# GENERAL PAINT REQUIREMENTS AND COLOR CONTROL

## 1. SCOPE

1.1 This specification identifies the color designations for paint materials and decals used on CNH products and parts. It also covers general requirements applicable to all paint materials, finishing processes, and finish painted parts. Those requirements apply to all CNH facilities and to suppliers providing painted parts to CNH. Additional requirements applicable to specific colors are shown in individual materials specifications MAT0100 through MAT0499.

1.2 Performance requirements for paint materials and finish painted parts relative to colors designated in this specification are provided in CNH MAT0103 (86628044). Specific requirements are defined for five performance Classes and reflect the capabilities of the finishing system that involves the combination of paint materials and painting processes used. Class 1 is the minimum performance level acceptable to CNH. Class 3, 4, or 5 performance can be attained using finishing systems that employ more sophisticated paint materials technologies and finishing processes. Only certain thermal or chemical cure primers, topcoats, or powder material systems can achieve Class 3, 4, or 5 performance.

1.3 This specification replaces Case MS-1 Paint, General Requirements and New Holland FNHA-2-J-005.00 (86505483) Color Designation. It does not cover surface finish acceptance criteria, continue to reference applicable sections of former CNH Company and local standards for these requirements.

1.4 This specification may involve hazardous materials, apparatus, and procedures. This specification does not claim to address all of the safety, health, and environmental issues associated with its use. Specification users bear responsibility for consulting appropriate safety, health, and environmental practices, and determining the applicability of regulatory limitations prior to use, application, or subsequent removal of paint materials supplied to this specification.

## 2. DESIGNATIONS ON DRAWINGS

2.1 Paint performance Class, color designation, and corresponding part numbers must be specified on the Engineering drawing. Class 1 paint performance requirements apply for finish systems and Class 1P primer performance requirements apply for primers or primed only parts unless another performance Class is specified.

Figure 1 provides an example of how the color and performance Class may be specified on the engineering drawing.

Figure 1

| | |
|---|---|
| 86628054 | Class 3 PAINT PERF. STD 86628044 |
| 86609757 | CASE RED STD 86628042 |
| 878xxxxx | BASE PART NAME |

2.2 Additional details related to specifying paint on Engineering drawings are provided in standard DWGA110 (86641291).

## 3. RELATED STANDARDS

CNH DWGA110 (86641291) Requirements for Painted Parts
CNH MAT0103, 86628044 Paint Material and Finished Part Performance Requirements
CNH MAT0110 – 0499: Individual Paint Material or Color Specifications
CNH MAT0101Q, 86628043 Approved Paint Material Listing
CNH MTM0110, 86628049 Heat Resistance of Paint
Munsell Color System
Pantone Color System
DuPont Standard Colors
Ditzler Standard Colors

