

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

SECTION 1: Identification of the substance / mixture and of the company / undertaking

1.1. Product identifier

Trade name(s) **Senatel™ Powerfrag™**

Other means of identification

Other names Not applicable

Chemical name Not applicable

INDEX number as listed in Annex VI of CLP Not applicable

ID number of the C&L inventory Not applicable

CAS number Not applicable

REACH registration no(s) Not applicable

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified Use(s) SU 2a - Mining, (without offshore industries)

Use(s) advised against Usage of the product only according to existing laws and official permissions.
Not to be used in mines with hazard of coal dust or fire damp explosion.

Function(s) of substance / mixture Senatel™ Powerfrag™ packaged emulsion explosive is a robust, high strength, detonator sensitive explosive.
Senatel™ Powerfrag™ is a water resistant packaged emulsion explosive designed for priming applications, and as a medium density column explosive, in surface and underground mining and general blasting.

1.3. Details of the supplier of the safety data sheet

Supplier **Orica UK Limited**
North Quarry Business Park
Skull House Lane
Appley Bridge
Wigan WN6 9DL
United Kingdom



Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Phone / Fax / Email : +44 (0) 1257 256100 / +44 (0) 1257 255670 / andy.rossiter@orica.com

Technical support : +44 (0) 1925 767679

Contact to the responsible person for safety data sheet : sds.emea@orica.com

1.4. Emergency telephone number

Emergency phone number : For medical advice call: +49 (0) 551 19240
(GIZ-Nord Poisons Centre)
(Member of EPECS network)
For chemical emergencies (spill, leak, fire, exposure or accident), call:
+44 (0) 1928 572000

SECTION 2: Hazards identification

H201 - Explosive, mass explosion hazard.
H272 - May intensify fire; oxidiser.
H319 - Causes serious eye irritation.
Risk of explosion by shock, friction, fire or other sources of ignition.

2.1 Classification of the substance or mixture

The mixture is classified as dangerous within the meaning of Regulation (EC) No 1272/2008.
The preparation is classified as dangerous according to Directive 1999/45/EC.

Classification in accordance with Regulation (EC) No. 1272/2008

Hazard class / category	Hazard statement(s)	Classification method	Additional Information
Expl. 1.1	H201	UN RTDG	CLP - figure 2.1.3
Ox. Sol. 3	H272	-	-
Eye Irrit. 2	H319	1272/2008/EC	Tab. 3.3.3

Wording of Hazard statements (H, EUH): see section 16.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20


Classification in accordance with Directive 67/548/EEC or Directive 1999/45/EC

Properties or classification letter	R phrases
E	R 2 Risk of explosion by shock, friction, fire or other sources of ignition.
O	R 8 Contact with combustible material may cause fire.
Xi	R 36 Irritating to eyes.

No additional information

2.2. Label elements

Labelling in accordance with Regulation (EC) No. 1272/2008

Product identifier	Senatel™ Powerfrag™	
Index or C&L number	Not applicable	
Hazardous component(s)	Ammonium nitrate, CAS No.: 6484-52-2 Sodium nitrate, CAS No.: 7631-99-4 Distillates (petroleum), hydrotreated light naphthenic, Index No.: 649-466-00-2 Thiourea, Index No.: 612-082-00-0	
Authorisation number	Not applicable	
Hazard pictogram(s)		
Signal word	Danger	
Hazard statement(s)	H201	Explosive, mass explosion hazard.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Precautionary statement(s)	P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
	P250	Do not subject to grinding / shock / ... / friction.
	P280	Wear protective gloves / protective clothing / eye protection / face protection.
	P370+P380	In case of fire: Evacuate area.
	P372	Explosion risk in case of fire.
	P373	DO NOT fight fire when fire reaches explosives.

Additional Information (EU)

-

Additional Labelling

-

Note

Use of special provisions according to 1272/2008/EC art. 23e.

Labelling in accordance with Directive 67/548/EEC or Directive 1999/45/EC

Hazard symbol(s)



Identification of danger

Explosive

R phrases

R 2 Risk of explosion by shock, friction, fire or other sources of ignition.

S phrases

S 15 Keep away from heat.
S 16 Keep away from sources of ignition — No smoking.
S 20/21 When using do not eat, drink or smoke.
S 33 Take precautionary measures against static discharges.
S 36/37/39 Wear suitable protective clothing, gloves and eye / face protection.

Note

Use of special provisions according to 67/548/EEC art. 25(1) and 1999/45/EC art. 12(1).

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

2.3. Other hazards

Results of PBT and vPvB assessment

Based on the current available information for the used ingredients, the PBT and vPvB criteria of Regulation (EC) No 1907/2006, Annex XIII will not be met.

Other hazards

Stythe is heavier than air and may accumulate below ground level, in pits, channels and basements in higher concentration.

All chemicals are potentially dangerous, they should only be handled by properly trained personnel with the necessary care.

Additional Information

Specific concentration limits

Not applicable

SECTION 3: Composition / information on ingredients

Packaged emulsion explosive inlaid in a plastic wrap with metallic clips at both sides.

