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北京航天长峰股份有限公司

Beijing Aerospace Changfeng Co., LTD


CASIC
航天长峰

Introduction

Beijing Aerospace Changfeng Co., Ltd. (abbreviated as 'ASCF'). It is a high-tech corporation which based on the application of aeronautic research result. And it is a public company with a military enterprise background. The No.2 research institute of China Aerospace science & industry corp. (CASIC) is the majority shareholder of ASCF.

The business scope of ASCF is including medical device, medical informatization, integrated digital operating room solution, laminar flow operating room project, safety city project, smart city project, security control of large-scale event, emergency and counter-terrorism, The border defense, policing informatization, information safety, safety in production and other business areas.

ASCF has undertaken and accomplished the security control system of Beijing Olympics Games and Shanghai World Expo. ASCF is granted the honorary title of "Beijing Olympics Games advanced group" and "Shanghai World Expo advanced group" by the CPC Central Committee and State Council.

ASCF is the first cooperation in China medical industry passed and approved by the ISO9001&ISO13485 quality standard. It has become one of the most famous medical device manufacturer in China. It has been appointed and supported by the Chinese government as a key industrial production bases of medical device. It is a designated supplier for Chinese government and Chinese military procurement. It is granted the honorary title of "National customers most satisfied company".

ASCF is the first company in China that developing and manufacturing anesthesia machine and ventilator. With the developing of this enterprise, it started to produce surgical table and light, ceiling-mounted pendant from 2004. In 2008 the laminar flow operating room project was launched. The integrated digital operating room was developed since 2010. After years of effort, ASCF became an operating room medical device and integrated digital operating room solution provider.

ASCF based on aeronautics technology. ASCF acquired experience from wide range of clinical practice of experts. It built a well-known brand in Chinese medical device industry.

Development history

The first multifunction anesthesia machine developer and manufacturer in China

2008

It was granted the Electrical and mechanical equipment installation and Building Decoration Engineering license to do the laminar flow operating room project.

2006

Surgical table and light was successfully developed and became a all-in-one operating room device supplier.

2002

It was approved by CE and entered the European market.

2012

Finished the company conversion and became the integrated digital operation room solution provider.

2010

Integrated digital operation room research project is checked and accepted by Beijing Scientific Association.

1995

Founded Beijing Aerospace Changfeng medical limited liability company.

1997

The first Chinese medical company that is approved by ISO9001 and ISO 13485.

2002

It was merged into Beijing Aerospace Changfeng company limited (public company) .

Significant achievement

Became high-tech export enterprise and is approved by Ministry of Science and Technology and Ministry of Foreign Trade

The Chinese People's Liberation Army off road vehicle-mounted anesthesia machine provider

Ground base ambulance equipment provider of China 'Shenzhou' Manned Spacecraft

National Development and Reform Commission official appointed ventilator provider for'SARS'

National Development and Reform Commission official appointed Disaster relief medical equipment provider

Successful bidden the tenders in several times, such as Ministry of Health procurement, Province Health Department procurement

Our company has supplied over 10 thousands medical devices to thousands hospital in China

Our company has completed the laminar flow operating room project for dozens hospitals in China

Corporation status

China Medical Device Industry Association General Council member organization

China Medical Equipment Association General Council member organization

China Medical Device Industry Technology Innovation and Strategy union member of the Standing Committee

China's rescue and first aid and surgical equipment industry technology innovation strategy union member of the Standing Committee

China's biotechnology development center member

China Electronics Standardization Technology Association digital medical equipment and systems standards committee member

National anesthesia and respiratory equipment Standardization Technical Commission standards committee member

National Science and Technology Support Program organization

Beijing Medical Industrial Innovation union executive director

Beijing Pharmaceutical Industry Association

Beijing bio-pharmaceutical industry development (G 20) project enterprise

Beijing biotechnology and new Pharmaceutical Industry Promotion Center member

Certificate of quality system

CE approved

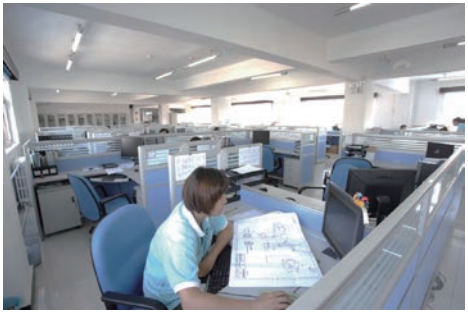
Passed ISO9001 and ISO13485 certificates

CE 0197

ISO9001/13485

Research and developing system

Good and opening working environment make the company gather lots of PhD and master degree researcher and developer. With the high combination of innovation, technology studying, developing and cooperation systems, it fulfilled the requirement of clinical practice.



ASCF applied and owned 103 patents for invention, 115 patents for utility models, 8 patents for appearance, 24 software copyrights and 21 patents for trademark.

Production management

- There are surgical table, surgical light, anesthesia machine and ventilator production lines and research lab located in the 6900m² advanced manufacturing base.
- Well-tested product assured the product quality, stability and reliability.






ACM
Anesthesia Machine Series

Anesthesia Workstation
ACM619 series

Multifunction Anesthesia Machine
ACM608B Anesthesia machine
ACM608C Anesthesia machine

Anesthesia Workstation

ACM650 series
ACM630 series

Classic Anesthesia Machine

ACM602 Anesthesia machine

Classic Anesthesia Machine

ACM606 Anesthesia machine
ACM603 Anesthesia machine

ACM659 Anesthesia Workstation

With ICU quality multifunction anesthesia machine

- 15" high-luminance large screen displaying
- Intelligentized safe self-test and alarm function
- Real-time monitoring pressure, flow, volume waveform and breathing loops
- Humanized design and clear functional zone make it easy to operate
- Electrical flowmeter can realize gas automatic monitoring and switch function

Innovation respiratory system design

- The whole respiratory system built-in the machine body, easy to dissemble
- Efficient integrated gas distribution system
- Low respiratory circuit compliance to meet the low-flow requirements

Main parameters:

Application	adult, child, neonate	Control mode	gas driven, electrical control
Ventilation pattern	VC、PC、PRVC	Ventilation mode	IPPV、SIPPV、SIMV、PSV、SIGH
Screen size	15" color touchable screen display	Waste gas discharge	built-in active AGSS
Respiratory circuit	integrated whole breathing circuit	Flowmeter	electronic
Gas source system	automatic monitor and switch	Power system	AC 110/220V, with battery
Waveform display	pressure-time waveform, flow-time waveform, volume-time waveform, O_2 -time waveform, N_2O-time waveform, CO_2–time waveform; pressure-volume loop, flow-volume loop.		
Monitoring parameters	tidal Volume, minute Volume, respiratory frequency, O_2 concentration, PEEP, Ppeak, average pressure, platform pressure, airway resistance, I/E ratio, compliance, $ETCO_2$ concentration, N_2O concentration, anesthesia gas		
Alarm parameters	alarm display clear away, silence for alarm, airway Pressure, tidal volume, minute volume, O_2 concentration, respiratory frequency, apnea, flow sensor failure, sustained pressure, complete gas circuit, $ETCO_2$ concentration, anesthesia gas concentration		

ACM639 Anesthesia Workstation

With ICU quality multifunction anesthesia machine

- 12" high-luminance large screen displaying
- Intelligent safe self-test and alarm function
- Real-time monitoring pressure, flow, volume waveform and breathing loops
- Humanized design and clear functional zone make it easy to operate
- Electrical flowmeter can realize gas automatic monitoring and switch function

Fully functional host machine system

- Integrated respiratory circuit, safe and reliable
- Built-in active AGSS absorption system
- Powerful battery back-up power supply system
- Large double drawer design to meet clinical requirement fully
- Extensible modular design, upgrade easily

Main parameters:

Application	adult, child, neonate	Control mode	Gas driven, electrical control
Ventilation pattern	VC、PC、PRVC(optional)	Ventilation mode	IPPV、SIPPV、SIMV、PSV、SIGH
Screen size	12" color touchable screen display	Waste gas discharge	built-in active AGSS
Respiratory circuit	integrated whole breathing circuit	Flowmeter	electronic
Gas source system	automatic monitor and switch	Power system	AC 110/220V, battery is optional
Waveform display	pressure, flow, volume, O_2 waveform; pressure-volume loop, flow-volume loop; Optional: N_2O,CO_2 and anesthesia gas waveforms		
Monitoring parameters	tidal volume, minute volume, respiratory frequency, O_2 concentration, PEEP, Ppeak, average pressure, airway pressure, I/E ratio, compliance, Optional:$ETCO_2$ concentration, N_2O concentration, anesthesia gas		
Alarm parameters	airway pressure, tidal volume, minute volume, O_2 concentration, respiratory frequency, apnea, flow sensor failure, sustained pressure, complete gas circuit Optional: $ETCO_2$ concentration, anesthesia gas concentration		

