### Jets Sanitary Systems – a smarter, greentech solution for any building





# What is a Jets<sup>™</sup> vacuum sanitary system?

#### A vacuum sanitary system uses air instead of precious water to transport human waste. Only a small volume of water is used to clean the bowl

The basic principle for a modern vacuum sanitary system is the use of an in-line pump to create the vacuum directly in the piping system.

When a vacuum toilet is flushed, the waste in the toilet bowl is drawn into the piping by the very air needed to transport it.

The Jets<sup>™</sup> Vacuumarator<sup>™</sup> pump then macerates the sewage using an integrated macerator, and automatically pumps it to a sewerage system of choice.

#### Two basic Jets™ vacuum systems

#### VOD<sup>™</sup> (Vacuum On Demand):

Smaller systems with up to 4 toilets, urinals and/or grey water interface units.

#### CVS<sup>™</sup> (Constant Vacuum System):

Larger systems with an unlimited number of toilets, urinals and/or greywater interface units.

# Vacuum is the future of sustainable sanitary systems!



# Three vacuum generating principles

#### Fifties and sixties solution

First generation vacuum sanitary systems were large and bulky, including an expensive vacuum tank. They required several pumps to operate satisfactorily.

One set of pumps maintained the vacuum in the system's large tank, while a second set of discharge pumps was used to empty the tank's contents.

### Seventies and eighties solution

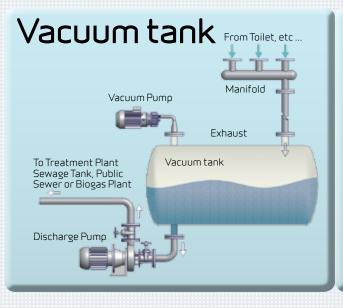
The ejector system launched in the late seventies was an improvement over the first generation. However, it was still a system of considerable size.

As in the first generation systems, several pumps were needed to operate an ejector system. A recirculation tank was also needed for vacuum generation, and this caused other problems such as foaming.

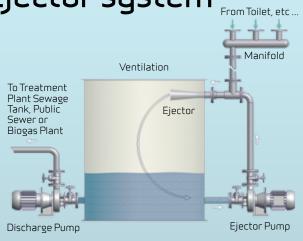
#### Millennium solution

The patented Jets<sup>™</sup> Vacuumarator<sup>™</sup> pump is the most compact, efficient and reliable vacuum generator for vacuum toilet systems.

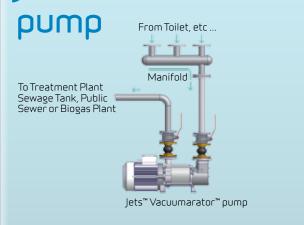
The Vacuumarator<sup>™</sup> pump can pump directly to a sewage treatment plant, a sewage tank, a biogas plant, or the public sewer system.



#### Ejector system



#### Jets<sup>®</sup> Vacuumarator<sup>®</sup>



# Gravity toilets vs vacuum toilets

	Traditional gravity toilets	Jets™VC™
Need for gravity / slope	Yes	No
Litres of water per flush	6 to 19 litres	1 litre
Sewage per year per person	13 - 41 m³	2 m <sup>3</sup>
Hygiene	—	+
Pipe dimensions	110-150 mm	50-75 mm
Piping cost	High	Lower
Initial investment cost	Depends on type of project	Depends on type of project
Return on investment	—	+
Installation work advantages	-	+
Installation flexibility	Low	High
Cost of outdoor infrastructure	High	Low
Transport / pumping cost water in	High	Low
Transport / pumping cost sewage out	High	Low
Sewage treatment cost	High	Low
Separation of black and grey water	Notsustainable	Sustainable solutions
Use of blackwater for biogas	Notsustainable	Sustainable solutions

# How much can you save?

	Traditional WC	Jets™ VC™
Water required per flush	8 litres	1 litre
Toilet visits per person - per day - average	6	6
Number of persons	10,000	10,000
Operation days per year	365	365
Total use of water per year	175,000 m³	21,900 m³

#### You will save 153,300m<sup>3</sup> of fresh water annually

Local water price per m³ (€2 per m³)	306,600 Euro
Sewage disposal cost per m³ (€1 per m³)	153,300 Euro
Total direct savings	459,900 Euro

