

Nivalis Overview

Nivalis are the World leaders in Ice Pigging

Ice Pigging is an innovative pipeline **cleaning** solution that uses ice + additive
Nivalis use the same principles as a kids slush puppy (U.S. *Slushy*) drink and use it in industrial applications

It utilises the special properties of the **multiphase** ice/liquid mixture

Flows like a **liquid**, moves like a **solid** – **It's Ice that flows, as it flows it cleans.....**

Applications across a range of industries

Low risk process (it melts)



The Nivalis Leadership Team



Nivalis have been at the forefront of Ice Pigging since the process was invented at the University of Bristol (UK).

Several of our current engineers were part of this original development work.

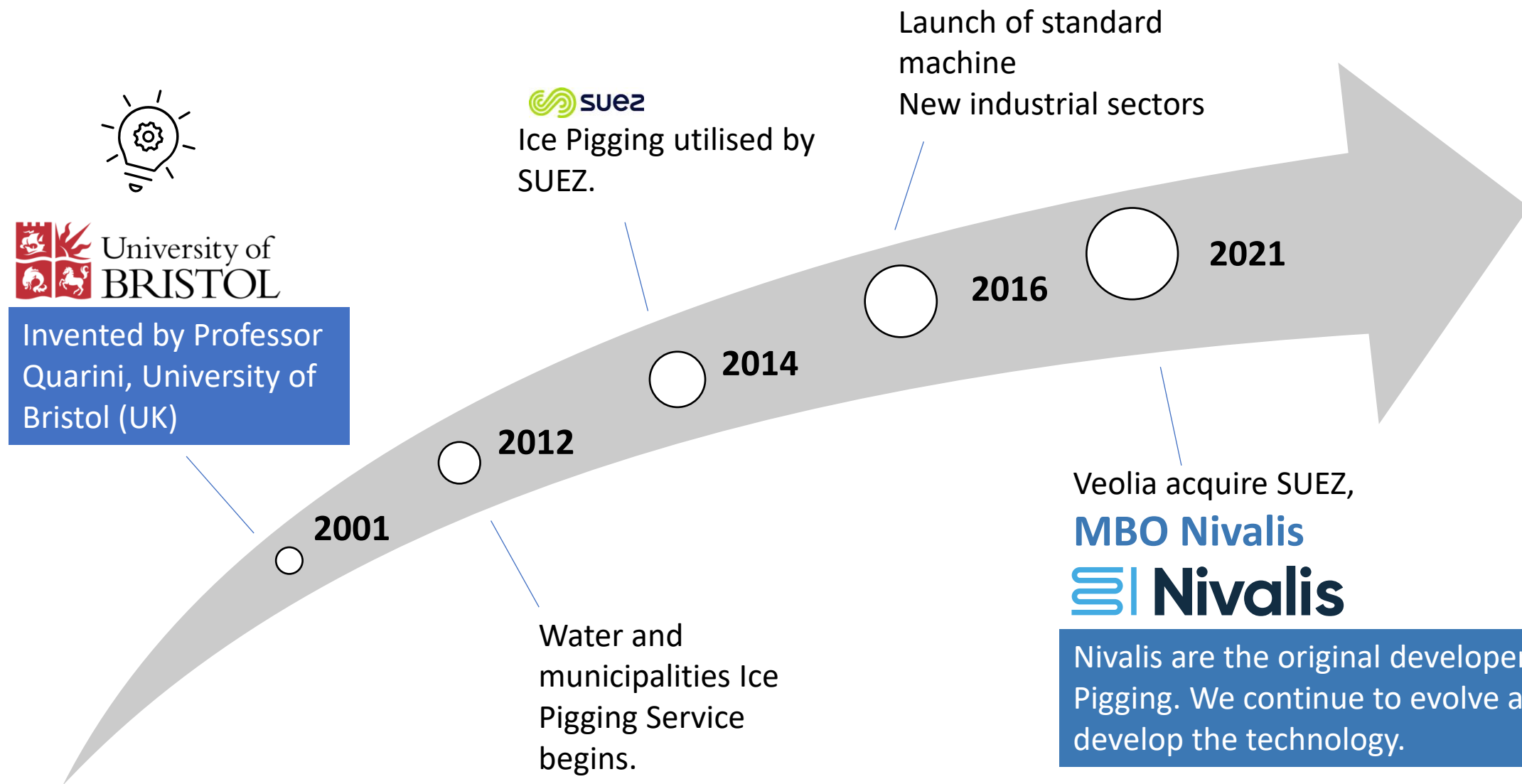
During several phases of growth the Nivalis team has continued to improve our equipment, and we now offer NIV500 as a standard machine.

