



AEROSPACE MATERIAL SPECIFICATION

AMS4349™**REV. F**

Issued	1977-07
Reaffirmed	2011-11
Revised	2024-09

Superseding AMS4349E

Core, Honeycomb, Aluminum Alloy, Corrosion Inhibited,
For Sandwich Construction,
5056, 350 Fahrenheit (177 Celsius)

RATIONALE

AMS4349F results from a Five-Year Review and update of this specification with changes to update the Title to add temperature units, relocate Definitions (see 2.3), and update Applicable Documents (see Section 2) and wording to prohibit unauthorized exceptions (see 8.4).

1. SCOPE

1.1 Form

This specification covers bonded honeycomb core made of aluminum alloy and supplied in the form of blocks, slices, or other configurations as ordered (see 8.5).

1.2 Application

This honeycomb core has been used typically in sandwich construction for short-term exposure up to 350 °F (177 °C) or for long-term exposure up to 200 °F (95 °C), but usage is not limited to such applications.

1.3 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards that may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS-A-81596	Aluminum Foil for Sandwich Construction
AMS-STD-595	Colors Used in Government Procurement
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B117	Operating Salt Spray (Fog) Apparatus
ASTM C273/C273M	Shear Properties of Sandwich Core Materials
ASTM C365/C365M	Flatwise Compressive Properties of Sandwich Cores

2.3 Definitions

Terms used in AMS are defined in AS7766 and as follows:

2.3.1 MISMATCHED NODES

A stacking misalignment defect that can occur for honeycomb that is manufactured using a corrugation process rather than an expansion process. See Figure 2 for a depiction of this defect.

3. TECHNICAL REQUIREMENTS

3.1 Material

3.1.1 Metal

Shall be AMS-A-81596, alloy 5056 aluminum alloy foil of the thickness specified on the part drawing or purchase order (see 8.5).

3.1.2 Adhesive

The adhesive system used for node-to-node attachment shall be such that the resultant core meets the requirements specified herein.

3.2 Configuration

The core material shall consist of strips of aluminum alloy foil treated for corrosion protection, bonded together such that cells approximately hexagonal in shape are formed when fully expanded (see Figure 1).

3.2.1 Designation

Core shall be designated according to the following numbering system:

Nominal density, pounds per cubic foot (kg/m^3)

Cell size, inch (mm)

Foil thickness, inch (μm)

“N” for non-perforated, “P” for perforated, or “HP” for highly perforated (see 3.2.2)

Alloy

Adhesive, option of supplier

EXAMPLE: Core with a nominal density of 4.3 pounds per cubic foot (69 kg/m^3) with a 1/4 inch (6.4 mm) cell size, 0.0020-inch (51- μm) foil thickness, non-perforated, made of 5056 aluminum alloy, and bonded with required adhesive shall be numbered as follows:

4.3 - 1/4 20N (5056) (XXXX) in inch/pound units

69 - 6.4 51N (5056) (XXXX) in SI units

3.2.2 Perforations

When perforated core is specified, the perforations shall be approximately 0.005 inch (0.13 mm) in diameter and spaced to vent each cell into at least three adjacent cells at least once for each 1/4 inch (6.4 mm) of core thickness. When thicknesses under 1/4 inch (6.4 mm) are furnished, there shall be at least one perforation per cell into each of three adjacent cells. When Type HP is specified, there shall be no fewer than 6000 perforations per square foot of foil, uniformly spaced and staggered.

3.2.3 Cell Pitch

Shall be 1.733 times the nominal cell size, +20%, -10%, measured by taking the average distance between ten nodes along a ribbon for six different ribbons.

3.3 Condition

Core shall be supplied in the expanded form; it shall be clean, free of contamination, and treated for corrosion resistance.

3.4 Properties

Core, having nominal dimensions as specified in Table 1, shall conform to the following requirements; tests shall be conducted on the core supplied in accordance with specified test methods. Properties of core having nominal dimensions other than specified in Table 1 shall be acceptable to the purchaser.

3.4.1 Flatwise Compressive Strength

The minimum individual values shall be as specified in Table 1, determined in accordance with 4.5.1.

