



Material Safety Data Sheet

Date 04/11/2020
Issue 4

Radi-CAL™ R2

1. Identification of the substance / mixture and of the company / undertaking

1.1 Product identifier: Radi-CAL™ R2 Brake fluid (CP3600-20) (CP5600-20)

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Hydraulic fluid for use in automotive brake and clutch systems

1.3 Details of the supplier of the MSDS:

Address:	AP Racing Wheler Road Coventry CV3 4LB
Telephone:	+44 (0) 24 76 639595
Fax:	+44 (0) 24 76 639559
Email:	sales@ap racing.co.uk

1.4 Emergency telephone number: **+44 (0) 24 76 639595**
Hours 09.00-17.00 Mon-Fri GMT
Alternatively, if in the UK dial 111 for NHS urgent care.
For contact details of Poisons centres in other countries, see World Health Organisation webpage
www.who.int/gho/phe/chemical_safety/poisons_centres/en/ from which there is a directory of poisons centres of member states.

2. Hazards identification

2.1 Classification of the substance or mixture

Classification according to regulation 1272/2008 (CLP/GHS):..

H361d, Suspected of damaging the unborn child.

2.2 Label Elements

Labelling according to 1272/2008 (CLP/GHS)

Hazard Pictogram/s;



Signal word: "Warning"

Hazard phrases; H361D Suspected of damaging the unborn child.

P101, If medical advice is needed, have product container or label at hand.

P102, Keep out of reach of children.

Prevention

P280, Wear protective gloves/protective clothing/eye protection/face protection.

P202, Do not handle until all safety precautions have been read and understood.

P301+P310, IF SWALLOWED: Immediately call a POISON CENTER/doctor.



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P305+P351+P338, IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P501, Dispose of contents/container to an approved waste disposal plant.

2.3 Other hazards

Product is not classified as flammable or combustible but will burn. Product is not classified as PBT or vPVB according to Annex XIII

3. Composition / information on ingredients

3.1 Substances

Not applicable.

3.2 Mixtures

General description: Blend of polyglycol ethers, glycol ether esters and polyglycols with added corrosion and oxidation inhibitors.

Hazardous Ingredients

Ingredient	Identifiers	% w/w	Classification 1272 / 2008	Note
Tris[2-[2-(2-methoxyethoxy)ethoxy]ethyl] orthoborat	CAS No.: 30989-05-0 EC No.: 250-418-4 REACH No.: 01- 2119462824-33-XXXX	30-90%	Repr. 2, H361d	
Butyl triglycol	CAS No.: 143-22-6 EC No.: 205-592-6 REACH No.: 01- 2119475107-38-XXXX Index No.: 603-183-00-0	1-9.9%	Eye Dam. 1, H318 (SCL: 30.00 %)	
Butyl Polyglycol	CAS No.: 9004-77-7 EC No.: 500-012-0 REACH No.: 01- 2119475115-41-XXXX Index No.:	5-10%	Eye Irrit. 2, H319 (SCL: 20.00 %)	
2-(2-methoxyethoxy)ethanol;	CAS No.: 111-77-3 EC No.: 203-906-6 REACH No.: 01- 2119475100-52-XXXX Index No.: 603-107-00-6	0-2.99%	Repr. 2, H361d	Annex XVII, EU

See full text of H-phrases in section 16. Occupational exposure limits are listed in section 8, if these are available. EU: European occupational exposure limit Annex XVII: The chemical substance is subject to REACH restrictions, REACH annex XVII.

4. First aid Measures

4.1 Description of first aid measures

4.1.1 General Advice - In the case of accident: Contact a doctor or casualty department – take the label or this safety data sheet. Contact a doctor if in doubt about the injured person's condition or if the symptoms persist. Never give an unconscious person water or other drink.



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4.1.2 Inhalation -Remove victim to fresh air –and keep at rest. If recovery is not rapid, seek medical attention.