#### Indirect savings - water used for flushing toilets:

80-90% less transportation / pumping cost of fresh water

- 80-90% less transportation / pumping cost of sewage
- 80-90% less sewage for disposal and treatment

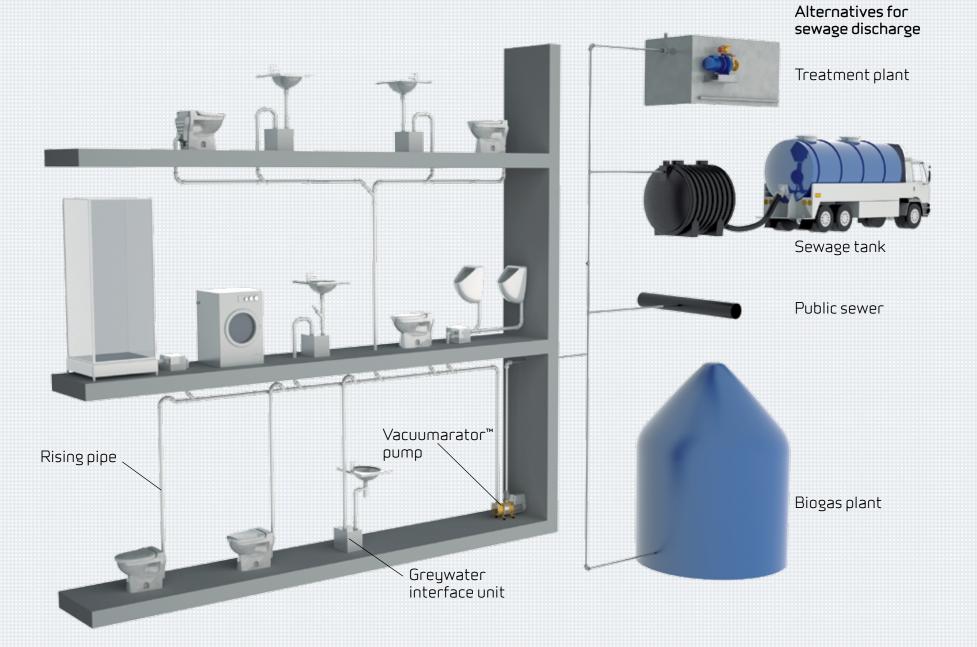
# A bathroom exactly the way you want it



A Jets<sup>™</sup> vacuum system fits in with any kind of bathroom – a luxurious retreat, the charm of traditional craftsmanship, or an ultra-modern design.

There's no need to compromise on any detail just because you have chosen an environment-friendly sanitary solution. On the contrary – Jets<sup>™</sup> flexibility creates new opportunities for creative bathroom architecture.

# A Jets<sup>™</sup> System may consist of...





FLOOR-MOUNTED PORCELAIN



WALL-MOUNTED PORCELAIN



STAINLESS STEEL



URINAL



GREYWATER INTERFACE UNIT



# The Jets<sup>™</sup>

The robust Jets<sup>™</sup> solution has proved to be highly practical for numerous applications.

In-line installation of Vacuumarator™ pumps combined with a small footprint and low weight allows unique installation flexibility and considerable weight savings compared with other systems.

# System

#### Unique Vacuumarator<sup>™</sup>pump

The patented Vacuumarator<sup>™</sup> pumps are the most compact, efficient and reliable vacuum generators available for vacuum toilet systems



- Continuous flow with no increase in temperature will enhance any downstream treatment process
  - Single-in, single-out connection allows true in-line installation – no need for extra components
- Highly efficient vacuum production enables a small motor with low energy consumption
- The helical screw and liquid seal ensure efficient vacuum production
- The integrated macerator cuts waste to a fine pulp for optimal transport







SMALL: 15MB-D



MEDIUM: 25MBA



LARGE: 95MB



XXL: 250NT

# Jets<sup>™</sup> is a practically

#### According to international standards:

- Toilets should have the capacity to handle peak periods when they are used by 67% of users within one hour
- The average person uses a toilet 6 times a day
- One public toilet allows up to 15 visits per hour
- Urinals: Allow up to 60 visits per hour

#### Jets solutions for buildings of any size:

- A lets<sup>™</sup> solution can be configured for any capacity and configuration
- Compact units with a small footprint are easy to install.



