High Efficiency Air Bearing Turbo Blower

Clean
Compact
Energy-efficient
Affordable Technology
Technology

- High Efficiency Centrifugal / Axial Flow Compressor Design
- Radial / Axial Flow Turbine Design
- Oil-free Bump Foil Air Bearings
- High Efficiency Permanent Magnet Synchronous Motor Design and Manufacturing
- High Speed Flexible Coupling
- High-precision Flux Measurement / Venturi / Orifice / Nozzle / Belmouth
- Low Emission Diesel / Natural Gas Combustor
- Air Cycle Turbo Refrigeration
- Precision Electronic Control (Flux Control / Velocity Control)
- Gas Ejector (Jet Pump)
- Design and Integration of Complete Aeration Control System
APG-Neuros’ Product Benefits

- Energy savings up to 40% compared to conventional technologies.
- Maintenance costs savings with minimum maintenance.
- Up to 50% smaller foot print and significant installation cost savings with compact blower package design.
- Product is recognized by energy efficiency and accreditation agencies for energy credit and rebates.
- Low noise and vibration for better working environment.
- Lower emissions, power savings, no oil to change, no disposable items, uses washable and re-usable air filters.

Typical Applications

- Aeration for municipal and industrial wastewater treatment
- Industrial Applications such as: pneumatic conveying of powders and materials in cement, wood chips, coal, limestone and plastic industries
- Pneumatic conveying and blending for petrochemical industry
- Oxidation in power plant desulfurization process
- Cooling air for power plant generators
- Combustion Air, in power generation plants
- Air knife application in steel industry
- Atomization
Introduction
The APG-Neuros Turbo Blower is a “Plug and Play” product that offers high-efficiency in a compact size unit made possible by combining the latest design technologies of Aeronautic Compressor, Bump Foil Air Bearing and High Speed Permanent Magnet Synchronous Motors (PMSM) with built in Variable Speed Drive and Programmable Logic Controller. APG-Neuros Turbo Blowers can attain flow rates of up to 8500 SCFM and a discharge pressure up to 15 PSIG with motor horsepower range from 30 to 300 HP. APG-Neuros also offers the “Dual Core” models from NX400 (400 HP) to NX700 (700 HP) that combine two cores within the same enclosure unit, achieving greater flow range between 3000 and 20,000 SCFM, while maintaining a small footprint compare to conventional technologies with similar flow rates.

Energy Efficiency & Operating Cost Savings
- The APG-Neuros Turbo Blower is the most efficient in its class through the use of advanced technologies in aerodynamics, high speed permanent magnet motors and Bump-Foil air bearings along with intelligent use of drive & control technologies.
- Operating cost savings of up to 40% are possible when compared to conventional blower, drive and control technologies.

Low Noise and Vibration
- APG-Neuros’ clever enclosure design, effectively controls sound propagation and reduces noise levels 80 dB(A) – 85 dB(A).
- Non-contact air bearing having low vibration eliminates need for heavy foundations.

Small Footprint: Reliable Product & Easy to Install
- Extensive field experience has proved the product’s reliability and durability in hot environments through monitoring of vibration, air bearing endurance and impeller spin tests.
- Blower packages are significantly more compact than conventional technologies and simpler to install. 25 to 50% savings in footprint compared to conventional blowers.
- Outdoor installation package is available.

Low Maintenance
- Regular maintenance involves cleaning or replacing of inlet air filter only, as required.
- Monitoring operating parameters from user-friendly touchscreen control panel.
High Efficiency Impeller Design and Manufacturing
- Ten years of experience designing impellers in aerospace industry.
- Designed with in-house software and 3-D Computational Fluid Dynamics.
- 5-axis machining of solid forging provides higher integrity, tighter manufacturing tolerances, larger diameters and lower speeds all resulting in higher efficiency.
- Production technology permits design of impeller with both axial and radial compression.

Oil-free, Non-contact Air Bearing
- No lubricating oil or associated maintenance.
- No contact - Less noise and vibration from rotor during operation.
- 25,000 cycle start-stop endurance test, equivalent to more than twenty years life time in typical operation.

Permanent Magnet Synchronous Motor (PMSM)
- High Efficiency and power factor.
- Maintains efficiency and power factor in partial load conditions.
- Driven by sinusoidal PWM algorithm which lowers motor heat rejection and minimizes cooling requirements.
- High precision motor speed control.

Cooling
- Blower core and motor cooled with blower inlet air.
- VFD and control systems cooled by inlet air.
- No heat rejection to blower room.
- Self-enclosed Glycol cooling system in NX200-NX700 standard models for higher performance and durability.
- No external water supply required.
- No auxiliary exhaust systems. (No additional power consumption).

