

Strata **AFS** is a hydrophobic polyurethane, designed to be injected into rock fissures, gravel layers, joints, cracks and voids to fill voids and consolidate strata. It is ideal for controlling and diverting water, including high volumes of gushing water.

Strata **Injectable Resins**

ROCK CONSOLIDATION, WATER CONTROL, VOID FILL



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Strata **Advanced Foam Solution (AFS)**

ROCK CONSOLIDATION,
VOID FILL, WATER CONTROL

SPECIFICATIONS

- Single Component
- Cures to a rigid, closed cell polyurethane foam
- Free foam expansion up to 30 times
- Controlled reaction time
- Catalysts required for optimal reactivity
- Multiple catalyst options for accelerated reaction times
- Resistant to most organic solvents, mild acids, alkali, petroleum and micro-organisms
- Contains no volatile solvents

APPLICATIONS

Void fill, rock consolidation and stabilization, water control

- Longwall extraction
- Tip-to-face void fill
- Rock consolidation above shields
- Floor-to-roof stabilization
- Water diversion and stoppage
- Grouting around surface and drill pipes



PROPERTIES • AFS Resin		
Solids	100%	ASTM D2369
Viscosity	200 cp at 77°F	ASTM D2196
Color	Black-Brown Liquid	
Density	1.10 g/cm3	ASTM D4659
Flashpoint	293°F	ASTM D93
Corrosiveness	Non-Corrosive	

PROPERTIES • AFS Cured		
Density confined	1.00 g/cm3	ASTM D3574
Density free	2 PCF	ASTM D3574
Compressive	4351 psi	confined
Flexural	2320 psi	confined
Free Foam	4 psi	unconfined

APPLICATION & TRAINING

Strata provides teams of experienced personnel to offer on-site training and assistance during pumping projects. This ensures safe, accurate and effective product application. Time and Materials includes the injection resin, pumping equipment and supervision of skilled mining professionals.



CATALYSTS - STRATA AFS FAST AND EXTRA FAST

Strata AFS Fast and Extra Fast are designed to be mixed with Strata AFS to provide faster reaction times, particularly in applications involving the cut-off of gushing water.

SPECIFICATIONS

- Accelerate the reaction time for Strata AFS
- Used at a 10% mixing ratio
- Non-flammable*
- Solvent free, and phthalate free
- Not classified as HAZMAT for transport by road, rail or air
- Final foam resistant to most organic solvents, mild acids, alkaloids and microorganisms

** See the flashpoints shown on the "Properties" tables in this product brochure. See also safety data sheets which show an NFPA rating for fire of 1 and a HMIS rating for fire of 1*

PROPERTIES • AFS Fast		
Viscosity	20 cPs at 77°F	ASTM D2196 A
Color	Transparent Red Liquid	
Density	0.973 g/cm3	
Flashpoint	257°F	ASTM D93

PROPERTIES • AFS Extra Fast		
Viscosity	20 cPs at 77°F	ASTM D2196 A
Color	Transparent Red Liquid	
Density	1.000 g/cm3	
Flashpoint	257°F	ASTM D93

REACTION TIMES • 10% Strata AFS Fast			
Temp	Start	End	Foam Factor
27°F	30"	1'40"	20V
40°F	28"	1'25"	26V
50°F	26"	1'23"	26V
60°F	23"	1'20"	28V
68°F	23"	1'20"	30V
77°F	20"	1'20"	32V

REACTION TIMES • 10% Strata AFS Extra Fast			
Temp	Start	End	Foam Factor
27°F	25"	1'15"	24V
40°F	23"	1'10"	28V
50°F	23"	1'10"	28V
60°F	23"	1'05"	30V
68°F	20"	1'05"	30V
77°F	18"	1'05"	32V



HEALTH AND SAFETY

- Always use protective clothing, gloves and goggles consistent with OSHA regulations.
- Avoid eye and skin contact. Do not ingest.
- Refer to SDS.

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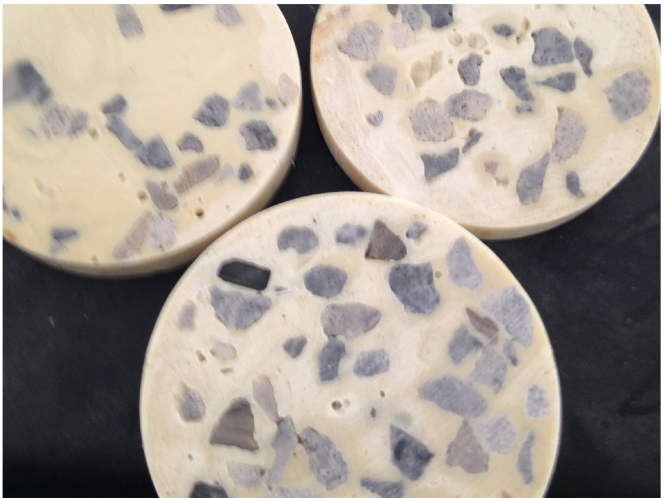
TYTRO **SI 550**
Rock Consolidation & Stabilization

TYTRO SI 550 is a two-component, urea-silicate, non-expanding and fast-acting injection slurry. It is designed to consolidate and join delaminated, fractured and loose strata in underground mining, tunneling and geotechnical applications and other excavations where slurries without expansion are preferred. TYTRO SI 550 has a low exothermic reaction temperature below 110°C (230°F).



