User instructions for time-setting of car painting

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Content

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1 General

The times in this document are based on studies performed at approved workshops according to automotive- and insurance associations. All workshops fulfilled the standards and requirements according to MRF´s MRF's (The Swedish Association for Motor retail trades and repairs) paint standard 2010 and according to the instructions in this document. These studies have been performed with cooperation of the automotive- insurance representatives.

Time calculations refer to painting performed in spray booth or combo booth, in facilities and with equipment that are approved by governing authorities for painting purposes.

The times are valid for passenger cars and transport vehicles up to 3,5 tonnes.
The times stated in the list are expressed in periods (1 hour = 100 periods).

For more detailed information about pre-conditions, see the heading 8.

2 Paint type classification

Paint type 2	Paint type 3
Base coat	Colour-specific undertone
Clear coat	Transparent base coat
	Clear coat

For vehicles with requirements on other methods and paint build-up, e.g., 3-layer with coloured clear coat or matte-finished vehicles, times are set on a case-by-case basis.

2.1.1 Explanation of paint type classification

Paint type 2

Colour-adapted primer filler and colour with poor coverage is included in the times.

Paint type 3

Colour-specific undertone is included in the times. Colour-specific undertone, transparent Pearl/solid, number of layers is adapted to reference surface or reference colour sample. Difference from paint type 2 is double spraying and process time.

Note that time for 1-layer solid paint, which no longer is included in the time formula, is set as paint type 2 where applicable.

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3 Painting procedure

3.1 Included work steps

3.1.1 Painting of new metal part

- Cleaning
- Fine-filling of pores and scratches
- Sanding of fine filler
- Matting of primer coat
- Masking
- Wash primer on ground (bare metal) surfaces
- Application of primer filler
- Sanding of primer filler
- Build-up of paint surface according to paint type 2 or paint type 3
- Demasking, checking
- Post-adjustment according to paint standard

3.1.2 Painting of old metal part

- Washing/cleaning
- Sanding of damaged surface
- Sanding of stone chips, if any
- Masking
- Fine-filling of pores and scratches
- Sanding of fine filler
- Wash primer on ground (bare metal) surfaces
- Application of primer filler
- Sanding of primer filler
- Matting of undamaged surfaces
- Build-up of paint surface according to paint type 2 or paint type 3
- Demasking, checking
- Post-adjustment according to paint standard

3.1.3 Painting of new plastic part

- Cleaning
- Fine-filling of pores and minor nicks
- Sanding of fine filler
- Matting
- Build-up of paint surface according to paint type 2 or paint type 3 with plasticizer in the clear coat
- Post-adjustment according to paint standard

- In section 5.3.3 (priming of new plastic part) application and sanding of primer filler with plasticizer is included.

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3.1.4 Painting of old plastic part

- Washing/cleaning
- Sanding of scratches up to 1 mm as well as stone chips.
- Fine-filling
- Sanding of fine filler
- Matting of undamaged surfaces
- Plastic primer on ground (bare metal) surfaces
- Application of primer with plasticizer
- Sanding of primer
- Build-up of paint surface according to paint type 2 or paint type 3 with plasticizer in the clear coat
- Post-adjustment according to paint standard

3.1.5 Painting of adjacent surface

- Washing/cleaning
- Matting
- Masking
- Fading of base coat (on part of surface)
- Application of clear coat (on whole surface)
- Demasking, checking
- Post-adjustment

3.2 Removing and installing

Times do not include removal and installation work for, e.g., remove/install trim, remains of glue/adhesives, rear-view mirrors, bumpers, etc.

Removal/installation of parts that are temporarily installed by the body shop for transport reasons, e.g., front hood and doors, is included in the times.

3.3 Cleaning

Times include use of floor, seat, and steering wheel covers as well as cleaning of the object, after soiling caused by the paint work.

3.4 Grinding and paint removal

Grinding and paint removal are assessed, and times are set on a case-by-case basis.

Sanding of stone chips is included in the times for painting of old paint surfaces (not applicable to adjacent surfaces).

Actions for flaked or peeling paint are not included in the time formula.

3.5 Corrosion damage and flaked or peeling galvanization (alkali removal)

Actions for corrosion damage and flaked or peeling galvanization (alkali removal) are not included in the time formula.

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3.6 Filling

3.6.1 Metal surfaces

Times include time for fine-filling of scratches and pores in the paint layer (not applicable to adjacent surfaces).

When filling aligned parts, normal alignment quality is assumed from the body shop, that is, correct contour-aligned surface and worked with sandpaper P120 or finer. Times include time for fine-filling of scratches and pores in the aligned surface.

Actions for defects, e.g., door scuff marks, are not included in the time formula.

3.6.2 Plastic surfaces

3.6.2.1 Old plastic surfaces

The painting procedure includes filling of scratches down to 1 mm with polyester filler on surfaces not covered by pedestrian protection. Surfaces to be filled and are covered by pedestrian protection shall be handled as plastic repair.

3.6.2.2 Plastic-repaired surfaces

Coming from the plastic repair shop, the damaged surface shall have been worked with P240 when sanded with machine or P320 when sanded by hand, or finer. The damaged surface shall not require any extra filling or sanding work before priming with sanding filler.

3.6.2.3 New plastic surfaces

Polyester filler may only be used for some minor pore or a minor nick.

3.7 Retouch and polish

3.7.1 Retusch when replacing parts

When painting replaced welded parts such as rear fenders and sills, the time for a normal retouching of adjacent areas is included in the replaced part. The retouch is a limited painting of the adjacent part(s) in order to fix the paint damages caused by the replace operation.

It is assumed that the retouch is professionally carried out in accordance to the paint standard.

