**Pos. 1.0**

**AVACS Multifunctional sail**

as a cooling/heating radiant ceiling sail in an optically sophisticated design for the removal of sensitive heat loads by means of convection and radiation. The optional ventilation function carries the conditioned air into the room and mixes it with the room air due to the high induction effect. A built-up air cushion at the outlet surface minimizes ceiling staining. All air guidance systems are integrated invisibly from below in the ceiling system.

consisting of:

* the substructure according to factory recommendation with building authority-approved steel dowels at least M6, threaded rods M6 or Nonius hangers with two safety pins per hanger, provided by the client. The number of suspension points depends on the static requirements. The sail ceiling panels are suspended by the client from the raw ceiling in a rigid and height adjustable manner using galvanized cross traverses, included in the scope of delivery. The material is made of galvanized sheet steel with a sheet thickness of at least 2.0 mm.
* the ceiling panels made of galvanized sheet steel 0.7 mm~~,~~ with micro perforation, standard similar to RAL 9010, coated on the back with an acoustically effective black fleece. **For oversize (length >3000 mm), several acoustic panels can be combined into a sail system.** The individual ceiling panels have a circumferential unperforated edge, approximately 10 mm wide; hole pattern of the ceiling panel 2.5 mm, 16% free cross-section. Circumferential bending 90°, front webs with C-fold 50/20 mm and longitudinal webs with G-fold 50/20/7 mm, overlapping corners riveted. Manufacture and execution of the ceiling elements is based on DIN EN 13964 and the technical rules of the TAIM e.v.
* the cooling/heating register, which is glued in as a factory prefabricated unit to match the ceiling system. It consists of copper pipe meanders with a diameter of 10/12 \* 0.35 mm as D-pipe, which are embedded in large-area heat conduction profiles made of aluminum and are glued into the ceiling panel elements.
* the AVACS supply air (optional, see specification item) with round pipe connection, suitable for flex pipe DN100, for targeted airflow from the facade to the inside of the room, which is fastened on the front side by the client using two sheet metal screws. (Note: Coordination with the ventilation trade is necessary).
* the AVACS recirculating air (optional, see specification item) for recirculating air operation (roller fan) for targeted airflow on the multifunctional sail, which has to be fastened in a traverse on the front side by the client using two sheet metal screws and connected electrically. In addition, a scoop tongue (baffle plate) is glued into the back of the ceiling panel. (Note: Coordination with the electrical / I&C trade is necessary).
* the AVACS Ventus (optional see specification item), the supply air ceiling outlet below the ceiling sail with horizontal 4-sided discharge direction, for generating a high-quality room air flow, which is introduced into the room parallel to the ceiling sail and thus causes no draughts in the occupied area. Various sizes available~~,~~ depending on the required air volume.

consisting of:

* air distribution element made of galvanized sheet steel
* connection box with flat construction height made of galvanized sheet steel, with lateral round connection spigot
* safety profile and adhesive tape for on-site mounting and securing the air outlet
* optionally with cover for 3-sided or 2-sided air discharge

(Note: Coordination with the ventilation trade is necessary.)

* the AVACS Ventus Plus (optional, see specification item), the supply air ceiling diffuser with horizontal 4-sided discharge direction below and 2-sided discharge direction above the ceiling sail, for generating a high-quality room air flow, which is introduced into the room parallel to the ceiling sail and therefore does not cause any draughts in the occupied zone. Different sizes available depending on the required air volume.

consisting of:

* air distribution element made of galvanized sheet steel
* plenum box with flat construction height made of galvanized sheet steel, with lateral connection spigot
* safety profile and adhesive tape for on-site installation and securing the air outlet
* optionally with cover for 3-sided or 2-sided air discharge

(Note: Coordination with the ventilation trade is necessary.)

