



BDG SYNTHESIS

Certificate of Analysis

BDG Synthesis certifies that this reference material meets or exceeds the specifications stated herein.

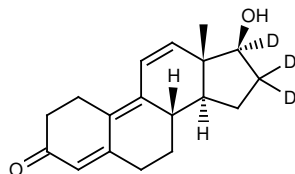
Neil Beare

Neil Beare, PhD, Director
25 July 2017

Name: 17 β -Trenbolone-16,16,17-d₃

CAS Number: 10161-33-8 (unlabelled)

Structure:



Molecular Weight: C₁₈H₁₉D₃O₂ = 273.38

Lot Number: BDG 16950.1

Appearance: Yellow, crystalline solid

Corrected Purity: 98.1 % (HPLC) - 1.1 % (ethanol) = 97.0 %

Isotopic Purity: Under 0.5 % d₀

Re-test Date: 25 July 2022

Storage and Handling: Temperature: Freeze (-20°C) for prolonged storage; may be handled and shipped at ambient temperature.

Humidity: not believed to be hygroscopic; may be handled in normal laboratory atmosphere.

Light: protect from strong sunlight.

Caution: only experienced laboratory personnel should handle the material.

Identity and Purity

Proton NMR Spectrum

Identity: the signals are consistent with the proposed structure and in accord with literature where available.

Isotopic Labelling: signals at the sites of deuteration are greatly diminished, compared with the spectrum of unlabelled material, indicating clean deuteration.

Residual Solvents: a small amount of ethanol (1.1 % w/w) is observed.

Impurities: no significant impurities are evident in the spectrum.

Carbon-13 NMR Spectrum

Identity: the signals are consistent with the proposed structure and in accord with literature where available.

Isotopic Labelling: signals at the sites of deuteration have collapsed to small multiplets compared with the spectrum of unlabelled material, indicating clean deuteration.

High-resolution Mass Spectrum (TOF MS ES+)

Found m/z 274.1884. $C_{18}H_{20}D_3O_2$ $[M+H]^+$ requires m/z 274.1886. The deviation of 0.7 ppm is within normally accepted limits for the establishment of identity by HRMS. No signal for d_0 material was seen (detection limit about 0.5 %).

HPLC

A sharp, symmetrical peak is observed (98.1 %). Note: in the absence of reference materials for preparing calibration curves, it is assumed that all peaks have the same detector response. Where possible, the conditions of analysis follow a pharmacopeial or literature method, or have been adapted from same.

Elemental Analysis

	Found:	C 77.52, H 6.93, D 2.31 %
$C_{18}H_{19}D_3O_2 \cdot 0.3H_2O$	Requires:	C 77.55, H 7.09, D 2.17 %, H_2O 1.94 %
$C_{18}H_{19}D_3O_2$	Requires:	C 79.08, H 7.01, D 2.21 %

The elemental analyses fall slightly outside those expected for anhydrous material; the presence of water is reasonably expected from the method of purification and/or the type of material, and the "best-fit" hydrated molecular formula is given. In the absence of a Karl-Fischer water analysis, we recommend that the "best-fit" water content be used when determining corrected purity.

