

Fans, NCF

NCF fan



Original user manual

EN USER MANUAL

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Declaration of Conformity

We, AB Ph. Nederman & Co., declare under our sole responsibility that the Nederman product: NCF fan (Part No. **, and stated versions of **) to which this declaration relates, is in conformity with all the relevant provisions of the following directives and standards:

Directives

2006/42/EC

Standards

EN ISO 12100:2010, EN ISO 20607:2019.

The name and signature at the end of this document is the person responsible for both the declaration of conformity and the technical file.

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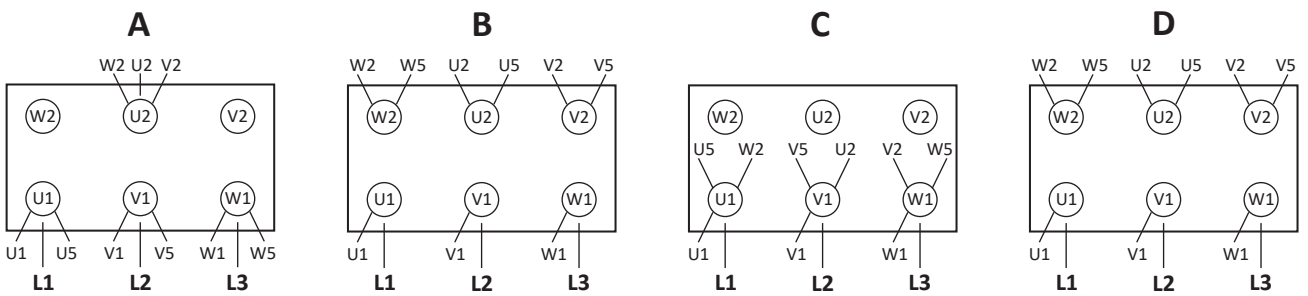


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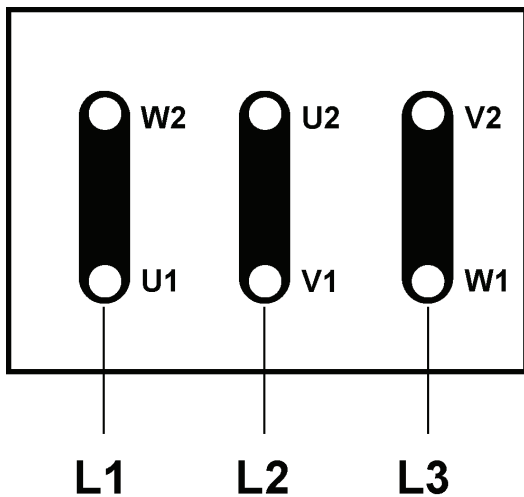
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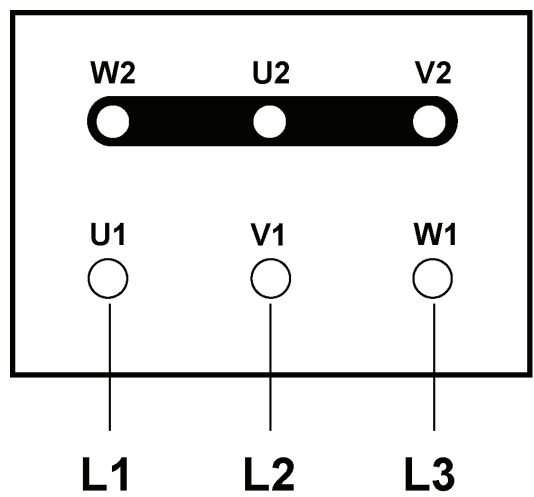
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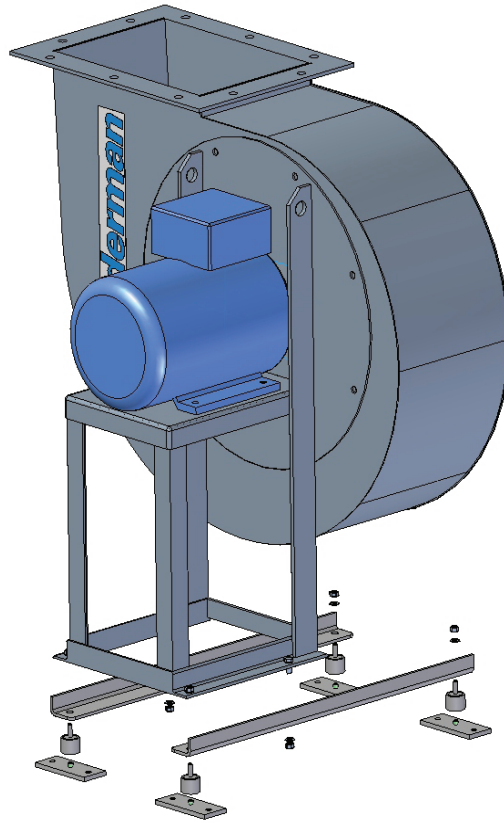
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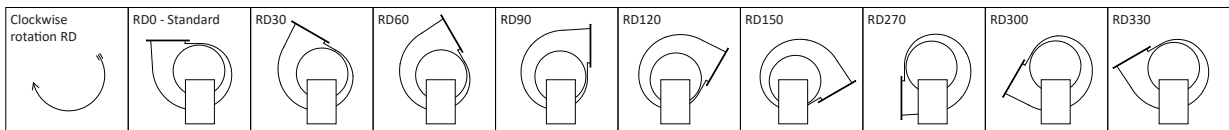


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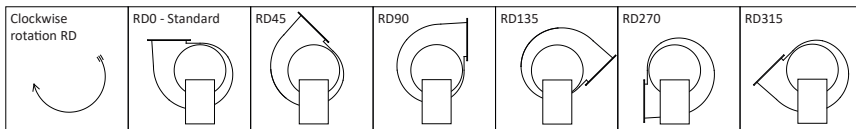


