



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2018 – 07:30 pm GMT

PDB ID : 4L1W  
Title : Crystal Structure of Human 3-alpha Hydroxysteroid Dehydrogenase Type 3 in Complex with NADP<sup>+</sup> and Progesterone  
Authors : Zhang, B.; Hu, X.-J.; Lin, S.-X.  
Deposited on : 2013-06-03  
Resolution : 2.20 Å (reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.7.3 (157068), CSD as539be (2018)  
Xtriage (Phenix) : 1.13  
EDS : trunk30967  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Refmac : 5.8.0158  
CCP4 : 7.0 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk30967

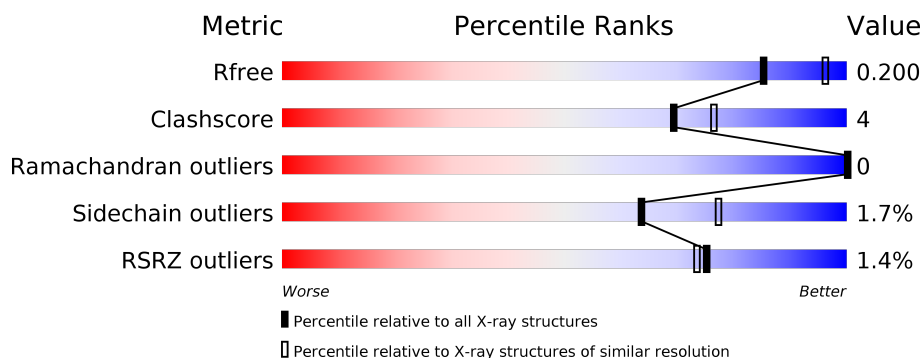
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	111664	4343 (2.20-2.20)
Clashscore	122126	5027 (2.20-2.20)
Ramachandran outliers	120053	4952 (2.20-2.20)
Sidechain outliers	120020	4953 (2.20-2.20)
RSRZ outliers	108989	4245 (2.20-2.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	325	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%;"></div> <div style="position: absolute; bottom: -10px; left: 0; width: 100%;"></div> <div style="position: absolute; top: 0; left: 0; width: 100%; height: 100%; background: linear-gradient(to right, red 0%, red 1%, orange 1%, orange 91%, yellow 91%, yellow 99%, green 99%, green 100%);"></div> <div style="position: absolute; top: 0; left: 0; width: 100%; height: 100%; background: linear-gradient(to right, red 0%, red 1%, orange 1%, orange 91%, yellow 91%, yellow 99%, green 99%, green 100%);"></div> </div> <div style="display: flex; justify-content: space-between; padding: 0 5px;"> <span>0%</span> <span>91%</span> <span>8% •</span> </div> </div>
1	B	325	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%;"></div> <div style="position: absolute; bottom: -10px; left: 0; width: 100%;"></div> <div style="position: absolute; top: 0; left: 0; width: 100%; height: 100%; background: linear-gradient(to right, red 0%, red 2%, orange 2%, orange 91%, yellow 91%, yellow 99%, green 99%, green 100%);"></div> <div style="position: absolute; top: 0; left: 0; width: 100%; height: 100%; background: linear-gradient(to right, red 0%, red 2%, orange 2%, orange 91%, yellow 91%, yellow 99%, green 99%, green 100%);"></div> </div> <div style="display: flex; justify-content: space-between; padding: 0 5px;"> <span>2%</span> <span>91%</span> <span>7% •</span> </div> </div>

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 5741 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

