

SUPPLIER LOGISTICS MANUAL

Version 5.0



Table of contents

Preamble	6
Scope of this Supplier Logistics Manual	6
1 Information management in logistics	6
1.1 Communication between the SUPPLIER and BOSCH	6
1.1.1 Points of contact	6
1.1.2 Availability	7
1.2 Information transmission via EDI	7
2 Control concepts and order processing	7
2.1 Control concepts	7
2.2 Flexibility and release periods.....	8
2.2.1 Production and material releases	8
2.2.2 Minimum order quantities	8
2.2.3 Flexibility	9
2.2.4 Ramp-up and phase-out control	9
3 Packaging	9
3.1 Packaging specifications	9
3.1.1 Packaging design criteria	9
3.1.2 Responsibilities for packaging design	9
3.1.3 Permitted and non-permitted materials	10
3.1.4 Delivery specifications	11
3.1.5 Requirements for electrostatic discharge (ESD) protection	11
3.1.6 Corrosion prevention and moisture control	12
3.1.7 Packaging for hazardous goods	12
3.2 One-way packaging.....	12

3.2.1	Verifying evidence of packaging quality if SUPPLIER is responsible for packaging design	12
3.2.2	Marking of handling units (HU) by SUPPLIER	12
3.2.3	Procurement	12
3.2.4	Specific requirements depending on transportation type	12
3.3	Returnable packaging.....	13
3.3.1	Specification depending on type of returnable packaging	13
3.3.2	Empties management	14
3.3.3	Provision and storage of BOSCH-returnable empties	14
3.3.4	Repairs and scrapping	14
3.3.5	Cleaning	14
3.3.6	Marking of BOSCH-returnable packaging by the SUPPLIER	15
4	Transport logistics	15
4.1	Transports.....	15
4.1.1	Forwarder / Logistics Service Provider (LSP)	15
4.1.2	Transports processed by BOSCH TMC	15
4.1.3	Transports not processed by BOSCH TMC	17
4.1.4	Couriers services and package shipments	17
4.2	Advanced Shipping Notices (ASN).....	17
4.3	Delivery note and transport documents.....	17
4.3.1	Delivery note	17
4.3.2	Transport documents	18
4.4	Marking of products (labeling).....	18
4.4.1	GTL Label	18
4.4.2	Labeling of shipments processed by the BOSCH TMC.....	19
4.4.3	MAT-Label for specific divisions	19
4.4.4	General requirements	19
4.5	Special arrangements for transportation of critical goods	19
4.6	Marking labels for sample parts	20
4.7	Safety and security in the movement of goods	20
5	Special transports and process failures	20
5.1	Special transports.....	20

5.2	Disruption of delivery (process failures), risk- and crisis management	20
6	Logistics quality	21
6.1	Logistics complaints	21
6.2	Dynamic Supplier Classification (DSC – section “Supplier Logistics Capability” (SLC)).....	21
6.3	On-Time-Delivery (OTD+).....	22
7	Further development of logistics	22
8	Related applicable documents	22
9	List of abbreviations	22
10	Definition of terms	24
11	Appendices	26
11.1	Appendix 1: Supply Delivery Matrix – Key Requirements for Collaboration in Logistics.....	26
11.1	Appendix 2: Transport Order (TO).....	27

Table of figures

Figure 1: Permitted and non-permitted materials	11
Figure 2: Marking-pictograms.....	12
Figure 3: Cleaning responsibility by region	15
Figure 4: List of abbreviations	23
Figure 5: Definitions of terms	25
Figure 6: Standard BBM Supply Delivery Concepts.....	26
Figure 7: Example Transport Order	27

Preamble

Competition in national and international markets has intensified significantly in recent years. Growing customer expectations in terms of quality and flexibility mean that our company and the entire supply chain face increasingly demanding challenges.

Traditional logistics operations have transformed into an integrated, customer-focused management function, that increasingly constitutes a strategic success factor in our company's competitiveness. The companies in the Bosch Group depend on cooperation with reliable, expert, and customer-focused suppliers.

Scope of this Supplier Logistics Manual

This supplier manual sets out the conditions for delivery of products by the SUPPLIER. The rules it contains shall apply in supplement to the agreements made with the SUPPLIER relating to the delivery of products (e.g. a corporate agreement on products and raw materials (EZRS), an A-supplier agreement, multi-year contract, (price) agreements, orders; the "supply contract").

Any provisions agreed to in any of the aforementioned documents that deviate or are contrary to this supplier manual shall take precedence over the Supplier Logistics Manual, and apply accordingly.

All companies of the Bosch Group (Robert Bosch GmbH and all companies directly or indirectly controlled by Robert Bosch GmbH ("BOSCH")) are authorized to apply the regulations set out in this supplier manual in the execution of supplier logistics with the SUPPLIER, or whichever of its group companies are responsible (affiliated enterprises pursuant to section 15 of the German Stock Corporation Act (AktG)), from whom they purchase products.

The term "controlled", as used above, means that the Bosch Group holds, directly or indirectly, over 50 percent of the voting rights in a business enterprise, and can determine its management.

The SUPPLIER is responsible for the quality of its products and for ensuring compliance with the requirements and rules set out in this supplier manual.

Deviations from or additions to this supplier manual (e.g. to take into account particular requirements for the BOSCH plant receiving the supplied product or of the BOSCH division involved) may be agreed upon in writing between the SUPPLIER and BOSCH.

Any provisions or specifications deviating from this Supplier Logistics Manual shall be regulated on a division- or plant-specific basis. Such deviating regulations can be found at: www.bosch.com > Purchasing & Logistics > Downloads > Logistics

1 Information management in logistics

Constructive cooperation between the SUPPLIER and BOSCH requires targeted, accurate communication of information. The key elements of this are:

- ▶ Prompt and unsolicited notification of any changes relating to the supply relationships
- ▶ Compliance with and monitoring of agreements made
- ▶ Use of state-of-the-art communication

1.1 Communication between the SUPPLIER and BOSCH

1.1.1 Points of contact

The SUPPLIER and BOSCH shall appoint specific persons to be responsible for acting as points of contact. The SUPPLIER shall appoint its contact by name, including his or her position, e-mail address, landline office telephone number, and mobile phone number, along with a telephone number to use in emergencies (the "emergency hotline").

The language of communication is English. The SUPPLIER and BOSCH may also agree on using the language of the BOSCH plant supplied.

1.1.2 Availability

Outside of its standard local working hours, the SUPPLIER shall remain available via the emergency hotline telephone during the production hours of the BOSCH plant supplied. The emergency contact reached by way of the emergency hotline telephone shall have access to decision makers who can authorize immediate emergency response actions.

1.2 Information transmission via EDI

As a general rule, prerequisite for a supply relationship with BOSCH is the transmission of information via *electronic data interchange* (EDI). The SUPPLIER shall use EDI to receive information from BOSCH and to send information to BOSCH. If the SUPPLIER has no existing EDI link to BOSCH, a time schedule for introduction EDI shall be agreed and implemented accordingly by the SUPPLIER.

The technical requirements and approved message formats are agreed in the EDI contract. Further information can be found in the BOSCH EDI brochure, which can be downloaded from www.edi-service.bosch.com.

When using WebEDI, the data is transmitted via the internet platform SupplyOn (available at <http://www.supplyon.com>). The SUPPLIER shall bear the cost of using SupplyOn.

The following business processes in particular, where they are used, shall be performed with EDI support:

- ▶ Transmission of scheduling agreement call-offs or single purchase orders from BOSCH to the SUPPLIER.
- ▶ Transmission of single purchase order acknowledgements (confirmations) from SUPPLIER to BOSCH
- ▶ Transmission of the delivery, packaging, and transport data via an advanced shipping notice (ASN) from the SUPPLIER to BOSCH.
- ▶ Transmission of the KANBAN call-offs (JIT-Call).
- ▶ Transmission of vendor-managed inventory (VMI) information.
- ▶ Self-billing invoicing (SBI) (if legally permitted, on a country-specific basis)
- ▶ If delivery is destined for consignment stock: Maintenance of stock movement list (unless otherwise regulated)
- ▶ Empties management (if empties management system applicable)
- ▶ Transmission of e-invoices (electronic invoicing)

2 Control concepts and order processing

BOSCH shall notify the SUPPLIER of its needs and requirements by the way of the control concept used by BOSCH.