Туре No. of flushes per hour







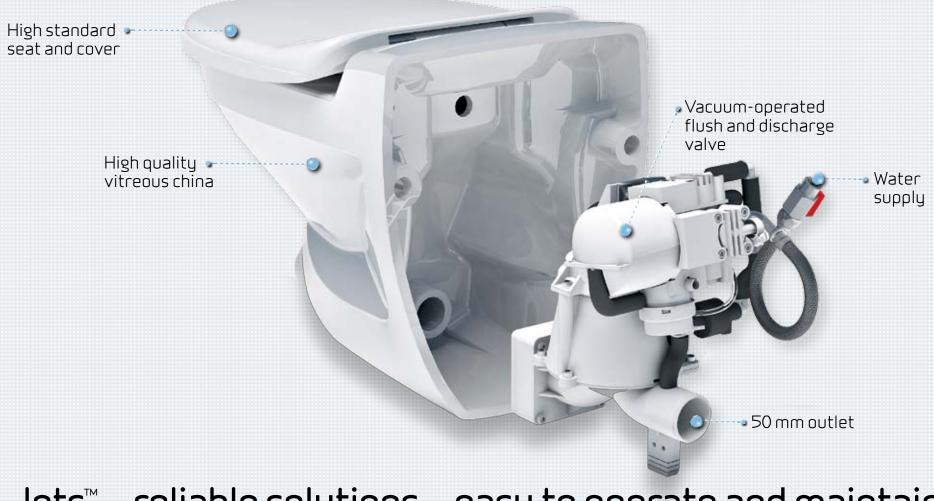
## limitless system







## The Jets<sup>™</sup> vacuum toilet – safe and simple construction



Jets<sup>™</sup> – reliable solutions – easy to operate and maintain

# Vacuumarator<sup>®</sup> pump well-proventechnology

Inlet Vacuum side Outlet
Pressure side

**Quality materials** All materials are rated for professional sanitation. The metals used are corrosion resistant

The Vacuumarator<sup>™</sup> pump has a proven record for low maintenance

The integrated macerator is made of high quality materials

1200

The helical screw principle uses liquid to create the seal, minimizing mechanical wear

Few moving parts. Robust and reliable

## Jets<sup>™</sup> toilets save USD 165,000 every year for this business complex in São Paulo

Complexo JK in São Paulo is a 30-storey office block of 90,000 square m<u>etres.</u>

The building was not originally designed for vacuum toilets when construction started.

After the project had been on hold for some time, the new owner saw the advantages of a Jets<sup>™</sup> installation.

The system, with 412 toilets, was delivered in December 2007. And further vacuum toilet installations are planned.

### Challenges

### Jets<sup>™</sup> Solution

WATER SUPPLY: Although Brazil has the largest reserve of fresh water on Earth, São Paulo is facing a water crisis due to wastage and contamination.	WATER SUPPLY: The Jets <sup>™</sup> vacuum system reduced water use by up to 90% of what gravity toilets would need. With São Paulo's soaring water prices, that meant a payback period of less than two years and substantial savings every year after that.
<b>SEWAGE:</b> The costs of treating sewage have risen in line with water prices.	<b>SEWAGE:</b> Sewerage costs were also reduced by up to 90%, saving running costs for the building complex every day.
<b>SEWER CONNECTION:</b> The closest point for the sewer connection was already working at full capacity. The nearest possibility was 200 metres away.	SEWER CONNECTION: The pumping power already available in the Jets <sup>™</sup> system made it possible to pump the sewage to the connection point further away. A gravity system would have required an additional pump.
<b>INFRASTRUCTURE:</b> The vast population of the megacity has placed its infrastructure under strain.	INFRASTRUCTURE: Jets <sup>™</sup> solutions create new opportunities for property development in areas with overloaded water and sewerage systems.
BUILDING DESIGN: The building had not originally been designed for vacuum toilets.	BUILDING DESIGN: The small-diameter pipes needed for the Jets <sup>™</sup> system made it possible to install vacuum toilets in a later construction phase. The flexible piping will also make it easier to change the layout to suit the different needs of new tenants in the future.
High costs	Lower total costs

## In São Paulo, Brazil, water is scarce and expensive In 2007 this university installed alets system which paid for itself in 15 months



### Challenges

WATER SUPPLY: High bills for water were a burden on the university.