ACM619 Series Anesthesia Workstation

ACM619/C/F

With ICU quality multifunction anesthesia machine

- 5.7"and 10.4" large screen displaying are available
- Real-time monitoring pressure, flow, volume waveform and breathing loops
- Humanized design and clear functional zone make it easy to operate
- Provide three gas source and high precise six-tube flowmeter
- Precise anesthetic delivery system with standardized connectors, double vaporizers position make is easy to upgrade

Fully functional host machine system

- Integrated respiratory circuit, safe and reliable, and easy to operate.
- Built-out active AGSS.
- Powerful battery back-up power supply system
- Extensible modular design, upgrade easily
- Series design to meet different need
- CE/ISO approved

Main parameters:

Application	adult, child, neonate	Control mode	gas driven, electrical control
Ventilation pattern	VCV、PCV、PRVC	Ventilation mode	IPPV、SIPPV、SIMV、PSV、SIGH
Screen size	5.7" OR 10.4" color display	Waste gas discharge	built-in active AGSS
Respiratory circuit	integrated whole breathing circuit	Flowmeter	mechanical
Gas source system	automatic monitor and switch	Power system	AC 110/220V, with battery
Waveform display	pressure-time waveform, flow-time waveform; pressure-volume loop, flow-volume loop;Optional: $ETCO_2$-time waveform		
Monitoring parameters	tidal volume, minute volume, respiratory frequency, O_2 concentration, PEEP, Ppeak, average pressure, airway pressure, I/E ratio Optional: compliance, $ETCO_2$ concentration, N_2O concentration, anesthesia gas		
Alarm parameters	pressure, tidal volume, minute volume, O_2 concentration, respiratory frequency, apnea, flow sensor failure, sustained pressure, complete gas circuit. PEEP, power failure. Optional: $ETCO_2$ concentration, $ETCO_2$ concentration		

ACM608B Multifunction Anesthesia Machine

- Color TFT screen display, double waveforms displayed for pressure and flow waveforms, it is easy for the doctors to observe the change of respiratory parameters
- ABS material，resistant to corrosion, beautiful in appearance, lightweight, easy to transport
- Double anesthesia vaporizers with large capability and high precision, have the function of flow/pressure fluctuation and temperature automatic compensation
- High precise six-tube flow meter and low impedance breath loop, meet low-flow requirements
- RS232 interface can be connected to hospital management network, so that to realize real-time transfer date
- Open design for machine frame, it is easy to connect patient monitor and information management system
- CE/ISO approved

Main parameters:

Application	adult, child	Control mode	gas driven, electrical control
Ventilation pattern	VCV	Ventilation mode	IPPV、SIPPV、SIMV、CPAP、SIGH、manual
Screen size	6.4" color TFT	Tidal Volume	0, 50-1600ml
Respiratory circuit	integrated whole breathing circuit	Flowmeter	mechanical
Gas source system	automatic monitor and switch	Power system	AC 110/220V
Waveform display	pressure-time waveform,		
Monitoring parameters	tidal volume, minute volume, respiratory frequency, O_2 concentration, Ppeak, average pressure, airway pressure, I/E ratio, PEEP		
Alarm parameters	pressure, tidal volume, minute volume, O_2 concentration, respiratory frequency, apnea, alarm for O_2 supply failure, power failure.		

ACM606 Classic Anesthesia Machine

- High-luminance TFT screen, displaying multi-parameters and waveforms of ventilation
- Double vaporizers position, easy to upgrade
- Double anesthesia vaporizers with large capability and high precision, have the function of flow/pressure fluctuation and temperature automatic compensation
- High precise six-tube flow meter and low impedance breath loop, meet low-flow requirements
- RS232 interface can be connected to hospital management network, so that to realize real-time transfer date
- SIGH ventilation mode accelerates CO_2 expiration and improve the patients' oxygenation ability
- With O_2 concentration monitoring function, realize real-time O_2 concentration monitoring
- Adopted reliable critical component, stable and durable, suitable for all levels of hospitals
- CE/ISO approved

Main parameters:

Application	adult, child	Control mode	gas driven, electrical control
Ventilation pattern	VCV	Ventilation mode	IPPV、SIGH、MANUAL
Screen size	color TFT	Tidal Volume	0, 50-1600ml
Respiratory circuit	integrated whole breathing circuit	Flowmeter	mechanical
Gas source system	automatic monitor and switch	Power system	AC 110/220V
Waveform display	pressure-time waveform,		
Monitoring parameters	tidal volume, minute volume, respiratory frequency, O_2 concentration, Ppeak, average pressure, airway pressure, I/E ratio, PEEP		
Alarm parameters	tidal airway pressure, tidal volume, minute volume, O_2 concentration, alarm for gas supply failure, power failure.		

ACM603 Classic Anesthesia Machine

- High-luminance LED displays multi-parameters of ventilation in real time
- Double anesthesia vaporizers with large capability and high precision, have the function of flow/pressure fluctuation and temperature automatic compensation
- High precise six-tube flow meter and low impedance breath loop, meet low-flow requirements
- Large capacity of circle absorber, meet long time operation need.
- Advanced technique, reliable performance, ideal for different clinics and hospitals
- ISO9001/13485 approved

Main parameters:

Application	adult, child	Control mode	gas driven, electrical control
Ventilation pattern	VCV	Ventilation mode	IPPV、MANUAL
Screen size	LED display	Tidal Volume	0, 50-1600ml
Respiratory circuit	integrated whole breathing circuit	Flowmeter	mechanical
Gas source system	automatic monitor and switch	Power system	AC 110/220V
Waveform display	overflow valve, APL valve, safe valve, ORC device.		
Monitoring parameters	tidal volume, airway pressure, Ppeak, manual operation.		
Alarm parameters	upper/lower airway pressure limit, alarm for short of gas supply, power failure.		

ACM602 Anesthesia Machine

- High-luminance LED displays multi-parameters of ventilation in real time
- Compact design, light weight, suitable for special environment (for example, first aid)
- Double anesthesia vaporizers with large capability and high precision, have the function of flow/pressure fluctuation and temperature automatic compensation
- High precise four-tube flow meter and low impedance breath loop, meet low-flow requirements
- Metal plate material, firm and durable, using spray paint in surface treatment, resistant to corrosion, acid and alkali resistance, easy to cleaning and sterilization
- Closed, half-closed, half-open anesthesia mode to meet versatile clinical solutions
- ISO9001/13485 approved

Main parameters:

Application	adult, child	Control mode	gas driven, electrical control
Ventilation pattern	VCV	Ventilation mode	IPPV、MANUAL
Screen size	LED display	Tidal Volume	0, 50-1200ml
Respiratory circuit	integrated whole breathing circuit	Flowmeter	mechanical
Gas source system	automatic monitor and switch	Power system	AC 110/220V
Waveform display	overflow valve, APL valve, safe valve, ORC device.		
Monitoring parameters	tidal volume. respiratory frequency.		
Alarm parameters	upper/lower airway pressure limit, alarm for short of gas supply, power failure.		

ACM960 Portable Ultrasound System

Portable Ultrasound System

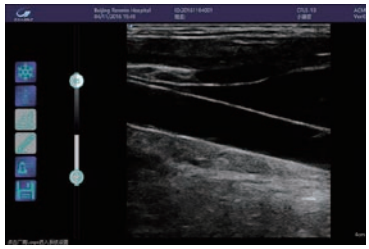
- ACM960 portable ultrasound system adopts advanced beam synthesis, image processing technology and touch screen workflow design.
- Superior image quality, easy to operate, which can greatly improve the examination and treatment success rate of tissue biopsy, peripheral vascular catheter and nerve block.

Probe Name	Center Frequency	Application	Type
CFL5-10	7.5MHz	Blood vessels, superficial tissues, small organs, skeletal muscle, nerve	Linear array
CFL6-14	10MHz	Blood vessels, small organs, skeletal muscle, nerve	Linear array
CFC2-5	3.5MHz	Abdomen, gynecology, obstetrics, nerve	Curved array

Clinical Images:

ACM960 Liver cyst display

ACM960 Gastric internal display



Carotid Artery

EIFFEL8600 Higher Level Electrical Hydraulic Universal Surgical Table

Perfect technology makes the extraordinary EIFFEL8600

- 5-section design, followed the principle of bio-mechanics and anatomy, formed a natural vertex angle, which enhances the application range of the surgical table
- New-style oriented column and double-acting cylinder, which makes the table more stable during the operation, safe loading ≥200Kg
- Double controllers with one key reset function, make it more convenient to reset the tabletop in level position
- Electric-driven sliding function can clear up the obstructions for X-ray during the operation
- 70mm thick memory foam, which effectively releases pressure
- New style fashionable design for large casters, makes the table more stable and flexible
- CE/ISO approved

Main parameters:

Control mode	electrical hydraulic	Table Capacity	≥200KG
Length	2040MM	Width	540MM
Height range	750—1150(MM)	Sliding distance	300MM
Trendelenburg	≥30°	Reverce-trendelebury	≥30°
Tilt left	≥25°	Tilt right	≥25°
Head plate	up≥45°; down≥90°	Shoulder plate	down≥30°
Back plate	up≥80°; down≥25°	Leg plate	down≥90°; outward≥90°

