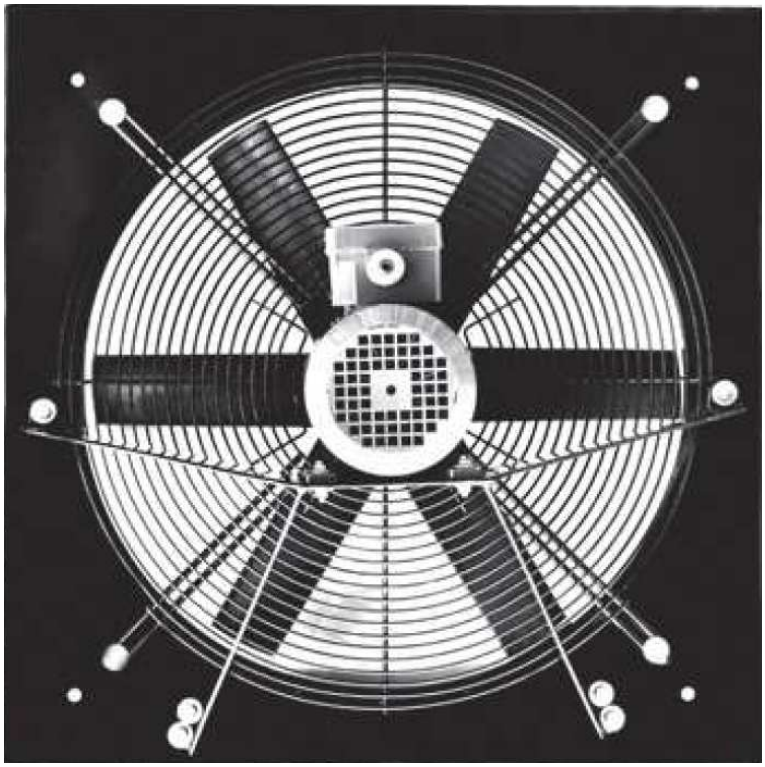
Deltafan
Wojciech Franczak
Brzeźnica 234B, 34-114 Brzeźnica
Phone: +48 33 879 20 38
Fax: +48 33 879 22 65
E-mail: biuro@deltafan.pl

INSTRUCTION MANUAL
for „DELTAFAN" wall fans
/R/*-*/**//Ex type



The instruction manual should be read before starting up the fan.

Version 2

Brzeźnica 2010

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NOTE!
Fans are not equipped with a power cord. The user should provide a power cord, which must meet requirements included in applicable directives and standards harmonized with given directives

1. GENERAL PRECAUTIONS

- This instruction manual is an integral part of the device. Information and data included must be strictly followed throughout the entire service life of the device and must be enclosed, should the device be used by another user. If the instruction manual is damaged or lost, please contact our company to obtain another copy.
- After the device is unpacked, check if the fan is complete and all parts are intact. If the device is damaged or some parts are missing, please contact our dealer. **In no case should the incomplete device be installed or started up!**
- The device is designed for ventilation of rooms and must be used accordingly. Otherwise, any claims will be rejected. Mechanical damages caused by people or animals, incorrect installation, failure to follow the rules or incorrect use are not subject to warranty claims.
- Repairs and maintenance should be performed by qualified personnel. Any modifications and tampering with the device are forbidden, since it may cause serious consequences, which the manufacture cannot be held responsible for.
- The device requires the use of original parts only. Damages caused by using incorrect, unoriginal materials and other accessories are not subject to warranty claims.
- Plant installations (electric, ventilation) should be correctly connected to the device and should not hinder its operation in any manner.
- Designers, engineers, fitters and users should be aware of all responsibilities related to legal provisions and standards in the designing, installation, operation and repairs of the device.
- The company cannot be held responsible for any damages caused as a result of the failure to observe instructions and information (in particular, as a result of misinterpretation) included in the instruction manual and concerning the operation and use of the device.

2. GENERAL SAFETY RULES

Please remember that using devices supplied with electric energy requires the observation of a number of the following general safety rules:

	The device should not be touched, if parts of the cover are wet or moist.
	The electric installation, which the device is connected to, should be performed according to regulations in force, must be technically operational and possess valid and required by regulations tests and certificates.
	When beginning any activities related to cleaning and maintenance, make sure that the main switch is disengaged and check whether the device is live!
	It is forbidden to modify protections of the device.

