General technical terms and conditions
of TAIM e.V. for

M e t a l c e i l i n g s

November 2009

Foreword

The general technical terms and conditions have been prepared under the guidance of the technical committee for metal ceilings TAIM. They are based on information from VOB-DIN 18340 and are for this purpose without contradiction and in addition, specifically for the characteristics of metal ceilings.

Normative references

The general technical terms and conditions (ATV) contain references from other publications. These normative references are cited at the appropriate places in the text and the publications are listed below. For dated references, only subsequent amendments or revisions of these publications apply to this rule, in case amendments or revisions are incorporated. For undated references, the latest edition of the referenced publication applies.

DIN 1960
(VOB) German construction contract procedures

DIN 1961
General conditions of contract relating to the execution of construction work, VOB part B

DIN 18202
Tolerances in building construction - Structures

DIN EN 13964:2004 + A1:2006 Suspended ceilings - Requirements and test methods;

DIN 18299
General rules applying to all types of construction work

DIN 18340
ATV Dry lining and partitioning work

The technical regulations for metal ceilings

Publisher TAIM www.taim.info
Association of Industrial Metal Ceiling Manufacturers

- Technical manual on metal ceilings Nov. 2003
- Quality standard for metal – cell ceilings Nov. 2004
- Technical data sheet 1 Fire protection with metal ceilings Jan. 2005
- Quality standard expanded metal Nov. 2006
- Technical data sheet 2 Information on EN 13964 suspended ceilings. Information for building designers, installers and system manufacturers Explanations expressed reflect the views of TAIM Nov. 2007
- Technical data sheet 3 Wind loads and metal ceilings March 2008
- Technical data sheet 4 Metal ceilings and corrosion protection Nov. 2008
- Technical data sheet 5 Metal ceilings as heated and chilled ceilings Nov. 2009

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0 Advice on drafting specifications

This advice supplements the ATV DIN 18299 "General rules applying to all types of construction work“, section 0. Adherence to this advice is prerequisite to a correct specification according to § 9 VOB/A.

The advice does not form an integral part of any contract.

According to each individual case, in the specification, should be stated:

0.1 Information about the construction site

0.1.1 The regulations apply according to DIN 18299, section 0.1.

0.1.2 Type, location, dimensions and layout as well as dates of assembly and dismantle of scaffolding provided by the client

0.1.3 Specific exposure to ambient pollution as well as particular climatic or operational conditions

0.1.4 Location and type of the physical structure, e.g. number and height of the floors as well as size and usability of transport facilities and routes, also for example, assembly openings

0.1.5 Information about the site location, e.g. internal or external areas

0.2 Information about the execution of work

0.2.1 Quantity, type, dimensions, carrying capacity, additional loads, materials and construction of the building components

0.2.2 Layout and arrangement of areas, especially installation type, module and joint layout and the formation of connections with adjacent building components

0.2.3 Dimensions, special formats, forms and profiles, e.g. boards, panels, cassettes.
Type of surface, structure and surface treatment as well as colours/gloss factor of the building components. Configuration of the edges and corners and their surfaces

0.2.4 Quantity, type, location, dimensions and composition of individual areas of sloping, curved or other types of shaped areas, as well as formed components. Cladding special building components

0.2.5 Quantity, type, quality and colour of the fixing elements, e.g. brackets, clips or rivets, visible or concealed; with or without capping.
Fixing of load bearing perimeter constructions

0.2.6 Type, design and dimensions of load bearing structures and substructures, amongst other suspension and ceiling heights

0.2.7 Type and design of the anchoring of the load bearing structures and substructures, e.g. plugs, screws, special suspension parts

0.2.8 Type, condition and stability of the subsurface, e.g. plastered or unplastered brick work, concrete, aerated concrete, hollow or wooden beamed ceilings, as well as corrugated sheeting or steel beamed constructions

0.2.9 Building component production according to implementation plan or on-site bill of quantities

0.2.10 Type, dimensions, free sectional area and construction of the ceiling void ventilation, as well as coverings of the openings

0.2.11 Quantity, type, location, dimensions and layout of the apertures to be produced or closed off, e.g. openings, penetrations, recesses and niches

0.2.12 Inputs of other contractors; especially with regard to execution of connections and closures

0.2.13 Quantity, type, location, dimensions and weight of installations and fixtures

0.2.14 Quantity, type and size of profiles, e.g. edge profiles, connecting and closing profiles and perimeter profiles.

0.2.15 Type and length of the reinforcements for fixtures, e.g. for integrated lighting and ventilation outlets

0.2.16 Type, location, dimensions and design of expansion joints, building and component joints.

0.2.17 Type and colour of joint seals, joint covers and joint backings.

0.2.18 Requirements for fire, sound, thermal, humidity and radiation protection, as well as air tightness and electrical conductivity. Acoustic as well as technical light and ventilation requirements.

