



We create chemistry

ml
800

Frontier® Optima

700

An emulsifiable concentrate herbicide for the pre-emergent control of annual grasses and certain annual broadleaf weeds (as indicated) and suppression of yellow nutsedge in maize, groundnuts, soyabeans and potatoes and for post-plant application in tobacco

600

500

400

300

Net Content:

200
ml

1 L



Reg. No.: 08-C-132-4



**HARMFUL IF
SWALLOWED**

Net Content:

1 L

Composition: mass/volume:

Dimethenamid-P 720 g/L

An emulsifiable concentrate herbicide for the pre-emergent control of annual grasses and certain annual broadleaf weeds (as indicated) and suppression of yellow nutsedge in maize, groundnuts, soyabeans and potatoes and for post-plant application in tobacco

Registered by:

Pivotal Agro-Services (Pvt) Ltd.
Agriculture House, Adylinn Road, Marlborough
PO Box WGT 450, Westgate, Harare
Telephone (263-4) 309800 – 18, Fax / Direct Line: (263-4) 309825

Manufactured and packed by:

BASF SE
Germany

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81142103.ZW.2030



TO CAUSE A HAZARD IN THE USE, STORAGE OR DISPOSAL OF THIS SUBSTANCE IS AN OFFENCE

READ THE LABEL BEFORE USING THE PRODUCT

WARRANTY: Although this remedy has been tested under a large variety of conditions the registration holder does not warrant, that it will be efficacious under all conditions because the action and effect thereof may be affected by factors such as abnormal climatic and storage conditions, quality of dilution water, compatibility within other substances not indicated on the label and the occurrence of resistance of the disease, weed or pest, against the remedy concerned, as well as by the method, time and accuracy of application. The registration holder furthermore does not accept responsibility for damage to crops, vegetation, the environment or harm to man or animal or for lack of performance of the remedy concerned due to the failure of the user to follow the label instructions or the occurrence of conditions which could not have been foreseen in terms of the registration. Consult the supplier in the event of any uncertainty.

PRECAUTIONS:

- Handle with care and avoid splashing/contact. Poisonous by ingestion inhalation and contact with skin.
- Wear suitable protective clothing i.e. gloves, boots, overalls and face shield when handling the concentrate. Irritating to eyes and skin.
- Do not eat, drink or smoke whilst mixing or applying the product or before washing hands and face with soap and water.
- On completion of spraying wash with soap and water and wash contaminated clothing after use.
- Toxic to fish, animals and bees.
- Do not contaminate wash where it will not contaminate water supplies (rivers, dams, pools etc.), crops, grazing areas, etc.
- Keep out of reach of children, uninformed persons and animals under lock and key.
- Keep apart from food and feed.
- Store in the original container in a cool dry place.
- Triple rinse empty container in the following manner: invert the empty container over the spray or mixing tank and allow to drain for at least 30 seconds after the flow has slowed down to a drip. Thereafter rinse empty container three times with a volume of water equal to a minimum of 10% of that of the container. Add the rinsings to the contents of the spray tank before destroying the container by perforation, flattening and burying, and never re-use for any other purpose.
- Clean applicator thoroughly after use and dispose of wash water safely.
- Do not inhale spray mist.
- Avoid spray drift onto other crops, grazing, rivers, dams and areas not under treatment.

FIRST AID MEASURES

IN CASE OF ACCIDENTAL POISONING – CONTACT A MEDICAL DOCTOR.

Symptoms of Poisoning: skin irritation, nausea, vomiting, diarrhoea, fall in blood pressure.

General advice: Avoid contact with the skin, eyes and clothing.

Take off immediately all contaminated clothing.

If difficulties occur: Obtain medical attention.

Show container, label and/or safety data sheet to physician.

If inhaled: Keep patient calm, remove to fresh air and seek medical attention.

On Skin contact: If irritation develops, seek medical attention.

After contact with skin, wash immediately with plenty of water and soap.

On contact with eyes: Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On Ingestion: Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

Note to physician: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

Hazards: When inhaled (e.g. during vomiting) risk of pulmonary oedema and/or pneumonia.

DIRECTIONS FOR USE: USE ONLY AS DIRECTED

USE RESTRICTIONS:

Do not apply Frontier® Optima in the following situations as crop damage may occur:

- On poorly drained soils, soils with a compaction layer or soils with a nutrient deficiency.
- On inbred parent plants of maize hybrids or experimental or newly released cultivars of all Frontier® Optima registered crops, including any seed production of any of the Frontier® Optima registered crops, without first consulting the advice of the distributor or manufacturer.