3.4.2 Plate Shear Strength and Plate Shear Modulus

Shall be as specified in Table 1, determined in accordance with ASTM C273/C273M at 65 to 85 °F (18.3 to 29.4 °C), using a 0.625-inch (15.88-mm) thick specimen.

3.4.3 Node Bond Strength

Shall be not less than 30 pound-force (133 N) at 65 to 85 °F (18.3 to 29.4 °C) and not than 15 pound-force (67 N) at 350 °F ± 5 °F (177 °C ± 3 °C), determined less in accordance with 4.5.2.

3.4.4 Core Density

Shall be within $\pm 10\%$ of the specified density, determined in accordance with 4.5.3.

3.4.5 Corrosion Resistance

Core specimens shall show a weight loss not greater than 125 mg per square foot (1345 mg/m²) of exposed foil area, determined in accordance with 4.5.4.

Table 1A - Core properties, inch-pound units (see 8.2)

Cell Size Inches	Nominal Foil Thickness Designated Inches	Nominal Foil Thickness Maximum Inches	Nominal Density Pounds per Cubic Foot	Plate Shear Strength psi, Min Individual Direction of Test W	Plate Shear Strength psi, Min Individual Direction of Test L	Plate Shear Modulus ksi, Min Average Direction of Test W	Plate Shear Modulus ksi, Min Average Direction of Test L	Flatwise Compressive Strength psi, Min (Individual) Bare	Flatwise Compressive Strength psi, Min (Individual) Stabilized
1/8	0.0007	0.0011	3.1	110	200	16.0	31.0	250	260
	0.0010	0.0015	4.5	205	350	25.0	51.0	475	500
	0.0015	0.0022	6.1	305	535	37.0	77.0	760	825
	0.0020	0.0029	8.1	440	740	50.0	112.0	1200	1300
5/32	0.0007	0.0011	2.6	80	152	12.0	24.0	180	185
	0.0010	0.0015	3.8	155	272	20.0	41.0	360	375
	0.0015	0.0022	5.3	250	435	31.0	64.0	615	650
	0.0020	0.0029	6.9	360	610	42.0	91.0	920	1000
	0.0025	0.0034	8.4	455	775	52.0	115.0	1110	1375
3/16	0.0007	0.0011	2.0	50	105	9.0	17.0	110	120
	0.0010	0.0015	3.1	110	200	16.0	31.0	250	260
	0.0015	0.0022	4.4	198	340	24.0	50.0	460	490
	0.0020	0.0029	5.7	280	480	34.0	70.0	665	735
	0.0025	0.0034	6.9	360	610	42.0	91.0	920	1000
	0.0030	0.0042	8.1	440	740	50.0	112.0	1200	1300
1/4	0.0007	0.0011	1.6	38	78	6.0	13.0	75	80
	0.0010	0.0015	2.3	62	130	11.0	21.0	145	155
	0.0015	0.0022	3.4	130	230	18.0	35.0	300	315
	0.0020	0.0029	4.3	190	325	24.0	48.0	440	465
	0.0025	0.0034	5.2	245	425	30.0	62.0	600	645
	0.0030	0.0042	6.0	300	512	36.0	75.0	740	805
	0.0040	0.0053	7.9	430	720	49.0	108.0	1150	1265
3/8	0.0007	0.0011	1.0	25	45	4.0	7.0	25	35
	0.0010	0.0015	1.6	38	78	6.0	13.0	75	80
	0.0015	0.0022	2.3	62	130	11.0	21.0	145	155
	0.0020	0.0029	3.0	100	190	15.0	30.0	240	250
	0.0025	0.0034	3.7	150	260	20.0	40.0	335	362
	0.0030	0.0042	4.2	180	315	23.0	47.0	410	443
	0.0040	0.0053	5.4	260	450	32.0	66.0	630	680
	0.0050	0.0065	6.5	335	568	39.0	84.0	825	908

Table 1B - Core properties, SI units (see 8.2)

