

NYBORG-MAWENT



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AXIAL FLOW - FAN

1. APPLICATION

Marine axial-flow fan MPV is designed and prepared for use in marine as well as offshore conditions.

The main purpose is operation in HVAC systems. Many variations give possibility to use in special applications such as explosion-proof, sanitary or in raised temperature.

The fans could be used indoor and on the open deck while cruising area is unlimited. MPV fans were used so far on vessels classified by e.g. **DNV-GL, PRS, BV, CCS, KR, ABS** and others.

2. CONSTRUCTION

Fan casing is made of steel sleeve ended with flanges.

Drilling of flanges to be selected:

- Nyborg-Mawent standard or heavy (holes are doubled),
- according to ISO 15138,
- special drilling is available on request.

Standard thickness of fan casing varies from 3 to 10 mm.

10mm thickness is available on request and dedicated for outdoor application.

Fan casing is made of carbon steel hot dip galvanized or painted up to C5 and CX, as well as of stainless steel including AISI 316L and seawater resistant aluminium alloy (both acid treated or painted).

Standard impeller is ~50 ÷ 75% reversible. True reversible (100%) is available on request.

Impellers are made of aluminium alloys sea- water resistant.

Impeller is normally made of sea water resistant aluminium alloy.

Static and dynamic balancing is done in accordance with ISO 1940/1 in class

G6,3 (higher balancing class available on request). Other materials such as PPG are available on request.

Explosion-proof/anti-spark execution of fans is designed in accordance with defined classification society and EN 14986. The fans are constructed in a way that protects from spark, explosion and fire. Safety class (EExe or EExd), IP enclosure and temperature class to be defined by the customer.

Electric motor is three-phase, induction, squirrel -cage, suitable for 50Hz and 60Hz in design destined to marine or marine/Ex application, efficiency class IE2. Nominal power hovers from 0,1kW up to 55kW and rotational speed is up to 3600rpm. Single phase 230V or motor prepared for frequency converter is available on request as well as painting C5-M, heater and efficiency class IE3.

Surface Treatment

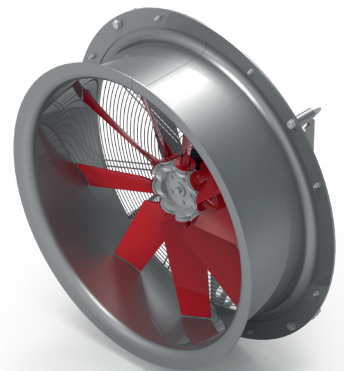
Standard treatment is carbon steel hot dip galvanized.

Optional treatment: carbon steel marine painted up to C5, CX stainless steel including AISI 316L, sea water resistant aluminium alloy - acid treated.



Optional accessories:

- true reversible impeller,
- external terminal box on the fan casing for easy connection,
- wire mesh as a guard on inlet and outlet,
- motor equipped with heater,
- counter flange,
- foot mounting, with or without vibration dampers,
- external greasing nipples for motor bearings placed on fan casing,
- vibration and temperature PTC sensors connected to motor bearings or fan casing,
- flexible connection for easy connection to the duct,
- silencers,
- diffusers/transitions.



3. OPERATING CONDITIONS

Working parameters are defined by static pressure dPs [Pa], volume flow rate Q [m^3/s] and power consumption P [kW]. Their common function defines efficiency.

Main parameters are given with respect of specific density = 1,2 [kg/m^3] and temperature $t = 20$ [$^{\circ}C$].

Tolerances of main working parameters are in accordance with ISO 5802.

