

# Material Safety Data Sheet

## 1. Product and company identification

**Product name** : AMP Broadman Mn 20  
**Synonym** : Micronutrient mix  
**Trade name** : 12% Mn 12% S  
**Code** :  
**Material uses** : Agricultural industry: Soil additive, pesticides, feed additive, etc.  
**Manufacturer** : Agrium Advanced Technologies (U.S.), Inc.  
 2405 West Vassar Road (M-15)  
 Reese, MI 48757  
**Supplier** : Agrium Advanced Technologies (U.S.), Inc.  
 100 Technology Loop  
 Sylacauga, AL 35150  
**Validation date** : Validated by Company on 5/20/2009.

**In case of emergency** : Transportation: 1-800-792-8311  
 Medical: 1-888-670-8123

## 2. Hazards identification

**Physical state** : Solid.  
**Odor** : Not available.  
**Emergency overview** :  
 CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.  
 Avoid exposure - obtain special instructions before use. Contains material that may cause target organ damage, based on animal data.

**Routes of entry** : Not available.

### Potential acute health effects

**Inhalation** : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.  
**Ingestion** : Ingestion may result in stomach irritation resulting in nausea, vomiting and diarrhea.  
**Skin** : No known significant effects or critical hazards.  
**Eyes** : May irritate the eyes upon contact.

### Potential chronic health effects

**Chronic effects** : High levels of manganese in the blood may increase anemia by interfering with iron absorption. Iron deficiency may increase an individual's susceptibility to manganese. Studies suggest that populations at risk of adverse effects due to manganese exposure are infants and those with existing iron deficiency. Disorders are reversible if recognized early and overexposure is eliminated. Inhalation of large quantities of manganese containing dusts over many years may result in damage to the central nervous system, with symptoms of sleepiness, tremors and weakness in the legs, slurred speech, emotional disturbances, loss of balance, and in more advanced cases, an irreversible condition with symptoms similar to Parkinsons or Lou Gehrig's disease including a mask-like facial expression, spastic gait, tremors, slurred speech, fatigue, anorexia, apathy, and inability to concentrate in more advanced cases. The neurologic disorder that develops is known as "manganism". A syndrome may develop with symptoms of compulsive behavior, emotional volatility and hallucinations.

**Carcinogenicity** : No known significant effects or critical hazards.  
**Mutagenicity** : No known significant effects or critical hazards.  
**Teratogenicity** : No known significant effects or critical hazards.  
**Developmental effects** : No known significant effects or critical hazards.

## 2 . Hazards identification

- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : Contains material which may cause damage to the following organs: blood, kidneys, lungs, upper respiratory tract, skin, eyes, central nervous system (CNS).

### Over-exposure signs/symptoms

- Inhalation** : No specific data.
- Ingestion** : No specific data.
- Skin** : No specific data.
- Eyes** : No specific data.

**Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

## 3 . Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
manganese sulfate, monohydrate	10034-96-5	15 - 40
manganese oxide	1344-43-0	10 - 30
diiiron trioxide	1309-37-1	1 - 5
urea	57-13-6	0.99 - 4.98

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

## 4 . First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

## 5 . Fire-fighting measures

**Flammability of the product** : No specific fire or explosion hazard.

### Extinguishing media

- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.

**Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

## 5 . Fire-fighting measures

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide  
nitrogen oxides  
sulfur oxides  
metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Not available.

