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**JDM F17****Enterprise Specification for Paint Performance****Table of Contents**

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## 1 Scope

**1.1** JDM F17 specifies the paint performance requirements of John Deere products worldwide. It defines paint performance requirements for simple parts, assembled components, and fully assembled equipment whether painted by a John Deere factory, supplier, paint service provider, or any other entity.

**1.2** JDM F17 specifies performance requirements for primed parts and final paint parts. It applies to all painted surfaces with the exception of those covered in JDM F14 or JDM F20.

**Note 1** As of the date of this publication, JDM F20 is in preparation.

**1.3** Appearance requirements are not covered by JDM F17. Appearance requirements are addressed by means of individual unit, product, or platform standards.

**1.4** Substrate requirements are not covered by JDM F17. This standard assumes that the condition of the substrate will not negatively influence the final paint quality.

**1.5** Paint materials are qualified using the process specified in JDM F17X1. Paint processes are qualified using the process specified in JDM F17X2.

## 2 Terms and Definitions

For purposes of JDM F17, the following terms and definitions apply:

### 2.1

#### **final paint**

Complete coating on a surface, including all layers of paint and conversion coating.

**Note 2** The final paint can consist of a primer plus topcoat or a single coat (for example, acrylic e-coat).

### 2.2

#### **primer**

Base layer of paint in a multi-layer coating.

**Note 3** Primers are allowed as a final paint only in limited applications without exposure to direct sunlight.

### 2.3

#### **topcoat**

Top layer of paint.

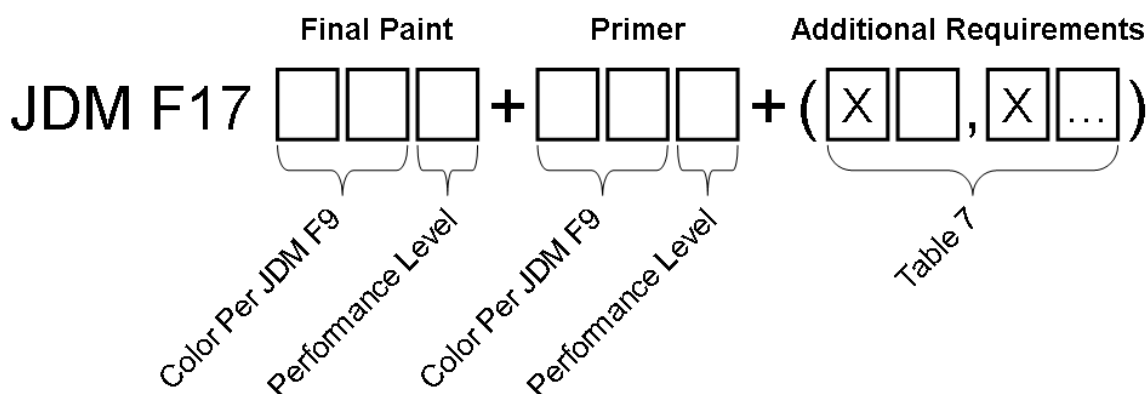
**Note 4** The topcoat can be a single paint layer or a paint layer applied over a primer.

### 3 Designations

#### 3.1 Format for Designation of Paint Performance

JDM F17 paint performance shall be designated using the overall format shown in Figure 1. The designation consists of the following, in the order indicated:

- standard number JDM F17
- designation of the final paint color according to JDM F9 (if other than a primer is required)
- designation of the final paint performance level according to JDM F17 (if other than a primer is required)
- a plus (+) sign (if a primer is required)
- designation of the primer paint color according to JDM F9 (if a primer is required)
- designation of the primer performance level according to JDM F17 (if a primer is required)
- a plus (+) sign (if there are additional requirements)
- any additional requirements according to JDM F17, with multiple additional requirements separated by a comma (,) and the totality of additional requirements enclosed by parentheses (round brackets)



**Figure 1 Format for Designation of Paint Performance According to JDM F17**

#### 3.2 Standard Number

The first section of the paint callout specifies JDM F17 as the applicable overall standard.

#### 3.3 Final Paint Requirements

The second section of the paint callout specifies the color and performance level of the final painted surface. The color requirement is for the top layer of paint (topcoat) and the performance level is for the final paint (all layers of paint on the surface). Color designations are specified in JDM F9.