3.1. Substances

Not applicable

Substance	Registration No. Index or C&L number	EC No. CAS No.	Classification (1272/2008/EC) Classification (67/548/EEC)	Content (w/w)
-	-	-	-	-

3.2. Mixtures

Substance	Registration No. Index or C&L number	EC No. CAS No.	Classification (1272/2008/EC) Classification (67/548/EEC)	Content (w/w)
Ammonium nitrate	01-2119490981-27-XXXX Not applicable	229-347-8 6484-52-2	H272, H319 R 8-36	70-80
Sodium nitrate	01-2119488221-41-XXXX Not applicable	231-554-3 7631-99-4	H272, H319 R 8-36	7-10

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Distillates (petroleum), hydrotreated light naphthenic	01-2119480375-34-XXXX 649-466-00-2	265-156-6 64742-53-6	H304 ¹⁾ R 65	ca. 1
Thiourea	05-2114370696-37-XXXX 649-469-00-9	200-543-5 62-56-6	H302, H351, H361d, H411 R 22-40-51/53-63	<0.3

¹⁾ less than 3 % DMSO extract as measured by IP 346

Comments

-

Additional information

Wording of R phrases and hazard statements (H, EUH): see section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice

- IF exposed or concerned: Get medical advice / attention.
- In case of unintentional ignition usual first aid measures are to be applied for bruises, wounds and burns.
- Remove affected person from the danger area and lay down.
- Do not leave affected person unattended.
- When in doubt or if symptoms are observed, get medical advice.
- If unconscious place in recovery position and seek medical advice.

In case of eye contact

- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists: Get medical advice / attention.

In case of skin contact

- Remove contaminated clothing.
- Subsequently wash off with: Water and soap
- Do not wash with: Solvents / thinner
- In case of skin irritation, consult a physician.

If swallowed

- IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
- IF SWALLOWED: Immediately call a POISON CENTER / doctor / ...

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

If inhaled

- In case of inhalation of decomposition products, affected person should be moved into fresh air and kept still.
- Get medical attention if any discomfort continues.
- In case of respiratory tract irritation, consult a physician.
- If breathing is irregular or stopped, administer artificial respiration.
- Apply cortisone spray at early stage.
- Symptoms may develop several hours following exposure medical observation therefore necessary for at least 48 hours.

4.2. Most important symptoms and effects, both acute and delayed

Acute symptoms / effects

Methaemoglobinaemia

Delayed symptoms / effects

If decomposition products are inhaled the following symptoms can occur:

- Pulmonary oedema

Self-protection for first-aider

First aider: Pay attention to self-protection!

4.3. Indication of any immediate medical attention and special treatment needed

Unlikely to be required but if necessary treat symptomatically.

SECTION 5: Fire fighting measures

Product is an explosive.

Keep unauthorised persons away.

Warn neighbourhood announcing risk of explosion.

5.1. Extinguishing media

Suitable extinguishing media

No fire-fighting attempts, risk of explosion.

Unsuitable extinguishing media

Not applicable

5.2. Special hazards arising from the substance or mixture

Product is an explosive.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Possible combustion gases or vapours

In case of fire may be liberated:

- Ammonia (NH₃)
- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Carbon dioxide (CO₂)

5.3. Advice for firefighters

Special protective equipment for fire fighting

In case of fire: Wear self-contained breathing apparatus.

Measures in case of adjacent fire (Fire has not yet reached product)

Co-ordinate fire-fighting measures to the fire surroundings.

Use water spray jet to protect personnel and to cool endangered containers.

Move undamaged containers from immediate hazard area if it can be done safely.

Measures in case of product fire (Fire has just reached the product or is about to reach it)

No fire-fighting attempts, risk of explosion.

Immediately evacuate danger zone and seek safe cover.

Additional Information

Restrict the number of action force members in the hazard area.

Avoid contact to combustible substances.

Do not inhale explosion and combustion gases.

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protection equipment.

For non-emergency personnel

Avoid substance contact.

Do not handle unprotected.

Respect emergency plans.

Ask for support by competent person.

For emergency responders

Close off hazard area widely.

Ask for support by competent person.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Notes on prevention of the spread of spilled materials

Due to the consistency and product packaging spillage of ingredients is not likely.

Instructions for cleaning after spillage

Use only non-sparking tools.

Take up mechanically, placing in appropriate containers for disposal.

Additional Information

When in doubt contact supplier.

6.4. Reference to other sections

Note also section 7, 8, 10 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Technical measures / Precautions

Only to be handled by authorized persons.

The explosives must be under supervision and unavailable for unauthorized persons.

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Do not subject to grinding / shock / ... / friction.

Available for use in ground temperatures -30 °C to a maximum of 50 °C.

Not to be used in mines with hazard of coal dust or fire damp explosion.

General occupation hygiene

Do not eat, drink or smoke when using this product.

Contaminated work clothing should not be allowed out of the workplace.

Wash hands before breaks and after work.

Keep away from food, drink and animal feeding stuffs.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

7.2. Conditions for safe storage, including any incompatibilities

Technical measures / Storage conditions	The cases should be stacked in the manner designated on the cases.
Requirements for storage areas and containers	Store in original container if possible.
Common storage instruction	Storage of explosives and explosive articles should be agreed with national authorities.
Incompatible products	Respect restrictions according to national law.
Storage temperature	Best stored between -30 °C and 30 °C.
Relative humidity (%)	Store under normal conditions.
Stability in storage	Stable under normal storage conditions.
Quantitative restrictions	Maximum storage volume should be agreed with national authorities.
Maximum period of storage	Storage life of up to 12 months.
Storage class	Explosive substances.