Based on this, the SUPPLIER will ensure that:

- ▶ Its sub-suppliers deliver the appropriate primary materials
- ▶ Its production capacity and that of its sub-suppliers are adequate to cover the previewed material requirements forecasts, and the previewed quantities and time frames are forwarded to the sub-suppliers without undue delay, and
- ▶ Supply shipments are delivered to BOSCH on schedule

2.1 Control concepts

1. KANBAN (*ship to line* (STL) or *ship to supermarket* (STS))
2. VMI, including consignment
3. Call-offs | single purchase orders (PO) | *reorder point pull* (ROP Pull) including consignment (customer-managed inventory (CMI) or without consignment

Separate dedicated contractual agreements shall be concluded to implement KANBAN, VMI and consignment.

Call-Off | PO | ROP Pull

Call-offs are communicated on a rolling basis. They are updated regularly and contain order and master data (e.g. quantities and dates) with a horizon of several months.

Master data relevant for call-offs must be communicated by the SUPPLIER. The most recent call-off is relevant, and supersedes previous call-offs.

Alternatively, single purchase orders may also be transmitted (e.g. POs for samples, auxiliary materials and operating supplies (HIBE), machine accessories and spare parts (MAZE), and division- or business unit-specific requirements).

For the Power Tools (PT) division, a control concept is used in which the binding call-off is transmitted using a PO and the rolling preview using call-offs (ROP pull).

At the Drive Control and Technology (DC) division, for scheduling agreement call-offs the statistical (i.e. originally scheduled) delivery date is relevant with regard to any costs arising from delay in delivery. The same applies for single purchase orders if delivery schedules are not used.

Order processing and tracking

Arrival and pick-up dates are usually specified for call-offs or single purchase orders. For Incoterm Free Carrier (named place of delivery) (FCA), the supplier provides the goods by the pick-up date. If in call-offs or single purchase orders only the arrival or delivery date is indicated, the SUPPLIER shall take into account the time needed for shipment).

For shipments delivered to Incoterms Delivered At Place (DAP) or Delivered Duty Paid (DDP), the arrival date at the Bosch plant supplied is the determinant stipulation.

The SUPPLIER checks the incoming order for accuracy, and plausibility (e.g. SUPPLIER name, part number, quantity, date) and notifies BOSCH immediately of any discrepancies. The SUPPLIER operates a continuous internal order tracking system. The SUPPLIER is able to provide information about production progress at any time. The SUPPLIER ensures that sub-suppliers operate a transparent end-to-end order tracking system as well.

2.2 Flexibility and release periods

2.2.1 Production and material releases

As a general rule, a production release of 4 weeks and a material release of 8 weeks are given based on the specified quantity and pick-up-date (for Incoterm FCA).

For shipments dispatched based on Incoterms DAP or DDP, the aforementioned release time frames are based on the actual ex-works shipping date at the SUPPLIER.

Any deviations from these time frames are subject to agreement between the SUPPLIER and BOSCH Purchasing.

The production and material releases for goods controlled by VMI are oriented analogously with to the aforementioned time frames based on the most recent production planning transmitted via SupplyOn.

The corresponding quantities of an average stock between the minimum and maximum levels based on the consumption quantities of the most recent transmission shall be applied retrospectively for the releases.

For supply deliveries within the Drive and Control Technology (DC) division, deviating dates, time frames, and regulations may be agreed to, for example in "part-specific agreements" (TLV: „Teilespezifische Vereinbarungen“).

Any and all changes regarding production and material release must be made in writing.

Required quantities that go beyond the production and material release periods are non-binding planned figures (forecasted previews), which SUPPLIERS use as a basis for adjusting their production capacity.

For goods already in transit, the arrival date usually isn't changed (frozen zone). Any exceptions to this rule are subject to clarification and agreement between BOSCH Logistics and the SUPPLIER.

2.2.2 Minimum order quantities

Minimum order quantities are not permitted unless BOSCH agrees to a minimum order quantity in exceptional situations. Existing agreements regarding minimum order quantities or batch-production sizes remain valid.

2.2.3 Flexibility

The regulations defined in the Corporate Agreement (purchasing framework contract) and supply-/ multi-year-contract shall apply.

2.2.4 Ramp-up and phase-out control

BOSCH expects increased flexibility from the SUPPLIER in the ramp-up and phase-out phases. The ramp-up and phase-out quantities and dates must be agreed between BOSCH and the SUPPLIER in good time. The control concept shall be discussed and, if necessary, adapted based on the requirements of the given situation.

3 Packaging

3.1 Packaging specifications

3.1.1 Packaging design criteria

In general, the packaging for shipments between BOSCH and the SUPPLIER shall be designed on the basis of economic, quality, and environmental criteria. The packaging concept proposed by SUPPLIER is subject to approval by BOSCH prior to the first delivery.

The SUPPLIER – provided the SUPPLIER is responsible for the packaging design – shall design the packaging concept and quality such as to ensure product integrity during transport, transshipment, and storage.

The packaging must protect all employees and any other persons against any hazards posed by the products (e.g. dangerous goods/hazardous materials). The packaging itself must also not pose any hazard to persons (e.g. from protruding nails). For reasons of environmental protection, recyclable and non-mixed materials shall be used that are environmentally compatible and easy to dispose of, and are labeled in compliance with the waste management industry specifications.

Further requirements for packaging if supplier is responsible for packaging design

- ▶ Easy handling during opening and closing, and for repacking operations.
- ▶ Stackability for identical loading units: providing a minimum dynamic stacking factor (as defined in section 10) of 1 (1+1). The packaging quality is to be verified by standardized testing methods (as defined in section 3.2.1) and the loading units labeled in accordance with VDA-recommendation 4525 (as per DIN EN ISO 780) (as defined in section 3.2.2).
- ▶ Maximized filling level of packages and loading units to minimize transportation costs.
- ▶ Gross weight limit per loading unit (as defined in section 10) maximum 1,000 kg.
In justified exceptional cases, a special approval may be agreed in consultation with the BOSCH contact.
- ▶ The gross weight limit per manually handled package (as defined in section 10) is 15 kg at maximum: alternative agreements can be made to accommodate specific requirements or for reason of regional regulations.
- ▶ For loading units with basic dimensions of 1200x800 mm, the following preferred external dimensions shall apply for packages: 300x200 mm, 400x300 mm, or 600x400 mm (see section 3.2 and section 3.3.).
- ▶ Loading units may not have any protruding or jutting labels or strips; cardboard boxed in particular cartons must be dimensionally stable and have correctly folded cover flaps.
- ▶ Mixed pallets are generally permitted, but must be clearly labeled as mixed pallets. Posting and non-mixed storage must be possible at no additional cost or effort (such as stackable (interim) load carriers). Any use of mixed pallets is subject to coordination and agreement with the BOSCH contact (see section 3.1.4 and section 4.1.2).
- ▶ International symbols shall be used to label goods that are subject to special handling.
- ▶ Specific supplementary requirements apply in supplement to the North American Free Trade Agreement (NAFTA) in accordance with the NA Supplier Packaging & Labeling Standards, see link: Internet: www.bosch.com > Purchasing & Logistics > Downloads > Logistics > Regional Regulations

3.1.2 Responsibilities for packaging design

The packaging concept shall be defined at an early stage - if possible during the development phase - in coordination and agreement between the BOSCH plant supplied and SUPPLIER. Bosch standard or generally standardized packaging (e.g. to German Association of the Automotive Industry (*Verband der Automobilindustrie* (VDA))) is preferred.

Before BOSCH approves the packaging for release, the SUPPLIER –if responsible for the packaging- must adequately test the packaging (see section 3.1.2). The SUPPLIER shall clarify the test procedures and scope with the BOSCH contact prior to performing such testing. BOSCH and the SUPPLIER shall ultimately agree on the finalized product-specific packaging in the form of a packaging specification, which will be generally binding for all future deliveries.

Alternative packaging solutions (as defined in Section 10) may be used in exceptional cases, but only in coordination and agreement with BOSCH, and subject to approval by BOSCH.

Any unapproved variances from the specified packaging, and any quality defects attributable to the SUPPLIER, shall be recorded as logistics errors (nonconformities) (see section 6.1), and can result in complaints, and handling process in accordance with the Eight Disciplines (8D) problem-solving method. BOSCH can charge the SUPPLIER for any additional costs arising within this context, including any additional BOSCH-internal costs

3.1.3 Permitted and non-permitted materials

The table below presents an overview of the possibilities for using various packaging materials. These materials shall be used in accordance with BOSCH-Standard N 2580-1 “Prohibition and declaration of substances”; see link <http://purchasing.bosch.com/de/de/info/download/downloads.html>.

