



Annex C:

Requirements to be met by installers

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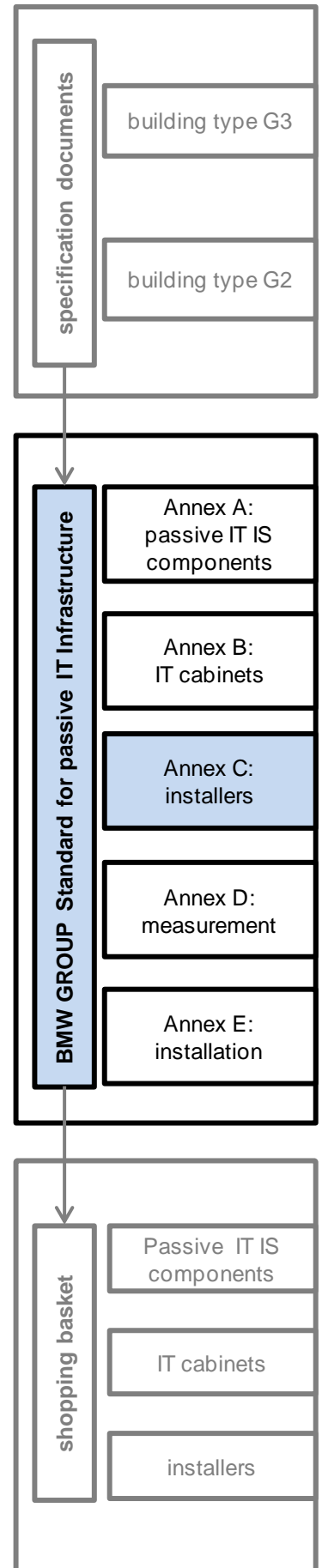




Table of Revisions

Version	Date	Modified chapters	Comments
1.0	June 1, 2006		Creation of document
1.1	May 31, 2008	1. 2	Update in line with modified examination regulations
2.0	April 1, 2012		Modification of department designation at client side and of annex letters
4.0	April 30, 2016	All	Comprehensive update and revision of the standard and its addenda



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1 Preliminary Remarks

The BMW Group has defined quality assurance measures in order to achieve a high level of product and service quality for the passive IT infrastructure, thus ensuring smooth communication between IT systems.

One of the steps required in this regard is to enhance installation quality. This is achieved by target-oriented training and the corresponding certification of the parties performing the installation.

All fibre-optic and copper installers to be commissioned the world over for the BMW Group, as well as their subcontractors for the installation of passive IT IS components (fibre-optic and copper), must present the following certificates of competence to the customer and the BMW Group IT IS Function Datacenter Technology (Rechenzentrumstechnik):

- General basic principles of electrical engineering
- Qualification covering workmanlike installation and laying of cables (for example termination of cabling components, compliance with maximum tensile forces and minimum bending radii, etc.)
- Qualification according to a current training program on the passive IT IS components used (fibre optic and copper technology) by the approved supplier
- Proof, test measurements taken on structured cabling according to good professional practice, using the measurement processes required (cf. "Annex D: Requirements measurements")
- Good command of the national language spoken in the individual country (except for unskilled workers)

Please note:

All fibre-optic installers currently certified for the BMW Group (full or partial certification) as well as copper installers are published on the intranet pages of the BMW Group IT.

This includes the following information for each installer:

- Surname and first name
- Type of certification/training (fibre optic, copper):
- Certified until (only for fibre optic certification)
- Company (name, street, post code, town)

Furthermore, installation service providers must prove that they are capable of using the COMMAND documentation system to create the documentation independently.



2 Fibre-optic certification

Contracted installers may be registered for fibre-optic installations by the BMW Group only after having passed a certification programme authorized by the BMW Group. Said process covers the personal certification of every participant.

BMW Group does not accept other certificates or similar documents.