## 6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

## 7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## 8 . Exposure controls/personal protection

### Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	Notations
manganese sulfate, monohydrate, as Mn	US ACGIH 1/2008	-	0.2	-	-	-	-	-	-	-	
	AB 6/2008	-	1	-	-	-	-	-	-	-	
	BC 6/2008	-	0.2	-	-	-	-	-	-	-	
manganese sulfate, monohydrate, as manganese	ON 6/2008	-	0.2	-	-	-	-	-	-	-	
	QC 6/2008	-	5	-	-	-	-	-	-	-	[a]
manganese sulfate, monohydrate, as Mn	US ACGIH 1/2008	-	0.2	-	-	-	-	-	-	-	
	AB 6/2008	-	1	-	-	-	-	-	-	-	
	BC 6/2008	-	0.2	-	-	-	-	-	-	-	
manganese oxide, as manganese	ON 6/2008	-	0.2	-	-	-	-	-	-	-	
	QC 6/2008	-	5	-	-	-	-	-	-	-	[a]
manganese oxide, as Mn	US ACGIH 1/2008	-	5	-	-	-	-	-	-	-	[b]
	AB 6/2008	-	5	-	-	-	-	-	-	-	[c]
	BC 6/2008	-	10	-	-	-	-	-	-	-	[d]
manganese oxide, as manganese	US ACGIH 1/2008	-	5	-	-	-	-	-	-	-	[e]
	AB 6/2008	-	5	-	-	-	-	-	-	-	[f]
	BC 6/2008	-	5	-	-	10	-	-	-	-	[g]
diiron trioxide	ON 6/2008	-	10	-	-	-	-	-	-	-	[h]
	QC 6/2008	-	5	-	-	-	-	-	-	-	[i]
	US AIHA 1/2008	-	10	-	-	-	-	-	-	-	[j]
diiron trioxide, as Fe	US ACGIH 1/2008	-	5	-	-	-	-	-	-	-	
	AB 6/2008	-	5	-	-	-	-	-	-	-	
	BC 6/2008	-	10	-	-	-	-	-	-	-	
diiron trioxide, as Fe	ON 6/2008	-	5	-	-	-	-	-	-	-	
	QC 6/2008	-	10	-	-	-	-	-	-	-	
	US AIHA 1/2008	-	5	-	-	-	-	-	-	-	
urea	US AIHA 1/2008	-	10	-	-	-	-	-	-	-	

**Form:** [a]Total dust. [b]Respirable fraction [c]Dust and fumes [d]Dust [e]Fume [f]Respirable dust [g]Total dust [h]The notation "respirable" following the name of an agent in this Schedule means that size fraction of the airborne particulate deposited in the gas-exchange region of the respiratory tract and collected during air sampling with a particle size-selective device that, (a) meets the American Conference of Governmental Industrial Hygienists (ACGIH) particle size-selective criteria; and (b) has the cut point of 4 microns at 50 per cent collective efficiency. [i]total dust [j]dust and fume

### Consult local authorities for acceptable exposure limits.

**Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

**Engineering measures** : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

### Personal protection

**Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

**Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

**Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

## 8 . Exposure controls/personal protection

<b>Environmental exposure controls</b>	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.
<b>Other protection</b>	: Not available.
<b>Personal protective equipment (Pictograms)</b>	: Not available.

## 9 . Physical and chemical properties

<b>Physical state</b>	: Solid.
<b>Flash point</b>	: Not available.
<b>Auto-ignition temperature</b>	: Not available.
<b>Flammable limits</b>	: Not available.
<b>Color</b>	: Not available.
<b>Odor</b>	: Not available.
<b>Taste</b>	: Not available.
<b>Molecular weight</b>	: Not applicable.
<b>Molecular formula</b>	: Not applicable.
<b>pH</b>	: Not available.
<b>Boiling/condensation point</b>	: Not available.
<b>Melting/freezing point</b>	: Not available.
<b>Critical temperature</b>	: Not available.
<b>Relative density</b>	: Not available.
<b>Vapor pressure</b>	: Not available.
<b>Vapor density</b>	: Not available.
<b>Volatility</b>	: Not available.
<b>Odor threshold</b>	: Not available.
<b>Evaporation rate</b>	: Not available.
<b>VOC</b>	: Not available.
<b>Viscosity</b>	: Not available.
<b>Ionicity (in water)</b>	: Not available.
<b>Dispersibility properties</b>	: Not available.
<b>Solubility</b>	: Not available.
<b>Physical/chemical properties comments</b>	: Not available.
<b>Bulk density</b>	: Not available.

## 10 . Stability and reactivity

<b>Chemical stability</b>	: The product is stable.
<b>Possibility of hazardous reactions</b>	: Under normal conditions of storage and use, hazardous reactions will not occur.
<b>Hazardous polymerization</b>	: Under normal conditions of storage and use, hazardous polymerization will not occur.
<b>Conditions to avoid</b>	: No specific data.
<b>Materials to avoid</b>	: No specific data.
<b>Hazardous decomposition products</b>	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**10 . Stability and reactivity**

Conditions of reactivity : Not available.  
Not available.

