

BDO-200 T1.6**F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : BDO-200 T1.6

MSDS Number : F88744

Product Use Description : Catalyst

Company : UOP LLC
25 E. Algonquin Road
Des Plaines, IL 60017-5017
USA

Telephone : +1-847-391-2000
Telefax : +1-847-391-2953

In case of emergency call : Medical (PROSAR): 1-800-498-5701 or +1-651-523-0309
: Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887

: (24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION**Emergency Overview**

Form : pellets

Color : green

Odor : none

Hazard Summary : Repeated or prolonged exposure may irritate eyes, skin and respiratory system. May cause sensitization by skin contact. Nickel and nickel compounds are classified as carcinogens.

Potential Health Effects

Skin : Prolonged skin contact may cause skin irritation.
Contains a component which is a known or suspected skin

SAFETY DATA SHEET



BDO-200 T1.6

F88744

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

sensitizer.

- Eyes : Repeated or prolonged exposure may cause eye irritation.
- Ingestion : The product is considered to have a low order of oral toxicity.
- Inhalation : Exposure to dust particles generated from this material may cause irritation of the respiratory tract.
Prolonged or repeated inhalation may cause lung injury/cancer.
- Chronic Exposure : Nickel and Nickel compounds are classified as carcinogens.
- Primary Routes of Entry : Contact with skin and eyes.
Exposure may also occur via inhalation or ingestion if product dust is generated.

Carcinogenicity

NTP:	Nickel oxide Known carcinogen.	1313-99-1
IARC:	Nickel oxide 1: Human carcinogen.	1313-99-1
ACGIH:	Nickel oxide A1: Confirmed human carcinogen	1313-99-1
	Molybdenum oxide A3: Confirmed animal carcinogen	1313-27-5

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture

Chemical Name	CAS-No.	Concentration
Aluminum oxide (non-fibrous)	1344-28-1	35.00 - 65.00 %

BDO-200 T1.6**F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Molybdenum oxide	1313-27-5	<30.00 %
Silica (amorphous)	7631-86-9	<20.00 %
Molybdenum	7439-98-7	<15.00 %
Nickel oxide	1313-99-1	<6.00 %
Aluminium phosphate	7784-30-7	<5.00 %

SECTION 4. FIRST AID MEASURES

- Inhalation : Remove to fresh air. If symptoms persist, call a physician.
- Skin contact : Wash off with soap and plenty of water. If skin irritation persists, call a physician.
- Eye contact : Rinse immediately with plenty of water for at least 15 minutes. If eye irritation persists, consult a physician.
- Ingestion : Do NOT induce vomiting. Obtain medical attention.

Notes to physician

- Treatment : If the product is inhaled, clean the nasal passages. Contact with eyes or skin causes irritation. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. Hydrocarbons and other materials that contact the product during normal use can be retained on the product. The used product can contain material of a hazardous nature. Identify that material and treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Not combustible.
Use extinguishing measures that are appropriate to local

BDO-200 T1.6**F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

circumstances and the surrounding environment.

Specific hazards during firefighting : The product itself does not burn.
May form nickel carbonyl, which is very toxic and potentially lethal, on contact with carbon monoxide.
Fumes of molybdenum trioxide may be released at temperatures above 795°C/1463°F.
The used product can retain material of a hazardous nature. Identify that material and inform the fire fighters.

Special protective equipment for firefighters : Wear suitable protective clothing.
In the case of respirable dust and/or fumes, use self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : For personal protection see section 8.

Environmental precautions : No special environmental precautions required.

Methods for cleaning up : Sweep, shovel or vacuum spilled product into appropriate containers (do not use a vacuum if material has contacted a hydrocarbon material).
Pick up and arrange disposal without creating dust.
Never return spills in original containers for re-use.
Spilled product should be disposed of in accordance with all applicable government regulations.

SECTION 7. HANDLING AND STORAGE**Handling**

Handling : Handle and open container with care.
Avoid dust formation.
Avoid contact with skin and eyes.
Provide an electrical ground connection during loading and transfer operations to avoid static discharge in an explosive atmosphere and to prevent persons handling the product from receiving static shocks.

SAFETY DATA SHEET



BDO-200 T1.6

F88744

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Storage

Requirements for storage areas and containers : Store in original container.
Keep tightly closed in a dry and cool place.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures : Handle in accordance with good industrial hygiene and safety practice.

Engineering measures : Ensure adequate ventilation, especially in confined areas.

Eye protection : Safety glasses
Safety goggles

Hand protection : Protective gloves

Skin and body protection : Lightweight protective clothing

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.
Breathing apparatus with filter: NIOSH classification N-100 or if oil/liquid aerosols are present P-100 (42 CFR 84).

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Aluminum oxide (non-fibrous)	1344-28-1	TWA : time weighted average	1 mg/m3	2009	ACGIH:US. ACGIH Threshold Limit Values
Further information	:	Form of exposure : Respirable fraction.			

Aluminum oxide (non-fibrous)	1344-28-1	PEL : Permissible exposure limit	15 mg/m3	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Further information	:	Form of exposure : Total dust.			