COMPATIBILITY

Frontier® Optima may be applied in a tank mix or a sequential application with other herbicides registered for use in a given crop. Always read the companion product label(s) and apply each product within label recommendations.

Frontier® Optima is compatible with: Hammer®, OptillTM, Atrazine SC formulations containing 500 g/L active ingredient and cyanazine and atrazine + terbuthylazine based products.

Stellar Star can be applied in a spray sequential program after Frontier® Optima application. Refer to the Stellar Star label for weeds controlled in addition to Frontier® Optima alone.

WITH HOLDING PERIOD:

Following normal harvest of a Frontier® Optima treated crop, there is no restriction on planting any other follow-up crops. In the event of weather induced failure of a crop treated with Frontier® Optima alone, lands can be immediately replanted with any Frontier® Optima registered crop.

MIXING INSTRUCTIONS:

Three-quarter fill the spray tank with clean water. Shake the Frontier® Optima container well. Measure the required volume of Frontier® Optima and pre-mix this with at least 10 L of water before adding to the spray tank. Fill the spray tank with water to the required level while maintaining agitation to ensure thorough mixing of the spray mixture before spraying commences. Maintain agitation while spraying. The prepared spray mixture must not be left in the spray tank for any length of time, e.g. overnight.

APPLICATION INSTRUCTIONS:

- Frontier® Optima must be applied post-plant of the crop and pre-emergence of the crop and weeds.
- When planting into moist soil, Frontier® Optima must be applied within 3 days after planting (but preferably at planting) onto a fine, even, firm and freshly prepared weed-free seedbed. No more than 3 days should elapse between cultivation and application. To obtain good results, it is necessary that application be followed by 10 – 15 mm of rain or sprinkler irrigation before the weeds emerge. If rainfall does not occur in time, emerging weeds will be stunted and can easily be controlled with a shallow cultivation that will simultaneously mix the herbicide with the top

10 – 20 mm of soil. A deep cultivation should be avoided as this may bring untreated soil to the surface that may result in poor weed control.

- When planting into dry soil (insufficient moisture for germination), Frontier® Optima must be applied as close to, but definitely before, the first rain. Weeds that have already emerged at the time of application will not be controlled.
- Under dry conditions, efficacy will be improved by a shallow incorporation of the product – not deeper than 10 – 20 mm.

NOTE: SUFFICIENT RAIN OR IRRIGATION AFTER APPLICATION IS ESSENTIAL TO ENSURE ACTIVATION OF THE HERBICIDE.

Soil erosion

On light sandy soils of 0 – 10% clay in the top soil, weed control will be reduced if strong winds blow away the soil surface after Frontier® Optima has been applied. Weed control may also be reduced if heavy rains erode or wash away the soil surface containing the herbicide.

Ground application

Frontier® Optima can be applied as either an overall application using a minimum of 200 L of water per hectare, or as a band application using the corresponding amount of water per hectare. Any medium or high volume tractor-mounted sprayer can be used as long as the sprayer can be properly calibrated and is fitted with effective tank agitation. The spray-boom should be fitted with flat fan type spray nozzles to ensure an even distribution of the herbicide on the soil surface.

Aerial application

For aerial application, increase all given rates by 10 %. Frontier® Optima, can be applied aerially, provided that the spray mixture is distributed evenly over the target area and the loss of spray material during application is restricted to a minimum. To achieve this, it is essential that the following requirements are met:

- Use a conventional boom. Nozzles must be equipped with flat fan tips.
- Maintain a flying height of three metres above the target area at wind speeds of 0 – 8 km/h or a flying height of two metres at wind speeds of 9 – 15 km/h. Do not spray when the wind speed exceeds 15 km/h.
- The difference between the wet and dry bulb reading, as determined with a swing hygrometer, must not exceed 8 °C.
- Do not spray during the heat of the day.
- Ensure that fields are accurately marked.

APPLICATION RATES:

Minimum cultivation or no-till situations: Since surface trash may reduce herbicide penetration into the soil, the higher rate for the relevant soil type will give a better result.

