

TDA[®]

Quality/Strength Enhancing Additive

Description

TDA[®] additives are aqueous compositions of grinding aids with set-accelerating, water-reducing, and strength enhancing compounds, all carefully controlled and accurately blended for constant quality and optimum performance.

Product specifications for the most widely used TDA formulations are as follows:

	S.G.	pH
TDA 730	1.21 (±0.01)	8 - 10
TDA 735	1.20 (±0.01)	8 - 10
TDA 770	1.17 (±0.01)	8 - 10

Product specifications particular to other TDA formulations are available through Grace Field Engineers.

Advantages

One of the key benefits of TDA additives is their ability to increase both grinding efficiency and cement strengths to a degree unequaled by conventional grinding aids.

- Increased early and long-term compressive strengths for production of better quality cements.
- Reduced cost of cement production through reduced unit grinding costs and through replacement of clinker with



reactive additions such as pozzolans, blast furnace slag and fly ash, or with fillers such as limestone.

The chemical action of TDA additives decreases the interparticle attraction between cement grains both in dry form and in water, and increases the rate of hydration of cements. Additional advantages of TDA additives include:

- Increased grinding efficiency resulting in increased mill output, higher cement fineness and reduced unit power input and grinding costs.
- Increased workability (flow) of cement mortars and concretes.

- Increased cement flowability for reduced pack set or “silo set” of cements, resulting in lower handling costs and reduced waste.

Applications of TDA

Laboratory mill evaluations of clinker and other additions are recommended to determine initial blend proportions, grinding efficiency, pack set index, mortar flow, compressive strengths of cements and to enable Grace Construction Products to formulate the most effective TDA product for each condition.

TDA vs Current Grinding Aids							
Types of Cements Treated with TDA	TDA Product Used	TDA Dosage Range (%)	Typical Benefits Obtained with TDA				
			Grinding Efficiency Increase (%)	Pack Set Decrease (%)	Mortar Flow Increase (%)	Strength Development Early Increase (%)	Strength Development Long-term Increase (%)
Rapid hardening Ordinary portland	TDA TDA N	0.20 - 0.30 0.15 - 0.25	5% to 15%	20% to 40%	10% to 25%	5% to 10%	10% to 25%
Ordinary portland Portland & pozzolan Portland & slag	TDA 730 TDA 735 TDA 770	0.15 - 0.25 0.15 - 0.25 0.15 - 0.25	10% to 20%	20% to 60%	10% to 30%	5% to 15%	10% to 30%
Portland & pozzolan or other fillers i.e. fly ash or limestone	TDA 730 TDA 735 TDA 770	0.10 - 0.25 0.15 - 0.25 0.10 - 0.25	5% to 10%	10% to 20%	0% to 5%	10% to 30%	0% to 5%

Handling

TDA additives are sprayed into the mill's first compartment or added onto the clinker conveyor belt. Suitable dispensing pumps with adjustable flow rates should be used for accurate dosing and for optimum performance of TDA.

Addition Rates

Excellent results are usually obtained with TDA addition rates of 0.10% to 0.30% by weight of cement. Lower rates of addition also have produced satisfactory results when cement formulations have been particularly responsive to the additive.

The optimum addition rate of TDA should be determined in cement mill tests.

Dosing Equipment

TDA additives should be accurately proportioned through a calibrated dosing system, suitable for the cement mill and output required.

Specification Compliance

TDA is approved for use under ASTM C 465 specification as a non-harmful, processing addition for cements.

Typical Performance Data TDA						
Objectives	A) Replacement of 10% Clinker by Slag (Laboratory Test)			B) Increase Limestone Content from 27% to 32% (Plant Test)		
Additive	Blank	TDA 735	TDA 735	Blank	TDA 770	TDA 770
Cement Composition:						
Clinker	95%	95%	85%	68%	68%	63%
Gypsum	5%	5%	5%	5%	5%	5%
Slag	—	—	10%	—	—	—
Limestone	—	—	—	27%	27%	32%
TDA Dosage	—	0.2%	0.2%	—	0.2%	0.2%
Mill Revolutions	3500	3310	3350	—	—	—
Mill Production (t/h)	—	—	—	45.0	49.0	50.5
Power Input (kWh/t)	—	—	—	35.0	31.5	30.9
Blaine (cm ² /g)	3950	3980	3960	4930	4870	5190
Residues 40 µm	0.85%	0.78%	0.46%	—	—	—
Flow (mm)	100	100	100	93	107	105
Compressive Strength: (MPa)						
1 Day	15.3	20.1	14.0	7.0	11.5	6.8
3 Days	35.0	39.2	36.0	15.1	20.3	15.6
7 Days	—	—	—	19.8	25.1	20.4
28 Days	57.8	62.1	58.0	25.5	31.8	26.1

Packaging

TDA is supplied in 210 L (55 gal) drums. TDA may also be supplied in bulk in certain locations. It contains no flammable materials.

Storage

Protect from freezing. Once frozen, the product should be thawed out slowly and re-mixed thoroughly prior to use. Shelf life is minimum 12 months in manufacturer's containers.

Technical Services

Field Engineers from Grace Construction Products are available to assist in laboratory and mill test evaluations of TDA. Complete testing equipment and methods for analyzing mill performance are also available during plant trials.