#### 3.4 Primer Requirements

The third section of the paint callout specifies the color and performance level of the primer painted surface. Color designations are specified in JDM F9. If no primer is designated in this section of the callout, primer is optional so long as the final paint performance requirements are met.

#### 3.5 Additional Requirements

This section of the paint callout specifies any additional requirements that are not covered in Table 1 through Table 6. The codes for these additional requirements are shown in Table 7.

## 4 Color

### 4.1 Final Paint Color

The final paint color shall be determined by the design control unit for the part, component, or product in accordance with *Industrial Design and Product Branding: Enterprise Design Intent Document*.

### 4.2 Primer Color

**4.2.1** The primer paint color shall be determined by the design control unit for that part or product.

**4.2.2** Unless specifically required, the primer paint color shall default to the designation “ZZ” from the JDM F9 specification, which indicates that any color of primer is acceptable.

**4.2.3** JDM F9 color designations for primers are intended to be visually similar to the JDM F9 color standard but are not required to meet the instrumental color or initial gloss specifications.

## 5 Performance Level

The paint performance level applicable to a given part, component, or product shall be determined by the design control unit for that part, component, or product.

## 6 Additional Requirements

Additional requirements may be specified to meet the design intent of the part or product. Any additional requirements shall be determined by the design control unit for that part or product.

## 7 Application Examples

### 7.1 John Deere Green Topcoat with Black Primer

REQUIREMENTS:

Final Paint Color:	F9A John Deere Green
Final Paint Performance:	Level 2
Primer Required:	YES
Primer Color:	F9T Black
Primer Performance:	Level 2
Additional Requirements:	NONE

JDM F17  A2 +  T2 + ( X  , X  )

PART DRAWING NOTE: JDM F17A2+T2

**7.2 John Deere Green Final Paint with Black Immersion Primer**REQUIREMENTS:

Final Paint Color:	F9A John Deere Green
Final Paint Performance:	Level 1
Primer Required:	YES
Primer Color:	F9T Black
Primer Performance:	Level 1
Additional Requirements:	YES, Immersion Primer

JDM F17  A1 +  T1 + (X3, X )

DRAWING NOTE: JDM F17A1+T1+(X3)

**7.3 Medium Gloss Black Final Paint with Primer (any color) and Chip Resistance Required**REQUIREMENTS:

Final Paint Color:	F9TR Medium Gloss Black
Final Paint Performance:	Level 2
Primer Required:	YES
Primer Color:	F9ZZ No Color Specified
Primer Performance:	Level 2
Additional Requirements:	YES, Chip Resistance

JDM F17 TR2 + ZZ2 + (X2, X )

DRAWING NOTE: JDM F17TR2+ZZ2+(X2)

## 7.4 Low Gloss Black Final Paint With or Without Primer

### REQUIREMENTS:

Final Paint Color:	F9T Low Gloss Black
Final Paint Performance:	Level 1
Primer Required:	OPTIONAL
Primer Color:	N/A
Primer Performance:	N/A
Additional Requirements:	NONE

JDM F17  T1 +     + ( X  , X  )

DRAWING NOTE:

**JDM F17T1**

## 7.5 Black Primer Only

### REQUIREMENTS:

Final Paint Color:	NONE, Primer Only
Final Paint Performance:	N/A
Primer Required:	YES
Primer Color:	F9T Black
Primer Performance:	1
Additional Requirements:	NONE

JDM F17     +  T1 + ( X  , X  )

DRAWING NOTE:

**JDM F17+T1**

## **8 General Requirements**

### **8.1 Restricted Materials Compliance**

All products, parts, materials, and components supplied to John Deere shall comply with the current John Deere restricted materials list for suppliers according to JDM H30.

### **8.2 Lead-Free Paint**

**8.2.1** All paint used for John Deere products shall be lead-free as defined in clause 8.2.2. John Deere products include those manufactured in John Deere factories regardless of the brand they carry. It also includes parts and products manufactured for John Deere by others.