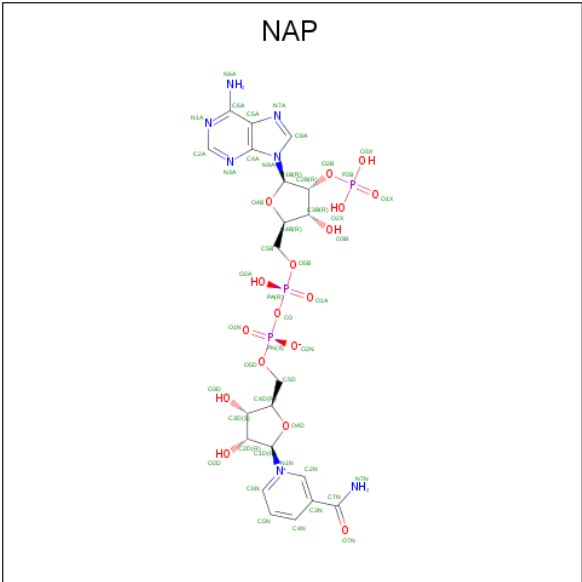
- Molecule 1 is a protein called Aldo-keto reductase family 1 member C2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	325	Total	C	N	O	S	0	1	0
			2613	1671	451	480	11			
1	B	325	Total	C	N	O	S	0	1	0
			2607	1670	447	479	11			

There are 6 discrepancies between the modelled and reference sequences:

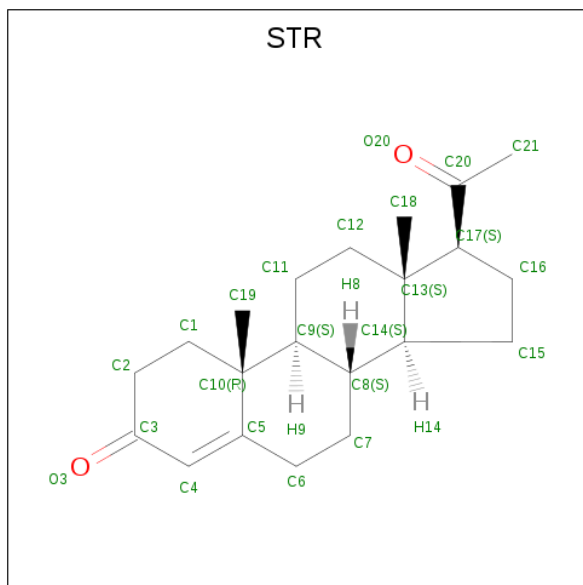
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	SER	-	EXPRESSION TAG	UNP P52895
A	0	VAL	-	EXPRESSION TAG	UNP P52895
A	1	ASP	-	EXPRESSION TAG	UNP P52895
B	-1	SER	-	EXPRESSION TAG	UNP P52895
B	0	VAL	-	EXPRESSION TAG	UNP P52895
B	1	ASP	-	EXPRESSION TAG	UNP P52895

- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: C<sub>21</sub>H<sub>28</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	B	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 3 is PROGESTERONE (three-letter code: STR) (formula:  $C_{21}H_{30}O_2$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			23	21	2		
3	B	1	Total	C	O	0	0
			23	21	2		

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula:  $O_4S$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	B	1	Total	O	S	0	0
			5	4	1		

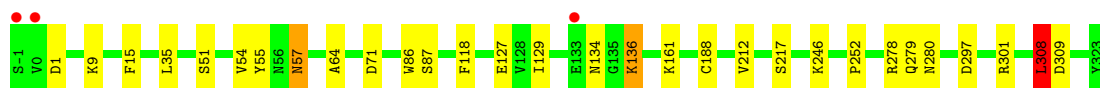
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	194	Total	O	0	0
			194	194		
5	B	175	Total	O	0	0
			175	175		

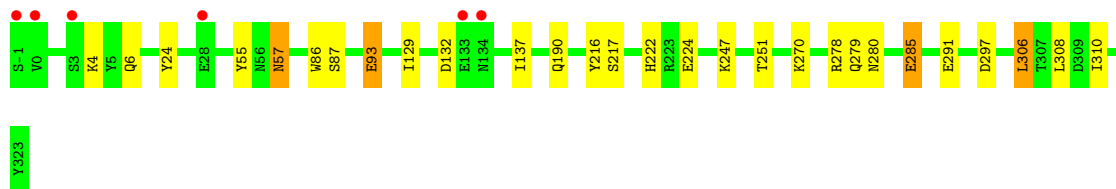
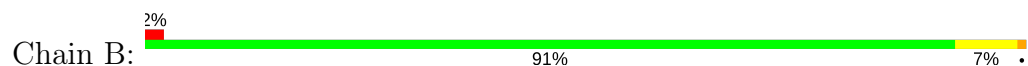
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Aldo-keto reductase family 1 member C2