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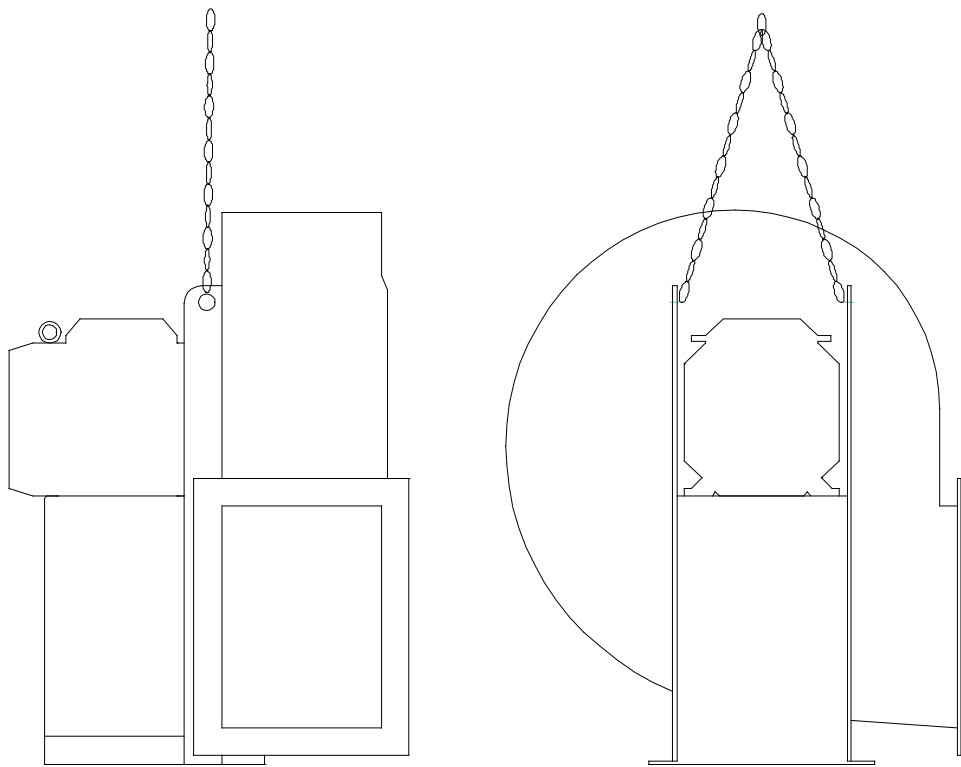
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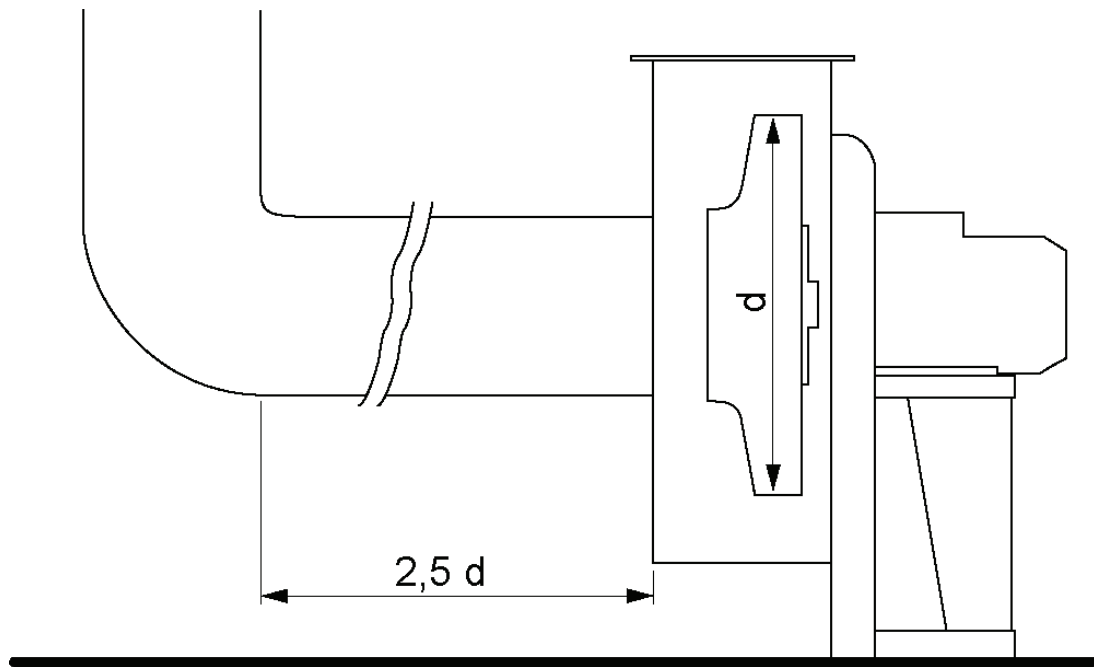
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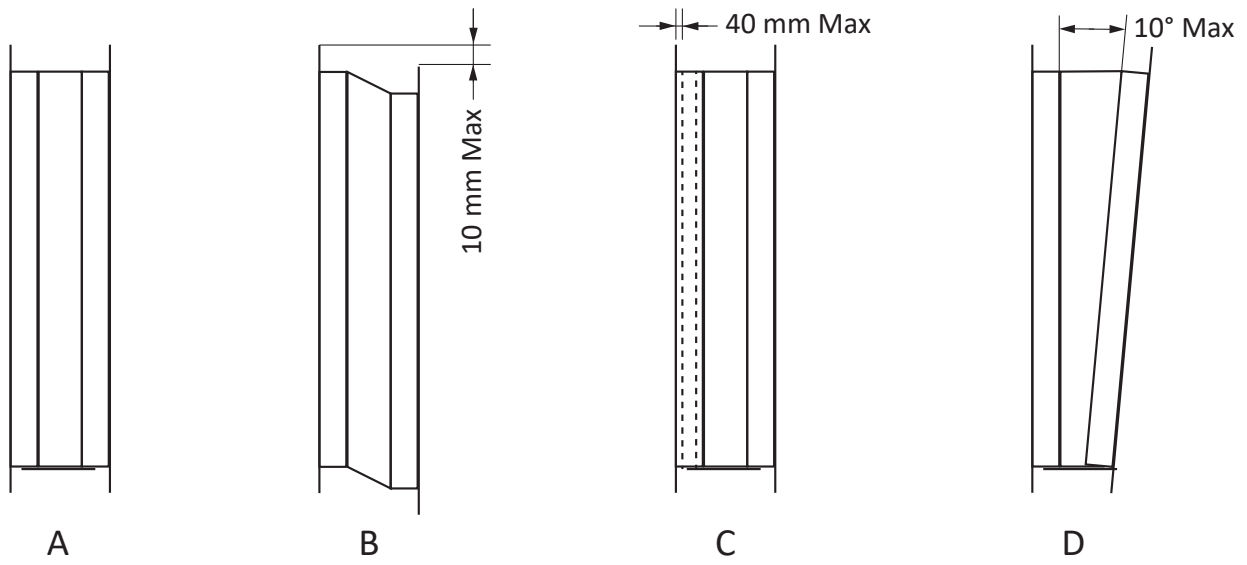
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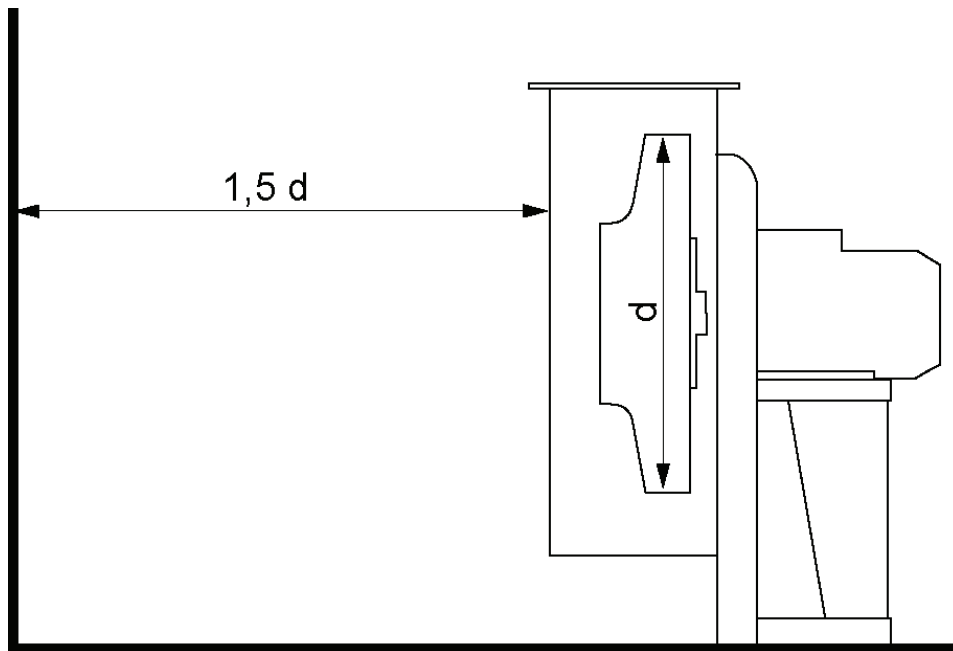
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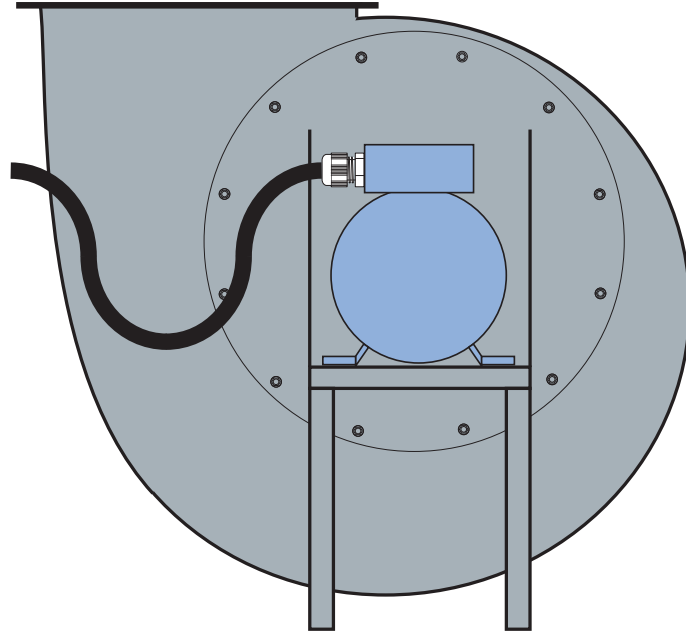


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EN 1 Preface

Thank you for using a Nederman product!

