BMW GROUP

Rolls-Royce Motor Cars Limited

Specifications for special containers of the painted body

Functional requirements for RfQ and Production

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Document History

Version	Changes compared to previous version	Author
2015-02	a) Section 2.3 ISO view stacking foot was added b) Section 3.2 Execution base- and endframes was detailed c) Section 3.4.1 The measurement of robot container was specified Für Auslandswerke relevant?	S.Brede
2014-10	a) Stacking tower finger width was specified	S.Brede
2013-11	a) Color for cross bar container was specified. b) Hardness of the bushings was specified	S.Brede
2013-06	a) Section 2.2 DIN EN 1090-1 and 1090-2 were incorporated; b) Point 2.4 Painting: Supplement the font size c) Section 2.5 Label was incorporated; d) Revision of Section 3.2 BMW base frame and special tube e) Revision of Section 3.3 CAD Engineering f) Section 3.4 Measurement method of container was specified g) Section 3.9 agreements was added h) Section 4.2. Reuse of base frame is omitted. i) Revise section 6.2 Warranty j) Added section 7 k) Added section 8 l) Spelling errors have been corrected	S.Brede

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1 General references

1.1 Introduction

The technical specification is the base for RfQ / engineering / production / buy-off and delivery of containers designated for press and body shop.

The suppliers guarantees the application of the below mentioned materials and methods. By bidding the supplier accepts the content of the document and commits itself to compliance.

Variations have to be made in writing.

The document doesn´t harm the the general terms and conditions of BMW purchasing.

1.2 Company premises / Subcontracting

Assumption for order placement is the certification of the company according to an international accepted quality management system (For example DIN ISO 9001 / ISO/TS 16949 / QS 9000)

Beside the production equipment the company possesses the regular MS Office applications as well as a digital camera and email.

Subcontracting by the supplier must be announced to BMW before.

Suppliers of regularly sub contracted components (Stacking columns) must be announced in the price confirmation while bidding.

The technical specification is valid for sub suppliers too.

Sub contracting without written announcement to BMW in connection with quality defects will result the end of contract.

1.3 Contact person

At the beginning of the project a German speaking contact person has to be appointed.

This person is responsible and informative regarding quality, quantities, dates and deadlines as well as for Costs.

The project language in BMW over sea plants is English.

2 Technical specifications

2.1 Material

The supplier has to up-date the valid norms and technical regulations for its Company independently.

2.1.1 Steel grade

Raw material (Semi-finished parts) for all containers is mild steel with an elastic limit according to S235 JRG2 within DIN EN 10025-1 to -6. Welded tubes according DIN EN 10220, DIN EN 10305-3. DIN EN 10058-1 to -3 und DIN EN 10056-1 for semi-finished parts.

Stainless steel according DIN EN 10088-1 to -3. For contact surfaces to automotive parts use steel quality 1.4301, other surfaces in 1.4016.

Blank steel in DIN 1623-2 and DIN EN 10029.

Variations of steel dimensions allowed in projects of BMW over sea plants but no descent of structural stiffness of the container.

2.1.2 Plastic material

General requirements of plastic parts over the period of use:

- No brittleness and hardening allowed
- Resistant against UV light
- Oil- and acid resistant
- Without silicone
- Cut proof + dimensionally stable within -20 °C to +80 °C
- Not hygroscopic
- Secure Connection between the single materials in case of sandwich material
- Carrier blanks for sandwich material in zinc coated version
- Recyclable

Plastic parts designed to carry automotive skin panels with hardness between 45-75 Shore.

Parts made of reclaimed rubber only after approval from BMW obtained.

2.2 Weld joint

For the construction and manufacture of containers DIN EN 1090-1 and 1090-2 date 2010-07 required to execute classes EXC2 needed (former DIN 18800-7: 2008-11Klasse: C).

Pallets for cranes must be produced according the requirements of EN ISO 1090-2 (former DIN 18800-7:2008-11 Klasse: E) with the addition of steel structures and crane tracks execution classes EXC3 needed. The welding supervisor has to be a Welding Engineer (IWE).

