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Department of Industry,  
Innovation and Science

National Measurement Institute



REFERENCE MATERIAL CATALOGUE

# WADA & PCC funded Reference Materials Catalogue

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	NMI reference	Unit of issue (mg)	Cost (A\$)	
			Domestic (excl GST)	International
<b>STEROIDS AND STEROID METABOLITE</b>				
<b>1-Androstendione</b>				
1-Androstendione (5 $\alpha$ -Androst-1-en-3,17-dione) *	D845	1	207	290
<b>Danazol metabolites</b>				
2 $\alpha$ -Hydroxymethylethisterone †	D920b	1	110	154
<b>Finasteride metabolites</b>				
Carboxy finasteride †	S045	1	110	154
<b>4-Hydroxy steroids</b>				
4-Hydroxy-estr-4-en-3,17-dione †	S043	1 (ampoule)	110	154
<b>17<math>\alpha</math>-Methylclostebol metabolite</b>				
4-Chloro-17 $\alpha$ -methyl-androst-4-ene-3 $\alpha$ , 17 $\beta$ -diol †	S044	1 (ampoule)	110	154
<b>Methyldienolone</b>				
Methyldienolone †	D916b	1 (ampoule)	110	154
<b>7<math>\alpha</math>-Methylnandrolone and metabolites</b>				
7 $\alpha$ -Methylnandrolone *	S048	1 (ampoule)	110	154
7 $\alpha$ -Methyl-5 $\beta$ -estran-3 $\alpha$ -ol-17-one (major metabolite) *	S047	1 (ampoule)	110	154
7 $\alpha$ -Methyl-estr-4-ene-3 $\alpha$ -ol-17-one (minor metabolite) *	S050	1 (ampoule)	110	154
<b>Nandrolone metabolites</b>				
19-Noretiocholanolone sulfate (Na salt) *	D849	1	110	154
Epinandrolone sulfate† TEA salt	D783b	5	110	154
<b>Norbolethone and metabolites</b>				
Norbolethone† (13 $\beta$ ,17 $\alpha$ -Diethyl-gonan-4-ene-17 $\beta$ -ol-3-one)	D825c	1 (ampoule)	110	110
13 $\beta$ ,17 $\alpha$ -Diethyl-5 $\beta$ -gonane-3 $\alpha$ , 17 $\beta$ -diol (major metabolite) †	D818b	1 (ampoule)	110	154
13 $\beta$ ,17 $\alpha$ -Diethyl-5 $\alpha$ -gonane-3 $\alpha$ , 17 $\beta$ -diol (minor metabolite) †	D820b	1 (ampoule)	110	154
<b>Testosterone metabolites (including internal standards)</b>				
5 $\beta$ -Androstane-3 $\alpha$ ,17 $\beta$ -diol-3- $\beta$ -glucuronic acid †	S003b	1	110	154
d4-5 $\alpha$ -Androstan-3 $\alpha$ ,17 $\beta$ -diol-17-O- $\beta$ -glucuronic acid *	S009	1	110	154
d4-5 $\alpha$ -Androstan-3 $\alpha$ ,17 $\beta$ -diol-3-O- $\beta$ -glucuronic acid *	S010	1	110	154
d3-5 $\beta$ -Androstan-3 $\alpha$ ,17 $\beta$ -diol-17-O- $\beta$ -glucuronic acid *	S011	1	110	154
d5-5 $\beta$ -Androstan-3 $\alpha$ ,17 $\beta$ -diol-3-O- $\beta$ -glucuronic acid *	S012	1	110	154
d4-Epitestosterone-17-O- $\beta$ -glucuronic acid *	S023	1	110	154
d5-Etiocholanolone-3-O- $\beta$ -glucuronide sodium salt *	S020	1	110	154
<b>1-Testosterone*</b>				
5 $\alpha$ -Androst-1-ene-3 $\alpha$ -ol-17-one* (Ampouled)	D832	0.2	110	154
<b>Oral Turinabol metabolite</b>				
6 $\beta$ -Hydroxy-oral turinabol †	D615b	1 (ampoule)	110	154

