

normet



**INJECTION SOLUTIONS
FOR WATER CONTROL AND
GROUND ENGINEERING**





THE DIFFERENCE

Our knowledge originates from experience, not just in how our products perform and function but equally importantly, how and where they are used. Practical experience of our materials and equipment is fundamental in fully understanding the complete project and customer requirement, something Normet has in abundance. This is why our global team is highly regarded in the mining and civil engineering industry due to our aptitude in providing practicable precise solutions and professional support. It is also about individual passion and having the desire to learn and succeed, both of which continues to drive our Normet team to provide you more competence in achieving higher success rates on your projects.

We share the same commitment within our global manufacturing facilities with our ISO quality assurance process. This process starts with thorough testing of all raw materials and continues throughout the full manufacturing cycle ensuring our products meet or exceed our customers' expectations. This ability to offer quality products continues to provide Normet a strong competitive advantage in our industry.

We are proud of our proficiency in producing products that meet the current global requirement; however, our commitment to the future of our business is constant through investment in new technologies. This allows us to innovate and produce materials that will transform and shape the future of our industry. This is what makes Normet unique and is the essence in driving our company forward, with the ultimate goal of providing you enhanced, reliable solutions.

LAWRENCE HALLS

Director & Global Manager Ground Engineering



PRESERVING OUR FUTURE (Lighter Environmental Footprints)

Injection resins have been used extensively in mining, civil engineering and the general building industry for many years and continue to play an important role in controlling or preventing water ingress, binding and improving soils through to rock consolidation and rock strata grouting. Our resins have been designed specifically for these applications and comply with country and site standards and more importantly, environmentally safe and user friendly!

EXPERIENCE & KNOWLEDGE

Normets comprehensive portfolio of injection resins, our in depth understanding of the technology, application and associated equipment allows Normet to provide technical solutions to meet all of our client's project demands. Injection resins are part of our core business and we continue to expand our offering in line with increasing global requirement, a testimony to the products and services we provide to our customers.

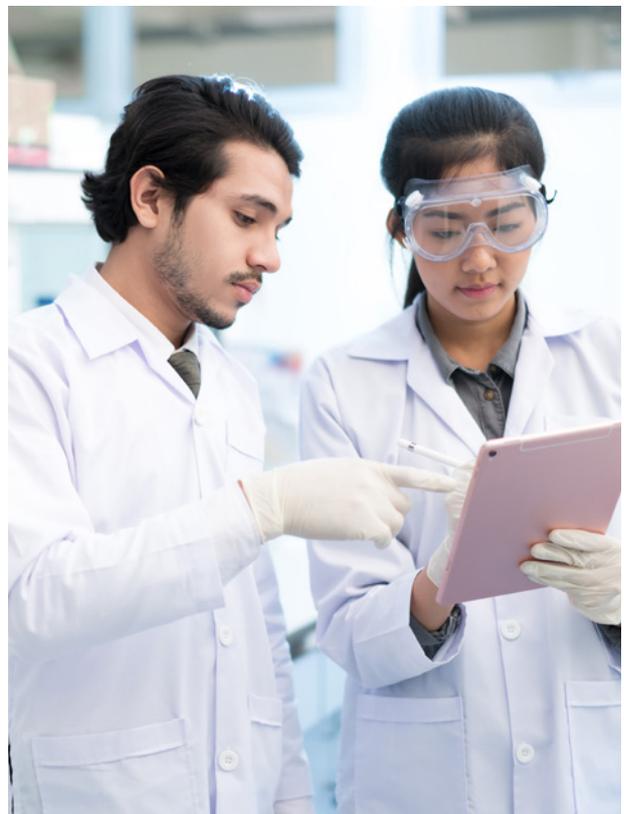
KEEPING UP THE PACE

Our industry is ever evolving and complex designs and advance in construction methods require innovative construction chemicals. Normets continued investment in our global R&D team and facilities allows us to regularly develop and improve our resin technology, providing the most effective and efficient materials for our client's injection requirements.