ADVANTAGES

- 1:1 volumetric mix ratio
- Good mixing without marbling
- Non-expanding, safe for weak strata and soils
- Reacts under water without dilution, expansion or foaming
- Low exothermic reaction temperature: < 230°F
- High bond strength > 600psi
- Final compressive strength approx. 5000 psi
- Maintains flexural integrity and high flexural strength
- Fire resistant, Class B2 per DIN 4102 Part 1
- Phthalate free, REACH compliant



APPLICATIONS

- Bonding and consolidating strata in underground operations
- Injection into rock and aggregates where grouts are required for consolidation and stabilization without expansion
- Effective water control and sealing in underground excavations
- Anchoring of roof bolts and self-drilling anchors

PACKAGING & HANDLING

- 10.5 gallon units:
- A-Component in plastic pail
- B-Component in metal drum
- Sensitive to moisture and frost
- Store in original closed packaging
- Storage temperatures: 41-86°F
- Shelf-life at 68°F: 24 months
- Once opened, useful life is greatly reduced and should be used as quickly as possible



PROPERTIES • TYTRO SI 550		
VALUE		TEST
A Component		
Density at 77°F	1.48 g/cm³	EN ISO 2811
Viscosity at 77°F	approx. 230 cps	EN ISO 3219
B Component		
Density at 77°F	1.16 g/cm³	EN ISO 2811
Viscosity at 77°F	approx. 110 cps	EN ISO 3219
Mixed Material		
Mixing ratio by volume	1:1	
Mixing ratio by mass	1.00:0.78 lbs	
Static mixer	Min. 24-36 plate levels	
Cured Material		
Gel time at 74°F	approx. 2'30"	Cup test
Expansion rate	Zero	Internal Test
Reaction Exotherm	< 230°F	Internal Test
Bond strength to dry concrete	> 600 psi	EN ISO 4624
		EN ISO 12190
Compressive Strength, lab samples at 68°F		
Pure resin- 15 min.	approx. 2900 psi	
Pure resin- 30 min.	approx. 3600 psi	
Pure resin- 24 hrs.	approx. 4900 psi	
Resin/gravel- 24 hrs	approx. 3500 psi	
Resin/water filled gravel-24 hrs	approx. 3000 psi	
Flexural strength- 24 hrs	approx. 3500 psi	

All tests made under laboratory conditions according to mentioned standards to the current product standard and testing methods.
GCP reserves the right to change data from test results pending updated information.

Strata **Injectable Resins**

ROCK CONSOLIDATION, WATER CONTROL, VOID FILL

TYTRO **SI 660**

Void and Cavity Fill

TYTRO SI 660 is a fast reacting, foaming, two-component urea-silicate injection grout used for void filling. TYTRO SI 660 is fire resistant to Class M1 according to NF P92-501. TYTRO SI 660 is designed for filling large cavities and voids in mining and underground applications.



ADVANTAGES

- TYTRO SI 660 is fire resistance class M1 according to NF P92-501
- Rapid reaction allows fast progress of excavation or mining operations
- Low polymerization temperature
- Good compressibility to allow slight movement of strata or consolidated soils
- Phthalate free, REACH compliant
- 1:1 volumetric mix ratio

APPLICATIONS

- Void and gallery filling in mining
- Void filling in tunnel operations
- Consolidation of fragmented strata and crevasses in front of tunneling excavations
- Umbrella injections

PACKAGING & HANDLING

- 10.5 gallon kits in 2 pails
- 105 gallon kits in 2 drums
- A-component plastic pail
- A-component plastic drum
- B-Component metal pail
- B-component metal drum



TYTRO SI 660 A and B-components are sensitive to moisture and frost. Store in original closed packaging in a dry and frost free area. Storage temperature needs to be between 40°F and 80°F. Once the packaging has been opened, the useful life if the material is greatly reduced and should be used as quickly as possible. Shelf life at 68°F : 1 year.



PROPERTIES • TYTRO SI 660		
VALUE		TEST
A Component		
Viscosity 77°F	40 cPs	EN ISO 3219
Density 68°F:	1.395 kg/dm3	EN ICO 2811
B Component		
Viscosity 77°F	145 cPs	EN ICO 3219
Density 68°F	1.22 kg/dm3	EN ICO 2811
Mixed Material		
Mixing ratio by volume	1;1	
Mixing ratio by weight (lbs)	100: 87.5 (A:B)	
Static mixer	24 – 36 plate levels minimum	
Reaction at 50°F	1:05 start 2:30 end	
Expansion	30V*	
Foam Density	1.25- 1.56 pcf*	EN ISO 845
Reaction at 75°F	0:25 start 1:20 end	
Expansion	35V*	
Foam Density	1.56- 1.87 pcf*	EN ISO 845
Cured Material		
Compressive strength	Free foam: Approx. 2 psi	EN ISO 844
Compressive strength	Semi-Confined** approx. 100 psi	EN ISO 844

Note: The data shown above reflects typical results based on laboratory testing under controlled conditions. Reasonable variations from the data shown above may result.

* Expansion rates and foam density can be influenced by the back pressure during injection.

** Confined at 110 psi counter pressure.



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