Safety data sheet according to the REACH regulations as amended by EC Regulation 2015/0830

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product Identifier	Dunarit D5 and D6 Boosters
1.2 Use of the Product:	Boosters for firing explosives These Boosters are designed for picking up and amplifying the initiating impulse and subsequent initiation of high-order detonation in low sensitivity commercial explosives (powders, suspensions, emulsions) used in the mining industry – in open quarries and underwater, where no risk of explosion from ignition of gas or dust exists
1.3 Details of the Supplier of the MSDS:	
Name	EPC-UK EXPLOSIVES
Address:	ROUGH CLOSE WORKS CARNFIELD HILL SOUTH NORMANTON ALFRETON, DERBYSHIRE, DE55 2BE
Telephone Number:	01773 832253
Contact e-mail	info@epc-groupe.co.uk
1.4 Emergency Telephone Number:	01773 832253

SECTION 2. HAZARD IDENTIFICATION

2.1 Classification of Mixture

H201:	Explosive, mass explosion hazard
H301+H311+H331:	Toxic if swallowed by skin contact or inhalation
H370	Causes damage to organs
H373	Can cause damage to organs upon prolonged-, or repetitive exposure.
H411:	Toxic to aquatic life, with long lasting effect.

2.2 Label elements

Pictogram

GHS01

- Signal word — Danger
- Warning — H201: Explosive, mass explosion hazard
  H301+H311+H331: Toxic if swallowed by skin contact or inhalation
  H370: Causes damage to organs

	H373 Can cause damage to organs upon prolonged-, or repetitive exposure. H411: Toxic to aquatic life, with long lasting effect.
- Prevention	P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking P250: Do not subject to grinding/shock/…/friction P280: Wear protective gloves/protective clothing/eye protection/face protection
- Measures	P370+P380: In case of fire, evacuate the area. Due to explosion hazard, fight fire from a reasonable distance P372: Explosion risk in case of fire P373: DO NOT fight fire when fire reaches explosives Risk of explosion upon impact, friction, fire, or other ignition sources.
2.3 Other Hazards	Not applicable

SECTION 3. COMPOSITION/INFORMATION ON THE INGREDIENTS

3.2 Mixtures

The cast booster D5 and D6 is a plastic cylindrical shell containing an explosive mixture. The shell has a central longitudinal tunnel. The top of the booster is tightly closed with a plastic cover with a central hole. On the bottom, around the central hole, the booster has one (D5) or two (D6) detonator wells intended for the initiating device. The explosive of the cast booster consists of TNT, RDX, PETN and aluminium powder (Al). The explosive is in 2 parts, the main body and a sensitizing pellet around the bottom of the detonator pocket(s).

Name	Comp (%)	CAS №	EINECS	INDEX	Classification
Trinitrotoluene (TNT)	16.5	118-96-7	204-289-6	609-008-00-4	Expl. 1.1: H201 Acute Tox. 3 H301, H311, H331 STOT RE 2 H373 Aquatic Chronic 2 H411
RDX	50	121-82-4	204-500-1	N/A	Expl. 1.1: H201 Acute Tox. 3 H301, STOT SE 1 H370 STOT RE 2 H373
Aluminium powder	15	7429-90-5	231-072-3	N/A	N/A
Ceresin	6	N/A	N/A	N/A	N/A
Polyethylene HD LITEN	9.5	N/A	N/A	N/A	N/A
PETN	3.0	78-11-5	201-084-3	603-035-00-5	Unst. Expl. H200

SECTION 4. FIRST AID MEASURES

4.1 Description of First Aid Measures

General Untrained and uninstructed persons shall not handle this material nor its packaging

First Aid – Inhalation: If necessary, perform artificial respiration. Call a doctor immediately.

First Aid – Skin: Immediately remove contaminated clothing, wash with soap and water and rinse immensely. Get medical attention if necessary

First Aid – Eyes: Flush thoroughly eyes for several minutes with running water while keeping your eyelids open, then consult a doctor.

First Aid – Ingestion: Rinse mouth out thoroughly. Consult a doctor. Seizure is possible in case of exposure to the explosive mixture, loss of consciousness, weakness, dizziness, irritability, insomnia.

4.2. Most Important Symptoms and Effects, Both Acute and Delayed

Eye contact: Irritation of the eye

Skin contact Irritant and allergic contact dermatitis, yellowish colouring of skin.

Inhalation Symptoms: eye and skin irritation, headache, irritability, tiredness, dizziness, vomiting, disturbed sleep.

ingestion Results in fainting, epileptic type seizures, nausea, vomiting.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

Treat symptomatically

SECTION 5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media: Water, carbon dioxide

- **DO NOT ATTEMPT TO EXTINGUISH THE BURNING EXPLOSIVES! RISK OF EXPLOSION.**

Try to remain calm and extinguish the fire before it reaches the product. In case of the risk of an explosion, do not attempt to extinguish the fire. Evacuate to a shelter located at least 300m away. Secure the site against unauthorized access.