0.2.19 Quantity, type, dimensions and layout of closings and connections with adjacent building components, e.g. with connection profiles, separating joints, spacer strips, airtight.

0.2.20 Type, thickness, condition and physical properties of insulating materials, vapour barriers, fleeces and the like (e.g. sound absorption coefficients – air permeability- building material classification)

0.2.21 Special physical properties of the materials

0.2.22 Type, design and properties of the humidity and corrosion protection for fixings, suspensions, substructures and ceiling membranes.

0.2.23 Special physical and chemical exposure to which the material and building components are exposed after installation, e.g. aggressive vapours, impact loads, humidity, ball impacts, wind loads and seismic requirements.

0.2.24 Type and extent of the construction drawings supplied by the contractor, as well as installation or assembly plans, material lists and other documentation.

0.2.25 Quantity, type and dimensions of samples, e.g. surface and colour samples, sample surfaces, sample constructions, models. Where the sample/mock-up is to be installed.

0.2.26 Limit samples for colour and gloss of the finished surfaces.

0.2.27 Quantity, type and dimensions as well as time of installation of advanced or retrospectively produced reference surfaces.

0.2.28 Special protection of the performances, e.g. packaging, edge protection, cover sheets, especially for complete or finished surfaces.

0.2.29 Protection from construction or machine components, furniture and fixtures etc.

0.2.30 Specific measures to accommodate building movement and deflections.

0.2.31 Type and requirement with regards the properties for technical use of the suspended ceiling, e.g. heated and/or chilled ceilings, accessible ceilings, as well as clean room ceilings and fire protection ceilings.

0.2.32 Type of surface finish treatment, e.g. wet paint, powder coating, coil coating, anodic coating with information on the coating thickness and types of sanded surfaces and construction requirements (e.g. building material classification, corrosion protection, gloss factor/light reflection)

0.2.33 Type of ceiling membrane fixing, e.g. lay-in, suspended, removable, push-in, as well as concealed, semi-concealed or visible substructure.

0.2.34 Type of substructure with soffit and/or primary suspension grid construction

0.2.35 Type of swing-down ceiling membrane, e.g. over the long or short side of the ceiling membrane

0.2.36 Type, quantity and direction of the sliding ceiling membranes in swing-down position.

0.2.37 Type and properties of the bearing/latch components, for example pip stops built into the tiles or separate self closing bearing/latch components, bearing components in fold-down position to slide the ceiling membrane or fixed to the substructure.

0.2.38 Type of operation of the fold down mechanism, such as operable with/without tools, visible or concealed latch components. Operable in the middle or border area, also so called mid-operations.

0.2.38 Type of installation aids and their fixing profile (to the substructure or soffit) in the form of s-hooks, holding ropes, holding rods or hook plates, which are used as stress relief for connections during the installation and maintenance.

0.2.39 Type and shape of the tool required to operate the swing-down ceiling membranes, as well as quantity of the delivered operating tools.

0.2.40 Type and free sectional area of the perforated surface. Information on type of perforation, hole diameter, free sectional area without taking the plain border into account, as well as the layout of the perforation, e.g. pitched, straight or staggered

0.2.41 Type of edge configuration, with/without plain borders, width of the plain border

0.2.42 Type and design of the expanded metal ceiling membrane, mesh sizes, frame design and surface treatment.

0.2.43 Edge type of the ceiling membrane, e.g. L-/C-/Z- edges and dimensions

0.2.44 Type and configuration of the sound absorption inlay such as fleeces. Specified whether inlaid, glued in or fixed in another way.