ACM-S3500 Mechanical Hydraulic Surgical Table

- Stainless steel material, firm and durable, beautiful in appearance
- Composite materials for tabletop. Pave the way for X-ray technology and compatible with C-Arm
- One time formed mattress, no gap, easy to clean and sterilization
- Detachable leg plate, easy to operate
- Foot pedal controls up-down movement, safe and reliable
- CE/ISO approved

Main parameters:

Control mode	manual hydraulic	Table Capacity	150KG
Length	2040MM	Width	520MM
Height range	740—1090 MM	Weight of table	100 KG
Trendelenburg	≥30º	Reverce-trendelebury	≥30º
Tilt left	≥22º	Tilt right	≥22º
Head plate	up≥90º；down≥90º	Back plate	up≥90º；down≥25º
Leg plate	down≥90º；outward≥90º	Optional	internal elevator

Features of Electrical Hydraulic Operation Table:

- Material: Stainless steel, high-rigidity and stability design, self-lubricating and wear-resisting material selection, that enables the table lift smoothly.
- Standard sized stainless side-rail, match up all necessary accessories.
- Tabletop: Specialized composite material for the top of table, compatible with X-ray and C-Arm, meet the requirements of X-ray image during the operation.
- Mattress: 50mm thick, one step forming, selected international widely-used material, streamline shaped. The joint is adopted the method of up/down pressing to reduce the gap.
- Detachable leg plate: Ideal for gynaecology-obstetrics and urinary surgery.
- Base: Compact base and hidden casters design. Keep enough contact area to assure the surgical table steady.
- CE/ISO approved.

Operation Table ACM-T536

- both with sliding function and Lowest position function, meet the requirement of ophthalmic and neurosurgery operation.
- lowest position: 600mm
- sliding distance: 300mm

Operation Table ACM-T532

- with sliding function, suitable for Orthopedics and Gynecology operation.
- sliding distance: 300mm

Standard accessories:			
anesthesia screen frame	leg rest	arm rest	body support
			
Optional accessories:			
up-down head rest	built-in elevator	built-out elevator	skull clamp
spinal traction frame	U-type head support	knee crutches	waste basin
double-layer board	memory-foam mattress	gantry	scalp retractor

Operation Table ACM-T500

- classic universal surgical table, connected with different accessories to realize different operation.

Operation Table ACM-T506

- with lowest position function, suitable for ophthalmic and neurosurgery, facial plastic and ENT operation.
- lowest position: 500mm

ACM-L6000 Series LED Surgical Shadowles Lamp

New LED technology, near to natural light

- LED touchable control board, adjustable for illumination, color temperature and CRI
- Double dome structure, provide shadowless light for operation and control the operation area lighting
- Six sets of universal suspension system may be started at the same time for fully satisfying needs for height, angle and posture during operation
- Adjustable large lighting spot and deep illumination, fully meet clinical requirements
- Streamline shape structure design, in favor of laminar flow cleaning, and lower down the risk of infection
- Camera system is available, pave the way of digitalization for hospitals

Main parameters:

Model	ACM-L6800	ACM-L6600	ACM-L6300
Head	double dome:700/700	double dome:700/500	single dome:700
Illumination(adjustable)	40000-160000LX	40000-160000LX	40000-160000LX
Spot diameter(adjustable)	250±100mm	250±100mm	250±100mm
Color temperature(adjustable)	6700K≥TC≥3000K	6700K≥TC≥3000K	6700K≥TC≥3000K
Illumination depth(adjustable)	≥1200MM	≥1200MM	≥1200MM
CRI	100≥RA≥85	100≥RA≥85	100≥RA≥85
Power	420W	400W	210W

ACM-W700 Series Reflection System Shadowless OT Light

- Advanced digital integrated control board, can realize power control, adjust main bulb and spare bulb monitoring
- Safe spare bulb, automatic switching is less than 0.3 S
- Streamline shape structure design, in favor of laminar flow cleaning, and lower down the risk of infection
- Six sets of universal suspension system may be started at the same time for fully satisfying needs for height, angle and posture during operation
- Multi-direct reflection system reflect the lightning multidirectional, therefore create an excellent shadow less effect
- Ceiling mounted double dome type, wall mounted single dome type and mobile single dome type to meet different need
- Camera system is available, pave the way of digitalization for hospitals

Main parameters:

Model	ACM-W720 series	ACM-W720/520	ACM-W520 series
	double dome: ACM-W720/720 single dome: ACM-W720	double dome : ACM-W720/520	double dome : ACM-W520/520 single dome:ACM-W520
Illumination(adjustable)	120000-160000LUX	120000-160000LUX	100000-160000LUX
Spot diameter（adjustable）	200±100mm	200±100mm	200±100mm
Color temperature	4200 ±300K	4200 ±300K	4200 ±300K
Illumination depth	≥900MM	≥900MM	≥800MM
CRI	Ra≥95	Ra≥95	Ra≥95
Power	400W / 200W	400W	400W /200W

ACM812A Ventilator

Features:

- Aerospace quality, military technology, practical machine
- Light weight, against moisture and shock
- Provide three ways of connection: invasive, non-invasive and manual
- Volume control, pressure regulated and time switch, fully embodied protection strategy for lung
- Inspiration halt, convenient for sucking phlegm, avoid cross infection
- Portable model is available, ideal for special environment, such as emergency or field battle
- Mobile model with trolley, convenient for transportation
- CE/ISO certificated

Application	adult, child	Control mode	gas driven, electrical control, time switch
Connection	invasive, non-invasive and manual	Ventilation mode	A/C、SIMV、SPONT、SIGH、NIPPV，MANUAL
Displaying	TFT screen display	Tidal volume	0, 50-1500ml
Respiratory rate	4bpm-80bpm	I/E ratio	1: 0.3 ---1:4
O_2 concentration	48-100%	Power system	AC、DC、vehicle-mounted, battery
Monitor parameters	tidal volume, minute volume, respiratory rate, Ppeak		
Alarm parameters	upper/lower airway pressure limit, gas shortage, power failure,		

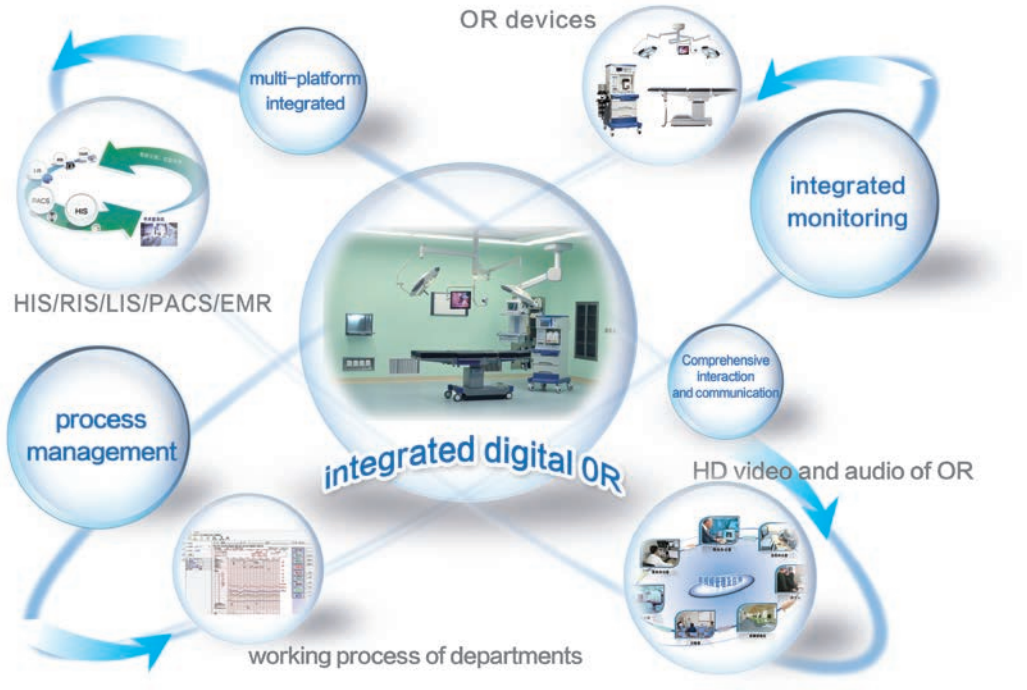
Ceiling-Mounted Medical Pendant/Suspension Bridge

With the rapid development of modern aseptic operation, ICU pendant and suspension bridge has been developed into an integrated working platform, which can undertake all kinds of medical equipment and provide comprehensive medical services. For a modern hospital, it is essential to equip with ICU pendant and suspension bridge, which can improve the environment of the ICU operation room optimized.

Beijing Aerospace Changfeng Co., Ltd, as the senior integrated supplier for digital OR and OR project, is familiar with all the requirements of hospital ICU and OR. We could provide the best medical equipments proposal for the hospitals, and at the same time, perfectly combine laminar OR construction with medical equipment installation together.