5.2 Special Hazards Arising from Product: The explosive can explode upon impact (sensitive to impact, not less than 15J), friction (friction sensitivity, above 360N), fire or other ignition sources.

SECTION 5. FIRE FIGHTING MEASURES (cont)

5.3 Advice for Firefighters: Do not attempt to fight a fire which is near to or has reached the explosives. Evacuate to a safe distance.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures:	Secure the area. Wear suitable personal protection equipment, cotton clothing and gloves. Unprotected persons are not allowed to access the area. All sorts of impact friction and sparks are to be avoided. Keep away from sources of heat and open flames
6.2 Environmental Precautions:	Prevent substance from soaking into soil, water, drains, underground waters. The spilled product must be collected and taken for disposal
6.3. Methods and material for containment and cleaning up	Collect with non-sparking tools and fill into properly labelled containers and transfer for disposal by specialized teams
6.4. Reference to other sections	See section 8 for 8hr TWA for TNT, and section 13 about disposal of waste

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for Safe Handling:	Only personnel with appropriate professional expertise and qualifications are allowed to handle this product. The packed boosters shall be stored in rooms intended for the purpose. Keep away from sources of heat, impact, friction. The quantity of boosters under temporary storage shall not exceed the quantity required for one shift at the site.
7.2 Conditions for safe storage, including any incompatibilities:	Storage rooms shall comply with the fire-fighting and rescue and controlled access requirements. Store in closed packages in cool dry place. Keep locked. Access allowed only to experts. In general storage must be licensed as required by the Explosives regulations 2014 Do not store boosters with their initiating devices Storage limits for which COMAH applies for Explosives: 10 tonnes Lower Tier; 50 tonnes Upper Tier
7.3 Specific end use(s)	The product is supplied for use, testing and analysis by qualified personnel who have been fully trained to handle explosives.

SECTION 8. EXPOSURE CONTROL / PERSONAL PROTECTION

8.1 Control Parameter: Trinitrotoluene	EH40 8 hr TWA: 0.5 mg/m^3
8.2 Exposure controls Hand protection	Impermeable gloves covered with fabric.

Eye protection	Not required for normal handling.
Body protection	Cotton workwear
Industrial hygiene:	Do not eat, drink, smoke when working. Remove all strongly contaminated or soaked clothing. Always wash hands before breaks and at end of work. Avoid substance contact with skin and eyes.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Basic physical and chemical properties

(a) Appearance/ colour:	External appearance is that of the orange plastic shell. The main charge inside the shell is a cast solid
(b) Odour:	Not available
(c) Odour threshold	Not available
(d) pH:	Not applicable
(e) Melting point / Freezing Point	Not available
(f) Initial Boiling point and boiling range	Not available
(g) Flash point:	Not available
(h) Evaporation Rate:	Not available
(i) Flammability:	Not available
(j) Upper / lower flammability or explosive limits	Not available
(k) Vapour pressure:	Not available
(l) Vapour density	Not available
(m) Relative Density	At least 1.5 g/ml for explosive material
(n) Solubility(ies)	Not available
(0) Partition coefficient (n-octanol / water):	Not available
(o) Auto-ignition temperature	180-190°C
(p) Decomposition temperature	Not available
(q) Viscosity:	Not available

9.1 Basic physical and chemical properties (cont)

(r) Explosive properties — Velocity of detonation: at least 7,000 m/s
Sensitivity to impact: Not less than 15 J
Sensitivity to Friction: 360 Newtons

(s) Oxidising properties — Not applicable

9.2 Other information

Information on ingredients

Feature	TRINITROTOLUENE	HEXOGEN
Colour	Light yellow to yellow	White
Odour	Odourless	
Melting point, C°	80,8	206-207
Flammability	Extremely flammable, develops into detonation	We do not have data
Burning temperature, C°	250	240
Flame characteristics	Thin layers burn with flame; in thicker layers – explodes	We do not have data
Decomposition temperature, C°	300	215-229
Solubility in water, %	Practically insoluble	0,03
Solubility in acetone at 20°C, g/dm3	We do not have data	6,81
Heat of formation, kJ/mole	We do not have data	37,7

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity: Explosive. May detonate if subjected to fire, excessive impact or friction.

10.2 Chemical Stability The product is chemically stable under normal conditions

10.3 Possibility of hazardous Reactions Fire, heat, impact friction or static electricity may cause the product to detonate.