Composite materials (as defined in Chapter 10) General		
General	✓	-
	0	Only with special approval from the BOSCH contact
	✗	-
Plastics		
One-way	✓	PE, PP, PS, ABS, EPS (except EPS chips), EPE, EPP, PET; labeling according to DIN Standard 6120 (of the German Institute for Standardization (DIN))
	0	PVC only with special approval from the BOSCH contact
	✗	PUR, EPS chips
Returnable	✓	ABS, PE, PP, PS, PET, EPP, EPE labeling in compliance with DIN 6120
	0	PVC only with special approval from the BOSCH contact
	✗	-
Films, bags and sacks made of film	✓	PE with labeling in compliance with DIN 6120 recommended, sticker/label and adhesive tape of the same materials; <i>Intercept/Volatile Corrosion Inhibitor (VCI)</i> – films as corrosion protection
	0	-
	✗	Sticker/label and adhesive tape of different materials
Paper and cardboard		
General	✓	Free of harmful paper manufacturing substances and labeled with universal recycling symbol (RESY)
	0	Use of non water-soluble coatings or adhesives, e.g. wax, paraffin, bitumen, and oil paper or impregnated papers and cardboards, fabric adhesive tapes, fiberglass-reinforced paper adhesive tapes shall be reduced to a necessary minimum. In general, these materials shall only be used in consultation and agreement with the BOSCH contact
	✗	-
Corrosion protective paper	✓	VCI papers with demonstrated recycling capability with paper/cardboard and labeled with the RESY symbol. The VCI materials used shall comply with the German Technical Rules for Hazardous Substances (TRGS) 615, and be nitrite-free to prevent formation of nitrosamine and to protect personnel
	0	-
	✗	-
Tapes		
General	✓	PP, PET labeling in compliance with DIN 6120 recommended

	0	Steel tapes and metal clamps <u>for heavy loads</u> only with special approval from the BOSCH contact
	×	Steel tapes and metal clamps
Wood		
General	✓	International Plant Protection Convention (IPPC) standard (only heat treatment) Moisture level < 20 % Country-specific requirements must be met, see Internet: https://www.IPPC.int , <i>International Standards for Phytosanitary Measures</i> (abbr.: ISPM)15: http://pflanzengesundheit.jki.bund.de/index.php?menuid=48&reporeid=40
	0	-
	×	IPPC standard (chemical pressure impregnation) Press board pallets (INKA pallets), coated and painted wood and wood wool
Padding and shock-absorbing materials		
General	✓	Usage is to be minimized as effectively as possible by adjusting the quantities of parts in packaging
	0	
	×	Chips and filling materials made of foodstuffs (e.g. corn starch, straw, bark)

Figure 1: Permitted and non-permitted materials

3.1.4 Delivery specifications

The SUPPLIER shall pack the packages unmixed, meaning that part numbers of different production batches, review status, shelf life, or countries of origin must be packaged separately. Products of differing modification or revision levels may not be combined in a single package.

The SUPPLIER shall combine the individual packages to form a transportable loading unit on the pallet, secured against slipping during transport.

Pallets shall be designed as 4-way pallets with three runners. For lower quantity volumes, any variances shall be agreed in advance with the BOSCH contact.

For deliveries on pallets, the top layer should be flat. If the quantities to be packaged means that a stackable surface cannot be created, it could be filled up with empty containers in consideration of the static and dynamic stacking factor (see section 10).

The containers (e.g. Euro containers (KLT boxes)) on the top layer shall be sealed with a cover. If plastic tapes are used to secure the entire loading unit, pallet covers shall be used to prevent damage.

3.1.5 Requirements for electrostatic discharge (ESD) protection

Components that are sensitive to electrostatic discharge (electrostatic discharge sensitive devices, or ESDS for short) must be protected against charging and rapid discharge according to the classification of their damage risk. If no external protection has been fitted, the electrostatic sensitive device/component shall be prevented from coming into contact with any electrostatically chargeable materials.

It shall be ensured at all times that ESDS components are not exposed to any risk in terms of ESD during transportation and storage. The SUPPLIER shall strictly comply with the relevant requirements for ESD-proof packaging set out in DIN EN 61340-5-1.

All ESD packaging materials shall be labeled with the ESD symbol.

The requirements for ESD packaging are determined by the relevant ESDS components to be packaged. The use and scope of ESD packaging are specified by BOSCH in coordination and agreement with the responsible ESD coordinator and the SUPPLIER.

3.1.6 Corrosion prevention and moisture control

Materials or products susceptible to corrosion must be protected during transportation and storage according to the prevailing external conditions (for example high relative humidity or for sea transportation). For example, desiccant bags, VCI paper and corrosion protection using reactive copper nanoparticles are suitable.

3.1.7 Packaging for hazardous goods

For each location and material number, the packaging for hazardous goods is subject to approval by the BOSCH hazardous goods officer or an logistics service provider (LSP) contracted by BOSCH before the first shipment of products. This also applies for pilot series and sample deliveries. The SUPPLIER shall always affix the appropriate warning symbols to the packaging at clearly visible locations. The SUPPLIER shall always comply with the laws and regulations applicable for hazardous goods in the respective countries.

3.2 One-way packaging

3.2.1 Verifying evidence of packaging quality if SUPPLIER is responsible for packaging design

To rule out quality risks during transportation, transshipment operations, and storage, the SUPPLIER, upon request by BOSCH, shall provide verifying proof of the packaging quality (i.e. material specifications, transport testing, washing characteristics, and box compression testing to DIN 55440-1 requirements, etc.), including test certificates.

The box stack compressive strength may be determined either by the packaging supplier or an accredited testing institution. The box compression test shall be conducted to DIN 55440-1 requirements, with a pallet positioned on top and below (minimum of 3 test objects, with conditioning in accordance with DIN ISO 2233, i.e. 24 h at 23°C, 50% relative humidity (RH), for determination of the maximum compressive strength).

3.2.2 Marking of handling units (HU) by SUPPLIER

The marking (i.e. labeling) of handling units (HU) shall comply with VDA Recommendation 4525 (DIN EN ISO 780). The pictograms shown below shall be placed in easily visible locations on all four sides of the HU with a minimum height of 160 mm.

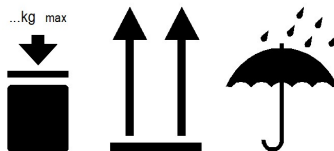


Figure 2: Marking-pictograms

3.2.3 Procurement

The SUPPLIER shall procure the approved one-way packaging (containing also all packaging aids needed) at its own costs. Generally, Bosch covers the cost of the packaging by way of the product price. The packaging costs shall be itemized separately in the quotation.

3.2.4 Specific requirements depending on transportation type

Specific requirements may differ depending on the type of transportation (for requirements applicable in North America, see section 3.1.1).

Land and air freight

- ▶ Preferred external dimensions: L1200 x W800 x H1000 mm
- ▶ For air freight, the use of sea freight pallets is also permitted.

Sea freight

Due to long transportation distances and times, and changing requirements (climatic zones, mechanical stress, moisture, etc.), particular attention must be given to ensuring sea freight is suitably packaged.

Sea freight packaging shall comply with VDA recommendation 4525.

- ▶ The preferred external dimensions for optimum utilization of shipping container loading volume are:
 - L1175 x B750 x H460/750/1045mm
 - L1140 x B790 x H460/750/1045 mm
 - L1140 x B980 x H460/750/1045 mm
 - In order to ensure an optimum utilization of shipping containers, a loading unit should not have any external dimensions longer than 5.7m, provided the packaged product allows such a limit.
- ▶ Use of outer cartons with moisture-proof / waterproof adhesive.
- ▶ Use of desiccant in oversea containers to prevent mold; see also e.g. DIN 55474
- ▶ Small cardboard boxes (<400 x 300 mm) are to be combined and protected inside a larger, completely filled (for stackability) external carton.
- ▶ The loading volume of the shipping container must be completely utilized. The SUPPLIER must ensure dynamic stackability to achieve this (normally 2-3 layers). A safety factor shall be calculated using the following formula.

$$\text{Safety factor} = \text{load bearing capacity} \frac{(\text{determined failure load in standard atmosphere})}{\text{required permitted additional load}}$$

Based on the VDA recommendation 4525, the SUPPLIER shall adhere to a safety factor of ≥ 3.5 (failure load of loading unit determined in a standardized climate).