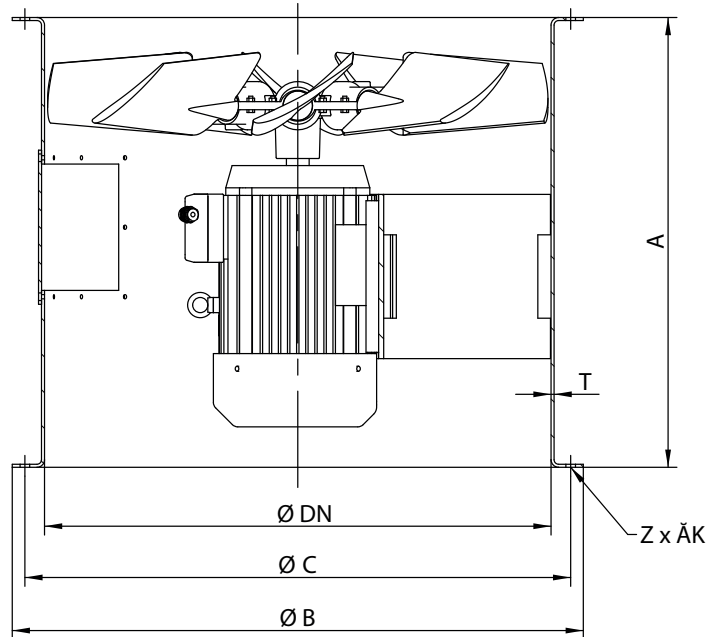
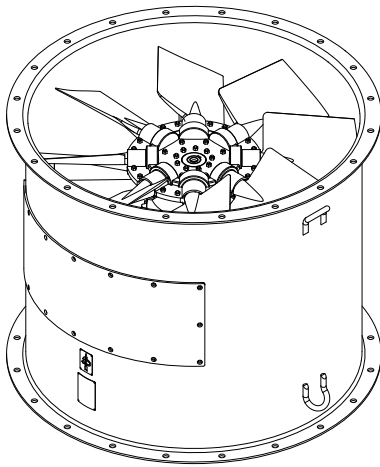
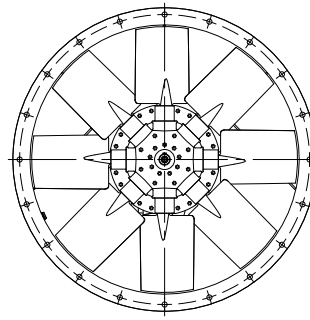
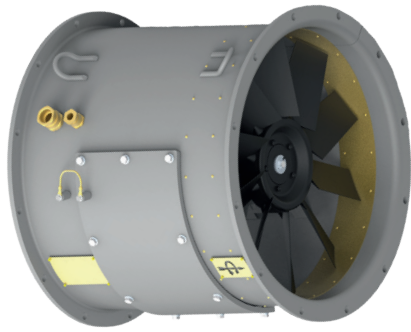
Maximum temperature of air is normally $t_{max} = 45$ [$^{\circ}C$] and allowable dust contents is no more than 0,2 [g/m^3].

