

# Final Sand & Polish

- **Audatex – Color Sand & Buff, Nib Sanding / De-nib**
- **CCC / Motor – Wet / Dry Sand Rub Out & Buff and De-nib & Polish**
- **Mitchell – Finish Sand & Buff, De-nib & Finesse**



## Generations of Innovation in Vehicle Care and Repair

- *You've asked... Here it is.*
  - In response to numerous inquiries and requests from valued 3M customers across the US and abroad, we have collected information and documentation intended to help clarify whether or not specific repair processes in which 3M materials may be consumed are considered to be required repair operations and if they are included or not-included within any other repair procedures. Our objective is to help our customers build a complete and accurate repair plan that results in seamless repairs, improving cycle time, touch time, the overall customer experience, satisfaction and retention for key stakeholders in the Collision Repair Industry.

# Final Sand & Polish – Definitions

## ■ Audatex Definition

### — Color Sand and Buff

- This process, which may or may not be required, is defined as wet sanding the entire panel by compound buffing and mechanical or hand polishing. Color sand and buff is further defined as all of the above steps performed to the finished surface for any reason, plus cleanup.
- **Color sand and buff can be estimated at:**  
30% of Audatex single-stage refinish labor (not including final wash).

Source: Audatex Database Reference Manual, Page 149

### — Nib Sanding / De-nib

- Nib sanding (or de-nib) is defined as the removal of isolated dirt and dust particles, and polishing the affected area(s).
- Audatex's formula for Color Sand and Buff does not apply to this operation. Additional steps or processes that may be required should be considered during estimate preparation.

Source: Audatex Database Reference Manual, Page 150

"Any printed copy of this document may not contain the most current information. For the latest version, please refer to the Database Reference Manual accessed through the Help Menu in the current release of Audatex Estimating, PenPro or Shoplink. The current version of the Database Reference Manual may also be found at [www.training.audatex.us](http://www.training.audatex.us).



# Final Sand & Polish – Definitions

## ■ Audatex Definition

### Section 4-4 Refinish Guidelines

#### Refinish within Panel Boundaries – continued

2. The second method is to override the prestored labor to the desired time.

It is important to keep in mind when using the method that all adjacent panel and nonadjacent panel overlap will still be considered in an estimate when the panel being painted is on a lower guide number. If this method is used, and overlap is not applicable, any overlap deducted by the system should be manually included in the estimated time for the spot painting. Non-adjacent panel overlap time is 0.2 and adjacent panel overlap time is 0.4.

Therefore, when using the override method and non-adjacent panel overlap applies, add 0.2 to the spot paint time. When using the override method and adjacent panel overlap applies, add 0.4 to the refinish operation.

#### Color Tint

Audatex's two-stage set-up refinish labor includes time for standard tint. Standard tint is defined as the initial mix, check, one tint cycle, and check.

Audatex's studies revealed instances where additional time was required for the tinting process. The range of this additional time was commonly between 0.1 and 1.0 hours with an average of 0.5 hours per estimate per color.

The appearance of color match can be difficult enough to require both color tint (tinting to adjust the color) and blending. I-CAR Finish Matching (Module 2, Topic 3) recommends planning and preparing for blending before the work begins. Per I-CAR, tinting should be done only to achieve a blendable match.

#### Color Sand and Buff

This process, which may or may not be required, is defined as wet sanding the entire panel by compound buffing and mechanical or hand polishing. Color sand and buff is further defined as all of the above steps performed to the finished surface for any reason, plus cleanup.

#### Color sand and buff can be estimated at:

- 30% of Audatex single-stage refinish labor (not including final wash).

\*Any printed copy of this document may not contain the most current information. For the latest version, please refer to the Database Reference Manual accessed through the Help Menu in the current release of Audatex Estimating, PenPro or Shoplink. The current version of the Database Reference Manual may also be found at [www.training.audatex.us](http://www.training.audatex.us).

# Final Sand & Polish – Definitions

## ■ Audatex Definition

### Section 4-4 Refinish Guidelines

#### Replaced Panel Refinish

Current Audatex refinish labor is based on the use of new and undamaged panels. Additional steps or processes that may be required should be considered during estimate preparation.

#### Repaired Panel Refinish

When a repaired panel is being refinished, the estimator provides time for the repair of the panel. Consequently, the estimator also determines included operations. When Audatex refinish labor is used for repaired panels, Audatex refinish times assume that the panel has been returned to the condition of a new, undamaged OEM panel or equivalent.

Operations that might be considered in the repair refinish time include any steps required to bring the panel to the condition of a new, undamaged panel. This may include feather edge, blow off and clean, mask to prime, tack off, mix etch primer, prime bare metal, mix and apply primer filler, guide coat application, unmask as required and block sand. Panel scuff to facilitate application of clear may also be considered for two- or three-stage refinish.

#### Feather / Prime / Block

Audatex recognizes that Feather/Prime/Block are required operations in the panel repair process, that occurs after 150 grit, to bring the repaired panel to the condition of a new, undamaged panel for the purpose of refinish. Audatex does not provide labor allowance for repaired panels, as this is a judgment time, nor does Audatex provide material allowance for the Feather/Prime/Block process. The determination and assessment for this operation is best provided by the estimate preparer for consideration and allowance during the estimate preparation process.

#### Nib Sanding/De-nib

Nib sanding (or de-nib) is defined as the removal of isolated dirt and dust particles, and polishing the affected area(s).

- Audatex's formula for Color Sand and Buff does not apply to this operation. Additional steps or processes that may be required should be considered during estimate preparation.

\*Any printed copy of this document may not contain the most current information. For the latest version, please refer to the Database Reference Manual accessed through the Help Menu in the current release of Audatex Estimating, PenPro or Shoplink. The current version of the Database Reference Manual may also be found at [www.training.audatex.us](http://www.training.audatex.us).

# Final Sand & Polish – Definitions

## ■ CCC / Motor Definition

### – WET/DRY SAND, RUB-OUT & BUFF

#### SPECIAL NOTATION:

Refinished panels may or may not require a varying amount of wet sanding, compound rub-out or buffing operations in order to match original finish texture. The clear coat contains ultraviolet screeners and reducing the clear coat thickness (mils) may result in early paint failure. Follow manufacturer's recommendations when performing this type of repair. Calculations should be based upon the outer surface only and should not include additions for clear coat, underside, inside or edges.

Base refinish time does not include deduction for refinish overlap. In the event that this type of operation will be performed, MOTOR suggests the following formula be considered:

Refinished panels may or may not require a varying amount of wet sanding, compound rub-out or buffing operations. In the event this type of operation will be performed, MOTOR suggests the following formula be considered.

- Each panel requiring wet sand, rub-out and/or buff (refinish or blend)
  - Add 30% of full base refinish time

#### **INCLUDED:**

- Panel outer surface only
- Wet sand full panel as required
- Compound, buff and/or polish as required

#### **DOES NOT INCLUDE:**

- Acid rain damage
- Overspray removal
- Removal of residual material from recessed edges and jambs if required
- Wash, clean, wax or detail entire vehicle prior to delivery if required



# Final Sand & Polish – Definitions

## ■ CCC / Motor Definition

### — DE-NIB & POLISH

#### SPECIAL NOTATION:

Refinished panels may or may not require a varying amount of de-nibbing, a process used to remove small particles in final finish surface. The clear coat contains ultraviolet screeners and reducing the clear coat thickness (mils) may result in early paint failure. Follow vehicle manufacturer's recommendations when performing this type of repair. Calculations should be based upon the base refinish time outer surface only and should not include additions for clear coat, underside, inside or edges. In the event that this type of operation will be performed, MOTOR suggests the following formula be considered:

Each panel requiring de-nibbing (refinish or blend)

*HOOD, ROOF, TRUNK LID, SPOILER*

First panel add up to 20% of full base refinish time,

each additional panel add up to 10%

*FENDER, DOOR, QUARTER PANEL, BUMPER COVER*

First panel add up to 10% of full base refinish time,

each additional panel add up to 5%

#### **INCLUDED:**

- Panel outer surface only
- Paint nib removal as required (spot only)
- Spot polish only

#### **DOES NOT INCLUDE:**

- Acid rain damage
- Full panel polish
- Overspray removal
- Removal of residual material from recessed edges and jambs if required
- Scratch damage
- Wash, clean, wax or detail entire vehicle prior to delivery if required
- Wet sand full panel



# Final Sand & Polish – Definitions

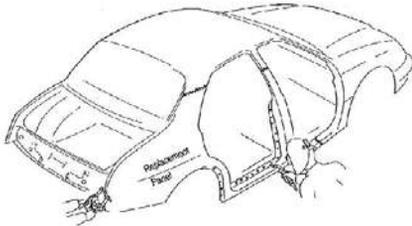
## ■ CCC / Motor Definition

### GUIDE TO ESTIMATING

#### WELD ZONE/ADJACENT PANEL

##### SPECIAL NOTATION:

Suggested refinish operation times do not include additional time for repair of damage to adjacent panels resulting from normal cutting, welding and grinding procedures. The amount of damage can vary considerably depending upon process and technique used by the servicing technician and, therefore, is impractical to anticipate in this publication. MOTOR recommends these factors be considered before finalizing any repair cost estimate. Typical areas to be considered are illustrated below.



#### DE-NIB & POLISH

##### SPECIAL NOTATION:

Refinished panels may or may not require a varying amount of de-nibbing, a process used to remove small particles in final finish surface. The clear coat contains ultraviolet screeners and reducing the clear coat thickness (mils) may result in early paint failure. Follow vehicle manufacturer's recommendations when performing this type of repair. Calculations should be based upon the base refinish time outer surface only and should not include additions for clear coat, underside, inside or edges. In the event that this type of operation will be performed, MOTOR suggests the following formula be considered:

Each panel requiring de-nibbing (refinish or blend)

**HOOD, ROOF, TRUNK LID, SPOILER**

First panel add up to 20% of full base refinish time, each additional panel add up to 10%

**FENDER, DOOR, QUARTER PANEL, BUMPER COVER**

First panel add up to 10% of full base refinish time, each additional panel add up to 5%

##### INCLUDED:

- Panel outer surface only
- Paint nib removal as required (spot only)
- Spot polish only

##### DOES NOT INCLUDE:

- Acid rain damage
- Full panel polish
- Overspray removal
- Removal of residual material from recessed edges and jams if required
- Scratch damage
- Wash, clean, wax or detail entire vehicle prior to delivery if required
- Wet sand full panel

#### WET/DRY SAND, RUB-OUT & BUFF

##### SPECIAL NOTATION:

Refinished panels may or may not require a varying amount of wet sanding, compound rub-out or buffing operations in order to match original finish texture. The clear coat contains ultraviolet screeners and reducing the clear coat thickness (mils) may result in early paint failure. Follow manufacturer's recommendations when performing this type of repair. Calculations should be based upon the outer surface only and should not include additions for clear coat, underside, inside or edges. Base refinish time does not include deduction for refinish overlap. In the event that this type of operation will be performed, MOTOR suggests the following formula be considered:

Refinished panels may or may not require a varying amount of wet sanding, compound rub-out or buffing operations. In the event this type of operation will be performed, MOTOR suggests the following formula be considered.

- Each panel requiring wet sand, rub-out and/or buff (refinish or blend)
  - Add 30% of full base refinish time

##### INCLUDED:

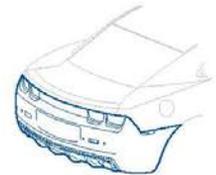
- Panel outer surface only
- Wet sand full panel as required
- Compound, buff and/or polish as required

##### DOES NOT INCLUDE:

- Acid rain damage
- Overspray removal
- Removal of residual material from recessed edges and jams if required
- Wash, clean, wax or detail entire vehicle prior to delivery if required

#### UNPRIMED FLEXIBLE COMPONENT PREPARATION

- 25% of the component's base refinish time
- Maximum time allocation: 1.0 hours



##### INCLUDED:

- Removal of mold-release agents as outlined by manufacturer
- Masking (if required)
- Application of adhesion promoter

##### DOES NOT INCLUDE:

- Correction of pre-existent surface imperfections
- Material Costs



# Final Sand & Polish – Definitions

## ■ Mitchell Definition

### – Finish Sand & Buff

- A labor time formula is provided **should it be necessary to perform this operation. This procedure includes the removal of orange peel and any blemishes** that affect paint texture in order to produce a smooth finish to the entire panel surface. This process is not limited to "nib sanding" or "finessing" which is the removal of isolated dirt/dust particles only. The performance of this operation is **NOT INCLUDED** in the Mitchell refinish labor time.
- The finish sand and buff formula is intended to be calculated as a percentage of the base refinish hours excluding overlap and clear coat. It **DOES NOT APPLY** to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinish time. No deduction for refinish overlap should be taken.
- **Finish sand and buff outside surface area(s):** Allow .3 per refinish hour (30%) to finish sand and buff each surface area(s).



# *Final Sand & Polish – Definitions*

## ■ Mitchell Definition

- **De-nib & Finesse**
- A labor time formula is provided **should it be necessary to perform this operation. This procedure includes the removal of small isolated dust particles (nibs) and the application of a finishing glaze.**
- The performance of this operation is **NOT INCLUDED** in the Mitchell refinish labor time.
- The de-nib and finesse formula is intended to be calculated as a percentage of the base refinish hours excluding overlap and clear coat. It **DOES NOT APPLY** to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinish time. No deduction for refinish overlap should be taken.
- **De-nib and finesse outside surface area(s):** Allow .2 per refinish hour (20%) to de-nib and finesse each surface area(s).



# Final Sand & Polish – Definitions

## ■ Mitchell Definition

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### Procedure Explanation

- Remove and install or mask attached components, trim, stripes or decals on blended panel/area
- Finish, sand, and buff

**NOTE:** Blend labor time does not apply to two-tone refinishing or custom non-OEM refinishing. **No overlap deduction applies to blended panel(s)/refinish area(s).**

**NOTE:** When calculated, the estimate will allocate 40% from the total blend time and apply it to the three stage line item. The total sum of the blend line and the amount allocated in the three stage line will total 70% of the exterior refinishing time for the panel being blended.

*Example:* A panel refinishing time is 2.0 hrs. When blended, the refinishing time for that panel will be displayed as 1.4 (.7 per refinishing hour). Once calculated, the refinishing blend line will be displayed as .8 and .6 (40%) will be allocated to the three stage line.

#### Extension of Clear Coat

In some applications, it may be required to extend the application of clear to the nearest panel edge or breakpoint.

The performance of this operation is NOT INCLUDED in the Mitchell refinishing labor time.

The extension of clear coat formula is intended to be calculated as a percentage of base refinishing hours excluding overlap.

It DOES NOT APPLY to edges, jambs, and undersides. No deduction for overlap should be taken.

This formula DOES APPLY to the 2.5 hours maximum clear coat allocation. Should this operation be necessary, the following formula is provided:

#### Extend Clear to Adjacent Panel(s)

Extend clear to adjacent panel(s): Allow .5 per refinishing hour (50%) for each panel(s)/refinish area(s) cleared.

#### Included Operations

- Detergent/solvent wash
- Wet sand, scuff (ScotchBrite) or rubout (compound) panel and clean for preparation
- Mask existing adjacent panels to 36"
- Apply bonding material - if required
- Clean and tack surface
- Apply clear material

#### Not Included Operations

- Repair existing surface imperfections
- Remove and install or mask attached components, trim, stripes or decals on extended clear panel/area
- Finish, sand, and buff
- Nib sand and finesse

#### Finish Sand & Buff

A labor time formula is provided should it be necessary to perform this operation. This procedure includes the removal of orange peel and any blemishes that affect paint texture in order to produce a smooth finish to the entire panel surface. This process is not limited to "nib sanding" or "finessing" which is the removal of isolated dirt/dust particles only. The performance of this operation is NOT INCLUDED in the Mitchell refinishing labor time.

The finish sand and buff formula is intended to be calculated as a percentage of the base refinishing hours excluding overlap and clear coat. It DOES NOT APPLY to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinishing time. No deduction for refinishing overlap should be taken.

**Finish sand and buff outside surface area(s):** Allow .3 per refinishing hour (30%) to finish sand and buff each surface area(s).

#### De-nib & Finesse

A labor time formula is provided should it be necessary to perform this operation. This procedure includes the removal of small isolated dust particles (nibs) and the application of a finishing glaze.

The performance of this operation is NOT INCLUDED in the Mitchell refinishing labor time.

The de-nib and finesse formula is intended to be calculated as a percentage of the base refinishing hours excluding overlap and clear coat. It DOES NOT APPLY to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinishing time. No deduction for refinishing overlap should be taken.

**De-nib and finesse outside surface area(s):** Allow .2 per refinishing hour (20%) to de-nib and finesse each surface area(s).