CROP	% CLAY	DOSAGE L/ha	DIRECTIONS FOR APPLICATION
Soybeans	0–10	0.5	Use the lower rate only for control of annual grasses. Use the higher rate if yellow nutsedge and/or broad leaf weeds are a problem. Where broad leaf weeds are a major problem it is recommended to tank mix Frontier® Optima with broad leaf herbicide (e.g. Optill™).
	11–20	0.5–0.75	
	21–30	0.75–1.0	
	31–40	1.0–1.25	
Groundnuts	10–20	0.5 – 0.75	Use the lower rate for control of annual grasses. Use the higher rate if yellow nutsedge and/or broad leaf weeds are a problem. Do not apply Frontier® Optima on groundnuts, when they are planted in soils with less than 10% clay content.
	21–30	0.75 - 1.0	
	31–40	1.0 – 1.25	
Maize	0–10	0.5	Pre-emergence weed control with Frontier® Optima as solo product: Where broadleaf weeds are not a major problem, Frontier® Optima may be applied alone. Use the higher rate if yellow nutsedge and/or broad leaf weeds are a problem. An early post-emergence follow-up treatment can be applied (see below). Pre-emergence weed control with Frontier® Optima in tank mixtures (all soil types): Where broadleaf weeds are a major problem it is recommended to tank mix Frontier® Optima with broad leaf herbicide. A follow-up post-emergent treatment of Stellar star can be applied at 1.0 L/ha for better control of late germinating weeds. NB. Frontier® Optima may be applied on Sweet corn and Popcorn. If using a tank-mix, ensure the partner product is also registered for use on sweet corn and popcorn. Do not apply Frontier® Optima to inbred parent plants of hybrids or to experimental or newly released cultivars.
	11–20	0.5 – 0.75	
	21–30	0.75 – 1.0	
	31–40	1.0 – 1.25	
Potatoes	0–10	0.4 – 0.5	Where applicable, use the lower rate for control of annual grasses. Use the higher rate if yellow nutsedge and/or broad leaf weeds are a problem.
	11–20	0.5 – 0.7	
	21–30	0.7 – 0.9	
	31–40	0.9 – 1.2	

TOBACCO – GROUND APPLICATION:

Warnings:

After Frontier® Optima application on tobacco, a slight yellowing of the sand leaves and/or plant stunting may occur. This is of a temporary nature and should not have any negative effect on the yield. However, certain precautions should be observed as the likelihood of damage occurring is enhanced by the following conditions:

- when diseased, weak and/or damaged plants are used for transplanting;
- when plants are incorrectly planted with roots curled up and come into contact with treated soil or roots exposed to the herbicide at the time of application;
- when tobacco is planted in very stony or gravel soil;
- when rainfall or irrigation in excess of 15 mm occurs shortly after herbicide application;
- when treated soil comes into contact with roots of inter-plants.

Method and Timing of application in tobacco

- Apply Frontier® Optima as a total surface application within 3 days after transplanting of the tobacco while the plants are still wilted.
- Where tobacco is planted on ridges, apply using a boom fitted with 110° nozzles, positioned between the ridges. This will ensure a more even distribution of the herbicide.
- Within 3 – 4 days after application of Frontier® Optima, not more than 15 mm of irrigation should be applied, to avoid washing out and to ensure activation of product.
- Flue cured tobacco – apply a broad leaf herbicide for broadleaf control, as a sequential spray and not as a tank mix, immediately after application of Frontier® Optima. Consult the respective label of the other products.

CROP	% CLAY	DOSAGE L / ha	DIRECTIONS FOR APPLICATION
Tobacco (TRB Cert. No. 14-17-C-44)	0 – 20	0.7	Pre-planting: Spray Frontier® Optima on the soil after ridging. Post-planting: Spray Frontier® Optima on to soil the surface over the seedlings within 7 days of transplanting. With irrigated tobacco, this must be done before settling in irrigation. Over irrigation will leach the herbicide into the root zone and retard early growth.
	21-30	1.0	

WEEDS CONTROLLED:

The following weed species are normally controlled by a pre-emergence application of Frontier® Optima at the dosage rates indicated below.

Annual Grasses

Scientific Name	Common Name
<i>Brachiaria eruciformis</i>	Sweet signal grass
<i>Dactyloctenium aegyptium</i>	Crow's foot
<i>Digitaria sanguinalis</i>	Crab finger grass
<i>Digitaria ciliaris</i>	Tropical finger grass
<i>Echinochloa crus-galli</i>	Barnyardgrass
<i>Eleusine indica</i>	Goosegrass
<i>Panicum maximum</i>	Common buffalo grass
<i>Panicum schinzii</i>	Sweet buffalo grass
<i>Setaria faberi</i>	Giant foxtail
<i>Setaria pallidifusca</i>	Red bristle grass
<i>Setaria verticillata</i>	Sticky bristle grass
<i>Urochloa panicoides</i>	Herringbone grass