4. TYPES, SIZES, PERFORMANCE

DN [mm]	Volume flow rate range Q [m ³ /h]	Static Pressure range dPs [Pa]	Max. Power consumption [kW]	Exemplary working point
200	200 ÷ 850	20 ÷ 80	0,6	dPs = 50 Pa, Q = 300 m ³ /h, P = 0,1kW / n = 3300rpm efficiency μ = 53%, sound power Lw 68 dB(A)
250	200 ÷ 3300	50 ÷ 600	0,7	dPs = 260 Pa, Q = 1250 m ³ /h, P = 0,2kW / n = 3300rpm efficiency μ = 54%, sound power Lw 87 dB(A)
315	200 ÷ 6000	50 ÷ 800	2,7	dPs = 280 Pa, Q = 2970 m ³ /h, P = 0,5kW / n = 3310rpm efficiency μ = 62%, sound power Lw 90 dB(A)
355	1000 ÷ 8500	50 ÷ 1000	6,0	dPs = 420 Pa, Q = 4960 m ³ /h, P = 1,3kW / n = 3450rpm efficiency μ = 59%, sound power Lw 90 dB(A)
400	1000 ÷ 12500	50 ÷ 1300	7,5	dPs = 370 Pa, Q = 6630 m ³ /h, P = 1,4kW / n = 3450rpm efficiency μ = 67%, sound power Lw 92 dB(A)
450	1800 ÷ 17000	50 ÷ 1500	18,5	dPs = 320 Pa, Q = 13000 m ³ /h, P = 3,5kW / n = 3460rpm efficiency μ = 67%, sound power Lw 94 dB(A)
500	2000 ÷ 24000	60 ÷ 2200	30,0	dPs = 500 Pa, Q = 15200 m ³ /h, P = 4,9kW / n = 3490rpm efficiency μ = 69%, sound power Lw 96 dB(A)
560	3000 ÷ 34000	100 ÷ 2200	45,0	dPs = 560 Pa, Q = 19500 m ³ /h, P = 6,8kW / n = 3490rpm efficiency μ = 69%, sound power Lw 101 dB(A)
630	4000 ÷ 24000	100 ÷ 650	8,5	dPs = 150 Pa, Q = 19500 m ³ /h, P = 2,8kW / n = 1720rpm efficiency μ = 68%, sound power Lw 87 dB(A)
710	4000 ÷ 33000	100 ÷ 900	20,0	dPs = 200 Pa, Q = 18100 m ³ /h, P = 2,1kW / n = 1720rpm efficiency μ = 70%, sound power Lw 89 dB(A)
800	10000 ÷ 50000	100 ÷ 1200	30,0	dPs = 200 Pa, Q = 35900 m ³ /h, P = 6,4kW / n = 1730rpm efficiency μ = 71%, sound power Lw 94 dB(A)
900	15000 ÷ 65000	100 ÷ 1300	38,0	dPs = 300 Pa, Q = 35300 m ³ /h, P = 6,1kW / n = 1730rpm efficiency μ = 72%, sound power Lw 95 dB(A)
1000	15000 ÷ 95000	150 ÷ 1400	50,0	dPs = 340 Pa, Q = 57600 m ³ /h, P = 13,5kW / n = 1740rpm efficiency μ = 71%, sound power Lw 100 dB(A)
1120	15000 ÷ 125000	150 ÷ 2000	55,0	dPs = 430 Pa, Q = 66100 m ³ /h, P = 16,9kW / n = 1740rpm efficiency μ = 71%, sound power Lw 99 dB(A)
1250	20000 ÷ 145000	150 ÷ 1200	50,0	dPs = 260 Pa, Q = 80000 m ³ /h, P = 14,3kW / n = 1165rpm efficiency μ = 73%, sound power Lw 102 dB(A)
1400	30000 ÷ 190000	150 ÷ 1300	55,0	dPs = 480 Pa, Q = 109000 m ³ /h, P = 31,3kW / n = 1175rpm efficiency μ = 70%, sound power Lw 103 dB(A)
1600	50000 ÷ 250000	150 ÷ 1500	55,0	dPs = 460 Pa, Q = 172000 m ³ /h, P = 53,7kW / n = 1175rpm efficiency μ = 72%, sound power Lw 109 dB(A)

Basic types of axial-flow MPV fans are: A1K, A1B, A1E, A1M.
Nominal diameters (inner) of axial fans are according to table below.