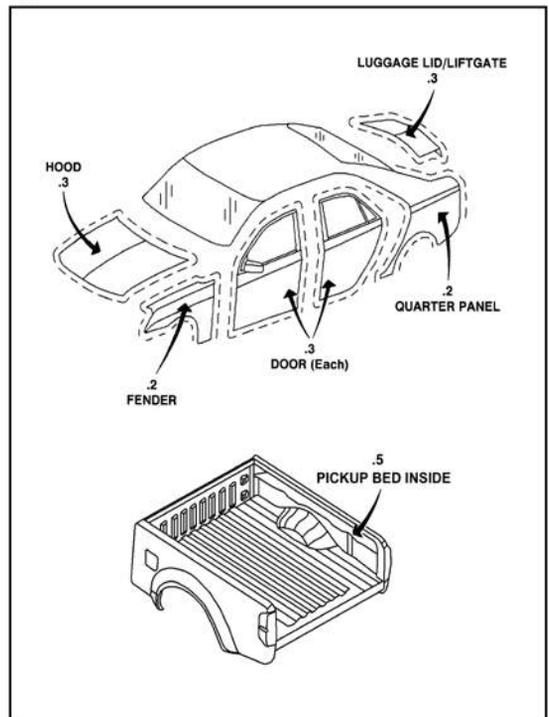
#### Mask Vehicle to Prevent Overspray Damage

The following refinishing information is provided should it be necessary to perform these operations as determined by individual job requirements:

#### MASK INTERIOR, ENTRYWAYS, ENGINE COMPARTMENT AND TRUNK OPENINGS

Interior masking may be necessary when refinishing exterior surfaces to stop overspray damage that is not prevented by adjacent panel perimeter masking which includes back taping or application of foam tape. Interior masking may also be used when exterior panels (door, hood, etc.) are removed while applying refinishing material. The performance of this operation is NOT INCLUDED in the Mitchell refinishing labor time.

Fig. 1: IDENTIFYING INTERIOR MASKING LOCATIONS



**NOTE:** The times shown in the illustration are for interior masking of that panel and/or opening. Labor time includes all pillars, jambs, weatherstrips, edges, entryways and openings as necessary. Deduct .1 hour overlap for each interior masked adjacent panel and/or opening.

The Mitchell *REFINISHING MATERIALS GUIDE* has the Latest Available Costs for Materials Used in Single and Multi-Stage Refinishing, and is an Accurate Source for Determining Costs.

# Final Sand & Polish

- **Audatex – Color Sand & Buff, Nib Sanding / De-nib**
- **CCC / Motor – Wet / Dry Sand Rub Out & Buff and De-nib & Polish**
- **Mitchell – Finish Sand & Buff, De-nib & Finesse**

## ■ Is “Final Sand & Polish” ...

### 1. *Required?*

(See the following documents from the Paint Companies, Toyota / Lexus / Scion along with more information from the leading Information Providers.)

### 2. *Included or Not-Included?*

(See the following pages from: The leading Information Providers and the SCRS Guide to Complete Repair Planning for Documentation)

### 3. What *Documentation* do we have to show that the Repair Operation was Performed and Completed as Required?

(See the following examples of Before, During & After Photos, S.O.P.'s, Directions For Use)



# Final Sand & Polish

- **Audatex – Color Sand & Buff, Nib Sanding / De-nib**
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## ■ Is “Final Sand & Polish” ...

### 1. *Required?*

- *The previous definitions from the leading Information Providers state that Final Sand & Polish may or may not be required.*

(See the following documents from the Paint Companies, Toyota / Lexus / Scion and more information from the leading Information Providers.)

# 1. Is “Final Sand & Polish” a *Required* Repair Operation?

- The following documents from the paint companies either state, recommend and / or agree that:
  - “It is not likely that a repair can be made that is completely free of surface defects.”
  - “Defects happen at the OEM level and will likely occur in a Collision Repair facility as well.”
  - “Some detail work (de-nib and polish / wet sand and buff) can be expected.”
  - “Polishing, sanding and or de-nibing to remove dirt inclusions from refinished automotive panels.” is necessary in order to match the texture appearance and overall durability of existing OEM paintwork.
  - “Polishing a paint finish to remove defects is a normal and necessary operation for both OEM manufacturers and collision repair shops.”
  - “Even with extreme care in cleanliness and preparation procedures, dirt and particulates can land in the clearcoat film during the application and drying process.”
  - “Color Sand & Buff involves a thorough sanding and polishing of the entire surface to remove surface texture to better match the OEM finish and texture. This is a necessary practice that is widely used to meet customer quality expectations as well as to return the vehicle to pre-accident condition.”

*(See the following letters from the Paint Companies)*

- Toyota, Lexus and Scion states that:
  - “Customers have high expectations for automotive paint finish appearance and expect repairs to match factory color, gloss, and texture. Flawed refinish appearance is a cause of concern and will likely have a negative affect on customer satisfaction and retention.”

*(See the following Refinish Bulletin #173 from Toyota, Lexus & Scion)*





**To** To Whom it May Concern  
**From** Alan Craighead  
**Date** June 6, 2009  
**Subject** De-Nib and Polish  
**Copies to** Tom Moreland

It is not likely that a repair can be made that is completely free of surface defects. Defects happen at the OEM level and will likely occur in a Collision Repair facility as well. At the OE level defects are anticipated and high intensity lighting is used to detect flaws. When defects are located they are finessed polished from the surface. If the defects are severe the car may be repainted or rejected.

The goal in a Collision Repair facility is to minimize these errors and balance detail expectations with paint productivity. Some detail work (de-nib and polish / wet sand and buff) can be expected.



Paint film measurements/calculations are necessary in order to determine the maximum amount of product that can be removed in the de-nib and polishing process. By only removing quantities approved by OEM and Sikkens, can you insure paint film integrity.



Maximum of .3 - .5 mils may be removed during the total de-nib and polishing process. For vertical surfaces a maximum of .3 mils of clear can be removed and .5 mils for horizontal surfaces. When performing color sanding and polishing on Sikkens clear coats be sure to follow technical reference manual recommendations for application and polishing.



The Chemical Company

July 1, 2009

Aaron Schulenburg  
SCRS  
P.O. Box 346  
Smyrna, DE 19977

RE: Sand, de-nib, polishing guidelines

Dear Aaron:

BASF recommends polishing, sanding and or de-nibing to remove dirt inclusions from refinished automotive panels. Sanding finishes to match the texture of existing paintwork is also recommended as long as the minimum amount of clearcoat thickness is maintained.

While refinishing automotive panels with zero dirt inclusions is possible in theory, it rarely happens in actual practice. Following best practices for cleanliness in paint processing areas, and equipment maintenance can minimize this problem and should never be disregarded, but in the overwhelming majority of repairs, some dirt is inevitable.

Detailed guidelines for polishing clearcoats and topcoats can be found in the R-M or Glasurit technical data sheets and technical reference manuals. These documents can also be found online at [BASFreinsh.com](http://BASFreinsh.com)

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph Skurka".

Joseph Skurka

Manager, OEM & Industry Relations  
BASF Corporation



## Polishing of Refinish Topcoats

Polishing a paint finish to remove defects is a normal and necessary operation for both OEM manufacturers and collision repair shops. OEM factories reduce the need to polish because they work with clean body shells in dedicated, highly specialized paint facilities with advanced air filtration systems and robotic application processes. Collision Repair Shops are not able to duplicate the application and dirt isolation processes used by the OEMs, and therefore are faced with the inevitable need to remove dust and dirt particles from the finish before the vehicle is delivered to the owner. Collision Industry suppliers and repair technicians have developed excellent polishing techniques that remove dirt and other surface imperfections, enabling the vehicle to be restored to pre-accident condition. The following process describes some finer points regarding polishing a vehicle.

### Before You Start

Be certain the surface is clean and dust free. Any dirt will create scratches in the finish that will be very difficult to repair.

### Optimum Times

Refer to the applicable Product Data Sheet for optimum times to polish the finish. The times range from immediately after cool down to 72 hours after the bake cycle.

### Sanding

Use 1500 grit or finer to remove imperfections.

### Compounding

Use finishing compound. Apply a thin ribbon of material to the area to be polished. Use a double-sided wool polishing pad. Maintain air polisher or variable speed buffer at 1200-1800 rpm. Remove excess finishing compound with a clean soft cloth prior to applying finishing polish.

### Polishing

Use finishing polish (shake well before using). Apply a ribbon of material to work a 2 – 3 foot square area. Use a foam pad or a terry cloth cover. Maintain a variable speed buffer or an orbital polisher at 1200 – 1500 rpm. Keep the polisher/buffer moving at all times. Overlap each pass approximately 50%. As finishing polish begins to dry, stop polishing. Wipe off excess finishing polish with a clean soft cloth. Hand buff with a clean soft cloth as a finishing touch.

### Tips for Success

- Always use clean water to wet sand and add a few drops of soap to help reduce clogging of the paper.
- Always use a foam interface pad when DA sanding.
- Do not use medium to heavy-duty compounds.
- Use clean cloths and pads to insure that the clear or topcoat does not get scratched with dirt particles from old or re-used cloths or pads.
- Do not wax for the first 120 days after painting.

Revised July 2009

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PD-0804

## Clearcoat Defect Removal

**Caution: Wear the proper safety protection when sanding, cleaning, mixing and spraying all materials included within this process.**

PPG Automotive refinish clearcoat finishes are designed to duplicate OEM manufacturer appearance and performance specifications when properly applied using recommended procedures undercoats and equipment.

Even with extreme care in cleanliness and preparation procedures, dirt and particulates can land in the clearcoat film during the application and drying process.

*The OEM environment can not be entirely duplicated in a collision repair facility for these and other reasons:*

- The vehicle is painted at the factory as a shell before any non-painted parts are attached.
- The vehicle can be cleaned thoroughly to eliminate dust and dirt and has never been "on the road".
- The vehicle is painted with computer controlled robotics for consistent texture.

*When removing dirt and particulates from the refinish clearcoat (both rigid and flexible parts), depending on severity, the procedure will require:*

- Sanding or "nibbing" the affected area to remove the dirt and particulates.
- When removing multiple spots in any given panel it may be necessary to gradually sand or level the texture away from the area from some or no texture in appearance to texture matching the OEM appearance. This procedure may entail sanding to some degree the entire panel.
- All areas sanded must be buffed and polished to bring back the desired appearance and DOI (Distinctness Of Image)

### **PD-0804 Repair Procedure:**

**Assess the repaired area to look for dust nibs or other environmental debris or defects such as runs or sags.**

**Clean area with an All Purpose Cleaner and Degreaser**

#### **Dust Nibs:**

1. Sand nib with P1500 grit using a finishing DA sander with an interface backup pad. Check area visually and by hand to make sure nibs are removed.
2. Refine entire sanded area with P3000 damp on a DA sander with a backup pad.
3. Proceed to the compounding procedure below.

#### **Runs/sags:**

1. Use P1200 grit Wet-or-Dry sandpaper with hand block to remove the defects.
2. Refine entire sanded area with P1500 using a DA sander with an interface pad.
3. Refine entire sanded area with P3000 damp on a DA sander with a backup pad.
4. Proceed to the compounding procedure below.

#### **Cosmetic scratches in non-collision damaged paint:**

Proceed to the compounding procedure below.

#### **Compounding**

Compound the entire repair area with extra cut compound with a white foam pad or a wool compounding pad.

#### **Polishing**

Polish the entire repair area with a swirl mark remover and a black foam pad.



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**Sherwin-Williams Automotive Finishes Corp.**  
4440 Warrensville Center Road  
Warrensville Heights, Ohio 44128

**Nick Bartoszek**  
Director – Global Product Management

December 3, 2009

Aaron Schulenburg  
SCRS Executive Director  
PO Box 346  
Smyrna DE 19977

Re: Finish Enhancement

Dear Aaron,

As a supplier of aftermarket refinish coatings to the collision repair industry, Sherwin-Williams Automotive Finishes produces guidelines and procedures called "Best Demonstrated Practices" to ensure the collision repair industry's ability to produce a pre-accident condition repair. It is our intention to explain our position on Color Sand and Polish.

Color Sand & Buff involves a thorough sanding and polishing of the entire surface to remove surface texture to better match the OEM finish and texture. This is a necessary practice that is widely used to meet customer quality expectations as well as to return the vehicle to pre-accident condition.

Please let me know if you have further questions. I would be more than happy to provide further elaboration.

Best Regards,

A handwritten signature in black ink, appearing to read "N. Bartoszek". The signature is written in a cursive, flowing style.

Nick Bartoszek

# **COLLISION REPAIR INFORMATION**

## **FOR THE COLLISION REPAIR PROFESSIONAL**

TITLE: TOPCOAT SAND & POLISH  
SECTION: REFINISH BULLETIN #173  
MODELS: ALL TOYOTA, LEXUS, AND SCION  
DATE: APRIL 2009

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Customers have high expectations for automotive paint finish appearance and expect repairs to match factory color, gloss, and texture. Flawed refinish appearance is a cause of concern and will likely have a negative affect on customer satisfaction and retention.

Toyota recognizes the reality of paint finish application in the shop environment. In addition to color matching and blending, countermeasures to remove paint process intrusion (dirt nibs) are necessary to achieve an undetectable finish match. This is also common in manufacturing plants when process intrusion is encountered. Countermeasures are defined as; ultra-fine sanding to level nibs followed by polishing to a level of gloss and texture consistent with the original finish. Technicians undertaking these tasks should review applicable technical data sheets for product process and handling instructions, as well as applicable safety information.

Topcoat sand and polish is one of many paint finish repair techniques covered in Toyota T101 and Lexus L101 Paint Finish Repair training. Please visit [www.crrtraining.com](http://www.crrtraining.com) for scheduling and registration information.



EXAMPLE IMAGES OF TOPCOAT ULTRA-FINE SANDING AND POLISHING TO REMOVE PROCESS INTRUSION DIRT NIBS - FACTORY AND BODY SHOP

**PLEASE ROUTE THIS BULLETIN TO YOUR COLLISION REPAIR CENTER  
MANAGER AND COLLISION REPAIR TECHNICIANS**



# Final Sand & Polish

- **Audatex – Color Sand & Buff, Nib Sanding / De-nib**
- **CCC / Motor – Wet / Dry Sand Rub Out & Buff and De-nib & Polish**
- **Mitchell – Finish Sand & Buff, De-nib & Finesse**

## ■ Is “Final Sand & Polish” ...

### 1. *Required?*

- *The following pages from the Estimating Guides and Database Reference Manuals State and / or Agree that:*
  - A. Final Sand & Polish and Denib & Polish can be Required Repair Operations necessary to restore a damaged panel to ***new undamaged*** condition.
  - B. Labor Time is based on ***new, undamaged parts***.
  - C. Refinish labor begins at 320 – 400 grit (dry) or 500 – 600 grit (wet) as this is the starting point for refinish of a ***new, undamaged panel***.

(See the following documents from the leading Information Providers.)



# 1. A. Color Sand & Buff *may or may not be* Required Repair Operations necessary to restore a panel new undamaged condition.

## Section 4-4 Refinish Guidelines

### Refinish within Panel Boundaries – continued

2. The second method is to override the prestored labor to the desired time.

It is important to keep in mind when using the method that all adjacent panel and nonadjacent panel overlap will still be considered in an estimate when the panel being painted is on a lower guide number. If this method is used, and overlap is not applicable, any overlap deducted by the system should be manually included in the estimated time for the spot painting. Non-adjacent panel overlap time is 0.2 and adjacent panel overlap time is 0.4.

Therefore, when using the override method and non-adjacent panel overlap applies, add 0.2 to the spot paint time. When using the override method and adjacent panel overlap applies, add 0.4 to the refinish operation.

### Color Tint

Audatex's two-stage set-up refinish labor includes time for standard tint. Standard tint is defined as the initial mix, check, one tint cycle, and check.

Audatex's studies revealed instances where additional time was required for the tinting process. The range of this additional time was commonly between 0.1 and 1.0 hours with an average of 0.5 hours per estimate per color.

The appearance of color match can be difficult enough to require both color tint (tinting to adjust the color) and blending. I-CAR Finish Matching (Module 2, Topic 3) recommends planning and preparing for blending before the work begins. Per I-CAR, tinting should be done only to achieve a blendable match.

### Color Sand and Buff

This process, which **may or may not be required**, is defined as wet sanding the entire panel by compound buffing and mechanical or hand polishing. Color sand and buff is further defined as all of the above steps performed to the finished surface for any reason, plus cleanup.

#### **Color sand and buff can be estimated at:**

- 30% of Audatex single-stage refinish labor (not including final wash).

# 1. A. Nib Sanding / De-nib *may be* Required Repair Operations necessary to restore a panel new undamaged condition.

## Section 4-4 Refinish Guidelines

### Replaced Panel Refinish

Current Audatex refinish labor is based on the use of new and undamaged panels. Additional steps or processes that may be required should be considered during estimate preparation.

### Repaired Panel Refinish

When a repaired panel is being refinished, the estimator provides time for the repair of the panel. Consequently, the estimator also determines included operations. When Audatex refinish labor is used for repaired panels, Audatex refinish times assume that the panel has been returned to the condition of a new, undamaged OEM panel or equivalent.

Operations that might be considered in the repair refinish time include any steps required to bring the panel to the condition of a new, undamaged panel. This may include feather edge, blow off and clean, mask to prime, tack off, mix etch primer, prime bare metal, mix and apply primer filler, guide coat application, unmask as required and block sand. Panel scuff to facilitate application of clear may also be considered for two- or three-stage refinish.

### Feather / Prime / Block

Audatex recognizes that Feather/Prime/Block are required operations in the panel repair process, that occurs after 150 grit, to bring the repaired panel to the condition of a new, undamaged panel for the purpose of refinish. Audatex does not provide labor allowance for repaired panels, as this is a judgment time, nor does Audatex provide material allowance for the Feather/Prime/Block process. The determination and assessment for this operation is best provided by the estimate preparer for consideration and allowance during the estimate preparation process.

### Nib Sanding/De-nib

Nib sanding (or de-nib) is defined as the removal of isolated dirt and dust particles, and polishing the affected area(s).

- Audatex's formula for Color Sand and Buff does not apply to this operation. Additional steps or processes that **may be required** should be considered during estimate preparation.

