

# SUPERSTICK® SHOTCRETE

September, 09 Page 1 of 4

## PRODUCT

TARGET® Products Ltd produces a range of bagged dry shotcrete mixes for use in either dry-mix or wet-mix shotcrete processes. Shotcrete aggregates are blended to ACI 506R-90 gradation requirements and shotcretes are available in either ACI Gradation No.2 (medium) or Gradation No.1 (fine) aggregate gradations. Other aggregate gradations can be manufactured on request.

TARGET SUPERSTICK® SHOTCRETE is made with accurately mass-batched blends of Portland cement, silica fume, sand, coarse aggregate and, where required, chemical admixtures, steel fibers or dry-powdered shotcrete accelerators.

All materials used conform to the requirements of relevant standards, including: CSA A23.1-94 "Concrete Materials and Methods of Concrete Construction", ACI 506.2 "Specifications for Materials, Proportioning and Application of Shotcrete", ASTM C1141 "Standard Specification for Admixtures for Shotcrete".

## USES

TARGET dry bagged shotcretes are used in a wide range of civil engineering and mining applications. Typical areas of use include:

- Mining applications, including ground support and lining of portals, shafts, drifts, raises, loading pockets, ore passes and underground chambers.
- Ground support and slope stabilization.
- Tunnel and shaft lining.
- Construction of retaining walls.
- Rehabilitation of deteriorated infrastructure, including bridges, dams, sewers, canals and cooling towers.
- Repair of deteriorated marine structures including wharves, jetties, piles and sea walls.
- Repair of deteriorated buildings and structures such as parking structures, grain silos, pulp and paper mills and chemical handling facilities.
- Lining of swimming pools, reservoirs, canals, syphons and pipelines.
- Construction of artificial rockscapes in zoos, aquariums, exhibits and recreational and park facilities.

## ADVANTAGES

TARGET SUPERSTICK SHOTCRETE offers many advantages to owners, contractors and engineers, particularly in situations where conventional formed concrete construction would not be appropriate or cost effective. Major advantages of using TARGET SUPERSTICK SHOTCRETE include:

- Supply of a precision mass-batched mixture produced to stringent quality control

Product performance is affected by many factors, including storage, method and conditions of application and use. User testing is ESSENTIAL to determine suitability of product for intended method of application and use. Target's SOLE WARRANTY is that the product has been manufactured to specifications. No oral or written information or advice shall increase this warranty or create new warranties. Target's SOLE LIABILITY is to replace product proved defective. In no event shall Target be liable for any consequential, indirect or other damages whether arising from negligence or otherwise.

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# SUPERSTICK® SHOTCRETE

September, 09 Page 2 of 4

standards.

## ADVANTAGES continued

- Ease of application, particularly in difficult to access or remote locations.
- Elimination or reduction of formwork.
- Greater thickness of build-up in a single pass relative to conventional shotcrete, particularly in the dry-mix shotcrete process.
- Substantial reductions in rebound, particularly in the dry-mix shotcrete process.
- Reduction in construction time.
- Superior bond to (properly prepared) surfaces.
- Elimination of secondary reinforcing steel or mesh when fiber reinforcement is included in the mixture.
- High early and later age strengths and low permeability.

## TYPICAL PROPERTIES

TARGET SUPERSTICK SHOTCRETE can be custom formulated to meet specific project requirements for both wet and dry-mix shotcretes. Typical shotcrete performance requirements are given below.

PHYSICAL PROPERTY	TEST METHOD		PERFORMANCE REQUIREMENT
	CANADA	USA	
<b>COMPRESSIVE STRENGTH</b> , MPa (psi) at 7 days at 28 days	CSA A23.2-14C	ASTM C42	Min 37 (5365) Min 50 (7250)
<b>FLEXURAL STRENGTH</b> , MPa (psi) at 7 days at 28 days	CSA A23.2-8C	ASTM C78 or ASTM C1609	Min 3.6(520) Min 4.8(700)
<b>BOILED ABSORPTION</b> Volume of Permeable Voids (start test at age 7 days)	-	ASTM C642	Max 8% Max 17%

All TARGET shotcrete products exceed these performance requirements.

## SPECIAL SHOTCRETES

- Fiber reinforced shotcretes can be custom formulated to meet different Toughness Performance Levels using appropriate fiber types and addition rates.
- TARGET Set Accelerator can be added to produce a range of different initial and final setting times and early strength development.
- Air entrainment can be added to wet-mix shotcretes to produce the required parameters of the air void system for freeze-thaw durable shotcrete.

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# SUPERSTICK® SHOTCRETE

September, 09 Page 3 of 4

- Special high alumina cement based shotcretes can be formulated for refractory applications and for shotcretes applied to permafrost or frozen ground.

## PROCEDURES

TARGET SUPERSTICK SHOTCRETE should be applied in accordance with good shotcrete practice as detailed in ACI 506R “*Guide to Shotcrete*” and ACI 506.2 “*Specifications for Materials, Proportioning and Application of Shotcrete*”. The use of nozzleman qualified to the ACI 506.3R “*Guide to Certification of Shotcrete Nozzleman*” is strongly recommended.

## CAUTION

- Store bagged shotcrete products in a warm, dry place. Preferably shotcrete temperature at the time of application should be in the range of 10°C to 20°C (50°F to 68°F). Discard any shotcrete that has been exposed to moisture in the bags and allowed to prehydrate.
- Shotcrete should not be applied to substrates with temperatures below 5°C (41°F) unless special cold-weather shotcretes are used.
- Preferably ambient temperatures during shotcrete application should be in the range of 10°C to 30°C (50°F to 86°F). DO NOT apply shotcrete at temperatures below 5°C (41°F) or above 35°C (95°F).
- Proper moist curing of applied shotcrete is important to minimize the potential for restrained shrinkage cracking and delamination. Three days of continuous moist curing is the minimum recommended requirement but seven days is preferred.
- In situations where moist curing is not feasible consult Target Products Ltd regarding the use of TARGET Cure and Seal curing compound.

## PACKAGING

TARGET SUPERSTICK SHOTCRETE is supplied in 30 kg (66 lb) multiwall paper bags or in synthetic cloth bulk bin bags with up to 1678 kg (3700 lb) capacity. The bulk bin bags can be supplied with or without discharge spouts. Bags are supplied on pallets and can be capped with plastic sheets and stretchwrapped for moisture protection. Custom packaging is available on request. Bulk deliveries to silos in the field, or to ready-mix concrete plants can be arranged. Also site production of dry pre-mixed materials, with silo storage, can be provided for large shotcrete projects.

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# SUPERSTICK® SHOTCRETE

September, 09 Page 4 of 4

## YIELD

Exact yield will depend on the specific shotcrete mix design but for conventional shotcrete mixes the yield and quantity estimating values (excluding an allowance for rebound and wastage) are as follows:

1 x	3700 lb	bulk bin bag	/ yd <sup>3</sup>
56 x	66 lb	paper bags	/ yd <sup>3</sup>
73 x	30 kg	paper bags	/ m <sup>3</sup>
0.48	ft <sup>3</sup>		/ 66 lb bag
0.0137	m <sup>3</sup>		/ 30 kg bag
0.767	m <sup>3</sup>		/ 3,700 lb bag

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