ENVIRONMENTAL CONSIDERATIONS

One of the most important considerations in the use of resins for water control and ground engineering is the environmental impact. Our systems are used regularly in environmentally sensitive locations such as tunnels, mining and general civil engineering projects. Normet is fully committed in the manufacturing of "green" chemicals helping you operate in an environmentally responsible manner.





PREFERRED PARTNER

High foaming, fast reactive hydrophobic resins are effective in controlling or stopping difficult water ingress events. Normet offers both single (1K) and dual component (2K) resins providing flexibility to the end user. Our single component resins reaction time can be adjusted at site through the addition of an accelerator, allowing the applicator to modify the reaction time to suit the conditions. Our two component resins, with built in accelerator are highly reactive and form a closed, dense and strong foam cell structure capable of withstanding high degrees of hydrostatic pressure. A separate accelerator can also be provided where even faster reaction times are required.

Moderate to low water ingress through concrete cracks and joints, substrate openings, masonry and brick structures are permanently controlled using our closed cell, semi or flexible single component or dual component polyurethane resins. Alternatively, our range of ultra-low viscosity acrylic injection gels provide effective sealing especially for fine hairline cracks, honeycombed concrete or controlling water ingress through rock bolt locations. Many of our resins are potable water certified allowing for their use in water retaining structures.

Normets water control resins are used throughout the full cycle of construction. From underground excavations such as shafts, tunnelling and basements through to above ground injection on bridges, roof structures to viaducts. In fact, our resins are used wherever water is a problem and needs to be controlled or permanently resolved.

Many of our water control resins are used extensively in tunnel construction, either cut and cover, drill and blast through to TBM related applications. Our success over the years on many of the leading global tunnelling projects has made Normet the preferred partner and supplier, not just for our chemical resins but associated equipment such as pumps and injection packers. In fact we extend our complete offering with on-site support through our global engineers "flying engineers". Our engineering team have years of experience and are fully conversant with our resin technology, pumps, associated equipment and application.

The use of Normet resin also extends to mining operations where controlling ingress is a necessity in allowing continued Mine development or where a dry working environment is required. Our dual component (2K) resins are ideally suited for water control in mining applications due to the enhanced resistance to hydrostatic pressure, typically encountered in deep mining excavations.

KEY BENEFITS

- Variable gel times and fast cure rates
- High stability, even in aggressive environments
- Chemically resistant and durable
- Anti washout
- Can react with salt water
- Global certification

WATER CONTROL POLYURETHANE RESINS

TAMPUR 100

- Fast reacting, single component (1K) hydrophobic PU resin
- Ideally suited for controlling medium to high water ingress
- Strong rigid foam structure
- High foam ratio
- Variable reaction speed with the addition of an accelerator (TamKat 100)

TAMPUR 120

- Two component (2K) hydrophobic PU resin
- Ideally suited where a solid, high strength resin is required
- Ability to control medium to high water ingress
- Exceptionally strong rigid closed cell foam
- Variable reaction speed with the addition of an accelerator (TamKat 120)

WATER CONTROL RESINS

Resin Type	Product Chemical	Components	Foam Factor	Characteristics	Permanent Waterproofing	High Water Cut Off	Structural Injection	Crack/Joint Injection	Grout Curtain	Injection Tube
TamPur 100	Hydrophobic Resin	Single	>25 X	Rigid	Yes	Yes	No	Yes	Yes	No
TamPur 120	Hydrophobic Resin	Dual	Solid	Rigid	Yes	Yes	Yes	Yes	Yes	No
TamPur 125	Hydrophobic Resin	Dual	>20 X	Rigid	Yes	Yes	No	Yes	Yes	No
TamPur 130	Hydrophobic Resin	Single	>20 X	Semi Flexible	Yes	Yes	No	Yes	Yes	No
TamPur 138	Hydrophobic Resin	Single	>20 X	Semi Flexible	Yes	Yes	No	Yes	Yes	No
TamPur 150 TDI	Hydrophilic Resin	Single	>5 X	Highly Flexible	Yes	No	No	Yes	No	No
TamPur 150 MDI	Hydrophilic Resin	Single	>5 X	Highly Flexible	Yes	No	No	Yes	No	No
TamPur 170	Hydrophobic Resin	Dual	Solid	Flexible	Yes	No	No	Yes	No	Yes
TamAcryl 2000	Hydrophilic Resin	Dual	Gel	Highly Flexible	Yes	No	No	Yes	Yes	Yes
TamAcryl 3000	Hydrophilic Resin	Dual	Gel	Highly Flexible	Yes	No	No	Yes	Yes	Yes