Annual Broad Leaves

Scientific Name	Common Name
<i>Amaranthus hybridus</i>	Common pigweed
<i>Amaranthus spinosus</i>	Thorny pigweed
<i>Amaranthus deflexus</i>	Perennial pigweed
<i>Chenopodium album</i>	White goosefoot
<i>Cleome monophylla</i>	Spindlepod
<i>Galinsoga parviflora</i>	Gallant soldier
<i>Nicandra physaloides</i>	Apple of Peru
<i>Portulaca oleracea</i>	Purslane
<i>Richardia brasiliensis</i>	Tropical richardia
<i>Schkuhria pinnata</i>	Dwarf marigold

Control of the following weeds is variable

Scientific Name	Common Name
<i>Bidens pilosa</i>	Black jack
<i>Commelina benghalensis</i> *	Wandering Jew
<i>Crotalaria sphaerocarpa</i>	Mealie crotalaria
<i>Cyperus esculentus</i>	Yellow nutsedge
<i>Datura ferox</i> *	Large thornapple
<i>Datura stramonium</i> *	Thornapple
<i>Tagetes minuta</i>	Khaki weed
<i>Tribulus terrestris</i> *	Devil's thorn
<i>Xanthium strumarium</i> *	Cocklebur

* N.B. Late and deep germinators not completely controlled.

Other weeds that were not present during the development trials with this product may also be controlled to a certain degree. The registration holder does not accept any responsibility for unlisted weeds.

Safety data sheet

Page: 1/17

BASF Safety data sheet according to Regulation (EC) No. 1907/2006

Date / Revised: 25.07.2013

Product: **FRONTIER OPTIMA**

Version: 4.0

(ID no. 30508044/SDS_CPA_EU/EN)

Date of print 27.07.2013

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

1.1. Product identifier

FRONTIER OPTIMA

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

Relevant identified uses: crop protection product, herbicide

1.3. Details of the supplier of the safety data sheet

Company:

BASF SE

67056 Ludwigshafen

GERMANY

Operating Division Crop Protection

Telephone: +49 621 60-27777

E-mail address: Produktinformation-Pflanzenschutz@basf.com

1.4. Emergency telephone number

International emergency number:

Telephone: +49 180 2273-112

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture

According to Regulation (EC) No 1272/2008 [CLP]

Asp. Tox. 1

Acute Tox. 4 (oral)

Skin Corr./Irrit. 2

Eye Dam./Irrit. 2

BASF Safety data sheet according to Regulation (EC) No. 1907/2006

Date / Revised: 25.07.2013

Version: 4.0

Product: **FRONTIER OPTIMA**

(ID no. 30508044/SDS_CPA_EU/EN)

Date of print 27.07.2013

Skin Sens. 1B
 Aquatic Acute 1
 Aquatic Chronic 1

According to Directive 67/548/EEC or 1999/45/EC

Possible Hazards:

Harmful if swallowed.

Irritating to eyes.

Irritating to skin.

May cause sensitization by skin contact.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

For the classifications not written out in full in this section the full text can be found in section 16.

2.2. Label elements

Globally Harmonized System, EU (GHS)

Pictogram:



Signal Word:

Danger

Hazard Statement:

H319	Causes serious eye irritation.
H315	Causes skin irritation.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H304	May be fatal if swallowed and enters airways.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
EUH401	To avoid risks to human health and the environment, comply with the instructions for use.

Precautionary Statements (Prevention):

P261c	Avoid breathing mist.
P280f	Wear protective gloves and eye/face protection.
P272	Contaminated work clothing should not be allowed out of the workplace.
P270	Do not eat, drink or smoke when using this product.
P264	Wash with plenty of water and soap thoroughly after handling.

Precautionary Statements (Response):

BASF Safety data sheet according to Regulation (EC) No. 1907/2006

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P333 + P311	If skin irritation or rash occurs: Call a POISON CENTER or doctor/physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P303 + P352	IF ON SKIN (on hair): Wash with plenty of soap and water.
P301 + P330	IF SWALLOWED: rinse mouth.
P391	Collect spillage.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.
P331	Do NOT induce vomiting.
P337 + P311	If eye irritation persists: Call a POISON CENTER or doctor/physician.

