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See more. **Do more.**

PneumoClear

The clear choice in insufflation

Smarter **insufflation**
for laparoscopic and robotic surgery

PneumoClear is the first all-inclusive system with integrated heating, humidification, and smoke evacuation capabilities, taking your insufflation experience to the next level.

6 Unique operating modes fine-tuned to the procedure at hand.

- Standard
- Advanced Flow
- Highflow/Bariatric
- Pediatric
- TAMIS
- Vessel Harvest

- **Heating**
- **Humidification**
- **Smoke evacuation**

All features are incorporated into lightweight and flexible tube set options

Heated/Humidified/Smoke Evacuation
PN: 620 050 350

Heated/Humidified
PN: 620 050 300

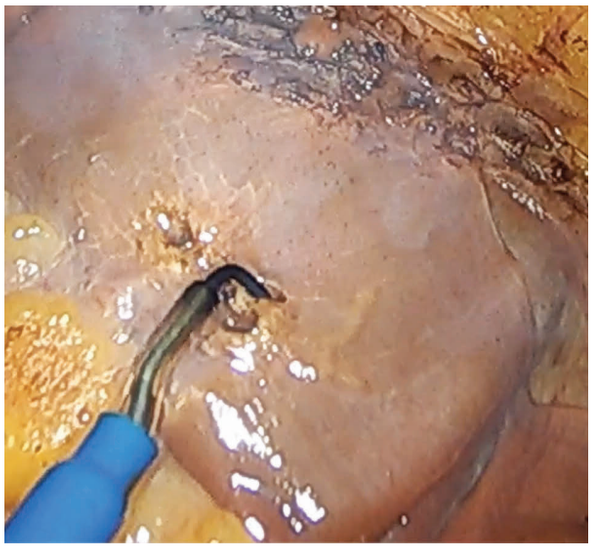
High Flow/Smoke Evacuation
PN: 620 050 250

Additional tube set options available: **High Flow** | PN: 620 050 100 **Heated** | PN: 620 050 200

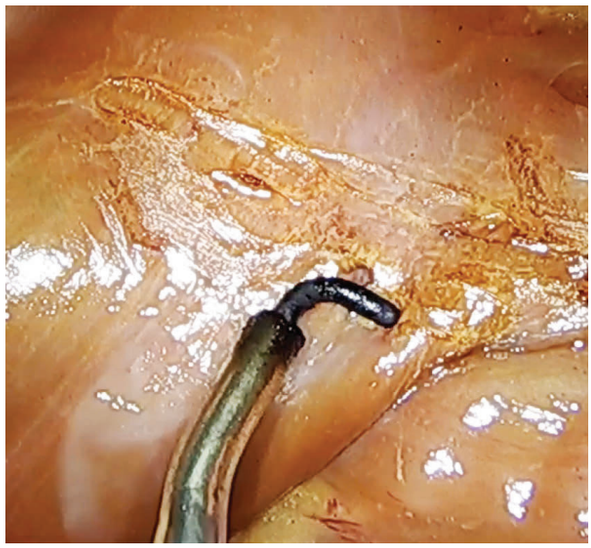
A clear **improvement**

Clarity when it counts

PneumoClear multitasks so that you can see what you need to see when it matters most. This smart insufflator is designed to provide a stable surgical site while actively removing smoke for a consistently clear image.



Conventional insufflation without smoke evacuation



PneumoClear smart insufflation with smoke evacuation

92% of surgeons surveyed said PneumoClear enhanced image clarity by **30% or more!**[5]

[5] PneumoClear Image Clarity Study, ECO052810

Make a **difference**

Protect your patients and staff

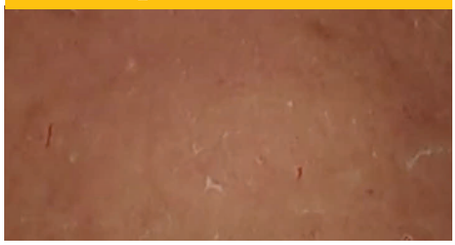
Protecting staff with the touch of a button, PneumoClear helps protect against the health hazards of smoke generation in your OR.