The Nederman Group is a world-leading supplier and developer of products and solutions for the environmental technology sector. Our innovative products will filter, clean and recycle in the most demanding of environments. Nederman's products and solutions will help you improve your productivity, reduce costs and also reduce the impact on the environment from industrial processes.

Read all product documentation and the product identification plate carefully before installation, use, and service of this product. Replace documentation immediately if lost. Nederman reserves the right, without previous notice, to modify and improve its products including documentation.


This product is designed to meet the requirements of relevant EC directives. To maintain this status, all installation, maintenance, and repair is to be done by qualified personnel using only Nederman original spare parts and accessories. Contact the nearest authorized distributor or Nederman for advice on technical service and obtaining spare parts. If there are


any damaged or missing parts when the product is delivered, notify the carrier and the local Nederman representative immediately.


2 Safety

2.1 Classification of important information

This document contains important information that is presented either as a warning, caution or note, according to the following examples:




 **WARNING! Risk of personal injury**
Warnings indicate a potential hazard to the health and safety of personnel, and how that hazard may be avoided.

 **CAUTION! Risk of equipment damage**
Cautions indicate a potential hazard to the product but not to personnel, and how that hazard may be avoided.

 **NOTE!**
Notes contain other information that is important for personnel.

2.2 General safety instructions

Table 2.1 Explanation of sign and sticker symbols used on the product.

Sign	Description
	Do not remove the guards.
	Indicates a point that is to be used for lifting and moving the fan.
	Generic hazard warning. Positioned near the condensation discharge plug (if present), to warn of the possible presence of hazardous substances and/or substances at a high temperature.

2.2.1 Mechanical characteristics risks

The following is a list of specific hazards related to the fan's mechanical characteristics.



WARNING! Risk of personal injury

A person may receive injuries as a result of:

- Vibrations and noise emission are directly correlated. Compliance with the instructions given for correct installation so as to reduce vibrations to a minimum is of equivalent importance for noise reduction.
- Avoid positioning fans in areas that could increase the noise risk.
- Avoid working positions that increase the noise risk for operatives.
- Reducing exposure times and the use of Personal Protection Equipment will reduce the risks caused by exposure to noise emissions. See [Figure 1](#).
- With sound pressures higher than 100 dBA, operatives may approach the fan only if it is not operating, even if wearing Personal Protection Equipment.

2.2.2 Environmental risks

The fan is designed to operate in and to withstand ordinary conditions of working environments.

The presence of the following can affect the life span of components, causing premature deterioration, above all with respect to guards:

- Vibrations
- Corrosive agents (dust, gas, fumes, mist)
- High temperatures
- Condensation
- Solid bodies
- Abnormal turbulence
- Currents of air
- Voltage differences due to installation

Since it is impossible to establish all-inclusive criteria that can take into account all the possible combinations of these effects, it is advisable to implement a plan of periodical checks according to the effective deterioration noted, so that any variations in structural characteristics can be detected in subsequent checks.

2.2.3 Vibration risks



CAUTION! Risk of equipment damage

- Failure to check vibration levels may generate high risk factors and compromise the operative lifespan of the fan.
- Fan operation within a very broad range of operating speeds may lead to increased vibration in correspondence with a specific resonance frequency of the system of which the fan is only a single component.
- Avoid working at speeds coinciding with structural resonance frequencies, and if this is not possible, modify some variable that can change the resonance frequency of the system, for example by using vibration dampers of a different type.

Vibrations are the main factor affecting the operational life and safety of fans, and for this reason it is essential to accurately monitor their level during fan operation and work cycles.

If ignored, vibrations can:

- Cause the formation of cracks serious enough to cause structural failure, which may even be sudden.
- Cause difficult operating conditions for bearings, with malfunctions that may even include seizing (with dangerous overheating effects).
- Cause slackening of tightening and fixing components (nuts and bolts).
- Generate greater noise.



NOTE!

The monitoring of vibrations and temperatures makes it easier to take preventive actions against accidents.

2.2.4 Operating speed risks



CAUTION! Risk of equipment damage

- Do not exceed the maximum rotation speed indicated by Nederman.
- Do not use ON-OFF operating cycles unless expressly approved by Nederman.
- Do not subject the fan to thermal gradients greater than 3°C/minute.
- A condition of overspeed, even for a limited time, may cause irreversible damage and create situations of extreme risk hazards. The maximum speeds indicated by Nederman must never be exceeded.
- The manufacturer must always be contacted in the case of use of a supply frequency other than the original design frequency. Do not proceed until authorized.
- In the case of fan operation with a variable speed cycle of less than 30 minutes, this cycle must be submitted to approval by the Nederman Technical Office, which will give its approval and notify the consequent reduction of maintenance intervals and the fan life span.
- Inverting the fan rotation direction or starting it with the impeller turning in the opposite direction may cause breakage of the blades and/or the impeller hub, with the risk of ejection of metal parts.
- Resonance phenomena at low frequencies may cause damage to the structure.

Operating speeds greater than those envisaged by the fan design can create conditions of risk due to the reduction of the operative life span of moving parts.

In case of faults or malfunctions, overspeed conditions may be created due to:

- Errors in the control logic system
- Short circuits on monitoring components
- Driver or inverter malfunctions
- Mechanical breakage of components, and in particular on encoder

During normal operation, conditions of overspeed attributable to the drive system or motor may occur, in particular if the fan is supplied "with shaft only" or with motor "without drive system".

The use of a supply frequency different from the original design frequency affects all fan characteristics. The modification of conditions of use requires a complete revision of the technical information sheet of the fan.

In the case of use at varying fan speeds or with frequent starting and stopping during operation, rotating organs are subject to mechanical stresses that may affect their operative life span.

If the rotation direction of a fan must be inverted, or if it must be restarted, this must be done only when the impeller is in the rest position (total standstill).

Operation at a speed significantly lower than up to 40% of nominal speed (unless otherwise specified by Nederman) may affect the cooling of the motor and bearings, with possible malfunctions due to higher temperatures. For electrical components, the user and installer are advised to provide adequate protection for the drive system or motor, with the use of heat detection capsules if possible, and also using a servo-ventilated motor if necessary.

Resonance phenomena in the structure must be avoided. These may emerge at specific rotation speeds, and may cause damage to the structure.

2.2.5 Noise emission risks



WARNING! Risk of personal injury

A person may receive injuries as a result of:

- Being dragged between a moving part and a fixed part, for example a impeller and the casing or some other fixed part of the fan.
- Being dragged into the fan through the air intake, with consequent contact with the shaft or impeller.
- Contact with a moving part, such as the impeller.
- Ejection from the fan exit of fragments deriving from the introduction of residual solids or liquids extraneous to the process, or deriving from the suction environment.
- An object drawn into the fan mouth and ejected at high speed from the fan intake or exit.
- Structural defects of fan components.
- Contact with fan surfaces at dangerous temperatures, for example below -20°C or higher than +50°C.
- When working with hot fluids, there may be losses of jets of hot fluid from the transmission shaft hole that may cause burns or scalds.
- The potential harmfulness of the fluid being moved or the presence of substances that in case of leaks may be hazardous (toxic and/or inflammable).
- A hazard deriving from motor overspeed, which may cause the breakage of machine parts.
- The intake of air at abnormal temperatures higher than those recommended may cause structural deformations, malfunctions and hazards.