0.2.45 Information about ceiling membranes that are perforated over the border, if special measures for the sound absorption inlay are required, e.g. fleece brought up over the edges.

0.2.46 Adapted panels, cut-off, cut-in, bent to special sizes/extra wide panels.

0.3 Specific information for deviations from the ATV

0.3.1 When other regulations, not designated in this ATV should be met, they should be stated clearly and in detail in the specification.

0.3.2 Differing regulations can in particular come into consideration:
- if other tolerances than those stated here should apply.
- if other than the visible wall angle should be used.
- for special ceiling membranes such as expanded metal
- for installation or use under special climate conditions

0.4 Specific information for additional performances and special performances

No additional regulations to ATV DIN 18299, section 0.4

0.5 Billed units

In the bill of quantities, the billed units are to be provided as follows:

0.5.1 Area dimensions (m²), separated according to construction type and dimensions for
- laminar substructures for ceilings with an area over 5 m²,
- Insulation layers and fleeces with an area over 5 m²
- Ceiling claddings and suspended ceilings with an area over 5 m²
- Reveal cladding of openings and recesses with a depth over 1m, e.g. roof light domes
- Upstands, bulkheads and side cladding, friezes, off-set structures and the like with widths over 1m for every visible area
- Cavity closings with an area over 5 m²
- Enclosures and cladding with a flat projection over 1m, joists, beams as well as ventilation, pipes, cables and the like
- Cleaning of ceiling membranes

0.5.2 Length dimensions (m), separated according to construction type and dimensions for
- Reveal cladding of openings and recesses with a depth up to 1m, e.g. roof light domes
- Upstands, bulkheads and side cladding, friezes, off-set structures and the like with widths up to 1m for every visible area
- Enclosures and cladding with a flat projection up to 1m, e.g. around joists and beams as well as around pipes
- Separating and protective layers, protective foil, channels, vapour barriers and the like with a width up to 1m
- airtight connections to components
- Cutting of facings and ceiling membranes, e.g. straight, angled, curved, other types of forms
- Shadow gaps, grooves and the like

- Apertures with a side ratio greater than 4:1 and a greatest length over 2m, e.g. openings for lighting strips, downlight strips, air outlets, cable trays, main runners, fixtures
- Substructures, reinforcements, bracing, replacements and bridging with a length over 2 m for installed and integrated components, e.g. for skylights, supporting and main runners, lighting strips, access openings, notches, cut cassettes and panels,
- sliding ceiling connections
- Central hangers, e.g. corridor extensions
- Shadow gap details
- Wide span profiles with a length over 2m
- Facing and/or surface finishes of the long and/or short sides for open ceiling ends
- Integration of wall and ceiling constructions to ceiling membranes of adjacent components
- Integration with existing building components and integration of building components with a length over 1m for each side in the ceiling to be integrated, e.g. with columns, pillars, joists, pipe work, installation channels, door and window elements
- Connection, expansion and building break gaps
- Sealing strips, sealing profiles, grouting
- Separation strips for connections with components and installation components, e.g. sealing strips on the ceiling membranes short and/or long edges
- Profile, bandraster, trims, perimeter trims, wall angles, perimeter strips and the like over 2m in individual length

0.5.3 Quantity (pieces), separated according to construction type and dimensions for
- areas up to 5 m²
- Apertures with a side ratio up to 4:1 or a greatest length up to 2 m, e.g. for recesses, columns, pillars, pipe work, single lamps, light domes, air outlets, switches, plugs, cables, fixtures, sprinklers and loud speakers
- Cavity closings up to 5 m²
- Substructures, reinforcements, bracing, replacements and bridging with a length up to 2 m for installed components and fixtures, e.g. for skylights, load-bearing and main runners, lighting strips, access openings, notches, cut cassettes and panels
- Wide span profiles with a length up to 2 m
- Installation of access panels, single lamps, ventilation grills, air outlets and the like
- Integration with existing building components and integration of building components with a length up to 1 m for each side in the ceiling to be integrated, e.g. with columns, pillars, joists, pipe work, installation channels, door and window elements and roof lights
- airtight connections to fixtures and installations
- Special formats, e.g. adapted tiles; with the requirements, whether factory produced or on site
- Maintenance work tools, spare elements and the like.
- Change in direction of ceiling membranes, friezes, profile mitres and the like, e.g. also in joint areas, for grooves, wall angles, bandraster and the like
- Factory-made length and width changes
- Formation of internal and external corners

1.0 Scope

1.1 The “ATV metal ceilings“ – applies to room creating ceiling components as a kit or individual components used in dry construction and fixed to load bearing construction components. It includes in particular the manufacture of open and closed, modular metal ceiling claddings and suspended ceilings for internal and external areas, with and without special technical functions according to the regulations in accordance with DIN EN 13964:2004+A1 Suspended ceilings – requirements and test methods.