4.1.3 Skin contact- Remove contaminated clothing. Wash affected skin with soap and water. If irritation persists, seek medical attention. Immediately remove contaminated clothing and shoes. Ensure that skin, which has been exposed to the material, is washed thoroughly with water and soap. Skin cleanser can be used. DO NOT use solvents or thinners.

4.1.4 Eye contact - Remove contact lenses. Flush eyes immediately with plenty of water or isotonic water (20-30°C) for at least 5 minutes and continue until irritation stops. Make sure to flush under upper and lower eyelids. If irritation continues, contact a doctor. Continue flushing during transport.

4.1.5 Ingestion - Provide plenty of water for the person to drink and stay with him/her. Seek medical advice immediately and bring the safety data sheet or label from the product. Do not induce vomiting, unless recommended by the doctor. Have the victim lean forward with head down to avoid inhalation of or choking on vomited material. If medical attention is delayed, give adults 90-120 ml hard liquor such as 40% v/v spirits. Give children proportionately less at a rate of 2ml/kg body weight.

4.2 Most important symptoms and effects both acute and delayed. The most important symptoms and effects are described in sections 2,11.

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

Medical personnel seeking to administer first aid are referred to the services of the Poisons Information Service, who can advise in such instances. There is no specific antidote and treatment of over exposure should be directed at control of symptoms and the patient's clinical condition. Due to the diethylene glycol content this material may have a mechanism of intoxication similar to ethylene glycol and treatment like that for ethylene glycol poisoning may help.

5. Firefighting measures

5.1 Extinguishing Media

Suitable extinguishing media - Alcohol resistant foam, dry powder, carbon dioxide or water (fog or fine spray).

Unsuitable Extinguishing Media - Water jets (although these may be used to cool adjacent containers).

5.2 Special hazards arising from the substance or mixture.

Fire will result in dense smoke. Exposure to combustion products may harm your health. Closed containers, which are exposed to fire, should be cooled with water. Do not allow fire-extinguishing water to enter the sewage system and nearby surface waters.

If the product is exposed to high temperatures, e.g. in the event of fire, dangerous decomposition compounds are produced. These are: **Carbon oxides (CO / CO)**.

5.3 Advice for fire fighters

Wear self-contained breathing apparatus and protective clothing to prevent contact. Upon direct exposure contact The National Poisons Information Service (dial 111, 24 h service) in order to obtain further advice.

6. Accidental release measures

6.1 Personal Precautions, protective equipment and emergency procedures.

Avoid direct contact with spilled substances.

Avoid inhalation of vapours from spilled material.

Prevent unnecessary personnel entering area of spillage. When cleaning up large spills appropriate protective clothing should be worn -see section 8.



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6.2 Environmental Precautions

Prevent from entering drains, ditches or rivers. If this happens inform relevant authorities. Prevent gross contamination of soil.

6.3 Methods and materials for containment and cleaning up.

Limit spillage and collect using granular absorbent or similar materials, and dispose of it in accordance with the regulations on dangerous waste. Use sand, sawdust, earth, vermiculite, diatomaceous earth to contain and collect non-combustible absorbent materials and place in container for disposal, according to local regulations. Wherever possible cleaning should be performed with normal cleaning agents. Avoid use of solvents.

6.4 References to other sections

For personal protection see section 8. For disposal methods see section 13.

7. Handling and storage

7.1 Precautions for safe handling

Avoid any method of handling that generates mists or aerosols.

Do not eat, drink or smoke when handling this product.

See section on 'Exposure controls/personal protection' for information on personal protection.

7.2 Conditions for safe storage including any incompatibilities

Suitable bulk storage vessels are mild/stainless steel tanks fitted with a dry air breathing system or tight head steel drums. Do not store in lined tanks or drums. Brake fluid absorbs water from the atmosphere - always keep containers tightly closed. Avoid contamination with any other substances and with mineral oils which are incompatible.