SEWAGE: With so many users, the volume of sewage and the associated costs were substantial.

**CLOGGING:** Clogging and vandalism had been a problem with the previous toilets, where a blockage could put a whole group of toilets out of action.

**22,000 STUDENTS:** With traditional gravity toilets - 60,000 toilet flushes per day 420,000 litres of water per day

### Jets<sup>™</sup> Solution

WATER SUPPLY: With less than 1 litre per flush, Jets<sup>™</sup> toilets reduced water consumption for flushing from 420,000 litres to about 60,000 litres every day.

**SEWAGE:** Volumes were cut by up to 90%, dramatically reducing the load on the sewerage systems and cutting costs accordingly.

GREATER RELIABILITY: Students appreciated the new Jets™ toilets, and there were far fewer problems with blocked toilets. If one toilet did get blocked, it was an isolated problem which did not affect the other toilets.

22,000 STUDENTS: With Jets<sup>™</sup> vacuum toilets -60,000 toilet flushes per day Only 60,000 litres of water per day

#### Daily water cost USD 1800

#### Daily water cost USD 320

# Jets building features in the Uninove university project

At Uninove's Campus "Barra Funda", one central 195MB Vacuumarator™ unit collects sewage from half of the building (360 toilets). Another 195MB Vacuumarator™ unit is connected with the first to serve the other 360 toilets. The water supply is connected to the reservoir, which collects rainwater.



5

# Jets<sup>™</sup> breakthrough in Brazil

#### "Green buildings – my niche"

"Our first major breakthrough in Brazil -

-

the Uninove university

in São Paulo"

"I had seen traditional vacuum systems for toilets before. As an engineer, I was sceptical. But when I saw the Jets<sup>™</sup> solution, I understood straight away that this was a much, much better design. With a small, powerful Vacuumarator™ pump and no need for a vacuum tank, it was easy to use and maintain.

I was looking for an opportunity in technology projects that would enable me to compete with larger players. Green buildings created a niche for me. lets™ vacuum toilets became an important part of my portfolio.

As a trial, Tavola installed 5 toilets at Incor, the Heart Institute at the University Hospital of São Paulo. During each of the two installation phases, half of the emergency room closed down for the installation. The other half continued functioning normally.

#### "They all liked how easy the sustem was to run"

The clients loved the vacuum system. The patients liked the idea of green technology and the hospital was very pleased with how easy the sustem was to run.

#### "Only this?"

If I take people to see the Vacuumarator™ pump, I have to ask the maintenance staff to clean the technical room first, because they hardly ever have to go in there otherwise and it might get a bit dustu. When my guests ask where the whole vacuum installation is, I say: "You're looking at it."

"What?" they say, "only this?" They can't believe it's so compact.

The next installation was at the university of Uninove in São Paulo. The complete project involves 720 toilets in the Barra Funda buildings and 680 on the Santo Amaro campus.

for water and sewerage,

the payback period for installations completed so far has been about

Interview with Marco Cerul

15 months."

Tavola engenharia lets<sup>™</sup> distributor in Brazil

> Another major installation was the WTorre office block with 426 toilets. A great advantage of Jets<sup>™</sup> systems is the flexibility that they enable in the floor layout.

Today, there is a whole new awareness of the potential of vacuum toilets for saving water in Brazil. And with Brazil's high charges for water and sewerage, the payback period for the installations completed so far has been about 15 months"

"With Brazil's high charges "Our second breakthrough in Brazil - the Torre São Paulo office block



Vacuum sanitary systems can be installed without closing down hospital sections. With small-diameter vacuum pipes, there is much less need for core drilling and the resulting noise and dust. This hospital in France, Les Cadrans Solaires, has 138 vacuum toilets. These were installed during renovation of the building with very little impact on the normal hospital functions. The system has functioned reliably since it started operating in 1993.