TOTAL FLEXIBILITY

TAMPUR 125

- Two component (2K) hydrophobic PU resin
- Ideally suited to controlling medium to high water ingress
- Exceptionally strong rigid closed cell foam
- High foam ratio
- Variable reaction speed with the addition of an accelerator (TamKat 125)

TAMPUR 130 (CE MARKED)

- Single component (1K) hydrophobic, semi flexible PU resin
- Ideally suited to controlling low to medium water ingress
- Strong semi flexible foam
- High foam ratio
- Variable reaction speed with the addition of an accelerator (TamKat 130)

TAMPUR 138

- single component (1K) hydrophobic, semi flexible PU resin
- Ideally suited for controlling low to medium water ingress
- Strong semi flexible foam
- Medium foam ratio
- Built in accelerator, no separate accelerator required

TAMPUR 150 MDI/TDI (CE MARKED)

- Single component (1K) hydrophilic PU resin
- Ideally suited for controlling low water ingress
- Strong flexible and compressible closed cell foam
- Medium foam ratio
- MDI and TDI based systems available

TAMPUR 170 (CE MARKED)

- Two component (2K), hydrophobic solid PU resin
- Ideally suited for injecting into moving cracks and joints
- Suitable for injection tube applications
- Strong, highly flexible solid resin
- Variable reaction speed with the addition of an accelerator (TamKat 170)

WATER CONTROL ACRYLIC GELS

TAMACRYL 2000 / 3000 (CE MARKED)

- Ultra-low viscosity hydrophilic acrylic injection gel
- Ideally for sealing fine hairline crack, joints
- Strong flexible gel
- Water based
- Variable reaction speed with the addition of an accelerator (TamAcryl Accelerator)

Many of our resins are potable water certified allowing for their use in water retaining structures.

FOREFRONT OF TECHNOLOGY

Chemical resins due to their very nature are among the most effective material groups for ground engineering applications! Low to ultra-low viscosity and controllable gel times allow these resins to be used regularly to form water cut off barriers, consolidate and strengthen rock strata to improvement in soil bearing capacity. Our silicate modified urea resins are also used extensively for cavity filling offering an economic and safe system for mining and tunneling applications.

Normet are at the forefront of resin technology for ground engineering, manufacturing and supplying a broad spectrum of materials each designed specifically for a certain application. Normets resins are based on modern innovative chemical technology providing systems that are environmentally safe, comply with local and international standards and thoroughly tested to meet industry regulations.

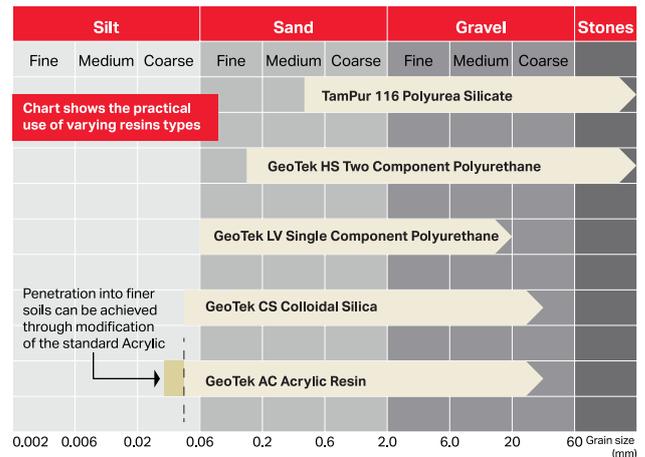
KEY BENEFITS

- Superior penetration capability compared to suspension grouts
- Controlled gel times and fast cure rates
- High stability, even in aggressive environments
- High immediate strength gain
- Chemically resistant and durable
- Anti washout (polyurethanes)
- Can react with salt water