Storage temperature room temperature 15 to 30°C

7.3 Specific end use

Users are referred to the Specification SAE J1707 "Service Maintenance of Brake Fluids"

8. Exposure controls / Personal protection

8.1 Control Parameters

8.1.1 Occupational exposure limits

2-(2-methoxyethoxy)ethanol;

Long term exposure limit (8 hours): 10 ppm

Long term exposure limit (8 hours): 50,1 mg/m³

Annotations:

Sk = Can be absorbed through the skin and lead to systemic toxicity.

The Control of Substances Hazardous to Health Regulations 2002. SI 2002/2677 The Stationery Office 2002. EH40/2005 Workplace exposure limits (Fourth Edition 2020)



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DNEL

Product/Ingredient name	DNEL	Route of exposure	Duration
Tris[2-[2-(2-methoxyethoxy)ethoxy]ethyl] orthoborate	8.3 mg/kgBW/day	Dermal	Long term - Systemic effects - Workers
Tris[2-[2-(2-methoxyethoxy)ethoxy]ethyl] orthoborate	29.1 mg/m3	Inhalation	Long term - Systemic effects - Workers
Butyl Triglycol	50mg/kgBW/day	Dermal	Long term - Systemic effects - Workers
Butyl Triglycol	195mg/m3	Inhalation	Long term - Systemic effects - Workers
2-(2-methoxyethoxy)ethanol	0.53mg/kg BW/day	Dermal	Long term - Systemic effects - Workers
2-(2-methoxyethoxy)ethanol	50.1mg/m3	Inhalation	Long term - Systemic effects - Workers

PNEC

Product/Ingredient name	PNEC	Route of exposure	Duration of Exposure
Tris[2-[2-(2-methoxyethoxy)ethoxy]ethyl] orthoborate	2.112mg/l	Water	Single
Tris[2-[2-(2-methoxyethoxy)ethoxy]ethyl] orthoborate	100 mg/l	Sewage Treatment Plant	Continuous
Butyl Triglycol	5mg/L	Water	Single
Butyl Triglycol	200mg/L	Sewage Treatment Plant	Continuous
2-(2-methoxyethoxy)ethanol	12mg/L	Water	Single
2-(2-methoxyethoxy)ethanol	10000mg/L	Sewage Treatment Plant	No data available

8.2.1 General

Employ good industrial hygiene practice as part of a control banding approach.

8.2.2 Appropriate engineering controls

Airborne vapour and mist concentrations must be kept at a minimum and below current limit values (see above). Installation of a Local exhaust system if normal air flow in the work room is not sufficient is recommended.

Ensure emergency eyewash and -showers are clearly marked.

8.2.3 Individual protection measures / personal protective equipment.

Respiratory Protection –Not needed under normal conditions. Self contained breathing apparatus or Organic vapour respirators (A-P2) may be used where product is being heated or atomised and engineering control measures are not practical.

Hand Protection -Wear chemically resistant impervious gloves (EN 374) to avoid prolonged or repeated contact. Butyl rubber, Natural rubber, Nitrile rubber and PVC are suitable materials. Because of great variety of types of gloves see manufacturer's figures for breakthrough times. In the case of prolonged contact a glove with a protection class of 6 (breakthrough time of >480 min) is recommended.

Eye Protection -Wear close-fitting goggles (EN 166) or face shield where there is a risk of splashing (acrylic or PVC preferred to polycarbonate which may be attacked by brake fluid). Eye baths should be provided at locations where accidental exposure may occur.

Skin Protection -Where significant exposure is possible wear impervious body covering. It is recommended that showers are provided at locations where accidental exposure may occur.

8.2.4 Environmental Exposure Controls

No special measures required.