Alternate Arrangement Option
- The specially tuned controls and Variable Frequency Drive integrated in our package can be built into a separate cabinet and located up to 600 feet away from mechanical section for high ambient temperature or toxic gas environments.

Control, Monitoring, Diagnostics
- Integrated Programmable Logic Controller (PLC) makes it possible to run the blower at constant pressure, flow or DO control mode.
- PLC options: Allen Bradley, CIMON, Siemens, GE and Modicon available to suit customer’s control system.
- Communication protocols include Ethernet, Profibus, Modbus and hard wiring.
- User friendly control, monitoring and diagnostics on touch screen panel to view all process parameters and blower conditions.
Model Selection

NX30, NX50, NX75
Condition: 68°F, 14.7 PSI, 65% RH

NX100, NX150
Condition: 68°F, 14.7 PSI, 65% RH

NX200, NX300
Condition: 68°F, 14.7 PSI, 65% RH
Model Selection

NX400, NX500

Condition: 68 DegF, 14.7 PSIA, 65% RH

Discharge Total Pressure (PSIG)

NX500-C100
NX500-C080
NX500-C070
NX500-C060
NX500-C050

Suction Flowrate (CFM) Air Flow Tolerance: ±5%

NX600, NX700

Condition: 68 DegF, 14.7 PSIA, 65% RH

Discharge Total Pressure (PSIG)

NX700-C100
NX700-C080
NX700-C070
NX700-C060
NX700-C050

Suction Flowrate (CFM) Air Flow Tolerance: ±5%
Performance Characteristics of the NX Series

Standard Air Flow Rate of NX Series Single Core Turbo Blower

<table>
<thead>
<tr>
<th>NX30</th>
<th>NX75</th>
<th>NX150</th>
<th>NX300</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>14</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>

Air Flow Rate (SCFM) vs. Discharge Pressure (PSIG)

Air Flow @ 68 Deg F, 14.7 PSIA, 65% RH

Air Flow Tolerance: ±5%

Standard Air Flow Rate of NX Series Dual Core Turbo Blower

<table>
<thead>
<tr>
<th>NX400</th>
<th>NX600</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>14</td>
</tr>
</tbody>
</table>

Air Flow Rate (SCFM) vs. Discharge Pressure (PSIG)

Air Flow @ 68 Deg F, 14.7 PSIA, 65% RH

Air Flow Tolerance: ±5%
## Technical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design pressure range</td>
<td>4-15 psig (0.276 -1.03 bar)</td>
</tr>
<tr>
<td>Design suction flow rate</td>
<td>670-7293 SCFM at 8.5 psi (0.59 bar)</td>
</tr>
<tr>
<td>Reference design condition</td>
<td>68F, 14.7 psia, 65% RH</td>
</tr>
<tr>
<td>Flow Turndown ratio</td>
<td>100-45 % for single core; 25 to 100% for dual cores</td>
</tr>
<tr>
<td>Operating speed range</td>
<td>17,000 ~ 47,000 rpm</td>
</tr>
<tr>
<td>Motor kW (HP) rating</td>
<td>22/37/55/75/112/150/223 kW (30-300 HP)</td>
</tr>
<tr>
<td>Casing design pressure</td>
<td>284 psig (19.6 bar) – Scroll</td>
</tr>
<tr>
<td>Casing design temperature</td>
<td>300°C (572 F) – Scroll</td>
</tr>
<tr>
<td>Vibration</td>
<td>&lt;0.039 in/Sec</td>
</tr>
<tr>
<td>Inlet configuration</td>
<td>Louver or Flange</td>
</tr>
<tr>
<td>Impeller</td>
<td>Single Stage / Centrifugal</td>
</tr>
<tr>
<td>Air Seals</td>
<td>Labyrinth</td>
</tr>
<tr>
<td>Discharge configuration</td>
<td>Vertical/Horizontal ANSI 150 lb Flange</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required</td>
</tr>
<tr>
<td>Bearings</td>
<td>Bump Foil Air Bearing</td>
</tr>
<tr>
<td>Motor</td>
<td>Permanent Magnet Synchronous Motor type</td>
</tr>
<tr>
<td>Motor starter</td>
<td>Inverter type – Variable frequency drive</td>
</tr>
<tr>
<td>Input power</td>
<td>380-480V, 3 Ø, 50/60 Hz</td>
</tr>
<tr>
<td>Noise level</td>
<td>80 to 85 dB(A)</td>
</tr>
<tr>
<td>Control panel</td>
<td>PLC &amp; Touch Screen (Allen Bradley, CIMON, Siemens, Modicon)</td>
</tr>
<tr>
<td>Control algorithm</td>
<td>Auto Speed/Flow/Pressure Mode/DO</td>
</tr>
<tr>
<td>Network communication</td>
<td>Ethernet IP/ Modbus/ Profibus/ Hard Wiring</td>
</tr>
<tr>
<td>Enclosure cooling</td>
<td>Filtered Air cooled</td>
</tr>
<tr>
<td>Motor/ VFD cooling</td>
<td>Air (50-150 HP)/ Glycol fully enclosed (200-300 HP)</td>
</tr>
</tbody>
</table>