GROUND IMPROVEMENT RESINS

GEOTEK LV

- Low viscosity, single component polyurethane resin
- Ideally suited for permeation grouting of granular soils
- Excellent penetration capability
- Significantly improves soil bearing capacity
- Variable reaction speed with the addition of an accelerator (GeoTek LV Accelerator)



GEOTEK HS

- Dual component polyurethane resin
- Ideally suited for grouting of granular soils, gravels and rock fissures
- Exceptionally strong rigid closed cell foam
- Excellent penetration capability
- Varying grades available

GEOTEK AC

- Ultra-low viscosity acrylic injection gel
- Ideally suited for permeation grouting in fine graded soils
- Excellent penetration capability
- Environmentally friendly
- Adjustable gel times with the addition of an accelerator (GeoTek AC Accelerator)

GEOTEK CS (TAMCRETE 400CS)

- Ultra-low viscosity colloidal silica gel
- Ideally suited for grouting of soils, gravels and rock fissures
- Excellent penetration capability
- Environmentally friendly
- Adjustable gel times with the addition of a hardener (GeoTek CS Hardener)

GEOTEK SJ

- Extremely fast reaction
- Ideally suited for slab lifting
- Exceptionally strong
- Excellent bearing capability
- Environmentally friendly

UREA SILICATE GROUND IMPROVEMENT RESINS



ECONOMICAL SOLUTIONS

Normets range of urea silicate resins are new generation systems used predominantly in the mining and tunnelling sector. Our TamPur 116T is a two component 1:1 ratio resin that reacts to form a non-expansive, solid compound that gains considerable adhesive, compressive and tensile strength within minutes. Ideal for injection into high convergence zones in deep mining or tunnel excavations to improve rock strength capability and as a binder for loose rock formation. TamPur 116T is also used extensively to secure rock and cable bolts allowing for early tensioning.

TamPur 117 is designed for cavity filling in hard rock mining, goff filling in coal workings to general void filling for tunnelling and civil engineering projects. TamPur 117 reacts within seconds to form a high expansive, lightweight foam, which is economical, non-toxic, fire resistant and user friendly.

KEY BENEFITS

- Controlled gel times and fast cure rates
- Fire resistant
- High stability, even in aggressive environments
- High immediate strength gain
- Chemically resistant and durable
- High foaming ratio (TamPur 117)

UREA SILICATE RESINS

TAMPUR 116T

- Two component, urea silicate resin
- Ideally suited for rock strengthening and consolidation
- Solid, high strength resin
- Fast reacting
- Environmentally friendly

TAMPUR 117

- Two component, urea silicate resin
- Ideally suited for cavity filling in mining and tunneling applications
- Exceptionally high foam development
- Fast reacting
- Environmentally friendly

TAMPUR RBG

- Two component, non-sag urea silicate resin
- Ideally suited for securing rock and anchor bolts in overhead installations
- Excellent gelling characteristics
- Exceptionally high early strength gain
- Environmentally friendly

TamPur RBG incorporates a gelling agent that produces a non-sag resin once the two components are mixed and injected. RBG is ideally suited for securing all type of rock bolts where early tensioning/loading is required along with full rock bolt encapsulation. TamPur RBG is available in varying grades to suit both an automated or manual injection process and to allow for local ambient and rock formation temperatures.

PERFORMANCE AND SAFETY

Complementing our chemical resins, Normet supplies an extensive range of grout injection packers, pumps and accessories designed with performance and safety in mind. All of our packers, pumps and packer accessories are thoroughly tested and certified for use in high pressure applications.

Our packer range includes mechanical disposable and reusable types ranging from 32mm - 125mm in diameter and capable of being used for drill hole diameters between 29mm - 128mm. Our GX-UP single use inflatable packer constructed of aluminium and rubber is specifically designed for TBM grouting operations. These types of packers self-expand at set pressures between 30 and 60 bar.

Normet also provides an extensive range of smaller diameter packers ideally suited for general crack and joint injection projects. Our range includes plastic grease nipple and hook on connector type, steel and alloy based packers with grease nipple non-return valves and plastic hammer packers. Our smaller packer range from 6 mm through to 25 mm diameter with varying length options, offering versatility to our end user. For further information on the full range of packers we supply, please contact your nearest Normet office.