## 4. COLORS

| TABLE 1 | CNH COLOR DESIGNATIONS (Paint Material and Decals) | | | |
|---|---|---|---|---|
| **Color Description (1)** | **Part Number** | **ID Code (Reference)** | **Gloss (2) 60°/20°** | **Specification Number** |
| **Blue** | | | | |
| NH Blue RAL5017 STD 86628042 | 86575407 | --- | 50 ± 10 @ 60° | |
| NH Blue STD 86628042 (New NH Blue) | 86593620 | --- | 90 / NA | |
| NH Blue M3635D STD 86628042 | 86505504 | M-3635-D | 50 ± 10 @ 60° | |
| NH Blue M1639A STD 86628042 | 86505485 | M-1639-a | 90 / NA | |
| NH Medium Blue STD 86628042 | 86513226 | NH 2AC | 5 ± 5 @ 60° | |
| NH Violet – Blue STD 86628042 | 86511865 | NH-22 | 85 ± 15 @ 60° | |
| Case Translucent Blue 86628042 (Warning Lights) | 86629846 | MS 40-22 | | |
| Intense Blue STD 86628042 | 87015898 | | | |
| Blue Green STD 86628042 | 87024450 | Kobelco | 90 @ 60° | |
| **Red** | | | | |
| Case Red STD 86628042 (1) | 86609757 | MS-3 | 90 / 80 | MAT0110(86629855) |
| NH Red STD 86628042 | 86511877 | NH-18 | 90 / NA | |
| NH Red RAL2002 STD 86628042 | 86575408 | --- | 90 @ 60° | |
| Case Translucent Red STD 86628042 (Warning Lights) | 86629847 | MS 40-20 | | |
| NH Terracotta STD 86628042 | 86505495 | TA-19 | >90 @ 60° | |
| Whaler Red STD 86628042 | 87015899 | | | |
| Flame Red STD 86628042 | 87020911 | RAL3000 | 90 / NA | |
| **Yellow and Tan** | | | | |
| Case Power Tan STD 86628042 (1) | 86609760 | MS-42 | 90 / 80 | MAT0115(86630466) |
| NH Bright Yellow STD 86628042 | 86572648 | --- | 90 / NA | |
| NH Translucent Yellow 86628042 | 86643495 | | 50 ± 10 @ 60° | |
| Light Tan STD 86628042 | 86631900 | | 50 ± 10 @ 60° | |
| Yellow Mark IV STD 86628042 | 87024451 | Kobelco | 90 @ 60° | |
| Sand Metallic STD 86628042 | 87028602 | | 90 @ 60° | |
| Zinc Gold Metallic STD 86628042 | 87049221 | | >85 @ 60° | |
| **Gray** | | | | |
| NH Gray RAL7037 STD 86628042 | 86603711 | --- | 50 ± 5 @ 60° | |
| NH Gray RAL7024 STD 86628042 | 86572647 | --- | 90 / NA | |
| NH F-H Gray STD 86628042 | 86570829 | F/H 1.1 | 90 / NA | |
| Cab Interior Gray STD 86628042 | 86512347 | NH-7D | 5 ± 5@ 60° | |
| Wheat STD 86628042 | 86614422 | MS 40-26 | | |
| Case Graphite Gray STD 86628042 (1) | 86609761 | MS-37 | 90 / 80 | MAT0121(86630467) |
| Case Trim Gray – Light STD 86628042 | 86629849 | MS 40-10 | | |
| Case Trim Gray Dark STD 86628042 (Dupont 45875L) | 86629850 | MS 40-11 | | |
| Case Medium Gray 86628042, (Rubber Parts, DuPont C8439LH) | 86629851 | MS 40-12 | | |
| Case Dawn Gray STD 86628042 | 86629852 | MS 40-25 | | |
| Slate Gray STD 86628942 | 86629853 | MS40-28 / RAL7015 | | |
| CNH CE Gray STD 86628042 | 86981868 | | 90 / NA | |
| CNH Dark Gray STD 86628042 (3) | 84433810 | MS-49 | 90 / NA | |
| Gray Metallic STD 86628042 | 87024452 | Kobelco | 80 @ 60° | |
| Seat Gray STD 86628042 | 87037374 | | <10 @ 60° | |

(1) Unique color requirements are specified in addition to designated performance Class requirements and are located in individual color specifications identified by the corresponding part and specification numbers.
(2) Gloss levels are minimums for paint materials unless a range is specified. For decals consult part drawings to verify proper gloss level.
(3) The same part number is to be used to designate a topcoat or a primer color. The color gloss requirement applies for the topcoat paint material, but does not apply to a corresponding primer paint material.