Spare parts that reaches over a number of positions, for example a rear fender with a “sill-part” included in the spare part. The sill-part of the rear fender is then counted to the sill. The positions are timed in it’s entirety.

3.7.2 Polish of retouching

Included in the paint time is time for polishing of the retouch of adjacent areas such as rear fender and roof edge. This applies to both new and old surfaces.
It is assumed that the polishing is professionally carried out in accordance with the paint standard.

3.8 Colour matching

Included in the paint time is the matching of colour with actual paint recipe/variants and/or measurement with **spectrophotometer**. Painting of test strips is included as well when the above methods are not applicable.

In the time study both surface-dependent and colour-dependent blending has occurred. These have been approved after a normal colour matching procedure has not given satisfactory matching to the colour of the car.

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3.9 Masking

3.9.1 Metal surfaces

Time for all masking of metal surfaces is included in the paint time. The only exception is when masking with lifting tape is required (see 5.6).

3.9.2 Plastic surfaces

The time for masking of plastic parts is included in the paint time for plastic parts with a painting area smaller than 3,0 dm^2 (see 5.3.4).

The time for masking of plastic parts with a painting area of 3,0 dm^2 or larger is *not* included in the paint time. If masking is required, the time is set according to 5.3.4 and 5.3.5.

4 Order time

An order time is added to the calculated time for every object (vehicle) as follows.

Paint type 2	77 periods/object
Paint type 3	105 periods/object

When painting different damages on a car at the same occasion (different estimates), the order time is shared between the damages. Example; a car with paint type 2 and two different damages. In that case the first estimate gets 39 periods and the other 38 periods as order time i.e. a total of 77 periods.

The divided order time is entered in CABAS under Main/Paint shop/Order Time.

5 Exterior painting

5.1 Basic constants

Every part obtains a basic constant. When painting several parts on the same car, several basic constants are obtained. The value of the basic constant is affected by if the part is painted as a detached part or mounted on the car.

A part which during the painting process at some time is handled detached is to be time set as a detached part even if it is fixed on the car when painted. For example a door which is detached when grinding and then mounted on the car in the spray booth, is to be time set as detached part.

In all there are four types of basic constants, two for detached parts and two for mounted parts.

5.1.1 Basic constants – Detached parts

The two basic constants for detached parts are:

Detached part with a smaller painting area than 3,0 dm^2:	7 periods/part
Detached part with a painting area 3,0 dm^2 or larger:	27 periods/part

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5.1.2 Basic constants – Fixed parts

The two basic constants for fixed parts are:

Fixed part; A-pillar/Roof edge:	27 periods/part
Fixed part; other parts:	81 periods/part

A-pillars and roof edges have a special handling of the basic constant. These parts have their own lower basic constant (see above) and in addition the A-pillar and the roof edge share one basic constant if they are painted together.

The basic constant for fixed part can only be obtained once in each CABAS-position, regardless of how many fixed parts are painted within the position.

5.1.2.1 Parts which normally are to be painted detached

Covers, sensors, mouldings and other parts which usually have to be painted detached in order to obtain satisfactory results will not get any basic constant if they are mounted on the main part during the painting of the main part.
If for example a filler flap is painted mounted on the rear fender the basic constant is included in the main part. See also section 5.14.

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5.2 Exterior paint - Metal

5.2.1 Definition - exterior paint metal parts

'Exterior paint surfaces' refers to metal surfaces that can be seen when: "*All hatches and doors are closed and removable parts such as, e.g., bumpers, spoiler, mouldings, and trim have been removed*". Does not apply to front parts as these are considered as internal, see heading 6.8.

Times for fenders, front hood, tailgate, doors, and plastic roof are set as metal parts. This is so since handling and painting procedures for these are equivalent to those for metal parts.

5.2.1.1 New, welded metal part

'Welded metal parts' refers to parts that normally are welded on the car from the factory, e.g., sill or rear fender. Even if the part has been installed with another method, e.g., rivet and glue, it is classified according to this definition for painting purposes.

The following parts are classified as welded metal parts:

- Exterior front plates
- Wheel arch front
- A-pillar
- B-pillar
- C-pillar
- D-pillar
- Sill
- Roof edge
- Roof
- Rear fender
- Tail light plate
- Body side
- Rear plate
- Back-piece on cab
- Cab corner

When a welded metal part, with exterior paint surface, is replaced, the time for the painted surface is set with a surface factor of its own, see heading 5.2.2. This surface factor shall be used regardless how big part of the spare part has been replaced, that is, also for jointing jobs. Time for any interior painting is set separately.

The reason for handling these parts with a surface factor of their own, for new part, is that they most often have filled joints and therefore require other handling than other new metal parts.

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5.2.2 Calculation of time (surface factors), metal parts.

Time is set for paint surface according to factors stated below.
The paint surface is entered in dm^2 with one decimal.

Surface in dm^2 multiplied by	Paint type 2 new	1,793 [periods/dm^2] (incl. interior painting)
	Paint type 2 new, welded part	1,708 [periods/dm^2]
	Paint type 2 old	1,708 [periods/dm^2]
	Paint type 3 new	2,067 [periods/dm^2] (incl. interior painting)
	Paint type 3 new, welded part	1,982 [periods/dm^2]
	Paint type 3 old	1,982 [periods/dm^2]

This gives periods for the paint surface. An order time as well as basic constants are added to these times (see 4 and 5.1).

5.3 Exterior paint - Plastic

5.3.1 Definition – plastic parts

Times for fenders, hood, tailgate, doors, and plastic roof are set as metal parts. This is so since handling and painting procedures for these are equivalent to those for metal parts. Time for other plastic parts is set as plastic.