3.3 Returnable packaging

3.3.1 Specification depending on type of returnable packaging

Euro pallet or Euro pallet cage

The preferred process is for exchanging full containers for empties and conducting empties accounting directly between BOSCH and the SUPPLIER. If the supply of Euro pallets / Euro pallet cages involves an exchange process with a logistics service provider (European Pallet Association e.V.; quality criteria: Internet: www.epal-pallets.org), the SUPPLIER is responsible for the exchange process.

In deviation from this rule, the Building Technologies (BT) division makes use of ISO pallets.

BOSCH-returnable empties

BOSCH-returnable empties include standard and special load carriers. These are procured by BOSCH and remain the property of BOSCH. The returnable packaging is specified by BOSCH based on company-internal standards. Proposals from the SUPPLIER for the design of returnable packaging are welcome. The SUPPLIER is responsible for the product quality.

BOSCH covers the demand for empties for the transportation time in both directions.

Unless agreed otherwise, the SUPPLIER will receive BOSCH-returnable empties for a product inventory of three (3) days without BOSCH charging the SUPPLIER a usage fee for this. For use of BOSCH-returnable empties exceeding the agreed inventory, BOSCH can charge the SUPPLIER a usage fee. The usage fee is calculated based on the inventory data of the empties accounts in the empties management system (see section 3.3.2 and Chapter 7).

Reusable empties located in the Bosch consignment warehouse are excluded from the usage fee.

If the SUPPLIER uses fewer BOSCH-returnable empties than described/ agreed above, there is no reimbursement by BOSCH.

Unless otherwise agreed, the SUPPLIER subject to prior approval by the BOSCH contact, may provide BOSCH-returnable empties to its sub-suppliers for their BOSCH-specific production processes. The BOSCH-returnable empties used by the sub-suppliers for their BOSCH-specific production processes shall be added to the empties account of the SUPPLIER and, if necessary, also debited to the SUPPLIER in accordance with the regulations described above. The SUPPLIER is liable to BOSCH for damage caused to the BOSCH-returnable empties by the SUPPLIER or its sub-suppliers. The SUPPLIER shall be responsible for any fault or culpability of its sub-suppliers to the same extent as it is for any fault or culpability of its own.

SUPPLIER should concentrate the delivery or collection of empties at one particular regional location.

3.3.2 Empties management

For the purpose of empties management, the SUPPLIER will indicate the ten-digit BOSCH packing material number and corresponding quantity on the delivery note for every delivery.

If exchange pallets are used, these must also be listed on the delivery note.

The SUPPLIER and BOSCH - or an LSP contracted by BOSCH – shall maintain empties accounts and reconcile the account balances with their direct exchange partners. The SUPPLIER will use the empties management system stipulated for this purpose by BOSCH.

The account balances shall be provided to the SUPPLIER monthly. Any complaints must be received by the BOSCH contact within 14 calendar days, including submission of a document copy (of the delivery note). Otherwise, the stated inventory is considered to be confirmed by the SUPPLIER. Quantity differences must be clarified by the SUPPLIER with support from the BOSCH contact or the LSP. Any outstanding quantity differences are to be reconciled with the replacement value based on the principle of causation.

The SUPPLIER shall perform inventory counts of all BOSCH-returnable packaging every year on a date specified by BOSCH. Within the scope of the quantity differences established during such inventory, the SUPPLIER shall reconcile any shortcomings with the replacement value.

3.3.3 Provision and storage of BOSCH-returnable empties

Where a 1:1 (without time delay) exchange of full containers for empties between BOSCH and the SUPPLIER is agreed, the SUPPLIER shall request BOSCH-returnable empties in good time (taking into account the lead times agreed with the exchange partner) using the designated empties management system.

In Europe, Turkey, and Russia, BOSCH returnable empties are supplied free of charge to the agreed unloading point. Any differing procedures to be applied in other regions are subject to prior written agreement.

The following deviating regulation shall apply for the DC division: returnable empties are supplied free of charge only in Germany.

The SUPPLIER shall check the returnable empties on receipt and report any deficiencies or defects identified (e.g. quantity differences, damage, etc.) immediately to the BOSCH contact, indicating the delivery note concerned and providing photographic evidence, and a short description of the complaint. Subsequent corrective action shall be agreed with the BOSCH contact on a case-specific basis.

The SUPPLIER shall store returnable empties such that any contamination before, during, or after the production process is ruled out.

3.3.4 Repairs and scrapping

The SUPPLIER may only scrap or repair Bosch-specific load carriers given prior consent thereto from BOSCH.

3.3.5 Cleaning

Responsibility for cleaning differs by region due to the defined standards:

Deliveries BOSCH – SUPPLIER	Cleaning responsibility	Deviations
Within Europe, Turkey and Russia	BOSCH	Deviations from these rules are subject to agreement between BOSCH and the SUPPLIER
Within NAFTA	SUPPLIER	
Within Latin America	By agreement	

Within Asia Pacific (including India, China, Japan, Association of Southeast Asian Nations (abbr.: ASEAN))	By agreement	
Innerhalb Afrika	By agreement	
Across regions	SUPPLIER	

Figure 3: Cleaning responsibility by region

In line with its responsibility for quality, the SUPPLIER shall pack its products only in packaging that meets the cleanliness requirements for its products as well as BOSCH's specifications.

If any follow-up cleaning of empties is necessary once BOSCH has assumed responsibility for cleaning, any possible assumption of costs thereof by BOSCH is subject to prior agreement with BOSCH. The SUPPLIER must provide evidence of any fouling or contamination caused by BOSCH.

3.3.6 Marking of BOSCH-returnable packaging by the SUPPLIER

No labels, tags, stickers or similar items may be affixed to BOSCH returnable load carriers. The standard label holders attached are to be used for marking the load carriers. The product tag is inserted in the label holder and, if necessary, secured with a maximum of two easy to detach adhesive points (complying with VDA recommendation 4500/4504).

3.3.7 Inner packaging (one-way or returnable packaging)

For some packaging, inner packages are also needed to protect the products and facilitate handling. Such inner packaging may be returnable (e.g. thermoformed moldings) or made of one-way materials (e.g. corrugated cardboard inserts). The requirement for inner packaging is derived from economic and qualitative considerations, and shall be agreed between the SUPPLIER and BOSCH.

The requirements for one-way packaging (see section 3.2) and returnable packaging (see section 3.3) also apply to inner packaging.

4 Transport logistics

The aim is to ensure punctual, complete, top-quality, and tamper-proof delivery of products to BOSCH by its SUPPLIERS.

4.1 Transports

4.1.1 Forwarder / Logistics Service Provider (LSP)

If BOSCH is paying for the freight (standard Incoterm Free Carrier (FCA) - named place of delivery for pick-up), the SUPPLIER shall use only the forwarders / freight carriers, and courier companies (LSP) specified by BOSCH. Exceptions are only permitted in justified cases and subject to prior written approval by the BOSCH contact.

The SUPPLIER shall combined multiple deliveries to the same BOSCH unloading point on a single day into a logistically sensible loading/shipping unit, and execute delivery using the specified LSP.

For shipments delivered to Incoterm Delivered At Place (DAP) – named place of destination, the freight forwarder contracted by the SUPPLIER shall ensure that customs clearance is performed by the BOSCH customs agent.

The SUPPLIER is responsible for ensuring that its products are safely loaded and the packages secured for transport, particularly if an LSP is to assume charge of a fully packed container (swap body).

The LSP can initially only conditionally confirm the number of packaging units. Follow-up corrections can be made subsequently provided the LSP is able to undertake a finalized count of the quantities it has taken into its safekeeping.

4.1.2 Transports processed by BOSCH TMC

If shipment transportation is processed by way of the BOSCH Transport Management Center (TMC) and the BOSCH Transport Management System (TMS), any direct notification to the LSP is no longer permissible.

The SUPPLIER shall issue a notification for each transport requirement (number of packages, dimensions, weight, etc.) only to the BOSCH TMC in line with the applicable regulations for order acceptance, processing times, and cutoff times (as defined in Section 10). The SUPPLIER enters the transport requirement in the BOSCH TMS in the form of a Transport Order (TO; see Appendix 2, Transport Order).