| TABLE 1 (Continued) | CNH COLOR DESIGNATIONS (Paint Material and Decals) | | | |
|---|---|---|---|---|
| **Color Description (1)** | **Part Number** | **ID Code (Reference)** | **Gloss (2) 60°/20°** | **Specification Number** |
| | | | | |
| **Black** | | | | |
| CNH Black STD 86628042 (1) | 86600186 | M1724P/MS-45 | 40 ± 3 @ 60° | MAT0140(86630223) |
| NH Black M1724G STD 86628042 | 86505493 | M-1724-G | 20 ± 3 @ 60° | |
| CNH Heat Resistant Black STD 86628042 (1) | 86629854 | MS-16 | | MAT0141(86630224) |
| Heat Resistant Black, High Corrosion Resistance STD 86628042 (1) | 87034371 | | | MAT0143(87034370) |
| CNH Hi Temp Ceramic Black STD 88628042 (1) | 87034363 | | | MAT0142(87034361) |
| Case Black STD 86628042 (Munsell N2.0/or lower) | 86629856 | MS 40-13 | | |
| Black High GL STD 86628042 | 87026672 | Kobelco | 90 @ 60° | |
| **Green** | | | | |
| NH Dryer Green STD 86628042 | 86511875 | NH-11E | 90 / NA | |
| NH Ginger M3605D STD 86628042 | 86505503 | M-3605-D | 50 ±10 @ 60° | |
| NH Green M5020D STD 86628042 | 86505506 | M-5020-D | 50 ±10 @ 60° | |
| NH F-H Green STD 86628042 | 86529933 | 3258 C | 85 ± 15@ 60° | |
| Green – DuPont 651D STD 86628042 | 86837126 | MS 40-1 | | |
| Case Translucent Green STD 86628042 (Warning Lights) | 86629859 | MS 40-19 | | |
| Steiger Green STD 86628042 | 86629860 | MS-22-1 | | |
| Concord Green STD 86628042 | 86629861 | MS-22-3 | | |
| **Silver and Chrome** | | | | |
| NH Silver Metal STD 86628042 | 86511866 | NH-19 | 85 ± 15 @ 60° | |
| Case Silver STD 86628042 (1) | 86609759 | MS-19 | 50 / 20 | MAT0150(86630227) |
| Brushed Chrome STD 86628042 | 86631901 | | 125 @ 60°, min | |
| Mirror Chrome STD 86628042 | 87037572 | | | |
| **White** | | | | |
| NH White STD 86628042 | 86512107 | NH-23 | 50 ±10 @ 60° | |
| NH White STD 86628042 (Bianco) | 86511879 | TA-21 | 90 / NA | |
| Steyr White STD 86628042 | 86629827 | MS-22-2 / RAL9018 | 80 / NA | |
| White Reflective STD 86628042 | 86632227 | | 90 / NA | |
| **Orange** | | | | |
| NH F-H Orange STD 86628042 | 85804148 | NHI-125 | 90 / NA | |
| Orange STD 86628042 | 86570828 | F/H 0.1/ RAL 2009 | 90 / NA | |
| Case Omaha Orange 86628042 (GSA Fed Std 595, Color 12246) | 86630219 | MS 40-14 | | |
| Case Translucent Orange STD 86628042 (Warning Lights) | 86630220 | MS 40-21 | | |
| **Primer Colors** | | | | |
| Case Yellow Primer STD 86628042 | 86629829 | MS-43 | NA | |
| Case Tan Primer STD 86628042 | 86629830 | MS-43 | NA | |
| Case White Primer STD 86628042 | 86630221 | MS-43 | NA | |
| Case Red Oxide Primer STD 86628042 | 86629828 | MS-43 | NA | |
| Case Black Primer STD 86628042 | 86629831 | MS-43 | NA | |
| Case Gray Primer STD 86628042 | 86629832 | MS-43 | NA | |
| Gray Primer **STD 86628042** | 86837074 | RAL 1015 | NA | |
| Dark Gray Primer STD 86628042 (3) | 84433810 | | NA | |
| NH Taupe Primer STD 86628042 | 86505487 | | NA | |
| **Safety Colors** | | | | |
| ANSI Safety Red STD 86628042 | 86505500 | 25093/MS40-6 | 50 ± 10 @ 60° | |
| ANSI Safety Yellow STD 86628042 | 86505501 | 25144/MS40-24 | 50 ± 10 @ 60° | |
| ANSI Safety Orange STD 86628042 | 86505502 | 22120/MS40-23 | 50 ± 10 @ 60° | |
| ANSI Safety White STD 86628042 | 86629835 | MS40-7 | 50 ± 10 @ 60° | |

(1) Unique color requirements are specified in addition to designated performance Class requirements and are located in individual color specifications identified by the corresponding part and specification numbers.