Foam-filled plastic parts are not included in the time formula; times are set on a case-by-case basis.

Repaired plastic parts are to be time set as old plastic surface.

5.3.2 Calculation of time (surface factors), plastic parts.

Time is set for paint surface according to factors stated below.
The paint surface is entered in dm^2 with one decimal.

Surface in dm^2 multiplied by	Paint type 2 new	0,689 [periods/dm^2]
	Paint type 2 old	1,923 [periods/dm^2]
	Paint type 3 new	0,963 [periods/dm^2]
	Paint type 3 old	2,197 [periods/dm^2]

This gives periods for the paint surface. An order time as well as basic constants are added to these times (see 4 and 5.1).

5.3.3 Addition, priming of new plastic part

Priming of a new plastic part is timed with an additional time of 0,655 periods/dm^2.
The time includes the following working steps:
- Applying of primer filler with plasticizer
- Sanding of primer filler

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5.3.4 Masking of plastic parts

Time is set for plastic parts, with a painting surface of 3 dm^2 or more, that require masking with a masking addition of 15 periods/painted plastic part. The cause for masking may be non-removable parts and/or exterior surfaces that are not to be painted.

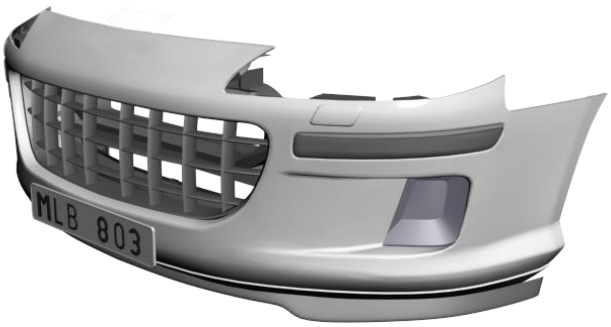
Plastic parts with a painting surface of less than 3 dm^2 are always given masking additional time of 1 period/painted part, regardless of if the part requires masking or not.

Parts made of plastic that are classified as metal according to heading 5.2.1 and 5.3.1 shall not be given additional time for masking.

5.3.5 Extra complicated masking of plastic part

For plastic parts that due to their design require extensive and/or complicated masking, e.g., bumpers with major embedded or welded grills, times are set on a case-by-case basis. A motivation is required in these cases.

Time is set in CABAS under Other.



Here is an example of a bumper where the "grill" cannot be removed and requires extra difficult masking.

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5.4 Blending

Blending can be applied to all paint types where required. 'Blending' refers to surfaces on parts next to the damaged surface that need to be painted.

In the time study both surface-dependent and colour-dependent blending has occurred. These have been approved after a normal colour matching procedure has not given satisfactory matching to the colour of the car.

There are two categories of blending surface; colour-dependent and surface-dependent, respectively. Time is set for both categories using the same surface factor, (see below).

Colour-dependent blending surface
Surfaces on adjoining parts that are painted to make colour differences less apparent, e.g., doors and fenders.

Surface-dependent blending surface
Surfaces where retouching of jointing of the painted surface is not possible and instead the paint is applied to the nearest suitable break line e.g. roof edge and A-pillar in connection with painting of rear fender.
Small parts which are to be painted and belong to the main part e.g., covers, caps, handles and mouldings, are also classified as surface-dependent blending.

Time for sanding/grinding of rust, stone chips, filler work, or other operations on earlier paint defects are not included in the time for blending. Remaining defects due to this shall not be rectified and are not included in the painting time.

Time for blending is set using the following surface factors:

- Paint type 2 0,404 periods/dm^2
- Paint type 3 0,678 periods/dm^2

5.5 Structure finish

Structure finishing is described and time is set according to the “User instructions for time-setting of plastic repairs”. This applies to both plastic and metal parts.

Time is set in CABAS under “Other row”. For calculation of material costs, (see 7.1.13).

5.6 Masking with lifting tape

For mouldings that require lifting tape, e.g., mouldings installed on windows, rails, or similar parts. When using lifting tape, the time set is 18 periods per masked part that is next to a surface that is to be painted.

Time is set in CABAS under “Other row”. For calculation of material costs, (see 7.1.6).

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5.7 Deviating colour or clear coat with different glossiness on detached part

When a detached part (plastic or metal) is painted in a colour that deviates from the rest of the object, there is an additional fixed time of 39 periods/different colour. This is also valid for clear coat with deviation glossiness (eg. matte clear coat). This is an additional time and assumes that first a time has been set for the part according to 5.2.2 or 5.3.2. The time cannot be used separately.

This includes time for:

- Colour determination
- Mixing of deviating colour / clear coat with deviating glossiness
- Cleaning of tools

If the vehicle has more than one *deviating colour or clear coat with deviating glossiness*, the fixed time is entered for this under “Other in CABAS. For calculation of material costs, see 7.1.4.

5.8 Deviating colour on fixed part

When a fixed part, e.g., roof, is painted completely in a colour that deviates from the rest of the object, the time is set according to heading 5.9.

5.9 Additional colour on same part

For details that are painted in an additional colour, the time is set for each additional colour according to the following:

- First time is set for the whole part according to the object's main colour, see heading 5.2.2 or 5.3.2.
- Then the following is added
    - A basic constant of 34 periods/additional colour
    - A surface factor of 0.699 periods/dm^2 for the surface painted in an additional colour

Masking belonging to this step (metal and plastic surfaces) is included in the time. The masking additional time for plastic parts (15 periods) cannot be used for this masking.