HIGH & LOW PRESSURE PACKERS



Complete range of high and low pressure reusable and disposable packers

Normet also supplies a full range of inflatable injection packers, burst disc packers and associated accessories.

Normet has recently introduced a high pressure packer for use in controlling extreme water ingress situations through drill holes in rock excavation tunnelling. The packer can be easily mounted to a drilling jumbo and positioned in the drill hole and then inflated.

HIGH PRESSURE PACKER

Diameter	Length	Hole diameter (mm)	GX HD	CS	CS Open
48	140	47-50	X	X	X
51	140	50-53	X	X	X
54	140	53-55	X	X	X
57	140	56-59	X	X	X
60	140	59-62	X	X	X
63	140	62-65	X	X	X
67	140	66-69	X	X	X
70	140	69-73	X	X	X
75	140	74-78	X	X	X

LOW PRESSURE PACKER

Diameter	Length	Hole diameter (mm)	GU/ CU	C	CO	GX	GX AL
32	140	29-33				X	
34	140	33-36				X	
36	140	35-38	X	X	X	X	
38	140	37-40	X	X	X	X	X
41	140	40-43	X	X	X	X	X
45	140	44-47	X	X	X	X	X
48	140	47-50	X	X	X	X	X
51	140	50-53	X	X	X	X	X
54	140	53-55	X	X	X	X	X
57	140	56-59	X	X	X	X	X
60	140	59-62	X	X	X	X	X
63	140	62-65	X	X	X	X	X
67	140	66-69	X	X	X	X	X
70	140	69-73	X	X	X	X	X
75	140	74-78	X	X	X	X	X
80	140	79-83	X	X	X	X	
90	140	89-93	X	X	X	X	
102	140	101-105	X	X	X	X	
110	140	109-112	X	X	X	X	
115	140	114-117	X	X	X	X	
120	140	119-123	X	X	X	X	
125	140	124-128	X	X	X	X	

COMPLETE PACKAGE OFFERING

Our range of resin injection pumps have been designed to cater for both high and low pressure applications. Our twin piston pumps are ideally suited for large scale projects where either high injection pressures or high resin delivery rates is required. Our range of EP electric and HP manual pumps are suited for smaller scale general leak sealing applications.

HIGH PRESSURE TWIN PISTON PNEUMATIC PUMPS



- TP2 and TP4SS Twin Piston Pneumatic Pumps

Our TP2 and TP4SS pneumatic pumps are manufactured from stainless steel components allowing the pumps to be used for either polyurethane or acrylic injection. Our TP2 has a maximum operating pressure of 210 bar with a delivery rate of 25 litres per minute. The TP2 is ideally suited for high pressure injection where a medium delivery rate is required (25 litres/min).

Our TP4SS offers the highest delivery volume at 40 litres per minute with a maximum operating pressure of 240 bar. The TP4SS IS especially suited for high to extreme water control or high volume void filling applications using our TamPur 117 void filling resin foam.

Both our TP2 and TP4SS are equipped with a separate piston flush pump allowing for easy cleaning of the pump mixing head in between injection operations.

HIGH PRESSURE SINGLE PISTON ELECTRIC PUMPS



Normets range of EP electric pumps offer versatility for the grouting team due to their compact size and lightweight construction. Designed specifically for smaller scale projects such as general crack or joint injection or for remote injection works where accessibility is difficult.