The “ATV metal ceilings“ does not apply to suspended ceilings and ceiling facings with mineral or organic ceiling membranes.

These include in particular:
- mineral fibre ceilings
- wooden ceilings
- textile and foil stretched ceilings
- glass and luminous ceilings
- ceiling membranes of non-metallic materials such as glass granulates

1.2 In addition the ATV DIN 18299 ”General rules applying to all types of construction work“, sections 1 to 5 applies. In case of contradictions, the regulations of the ATV metal ceilings as well as the ATV DIN 18340 takes precedence.

2.0 Materials and components

In addition to ATV DIN 18299, section 2, applies:

For the most commonly used materials and components, the DIN standards are listed below.

2.1 Product related requirements - test standards

- DIN EN 13964:2004 + A1:2006
  Suspended ceilings – Requirements and test methods
- Data sheets, published by TAIM,
  as long as the individual points are not regulated in DIN EN 13964
- Technical manual on metal ceilings Nov.2003
- Quality standard for metal cell ceilings Nov. 2004
- Data sheet 1 Fire protection January 2005
- Quality standard expanded metal November 2006
- Data sheet 2 Explanation of EN 13964 November 2007
- Data sheet 3 Wind loads March 2008
- Data sheet 4 Corrosion protection November 2008
- EN 14240 Ventilation for buildings - chilled ceilings - testing and rating
- VDI 6031 Acceptance test of cooling surfaces for rooms
- EN 14037:2004 Ceiling mounted radiant panels supplied with water at temperature below 120 °C
- DIN 18380 VOB/C - General technical specifications in construction contracts (ATV) - Installation of central heating systems and hot water supply systems

2.2 Materials and corrosion protection

- DIN EN 13964:2004 + A1:2006
  Suspended ceilings – Requirements and test methods
- EN 10327 Continuously hot-dip coated strip and sheet of low carbon steels for cold forming - Technical delivery conditions
- EN 10152 Electrolytically zinc coated cold rolled steel flat products for cold forming – Technical delivery conditions
- EN 10169 Part 1 Continuously organic coated (coil coated) steel flat products
  General information (definitions, materials, tolerances, test methods)
- EN 10169 Part 2 Continuously organic coated (coil coated) steel flat products
  Products for building exterior applications
- EN 573-3 Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products
- EN 485 Aluminium and Aluminium alloys - sheet, strip and plate
  Part 1 Technical delivery conditions
- EN 485 Aluminium and Aluminium alloys - sheet, strip and plate
  Part 2 mechanical properties, comparison of the material condition designation

- EN 485 Aluminium and Aluminium alloys – sheet, strip and plate
  part 3 Tolerances on dimensions and form for hot rolled products
- EN 485 Aluminium and Aluminium alloys – sheet, strip and plate
  part 4 Tolerances on shape and dimensions for cold rolled products
- EN 1396 Aluminium and Aluminium alloys– Coil coated sheet and strip for general applications – specifications
- EN 12206 Paints and varnishes - Coating of aluminium and aluminium alloys for architectural purposes
  Part 1: Coatings prepared from coating powder
- DIN 17611 Anodized products of wrought aluminium and wrought aluminium alloys - Technical conditions of delivery
- EN ISO 12944 parts 1 – 8 corrosion protection of steel structures
- DIN 55634 Paints, varnishes and coatings - Corrosion protection of supporting thin-walled building components made of steel

2.3 Insulating materials

When using insulating materials the current, valid standards are to be taken into account.