Cell Size Millimeters	Nominal Foil Thickness Designated μm	Nominal Foil Thickness Maximum μm	Nominal Density kg/m ³	Plate Shear Strength MPa, Min Individual Direction of Test W	Plate Shear Strength MPa, Min Individual Direction of Test L	Plate Shear Modulus MPa, Min Average Direction of Test W	Plate Shear Modulus MPa, Min Average Direction of Test L	Flatwise Compressive Strength MPa, Min (Individual) Bare	Flatwise Compressive Strength MPa, Min (Individual) Stabilized
3.2	17.8	27.8	50	0.758	1.379	110	214	1.724	1.793
	25.4	38.1	72	1.413	2.413	172	352	3.275	3.448
	38.1	55.9	98	2.103	3.620	255	531	5.240	5.688
	50.8	73.7	130	3.034	5.102	345	772	8.274	8.964
4.0	17.8	27.8	42	0.552	1.048	83	165	1.241	1.276
	25.4	38.1	61	1.069	1.875	138	283	2.482	2.586
	38.1	55.9	85	1.724	2.999	214	441	4.240	4.482
	50.8	73.7	110	2.482	4.206	290	627	6.343	6.895
	63.5	86.4	135	3.137	5.344	359	793	7.633	9.481
4.8	17.8	27.8	32	0.345	0.724	62	117	0.758	0.827
	25.4	38.1	50	0.758	1.379	110	214	1.724	1.793
	38.1	55.9	70	1.365	2.344	165	345	3.172	3.329
	50.8	73.7	91	1.931	3.310	234	483	4.723	5.068
	63.5	86.4	110	2.482	4.206	290	627	6.343	6.895
	76.2	106.7	130	3.034	5.102	345	772	8.274	8.964
6.4	17.8	27.8	26	0.262	0.538	41	90	0.517	0.552
	25.4	38.1	37	0.427	0.896	76	145	1.000	1.069
	38.1	55.9	55	0.896	1.586	124	241	2.068	2.172
	50.8	73.7	69	1.310	2.241	165	331	3.034	3.206
	63.5	86.4	83	1.689	2.930	207	427	4.137	4.447
	76.2	106.7	96	2.068	3.530	248	517	5.102	5.550
	101.6	134.6	126	2.965	4.964	338	745	7.929	8.722
9.5	17.8	27.8	16	0.172	0.310	28	48	0.172	0.241
	25.4	38.1	26	0.262	0.538	41	90	0.517	0.552
	38.1	55.9	37	0.427	0.896	76	145	1.000	1.069
	50.8	73.7	48	0.690	1.310	103	207	1.655	1.724
	63.5	86.4	59	1.034	1.793	138	276	2.310	2.496
	76.2	106.7	67	1.241	2.172	159	324	2.827	3.054
	101.6	134.6	86	1.793	3.103	221	455	4.344	4.689
	127.0	165.1	104	2.310	3.916	269	579	5.688	6.261

3.5 Quality

The core, as received by the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the core.

3.5.1 The core shall be free from corrosion, oil, and other contamination detrimental to bonding.

3.5.2 A change in color of core material shall be acceptable provided the color change occurs in a line parallel to "L" (see Figure 1), indicative of a change in foil material where more than one foil coil is used in the manufacture of a core block.

3.5.3 Expanded core shall make total facing contact with a flat surface under uniform pressure without resulting in any damage that would cause rejection of the core.

3.5.4 Expanded core splices that have double foils (two ribbons bonded together that cause uneven expansion in the "L" direction [see Figure 1]) shall be acceptable if the double foils are not more frequent than one in any 8 inches (203 mm).

- 3.5.5 The maximum requirements for imperfections visually observed in any randomly selected 12-inch (305-mm) diameter circle are shown in Table 2.