* Acoustic insulation strips made of grey melamine resin (optional)~~,~~ are inserted into the ceiling sails when they are installed to increase the degree of sound absorption (3 strips 50 mm x 50 mm in sail length)
* Suspension cables if the ceiling panels should be folded down for maintenance purposes (optional), the folding depth is limited by means of thin wire ropes, 2 ropes per ceiling panel provided
* Air volume-related telephony silencer TSD (optional), rectangular with controller for constant volume flow, in flat design, suitable for on-site installation above the multifunctional ceiling sails for connection to the AVACS supply air, airtight, made of galvanized sheet steel with round connection spigot, which is fastened on site using threaded rods, insertion loss 24 dB (at 500 Hz) measured in accordance with EN ISO 7235, maximum supply air volume flow 100 m³/h

(Note: Coordination with the ventilation trade is necessary).

Technical data

|  |  |
| --- | --- |
| Standard cooling capacity according to EN 14240: (Verification by neutral expert opinion required) | 165 W/m² |
| Room temperature: | °C |
| Cooling water flow: | °C |
| Cooling water return: | °C |
| Cooling capacity: | W/m2 |
| Total sail cooling capacity: | W |
| Occupancy rate | % |
| Supply air temperature: | °C |

|  |  |
| --- | --- |
| Standard cooling capacity according to EN 14240: (Verification by neutral expert opinion required) | 190 W/m² |
| Room temperature: | °C |
| Heating water flow: | °C |
| Heating water return | °C |
| Heating capacity (water side) | W/m2 |
| Total sail heating capacity | W |

|  |  |
| --- | --- |
| Color of the ceiling panel: | RAL 9010 |
| Perforation of the ceiling panel: | Rg 2516 |
| Hangers and span width: | in accordance with DIN 18168 |
| Quality grade: | according to TAIM |
| Suspension height from bottom edge of raw ceiling to bottom edge of suspended ceiling: | ~~From~~170 mm up to 500 mm |
| Connection: | Pipe end for plug connection,  Da = 12 mm (standard) |
| Connection side: | one-sided |
| Manufacturer: | KRANTZ |
| Type: | Multifunctional sail AVACS |
|  | deliver |

The ceiling sails must be hydraulically connected in such a way that a pressure loss <25 kPa is ensured with a turbulent flow of the cooling/heating medium.

**Pos. 1.1**

**Multifunctional sail AVACS Acoustic 2100 x 1150 mm**

as previously described in Item 1.0

|  |  |
| --- | --- |
| Ceiling panel dimension, one-piece: | 2100 x 1150 mm |
| Ceiling panel dimension, two-piece: divided into: 1st ceiling panel dimension: 2nd ceiling panel dimension: | 3000 x 1150 mm  1500 x 1150 mm 1500 x 1150 mm |
| Acoustic insulation strips: | included / excluded |
| Quantity of sails: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | **€**  plus~~,~~ VAT |

**Pos. 1.2**

**Multifunctional sail AVACS Cooling and Heating 2100 x 1150 mm**

as previously described in Item 1.0

|  |  |
| --- | --- |
| Ceiling panel dimension, one-piece: | 2100 x 1150 mm |
| Ceiling panel dimension, two-piece: divided into: 1st ceiling panel dimension: 2nd ceiling panel dimension: | 3000 x 1150 mm  1500 x 1150 mm 1500 x 1150 mm |
| Acoustic insulation strips: | included / excluded |
| Quantity of sails: | XX piece |
| Delivery unit price: | €/piece |
| Total delivery price: | **€**  plus~~,~~ VAT |

**Pos 1.3**

**Multifunctional sail AVACS Supply Air 2100 x 1150 mm**

as previously described in Item 1.0, but with AVACS Supply Air, supply air volume 100 m³/h

|  |  |
| --- | --- |
| Ceiling panel dimension, one-piece: | 2100 x 1150 mm |
| Ceiling panel dimension, two-piece: divided into: 1st ceiling panel dimension: 2nd ceiling panel dimension: | 3000 x 1150 mm  1500 x 1150 mm 1500 x 1150 mm |
| Acoustic insulation strips: | included / excluded |
| Quantity of sails: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | **€**  plus~~,~~ VAT |