At the Belfast City Hospital, renowned for its work in cancer diagnosis, treatment, and research, Jets<sup>™</sup> sanitary systems provide a practical and effective solution for storing radioactive sewage until the radioactivity has been reduced to a safe level. The low volume of sewage from vacuum toilets simplifies this process. Greater hygiene with less risk of aerosol contamination from flushing toilets is another important factor.

In a pilot project, five vacuum toilets were installed at Incor, the Heart Institute at the University Hospital of São Paulo, one of the world's leading cardiology institutions. The installation was completed in two stages. During each stage, half of the emergency room was closed down for the installation – the other half continued functioning normally.

Ballino De SORAISÃO

### Challenges

Jets<sup>™</sup> Solution

<b>ISOLATION OF SEWAGE</b> : Sewage contaminated by radioactive isotopes poses a risk to the environment.	ISOLATION OF SEWAGE: Jets <sup>™</sup> sanitary solutions make it possible to install a sealed system for isolating radioactive sewage until the radioactivity has been reduced to a safe level. The low volume of sewage from a vacuum sanitary system simplifies this process.
<b>HYGIENE:</b> Hospital-acquired infections are a growing concern.	HYGIENE: A Jets™ toilet draws air and pathogens into the vacuum system with every flush. Practically no aerosols are released into the room.
<b>RENOVATIONS:</b> May disturb patients and make it necessary to close sections of the hospital.	<b>RENOVATIONS:</b> Vacuum sanitary systems with small diameter pipes can be installed in existing facilities with much less downtime and disturbance to patients than gravity systems involve. There is less need for floor and ceiling penetration, with the resulting dust produced by concrete drilling. Sewage can even be pumped upwards for up to 4 meters.
Hospitals need better	Vacuum toilets offer new

#### Hospitals need better sanitary systems

Vacuum toilets offer new solutions for sewage isolation and hygiene

## The Norwegian University of Life Sciences (UMB) – focusing on sustainability – chooses lets Solutions

#### Vision: closing the loop

The Norwegian University of Life Sciences and Jets<sup>™</sup> both require an innovative sanitation system for collecting and recycling waste water and organic household wastes in order to reuse water, energy and nutrients.

### Challenges

### Jets<sup>™</sup> Solution

SEWAGE IS A RISK IN INLAND WATERS: Sewage washes out nutrients that cause SEWAGE IS A RESOURCE: Greywater (from sinks, showers and washing machines) harmful accumulation in inland waters. Bacteria feeding on decomposing sewage and blackwater (from toilets) go to separate outlets. This creates possibilities for steal dissolved oxygen from the water, which can suffocate other aquatic life. water saving and reuse, and production of organic fertilizer and renewable energy (biogas) from blackwater. This is the aim behind the sanitation sustem at Sørhellinga Building and student apartments at the Norwegian University of Life Sciences (UMB). They are equipped with a Jets<sup>™</sup> vacuum toilet system and biological purification of greywater. FOSSIL FUELS: Diluted blackwater from gravity toilets is difficult to convert into **RENEWABLE ENERGY:** Concentrated blackwater from vacuum toilets is a resource for renewable energy (biogas). biogas as an alternative to fossil fuels. WORLD PHOSPHATE SHORTAGE: Exploding growth in food production could cause **RECOVERY OF NUTRIENTS:** Vacuum toilets make it possible to recover valuable a shortage of phosphate, which is essential to agriculture. There is no substitute nutrients from blackwater so that it can be used as organic fertilizer in the field of for phosphate, and energy is needed to produce it. agriculture. FRESH WATER IS USED TO FLUSH TOILETS: Energy used to purify and pump fresh LESS ENERGY AND CO., EMISSIONS: A source separating outlet, vacuum toilets, and low-energy greywater purification reduce the energy needed for water water is wasted when the water is used to flush toilets. pumping and sewage treatment. This also reduces CO<sub>2</sub> emissions. SORHELLINGA - AN OPPORTUNITY REALIZED: The university's Sorhellinga Building, built in 1979, has been modernized with environment-friendly technology **RENOVATION OF OLD BUILDINGS:** Renewal of existing buildings creates opportunities for more sustainable solutions. including vacuum toilets, a source separating outlet for greu- and blackwater, and a separate water supply for flushing toilets. The biological purification of greywater has been developed by the university and lets™ through the company Ecomotive™.

