Project
Component **Unidirectional Axial Flow Fan**

Item	Quant.	Description	Unit price €	Total price €
01		**General Requirements** The axial flow fans should be manufactured in a sturdy and robust manner. The fans should be exchangeable. Under normal conditions, the fan has to be designed to run at temperatures between –20 and +40°C. In the event of a fire, the fan has to withstand a temperature of up to 400°C for 90 minutes. In order to prove this, for the relevant parts like impeller, motor, terminal box and terminals a heat test according to EN 12101-3 of a complete unit has to be conducted. The test must be certified by an independent laboratory. Testing of single parts e.g. impeller blades is not valid or sufficient. If the manufacturer can not provide a suitable certificate, then the costs for a heat test must be included in the quoted price. **Fan characteristics** Different duty points have to be reached by speed control via a frequency converter. To enable the axial fans to run in parallel, the performance curve must be 'stall-free.' This should be ensured by a suitable anti-stall device. **Casing** The casing and the motor support should be manufactured from heavy construction of min. 10 mm steel. To avoid corrosion in cracks, the flanges should be formed at the fan casing. Welds must be continuous. To avoid corrosion, the casing has to be hot dip galvanized and coated by suitable primer and epoxy paint. The thickness of the galvanization should be not less than 80 µm, and the additional coating not less than 150 µm. The separated external terminal boxes for power supply and control devices should be manufactured in IP65. **Impeller** The impeller must be able to resist fire conditions. The blades should be made from corrosion-resistant, cast aluminium with imbedded structures of high quality steel or constructed as a welded steel hollow blade. The hub should be made from steel in a welded design. The impeller is directly mounted onto the motor shaft. To ensure high efficiencies, the blades should be		

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		profiled. The blade angle is adjustable when the fan is at standstill. The impeller has to be carefully statically and dynamically balanced (min. G6.3). To minimize the amount of maintenance and to ensure maximum safety in the event of fire, a design without hydraulically adjustable impeller blades would be preferable. **Motor** For axial-flow fans, 3 phase, fully enclosed, squirrel cage motors in IP 55 (according to IEC standards) should be used. To reach a well-balanced cooling and air stream, the motor design should be IMB5. The motor support with integrated guide vanes is welded onto the fan casing. The electrical start will be direct on line in voltage operation 400V +/- 5%. If the axial-flow fan be should be driven via a frequency converter, the motors have to be sized in a manner that the axial fan can run, considering a quadratic resistance curve, without motor overload in case the frequency converter fails. The motors are suitable to withstand 400°C for 90 minutes. A certificate from the motor manufacturer is required. The bearings are lubricated for life. The bearing lifetime is min. 20 000 hours. The bearings have to be easily re-lubricated from outside the casing. The halogen free and flame resistant power cables are connected to the external terminal box. **Performance unidirectional Axial Flow Fan** Air density kg/m³ Volume flow m³/s Total pressure Pa Static pressure Pa Speed min^{-1} Shaft power kW Sound power level dB(A) In order to size the silencers, the manufacturer has to provide a detailed calculation of the sound power level in relation to the octave band according to VDI 2081		

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Item	Quant.	Description	Unit price €	Total price €
		Dimensions		
		Size mm		
		Materials		
		Fan casing steel		
		Impeller blades seawater resistant cast aluminium/ steel		
		Connection blade/hub steel bolt		
		Impeller hub steel		
		Technical Data el. motor		
		Manufacturer ATB, ABB, WEG, NIDEC, or equivalent		
		Size		
		Design IMB5		
		Power kW		
		Voltage V		
		Frequency Hz		
		Operation DOL		
		Rated current A		
		Start up time: s		
		Efficiency %		
		Power factor		
		Protection IP55		
		Isolation class		
		Bearing life time min. 20 000 h		
		Manufacturer ***WITT&SOHN***	_____,___	_____,___
		Type		
		Accessories		
		The axial flow-fans should be equipped with the following accessories.		
		Vibration attenuators		
		The axial-flow fans should be mounted on steel spring type vibration attenuators.	_____,___	_____,___
		Vibration control		
		A vibration control in IP 65 to measure the vibration velocity should be mounted at the fan casing. The sensor is furnished with an analogue output of 4 -20 mA corresponding to 0 –20	_____,___	_____,___

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		mm/s and a potential free switching contact of 30V 1A. **Options** o Thermistor protection (3 PTC) o Thermistor protection (6 PTC) o Thermistor protection (3 Pt100) o Monitoring of the bearing temperatures (PTC) o Monitoring of the bearing temperatures (Pt100) o Bearing control VC-1100 o Space heater o Flex. Connection including counter flanges suitable for 400°C/90 min o Antistall device o Split casing o Inspection opening o Inlet cone o Protection grills		