For all crane containers a static calculation has to be provided.

The qualification hast o be provide during tender.

Requirements on weld joints:

Free from damages, in the middle of the batch, evenly and flat. Fusion penetration 75 % of material thickness. No porosity, weld seams on the outside of the container with abrasive finish. See point 2.3 Centre bolt.

Cover panels around containers must be welded 30 % of the total length. Minimum 30 mm length per seam.

Welding seams should be welded closed, respectively with 10 mm drain holes.

Centre bolts must be welded completely around the connection edge – the welding seam without Overlap.

2.2.1 Material preparation

No burrs allowed on all steel parts. – Tubes chamfered on the inside too.

2.3 Standard parts / Purchase parts

The supplier is responsible for the availability of standard and purchase parts needed for container built. All parts available on time in the right quality and quantity.

Screws

Screws have to be used in quality 8.8 or higher with a washer and self-locking nut. All screws should be zinc coated – 2 pitches overlap of the winding after mounting. Movable Parts equipped with a spacer.

Screws for the adjustment of components like stacking columns or blocks should be covered with a drop of colour to make changes obvious.

Rivets along DIN EN ISO 15984

Gas struts with end cushioning in both directions.

Mounting position downwards to protect the driving rod gasket from dust and water. End position locking bars adjustable with screw and counter nut.

Lock pin in weatherproof version and smooth-running over the period of use.

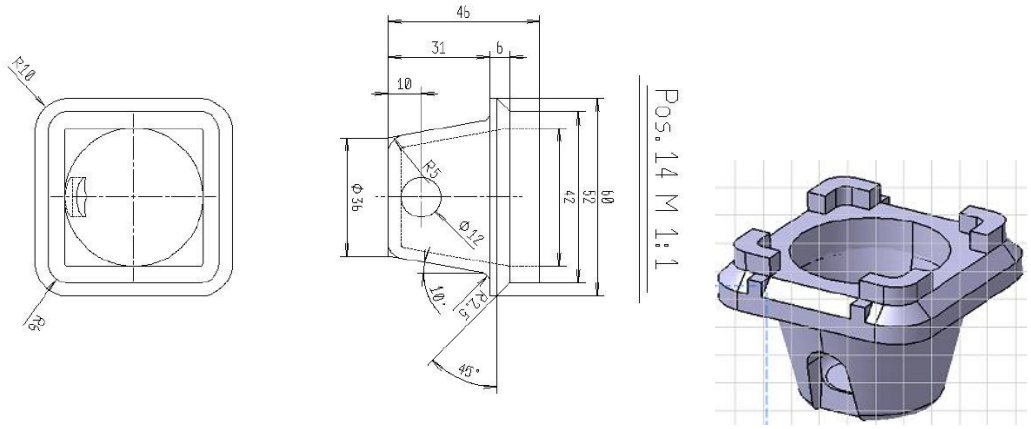
Pay attention that lock pin coating on the inside won´t be damaged while welding.

Stacking columns

Column body with min. 4 mm Material thickness, zinc coated with slide bar. Fingers and mechanism made of stainless steel in 3 mm material thickness and 40mm finger width. – Material requirements see point 2.1, respectively covered with plastic parts (Requirements see point 2.1.2 plastic parts).

Variations to be agreed with the responsible BMW planner

Stacking foots along BMW-drawing 3100418



2.4 Painting / Identification

BMW prefers the powder coating system. Wet paint finish will be accepted too.

Test system for painting according DIN EN ISO 2409 (Cross-Cut-Test)

Requirements to the background according DIN EN ISO 12944 part -1 to -8

Thickness of the paint minimum 60/1000 mm

Identification of the revision level:

Revision level 1	RAL 3000
Revision level 2	RAL 1018
Revision level 3	RAL 6010
Revision level 4	RAL 9010

The caps of the end frame will be coloured with the related change level colour diagonally.