If the vehicle has more than one *additional colour,* the basic constant for the extra colour is set in the CABAS painting dialogue. For example, a red car that has two *additional colours,* black and grey. The first *additional colour* (black) is automatically given a basic constant in CABAS, but for the second *additional colour (grey)* the basic constant is stated under “Other”. For calculation of material costs, see section 7.1.5.

Time for layout of fields, special decor, and similar in connection with additional colours is set on a case-by-case basis.

5.9.1 Additional clear coat on same part

For parts that are painted with an additional clear coat on the same part, e.g., clear coat with deviating gloss on a section of the part, the time is set according to heading 5.9.

5.10 Body/Stone chip protection

Time is set with 0,206 periods per dm^2, however, at least 8 periods (total surface for the whole car). Afterwards, if the surface is to be painted with an additional colour for the car, the time is set according to heading 5.9.

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The time is an additional time in connection with painting of a part and cannot be used separately.

The following working steps are included:

- Masking for body (one masking)
- Aplication of body (aftermarket products)
- Demasking

5.11 Stripes and decor

Times are set on a case-by-case basis.

5.12 Exterior rear-view mirrors

If there are no painting periods/paint surfaces, an established surface of 5.8 dm^2 applies to all sizes and models of passenger car, minibus/pick-up, and transport vehicles.

5.13 Hinges and brackets

Hinges and brackets are included in the time for the main part (front fender, hood, door, tailgate) if they are mounted on the main part.

If these are painted as loose parts, then time is set for them as own exterior paint surfaces. If there are no painting periods/paint surfaces, an established surface of 1.0 dm^2 applies to all sizes and models of passenger car, minibus/pick-up, and transport vehicles.

5.14 Filler flap, washer cap, and caps

Filler flap, washer cap, and other small caps are handled as own parts and time is set in the usual way with surface factors and basic factor.

Exception: if these parts are painted mounted on the main part which also is to be painted, they get no separate basic constant. In these cases, the basic constant is included in the time for the part they are mounted on (see 5.1.2.1).

5.15 Inside all-folded rear fender edge

When painting a rear fender edge that is folded and angled up towards the wheel well in such a way that it requires removal of wheel to enable painting, the time is set for this using 25 periods/fender edge. Time setting is based on the work step being performed in connection with priming of the object.

Time is set in CABAS under “Other row”. For calculation of material costs, (see 7.1.12).

5.16 Priming under filler

If a primer should be applied prior to the body filler according to the car manufacturer, this should be timed separately according to the description below. The time setting presumes that the work is carried out in conjunction with a sheet metal repair or paint work repair.

Time is set in CABAS under “Other row”.

There are two different methods timed – A and B. The difference between the methods is that in method B in addition to the primer, a filler is also applied prior to the body filler.

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5.16.1 Method A – Primer only

Included working steps, method A:

- Masking
- Washing/cleaning
- Mixing of primer coat (primer)
- Application of primer coat (primer) on bare metal surfaces
- Time for primer coat (primer)
- Cleaning of tools for primer coat (primer)
- Matting/sanding of primer coat (primer)
- Demasking

Time setting, method A

The work is timed with a basic constant for each car and an additional time for every concerned CABAS-position according to the following:

- Basic constant, once for each car: 19 periods/car
- Additional time, once for each concerned CABAS-position: 10 periods/position

5.16.2 Method B – Primer and filler

Included working steps, method B:

- Masking
- Washing/cleaning
- Mixing of primer coat (primer)
- Application of primer coat (primer) on bare metal surfaces
- Venting of primer coat (primer)
- Cleaning of tools for primer coat (primer)
- Mixing of filler
- Application of filler
- Drying time for filler
- Cleaning of tools for filler
- Matting/sanding of filler
- Demasking

Time setting, method B

The work is timed with a basic constant for each car and an additional time for every concerned CABAS-position according to the following:

- Basic constant, once for each car: 49 periods/car
- Additional time, once for each concerned CABAS-position: 14 periods/position

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5.16.3 Material cost

Material is charged on a case-by-case basis.

6 Interior painting

6.1 Definition - interior paint metal parts

'Interior paint surfaces' refers to painted metal surfaces that **cannot** be seen when: "*All hatches and doors are closed and removable parts such as, e.g., bumpers, spoiler, mouldings, and trim have been removed*". Front parts are also considered as interior, (see 6.8).

6.2 General

Time for interior painting is always set as complete part, regardless of the size of the surface that is to be painted.

For new parts, that have a painted exterior surface, time for interior painting is always included in the time for exterior surface (with exception of welded metal parts, (see 6.10). For example, the time for interior painting is included in the time for exterior painting of a new hood.

Times for parts that do not have a painted exterior surface are set according to the descriptions below. The same time is given regardless of if the part is new or old.

NOTE! Retouch on adjoining part caused by the replacement operation is included in the time. E.g., retouch of paint joint between front plate and wheel well is included in the time for painting the front plate.

6.3 Parts that are painted on the vehicle

Interior surfaces that are painted on the vehicle (not as loose part) are divided into 5 zones (surfaces) as follows:

Zone	Designation
A	Front
B	Side L
C	Side R
D	Rear
E	Roof

For each zone there is a basic constant (start time) of 34 periods. In addition to the basic constant there is an additional time of 35 periods for each part that is painted within the zone.

6.4 Painting of loose parts

Time for interior parts that are painted loose is set to 35 periods/loose part. Exceptions are doors, tailgates, and hoods. For these parts time setting is applicable according to heading 6.5.

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6.5 Door, tailgate, and hood

Time for interior painting of loose doors, tailgates, and hoods is set to 51 periods/part. If the door, tailgate, or hood is painted when installed on the vehicle, the time is set as for other parts, that is, to 35 periods/part plus the basic constant for the zone where it is installed.