## Construction Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blower casing</td>
<td>Al Alloy</td>
</tr>
<tr>
<td>Impeller</td>
<td>Forged aluminum alloy (Al 7075)</td>
</tr>
<tr>
<td>Diffuser vanes</td>
<td>Vaneless Type</td>
</tr>
<tr>
<td>Shaft</td>
<td>Ti Alloy (Ti-6Al-04V)</td>
</tr>
<tr>
<td>Air bearing</td>
<td>Ni-base Super Alloy (X-750)</td>
</tr>
<tr>
<td>Motor Case</td>
<td>ASTM 356.0 (Al Alloy)</td>
</tr>
<tr>
<td>Electrical enclosure</td>
<td>Powder coated steel</td>
</tr>
<tr>
<td>Blower enclosure</td>
<td>Powder coated steel with sound dampening material</td>
</tr>
<tr>
<td>Blower enclosure skid</td>
<td>Structural steel construction with fork lift access ports</td>
</tr>
<tr>
<td>Enclosure finish</td>
<td>Powder coating</td>
</tr>
</tbody>
</table>
Standard Blower Package

<table>
<thead>
<tr>
<th></th>
<th>NX50-NX100</th>
<th>NX150</th>
<th>NX200</th>
<th>NX300</th>
<th>NX400</th>
<th>NX500-700</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>61</td>
<td>69</td>
<td>83</td>
<td>83</td>
<td>83</td>
<td>119</td>
</tr>
<tr>
<td>B</td>
<td>30</td>
<td>30</td>
<td>39</td>
<td>55</td>
<td>55</td>
<td>74</td>
</tr>
<tr>
<td>C</td>
<td>53</td>
<td>53</td>
<td>65</td>
<td>80</td>
<td>80</td>
<td>85</td>
</tr>
</tbody>
</table>

Unit: inch
"We have had very successful operational results and very impressive feedbacks from clients regarding the Neurors High Speed Turbo Blowers. They were very happy with the operation of the blowers – I would certainly recommend this type of blowers."
Khalil Kairouz, Ph.D., Carollo Engineers, Mooroo Valley, CA

NX306-C070 (2) Installation

"Everyone is very happy with the performance of your unit. The smoothness and quietness of the unit astounds everyone that sees it. We have informed our leadership of the unit so the word can be spread to other locations for potential future projects."

Michael Born, Neenah Nonwovens Facility, Kimberly-Clark Corp.
Dual Core NX500-C100 Installation

"I want to tell you that I was very impressed with the facility in Plattsburgh, and that you have assembled an excellent staff at that location. Overall I thought the PTC-10 and functional tests of the blowers went very well. I'm looking forward to having them installed and running in the plant, and expect to have many years of trouble-free aeration. Thank you very much for all your assistance over the last few weeks."

Harry P. Butland, Marlborough West Plant
NX75-C060 (2) & NX100-C060 (2) Installation

"APG-Neurors' Turbo Blowers are the greatest thing that came along in a long time. It's a great and easy to use blower that runs flawlessly and requires minimal maintenance. We dealt with a lot of competitors' blowers and this one is by far the best product out there."

Jonathan Lane, Wastewater Operator, Boricia, CA
NX75-C080 (3) Installation

"These blowers are far superior to anything else that we have used, as testimony I refer to the installation of these at our second facility and future considerations. Most importantly, we have worked closely with APG-Neurors to ensure the installation meets, in fact exceeds, our expectations."

Allan K. Lucas, P. Eng., Utilities Engineer
City of Kingston, Ontario
NX150-C070 (6) Installation
Company Overview

APG-Neuros, Inc.

**Name:** APG-Neuros, Division of APGN

**Business:** Manufacturing, Sales, Service, Design

**Products:** Turbo machinery and Waste Water Control Systems

**Address:**
- **Headquarters & Engineering Facility**
  1270 Michèle-Bohec, Blainville, Québec Canada J7C 5S4
  Toll free: 1 866 592-9482
- **Manufacturing & Testing Facility**
  160, Banker Road, Plattsburgh, New York 12901
  Toll free: 1 877 717-4150

www.apg-neuros.com
info@apg-neuros.com