Container colour:

Sample container	RAL 2000
Container for press parts	RAL 6027
Container for assemblies	RAL 5015
Checking fixture and cross bars	RAL 5015

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Identification

Container code as 7–digit-number + Name in Colour black or white, located on the end frame traverse and on the backside of the container in character height 40mm.

All containers should be equipped with tare weight inscription and consecutive number.

Container for LH and RH parts

In relation to the container long side for LH parts the left end frame pillar on the backside of the container will be painted in red. For RH-parts the right pillar in black.

Color mark revision level

End sideframe till sideframe cross bar

Color mark container LH RH parts

Corner pillar opposite load side; LH red; RH black
Lenght apr. (500mm)

2.5 Label

All materials handling equipment shall be provided with the manufacturer's label.

The Süddeutsche metal and professional association writes in the provision ZH 1/428, the additional marking of material handling equipment in the form that the payload and the surcharge are presented separately from each other. This regulation fulfills the standard BMW label for steel container as follows:

Constructive Design: It is required that each container is covered with a label. The content to be printed on the label are (see sketch in the Appendix):

- BMW logo with inscription „Property BMW“ *)
- Container No. (big)
- Payload
- Surcharge
- Tare
- Year
- Manufacturer name and adress
- Running number

Attachment: If possible at the front left and right uprights, but not at the exterior of the container, 200mm from the top of the bottom frame, otherwise individually.

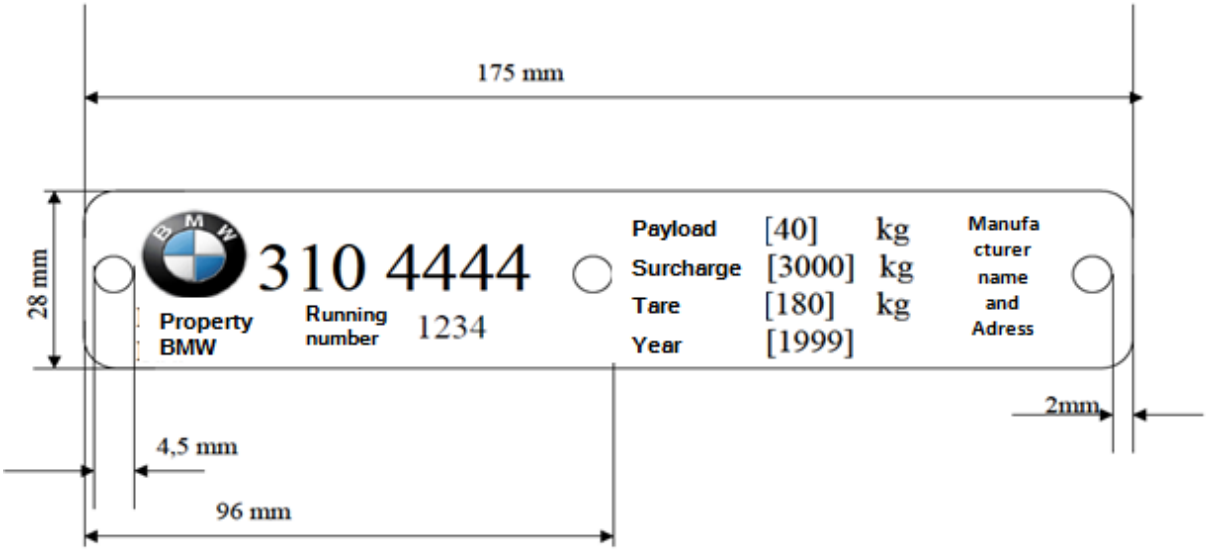
Dimensions Label: 175 mm x 28 mm x 0,5 mm

Material: Labels from UV and water-resistant material;
Life of at least 7 years.

Execution: Rounded corners, inscription print

*) The label text for German plants is: "Eigentum BMW AG" and for plants in abroad the inscription "Property BMW" + the name of the present legal form.

Containers which were used in Germany and abroad the inscription needs to be neutral „Eigentum BMW“, such as e.g. 3101860 container.