2.4 Thermal, sound and humidity protection

DIN 4108-7	Thermal insulation and energy economy in buildings Part 7: Air tightness of buildings - Requirements, recommendations and examples for planning and performance
DIN 4109	Sound insulation in buildings; Requirements and verification
ISO 20354	Sound absorption

3.0 Execution of work

In addition to ATV DIN 18299, section 3, applies:

3.1 General

3.1.1 The client should state his concerns (see § 4 Nr. 3 VOB/B), especially in terms of:
- Deviations in the existing structure in terms of the requirements, e.g. missing or insufficient data for the room height from OFF to the under side of the ceiling or the suspension height
- Incorrect position and height of the soffit
- Recognised insufficient load bearing capacity (type and properties) of the subsurface or the soffit
- Greater unevenness of the surrounding building components than those allowed according to DIN 18202
- Missing or too little equalisation of tolerance measures, e.g. by joints, friezes, special equalising perimeter trims
- If the module size of the ceilings surrounding components such as facade posts don't match the module size of the suspended ceiling
- Unsuitable climatic conditions
- Weaknesses in the substructure, e.g. through installation and/or crossings from services and the like
- If installations and/or installation of the suspended ceiling and the ceiling membrane cause unallowable loads.
- Missing reference points, especially missing data for reference points in non-square rooms.
- If there is danger with accessible suspended ceilings, that other trades access the ceiling membranes and therefore the ceiling is unchecked, e.g. damage through overloading the suspension construction.
- If the safety of the suspended ceiling can be impaired by external influences, e.g. wind loads
- If foreign coatings change the suspended ceilings physical properties or approvals, e.g. with regard to the building material class or the absorption properties.

3.1.2 For unsuitable climatic conditions, e.g. the conditions stated in table 7, class A of DIN EN 13964, special measures must be taken in consultation with the client. The measures to be taken are special performances, see section 4.2

3.1.3 Deviations from the specified tolerances are allowed within the defined limits,

DIN 18202	Tolerances in building construction - Structures
DIN 18203-1	Tolerances in building construction - Part 1: Prefabricated components made of concrete, reinforced concrete and pre-stressed concrete
DIN 18203-2	Tolerances in building construction - Part 2: Prefabricated steel components
DIN 18203-3	Tolerances in building constructions - Part 3: Building components of wood and derived timber products

whereby, DIN 18202 applies only to the total area.

The tolerance limits of the component dimensions, deflections or undulations of the ceiling membrane are allowed within the defined limits of DIN EN 13964. Quality, tolerances and more regarding the performances and requirements of EN 13964 are to be taken from the regulations of TAIM (TMMC) Technical Manual on Metal Ceilings Nov. 2003 and the data sheets from TAIM (see www.taim.info).

By side light, visible unevenness of the surface is allowed as long as the limit values according to DIN 18202 and DIN EN 13964 are not exceeded.
This especially applies to ceiling membrane unevenness caused by fixtures, undulations from fully perforated edges, reinforcements and reverse side inlays or surface deformations of ceiling membranes in corner areas and the like.

3.1.4 Expansion joints of the building must be constructively solved with the same possibilities to move, respectively, an uncontrolled collapse of the ceiling membrane should be avoided by constructive measures.
The design of the expansion joints is a special performance (see section 4.2)

3.1.5 Connections of ceiling membranes to adjacent building components should be butt cut or carried out with profile backings/profile supports.
Abutment gaps to surrounding building components are allowed.
In the connection area of penetrations unallowable tension on the suspended ceiling should be avoided.

3.1.6 Constructions and claddings of elements that result in regular modules should be installed in alignment and centralised according to the given reference points.

3.1.7 Undesired tolerance deviations between the suspended ceiling and adjacent building components are to be dealt with through planned compensation measures, e.g. friezes, open gaps and the like (special performances).

3.2 Metal ceilings as ceiling claddings and suspended ceilings

3.2.1 For the execution of light ceiling claddings and suspended ceilings DIN EN 13964:2004 + A1:2006 applies.

3.2.2 Substructures and hangers are to be carried out according to DIN EN 13964:2004 + A1:2006. The substructure must be suitable for the ceiling membrane.

3.2.3 For fixtures with a higher installation mass than is allowed by the ceiling construction, suitable measures have to be taken, e.g. additional hangers, individual hangers, different material thickness, construction reinforcements. The required measures are special performances.