6.6 Paint codes for interior paint

6.6.1 Zone A – Front

Code, New/Old	Part	Time per part, detached	Time per part, on vehicle	Surface for material calculation
100/200	Cross member/Front member	35 [per]	35 [per]	27 [dm^2]
-/201	Outer front plate	35 [per]	35 [per]	10 [dm^2]
102/202	Light/Intermediate plate	35 [per]	35 [per]	9 [dm^2]
103/203	Hood lock plate	35 [per]	35 [per]	29 [dm^2]
104/204	Wheel well front and/or frame side member	35 [per]	35 [per]	25 [dm^2]
-/205	Fender edges f-fender (complete)	35 [per]	35 [per]	7 [dm^2]
-/206	Firewall fold	35 [per]	35 [per]	7 [dm^2]
-/208	Hood	51 [per]	35 [per]	109 [dm^2]
109/209	Bumper member	35 [per]	35 [per]	27 [dm^2]
143/243	Roof edge front	35 [per]	35 [per]	4 [dm^2]

6.6.2 Zone B and C – Side L and R

Code, New/Old	Part	Time per part, detached	Time per part, on vehicle	Surface for material calculation
-/220	Front side door	51 [per]	35 [per]	66 [dm^2]
-/221	Rear side door	51 [per]	35 [per]	56 [dm^2]
122/222	Sill plate (per door opening)	35 [per]	35 [per]	10 [dm^2]
125/225	A-pillar	35 [per]	35 [per]	25 [dm^2]
126/226	B-pillar	35 [per]	35 [per]	39 [dm^2]
127/227	C-pillar	35 [per]	35 [per]	20 [dm^2]
128/228	D-pillar	35 [per]	35 [per]	25 [dm^2]
131/231	Fender edges on r-fender, front	35 [per]	35 [per]	20 [dm^2]
140/240	Door opening edge upper L (roof edge)	35 [per]	35 [per]	5 [dm^2]
142/242	Door opening edge upper R (roof edge)	35 [per]	35 [per]	5 [dm^2]

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6.6.3 Zone D – Rear

Code, New/Old	Part	Time per part, loose	Time per part, on vehicle	Surface for material calculation
-/230	Cabin wall		35 [per]	133 [dm^2]
132/232	Fender edges on r-fender, rear		35 [per]	11 [dm^2]
133/233	Wheel well rear		35 [per]	25 [dm^2]
134/234	Rear plate		35 [per]	37 [dm^2]
135/235	Luggage compartment floor		35 [per]	55 [dm^2]
-/236	Luggage compartment, side		35 [per]	8 [dm^2]
-/237	Tailgate/Cargo compartment door		35 [per]	68 [dm^2]
-/238	Cargo wall front		35 [per]	81 [dm^2]
-/239	Back board		35 [per]	81 [dm^2]
144/244	Roof edge rear		35 [per]	10 [dm^2]
146/246	Bumper member		35 [per]	27 [dm^2]

6.6.4 Zone E – Roof

Code, New/Old	Part	Time per part, loose	Time per part, on vehicle	Surface for material calculation
-/241	Roof hatch opening	35 [per]	35 [per]	15 [dm^2]
-/245	Roof hatch	35 [per]	35 [per]	10 [dm^2]

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6.7 Deviating interior colour

Time for interior parts with a colour that deviates from the car's exterior colour, e.g., engine compartment and cargo compartment, is first set according to interior time list, then the following additional times are applied:

- Basic constant, for the colour: 57 periods/different colour
- Additional time per part: 5 periods/part with different colour

Time is set in CABAS under “Other row”. For calculation of material costs, (see 7.1.9).

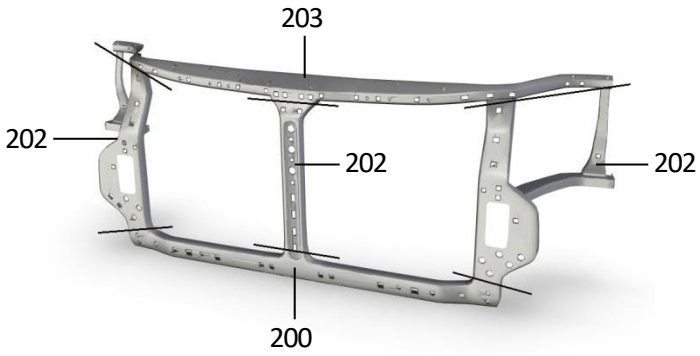
6.8 Interior front parts

The following are considered to be interior front parts:

Code	Part
200	Cross member/Front member/Bumper member
201	Outer front plate
202	Light/Intermediate plate
203	Hood lock plate

These codes can only be set once each, even if there are several parts that are covered by the code. For example, if both right and left light plate and intermediate plate are painted, time is only set once for code 202.

Painting refers to the part's front and back side.



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6.9 Door openings

In a whole door opening, a maximum of 4 interior parts can be counted, that is, 4 x 35 periods.

For two whole door openings (same side), a maximum of 7 parts can be counted (B-pillar as 1 part), that is, 7 x 35 periods.

For the above times, a basic constant is added for the zone, see heading 6.3.

6.10 Interior paint, new welded parts

For new, welded metal parts, with exterior surface, time is not included for interior paint in the time for exterior painting. For these parts, time for interior paint can be set separately.

For definition of new, welded part, see heading 5.2.1.1.

6.11 Complete interior paint for new metal parts

Where the automotive manufacturer, in the repair instructions, states requirement for extra interior rustproof painting of new, loose parts, time for this is set as follows.