**11 . Toxicological information****Acute toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
manganese sulfate, monohydrate	TDL <sub>o</sub> Intravenous	Rat	4.5 mg/kg	-
urea	LD50 Intratracheal	Rat	567 mg/kg	-
	LD50 Oral	Rat	8471 mg/kg	-

Conclusion/Summary : Not available.

**Chronic toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

**Irritation/Corrosion**

Product/ingredient name	Result	Species	Score	Exposure	Observation
Not available.					

Conclusion/Summary : Not available.

**Sensitizer**

Product/ingredient name	Route of exposure	Species	Result
Not available.			

Conclusion/Summary : Not available.

**Carcinogenicity**

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

**Classification**

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
diiron trioxide	A4	3	-	-	-	-

**Mutagenicity**

Product/ingredient name	Test	Experiment	Result
Not available.			

Conclusion/Summary : Not available.

**Teratogenicity**

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

**Reproductive toxicity**

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
Not available.						

Conclusion/Summary : Not available.

Synergistic products : Not available.

## 12 . Ecological information

**Environmental effects** : No known significant effects or critical hazards.

### Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
urea	-	Acute LC50 66800 to 70500 ug/L Fresh water	Fish - Rohu - Labeo rohita - Egg	96 hours
	-	Acute LC50 22500 ug/L	Fish - Mozambique tilapia - Tilapia mossambica	96 hours

**Conclusion/Summary** : Not available.

### Biodegradability

Product/ingredient name	Test	Result	Dose	Inoculum
Not available.				

**Conclusion/Summary** : Not available.

**Octanol/water partition coefficient** : Not available.

**Bioconcentration factor** : Not available.

**Mobility** : Not available.

**Toxicity of the products of biodegradation** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## 13 . Disposal considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

**Waste stream** : Not available.

**RCRA classification** : Not available.

**Disposal should be in accordance with applicable regional, national and local laws and regulations.**

**Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.**

## 14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
<b>DOT Classification</b>	Not available.	Not available.	Not available.	-		-
<b>TDG Classification</b>	Not available.	Not available.	Not available.	-		-
<b>Mexico Classification</b>	Not available.	Not available.	Not available.	-		-

PG\* : Packing group

## 15 . Regulatory information

**United States inventory (TSCA 8b)** : All components are listed or exempted.

**WHMIS (Canada)** : Class D-2A: Material causing other toxic effects (Very toxic).

**Canadian lists** : **CEPA Toxic substances:** None of the components are listed.  
**Canadian ARET:** None of the components are listed.  
**Canadian NPRI:** The following components are listed: Manganese; Manganese  
**Alberta Designated Substances:** None of the components are listed.  
**Ontario Designated Substances:** None of the components are listed.  
**Quebec Designated Substances:** None of the components are listed.

**Canada inventory** : At least one component is not listed in DSL but all such components are listed in NDSL.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

### EU regulations

**Hazard symbol or symbols** :



**Risk phrases** : R48/20/22- Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.  
R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety phrases** : S2- Keep out of the reach of children.  
S29- Do not empty into drains.  
S46- If swallowed, seek medical advice immediately and show this container or label.  
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

### International regulations

**International lists** : **Australia inventory (AICS):** All components are listed or exempted.  
**China inventory (IECSC):** Not determined.  
**Japan inventory (ENCS):** Not determined.  
**Japan inventory (ISHL):** Not determined.  
**Korea inventory (KECI):** All components are listed or exempted.  
**New Zealand Inventory of Chemicals (NZIoC):** All components are listed or exempted.  
**Philippines inventory (PICCS):** Not determined.

**Chemical Weapons Convention List Schedule I Chemicals** : Not listed

## 15 . Regulatory information

Chemical Weapons : Not listed  
 Convention List Schedule  
 II Chemicals  
 Chemical Weapons : Not listed  
 Convention List Schedule  
 III Chemicals

## 16 . Other information

Label requirements : CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material :  
 Information System (U.S.A.)

Health	1
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material. Suggested protective clothing might not be adequate. Consult a specialist before handling this product.

Other special considerations : Not available.

References : Not available.

Date of issue : 5/20/2009.

Version : 1

☑ Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.