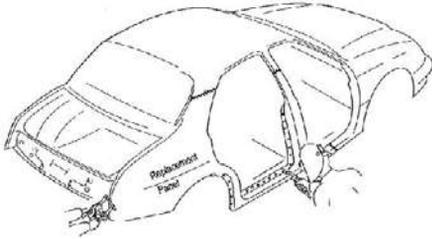
# 1. A. De-Nib & Polish and Wet / Dry Sand, Rub-Out & Buff *may or may not be* Required Repair Operations necessary to restore a panel new undamaged condition.

## GUIDE TO ESTIMATING

### WELD ZONE/ADJACENT PANEL

#### SPECIAL NOTATION:

Suggested refinish operation times do not include additional time for repair of damage to adjacent panels resulting from normal cutting, welding and grinding procedures. The amount of damage can vary considerably depending upon process and technique used by the servicing technician and, therefore, is impractical to anticipate in this publication. MOTOR recommends these factors be considered before finalizing any repair cost estimate. Typical areas to be considered are illustrated below.



### DE-NIB & POLISH

#### SPECIAL NOTATION:

Refinished panels *may or may not require* a varying amount of de-nibbing, a process used to remove small particles in final finish surface. The clear coat contains ultraviolet screeners and reducing the clear coat thickness (mils) may result in early paint failure. Follow vehicle manufacturer's recommendations when performing this type of repair. Calculations should be based upon the base refinish time outer surface only and should not include additions for clear coat, underside, inside or edges. In the event that this type of operation will be performed, MOTOR suggests the following formula be considered:

Each panel requiring de-nibbing (refinish or blend)

**HOOD, ROOF, TRUNK LID, SPOILER**

First panel add up to 20% of full base refinish time,

each additional panel add up to 10%

**FENDER, DOOR, QUARTER PANEL, BUMPER COVER**

First panel add up to 10% of full base refinish time,

each additional panel add up to 5%

#### INCLUDED:

- Panel outer surface only
- Paint nib removal as required (spot only)
- Spot polish only

#### DOES NOT INCLUDE:

- Acid rain damage
- Full panel polish
- Overspray removal
- Removal of residual material from recessed edges and jams if required
- Scratch damage
- Wash, clean, wax or detail entire vehicle prior to delivery if required
- Wet sand full panel

### WET/DRY SAND, RUB-OUT & BUFF

#### SPECIAL NOTATION:

Refinished panels *may or may not require* a varying amount of wet sanding, compound rub-out or buffing operations in order to match original finish texture. The clear coat contains ultraviolet screeners and reducing the clear coat thickness (mils) may result in early paint failure. Follow manufacturer's recommendations when performing this type of repair.

Calculations should be based upon the outer surface only and should not include additions for clear coat, underside, inside or edges. Base refinish time does not include deduction for refinish overlap. In the event that this type of operation will be performed, MOTOR suggests the following formula be considered:

Refinished panels may or may not require a varying amount of wet sanding, compound rub-out or buffing operations. In the event this type of operation will be performed, MOTOR suggests the following formula be considered.

- Each panel requiring wet sand, rub-out and/or buff (refinish or blend)
  - Add 30% of full base refinish time

#### INCLUDED:

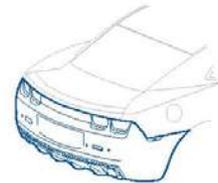
- Panel outer surface only
- Wet sand full panel as required
- Compound, buff and/or polish as required

#### DOES NOT INCLUDE:

- Acid rain damage
- Overspray removal
- Removal of residual material from recessed edges and jams if required
- Wash, clean, wax or detail entire vehicle prior to delivery if required

### UNPRIMED FLEXIBLE COMPONENT PREPARATION

- 25% of the component's base refinish time
- Maximum time allocation: 1.0 hours



#### INCLUDED:

- Removal of mold-release agents as outlined by manufacturer
- Masking (if required)
- Application of adhesion promoter

#### DOES NOT INCLUDE:

- Correction of pre-existent surface imperfections
- Material Costs

# 1. A. Finish Sand & Buff and De-nib & Finesse *may or may not be* Required Repair Operations necessary to restore a panel new undamaged condition.

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## Procedure Explanation

- Remove and install or mask attached components, trim, stripes or decals on blended panel/area
- Finish, sand, and buff

**NOTE:** Blend labor time does not apply to two-tone refinish or custom non-OEM refinish. **No overlap deduction applies to blended panel(s)/refinish area(s).**

**NOTE:** When calculated, the estimate will allocate 40% from the total blend time and apply it to the three stage line item. The total sum of the blend line and the amount allocated in the three stage line will total 70% of the exterior refinish time for the panel being blended.

*Example:* A panel refinish time is 2.0 hrs. When blended, the refinish time for that panel will be displayed as 1.4 (.7 per refinish hour). Once calculated, the refinish blend line will be displayed as .8 and .6 (40%) will be allocated to the three stage line.

### Extension of Clear Coat

In some applications, it may be required to extend the application of clear to the nearest panel edge or breakpoint.

The performance of this operation is NOT INCLUDED in the Mitchell refinish labor time.

The extension of clear coat formula is intended to be calculated as a percentage of base refinish hours excluding overlap.

It DOES NOT APPLY to edges, jambs, and undersides. No deduction for overlap should be taken.

This formula DOES APPLY to the 2.5 hours maximum clear coat allocation. Should this operation be necessary, the following formula is provided:

### Extend Clear to Adjacent Panel(s)

Extend clear to adjacent panel(s): Allow .5 per refinish hour (50%) for each panel(s)/refinish area(s) cleared.

### Included Operations

- Detergent/solvent wash
- Wet sand, scuff (ScotchBrite) or rubout (compound) panel and clean for preparation
- Mask existing adjacent panels to 36"
- Apply bonding material - if required
- Clean and tack surface
- Apply clear material

### Not Included Operations

- Repair existing surface imperfections
- Remove and install or mask attached components, trim, stripes or decals on extended clear panel/area
- Finish, sand, and buff
- Nib sand and finesse

### Finish Sand & Buff

A labor time formula is provided **should it be necessary** to perform this operation. This procedure includes the removal of orange peel and any blemishes that affect paint texture in order to produce a smooth finish to the entire panel surface. This process is not limited to "nib sanding" or "finessing" which is the removal of isolated dirt/dust particles only. The performance of this operation is NOT INCLUDED in the Mitchell refinish labor time.

The finish sand and buff formula is intended to be calculated as a percentage of the base refinish hours excluding overlap and clear coat. It DOES NOT APPLY to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinish time. No deduction for refinish overlap should be taken.

**Finish sand and buff outside surface area(s):** Allow .3 per refinish hour (30%) to finish sand and buff each surface area(s).

### De-nib & Finesse

A labor time formula is provided **should it be necessary** to perform this operation. This procedure includes the removal of small isolated dust particles (nibs) and the application of a finishing glaze.

The performance of this operation is NOT INCLUDED in the Mitchell refinish labor time.

The de-nib and finesse formula is intended to be calculated as a percentage of the base refinish hours excluding overlap and clear coat. It DOES NOT APPLY to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinish time. No deduction for refinish overlap should be taken.

**De-nib and finesse outside surface area(s):** Allow .2 per refinish hour (20%) to de-nib and finesse each surface area(s).

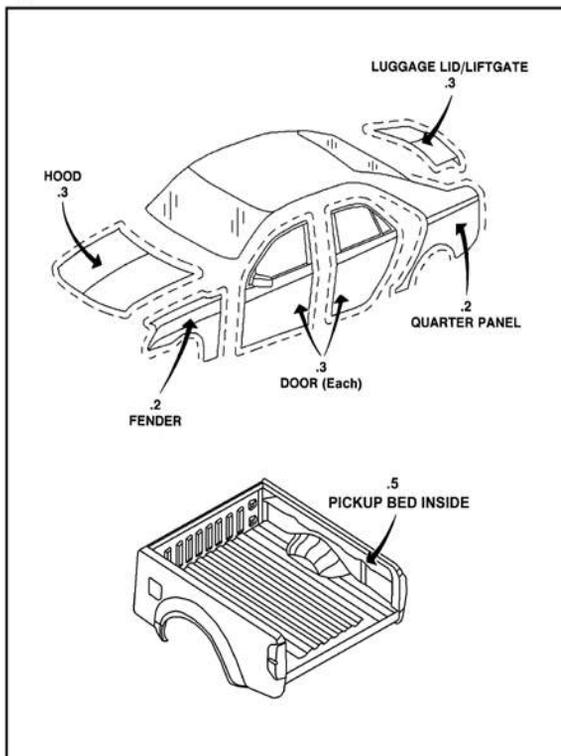
### Mask Vehicle to Prevent Overspray Damage

The following refinish information is provided should it be necessary to perform these operations as determined by individual job requirements:

### MASK INTERIOR, ENTRYWAYS, ENGINE COMPARTMENT AND TRUNK OPENINGS

Interior masking may be necessary when refinishing exterior surfaces to stop overspray damage that is not prevented by adjacent panel perimeter masking which includes back taping or application of foam tape. Interior masking may also be used when exterior panels (door, hood, etc.) are removed while applying refinish material. The performance of this operation is NOT INCLUDED in the Mitchell refinish labor time.

Fig. 1: IDENTIFYING INTERIOR MASKING LOCATIONS



**NOTE:** The times shown in the illustration are for interior masking of that panel and/or opening. Labor time includes all pillars, jambs, weatherstrips, edges, entryways and openings as necessary. Deduct .1 hour overlap for each interior masked adjacent panel and/or opening.

The Mitchell *REFINISHING MATERIALS GUIDE* has the Latest Available Costs for Materials Used in Single and Multi-Stage Refinishing, and is an Accurate Source for Determining Costs.

## 1. B. Labor Time is based on *new, undamaged parts*.

### Section 4-1 Labor Overview

#### Introduction

Labor supplied in an Audatex estimate is intended for use as a guide for collision repair. Labor allotments suggested by Audatex estimates are for replacement of new and undamaged parts. Additional allowances are provided for optional equipment supplied by the vehicle manufacturer by selecting the appropriate options and parts. Because each vehicle's collision damage is unique, automation cannot cover every situation. The flexibility of the Audatex system, coupled with the estimate preparer's knowledge and expertise, provides for adjustment of any estimate to meet the needs presented by each collision situation.

#### How Labor is Determined

Audatex's labor is developed through an in-depth process that establishes incremental values for each connection point that must be accessed to replace a given part. These incremental labor values are determined in several ways that include:

- Review of manufacturer service manuals and engineering drawings to define the necessary operations
- Independent time and motion studies conducted in repair and research facilities
- Analysis of Audatex historical information, in which like operations are reviewed in existing vehicles for use in new vehicles of similar construction
- Review of technical bulletins from:
  - independent sources
  - original equipment manufacturers
  - paint manufacturers
  - research groups
- Requests from repairers and estimate preparers to review established labor and procedures (Request for Review)
- Extensive experience of the Audatex technical staff in collision repair
- Continuous training in the latest repair techniques including I-CAR training

## 1. B. Refinish Labor Time is based on *new, undamaged parts*.

### Section 4-4 Refinish Guidelines

#### Replaced Panel Refinish

Current Audatex refinish labor is based on the use of new and undamaged panels. Additional steps or processes that may be required should be considered during estimate preparation.

#### Repaired Panel Refinish

When a repaired panel is being refinished, the estimator provides time for the repair of the panel. Consequently, the estimator also determines included operations. When Audatex refinish labor is used for repaired panels, Audatex refinish times assume that the panel has been returned to the condition of a new, undamaged OEM panel or equivalent.

Operations that might be considered in the repair refinish time include any steps required to bring the panel to the condition of a new, undamaged panel. This may include feather edge, blow off and clean, mask to prime, tack off, mix etch primer, prime bare metal, mix and apply primer filler, guide coat application, unmask as required and block sand. Panel scuff to facilitate application of clear may also be considered for two- or three-stage refinish.

#### Feather / Prime / Block

Audatex recognizes that Feather/Prime/Block are required operations in the panel repair process, that occurs after 150 grit, to bring the repaired panel to the condition of a new, undamaged panel for the purpose of refinish. Audatex does not provide labor allowance for repaired panels, as this is a judgment time, nor does Audatex provide material allowance for the Feather/Prime/Block process. The determination and assessment for this operation is best provided by the estimate preparer for consideration and allowance during the estimate preparation process.

#### Nib Sanding/De-nib

Nib sanding (or de-nib) is defined as the removal of isolated dirt and dust particles, and polishing the affected area(s).

- Audatex's formula for Color Sand and Buff does not apply to this operation. Additional steps or processes that may be required should be considered during estimate preparation.

# 1. B. Labor Time is based on *new, undamaged parts.*



## GUIDE TO ESTIMATING

### LABOR TIME LISTINGS

All operation times are listed in hours and tenths of an hour. A time listed as 3.5 indicates three and tenths of an hour.

### LABOR TIME PREMISE

The times reported in this publication are to be used as a GUIDE ONLY. Reported times include normal align procedure to insure proper fit of the individual new part being replaced. Reported times include tube/paddled OEM caulking and seam sealer removal/application on welded replacement panels. Sprayable seam sealer equipment requires preparation and adjustment before application and is NOT INCLUDED IN LABOR TIME.

Times do not apply to vehicles with equipment other than that supplied by the vehicle manufacturer as standard or regular production options. If other equipment is used, the time may be adjusted to compensate for the variables. Removal and replacement of exchanged or used parts is not considered. If additional aligning or repair must be made, such factors should be considered when developing the estimate. Items not listed under the INCLUDED/DOES NOT INCLUDE heading for any given procedure have not been considered in the estimated work time development for that procedure, unless specified by a footnote. All included/not included items for labor procedures listed between pages G10 and G33 are for component R&R and R&I procedures unless otherwise indicated in operation heading.

**OPERATION TIMES LISTED ARE BASED ON NEW UNDAMAGED PARTS INSTALLED ON NEW UNDAMAGED VEHICLES AS INDIVIDUAL OPERATIONS. TIME HAS NOT BEEN CONSIDERED FOR ALIGNMENT PULLS, DAMAGE-RELATED ACCESS TIME, DAMAGED, USED, REMANUFACTURED OR AFTERMARKET PARTS. SOME OPERATION TIMES ARE APPLICABLE AFTER BOLTED, ATTACHED OR RELATED PARTS HAVE BEEN REMOVED. REFER TO SPECIFIC FOOTNOTES ATTACHED TO OPERATION TIME LISTING.**

#### LABOR TIME DOES NOT INCLUDE:

##### SPECIAL NOTATION:

The items listed below apply to all labor procedures.

- A/C System, Evacuate and Recharge
- Aftermarket & OEM accessories
- Alignment, check or straightening related parts
- Alignment check of front or rear suspension/steering
- Anticorrosion material restoration/application
- Battery D&R/recharge
- Brackets & braces transfer
- Broken glass removal or clean up
- Brakes, bleed and adjust
- Caulk (non-OEM), sound insulate or paint inner areas
- Clean up or detailing of vehicle prior to delivery
- Computer control module D&R/relearn
- Conversion Vans (special components, equipment and trim)
- Cutting, pulling or pushing collision damaged parts for access
- Damaged or defective replacement parts
- Drain & refill fuel tank
- Drilling, modification or fabrication of mounting holes
- Fabricate templates, reinforcing inserts, sleeves or flanges
- Filling, plugging and finishing of unneeded holes in new parts
- Information label installation
- Material costs
- Pinch weld clamp damage repair
- Refinishing

### LABOR TIME PREMISE - Continued

- Reset electronic memory functions after battery disconnect
- Road test vehicle
- Rusted, frozen, broken or corrosion damaged components or fasteners
- Scan tool clear/reset electronic module
- Scan tool diagnostics
- **Steering Angle Sensor recalibration**
- Straighten or align used, reconditioned or non-OEM parts
- Structural damage diagnosis and vehicle set up time
- Structural foam removal or application
- Test panel/spray caulk
- Undercoating, tar or grease removal
- Unprimed bumpers, removal of mold-release agents
- Waste disposal fees (all types)
- Weld through primer
- Welded seam surface finishing finer than 150 grit sandpaper
- Wheel or hub cap locks R&I

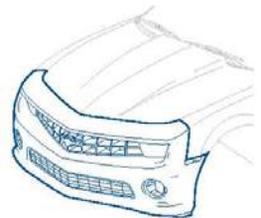
### FRONT BUMPER ASSEMBLY - R&I ALL TYPES

#### INCLUDED:

- Align to vehicle
- Face bar/bumper cover assembly R&I

#### DOES NOT INCLUDE:

- Air bag sensor
- Battery
- Emblems & nameplates
- Energy absorber, all types
- Lamp aiming
- Lamps (when not mounted in bumper)
- Moldings & impact strip
- Stripe tape, decals or overlays
- Valance panel/spoiler (when not mounted to bumper)



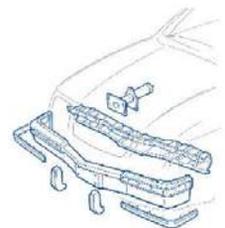
### FRONT BUMPER - R&R FACE BAR TYPE

#### INCLUDED:

- Align to vehicle
- Emblem & nameplate
- Face bar R&I
- Guard
- Guard cushions
- **Lamps (when mounted to bumper)**
- Molding & impact strip

#### DOES NOT INCLUDE:

- Air bag sensor
- Battery
- Distance sensor
- Energy absorber, if mounted to frame rail (all types)
- Lamp aiming
- **Lamps (optional equipment, or not mounted to bumper)**
- License plate/bracket
- Stripe tape, decals or overlays
- Valance panel/spoiler (when not mounted to bumper)



# 1. B. Refinish Labor Time is based on *new, undamaged parts.*



## GUIDE TO ESTIMATING

### REFINISH TIME LISTINGS

All refinish times are listed in hours and tenths of an hour. A time in parentheses adjacent to the part name, such as (p3.5) indicates three and one half hours. Replacement operation time does not include time necessary to refinish the component.

