#### Safety Data Sheet



#### **Section 1: Identification**

**Product identifier** 

• Carbon Dioxide (0.5001 - 50%), Oxygen (0.0001 - 19.49%) and

Sulfur Dioxide (0.0002 - 0.0999%), Nitrogen (Balance)

Product Code 

• M-C400-11/E-2

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

Recommended use • Calibration Gas

Details of the supplier of the safety data sheet

Manufacturer • Air Liquide

2700 Post Oak Blvd. Houston, TX 77056 United States www.us.airliquide.com sds@airliquide.com

Telephone (Technical) • 713-896-2896 Telephone (Technical) • 800-819-1704

**Emergency telephone number** 

Manufacturer 800-424-9300 - CHEMTREC

Manufacturer +1 703-527-3887 - Outside United States

#### Section 2: Hazard Identification

**United States (US)** 

According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012

Compressed Gas - H280 Simple Asphyxiant

Label elements

**OSHA HCS 2012** 

WARNING



**Hazard statements** • Contains gas under pressure; may explode if heated - H280 May displace oxygen and cause rapid suffocation.

**Precautionary statements** 

Storage/Disposal . Store in a well-ventilated place. - P403

#### Other hazards

**OSHA HCS 2012** 

 Inhalation of carbon dioxide can increase respiration and heart rate. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

#### Canada

**According to WHMIS** 

#### Classification of the substance or mixture

**WHMIS** 

Compressed Gas - A

# Label elements

**WHMIS** 



Compressed Gas - A

# Other hazards WHMIS

Inhalation of carbon dioxide can increase respiration and heart rate.
 This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
 In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

# Section 3 - Composition/Information on Ingredients

#### **Substances**

Material does not meet the criteria of a substance.

#### **Mixtures**

	Composition				
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Nitrogen	<b>CAS</b> :7727-37-9	30.4101% TO 99.4996%	NDA	OSHA HCS 2012: Press. Gas - Comp.; Simp. Asphyx.	Balance
Oxygen	<b>CAS</b> :7782- 44-7	0.0001% TO 19.49%	NDA	OSHA HCS 2012: Ox. Gas 1; Press Gas Comp.	NDA
Carbon dioxide	<b>CAS</b> :124-38-9	0.5001% TO 50%	Inhalation-Rat LC50 • 470000 ppm 30 Minute(s)	OSHA HCS 2012: Press. Gas - Comp.; Simp. Asphyx.	NDA
Sulfur dioxide	<b>CAS</b> :7446- 09-5	0.0002% TO 0.0999%	Inhalation-Rat LC50 • 2520 ppm 1 Hour(s)	OSHA HCS 2012: Press. Gas - Comp.; Muta. 2; Acute Tox. 3 (inh); Repr. 2	2.0001 - 9 ppm

See Section 11 for Toxicological Information.

#### **Section 4: First-Aid Measures**

# **Description of first aid measures**

Format: GHS Language: English (US) WHMIS, OSHA HCS 2012

#### Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin

Although exposure is unlikely, in case of contact immediately flush skin with running water. If skin irritation develops get medical advice/attention.

Eye

First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If irritation develops and persists, get medical attention.

Ingestion

Indestion is not considered a potential route of exposure.

#### Most important symptoms and effects, both acute and delayed

Refer to Section 11 - Toxicological Information.

#### Indication of any immediate medical attention and special treatment needed

**Notes to Physician** 

• All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred. A potential health hazard associated with this gas is anoxia.

#### Other information

Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after overexposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

## Section 5: Fire-Fighting Measures

## Extinguishing media

Suitable Extinguishing Media . Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media

No data available

# Special hazards arising from the substance or mixture

**Unusual Fire and Explosion** Hazards

**Hazardous Combustion Products** 

Containers may explode when heated. Ruptured cylinders may rocket.

No data available

# Advice for firefighters

Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

Always wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear positive pressure self-contained breathing apparatus (SCBA).

Move containers from fire area if you can do it without risk.

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out.

FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices;

icing may occur.
FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

#### Section 6 - Accidental Release Measures

#### Personal precautions, protective equipment and emergency procedures

#### **Personal Precautions**

 Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

#### **Emergency Procedures**

 Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 mile)

#### **Environmental precautions**

No special environmental precautions necessary.