	In no case should any objects be placed between the protection screen and rotor.
	Great caution should be exercised, because outside motor temperature can be high. Touching it can cause burns.
	It is forbidden to use connectors, multiple sockets and extensions in order to connect the device to the electric supply.
	The safe operation of electric devices in explosion endangered areas depends mainly on their proper selection to explosion hazard conditions, correct installation and power supply, protection against short-cuts and overloads, and then, on proper usage. If one of the conditions is not satisfied, the safety will not be ensured or be very expensive to obtain.
	Electric devices marked with Ex, of proper parameters and certified as explosion-proof according to the ATEX 94/9/WE directive should be used in explosion endangered areas.

3. GENERAL INFORMATION

A fan is a rotor device, which receives mechanical energy and by means of one or a few rotors equipped with blades uses the energy to constantly transfer a medium. Therewith, the value of transferred work per a mass unit does not exceed the normal value of 25 [kJ/kg].

Wall fans of the type ***/R/*-*/**/***/Ex from Deltafan are designed to operate in spaces, where there is a danger of explosive atmosphere occurrence as a result of the existence of gas, air, mist and vapour mixtures rated as the group II.

The fans are included in the device group II category 2G. The devices are designed and produced according to the requirements of the Directive 94/9/WE (ATEX) and harmonized standards assigned to the Directives:

- PN-EN 60079-0:2009,
- PN-EN 60079-7:2008,
- PN-EN 13463-2010,
- PN-EN 13463-5:2005,
- PN-EN 14986:2009.

Additional means were providing in the construction of fans to ensure enhanced safety in case of excessive temperature, occurrence of arches and sparks both inside and outside of the motor, and outside elements during normal operation.

The fans meets the temperature class of T3 and T4 – that is, the maximum temperature of any fan part in the most unfavourable but permissible conditions does not exceed 200°C and 135°C, respectively. The temperature class of a fan depends of an electric motor used in the fan.

4. TECHNICAL DATA

4.1 DEVICE DESCRIPTION AND CONSTRUCTION

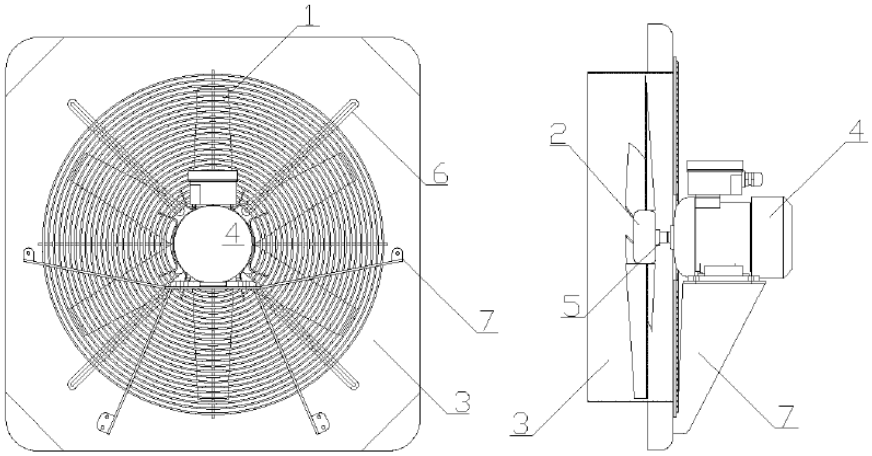
The „DELTAFAN" wall fans of the type ***/R/*-*/**/***/Ex are devices with short housing designed to be mounted in a wall. The main task of such fans is to discharge explosive mixtures of gas or flammable fluid vapour with air from the room being ventilated.

The fan housing consists of elements made of welded steel sheets. Supporting arms are screwed to the front part of the housing. Asynchronous electric motor adapted to continuous operation (S-1) in explosion endangered areas of the isolation class F and protection degree IP56 is mounted to the supporting arms. The supporting arms are made of steel sheets coated with powder epoxy-polyester paint „ALESTA EP KP-E45" of the surface resistance of 2x105-106 [Ω].