3.2.4 Individual, open or closed ceiling elements, e.g. baffles, linear strips, or ceiling rafts should be fixed separately.

3.2.5 Cut metal cassettes, as well as metal panels and metal plank tiles should be reinforced at the edges so that the cut edge does not undulate and the surface deflects no more than as allowed according to DIN EN 13964. If necessary, special holding brackets or clips/springs should be installed.
This also applies to cut-out areas within the ceiling membrane.

3.2.6 Connections to adjacent building components for metal ceiling constructions should be done with a simple right angled, formed, visible, metal wall angle that is butt cut in the corners.

3.2.7 Should partitions be installed under suspended ceilings, e.g. under bandraster, they should not load the suspended ceiling with the partitions resulting force. For the required load transfer of

these forces to the load bearing soffit, constructive measures e.g. horizontal and/or diagonal bracing should be carried out (special performance 4.2).

3.2.8 Integrated components and fixtures such as lighting, ventilation and sprinklers are to be independently self supporting and suspended from the soffit and are not to load the suspended ceiling. Should the fixtures be integrated and load the suspended ceiling, this should be agreed with the respective system manufacturer (special performance 4.0)

3.2.9 Should the optic of the fixtures surfaces and suspended ceiling be required to match, the colour, gloss factor and surface structure should be agreed before execution.

3.3 Inlays and overlays in ceiling membranes

3.3.1 If an inlay is used in the ceiling membrane for a special technical performance such as absorption, attenuation /sound insulation, fire protection or conductivity for chilled ceilings, these requirements are to be planned and specified separately (special performance in accordance with 4.2).

3.3.2 In addition to the information regarding type and material of the inlay, the method of fixing e.g. lay-in, glued, mechanical fixing should be given separately.

3.3.3 If apertures and/or fixtures are required in areas with inlays/overlays, the therefore necessary measures must be planned and separately declared to maintain the respective requirements.

4 Additional performances and special performances

4.1 Additional performances are in addition to ATV DIN 18299, section 4.1, especially:

4.1.1 Assembly and dismantling as well as provision of scaffolding, whose working platform does not exceed 2 m above the ground or floor.

4.1.2 Completion of work

4.1.3 Providing pre-fabricated surface and colour samples.

4.2 Special performances are in addition to ATV DIN 18299, section 4.2, e.g.:

4.2.1 Provision of recreation and storage rooms, if the client doesn't provide rooms which can be easily secured.

4.2.2 Assembly, dismantling and provision of scaffolding, whose working platform is over 2 m above the ground or floor.

4.2.3 Reconstruction of scaffolding for purposes of other contractors.

4.2.4 Measures to protect from unsuitable climatic conditions according to section 3.1.2, e.g. heating

4.2.5 Special measures to protect building and machinery components, as well as items of furniture, e.g. masking windows, doors, floors and surface finished parts, dust-tight masking of sensitive installations and technical equipment, dust protection walls, laying of hardboard and building protection foils. Due to various possibilities, the type, surface property, position and the dimension of the building components to be protected as well as the planned measures and material for protection are to be exactly described. Special protection measures also include, amongst others, factory applied, removal and disposal of protection foils on metal ceilings.

4.2.6 Cleaning of the sub-surface to remove heavy soiling, e.g. plaster residue, residual mortar, paint and oil, as long as they are not caused by the client.

4.2.7 Measures to fulfil increased requirements for flatness or dimensional accuracy (see section 3.1.3).

4.2.8 Measures to increase the surface quality, e.g. filler pieces behind the perimeter trim to even out the unevenness of the wall.

4.2.9 Production and installation of sample surfaces, sample constructions and models.

4.2.10 Delivery of structural evidence as well as static calculations and the drawings required for this evidence.

4.2.11 Tests to prove the stability of the construction, e.g. plug pull-out test, test loads

4.2.12 Production of installation and assembly plans as well as revising given installation and assembly plans.

4.2.13 Production, processing and adaptation as well as closing of apertures for columns, pillars, pipe work, single lamps, light domes, air outlets, cables, downlight strips, cable trays, main runners, fixtures, access panels, profiles and the like.

4.2.14 Retrospective processing of fixtures and installations.

4.2.15 Closing of ceiling constructions, if the substructure and ceiling membrane as well as the covering in the working area can not be carried out in one working cycle.