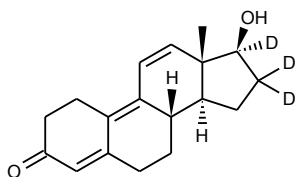
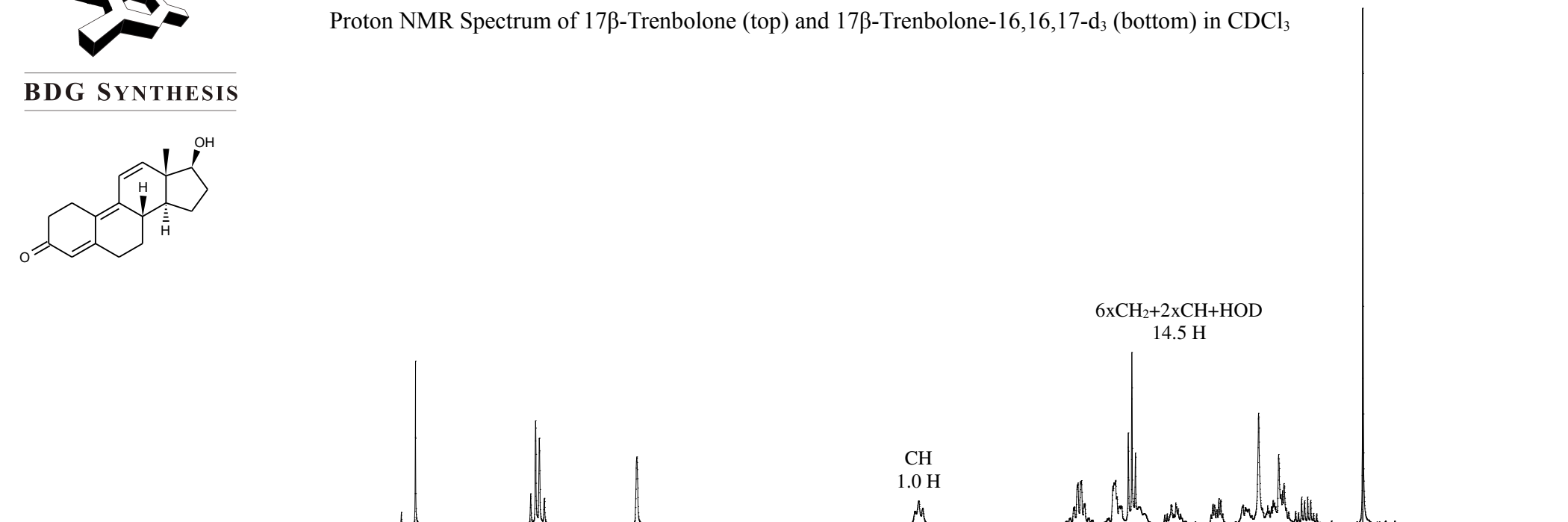
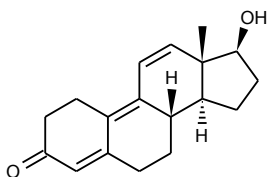
The available quantity of custom-synthesised material is always small, and this limits the extent and type of analytical data which can be obtained. This Certificate is presented in descriptive format for use by analytical chemists who are trained in the use of custom-synthesised materials. Custom materials often contain higher levels of residual solvents and/or water, and we urge you to use the corrected purity where needed rather than the raw HPLC purity. This compound is intended for use as an analytical reference material and it is not for human administration. Structures are shown with relative stereochemistry unless otherwise specified.

The re-test date is assigned from experience gained with the material in the laboratory and/or on storage. It is not possible to perform formal storage studies because of the small amount of material available.

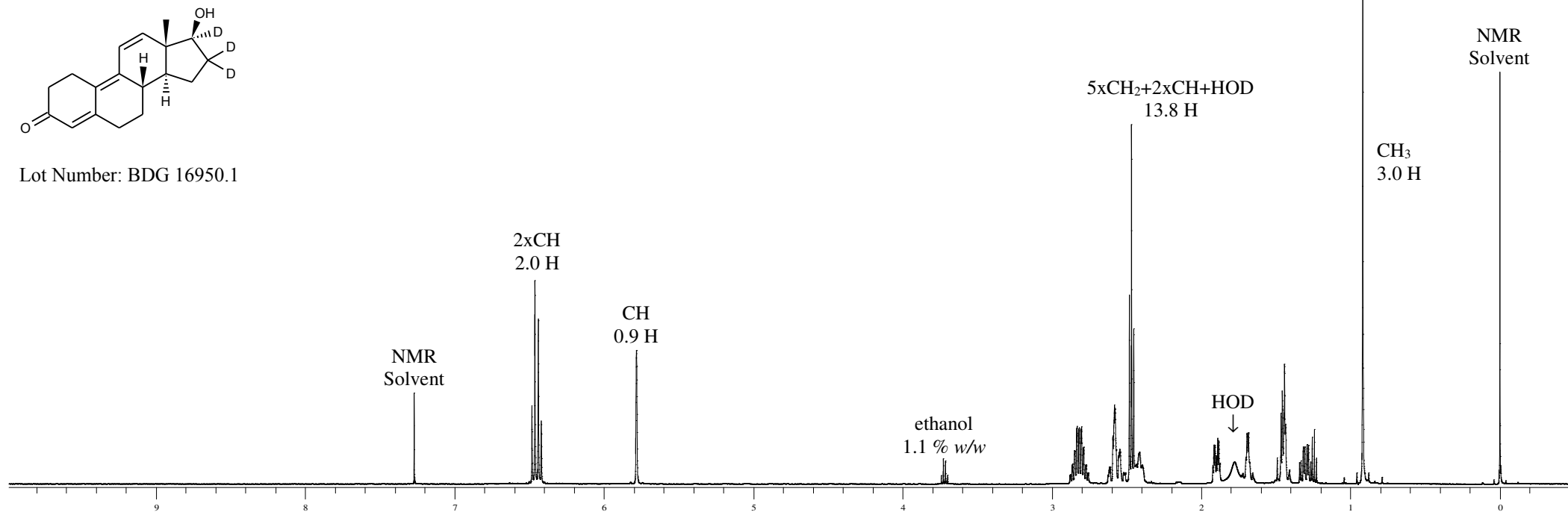


BDG SYNTHESIS

Proton NMR Spectrum of 17 β -Trenbolone (top) and 17 β -Trenbolone-16,16,17-d₃ (bottom) in CDCl₃