Since the noise emitted by a fan can be influenced by external factors that can affect the overall noise level, such as:

- The dimensions of the environment in which the fan is installed.
- The presence of static elements near the fan (e.g. walls).
- The presence of other machines that are also sources of noise emission.

Nederman invites the user to measure ambient noise levels. It should be noted that the presence of other operating machines generates a "superimposition of effects" and resonance that multiply ambient noise.

In addition, in cases of restricted environments, or if the fan is installed against walls, the effect of reverberation and resonance on structures (walls and ceiling) is "exponential".

The definition of the risks to workers of exposure to noise is not the responsibility of Nederman, which limits itself to indications of values, levels of uncertainty, standards or criteria used for noise emission measurements.

As envisaged by applicable legislation, it is the user that must assess the level of exposure of operatives to noise emissions using its own specific procedures, identifying:

- Sources of noise and their relative importance.
- Average exposure times for each operative.
- The level of direct and reflected noise.
- The noise transmitted by structures and not through the air.

If exposure to noise, in terms of sound pressure, exceeds 80 dBA, the employer must provide operatives with PPE for the hearing, such as earplugs or earmuffs. If exposure is equal to or higher than 85 dBA, the employer must take all possible action to ensure that PPE for the hearing is effectively used.

3 Description

3.1 Intended use

The NCF fan is a centrifugal fan designed for use in all types of industrial process and ventilation systems, mounted indoor as well as outdoor.

The NCF fan must be used in the flow range specified in the performance diagrams. Use of the fan with flows lower than the minimum value indicated in the diagrams may cause unstable fluid dynamic operation and vibrations.

3.2 Prohibited uses

Below is a list of specific uses that are prohibited:

- Operation of the NCF fan with non-gaseous fluids or with fluids with characteristics different from those defined to be used with the fan, since structural damage may be caused to the fan with the possible risk of injury to persons and/or damage to things;
- Operation of the NCF fan in all types of system with pressures (present or even partially generated by the fan) greater than 1.2 times standard atmospheric pressure, since structural damage may be caused to the fan with the possible risk of injury to persons and/or damage to things;
- Operation of the NCF fan in all types of systems classified in accordance with the ATEX directive and that move potentially explosive fluids, since risks of ignition/explosion may arise with possible injury to persons and/or damage to things;
- Operation of the NCF fan in industrial chemical plants where the fluid moved is highly corrosive for the materials used in fan construction, or in the presence of highly toxic fluids where the construction methods of casings and the types of seal used are not suitable for this specific application, since structural damage may be caused to the fan with the possible risk of injury to persons and/or damage to things;
- Operation of the NCF fan in mining industry plants and with underground installations, since additional risks not considered in the use of the fan above ground may arise, with possible injury to persons and/or damage to things.

3.3 Life cycle of the NCF fan

The reliability of all components is guaranteed if they are properly maintained and if Nederman original parts and accessories are used.

For safety reasons, guards in electrowelded wire must be replaced every 2 to 3 years.

If the NCF fan is used at constant speed for two work shifts every day equivalent to 16 hours, calculated for 250 days per year, the expected life cycle for the impeller is equivalent to 40,000 hours, ie., 10 years.

In the specific case of operation at variable speeds, the impeller life cycle must be assessed on a case-by-case basis, and must also be agreed with Nederman.

Even if it has never been used, an impeller that has been stored for more than ten years must be checked by Nederman for possible defects before it can be used.

3.4 Technical data

3.4.1 50 Hz fans (metric)

	NCF 30/15	NCF 30/25	NCF 40/25	NCF 50/25	NCF 80/20	NCF 120/15	NCF 120/25	NCF 160/25
Capacity [m ³ /h]	1100 - 4400	1700 - 6500	2000 - 6700	1800 - 5900	2300 - 9100	5700 - 14400	3500 - 12400	4600 - 17900
Total pressure [Pa]	1840 - 700	2440 - 920	3440 - 1410	4550 - 1690	3070 - 1150	2520 - 740	4500 - 2000	5030 - 1880
Motor power [kW]	2,2	4	5,5	5,5	7,5	7,5	15	18,5
Speed [rpm]	2880 rpm	2905 rpm	2925 rpm	2925 rpm	2930 rpm	2930 rpm	2940 rpm	2940 rpm
Voltage [V]	230Δ/400Y	230Δ/400Y	230Δ/400Y	230Δ/400Y	230Δ/400Y	230Δ/400Y	230Δ/400Y	230Δ/400Y
Current [A]	7,9/4,55	13,6/7,8	17,9/10,3	17,9/10,3	24,0/13,8			
Voltage [V]		400Δ/690Y	400Δ/690Y	400Δ/690Y	400Δ/690Y	400Δ/690Y		
Current [A]		7,8/4,5	10,3/6,0	10,3/6,0	13,8/8,0	13,8/8,0		
Phase:	3~	3~	3~	3~	3~	3~	3~	3~
Starting current	6 - 7 x rated current	6 - 7 x rated current	6 - 7 x rated current	6 - 7 x rated current	6 - 7 x rated current	6 - 7 x rated current	6 - 7 x rated current	6 - 7 x rated current
Degree of protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Weight [kg]	67	105	110	112	150	132	232	292
Working temperature [°C]	Max +60	Max +60	Max +60	Max +60	Max +60	Max +60	Max +60	Max +60
Ambient temperature [°C]	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40
Sound power level L _w (A) ± 3dB *	94dB(A)	97dB(A)	106dB(A)	100dB(A)	98dB(A)	104dB(A)	107dB(A)	103dB(A)
Sound pressure level L _p (A) ± 3dB *	80dB(A)	82dB(A)	83dB(A)	86dB(A)	83dB(A)	89dB(A)	92dB(A)	90dB(A)

* Reference standards: ISO 3744, ISO 3746, ISO 13347. Installation Type D: ducted inlet, ducted outlet.

3.4.2 60 Hz fans (metric)

	NCF 30/15	NCF 30/20	NCF 30/25	NCF 40/25	NCF 50/25	NCF 80/20	NCF 120/15	NCF 120/25	NCF 160/25
Capacity [m ³ /h]	535 - 4180	700 - 4315	830 - 6000	910 - 6550	800 - 5600	1600 - 8540	2600 - 13980	2340 - 11650	2650 - 17140
Total pressure Pa	1970 - 575	2890 - 950	2540 - 870	3640 - 1320	4540 - 1570	3170 - 1020	3590 - 1170	5260 - 1700	5060 - 1870
Motor power	2,2 kW	3,0 kW	4,0 kW	5,5 kW	5,5 kW	7,5 kW	11 kW	15 kW	18,5 kW
Speed [r/min]	3500	3515	3535	3510	3520	3550	3540	3550	3560
Voltage	208 V	208 V	208 V	208 V	208 V	208 V	208 V	208 V	208 V
Current	8,6 A	11,5 A	15,1 A	18,7 A	18,7 A	26,2 A	38,4 A	52 A	66,4 A
Voltage [V]	230YY/460Y	230YY/460Y	230ΔΔ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ	30ΔΔ/460Δ	230ΔΔ/460Δ
Current [A]	7,8/3,9	10,4/5,2	13,6/6,8	17/8,5	17/8,5	23,8/11,9	34,8/17,4	46,8/23,4	60/30
Voltage	575 V	575 V	575 V	575 V	575 V	575 V	575 V	575 V	575 V
Current	3,1 A	4,2 A	5,5 A	6,8 A	6,8 A	9,5 A	11,0 A	19,4 A	24 A
Phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase
Starting current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current
Protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Weight	67 kg	85 kg	105 kg	110 kg	112 kg	150 kg	161 kg	232 kg	292 kg
Working temperature (°C)	Max +60	Max +60	Max +60	Max +60	Max +60	Max +60	Max +60	Max +60	Max +60
Ambient temperature (°C)	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40
Sound power level L _w (A) ± 3dB *	94dB(A)	103dB(A)	97dB(A)	106dB(A)	100dB(A)	98dB(A)	104dB(A)	107dB(A)	103dB(A)
Sound pressure level L _p (A) ± 3dB *	80dB(A)	89dB(A)	82dB(A)	83dB(A)	86dB(A)	83dB(A)	89dB(A)	92dB(A)	90dB(A)

* Reference standards: ISO 3744, ISO 3746, ISO 13347. Installation Type D: ducted inlet, ducted outlet.