Table 2 - Visual imperfections

Type of Imperfection	Maximum Number for 1/8-Inch (3.2-mm) Cell Size	Maximum Number for 5/32-Inch (4.0-mm) Cell Size	Maximum Number for 3/16-Inch (4.8-mm) Cell Size	Maximum Number for 1/4-Inch (6.4-mm) Cell Size	Maximum Number for 3/8-Inch (9.5-mm) Cell Size
Mismatched Nodes (see 2.3.1)	70	55	40	25	10
Loose Metal or Flakes (see 3.5.6.1)	35	28	20	12	5
Split Cell Walls	0	0	0	0	0
Buckled Cell Walls	0	0	0	0	0
Unbonded Nodes	2	2	2	2	2

- 3.5.5.1 Flakes are excess metal attached to foil edges that do not interfere with measurements of core thickness.
- 3.5.5.2 Split cell walls are free cell walls with a break or tear in the wall, partial or total.
- 3.5.5.3 Buckled cell walls are a bend in the free cell wall that creates a dimple on one surface and a dent in the other surface of the slice.
- 3.5.5.4 Unbonded nodes are a completely open, unbonded node. Partially opened nodes with some peeling are not open nodes.

3.6 Sizes and Tolerances

3.6.1 Size

Core shall be supplied in the size ordered with core dimensions as shown in Figure 1.

where:

T = thickness, depth, or height dimension measured parallel to the core cell axis

L = longitudinal or ribbon (length) dimension measured along the direction of a ribbon

W = width dimension measured normal to the ribbon direction

3.6.2 Core Thickness

Shall be ± 0.005 inch (± 0.13 mm) for machined slices up to 4.0 inches (102 mm) in nominal thickness, ± 0.062 inch (± 1.57 mm) for machined slices over 4 inches (102 mm) in nominal thickness, and $+0.25$ inch ($+6.4$ mm), -0.00 for raw block.

- 3.6.3 Length (L) and width (W) of unexpanded core shall be as ordered, $+0.25$ inch ($+6.4$ mm), -0 ; for expanded core, tolerances shall be $+2$ inches ($+51$ mm), -0 .
- 3.6.4 The cell size of any ten adjacent cells shall vary not more than $\pm 10\%$ from nominal, determined by taking the average distance between node bonds along the "W" dimension (see Figure 1) for at least 60 cells selected at random in groups containing ten adjacent cells.
- 3.6.5 All ribbons shall be parallel to each other within 10 degrees. The ribbon direction shall be determined by measuring the angle between one line through two nodes on the same ribbon ("L" direction), 12 inches (305 mm) apart, and another line in the principal ribbon direction (see Figure 1).

3.7 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.6.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The manufacturer of core shall supply all samples and shall be responsible for all required tests. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the core conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Flatwise compressive strength (see 3.4.1), node bond strength (see 3.4.3), and core density (see 3.4.4) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests

All technical requirements are preproduction tests and shall be performed prior to or on the first-article shipment of core by the manufacturer, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when the purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing

Shall be in accordance with the following:

4.3.1 For Acceptance Tests

Each block or 2% of the slices from each lot shall be sampled at random to provide sufficient core to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified, not less than three.

4.3.1.1 A lot shall be each block or all slices cut from a single block.

4.3.1.2 A statistical sampling plan, acceptable to the purchaser, may be used in lieu of sampling as in 4.3.1.

4.3.2 For Preproduction Tests

Shall be acceptable to the purchaser.

4.4 Approval

4.4.1 Sample core shall be approved by the purchaser before core for production use is supplied, unless such approval be waived by the purchaser. Results of tests on production core shall be essentially equivalent to those on the approved sample.

4.4.2 The manufacturer shall use ingredients, manufacturing procedures, processes, and methods of inspection on production core that are essentially the same as those used on the approved sample. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, the manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample core. Production core made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods

Shall be as follows:

4.5.1 Flatwise Compressive Strength

Shall be determined at $77\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$ ($25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$) in accordance with ASTM C365/C365M, Method A for stabilized specimens and Method B for bare specimens. Test specimens shall be nominally 0.625-inch (15.88-mm) thick x 3.00 inches $\pm$ 0.25 inch (76.2 mm $\pm$ 6.4 mm) square. The test machine loading faces shall be approximately 4 inches (102 mm) square. Spherical loading blocks, preferably the suspended self-aligning type, shall transfer the load at 0.020 inch $\pm$ 0.005 inch (0.51 mm $\pm$ 0.13 mm) per minute. At least six specimens shall be tested for each product. The flatwise compressive strength shall be computed by dividing the maximum load by the cross-sectional area of the specimen. Report all values.