93% of nurses surveyed said they would feel more comfortable working in the OR when a smoke evacuator is being used[1]

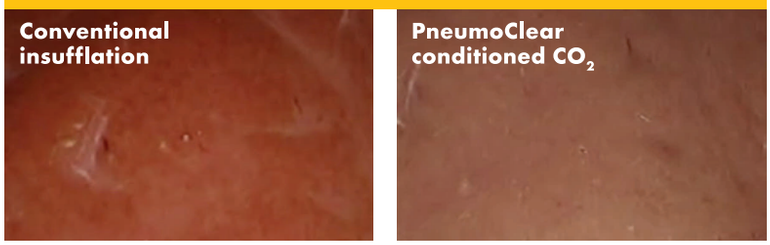
Helping patients recover with less pain[2]

See how tissue is affected using conventional vs. conditioned CO_2

Tissue at the start of procedure



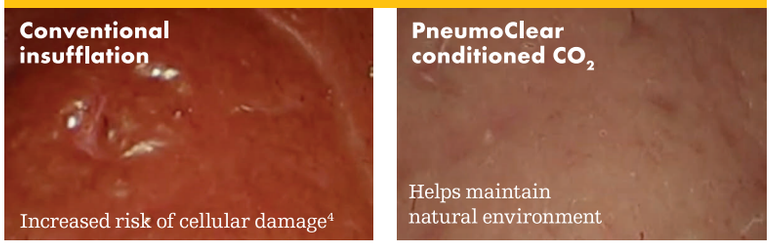
Tissue 30 minutes into procedure



Compared to cold and dry CO_2, heating and humidification can[3,4]:

- Reduce cellular damage
- Lessen inflammatory response
- Decrease adhesion formation

Tissue 60 minutes into procedure



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Learn more about:

- **Heating and humidification of CO_2**
- **Smoke evacuation**
- **Smoke Free OR Program**
- **PneumoNow Acquisition Program**

Contact your Stryker representative or call Stryker customer service for product ordering and additional information.

PneumoClear

All-in-one insufflation. **One-of-a-kind technology.**

One easy-to-manage device for all your insufflation needs:

- Smoke evacuation
- Heating
- Humidification
- Six unique operating modes
- Five interchangeable tube set options

One consolidated insufflation platform with several OR benefits:

- Enhanced image clarity[6]
- Improved workflow[2]
- Safer work environment[1]
- Improved patient satisfaction[4,5]

To learn more, contact your Stryker representative or call Stryker customer service at 1-800-624-4422 and get started today!

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Literature Number: Rev A. 1000902616

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Could you be smoking in your OR?

27-30 unfiltered cigarettes

The average daily impact of surgical smoke is equal to 27-30 unfiltered cigarettes.[1]

Potential risks of surgical smoke include:

- **Chronic bronchitis**
- **Carcinoma**
- **Leukemia**
- **Cardiovascular dysfunction**
- **and more...** [1, 2]

93%

of nurses feel more comfortable working in the OR with a smoke evacuation device in use.[3]

PneumoClear's smart inflow and outflow management system is designed to maintain stability while actively evacuating the harmful toxins of surgical smoke.

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Stryker's smoke-free **OR program**

Designed to protect patients and staff from surgical smoke while improving workflow at the same time.

97%

of nurses believe that integrating smoke evacuation into their insufflation tubing would give them more time to focus on patient needs.[3]

18 min

On average, integrated smoke evacuation is perceived to save 18 minutes per lap case.[3]

Use the PneumoClear system to help your facility **Go Clear.**

The AORN Go Clear Award™ program is designed for any facility that wants to improve patient and workplace safety, recruitment, retention, and be recognized for their commitment to a surgical smoke-free environment. Visit www.aorn.org/goclear.

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Literature Number: 1000902479 Rev. A

Get the PneumoClear Insufflator today with the PneumoNow program

Technology in healthcare is constantly evolving to keep up with the ever-changing needs of patients and health-care professionals. The **PneumoNow program** offers a solution to provide consistently clear images and additional control to the OR without any upfront capital outlay.