Athena Integrated Digital OR Platform from ASCF

Integrated digital OR platform combined computer network technology, automatic control technology, image processing technology, information sharing, multimedia display technology, ergonomic design and Comprehensive wiring technology together. It mainly includes audio and video management and application, integrated operating room monitoring, integration of OR information system with HIS and Anesthesia Information Management System. This platform totally satisfied the requirement of patients, doctors, nurses and managers about OR. It implemented surgery live broadcast, Operation teaching, medical training, Remote guidance, surgery process optimization, and scheduling management. This platform provided an important tool for a hospital to improve surgery teaching and management.



Laminar Operating Room

Aerospace Changfeng's Laminar Operating Room technology is based on the strategy of "Integrated Digital Operating Room Solution", and persisting in the engineering philosophy of "Economical, Energy Saving, Normative and Standard". Our practice-oriented project allows for highly efficient OR work flows and the best-possible patient outcome, provides physicians, nursing personnel and planner with a operating room more freedom, modular, flexible, and cost-efficient.

Being a member of China Electronics Academy Clean Technology Institute and China Air-Conditioning Industry Association Clean technology Committee, with years of experience of research & manufacture of operating room devices, and operating room engineering, Aerospace Changfeng has the most experienced and professional experts in China, takes most advanced design method, and brings you best ever scheme and scientific formula of management and operation of project construction.

Nowadays, Aerospace Changfeng is a company of great strength and best quality in the area of Laminar Operating Room Project in China. There are over 500 successful Operating Rooms constructed by us in nearly 40 advanced hospitals throughout the country.

AEROSPACE CHANGFENG MEDICAL

Athena 8500 Ventilator

- Dynamic Bilevel ventilation(Dyn-BiLevel)automatically provides protective soft ventilation to the lungs
- Intelligent Bilevel ST (Bi-Level ST) can automatically switch between automatic respiration and mechanical ventilation according to patients' needs
- Synchronized exhalation trigger (E-Trigger): more sensitive man-machine synchronization in pressure mode
- Complete offline indicators and automatic intubation compensation (ATC) make the offline activity more orderly
- Automated Sputum Aspiration (ASR) is convenient for nurses to perform sputum aspiration, keep patients' bronchi clean and reduce complications
- People oriented safety measures embody the advanced safety concept of products

Aerospace Quality
Military Technology

Adhering to the production concept of German ventilator

VCV
Volume controlled ventilation

- Ensure tidal volume and minute ventilation;
- Suitable for the treatment of hypocapnia;

P–SIMV
Pressure synchronized intermittent mandatory ventilation

- Prevent high ventilation pressure;
- It can be used with PSV;

Dynamic BiLevel

- Pressure control volume guarantee can prevent lung volume injury
- Automatically adjust the inspiratory pressure according to the condition of mechanical ventilation, which is safer for patients
- Supports spontaneous breathing at high or low pressure, making it easy for patients to go offline
- It can be used with PSV
- Suitable for therapeutic hypocapnia

BiLevel

- Control airway pressure and reduce the risk of barotrauma
- Conducive to alveolar opening and gas distribution,

improve oxygenation,and facilitate alveolar ventilation.

- Allow spontaneous breathing at all times
- Less sedative dose than VCV (volume controlled ventilation);
- It can be used with PSV

PCV
Pressure controlled ventilation

Pressure controlled ventilation;

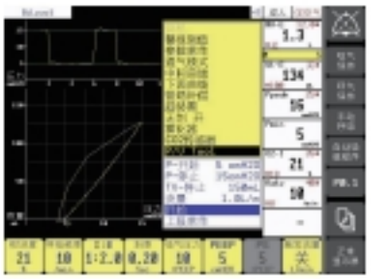
- Control airway pressure and reduce the risk of barotrauma
- Conducive to alveolar opening and gas distribution, improve oxygenation, and facilitate alveolar ventilation.

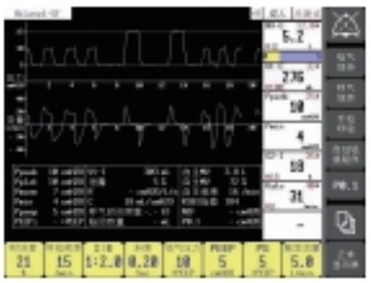
Good human–computer interaction and flexible configuration scheme

The color touch screen can not only adjust the up and down rotation angle, but also can be separated from the ventilator host and installed on the bedside or wall (wired connection is required).

The unique metal exhalation valve not only can be used repeatedly after high temperature disinfection, but also can realize the mutual transformation from adults, children to newborns by changing different types of exhalation valve.

Intensive care support ventilator in real sense





Athena 8500 ventilator is originated from German technology, benefited from Chinese innovation, and has full independent intellectual property rights.

Medical staff can fully understand the working status of the ventilator through the powerful breath monitoring function, monitor the pressure parameters, lung function parameters and offline indicators of patients in real time, and make the best treatment plan for patients.

The storage and playback function of more than 5000 patient trend logs has laid a solid foundation for medical staff to evaluate the treatment effect of patients.

Support invasive ventilation of newborn

Intelligent design makes operation much easier

After starting the machine and entering the ideal body weight, the ventilator can automatically select the patient type and provide the corresponding safe ventilation parameters;

Automatic alarm parameter setting provides alarm parameters suitable for most patients;

The intelligent sputum aspirating program can provide pre oxygen supply and replenish oxygen time to rapidly improve the oxygenation of patients during sputum aspirating;

It provides a variety of shortcuts to integrate common functions into the display screen of the ventilator for medical staff to quickly select;

Provide perfect off-line index and automatic pipeline compensation to create conditions for patients to get off-line smoothly;

It is compatible with non-invasive ventilation, has synchronous atomization function and intelligent closed-loop ventilation mode, and can reduce the work intensity of medical staff.

Excellent medical technology from Germany——Athena 8500 Ventilator

The Athena 8500 ventilator produced by Aerospace Changfeng is originated from German technology, and has been cooperating with German R & D team for many years. Technicians have gone to Germany to develop and master the production process and management process thoroughly.

Athena 8500 ventilator is a kind of pneumatic electronic contral ventilator with precise ventilation function, which integrates modern microprocessor technology, precise measurement technology and air path integration technology.

The Athena 8500 ventilator is apply for ventilation in intensive care patients.

Athena 8500 ventilator has both VC and PC; it is apply for adults, children and newboms; it can provide both invasive and non-invasive ventilation.

Synchronous atomization function realizes simultaneous atomization treatment and respiratory support, reducing the labor intensity of medical staff.

Beijing Aerospace Changfeng Co., LTD
Address: Casunc Building, NO. 51, YongDing Rd., Haidian District, Beijing, China
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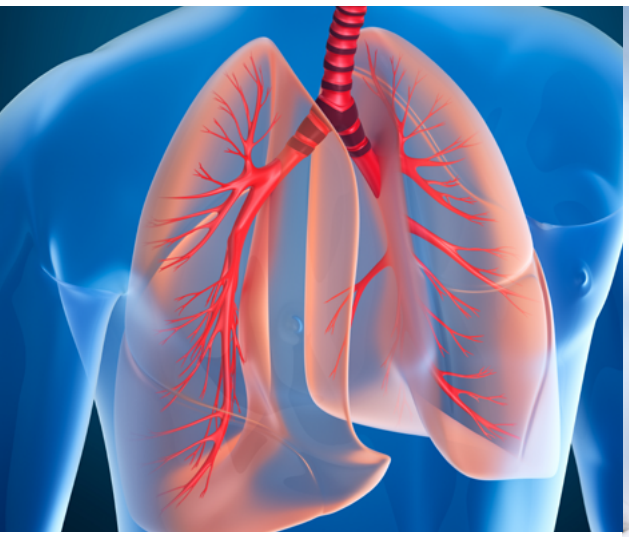
TNI

Medical leaflet

Therapy with Nasal Insufflation

The unique nasal high flow therapy.



TNI *soft*Flow *50*

TNI medical

Your partner for respiratory support

Dear TNI audience,

For ten years, TNI® medical AG has had one goal: to develop nasal high flow therapy in order to provide highly efficient and comfortable respiratory support to patients suffering from respiratory insufficiency.

We are committed to keeping you up to date with any information on Therapy with Nasal Insufflation (TNI) – the evolution of nasal high flow therapy – and the company behind this therapy: TNI® medical AG. In the following pages, we would like to give you an overview of TNI and the current technological and clinical knowledge. We would also like to invite you to regularly check our website www.tni-medical.com for current information on new TNI products, application recommendations as well as scientific publications and events.

Convince yourself of the efficiency, safety and comfort of TNI and get a genuine alternative to NIV for hospital and outpatient treatment of patients suffering from respiratory insufficiency. Set new standards – we will support you as a steadfast partner. Your patients will be grateful.

