Material Safety Data Sheet

Universal Calibration Mix, Part Number 5184-3541

1. Identification of the material and supplier

Names
- **Product name**: Universal Calibration Mix, Part Number 5184-3541
- **Part No.**: 5184-3541
- **ADG**: METHANE, COMPRESSED

Supplier
- **Supplier/Manufacturer**: Agilent Technologies Australia Pty Ltd
  679 Springvale Road
  Mulgrave
  Victoria 3170, Australia
  1800 802 402
- **Emergency telephone number**: CHEMTREC®: +(61)-290372994

Uses
- **Area of application**: Industrial applications, Professional applications.
- **Material uses**: Analytical chemistry.
  1L Cylinder

2. Hazards identification

Classification: F+; R12

Risk phrases: R12- Extremely flammable.

Safety phrases: S9- Keep container in a well-ventilated place.
                 S16- Keep away from sources of ignition - No smoking.
                 S33- Take precautionary measures against static discharges.

Statement of hazardous/dangerous nature: NON-HAZARDOUS SUBSTANCE. DANGEROUS GOODS.

3. Composition/information on ingredients

Mixture: Yes.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>74-82-8</td>
<td>&gt;60</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>630-08-0</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>1333-74-0</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Acetylene</td>
<td>74-86-2</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Butane</td>
<td>106-97-8</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Ethane</td>
<td>74-84-0</td>
<td>&lt;10</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>110-54-3</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Propyne</td>
<td>74-99-7</td>
<td>&lt;10</td>
</tr>
<tr>
<td>n-Heptane</td>
<td>142-82-5</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Propane</td>
<td>74-98-6</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Ethylene</td>
<td>74-85-1</td>
<td>&lt;10</td>
</tr>
</tbody>
</table>

Other ingredients, determined not to be hazardous according to Safe Work Australia criteria, and not dangerous according to the ADG Code, make up the product concentration to 100%.

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

**Inhalation**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

**Skin contact**: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

**Eye contact**: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

**Protection of first-aiders**: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

**Advice to doctor**: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

**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. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance.

**Hazardous thermal decomposition products**: Decomposition products may include the following materials: carbon dioxide, carbon monoxide

**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.

**Hazchem code**: 2SE

6. Accidental release measures

**Personal precautions**: Accidental releases pose a serious fire or explosion hazard. Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

**Environmental precautions**: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
# 6. Accidental release measures

**Methods for cleaning up**: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

# 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. Remove contaminated clothing and protective equipment before entering eating areas. Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.

**Storage**: Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use.

# 8. Exposure controls/personal protection

## Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>Safe Work Australia (Australia, 4/2013). TWA: 34 mg/m³ 8 hours. TWA: 30 ppm 8 hours.</td>
</tr>
<tr>
<td>Butane</td>
<td>Safe Work Australia (Australia, 4/2013). TWA: 1900 mg/m³ 8 hours. TWA: 800 ppm 8 hours.</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>Safe Work Australia (Australia, 4/2013). TWA: 72 mg/m³ 8 hours. TWA: 20 ppm 8 hours.</td>
</tr>
<tr>
<td>Propyne</td>
<td>Safe Work Australia (Australia, 4/2013). TWA: 1640 mg/m³ 8 hours. TWA: 1000 ppm 8 hours.</td>
</tr>
<tr>
<td>n-Heptane</td>
<td>Safe Work Australia (Australia, 4/2013). STEL: 2050 mg/m³ 15 minutes. STEL: 500 ppm 15 minutes. TWA: 1640 mg/m³ 8 hours. TWA: 400 ppm 8 hours.</td>
</tr>
<tr>
<td>Propane</td>
<td>TRGS900 AGW (Germany, 9/2013). PEAK: 7200 mg/m³ 15 minutes. PEAK: 4000 ppm 15 minutes. TWA: 1800 mg/m³ 8 hours. TWA: 1000 ppm 8 hours.</td>
</tr>
<tr>
<td>Ethylene</td>
<td>ACGIH TLV (United States, 6/2013). TWA: 200 ppm 8 hours.</td>
</tr>
</tbody>
</table>

**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. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

## Exposure controls

### Engineering measures

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
8. Exposure controls/personal protection

**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.

**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. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

**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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Respiratory**: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. The gas can cause asphyxiation without warning by replacing the oxygen in the air. 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.

**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. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

**Environmental exposure controls**: 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.

9. Physical and chemical properties

**Physical state**: Gas.

**Colour**: Not available.

**Odour**: Not available.

**Boiling point**: Not available.

**Melting point**: Not available.

**Vapour pressure**: Not available.

**Flash point**: Closed cup: <-18°C (<-0.4°F)

**Flammable limits**: Not available.

**Vapour density**: Not available.

**pH**: Not available.

**Auto-ignition temperature**: Not available.

**Solubility**: Very slightly soluble in the following materials: cold water and hot water.

10. Stability and reactivity

**Chemical stability**: The product is stable.

**Possibility of hazardous reactions**: Under normal conditions of storage and use, hazardous reactions will not occur.

**Conditions to avoid**: Avoid all possible sources of ignition (spark or flame). Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow gas to accumulate in low or confined areas.
10. Stability and reactivity

Materials to avoid: Reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. Toxicological information

Potential acute health effects

Inhalation: At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.
Ingestion: As this product is a gas, refer to the inhalation section.
Skin contact: Contact with rapidly expanding gas may cause burns or frostbite.
Eye contact: Contact with rapidly expanding gas may cause burns or frostbite.