EN 3.4.3 60 Hz fans, 380 V (metric)

	NCF 30/25	NCF 40/25	NCF 50/25	NCF 80/20	NCF 120/25	NCF 160/25
Capacity [m ³ /h]	830 - 6000	910 - 6550	800 - 5600	1600 - 8540	2340 - 11650	2650 - 17140
Total pressure [Pa]	2540 - 870	3640 - 1320	4540 - 1570	3170 - 1020	5260 - 1700	5060 - 1870
Motor power [kW]	4,0	5,5	5,5	7,5	15	18,5
Speed [r/min]	3535	3510	3520	3550	3550	3560
Voltage [V]	380Δ	380Δ	380Δ	380Δ	380Δ	380Δ
Current [A]	8,2	10,8	10,8	14,5	27,9	34
Phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase
Starting current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current
Protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Weight [kg]	105	110	112	150	232	292
Working temperature [°C]	Max + 60	Max + 60	Max + 60	Max + 60	Max + 60	Max + 60
Ambient temperature [°C]	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40	-30 to +40
Sound power level L _w (A) ± 3dB *	95dB(A)	97dB(A)	96dB(A)	95dB(A)	101dB(A)	102dB(A)
Sound pressure level L _p (A) ± 3dB *	82dB(A)	83dB(A)	86dB(A)	83dB(A)	89dB(A)	90dB(A)

* Reference standards: ISO 3744, ISO 3746, ISO 13347. Installation Type D: ducted inlet, ducted outlet.

3.4.4 60 Hz fans (imperial)

	NCF 30/15	NCF 30/20	NCF 30/25	NCF 40/25	NCF 50/25	NCF 80/20	NCF 120/15	NCF 120/25	NCF 160/25
Capacity [cfm]	315 - 2466	410 - 2540	490 - 3535	535 - 3855	470 - 3300	940 - 5025	1530 - 8230	1375 - 6855	1560 - 10090
Total pressure [in w.g.]	7.9 - 2.3	11.6 - 3.8	10.2 - 3.5	14.6 - 5.3	18.2 - 6.3	12.7 - 4.1	14.4 - 4.7	21.1 - 6.8	20.3 - 7.5
Motor power	3.0 hp	4.0 hp	5.5 hp	7.5 hp	7.5 hp	10 hp	15 hp	20 hp	25 hp
Speed [r/min]	3500 r/min	3515 r/min	3535 r/min	3510 r/min	3520 r/min	3550 r/min	3540 r/min	3550 r/min	3560 r/min
Voltage	208 V	208 V	208 V	208 V	208 V	208 V	208 V	208 V	208 V
Current	8.6 A	11.5 A	15.1 A	18.7 A	18.7 A	26.2 A	38.4 A	52 A	66.4 A
Voltage [V]	230YY/460Y	230YY/460Y	230Δ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ	230ΔΔ/460Δ
Current [A]	7.8/3.9	10.4/5.2	13.6/6.8	17/8.5	17/8.5	23.8/11.9	34.8/17.4	46.8/23.4	60/30
Voltage	575 V	575 V	575 V	575 V	575 V	575 V	575 V	575 V	575 V
Current	3.1 A	4.2 A	5.5 A	6.8 A	6.8 A	9.5 A	11.0 A	19.4 A	24 A
Phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase
Starting current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current	6-7 x rated current
Protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Weight	148 lbs	187 lbs	231 lbs	243 lbs	247 lbs	331 lbs	355 lbs	511 lbs	644 lbs
Working temperature [°F]	Max +140	Max +140	Max +140	Max +140	Max +140	Max +140	Max +140	Max +140	Max +140
Ambient temperature [°F]	-22 to +104	-22 to +104	-22 to +104	-22 to +104	-22 to +104	-22 to +104	-22 to +104	-22 to +104	-22 to +104
Sound power level Lw(A) ± 3dB *	94dB(A)	103dB(A)	97dB(A)	106dB(A)	106dB(A)	98dB(A)	104dB(A)	107dB(A)	103dB(A)
Sound pressure level Lp(A) ± 3dB *	80dB(A)	89dB(A)	82dB(A)	83dB(A)	86dB(A)	83dB(A)	89dB(A)	92dB(A)	90dB(A)

* Reference standards: ISO 3744, ISO 3746, ISO 13347. Installation Type D: ducted inlet, ducted outlet.

4 Installation



WARNING! Risk of personal injury

- All installation and assembly operations must be carried out only by qualified personnel, equipped with the correct PPE for protection against blows and/or falling objects.
- Before installation, the user must provide a well-levelled fixing surface. Incorrect levelling may cause abnormal fan vibrations that over time could cause deformation and/or breakage, with the detachment of fan parts, representing a hazard for exposed persons that may even be fatal.
- All guards installed must remain correctly connected to the NCF fan with all relative fasteners (bolts, nuts, etc). The removal of one or more fixing points may impair the functionality and solid fixing of the guard.
- NCF fans supplied as standard versions are not intended for use in potentially explosive environments.
- The safety measures adopted for using the NCF fan must also be tailored to suit the specific applications for which the fan will be used. The safety measures taken differ depending on the type of fan installation. Therefore, the information in this manual is indispensable for the appropriate and hazard-free use of the NCF fan.



CAUTION! Risk of equipment damage

- The place of installation of the NCF fan must be kept clean. Any spills of oil or water not due to the fan must be cleaned away as quickly as possible.
- The minimum installation distances defined in this manual must always be respected to guarantee correct operation and the absence of additional risks. Incorrect positioning could impair the correct function of the NCF fan.



NOTE!

- Always use anti-vibration supports and joints to reduce to a minimum the transmission of vibrations during fan operation. See [Figure 5](#).
- During installation, the conservation of the minimum access spaces requested for maintenance operations must be verified.

4.1 Delivery check

If there are any damaged or missing parts when the product is delivered, notify the carrier and the local Nederman representative immediately.

4.2 General information

4.2.1 Fan orientation

See [Figure 6](#). NCF fans can be supplied with 9 different orientations except for the NCF 30/15 that can only be supplied with 6 different orientations.

The rotation direction of a fan is defined for an observer located on the transmission side.

4.2.2 Standard fan outlet position for NCF fans

The standard NCF fans are delivered as RDO, shown in [Figure 6](#).

- A Outlet directions for all NCF fans except NCF 30/15.
- B Outlet directions only for NCF 30/15.

Other positions can be delivered on request. Please contact your Nederman representative for assistance.

4.3 Installation types



WARNING! Risk of personal injury

- Even with guards installed (regardless of the conditions of supply or installation), the NCF fan may be dangerous due to the effects of indrawn or moved air.
- It is advisable to adopt precautions that prevent access to the room containing the NCF fan while it is operating, or to keep persons away with fixed guards that maintain a safe distance from the intake opening.
- Check the efficiency of all guards every month. In case of wear, damage or breakage, replace them immediately.
- The user is responsible for the selection of equipment, ropes, belts and chains best suited for both load and functionality.
- Unless otherwise specified by contract, the NCF fan and guards are suitable for installation as a single unit, and must not be subjected to effects of fluid dynamics caused by other machines installed in the same fluid movement system.
- On starting and in compliance with programmed maintenance intervals, check that nuts and bolts are correctly tightened.
- A safety procedure for access to the NCF fan must be compiled, taking into consideration the indications provided by the manufacturer, information deriving from the analysis of risks at the installation point and safety requirements in workplaces.
- The client and/or the installer of the electric system is responsible for choosing the equipment and cables used for connecting the NCF fan electrically, based on the dimensions of the motor installed and the characteristics of the main power supply.