2.1 Approach

The certification programme offers both **partial certification** and **full certification**. Partial certification is sufficient for installers who are exclusively employed for the laying of fibre-optic cabling. Full certification also authorizes installers to carry out splicing work, acceptance measurements, and to clean fibre-optic connector end faces.

Full certification requires installers to attend a two-day training organised by authorized suppliers and the **successful passing of an on-line examination**.

Partial certification requires participation in an authorized half-day training seminar and the **successful passing of an on-line examination**.

Both certifications include fundamental theoretical information and practical exercises. The training content is subject to continuous quality control by BMW Group.

Certification is valid for **36 months**. GHMT will issue a certificate to every fibre-optic installer certified successfully after the examination has been passed. The certificate states the term of validity.

Once this term has expired, installers must attend the relevant training course again and **pass an on-line examination** to maintain certification.

2.2 Flow chart

The process designed for full or partial certification on fibre-optic cabling is illustrated in the form of a flow chart in the following figure:

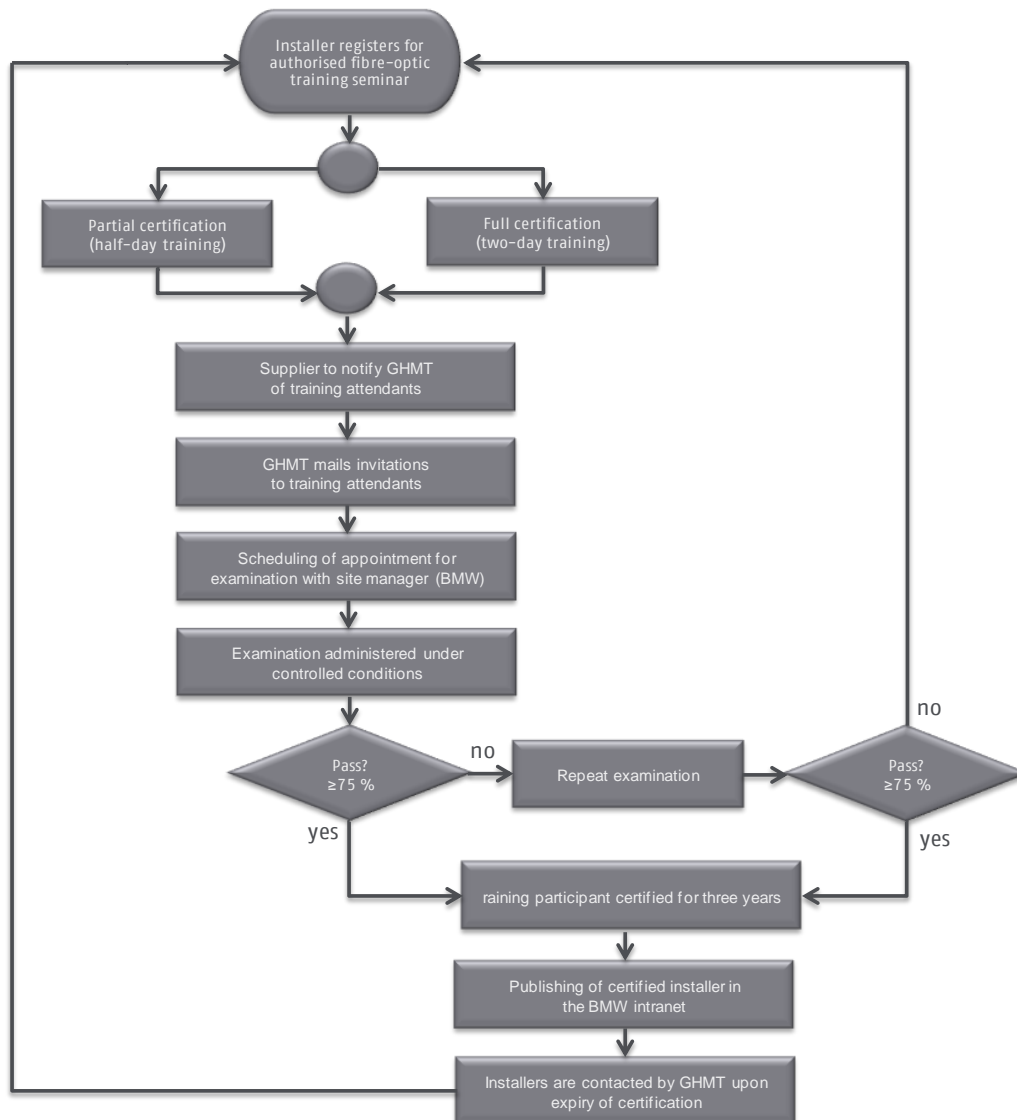


Figure 1: Flow chart showing full and partial certification for fibre-optic installations

3 Copper training

All installers of passive IT IS components (copper) must be trained on the products to be used by the supplier with the relevant authorization / the authorized supplier. On the basis of feedback from the supplier, GHMT provides proof of attendance by issuing a personalized confirmation of attendance.

BMW Group does not accept other certificates or similar documents.

3.1 Approach