Unloading and pick-up times between 8:00 am and 4:00 pm shall be ensured for less-than-full-truckload (LTL) freight shipments. The unloading and pick-up times for full-truck-load (FTL) or milk-run (MR) freight shall be coordinated and agreed with the TMC.

If there are changes in pick-up/ loading areas The SUPPLIER shall inform the TMC at least 6 weeks in advance of any changes to or potential, new destinations serving as pick-up and unloading locations.

Any information concerning freight transportation shall be communicated directly with TMC, and the SUPPLIER shall likewise notify the TMC directly of any delays.

All relevant shipping documents (delivery note, invoice, customs documents (Export Accompanying Document (EAD), corresponding to the Master Reference Number (MRN), etc.) shall be uploaded to the TMS by no later than the date of pick-up.

If TMS is being used, a Transport Order (TO) shall be created in TMS in one of the four following ways:

- ▶ SUPPLIER creates the TO manually.
- ▶ The SUPPLIER creates the TO on the basis of an Advanced Shipping Notice dispatched from its own enterprise resource planning (ERP) system
- ▶ System-driven creation of TO on each shipping date based on the defined route saved with the TO data.
- ▶ System-driven creation of TO on each shipping date based on the material call-off from the BOSCH plant supplied.

The SUPPLIER shall declare its willingness to accept these four ways of creating TOs, and to provide notification of all of its shipments, with all requested information herewith. The decision regarding which manner of creating the TO shall be taken by the plant in cooperation with the TMC-planner.

In all cases, the TO must contain the following information, which is either pre-entered by the system or manually entered by the SUPPLIER depending on the method of TO creation opted for:

- ▶ Sender and recipient data.
- ▶ Shipment data: Type and number of packages/handling units, gross weight, outside dimensions, and stacking factor.
- ▶ Order data: Order number, delivery note number.
- ▶ Item data: Part number, quantity.
- ▶ Master (formerly Movement) Reference Number (MRN)
- ▶ Invoice number
- ▶ Harmonized System (HS) Code for shipments requiring customs clearance.

For air and sea freight shipments, this information must always be maintained at the item level.

Saved transport orders become binding at the end of the cutoff-time for the given shipment. If quantity deviations occur between the transport notification and the actual transport requirement after the cutoff time, they must be entered directly in the TO by no later than the day of pickup within the pickup time window. If it is not (or no longer) possible to adjust these data in the system, the TMC shall be informed immediately. Should the requirement exceed the maximum agreed loading capacity, the TMC must also be informed thereof immediately by telephone or e-mail.

The LSP is not allowed to pick up goods without a TO number.

The SUPPLIER shall inform the TMC of the business hours before public holidays if they differ from the regular opening hours.

4.1.3 Transports not processed by BOSCH TMC

If the shipment is not processed via the BOSCH TMC, then the SUPPLIER shall issue a notification to the LSP specified by BOSCH. The SUPPLIER shall do so independently under its own responsibility such that on-time delivery to BOSCH is ensured. Exceptions are only permitted subject to prior written consent by the BOSCH contact.

The LSP shall collect the shipment within a defined time window or at the time specifically agreed between the SUPPLIER and the LSP.

4.1.4 Couriers services and package shipments

Packages weighing of up to 31.5 kg and sized within the maximum combined length and girth (as defined in Section 10) shall be processed using the specified courier companies. The regulations governing the choice of packaging must be observed (see section 3.1.2). The SUPPLIER shall observe any differing regional guidelines governing packages and package shipments.

4.2 Advanced Shipping Notices (ASN)

For each shipment (dispatched to Incoterm DAP/DDP requirements) or pick-up (to Incoterm FCA requirements), the SUPPLIER shall send an advance shipping notice (ASN) to BOSCH using EDI or some other electronic interface (e.g. InTrack ASN).

ASNs shall be dispatched on exactly the same days of the scheduled pick-up/ex-works shipment of the goods from the SUPPLIER to BOSCH.

For any new EDI connections, the transfer protocol OFTP2 (Odette file transfer protocol) or AS2 (Applicability Statement 2) shall be used, as well as message format GLOBAL EDIFACT based on the ODETTE recommendations. Detailed information on what data-entry fields in the ASN are specified individually as mandatory or optional fields and to be communicated accordingly by the SUPPLIER can be noted from the document "Message Implementation Guideline: GLOBAL DESADV D.07A2" and the associated appendix, which can be downloaded from the EDI Bosch Portal at www.edi-service.bosch.com.

Existing connections which do not use the ODETTE GLOBAL EDIFACT message format must be changed over to the required format by no later than December, 31, 2021.

4.3 Delivery note and transport documents

4.3.1 Delivery note

The SUPPLIER shall create the delivery note in the format dictated by DIN 4994/4991. It shall contain, at minimum, the following information:

- ▶ SUPPLIER name and sender address
- ▶ SUPPLIER number as assigned at the relevant BOSCH plant supplied
- ▶ Recipient address (recipient plant supplied, unloading point as per call-off, for example)
- ▶ BOSCH part number (PN)
- ▶ Total quantity of PN
- ▶ Number and type of packaging with ten-digit BOSCH packing material number (e.g. packing units, Euro pallets) for returnable packaging
- ▶ Number of exchange pallets used per order (see also section 3.3.3)
- ▶ Delivery note number also printed as a barcode on the delivery note, format in Code 39 as specified by the International Standards Organization (ISO) and International Electrotechnical Commission (IEC) 16388.
- ▶ BOSCH order number or call-off number including item line.
- ▶ Batch number and, where applicable, shelf life expiration date (SLED)
- ▶ Revision status of bill of material/parts list, or if the revision identifier is not used: Bill of material/parts list change number
- ▶ Mixed HUs: (see section 4.1.2 and section 3.1.1.)
- ▶ Clear description of the goods for creation the summary customs declaration, if the shipment crosses customs borders (third countries)

- ▶ Specification of material composition of the packaging material, e.g. wooden pallet, plastic pallet, if shipment crosses customs borders (third countries)

Division- and/ plant-specific regulations shall apply.

4.3.2 Transport documents

In addition to the delivery note, the SUPPLIER normally provides the LSP with the following information to record the shipments: transport (shipping) documents and customs documents.

Transport (shipping) documents

Standard freight transport / forwarder order, e.g. VDA 4922, waybill

For shipments processed through the BOSCH TMC and BOSCH TMS, the SUPPLIER creates the waybill directly from the TMS. As a result, the Transport Order (TO) number is taken over automatically into the waybill.

Should the waybill not be created via TMS in any case the TO number and all shipping related invoice, order and delivery note numbers must be printed on the waybill.

Customs documents

The SUPPLIER shall provide the LSP with all documents necessary for customs clearance, i.e. for export in the country of origin, for transit if applicable, and for import in the destination country, in a permitted form (electronic or in paper form, copies or originals, signed or not signed) and at the correct time.

The SUPPLIER shall provide all documents in TMS necessary for shipments (third country deliveries) handled via the BOSCH TMC and BOSCH TMS.

Required customs clearance documents include in particular:

- ▶ Export declaration
- ▶ Commercial invoice (or in the case of consignment deliveries or non-chargeable samples, a proforma invoice). The commercial invoice must match the value of the transport documents
- ▶ Packing list
- ▶ Packing declaration
- ▶ Certificate of non-preferential origin or proof of preferential origin (included in the applicable free trade agreement). The SUPPLIER shall send the original preference proofs (e.g. EUR.1) by postal service to the LSP customs agent named by BOSCH
- ▶ If the SUPPLIER is provided with goods free of charge (provision), the value and origin of these goods must still be shown separately on the invoice
- ▶ Any use of a standard invoice format provided by a LSP (e.g. UPS, FedEx etc.) is prohibited

Document forms and resulting details required regionally shall be coordinated and agreed with the BOSCH plant supplied.

4.4 Marking of products (labeling)

4.4.1 GTL Label

Representatives from Europe (ODETTE), Japan (JAMA / JAPIA) and North America (AIAG) have developed a common "Global Transport Label" standard that can be used worldwide for supplier and customer relations. In December 2015, the new VDA Standard 4994 "Application Recommendation for the Global Transport Label - GTL" was published for this standard.