NOTE! There times for passenger cars are different than the times for vans and transport vehicles.

The times are additional times, in addition to the ordinary interior painting included on new parts, according to 6.2.

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6.11.1 Bolted parts

Refers to additional interior surfaces on doors/front fenders/tailgate that are painted in connection with ordinary interior painting according to 6.2.

The following work steps are included in the additional times:

- Matting
- Cleaning
- Application of filler
- Application of base coat
- Application of clear coat

6.11.1.1. Passenger cars

Time for complete interior painting of bolted parts is set to 39 periods/part.

6.11.1.2 Vans and transport vehicles

Time for front fenders and front doors is set according to passenger car (39 periods/part).

Sliding door/side door/rear door and parts with a top coat from the car manufacturing is timed with the surface factor of 0,662 periods/dm^2.

6.11.2 Welded parts before installing

6.11.2.1 Priming

The additional times for priming include the following work steps:

- Cleaning
- Buffing/mattning
- Cleaning
- Masking and demasking
- Application/bleeding/mixing/cleaning of tools for primer
- Application/bleeding/drying time/mixing/cleaning of tools for filler
- Marshalling of loose part
- Handling of protective equipment

Time is set as follows:

- Basic constant: 74 Periods/object (vehicle)
- Additional time per part: 46 Periods/part that is primed

Times refer to loose part before installation.

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6.11.2.2 Top coat

The additional times for top coat include the following work steps:

- Application/bleeding/mixing/cleaning of tools for base coat (single spray stroke in spray booth)
- Application/drying time/mixing/cleaning of tools for clear coat (single spray in spray stroke booth)

Time is set as follows:

- Basic constant: 29 Periods/object (vehicle)
- Additional time per part: 3 Periods/part that is finished with top coat

Times refer to loose part before installation. Shall only be used in connection with priming according to heading 6.11.2.1.

6.11.2.3 Vans and transport vehicles

Complete interior painting of welded parts that requires top coat on vans and transport vehicles and parts with top coat from factory is timed according to 6.12.

Other welded parts with no demand on top coat (only primer) is timed according to 6.11.2.1.

6.12 Interior painting of cargo compartment in vans and transport vehicles

Interior painting of cargo compartment refers to body sides, intermediate wall, roof, and floor.

Time for parts that are painted on the vehicle is set as follows:

- A basic constant of 68 periods/object (vehicle)
- A surface factor of 0,662 periods/dm^2 for the surface that is painted

Time for parts that are painted loose is set as follows:

- A basic constant of 74 periods/object (vehicle)
- A surface factor of 0,662 periods/dm^2 for the surface that is painted
- An additional time for touch-up after installation of 39 periods/object (vehicle)

Time is calculated in CABAS under “Other row”. For calculation of material costs, see section 7.1.11.

Interior painting of cargo compartment cannot be combined with complete *interior painting* according to heading 6.11.

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7 Material cost

The material cost for paint consists of two parts:

- A fixed start cost – given once per vehicle (calculation).
- A surface factor (flexible part) – calculated based on how big a surface that is painted as well as which painting actions are performed.

The following information is needed to calculate the material cost:

- The charge factor for paint materials – that is, the agreed charge factor between the paint shop and the actual insurance company.
- Total paint surface in square metres for each type, e.g., new metal.
- Information about any painting actions that are not included in the surface factors, e.g., deviating colour
- Weighting factors for each work step, see heading 7.1.

The material cost is calculated by, for each step in the work, multiplying the above parts and then summarize the results. For example, the material cost for *new metal* is calculated as follows: Charge factor Paint material x Surface New Metal x Weighting factor New Metal. The result of this calculation is then added to the results from the other work steps to obtain the total calculated material cost.

7.1 Weighting factors

Since material consumption is affected by what type of surface is to be painted, e.g., *if adjacent surface* has a lower consumption than *old metal*, the calculation is “weighted” to obtain a correct distribution of the material cost. Weighting factors described below are used for this “weighting”. These factors have been developed using the information from the time study.

When calculating weighting factors, the factor for old metal has been chosen as reference value and is therefore given the value 1,000.

7.1.1 Start cost

The start cost is given once per vehicle (calculation). There are two versions of start cost, one that is used when the vehicle is painted in the booth and one that is used when the paint job only consists of loose parts.

Weighting factors:

- Vehicle in booth: 1,132
- Only loose parts: 1,046

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7.1.2 Surface factors

The flexible material cost for the surfaces is calculated using the following weighting factors:

- Old metal: 1,000 (reference value)
- New metal: 1,283
- New metal, welded: 1,000
- Old plastic: 1,281
- New plastic: 1,104
- Adjacent surface: 0,703
- Interior paint 1,000

7.1.3 Paint type 3

When painting with paint type 3, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factors:

- Fixed part, once per object: 0,386
- Flexible part, per square metre: 0,357

7.1.4 Deviating colour

For *deviating colour of loose part*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factor:

- Once per deviating colour: 0,386

7.1.5 Additional colour on same part

For *additional colour on the same part*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factors:

- Fixed part, once per additional colour: 0,409
- Flexible part, per square metre: 0,357

The above also applies to clear coat with deviating gloss.

7.1.6 Masking with lifting tape

When *masking with lifting tape*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factor:

- Once per masked part: 0,077

The material cost is calculated manually and stated in CABAS on the same other row as the time.

