

MATERIAL MANUAL

First Issued: 6-18-48	MATERIAL SPECIFICATION ELECTRO-MOTIVE DIVISION GENERAL MOTORS CORPORATION LA GRANGE, ILLINOIS	SPECIFICATION NO EMS 309		
ORIGINATOR W. J. Brechtel		REV	DATE	RFC
APPROVED B.L. Braglia		D	1/24/2002	D60762
NAME: WROUGHT PURE ALUMINUM – HIGHEST CORROSION RESISTANCE - VERY SOFT – TYPE 1100				

REQUIREMENTS:

1. Standards & Practices: To comply with all requirements of the Society of Automotive Engineers for SAE AA 1100 Aluminum.
2. Chemical Composition:

Copper	0.20 maximum
Iron plus Silicon	1.0 maximum
Manganese	0.05 maximum
Zinc	0.10 maximum
Other Elements, each	0.05 maximum
Other Elements, total	0.15 maximum
Aluminum	99.00 minimum

3. Properties:

Tem- per	Tensile Str'gth PSI Min	Minimum Elongation in 2", %, for Thickness											
		.006- .007	.008- .012	.013- .019	.020- .031	.032- .050	.051- .113	.114- .160	.161- .249	.250- .500	.500- 1.000	1.001- 2.000	2.001- 3.000
0	15,500 ²	15	15	15	20	25	30	30	30	28	28	28	28
H12	14,000	--	--	3	4	6	8	9	9	9	12	12	--
H14	16,000	--	1	2	3	4	5	6	6	6	10	--	--
H16	19,000	1	1	1	2	3	4	4	--	--	--	--	--
H18	22,000	1	1	1	2	3	4	4	--	--	--	--	--
H112	12,000	--	--	--	--	--	--	--	--	9	14	14	20

¹Sheet and plate only.²Maximum

4. Test Report: Vendor shall furnish test report showing chemical analysis of materials supplied.

GENERAL INFORMATION: (Not Mandatory Vendor Requirements)

This material is furnished in all commercial forms. It is used where the very highest corrosion resistance or formability is required. Since it is commercially pure aluminum, the strength and fatigue limits are at a minimum. It has been used for EMD air filter louvre

MATERIALS MANUAL

GENERAL MOTORS CORPORATION	MATERIAL SPECIFICATION	SPECIFICATION NO. EMS 309
LA GRANGE, ILLINOIS	ELECTRO-MOTIVE DIVISION	Rev. D (CONTINUED)

sheets. It is suitable for any aluminum sheet applications within its physical strength limitations. Typical yield strength runs 5,000 to 21,000 psi, according to temper.

Physicals of EMS 309 are controlled by rolling practice. This is one of the non-heat treatable class of alloys. In forms that cannot be cold worked considerably, it is only available in the "O" temper or "F" temper. The physical properties given apply to sheet and plate only, but may be used for design purposes for other forms.

Typical Properties include:

	Temper		
	O	H14	H18
Density, lbs./in. ³	.098	-	-
Specific Gravity	2.71	-	-
Average Coeff. Of expansion (68-212°F)	13.1×10^{-6}	-	-
Thermal Conductivity CGS @ 25°C.	.53	-	.52
Electrical Conductivity % IACS @ 20°C.	59	-	57
Modulus of Elasticity	10.0×10^{-6}	-	-
Hardness, BHN	23	32	44
Sheer Strength, psi	9,000	11,000	13,000
Fatigue Endurance Limit, psi	5,000	7,000	9,000

Radii required to bend 90°, inches:

Thickness, inches	Temper				
	0	H12	H14	H16	H18
.016	0	0	0	0	0
.032	0	0	0	0	1/16
.064	0	0	0	1/16	1/8
1/8	0	0	0	1/8	1/4
3/16	0	3/32	3/32	1/4	1/2
1/4	0	3/16	3/16	1/2	1

DRAFTING INFORMATION:

Where use of this material is specified, it shall be designated as:

MATERIAL: EMS 309 _____ ALUMINUM

And insert the desired temper designation 0, H12, H14, H16, or H18

NOTE: These specifications were developed without considering whether patents may or may not be involved. In all cases, therefore, the supplier shall be required to assume patent liability.