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(3) The same color part number is to be used for a top coat and a primer color. The color gloss requirement applies for the topcoat paint material, but does not apply to a corresponding primer paint material.

| TABLE 1 (Continued) | CNH COLOR DESIGNATIONS (Paint Material and Decals) | | | |
|---|---|---|---|---|
| **Color Description (1)** | **Part Number** | **ID Code (Reference)** | **Gloss (2) 60°/20°** | **Specification Number** |
| | | | | |
| **Conductive Primer Colors** | | | | |
| Case Conductive Black Primer STD 86628042 (1) | 86629836 | MS-47 | NA | MAT0130(86630222) |
| Case Conductive Gray Primer STD 86628042 (1) | 86629837 | MS-47 | NA | MAT0130(86630222) |
| **Textured Colors** | | | | |
| Textured Black, Level 5 STD 86628042 | 87041284 | | | |
| **Service Colors** | | | | |
| Case Power Red STD 86628042 | 86629838 | MS-24/MS-2 | | |
| Case Red STD 86628042 | 86609757 | MS-24/MS-3 | | |
| Case Power Tan STD 86628042 | 86609760 | MS-24/MS-42 | | |
| Case Silver STD 86628042 | 86609759 | MS-24/MS-19 | | |
| Case Graphite Gray STD 86628042 | 86609761 | MS-24/MS-37 | | |
| Case Brown STD 86628042 | 86629839 | MS-24/MS-44 | | |
| Case Black STD 86628042 | 86600186 | MS-24/MS-45 | | |
| Case Power White STD 86628042 | 86629842 | MS-24/MS-7 | | |
| Case Power Yellow STD 86628042 | 86629843 | MS-24/MS-11 | | |
| Case Concord Green STD 86628042 | 86629844 | MS-24/MS22-3 | | |
| Case Desert Sunset STD 86628042 | 86629845 | MS-24/MS-6 | | |
| Case Gray Primer STD 86628042 | 86629832 | MS-24/MS-43 | | |
| Case Red Oxide Primer STD 86628042 | 86629828 | MS-24/MS-43 | | |
| **Special Order Colors** | | | | |
| WT 0069 Vancouver WHITE 86628042 | 86837096 | WT 0069 | | |
| WT 0619 Newport WHITE 86628042 | 86837097 | WT 0619 | | |
| WT 5638 Virginia QRANGE 86628042 | 86837098 | WT 5638 | | |
| WT 5651 Colorado ORANGE 86628042 | 86837099 | WT 5651 | | |
| YELLOW STD 86628042 (Industrial Yellow) | 86505488 | M 5771A | | |
| WT 6020 Alabama YELLOW 86628042 | 86837100 | WT 6020 | | |
| WT 6113 Carolina YELLOW 86628042 | 86837101 | WT 6113 | | |
| WT 6642 Airport YELLOW 86628042 | 86837102 | WT 6642 | | |
| NY Yellow 86628042 (New York Yellow) | 86639766 | 217223(PPG) | | |
| WT 6675 S B YELLOW 86628042 | 86837125 | WT 6675 | | |
| WT 6684 School Bus Yellow 86628042 | 85805527 | WT 6684 | | |
| WT 6695 Lincoln GREY 86628042 | 86837103 | 26280 | | |
| WT 5185 Kansas ORANGE 86628042 | 86837104 | WT 5185 | | |
| Bright YELLOW STD 86628042 | 86572648 | | | |
| WT 7600 Lime YELLOW 86628042 | 86837105 | WT 7600 | | |
| NC Yellow STD 86628042 | 85805526 | WT 6695 | | |
| White STD 86628042 | 85805524 | RAL9010 | | |
| WT 0071 NewYork WHITE | 86837927 | WT 0071 | | |
| Orange RAL2004 STD **86628042** | 87324880 | RAL2004 | >90 @ 60° | |
| **Non-CNH Colors** | | | | |
| Gehl Red STD 86628042 | 86544595 | GR | 90 / NA | |
| Gehl Gray STD 86628042 | 86544596 | GG | 90 / NA | |
| Sumitomo Red **STD 86628042** | 87047471 | LinkBelt | >90 @ 60° | |
| Sumitomo Gray **STD 86628042** | 87047472 | LinkBelt | >90 @ 60° | |
| Sunbelt Rental Green 86628042 | 86587683 | | >90 @ 60° | |
| | | | | |

1 Unique color requirements are specified in addition to designated performance Class requirements and are located in individual color specifications identified by the corresponding part and specification numbers.

2 Gloss levels are minimums for paint materials unless a range is specified. For decals consult part drawings to verify proper gloss level.

## 5. REQUIREMENTS

### 5.1. LIQUID AND POWDER PROPERTIES

5.1.1 All paint materials supplied to this specification shall meet the following property guidelines in addition to any specified performance Class requirements.