Offered through Stryker's Flex Financial business, PneumoNow is an alternative to cash and traditional finance agreements that will help you get the PneumoClear Insufflator through the regular purchase of insufflation tubesets.

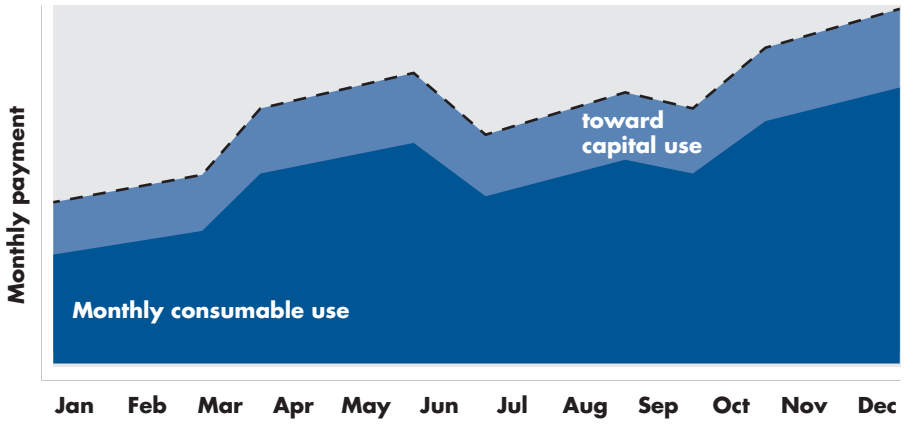
Integration of heating, humidification and smoke evacuation offer an all-inclusive insufflation package that can be tailored to the specific needs of your OR.

- **No capital outlay**
- **Simple, easy to understand agreement language**
- **Usage-based program is easy and convenient**
- **No buyout language**

How the PneumoNow program works

A representative from Stryker will work with you to determine your insufflator needs and identify your tubeset usage. We will use this information to prepare a proposal that includes recommendations for disposable usage over an agreed-upon time frame that will fund your immediate insufflation needs. At the end of the term, you can choose to return the equipment or continue paying for use.

Payments aligned with your surgical volume



Contact your local Sales Representative for more information about our flexible payment options.

PN 1000902415 Rev. A

Literature Matters Research Bulletin

Clinical Benefits of Heated and Humidified Insufflation
A Review of the Relevant Literature

SUMMARY

A recent review of the relevant published literature reveals a variety of positive clinical effects when comparing cold and dry insufflation with heated and humidified insufflation, including the effect on core body temperature, post-operative pain and peritoneal biological response.

Key Clinical Effects

- Core temperature heat loss has been shown to be mitigated during laparoscopic procedures when using heated and humidified CO_2 [1,2,3,5,10].
- Post-operative pain has been shown to be decreased after using heated and humidified insufflation[1,2,6,7,8].
- Heated and humidified insufflation has been shown to cause less peritoneal cellular damage, less inflammatory response, and less adhesion formation compared to cold and dry insufflation.[4,9]

Effect on core temperature:

Hypothermia is a concern and can be a detrimental effect of standard cold and dry CO_2 insufflation[4]. It is known to be associated with several effects such as susceptibility to wound infection, hypokalemia, impaired myocardial function and prolonged postoperative recovery[4]. During a literature review of clinical studies and laparoscopic procedures, authors concluded heated and humidified insufflation resulted in less heat loss than cold and dry insufflation.[1,2]

Effect on Postoperative pain and analgesic usage

Several clinical studies assessed postoperative pain and analgesic usage after using heated and humidified insufflation or cold and dry insufflation during general surgery, bariatric and gynecological procedures. All studies concluded there was a reduction of postoperative pain at various time points[1,2,6,7,8] and some concluded less analgesic usage following use of heated and humidified insufflation. While one randomized study reported no reduction of analgesic use after laparoscopic gastric bypass[8], a different double-blinded randomized controlled trial (RCT) reported decreased pain medication utilization up to 10 days post-operatively[6] after lap-band procedures when heated and humidified insufflation was used.

