0.020 \times 40.833 - 0.006 = 0.8107\ lb/ft^2}$$

Theoretical Mass

The formula for calculating the Theoretical Mass of galvanized sheet in kg/m^2 is:

$$TM = t \times 7.85 - CF \qquad (5)$$

Where: TM = Theoretical Mass in kg/m^2

t = actual sheet thickness in millimetres (7.85 is the mass in kg of 1 m^2 of 1mm thick steel)

CF = Coating Factor in kg/m^2

For example; galvanized sheet 0.50 mm thick with a Z275 coating has a coating factor of 0.029 kg/m^2, based on the relationship in (1) and a typical actual Z275 coating mass of 293 g/m^2. Therefore:

$$\mathbf{TM = 0.50 \times 7.85 - 0.029 = 3.896\ kg/m^2}$$

Using the above relationships, Theoretical Weight [Mass] can be calculated for all combinations of sheet thicknesses and coating types/thicknesses. For quick reference, producers of coated sheet usually have tables available for their customers showing this information for the products and thicknesses they sell. The above formulas can be used to interpolate between the thicknesses shown in these tables. If you do not have access to such information, Table X.1 shows the coating factors for example coating weights [masses] of most of the commonly ordered coating designations for galvanize, 55% Al-Zn alloy coated sheet, and Zn-5% Al alloy coated sheet.

Table X.1 Coating Factors for Zinc-Based Coated Sheet

ASTM Coating Type	Inch-pound			SI (Metric)		
	Designation	Example Coating Weight (oz/ft^2)	Coating Factor (lb/ft^2)	Designation	Example Coating Mass (g/m^2)	Coating Factor (kg/m^2)
A 653 – Galvanize and Galvanneal	G30	0.40	**0.0025**	Z90	120	**0.012**
	G40	0.48	**0.0030**	Z120	144	**0.014**
	G60	0.66	**0.0041**	Z180	198	**0.020**
	G90	0.96	**0.0060**	Z275	293	**0.029**
	G115	1.23	**0.0076**	Z350	375	**0.037**
	G140	1.50	**0.0093**	Z450	482	**0.048**
	G165	1.76	**0.0109**	Z500	533	**0.053**
	G185	1.98	**0.0123**	Z550	588	**0.058**
	G210	2.25	**0.0140**	Z600	643	**0.064**
	G235	2.54	**0.0158**	Z700	756	**0.075**
	G300	3.25	**0.0202**	Z900	975	**0.097**
	G360	3.90	**0.0242**	Z1100	1190	**0.118**
	A25	0.35	**0.0022**	ZF75	105	**0.010**
	A40	0.46	**0.0029**	ZF120	138	**0.014**
	A60	0.66	**0.0041**	ZF180	198	**0.020**
A 792 - 55% Aluminum-Zinc	AZ50	0.55	**0.0375**	AZM150	165	**0.180**
	AZ55	0.61	**0.0416**	AZM165	180	**0.196**
	AZ60	0.66	**0.0450**	AZM180	198	**0.216**
A 875 - Zinc-5% Aluminum	GF30	0.40	**0.0047**	ZGF90	120	**0.023**
	GF45	0.51	**0.0060**	ZGF135	153	**0.029**
	GF60	0.66	**0.0078**	ZGF180	198	**0.038**
	GF75	0.82	**0.0097**	ZGF225	245	**0.046**
	GF90	0.96	**0.0114**	ZGF275	293	**0.055**
	GF115	1.23	**0.0146**	ZGF350	375	**0.071**
	GF140	1.50	**0.0177**	ZGF450	482	**0.091**
	GF210	2.25	**0.0266**	ZGF600	643	**0.122**
	GF235	2.54	**0.0301**	ZGF700	756	**0.143**