Schematic constructive schema of the label with Dimensions

3 Engineering / Sample built / Checking fixture

3.1 General advices

The CA-engineering and the sample container are the assumption for the features of the container in sense of transport quality, function, maintenance, ergonomics/operational safety and costs. Suggestions for improvement from supplier side are basically welcome by BMW.

3.2 BMW-base frame and special tube

For the containers of press and body shop a system of standard components is used to define the basic size of the containers.

In the list all standard components are obvious which are actually used.

The current and valid drawings, including tolerances are on the

PANAMA-LAUFWERK below **VORLAGEN LIEFERANTEN** → **ZEICHNUNGEN**

BMW Group
Technische Planung

Name: Werner
Kurzzeichen: TP-712
Hausruf: FIZ-42649

Zeichnungsnummern Rackbauteile

		Maße (in mm)	Nummer
Grundrahmen		1200 x 1000	3106644
		2000 x 1200	3106639
		2200 x 1200	3106640
		2400 x 1200	3100416
		2500 x 1200	3106641
		2600 x 1200	3103773
		3000 x 1200	3106642
		3200 x 1200	3100118
		3300 x 1200	3103870
		3500 x 1200	3100142
		3600 x 1200	3080642
		3700 x 1200	3100929
		3800 x 1200	3100872
		4000 x 1200	3106643
		4200 x 1200	3105106
		4400 x 1200	3101190
		4500 x 1200	3101432
Grundrahmen mit Buchse		2000 x 1200	3102826
		2200 x 1200	3106983
		2400 x 1200	3102827
		2500 x 1200	3106984
		2600 x 1200	3103778
		3000 x 1200	3106985
		3200 x 1200	3106986
		3300 x 1200	3106987
		3500 x 1200	3106988
		3600 x 1200	3080643
		3700 x 1200	3106989
		3800 x 1200	3106991
		4000 x 1200	3106992
		4200 x 1200	3102696
		4400 x 1200	3103971
		4500 x 1200	3101508
Endrahmen		500	3106653
		650	3100251
		750	3106659
		1000	3106654
		1250	3106656
		1300	3106700
	mit einer Strebe	1500	3106702
	mit zwei Streben	1500	3100370
Ausleger	alle		3100417
			
Steher		750	3106710
		1500	3106711
Endrahmen	Verlängerung	250	3106650
Bodengitter	alle		3106693

Deviant sizes should be agreed between the supplier and the planning department at BMW.

Mesh flooring is also a standard part – production according drawing 3106693.

Special tube (Specification 60X60X3,5 radius inside 5,5 mm)

For the listed base and end frames a welded cold drawn precision tube is used according EN 10305-5 in material quality **E**235 (1.0308). The radius on the inside differs from the S-Norm.

In the related drawings references to this tube can be found too.

3.3 CAD-Engineering / Patents / Data exchange

Engineering

The engineering of the container takes place in **Catia V5**. From BMW side a concept will be provided to the supplier which was used for RfQ too. The BMW Engineering method is mandatory (To be found on the B2B-Portal) (CEG Catia-information's, OEM-Base advice, BMW CATIA adjustment, BMW Catia reference card).

The concept consists of the base and end frame as parametric CA-Data's, as well as the Part data's.

The engineering of the inlay to be effected by the supplier. For containers that are automated unloaded / loaded, interfering and locking mechanism may only be changed after consultation with BMW.

The engineering must be agreed with the BMW planner continuously while in the development process.

Compatibility problems because of different CA systems will not be solved by the BMW planning department. Catia-Data´s won´t be changed into other filing formats.

The CAD date must be provided as a native Catia V5 data (= CATProduct incl. CATParts + CATDrawing)) and may contain no broken solids (except jack columns).

Locking bar: Bearings of locking bars must always be equipped with bushings. Moreover, the principle of double security applies, so that a second lock level must be present.

Gas spring: Containers with gas springs need to have at least 2 dampers.