5.1.2 LIQUID

| Table 2 | LIQUID MATERIAL REQUIREMENTS | |
|---|---|---|
| **Properties** | **Material Requirements** | **Test Method** |
| Weight Per Unit Volume | Report; shall be within ± 0.120kg/L of qualification sample | ASTM D1475 |
| Weight Solids, % by Weight | Report; ± 2% from qualification sample | CNH MAT0114 86628051 |
| Volume Solids, % by Volume | Report; ± 2% from qualification sample | ASTM D2697 |
| Viscosity at 25°C, Seconds | Report; ± 5 seconds from qualification sample | ASTM D4212 |
| Volatile Organic Content (VOC), % by Weight | Report; Shall be less than or equal to VOC of qualification sample | ASTM D2369 |
| Fineness of Grind | Minimum value for grind established from qualification sample | ASTM D1210 |

5.1.3 POWDER TABLE

| TABLE 3 | POWDER MATERIAL REQUIREMENTS | | |
|---|---|---|---|
| **Properties** | **Material Requirements** | **Painted Part Requirements** | **Test Method** |
| Specific Gravity | Report; shall be within ± 0.05 of qualification sample | | ASTM D5965 |

### 5.2 DRY FILM THICKNESS ON TEST PANELS

| TABLE 4 | DRY FILM THICKNESS GUIDELINES |
|---|---|
| Primers | 0.020mm – 0.025mm (0.8mil – 1.0mil) |
| Topcoats | 0.025mm – 0.051mm (1.0mil – 2.0mil) |
| Powders, Direct to Metal | 0.046mm – 0.089mm (1.8mil – 3.5mil) |

5.2.1 Paint materials will be tested against specifications at the supplier recommended dry film thickness minimums. As a guideline, CNH expects the film thickness minimums to be specified within the ranges shown in Table 4. Measure dry film thickness per ASTM D1186.

5.3 COLOR MASTER CONTROL-DISTRIBUTION

5.3.1 Color Master Control

5.3.1.1 The responsibility for color masters or color standards shall be with the CNH Engineering Standards and Materials group. They have worldwide responsibility for the manufacture, color matching, inventory, distribution, and tracking of color masters. See Diagram 1, which illustrates the basic steps involved in new and ongoing color control and provides contact information to request color masters.

5.3.1.2 The color masters or standards shall be panels of minimum size of 50 X 100 mm (2 X 4 inches). The panel can be made of steel, plastic, durable paper, or cardboard. These panels shall be large enough to provide enough viewing area to compare the color of the color master to an actual CNH product to determine if there is a visual color match. These panels may also be measured with a color spectrophotometer and be used as a standard reference. Color masters shall be stored in an enclosure to protect the panel from abrasion or excessive exposure to light. Freezer storage -20°C (-4°F) of color master panels to prevent deterioration is recommended.

5.3.1.3 The color components of the color master shall be in a resin base, which minimizes the loss of the gloss, and shall maintain the color for an extended period of time. This resin base shall be in the form of paint. A mixture of predetermined pigments shall be blended into the resin base to create the color coating of the panel. The resin base and pigment combination shall have an aging durability of at least 2.0 years exposure in Florida and shall meet or exceed applicable Class 3 performance requirements. Color masters shall have a life expectance of 4 years from the time of manufacture and shall be replaced at the time of expiration. Color masters may be evaluated, certified and obtain a time extension of no more than 1 year from the expiration date.

5.3.1.4 The color master shall duplicate a gloss level as determined from the initial color sample. The deviation in gloss on the color master standard shall be less than ± 3%. The acceptance criteria for master color standard from the original master shall be a Delta E of 0.20 or less measured in D 65 light, 10° observer, specular component, UV component included, large area of view and aperture on CIE Lab coordinates. The gloss shall be excluded from this reading.