The fan rotor is made of antistatic polyamide (PAGAS), die cast and reinforced with glass fibre (blades) and silumin alloy (Al Si 12 Cu), also die cast (fan hub). The fan rotor is mounted directly on the electric motor shaft. Rotors of such type are adapted to operate in a potential explosive atmosphere and meets the requirements related to the ATEX Directive.

From the air intake side of the fan there is the protection screen preventing foreign bodies IP20 from entering. The protection screen is made of steel wire (St3S grade) according to the standard PN-67/M-80026. The wire is coated with powder epoxy-polyester paint „ALESTA EP KP-E45" of the surface resistance of 2x105-106 [Ω].

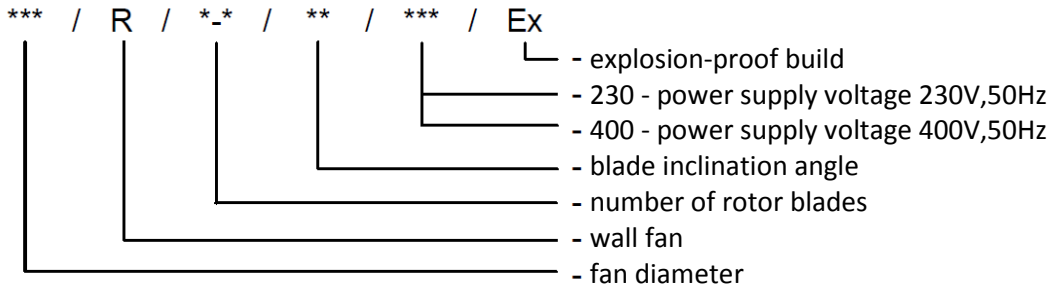
Fig. 1 „DELTAFAN" wall fan of the type***/R/*-*/**/***/Ex



1. Fan blade,
2. Rotor hub,
3. Short housing,
4. Electric motor,
5. Motor shaft,
6. Protection screen from the motor side,
7. Motor supporting arms.

4.2 MARKING

„DELTAFAN" wall fans of the type:



4.3 NOMINAL PARAMETERS

The aerodynamic characteristics were developed on the basis of investigations in a laboratory of Multi-Wing (Denmark). Due to the extensiveness of the material, the data – the dependency of the air volume flow on the fan compression, in particular – for all fans are published in the catalogue and are available on our regularly updated website at www.deltafan.pl. The selection of a fan for a particular application should be carried out by a competent person, so that the fan operation point in not located in the unstable operation area (the so called fan stall phenomenon).

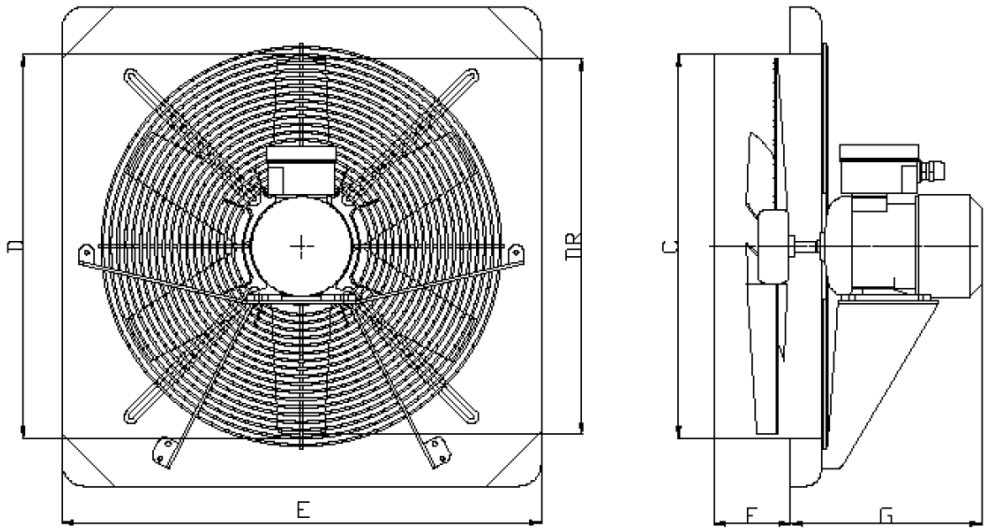
Common parameters for all fans in the series of types:

- Protection degree IP20 (from the fan air intake side)

  IP56 (fan drive)
- Working temperature -20°C ≤Tamb≤ +40°C
- Relative humidity up to 95%

Fan type	Rotations	Output	Power	Current	tE	Temp. class	Noise level	Motor type	Dimensions [mm]					
	[rpm]	[m^3/h]	[kW]	[A]	[s]	[-]	dB(A)	[-]	DR	D	C	E	F	G
355/R/6-6/30/400/Ex	1380	2340	0,12	0,5	18,6	T4	54	Ex Sg 63-4A-T4	350	355	370	490	85	205,3
400/R/6-6/40/400/Ex	1370	4470	0,18	0,6	14,2	T4	60	Ex Sg 63-4B-T4	395	400	410	525	60	223,5
400/R/6-6/45/400/Ex	1370	5020	0,18	0,6	14,2	T4	59	Ex Sg 63-4B-T4	395	400	410	525	60	223,5
400/R/5-5/40/400/Ex	1350	4500	0,25	0,8	41,7	T3	57	Ex Sh 71-4A-T3	395	400	410	525	60	223,5
450/R/3-6/45/400/Ex	1370	6090	0,18	0,6	14,2	T4	61	Ex Sg 63-4B-T4	445	450	465	590	100	221,5
450/R/6-6/40/400/Ex	1370	6130	0,18	0,6	14,2	T4	61	Ex Sg 63-4B-T4	445	450	465	590	100	221,5
450/R/8-8/40/400/Ex	1350	6340	0,25	0,8	41,7	T3	62	Ex Sh 71-4A-T3	445	450	465	590	100	229,0
500/R/3-6/45/400/Ex	1350	7690	0,25	0,8	41,7	T3	63	Ex Sh 71-4A-T3	495	500	510	620	100	229,5
500/R/6-6/40/400/Ex	1350	7660	0,25	0,8	41,7	T3	62	Ex Sh 71-4A-T3	495	500	510	620	100	229,5
500/R/6-6/45/400/Ex	1420	9340	0,37	1,3	20,4	T3	65	Ex Sh 71-4B-T3	495	500	510	620	100	250,0
500/R/8-8/40/400/Ex	1420	8740	0,37	1,3	20,4	T3	64	Ex Sh 71-4B-T3	495	500	510	620	100	250,0
560/R/3-6/40/400/Ex	1350	8850	0,25	0,8	41,7	T3	64	Ex Sh 71-4A-T3	555	560	570	715	100	230,9
560/R/6-6/40/400/Ex	1420	10300	0,37	1,3	20,4	T3	66	Ex Sh 71-4B-T3	555	560	570	715	100	251,0
560/R/6-6/45/400/Ex	1420	12000	0,55	1,6	16,5	T3	69	Ex Sh 80-4A-T3	555	560	570	715	100	257,0
560/R/8-8/40/400/Ex	1420	11300	0,55	1,6	16,5	T3	67	Ex Sh 80-4A-T3	555	560	570	715	100	257,0
600/R/3-6/30/400/Ex	1370	7820	0,18	0,6	14,2	T4	62	Ex Sg 63-4B-T4	595	600	615	780	110	235,9
600/R/6-6/40/400/Ex	1420	12700	0,55	1,6	16,5	T3	68	Ex Sh 80-4A-T3	595	600	615	780	110	262,0
600/R/6-6/45/400/Ex	1370	14300	0,75	2,1	20,0	T3	70	Ex Sh 80-4B-T3	595	600	615	780	110	274,0
600/R/8-8/40/400/Ex	1420	12900	0,55	1,6	16,5	T3	68	Ex Sh 80-4A-T3	595	600	615	780	110	262,0
630/R/5-5/45/400/Ex	880	12200	0,55	1,7	22,0	T3	62	Ex Sh 80-6B-T3	625	630	645	785	120	269,0
630/R/8-8/40/400/Ex	1370	13700	0,75	2,1	20,0	T3	68	Ex Sh 80-4B-T3	625	630	645	785	120	269,0

- Power data given in the table concerns the power on the electric motor shaft.
- The current value is given for the star motor connection.
- The level of acoustic pressure in the distance of 1m from the fan with spherical form of sound propagation.