Patents

The supplier assures no abuse of patents.

All developed trade mark rights vest in BMW

The right of application for patent is subject to BMW.

Data exchange

Data exchange takes place over Panama which is an internet server to provide access to the BMW systems by the suppliers.

Assumption for access to this server is an approval to the B2B-Portal of the BMW Group

https://b2b.bmw.com

The approval to Panama takes place after request of the BMW container planner. The CA-models of the standard base and end frames are there available too.

3.4 Automatic load and unload + Robcad-Simulation

After finish of engineering the completed CA-model has to be supplied to BMW via Panama.

The BMW container planning initiates the Robcad-Simulation.

Necessary changes on the model because of collisions are included in the offered price and free of charge for BMW. Without written Robcad release the supplier has no permission to produce the sample container or pre-series amount.

Automatic containers should be engineered as a frame-in-frame-system, in case of sufficient space. Means that end frames and Backside have the function of a collision protection. The parts which define the position of the parts in the container will be built up from the base frame.

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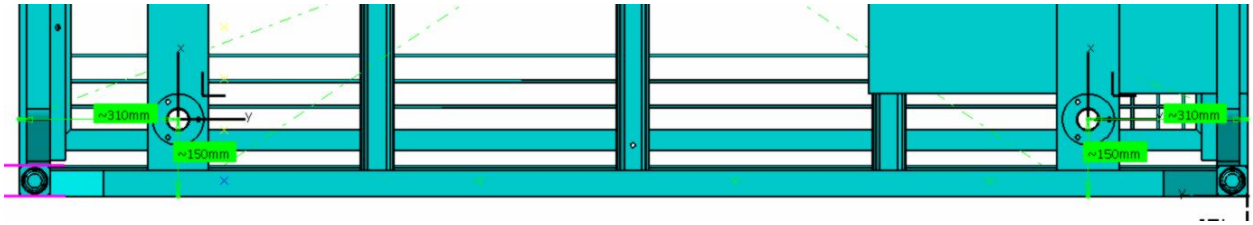
Parts positioning tolerances in X/Y/Z-Axis +/-2mm in relation to the bushings

Tolerance norm for length and angular measure DIN ISO 2768-1-m

Norm for welding DIN EN ISO 13920 –A

For the repeat accuracy positioning of the container in the pallet housing the base frame is equipped with 2 hardened bushings



Bushings need to be hardened with hardness 54 HRC.

3.4.1 Measuring of containers

Every 10th robot suitable container (but at least 10 containers) must be measured with a measuring machine and the measurement result needs to be documented with a report. The measurement protocol is handed over to BMW.

BMW will have a random sample survey measurement of robot suitable containers.

There are two measurement methods accepted:

- With measuring fingers (3D coordinate measuring machine)
- Optical measuring methods

Both measurement methods are only allowed when the container centered on a measuring table on the centering bushings and aligned (bearing surfaces analogous to the BMW container housing /towers; see Figure: Alignment of the container on the measuring table).

BMW recommend as the measurement method, the 3D coordinate measuring machine, as it is for calibrating and adjusting the welding gauges and checking fixture (matching container on welding gauges and checking fixture) suitable.

To obtain a repeatable measurement results, a measurement program is necessary.

BMW coordinate system containers:

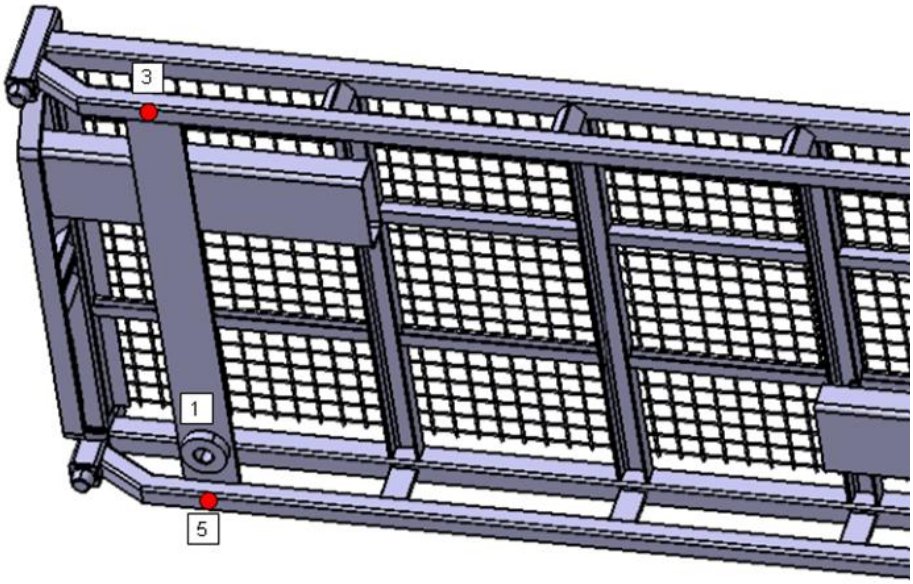
Length of the container: X

Width of the container: Y

Height of the container: Z

Zero-point in the container is the left bushing.

Alignment of the container on the measuring table



1. Alignment of the left bushing in the X,Y- direction
2. Alignment of the right bushing in the Y- direction
3. Alignment of the bearing surfaces of the container in container housing

The BMW provided data must include a coordinate system and an overview of the measured points. In addition, these figures needs to be electronic (Excel) evaluated. An Excel file containing the measured points is to provide BMW always and in every case, without prior request.

Structure of the Excel file with measuring points:

Container number	Running number	- tolerance	+ tolerance	Measuring point 1 X,Y,Z	Measuring point 2 X,Y,Z	Measuring point 3 X,Y,Z
620 xxxx	1					
620 xxxx	11					
620 xxxx	21					

3.5 Sample built

After inspection / Release of the engineering the sample built takes place.

A full working container including dunnages and stacking columns must be provided for sample buy-off. The buy-off takes place at BMW plant with substitutes of the BMW departments including a participant of the supplier. Changes on the sample and the CA-Model based on the results of the buy-off are included in the sample price and free of charge for BMW. As well as the costs for shipment and handling of the sample container to BMW and back to the supplier. See Point 6.2

3.6 Equipment and tools

All Equipment and dies to produce containers are included in the offered price and property of BMW.

All Equipment and dies should be stored weatherproof over 7 Years and sent to BMW on demand.

3.7 Checking fixture

The development of the checking fixture takes place after design match with BMW.

Fixture built and definition of the master container after adjusting with BMW planning department. The release of series production doesn´t start before fixture inspection by BMW container planner.

The checking fixture must be built up based upon Catia-Data's and double checked with a measuring device. The Verification of the fixture has to be effected by a test record.

The checking fixture must be stored weatherproof over 7 years and delivered to BMW on demand.

3.8 Pre-Series / Series production / Quality assurance

The production start of pre-series and series containers happens after release by BMW container planning department.

All containers must be checked before delivery.

Containers for automatic load and unload have to go through the checking fixture before delivery. The results of the Adjustment in the checking fixture should be documented in a check list. The collection of the check lists should be available for BMW on demand.

3.9 Agreements

Any agreements between contractor and client are documented in writing by the Contractor, stating the date, subject and persons involved and to distribute accordingly.

4 Recycling of base frames / Scrap

4.1 Identification of plastic parts

All plastic parts to be identified with material id / container code / manufacturer and production date.

4.2 Scrap

All dies and equipment, as well as the checking fixture may be scrapped after written approval by BMW container planning department. The allowance to scrap takes places earliest after end of series production of the part to be transported.

Costs for handling of the scrap material are not paid by BMW.

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5 Tendering + Quotation

All inquiries will be distributed over the internet application ASTRAS.

Mein Arbeitsplatz Meine Anwendungen Astras 6

The suppler receives an invitation to the bidding in before by an automatic generated mail from Astras – In the mail a link is applied which leads to the homepage.