#### New solutions needed

# Sustainable solutions implemented in practice

### When 70,000 fans visit toilets within a few minutes you need enormous water and sewage capacity!

# Unless you install a vacuum sanitary system

The Castelão Stadium in Fortaleza, Brazil, holds the record for the world's largest onshore vacuum sanitary installation. Read more about it on www.jetsgroup.com.

### Challenges

volumes of water.

FIFA RECOMMENDATIONS: There should be at least 20 toilets for each 1000 women, and 15 toilets and/or urinals for each 1000 men, with a higher ratio in VIP areas. The infrastructure required to achieve this may be difficult to provide.

Jets<sup>™</sup> Solution

FIFA RECOMMENDATIONS: |ets<sup>™</sup> vacuum systems can meet the recommended specifications and cope with high flushing rates in short periods, proven for decades on the world's largest cruise liners. The small footprint of the system, simpler logistics, less need for core drilling and sewerage trenching make it easier to install vacuum toilets. Small-diameter vacuum piping can be routed upward and around obstacles. WATER SAVINGS: Water consumption can be reduced by up to 90% WATER CONSUMPTION: Gravity toilets for stadiums need large compared with gravity toilets. SEWERAGE: The volume of sewage from the stadium may SEWERAGE: Vacuum toilets reduce sewage volumes by up to 90%, reducing the load on the existing public network. **DIFFICULTTERRAIN**: Vacuum piping can be laid in shallow trenches in flat, rocky, sandy, or swampy terrain, reducing installation and

sewage to the nearest connection point.

overload the existing infrastructure.

**DIFFICULT TERRAIN:** Geological conditions at stadiums can make excavation difficult.

HYGIENE: Inadequate, unhygienic and dirty toilets may be a health risk and encourage anti-social behaviour.

MORE HYGIENIC: The powerful vacuum draws the waste along with more than 60 litres of air into the piping with every flush, reducing aerosols and odours. Spectators respect clean and efficient toilet facilities.

maintenance costs. The built-in vacuum can also be used to pump

#### **Costly infrastructure** is needed

#### **Cost-effective solutions** for stadiums

#### The ultimate in hygiene is essential at this Marine Harvest salmon processing plant in Herøy, Norway — one of the largest in the world. Jets<sup>™</sup> vacuum toilets make it possible to keep the sanitary systems completely separate from the production area.

Jets systems add sanitary benefits

to food processing plants

### Challenges

### Jets<sup>™</sup> Solution

FOOD SAFETY: Consumers and authorities set high standards<br/>for food safety. It is vital to pay the utmost attention to hygienic<br/>food production. One recall of products or a stop in production<br/>because of contaminated food due to poor hygiene can spell<br/>disaster for a food producer and its reputation.E<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>to<br/>

**TOILET FLUSHING MAY SPREAD GERMS:** Gravity toilets may spread germs and odours with every flush.

LACK OF INFRASTRUCTURE: Processing plants may be some distance from municipal sewer connections.

**FACTORY UPGRADE COSTS:** The need for continuous renewal and upgrades of the production facilities involves high costs.

**DIFFICULT TERRAIN:** The land around processing plants may be rocky or difficult to excavate.

**REGULATIONS FOR FACTORY DESIGN:** Stricter regulations from the authorities may require changes in factory sluices and plumbing installations. This can be difficult to achieve with gravity sanitary systems. **EXTREME HYGIENE:** The flexibility of the Jets<sup>™</sup> vacuum system makes it easy to keep sewage in a closed system separate from the production area, contributing to the highest standards of cleanliness and hygiene.

**CLEANER FLUSHING:** The powerful vacuum draws the waste along with 60 litres of air into the piping with every flush, reducing aerosols and odours to an absolute minimum.

PUMP SEWAGE TO NEAREST CONNECTION: The built-in pumping power in the Jets<sup>™</sup> system can be used to pump sewage several hundred metres to the nearest connection point. No extra pump is needed for this process. And with 90% less sewage, the load on the infrastructure is far less.

SAVE UPGRADE COSTS: The flexibility and adaptability of the Jets<sup>™</sup> vacuum system save costs when production facilities are upgraded. It is easy to position sanitary facilities wherever they fit in best in the building.