4.4 LOCATION

The device mounting location must be established in a design by a competent person. Technical requirements and regulations in force must be met to obtain permissions (among others, related to a building, architectonic and fire-proof provisions, environmental legislation). Prior to the device fitting and installation it is recommended to obtain all necessary permissions.

The following conditions must be met to ensure the correct installation of a device:

- the device should be used according to its purpose,
- the device should be built in a construction capable of supporting the fan weight,
- proper distances must be maintained to ensure correct air flow and free access during maintenance works,
- simple activities and device operation monitoring are permitted,
- the fan should be protected on the other side of a room being ventilated by means of a protection screen preventing any objects from entering and damaging the fan during operation. The protection screen should be adapted to explosion-proof working conditions,
- in order to protect against accidental contact with device moveable parts it is forbidden to remove fan protecting elements, that is, protection screen installed.

4.5 OPERATION

The fan can operate in voltage variations not exceeding 5% of the motor rated voltage. All rating is related to rated voltage. If voltage variations exceed 5% of the rated voltage, the motor should not be started.

The fan motor has protection rating of IP 56, which prevents solids and water from entering its inside in the scope specified in the standard IEC 60034-5.

The motor can be used for constant operation only, which means light and rare start-ups not causing serious motor heating. The use of a protection clamp depends of electric shock protection applied according to standards in force.

The following should be checked before connecting the motor:

	The rated voltage of the motor must correspond to the voltage of a power supply network (network voltage variations cannot exceed ±5 % of the rated voltage).
	Connections for correct winding on the terminal box.
	Mounting and continuity of the protection connection.
	The motor should have correct overload protection, whose current-time characteristic guarantees that the motor will be disconnected from the supply voltage in a time shorter than time tE specified for it at a current equal to the motor starting current.
	The motor isolation resistance cannot be less than 20MΩ in the cold state. In case when the motor is moist (when the motor isolation resistance is less than 20MΩ) it should be dried in the temperature below 353K (+ 80°C).
	The motor rotation direction should be consistent with the rotation direction of a device being driven; in typical motors the rotation direction is clockwise – looking from the motor driving side.

During operation special attention should be paid to the following:

⚠	The access of cooling air from the motor housing cannot be hindered. The housing may have worse conducting properties due to the sticking of dust and dirt particles to the fan surface. Therefore, the housing surface should be periodically cleaned with a cotton cloth.
⚠	During the operation special attention should be paid to motor operation and immediately disconnect the motor from the supply network in case of: ▪ excessive motor vibrations, ▪ considerable decrease of rotational speed, ▪ excessive heating up of the motor or bearings.

4.6 THE POWER SUPPLY OF THE FAN MOTOR

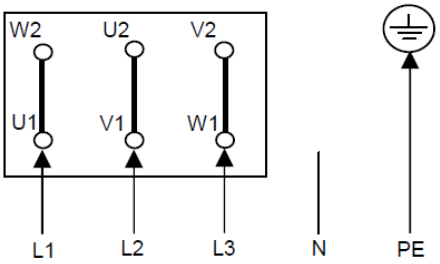
The „DELTAFAN" wall fans of the type ***/R/*-*/**/***/Ex are equipped with asynchronous motors in the explosion-proof version with certificates of EC type examinations (ATEX). In order to connect the device to the electric installation, power supply cables or wires should be lead out through proper cable outlets of the motor terminal box.

Power supply cables should be connected according to given diagrams and observing the following conditions:

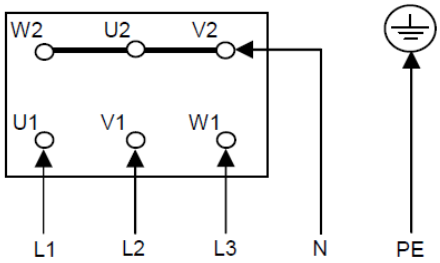
- The motors are designed for the basic voltage of 230/400V and can be connected to the network of the inter-lead voltage of 3x400V ±5% with the star motor winding connection (Y) or to the network of the inter-lead voltage of 3x230V ±5% with delta motor winding connection (Δ).
- The installation must have correctly selected overload and short-cut protection.
- The installation must have efficient protection against electric shocks.
- Leads of the electric installation are to be lead through isolation bushings in the motor terminal box.
- Authorised personnel should check whether lead dimensions are appropriate to the maximum consumption of the electric power, but their cross-section should not be less than $1mm^2$.
- The device should always be earthed. The fan operation without connected PE leads is forbidden. Protection leads PE (should of colour yellow-green) should be connected to the terminal marked with the symbol.
- Always make sure that the earthing lead is longer than the power supply lead so that it is the last lead in case of accidental disconnection (tear out).
- Before starting up the device, check the connections for correctness and consistency with the enclosed electric diagram. Switching on the power supply without previous checking the connections is forbidden.
- **The explosion-proof motors of a standard reinforced construction do not have a thermal protection. However, the motors can be additionally protected against overheating by means of three thermistors (one for each phase) P-(TC)120-B connected in series, whose leads-out should be connected to an external protection circuit or to an electronic resistance relay. When the set temperature is exceeded, the circuit should disconnect the device from the power supply network. It is recommended that the protection circuit accounted for the temperature growth caused by multiple fan motor start-ups.**

Fig. 2 The connection diagram for the wall fans powered by the three-phase inter-lead current 3x400V 50Hz (star) and 3x230V 50Hz (delta).

Delta connection



Star connection



5. TRANSPORT AND HANDLING

- Transport and handling must be performed with great caution to prevent the device from damaging.
- Fans should be transported on covered means of transportation, in wooden boxes, on metal pallets or carton packages protecting against water and moisture.
- The packaging should maintain fans in new, factory condition during storage and transportation, and ensure the correct operation of the fan, when it is delivered to the installation location.
- When packing, special attention should be paid to stability and inertia of the fan in its packaging.
- Fans and their parts should not be stored in a room with chemical substances causing metal corrosion.
- Fans should be stored in dry and permeable to air containers, free from gases, fluids and caustic vapours, which are harmful to motor isolation and other fan parts.
- Fans cannot be stored in rooms, where chemical fertilizers, chlorinated limes, acids, chemical substances, etc. are stored.
- The ambient temperature in the room, where fans are stored, cannot be lower than 278K (+5°C), and relative humidity cannot exceed 70%.

6. INSPECTIONS AND MAINTENANCE

Each working fan should be subjected to periodical inspections:

- small inspection – every 12 months,
- main inspection:
  - motors of the rotational speed of n = 1500 rpm -
    - after 6000 working hours
  - motors of the rotational speed of n = 1000 rpm -
    - after 7000 working hours, but no seldom than every 3 years.

6.1 THE SMALL INSPECTION

- visual inspection, and motor and protection equipment cleaning without disassembly, as long as the inspection does not necessitate it,
- resistance measurement of motor winding isolation,
- efficiency measurement of resetting or protection connection resistance,
- resistance measurement of power supply cable isolation,
- checking the correct setting of overload protection,
- discharge the condensate:
  - pull out the rubber plug from the drain hole in both plates to discharge water and re-plug both holes.

6.2 THE MAIN INSPECTION

- motor removal consisting in performing the below activities in the following order:
  - unscrew the three screws mounting the fan cover,
  - removal of the fan from the shaft using a puller,
  - unscrew the three bolts holding bearing plates,
  - removal of bearing plates using special pullers or by lightly tapping the protruding plate logs with a wooden hammer,
  - removal of the rotor with bearings,
  - removal of bearing from the motor shaft using three-arm pullers – only when it is necessary to replace them.
- **Bearings should be absolutely replaced after 40000 motor working hours.**

Double-sidedly closed ball bearings (2Z) that do not require grease filling are used in the motor (bearings are factory greased by the manufacturer).

Motor	Bearing type
63	63 6202 2Z
71	71 6203 2Z
80	80 6204 2Z

- checking the stator winding condition, which should be carefully cleaned and blown out with compressed air; winding faces cannot have damaged spots, faces must be well stiffened; if necessary they should be coated with an electric isolation paint without solvent PK-155 and well dried in the temperature below 373 K (+ 100°C),
- check the isolation resistance between particular winding phases and between the winding and motor housing,
- **check the correct setting of the motor overload protection,**
- **it is forbidden to replace any motor elements and make any modification. If a repair is necessary (motor rewinding), it can be done by the manufacturer or a authorised company,**
- the motor should be installed in the reverse order.