7.3. Specific end use(s)

Read instructions before use.
No other specific end uses than those specified in section 1.2 are provided.
Usage of the product only according to existing laws and official permissions.

SECTION 8: Exposure controls / personal protection

Because of design and shape of the product (explosive inlaid in a plastic wrap with metallic clips at both sides) a contact with ingredients is to be expected only in case of accidental release.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

8.1. Control parameters

Exposure limit values

Components / CAS No.	Value	Limit	Basis	Comments
Ammonium nitrate 6484-52-2	-	Not established	-	-
Sodium nitrate 7631-99-4	-	Not established	-	-
Distillates (petroleum), hydrotreated light naphthenic 64742-53-6	-	Not established	-	-
Base oil derived from petroleum	-	Not established	-	-
Thiourea 62-56-6	-	Not established	-	-
Dust	Long term Long term	10 mg/m ³ (inhalable dust) 4 mg/m ³ (respirable aerosol)	- -	UK UK
Ammonia 7664-41-7	Long term Long term Short term Short term	14 mg/m ³ ; 20 ppm 18 mg/m ³ ; 25 ppm 36 mg/m ³ ; 50 ppm 25 mg/m ³ ; 35 ppm	GESTIS GESTIS GESTIS GESTIS	EU ¹⁾ UK EU ¹⁾ UK
Carbon dioxide 124-38-9	Long term Long term Short term	9000 mg/m ³ ; 5000 ppm 9150 mg/m ³ ; 5000 ppm 27400 mg/m ³ ; 15000 ppm	GESTIS GESTIS GESTIS	EU ¹⁾ UK UK
Carbon monoxide 630-08-0	Long term Short term	35 mg/m ³ ; 30 ppm 232 mg/m ³ ; 200 ppm	GESTIS GESTIS	UK UK

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Nitrogen dioxide 10102-44-0	Long term Short term	9.6 mg/m ³ ; 5 ppm	0.2 ppm 5 ppm	GESTIS GESTIS	EU ²⁾ UK
Nitrogen monoxide 10102-43-9	-	Not established	-	-	-

1) Indicative Occupational Exposure Limit Values and Limit Values for Occupational Exposure.

2) Proposal, Indicative Occupational Exposure Limit Values.

Biological limit values

Components / CAS No.	Value	Limit	Specimen	Sampling time
Ammonium nitrate 6484-52-2	-	Not established	-	-
Sodium nitrate 7631-99-4	-	Not established	-	-
Distillates (petroleum), hydrotreated light naphthenic 64742-53-6	-	Not established	-	-
Thiourea 62-56-6	-	Not established	-	-
Ammonia 7664-41-7	-	Not established	-	-
Carbon dioxide 124-38-9	-	Not established	-	-
Carbon monoxide 630-08-0	Carbon monoxide	30 ppm	End-tidal breath	End of exposure
Nitrogen dioxide 10102-44-0	-	Not established	-	-
Nitrogen monoxide 10102-43-9	-	Not established	-	-

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Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

The Power
of Partnership

Recommended monitoring methods

The methods for measuring workplace atmosphere have to correspond to the requirements of norms DIN EN 482 and DIN EN 689.

Additional exposure limits under processing conditions

Route of exposure	Exposure frequency	DNEL	Critical component	Comments
Inhalation	Long term - systemic effects	37.6 mg/m ³	Ammonium nitrate	Workers
Inhalation	Long term - systemic effects	11.1 mg/m ³	Ammonium nitrate	Consumer
Inhalation	Long term - systemic effects	36.7 mg/m ³	Sodium nitrate	Workers
Inhalation	Long term - systemic effects	10.9 mg/m ³	Sodium nitrate	Consumer
Inhalation	Long term - Local	5.4 mg/m ³	Distillates (petroleum), hydrotreated light naphthenic	Workers
Inhalation	Long term - systemic effects	1 mg/m ³	Thiourea	Workers
Inhalation	Long term - systemic effects	0.2 mg/m ³	Thiourea	Consumer
Dermal	Long term - systemic effects	21.3 mg/kg bw/d	Ammonium nitrate	Workers
Dermal	Long term - systemic effects	12.8 mg/kg bw/d	Ammonium nitrate	Consumer
Dermal	Long term - systemic effects	20.8 mg/kg bw/d	Sodium nitrate	Workers
Dermal	Long term - systemic effects	12.5 mg/kg bw/d	Sodium nitrate	Consumer
Dermal	Long term - systemic effects	3.4 mg/kg bw/d	Thiourea	Workers
Dermal	Long term - systemic effects	1.7 mg/kg bw/d	Thiourea	Consumer
Oral	Long term - systemic effects	12.8 mg/kg bw/d	Ammonium nitrate	Consumer
Oral	Long term - systemic effects	12.5 mg/kg bw/d	Sodium nitrate	Consumer
Oral	Long term - systemic effects	0.1 mg/kg bw/d	Thiourea	Consumer

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

PNEC:

Ammonium nitrate: Fresh water: 0.45 mg/L, Marine water: 0.045 mg/L, Intermittent release: 4.5 mg/L, STP: 18 mg/L

Sodium nitrate: Fresh water: 0.45 mg/L, Marine water: 0.045 mg/L, Intermittent release: 4.5 mg/L, STP: 18 mg/L

Distillates (petroleum), hydrotreated light naphthenic: Oral: 9.33 mg/kg food

Thiourea: Fresh water: 0.01 mg/L, Marine water: 0.001 mg/L, Intermittent release: 0.038 mg/L,
STP: 0.38 mg/L, Sediment (fresh water): 0.0725 mg/kg dw,
Sediment (marine water): 0.00725 mg/kg dw, Soil: 2.725 mg/kg dw

8.2. Exposure controls

Limitation and monitoring of occupational exposure

Product related measures to prevent exposure

Keep cases closed and store in a cool, well ventilated place.
Avoid damage of the product.

Instructive measures to prevent exposure

Do not eat, drink or smoke when using this product.
Wash hands before breaks and after work.
Use skin care measures in accordance with professional association's rules.
When working with substances minimum standards for protective measures in accordance with professional association's rules should be respected.

Organizational measures to prevent exposure

Minimize the time spent in the danger zone.
Reduce staff in the danger zone to the required level.
Separate storage facilities for street and work clothes should be available when a risk is to be expected from contamination of work clothes.

Technical measures to prevent exposure

See section 7.
Further information: see exposure scenarios attached to this Safety Data Sheet.

Individual protection measures, such as personal protective equipment

Technical measures and the application of suitable work processes have priority over personal protection equipment.
The quality of the protective clothing resistant to chemicals must be chosen as a function of the specific working place concentration and quantity of hazardous substances.
For special purposes, it is recommended to check the resistance of the protective clothing to chemicals together with the supplier.
Professional association's rules should be respected.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Eye / face protection

Suitable eye protection: Eye glasses with side protection
DIN-/EN-Norms: DIN EN 166

Hand protection

Suitable gloves type: Gloves with long cuffs
Suitable material: NBR (Nitrile rubber)
DIN-/EN-Norms: DIN EN 388

Skin protection

Work clothes made from cotton meets the requirements.
Choice and design of the work clothes to be used depends on the results of the risk assessment for the specific working environment.
It is necessary to consider the following needs of protection:

- Protection against heat and open fire (clothing must not melt and not be flammable);
- Protection against contact with chemicals (the fabric shall not absorb particles of explosives as this would make the fabric more flammable);
- Protection from electrostatic charging;
- Protective clothing used to protect against further hazards (reflective clothing, weather proof clothing) must comply with the above requirements.

Respiratory protection

No personal respiratory protective equipment normally required.
Respiratory protection necessary at: exposure limit overshoot
Suitable respiratory protection apparatus: Half-face mask (DIN EN 140); Type A2

Hygiene measures

Do not eat, drink or smoke when using this product.
Wash hands before breaks and after work.

Thermal hazards

No thermal hazard is to be expected.

Environmental exposure controls

Product related measures to prevent exposure

Avoid damage of the product.

Instructive measures to prevent exposure

Avoid release to the environment.

Organizational measures to prevent exposure

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Technical measures to prevent exposure

-

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Limitation and monitoring of Consumer exposure

Measures relating to the use of the substance (as such or in mixtures) by the consumer Not applicable, the exposure of consumers is not to be expected.

Measures relating to the use of the substance in articles Not applicable

SECTION 9: Physical and chemical properties

Emulsion explosive white in colour with a firm putty-like consistency, inlaid in a plastic wrap with metallic clips at both sides.

9.1. Information on basic physical and chemical properties

Appearance Physical state: Solid, Pasty
Colour: White

Odour Odourless

Odour threshold Not applicable

pH Not applicable

Melting point / freezing point Not applicable

Initial boiling point and boiling range No data available

Flash point Not applicable

Evaporation rate No data available

Flammability (solid, gas) Not applicable

Upper / lower flammability or explosive limits Not applicable

Vapour pressure No data available

Vapour density No data available

Relative density 1.15 - 1.23 g/cm³ (20 °C)

Solubility(ies) No data available



Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Partition coefficient: n-octanol / water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	Explosive
Oxidising properties	Oxidising properties

9.2. Other information

Risk of explosion by shock, friction, fire or other sources of ignition (R 2).
See Technical Data Sheet for more information.

SECTION 10: Stability and reactivity

10.1. Reactivity

Risk of explosion by shock, friction, fire or other sources of ignition (R 2).

10.2. Chemical stability

The product is chemically stable under standard ambient conditions (room temperature).

10.3. Possibility of hazardous reactions

Fire, heat, electrostatic or impact may cause the product to explode.

10.4. Conditions to avoid

Mechanical influences (e.g. shock, pressure, impact, friction).

Fire, sparks or other ignition sources.

Electrostatic discharges.

10.5. Incompatible materials

Reducing agent, Acids, Alkalis, Combustible products, Metal powders, Chromates, Zinc, Copper, Copper alloys, Chlorates.

Product contact with alkaline substances leads to liberation of ammonia (corrosive).



Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

10.6. Hazardous decomposition products

Ammonia (NH₃), Nitrogen oxides (NO_x), Carbon monoxide (CO), Carbon dioxide (CO₂)

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity of Ammonium nitrate, CAS No. 6484-52-2

Route of exposure	Value	Effective dose	Species	Basis	Comments
Oral	LD ₅₀	2950 mg/kg bw	Rat	¹⁾	OECD 401
Dermal	LD ₅₀	>5000 mg/kg bw	Rat	¹⁾	OECD 402

¹⁾ SDS of Supplier

Acute toxicity of Sodium nitrate, CAS No. 7631-99-4

Route of exposure	Value	Effective dose	Species	Basis	Comments
Oral	LD ₅₀	3430 mg/kg bw	Rat	¹⁾	OECD 401
Dermal	LD ₅₀	>5000 mg/kg bw	Rat	¹⁾	OECD 402

¹⁾ SDS of Supplier

Acute toxicity of Distillates (petroleum), hydrotreated light naphthenic, CAS No. 64742-53-6

Route of exposure	Value	Effective dose	Species	Basis	Comments
Oral	LD ₅₀	>5000 mg/kg bw	Rat	¹⁾	-
Dermal	LD ₅₀	>2000 mg/kg bw	Rabbit	¹⁾	-
Inhalation	LC ₅₀ (4h)	>5.53 mg/L	Rat	¹⁾	-

¹⁾ SDS of Supplier

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Acute toxicity of Thiourea, CAS No. 62-56-6

Route of exposure	Value	Effective dose	Species	Basis	Comments
Oral	LD ₅₀	125 mg/kg bw	Rat	¹⁾	Tumorigenic, mutagenic
Dermal	LD ₅₀	>2800 mg/kg bw	Rabbit	¹⁾	-

¹⁾ SDS of Supplier

Acute toxicity of Senatel™ Powerfrag™

Route of exposure	Value	Effective dose	Species	Basis	Comments
Oral	LD ₅₀	>3050 mg/kg bw	-	ATE _{mix}	Calculation
Dermal	LD ₅₀	>5000 mg/kg bw	-	ATE _{mix}	Calculation

Inhalation is a unlikely route of exposure.

Skin corrosion / irritation Non-irritant

Serious eye damage / eye irritation Eye Irrit. 2; Causes serious eye irritation (Calculation, Tab. 3.3.3, CLP-regulation).

Respiratory or skin sensitization It is not a skin sensitizer.

Repeated dose toxicity Ingredients are not classified.

Germ cell mutagenicity Ingredients are not classified.

Carcinogenicity Ingredients are not classified.

Reproductive toxicity Ingredients are not classified.

STOT - single exposure The substance or mixture is not classified as specific target organ toxicant, single exposure.

STOT - repeated exposure The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard No aspiration toxicity classification.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Information on likely routes of exposure

The primary route of exposure is the dermal route.

Mixture versus substance information

Ammonium nitrate:

- Reproductive toxicity: NOAEL \geq 1500 mg/kg bw/d;
- Repeated dose toxicity: NOAEL = 256 mg/kg bw/d (chronic, rat)

Sodium nitrate:

- Reproductive toxicity: NOAEL \geq 1500 mg/kg bw/d;
- Repeated dose toxicity: NOAEL \geq 1500 mg/kg bw/d (subacute, rat)

Other information

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1. Toxicity

Toxicity of	Ammonium nitrate, CAS No. 6484-52-2
Acute fish toxicity	LC ₅₀ (48 h): 447 mg/L (no guideline followed)
Chronic fish toxicity	No data available
Acute toxicity to daphnia and other aquatic invertebrates	EC ₅₀ (48 h): 490 mg/L (no guideline followed, with potassium nitrate)
Chronic toxicity to daphnia and other aquatic invertebrates	No data available
Acute toxicity to algae	EC ₅₀ (10 d): >1700 mg/L (seawater, no guideline followed, performed with potassium nitrate)
Chronic toxicity to algae	No data available
M-Factor	Not applicable

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Further toxicological information

Inhibition of microbial activity:	EC ₅₀ (3 h): >1000 mg/L, NOEC: 180 mg/L (OECD 209, with sodium nitrate)
Persistence and degradability:	The methods of determining this info are not applicable to inorganic substances.
Bioaccumulative potential:	The substances have no potential for bioaccumulation.
Mobility in soil:	The substance is soluble.

Toxicity of

Sodium nitrate, CAS No. 7631-99-4

Acute fish toxicity

LC₅₀ (96 h): >1000 mg/L (no guideline followed)

Chronic fish toxicity

No data available

Acute toxicity to daphnia and other aquatic invertebrates

EC₅₀ (24 h): 8600 mg/L (Daphnia magna, OECD 202)

Chronic toxicity to daphnia and other aquatic invertebrates

No data available

Acute toxicity to algae

EC₅₀ (10 d): >1700 mg/L (no guideline followed, with potassium nitrate)

Chronic toxicity to algae

No data available

M-Factor

Not applicable

Further toxicological information

Inhibition of microbial activity:	EC ₅₀ (3 h): >1000 mg/L, NOEC: 180 mg/L (OECD 209)
Persistence and degradability:	The methods of determining this info are not applicable to inorganic substances.
Bioaccumulative potential:	The substances have no potential for bioaccumulation.
Mobility in soil:	The substance is soluble.