4.5.2 Node Bond Strength

A core slice, nominally 0.625T x 5L x 10W inches (15.88T x 127L x 254W mm), shall be tested in a suitable tension fixture by mounting, without causing cell distortion, at opposite ends of the "W" dimension (see Figure 3) with round pins. Pins shall be as large as cell size permits and shall engage all cells of a continuous row. Opposite pins shall be in a mirror image alignment at a distance as near to 8 inches (203 mm) as this mounting method permits. The fixture shall be slotted to allow horizontal pin movement. A steady loading rate of 1.00 inch $\pm$ 0.05 inch (25.4 mm $\pm$ 1.3 mm) per minute shall be maintained. Specimens shall be brought to temperature equilibrium before testing; elevated temperature tests shall be conducted at the specified temperature after holding at that temperature for 15 minutes $\pm$ 1 minute.

4.5.3 Core Density

Shall be determined on blocks and slices from their weight and dimensions to an accuracy within 1%. Thickness shall be measured with an accuracy of 0.001 inch (0.025 mm) and width and length with an accuracy of 0.010 inch (0.25 mm). Thickness measurements shall be made using a dial gauge capable of applying a 10 pound-force (44 N) over a 1.5-inch (38-mm) diameter area. Density shall be calculated in pounds per cubic foot (kg/m^3).

4.5.4 Corrosion Resistance

Representative specimens shall be 5 inches $\pm$ 1/16 inch (127 mm $\pm$ 1.6 mm) long (longitudinal direction "L" [see Figure 1]), 6 inches $\pm$ 1/16 inch (152 mm $\pm$ 1.6 mm) wide (transverse direction "W"), and 0.625 inch $\pm$ 0.010 inch (15.88 mm $\pm$ 0.25 mm) thick "T." The core specimens shall be weighed to the nearest milligram using an analytical balance. Specimens shall be dried for 16 hours $\pm$ 0.25 hour at $350\text{ }^{\circ}\text{F} \pm 10\text{ }^{\circ}\text{F}$ ($177\text{ }^{\circ}\text{C} \pm 6\text{ }^{\circ}\text{C}$) in an electric drying oven and allowed to cool to room temperature before weighing. The test specimens shall be subjected to a 5% salt spray test in accordance with ASTM B117 except that the cell axis shall be supported or suspended horizontally. At the end of 30 days exposure, the specimens shall be removed and rinsed thoroughly in clear, running water for at least 5 minutes. Immediately following rinsing, the specimens shall be stripped by immersion in a phosphoric-chromic acid solution for 5 minutes $\pm$ 0.25 minute at $212\text{ }^{\circ}\text{F} \pm 2\text{ }^{\circ}\text{F}$ ($107\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$). The stripping solution shall consist of the following:

- Phosphoric acid, 85% H_3PO_4 : 103 mL
- Chromic acid: 76 g
- Water, to make: 1 gallon (3.8 L)

The specimens shall be removed from the solution, rinsed in distilled or deionized water for at least 5 minutes, dried at $225\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$ ($107\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$) for 30 to 40 minutes, cooled to room temperature, and reweighed. The stripping solution shall be discarded after 1 gallon (3.8 L) of the solution has dissolved 20 g of oxides or coating. Compute the weight loss using Equation 1 (inch/pound units) or Equation 2 (SI units).

$$M = \frac{36C (O - A)}{TLW} \quad (\text{Eq. 1})$$

where:

M = weight loss per square foot of exposed foil area, milligrams

C = nominal cell size, inch (1/8, 5/32, 3/16, 1/4, 3/8)

T = thickness measurement in direction of cell axis, inches

L = ribbon length direction, inches

W = transverse direction, inches

O = original weight of specimen before exposure, milligrams

A = final weight of specimen after stripping, milligrams

$$M = \frac{26507C (O - A)}{TLW} \quad (\text{Eq. 2})$$

where:

M = weight loss per square meter of exposed foil area, milligrams

C = nominal cell size, millimeters (3.2, 4.0, 4.8, 6.4, 9.5)

T = thickness measurement in direction of cell axis, millimeters

L = ribbon length direction, millimeters

W = transverse direction, millimeters

O = original weight of specimen before exposure, milligrams

A = final weight of specimen after stripping, milligrams

4.6 Reports

The supplier of core shall furnish with each shipment a report from the manufacturer showing the results of tests to determine conformance to the acceptance test requirements and stating that the core conforms to the other technical requirements. This report shall include the purchase order number, block or lot number, AMS4349F, the manufacturer's identification, size, quantity, and, when requested, the foil lot number.