Operation times for the application of painted-on stripes are not covered in this publication. The time necessary to perform this type of operation should be estimated after an on-the-spot evaluation of required procedure.

### REFINISH TIME PREMISE

Published refinish times are for one color applied to new undamaged replacement components, without exterior trim, interior trim or other attached components and applied in one continuous process. For damaged panel(s), published refinish times may be applied after the damaged panel has been returned to a NEW UNDAMAGED condition.

Refinish times do not include time which may be required to match color tints or defective finish textures on interior or exterior surfaces. Nor do they include time which may be required to correct finish imperfections caused by improper weather conditions, application, or environmental contamination such as dust, dirt, grease, etc. MOTOR advises all parties consider these factors beforehand to determine mutually acceptable provisions in the event such conditions exist or occur.

### ANTI-THEFT LABELS (R DOT)

Replacement part labels are coded with the letter "R" to show that it is a replacement part. R Dot labels should not be removed from the part. Use caution when refinishing, rustproofing or undercoating replacement components to avoid damaging the label.

### BUMPER COVERS AND OTHER FLEXIBLE COMPONENTS

Refinish times listed on the parts detail lines for these components are based on the items being refinished prior to installation. Refinish time listed on the parts detail line for an OEM bumper cover that has both body color and unpainted grained portion allows for the refinish of the body color only. Masking the grained, textured, or non-body color portions in preparation for body color application is an included operation. It includes exterior surface and edges refinished during one continuous process. If a separate edging procedure is utilized then the appropriate time should be estimated after an on-the-spot evaluation. Refinish times do not include removal of mold release agent from new unprimed molded components. Parts received from the OEM manufacturer without primer and some non-OEM parts with or without primer should be tested for the presence of release agents that would cause paint adhesion problems and treated accordingly. For unprimed bumper preparation time, see "Add If Required" operation(s). Preparation time for all other unprimed components should be estimated after an on-the-spot evaluation. For unprimed component preparation time, see Unprimed Flexible Component Preparation on page G39.

### DOOR OUTER REPAIR PANELS

Refinish times listed on the parts detail line for new repair panels (i.e. door outer repair panel, tail gate and lift gate repair panels) include panel lip and immediate area. It does not include time for refinishing the entire door frame edge or interior side. Where possible, MOTOR will publish time for those areas under a "Refinishing Notes" heading within that group.

### DOOR SHELLS, LIFT GATES AND TAIL GATES

Refinish times listed on the parts detail line for these new components include exterior surface, edges and interior sides, unless otherwise noted in text.

### REFINISH TIME PREMISE - Continued

#### DOOR SHELLS, LIFT GATES AND TAIL GATES - Continued

Refinish times listed under the "Refinishing Notes" heading for "door outer panel only" operations do not include time for refinishing the door frame edge or interior side. Where possible, MOTOR will publish time for those areas under a "Refinishing Notes" heading within that group.

#### FENDERS, HOODS, TRUNK LIDS AND OTHER MAJOR BOLTED PANELS

Refinish times listed on the parts detail line for these new panels do not include time for refinishing the edge or underside. Where possible, MOTOR will publish time for those areas under a "Refinishing Notes" heading within that group.

#### QUARTER PANELS AND OTHER MAJOR WELDED PANELS

Refinish times listed on the parts detail line for these new panels include exterior side, recessed edges, gutters and pockets, unless otherwise noted in text.

Refinish times listed under the "Refinishing Notes" heading for quarter panels or other major welded panels "exterior surface only" operations do not include time for refinishing recessed edges, gutters and pockets. Where possible, MOTOR will publish time for these areas under the "Refinishing Notes" heading within that group.

#### NEW UNDAMAGED PANEL

A component manufactured to the same exacting standards as the parts installed on new vehicles when the car was built. Exterior body panels are supplied with a smooth painted surface (e-coat).

#### UNDERSIDE COLORS

Refinish times presented in this guide are developed under the premise that the underside and jamb color is the same as the exterior body color. Some vehicle manufacturers use a different color for the engine compartment, trunk compartment and/or jamba. An additional paint mix is required if the underside and/or jamb color is a different color than the exterior body color. Clear coat (gloss or matte) will be required for base color coat applications. This should be considered when developing the estimate.

#### PRIME & BLOCK

Prime & block (high build/primer-filler) is a required procedure that restores a repaired panel surface, including the joined areas of replaced welded panels, from 150-grit finish to NEW UNDAMAGED condition. It is MOTOR's position that prime and block is a process best reserved for the judgment of an estimator/appraiser following a thorough on-the-spot evaluation of the specific vehicle and damage in question.

#### REPAIRED PANEL REFINISHING

MOTOR suggests using component(s) base refinish time for this type of procedure after the damaged panel is repaired to new undamaged condition. Repaired surface preparation requires an on-the-spot evaluation for additional procedural steps such as featheredge and/or prime and block not required for new undamaged panels.

#### PARTIAL PANEL REFINISHING

This is NOT a BLEND-WITHIN procedure; partial panel refinishing is NOT a BLEND operation. MOTOR defines partial panel refinishing as refinishing a body panel with damage that is contained within a defined border or underneath body cladding after the panel has been repaired to that of a "NEW UNDAMAGED PANEL." It is MOTOR's position that partial panel refinishing is a process best reserved for the judgment of an estimator/appraiser following a thorough on-the-spot evaluation of the specific vehicle and refinishing requirements in question. Refer to G.T.E. "BASIC COLOR COAT APPLICATION."

# 1. B. Labor Time is based on *new, undamaged parts*.

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## Estimating Information

### Guide Layout Sequence

#### Identify the Vehicle

Models are often combined in one service because there is enough similarity between them that a separate service for each is not necessary. Record all model identification information on the damage report. Paint code locations are found in the front of the *Guide* and/or the beginning of each service. This will save time in searching for refinish codes or touchup paint.

#### Use the Layout as a Guide

An alphabetized Section Index can be found at the beginning of each service. Arranged from front to rear and from outside the vehicle inward are about 30 sections for each service (example: grille, quarter panel, luggage lid). Most have illustrations in which the components are identified and described, and part numbers, part prices, and labor times are shown. The descriptions are carefully arranged to depict the most frequent kinds of collision damage.

#### Work Through the First Section

From the outside inward, note each part that is damaged and its attachments. For each part, list the part number, the price and the labor time.

#### Work Through Each Section

Use the sequence in the book as a guide and a reminder, and observe the notes that apply to specific situations. For the first few damage reports it is well worth reading through the *Procedure Explanations* to become thoroughly familiar with the approach used, and to know which parts and operations are included and which are not.

#### Complete the Damage Report

Add up all the labor times and calculate the total. Add up total part prices and material costs. Total, and you have a complete and accurate damage report.

### Definitions

#### Bolted Parts and Assemblies

Refers to items bolted to inner structures, radiator supports, cowl and dash, etc., that may need to be removed for access. Due to the variety of these items and vehicles, time to remove and install or replace them is not included. Refer to the specific *Procedure Explanation* for examples of these items.

#### Disconnect & Connect

Disconnect a part or assembly by unbolting and/or unplug, and set it aside without physically removing it from the vehicle to gain access or removal of an adjacent part. The disconnected part or assembly is then reconnected during the assembly process.

#### High Strength Steels

Complete HSS information is not available from the vehicle manufacturers. When information is available, the components will be called out by the appropriate acronym (HSS/UHSS etc.) within the text after the name of the part identified. See *Abbreviations in Reference Information* for a list of acronyms and their definitions.

#### New Undamaged Part

Refers to a replacement part from the vehicle manufacturer without exterior or interior trim or attached parts.

#### Overhaul (O/H)

Remove an assembly, disassemble, clean and visually inspect it, replace needed parts, reassemble and reinstall on the vehicle making any necessary adjustments. Items which can only be changed by using the overhaul operation are shown by placing "IOH" (Included in Overhaul) in the column. There are other items which are included in the overhaul operation that may be replaced individually. These will have a time assigned for a stand-alone operation. For verification, refer to the *Procedure Explanation* for the operation being performed.

#### Overlap

If adjoining parts are being replaced (example: quarter and rear body panels), there is an overlap in that both individual operations include common welded surfaces or parts attached to both panels. A deduction must, therefore, be made from the total of the individual operations to compensate for the two or more repeated operations in each sub-task. Similarly, if a part has already been removed, it makes access to other parts easier.

#### Remove and Install (R&I)

Remove a part or assembly, set it aside and reinstall it later. The time shown includes the alignment that can be done by shifting the part or assembly.

#### Remove and Replace (R&R)

Remove a part or assembly identified as included within the *Procedure Explanation* and replace the part or assembly with a new one. The time shown includes the alignment that can be done by shifting the part or assembly.

#### Underhood Dimensions

Engine compartment views are shown as if you are above the vehicle looking down. A centerline is provided for measuring strut widths. The illustration is an exact view of the engine compartment showing all bolts, holes, supports and other structural components. Measurements can be duplicated with tape measure or with tram bar pointers set at equal lengths. Dimensions are given, whether symmetrical or non-symmetrical. All round holes are measured to center. Oval holes are usually measured to the front or rear center. Measurements are shown in millimeters. These dimensions are for estimating purposes only. See *Vehicle Dimension* topic in the *Mitchell Information Center*.

#### Order by Application

Many parts vary in usage according to differences in colors, materials, engines, transmissions, VIN, year and other factors. Where there are occasional variations regarding the part price, a representative part number at times is selected and the phrase "Order By Application" is footnoted to the part's description. Consult the dealer parts department for exact price and/or part number information.

### Labor General Information

**IMPORTANT REMINDER:** Labor related notes in the text portion override the *Procedure Explanation* pages.

#### Aluminum

The labor times shown for aluminum panel R&R represent replacement according to the manufacturer's recommended procedures and guidelines. Within the published labor times Mitchell has also taken into consideration these commonly asked about items; **Remove and Replace:** Rivets, Drill and de-burr rivet holes, EMC screws, Flow drill screws, **Body pretreatment:** Flame coat treatment, Application of bonding adhesives, **Welding (if applicable):** Welding equipment set-up, "Run-on" or "Cold start" tabs.

**NOTE:** In addition, Aluminum panel replacement follows the guidelines outlined in specific applicable panel P-Pages, e.g. Aluminum Quarter Panel replacement follows Procedure 20, Quarter Panel R&R.

**IMPORTANT REMINDER:** The cost of aluminum panel replacement materials is not included in panel replacement R&R times. (example: Rivets, Panel bonding, Adhesives, Bonding primer, EMC screws, Flow drill screws etc.).

#### Labor Times

**THE LABOR TIMES SHOWN IN THE GUIDE ARE IN HOURS AND TENTHS OF AN HOUR (6 MINUTES) AND ARE FOR REPLACEMENT WITH NEW, UNDAMAGED PARTS FROM THE VEHICLE MANUFACTURER ON A NEW, UNDAMAGED VEHICLE.** Any additional time needed for collision **DAMAGE ACCESS, ALIGNMENT PULLS, NON-ORIGINAL EQUIPMENT** or **USED PARTS** should be agreed upon by all parties. Times for some operations are applicable after necessary bolted, attached or related parts have been removed. Exceptional circumstances, including all the sub-operations or extra operations, are indicated as notes throughout the text or are identified in the *Procedure Explanations*. The actual time taken by individual repair facilities to replace collision damaged parts can be expected to vary due to severity of collision, vehicle condition, equipment used, etc.

# 1. B. Refinish Labor Time is based on *new, undamaged parts*.

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## Procedure Explanation

### Bumper Assembly O/H

#### Included Operations

- Remove and install assembly
- Disassemble and replace damaged parts
- Replace or transfer parts attached except those listed in *Not Included Section*
- Remove and install or replace: License plate/bracket
- Assemble and install
- Adjust alignment to vehicle

#### Not Included Operations

- Refinish bumper
- Remove and replace impact absorbers or mounting arms
- Remove and install or replace optional accessories (example: trailer hitch, trailer connector)
- Remove and install adhesive exterior trim; add to clean and retape
- Replace new adhesive exterior trim; deduct one-half of R&R time
- Install stripes, decals, transfers or overlays

## Procedure 28—Refinish Procedure

### Refinish General Information

#### Complete Refinish

Refinish times in this *Guide* pertain to **NEW, UNDAMAGED PARTS** and are not intended for calculating complete vehicle refinish—single- or multi-stage. An estimate of this nature would suggest all new panels have been fitted to the vehicle.

#### Lifetime Refinish Warranty/Clear Coat

The major paint manufacturers listed below have provided the following information: "Major refinish paint manufacturers recommend that when performing refinish warranty repairs on an OEM multi-stage or basecoat/clearcoat finish, you must extend the application of clear to the nearest panel edge or breakpoint to qualify for lifetime warranty." **AKZO — DuPont — Sherwin Williams — BASF — PPG**

#### Repaired/Used Panels

Labor times related to repaired and/or used panels—example: Remove and install or masking of glass, outside handles or exterior trim, feather prime & block, masking for primer surfacer application—are not included in refinish time. The steps required for refinishing a repaired and/or used panel may vary from those required for a new panel depending on the condition of the repaired and/or used panel.

#### Feather, Prime & Block

Is the Not-Included refinish operation that completes bodywork repair from 150 grit smoothness to the condition of a new undamaged panel, and the point at which refinish labor time begins. The labor and materials associated with feather, prime and block may vary depending upon the size of the repair area, and should be evaluated when determining the work to be performed. See *Welded Panels under Estimating Information*.

#### SPOT REPAIR/BLEND ADJACENT PANEL

##### Spot Repair

Spot repair is defined as applying color to the repaired area of a damaged panel to obtain full coverage of undercoats, and blending that color into the original panel finish so that no transition can be detected. The goal is to keep the actual repair as small as possible to avoid having newly applied color directly next to an undamaged adjacent panel(s). Clear coat is then applied to the entire panel. This refinish process minimizes color mismatch.

##### Blend for Color Match

Blending is defined as applying color, without necessity to cover undercoats, to less than the full surface area of an adjacent undamaged panel. Paint manufacturers recommend blending adjacent panels when a panel is replaced, or repaired and color applied to the full surface areas, or to the area that borders the adjacent undamaged panel(s). Clear coat is then applied to the entire blended panel.

##### Major Panels

Major panels are those listed: **FRONT HEADER, FENDER, HOOD, COWL TOP, DOOR, ROCKER, ROOF, PICKUP CAB CORNER, PICKUP CAB**

**BACK, QUARTER, PICKUP BED FRONT, PICKUP BED SIDE, VAN SIDE, VAN REAR CORNER, ENGINE LID, LUGGAGE LID, LIFT GATE, REAR RATE, TAIL GATE, REAR BODY**

#### Overlap

Deduct .4 hour from refinish time for each **ADJACENT MAJOR PANEL** and deduct .2 hour from time for each **NON-ADJACENT MAJOR PANEL**. There is no overlap deduction taken for the first major panel.

Adjacent major panel example: Right front fender 2.5 hours (full time) and right front door 2.5 hours minus .4 hour overlap for a total of 4.6 hours.

Non-adjacent major panel example: Right front fender 2.5 hours (full time) and left front fender 2.5 hours minus .2 hour overlap for a total of 4.8 hours.

No overlap deductions for valance panel, pillars, door jambs, underside of hood, underside of luggage lid or underside of gate, inner panels, filler panels, soft bumper covers or bolt-on finish panels.

**NOTE:** Refinish times are for outside surfaces only unless stated otherwise in text (example: add for underside, add to edge).

#### Included Operations

- Solvent wash
- Scuff panel and clean
- Mask adjacent panels up to 36 inches or substitute with cover vehicle (bag) complete
- Prime or seal as required
- Final sanding and clean
- Mix materials
- Adjust spray equipment
- Apply color
- Clean equipment

#### Not Included Operations

- Blending into adjacent panel and/or panels, or nearest breaking point
- Color match or tinting
- Applying anti-corrosion rust resistant materials
- Additional application of soft chip primers or anti-chip undercoats
- Finish sand and buff
- Subsequent vehicle bagging when required: add .2 hour for each application & removal
- Mask interior to prevent overspray damage
- Removal of protective coatings
- Removal of release agent from OEM raw plastic components (example: non-primed bumper covers) See formula under *Raw Substrate Prep*
- Feather, Prime & Block paint damage to adjacent panel and/or panels joined by welding due to burn damage (see Feather, Prime & Block definition under *Refinish General Information*)
- Gravel guard refinish: add .5 hour for the first major panel and .3 hour for each additional panel.

**NOTE:** The included operation of mask adjacent panels is inclusive of any necessary back tape masking to prevent overspray.

**IMPORTANT REMINDER:** Refinish times are for **NEW, UNDAMAGED PARTS** without exterior or interior trim or attached components. Refinish times may vary depending on individual procedures, product and/or weather conditions.

A small percentage of colors are identified by the paint manufacturers as highly transparent. These colors may require additional application coats to achieve visual hiding. In instances where four or more color coats are necessary to achieve adequate hiding, some adjustment in refinish times may be appropriate.

**IMPORTANT REMINDER:** The cost of paint and materials is not included in refinish time.

**NOTE:** Gravel Guard application and appropriate refinish may be necessary beyond the actual replacement area to achieve a "texture" match.

It may be necessary to tint or otherwise modify non-exterior colors applied to undersides, edges and/or jambs for which there is no paint color formula to achieve a color match. When necessary, reference "color match or tinting" listed above in *Not Included Operations*.

#### Raw Substrate Prep

Allow .2 per refinish hour (20%) for plastic components that come from the manufacturer/supplier in a raw/un-primed state.