5.3.2 Color Master Process

5.3.2.1 After receiving the original color sample, the CNH Engineering Standards and Materials group shall determine the electronic color centroid, assign a color control part number and submit a color sample to the manufacturer of color masters. The manufacturer shall measure the original master and formulate the color with pigments specified by the CNH Company. A color shall be developed within the criteria specified in section 5.3.1. Metamerism shall be kept to a minimum when observed in two additional light sources, CWF-2 (fluorescent) and A (tungsten). The color shall be blended so that the color variation shall be less than 0.10 Delta E from top to bottom or from side to side. After the product has been produced, the master color standards shall be submitted to CNH Engineering Standards and Materials group for evaluation

5.3.2.2 CNH Engineering Standards and Materials shall evaluate the prepared color master standards. If approval is granted, the approval shall be provided in writing and a copy retained with a color master for future reference.

5.3.2.3 Future batch manufacturing of color masters shall require that the color match be in the same color quadrant as the original master standard batch. Future batches shall be within 0.20 Delta E of the original color master centroid.

5.3.2.4 A label shall be affixed to the backside of the prepared color standard panels and shall contain the information seen in Figure 1. All color masters shall have serial numbers for identification and record keeping.

FIGURE 1

Color Master

| | Centroid | Color Chip | Difference |
|---|---|---|---|
| MS-49 Dark Gray | L* 28.05 | _____ | _____ |
| PN 84433810 | A* - 0.12 | _____ | _____ |
| SN0049153 | B* - 1.26 | _____ | _____ |
| | ΔE* | _____ | _____ |

**Gloss**: 55%-65% @ 60 Degrees
**Pigment:** Carbon Black, Synthetic Yellow Oxide, Titanium Dioxide
**Measurement System**: CIE LAB D65/10° Included, Spherical
Expiration Date: _____
CNH Company, 500 Diller Ave., New Holland Pa. 17557-0903

5.3.3 Color Master Distribution

5.3.3.1 The CNH Engineering Standards and Materials group will maintain a library of color masters and has sole responsibility for the distribution of these color panels to authorized personnel upon request.

5.3.3.2 Color masters are available through the Paint Engineer, CNH Engineering Standards and Materials group, see Diagram 1 page 10. The Paint Engineer is responsible to control and track all color master distribution. A limited number of remote locations may be established to assist with color panel distribution.

5.4 PRODUCTION COLOR APPROVAL

5.4.1 Color verification of initial batches shall be performed on all colored parts, whether painted or integrally colored (e.g. Plastic). For a painted part, hide shall be determined prior to having any color check. After hide is determined, then the thickness of paint to provide hide plus 1.0 mils (0.001 inches) shall be applied to the color test panel and both visual and spectrophotometer color shall be evaluated.

5.5 SERVICE PAINTS

5.5.1 Aftermarket and repair enamel service paints for use on CNH products or parts are required to meet Class 1 performance requirements as a minimum.

5.6 PAINT PROCESS

5.6.1 Substrate Quality

5.6.1.1 The quality of the part surfaces prior to painting is the third element (besides paint materials and paint processes) that determines the appearance of finish painted parts. This specification avoids unduly limiting both CNH plants and outside suppliers regarding items such as mold and die surface conditions or characteristics of the unpainted plastic or metal part surfaces. However, because the quality of the part surfaces prior to painting so strongly influences finish painted part appearance, factors such as mold or die surface finish, part surface roughness and texture, etc., will need to be specified and controlled by the part manufacturer if finish painted parts are to meet the stated requirements. Substrates must also remain free of visible discontinuities throughout the entire fabrication process (forming, molding etc.) to ensure that the part, when finish painted, will conform to all applicable requirements of this specification.

5.6.1.2 Parts shall be cleaned and coated only with paint materials that have been approved by CNH Engineering Standards and Materials. Such paint materials are tabulated in the CNH MAT0101Q, 86628043 Approved Paint Materials List.

5.6.1.3 Parts not to be coated with heat resistant paint (applications used above 250°C or 500°F) or by autodeposition, as a guideline surface preparation for painting should include two steps: cleaning and phosphate coating. Surface preparation for parts to be coated with heat resistant paint or by autodeposition should require only the cleaning step; phosphate coating is typically not permitted.

5.6.2 Substrate Cleaning and Pretreatment

5.6.2.1 Parts shall be mechanically cleaned (wire brushed, ground, sand blasted, shot blasted, etc.) or chemically cleaned (solvent wiped, alkaline cleaned, acid cleaned, etc.) Cleaning must remove rust, scale, drawing compounds, rust preventives, weld flux, weld spatter, etc. After cleaning, all surfaces must be kept free of dirt, dust, finger marks, oil, rust, and other contaminants. Cleaning processes described provide surface conditions necessary for painted parts to meet specified paint performance requirements.