SAFETY DATA SHEET

**BDO-200 T1.6****F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Aluminum oxide (non-fibrous)	1344-28-1	PEL : Permissible exposure limit	5 mg/m3	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Further information	:	Form of exposure : Respirable fraction.			

Aluminum oxide (non-fibrous)	1344-28-1	TWA : time weighted average	10 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
Further information	:	Form of exposure : Total dust.			

Aluminum oxide (non-fibrous)	1344-28-1	TWA : time weighted average	5 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
Further information	:	Form of exposure : Respirable fraction.			

Molybdenum oxide	1313-27-5	TWA : time weighted average	10 mg/m3	2009	ACGIH:US. ACGIH Threshold Limit Values
Further information	:	Form of exposure : Inhalable fraction. Expressed as : as Mo			

Molybdenum oxide	1313-27-5	TWA : time weighted average	3 mg/m3	2009	ACGIH:US. ACGIH Threshold Limit Values
Further information	:	Form of exposure : Respirable fraction. Expressed as : as Mo			

SAFETY DATA SHEET

**BDO-200 T1.6****F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Molybdenum oxide	1313-27-5	PEL : Permissible exposure limit	15 mg/m3	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Further information	:	Form of exposure : Total dust. Expressed as : as Mo			

Molybdenum oxide	1313-27-5	TWA : time weighted average	10 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
Further information	:	Form of exposure : Total dust. Expressed as : as Mo			

Silica (amorphous)	7631-86-9	REL : Recommended exposure limit (REL):	6 mg/m3	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
--------------------	-----------	--------------------------------------------	---------	------	------------------------------------------------------------------

Silica (amorphous)	7631-86-9	TWA : time weighted average	6 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
--------------------	-----------	--------------------------------	---------	------	---------------------------------------------------

Silica (amorphous)	7631-86-9	TWA : time weighted average	20 millions of particles per cubic foot of air	2000	Z3:US. OSHA Table Z-3 (29 CFR 1910.1000)
--------------------	-----------	--------------------------------	------------------------------------------------	------	------------------------------------------------

SAFETY DATA SHEET



BDO-200 T1.6

F88744

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Silica (amorphous)	7631-86-9	TWA : time weighted average	0.8 mg/m3 The exposure limit is calculated from the equation, 80/(%SiO2), using a value of 100% SiO2. Lower values of % SiO2 will give higher exposure limits.	2000	Z3:US. OSHA Table Z-3 (29 CFR 1910.1000)
--------------------	-----------	--------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------	------	------------------------------------------

Molybdenum	7439-98-7	TWA : time weighted average	3 mg/m3	2008	ACGIH:US. ACGIH Threshold Limit Values
------------	-----------	--------------------------------	---------	------	----------------------------------------

Further information	:	Form of exposure : Respirable fraction. Expressed as : as Mo			
---------------------	---	-----------------------------------------------------------------	--	--	--

Molybdenum	7439-98-7	TWA : time weighted average	10 mg/m3	2008	ACGIH:US. ACGIH Threshold Limit Values
------------	-----------	--------------------------------	----------	------	----------------------------------------

Further information	:	Form of exposure : Inhalable fraction. Expressed as : as Mo			
---------------------	---	----------------------------------------------------------------	--	--	--

Molybdenum	7439-98-7	PEL : Permissible exposure limit	15 mg/m3	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
------------	-----------	-------------------------------------	----------	------------	------------------------------------------------------------------------------

Further information	:	Form of exposure : Total dust. Expressed as : as Mo			
---------------------	---	--------------------------------------------------------	--	--	--

SAFETY DATA SHEET

**BDO-200 T1.6****F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Molybdenum	7439-98-7	TWA : time weighted average	10 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
Further information	:	Form of exposure : Total dust. Expressed as : as Mo			
Nickel oxide	1313-99-1	TWA : Time Weighted Average (TWA):	0.1 mg/m3	05 1998	Honeywell:Limit established by Honeywell International Inc.
Nickel oxide	1313-99-1	TWA : time weighted average	0.2 mg/m3	2008	ACGIH:US. ACGIH Threshold Limit Values
Further information	:	Form of exposure : Inhalable fraction. Expressed as : as Ni			
Nickel oxide	1313-99-1	REL : Recomm ended exposure limit (REL):	0.015 mg/m3	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
Further information	:	Expressed as : as Ni			
Nickel oxide	1313-99-1	PEL : Permissi ble exposure limit	1 mg/m3	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Further information	:	Expressed as : as Ni			
Nickel oxide	1313-99-1	TWA : time weighted average	1 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)

SAFETY DATA SHEET



BDO-200 T1.6

F88744

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Further information	:	Expressed as : as Ni
---------------------	---	----------------------

Aluminium phosphate	7784-30-7	TWA : time weighted average	1 mg/m3	2008	ACGIH:US. ACGIH Threshold Limit Values
---------------------	-----------	--------------------------------	---------	------	-------------------------------------------

Further information	:	Form of exposure : Respirable fraction.
---------------------	---	-----------------------------------------