Toxicity of

Distillates (petroleum), hydrotreated light naphthenic, CAS No. 64742-53-6

Acute fish toxicity

LC₅₀: >100 mg/L

Chronic fish toxicity

No data available

Acute toxicity to daphnia and other aquatic invertebrates

No data available

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Chronic toxicity to daphnia and other aquatic invertebrates	No data available
Acute toxicity to algae	IC ₅₀ : >100 mg/L
Chronic toxicity to algae	No data available
M-Factor	Not applicable

Further toxicological information

Persistence and degradability:	This component is not readily biodegradable. Inherently biodegradable.
Bioaccumulative potential:	This component has a potential to bioaccumulate.
Mobility in soil:	Insoluble in water.

Toxicity of	Thiourea, CAS No. 62-56-6
Acute fish toxicity	LC ₅₀ (48 h): 10 g/L (Leuciscus idus) LC ₅₀ (96 h): 10 g/L (Brachydanio rerio)
Chronic fish toxicity	No data available
Acute toxicity to daphnia and other aquatic invertebrates	EC ₅₀ (48 h): 35 mg/L (Daphnia magna)
Chronic toxicity to daphnia and other aquatic invertebrates	No data available
Acute toxicity to algae	EC ₅₀ (96 h): 6.8 mg/L (Scenedesmus quadricauda)
Chronic toxicity to algae	No data available
M-Factor	Not applicable

Further toxicological information

Persistence and degradability:	Moderate biodegradability in soil. Not readily biodegradable when dissolved in water. When released into the air, a moderate degradation is expected by a photochemical reaction that is caused by hydroxyl radicals. Additional atmospheric removal by wet and dry disposition.
Bioaccumulative potential:	No or low potential for bioaccumulation.
Mobility in soil:	The substance is soluble.



Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Toxicity of Senatel™ Powerfrag™

Acute fish toxicity No data available

Chronic fish toxicity No data available

Acute toxicity to daphnia and other aquatic invertebrates No data available

Chronic toxicity to daphnia and other aquatic invertebrates No data available

Acute toxicity to algae No data available

Chronic toxicity to algae No data available

M-Factor Not applicable

Further toxicological information

No data available

12.2. Persistence and degradability

Biodegradation No data available

Hydrolysis No data available

12.3. Bioaccumulative potential

Partition coefficient: n-octanol / water No data available

Bioconcentration factor (BCF) No data available

12.4. Mobility in soil

Based on the high content of soluble ingredients a low potential for adsorption is to be expected.

12.5. Results of PBT and vPvB assessment

The PBT and vPvB criteria of Regulation (EC) No 1907/2006, Annex XIII will not be met.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

12.6. Other adverse effects

Excessive exposure of ammonium nitrate, sodium nitrate or Senatel™ Powerfrag™ can lead to an over-fertilization of soil and waters; therefore a careful handling of the product is mandatory.

SECTION 13: Disposal considerations

Waste material must be disposed of in accordance with Directive on waste 2008/98/EC as well as other national and local regulations. It is recommended to stay in contact with the authorities and / or waste disposal company to request further information about the recovery or disposal.

13.1. Waste treatment methods

Leave product in original containers. No mixing with other waste. If possible take advantage of take-back systems for products and packaging.

Product residues

Burn under supervision of an expert at a government-approved explosive burning ground or destroy, by detonation in boreholes, in accordance with applicable local, provincial and federal laws.

Packaging

Handle uncleaned containers like the product itself.

Waste classification according to EWC

The allocation of waste identity numbers / waste descriptions must be carried out according to the EWC, specific to the industry and process. Evidence for disposal must be provided.

List of proposed waste codes / waste designations in accordance with EWC:

16 04 03 Other waste explosives

SECTION 14: Transport information

14.1. UN number

0241

14.2. UN proper shipping name

EXPLOSIVE, BLASTING, TYPE E (Senatel™ Powerfrag™)

14.3. Transport hazard class(es)

1.1D

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

14.4. Packing group

Not applicable

14.5. Environmental hazards

Dangerous for the environment No

IMDG Marine pollutant No

14.6. Special precautions for user

Attention: explosive product

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Name of product Not applicable, transport in bulk is not to be expected.

Required type of ship -

Pollution category -

SECTION 15: Regulatory information

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

European regulations
Directive 67/548/EEC (Dangerous Substance Directive)
Directive 1999/45/EC (Dangerous Preparation Directive)
Directive 2008/98/EC (Waste Framework Directive)
Regulation 1907/2006/EC (REACH)
Regulation 1272/2008/EC (CLP)

National regulations
Approval conditions must be respected.
Compare national regulations for handling with explosives.

15.2. Chemical safety assessment

For the following substances of this mixture a chemical safety assessment has been carried out:

- Ammonium nitrate, CAS No. 6484-52-2
- Sodium nitrate, CAS No. 7631-99-4
- Distillates (petroleum), hydrotreated light naphthenic, CAS No. 64742-53-6

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

SECTION 16: Other information

List of relevant H and P statements

H201	Explosive; mass explosion hazard.
H272	May intensify fire; oxidiser.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H361d	Suspected of damaging the unborn child.
H411	Toxic to aquatic life with long lasting effects.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P250	Do not subject to grinding / shock / ... / friction.
P280	Wear protective gloves/protective clothing/eye protection / face protection.
P370+P380	In case of fire: Evacuate area.
P372	Explosion risk in case of fire.
P373	DO NOT fight fire when fire reaches explosives.