In a gynecological double-blinded RCT clinical study it was reported that morphine demand was significantly reduced after using heated and humidified insufflation during laparoscopic assisted vaginal hysterectomy[7].

Effect on Peritoneum:

Research in rat models reported there was less damage to peritoneal tissue after exposure to heated and humidified insufflation vs exposure to cold and dry insufflation.[4, 9] After use of cold and dry insufflation, peritoneal damage was detected through disruption of the underlying connective tissue, increased inflammatory cells and intra-abdominal adhesion formation two weeks after the procedure.[4,9] In contrast, exposure to heated and humidified insufflation showed much less peritoneal damage and intra-abdominal adhesions were not found.[4]

Conclusion

Positive health effects have been reported with the use of heated and humidified insufflation during studies of laparoscopic procedures. Across several studies authors concluded that the usage of heated humidified vs. cold and dry insufflation reduced heat loss, reduced postoperative pain, and caused less peritoneal damage.[1-10]

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Literature Number 1000902228 Rev. A

Literature Matters
Research Bulletin

Clinical Impact of Surgical Smoke Evacuators
A Review of the Relevant Literature

Top Level Summary

The use of electrosurgery tools, laser ablation and ultrasonic scalpels during Operating Room (OR) procedures generate surgical smoke through thermal tissue destruction. Surgical smoke causes several health hazards to OR personnel depending on chemical composition of smoke, duration and type of procedure, type of tissue ablation and worker's proximity to surgical field. In recent studies, surgical smoke has been reported to be carcinogenic, mutagenic and capable of carrying viable viruses, viable bacteria and cells.[1, 4, 6]

Although surgical smoke exposure is unavoidable for OR personnel, studies have discussed the positive clinical impact of a smoke evacuator during procedures including better visualization of surgical field, reduced risk of exposure to harmful compounds and possible prevention of aerosolization of bacteria to surgical site. [1, 2]

Key Take-aways

- It is estimated that each year 500,000 healthcare workers are exposed to surgical smoke, with potentially serious repercussions.[3]
- Ablation of 1 g of tissue produces a smoke plume with an equivalent mutagenicity to six unfiltered cigarettes.[4]
- Surgical smoke contains intact virions (HIV, Hepatitis, HPV), viable bacteria and viable cells.[6,12] In an animal study, surgical smoke was reported as a vehicle for transplanting malignant cell to benign tissue.[6,7]
- Standard surgical masks are inadequate in filtering smaller size particles(less than 1.1 microns) and 77% of the particulate matter of surgical smoke is less than 1.1 microns in size.[5]

Discussion and Conclusions

Surgical smoke evacuation devices have been shown to be effective in limiting exposure to the noxious odor and potential health hazards of smoke and plume.[1,2] Although no legal or regulatory mandate specific to surgical smoke evacuation currently exists, a number of standard organizations (OSHA, NIOSH and AORN) recommend removal of surgical smoke with acceptable engineering controls and local ventilation including smoke evacuation systems.[3,11] Yet, these devices have not been used on a routine and consistent basis in many ORs.[5] A multispecialty survey, by the Royal College of Surgeons (England), found only 3% of surgeons used a smoke extracting device in their practice.[8] A few reasons for lack of use of smoke evacuation devices may include high cost, inconvenience due to loud noise, and a general lack of knowledge regarding potential hazards associated with exposure to surgical smoke plumes.[9,10] Despite the mutagenic effects and presence of carcinogens in the surgical smoke being known for over 20 years, scientific consensus on the dangers of long-term human exposure is lacking.[13]

Authors acknowledge that expense, convenience, and apathy are unacceptable impediments when the health and safety of OR personnel may be compromised without evacuation devices.[10] Authors concluded that although studies in larger cohorts are needed on long-term health effects of surgical smoke exposure[4], available study evidence indicate that it is time to mandate the use of smoke evacuation systems in every OR.[10]

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