10.4 Conditions to avoid Protect from impact, friction and heat. Electrostatic discharges

10.5 Incompatible materials Organic amines, acids, bases, phosphorous, oxidisers

10.6 Hazardous Decomposition Products: Nitrogen oxides, carbon oxides

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

(a) acute toxicity — Toxic if swallowed

	Results		
For component	Trinitrotoluene	RDX	Pentaerythritol Tetranitrate
Oral LD50 rat	795 mg/kg	100 mg/kg	19 500 mg/kg
Oral LD50 mouse	660 mg/kg	N/A	N/A

(b) skin corrosion / irritation — Causes skin irritation

(c) Serious eye damage / irritation — Causes eye irritation

(d) Respiratory or skin sensitisation — Data not available

(e) Germ Cell Mutagenicity — Not known to be mutagenic

(f) carcinogenicity — Not known to be carcinogenic

(g) reproduction toxicity — This product is not known to have negative effects on the reproductive system and on development

(h) STOT – single exposure — Data not available

(i) STOT –repeated exposure — Data not available

(j) aspiration hazard — Not applicable

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity: Toxic to aquatic life. May cause long lasting negative effects on aquatic environment.

12.2 Persistence and Degradability: The product is practically insoluble in water. The product may entail environmental hazard, if decomposed or in case of explosion.

12.3 Bioaccumulation potential; Data not available

12.4 Mobility in soil Data not available

12.5 Result of PBT and vPvB Assessment: Data not available

12.6 Other Adverse Effects Data not available

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:

Product and Container disposal	Waste and used empty containers shall be disposed in accordance with the national and local Safety Regulation for handling explosives. See the CBI/EIG "Guidance for the Safe Management and Disposal of Explosives" Mixing with other types of waste is not allowed. List of the suggested names of codes/wastes in accordance with EWC: 16 04 03 – Other explosive materials, wastes

SECTION 14. TRANSPORT INFORMATION

14.1 UN Number :	UN 0042
14.2 UN Proper Shipping Name :	BOOSTERS without detonator
14.3 Transport Hazard Classes:	1.1D
14.4 Packing Group :	Not assigned but explosives usually treated as PGII
14.5 Environmental Hazards	Not classed as a marine pollutant
14.6 Special Precautions for User	As an explosive, the product is a high consequence dangerous good and adequate transport precaution must be taken for its security
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable

For further information contact the Explosive Engineering Dept at
EPC-UK Explosives, Venture Crescent, Alfreton, Derbyshire DE55 7RA
Tel 01773 832253 Fax 01773 837683

SECTION 15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

UK Legislation: Carriage of Dangerous Goods Regulations 2009, as amended – implementing ADR
Control of Substances Hazardous to Health regs 2002, as amended
Explosives Regulations 2014, as amended
Control of Major Accident Hazard Regulations 2015

EC Regulations: Registration Evaluation, Authorisation and Restriction of Chemicals Regulations 2006, as amended
Classification Labelling and Packaging Regulations 2008, as amended

15.2 Chemical Safety Assessment: Not available

SECTION 16. OTHER INFORMATION

MSDS first issued: January 2017

(a) Changes

Issue	Issue Date	Changes
1	02/01/2017	New issue, based on the manufacturer's MSDS
2	13/03/2018	Amended following new version of supplier SDS 2.1 Updated hazard phrases 3.2 Composition list amended 6.1 and 6.2 updated 7.2 Added do not store with initiating device 9.1 amended minimum density. Added auto ignition temperature 9.2 amended information on ingredients 10.3/10.4 amended 11.1 added info on components eco-toxicity 12.1 amended

(b) Abbreviations and acronyms
(c) References
EH40/2005 Workplace Exposure limits. HSE publication.
(d) Evaluation method for mixtures

For further information contact the Explosive Engineering Dept at
EPC-UK Explosives, Venture Crescent, Alfreton, Derbyshire DE55 7RA
Tel 01773 832253 Fax 01773 837683

(e) Relevant hazard Statements and Precautionary statements

Meanings of Hazard Phrases

H200 Unst. Expl.
H201 Explosive; mass explosive hazard
H228 Flam. Sol. 1
H261 Water-react. 2
H301 Toxic, if swallowed
H311 Toxic in contact with skin
H315 Causes skin irritation
H331 Toxic, if inhaled
H370 STOT SE 1
H373 STOT RE 2
H411 Aquatic Chronic 2

Meanings of Precautionary Phrases

P401: Store in locked premises.
P501: Dispose of content / containers to disposal plant in accordance with the relevant regulations

(f) Advice on training

Handling and use of this product should only be allowed by qualified persons.

Notice: **FOR FURTHER INFORMATION CONTACT**
EPC-UK EXPLOSIVES EXPLOSIVE ENGINEERING DEPARTMENT