STEEL, SHEET, DENT RESISTANT

NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A1
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A2
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A3
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A4
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A5
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A6
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A7
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A8
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A9
NOT TO BE USED FOR NEW DESIGN	WSS-M1A341-A10
	WSS-M1A341-A11
	WSS-M1A341-A12

1. SCOPE

The materials defined by these specifications are steel sheet possessing good formability, weldability, and resistance to denting. Variants A1, A2, A8, A10, A11, A12 increase in yield strength due to strain hardening. Variants A3 to A7 & A9 increase in yield strength due to a combination of strain hardening and paint baking (bake hardening). Variants A7, A10, A11 & A12 shall be supplied in the isotropic condition (see para 4.3) and be additionally controlled by the SMRL or EU2066 (see para 3.5). The choice of strengthening mechanism is at the discretion of the supplier and shall be described in the control plan. To assist users of these specifications (while not restricting the supplier's choice of strengthening mechanism) detailed below is a list of commonly used terms: (See also para 4.7).

WSS-M1A341-A1:	Dent Resistant 210
WSS-M1A341-A2:	Dent Resistant 250
WSS-M1A341-A3:	BH 180
WSS-M1A341-A4:	BH 210
WSS-M1A341-A5:	BH 250
WSS-M1A341-A6:	BH 280
WSS-M1A341-A7:	Isotropic BH 235
WSS-M1A341-A8:	Dent Resistant 180
WSS-M1A341-A9:	BH 300
WSS-M1A341-A10:	Isotropic 210
WSS-M1A341-A11:	Isotropic 250
WSS-M1A341-A12:	Isotropic 300

Specification WSS-M1P94-A shall be used where precoating by the steel supplier is required.

2. APPLICATION

These specifications were originally released for material used in body panels to improve dent resistance. Due to higher tensile and yield strength properties attainable with these products, down-gauging with subsequent cost and weight savings are possible.

Date	Action	Revisions
2013 05 06	N Status	A1/2/3/4/5/6/7/8/9/10 no direct replacement, use CBP strategy D. Rhuno, NA
2009 01 08	Revised	Added A11 & A12. Minor Revision A. Toennessen, FOE
2006 05 03	Revised	European specific re: gauge & mech props; Added 3.4.1 & 3.4.2; Rev 1, 3.4, 3.5, 3.7, 4.2 & 4.6 S. Buckingham
1998 09 22	Activated	J.E. Nelson, K.J. Thugood (FAO)

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3. REQUIREMENTS

Material specification requirements are to be used for initial qualification of materials.

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 CHEMICAL COMPOSITION (weight percent)

The upper and lower limits of chemical composition of the controlled elements shall be established by the supplier and be included in the Control Plan.

3.3 MECHANICAL PROPERTIES

(Longitudinal Tensile Specimens)
(ISO 6892/ASTM E 8M/EN 10002)

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
As Received												
Yield Strength, MPa, Typical	240	280	210	250	280	310	250	210	320	235	275	320
min	210	250	180	210	250	280	235	180	300	210	250	300
Tensile Strength, MPa, Typical	375	390	320	360	400	410	385	320	430	350	365	410
*Elongation %, Typical	38	33	42	37	36	35	34	42	32	40	33	32
After 2% Strain and Baking at 175 °C for 30 minutes:												
Yield Strength**, MPa, Typical	N/A	N/A	260	300	330	365	295	N/A	385	N/A	N/A	N/A
min	N/A	N/A	230	260	305	335	280	N/A	355	N/A	N/A	N/A

*Gage lengths other than 50 mm may be used for control purposes, with appropriate correction in % elongation. In all cases, 50 mm will be considered the umpire standard gage length.

**See also para 4.8.

N/A = Not Applicable

3.4 THICKNESS AND THICKNESS TOLERANCE (see also para 4.6)

The thickness specified on the Engineering Drawing or CAD (computer aided design) file shall be a minimum, or a nominal, depending upon the vehicle model program.

Unless otherwise specified by Ford via the Engineering Drawing, the SMRL, EU2066 (see para 3.5) or Purchasing (Supply), the tolerance range on thickness shall comply with half (0.5X) that stated in the relevant standard for cold rolled material. The relevant standards are EN 10131 and ASTM A 568M.

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