Best wishes,

Ewald Anger, CEO

TNI

Therapy with Nasal Insufflation

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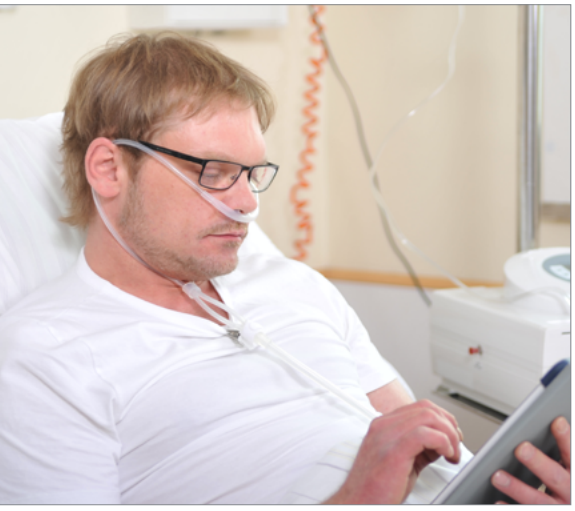
TNI

Therapy with Nasal Insufflation

An overview



A huge step in nasal high flow therapy.

TNI *soft***Flow** *50* is the flagship of the TNI product family. It has been developed through intensive research and focussed development in Therapy with Nasal Insufflation (TNI).

The three pillars of TNI.

Due to the unique technology of the internal high flow generator, TNI *soft***Flow** *50* generates a precisely regulated, stable high flow (TNI Flow) from room air or a mix of room air and oxygen. Controlled oxygen supply ensures oxygenation while, at the same time, the respiratory airways are humidified.

Convincing. The quality of life.

In practice, this therapy is more effective than conventional oxygen therapy and just as successful but much more comfortable than NIV (non-invasive ventilation). The use of a soft, comfortable and noise-optimized patient interface ensures recovering patients' quality of life. Being able to eat, drink and talk during therapy contributes significantly to higher patient compliance.

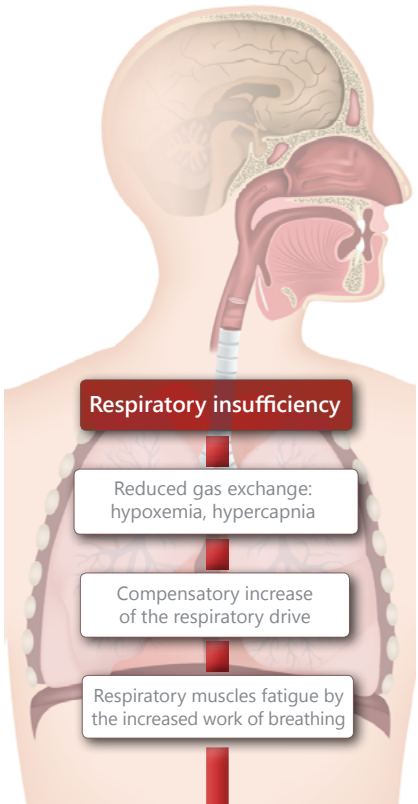
We can Flow.

A stable air flow is essential for treating hypoxemic and hypercapnic respiratory failure. Together with the TNI applicator (comprising respiratory circuit and patient interface), the TNI Flow generator guarantees a constant TNI Flow and in doing so, it is completely independent of external pneumatic systems. Due to this, the TNI *soft***Flow** *50* is able to treat respiratory insufficiency and allows therapy at home as reliable and efficient as in the hospital.

Only TNI can be as effective as NIV in hospital and homecare treatment!

Nasal High Flow

The Flow makes the difference



TNI Flow:
Stable high flow

Air / Mixture of air and O_2, humidified and warmed

- Consistent CO_2 washout:
  - > from the anatomical dead space
  - > from the small respiratory tracts
- Steady O_2 supply:
  - > stable FiO_2
- PEEP*
  - Preventing end-expiratory collapse of alveoli
  - Recruiting further areas in the lungs

*positive end-expiratory pressure

- Higher breathing efficiency:
  - > pO_2 increases and pCO_2 decreases
- Increase of tidal volume
- Decrease of respiratory rate
- Facilitated work of breathing
- Relief of breathing muscles

Comfortable patient interface

TNI *soft*Flow *50*

Unique technology:
the internal high flow generator

Hypercapnic respiratory failure

Mechanical ventilation

Reduction of risk

TNI

Therapy with Nasal Insufflation

Improved respiratory efficiency

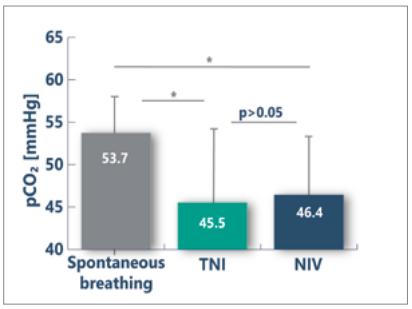


Fig. 1 pCO_2 levels of hypercapnic COPD patients during spontaneous breathing following TNI and NIV. * Significant p value. Source: Bräunlich et al., 2015a

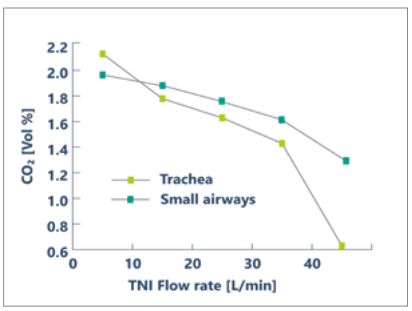


Fig. 2 CO_2 changes in the respiratory tract of a lung model proportionally to the TNI Flow rates. Source: Bräunlich et al., 2017

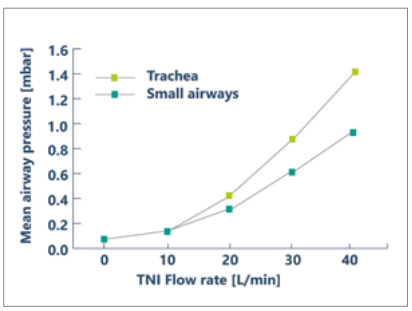


Fig. 3 Increase of mean airway pressure in the trachea and small airways proportionally to the TNI Flow rates. Source: Bräunlich et al., 2017

Reduction of hypercapnia

Studies with chronic hypercapnic COPD and IPF patients show that applying TNI for a short time reduces arterial pCO_2. At higher flow rates, pCO_2 decreases even further. A significant decrease in pCO_2 was noticed in stable hypercapnic COPD patients who were treated with TNI at home for several weeks. The normocapnic value remained stable during the following NIV treatment (Bräunlich et al., 2013a, 2015a, 2016; Fig.1).

Mechanism: Washout effect

The washout effect is viewed as the central mechanism of pCO_2 reduction. Supplying a flow rate exceeding the inspiratory demand results in a constant washout of breathed air (rich in CO_2) out of the nasopharynx and the small airways. Of essential value is a stable air flow during inspiration and expiration. This is guaranteed by the technology of the TNI Flow generator in combination with the TNI applicator. CO_2 elimination increases with higher flow rates (Bräunlich et al., 2017, Fig. 2).

Efficient oxygenation

TNI efficiently treats chronic hypoxemic respiratory insufficiency without causing any side effects. This was confirmed during a clinical comparison with conventional O_2 therapy in stable O_2-dependent COPD patients. The application of TNI Flow alone (without adding O_2) already resulted in an improved oxygenation. A comparatively lower volume of O_2 had to be added to the therapy air to reach the same level of oxygenation as with pure O_2 therapy (Vogelsinger et al., 2013).

Mechanism: constant FiO_2 + PEEP

The stable high TNI Flow guarantees continuous supply of therapy air with an FiO_2 value that is individually adjusted to the patient's deficit. It remains stable even during high breathing frequency. As the flow rate increases, a PEEP builds up: an expiratory alveolar collapse is avoided and otherwise insufficiently ventilated areas of the lung are recruited. As a consequence, the gas exchange improves (Bräunlich et al., 2016, 2017; Fig. 3; McGinley et al., 2007).

Relief of the respiratory muscles

Facilitated work of breathing

In patients suffering from chronic respiratory insufficiency, the respiratory muscles are constantly overloaded. During TNI, the desired effect of a respiratory therapy can be noticed: COPD patients were breathing slower and deeper; the respiratory minute ventilation decreased (Bräunlich et al., 2013a). The respiratory muscles were thus relieved, rested and were able to resume their ventilating function again.
In comparison to breathing room air or O_2, TNI facilitated work of breathing during sleep in COPD patients (Biselli et al., 2016; Fig. 4). Reaction due to an improved exchange of gas and a reduced sympathetic tone is discussed as mode of action. Sympathetic activity decreased in REM and Non-REM phases in COPD patients during TNI, but not during an O_2 therapy as shown in clinical studies (Schneider, DGP congress 2017, Symposium "Symposium „NHF: The better alternative?").