MPV: A1K



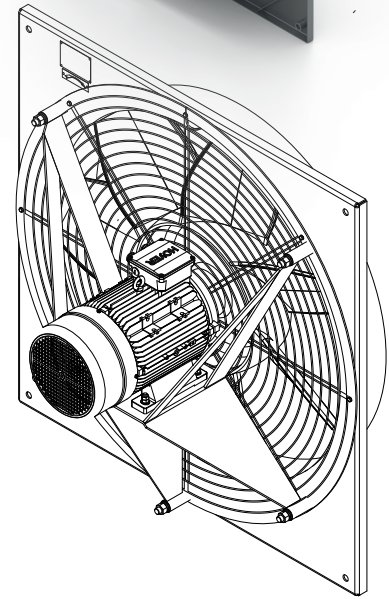
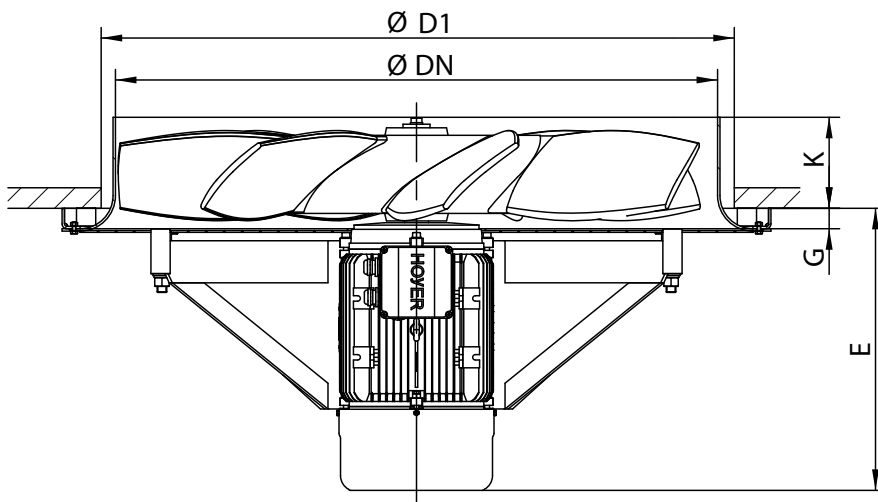
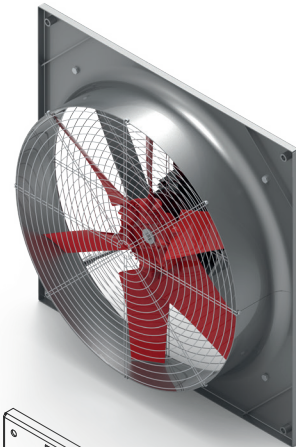
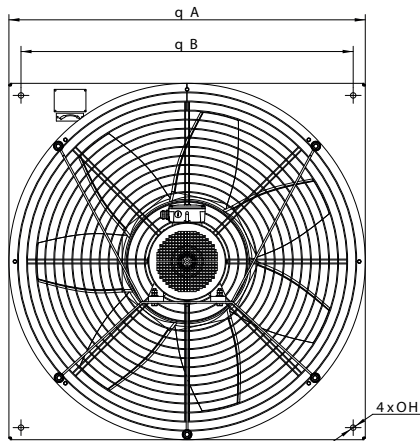
DN	A	B*	C*	T**	Z x K	Motor size	weight*** [kg]
250	330	334	310	3	8 x 12	63/71	~14/~15
315	360	398	360	3	8 x 14	71	~18/~23
355	420	447	405	3	8 x 14	71/80/90	~23/~27/~34
400	420	484	460	3	12 x 14	71/80/90/100/112	~24/~29/~35/~42/~51
450	500	534	510	3	12 x 14	80/90/100/112/132	~34/~41/~48/~57/~76
500	500	584	560	3	12 x 14	80/90/100/112/132	~37/~43/~50/~60/~79
560	630	672	630	3	16 x 14	80/90/100/112/132	~57/~64/~71/~80/~100
630	630	736	698	4	16 x 14	80/90/100/112/132	~63/~70/~78/~88/~108
710	700	816	775	4	16 x 14	100/112/132/160	~92/~101/~122/~226
800	750	906	870	5	16 x 19	112/132/160	~131/~153/~258
900	800	1028	980	5	16 x 19	132/160/180	~177/~282/~345
1000	890	1130	1080	6	20 x 19	160/180/200/225	~334/~401/~432/~519
1120	1000	1250	1200	6	20 x 19	160/180/200/225/250	~379/~442/~474/~561/~687
1250	1000	1380	1320	6	24 x 19	180/200/225	~469/~501/~589
1400	1300	1530	1490	6	32 x 19	225/250	~684/~812
1600	1500	1730	1690	8	32 x 19	280	~1339