# 1. C. Refinish labor begins at 320 – 400 grit (dry) or 500 – 600 grit (wet) as this is the starting point for refinish of a *new, undamaged panel*.

## Section 4-5 Refinish Operations

### Refinish Operations

Audatex refinish labor generally includes time to perform all operations necessary to accomplish refinish for new and undamaged OEM or equivalent panels. Audatex refinish labor begins at 320 - 400 grit (dry) or 500 - 600 grit (wet) as this is the starting point for refinish of a new, undamaged panel. Audatex refinish times are for single panels unless otherwise noted.

### Two-stage

#### Included Operations:

- Move car
- Review estimate/work order
- Get paint code
- Order paint
- Get paint
- Gather materials, equipment and tools\*\*
- Clean equipment and materials
- De-wax and degrease
- Prepare to sand
- Dual action sand\*
- Hand/wet sand
- Mix, apply, and flash primer (for adhesion and sealing)
- Application of guide coat\*
- Block sand\*
- Water wash and clean panel with solvent
- Blow dry clean panels
- Prepare to spray
- Clean booth
- Booth operations
- **Protect exterior of vehicle from overspray utilizing all acceptable methods of bagging, masking, masking up to 36 inches surrounding the panel and masking of glass within a panel. This includes using backtaping and/or foam tape to close out the gap between panels. If backtaping and/or foam tape does not adequately prevent overspray from entering the jamb areas, any additional masking to protect the interior and jambs is a not included operation. (labor only)**
- Basic corrosion protection provided by paint system/primer applied
- Mix and apply flash; additives
- Tack wipe
- Mix color, spray test panel, compare to vehicle
- Initial tint, spray test panel, let down, compare to vehicle\*\*
- Apply and flash; color
- Inspect job and paint
- Clean gun; color
- Add flex additive\*\* (when required, **labor only**)
- Tack wipe (between color and clear when required)
- Apply flash clear coat
- Mix clear coat\*\*
- **Clear; Clean gun\*\***

\*Welded panel operations

\*\*Included in setup

#### NOT Included:

- Body work
- Spot putty
- Panel stripping (see Panel Stripping section, page 146)
- Additional preparation or cleaning of new, unprimed panels (i.e., bumper covers)
- Removal of release agents from raw, unprimed plastic components (i.e., bumper covers)
- Moulding R&I
- Stripe R&I
- Parts R&I
- Painting of stripes
- Adhesive removal
- **Masking of interior surfaces/entryways, engine compartment and trunk openings. Interior masking may be performed when necessary to ensure prevention of overspray damage that may not be prevented by adjacent panel perimeter masking (including backtaping or application of foam tape). Interior masking may be considered when exterior panels (doors, hoods, etc.) are removed and refinished.**
- Mask mouldings
- Spray additional test panel
- Blending into adjacent panels (see Blending, page 143)
- Color Sand and Buff (see page 144)
- Chipguard application (see page 142)
- Gravel guard (see Chipguard, page 142)
- Additional time for two-tone (see page 142)
- Additional time for three-stage (see page 140-141)
- Custom finishes
- Tint primer or clear coat
- Undercoating
- Metal preparation and corrosion protection beyond those listed in Included Operations (i.e. cavity wax)
- Final wash
- Hazardous waste removal
- Any special coatings applied to luggage compartment
- Second or third bagging or masking of vehicle
- Paint and materials

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# Final Sand & Polish

- *Audatex – Color Sand & Buff, Nib Sanding / De-nib*
- *CCC / Motor – Wet / Dry Sand Rub Out & Buff and De-nib & Polish*
- *Mitchell – Finish Sand & Buff, De-nib & Finesse*

## ■ Is “Final Sand & Polish” ...

### 2. *Included or Not-Included?*

A. *According to the leading Information Providers Final Sand & Polish and Denibbing are Not-Included with any other Repair Operation.*

(See the following documents from the leading Information Providers)

B. *SCRS, ASA and other resources list:*

- *Color Sand & Buff, Nib Sanding, Finish Sand & Buff, De-Nib & Finesse, Wet / Dry Sand Rub Out & Buff and De-nib & Polish as Not-Included Required Repair Operations necessary to restore a damaged panel to new undamaged condition.*

(See the following pages from the SCRS Guide to Complete Repair Planning for Documentation)



## 2. A. Color Sand & Buff, Nib Sanding / De-nib are *Not-Included* Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

### Section 4-3 Replacement & Recycled Operations

*Refer to the Audatex Labor Report for Operations Specific to the Vehicle Being Repaired*

#### Audatex's definition of Remove and Replace (R&R)

Is an operation or group of operations that are required to remove the damaged part and replace with a new OEM or new alternative part. Audatex time:

- includes normal adjustment and alignment for correct fit.
- does not include any duplicated effort.

Replace includes any operations over and above the R&I operations.

#### Replacement and Recycled Operations Overview

***Asterisks on an estimate are used to denote user entered values. They do not imply that the operation noted is not a necessary procedure.***

***Manual entries on an estimate do not imply that the part/operation entered is not a necessary procedure.***

***Audatex labor allowances include time to fabricate sleeves when they can be made from existing parts. If the sleeve needs to be fabricated from raw stock, the time to fabricate the sleeve is not included.***

***Sandwiched panel replacement includes time to separate the panels by drilling out the spot welds and sliding the replacement panel in between, rewelding and smoothing welds if necessary.***

***A required labor operation that is not listed as either "Included" or "Not Included" is usually not included in Audatex labor times. This applies to the content of the DBRM and the specific operations listed for each vehicle through the Labor Report.***

#### FULL PANEL REPLACEMENT

***Audatex*** labor is for replacement at factory seams when possible. Many vehicles now have panels that may not be replaced at roof seams because of overlapping panels. If a quarter panel is designed in this manner and a "Partial" repair time is not shown, the Audatex time represents replacement of the panel at the most practical area – usually in the window openings below the roof seam. This method is considered a full panel replacement.

#### Welded Partial Panel Replacement

***Partial Panel Replacement is the replacement of a portion of an OEM panel at either a factory seam or using a viable sectioning procedure.***

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2. **A.** Color Sand & Buff, Nib Sanding / De-nib are ***Not-Included*** Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

## Section 4-5 Refinish Operations

### Single-stage

Audatex's single-stage refinish formula includes all two-stage refinish operations except:

- Gather additional materials to apply clear coat
- Spray test panel/let down panel (***Clear Coat***)
- Add flex additive (when required)
- Tack wipe for clear coat
- Mix, apply, and flash clear coat

### Three-stage

Audatex's three-stage refinish formula includes the following operations:

- Gather additional materials
- Spray test panel/let down panel
- Tack wipe (between color and pearlescent / mica coat, when required)
- Mix, apply and flash pearlescent / mica coat
- Clean gun
- Tack wipe (between pearlescent/mica coat and clear coat, when required)
- Mix, apply and flash clear coat
- Clean gun

### Two-Tone

Audatex's two-tone refinish formula includes the following operations:

- Tack wipe (between colors)
- Additional masking
- Mix second color
- Color tint and check second color
- Apply and flash second color
- Clean gun

### Blending

Audatex's blending refinish formula includes the following operations:

- Complete preparation of blended panel
- Scuff or buff
- Application of color to blended panel
- Application of clear coat to entire blended panel in two-stage and three-stage systems

### Chipguard

Audatex's chipguard refinish formula includes the following operations:

- Gather chipguard materials
- Masking
- Application of chipguard
- Cleanup

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2. **A.** Color Sand & Buff, Nib Sanding / De-nib are ***Not-Included*** Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

## Section 2-2 An Explanation of the Audatex Estimate

### 5 The Body of the Estimate - continued

#### OP – Operation Codes

##### UP – Unrelated Prior Damage

The estimate may also be adjusted based upon prior damage in a different area from the current collision. ***This code indicates that in the estimate preparer's judgment, damage exists from a prior incident which has no effect on the damage in the current estimate. This may be accounted for either in monetary values or labor time.*** The total UP amount will be printed separately from all other estimate totals. ***Overlap is applied between the current estimate and the Unrelated Damage portion of the estimate.***

##### M Code – Manual Entry

This column allows the estimate preparer to enter:

- parts or operations not provided by Audatex
- labor operations at a specific Labor Rate Code

The estimate preparer can:

- input these entries manually or use the Standard Manual Entries provided by Audatex (see Section 5-1.) Standard Manual Entries provide the description and a default rate code.
- override default rate codes to provide for local accepted practice. All other information must be supplied by the estimate preparer.

The totals will be added to the gross estimate total.

#### GDE – Guide Numbers

These numbers identify parts, assemblies, and/or operations.

#### Description

The description name Audatex has given the part, assembly, or operation.

#### MFG. PART NO. – Manufacturers Part Number

The manufacturer's part number for OEM **and** NAGS replacement parts or descriptions on all other operations (e.g., repair/align, sublet, etc.).

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**2. A. Color Sand & Buff, Nib Sanding / De-nib are *Not-Included***  
 Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

**Section 5-1 Standard Manual Entries**

This is a listing of Standard Manual Entries sorted by M Code. For an explanation of Audatex's Manual Entries, see page 15.

M CODE	DESCRIPTION		M CODE	DESCRIPTION	
M00	UNIBODY-FRAME INCL. SETUP	3	M38	PULL LEFT STRUT TOWER	3
M01	CLEAR COAT	4	M39	PULL RIGHT STRUT TOWER	3
M02	TWO TONE PAINT	4	M40	FRAME SIDE SWAY, FRONT	3
M03	FLEX ADDITIVE	4	M41	FRAME SAG, FRONT	3
M04	UNDERCOATING	4	M42	FRAME BUCKLE, FRONT	3
M05	RUSTPROOFING	4	M43	FRAME MASH, FRONT	3
M06	PINSTRIPES – PAINTED	4	M44	FRAME TWIST	3
M07	PINSTRIPES – TAPE	1	M45	FRAME DIAMOND	3
M08	STONEGUARD	4	M46	FRAME SIDE SWAY, REAR	3
M10	PAINT AS REQUIRED	4	M47	FRAME SAG, REAR	3
M11	REPAIR SCRATCHES	4	M48	FRAME BUCKLE, REAR	3
M12	POLISH PAINT	4	M49	FRAME MASH, REAR	3
M13	WHEEL BALANCE	1	M50	CLEAN INTERIOR	1
M14	CORROSION PROTECTION	4	M51	REFINISH, BELTLINE UP	4
M15	COLOR TINT	4	M52	FLUSH AND FILL CRANKCASE	1
M16	COLOR BLEND	4	M53	FLUSH AND FILL TRANSMISSION	1
M17	COVER CAR EXTERIOR	4	M54	FLUSH AND FILL DIFFERENTIAL	1
M18	SET UP AND MEASURE	3	M55	STEAM CLEAN ENGINE	1
M19	REALIGN CONTROL POINTS	3	M56	WASH AND DRY CARPETING	1
M20	ANTIFREEZE / COOLANT	1	M57	CLEAN UPHOLSTERY	1
M21	REFRIGERANT	1	M58	CLEAN FOR DELIVERY	1
M22	TIRE-RIGHT FRONT, BALANCED	1	M59	URETHANE ADHESIVE REMOVAL	1
M23	TIRE-LEFT FRONT, BALANCED	1	M60	HAZARDOUS WASTE REMOVAL	1
M24	TIRE-RIGHT REAR, BALANCED	1	M61	DRILL TIME	1
M25	TIRE-LEFT REAR, BALANCED	1	M62	COLLISION ACCESS TIME	1
M26	TIRE, SPARE	1	M63	FACTORY HARDWARE	1
M27	VALVE STEM	1	M64	UNIBODY-FRAME ALIGNMENT	3
M28	BATTERY	1	M65	DISABLE AIRBAG	1
M29	GLASS INSTALLATION KIT	1	M66	COLOR SAND AND BUFF	4
M30	COLLISION REPAIR MATERIAL	1	M67	RESET ELECT. COMPONENTS	1
M31	SET UP FOR REALIGNMENT	3	M68	CAULK	1
M32	UNIBODY REALIGNMENT-LT FRT	3	M69	GLASS CLEANUP	1
M33	UNIBODY REALIGNMENT-RT FRT	3	M70	COVER CAR INTERIOR	4
M34	UNIBODY REALIGNMENT-LT RR	3	M71	WHEEL OPENING MOULDING KIT	1
M35	UNIBODY REALIGNMENT-RT RR	3	M72	DOOR EDGE MOULDING	1
M36	UNIBODY REALIGNMENT-LT CTR	3	M73	CODE LOCK CYLINDER	1
M37	UNIBODY REALIGNMENT-RT CTR	3	M99	REFINISH SETUP	4

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## 2. A. De-Nib & Polish and Wet / Dry Sand, Rub-Out & Buff are **Not-Included** Required Repair Operations necessary to restore a damaged panel to new undamaged condition.



### GUIDE TO ESTIMATING

#### REFINISH TIME LISTINGS

All refinish times are listed in hours and tenths of an hour. A time in parentheses adjacent to the part name, such as (p3.5) indicates three and one half hours. Replacement operation time does not include time necessary to refinish the component.

Operation times for the application of painted-on stripes are not covered in this publication. The time necessary to perform this type of operation should be estimated after an on-the-spot evaluation of required procedure.

#### REFINISH TIME PREMISE

Published refinish times are for one color applied to new undamaged replacement components, without exterior trim, interior trim or other attached components and applied in one continuous process. For damaged panel(s), published refinish times may be applied after the damaged panel has been returned to a NEW UNDAMAGED condition.

Refinish times **do not include time** which may be required to match color tints or defective finish textures on interior or exterior surfaces. Nor do they include time which may be required to correct finish imperfections caused by improper weather conditions, application, or environmental contamination such as dust, dirt, grease, etc. MOTOR advises all parties consider these factors beforehand to determine mutually acceptable provisions in the event such conditions exist or occur.

#### ANTI-THEFT LABELS (R DOT)

Replacement part labels are coded with the letter "R" to show that it is a replacement part. R Dot labels should not be removed from the part. Use caution when refinish, rustproofing or undercoating replacement components to avoid damaging the label.

#### BUMPER COVERS AND OTHER FLEXIBLE COMPONENTS

Refinish times listed on the parts detail lines for these components are based on the items being refinished prior to installation. Refinish time listed on the parts detail line for an OEM bumper cover that has both body color and unpainted grained portion allows for the refinish of the body color only. Masking the grained, textured, or non-body color portions in preparation for body color application is an included operation. It includes exterior surface and edges refinished during one continuous process. If a separate edging procedure is utilized then the appropriate time should be estimated after an on-the-spot evaluation. Refinish times do not include removal of mold release agent from new unprimed molded components. Parts received from the OEM manufacturer without primer and some non-OEM parts with or without primer should be tested for the presence of release agents that would cause paint adhesion problems and treated accordingly. For unprimed bumper preparation time, see "Add If Required" operation(s). Preparation time for all other unprimed components should be estimated after an on-the-spot evaluation. For unprimed component preparation time, see Unprimed Flexible Component Preparation on page G39.

#### DOOR OUTER REPAIR PANELS

Refinish times listed on the parts detail line for new repair panels (i.e. door outer repair panel, tail gate and lift gate repair panels) include panel lip and immediate area. It does not include time for refinish the entire door frame edge or interior side. Where possible, MOTOR will publish time for those areas under a "Refinishing Notes" heading within that group.

#### DOOR SHELLS, LIFT GATES AND TAIL GATES

Refinish times listed on the parts detail line for these new components include exterior surface, edges and interior sides, unless otherwise noted in text.

#### REFINISH TIME PREMISE - Continued

#### DOOR SHELLS, LIFT GATES AND TAIL GATES - Continued

Refinish times listed under the "Refinishing Notes" heading for "door outer panel only" operations do not include time for refinish the door frame edge or interior side. Where possible, MOTOR will publish time for those areas under a "Refinishing Notes" heading within that group.

#### FENDERS, HOODS, TRUNK LIDS AND OTHER MAJOR BOLTED PANELS

Refinish times listed on the parts detail line for these new panels do not include time for refinish the edge or underside. Where possible, MOTOR will publish time for those areas under a "Refinishing Notes" heading within that group.

#### QUARTER PANELS AND OTHER MAJOR WELDED PANELS

Refinish times listed on the parts detail line for these new panels include exterior side, recessed edges, gutters and pockets, unless otherwise noted in text.

Refinish times listed under the "Refinishing Notes" heading for quarter panels or other major welded panels "exterior surface only" operations do not include time for refinish recessed edges, gutters and pockets. Where possible, MOTOR will publish time for these areas under the "Refinishing Notes" heading within that group.

#### NEW UNDAMAGED PANEL

A component manufactured to the same exacting standards as the parts installed on new vehicles when the car was built. Exterior body panels are supplied with a smooth painted surface (e-coat).

#### UNDERSIDE COLORS

Refinish times presented in this guide are developed under the premise that the underside and jamb color is the same as the exterior body color. Some vehicle manufacturers use a different color for the engine compartment, trunk compartment and/or jamba. An additional paint mix is required if the underside and/or jamb color is a different color than the exterior body color. Clear coat (gloss or matte) will be required for base color coat applications. This should be considered when developing the estimate.

#### PRIME & BLOCK

Prime & block (high build/primer-filler) is a required procedure that restores a repaired panel surface, including the joined areas of replaced welded panels, from 150-grit finish to NEW UNDAMAGED condition. It is MOTOR's position that prime and block is a process best reserved for the judgment of an estimator/appraiser following a thorough on-the-spot evaluation of the specific vehicle and damage in question.