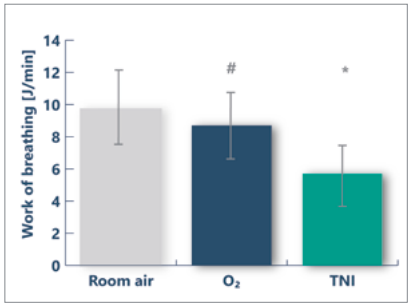


Fig. 4 Decrease of work of breathing in COPD patients during TNI, compared to room air and O_2 therapy during sleep. Significant p value # as compared to room air, * as compared to room air and oxygen. Source: Biselli et al., 2016

TNI ensures
> pCO_2 ↓
> pO_2 ↑
> work of breathing↓

Comments from the DGP congress 2017 // Symposium "NHF: The better alternative?"

Prof. H. Wirtz, Pneumlogy dept. , Uniklinikum Leipzig

"NIV is seen as standard therapy for hypercapnic respiratory insufficiency which, however, is not always tolerated by the patients. TNI is an alternative for these patients in particular: TNI supports ventilation - the task of the breathing pump - which counteracts parenchyma failure and improves the gas exchange. In addition, patients being treated with TNI save energy they would have to spend on conditioning the respiratory gas."

Prof. Kähler, Lungenzentr. Süd-West, Wangen im Allgäu

"NHF is not NHF - each system applies a different way of generating high flow. Thus, not all systems are equally suitable for hospital and homecare use.

Using NHF in weaning is promising with regard to the duration of stay in intensive care and the reintubation rate."

TNI

Therapy with Nasal Insufflation

Lung protection

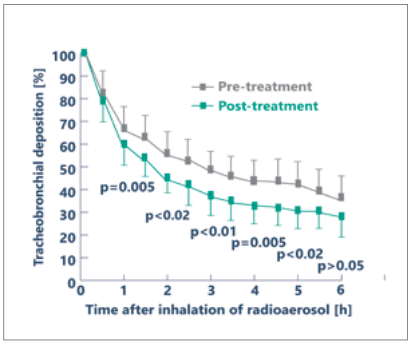


Fig. 5 Tracheobronchial deposition at baseline and following breathing gas humidification. Source: Hasani et al., 2008

Improved mucociliary clearance

It has been verified that an optimized breathing gas conditioning leads to an improved self-cleaning function of the ciliated epithelium, the mucociliary clearance. Mucus in the lung becomes more fluid facilitating removal and expectoration (Hasani et al., 2008, Fig. 5). The TNI humidification technology reliably provides warming and humidification of the therapy air, which is balanced with the physiological demand of the lungs. The TNI applicator is heated for its entire length to the nostrils, which guarantees that humidity remains stable without condensing in the patient curcuit. Humidity reaches the patient's respiratory tract.

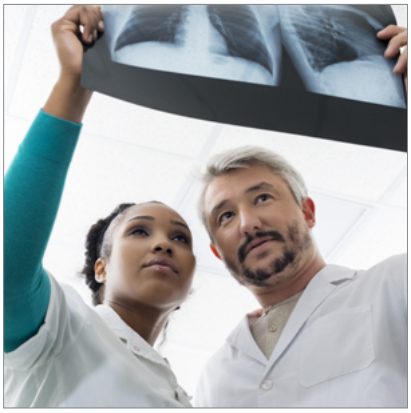
TNI ensures

> no drying-out of the mucosa

> improval of mucociliary clearance

· mucus dissolution and removal

· lower risk of respiratory infections



From practice

Prof. H. Schneider, Johns Hopkins University, Baltimore, USA
DGP congress 2017, Symposium "NHF: The better alternative?"

"Application fields of NHF include any conditions benefitting from an improved respiratory efficiency. This mainly relates to patients suffering from stable COPD, restrictive lung diseases such as ILD or pulmonary hypertension as well as neuromuscular disorders. Patients suffering from pneumonia, cystic fibrosis, bronchiectasis and asthma benefit from an improved mucociliary clearance and an increase in PEEP."

Better quality of life

Comfort

The TNI applicator's small, soft and noise-optimized nasal cannula was developed guaranteeing a comfortable feel without causing any pressure marks and skin irritation. It is suitable for use during sleep.
A key advantage of TNI is the fact that the patient can almost unrestrictedly eat, drink and talk during therapy.
Humidification of therapy air prevents side effects such as dry nasal and oral mucosa, which in turn significantly contributes to the therapy tolerance. The patient can regulate the therapy air temperature according to comfort.

In addition to the therapy efficiency, TNI's comfort further adds to the patients' compliance.

Efficiency of therapy + comfort = better quality of life

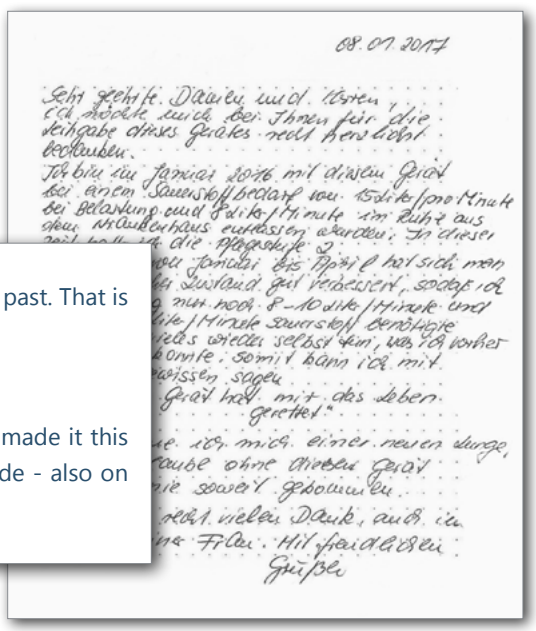
Patient letter

We are very grateful for receiving such a feedback from our patients.

"... I was able to do so many things I could not even think to do in the past. That is why I can say:

This device saved my life!

Now, I am very happy with my new lung and I think I wouldn't have made it this far without this device. I would like to once again express my gratitude - also on behalf of my wife ..."



TNI

Therapy with Nasal Insufflation

Application: easy, secure, effective

In which patients can TNI *soft*Flow *50* be used?

For treating respiratory insufficiency type I and II in patients suffering from

> COPD (chronic obstructive pulmonary disease)
> ILD (interstitial lung disease)

The three pillars of efficient TNI

TNI Flow

The flow rate can be accurately determined, according to the patient's individual ventilation demand.
In combination with the TNI applicator, the TNI Flow generator guarantees a stable air flow during inspiration and expiration independent of the environment and pneumatic systems.

> flow volume: 10–50 l/min
> increments of 0.5 l/min

The flow rate should be significantly higher than the inspiratory demand. CO_2 elimination increases by raising the flow rate.

Applicator sizes cover different flow rates. The higher CO_2 washout required, the larger the applicator size needed.

Oxygen

O_2 addition can be titrated according to the patient's O_2 deficit.

> supply from any external O_2 source
> up to 20 l/min

Oxygenation remains efficient if the oxygen supply is simultaneously increased with the flow rates.

Humidification

The level of humidification and the temperature of therapy air can be adjusted by the patient according to comfort.

> dew point: 30–37°C DP
> increments of 1°C DP

34–37°C DP is recommended for optimal humidification of the respiratory tract.

Therapy air: humidification, application, monitoring

Humidification of therapy air in hospital / homecare environment

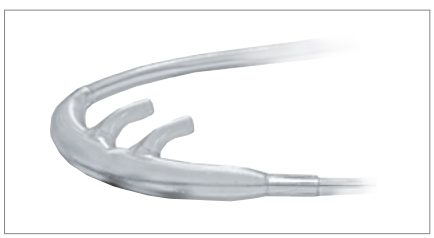
Hospital humidifier

- **quick transfer** between patients due to use of disposable components
- respiratory infection control guaranteed by bacterial filter

Easy conversion from hospital to homecare mode:
immediate continuation of efficient TNI for the patient at home.

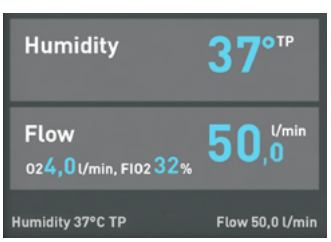
Homecare humidifier

- **easy handling** when filling with drinking water
- stable construction



Therapy air supply

- comfortable, soft silicone patient interface
- noise-optimized
- different sizes for customised therapy
- heating up to the prongs prevents condensation
- automatic applicator type recognition



Monitoring

The display provides information on

- current humidification and nominal value
- current flow rate and nominal value
- O_2 flow rate
- therapy air FiO_2

TNI

Therapy with Nasal Insufflation

Study results on TNI

2017

"TNI causes an effective CO_2 washout in the small respiratory tracts."

Bräunlich, J., Goldner, F.. & Wirtz, Nasal highflow eliminates CO2 from lower airways. Respir. Physiol. Neurobiol. 242, 86–88

2016

"As compared to O_2 therapy, TNI results in a significant reduction of work of breathing and respiratory minute ventilation as well as in a reduction of CO_2 levels, if applied during sleep in patients suffering from chronic COPD."