List of relevant R and S phrases

R 2	Risk of explosion by shock, friction, fire or other sources of ignition.
R 8	Contact with combustible material may cause fire.
R 22	Harmful if swallowed.
R 36	Irritating to eyes.
R 40	Limited evidence of a carcinogenic effect.
R 51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 63	Possible risk of harm to the unborn child.
R 65	Harmful: may cause lung damage if swallowed.
S 15	Keep away from heat.
S 16	Keep away from sources of ignition — No smoking.
S 20/21	When using do not eat, drink or smoke.
S 33	Take precautionary measures against static discharges.
S 36/37/39	Wear suitable protective clothing, gloves and eye / face protection.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Training advice

Employees should be trained before handling the substance.
Refresher training should be scheduled at regular intervals and in accordance with legal requirements.

Recommended restrictions on use

Please note the use identified in section 1.2

Further information

ID	Identification number
PBT	Persistent, bioaccumulative and toxic
vPvB	Very persistent and very bioaccumulative
C&L	Classification and Labelling
EC No.	The three European lists of substances from the previous EU chemicals regulatory framework, EINECS, ELINCS and the NLP-list, in combination are called the EC Inventory. The EC Inventory is the source for the seven-digit EC number, an identifier of substances commercially available within the European Union.
CAS No.	Chemical Abstracts Service Number
UN RTDG	United Nations Regulations on the Transport of Dangerous Goods
Expl. 1.1	Explosives, Division 1.1
Ox. Sol. 3	Oxidising solid, Hazard Category 3
Eye Irrit. 2	Serious eye damage/eye irritation, Hazard Category 2
E	Explosive
O	Oxidizing
Xi	Irritant
R phrases	Risk phrases
S phrases	Safety phrases
EUH	European Hazard Statement
CLP	Regulation (EC) No 1272/2008 of the European parliament and of the council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.
REACH	Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

STOT	Specific Target Organ Toxicity
STOT - RE	Specific Target Organ Toxicity — repeated exposure
K _{OW}	Octanol-water partition coefficient
DIN-/EN Norm	German Industry Standard / European Standard
A2	Filter category A2
BCF	Bioconcentration factor
LD ₅₀	Median lethal dose
LC ₅₀	Median lethal Concentration
EC ₅₀	The effective concentration of substance that causes 50% of the maximum response.
ATE _{mix}	Acute Toxicity Estimates of mixture
PNEC	Predicted No Effect Concentration
PEC	Predicted Environmental Concentration
RCR	Risk Characterisation Ratio
NOEC	No Observed Effect Concentration
NOAEL	No Observed Adverse Effect Level
DNEL	Derived No Effect Level
CSA	Chemical Safety Assessment
RMM	Risk Management Measures
OC	Operational Conditions
UVCB	Substance of unknown or variable composition, complex reaction products or biological materials
OECD	Organisation for Economic Co-operation and Development
STP	Sewage Treatment Plant
bw	Body weight
bw/d	Body weight/day
SU	Sector of Use
UK	United Kingdom
EWC	European Waste Catalogue
EU	European Union
EC	European Community
EEC	European Economic Community

Safety Data Sheet

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

The Power
of Partnership

Sources of key data used to compile the Safety Data Sheet

GESTIS Database
TOXNET Database
Senatel™ Powerfrag™ Technical Data Sheet

Information which has been added, deleted or revised

Complete revision in the context of adaptations under Regulation 453/2010/EU.

*The information contained is based on the present state of our knowledge.
It characterizes the product with regard to the appropriate safety precautions.
It does not represent any guarantee with regard to product.*

Safety Data Sheet - Annex

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

1. Exposure Scenario (1)

Conservative extract / merging of the following exposure scenarios:

- Ammonium nitrate, Exposure scenario (2):
Industrial use for formulation of preparations / articles, intermediate use and end-use in industrial settings.
- Sodium nitrate, Exposure scenario (2):
Industrial use for formulation of preparations, intermediate use and end-use in industrial settings.
- Distillates (petroleum), hydrotreated light naphthenic, Generic Exposure scenario 18b:
Covers exposures arising from the manufacture and use of slurry explosives (including materials transfer, mixing and charging) and equipment cleaning.

Sector of use (SU)	SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Chemical product category (PC)	PC11: Explosives
Process category (PROC)	PROC1: Use in closed process, no likelihood of exposure PROC3: Use in closed batch process (synthesis or formulation) PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging / discharging) from / to vessels / large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging / discharging) from / to vessels / large containers at dedicated facilities
Article category (AC)	Not applicable
Environmental Release Category (ERC)	ERC8e: Wide dispersive outdoor use of reactive substances in open systems

Safety Data Sheet - Annex

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

2. Contributing scenarios

2.1. Contributing scenario (1) controlling environmental exposure for ...

Data refers only to Distillates (petroleum), hydrotreated light naphthenic:

ERC8e: Wide dispersive outdoor use of reactive substances in open systems

An environmental assessment for ammonium nitrate and sodium nitrate has not been performed as the substances do not meet the criteria for being classified as dangerous for the environment.