* standard Nyborg-Mawent drilling, other available on request

** standard thickness, other thickness available on request

*** depends on motor weight, accessories and casing thickness

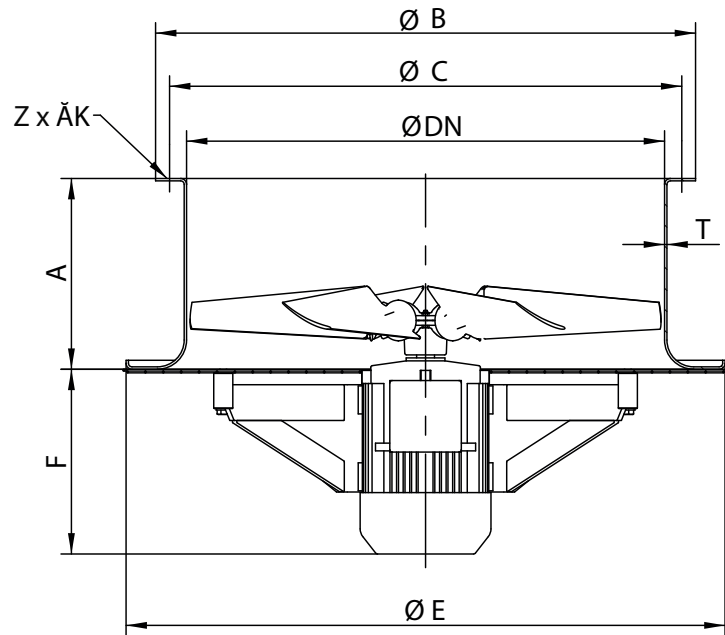
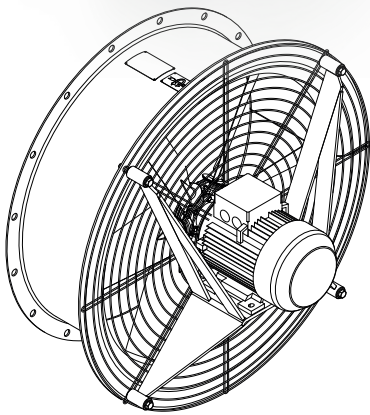
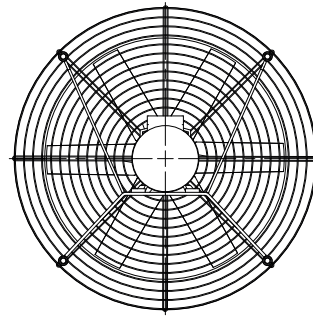
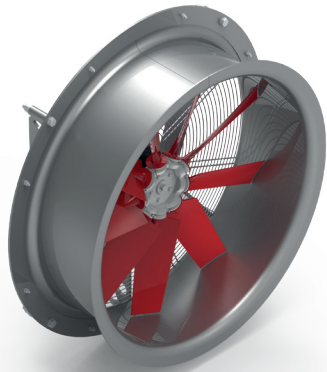
MPV: A1B