	NMI reference	Unit of issue (mg)	Cost (A\$)	
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<b>Prohormones and metabolites</b>				
3 $\alpha$ ,5-Cyclo-5 $\alpha$ -androstan-6 $\beta$ -ol-17-one †	S039	1 (ampoule)	110	154
16 $\alpha$ -Hydroxyandrosterone *	D843	1 (ampoule)	110	154
6 $\beta$ -Hydroxyetiocholanolone *	D867	1	110	154
4 $\beta$ -Hydroxy DHEA *	D834	1 (ampoule)	110	154
7-Keto DHEA *	D833	10	110	154
7 $\alpha$ -Hydroxy DHEA *	D875	1	110	154
7 $\beta$ -Hydroxy DHEA *	D865	1	110	154
16 $\beta$ -Hydroxy DHEA *	D844	1	110	154
3 $\alpha$ -Hydroxy-4-estren-17-one *	D873	1	110	154
3 $\beta$ -Hydroxy-4-estren-17-one *	D866	1	110	154
<b>Anti-inflammatory metabolites</b>				
$\alpha$ -Hydroxycarprofen†	D1072	5	110	154
<b>REV-ERB agonist SR9009 metabolites</b>				
<i>N</i> -[(4-Chlorophenyl)methyl]-5-nitro-2-thiophenemethanamine hydrochloride†	D1066	1 (ampoule)	110	154
Ethyl <i>N</i> -(5-nitro-2-methylthiophene)-3-aminomethylpyrrolidine-1-carboxylate†	D1067	1 (ampoule)	110	154
<b>Stimulants</b>				
Formoterol fumarate†	D1065	25	110	154
Higenamine hydrochloride†	D1070	25	110	154
<b>STERIODS AND STEROID METABOLITES</b>				
<b>Steroid carbon isotope ratio standard mixture reference material for GCC-IRMS</b>				
Carbon isotope delta value reported for 5 $\alpha$ -androstan-3 $\beta$ -ol acetate ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -32.00 \pm 0.09$ ), 5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one acetate ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -32.58 \pm 0.03$ ), 5 $\beta$ -androstan-3 $\alpha$ -ol-11,17-dione acetate ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -16.50 \pm 0.03$ ), and 5 $\alpha$ -cholestane ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -24.90 \pm 0.05$ ) †	CU-PCC 33-2	Ampoule	110	154
Carbon isotope delta value reported for 5 $\beta$ -androstan-3 $\alpha$ -ol-17-one ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -28.75 \pm 0.01$ ), 5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -26.74 \pm 0.03$ ), 5 $\beta$ -pregnan-3 $\alpha$ , 20 $\alpha$ -diol ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -18.65 \pm 0.03$ ) †	CU-PCC 34-3	Ampoule	110	154
Carbon isotope delta value reported for 5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -27.09 \pm 0.07$ ) †	CU-PCC 40-1	Ampoule	110	154
Carbon isotope delta value reported for 5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one acetate ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -32.82 \pm 0.02$ ) †	CU-PCC 41-1	Ampoule	110	154
Carbon isotope delta value reported for 5 $\alpha$ -cholestane ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -25.03 \pm 0.01$ ) †	CU-PCC 42-1	Ampoule	110	154
Carbon isotope delta value reported for 5 $\alpha$ -androstan-3 $\alpha$ -ol-17-one acetate ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -32.73 \pm 0.06$ ), 5 $\beta$ -androstan-3 $\alpha$ , 17 $\beta$ -diacetate ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -30.19 \pm 0.07$ ), 5 $\alpha$ -cholestane ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -24.83 \pm 0.13$ ), and 5 $\beta$ -pregnan-3 $\alpha$ , 20 $\alpha$ -diacetate ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -21.16 \pm 0.08$ ) †	CU-PCC 44-1	Ampoule	110	154
<b>Steroid Matrix Reference Material</b>				