#### Methods and material for containment and cleaning up

# Containment/Clean-up Measures

Stop leak if you can do it without risk.

Do not direct water at spill or source of leak.

Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.

If possible, turn leaking containers so that gas escapes rather than liquid.

Isolate area until gas has dispersed.

Ventilate the area.

## Section 7 - Handling and Storage

#### Precautions for safe handling

#### Handling

• Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

# Conditions for safe storage, including any incompatibilities

Storage

Store in a cool, dry, well-ventilated place. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.

# **Section 8 - Exposure Controls/Personal Protection**

# **Control parameters**

	Exposure Limits/Guidelines					
	Result	ACGIH	Canada Ontario	Canada Quebec	NIOSH	OSHA
Sulfur dioxide	STELs	0.25 ppm STEL	5 ppm STEL; 10.4 mg/m3 STEL	5 ppm STEV; 13 mg/m3 STEV	5 ppm STEL; 13 mg/m3 STEL	Not established
(7446-09-5)	TWAs	S INOT ESTANISHED I	2 ppm TWAEV; 5.2 mg/m3 TWAEV	2 ppm TWA; 5 mg/m3 TWA	5 ppm TWA; 13 mg/m3 TWA	
Carbon dioxide	STELs	30000 ppm STEL	30000 ppm STEL	30000 ppm STEV; 54000 mg/m3 STEV	30000 ppm STEL; 54000 mg/m3 STEL	INOT ASTANIISHED
(124-38-9)	TWAs	5000 ppm TWA	5000 ppm TWA	5000 ppm TWAEV; 9000 mg/m3 TWAEV		5000 ppm TWA; 9000 mg/m3 TWA

# **Exposure Control Notations ACGIH**

•Sulfur dioxide (7446-09-5): Carcinogens: (A4 - Not Classifiable as a Human Carcinogen)

#### **Exposure controls**

Engineering Measures/Controls

 Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

# **Personal Protective Equipment**

**Pictograms** 



Respiratory

 Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

Wear safety glasses.

Skin/Body

Wear leather gloves when handling cylinders.

**Environmental Exposure Controls** 

Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

## Section 9 - Physical and Chemical Properties

#### **Information on Physical and Chemical Properties**

Material Description			
Physical Form	Gas	Appearance/Description	Colorless gas with irritating pungent odor.
Color	Colorless	Odor	Irritating pungent odor.
Taste	Data lacking	Particulate Type	Not relevant
Particulate Size	Not relevant	Aerosol Type	Not relevant
Odor Threshold	0.33 to 5 ppm	Physical and Chemical Properties	Data lacking
General Properties			
Boiling Point	Data lacking	Melting Point	Data lacking
Decomposition Temperature	Data lacking	Heat of Decomposition	Data lacking
рН	Not relevant	Specific Gravity/Relative Density	Data lacking
Density	Data lacking	Bulk Density	Data lacking
Water Solubility	Data lacking	Solvent Solubility	Data lacking
Viscosity	Not relevant	Explosive Properties	Not explosive.
Oxidizing Properties:	Not an oxidizing gas.		
Volatility	-	-	
Vapor Pressure	Not relevant	Vapor Density	1.29 Air=1
Evaporation Rate	Data lacking	VOC (Wt.)	Data lacking
VOC (Vol.)	Data lacking	Volatiles (Wt.)	Data lacking
Volatiles (Vol.)	Data lacking		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Burning Time	Not relevant	Flame Height	Not relevant
Flame Extension	Not relevant	Ignition Distance	Not relevant
Flame Duration	Not relevant	Self-Accelerating Decomposition Temperature (SADT)	Not relevant

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Heat of Combustion (ΔHc)	Not relevant	Flammability (solid, gas)	Not flammable.
Environmental			
Half-Life	Data lacking	Octanol/Water Partition coefficient	Data lacking
Coefficient of water/oil distribution	Data lacking	Bioaccumulation Factor	Data lacking
Bioconcentration Factor	Data lacking	Biochemical Oxygen Demand BOD/BOD5	Data lacking
Chemical Oxygen Demand	Data lacking	Persistence	Data lacking
Degradation	Data lacking		

# **Section 10: Stability and Reactivity**

## Reactivity

No dangerous reaction known under conditions of normal use.

# **Chemical stability**

• Stable under normal temperatures and pressures.

#### Possibility of hazardous reactions

• Hazardous polymerization will not occur.