#### REPAIRED PANEL REFINISHING

MOTOR suggests using component(s) base refinish time for this type of procedure after the damaged panel is repaired to new undamaged condition. Repaired surface preparation requires an on-the-spot evaluation for additional procedural steps such as featheredge and/or prime and block not required for new undamaged panels.

#### PARTIAL PANEL REFINISHING

This is NOT a BLEND-WITHIN procedure; partial panel refinish is NOT a BLEND operation. MOTOR defines partial panel refinish as refinish a body panel with damage that is contained within a defined border or underneath body cladding after the panel has been repaired to that of a "NEW UNDAMAGED PANEL." It is MOTOR's position that partial panel refinish is a process best reserved for the judgment of an estimator/appraiser following a thorough on-the-spot evaluation of the specific vehicle and refinish requirements in question. Refer to G.T.E. "BASIC COLOR COAT APPLICATION."

## 2. A. De-Nib & Polish and Wet / Dry Sand, Rub-Out & Buff are Not-Included Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

### GUIDE TO ESTIMATING

#### REFINISH TIME PREMISE - Continued

##### SPECIAL NOTATION:

The items or operations below were not considered during the development of any published basic refinish operation times. These operations may or may not be required depending upon the vehicle or process used. If any of these items or operations are required, they should be considered by the estimator and added to the estimate if necessary.

##### REFINISH, WET/DRY SAND, DE-NIB and/or RUB-OUT TIME DOES NOT INCLUDE:

- Anti-corrosion material application
- Filling, blocking, featheredging repaired panels
- Flex additive mixing time
- Flex prep application
- Material costs
- Mask inner panels ex: apron/cowl/pillars/rail/floor, etc.
- Molding & ornamentation
- Protective coating material application
- Protective coating removal
- Sound deadening application
- Spatter paint application time
- Stripe tape, decal & overlay
- Waste disposal fees (all types)

#### PANEL and/or COMPONENT DESIGNATION

##### MAJOR PANELS/COMPONENTS

All panels or components with a base refinish time of 1.0 hour or greater are generally considered by MOTOR to be major panels. Example: grille header panel, fender, hood, cowl top panel, doors, roof panel, rocker panel, quarter panel, engine lid, trunk lid, lift gate, rear gate, rear body panel, truck cab corner and back panel, truck bed front and side panel and van side and corner panels.

##### MINOR PANELS/COMPONENTS

All panels or components with a base refinish time of less than 1.0 hour.

##### FLEXIBLE PANELS/COMPONENTS

All panels or components for which paint systems require a flex agent added to the paint mix. Example: fascia covers, fillers, extensions, spoilers, etc.

No overlap deduction should be taken when calculating refinish time for a single item from this category.

A combination of items from this category refinished during a single, continuous procedure should be subject to the appropriate "Adjacent" or "Non-Adjacent" overlap formula deduction.

When a flex agent or a separate paint mix procedure is not required and when the flexible component is refinished during the same procedure with major or minor components, then flexible components should be considered the same designation as major or minor components for the purpose of calculating refinish overlap deductions and/or multi-stage refinishing additions.

##### INDIVIDUAL PROCEDURE ITEMS/AREAS

Areas of a panel or component that are part of a main component, but are refinished during a procedure separate from the main component. Example: edges, jambs, hinges, inside panels and the underside of hoods, deck lids, liftgates, etc.

No overlap deduction should be taken when calculating refinish time for items from this category.

#### DEDUCTIONS TO BASIC REFINISH TIMES (Refinish Overlap)

##### OVERLAP - NON-ADJACENT PARTS:

- First major panel:
  - Use full published time
- Each additional part:
  - Deduct 0.2 per part

##### OVERLAP - ADJACENT PARTS:

- First major panel:
  - Use full published time
- Each additional part with a base time of 1.0 hour or greater:
  - Deduct 0.4 per part
- Each additional part with a base time less than 1.0 hour:
  - Deduct 0.2 per part

##### OVERLAP - INNER PANEL COMPONENTS:

- First inner part:
  - Use full published time
  - Each additional inner part with a base time of 0.5 hour or greater:
    - Deduct 0.2 per part
- Inner part with a base time less than 0.5 hour:
  - No deduct

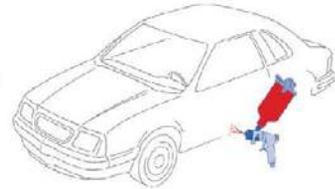
#### BASIC COLOR COAT APPLICATION

##### INCLUDED:

- Back tape opening (handle, lock cylinder, mirror)
- Clean component (solvent wash)
- Clean sprayer
- Color coat application
- Initial dry sand (as recommended by paint manufacturer)
- Light buff, lacquer paint only
- Load sprayer
- Mask adjacent panels (three-foot perimeter)
- Mask/close gap between adjacent panels up to foam tape (overspray)
- Mask glass opening
- Mask/protect grille radiator opening (overspray)
- Mix paint (color and necessary solvents)
- Primer-sealer coat application
- Primer-sealer coat final clean
- Primer-sealer coat final application
- Remove masking
- Retrieve accurate color information, including paint chip

##### DOES NOT INCLUDE:

- Adhesion promoter (unprimed flexible component)
- Backside refinishing
- Blending into adjacent panels
- Cover mask engine/compartment to prevent overspray
- Color matching to adjacent panels
- Cover/mask for prime and block
- Cover/mask for cut-in
- Cover/mask recessed edges/jambs/weatherstrips



## 2. A. De-Nib & Polish and Wet / Dry Sand, Rub-Out & Buff are *Not-Included* Required Repair Operations necessary to restore a damaged panel to new undamaged condition.



### REFINISHING PROCEDURES

## GUIDE TO ESTIMATING

### BASIC COLOR COAT APPLICATION - Continued

#### DOES NOT INCLUDE (continued):

- Cover/mask trunk/compartment to prevent overspray
- Cover/mask entire exterior of vehicle to prevent overspray damage
- Cover/mask interior of vehicle to prevent overspray damage
- Edge refinishing
- Grind, fill, & smooth welded seams (up to 150 grit sandpaper)
- Paint or material costs
- Prime & block (high build/primer-filler)
- Test spray-out panel
- Tinting Primer-Sealer
- Tinting to achieve color match
- Underside refinishing
- Weld, grind or sanding damage to adjacent panels
- **Wet sanding**

### BAGGING (Cover Entire Vehicle Exterior)

Published refinish times include time necessary to mask exterior surface adjacent to the refinish area to a perimeter of 36 inches, or 3 feet. When the process of perimeter masking is substituted for an entire vehicle bagging procedure, then no additional time should be added. If entire vehicle bagging is used along with perimeter masking, then the following formula may be considered:

#### APPLY AND REMOVE VEHICLE COVER (BAGGING)

- Add 0.2 each time a cover is applied and removed

### CLEAR COAT FINISHES (Base Coat/Clear Coat)

#### SPECIAL NOTATION:

The following items or operations were not considered during the development of any published basic refinish operation times. If any of these items or operations are required, they should be considered by the estimator. Calculations should be made after deductions for overlap and additions for underside and edges, if required.

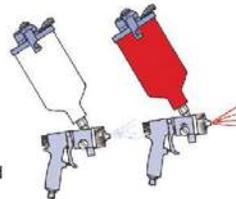
- First major panel:
  - Add 40% to refinish time
- Each additional panel:
  - Add 20% to refinish time
- Maximum time allocation:
  - 2.5 hours

#### INCLUDED:

- All components clear coated during a single, continuous procedure
- Apply clear coat
- Clean sprayer (one time)
- Mix clear coat (one time)
- Tack wipe surface (when required)

#### DOES NOT INCLUDE:

- Any component clear coated as a separate procedure
- Any operation previously excluded in "Refinish time Premise" and/or "Basic Color Coat Applications" groups
- Material costs



### THREE STAGE FINISHES (Base/Mica/Clear Coat)

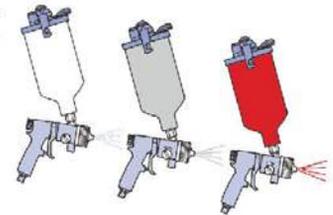
#### SPECIAL NOTATION:

The following items or operations were not considered during the development of any published basic refinish operation times. If any of these items or operations are required, they should be considered by the estimator. Calculations should be made after deduction for overlap and additions for underside and edges, if required (if three stage finish from factory).

- First major panel:
  - Add 70% to refinish time
- Each additional panel:
  - Add 40% to refinish time

#### INCLUDED

- Back tape opening (handle, lock cylinder, mirror)
- Mask/close gap between adjacent panels up to foam tape (overspray)
- Mask glass opening
- Mask/protect grille radiator opening (overspray)
- Retrieve accurate color information, including paint chip



#### DOES NOT INCLUDE

- Any component clear coated as a separate procedure
- Any operation previously excluded in "Refinish Time Premise" and/or "Basic Color Coat Application" groups
- Material costs
- Test spray-out panel

### CLEAR COAT UNDAMAGED PANEL

#### SPECIAL NOTATION:

Calculations for clear coating an undamaged panel are based upon the outer surface only and should not include additions for underside, inside or edges of the clear-coated panel. There should be no overlap deduction between refinished or clear-coated panel(s), nor should this procedure be applied towards the maximum clear coat allocation. Clear coating may be necessary for adjacent body panel(s) to nearest break point (see G 8). The following formula may be considered in the event this type of procedure is required on an undamaged panel:

- Each clear coated panel(s)
  - 40% of panel's Base Refinish Time

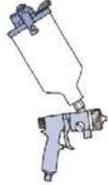
## 2. A. De-Nib & Polish and Wet / Dry Sand, Rub-Out & Buff are *Not-Included* Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

### GUIDE TO ESTIMATING

#### CLEAR COAT UNDAMAGED PANEL - Continued

##### INCLUDED:

- Back tape opening (handle, lock cylinder, mirror)
- Bonding/adhesion coat application (if required)
- Clear coat application
- Clean component (solvent/detergent wash)
- Clean in preparation for material application
- Initial wet sand or scuff
- Mask adjacent panels (three foot perimeter)
- Mask/close gap between adjacent panels up to foam tape (overspray)
- Mask glass opening
- Mask/protect grille radiator opening (overspray)
- Remove masking
- Tack wipe surface (when required)



##### DOES NOT INCLUDE:

- Correction of pre-existent surface imperfections
- Damage repair
- De-nib/wet sand and/or buff for polishing
- Masking of attached parts
- Material costs
- R&I of attached parts

#### COLOR BLEND (Adjacent Panels)

##### SPECIAL NOTATION:

Calculations for blending are based upon the outer surface only and should not include additions for underside, inside or edges of the blend panel. There should be no overlap deduction between blend panel(s) and/or refinished panel(s). This formula is not applicable to SINGLE-STAGE, 3-STAGE, 4-STAGE or TWO-TONE type finishes. Finishes of this type should be negotiated after an on-the-spot evaluation. Estimation of material cost should be based upon the full blended panel(s).

Blending may be necessary for adjacent body components to avoid noticeable color variation between newly applied paint and the existing paint of adjacent components or areas. The following formula may be considered in the event this type of procedure is required on an UNDAMAGED panel:

- Each blended adjacent panel or area  
– 50% of blend panel's base refinish time

##### INCLUDED:

- Back tape opening (handle, lock cylinder, mirror)
- Blend coat application
- Bonding/adhesion coat application
- Clean component (solvent/detergent wash)
- Clean in preparation for material application
- Clear coat application (full blend panel if required)
- Initial wet sand or scuff (when required)
- Mask adjacent panels (three-foot perimeter)
- Mask/close gap between adjacent panels up to foam tape (overspray)
- Mask glass opening
- Mask/protect grille radiator opening (overspray)
- Remove masking

#### COLOR BLEND (Adjacent Panels) - Continued

##### DOES NOT INCLUDE:

- Correction of pre-existent surface imperfections
- Cover/mask recessed edges/jamb/weatherstrips
- Damage repair
- Masking of attached parts
- Material costs
- R&I of attached parts
- Wet sand and/or buff for polishing

#### EDGES OF NEW PARTS (Edging)

##### SPECIAL NOTATION:

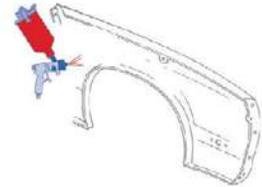
The following items or operations were not considered during the development of any published basic refinish operation times. If any of these items or operations are required, they should be considered by the estimator. An additional paint mix is required if the edge color is a different color than the exterior body color. Clear coat (gloss or matte) will be required for base color coat applications.

##### INCLUDED:

- Refer to specific parts text for estimated time allowance
- Use full refinishing time without deduction for overlap

##### DOES NOT INCLUDE:

- Clear coat
- Color tinting
- Mixing a different edge color



#### THREE STAGE COLOR BLEND (Adjacent Panels)

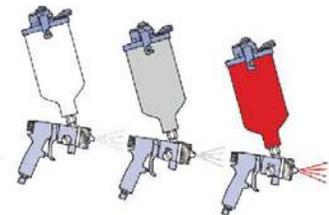
##### SPECIAL NOTATION:

Calculations for blending are based upon the outer surface only and should not include additions for underside, inside or edges of the blend panel. There should be no overlap deductions between blend panel(s) refinish time. Blending may be necessary for adjacent body components to avoid noticeable color variation between newly applied paint and the existing paint of adjacent components or areas. The following formula may be considered in the event this type of procedure is required on an undamaged panel:

- Each blended adjacent panel or area  
70% of blend panel's base refinish time

##### INCLUDED:

- Back tape opening (handle, lock cylinder, mirror)
- Blend coat application



## 2. A. De-Nib & Polish and Wet / Dry Sand, Rub-Out & Buff are **Not-Included** Required Repair Operations necessary to restore a damaged panel to new undamaged condition.



### REFINISHING PROCEDURES

## GUIDE TO ESTIMATING

### THREE STAGE COLOR BLEND (Adjacent Panels) - Continued

#### INCLUDED (continued):

- Bonding/adhesion coat application
- Clean component (solvent/detergent wash)
- Clean in preparation for material application
- Clear coat application (full blend panel if required)
- Cover/mask recessed edges/jamb
- Panel preparation (when required)
- Mask adjacent panels (three-foot perimeter)
- Mask/close gap between adjacent panels up to front tape (overspray)
- Mask glass opening
- Mask/protect grille radiator opening (overspray)
- Remove masking

#### DOES NOT INCLUDE:

- Correction of pre-existent surface imperfections
- Damage repair
- Masking of attached parts
- Material costs
- R&I of attached parts
- Wet sand and/or buff for polishing
- Test spray-out panel

### STONE CHIP GUARD (Protective Material)

#### SPECIAL NOTATION:

The following items or operations were not considered during the development of any published basic refinish operation times. If any of these items or operations are required, they should be considered by the estimator.

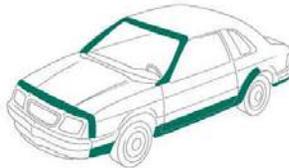
- First panel:  
– Add 0.5 per panel
- Each additional panel:  
– Add 0.3 per panel

#### INCLUDED:

- Up to a 12" height

#### DOES NOT INCLUDE:

- Texture matching

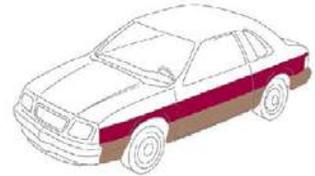


### TWO TONE REFINISHING (Second Color Tone Application)

#### SPECIAL NOTATION:

The following items or operations were not considered during the development of any published basic refinish operation times. If any of these items or operations are required on exterior, interior or undersides, they should be considered by the estimator. The following formula may be superseded by information published in specific parts text. Calculations should be made after deductions for overlap and additions for edges, if required.

- First panel:  
– Add 40% to refinish time
- Each additional panel:  
– Add 30% to refinish time



### UNDERSIDE OF HOODS, LIDS OR GATES

#### SPECIAL NOTATION:

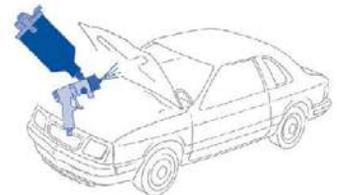
The following items or operations were not considered during the development of any published basic refinish operation times. If any of these items or operations are required, they should be considered by the estimator. An additional paint mix is required if the underside color is a different color than the exterior body color. Clear coat (gloss or matte) will be required for base color coat applications.

#### INCLUDED:

- Refer to specific vehicle text for estimated time allowance
- Use full refinishing time without deduction for overlap

#### DOES NOT INCLUDE:

- Clear coat
- Color tinting
- Mixing a different underside color



## 2. A. Finish Sand & Buff, De-Nib & Finesse are **Not-Included** Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

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### Procedure Explanation

#### Bumper Assembly O/H

##### Included Operations

- Remove and install assembly
- Disassemble and replace damaged parts
- Replace or transfer parts attached except those listed in *Not Included* Section
- Remove and install or replace: License plate/bracket
- Assemble and install
- Adjust alignment to vehicle

##### Not Included Operations

- Refinish bumper
- Remove and replace impact absorbers or mounting arms
- Remove and install or replace optional accessories (example: trailer hitch, trailer connector)
- Remove and install adhesive exterior trim; add to clean and retape
- Replace new adhesive exterior trim; deduct one-half of R&R time
- Install stripes, decals, transfers or overlays

### Procedure 28—Refinish Procedure

#### Refinish General Information

##### Complete Refinish

Refinish times in this *Guide* pertain to **NEW, UNDAMAGED PARTS** and are not intended for calculating complete vehicle refinish—single- or multi-stage. An estimate of this nature would suggest all new panels have been fitted to the vehicle.