	NMI reference	Unit of issue (mg)	Cost (A\$)	
			Domestic (excl GST)	International
19-Norandrosterone (221.4 ng/g) in 1,2-dimethoxyethane (1 mL) *	MX003	Ampoule	165	242
Carbon Isotope Delta Value of 19-norandrosterone in Water containing 20% Methanol 1 (mL) * $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰} -29.7 \pm 0.8$	MX016	Ampoule	220	308
Mass fraction of testosterone metabolites in freeze dried human urine: 5 $\alpha$ -androstane-3 $\alpha$ -17 $\beta$ -diol (41.2 $\pm$ 1.8 ng/g), 5 $\beta$ -androstane-3 $\alpha$ -17 $\beta$ -diol (66.0 $\pm$ 2.9 ng/g), androsterone 1652 $\pm$ 29 ng/g), etiocholanolone (1359 $\pm$ 36 ng/g), testosterone (88.1 $\pm$ 4.2 ng/g), epitestosterone (21.9 $\pm$ 1.0 ng/g), T/E mass ratio (4.03 $\pm$ 0.26) *	MX017	Bottle	240	336
Carbon Isotope Delta Value ( $\delta^{13}\text{C}_{\text{VPDB}} / \text{‰}$ ). Three ampoules containing dry steroid mixtures. The ampoules contain approximately 400 $\mu\text{g}$ of each steroid with the exception of 16-androstenol supplied close to 280 $\mu\text{g}$ . <b>Vial 1:</b> etiocholanolone (-27.94 $\pm$ 0.24), androsterone (-27.79 $\pm$ 0.21), 11-oxoetiocholanolone (-13.58 $\pm$ 0.23), testosterone (-27.87 $\pm$ 0.24), 11 $\beta$ -hydroxyetiocholanolone -29.51 $\pm$ 0.36) <b>Vial 2:</b> 5 $\beta$ -androstane-3 $\alpha$ -17 $\beta$ -diol (-29.86 $\pm$ 0.16), 5 $\alpha$ androstane-3 $\alpha$ -17 $\beta$ -diol (-31.14 $\pm$ 0.24), pregnanediol (-16.79 $\pm$ 0.42), epitestosterone (-30.17 $\pm$ 0.36), 11 $\beta$ -hydroxyandrosterone (-28.59 $\pm$ 0.22) <b>Vial 3:</b> 16-androstenol (-30.96 $\pm$ 0.37), dehydroepiandrosterone (-31.63 $\pm$ 0.54), testosterone (-22.52 $\pm$ 0.33) †	MX018	3 Ampoules	240	336

\*Production funded by the World Anti-Doping Agency.

†Production funded by the Partnership for Clean Competition.

## NOTES

### 1. Restrictions on Issue

Production of these materials is funded by the World Anti-Doping Agency. These materials are only available to WADA accredited laboratories, or to laboratories which have entered the WADA accreditation process. Non-WADA-accredited laboratories who wish to purchase these materials must seek approval from WADA and provide evidence of the approval to NMI.

### 2. Classes of Reference Materials available from NMI

#### 2.1 NMI Reference Materials

Reference Materials (RMs) produced by NMI are prepared in accordance with our accreditation from NATA to ISO 17034:2016(E) *General requirements for the competence of reference materials producers*. RMs are supplied with product information sheets and SDS, and have demonstrated homogeneity and stability.

#### 2.2 NMI Certified Reference Materials

Certified Reference Materials (CRMs) produced by NMI have established metrological traceability to the SI unit for mass (kg). All purity values, stated as a mass fraction, are reported with the associated uncertainty in the certificate of analysis.

### 3. Ampouled Materials

For each ampouled reference material the product information sheet / certificate of analysis will state the mass of analyte dispensed into each ampoule. For reference materials with certified reference material status the mass of analyte will be reported with an associated uncertainty.

### 4. GST charges (Australian customers only)

The prices quoted are EXCLUSIVE of Goods and Services Tax (GST). The current GST rate is 10%. Upon delivery of the requested reference materials NMI will issue valid tax invoices and, if required, adjustment notes as per the requirements of the GST legislation.

### 5. Delivery fee

Delivery and handling fees apply for all orders and vary with destination. Please check the applicable rates when ordering.

### 6. For further information

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