There are four possible installation types, in compliance with UNI 10615 specifications:

- Type A: open intake and outlet.
- Type B: open intake and outlet connected to a pipe.
- Type C: intake connected to a pipe and open outlet.
- Type D: intake and outlet connected to a pipe.

Clearly Nederman cannot be aware of which of these four installation types will be used by the user. Therefore, the installer or end client themselves must analyze the risks involved for the chosen installation type used in the specific application.

Depending on the applications that the client intends to use the NCF fan for and on the type of installation chosen, the following safety shields must be fitted:

- Type A installation: fixed shields at the intake and outlet.

- Type B installation: shield fitted only at the intake.
- Type C installation: shield fitted only at the outlet.
- Type D installation: no shield at either the intake or outlet.
- The shielding must be constructed to impede access to the parts of the NCF fan that could cause injury. It must be robustly built enough to stand the vibrations and stress caused by the machine and by environmental conditions. It must be securely fixed in position by devices that will not become loosened by vibrations and that cannot be removed without the use of tools.
- It is, in any case, the person installing the NCF fan is responsible for ensuring that adequate measures have been taken to prevent accidental contact with the fan's moving parts.
- The installer and the user must also take into account other types of risks present, in particular those caused by foreign matter entering the NCF fan and the aspiration of explosive, inflammable or toxic gases at high temperatures.
- The user must also bear in mind the risks inherent in maintenance work, which must always be carried out in conditions of the utmost safety, with the NCF fan separated from the motor or isolated using suitable equipment.
- Once the installer and/or user has decided which installation type is to be used and all the above procedures have been applied, the NCF fan can now be considered a "complete machine" as described by machine use regulations. An overall risk evaluation must be made. With regard to guards to be fitted to ducts, in compliance with the design project, they must prevent access to parts of the NCF fan and its accessories that could cause injuries. They must also be sufficiently robustly constructed to resist the stresses generated by the NCF fan and environmental conditions.
- Nederman invites users and/or system designers to design, construct and install guards in conformity with the criteria of the UNI EN ISO 12499 standard.
- The installer and the user must also take other types of risk into consideration, and in particular those deriving from the entry of foreign bodies and the intake of explosive, inflammable or toxic gases or gases at a high temperature.

4.4 Transport

4.4.1 Transport and lifting



WARNING! Risk of personal injury

The user is responsible for the selection of equipment, ropes, belts and chains best suited for both load and functionality.

**CAUTION! Risk of equipment damage**

- The user assumes liability for the choice of the lifting equipment and ropes, straps or chains considered to be most suitable both for the purpose and for their lifting capacity. For lifting and movement, do not use zones or points other than those marked by a symbol.
- All transport operations must be carried out only by qualified personnel, equipped with the correct PPE for protection against blows and/or falling object.
- The movement of separate or disassembled parts of the machine must be carried out with suitable means of transport.
- The lifting lugs on motors must never be used to lift the fan.

Lifting and movement operations with the NCF fan may create hazardous situations for exposed persons. It is therefore advisable to follow the instructions provided by Nederman and to use suitable equipment.

It is advisable to carry out all lifting and movement operations on the fan and its components with extreme care, avoiding impacts that may affect its correct operation or damage covered parts.

Use only the points indicated to lift the fan, distributing the load in a uniform manner.

NCF fans are complete with motor. To lift them, only the specific holes provided in the structure should be used (as shown in [Figure 7](#)). These holes are located on opposite sides above the centre of gravity, and are indicated by specific symbols.

4.4.2 Storage in a warehouse**CAUTION! Risk of equipment damage.**

Close intake and exit openings during storage.

Should it be necessary to store the NCF fan in a warehouse, it must be protected from atmospheric conditions, humidity, dust and any harmful substances present in the air.

It is recommend to periodically check that the NCF fan is in a good condition and turn the impeller manually approximately once a month to prevent the deformation of its bearings.

4.5 Mounting**NOTE!**

- The support surface must be sufficiently rigid to withstand normal NCF fan vibrations, and must not be subject to phenomena of structural resonance.
- If the NCF fan is mounted on a structure raised above floor level, the vibration characteristics of this structure must be verified.

- Special foundations are not necessary for positioning the NCF fan. A well-levelled concrete support surface is sufficient, suitable to withstand the weight load of the NCF fan and the dynamic stresses generated by its normal operation.
- During installation, the user and/or installer must take the necessary measures to reduce vibrations from the overall system (fan and ducts).
- The support surface must be flat and horizontal, to prevent the bending and misalignment of supports. If necessary, suitable metal spacers must be placed between the NCF fan base and the support surface to ensure perfect adherence. Use the fixing points provided, ensuring that the tightening of nuts and bolts does not deform fan structures.
- Ducting connected to the NCF fan must be supported separately, and must be coaxial with respect to the intake and exit openings, so as to prevent deformation caused by the tightening of nuts and bolts.

4.5.1 Outdoor installation**CAUTION! Risk of equipment damage.**

- An IP55 motor will not be water tight in outdoor operating conditions. The application where the motor is used, mounting position and actual exposure to external factors must be taken into account.
- Make sure there are draining holes in the NCF fan casings for fans used in outdoor installations.
- Leave a bend on the cable before the motor so that water can run down and off of the cable. See [Figure 11](#).

If the NCF fan is to be used outdoors or under other circumstances where moisture and condensation can be present the motor must be protected by a suitable cover.

Make sure to have a draining hole in the lowest level of the NCF fan casing. Drill a hole (approximately $\varnothing 5$ mm). Then treat the hole with an anticorrosive agent.

4.5.2 Minimum distances between components**WARNING! Risk of personal injury**

The access of personnel, even if qualified, to the intake area of fans capable of developing, with zero flow, a negative pressure greater than 5000 Pa, must be prohibited.

If the available space permits, in installations where the intake is connected to a pipe, we recommend fitting a straight length of pipe with a length approximately 2.5 times the diameter of the impeller, to guarantee correct air flow into the intake. See [Figure 8](#).

With installations with an open air intake, we recommend leaving a distance equal to approximately 1.5

times the diameter of the impeller between the fan intake and the nearest wall or machine. See [Figure 10](#).

4.5.3 Electrical connections

- The NCF fan's power supply line must have a sufficiently high power rating.
- Connection to the main power grid must only be carried out by qualified personnel. Also, the client is responsible for the entire electrical system up to motor terminal board.
- Remember the importance of installing a safe connection to earth for the NCF fan. The earth connection system must comply with legislation in effect in the country of installation and must be periodically checked by qualified personnel. Make the connection to earth before any other connection. Check that the connection layout is suited to the mains power voltage.
- Usually, standard electric motors can run in both directions indifferently. To invert the direction of rotation, simply swap over any two power cables directly on the terminal board.
- The client must also install an electrical disconnecting device near the NCF fan so that maintenance personnel can have direct control over the power supply to the NCF fan.
- All work performed on the electrical system must only be carried out with the NCF fan at rest and electrically disconnected from the mains.
- Before installing/starting up, ensure that the information on the identification plate on the motor is compatible with the main power supply.

4.5.4 Motor connections

Check the data on the motor identification plate for which connection to be used.

[Figure 2](#):

- A YY connection 230 V
- B Y connection 460 V
- C $\Delta\Delta$ connection 230 V
- D Δ connection 460 V

[Figure 3](#): Delta connection

[Figure 4](#): Star connection

4.6 Connection to ducts

See [Figure 9](#):

- A Theoretical
- B Parallel misalignment
- C Axial compression
- D Angular misalignment

NOTE!