**8.2.2** For purposes of this standard, lead-free is defined as less than 600 parts per million (ppm), by mass, in the dry film. The analytical method used to quantify the level of lead is CPSC-CH-E1003 as specified in "Standard Operating Procedure for Determining Lead (Pb) in Paint" per United States Consumer Product Safety Commission (CPSC) Directorate for Laboratory Sciences.

**8.2.3** Analytical testing shall be performed by a laboratory which is on the current "List of Accredited Testing Laboratories" for scope Lead Paint, 16 CFR Part 1303. The list of accredited laboratories is maintained on the CPSC web site.

**8.2.4** John Deere reserves the right to use X-ray fluorescence (XRF) spectroscopy to audit paints for compliance. XRF lead (Pb) detection of any level shall be considered not in compliance until further testing and analysis is completed according to the analytical method specified in clause 8.2.2. XRF results shall not be used as the sole verification that the paint is lead-free.

### **8.3 Part Dimensions**

Part dimensions shown on part drawings shall apply before painting.

## 9 Paint Performance Requirements

### 9.1 Corrosion Resistance

Table 1 shows corrosion resistance requirements for final paints and primers according to paint performance level. The requirements in Table 1 apply equally to JDM F17X1 (Form A) and JDM F17X2 (Form B) except as shown for mean creep from scribe and maximum creep from scribe after salt spray testing.

**Table 1 Corrosion Resistance Requirements for Final Paints and Primers**

Property	Performance Level	Test Duration	Mean Creep from Scribe (mm)		Maximum Creep from Scribe (mm)		ASTM D714 Blister Rating	ASTM D610 Surface Rust Rating	Test Method
			JDM F17X1	JDM F17X2	JDM F17X1	JDM F17X2			
Salt spray resistance	1	240 h	< 2.0	< 3.0	< 5.0	< 8.0	10	≥ 9	JDQ 115 ASTM D714 ASTM D610
	2	504 h	< 2.0	< 3.0	< 5.0	< 8.0	10	≥ 9	
	3	1008 h	< 2.0	< 3.0	< 5.0	< 8.0	10	≥ 9	
Cyclic corrosion resistance	1	20 cycles	Report		Report		Report	Report	JDQ 159 ASTM D714 ASTM D610
	2	20 cycles	Report		Report		Report	Report	
	3	40 cycles	Report		Report		Report	Report	
Humidity resistance	1	240 h	—		—		10	10	JDQ 120 ASTM D714 ASTM D610
	2	504 h	—		—		10	10	
	3	1008 h	—		—		10	10	

### 9.2 Physical Properties

Table 2 shows physical property requirements for primers and topcoats (Form A) and for final paints (Form B). The same requirements apply to all paint performance levels.

**Table 2 Physical Property Requirements for Final Paints, Primers, and Topcoats**

Property	Requirements		Test Method
	Paint Material (Primers and Topcoats) JDM F17X1 (Form A)	Process (Final Paints) JDM F17X2 (Form B)	
Pencil hardness	≥ H	≥ H	JDQ 11
Dry adhesion	≥ B	≥ B	JDQ 17
Elongation	≤ 3 mm crack from end	≤ 6 mm crack from end	JDQ 116
Impact resistance – Direct	≥ 40 lb-in	≥ 30 lb-in	JDQ 117A
Impact resistance – Reverse	≥ 20 lb-in	≥ 10 lb-in	JDQ 117B



**9.3 Chemical Resistance Properties****9.3.1 Chemical Resistance of Topcoats**

Table 3 shows chemical resistance requirements for topcoats. The same requirements apply to all paint performance levels.

**Table 3 Chemical Resistance Requirements for Topcoats**

<b>Chemical</b>	<b>Type of Test</b>	<b>Requirement</b>	<b>Test Method</b>
Distilled water	immersion	pass	JDQ 138A
Trisodium phosphate	immersion	pass	JDQ 138B
Engine coolant	spot	pass	JDQ 142C
Engine oil	spot	pass	JDQ 142D
Transmission oil	spot	pass	JDQ 142E
Diesel fuel	spot	pass	JDQ 142F
Unleaded gasoline	spot	pass	JDQ 142G

**9.3.2 Chemical Resistance of Primers**

Table 4 shows chemical resistance requirements for primers. The same requirements apply to all paint performance levels.