While not expected to be present on parts following the cleaning processes described above, any residual scale, such as weld scale or scale [e.g. metal oxides] on edges from laser, plasma, or torch cutting, will affect parts meeting specified painted part performance requirements. Parts where final paint quality is negatively impacted by these conditions generally require additional processing to meet specified paint performance requirements. Use of nitrogen shielding gas to limit scale (oxide deposits) from cutting processes, buffing or grinding edges, blasting parts, or acid pickling are processes that may be used to reduce or remove scale to improve finish painted part performance.

5.6.2.2 Hot rolled bar, plate, tubing, structural shapes, castings, and forgings that have been mechanically cleaned but not painted within 2 hours shall be chemically cleaned just prior to painting. Parts to be coated with heat resistant paint, such as mufflers, exhaust pipes, etc. must be thoroughly deoiled prior to painting. Deoiling processing is acceptable provided the finish painted part meets all specification requirements for high temperature parts, particularly heat resistance as determined by CNH MTM0110 (86628049) Heat Resistance of Paint.

5.6.2.3 Parts to be coated by autodeposition shall be chemically cleaned and water rinsed prior to coating.

5.6.2.4 Metal parts, except those to be coated with heat resistant paint or by autodeposition, should be given an iron or zinc phosphate chemical conversion treatment. Minimum recommended coating weight shall be 40 mg/ft$^2$ (0.43 g/m$^2$ ) for iron phosphate and 120 mg/ft$^2$ (1.3 g/m$^2$ ) for zinc phosphate. Sealer application and final rinse with clean, deionized water (35 μMho/cm max conductivity) may be needed to meet the performance requirements. Phosphate coated parts must then be thoroughly dried prior to painting.

5.6.3 Finish Painted Parts

5.6.3.1 All parts should be painted prior to assembly, whenever possible. Uniform film build that meets the recommended minimums shall be achieved on all surfaces, including edges and recesses. Parts shall be primed and/or topcoated only with materials that have been approved by CNH Engineering Standards and Materials. Finished parts shall be cured per the specified schedule prior to exposure to any detrimental environment. Approved paint materials for use to finish parts are tabulated in the CNH MAT0101Q (86628043) Approved Paint Materials List.

5.7 SURFACE QUALITY

5.7.1 The surface finish quality may be specified on the drawing or purchase order in addition to the material performance. Acceptable levels of dirt contamination, orange peel, scratches, etc. may be included.

5.8 REPAIR - FINISH PAINTED PARTS

5.8.1 Repaired parts must meet the finish painted part performance requirements specified and be accomplished with no visible defects.

## 6. QUALITY

6.1 All paint supplied to this specification shall be formulated and manufactured using good commercial practices and shall comply with all applicable governmental regulations.

6.2 All paint shall be non-hazardous with regard to heavy metals. Upon analyzing ash from a completely incinerated sample of dried paint, the amount of each heavy metal found

shall not exceed the levels defined as hazardous in either OSHA or Resource Conservation and Recovery ACT (RCRA) regulations. All paint shall be free of foreign matter and other hazardous materials, unless details of such other hazardous materials are furnished in advance of initial qualification.

6.3 Pigments used shall be exterior grade conforming to CNH requirements and those designated in individual material specifications.

6.4 All paints reduced with solvents and applied under normal manufacturing conditions shall flow properly and build the recommended film thicknesses.

## 7. PACKAGING AND IDENTIFICATION

7.1 PAINT MATERIALS

7.1.1 Paint containers, except pressurized cans, shall be clearly marked with the following information:

Gross, Tare, and Net Weight
Name of Supplier
Destination
Formula Number or Code
Date of Manufacture
Paint Specification Number and Name
Purchase Order Number
Precautionary Labels (Danger, Caution, or Warning) as Required by Governmental Regulations such as the FDA Hazardous Substance Labeling Act.

7.1.2 Pressurized containers shall be clearly marked with the following information on each container:

Net Weight
CNH Part Number
Type of Propellant
Formula Number or Code
Date of Manufacture
Paint Specification Number and Name
Precautionary Labels (Danger, Caution, or Warning) as Required by Governmental Regulations such as the FDA Hazardous Substance Labeling Act.