Biselli, P.J.C. et al. Nasal High Flow therapy reduces work of breathing compared to oxygen during sleep in COPD and smoking controls – prospective observational study. J. Appl. Physiol. jap.00279

"TNI increases the breathing efficiency in COPD patients facilitating the work of breathing and decreases pCO_2 proportionally to the flow rate."

Bräunlich, J., Köhler, M. & Wirtz, H. Nasal highflow improves ventilation in patients with COPD. Int. J. Chron. Obstruct. Pulmon. Dis. 11

"Constant FiO_2 of TNI guarantees an effective oxygenation."

Bräunlich, J., and Wirtz, H. Nasaler Highflow: Oxygenierungsverhalten unter verschiedenen Flowstufen. Pneumologie 70, P13

2015

"In patients suffering from stable hypercapnic COPD, TNI reduces the pCO_2-value."

Bräunlich, J., Seyfarth, H.-J. & Wirtz, H. Nasal High-flow versus non-invasive ventilation in stable hypercapnic COPD: a preliminary report. Multidiscip. Respir. Med. 10

"The CO_2 washout effect increases proportionally to the increase of flow rate."

Bräunlich, J., Goldner, F. & Wirtz, H. Nasaler Highflow (NHF) – Quantifizierung des CO_2–Auswascheffektes in einem Lungenmodell. Pneumologie 69

"In combination of NHF and O_2 in TNI improves oxygenation (SpO_2), reduces the breathing rate and alleviates signs of dyspnoea in patients with chronic lung diseases."

Bräunlich, J., Goldner, F. & Wirtz, H. Nasaler Highflow (NHF) – Konkurrenz für die Sauerstofftherapie? Pneumologie 69

! Please find more information on the studies at www.tni-medical.com

2013

"In COPD patients, tidal volumes increase due to TNI. Work of breathing is facilitated in patients suffering from obstructive or restrictive lung diseases."

Bräunlich, J. et al. Effects of nasal high flow on ventilation in volunteers, COPD and idiopathic pulmonary fibrosis patients. Respiration 85

"TNI lowers minute ventilation and breathing frequency while simultaneously increasing the tidal volume. The washout effect seems to be the key mechanism for the decrease in pCO_2."

Bräunlich, J., Köhler, M. & Wirtz, H. Nasaler High-Flow: Ist es ein wash-out-Effekt? Pneumologie 67

"TNI is a secure and efficient therapy procedure allowing oxygenation and reducing hypercapnia in COPD patients. TNI is superior to the classic O_2 therapy and improves oxygenation merely through nasal high flow."

Vogelsinger, H. et al. Highflow-Sauerstofftherapie bei hyperkapnischen COPD-Patienten: optimiertes Sauerstoffangebot – Daten aus der STIT-2-Studie. Pneumologie 67

"As compared to O_2 therapy, TNI alleviates nocturnal hypoventilation in COPD patients suffering from severe hypercapnic respiratory insufficiency."

Nilius, G. Nasal High Flow Oxygen Therapy Attenuates Nocturnal Hypoventilation In COPD Patients With Hypercapnic Respiratory Failure: B55. NON-INVASIVE VENTILATION. ATS 2013

2012

"Indices of sleep-related respiratory disorders improve during TNI."

Haba-Rubio, J. et al. Effect of transnasal insufflation on sleep disordered breathing in acute stroke: a preliminary study. Sleep Breath. Schlaf Atm. 16

"TNI does not negatively effect the cardiac performance and frequency, the stroke volume neither the mean arterial pressure and is thus a suitable alternative to CPAP for patients suffering from heart diseases."

Tiffin and Connelly. Differences in Hemodynamic Effects between CPAP and High Flow Therapy. RTSO Airwaves Fall

"Compared to CPAP, TNI does not raise the sympathetic tone."

Tiffin and Connelly. Differences in Neurophysiologic Effects between CPAP and High Flow Therapy. RTSO Airwaves Fall

2011

"In hypoxic patients, TNI is as effective as O_2 therapy during physical exertion. With regard to performance, energy and ventilation efficiency, TNI is superior."

Juhász. Comparison of two different O_2-delivery systems during exercise in patients with chronic hypoxia. The European respiratory journal

2010

"Obstructive hypopnea can efficiently be treated with TNI."

Nilius, G. et al. Predictors for Treating Obstructive Sleep Apnea With an Open Nasal Cannula System (Transnasal Insufflation). Chest 137

2009

"Moderate to serious sleep apnea in children can efficiently be treated with TNI."

McGinley, B. et al. Effect of a high-flow open nasal cannula system on obstructive sleep apnea in children. Pediatrics 124

TNI Therapy with Nasal Insufflation

References

Biselli, P.J.C., Kirkness, J.P., Grote, L., Fricke, K., Schwartz, A.R., Smith, P.L., and Schneider, H. (2016). Nasal High Flow therapy reduces work of breathing compared to oxygen during sleep in COPD and smoking controls - prospective observational study. J. Appl. Physiol. jap.00279.2016.

Bräunlich, J., and Wirtz, H. (2016). Nasaler Highflow: Oxygenierungsverhalten unter verschiedenen Flowstufen. Pneumologie 70, P13.

Bräunlich, J., Beyer, D., Mai, D., Hammerschmidt, S., Seyfarth, H.J., and Wirtz, H. (2013a). Effects of nasal high flow on ventilation in volunteers, COPD and idiopathic pulmonary fibrosis patients. Respiration 85.

Bräunlich, J., Köhler, M., and Wirtz, H. (2013b). Nasaler High-Flow: Ist es ein wash-out-Effekt? Pneumologie 67, P21.

Bräunlich, J., Seyfarth, H.-J., and Wirtz, H. (2015a). Nasal High-flow versus non-invasive ventilation in stable hypercapnic COPD: a preliminary report. Multidiscip. Respir. Med. 10, 27.

Bräunlich, J., Goldner, F., and Wirtz, H. (2015b). Nasaler Highflow (NHF) – Quantifizierung des CO_2 – Auswascheffektes in einem Lungenmodell. Pneumologie 69, V427.

Bräunlich, J., Goldner, F., and Wirtz, H. (2015c). Nasaler Highflow (NHF) – Konkurrenz für die Sauerstofftherapie? Pneumologie 69, P432.

Bräunlich, J., Köhler, M., and Wirtz, H. (2016). Nasal highflow improves ventilation in patients with COPD. Int. J. Chron. Obstruct. Pulmon. Dis. 11, 1077–1085.

Bräunlich, J., Goldner, F., and Wirtz, H. (2017). Nasal highflow eliminates CO_2 from lower airways. Respir. Physiol. Neurobiol. 242, 86-88.

Haba-Rubio, J., Andries, D., Rey, V., Michel, P., Tafti, M., and Heinzer, R. (2012). Effect of transnasal insufflation on sleep disordered breathing in acute stroke: a preliminary study. Sleep Breath. Schlaf Atm. 16, 759–764.

Hasani, A., Chapman, T., McCool, D., Smith, R., Dilworth, J., and Agnew, J. (2008). Domiciliary humidification improves lung mucociliary clearance in patients with bronchiectasis. Chron. Respir. Dis. 5, 81-86.

Juhász (2011). Comparison of two different O_2 -delivery systems during exercise in patients with chronic hypoxia. (The European respiratory journal), p. 387.

McGinley, B., Halbower, A., Schwartz, A.R., Smith, P.L., Patil, S.P., and Schneider, H. (2009). Effect of a high-flow open nasal cannula system on obstructive sleep apnea in children. Pediatrics 124, 179–188.

McGinley, B.M., Patil, S.P., Kirkness, J.P., Smith,1 P.L., Schwartz, A.R., and Schneider, H. (2007). A Nasal Cannula Can Be Used to Treat Obstructive Sleep Apnea. Am. J. Respir. Crit. Care Med. 176, 194-200.

Nilius, G. Nasal High Flow Oxygen Therapy Attenuates Nocturnal Hypoventilation In COPD Patients With Hypercapnic Respiratory Failure : B55. NON-INVASIVE VENTILATION.

Nilius, G., Wessendorf, T., Maurer, J., Stoohs, R., Patil, S.P., Schubert, N., and Schneider, H. (2010). Predictors for treating obstructive sleep apnea with an open nasal cannula system (transnasal insufflation). Chest 137, 521–528.

Tiffin, N.H., and Connelly, S.F. Tiffin and Connelly, RTSO Airwaves 2012_ Hemodynamics

Tiffin, N.H., and Connelly, S.F. Tiffin and Connelly, RTSO Airwaves 2012_ Neurophysiology

Vogelsinger, H., Halank, M., Wilkens, H., Geiser, T., Braun, S., Plattner, L., Janschek, E., Ott, S., Stucki, A., and Kaehler, C.M. (2013). Highflow-Sauerstofftherapie bei hyperkapnischen COPD-Patienten: optimiertes Sauerstoffangebot – Daten aus der STIT-2-Studie. Pneumologie 67, P40.