- Installations with an open air intake are not recommended.
- The NCF fan must be connected to ducting with all parts correctly aligned, without obstructions to air flow from gaskets or flexible components.
- The weight of ducting must not be supported by the NCF fan, and deformations of parts of the machine by ducting connections must be avoided.
- Any flexible joints between the NCF fan and intake and/or exit ducts must be installed in a way that prevents stress on flexible components, and that avoids contacts between metallic parts of the joints.

4.7 Checks to be made before and after starting

4.7.1 Preliminary checks



WARNING! Risk of personal injury

Preliminary checks must only be performed with the NCF fan at rest and disconnected from the power supply.

Close off the air intake partially to reduce the power peak at start-up and the motor starting time.

When starting the NCF fan for the first time, the following preliminary checks are necessary:

- Check that all bolts are correctly tightened (impeller, supports, foundation bolts, and transmission components).
- Check that the impeller can turn freely.
- Check that there are not foreign objects inside the NCF fan.
- Check that the NCF fan turns in the correct direction: power the motor for a brief moment to see if it turns in correct direction indicated by the arrow on the fan housing; if necessary, invert the direction of rotation, see [Section 4.5.3 Electrical connections](#).

4.7.2 Checks to be carried out with the fan running

- Check that the power absorption does not exceed the value indicated on the motor identification plate, if it does; stop the NCF fan immediately and contact the manufacturer.
- The NCF fan must run without excessive vibration and noise.
- Check, with the NCF fan at rest and at an outside air temperature of 20°C, that the bearings do not exceed the maximum operating temperature (maximum bearing temperature 70°C).
- During the first few hours of operation, it is normal for the bearings to reach slightly higher temperat-

ures, as long as they later stabilise at a lower value. In the event of overheating of the bearings, contact the Nederman technical assistance department.

- After 3 - 4 operating hours, with the NCF fan at rest and disconnected from the power supply, check again that all bolts are correctly tightened and the bearing temperature.

4.7.3 Visual checks on guards



CAUTION! Risk of equipment damage

- All guards must be inspected every month and replaced if necessary.
- In case of doubts, carry out checks more frequently or replace the guard.

For mesh guards, checks must be made for the following:

- Corrosion or dullness of galvanized surfaces
- Detachment of rivets/welds

- Evidence of noises typical of loose guards
- Impacts and permanent deformation of components
- Breakage of wires
- Corrosion of fasteners
- Slackening of fixing elements

For guards in pressed and painted sheet metal, checks must be made for the following:

- Corrosion or dullness of painted surfaces
- Detachment of rivets/welds
- Evidence of noises typical of loose guards
- Impacts and permanent deformation of components
- Mechanical deformation or breakage of guards
- Presence of cracks
- Corrosion of fasteners
- Slackening of fixing elements

5 Use



WARNING! Risk of personal injury

- When moving, lifting and installing the NCF fan, always follow the instructions provided in this manual.
- Never use the NCF fan in conditions other than those indicated by the data on the identification plate.
- Never deactivate, remove, modify or in any other way render inoperative safety devices, guards or control devices, either of individual components or of the NCF fan itself.
- Never place hands, arms or any other part of the body near any moving part even by forcing the opening of apertures.
- Never extend parts of the body beyond protection structures. It is forbidden to use aids that may increase normal accessibility.
- Never use the NCF fan in atmospheres or environments with the risk of explosions, with the exception of fans that are in conformity with the ATEX /EC Directive.
- Unauthorized operators must not attempt to rectify any malfunction of the NCF fan and/or modify the functional characteristics or and installation type.
- Ensure that fluids are not introduced into fans.
- After any unprogrammed maintenance operation that required the removal of shields, barriers or any other protective device, ensure that all these components have been refitted and are fully functional before restarting the NCF fan.
- All guards and safety devices must be maintained in conditions of perfect and constant efficiency. Warning signs, safety symbols and danger warnings must be also maintained in perfect efficiency and in their correct position.
- When troubleshooting any faults or malfunctions with NCF fans, take all the precautions described in this manual, intended to prevent all and any kind of injury to persons or damage to things.
- Remember to tighten all bolts, nuts and fixing rings on all mechanical components that are adjusted or serviced, following the indications given in this manual.
- Before starting the NCF fan, check that all guards and safety devices are installed and in perfect operating condition. If they are not, it is absolutely prohibited to start the NCF fan. The person responsible for plant safety or the department head must be informed immediately.
- Operators must be provided with Personal Protection Equipment (PPE) in conformity with legal requirements, such as for example safety footwear, a protective helmet (if suspended loads are to be moved), work gloves, insulated footwear and gloves (in case of work on electrical components) and all other items of PPE required by specific safety regulations. Bulky garments and various accessories (ties, wide sleeves, etc) are prohibited.
- The fluid moved by the NCF fan must be adequately checked for the possible presence of toxic and/or inflammable substances, even if their presence is not expected in the use of the fan.

6 Maintenance

Read this section carefully before carrying out maintenance operations on the NCF fan. This will ensure greater conditions of safety for maintenance personnel and greater reliability of the work done.



WARNING! Risk of personal injury

- All installation and assembly operations may only be carried out by qualified personnel, equipped with the correct PPE for protection against blows and/or falling objects.
- Do not start any maintenance work on the NCF fan (including lubrication) without first disconnecting the fan from the main power supply.
- Be careful of the impeller during maintenance and cleaning of the impeller. This can lead to parts of the body becoming trapped and seriously injured between the impeller and fixed parts of the NCF fan housing.
- Avoid rotating parts. Even when the NCF fan is disconnected from the power supply, the rotating parts can still turn due to any air movement through the fan. This air flow may be natural or may be caused by the current induced by another fan installed elsewhere in the connected tubing system. This can also lead to parts of the body becoming trapped and seriously injured between the impeller itself and fixed parts of the NCF fan housing.
- Do not carry out any type of maintenance operation without having first checked the NCF fan impeller is effectively at a standstill. The impeller takes several minutes to stop after the drive system has been switched off.
- Do not proceed with any type of maintenance operation on the NCF fan (including lubrication) without having first disconnected it from the mains powers supply.
- Do not clean the NCF fan while it is operating.
- Do not open NCF fan guards or inspection hatches while the fan is operating.



CAUTION! Risk of equipment damage

- Periodic cleaning and maintenance are essential to ensure the correct NCF fan operation and a longer operative life span of the fan.
- A fan maintenance program must be drawn up and followed to prevent mechanical failure or breakage due to wear or insufficient maintenance.
- The NCF fan must be disconnected and isolated from the electrical power supply during maintenance operations. Always check that the impeller and motor are at a standstill before accessing the NCF fan and its components or opening the inspection hatch. In the case of fans that move hot fluids, wait for the fan to cool down before carrying out maintenance operations, so as to prevent contact with surfaces at high temperatures.
- Any necessary movement of parts to be removed or disassembled from the machine must be made with suitable transport and lifting equipment.
- Complete systematic maintenance of the NCF fan is necessary for its normal correct operation, and is also a factor of safety for operatives.



NOTE!

- An integrated maintenance program is necessary for the normal and correct operation of the NCF fan, and also ensures greater safety for the operator.
- Regular cleaning and maintenance are vital for ensuring correct operation and greater durability of the NCF fan.

Read [Chapter 2 Safety](#) before carrying out maintenance.

The safety rules to be respected during maintenance operations on the fan are as follows:

- Maintenance operations must be carried out only by qualified and expert personnel, authorized by the technical management of the factory, in conformity with applicable safety directives and standards, using tools, equipment and products suitable for the purpose.
- During maintenance operations, suitable clothing must be worn, such as closely-fitting overalls and safety footwear, absolutely avoiding bulky garments or loose parts.
- During maintenance operations on the NCF fan, it is advisable to fence it off and to identify it with signs with the wording: "FAN UNDERGOING MAINTENANCE".