**Pos 1.4**

**Multifunctional sail AVACS Supply Air 2100 x 1150 mm including telephony silencer**

as previously described in Item 1.0, but with AVACS Supply Air, supply air volume 100 m³/h

|  |  |
| --- | --- |
| Ceiling panel dimension, one-piece: | 2100 x 1150 mm |
| Ceiling panel dimension, two-piece: divided into: 1st ceiling panel dimension: 2nd ceiling panel dimension: | 3000 x 1150 mm  1500 x 1150 mm 1500 x 1150 mm |
| Acoustic insulation strips: | included / excluded |
| Quantity of sails: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | **€**  plus~~,~~ VAT |

**Pos 1.5**

**Multifunctional sail VENTUS 2100 x 1150 mm**

as previously described in Item 1.0, but with Ventus BG XXX supply air diffuser, supply air volume XXX m³/h

|  |  |
| --- | --- |
| Ceiling panel dimension, one-piece: | 2100 x 1150 mm |
| Ceiling panel dimension, two-piece: divided into: 1st ceiling panel dimension: 2nd ceiling panel dimension: | 3000 x 1150 mm  1500 x 1150 mm 1500 x 1150 mm |
| Acoustic insulation strips: | included / excluded |
| Quantity of sails: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | **€**  plus~~,~~ VAT |

**Pos 1.6**

**Multifunctional sail VENTUS Plus 2100 x 1150 mm**

as previously described in Item 1.0, but with Ventus Plus BG XXX supply air diffuser, supply air volume XXX m³/h

|  |  |
| --- | --- |
| Ceiling panel dimension, one-piece: | 2100 x 1150 mm |
| Ceiling panel dimension, two-piece: divided into: 1st ceiling panel dimension: 2nd ceiling panel dimension: | 3000 x 1150 mm  1500 x 1150 mm 1500 x 1150 mm |
| Acoustic insulation strips: | included / excluded |
| Quantity of sails: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | **€**  plus~~,~~ VAT |

**Pos. 2.0**

**Changeover and set-up costs**

**Pos. 2.1**

**Allowance for changeover costs – contingency item**

for a change in length of the metal ceiling panel per item and call-off

|  |  |
| --- | --- |
| Quantity: | 1 piece |
| Price: | 200.00 €/piece |

**Pos. 2.2**

**Allowance for changeover costs – contingency item**

for a change in width of the metal ceiling panel per item and call-off

|  |  |
| --- | --- |
| Quantity: | 1 piece |
| Price: | 200.00 €/piece |

**Pos. 2.3**

**Allowance for change in length and width of cooling register – contingency item**

for a change in length and width of the cooling register per item and call-off

|  |  |
| --- | --- |
| Quantity: | 1 piece |
| Price: | 85.00 €/piece |

**Pos. 2.4**

**Allowance for round ceiling cut-out sprinkler**

round ceiling cut-outs in the ceiling tiles up to a diameter of 100 mm (without upstand) per piece, pierced perforation in the cut-out area

|  |  |
| --- | --- |
| Quantity: | piece |
| Price: | 4.50 €/piece |

**Pos. 2.5**

**Allowance for round ceiling cut-out**

round ceiling cut-outs in the ceiling tile sizes up to a diameter of 250 mm (without upstand) per piece, pierced perforation in the cut-out area

|  |  |
| --- | --- |
| Quantity: | piece |
| Price: | 7.00 €/piece |

**Pos. 2.6**

**Allowance for round ceiling cut-out**

Round ceiling cut-outs in the ceiling tile sizes up to a diameter of 400 mm

(without upstand) per piece, pierced perforation in the cut-out area

|  |  |
| --- | --- |
| Quantity: | piece |
| Price: | 9.00 €/piece |

**Pos. 2.7**

**Allowance for changeover costs – contingency item**

for a cut-out in the metal ceiling panel (without upstand) per position and call-off

|  |  |
| --- | --- |
| Quantity: | 1 piece |
| Price: | 50.00 €/piece |

**Pos. 3.0**

**Tubing**

consisting of:

* flexible hose line with stainless steel braiding and extremely smooth inner surface for low pipe resistance,
* stainless steel braiding according to AISA 304,
* oxygen diffusion-tight according to DIN 4726

**Pos. 3.1**

**Connecting hose**

Flexible connection hoses for connecting the multifunctional sails to the on-site pipework above the chilled ceiling using quick-release couplings

|  |  |
| --- | --- |
| 1st side: | Plug-in fitting 10/12 mm |
| 2nd side: | Pipe end 10/12 mm, suitable for Krantz transition piece |
| Connection material: | brass |
| Length: | 1000 mm |
| Quantity: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | €  plus~~,~~ VAT |

**Pos. 3.2**

**Connection hose**

Flexible connection hoses for the hydraulic connection of multi-part multifunctional sails above the chilled ceiling by means of quick coupling~~,~~

|  |  |
| --- | --- |
| 1st side: | Plug-in fitting 10/12 mm |
| 2nd side: | Plug-in fitting 10/12 mm |
| Connection material: | brass |
| Length: | 800 mm |
| Quantity: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | €  plus~~,~~ VAT |

**Pos. 3.3**

**Press-fit transition piece**

Transition piece~~,~~ for pressing (Viega system) into the internal chilled ceiling pipework (to be provided by the customer), for inserting the connection hoses~~,~~

|  |  |
| --- | --- |
| 1st side: | 15 mm brass tube for pressing into pipeline |
| 2nd side: | Plug-in socket for 10/12 mm pipe end |
| Quantity: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | €  plus~~,~~ VAT |

**Pos. 4.0**

**Accessories**

**Pos. 4.1**

**Suspension cables**

Inspection aid consisting of thin steel cables for quick suspension and securing of the multifunctional sails described above by means of an integrated adjustment mechanism and snap hooks. At least two inspection aids must be used per multifunctional sail.

|  |  |
| --- | --- |
| 1st side: | Integrated adjustment mechanism |
| 2nd side: | Snap Hook |
| Length: | 2000 mm |
| Quantity: | piece |
| Delivery unit price: | €/piece |
| Total delivery price: | €  plus~~,~~ VAT |

**!!! Only important for assembly quotations!!!**

**Pos. 5.0**

**Flushing, filling, venting and pressurizing**

Flushing, filling, venting and pressurizing of the individual lines incl. record of the pressure test over 24 h with air or water.

|  |  |
| --- | --- |
| Quantity: | piece |
| Price: |  |

**Pos. 6.0**

**Connection to on-site control group**

incl. copper pipe, copper bends, gunmetal transition pieces without assembly cracks

|  |  |
| --- | --- |
| Quantity: | piece |
| Price: |  |

**Pos. 7.0**

**Commissioning**

Commissioning with the creator of the on-site control system and the installer of the hydraulic system (bidder)

|  |  |
| --- | --- |
| Price: |  |
| Travel expenses (lump sum): |  |

**Pos. 8.0**

**Thermography**

Proof of the correct installation of the chilled ceilings using infrared thermography. The entire chilled ceiling area is scanned after commissioning the chilled-water system and 10 images of the client's choice are documented. For documentation purposes, color printouts of the graphically displayed measurement results must be submitted and attached to the inspection documents.

Only one arrival and one departure are calculated.

|  |  |
| --- | --- |
| Price: |  |

**Pos. 9.0**

**Creation of occupancy plans**

Representation of the entire chilled ceiling system consisting of:

* technical parameters at the transfer point on-site control group (mass flow, required differential pressure),
* documentation of the achieved specific cooling capacity,
* documentation of the internal piping from the on-site zone control group,
* documentation of the active occupancy.

Note:

The assembly/occupancy planning is carried out **once** per provided trade-coordinated and thus approved CAD ceiling mirror.

|  |  |
| --- | --- |
| Price: | €  plus, VAT |