**Table 4 Chemical Resistance Requirements for Primers**

<b>Chemical</b>	<b>Type of Test</b>	<b>Requirement</b>	<b>Test Method</b>
Distilled water	immersion	pass	JDQ 138A
Trisodium phosphate	immersion	pass	JDQ 138B
Engine coolant	Immersion	pass	JDQ 138C
Engine oil	Immersion	pass	JDQ 138D
Transmission oil	immersion	pass	JDQ 138E

## 9.4 Initial Gloss and Color Match Requirements

### 9.4.1 Initial Gloss and Color Match for Final Paints and Topcoats

Table 5 shows initial gloss and color match requirements for final paints and topcoats according to gloss level and color. The same requirements apply to all paint performance levels.

**Table 5 Initial Gloss and Color Match Requirements for Final Paints and Topcoats**

Paint Color by Gloss Level and Color	Property	Requirement		Test Method
High Gloss F9A F9H F9LA F9TC F9VC F9KE (high gloss)	Initial Gloss 20° meter	≥ 80		JDQ 12A
Medium Gloss F9TR F9KE (medium gloss)	Initial Gloss 60° meter	≥ 50 ≤ 60		JDQ 12B
Low Gloss F9T F9KE (low gloss) F9KF	Initial Gloss 60° meter	≥ 20 ≤ 30		JDQ 12B
Other Gloss Levels	Initial Gloss 60° meter	F9KI	F9AE	JDQ 12B
		≥ 5 ≤ 15	≥ 25 ≤ 35	
All Gloss Levels All Colors	Initial Color Visual Match	pass		JDQ 14
All Gloss Levels All Colors	Initial Color Instrumental Match	≤ 0.7 ΔE (CIEDE2000 Equation)		JDQ 114A
All Gloss Levels All Colors	Metamerism Index (D65 / F2)	≤ 0.7 ΔE (CIEDE2000 Equation)		JDQ 114A
<ul style="list-style-type: none"><li>• Requirements for JDM F9 colors not specified in this table are the same as shown for the corresponding gloss levels (high gloss, medium gloss, low gloss).</li><li>• A visual color evaluation by designated John Deere personnel is permitted to take precedence over the instrumental measurement.</li></ul>				

### 9.4.2 Initial Gloss and Color Match for Primers

Primer paints require only an initial visual color match similar to the specified JDM F9 color when evaluated according to JDQ 14. Primer paints do not have requirements for initial gloss, instrumental color match, or metamerism index.

**9.5 Weathering Requirements**

Table 6 shows gloss retention and color change requirements for topcoats after weathering. The same requirements apply to all paint performance levels.

**Table 6 Weathering Requirements for Topcoats**

Property	Requirement		Test Method
Gloss Retention after Florida exposure, 12 months	High gloss, 20° meter	$\geq 40$	JDQ 13 JDQ 12
	Medium gloss, 60° meter	$\geq 20$	
	Low gloss, 60° meter	$\geq 10$	
Gloss Retention after Xenon Arc Laboratory Weathering, 2000 h	Initial gloss	report	JDQ 157 JDQ 12
	500 h results		
	1000 h results		
	1500 h results		
	Final (2000 h) results		
Color Change after Florida exposure, 12 months, CIEDE2000 equation	F9A	$\leq 2 \Delta E$	JDQ 13 JDQ 114A
	F9LA	$\leq 3 \Delta E$	
	F9H	$\leq 3.5 \Delta E$	
	F9TC	$\leq 3.5 \Delta E$	
	All other colors	$\leq 6 \Delta E$	
Color Change after Xenon Arc Laboratory Weathering, 2000 h, CIEDE2000 equation	500 h results	Report $\Delta L^*$ $\Delta C^*$ $\Delta H^*$ $\Delta E$	JDQ 157 JDQ 114A
	1000 h results		
	1500 h results		
	Final (2000 h results)		

## 9.6 Additional Requirements

Table 7 shows the codes, requirements, and test methods for additional requirements that can be specified according to JDM F17 callouts on part drawings.