Precautionary Statements (Storage):

P405	Store locked up.
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Precautionary Statements (Disposal):

P501	Dispose of contents/container to hazardous or special waste collection point.
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According to Regulation (EC) No 1272/2008 [CLP]


Hazard determining component(s) for labelling: Dimethenamid-P, SOLVENT NAPHTHA, Polymeraminphosphat

According to Directive 67/548/EEC or 1999/45/EC

EEC Directives

Hazard symbol(s)

Xn	Harmful.	
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N	Dangerous for the environment.	
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R-phrases(s)

R22	Harmful if swallowed.
R36	Irritating to eyes.
R38	Irritating to skin.
R43	May cause sensitization by skin contact.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrases(s)

BASF Safety data sheet according to Regulation (EC) No. 1907/2006

Date / Revised: 25.07.2013

Version: 4.0

Product: **FRONTIER OPTIMA**

(ID no. 30508044/SDS_CPA_EU/EN)

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S2	Keep out of the reach of children.
S13	Keep away from food, drink and animal feeding stuffs.
S20/21	When using do not eat, drink or smoke.
S24	Avoid contact with skin.
S29/35	Do not empty into drains, this material and its container must be disposed of in a safe way.
S37	Wear suitable gloves.
S46	If swallowed, seek medical advice immediately and show this container or label.
S57	Use appropriate container to avoid environmental contamination.

Hazard determining component(s) for labelling: Dimethenamid-P, SOLVENT NAPHTHA, Polymeraminphosphat

2.3. Other hazards

According to Regulation (EC) No 1272/2008 [CLP]

See section 12 - Results of PBT and vPvB assessment.

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

SECTION 3: Composition/Information on Ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Chemical nature

crop protection product, herbicide, Emulsifiable concentrate (EC)

Hazardous ingredients (GHS)

according to Regulation (EC) No. 1272/2008

Acetamide, 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-[(1S)-2-methoxy-1-methylethyl]-

Content (W/W): 63.7 %

CAS Number: 163515-14-8

Acute Tox. 4 (oral)

Skin Sens. 1B

Aquatic Acute 1

Aquatic Chronic 1

M-factor acute: 1

H302, H317, H400, H410

Solvent naphtha (petroleum), heavy arom.; Kerosine - unspecified

BASF Safety data sheet according to Regulation (EC) No. 1907/2006

Date / Revised: 25.07.2013

Version: 4.0

Product: **FRONTIER OPTIMA**

(ID no. 30508044/SDS_CPA_EU/EN)

Date of print 27.07.2013

Content (W/W): < 30 %	Asp. Tox. 1
CAS Number: 64742-94-5	Aquatic Chronic 2
EC-Number: 265-198-5	H304, H411
REACH registration number: 01-2119463583-34	
INDEX-Number: 649-424-00-3	

Polymeraminphosphat

Content (W/W): < 10 %	Skin Corr./Irrit. 2
	Eye Dam./Irrit. 2
	H319, H315

naphthalene

Content (W/W): < 1 %	Acute Tox. 4 (oral)
CAS Number: 91-20-3	Carc. 2
EC-Number: 202-049-5	Aquatic Acute 1
INDEX-Number: 601-052-00-2	Aquatic Chronic 1
	M-factor acute: 1
	M-factor chronic: 1
	H302, H351, H400, H410

Hazardous ingredients

according to Directive 1999/45/EC

Acetamide, 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-[(1S)-2-methoxy-1-methylethyl]-

Content (W/W): 63.7 %
CAS Number: 163515-14-8
Hazard symbol(s): Xn, N
R-phrase(s): 22, 43, 50/53

Solvent naphtha (petroleum), heavy arom.; Kerosine - unspecified

Content (W/W): < 30 %
CAS Number: 64742-94-5
EC-Number: 265-198-5
REACH registration number: 01-2119463583-34
INDEX-Number: 649-424-00-3
Hazard symbol(s): Xn, N
R-phrase(s): 65, 51/53

Polymeraminphosphat

Content (W/W): < 10 %
Hazard symbol(s): Xi
R-phrase(s): 36/38

naphthalene

Content (W/W): < 1 %
CAS Number: 91-20-3
EC-Number: 202-049-5
INDEX-Number: 601-052-00-2
Hazard symbol(s): Xn, N
R-phrases(s): 22, 40, 50/53
Carc. Cat. 3

For the classifications not written out in full in this section, including the indication of danger, the hazard symbols, the R phrases, and the hazard statements, the full text is listed in section 16.

SECTION 4: First-Aid Measures

4.1. Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:

Keep patient calm, remove to fresh air, seek medical attention.

On skin contact:

Immediately wash thoroughly with soap and water, seek medical attention.

On contact with eyes:

Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:

Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention. Do not induce vomiting due to aspiration hazard.

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

Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further important symptoms and effects are so far not known.

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

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing media

Suitable extinguishing media:

water spray, foam, dry powder, carbon dioxide

5.2. Special hazards arising from the substance or mixture

carbon monoxide, hydrogen chloride, Carbon dioxide, nitrogen oxides, organochloric compounds
The substances/groups of substances mentioned can be released in case of fire.