**SHALLOW TRENCHES:** Less excavation is needed for vacuum piping.

**REGULATIONS FOR FACTORY DESIGN:** Replacing gravity toilets with vacuum technology during renovations makes it easier to update the factory layout for compliance with new regulations that may be introduced in the future.

## "In unspoilt fjords and valleys greentech solutions make sense -

HOTELL IVAR AASEN

smarter ways to build are the bonus!" "When you look out over the Ørsta fjord and the Sunnmøre Alps, you understand: the environment is at the heart and soul of this hotel. Our guests expect us to take the best possible care of it.

The small-diameter vacuum piping was a great advantage during the renovations. It reduced our installation costs because we did not need to do so much core drilling or to hack up existing floors, and we needed less ceiling height. What's more, we did not need to close the hotel during the building period.

The vacuum system cuts our water consumption and sewage output by 80-90%, reducing our operating costs.

And the sewage – both blackwater and greywater – is a resource with the potential for renewable energy. To survive in this competitive market, we must listen and live up to our customers' expectations regarding environmental issues. Choosing the greenest possible alternative gives us a competitive edge."

#### "Traditional ways are not good ..." enough any longer... fo

...the time has come for better solutions!"

– says Sigurd Johan Torheim, owner of Hotell Ivar Aasen in Ørsta, Norway

### New opportunities in both new bu

Bedroom converted to bathroom. Bathroom can be located anywhere without disturbing the floor below

New opportunities for areas at street level restaurant, hair salon, dental surgery Small pipe dimensions save space in ceilings and walls

> Room ready for interior fitting of bathroom, kitchen, laundry

Make the most of a basement, position sanitary installations anywhere

# ildings and rehabilitation projects

Simple installation, not dependent on slope. Easy to route around ventilation ducts and other obstacles

Only 3 points for core drilling. Savings compared with core drilling of 17 holes for ordinary wastewater pipes.

No need for submersible sewage pump

### Case 1 - Making the most of a basement

**CHALLENGE:** An insurance company needed extra space. To make the most of the basement, the company wanted to install two toilets there. But the basement was below the municipal sewer line.

JETS<sup>™</sup> SOLUTION: The vacuum system enabled sewage to be pumped up to the municipal sewer. No need for new piping or concrete drilling in the upper floors. Above ground, the staff could carry on working as usual without downtime. The compact Vacuumarator<sup>™</sup> pump needed less than a square metre of space, so it was easy to fit into an existing storeroom.

#### Case 2 - Don't disturb tenants below

**CHALLENGE:** An apartment owner wanted to install a new bathroom in the building without disturbing the existing tenants who were living below, or putting a soil pipe through their ceiling.

JETS<sup>™</sup> SOLUTION: A Jets<sup>™</sup> system was installed, with the vacuum pipe leading up to the ceiling and into the existing soil pipe. The people living below were unaffected.

### Case 3 - No concrete drilling for the dentist

CHALLENGE: The offices for the county dentist were above a supermarket. The dentist needed two toilets in the waiting room as well as a washbasin and mouth-rinse facility in the surgery. Installing a gravity toilet would have involved drilling through the concrete floor slab, not to mention placing a soil pipe over the vegetable counter of the supermarket below.

JETS<sup>™</sup> SOLUTION: Instead of core drilling, a Jets<sup>™</sup> vacuum system was installed. The Vacuumarator<sup>™</sup> pump was placed in the loft together with the air compressors needed for the dental equipment.

#### Case 4 - Defying gravity

**CHALLENGE:** A house situated below the municipal sewer line and close to a protected lake with 250 species of nesting birds.

JETS<sup>™</sup> SOLUTION: A Jets<sup>™</sup> vacuum system was installed with two toilets, a shower and kitchen plumbing in the main house. A self-contained basement unit had a shower, toilet, washbasin and kitchen. A gravity solution would have required a large tank and pump station, and would have been more expensive to install. The sewerage pipe had to be dug beneath the road, so the small dimensions and small sewage volume were a major advantage. The result: a complete sanitary solution, fully compliant with municipal regulations.

### Jets™ Sanitary Systems – made to please



#### solutions that make sense for a new century

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#### www.jetsgroup.com

Your local Jets™ distributor:

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