Technical Data Sheet

Fortis™ Coal System

The Power of Partnership

Description

The *Fortis™ Coal* Bulk System of sensitised pumped emulsion blends has been designed for use in wet blasting applications. The *Fortis™ Coal* system complements the Orica Mining Services *Fortan™ Coal* dry hole product range.

Application

Fortis™ Coal has been specifically tailored for use in open cut coal mining. *Fortis™ Coal* can be used whenever wet blast holes are encountered. It is not suitable for ground containing reactive sulphide.

Key Benefits

- *Fortis™ Coal* is reliable in dry and wet blastholes.
- The integrated product and delivery systems of the *Fortis™ Coal* Bulk System ensures accuracy, productivity and dependability of supply.
- *Fortis™ Coal* can be loaded at varying energies and densities to maximise fragmentation improve mine productivity.
- *Fortis™ Coal* provides fully coupled explosive charges to maximise blasting outcomes.

Recommendations for Use

Blasthole Charge Length

Fortis™ Coal is suitable for use in holes of up to 50 metres in length, depending on hole diameter, product density and presence of water. Please contact Orica Technical Services Representative for further information.

Priming and Initiation

Blasthole Diameter	Min. Booster Mass	Recommended
Greater than 102mm	390g	*Pentex* PPP

Use of detonating cord is ONLY recommended when blasting coal. Please contact your Orica Technical Services Representative for further information. Maximum recommended detonating cord strength is 3.6gm/m and minimum recommended hole diameter for detonating cord use is 150mm.

Charging

Fortis™ Coal is part of the range of bulk explosives delivered by Orica's Mobile Manufacturing Units (*MMU*®). *Fortis™ Coal* is manufactured on the MMU® and pumped into blastholes on demand.

Technical Properties

Property	*Fortis™ Coal* S	*Fortis™ Coal*	*Fortis™ Coal* H
Density (g/cm^3) [1]	1.15 – 1.25		
Minimum Blasthole Diameter (mm) [2]	115		
Maximum Blasthole Depth (m) [2]	50		
Maximum Charge Length (m) [2]	45		
Hole Type	Dry, Wet or Dewatered		
Delivery System	Pumped		
Recommended *Pentex Booster* for minimum hole diameter	PPP		
Typical VOD (km/s) [3]	3.7 – 6.5	3.7 – 6.5	3.7 – 6.5
Relative Effective Energy (REE) [4]			
Relative Weight Strength	100 – 107	103 – 110	107 - 113
Relative Bulk Strength	144 – 167	148 – 172	154 - 177
CO_2 output (kg/tonne) [5]	145 – 133	140 – 135	151 - 148
Sleep Time	*21 Days*		

The average in hole density of *Fortis™ Coal* can be varied to match your blasting application within the parameters shown below. Select your blasthole depth and density and determine the required minimum blasthole diameter from the table. For example to achieve an average in hole density of 1.20 g/cc in a blasthole of depth 40m requires a diameter of at least 160mm.

Hole Depth (m)	Average In Hole Density (g/cc)		
	1.15	1.20	1.25
5			
10			
15			
20			
25			
30			
35			
40			
45			
50			

	For use in holes 115 mm and above
	For use in holes 160 mm and above
	Consult your Orica Technical Services Representative

If you would like further information on the performance of the *Fortis™ Coal* please contact your Orica Technical Services Representative.

Gassing Time

Allow at least 30 minutes between loading and stemming blastholes.

Fortis™ Coal System

Sleep-Time Within Blastholes

The recommended maximum sleep time is 21 days. Sleep time is dependent on factors such as hole diameter, density, ground water conditions and initiation system. Orica Technical Services Representative should be consulted if special conditions exist.

Ground Temperature

These products are available for use in ground temperatures 0° to a maximum of 55°C. If your application requires you to operate outside this temperature range please contact your Orica Technical Services Representative.

Storage and Handling

Product Classification

Authorised Name:	*Fortis™ Coal* System
Correct Shipping Name:	Explosive, Blasting, Type E
UN No:	0241
Classification:	1.1D

Product Quality

Orica's bulk emulsion explosives are manufactured and loaded using an ISO9001 accredited quality process. *Fortis™ Coal* System explosives have been developed by Orica Australia specifically for the mining industry using ISO9001 accredited research and engineering processes.

Disposal

Disposal of explosive materials can be hazardous. Methods of safe disposal of explosives may vary depending on the user's situation. Please contact a Orica Technical Services Representative for information on safe practices.

Safety

Fortis™ Coal is relatively insensitive to accidental initiation by shock, friction or mechanical impact under normal conditions of use. Detonation may occur from heavy impact or excessive heating particularly under conditions of confinement.

Explosives based on Ammonium Nitrate such as the *Fortis™ Coal* may react with pyritic materials in the ground and create potentially hazardous situations. Orica accepts no responsibility for any loss or liability arising from use of the product in ground containing pyritic or other reactive material.

More detailed information can be found in the product Material Safety Data Sheet.

Trademarks

Disclaimer

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Notes:
(1.) Nominal Density only.
(2.) Refer to the Average In-hole Density chart for the limits to diameter, and hole depth for each density.
(3.) The actual VOD depends on the conditions of use including the diameter of the hole and the degree of confinement. The range quoted refers to unconfined minimum diameter up to calculated ideal VOD.
(4.) REE is the Effective Energy relative to ANFO at a density of 0.8 g/cm^3. ANFO has an effective energy of 2.30 MJ/kg. Energies quoted are based on ideal detonation calculations with a 100MPa cut off pressure. Non-ideal detonation energies are also available on request. These take account of blasthole diameter, rock type and explosive reaction behaviour.
(5.) Carbon dioxide is the main greenhouse gas produced. The output is calculated assuming ideal detonation.