DN	A	B	D1	K	G	H	Motor size	E	weight* [kg]
250	340	285	280	60	15	10	63/71	~200/~224	~9/~11
315	400	350	320	65	15	10	71/80	~224/~254	~12/~17
355	460	410	370	65	20	10	71/80/90	~230/~260/~320	~14/~18/~25
400	520	460	420	65	20	14	71/80/90/100/112	~230/~260/~320/~340/~350	~15/~20/~26/~33/~43
450	570	510	470	65	20	14	80/90/100/112/132	~260/~320/~340/~350/~420	~21/~28/~34/~44/~64
500	650	580	520	70	20	14	80/90/100/112/132	~260/~320/~340/~350/~420	~25/~31/~38/~47/~67
560	700	630	570	70	20	14	80/90/100/112/132	~260/~320/~340/~350/~420	~26/~32/~39/~48/~68
630	800	720	650	80	20	14	80/90/100/112/132	~260/~320/~340/~350/~420	~33/~40/~46/~57/~77
710	870	800	730	115	25	14	100/112/132/160	~350/~350/~420/~560	~53/~63/~85/~190
800	970	900	830	115	25	18	112/132/160	~360/~420/~560	~79/~100/~209
900	1080	980	930	122	28	18	132/160/180	~420/~560/~640	~116/~226/~295
1000	1180	1100	1030	201	34	18	160/180/200/225	~560/~640/~690/~700	~242/~310/~342/~428
1120	1300	1200	1160	201	34	18	160/180/200/225/250	~560/~640/~690/~700/~770	~253/~322/~354/~440/~571
1250	1420	1320	1300	190	50	22	180/200/225	~660/~700/~720	~337/~368/~455
1400	1550	1450	1450	230	50	25	225/250	~720/~770	~473/~604

*** depends on motor weight, accessories and casing thickness

MPV: A1E



DN	A	B*	C*	T**	E	Z x K	Motor size	F	weight*** [kg]
250	202	334	310	3	430	8 x 12	63/71	185/210	~14/~16
315	194	400	360	3	430	8 x 14	71/80	210/240	~16/~21
355	195	440	405	3	485	8 x 14	71/80/90	210/240/300	~18/~22/~29
400	198	484	460	3	530	12 x 14	71/80/90/100/112	210/240/300/320/320	~19/~24/~30/~37/~46
450	215	534	510	4	595	12 x 14	80/90/100/112/132	240/300/320/320/350	~30/~36/~43/~52/~71
500	250	584	560	4	660	12 x 14	80/90/100/112/132	240/300/320/320/350	~34/~41/~47/~56/~76
560	260	672	630	4	730	12 x 14	80/90/100/112/132	240/300/320/320/350	~38/~45/~52/~61/~80
630	260	736	698	4	820	16 x 14	80/90/100/112/132	240/300/320/320/350	~46/~52/~58/~69/~89
710	320	816	775	4	900	16 x 14	100/112/132/160	320/320/350/490	~70/~81*/~102/~206
800	320	906	870	5	990	16 x 19	112/132/160	340/360/490	~100/~121/~228
900	320	1028	980	5	1100	16 x 19	132/160/180	3510/490/560	~140/~249/~317
1000	400	1128	1080	6	1275	20 x 19	160/180/200/225	490/560/610/620	~287/~354/~386/~472
1120	420	1248	1200	6	1405	20 x 19	160/180/200/225/250	490/560/610/620/690	~314/~382/~414/~501/~631
1250	520	1380	1320	6	1550	24 x 19	180/200/225	560/610/620	~415/~447/~535
1400	520	1530	1490	6	1740	32 x 19	225/250	620/690	~606/~737

* standard Nyborg-Mawent drilling, other available on request

** standard thickness, other thickness available on request

*** depends on motor weight, accessories and casing thickness

5. MARKING

Example of marking is specified below:

- MPV 500 A1K,
- MPV – axial-flow fan,
- 500 – nominal diameter,
- A1K – type of fan.

Customer is also asked to define:

- **position of mounting:** horizontal or vertical,
- **air flow direction:** from impeller to motor or from motor to impeller,
- **light or heavy execution** (for light - casing is made 3 – 10 mm of thickness, for heavy it is always 10mm),
- external diameter of **power cable**,
- **door opening:** left or right (MPV A1M only),
- selection of **optional items**,
- additional **customer's requirements**.

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