The training includes instructions on how to handle and install the relevant passive IT IS components, including practical exercises. The participants will among other things be trained in the special characteristics that need to be taken into account during construction.

The training is valid as long as the passive IT IS components covered by the training are approved by the BMW Group. If new products are approved, it is obligatory to attend the relevant training again.

3.2 Flow chart

The training process is shown in the following flow chart:

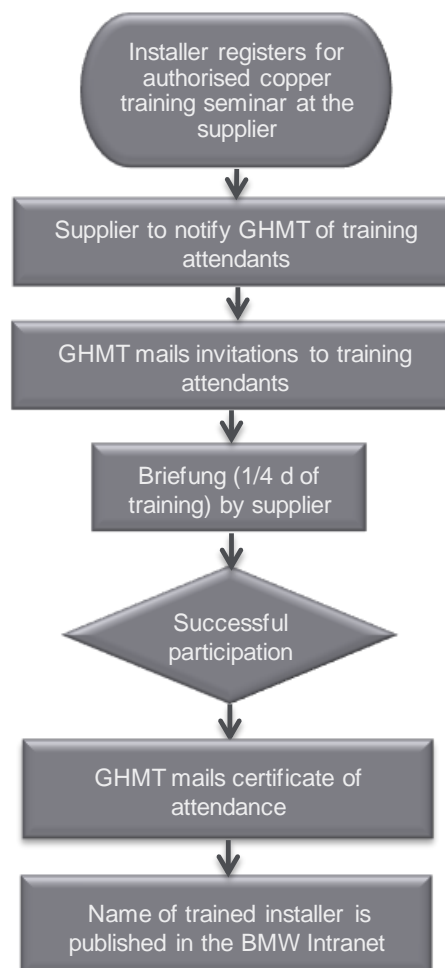


Figure 2: Flow chart showing copper training



4 Documentation passive IT IS components

Installers of passive IT IS components (copper, fibre-optic and IT cabinets) are themselves responsible for the documentation of the aforementioned IT IS components in BMW's own COMMAND documentation system by FNT.

If the installation service provider has not recorded the documentation fully, consistently and accurately in COMMAND according to the specifications, there will be no acceptance and thus no handover to IT for operation (for example, LAN, wireless networks). The IT business processes of wired IT systems (for example LAN, wired networks, PCs, printers, servers, storage, ...) are based on the aforementioned documentation.

The following documentation must be created by the installation service provider both in electronic and in printed form and must be stored in the COMMAND documentation system completely and accurately:

- Drawings and sketches
 - o Floor plans
 - o Type of cables and campus terminations (fibre-optic backbone, copper cabling)
 - o Cabinet overview
- Measuring records
 - o Copper cabling
 - o Fibre-optic cabling
 - o (Telephone cabling)

Please note:

Further details on the documentation are described in "Annex D: Requirements measurements" and in "Annex E: Requirements installation". These contents must likewise be strictly observed and adhered to!