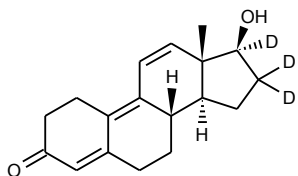
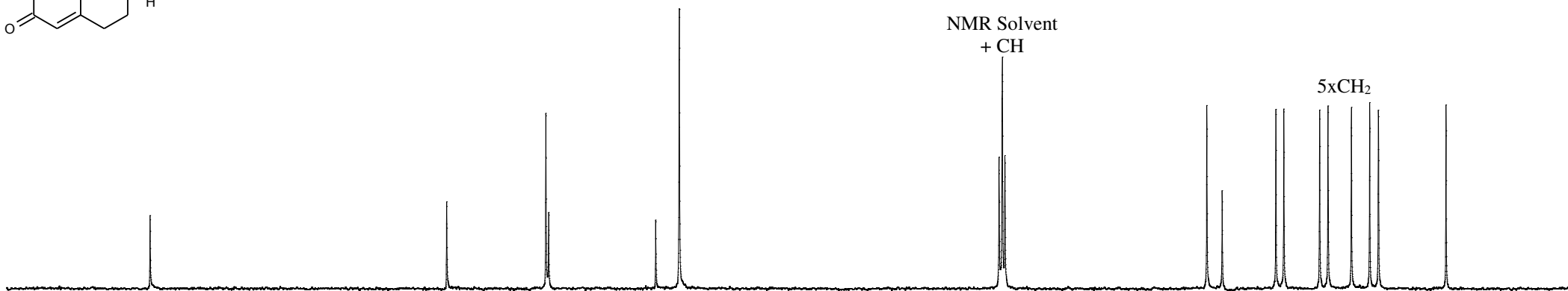
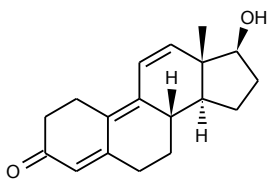
Lot Number: BDG 16950.1



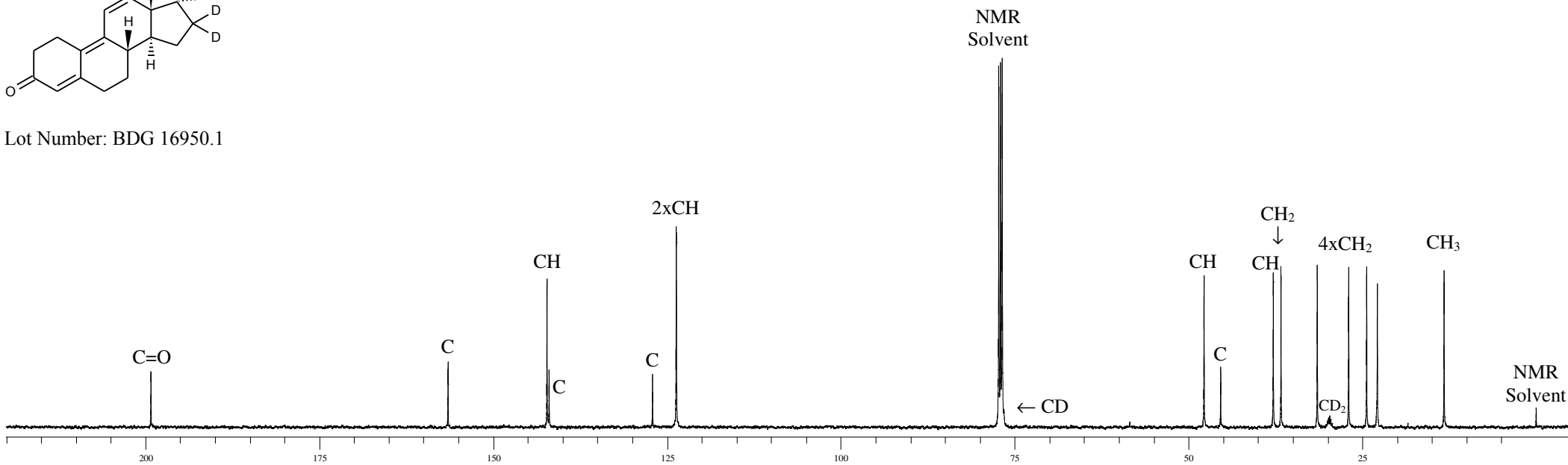


Carbon-13 NMR Spectrum of 17β -Trenbolone (top) and 17β -Trenbolone-16,16,17- d_3 (bottom) in $CDCl_3$