- 4.6.1 When material produced to this specification has exceptions taken to the technical requirements listed in Section 3 (see 5.1.3), the report shall contain a statement "This material is certified as AMS4349F(EXC) because of the following exceptions:" and the specific exceptions shall be listed.

4.7 Resampling and Retesting

If any specimen used in the above tests fails to meet the specified requirements, disposition of the core may be based on the results of testing three additional specimens, cut from the same block, for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the core represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Identification

5.1.1 Color Identification

Each block or slice of core shall be identified on the edges by parallel stripes: One 2-inch (51-mm) wide red stripe to identify 350 °F (177 °C) core, two 0.5-inch (12-mm) wide black stripes to identify 5056 alloy, and a 0.5-inch (13-mm) wide colored stripe beside the second black stripe to identify the density range. The colors of the stripes shall be as specified in Table 3 and shall approximately match the color numbers of AMS-STD-595. The group of parallel identification stripes shall be repeated at intervals not greater than 2 feet (610 mm). The color shall be produced by adding a dye to an adhesive that is compatible with the core. Stripes shall be painted or sprayed on the edges of core blocks or slices. The dye shall retain its color through the curing cycles, shall be noncorrosive, and shall have no adverse effect on the curing or the strength of the adhesive used for construction of the core or the adhesive used with the core in fabricating sandwich components.

Table 3 - Color identification

Color	AMS-STD-595 Color Number	Density Range Pounds Per Cubic Foot	Density Range kg/m ³
Brown	10076	Up to 2.0, excl	Up to 32, excl
Orange	12246 or 22246	2.0 to 3.0, excl	32 to 48, excl
Blue	15102 or 25102	3.0 to 4.0, excl	48 to 64, excl
Red	11105 or 21105	4.0 to 5.0, excl	64 to 80, excl
Yellow	13655 or 23655	5.0 to 6.0, excl	80 to 96, excl
Purple	17142 or 27142	6.0 to 7.0, excl	96 to 112, excl
Green	14187	7.0 to 9.0, excl	112 to 144, excl
Brown and Green	10076 and 14187	9.0 to 11.0, excl	144 to 176, excl
Brown and Purple	10076 and 17142 or 27142	11.0 to 13.0, excl	176 to 208, excl
Orange and Blue	12246 or 22246 and 15102 or 25102	13.0 to 15.0, excl	208 to 240, excl
Blue and Red	15102 or 25102 and 11105 or 21105	15.0 to 17.0, excl	240 to 272, excl
Orange and Green	12246 or 22246 and 14187	17.0 to 19.0, excl	272 to 304, excl
Blue and Yellow	15102 or 25102 and 13655 or 23655	19.0 to 21.0, excl	304 to 336, excl
Orange and Brown	12246 or 22246 and 10076	21.0 to 23.0, excl	336 to 368, excl

NOTE: The term "excl" applies only to the higher figure of the specified range.

5.1.2 Each piece of core and each interior and exterior container shall be legibly identified with not less than the following information, applied to a durable tag or label, using characters that will not be obliterated by normal handling.

CORE, HONEYCOMB, ALUMINUM ALLOY, CORROSION INHIBITED, 5056, 350 (177)

AMS4349F

CORE DESIGNATION _____

PURCHASE ORDER NUMBER _____

MANUFACTURER'S IDENTIFICATION _____

BLOCK OR CORE LOT NUMBER _____

PART NUMBER OR SIZE (T x L x W) _____

QUANTITY _____

5.1.3 When technical exceptions are taken (see 4.6.1), the material shall be marked with AMS4349F(EXC).

5.2 Packaging

5.2.1 A honeycomb lot may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.

5.2.2 Core shall be packaged and shipped in outer containers to ensure that the core, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to weather or any other normal hazard.