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state : pellets

Color : green

Odor : none

pH : Note: not applicable

Melting point/freezing point : > 400 °C

Boiling point/boiling range : Note: not applicable

Flash point : Note: not applicable

Density : > 2 g/cm3

Water solubility : Note: negligible

Bulk density : Note: For further information, refer to the product technical

BDO-200 T1.6**F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

data sheet.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	: Stable
Incompatible materials to avoid	: Free water may damage the product. Contact with carbon monoxide under certain conditions can form very toxic and potentially lethal nickel carbonyl.
Hazardous decomposition products	: Molybdenum trioxide fumes may be released at high temperatures (>795°C). Hydrocarbons and other materials that contact the product during normal use can be retained on the product. It is reasonable to expect that decomposition products will come from these retained materials of use.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	: Note: no data available
Acute inhalation toxicity	: Note: no data available
Acute dermal toxicity	: Note: no data available
Skin irritation	: Note: no data available
Eye irritation	: Note: no data available
Further information	: Note: May cause sensitization by skin contact. Avoid repeated exposure.

BDO-200 T1.6**F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

SECTION 12. ECOLOGICAL INFORMATION**Ecotoxicity effects**

Toxicity to fish : Note: no data available

Toxicity to daphnia and other aquatic invertebrates : Note: no data available

Toxicity to algae : Note: no data available

Toxicity to bacteria
Molybdenum oxide : LC50: 1,100 mg/l
Exposure time: 0.5 h
Species: activated sludgeLC50: 820 mg/l
Exposure time: 3 h
Species: activated sludge**Elimination information (persistence and degradability)**

Bioaccumulation : Note: no data available

Mobility : Note: no data available

Biodegradability : Note: no data available

Further information on ecology

Additional ecological information : No information on ecology is available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : This product (in its fresh unused state) is not listed by generic name or trademark name in the U.S. EPA's RCRA regulations

BDO-200 T1.6**F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

and does not possess any of the four identifying characteristics of hazardous waste (ignitability, corrosivity, reactivity or toxicity).
The used product can contain material of a hazardous nature. Identify that material and dispose accordingly.
The U.S. EPA has listed as hazardous waste, spent hydrotreating catalysts (K171) and spent hydrorefining catalyst (K172) generated in petroleum refining operations. Customers should review their use of this catalyst to determine the applicability of the K171 and K172 hazardous waste listings.

SECTION 14. TRANSPORT INFORMATION**DOT** Not dangerous goods**TDG** Not dangerous goods**IATA** Not dangerous goods**IMDG** Not dangerous goods**SECTION 15. REGULATORY INFORMATION****Inventories**US. Toxic Substances : On TSCA Inventory
Control ActAustralia. Industrial : On the inventory, or in compliance with the inventory
Chemical (Notification and
Assessment) ActCanada. Canadian : All components of this product are on the Canadian DSL list.
Environmental Protection
Act (CEPA). Domestic
Substances List (DSL)Japan. Kashin-Hou Law : On the inventory, or in compliance with the inventory
List

Korea. Existing Chemicals : On the inventory, or in compliance with the inventory

BDO-200 T1.6**F88744**

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Inventory (KECI)

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : On the inventory, or in compliance with the inventory

National regulatory information

SARA 302 Components : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components : The following components are subject to reporting levels established by SARA Title III, Section 313:

: Molybdenum oxide 1313-27-5
 : Nickel oxide 1313-99-1

SARA 311/312 Hazards : Chronic Health Hazard

California Prop. 65 : WARNING! This product contains a chemical known to the State of California to cause cancer.

Nickel oxide 1313-99-1

Massachusetts RTK : Molybdenum oxide 1313-27-5
 : Nickel oxide 1313-99-1
 : Molybdenum 7439-98-7
 : Aluminum oxide (non-fibrous) 1344-28-1
 : Silica (amorphous) 7631-86-9

SAFETY DATA SHEET



BDO-200 T1.6

F88744

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

New Jersey RTK : Molybdenum oxide 1313-27-5
: Nickel oxide 1313-99-1
: Molybdenum 7439-98-7
: Aluminium phosphate 7784-30-7
: Aluminum oxide (non-fibrous) 1344-28-1

Pennsylvania RTK : Molybdenum oxide 1313-27-5
: Nickel oxide 1313-99-1
: Molybdenum 7439-98-7
: Aluminum oxide (non-fibrous) 1344-28-1
: Silica (amorphous) 7631-86-9

WHMIS Classification : D2A: Very Toxic Material Causing Other Toxic Effects
D2B: Toxic Material Causing Other Toxic Effects
This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

SECTION 16. OTHER INFORMATION

	HMIS III	NFPA
Health hazard	: 1*	1
Flammability	: 0	0
Physical Hazard	: 0	
Instability	:	0

* - Chronic health hazard

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

BDO-200 T1.6

F88744

Version 1.1

Revision Date 10/30/2012

Print Date 11/26/2012

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Previous Issue Date: 10/11/2012

Prepared by: Honeywell Performance Materials and Technologies Product Stewardship Group