5.3. Advice for fire-fighters

Special protective equipment:

Wear self-contained breathing apparatus and chemical-protective clothing.

Further information:

In case of fire and/or explosion do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

SECTION 6: Accidental Release Measures**6.1. Personal precautions, protective equipment and emergency procedures**

Do not breathe vapour/spray. Use personal protective clothing. Avoid contact with the skin, eyes and clothing.

6.2. Environmental precautions

Do not discharge into drains/surface waters/groundwater. Do not discharge into the subsoil/soil.

6.3. Methods and material for containment and cleaning up

For small amounts: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr).

For large amounts: Dike spillage. Pump off product.

Dispose of absorbed material in accordance with regulations. Collect waste in suitable containers, which can be labeled and sealed. Clean contaminated floors and objects thoroughly with water and detergents, observing environmental regulations.

6.4. Reference to other sections

Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7: Handling and Storage**7.1. Precautions for safe handling**

No special measures necessary if stored and handled correctly. Ensure thorough ventilation of stores and work areas. When using do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift.

Protection against fire and explosion:

Vapours may form ignitable mixture with air. Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy.

7.2. Conditions for safe storage, including any incompatibilities

Segregate from foods and animal feeds.

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Further information on storage conditions: Keep away from heat. Protect from direct sunlight.

Storage stability:

Storage duration: 36 Months

Protect from temperatures below: -10 °C

Changes in the properties of the product may occur if substance/product is stored below indicated temperature for extended periods of time.

Protect from temperatures above: 40 °C

Changes in the properties of the product may occur if substance/product is stored above indicated temperature for extended periods of time.

7.3. Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

SECTION 8: Exposure Controls/Personal Protection

8.1. Control parameters

Components with occupational exposure limits

64742-94-5: Solvent naphtha (petroleum), heavy arom.; Kerosine - unspecified

91-20-3: naphthalene

TWA value 50 mg/m³ ; 10 ppm (OEL (EU))
indicative

8.2. Exposure controls

Personal protective equipment

Respiratory protection:

Suitable respiratory protection for higher concentrations or long-term effect: Combination filter for gases/vapours of organic, inorganic, acid inorganic and alkaline compounds (e.g. EN 14387 Type ABEK).

Hand protection:

Suitable chemical resistant safety gloves (EN 374) also with prolonged, direct contact

(Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374): E.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), butyl rubber (0.7 mm) and other

Eye protection:

Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures

The statements on personal protective equipment in the instructions for use apply when handling crop-protection agents in final-consumer packing. Wearing of closed work clothing is recommended. Store work clothing separately. Keep away from food, drink and animal feeding stuffs.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Form:	liquid	
Colour:	brown	
Odour:	aromatic	
Odour threshold:	Not determined due to potential health hazard by inhalation.	
pH value:	approx. 2 - 4 (1 %(m), 20 °C)	
Melting point:	The product has not been tested.	
Boiling range:	approx. 220 - 290 °C Information applies to the solvent.	
Boiling point:	approx. 122.6 °C (9.3 Pa) Information based on the main components.	
Flash point:	approx. 70 °C No flash point - Measurement made up to the indicated temperature, pilot light extinguishes.	(Regulation 440/2008/EC, A.9)
Evaporation rate:	not applicable	
Flammability:	Product is combustible.	
Lower explosion limit:	As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.	
Upper explosion limit:	As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.	
Ignition temperature:	approx. 391 °C	(Regulation 440/2008/EC, A.15)
Vapour pressure:	approx. 0.07 hPa (20 °C) Information applies to the solvent.	

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Density:	approx. 1.13 g/cm ³ (20 °C)	
Relative vapour density (air):	not determined	
Solubility in water:	emulsifiable	
<i>Information on: Acetamide, 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-[(1S)-2-methoxy-1-methylethyl]-</i>		
<i>Partitioning coefficient n-octanol/water (log Kow): 1.89</i>		

Thermal decomposition:	230 °C, 370 kJ/kg (DSC (OECD 113)) 380 °C, > 230 kJ/kg (DSC (OECD 113))	
Viscosity, dynamic:	approx. 43.6 mPa.s (20 °C)	
Viscosity, kinematic:	14.7 mm ² /s (40 °C)	
Explosion hazard:	not explosive	(Regulation 440/2008/EC, A.14)
Fire promoting properties:	not fire-propagating	(Regulation 440/2008/EC, A.21)

9.2. Other information

Surface tension: approx. 31.3 mN/m
(20 °C; 1 %(V))

Other Information:

The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

If necessary, information on other physical and chemical parameters is indicated in this section.