##### Lifetime Refinish Warranty/Clear Coat

The major paint manufacturers listed below have provided the following information: "Major refinish paint manufacturers recommend that when performing refinish warranty repairs on an OEM multi-stage or basecoat/clearcoat finish, you must extend the application of clear to the nearest panel edge or breakpoint to qualify for lifetime warranty." **AKZO — DuPont — Sherwin Williams — BASF — PPG**

##### Repaired/Used Panels

Labor times related to repaired and/or used panels—example: Remove and install or masking of glass, outside handles or exterior trim, feather prime & block, masking for primer surfacer application—are not included in refinish time. The steps required for refinishing a repaired and/or used panel may vary from those required for a new panel depending on the condition of the repaired and/or used panel.

##### Feather, Prime & Block

Is the Not-Included refinish operation that completes bodywork repair from 150 grit smoothness to the condition of a new undamaged panel, and the point at which refinish labor time begins. The labor and materials associated with feather, prime and block may vary depending upon the size of the repair area, and should be evaluated when determining the work to be performed. See *Welded Panels under Estimating Information*.

##### SPOT REPAIR/BLEND ADJACENT PANEL

###### Spot Repair

Spot repair is defined as applying color to the repaired area of a damaged panel to obtain full coverage of undercoats, and blending that color into the original panel finish so that no transition can be detected. The goal is to keep the actual repair as small as possible to avoid having newly applied color directly next to an undamaged adjacent panel(s). Clear coat is then applied to the entire panel. This refinish process minimizes color mismatch.

###### Blend for Color Match

Blending is defined as applying color, without necessity to cover undercoats, to less than the full surface area of an adjacent undamaged panel. Paint manufacturers recommend blending adjacent panels when a panel is replaced, or repaired and color applied to the full surface areas, or to the area that borders the adjacent undamaged panel(s). Clear coat is then applied to the entire blended panel.

###### Major Panels

Major panels are those listed: **FRONT HEADER, FENDER, HOOD, COWL TOP, DOOR, ROCKER, ROOF, PICKUP CAB CORNER, PICKUP CAB**

**BACK, QUARTER, PICKUP BED FRONT, PICKUP BED SIDE, VAN SIDE, VAN REAR CORNER, ENGINE LID, LUGGAGE LID, LIFT GATE, REAR RATE, TAIL GATE, REAR BODY**

##### Overlap

Deduct .4 hour from refinish time for each **ADJACENT MAJOR PANEL** and deduct .2 hour from time for each **NON-ADJACENT MAJOR PANEL**. There is no overlap deduction taken for the first major panel.

Adjacent major panel example: Right front fender 2.5 hours (full time) and right front door 2.5 hours minus .4 hour overlap for a total of 4.6 hours.

Non-adjacent major panel example: Right front fender 2.5 hours (full time) and left front fender 2.5 hours minus .2 hour overlap for a total of 4.8 hours.

No overlap deductions for valance panel, pillars, door jambs, underside of hood, underside of luggage lid or underside of gate, inner panels, filler panels, soft bumper covers or bolt-on finish panels.

**NOTE:** Refinish times are for outside surfaces only unless stated otherwise in text (example: add for underside, add to edge).

##### Included Operations

- Solvent wash
- Scuff panel and clean
- Mask adjacent panels up to 36 inches or substitute with cover vehicle (bag) complete
- Prime or seal as required
- Final sanding and clean
- Mix materials
- Adjust spray equipment
- Apply color
- Clean equipment

##### Not Included Operations

- Blending into adjacent panel and/or panels, or nearest breaking point
- Color match or tinting
- Applying anti-corrosion rust resistant materials
- Additional application of soft chip primers or anti-chip undercoats
- **Finish sand and buff**
- Subsequent vehicle bagging when required: add .2 hour for each application & removal
- Mask interior to prevent overspray damage
- Removal of protective coatings
- Removal of release agent from OEM raw plastic components (example: non-primed bumper covers) See formula under *Raw Substrate Prep*
- Feather, Prime & Block paint damage to adjacent panel and/or panels joined by welding due to burn damage (see Feather, Prime & Block definition under *Refinish General Information*)
- Gravel guard refinish: add .5 hour for the first major panel and .3 hour for each additional panel.

**NOTE:** The included operation of mask adjacent panels is inclusive of any necessary back tape masking to prevent overspray.

**IMPORTANT REMINDER:** Refinish times are for **NEW, UNDAMAGED PARTS** without exterior or interior trim or attached components. Refinish times may vary depending on individual procedures, product and/or weather conditions.

A small percentage of colors are identified by the paint manufacturers as highly transparent. These colors may require additional application coats to achieve visual hiding. In instances where four or more color coats are necessary to achieve adequate hiding, some adjustment in refinish times may be appropriate.

**IMPORTANT REMINDER:** The cost of paint and materials is not included in refinish time.

**NOTE:** Gravel Guard application and appropriate refinish may be necessary beyond the actual replacement area to achieve a "texture" match.

It may be necessary to tint or otherwise modify non-exterior colors applied to undersides, edges and/or jambs for which there is no paint color formula to achieve a color match. When necessary, reference "color match or tinting" listed above in *Not Included Operations*.

##### Raw Substrate Prep

Allow .2 per refinish hour (20%) for plastic components that come from the manufacturer/supplier in a raw/un-primed state.

## 2. A. Finish Sand & Buff, De-Nib & Finesse are *Not-Included* Required Repair Operations necessary to restore a damaged panel to new undamaged condition.

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### Procedure Explanation

- Remove and install or mask attached components, trim, stripes or decals on blended panel/area
- Finish, sand, and buff

**NOTE:** Blend labor time does not apply to two-tone refinish or custom non-OEM refinish. **No overlap deduction applies to blended panel(s)/refinish area(s).**

**NOTE:** When calculated, the estimate will allocate 40% from the total blend time and apply it to the three stage line item. The total sum of the blend line and the amount allocated in the three stage line will total 70% of the exterior refinish time for the panel being blended.

*Example:* A panel refinish time is 2.0 hrs. When blended, the refinish time for that panel will be displayed as 1.4 (.7 per refinish hour). Once calculated, the refinish blend line will be displayed as .8 and .6 (40%) will be allocated to the three stage line.

#### Extension of Clear Coat

In some applications, it may be required to extend the application of clear to the nearest panel edge or breakpoint.

The performance of this operation is **NOT INCLUDED** in the Mitchell refinish labor time.

The extension of clear coat formula is intended to be calculated as a percentage of base refinish hours excluding overlap.

It **DOES NOT APPLY** to edges, jambs, and undersides. No deduction for overlap should be taken.

This formula **DOES APPLY** to the 2.5 hours maximum clear coat allocation. Should this operation be necessary, the following formula is provided:

#### Extend Clear to Adjacent Panel(s)

Extend clear to adjacent panel(s): Allow **.5 per refinish hour (50%)** for each panel(s)/refinish area(s) cleared.

#### Included Operations

- Detergent/solvent wash
- Wet sand, scuff (ScotchBrite) or rubout (compound) panel and clean for preparation
- Mask existing adjacent panels to 36"
- Apply bonding material - if required
- Clean and tack surface
- Apply clear material

#### Not Included Operations

- Repair existing surface imperfections
- Remove and install or mask attached components, trim, stripes or decals on extended clear panel/area
- Finish, sand, and buff
- Nib sand and finesse

#### Finish Sand & Buff

A labor time formula is provided **should it be necessary to perform this operation**. This procedure includes the removal of orange peel and any blemishes that affect paint texture in order to produce a smooth finish to the entire panel surface. This process is not limited to "nib sanding" or "finessing" which is the removal of **isolated dirt/dust particles only**. The performance of this operation is **NOT INCLUDED** in the Mitchell refinish labor time.

The finish sand and buff formula is intended to be calculated as a percentage of the base refinish hours excluding overlap and clear coat. It **DOES NOT APPLY** to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinish time. No deduction for refinish overlap should be taken.

**Finish sand and buff outside surface area(s):** Allow **.3 per refinish hour (30%)** to finish sand and buff each surface area(s).

#### De-nib & Finesse

A labor time formula is provided **should it be necessary to perform this operation**. This procedure includes the removal of small isolated dust particles (nibs) and the application of a finishing glaze.

The performance of this operation is **NOT INCLUDED** in the Mitchell refinish labor time.

The de-nib and finesse formula is intended to be calculated as a percentage of the base refinish hours excluding overlap and clear coat. It **DOES NOT APPLY** to edges, jambs, and undersides. For blended panels, the formula should be applied to the full panel refinish time. No deduction for refinish overlap should be taken.

**De-nib and finesse outside surface area(s):** Allow **.2 per refinish hour (20%)** to de-nib and finesse each surface area(s).

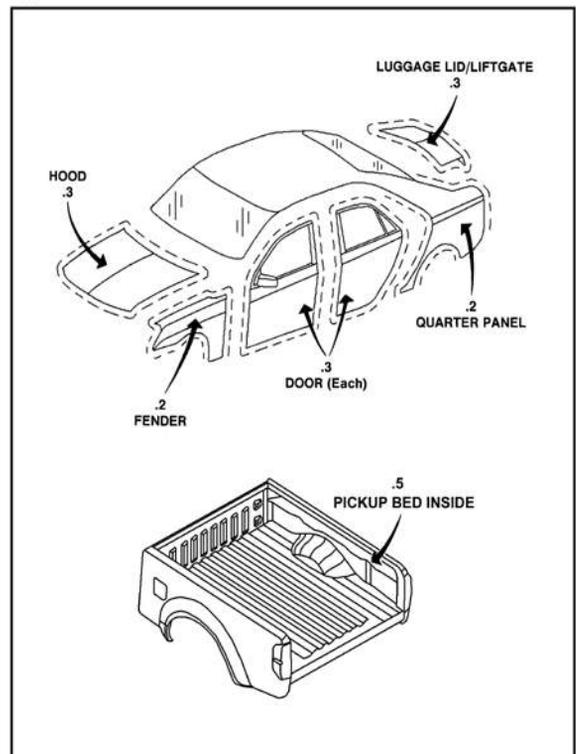
#### Mask Vehicle to Prevent Overspray Damage

The following refinish information is provided should it be necessary to perform these operations as determined by individual job requirements:

#### MASK INTERIOR, ENTRYWAYS, ENGINE COMPARTMENT AND TRUNK OPENINGS

Interior masking may be necessary when refinishing exterior surfaces to stop overspray damage that is not prevented by adjacent panel perimeter masking which includes back taping or application of foam tape. Interior masking may also be used when exterior panels (door, hood, etc.) are removed while applying refinish material. The performance of this operation is **NOT INCLUDED** in the Mitchell refinish labor time.

Fig. 1: IDENTIFYING INTERIOR MASKING LOCATIONS



**NOTE:** The times shown in the illustration are for interior masking of that panel and/or opening. Labor time includes all pillars, jambs, weatherstrips, edges, entryways and openings as necessary. Deduct **.1 hour overlap** for each interior masked adjacent panel and/or opening.

The Mitchell *REFINISHING MATERIALS GUIDE* has the Latest Available Costs for Materials Used in Single and Multi-Stage Refinishing, and is an Accurate Source for Determining Costs.

## 2. B. SCRS, ASA and many other resources list:

- Color Sand & Buff, Nib Sanding, Finish Sand & Buff, De-Nib & Finesse, Wet / Dry Sand Rub Out & Buff and De-nib & Polish as ***Not-Included*** Required Repair Operations necessary to restore a damaged panel to new undamaged condition.



### Labor Category Legend – By Color:

- Body
- Paint
- Structural
- Mechanical
- Detail
- Other

607. SPOT PAINT CENTER FLOOR AREA		
608. SPOT PAINT CROSSMEMBER		
609. SPOT PAINT FLOOR EXTENSIONS		
610. SPOT PAINT RAILS AT WELD AREA, UNDERSIDE		
611. SPOT PAINT WHEEL HOUSE AT WELD AREA		
612. FLOOR TWO TONE AND/OR BLACK-OUT		
<b>105 - Protection &amp; Safety:</b>		
613. D&R HYBRID BATTERY		
614. HYBRID BATTERY PROTECTIVE STORAGE		
615. D&R BATTERY		
616. RESET ELECTRONIC MEMORY, RADIO		
617. RESET ELECTRONIC MEMORY, SEAT/STEERING WHEEL		
618. DIAGNOSE SRS DISPLAY		
619. DISABLE/ENABLE SRS		
620. DIAGNOSE ALARM CODES		
621. MASK ELECTRONIC CONNECTIONS		
622. R&I FUEL TANK		
623. DRAIN FUEL FROM TANK		
<b>110 - Paint Prep:</b>		
624. REMOVE OIL , TAR & GREASE		
625. REMOVE CORROSION PROTECTION MATERIAL		
626. RESTORE CORROSION PROTECTION		
627. REMOVE MOLDING ADHESIVE		
<b>115 - Refinish Process:</b>		
628. DIFFICULT COLOR, TINTING & TESTING (INACCURATE VARIANCE)		
629. MASK FOR PRIMING		
630. SPOT PAINT CORESUPPORT AFTER INSTALLED (SECOND PAINT)		
631. SPRAY OUT TEST PANEL		
632. SPRAY OUT LET-DOWN PANEL FOR THREE STAGE		
633. SPRAY OUT LET-DOWN PANEL FOR TRANSPARENT COLOR		
634. COLOR TINT & TEST TO BLENDABLE MATCH		
635. COLOR TINT SECOND COLOR		
636. GRAVEL GUARD FIRST PANEL		
637. GRAVEL GUARD SECOND PANEL		
638. GRAVEL GUARD THIRD PANEL		
639. GRAVEL GUARD SPRAY-OUT TEST PANEL		
640. HAZARDOUS WASTE DISPOSAL		
641. UNDERSIDE COLOR TINTING & TESTING (CORESUPPORT & TRUNK AREAS)		
642. UNDERSIDE COLOR REFINISH		
643. COVER VEHICLE (FOR REFINISHING ONE TIME)		
644. REFINISHING JAMBS (SEPARATE COLOR THAN EXTERIOR-EACH COLOR*)		
645. MASKING JAMBS		
<b>120 - Color-Sand &amp; Polish:</b>		
646. COLOR SAND & POLISH, 1 <sup>ST</sup> PANEL (MATERIALS AND LABOR)		
647. COLOR SAND & POLISH, 2 <sup>ND</sup> PANEL (MATERIALS AND LABOR)		
648. COLOR SAND & POLISH, 3 <sup>RD</sup> PANEL (MATERIALS AND LABOR)		
649. COLOR SAND & POLISH, 4 <sup>TH</sup> PANEL (MATERIALS AND LABOR)		
650. COLOR SAND & POLISH, 5 <sup>TH</sup> PANEL (MATERIALS AND LABOR)		
651. COLOR SAND & POLISH, 6 <sup>TH</sup> PANEL (MATERIALS AND LABOR)		
652. COLOR SAND & POLISH, 7 <sup>TH</sup> PANEL (MATERIALS AND LABOR)		

## 2. B. SCRS, ASA and many other resources list:

- Color Sand & Buff, Nib Sanding, Finish Sand & Buff, De-Nib & Finesse, Wet / Dry Sand Rub Out & Buff and De-nib & Polish as ***Not-Included*** Required Repair Operations necessary to restore a damaged panel to new undamaged condition.