Robert Bosch has been guided by this standard in the design of its goods tag, which must be used by the suppliers for product labeling worldwide. The marking of all containers with this GTL label is essential for optimizing Bosch incoming goods.

All details on the related requirements and specifications can be found in the appendix "GTL Guideline"; see www.bosch.com> Purchasing & Logistics> Downloads> Logistics> GTL Guideline.
<http://purchasing.bosch.com/de/de/info/download/downloads.html>

Changeover to GTL labeling and replacing the previous VDA / Odette goods tags (or others) shall be agreed separately with the BOSCH plant supplied.

4.4.2 Labeling of shipments processed by the BOSCH TMC

For transports handled via the BOSCH TMC, the SUPPLIER is obligated to mark HUs as follows:

1. HU label (primary/main/ master GTL label from the SUPPLIER's ERP system) and TMS transport label (from the TMS), including the imprint of the transport order (TO) (see Appendix 2: Transport Order).
2. With usage of the GLOBAL DESADV D.07A (see Section 4.2), including the GTL label and unique ID (see Section 10), the TMS transport label is no longer required. The mandatory precondition is therefore the link between the delivery note number and TO number in the BOSCH TMS.

4.4.3 MAT-Label for specific divisions

Unless otherwise agreed in writing with the responsible BOSCH contact, the following deviating requirement shall apply for deliveries destined for the Automotive Electronics (AE) division and Car Multimedia (CM) division: a MAT Label shall be used in addition to the other required markings. When using the MAT label, the specific requirements specified in the Purchasing & Logistics download area must be complied with. Internet: www.bosch.com > Purchasing & Logistics > Downloads > Logistics > MAT label.

Other BOSCH plants may require use of the MAT label in coordination and agreement with the SUPPLIER.

4.4.4 General requirements

The SUPPLIER shall mark the smallest packing units / packages shall be labeled with a single label (secondary product tag). These secondary product tags must be provided with a barcode label.

Unless otherwise agreed, all barcodes shall be created and presented to Code 39 requirements in accordance with ISO/IEC 16388.

For KANBAN processing between BOSCH and the SUPPLIER, the SUPPLIER shall affix KANBAN cards in a clearly visible location on the defined packing unit, in line with the agreement with the BOSCH plant supplied. BOSCH shall provide the KANBAN cards to be used, either in physical or electronic format.

All labels, tags, or other markings on returnable packaging must be easily detachable leaving no residue, requiring no additional cleaning work upon removal.

If the packing units are protected by a protective foil, the labeling, tags, or other markings shall additionally be affixed outside the foil.

4.5 Special arrangements for transportation of critical goods

The SUPPLIER shall issue separate notifications of critical shipment transports if transportation is being organized by BOSCH.

For **hazardous goods**, the SUPPLIER is responsible for ensuring that the collecting LSP is provided with all the required hazardous goods documents in advance, and that these documents are complete and correct.

Critical material property

The LSP shall be notified of prior to shipment of products which, due to their very nature, cannot be packaged, and of extremely bulky products, and informed as well as of the required temperature control for heat- or frost-sensitive materials.

4.6 Marking labels for sample parts

Sample parts shall be sent exclusively to the delivery address specified in the order. In addition, sample parts must be clearly marked as such on the outer packaging. How sample parts are to be labeled shall be agreed with the BOSCH contact in advance. Sample shipments shall never be delivered together with a series delivery (on pallets, pallet cages, etc.), but must be delivered in separate packing units.

4.7 Safety and security in the movement of goods

The SUPPLIER shall take action commensurate with its business model to facilitate and ensure the security of its supply chain as defined in the WCO SAFE Framework of Standards and, when necessary, provide adequate documented evidence of compliance in the form of licenses, authorizations, or declarations (e.g. security declarations, declarations under the U.S. Customs Trade Partnership Against Terrorism (C-TPAT) or similar programs).

The SUPPLIER shall provide the products securely for loading as air freight in line with the applicable legal requirements and regulations (such as the EU Aviation Security Regulation 300/2008), i.e. in such a way that they can be transported as air freight without any additional work for BOSCH (radiographic inspection, sniffer dogs, or other checks) and with no delays. For example, in Europe this can be done by achieving certification as a "known consignor" or by having the products secured by an authorized agent.

If the SUPPLIER is unable to fulfill this requirement, BOSCH shall be notified thereof immediately.

For shipment deliveries into the United States, the C-TPAT regulations defined in the "C-TPAT Minimum Security Criteria and Guideline" issued by the U.S. Customs and Border Protection shall be observed, and can be downloaded from www.cbp.gov.

If so requested, any information relevant for C-TPAT shall be provided to the BOSCH contact.

5 Special transports and process failures

5.1 Special transports

Special shipment transports shall be organized by either the SUPPLIER or BOSCH in accordance with the principle of causation. Special shipment transports shall be implemented if there is a need to deviate from the defined standard form of transport method and shipment processing due to process disruptions or failures, in order to reduce transport times.

The SUPPLIER shall inform the responsible BOSCH contact of the transport details.

The costs for special transports shall be borne by the party responsible for the process disturbance, in line with the causation principle.

Prior written agreement from the BOSCH contact is required if BOSCH is to assume the related costs. BOSCH shall record every special transport caused by the SUPPLIER and incorporate this information into the SUPPLIER assessment.

5.2 Disruption of delivery (process failures), risk- and crisis management

If disruptions (process failures) occur at the SUPPLIER that impact shipment deliveries to BOSCH (in particular the delivery date or shipment quantity or quality), the SUPPLIER shall undertake whatever measures are required to resolve the failure, taking into account the BOSCH quality requirements.

If it is discernable that, despite the countermeasures undertaken, agreements or assurances cannot be met, the SUPPLIER shall proactively notify the BOSCH contact immediately of the situation, without being requested to do so. The SUPPLIER shall coordinate and agree with BOSCH on how to further proceed, e.g. regarding a new delivery date or delivery quantity.

If requested by BOSCH, the SUPPLIER shall provide BOSCH with the following information, at minimum:

- ▶ The cause of the disturbance

- ▶ The maximum production capacity available, PLANNED and ACTUAL output quantities, personnel capacity, and the current shift model (number of hours, shifts, and working days per week). Tracking sheets specified by BOSCH shall be completed truthfully and on a rolling basis, providing current figures and data, and transmitted to BOSCH
- ▶ Reviewed alternative production options
- ▶ Possible options for reducing the transportation times by implementing special transports
- ▶ Backlog reduction plan

BOSCH may file and enforce complaints or claims arising from or in connection with special transports needed for reasons the SUPPLIER is responsible for, process nonconformities, failure to comply with delivery dates or quantities, and any other nonconformities and disruptions.

The SUPPLIER shall provide verifying evidence that it has a defined process in place for early warning and decision-escalation management to address process nonconformities, and will appoint contact persons authorized to make decisions should a task force be established.

6 Logistics quality

6.1 Logistics complaints

A logistics complaint may be triggered by a process disruption or failure at BOSCH that was caused by the SUPPLIER. The SUPPLIER shall be liable for costs arising from logistics errors and/or damages.

Logistics complaints are recorded and evaluated internally by BOSCH in terms of the costs caused in the given context.

Potential logistics complaints are summarized in a catalogue of failures that contains the additional costs and efforts that BOSCH incurs (see www.bosch.com > Purchasing & Logistics > Downloads > Logistics > Logistics Failure Catalogue V1.0). These costs shall be multiplied on the basis of minute factors by the average country-specific hourly rates, and charged to the SUPPLIER.

In the event of failure to comply with the specifications set out in this Supplier Logistics Manual, and any additional requirements defined for a specific BOSCH location, BOSCH reserves the right to refuse to accept the shipment concerned.

In the event of a logistics complaint, the SUPPLIER shall be notified thereof and requested to analyze the error description or logistics failure, and initiate appropriate corrective and preventive action. The SUPPLIER shall address the logistics complaint from BOSCH at the request of BOSCH with immediate countermeasures and 3D or 8D system methodology. BOSCH can request the associated documentation.

BOSCH reserves the right to assess the supply chain maturity and conduct process audits on site at the SUPPLIER's premises, or to have a third party contracted by BOSCH conduct such reviews, or to request a logistics self-assessment by the SUPPLIER including action plans (for example based on the Global Materials Management Operations Guidelines / Logistic Evaluations (MMOG/LE) (as defined in section 10)).