Nivalis equipment is now in use in Europe, Asia, North America and the Middle East.

Ice Pigging has won many awards and is recognised as best available technique in many sectors.



Ice Pigging Timeline



What do Nivalis do?

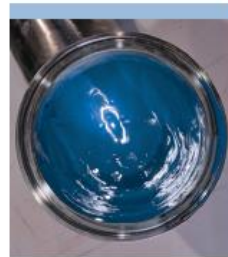
We can break this down into **two** main parts

1. Firstly Our Focus **manufacture equipment- NIV500** that the customer buys and uses in their factory to reduce waste, save time, improve cleaning

Typical customers are **fast moving consumer goods** manufacturers



START:
PVA GLUE WITH DYE



METHOD 1:
COLD WATER FLUSH



METHOD 2:
HOT WATER FLUSH



METHOD 3:
ICE PIGGING

"Ice flows as a liquid"



 **Nivalis**



What do Nivalis do?



2) We also provide Ice Pigging as a service

2. Ice Pigging as a service this usually includes the supply of equipment and personnel to carry out infrequent operations at a customers site.

This work tends to be larger scale and involves larger containerised equipment – Typical customers are high value engineering – Defence, Automotive.



We do this because Ice Pigging is a **transferrable technology**, and can be applied in many sectors and applications



Nivalis - Engineering Focused



Design

- Our “in house” design team can work on bespoke projects when our standard NIV500 is not suitable

Build

- Build is completed in Bristol UK. Customers are encouraged to visit us and witness FAT [Factory acceptance testing]
- We offer Siemens and Allen Bradley as options for system integration

Commission

- The Nivalis team will attend site to support the customer with SAT [site acceptance testing]

Service and Support

- Following installation, Nivalis offer a number of comprehensive support packages
- Nivalis provide follow up refresher training for operatives and system maintainers



Nivalis NIV500 Examples

Defence Contractor - Maritime



Babcock International (UK and Canada)

- ✓ Reason for Ice Pigging – Time saving & cleaning efficiency
- ✓ Equipment – 1 x NIV500 + Larger + ancillary
- ✓ Maritime surface and sub surface platforms.
- ✓ Sea Water, Fresh Water, Diesel, Aviation Fuel
- ✓ **Direct Saving –**
 - ✓ 1) Enhanced cleaning, far greater than conventional flushing
 - ✓ 2) Order of magnitude – time saving
 - ✓ Single pass of Nivalis ice
- ✓ **Benefits**
 - ✓ Increased system resilience and availability
 - ✓ Time saving