Note:

All activities related to disassembly, inspection and assembly should be performed in such a manner not to damage the winding, locks in the plates, body and other motor parts.

When the inspection is carried out and the motor is refitted, it should be subjected to the following tests:

- measure the winding resistance,
- check the connections,
- measure the isolation resistance in the cold state,
- the motor should be tested on the idle gear for two hours and, if possible, perform the test under rated load as long as the motor temperature stops to visibly increase. Test results should be noted and kept for future reference.

The above tests should be performed according to the standard EN 60034-1.

Note:

All activities related to inspections and technical commissioning, including checking the electrical isolation strength (high voltage tests) should be performed by a trained and qualified person.

7. DISPOSAL

In the countries of the European Union and other European countries, there are separate systems of waste segregation designed for disposal of electric and electronic equipment. By such a pro-ecological attitude you prevent potential negative influences on the natural environment and human health, which can occur as a result of the inappropriate storage and disposal process of such products. We also save natural resources through material management. To obtain more detailed information on electronic material processing and recycling, please contact your local city or commune hall, local electric and electronic equipment disposal plant.

8. WARRANTY CONDITIONS

The „DELTAFAN" wall fans of the type ***/R/*-*/**/***/Ex are covered with the manufacturer warranty according to the conditions and provisions set out in the delivery contract or the factory certificate.

9. MANUFACTURER

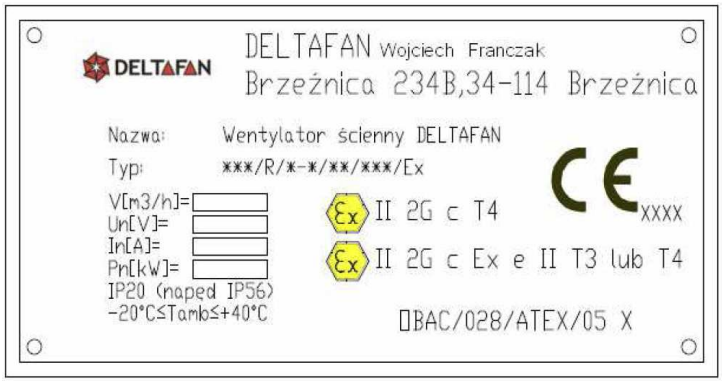
Deltafan

Wojciech Franczak

Brzeźnica 234B

34-114 Brzeźnica

10. RATING PLATE



11. DECLARATION OF CONFORMITY

DELTAFAN

DECLARATION OF CONFORMITY

Manufacturer: **Deltafan Wojciech Franczak**
Brzeźnica 234B
34-114 Brzeźnica

We hereby declare with the sole responsibility that the product:

The „DELTAFAN" wall fans of the type */R/*-*/**/***/Ex**

II 2G c T4
II 2G Ex e II T3 or T4

marked with the CE sign conforms with the requirements of the Directive 94/9/WE (ATEX) and the Machinery Directive 2006/42/WE,

and consistent with the requirements of the following harmonized standards:

- PN-EN 60079-0:2009,
- PN-EN 60079-7:2010,
- PN-EN 13463-2010,
- PN-EN 13463-5:2005,
- PN-EN 14986:2009,
- PN-EN ISO 12100-1:2005
- PN-EN ISO 12100-2:2005/A1:2009

In the process of the product design, the requirements of the Directive 94/9/EC (ATEX) Machinery Directive 2006/42/WE are accounted for.

Certified by: Notified Body no. 1461
Ośrodek Badań Atestacji i Certyfikacji OBAC Sp. z o.o. Gliwice 44-100, ul. Jasna 31

Certificates of the CE type examination:

The complete device:	OBAC/028/ATEX/05 X,
The components:	KEMA 03 ATEX 2180,
	KEMA 03 ATEX 2181,
	KEMA 03 ATEX 2176,
	KEMA 03 ATEX 2177,
	KEMA 03 ATEX 2178,
	KEMA 03 ATEX 2179.

Date: 31.08.2010
Signature: Wojciech Franczak