The regulations governing warranty claims, product liability, and recalls as well as cancellation and termination rights in Sections 9 through 11 of the Robert Bosch GmbH terms and conditions of purchase (version of 11/2015) shall apply in the event of logistics-related failures. Other claims by BOSCH in connection with logistics complaints remain unaffected.

6.2 Dynamic Supplier Classification (DSC – section “Supplier Logistics Capability” (SLC))

The aim of such dynamic supplier evaluation is to provide comprehensive systematic assessment of SUPPLIERS based on standardized criteria. The results of the Dynamic Supplier Classification (DSC) shall be duly considered when awarding new projects and orders.

The Supplier Logistics Capability (SLC) is the logistical assessment part of the DSC, in which factors relevant to the assessment are adapted to the defined logistics strategy. The criteria of the SLC can be found at: www.bosch.com > Purchasing & Logistics > Downloads > Logistics > SLC-Criteria).

6.3 On-Time-Delivery (OTD+)

On-Time-Delivery (OTD+) measurement at BOSCH is based on the applicable Incoterms in relation to the respective sphere of influence of the SUPPLIER:

For Free Carrier (FCA): Dispatch date and quantity according to the call-off compared to the dispatch date and quantity according to the ASN.

For Delivered At Place (DAP) and Delivery Duty Paid (DDP): Arrival date and quantity according to the call-off compared to the actual date and quantity of the goods received posting.

Deviating regulations may apply for non-Bosch Mobility Solutions (i.e. non-automotive) organizational units.

7 Further development of logistics

For the purpose of continuous further development, the SUPPLIER commits to proactively participate in future innovations, review such developments taking into consideration their technical feasibility and cost effectiveness, and implement them subsequent to mutual coordination and agreement with BOSCH.

8 Related applicable documents

1. EDI-Contract
2. Bosch GTL Guideline
3. MAT-Label: Bosch-AE Instruction MAT-Label based on [Requirements on] Marking of Goods and Accompanying Information [for Purchased Production Parts]
4. VMI-Manual
5. Logistics Failure Catalogue V1.0
6. RFID-Agreement
7. Bosch (Supply) Standards (e.g. N 2580-1, Prohibition of Content)

9 List of abbreviations

ABS	Acrylonitrile Butadiene Styrene
AE	Automotive Electronics (a division of BOSCH)
AIAG	Automotive Industry Action Group
ASN	Advanced Shipping Notice
AS2	Applicability Statement 2
BBM	Mobility Solutions (a division of Bosch)
BT	Building Technologies (a division of Bosch)
CM	Car Multimedia (a division of Bosch)
CMI	Customer Managed Inventory
C-TPAT	Customs-Trade Partnership Against Terrorism
DC	Drive and Control division of Bosch Rexroth
DIN	<i>Deutsches Institut für Normung e. V.</i> (German Institute for Standardization)
DSC	Dynamic Supplier Classification
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange For Administration, Commerce and Transport
EFS	Empties Fee Settlement
EMS	Empties Management System
EPC	Electronic Product Code
EPCIS	Electronic Product Code Information Service
EPE	Expanded Polyethylene
EPP	Expanded Polypropylene
EPS	Expandable Polystyrene
ESD	Electrostatic Discharge
ESDS	Electrostatic Discharge Sensitive Device
EUR.1	Movement certificate form (used in international commodity traffic)

EZRS	<i>Erzeugnisse und Rohstoffe</i> (German for “products and raw materials)
GTL	Global Transport Label
GS1	Global Standard One
HC-Code	Harmonized Commodity Description and Coding System (customs tariff number)
HIBE	<i>Hilfs- und Betriebsstoffe</i> (German for auxiliary materials and operating supplies)
HU	Handling Unit
ID	Identifier, identification code or marking
IEC	International Electrotechnical Commission
IPPC	International Plant Protection Convention
ISO	Internationale Organisation for Standardization
ISPM	International Standards for Phytosanitary Measures
JIT Call	E-Kanban
KLT	KLT boxes (Euro containers)
LAB	<i>Lieferplanabruf</i> (German for the English term “call-off”)
LSP	Logistics Service Provider
MAT	Material
MAZE	<i>Maschinenzubehör- und Ersatzteile</i> (German for machine accessories and spare parts)
MMOG/LE	Materials Management Operations Guidelines/Logistics Evaluation
MRN	Master Reference Number (formerly Movement Reference Number)
OFTP2	Odette File Transfer Protocol 2
OTD	On Time Delivery
PE	Polyethylene
PET	Polyethylene Terephthalate
PN	Part Number (equivalent to the German <i>Sachnummer</i>)
PO	Purchase Order
PP	Polypropylene
PS	Polystyrene
PT	Power Tools (a division of Bosch)
PUR	Polyurethane
PVC	Polyvinylchloride
RESY	Recycling Symbol (universal recycling symbol)
RFID	Radio Frequency Identification
ROP	Reorder Point
SBI	Self-billing Invoice (English equivalent of the German <i>Gutschriftenanzeigeverfahren</i> (GAV))
SLED	Shelf Life Expiration Date
SSCC	Serial Shipping Container Code
STL	Ship to line
TMC/TMS	Transport Management Center / Transport Management System
TO	Transport Order
TRGS 615	<i>Technische Regel für Gefahrstoffe (615: Verwendungsbeschränkung für Korrosionsschutzmittel)</i> / German Technical Rules for Hazardous Substances (615: Restrictions on the use of anticorrosion agents)
VCI	Volatile Corrosion Inhibitor
VDA	<i>Verband der Automobilindustrie</i> (German Association of the Automotive Industry)
VMI	Vendor Managed Inventory

Figure 4: List of abbreviations

10 Definition of terms

Alternative packaging	An alternative to the packaging agreed for the series delivery (normally consisting of one-way materials). Alternative packaging is normally to be added to the packaging specification.
BOSCH contact	The contact named by BOSCH for the SUPPLIER (usually the procurement planner of the BOSCH plant supplied).
Gross demands	Gross requirements constitute the total demand of BOSCH production requirements. Stock at the BOSCH plant or products that, subsequent to outgoing goods issue from BOSCH storage, are underway to production, do not count towards gross requirements
Cutoff time	The cutoff time in the TMS/TMC environment defines the time by which the shipment and all relevant data must be registered (for collection to take place on the subsequent day). The standard cutoff time for release of the Transport Order (TO) is 11:00 on the day before collection.
Global MMOG/LE	The Global MMOG/LE is a standardized assessment tool that contains around 200 logistics assessment criteria and measures an organization's processes against best practice in the industry. (Internet: www.odette.org/services/mmog)
GS1 standard (SSCC code)	Refers to a globally unique ID. The Serial Shipping Container Code (SSCC) is used to uniquely identify logistical units (shipments, packages, HUs) on a one-time-only basis.
Combined length and girth	Measurement (circumference [across the two shorter sides] + longest side)
Incoterm	The coding of an Incoterm comprises the following: XXX (e.g. FCA) followed by the named place of delivery/destination (e.g. FCA Zuffenhausen). The current Incoterms (e.g. currently the Incoterms 2010) shall apply.
Crisis	Triggered by a temporary event situation that endangers or adversely affects the regular business of BOSCH, usually with possible adverse effects on the BOSCH customers.
LAB	BOSCH prepares delivery schedules with quantities and delivery dates and transmits these to the SUPPLIER using call-offs. A call-off contains (in addition to the non-binding preview) the order for the products to be delivered by the SUPPLIER at the delivery date stated in the call-off and is adjusted to the current requirements situation at BOSCH.
Loading unit / handling unit (HU)	Normally a pallet fully loaded with multiple packages.
SUPPLIER	The contracting party of the applicable supply agreement on the vendor side.
Package	Multiple products combined into a carton or small load carrier.
Written / written form	Unless otherwise agreed, the requirement for written form is satisfied by a telecommunications transmission of a declaration in a written message or using another method suitable for permanent reproduction in writing (e.g. e-mail or other electronic telecommunications systems).
Stack factor (dynamic)	Static: The stacking factor defines the number of identical parts / load carriers that can be stacked on top of one another. Dynamic: The dynamic stacking factor describes the same thing for moving quantities. The stack factor is defined as follows: 0 (SAP) = not stackable = TMS 1 → must be marked with warnings! 1 (SAP) = stack of 2 (1+1) = TMS 2 2 (SAP) = stack of 3 (2+1) = TMS 3 99 (SAP) = flexible stacking = TMS 999
Composite material	Material made of two or more bonded materials (example: aluminum composite bag, climate protection bag).