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>LC50 Inhalation Dusts and mists Rat</td>
<td>1900 mg/m³</td>
<td>4 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC50 Inhalation Vapour Rat</td>
<td>1807 ppm</td>
<td>4 hours</td>
<td></td>
</tr>
<tr>
<td>Butane</td>
<td>LC50 Inhalation Dusts and mists Rat</td>
<td>658000 mg/m³</td>
<td>4 hours</td>
<td></td>
</tr>
<tr>
<td>n-Hexane</td>
<td>LC50 Inhalation Vapour Rat</td>
<td>48000 ppm</td>
<td>4 hours</td>
<td></td>
</tr>
<tr>
<td>n-Heptane</td>
<td>LD50 Oral</td>
<td>15840 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC50 Inhalation Vapour Rat</td>
<td>103 g/m³</td>
<td>4 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC50 Inhalation Vapour Rat</td>
<td>48000 ppm</td>
<td>4 hours</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion/Summary: Not available.

Potential chronic health effects

Chronic toxicity

Conclusion/Summary: Not available.

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Hexane</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>10 milligrams</td>
<td>-</td>
</tr>
</tbody>
</table>

Conclusion/Summary: Not available.

Sensitiser

Conclusion/Summary: Not available.

Mutagenicity

Conclusion/Summary: Not available.

Teratogenicity

Conclusion/Summary: Not available.

Reproductive toxicity

Conclusion/Summary: Not available.

<table>
<thead>
<tr>
<th>Product name</th>
<th>Carcinogenic effects</th>
<th>Mutagenic effects</th>
<th>Developmental effects</th>
<th>Fertility effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>-</td>
<td>-</td>
<td>Repr. Cat. 1; R61</td>
<td>-</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Repr. Cat. 3; R62</td>
</tr>
</tbody>
</table>

Chronic effects: No known significant effects or critical hazards.
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.
Fertility effects: No known significant effects or critical hazards.

Over-exposure signs/symptoms

Inhalation: No specific data.
Ingestion: No specific data.
Skin: No specific data.
11. Toxicological information

**Eyes**: No specific data.

**Target organs**: Contains material which may cause damage to the following organs: lungs.

12. Ecological information

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

**Aquatic ecotoxicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Hexane</td>
<td>Acute LC50 113000 µg/l Fresh water</td>
<td>Fish - Oreochromis mossambicus</td>
<td>96 hours</td>
</tr>
<tr>
<td>n-Heptane</td>
<td>Acute LC50 375000 µg/l Fresh water</td>
<td>Fish - Oreochromis mossambicus</td>
<td>96 hours</td>
</tr>
</tbody>
</table>

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP&lt;sub&gt;ow&lt;/sub&gt;</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>1.09</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Acetylene</td>
<td>0.37</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Butane</td>
<td>2.89</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Ethane</td>
<td>1.09</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>4</td>
<td>501.187</td>
<td>high</td>
</tr>
<tr>
<td>Propyne</td>
<td>0.94</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>n-Heptane</td>
<td>4.66</td>
<td>552</td>
<td>high</td>
</tr>
<tr>
<td>Propane</td>
<td>1.09</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Ethylene</td>
<td>1.13</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

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

13. Disposal considerations

**Methods of disposal**: The generation of waste should be avoided or minimised wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

14. Transport information

<table>
<thead>
<tr>
<th>Regulation</th>
<th>UN number</th>
<th>Proper shipping name</th>
<th>Classes</th>
<th>PG*</th>
<th>Label</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADG</td>
<td>UN1971</td>
<td>METHANE, COMPRESSED</td>
<td>2.1</td>
<td>-</td>
<td></td>
<td>Hazchem code</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2SE</td>
</tr>
<tr>
<td>IMDG</td>
<td>UN1971</td>
<td>METHANE, COMPRESSED</td>
<td>2.1</td>
<td>-</td>
<td></td>
<td>Emergency schedules</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(EmS) F-D, S-U</td>
</tr>
</tbody>
</table>

Version : 3  Page: 6/7
14. Transport information

| IATA | UN1971 | Methane, compressed | 2.1 | - |

**Passenger and Cargo Aircraft**
- Quantity limitation: Forbidden
- Packaging instructions: Forbidden
- **Cargo Aircraft Only**
- Quantity limitation: 150 kg
- Packaging instructions: 200

**Limited Quantities - Passenger Aircraft**
- Quantity limitation: Forbidden
- Packaging instructions: Forbidden

**Special provisions**
- A1

**Remarks**
- Requires Shipper's Declaration of Dangerous Goods

PG*: Packing group

15. Regulatory information

**Standard Uniform Schedule of Medicine and Poisons**
Not regulated.

**Control of Scheduled Carcinogenic Substances**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>No listed substance</td>
<td></td>
</tr>
</tbody>
</table>

**Australia inventory (AICS)**
- All components are listed or exempted.

16. Other information

**Date of issue**
- 28/08/2014

**Date of previous issue**
- 26/07/2012.

Indicates information that has changed from previously issued version.

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