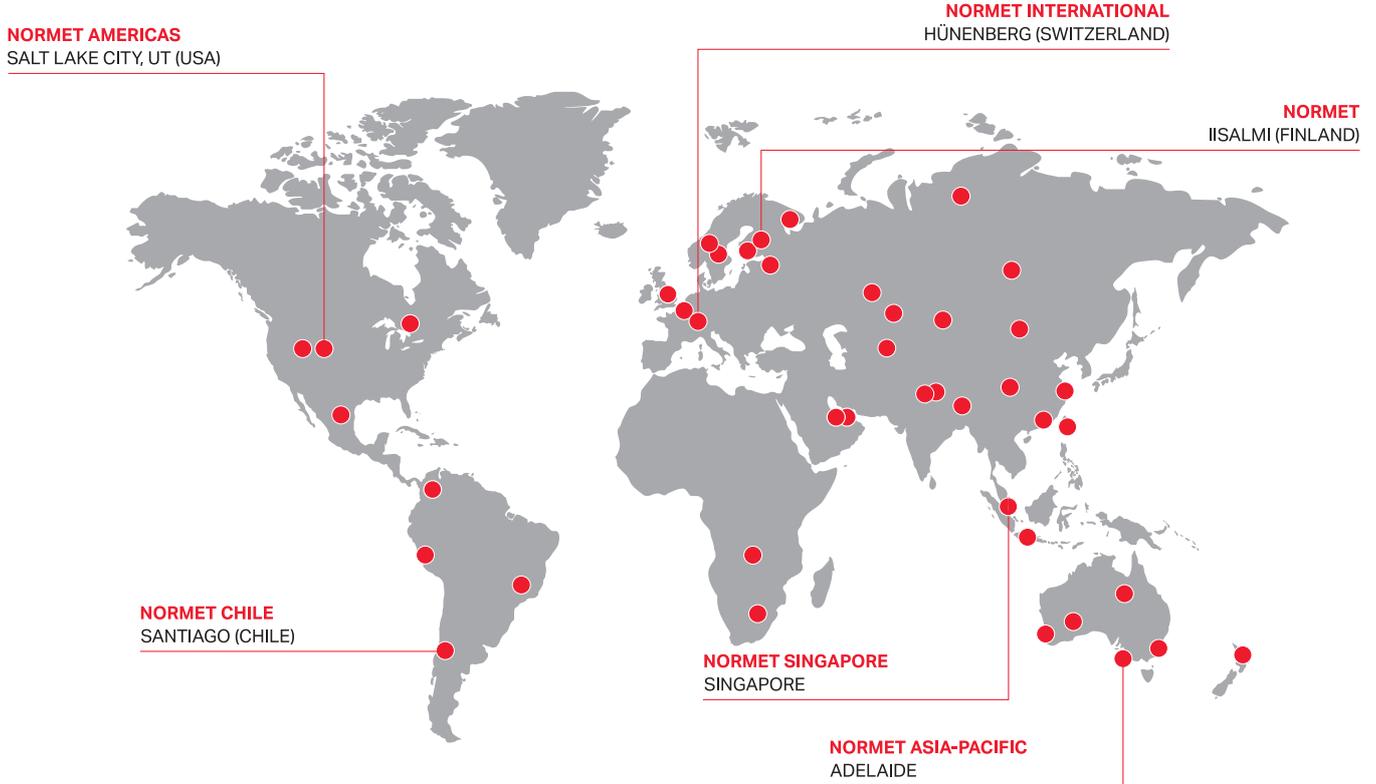
HIGH PRESSURE SINGLE AND TWIN PISTON MANUAL PUMPS



Our manual hand pumps such as our single piston HP1 or twin piston HP2 range are compact, lightweight and easily maintainable. Designed for use with our single and dual component polyurethanes, they are ideal for general small scale injection works or where air supply or electric power is not available.

For further information on our range of injection resins, packers and pumps, please contact your nearest Normet representative.

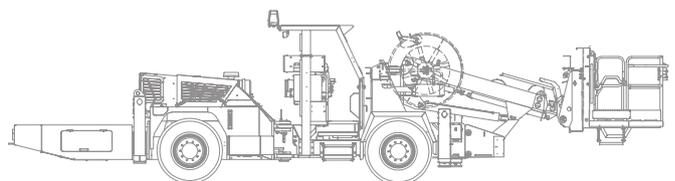
GLOBAL PRESENCE / LOCAL SUPPORT



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WE ARE HERE FOR YOU

For more information, please contact your local Normet representative, visit www.normet.com for contact details.







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Subject to technical and design modifications without notice. Technical properties have been achieved under theoretical and normal conditions.
Please consult the respective machine manual for all matters related to safety, operation and maintenance.

Injection Solutions Brochure Version 1.18