Statistical delivery date	Used primarily at GB DC, containing the original delivery deadline that is not moved in case of delays, and is used to measure on-time delivery compliance.
Unique ID	A unique, assigned number for identifying and tracking packing units
Forecast requirements (preview quantity)	Non-binding planned figures outside of the production release once the SUPPLIER has established its production capacity. It is intended merely to provide the supplier with information on future demand from BOSCH and enable long-term capacity planning.
BOSCH plant supplied	This term also includes (de)consolidation centers in the case of commodities, merchandise products or consignment goods.
Working day	Working days in the SUPPLIER's country.

Figure 5: Definitions of terms

11 Appendices

11.1 Appendix 1: Supply Delivery Matrix – Key Requirements for Collaboration in Logistics

	Procurement Control Concept	Ownership of inventory	Incoterm	TAX	Customs	Payment	Data Exchange	Production- and material release	Minimum order qty	Order type	Mode of Transportation	Packaging		Supplier clarifies additional regulations and requirements with customer plant
												Type	Ownership	
1.	KANBAN Ship to Supermarket (STL) / Ship to Line (STL), from local supplier plant or from local supplier warehouse If possible the preferred concept	FCA "place": ownership RB from goods dispatch at supplier. --> Goods in Transit until goods received at RB "place"	FCA "Place"	Not to be considered, unless it involves two different tax regions	Not to be considered, unless it involves two different customs regions	Payment according to transfer of ownership	Transfer Kanban JIT Call (short term) by means of SAP eKanban Transfer demand process / scheduling agreement release (mid/long term) via Classic EDI or Web-EDI --> Refer to the "Message Implementation Guideline: GLOBAL DESADV D.07A" --> for further details see EDI contract and KANBAN-contract			Kanban (SAP-Kanban, eKanban, JIT-Call; etc.)	TMC if in place else: Mikrun or forwarder according to frame contract	Preferred: Overseas suppliers one way Else: Returnables (standard Bosch (VDA) concept) if TCO beneficial Generally: Packaging specification with Bosch plant - supplier release mandatory. Stackability per pallet at least 1+1.		
2.	VMI/ Consignment If KANBAN is not applicable, concept 2. VMI/ Consignment is preferred	Consignment stock is owned by the Supplier until goods are withdrawn	Standard: FCA "Place"	According to local tax- customs rules and legislation following options to be used (ranking): 1. Legal entity (supplier) 2. Free / Foreign Trade Zone (RB, LSP) 3. Bonded warehouse (RB, LSP) 4. Fiscal Agent (supplier) Regional specific consignment contract has to be used to define further details	(1) If legally possible: self-billing invoice SBI (GAV) (2) If SBI (GAV) is legally not possible: BOSCH provides withdrawal list ("Bewegungsliste")		Classic EDI or Web-EDI: - Transfer of VMI specific information - Advanced Shipping notification (ASN) (incl. - among others - packaging data) --> Refer to the "Message Implementation Guideline: GLOBAL DESADV D.07A" --> for further details see EDI contract, consignment and VMI-contracts	Values to be defined individually , depending e.g. per material field, Default values: 4 weeks for production release, 8 weeks for material release	Minimum order quantity (MOQ) is prohibited, unless exceptions are approved by responsible ABx, the smallest economic order quantity is defined by purchasing and logistics in cooperation with supplier.	VMI Inventory information (stock movements, stock levels) and gross demand are given to supplier via Classic EDI or WebEDI (SupplyOn VMI module) Supply based on dynamically set MIN/MAX level and rolling forecast figures. In special circumstances: Call-off s may be agreed		Returnables Unless otherwise agreed, returnables are covered by BOSCH up to a defined level of 3 days stock at supplier's warehouse (excluding transit stock). Account management and monthly balancing for returnables is mandatory for supplier - Bosch plant relation. Preferred: Overseas suppliers one way Else: Returnables (standard Bosch (VDA) concept) if TCO beneficial Generally: Packaging specification with Bosch plant - supplier release mandatory. Stackability per pallet at least 1+1.	for example: - Time frame for pick up (TMC) - Time window reception - Mixed load - Packaging - Process "returnable packaging" - Labelling (of samples) - Kind of unloading (rear/side) - ...	
3.	Call off (LAB) / purchase orders If 1. and 2. are not applicable, then concept 3. has to be applied.	Transfer of ownership depends on Incoterm: FCA "place": ownership RB from goods dispatch at supplier --> Goods in Transit until goods received at RB "place" DAP/DDP "place": ownership Supplier until goods received at RB "place"	Exceptions: For the Electronics material group code, but not for Electro mechanics, in contrast DDP – "Delivered Duty Paid" / DAP – "Delivered At Place of the specified destination" is used as standard. DAP must be used as standard for hazardous goods and special transport , e.g. abnormal loads, temperature monitoring required.	According to tax rules and legislations	According to customs rules and legislations	(1) Payment by invoice (2) If legally possible: self-billing invoice SBI (GAV)	Classic EDI or Web-EDI: - Transfer demand process (scheduling agreement release or purchase order) - Advanced Shipping notification (ASN) (incl. - among others - packaging data) via Classic EDI or Web-EDI --> Refer to the "Message Implementation Guideline: GLOBAL DESADV D.07A" --> for further details see EDI contract		SAP call off (LAB) - incl. rolling forecast via SAP order in particular cases Purchase orders can be used - for e.g.: samples orders, operating supplies or machine accessories / replacement parts	TMC if in place else: FCA: Forwarder according to frame contract DAP/DDP: supplier transport	Preferred: Overseas suppliers one way Else: Returnables (standard Bosch (VDA) concept) if TCO beneficial Generally: Packaging specification with Bosch plant - supplier release mandatory. Stackability per pallet at least 1+1.			

Figure 6: Standard BBM Supply Delivery Concepts

11.1 Appendix 2: Transport Order (TO)

Transport orders contain information on the order, transport, packaging, and item data. Clicking on a TO number in the order or transport list will link you to a detailed view. The TO data-entry page is divided into 5 (five) sections:

Auftragsbearbeitung

Status: **offen**
Pflichtfelder sind mit * gekennzeichnet

Dienstleistung: Road Freight | Kontakt: Support, +55 (19) 2103 1767

Auftragsnr.* [wird automatisch generiert] | Referenznr. []

Bestellnr. [] | Lieferschein Nr. []

Geschäftsfall* [] | Frachtart []

Service-Level* Standard | Client []

Sonderfracht [] | Latest Release []

Export Deklaration Nr. [] | Latest TO update []

Update required | Shipment no. []

Absender | Abholung | Empfänger | Zustellung | TA Besitzer | Auftraggeber

Kunden-ID [] | Kontaktperson []

Firma* [] | Telefon []

Be-/Entladestelle [] | Fax []

Straße* [] | eMail []

Land / PLZ / Ort* [] | State/Province []

Teilstrecken | Dispo-Bereich

Nr	Status	Ladungsnr.	Transport	Abgangsstelle	via Hub	Dienstleister	Dienstleistung	Service	EQD	Container ID
Transportinformationen										
Ladereferenz		[]		Abholtermin*		[]		von [] bis []		
Incoterm*		Bestimmung []		Zustelltermin*		[]		von [] bis []		
Bemerkung []										

Packstuecke	Summe Packstücke	Gesamtgewicht [kg]	Gesamtvolumen [m³]	Ebene: 1						
Pos	Handling Unit ID*	Bezeichnung*	Anz* Art*	Brutto* [kg]	Vol.* [m³]	L* [mm]	W* [mm]	H* [mm]	StFa*	Remark
1	[]	[]	CLL	[]	[]	[]	[]	[]	[]	[]

Artikeldaten

Pos	Teilenr.*	Warenbezeichnung*	Menge*	Einheit*	Netto [kg]	Ursprung	UNNr	Gefahrgut
[]	[]	[]	[]	[]	[]	[]	[]	[]

Figure 7: Example Transport Order

1. General order details and transport references
2. Address information
3. Transport details and times
4. Packaging information
5. Item information including delivery note, commercial invoice, and order number mandatory for sea and air freight

Data-entry fields marked with an asterisk (*) are mandatory.



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