Base for the Quotation is the concept. It is available in the sub file “Down loads” and edit in the MS Office application format PowerPoint.

To bid it´s necessary to fill the precast Excel form.

Further it´s necessary to edit a price confirmation with company stamp and signature. The confirmation should be stored as PDF file in the area “up-loads”.

Meeting the timeline is mandatory.

Companies with delayed quotations will not attend purchasing negotiation.

6 Terms of delivery

6.1 Delivery

The containers will be delivered to the place described in the inquiry or to a different place after agreement with the container planner. The delivery accomplishes according INCOTERMS 2000 as CPT – carriage free + no insurance.

Detailed time and place of unloading should be agreed between BMW and the supplier.

Containers to be delivered in up-right position without extra packaging material or transit support.

To relieve service confirmation the delivery notes should be sent to the planning department parallel per fax.

6.2 Buy-off + warranty / Objection / Amendment

The regular advices regarding Buy-off, warranty, objection and amendment can be found in the general terms and conditions of BMW Group purchasing.

See B2B-Portal of BMW Group:

Funktionsbereiche Einkauf indirektes Material Einkaufsbedingungen

Buy-off

Sample acceptance: The sample acceptance doesn´t relieve the supplier to issue a guaranty. The buy-off is the functional confirmation of the developed concept.

Series buy-off: The buy-off takes place according to the GTC of BMW Group – Test duration 3 months under series conditions. Without related feedback from BMW the container is accepted 3 months after start of production of the car.

The payment of the delivered goods does not represent a buy-off.

Warranty

The contractor guaranteed under normal use a trouble-free use for a period of 7 years. The costumer may make a warranty claim within 24 months. If necessary the supplier needs to create a utility or manual that corresponds to current legal requirements. In particular, the supplier shall refer to parts or components that need to be serviced at regular intervals. In this case, a maintenance plan has to be provided by the supplier, which lists all function-preserving measures. Basically, containers should be designed to be maintenance free. Exceptions require consultation and approval by BMW.

Objection

BMW commits itself to inform the supplier over objections in written form and gives the opportunity for analyses and amendment.

The supplier waives to overrule the objection because of delay.

Amendment

The supplier has the right to solve objections by rework or replacement delivery.

If the remedy of objection does not take place promptly BMW takes care to solve the problem. Accruing expenses will be charged to the supplier.

In case of further objections after rework or replacement BMW reserves the right to cancel the contract.

7. Validity of offer

The offer must be valid at least 3 months.
By submitting a bid, the contractor identifies with the Specifications for special containers of the painted body and agrees to abide.

8. China

Jack column fingers must always have a minimum thickness of 4mm and lock individually (Transport and road conditions).
In consultation with the BMW planner can another finger thickness be selected.

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9 Tolerances / Mentioned norms and regulations

Tolerances

For length and angular measure DIN ISO 2768-1-m

For welding DIN EN ISO 13920 –A

Mentioned norms and regulations:

DIN EN ISO 9001 / ISO/TS 16949 for QA-Systems

DIN EN ISO 5817 for welding application

DIN EN 10025-1 bis -6 / DIN EN 10220 / DIN EN 10305-3 / DIN EN 10305-5 /

DIN EN 10056-1 / DIN EN 10058-1 bis -3, DIN EN 10029, DIN 1623-2

for steel

DIN EN 10088-1 bis -3 für stainless steel

ISO 7041 for self-locking nuts

DIN EN ISO 15984, for rivets

DIN EN ISO 2409 for fence-cut-test

DIN 18800-7, 6.3 “Kleiner Schweißnachweis”

DIN 18800-7, 6.2 “Großer Schweißnachweis”

DIN EN ISO 12944-1 bis -8

DIN EN 1090-1 und 1090-2

Further applicable documents:

Drawings for container standard components as well as the cross-references to other norms and regulations.

Regulations and standards about CA-Engineering can be found on the B2B-Portal of the BMW Group: https://b2b.bmw.com

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10 Contact

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