7.1.7 Addition for priming when painting a new plastic part

When *priming a new plastic part which needs priming*, the consumption is calculated using the following weighting factor:

- Per square metre: 0,283

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7.1.8 Body/Stone chip protection

For *body/stone chip protection*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factor:

- Fixed part, once per object: 0,041
- Flexible part, per square metre: 0,288

7.1.9 Deviating colour interior paint

For *deviating colour of interior paint*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factors:

- Fixed part, once per deviating colour: 0,404
- Flexible part, per square metre: 0,367

The established surfaces according to time tables under heading 6.6 are used for material calculation.

The material cost is calculated manually and stated in CABAS on the same other row as the time.

7.1.10 Complete interior painting

7.1.10.1 Bolted parts

When *painting complete interior bolted parts*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factor:

- Passenger car, per square metre: 1,175
- Van and transport vehicle, per square metre: 0,802

7.1.10.2 Welded parts

Priming

When *complete interior painting* (*priming) is performed on welded parts*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factors:

- Fixed part, once per vehicle: 0,101
- Flexible part, per square metre: 0,356

Top coat

When *complete interior painting* (*top coat) is performed on welded parts*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factors:

- Fixed part, once per vehicle: 0,535
- Flexible part, per square metre: 0,410

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7.1.10.3 Surfaces – complete interior painting

The established surfaces according to table below are used when calculating material for *complete interior painting*. These surfaces are general and are used regardless of vehicle make and model.

Code	Part	Surface for material calculation
151	Front fender, inside	38 [dm^2]
152	Door, inside	77 [dm^2]
153/183	Body side whole, inside	176 [dm^2]
154/184	Wheel well front	25 [dm^2]
155/185	Wheel well rear	25 [dm^2]
156/186	Rear fender, inside	53 [dm^2]
159/189	Rear plate, inside	37 [dm^2]
160/190	Sill plate, inside	34 [dm^2]
161/191	Luggage compartment floor	130 [dm^2]
163/193	A-pillar, inside	30 [dm^2]
164/194	B-pillar, inside	39 [dm^2]
165/195	Roof edge, inside	20 [dm^2]

7.1.11 Interior painting of cargo compartment in vans and transport vehicles

For *interior painting of cargo compartment in vans and transport vehicles*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factors:

- Fixed part, once per vehicle: 0,342
- Flexible part, per square metre: 0,802

The material cost is calculated manually and stated in CABAS on the same other row as the time.

7.1.12 Inside all-folded rear fender edge

For *inside all-folded rear fender edge*, the supplement (additional charge) for the extra material consumption is calculated using the following weighting factor:

- Per rear fender edge: 0,050

The material cost is calculated manually and stated in CABAS on the same other row as the time.

7.1.13 Structural painting

Structural painting is timed according to instructions for plastic.

Material cost is calculated with the following weight factor:

- Per square meter: 0,283

The material cost is calculated manually and stated in CABAS on the same other row as the time.

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7.2 Interior paint – surfaces for material calculation

The established surfaces according to the tables under heading 6.6 are used when calculating material for interior paint. These surfaces are general and are used regardless of vehicle make and model.

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8 Pre-conditions

Time studies are conducted at regular intervals to follow up and ensure that the paint time formula's level matches current work methods and materials. During the study, it is ensured that all repairs are carried out with a satisfactory methods and quality. These are demands from the insurance and motor industry.

Prior to a new study the insurance and automotive industry, in conjunction with paint suppliers, paint workshops are selected that meet the industry requirements. Then CAB studies all the time that the selected workshops use during the study weeks.

Before the study was conducted extensive work was done to develop requirements and criteria for those body shops that would be included in the study. Materials suppliers presented candidates and MRF (The Swedish Association for Motor retail trades and repairs), insurance companies along with the CAB made the selection. The final selection was made after a large number of workshops had been visited and documented.

The workshops in the study have been selected since they follow development within the industry, have the correct facilities, equipment, methods, training, flow, and perform preventive maintenance to be able to do a correct and rational job. They also meet environmental requirements and industrial safety regulations as stipulated by governing authorities. We have also taken into consideration size of the workshop, geographical spread, as well as the car models they work with. The study has been conducted during all seasons of the year.

The times in this instruction pre-supposes that the job can be done under normal conditions in a paint shop intended for passenger cars. Time can also be set for light transport vehicles and trucks according to this time list if the workshop has facilities for this. If this is not possible due to the vehicle's size, then refer to the LBA-instruction (Truck, Bus, and Construction machines).
NOTE! Times from the LBA-instruction and this instruction may not be mixed.

Following pre-conditions have prevailed during the time study:

- The studies were conducted during all seasons of the year to include climate impact, if any, in the times.
- Requirements of the authorities and the car manufacturers were complied with.
- The workshops have had a quality manager who insured that all quality requirements and procedures are followed in every moment.
- The workshops had computerised planning systems, and practices for a good flow through the workshop. Premises, staff and paint booths were used effectively to shorten lead times.
- All parts in the study were dismantled by the alignment workshop under CABAS-specification and aligned surfaces were according to the standards for sheet metal alignment.
- Upon arrival at the paint shop all cars were provided with seat, steering wheel and floor covers. Leakage control and colour control has been carried out on all cars (when necessary sample plates were made for colour matching).
- Most of the workshops used special electric **vehicle moving jack** for transfer of cars within the premises in order to effective transfer of cars with only one person and because the cars were completely masked when they are put into the paint booth.
- All detached parts that belonged to the car and were to be painted were placed in separate wrapping.
- All detached parts that belonged to a vehicle were tagged in order not to miss any when painting.
- Management of racks for detached parts within the facilities were effective.