BDG SYNTHESIS



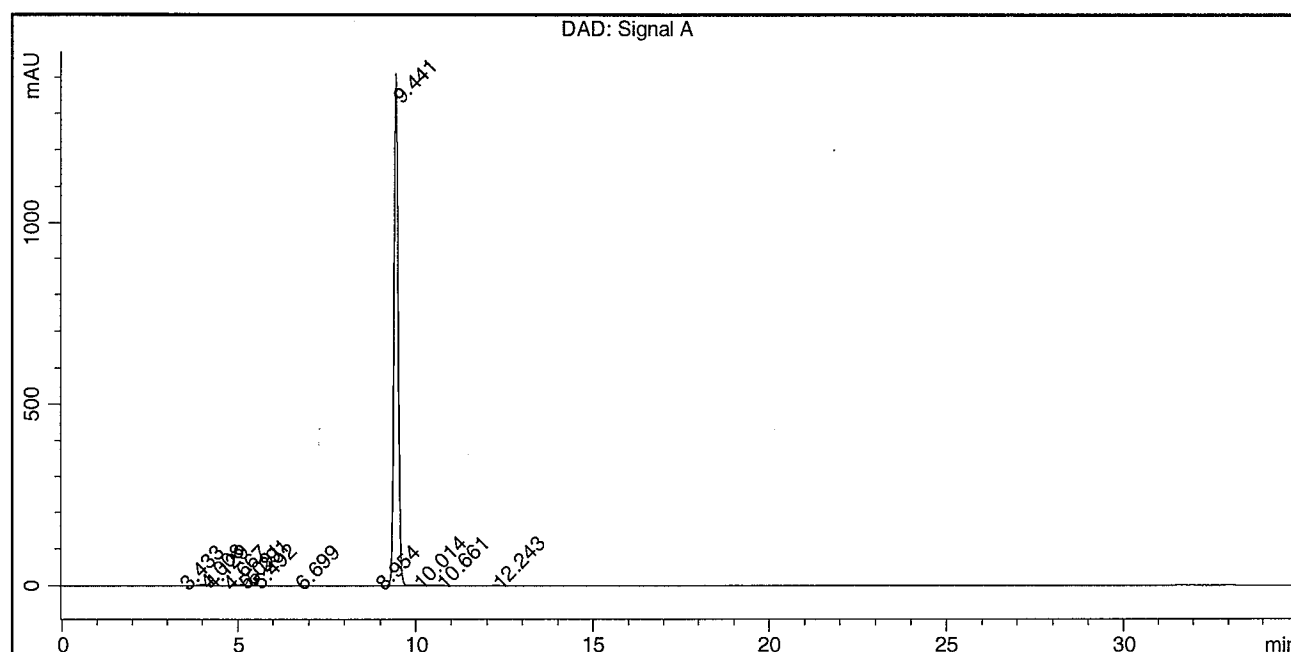
Lot Number: BDG 16950.1



BDG - Analysis of 17beta-Trenbolone,16,16,17-d3

Column : Phenomenex Luna C18(2) 5um 250 x 4.6 mm
 Guard : Phenomenex Security Guard C18 RP 4 x 3 mm
 Mobile Phase A : 60:40 Water : Acetonitrile Mobile Phase B : 20:80 Water : Acetonitrile
 Gradient (A:B) : T0=100:0, T25=0:100, T30=0:100, T32=100:0, T35=100:0
 Flow Rate : 1.0 mL/min Sample Solvent : 1:1 Water : Acetonitrile
 Column Temperature : 20 C Injection Volume : 10 uL Detection : UV at 341 nm

Sample Name	BDG 16950.1	Instrument	AnalyticalLC01
Acquisition	25/07/2017, 13:53:52	Method (rev.)	LC10324b (10)
Sequence	BDG_25Jul2017a - Reprocessed	Vial Position	1
Operator	solvation010\cerityadmin	Injection	2 of 2



Area Percent Report

Peak#	RT	Peak Height	Peak Area	Width	Area %
1	3.43 min	0.3087	3.0820	0.1385 min	0.026 %
2	4.01 min	3.8811	40.0270	0.1423 min	0.342 %
3	4.13 min	1.6026	8.3441	0.0787 min	0.071 %
4	4.67 min	0.3356	2.1344	0.0962 min	0.018 %
5	5.09 min	2.2157	11.4397	0.0842 min	0.098 %
6	5.29 min	15.6112	109.2477	0.1076 min	0.933 %
7	5.49 min	2.3689	13.5530	0.0907 min	0.116 %
8	6.70 min	0.4046	4.2183	0.1356 min	0.036 %
9	8.95 min	0.3381	2.6092	0.1180 min	0.022 %
10	9.44 min	1409.9940	11485.1015	0.1250 min	98.112 %
11	10.01 min	0.3361	6.5562	0.2376 min	0.056 %
12	10.66 min	0.6316	8.0947	0.1915 min	0.069 %
13	12.24 min	1.3092	11.6716	0.1380 min	0.100 %