SECTION 10: Stability and Reactivity

10.1. Reactivity

No hazardous reactions if stored and handled as prescribed/indicated.

10.2. Chemical stability

The product is stable if stored and handled as prescribed/indicated.

10.3. Possibility of hazardous reactions

No hazardous reactions if stored and handled as prescribed/indicated.

10.4. Conditions to avoid

See MSDS section 7 - Handling and storage.

10.5. Incompatible materials

Substances to avoid:

strong acids, strong bases, strong oxidizing agents

10.6. Hazardous decomposition products

Hazardous decomposition products:

No hazardous decomposition products if stored and handled as prescribed/indicated.

Possible decomposition products:

nitrogen oxides, sulfur oxides, aldehydes

SECTION 11: Toxicological Information

11.1. Information on toxicological effects

Acute toxicity

Assessment of acute toxicity:

Of moderate toxicity after single ingestion. Virtually nontoxic by inhalation. Virtually nontoxic after a single skin contact. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Experimental/calculated data:

LD50 rat (oral): > 500 mg/kg (OECD Guideline 423)

The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

LC50 rat (by inhalation): > 5.6 mg/l 4 h (OECD Guideline 403)

No mortality was observed.

LD50 rat (dermal): > 5,000 mg/kg (OECD Guideline 402)

No mortality was observed.

Irritation

Assessment of irritating effects:

Skin contact causes irritation. Eye contact causes irritation. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Experimental/calculated data:

Skin corrosion/irritation rabbit: Irritant. (OECD Guideline 404)

Serious eye damage/irritation rabbit: Irritant. (OECD Guideline 405)

Respiratory/Skin sensitization

Assessment of sensitization:

Sensitization after skin contact possible. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Experimental/calculated data:

modified Buehler test guinea pig: Caused skin sensitization in animal studies. (OECD Guideline 406)

Germ cell mutagenicity

Assessment of mutagenicity:

The product has not been tested. The statement has been derived from the properties of the individual components.

*Information on: naphthalene**Assessment of mutagenicity:*

The substance was not mutagenic in bacteria. The substance was mutagenic in a mammalian cell culture test system. The substance was not mutagenic in a test with mammals. Literature data.

Carcinogenicity**Assessment of carcinogenicity:**

The product has not been tested. The statement has been derived from the properties of the individual components.

*Information on: solvent naphtha**Assessment of carcinogenicity:*

Long-term exposure to highly irritating concentrations resulted in skin tumors in animals. A carcinogenic effect in humans can be excluded after brief skin contact. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Reproductive toxicity**Assessment of reproduction toxicity:**

The product has not been tested. The statement has been derived from the properties of the individual components. The results of animal studies gave no indication of a fertility impairing effect.

Developmental toxicity**Assessment of teratogenicity:**

The product has not been tested. The statement has been derived from the properties of the individual components. Animal studies gave no indication of a developmental toxic effect at doses that were not toxic to the parental animals.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)**Assessment of repeated dose toxicity:**

The product has not been tested. The statement has been derived from the properties of the individual components.

*Information on: Acetamide, 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-[(1S)-2-methoxy-1-methylethyl]-**Assessment of repeated dose toxicity:*

Adaptive effects were observed after repeated exposure in animal studies.

Aspiration hazard

May also damage the lung at swallowing (aspiration hazard).

Other relevant toxicity information

Misuse can be harmful to health.

SECTION 12: Ecological Information

12.1. Toxicity

Assessment of aquatic toxicity:

Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Toxicity to fish:

LC50 (96 h) 8.32 mg/l, *Oncorhynchus mykiss* (OECD Guideline 203)

Aquatic invertebrates:

EC50 (48 h) 17.1 mg/l, *Daphnia magna* (OECD Guideline 202, part 1)

Aquatic plants:

EC50 (72 h) 0.1327 mg/l, *Scenedesmus subspicatus* (OECD Guideline 201)

EC50 (7 d) 0.054 mg/l, *Lemna gibba*

12.2. Persistence and degradability

Assessment biodegradation and elimination (H₂O):

The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: Acetamide, 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-[(1S)-2-methoxy-1-methylethyl]-

Assessment biodegradation and elimination (H₂O):

Not readily biodegradable (by OECD criteria).

12.3. Bioaccumulative potential

Assessment bioaccumulation potential:

The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: Acetamide, 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-[(1S)-2-methoxy-1-methylethyl]-

Bioaccumulation potential:

Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

12.4. Mobility in soil

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Assessment transport between environmental compartments:

The product has not been tested. The statement has been derived from the properties of the individual components.