6.1 Visual inspections of blades and casing

- Periodical visual checks must be made for wear on impeller blades, given that deterioration of these parts can create a condition of extreme risk, due to the ejection of the blade or the failure of structural components, with consequences that may even be fatal.
- To monitor phenomena of abrasion on impeller blades and the casing, use a portable lamp to visually inspect components, slowly rotating the impeller to allow all blades to be seen. Blades must be totally free from damage and must show no signs or abrasion or missing sections.

With regard to the phenomenon of corrosion on impeller blades and the casing, corrosive and acidic environments can reduce the thickness of NCF fan safety components. This phenomenon must not be underestimated, also because it does not depend solely on the concentration of aggressive agents. Condensation may form during pauses in NCF fan operation, and this may accelerate the phenomenon of chemical corrosion, which in turn may alter the thickness of components, affecting their integrity.

Components to check	Type of check/instrument	Criteria for acceptability	Result
Impeller: blade thickness	Dimension/Caliper	Reduction of thickness no greater than 10% in an area without wear or with paint undamaged	
Impeller: thickness of impeller disk	Dimension/Caliper	Reduction of thickness no greater than 10% in an area without wear or with paint undamaged	
Casing: thickness of sides and sheeting	Dimension/Caliper or equivalent	Reduction of thickness no greater than 10% in an area without wear	
Intake: thickness	Dimension/Caliper	Reduction of thickness no greater than 20% in an area without wear or with paint undamaged	
Anti-vibration joints: thickness of anti-wear sheeting (if present)	Dimension/Caliper	Reduction of thickness no greater than 20% in an area without wear or with paint undamaged	
Welding (entire structure)	Visual	Absence of damage and cracks	
Date:			
Signature:			

6.2 Checking and cleaning parts in contact with the fluid

- The fan impeller should be cleaned regularly to prevent vibration caused by dust accumulating on the blades during operation.
- If the NCF fan is used to pump even slightly dusty air, air containing abrasive powders or for the pneumatic transport material, the cleanliness and wear of the impeller must be checked regularly. Dirt deposits on the impeller or wear of parts of the impeller can cause undesirable vibrations during fan operation.
- If any part of the impeller is excessively worn, it is imperative that the impeller be replaced. For this and before carrying out any modification to one of our fans, please contact Nedermanl and quote the part number found on the fan identification plate.

6.3 Disassembly



WARNING! Risk of personal injury

All the disassembly and reassembly operations described below must only be carried out by qualified and authorised personnel. For no reason whatsoever must the operator or factory personnel carry out these operations.



CAUTION! Risk of equipment damage

All the disassembly and reassembly work must be carried out under the following conditions:

- You must be absolutely certain that the NCF fan is completely stationary (impeller at rest); disconnect the electrical power at the main panel with the switch, lock the switch with a padlock and hand the key to the head of maintenance.
- The working environment must be equipped with every tool necessary and must be free of any hazards.
- Every piece to be refitted must be thoroughly cleaned, degreased and lubricated as necessary before refitting.

6.3.1 Intake nozzles

- Undo the nozzle securing nuts from the NCF fan housing. Slide out the nozzle.

6.3.2 Housing

With all orientable fans, the housing is secured to the frame by bolts. Simply undo the securing nuts at the frame plate. With non-orientable fans with single-piece housings, the housing cannot be disassembled. The housing in certain fan types may be divided into two or more pieces, secured together by bolts.

6.3.3 Impeller

- Remove the nozzle and, where possible, the NCF fan housing. With single intake fans: remove the screw with the lock ring and use a suitably sized extractor. We recommend setting up support for the impeller before extracting it completely. In any event, this operation must always be carried out with great care, avoiding any knocks that could alter the balance of the impeller or deform it.

6.4 Flexible anti-vibration joints between the NCF fan and ducting

Flexible joints are located between the NCF fan and exit and/or intake ducting must be checked visually to ensure that they are undamaged and that no flexible components have become detached. If these joints must be dismantled for maintenance of the system and/or the fan, they must be reassembled taking the precautions indicated for the first assembly/installation.

6.5 Technical enclosures

6.5.1 Tightening torques for nuts and bolts

The tightening torques M, for bolts with ISO metric thread, given in the table are applicable in the following conditions:

- Hexagonal head UNI 5737 type screws, cylindrical head UNI 5931 and UNI 6107 type screws, in normal conditions in which they are supplied.
- Tightening torques must be applied slowly using a torque wrench.

While maintaining the same pre-load values, tightening torques must be modified as described below in the following cases:

- Increased by 5% for wide-head UNI 5712 screws.
- Reduced by 10% for zinc-plated oiled screws.
- Reduced by 20% for phosphor-coated oiled screws.
- Reduced by 10% if the screw is tightened with an impulse tightener.

d x pitch [mm]	S r [mm ²]	8.8 M [Nm]	10.9 M [Nm]	12.9 M [Nm]
6 x 1	20,1	1. 10,4	2. 15,3	3. 17,9
7 x 1	28,9	17,2	25	30
8 x 1,25	36,6	25	37	44
10 x 1,5	58	50	73	86
12 x 1,75	84,3	84,3	127	148
14 x 2	115	115	115	115
16 x 2	157	214	314	368
18 x 2,5	192	306	435	509
20 x 2,5	245	432	615	719
22 x 2,5	303	592	843	987
24 x 3	353	744	1060	1240
27 x 3	459	1100	1570	1840
30 x 3,5	561	1500	2130	2500

7 Troubleshooting

The following chart lists the main problems that may be encountered:

Problem	Cause	Solution
NCF fan does not start	No electrical connection	Check that the motor and/or command inverter is connected to the electrical power supply line and is correctly powered
	Motor malfunction	Check internal connections and motor components and replace them if necessary
	No connection between command inverter and motor	Check for correct connection between inverter and motor
	Command inverter malfunction	Check internal inverter circuits and components and replace them if necessary
Power absorption is much lower than the design value	Rotation speed too low	Increase rotation speed
	Openings or ducting partially blocked	Eliminate obstruction Check the position of regulation organs
	Impeller partially blocked	Eliminate obstruction
	Resistance pressure of system higher than the design value	Check the resistance pressure value of the system
	Fluid density lower than the intended value	Check the fluid density value
Too high power absorption	Rotation speed too high	Reduce rotation speed
	Resistance pressure of system lower than the design value	Check the resistance pressure value of the system
	Incorrect impeller rotation direction	Check impeller rotation direction and orientation
	Pre-rotation of air in opposite direction to fan rotation	Check minimum installation distances (paragraph 5.1.1) or correct orientation of intake with pre-distributors
	Fluid density higher than the intended value	Check the fluid density value
	Power supply to the motor with voltage lower than shown on the identification plate	Check for the correct voltage of the power supply to the motor
	Defects in motor windings	Check for correct motor operation

Problem	Cause	Solution
Insufficient pressure	Rotation speed too low	Increase rotation speed
	Fluid density lower than the intended value	Check the fluid density value
	Air flow greater than the intended value	Check the resistance pressure value of the system
Pulsating operation	Instability of air flow	Check the operating field envisaged by the operating curve
	Fluctuations in flow due to other fans operating in parallel	Check for correct installation on the system
	Intake air turbulence created by system near intake opening	Check minimum installation distances.

8 Spare Parts

**CAUTION! Risk of equipment damage**

Use only Nederman original spare parts and accessories.

Contact your nearest authorized distributor or Nederman for advice on technical service or if you require help with spare parts. See also www.nederman.com.

8.1 Ordering spare parts

When ordering spare parts always state the following:

- The part number and control number (see the product identification plate).
- Detail number and name of the spare part (see www.nederman.com/en/service/spare-part-search).
- Quantity of the parts required.

9 Recycling

The product has been designed for component materials to be recycled. Different material types must be handled according to relevant local regulations. Contact the distributor or Nederman if uncertainties arise when scrapping the product at the end of its service life.

Nederman

www.nederman.com