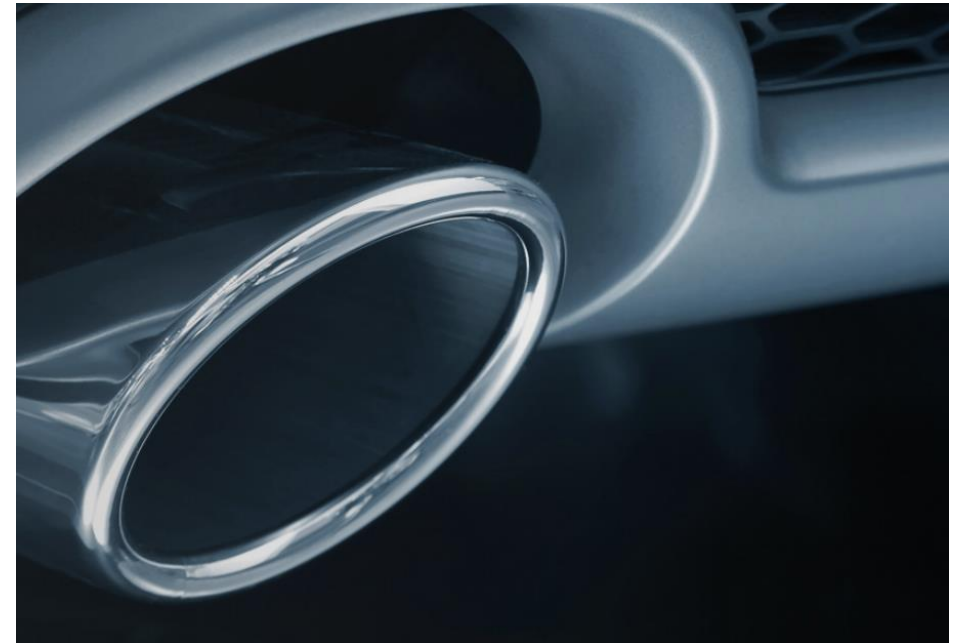
Nivalis NIV500 Examples



Automotive Supply chain - UK

Johnson Matthey

- ✓ Reason for Ice Pigging – Time saving & cleaning efficiency
- ✓ Equipment – 1 x NIV500
- ✓ Products – Chemical Process.
- ✓ **Direct Saving** - thru' quicker cleaning from historic 8 hours flushing to less than 1 hour using Ice Pigging.
Increased high value productivity
- ✓ Plant runs 360 days per year 3 shifts



Nivalis NIV500 Examples



Paints and Surface Coatings - Germany

“Global Paint manufacturer” Est over 100 years

- ✓ Reason for Ice Pigging – Time saving & cleaning efficiency
- ✓ Equipment – 1 x NIV500
- ✓ Products – Paints.
- ✓ **Direct Saving** - thru’ quicker cleaning on product changeover. Reduction in water and chemical use. Main benefit production time savings and *overall equipment effectiveness*.



Nivalis NIV500 Examples



Personal Care – USA

Personal care manufacturer USA

- ✓ Reason for Ice Pigging - Product recovery
- ✓ Equipment – 1 x NIV500
- ✓ Products – See picture – shampoos, creams, scrubs etc.
- ✓ Direct Saving - >2200lb (1000 Kg) per day improvement in production output
- ✓ Plant runs 360 days per year 3 shifts
- * Secondary benefit decreased CIP



Larger Scale Ice Pigging Equipment



Municipal – UK, Japan, Singapore, USA, Estonia

Multiple systems in various parts of the world

- ✓ Reason for Ice Pigging – Time saving & cleaning efficiency, “Platform availability”
- ✓ Equipment – Larger scale often bespoke manufacture
- ✓ Applications – Potable and waste water
- ✓ **Direct Saving** – Our customers provide “in country” Ice Pigging as a service to municipalities and large industrial water consumers. Nivalis designs and manufactures equipment to allow them to provide Ice Pigging as a service to the “end user”



Other Applications

- Cosmetics – Product recovery
- Energy – High level system cleaning – instrumentation accuracy
- Pharmaceutical – Ultra Pure water loops.
- Chemical – System cleaning
- Chemical – System remediation (change of classification of pipe system following Ice Pigging)



 **Nivalis**



Delivery and on-site work

- **FAT** – Carried out at Nivalis facility with customer in attendance if possible
- **Equipment shipped** – Installed by customer onsite
- **SAT** – Nivalis attend site to commission and SAT (Typically 1 week)
- **Training** – Nivalis attend site to train operatives (Typically 1 week) Type of training adapted to suit manual verses integrated systems.

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Thank you!





Service Provision



Equipment Build



**Equipment
Hire/Rental**