4.2.16 Work carried out for other contractors, e.g. measuring up, installation, de-installation and reinstallation of cladding elements, ceiling membranes and fixtures.

4.2.17 Cutting of claddings and ceiling membranes or factory pre-fabricated elements to adapt for sloping and curved or non-square components.

4.2.18 Delivery of factory fabricated special formats.

4.2.19 Production of adapted tiles

4.2.20 Adaptation of substructure in areas with special formats and adapted tiles.

4.2.21 Reinforcement of cut elements in connection and aperture areas.

4.2.22 Production of special substructures as reinforcement to take up loads or overbuilding of partition walls, installation parts, assembly elements and fixtures, light fittings, access panels, joists and the like.

4.2.23 Subsequent treatment of cut elements to protect the cut edges e.g. sealing, coating, corrosion protection.

4.2.24 Production of over-hangs, graduations and special upstands, that exceed the static requirements.

4.2.25 Production of bulk heads, up-stands, false beams and side claddings

4.2.26 Production of mitres, e.g. for wall angles, friezes, bandraster, ceiling membranes and roundings.

4.2.27 Installation of connection and finishing profiles, e.g. wall and perimeter trims, as well as production and installation of formed components

4.2.28 Production of connections to building components as flexible, dense, sliding or open connections, grooves or shadow gaps.

4.2.29 Production of expansion and imitation joints, as well as joint seals (see section 3.1.4 and 3.1.5)

4.2.30 Production of airtight connections to adjacent building components, fixtures, penetrations and the like.

4.2.31 Measures for fire, sound, thermal, humidity and radiation protection, as long as they exceed the performances according to section 3, as well as measures to fulfil acoustic and technical light requirements.

4.2.32 Measurement of missing reference points to perform necessary measurements according to ATV DIN 18299, section 4.1.3.

5.0 Settlement of account

In addition to ATV DIN 18299, section 5, applies:

5.1 General

5.1.1 The determination of the performance – no matter whether according to drawings or local measurements – have to be set as a basis for ceiling membranes, claddings, substructures, vapour barriers, insulation material, partition and protection layers, sound absorption and sound insulation inlays, surface finishes, perforated surfaces, protective foils and the like, the dimensions of the ceiling membrane and the claddings.

5.1.2 In areas with adjacent building components the dimensions are set as a basis up to the bordering unfinished, un-insulated, unclad building components.
Light partition walls apply as adjacent building components, provided that their surface does not penetrate the ceiling.

5.1.3 When determining the dimensions, the biggest component or where applicable the total area of the building component dimensions is set as the basis, e.g. ceiling membranes with circumferential friezes.
The same applies to installations to existing building components, fixtures and the like. Joints are measured over.

5.1.4 Directly connected different types of apertures, e.g.
openings with bordering apertures are calculated separately. Similar apertures which are separated by structural elements are also calculated separately.

5.1.5 For claddings and covered areas, connections, friezes, perimeter friezes, plain borders, bandraster, open joints, recesses, enclosures and the like up to 30 cm width are measured over and separately calculated.

5.1.6 Special formats and adapted tiles are calculated separately.

5.1.7 Apertures for, for example, modular lighting, ventilation grills, access panels, grid, columns, pillars, sprinklers and others are calculated separately according to dimensions.

5.1.8 The billing of heated and chilled ceilings is carried out according to the agreed values of the total heating and chilling loads (per room/component/floor or similar) in square metres over the total floor area of all active and passive surfaces.
Fixtures, fixing frames, joints, air gaps and wall connections etc. as well as visible, load bearing and non-load bearing substructure components are measured over.
For areas without adjacent building components, the billing is done in accordance with the measuring rules 5.1.1;
For areas with adjacent building components according to the measuring rules 5.1.3.

5.2 **Reductions will be:**

5.2.1 When billing according to surface area (m²):
openings, apertures and niches over 2.5 m² individual size

5.2.2 When determining the reduction, the smallest dimensions of the apertures are used as a basis.

5.2.3 Interruptions in the cladding or cladded areas by building components,
e.g. frame work components, columns, joists, bandraster and visible
substructure components with an installation width over 30 cm.

5.2.4 When billing according to length (m):
Interruptions over 1 m individual length