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Hand protection

Worksituation	Material	Glove thickness (mm)	Breakthrough time (min.)	Standards	
	Butyl	0.3	> 480	EN374-2, EN374-3, EN388	
	Nitrile	0.2	> 480	EN374-2, EN374-3, EN388	

Eye protection

Worksituation	Recommended	Standards	
	Wear safety glasses with side shields.	EN166	

9. Exposure controls / Personal protection

9.1 Information on basic physical and chemical properties

		Test method
Appearance	Clear liquid - colourless to amber (although some brake fluids may be dyed).	Visual.
Odour	Bland	N/A
Odour threshold	N/A –very low odour	
pH	7.0 to 10.50	SAE J 1703
Melting point	< -50 °.C.	SAE J 1703
Boiling point	> 260 °.C.	SAE J 1703
Flash point	> 120 °.C.	IP 35
Flammability limits in air.	Not established as non-volatile	
Auto ignition temp.	> 280°C.	ASTM D 286
Decomposition Temperature	>300°C	
Evaporation Rate	Negligible	
Density @ 20°C	1.020 – 1.070 g/ml	DIN 51757
Solubility	In water: miscible in any ratio In ethanol: miscible in any ratio	
Partition Coefficient (n-Octanol/Water)	< 1.5 (all main ingredients)	OECD 117
Viscosity @ 20°C	Approx. 5-10 cSt	ASTM D 445
Vapour pressure 20°C	< 1 millibars	Reid
Vapour Density	Not established as non-volatile	
Explosive properties	Testing not relevant or not possible due to nature of the product.	



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Oxidising Properties

Testing not relevant or not possible due to nature of the product.

9.2 Other information

No other relevant data

10. Stability and reactivity

10.1 Reactivity

No hazardous reactions if stored and handled as indicated.

10.2 Chemical Stability

Product is stable under normal conditions.

10.3 Possibility of hazardous reactions.

None special

10.4 Conditions to Avoid

Do not distil to dryness without testing for peroxide formation.

10.5 Incompatible Materials

Strong oxidising agents. For user safety, brake fluid should never be contaminated with any other substance.

10.6 Hazardous Decomposition Products

None known.

11. Toxicological information

11.1 Information on toxicological effects

11.1.1 Acute Toxicity

Based on available data, the classification criteria are not met.

Oral -Based on read across data toxicity is low (LD 50 Rat >5000 mg/kg). Sparse experience indicates toxicity in man could be greater.

Inhalation - Not applicable due to low vapour pressure of product.

Dermal - Based on read across data toxicity is low (LD 50 Rabbit >3000 mg/kg).

General - Although acute toxicity of this product is low, if significant amounts are absorbed there is a risk of renal damage which could lead to kidney failure or even death. Other symptoms of overexposure include Central Nervous System effects, abdominal discomfort, metabolic acidosis and headache or nausea.

Aspiration -No aspiration hazard expected.

Skin corrosion/irritation



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Based on available data, the classification criteria are not met.
However, repeated contact may de-fat the skin and cause dermatitis.

Serious eye

damage/irritation Causes
serious eye irritation.

Respiratory or skin sensitisation

Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Based on available data, the classification criteria are not met.

Carcinogenicity

Based on available data, the classification criteria are not met.

Reproductive toxicity

Suspected of damaging the unborn child.

STOT-repeated exposure

Based on available data, the classification criteria are not met.

Aspiration hazard

Based on available data, the classification criteria are not met.

Long term effects

Reproductive toxicity: This product contains teratogenic substances, which may produce anomalies and/or developmental defects to the human offspring. Adverse effects include: death, growth retardation, congenital disorders, delayed mental development, and functional disorders.

Irritation effects: This product contains substances, which may cause irritation upon exposure to skin, eyes or lungs. Exposure may result in an increased absorption potential of other hazardous substances at the area of exposure.

12. Ecological information

12.1 Toxicity

Product is of low acute ecotoxicity.

Fish	96h	LC50 = > 100 mg/l (Oncorhynchus Mykiss)	
Daphnia	48h	EC50 = Not Determined but expected to be virtually non-toxic.	Algae 72h
		EC50 = Not Determined but expected to be virtually non-toxic.	