#### Conditions to avoid

Excess heat.

# Incompatible materials

No data available

#### **Hazardous decomposition products**

 Under normal conditions of storage and use, hazardous decomposition products should not be produced.

# **Section 11 - Toxicological Information**

## Information on toxicological effects

Component Name	CAS	Data
Oxygen (0.0001% TO 19.49%)	7782-44-7	Reproductive: ihl-rat TCLo:10 pph/9H (22D preg)
Carbon dioxide (0.5001% TO 50%)	124-38-9	Acute Toxicity: ihl-rat LC50:470000 ppm/30M; Reproductive: ihl-rat TCLo:6 pph/24H (10D preg)
Sulfur dioxide (0.0002% TO 0.0999%)	7446-09-5	Acute Toxicity: ihl-rat LC50:2520 ppm/1H; Tumorigen/Carcinogen: ihl-rat TCLo:72 mg/kg/300D-l

GHS Properties	Classification
Acute toxicity	OSHA HCS 2012 • Classification criteria not met
Aspiration Hazard	OSHA HCS 2012 • Classification criteria not met
Carcinogenicity	OSHA HCS 2012 • Classification criteria not met
Germ Cell Mutagenicity	OSHA HCS 2012 • Classification criteria not met
Skin corrosion/Irritation	OSHA HCS 2012 • Classification criteria not met
Skin sensitization	OSHA HCS 2012 • Classification criteria not met
STOT-RE	OSHA HCS 2012 • Classification criteria not met
STOT-SE	OSHA HCS 2012 • Classification criteria not met

Toxicity for Reproduction	OSHA HCS 2012 • Classification criteria not met
Respiratory sensitization	OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation	OSHA HCS 2012 • Classification criteria not met

#### **Potential Health Effects** Inhalation

#### Acute (Immediate)

If this material is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.

#### Chronic (Delayed)

Acute (Immediate)

Chronic (Delayed)

Eve

Skin

Acute (Immediate)

Chronic (Delayed)

Ingestion

Acute (Immediate)

**Chronic (Delayed)** 

**Mutagenic Effects** 

Carcinogenic Effects

No data available

- Under normal conditions of use, no health effects are expected.
- Under normal conditions of use, no health effects are expected.
- Under normal conditions of use, no health effects are expected.
- Under normal conditions of use, no health effects are expected.
- Ingestion is not anticipated to be a likely route of exposure to this product.
- Ingestion is not anticipated to be a likely route of exposure to this product.
- No data available.
- The components of this material are not found on the following lists: FEDERAL OSHA Z LIST, NTP and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

# Section 12 - Ecological Information

# **Toxicity**

Material data lacking.

# Persistence and degradability

Material data lacking.

## Bioaccumulative potential

Material data lacking.

#### Mobility in Soil

Material data lacking.

#### Results of PBT and vPvB assessment

PBT and vPvB assessment has not been conducted for this material.

#### Other adverse effects

Material data lacking.

# Section 13 - Disposal Considerations

#### Waste treatment methods

Product waste

Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

**Packaging waste** 

Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

#### Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards
DOT	UN1956	Compressed gas, n.o.s (Nitrogen, Carbon Dioxide)	2.2	NDA	NDA
TDG	UN1956	COMPRESSED GAS, N.O.S. (Nitrogen, Carbon Dioxide)	2.2	NDA	NDA
IMO/IMDG	UN1956	COMPRESSED GAS, N.O.S. (Nitrogen, Carbon Dioxide)	2.2	NDA	NDA
IATA/ICAO	UN1956	Compressed gas, n.o.s (Nitrogen, Carbon Dioxide)	2.2	NDA	NDA

**Special precautions for user** • Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant.

# **Section 15 - Regulatory Information**

# Safety, health and environmental regulations/legislation specific for the substance or mixture SARA Hazard Classifications • Acute, Pressure(Sudden Release of)

State Right To Know				
Component	CAS	MA	NJ	PA
Carbon dioxide	124-38-9	Yes	Yes	Yes
Nitrogen	7727-37-9	Yes	Yes	Yes
Oxygen	7782-44-7	Yes	Yes	Yes
Sulfur dioxide	7446-09-5	Yes	Yes	Yes