**Table 7 Additional Requirements Applicable to Final Paints, Primers, and Topcoats**

Requirement Code	Property	Description		Test Method
X	Performance exception as defined by design control unit	Specified on part drawing below paint note. <b>Example:</b> JDM F17A1+ZZ1+(X) X = Hardness $\geq$ F		To be specified by design control unit
X1	Wet Adhesion	Rating $\geq$ B		JDQ 145
X2	Chip Resistance	Rating $\geq$ 5A		JDQ 118
X3	Immersion Primer	Requires an immersion primer such as e-coat or a-coat.		Not Applicable
X4	Machinability	Machinability shall pass if the paint film cuts cleanly when machined, shows no flaking or cracking at the edge, and does not retain hot chips from the machining operation. Confirmation of machineability shall be determined using production parts and representative machining processes.		To be specified by design control unit
X5	Superior Weathering Resistance, 12 months Florida exposure	Gloss Retention	High gloss 20° meter $\geq$ 60 Does not apply to other than high gloss paints.	JDQ 13 JDQ 12
		Color Retention, CIEDE2000 equation	F9A $\leq$ 1 $\Delta E$ F9LA $\leq$ 1 $\Delta E$ F9H $\leq$ 2 $\Delta E$ F9TC $\leq$ 2 $\Delta E$ Other colors $\leq$ 3 $\Delta E$	JDQ 13 JDQ 114A
X6	Chemical Resistance to B20 Biodiesel	pass		JDQ 142H
X7	Chemical Resistance to B100 Biodiesel	pass		JDQ 142J

## 10 References

For undated references, the latest edition of the referenced document (including any amendments) applies.

### 10.1 Access to John Deere Standards

**10.1.1** John Deere Standards can be accessed by John Deere personnel via the [Engineering Standards](#) internal website.

**10.1.2** Employees of suppliers with an approved John Deere supplier number can obtain access to John Deere Standards via the [JD Supply Network \(JDSN\)](#). Access to JDSN is by approved individual name and password. Suppliers should contact their Supply Management representative with questions about JDSN.

**Note 5** Only John Deere Standards which have been approved for supplier distribution are available via JDSN.

### 10.2 Access to Standards from External Organizations

**10.2.1** Most standards from organizations external to John Deere are available to John Deere personnel via the [Engineering Standards](#) internal website.

**10.2.2** Suppliers are responsible for obtaining relevant external standards. In accordance with copyright laws and Company policy, John Deere personnel shall not provide copies of these standards to suppliers.

### 10.3 John Deere Standards

JDM F9	John Deere Colors
JDM F14	Performance Requirements for High Temperature Coatings
JDM F17X1	Annex X1: Paint Material (Form A) Qualification
JDM F17X2	Annex X2: Paint Process (Form B) Qualification
JDM F20	Enterprise Specification for Performance of Paints with Limited Application
JDM H30	John Deere Restricted Materials Lists
JDQ 1	Test Specimens for Evaluation of Paint Materials and Processes
JDQ 11	Determination of Paint Film Hardness by Pencil Test
JDQ 12	Test for Specular Gloss of Paint Films
JDQ 13	Method for Outdoor Exposure Testing of Paint Films
JDQ 14	Method for Visual Evaluation of Color Differences
JDQ 17	Cross-Cut Test for Adhesion of Paint Films
JDQ 114	Test Methods for Instrumental Evaluation of Color Differences
JDQ 115	Salt Spray Test for Corrosion Resistance of Paint Films
JDQ 116	Test for Impact Resistance of Paint Films
JDQ 118	Test for Chip Resistance of Paint Films
JDQ 120	Test for Humidity Resistance of Paint Films
JDQ 138	Tests for Chemical Resistance of Paint Films by Immersion Methods

JDQ 142	Tests for Chemical Resistance of Paint Films by Spot Exposure Methods
JDQ 145	Tests for Wet Adhesion of Paint Films by Cross-Cut Method
JDQ 157	Method of Accelerated Weathering of Materials using Xenon Arc Light Apparatus
JDQ 159	Cyclic Corrosion Test for Corrosion Resistance of Paint Films

## 10.4 Other John Deere Documents

*Industrial Design and Product Branding: Enterprise Design Intent Document*

## 10.5 ASTM Standards

ASTM D610	Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D714	Test Method for Thermal Diffusivity of Carbon and Graphite by Thermal Pulse Method