12.2 Persistence and Degradability

Product is inherently biodegradable and is expected to be readily biodegradable based on ingredients (OECD 302B).

If admitted into adapted biological water treatment plants no adverse effects of the degrading action of the live sludge are expected

12.3 Bioaccumulative Potential

Not expected to bio accumulate. Log POW for all main ingredients = < 2.0

12.4 Mobility in soil

Soluble in water and will partition to aqueous phase. Volatilisation from water to air not expected. Mobile in soil until degraded.

12.5 Results of PBT and vPvB assessment.

This mixture/product does not contain any substances considered to meet the criteria classifying them as PBT and/or vPvB.

12.6 Other adverse effects. Not relevant



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13. Disposal considerations

13.1 Waste treatment methods

Dispose of in accordance with local and national regulations. In the E.U. used brake fluids are classified as Hazardous Waste. EWC number: 16.01.13.

Controlled incineration or recycling is recommended. Do not dispose of to landfill or drains. It is recommended that contaminated packaging is either incinerated or cleaned and sent for recycling.

14. Transport information

14.1 UN No. / Class	None
14.2 UN Proper shipping name	N/A
14.3 Transport hazard classes	
Land Transport	
ADR	Not classified
RID	Not classified
Sea Transport	
IMO/IMDG	Not classified
Marine Pollutant	No
Air Transport	
IATA/IACO	Not classified
Inland waterways	
ADN	Not classified
14.4 Packing Group	N/A
14.5 Environmental Hazards	Not environmentally hazardous
14.6 Special precautions for user	None relevant
14.7 Transport in bulk (annex II of Marpol)	Not classified.

15 Regulatory Information

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

Pregnant women and women breastfeeding must not be exposed to this product. The risk, and possible technical precautions or design of the workplace needed to eliminate exposure, must be considered.

Council Directive 94/33/EC of 22 June 1994 on the protection of young people at work.

Council Directive 92/85/EEC on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding.

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and



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repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (CLP).
Regulation (EC) 1907/2006 (REACH).

16 Other information

Abbreviations and acronyms used in this data sheet.

Full text of H-phrases as mentioned in section 3

H318, Causes serious eye damage.
H361d, Suspected of damaging the unborn child.
H302, Harmful if swallowed.
H319, Causes serious eye irritation.

Abbreviations and acronyms

ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE = Acute Toxicity Estimate BCF =
Bio concentration Factor CAS =
Chemical Abstracts Service
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008] CSA =
Chemical Safety Assessment
CSR = Chemical Safety Report
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EINECS = European Inventory of Existing Commercial chemical Substances ES =
Exposure Scenario
EUH statement = CLP-specific Hazard statement EWC =
European Waste Catalogue
GHS = Globally Harmonized System of Classification and Labelling of Chemicals IARC =
International Agency for Research on Cancer (IARC)
IATA = International Air Transport Association IBC =
Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" =
marine pollution)
OECD = Organisation for Economic Co-operation and Development PBT =
Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail RRN = REACH
Registration Number
SVHC = Substances of Very High Concern
STOT-RE = Specific Target Organ Toxicity - Repeated Exposure STOT-
SE = Specific Target Organ Toxicity - Single Exposure TWA = Time
weighted average
UN = United Nations
UVCB = Complex hydrocarbon substance VOC
= Volatile Organic Compound
vPvB = Very Persistent and Very Bioaccumulative

Additional information

In accordance with Regulation (EC) No. 1272/2008 (CLP) the evaluation of the classification of the mixture is based on:

The classification of the mixture in regard of health hazards are in accordance with the calculation



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methods given by Regulation (EC) No. 1272/2008 (CLP)

The classification of the mixture is based on test data. This data sheet is available in other European Languages.

Data sheets for other areas of the Globe may be available on request.

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