	Inventory				
Component	CAS	Canada DSL	Canada NDSL	TSCA	
Carbon dioxide	124-38-9	Yes	No	Yes	
Nitrogen	7727-37-9	Yes	No	Yes	
Oxygen	7782-44-7	Yes	No	Yes	
Sulfur dioxide	7446-09-5	Yes	No	Yes	

#### Canada

Canada - WHMIS - Classifications of Substances		
Oxygen	7782-44-7	A, C
Sulfur dioxide	7446-09-5	A, D1A, D2B, E
Carbon dioxide	124-38-9	A; Uncontrolled product according to WHMIS classification criteria (solid
• Nitrogen	7727-37-9	Α
Canada - WHMIS - Ingredient Disclosure List		
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	1 %
Carbon dioxide	124-38-9	1 %
• Nitrogen	7727-37-9	Not Listed
vironment		
Canada - CEPA - Priority Substances List		N. alla al
• Oxygen	7782-44-7	Not Listed
• Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
ted States		
bor J.S OSHA - Process Safety Management - Highly Hazardous Che	micals	
• Oxygen	7782-44-7	Not Listed
• Sulfur dioxide	7446-09-5	1000 lb TQ (liquid)
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
U.S OSHA - Specifically Regulated Chemicals		
• Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
vironment J.S CAA (Clean Air Act) - 1990 Hazardous Air Pollutants		
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7782-44-7 7446-09-5	Not Listed Not Listed
Carbon dioxide	7446-09-5 124-38-9	Not Listed Not Listed
Nitrogen	7727-37-9	Not Listed
J.S CERCLA/SARA - Hazardous Substances and their Reportable	Quantities	
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
J.S CERCLA/SARA - Radionuclides and Their Reportable Quantition	es	
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
A PG		

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Nitrogen

Not Listed

7727-37-9

Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	500 lb EPCRA RQ
Carbon dioxide	124-38-9	Not Listed
• Nitrogen	7727-37-9	Not Listed
U.S CERCLA/SARA - Section 302 Extremely Haza	rdous Substances TPQs	
• Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	500 lb TPQ
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
U.S CERCLA/SARA - Section 313 - Emission Repo	orting	
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
U.S CERCLA/SARA - Section 313 - PBT Chemical	Listing	
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed

#### **United States - California**

nvironment U.S California - Proposition 65 - Carcinogens List		
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
U.S California - Proposition 65 - Developmental To	xicity	
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	developmental toxicity, initial date 7/29/11
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
U.S California - Proposition 65 - Maximum Allowab	ole Dose Levels (MADL)	
Oxygen	7782-44-7	Not Listed
Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
U.S California - Proposition 65 - No Significant Risl	k Levels (NSRL)	
	k Levels (NSRL) 7782-44-7	Not Listed
• Oxygen		Not Listed Not Listed
<ul> <li>U.S California - Proposition 65 - No Significant Risl</li> <li>Oxygen</li> <li>Sulfur dioxide</li> <li>Carbon dioxide</li> </ul>	7782-44-7	
Oxygen     Sulfur dioxide	7782-44-7 7446-09-5	Not Listed
<ul><li>Oxygen</li><li>Sulfur dioxide</li><li>Carbon dioxide</li></ul>	7782-44-7 7446-09-5 124-38-9 7727-37-9	Not Listed Not Listed

Sulfur dioxide	7446-09-5	Not Listed
Carbon dioxide	124-38-9	Not Listed
Nitrogen	7727-37-9	Not Listed
U.S California - Proposition 65 - Reproductive Toxicity - Male		
0	7700 44 7	Not Listed
Oxygen	7782-44-7	NOL LISTER
Oxygen     Sulfur dioxide	7782-44-7 7446-09-5	Not Listed
75		

#### **United States - Pennsylvania**

Oxygen	7782-44-7 Not Listed
Sulfur dioxide	7446-09-5
Carbon dioxide	124-38-9 Not Listed
Nitrogen	7727-37-9 Not Listed
	al Hazardous Substances
<ul> <li>U.S Pennsylvania - RTK (Right to Know) - Speci</li> <li>Oxygen</li> <li>Sulfur dioxide</li> </ul>	7782-44-7 Not Listed

#### **Section 16 - Other Information**

# Last Revision Date Preparation Date Disclaimer/Statement of Liability

- 07/December/2012
- 07/December/2012
- To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

# **Key to abbreviations**NDA = No Data Available