Basic Regulations

- In order to plan to be able to plan centrally for all the plants, it is necessary to have up to date standards for geometric documentation of the productions equipment.
  The following guidelines for CAD documentation describes the geometric construction and documentation of production equipment with regard to cost-benefit analysis.
  In regards to supplier quality, the layout and production equipment are dealt with separately. The production equipment is further separated into construction quality and DMU quality (Digital Mock-Up).

- The specific instructions and precise documentation are regulated by the following guidelines:
  L --> Layout quality: Guidelines for suppliers of CAD layouts for assembly.
  K --> Construction quality (production equipment): OEM and construction regulations for the assembly technology
  D --> Production equipment with DMU quality: DMU supplier regulations for the assembly technology
  These regulations are available in the BMW Partner Portal: https://b2b.bmw.com > public area > Departments > Technologies > Assembly

- The CAD-Documentation-Specification specifies **which systems** are to be used and in **which data format** the information is to be delivered in. Which data requires which attributes is further described in the table below. For the following description several abbreviations will be used:
  L --> Layout quality: Data is to be generated in Microstation. The required document format is .dgn.
  K --> Construction quality: Data is to be generated in Catia V5 with CARISMA. The required document formats are: .CATProduct, .CATPart, .CATDrawing, .xml
  D --> DMU quality: Data may be generated in any system. The required document formats are: .CATProduct, .CATPart, .xlsx, .pdf

- The Team Layout Assembly is responsible for all issues regarding layouts.
  The Team Tool Design is responsible for all issues regarding production equipment.
  The contact people for each Fachteam is listed in the BMW Partner Portal. The homologation and provision of CAD data for assembly tools for screws and nuts is done by the Fachteam for fastening technologies.

Topic	Layout Quality	Production equip. Quality	Examples	Comment
Workshop Facilities				
Standard fastening tools (pneumatic or battery), hand tools		**D**	All of the standardized tools in the tooling database (HSD) and other catalogues. Ex. Grip tongs, rivet tongs, etc.	Only 3D geometries. Drawings or part lists are not acceptable.
Torque reaction arms and fixture devices for EC assembly tools		**K (D)**		
Custom made tools and test equipment		**K**		For the construction of test tools the most recent testing regulations must also be applied.
VIN engraving machine		**D**		
Arms machines for maneovering equipment and robots in general		**K**	- Arm for glueing the windshields - Cockpit fitting - Frontend and rearend fitting - Sunroof and panorama roof fiiting - Gas tank fitting - Seat installation - Battery installation	
Balancing machines and tooling equipment		**K (D)**	Balance machine for fitting/installing: - Gas tank - Windschield glueing - Cockpit - Seat - Battery - Frontend and rearend - Sunroof and panorama roof	Balancer = as of arm interface up to and including the rail system (interface overhead assembly line rails)
Larger equipment	**L**	**K**		Layout relevant if the required area is >= 5m².
Robots	**L**			Layout with marked work areas.
Robot equipment	**L**	**K**		
Conveyor Equipment				
Assembly adapter (crossbar, car adapter, etc.)		**K**		
Hangers (for heavy duty conveyor)	**L**	**K (D)**	Hangers for : - doors - motor - transmission - axles - gas tank - C-hangers - tilt hangers - Part specific hangers (eg. Cockpit)	
Hangers (for tilt assembly)		**D**		
Carriers	**L**	**D**		The complete assembly is to be shown in the layout. For the production tool quality it is necessary to deliver the whole.
Load handling equipment, workpieace holder, etc.	**L**	**K**	MAT (Montage-Aggregate-Träger)	The complete assembly is to be shown in the layout. For the production tool quality it is necessary to deliver the whole.
Conveyors				
Overhead conveyor	**L**			TriCAD FT for the early planning phase and if the TriCAD FT is also responsible for the actual geometry, then also for the documentation.
Floor conveyor	**L**			TriCAD FT for the early planning phase and if the TriCAD FT is also responsible for the actual geometry, then also for the documentation.
Roll, belt or chain conveyors (e.g. dual strand conveyors)	**L**			TriCAD FT for the early planning phase and if the TriCAD FT is also responsible for the actual geometry, then also for the documentation.
Slat conveyor, associates carrier	**L**			TriCAD FT for the early planning phase and if the TriCAD FT is also responsible for the actual geometry, then also for the documentation.
AGV	**L**	**D**		TriCAD FT for the early planning phase and if the TriCAD FT is also responsible for the actual geometry, then also for the documentation.
Lifter, converter, etc.	**L**	**D**		
Equipment				
Systems engineering, automated equipment, testing bays	**L**	**D**	- Machines for power train and marriage (lift table, tooling systems) - Foaming machines - Machines for the automatic conveyors and adapters - Rolling test stand - Axle alignment machine	
Storage racks, buffers, etc.	**L**			TriCAD FT and/or TriCAD BT
Automatic racks	**L**			TriCAD FT and/or TriCAD BT
Cranes	**L**			
Protective fences	**L**			TriCAD FT
Team areas, line runner stations	**L**			
Structural steelwork, hangers, tool steel	**L**			TriCAD BT
Control cabinets, maintenance cabinets	**L**			TriCAD FT
Workbenches, workplace layout, tool cabinets, etc.	**L**			Cells taken from TriCAD LT for layouts.
Mezzanines, platforms, machine beds, etc.	**L**			TriCAD BT
Logistics				
Containers, special purpose containers (FFG)	**L**	**K (D)**		The assembly process containers are meant (production tool construction for containers is managed by logistics); layout cells should be taken from TriCAD LT.
Facilities, racks, live storage racks, heavy duty racks, etc.	**L**			Cells taken from TriCAD LT for layouts.
Building, technical facility equipment				
Building design (steel structure, concrete structure)	**L***			* Speedikon according to the supplier requirements from BMW Realestate and facility management. Geometry should be in dgn-format.
Areas, assembly topology	**FIS****			** BMW Area Information System is FIS (Flächen-Informations-System) based on the system Bentley Facilities Planner.
Electric lighting	**L**			TriCAD HT
Water supply, wastewater disposal	**L**			TriCAD HT
Heating, ventilation	**L**			TriCAD HT
Cable trays, network, electricity	**L**			TriCAD HT