Product characteristics

Solid, putty (based on final product characteristic).

Distillates (petroleum), hydrotreated light naphthenic is complex UVCB. Predominantly hydrophobic

Amount used

-

Frequency and duration of use

Continuous release.

Environment factors not influenced by risk management

Local freshwater dilution factor: 10

Local marine water dilution factor: 100

Other given operational conditions affecting environmental exposure

Intermittent use / release:

According to the above described process categories.

Number of emission days per year: Not applicable

Emission or Release Factor:

Air: -

Water: -

Technical conditions and measures at process level (source) to prevent release

Common practices vary across sites thus conservative process release estimates used.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk from environmental exposure is driven by freshwater sediment.

No wastewater treatment required.

Prevent discharge of undissolved substance to or recover from onsite wastewater.

Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): 0

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%): 0

Safety Data Sheet - Annex

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Organizational measures to prevent / limit release from site

Do not apply industrial sludge to natural soils.
Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

-

Conditions and measures related to external treatment of waste for disposal

During manufacturing, no waste of the substance is generated.

Conditions and measures related to external recovery of waste

During manufacturing, no waste of the substance is generated.

2.2. Contributing scenario (2) controlling worker exposure for:...

PROC1: Use in closed process, no likelihood of exposure

PROC3: Use in closed batch process (synthesis or formulation)

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

PROC8a: Transfer of substance or preparation (charging / discharging) from / to vessels / large containers at non-dedicated facilities

PROC8b: Transfer of substance or preparation (charging / discharging) from / to vessels / large containers at dedicated facilities

Product characteristics

Solid, putty (based on final product characteristic).
Vapor pressure of <0.5 kPa at normal temperature and pressure.
Covers the percentage of substance in the product up to 100% (unless otherwise stated).

Amount used

Not applicable

Frequency and duration of use / exposure

Covers daily exposures up to 8 hours (unless otherwise noted).

Human factors not influenced by risk management

Not applicable

Other given operational conditions affecting workers exposure

Personal protection: see section 8
IF SWALLOWED: Immediately call a POISON CENTER / doctor / ... Do NOT induce vomiting as there is high risk of aspiration.

Safety Data Sheet - Annex

according to regulation 453/2010/EU amending 1907/2006/EC

The Power
of Partnership

Senatel™ Powerfrag™ (1.1D)

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Technical conditions and measures at process level (source) to prevent release

Not applicable

Technical conditions and measures to control dispersion from source towards the worker

Containment as appropriate
Good standard of general ventilation

Organisational measures to prevent / limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Chemical goggles

3. Exposure estimation and reference to its source

Exposure estimation for the environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Environment	Value	Level of Exposure (PEC)	RCR (PEC/PNEC)
-	-	-	-	-	-	-

Data refers only to Distillates (petroleum), hydrotreated light naphthenic. An environmental risk assessment of ammonium nitrate and sodium nitrate was not carried out since the substances do not meet the criteria to be classified as dangerous for the environment.

The Hydrocarbon Block Method was used to calculate environmental exposure to the PETRORISK model.

Exposure estimation for workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
-	-	-	-	-	-

Safety Data Sheet - Annex

according to regulation 453/2010/EU amending 1907/2006/EC

Senatel™ Powerfrag™ (1.1D)

The Power
of Partnership

SDS No. : 3006
Issue : 03.0
Date of revising : 2014-04-20

Distillates (petroleum), hydrotreated light naphthenic:

The risk assessment tool ECETOC TRA was used to calculate the exposures of the workplace, unless otherwise indicated.

Ammonium nitrate, sodium nitrate:

A qualitative approach was used to conclude safe use for workers.

The leading toxicological effect is eye irritation (local endpoint), for which no DNEL can be derived as no dose-response information is available. As minimal systemic effects were only noted at such high levels of substance that humans are normally not exposed to (see DNELs), a quantitative assessment is not considered necessary.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The guidance is based on the assumed operating conditions, which may not be applicable to all sites and for this reason it may be necessary to consider scale effects in order to define the risk management measures according to suitable and specific for each site. The removal efficiencies required for the waste water can be achieved by site / off site technologies, itself or in combination. The required removal efficiency for air can be achieved by site technologies, itself or in combination. More information about scaling and control technologies are provided in SpERC (Specific Environmental Release Categories).

A DNEL (derived no effect levels) cannot be derived.

This general qualitative CSA (chemical safety assessment) approach aims to reduce/avoid contact or incidents with the substance. However, implementation of risk management measures (RMMs) and operational conditions (OCs) need to be proportional to the degree of concern for the health hazard presented by the substance.

5. Additional good practice advice beyond the REACH CSA

Additional good practices (Operational Conditions and Risk Management Measures) beyond the REACH Chemical Safety Assessment established within Chemical Industry are also advised and communicated through Safety Data Sheets. Such as:

- Containment as appropriate;
- Minimise number of staff exposed;
- Segregation of the emitting process;
- Effective contaminant extraction;
- Good standard of general ventilation;
- Minimisation of manual phases;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management / supervision in place to check that RMMs in place are being used correctly and OCs followed;
- Training staff on good practice;
- Good standard of personal hygiene.