*Information on: Acetamide, 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-[(1S)-2-methoxy-1-methylethyl]-**Assessment transport between environmental compartments:**Following exposure to soil, the product trickles away and can - dependant on degradation - be transported to deeper soil areas with larger water loads.*

12.5. Results of PBT and vPvB assessment

The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria.

12.6. Other adverse effects

The product does not contain substances that are listed in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

12.7. Additional information

Other ecotoxicological advice:

Do not discharge product into the environment without control.

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

Must be sent to a suitable incineration plant, observing local regulations.

Contaminated packaging:

Contaminated packaging should be emptied as far as possible and disposed of in the same manner as the substance/product.

SECTION 14: Transport Information

Land transport

ADR

UN number	UN3082
UN proper shipping name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains SOLVENT NAPHTHA, DIMETHENAMID-P)
Transport hazard class(es):	9, EHSM
Packing group:	III
Environmental hazards:	yes

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Special precautions for user: Tunnel code: E

RID

UN number: UN3082
 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains SOLVENT NAPHTHA, DIMETHENAMID-P)
 Transport hazard class(es): 9, EHSM
 Packing group: III
 Environmental hazards: yes
 Special precautions for user: None known

Inland waterway transport**ADN**

UN number: UN3082
 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains SOLVENT NAPHTHA, DIMETHENAMID-P)
 Transport hazard class(es): 9, EHSM
 Packing group: III
 Environmental hazards: yes
 Special precautions for user: None known
 Transport in inland waterway vessel: Not evaluated

Sea transport**IMDG**

UN number: UN 3082
 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains SOLVENT NAPHTHA, DIMETHENAMID-P)
 Transport hazard class(es): 9, EHSM
 Packing group: III
 Environmental hazards: yes
 Marine pollutant: YES
 Special precautions for user: None known

Air transport**IATA/ICAO**

UN number: UN 3082
 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains SOLVENT NAPHTHA, DIMETHENAMID-P)

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Product: **FRONTIER OPTIMA**

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Transport hazard class(es): 9, EHSM
Packing group: III
Environmental hazards: yes
Special precautions for user: None known

14.1. UN number

See corresponding entries for "UN number" for the respective regulations in the tables above.

14.2. UN proper shipping name

See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

14.3. Transport hazard class(es)

See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

14.4. Packing group

See corresponding entries for "Packing group" for the respective regulations in the tables above.

14.5. Environmental hazards

See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

14.6. Special precautions for user

See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

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

Regulation: Not evaluated
Shipment approved: Not evaluated
Pollution name: Not evaluated
Pollution category: Not evaluated
Ship Type: Not evaluated

SECTION 15: Regulatory Information

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

For the user of this plant-protective product applies: 'To avoid risks to man and the environment, comply with the instructions for use.' (Directive 1999/45/EC, Article 10, No. 1.2)

15.2. Chemical Safety Assessment

Advice on product handling can be found in sections 7 and 8 of this safety data sheet.

SECTION 16: Other Information

For proper and safe use of this product, please refer to the approval conditions laid down on the product label.

Full text of the classifications, including the indication of danger, the hazard symbols, the R phrases, and the hazard statements, if mentioned in section 2 or 3:

Xn	Harmful.
N	Dangerous for the environment.
Xi	Irritant.
22	Harmful if swallowed.
43	May cause sensitization by skin contact.
50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
65	Harmful: may cause lung damage if swallowed.
51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
36/38	Irritating to eyes and skin.
40	Limited evidence of a carcinogenic effect.
Asp. Tox.	Aspiration hazard
Acute Tox.	Acute toxicity
Skin Corr./Irrit.	Skin corrosion/irritation
Eye Dam./Irrit.	Serious eye damage/eye irritation
Skin Sens.	Skin sensitization
Aquatic Acute	Hazardous to the aquatic environment - acute
Aquatic Chronic	Hazardous to the aquatic environment - chronic
Carc.	Carcinogenicity
Carc. Cat. 3	Carcinogenic substances Category 3: Substances which cause concern for man owing to possible carcinogenic effects.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H304	May be fatal if swallowed and enters airways.
H411	Toxic to aquatic life with long lasting effects.
H319	Causes serious eye irritation.
H315	Causes skin irritation.
H351	Suspected of causing cancer.

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. The data do not describe the product's properties (product specification). Neither should any agreed property nor the suitability of the product for any specific purpose be deduced from the data contained in the safety data sheet. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.