### Labor Category Legend – By Color:

- Body
- Paint
- Structural
- Mechanical
- Detail
- Other

653. COLOR SAND & POLISH, 8 <sup>TH</sup> PANEL (MATERIALS AND LABOR)		
654. FINAL WASH TO REMOVE COMPOUND RESIDUE		
655. POLISH RIM SKUFF		
656. SPOT REFINISH RIM		
<b>125 - Stripes:</b>		
657. REMOVE OLD STRIPES (WITH ERASER WHEEL)		
658. RESTRIPE WITH FINE-LINE TAPE		
659. RESTRIPE PAINTED-ON		
660. FACTORY STRIPE INSTALLATION		
<b>130 - Glass:</b>		
661. CAUTIONARY STEPS TO PREVENT DAMAGE		
662. REPAIR FLANGE DAMAGE FROM CUT KNIFE		
663. TEST FIT GLASS		
664. REMOVE URETHANE RESEDUE AT PINCHWELD, FULL CUT OUT		
665. BROKEN GLASS CLEAN-UP (SEATS & CARPET)		
666. BROKEN GLASS CLEAN-UP (VENTS / R&I Dash Needed?)		
667. URETHANE GLASS KIT		
<b>135 - Frame Set Up:</b>		
668. UNIBODY CLAMP SYSTEM		
669. FULL FRAME CLAMP SYSTEM		
670. NON-DRIVE VEHICLE (NO START)		
671. DISABLED VEHICLE (DOES NOT ROLL)		
672. LIFTED/LOWERED VEHICLE		
673. TRAM VEHICLE TO DETERMINE IF MOVEMENT EXISTS		
674. INSTALL MECHANICAL MEASURING SYSTEM		
675. ELECTRONIC MEASUREMENT DOCUMENT		
676. R&I ROCKER MLDGS- ACCESS TO CLAMP AREA		
677. ACCESS PULLING TO FACILITATE TEAR DOWN		
678. R&I INTERFERING WIRES, TUBING/LINES, EXHAUST		
679. R&I SUSPENSION/STEERING, PARTIAL		
680. REPAIR CLAMP SCARING ON ROCKER FLANGE		
681. REPAIR ANCHOR DAMAGE AT LOCKING POINTS		
682. REPAIR PROTECTIVE COATING AT ROCKER		
683. PAINT ROCKER FLANGE		
<b>140 - Front End Damage:</b>		
684. PRE-PULL TO FACILITATE TEAR DOWN		
685. PULL & REPOSITION CORESUPPORT		
686. REPAIR FRONT BUMPER WELDED MOUNTING BRACKET (EACH)		
687. CORRECT UPPER RAIL/APRON SWAY, LEFT		
688. CORRECT UPPER RAIL/APRON SWAY, RIGHT		
689. CORRECT UPPER RAIL/APRON HEIGHT, LEFT		
690. CORRECT UPPER RAIL/APRON HEIGHT, RIGHT		
691. CORRECT UPPER RAIL APRON LENGTH/MASH, LEFT		
692. CORRECT UPPER RAIL APRON LENGTH/MASH, RIGHT		
693. REPAIR AND CORRECT DIAMOND CONDITION		
694. MEASURE SUSPENSION		
695. POSITION AND ALIGN FRONT CROSSMEMBER		
696. POSITION AND ALIGN CENTER CROSSMEMBER		
697. POSITION AND ALIGN REAR CROSSMEMBER		
698. R&I COMPONENTS MOUNTED TO APRON-S		

Last Updated 04-2011

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# Final Sand & Polish

- **Audatex – Color Sand & Buff, Nib Sanding / De-nib**
- **CCC / Motor – Wet / Dry Sand Rub Out & Buff and De-nib & Polish**
- **Mitchell – Finish Sand & Buff, De-nib & Finesse**

## 3. What *Documentation* do we have to show that the Repair Operation was Performed and Completed as Required?

(See the following examples of Before, During & After Photos, S.O.P.'s, Directions For Use)

### 3. What *Documentation* do we have to show that the Repair Operation was Performed and Completed as Required?

#### Documentation for De-Nib & Polish (Examples of Before, During & After Photos)

- *Audatex – Nib Sanding / De-nib*
- *Mitchell – De-nib & Finesse*
- *CCC / Motor – De-nib & Polish*



1. Before



2. During



3. After



# Documentation for Final Sand & Polish

(Examples of Before, During & After Photos)

- *Audatex – Color Sand & Buff*
- *Mitchell – Final Sand & Buff*
- *CCC / Motor – Wet / Dry Sand Rub Out & Buff*

## 1. Before



1. Wet/Dry Sand



2. Compound

## 2. During



3. Polish



4. Ultra Fine Polish

## 3. After



5. Clean-up



# De-nib & Polish



## Standard Operating Procedures

### Sanding

Paint Finish Denibbing Process		Product List	
<b>1</b>	<p><b>Initial Defect Removal</b></p> 	<p>Attach the appropriate abrasive to the denibbing tool 1000 (Black) for large dirt nibs &amp; 1500 (Grey) for small dirt nibs. Adjust the speed to the appropriate setting. Use medium setting as a starting point. Turn on tool and sand the nib with light downward pressure. Water may be required for some clearcoats.</p>	<ul style="list-style-type: none"> <li>3M™ Perfect-It™ Denibbing Tool, PN 07650 Cordless dent sander</li> <li>3M™ Perfect-It™ Denibbing Abrasive, PN 02047 P1000 Grade Tritract™ abrasive stem, 20 stems per box</li> <li>3M™ Perfect-It™ Denibbing Abrasive, PN 02080 P1500 Grade Tritract™ abrasive stem, 20 stems per box</li> </ul>
<b>2</b>	<p><b>Scratch Refinement</b></p> 	<p>If the 1000 grit abrasive was used in step one, refine these coarse scratches with the 1500 denibbing abrasive before polishing. Use the same sanding technique as in step one for best results.</p>	<ul style="list-style-type: none"> <li>3M™ Perfect-It™ Denibbing Abrasive, PN 02047 P1000 Grade Tritract™ abrasive stem, 20 stems per box</li> <li>3M™ Perfect-It™ Denibbing Abrasive, PN 02080 P1500 Grade Tritract™ abrasive stem, 20 stems per box</li> </ul>
<b>3</b>	<p><b>Apply Polish</b></p> 	<p>Attach the 3 in. 3M™ Purple Foam Pad to the polisher. If the pad is dry apply a small amount of 3M™ Perfect-It™ Denibbing Polish directly to the pad. Apply a small spot of polish on each nib as well. For optimum performance, set polisher at 70 to 90 PSI.</p>	<ul style="list-style-type: none"> <li>3M™ Perfect-It™ Foam Buffing Pad, PN 05759 Foam Buffing Pad, 3 in., Purple</li> <li>3M™ Perfect-It™ Denibbing Polish, PN 39063 Denibbing Polish, 16 oz./473 mL.</li> <li>3M™ Polisher, PN 28363, 75 mm Diameter</li> </ul>
<b>4</b>	<p><b>Machine Polish</b></p> 	<p>Slightly collapse the foam pad to the painted surface and pull the trigger to start polishing the defect area. Using a circular motion, polish each sanded area for 7 to 10 seconds. Minimize siring by releasing the trigger while pad is still collapsed on the surface. Wipe residue with a yellow microfiber cloth.</p>	<ul style="list-style-type: none"> <li>3M™ Perfect-It™ Detailing Cloth, PN 06016 Yellow Microfiber Cloth</li> <li>3M™ Polisher, PN 28363, 75 mm Diameter</li> </ul>
<b>5<sub>A</sub></b>	<p><b>Swirl Elimination (Option A)</b></p> 	<p>On dark colored vehicles, attach the 3 in. Ultrafine foam polishing pad to the polisher. Apply a small amount of 3M™ Ultrafine Machine Polish directly to a dry pad. Apply a small spot of 3M™ Ultrafine Machine Polish to each nib as well. Polish the haze spots for 7 to 10 seconds each, and wipe residue with a blue microfiber cloth.</p>	<ul style="list-style-type: none"> <li>3M™ Perfect-It™ Ultrafine Foam Polishing Pad, PN 05760 Foam Polishing Pad, 3 in., Blue</li> <li>3M™ Perfect-It™ Ultrafine Machine Polish, PN 39062 Machine Polish, 16 oz./473 mL.</li> <li>3M™ Perfect-It™ Detailing Cloth, PN 06020 Light Blue Microfiber Cloth</li> </ul>
<b>5<sub>B</sub></b>	<p><b>Swirl Elimination (Option B)</b></p> 	<p>A full sized polisher equipped with a 3M™ Ultrafine Foam Polishing Pad may also be used to polish the full panel. Wipe residue with a blue microfiber cloth.</p>	<ul style="list-style-type: none"> <li>3M™ Perfect-It™ Ultrafine Foam Polishing Pad, PN 05708 9 in., 1 pads/bag</li> <li>3M™ Perfect-It™ Detailing Cloth, PN 06020 Light Blue Microfiber Cloth</li> <li>3M™ Electric Variable Speed Polisher, PN 28391</li> </ul>



## Think About Your Health



3M™ E-A-R™ Skull Screws™ Ear Plug, PN P1300



3M™ Particulate Respirator N95 PN 07185



3M™ Lexa™ Protective Eyewear, PN 15200

For ordering information, contact your 3M Sales Representative

Watch the video at [www.3MCollision.com](http://www.3MCollision.com)



# Final Sand & Polish (Small Area)



Standard Operating Procedures

Automotive Detailing

Paint Finish Small Area Process		Product List	
<b>1</b>	<p><b>Initial Defect Removal</b></p>  <p>DA sand the repair area with a 3 in. P1500 Finishing Film discs, removing all paint defects. Wipe panel clean. When using Trizact™ Abrasives, use a light mist of water while sanding to avoid clogging of the disc.</p>	 <ul style="list-style-type: none"> <li>• 3M™ Trizact™ Hookit™ Clear Coat Sanding Disc, PN 02094 P1500, 3 in., 25 discs per box</li> <li>• 3M™ Hookit™ Finishing Film, PN 00907 3 in., P1500, 50 discs per box</li> <li>• 3M™ Hookit™ Soft Interface Pad, PN 05771 3 in., 1 pad/bag</li> </ul>	<p><b>Think About Your Health</b></p> 
<b>2</b>	<p><b>Scratch Refinement</b></p>  <p>Refine the P1500 scratches with a DA and a 3 in. P3000 Trizact™ Foam Disc used damp with a soft interface pad. Wipe panel clean.</p>	 <ul style="list-style-type: none"> <li>• 3M™ Trizact™ Hookit™ Foam Disc, PN 02087 3 in., P3000, 15 discs per box</li> <li>• 3M™ Hookit™ Soft Interface Pad, PN 05771 3 in., 1 pad/bag</li> </ul>	<p><b>Think About Your Health</b></p> 
<b>3</b>	<p><b>Compound</b></p>  <p>Compound the repair area with a 3 in. polisher. Use a 3 in. foam compound pad and the appropriate rubbing compound. Wipe panel clean.</p>	 <ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Rubbing Compound, PN 06085 1 qt. (946 mL)</li> <li>• 3M™ Foam Buffing Pad, PN 05759 3 in., 2 pads/bag</li> </ul>	<p><b>Think About Your Health</b></p> 
<b>4</b>	<p><b>Machine Polish</b></p>  <p>Polish the repair area with a 3 in. polisher. Use a 3 in. black foam polishing pad and the appropriate machine polish. Wipe panel clean with a yellow microfiber cloth.</p>	 <ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Machine Polish, PN 06064 1 qt. (946 mL)</li> <li>• 3M™ Perfect-It™ Foam Polishing Pad, PN 05726 3 in., 2 pads/bag</li> <li>• 3M™ Perfect-It™ Detail Cloth, PN 06016, 6 cloths/bag</li> </ul>	<p><b>Think About Your Health</b></p> 
<b>5</b>	<p><b>Ultrafine Machine Polish</b></p>  <p>Ultrafine polish the repair area with a 3 in. polisher. Use a 3 in. blue foam polishing pad and ultrafine machine polish. Leave a light film of polish on the surface and wipe the panel clean with a blue microfiber cloth.</p>	 <ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Ultrafine Machine Polish, PN 06068 1 qt. (946 mL)</li> <li>• 3M™ Perfect-It™ Ultrafine Foam Polishing Pad, PN 05760 3 in., Single Sided, 2 pads/bag</li> <li>• 3M™ Perfect-It™ Detail Cloth, PN 06016 6 cloths/bag</li> </ul>	<p><b>Think About Your Health</b></p> 
<b>6</b>	<p><b>Final Detail</b></p>  <p>Clean sling from adjacent panels and door jamb areas. Doing this immediately after the repair will greatly improve the ease of this step.</p>	 <ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Detail Cloth, PN 06016 6 cloths/bag</li> </ul>	<p><b>Think About Your Health</b></p> 

Watch the video at [www.3MCollision.com](http://www.3MCollision.com)

For ordering information, contact your 3M Sales Representative



# Final Sand & Polish (Full Panel)



## Standard Operating Procedures

### Automotive Detailing

Paint Finish Full Panel Process		Product List	
<b>1</b>	<p><b>Initial Defect Removal Texture Match</b></p> 	<p>DA sand the repair area with a P1500 3M™ Trizact™ Clearcoat Sanding Disc used damp or P1500 3M™ Hookit™ Purple Finishing Film Disc. Remove all paint defects and match texture to adjacent OEM panels. Wipe panel clean.</p>	<ul style="list-style-type: none"> <li>• 3M™ Trizact™ Hookit™ Clearcoat Sanding Disc, PN 02088 P3000, 6 in., 25 discs per box</li> <li>• 3M™ Purple Finishing Film Hookit™ Disc, PN 30667 P1500, 6 in., 50 discs per box</li> <li>• 3M™ Hookit™ Soft Interface Pad, PN 05777, 6 in., Disc</li> </ul>
<b>2</b>	<p><b>Scratch Refinement</b></p> 	<p>Refine the P1500 scratches with a DA and a P3000 3M™ Trizact™ Foam Disc used damp with a soft interface pad. Wipe panel clean.</p>	<ul style="list-style-type: none"> <li>• 3M™ Trizact™ Hookit™ Foam Disc, PN 02085 P3000, 6 in., 15 discs per box</li> <li>• 3M™ Hookit™ Soft Interface Pad, PN 05777, 6 in., Disc</li> </ul>
<b>3</b>	<p><b>Compound</b></p> 	<p>Compound the repair area with a high speed polisher set between 1200 to 2000 rpm. For faster results, use a wool compounding pad and the appropriate rubbing compound. Wipe panel clean.</p>	<ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Rubbing Compound, PN 06065, 1 qt. (946mL.)</li> <li>• 3M™ Perfect-It™ Wool Compounding Pad, PN 05763, 9 in.</li> <li>• 3M™ Perfect-It™ Foam Compounding Pad, PN 05706, 9 in.</li> <li>• 3M™ Quick Release Adaptor, PN 05752, 5/8 in. Thread</li> <li>• 3M™ Perfect-It™ Low Linting 100% Wool Compound Pad, PN 33279, Double Sided, Quick Connect</li> </ul>
<b>4</b>	<p><b>Machine Polish</b></p> 	<p>Polish the repair area with a high speed polisher set between 1200 to 2000 rpm. Use a black foam polishing pad and the appropriate machine polish. Wipe the panel clean with a yellow microfiber cloth.</p>	<ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Machine Polish, PN 06064, 1 qt. (946mL.)</li> <li>• 3M™ Perfect-It™ Foam Polishing Pad, PN 05707, 9 in.</li> <li>• 3M™ Quick Release Adaptor, PN 05752, 5/8 in. Thread</li> <li>• 3M™ Perfect-It™ Detail Cloth, PN 06016, 6 cloths/bag</li> </ul>
<b>5</b>	<p><b>Ultrafine Machine Polish</b></p> 	<p>Polish the repair area with a high speed polisher with the speed set between 1200 to 2000 rpm. Use a blue foam polishing pad and the appropriate ultrafine machine polish. Leave a light film of the polish on the panel and wipe clean with a blue microfiber cloth.</p>	<ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Ultrafine Machine Polish, PN 06068, 1 qt. (946mL.)</li> <li>• 3M™ Perfect-It™ Ultrafine Foam Polishing Pad, PN 05708, 9 in.</li> <li>• 3M™ Quick Release Adaptor, PN 05752, 5/8 in. Thread</li> <li>• 3M™ Perfect-It™ Detail Cloth, PN 06020, 6 cloths/bag</li> </ul>
<b>6</b>	<p><b>Final Detail</b></p> 	<p>Remove any masking material from the repair area and clean any residual sling from adjacent panels and door jamb areas. Cleaning the panel immediately after compounding and polishing will greatly improve the ease of cleaning.</p>	<ul style="list-style-type: none"> <li>• 3M™ Perfect-It™ Detail Cloth, PN 06020 6 cloths/bag</li> <li>• 3M™ Perfect-It™ Clean and Shine, PN 06084 16 fl. oz., bottle</li> </ul>



## Think About Your Health



3M™ E-A-R™ Skull Screws™ Ear Plug, PN P1300



3M™ Particulate Respirator N95 PN 07185



3M™ Lexa™ Protective Eyewear, PN 15200



# A Perfect Finish

## 3M™ Perfect-It™ Paint Finishing System



### DEFECT REMOVAL P1500

To remove dirt nibs and level excess surface texture over large or small areas, use the following fine grade abrasives:

- 3M™ Purple Finishing Film Disc, P1500, PN 30667**
  - Use dry to highlight surface defects, then remove.
- 3M™ Trizact™ Clear Coat Sanding Disc, P1500, PN 02088**
  - Use damp for long life and reduced 'pigtail' marks.
- 3M™ Wetordry™ Sheet, 2000, PN 02044**



### SCRATCH REFINEMENT P3000

To reduce compounding time, refine the remaining scratches using the following abrasive:

- 3M™ Trizact™ Hookit™ Foam Disc, P3000, PN 02085**
    - Use damp to reduce compounding time.
- Removing P1500 scratches means less time compounding.  
P3000 abrasive is required prior to using 5000 abrasive.*



### SCRATCH REFINEMENT 5000

For the best results and ultimate finish, further refine the P3000 scratches using the following abrasive:

- 3M™ Trizact™ Hookit™ Foam Disc, 5000, PN 30662**
    - Use damp.
- Removing P3000 scratches means even less time compounding.  
Do not use in place of P3000. P3000 abrasive is required prior to using 5000.*



### COMPOUND

To remove sand scratches completely in the shortest amount of time, use the following compound and pads:

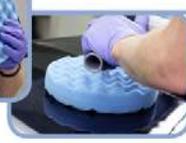
- 3M™ Perfect-It™ Rubbing Compound, PN 06085**
- 3M™ Perfect-It™ Compounding Pads**
  - For the fastest cut, use a 3M™ Perfect-It™ Wool Compounding Pad, 05753 or 05719.
  - To reduce lint and achieve a better finish, use a Perfect-It™ Low Linting Wool Compound Pad, PN 33279.
  - Eliminate lint and achieve a finer finish by using a 3M™ Perfect-It™ Foam Compounding Pad, PN 05706 or 05737.



### POLISH

To remove compound swirl marks, use the following polish and pads:

- 3M™ Perfect-It™ Machine Polish, PN 06064**
- 3M™ Perfect-It™ Machine Polishing Pads:**
  - For the best finish on all colors, use a black 3M™ Perfect-It™ Foam Polishing Pad, PN 05707 or 05738.



### SWIRL ELIMINATION

To eliminate fine swirl marks (even on dark colored vehicles), use the following polish and pads:

- 3M™ Perfect-It™ Ultrafine Machine Polish, PN 06068**
- 3M™ Perfect-It™ Ultrafine Machine Polishing Pads:**
  - For the best finish, use a blue 3M™ Perfect-It™ Ultrafine Polishing Pad, 05708 or 05733.





**Automotive  
Aftermarket Division**  
3M Center  
Building 223-6N-01  
St. Paul, MN 55144-1000  
U.S.A.

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