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- Protective equipment (masks, gloves) were used and changes of overalls made in connection with spray work.
- When grinding instructions from materials suppliers were followed and correct sandpaper with right grades of coarseness were used for both for machine and hand sanding.
- When hand sanding, with pads with dust extraction has been used.
- When masking door openings foam tape was used and on mounted windows a so-called lifting tape.
- The studied workshops were able to perform priming of parts continuously during the workday in order to maintain the flow and short lead times.
- All cars and parts (new and old) were primed before they were placed in the spray booth.
- The spray booths were used effetely and transfer of cars and parts in and out of the booth were rational.
- Paint and materials supplier's instructions for the products were followed and plasticiser used for base and clear coat when painting plastic parts (not body parts such as doors, hoods and fenders).
- Paint standard 2010 version 1.1 was the basis for assessing paint quality in the study.
- All employees were informed about the new paint standard and all items in the study have fulfilled the requirements of this.
- The inspection place was provided with lighting in accordance with the paint standard.
- Procedures for control of paint layer thickness has existed and been carried out.
- When deviations from the paint standard occurred a professional evaluation was done regarding repaint or other operations in the most effective manner.
- Facilities and equipment were kept in good order and continues cleaning carried out with vacuum cleaner and scrubbing machine (not sweeping).
- Paint shops have followed service schedules for machines and booth filter changes. These operations are not included in the working time for the painting.
- Operations for any stone chips on the painted surface are included in the times (not on blending surface).
- In the study there is a number of paint jobs that, despite all necessary preparations having been done, have required repainting (turn arounds). Time for this is included in the time list.
- In the study, plastic masking times exceeding 20 minutes, described under heading 5.3.5 were omitted from the calculation material for plastic masking time according to the heading 5.3.3.
- Apprentices who were employed and worked independently were part of the study.

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The following materiel suppliers have participated in the project:

- DPC (Standox, Spieshecker, DuPont)
- BASF (Glasurit, RM)
- PPG
- Akzonobel (Sikkens)
- 3M
- Some other suppliers have delivered materials during the study but have not participated in the project.

Paint jobs done using other methods and on parts that are not indicated in the instruction are not included in this time list, for example;

- Factory-new metal parts that only are primed for transport.
- Other paint types, type UV, powder, and nano paint.
- Composite materials such as fibreglass and carbon fibre.

Also note that:

- The terms *matte black* and *several colours* were replaced by *Additional colour on same part* (see 5.9).

9 Terminology

Limitation = Natural boundary where the paint can be ended without any unnecessary finishing work. For example, folds or hidden surfaces under moulding.

Body/Stone chip protection = Surface layer applied to prevent stone spray from breaking through the paint layer (see also 5.10).

Part = Usually the same as spare part but there are two exceptions. The first one is spare parts that concern several positions. For example, rear fender with sill part. In that case the sill part is considered to belong to the sill. The second is when a several small parts form one part. For example a door handle which consists of a handle and a cover around the key cylinder or a parking sensor with a holder. If these small parts are not separately mentioned in the paint time list they were merged in one part for painting in order to simplify the calculation and make the times more accurate.

Professionally = The painter is to use methods and materials which are approved by material suppliers/car manufacturers and to have the appropriate skills. The results are to be in accordance to the paint standard.

Basic constant = Basic constant is a type of start time (order time) connected to the part that is to be painted or to a specific work step.

Clear coat with deviating gloss = When a part of the surface on a part (spare part) is to be painted with clear coat with deviating gloss. For example, may be lower part of a bumper that has a matte clear coat while the upper part has normal clear coat. If the whole part is to be painted using another clear coat than the rest of the car, and the part is painted detached, time is set for this as different colour.

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Correct contour = Excerpt from surface alignment preface. *"Surface alignment refers to the alignment value that is required to, using alignment tools and filler materials, restore a damaged surface to original condition with regards to surface shape. The processed surface shall thus be of such quality that painting, with normal primer work, shall be possible."*

Paint surface = These surfaces do not have to follow the spare part's shape but may have their own limitation lines. For example, a rear fender with sill part where the paint surface often ends where the sill starts. The surface area is entered in dm^2 to one decimal.

Lifting tape = Tape with stiff edge applied to lift a moulding so that professional painting can be performed. For time set, see 5.6.

Order time = A start time to perform a paint job. The order time is given once per vehicle (calculation) and it is affected by the type of paint that is used.
The order time is the painting time that cannot be attributed to the size of the painted surface but only to the object itself (the vehicle). That is, a type of "lowest common denominator" regardless of the scope of the paint job. The order time is a mathematical basic constant that results at the statistical calculation of the surface factors. Therefore it is not possible to state which specific work steps that are included in the order time, instead it is affected by all work steps that are included in the statistical calculation.

Time is set on case-by-case basis = Here the study has not had enough information to establish a time level. The time has to be settled between the parties.

Additional colour on same part = When a part of the surface on a part (spare part) is to be painted in an additional colour. For example, may be a door that should have another colour under the moulding. If the whole part is to be painted using another colour than the rest of the car, and the part is painted detached, time is set for this as different colour.

Complete interior painting = Parts/surfaces where the car manufacturer demands painting of the complete inside which is normally not visible, for example: inside of door plate, sill, rear fender etc.

Is also valid for inside of vans and transport vehicles that are painted with top coat from the car manufacturer.

It’s divided in primer only of the part, or primer and top coat.

Interior painting = Painting of interior surfaces that are visible when doors and hatches are open and interior panels (for example internal door panel) are not dismantled.

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10 Amendment log

Doc.	Version	Datum	Ändring	Utfärdare
CABNET-904420094-181	1.0	181114	New document template replaces document CABNET-1933461346-19	Lars Ahlgren
CABNET-904420094-181	2.0	230302	Corrected document name and aligned content with the Swedish instruction (CABNET-904420094-179 ver 3.0)	Jonas Hultman

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