7.1.3 Finish painted parts supplied to this specification shall be packaged to prevent damage during handling, transportation, and storage.

## 8. METHODS OF TEST

8.1 All test designations are latest issue unless otherwise specified. Suppliers are not required to perform the specific test procedures listed, but must ascertain and be able to demonstrate that their paint or finish painted part will conform to the specification limits when tested by the specified methods. Specified methods will be used to reconcile disputed results.

8.2 CNH Materials Test Methods are available through CNH Engineering Standards and Materials. Questions or further clarification regarding these test methods may be directed to CNH Engineering Standards and Materials, 7 S 600 County Line Road, Burr Ridge, IL 60521-6975.

8.3 ASTM test methods are available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

8.4 ACT orange peel standards and Bonderite 1000 test panels specified per CNH MTM0102 Test Panel Preparation are available from following sources:

ACT Laboratories, Inc.,
273 Industrial Drive, P.O. Box 735,
Hillsdale, MI 49242-0735.
Phone: 517-439-1485

Q-Panel Lab Products, North America,
26200 First Street,
Cleveland, Ohio 44145
Phone: 440-835-8700

Q-Panel Lab Products, European Branch,
Express Trading Estate
Farnworth Bolton
BL49TP, England
Phone: (01204) 861616

## 9. MATERIAL AND PROCESS TESTING

9.1 Testing and approval is required for both paint materials and suppliers of primed and/or topcoated parts to CNH. Material approval shall be based on laboratory, engineering, or plant testing conducted or approved by CNH Engineering Standards and Materials. Approved formulations of paint materials for finished parts are tabulated in the CNH MAT0101Q, 86628043 Approved Paint Materials List. Full CNH approval of paint material suppliers and suppliers of primed and/or topcoated parts also requires SQA auditing by CNH.

9.2 PAINT MATERIALS

9.2.1 No shipments of paint materials shall be made by a new source until samples of materials they propose to supply to this specification have been approved by CNH Engineering Standards and Materials. When requested, the supplier shall furnish samples for formal qualification that may include performance testing. Material submitted for qualification shall be accompanied by detailed test information, certification that the material meets all requirements of this specification, and a completed Materials Safety Data Sheet (MSDS). Additional samples may also be required by the receiving CNH location in advance of the first and subsequent production shipments in accordance with the provisions of CNH Supplier Quality Assurance (SQA) or other CNH quality assurance programs.

9.3 FINISH PAINTED PARTS

9.3.1 No shipments of finish painted parts shall be made by a new supplier until samples of finish painted parts (and representative painted test panels if requested,) they propose to supply to this specification have been tested or approved by the receiving CNH Plant or their designated representative. Finish painted parts submitted for qualification shall be accompanied by detailed test information and certification that they meet all requirements of this specification. Additional samples may also be required by the receiving CNH location in advance of the first and subsequent production shipments in accordance with the provisions of CNH Supplier Quality Assurance (SQA) or other CNH quality assurance programs.

## 10. INSPECTION AND REJECTION

Shipments of paint materials or finish painted parts against contracts or purchase orders citing this specification shall be equivalent in every respect to samples approved by the purchaser. No changes in formulation, processing, or place of manufacture are permitted without prior written approval from the CNH Supplier Quality Assurance group (SQA). Test data, test samples and a new supplier code identification are to be submitted to CNH Engineering Standards and Materials group with the request for the material change. While the purchaser may test samples from incoming shipments for quality assurance purposes, the supplier is responsible for ensuring that shipments meet the stated requirements without depending upon the purchaser's inspection.

## 11. SUPPLIER RESPONSIBILITY

All paint materials supplied to this specification shall be equivalent in all characteristics to the material upon which approval was originally granted. Prior to the making of any changes to a paint material originally approved under this specification, whether or not such changes affect the ability to meet this specification requirements, the supplier shall notify Engineering Standards and Materials of the proposed changes. Test data, test samples and a new supplier code identification are to be submitted with the request. The supplier shall obtain the written approval from Engineering Standards and Materials prior to any production of this change.

**DIAGRAM 1** **CNH COLOR CONTROL FLOW DIAGRAM**