TNIFlow Makes The Difference

Against epidemics action

Scientific prevention

The"Disinfectant Use Guide"issued by National Health Commission of China for the new crown virus pneumonia epidemic clear the effectiveness of chlorine dioxide disinfectants and recommend the use of chlorine dioxide for air disinfection.

NO.206 Institute, NO.2 Second Research Academies, CASIC

Aerospace Guarder

Air Purifying Gel

Gaseous chlorine dioxide is released slowly

航天卫士™ 空气净化凝胶

Safe and lasting

Kill virus effectively

A powerful assistant for indoor sterilization.

Safe and Environmental protection

Lasting purification

Rapid disinfection

99.92%

Efficient sterilization

Slow release gaseous chlorine dioxide technology

Purify initiatively

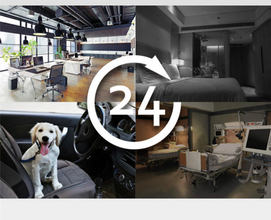
With slow-release gel technology, the release rate of chlorine dioxide gas is slowed down, and the low-concentration chlorine dioxide gas is continuously and steadily released, thereby achieving long-term continuous space disinfection.

Chlorine dioxide has a good adsorption and penetrating effect on the cell wall of microorganisms, It can penetrate into the interior of microorganisms, and inhibit the synthesis of proteins in them to achieve the purpose of microbial inactivation.

Day and Night

24 hours a day

Unrestricted place of use
Home, office, dormitory, car, hospital, etc.
Day and Night,
uninterrupted purification throughout the day.



Safe 安全绿色 Green

SGS Test is Non-toxic and Harmless

The product has been tested by SGS, an international authority inspection and certification agency. The results show that the Aerospace Guarder Air Purifying Gel is non-toxic and harmless, and has no irritation to the human body. The effective ingredient of the product is chlorine dioxide, which is internationally recognized as a safe and non-toxic green disinfectant.

Core Slow-release Technology
Lasting Purification

The technology of slow release gaseous chlorine dioxide can control the release concentration and cycle of chlorine dioxide through the formula and form of the gel and the slow release device. Aerospace Guard Air Purification Gel can currently control the release concentration between 0.01ppm to 0.03ppm, and the continuous release cycle is 1-2 months.

Efficient Sterilization

Research results at home and abroad show that chlorine dioxide can kill many pathogenic bacteria such as Escherichia coli and Staphylococcus aureus at very low concentrations.
Even under the interference of organic matter, almost all microorganisms such as bacterial propagules, viruses, phages and bacterial spores can be completely killed.
Tested by Guangzhou Institute of Microbiology 92%。
Aerospace Guarder air purification gel sterilization rate reached 99. 92%.

广微测
Gmicro Testing

CMA 201819000883
ilac-MRA
CNAS 中国认可 国际互认 检测 TESTING CNAS L1747

广东省微生物分析检测中心

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

分析检测结果

ANALYSIS AND TEST RESULT

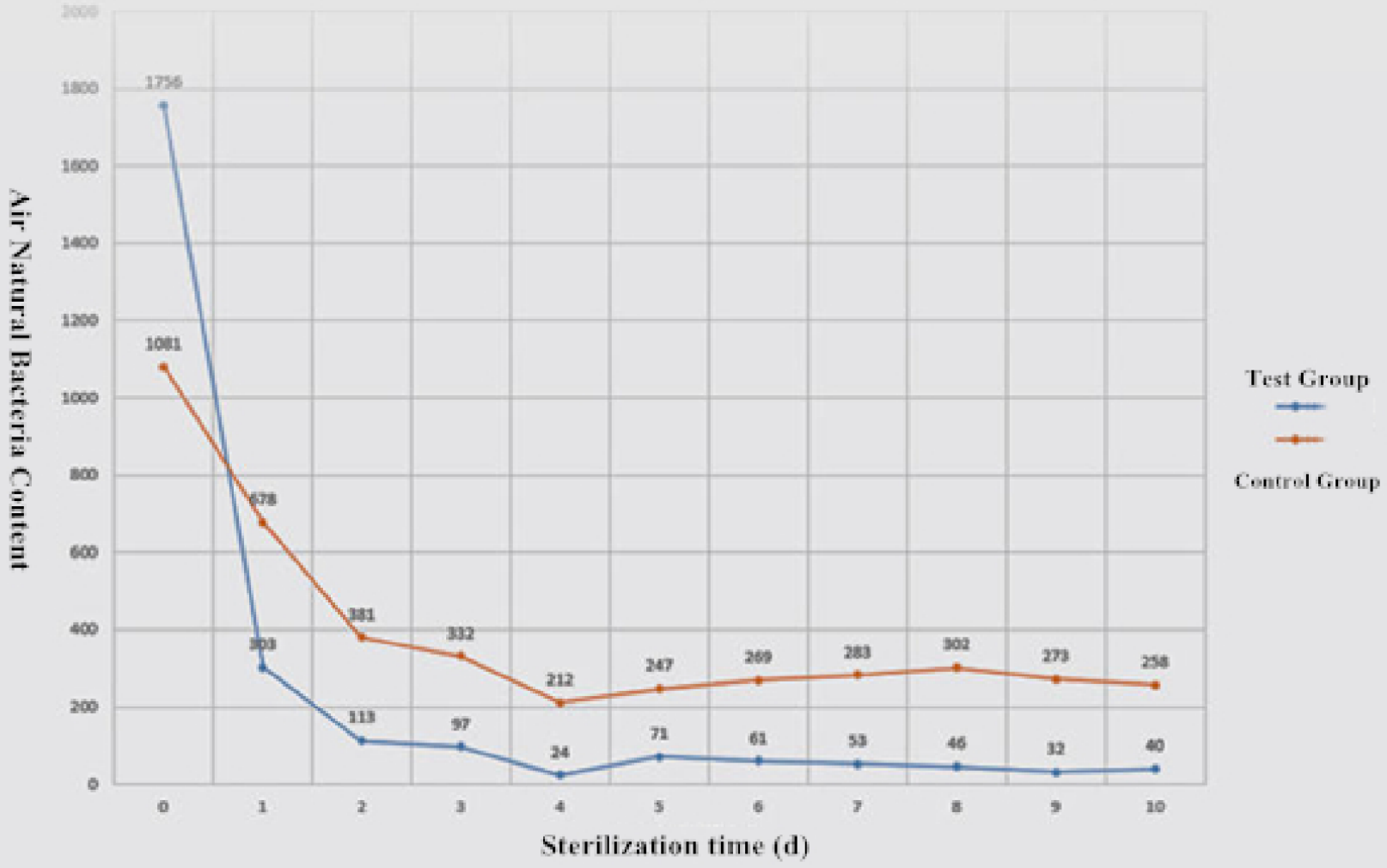
报告编号（Report №）：2019FM18592R02

Processing Time	Testing microorganisms	序号	空气中细菌总数（cfu/m³）	Sterilization Rate(%)
0（CK）	白色葡萄球菌（*Staphylococcus albus*）8032	1	3.1×10^{4}	
		2	2.9×10^{4}	
		3	3.4×10^{4}	
2h	白色葡萄球菌（*Staphylococcus albus*）8032	1	9.1×10^{2}	99.92
		2	9.1×10^{2}	99.92
		3	9.1×10^{2}	99.92

Rapid Disinfection

快速消毒

Compared with 84 disinfection solutions, ozone, chlorine and other traditional methods, slow-release chlorine dioxide is more effective and rapid in inactivating viruses and bacteria, and the sterilization and disinfection effect is continuously stable.



Visible Colors

颜色“可见”

With the active ingredient chlorine dioxide disinfection and sterilization, the color of the gel gradually changes from bright yellow-green to colorless; when the color of the gel becomes colorless, it can be replaced in time to determine the margin based on the color of the gel, and the use progress is clear.

Gel Color Changes During Use

Using Steps

Step 1:
Unscrew the cap and tear off the sealing film.

Step 2:
Screw on the bottle cap and open different release holes as needed.

Step 3:
Place it in a high place indoors (recommended 1 meter above the ground) to keep the bottle level.

Step 4:
If the gel color becomes colorless after continuous use, please replace it. (As shown below)

Invalid

Notice

1.Do not tilt or invert, each bottle (100g) of gel is suitable for 10-20m2 space.
2.The product should not be placed near radiators, direct sunlight, high temperature, etc., which may cause deterioration and failure.
3.If you feel the smell is too heavy, please use small holes to release it, and open the doors and windows for ventilation.
4.If you accidentally contact the gel in the bottle, please rinse with water in time.
5.Please keep out of the reach of children to avoid accidental eating.
6.There is a strong odor when the product is torn, which is a normal phenomenon. Please rest assured.

Product Information

Product Name: Aerospace Guarder Air Purifying Gel

Health Permit: Jin Bin Wei Xiao Zheng Zi (2020) No. 0018

Executive standard: Q / TTE005-2019

Active Ingredient: Slow-release gaseous chlorine dioxide

Specifications: 55mm diameter * 80mm

Net Content: 100g / bottle

Covered Area: 10-20 square meters / bottle

Duration: 1-2 months in normal environment after activation