- Molecule 1: Aldo-keto reductase family 1 member C2



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	52.80Å 86.82Å 76.49Å 90.00° 105.96° 90.00°	Depositor
Resolution (Å)	21.35 – 2.20 21.35 – 2.20	Depositor EDS
% Data completeness (in resolution range)	96.4 (21.35-2.20) 96.5 (21.35-2.20)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	17.02 (at 2.19Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, $R_{free}$	0.146 , 0.194 0.157 , 0.200	Depositor DCC
$R_{free}$ test set	1640 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	10.1	Xtriage
Anisotropy	0.189	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.40 , 44.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	5741	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	11.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.08% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NAP, SO4, STR

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.96	1/2674 (0.0%)	0.92	6/3621 (0.2%)
1	B	0.92	3/2671 (0.1%)	0.90	10/3618 (0.3%)
All	All	0.94	4/5345 (0.1%)	0.91	16/7239 (0.2%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	285	GLU	CG-CD	-6.59	1.42	1.51
1	B	55	TYR	CZ-OH	-5.35	1.28	1.37
1	A	252	PRO	N-CD	5.11	1.55	1.47
1	B	291	GLU	CD-OE2	5.06	1.31	1.25

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	278	ARG	NE-CZ-NH1	10.15	125.38	120.30
1	B	285	GLU	OE1-CD-OE2	10.02	135.32	123.30
1	A	278	ARG	NE-CZ-NH2	-7.54	116.53	120.30
1	A	301	ARG	NE-CZ-NH2	-7.45	116.58	120.30
1	B	306[A]	LEU	CB-CG-CD1	6.48	122.02	111.00
1	B	306[B]	LEU	CB-CG-CD1	6.48	122.02	111.00
1	A	297	ASP	CB-CG-OD1	6.30	123.97	118.30
1	B	297	ASP	CB-CG-OD1	5.96	123.67	118.30
1	B	278	ARG	NE-CZ-NH1	5.69	123.14	120.30
1	A	71	ASP	CB-CG-OD1	5.69	123.42	118.30
1	A	308	LEU	CA-CB-CG	5.66	128.32	115.30
1	B	93	GLU	CA-CB-CG	5.29	125.03	113.40
1	B	297	ASP	CB-CG-OD2	-5.23	113.59	118.30
1	B	251	THR	C-N-CD	5.17	139.25	128.40
1	B	132	ASP	CB-CG-OD1	5.16	122.95	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	93	GLU	CB-CA-C	-5.12	100.15	110.40

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2613	0	2620	18	0
1	B	2607	0	2619	18	0
2	A	48	0	25	5	0
2	B	48	0	25	11	0
3	A	23	0	30	4	0
3	B	23	0	30	6	0
4	A	5	0	0	0	0
4	B	5	0	0	0	0
5	A	194	0	0	3	0
5	B	175	0	0	3	0
All	All	5741	0	5349	43	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (43) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:280:ASN:HD21	2:B:401:NAP:H61A	1.35	0.73
1:B:129:ILE:HD12	3:B:402:STR:H12	1.73	0.71
1:A:309:ASP:OD2	5:A:660:HOH:O	2.10	0.69
2:B:401:NAP:C4N	5:B:572:HOH:O	2.42	0.67
1:A:129:ILE:HD12	3:A:402:STR:H61	1.78	0.66
1:B:190:GLN:OE1	2:B:401:NAP:H2N	2.03	0.58
2:B:401:NAP:C3N	5:B:572:HOH:O	2.51	0.58
1:B:137:ILE:HD11	1:B:310:ILE:HD12	1.88	0.56
2:A:401:NAP:H3D	2:A:401:NAP:H6N	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:401:NAP:H3D	2:B:401:NAP:H6N	1.90	0.54
1:A:308:LEU:HD11	3:A:402:STR:C16	2.39	0.53
1:B:270:LYS:O	2:B:401:NAP:H8A	2.08	0.52
1:B:280:ASN:ND2	2:B:401:NAP:H61A	2.05	0.52
1:A:279:GLN:NE2	2:A:401:NAP:H62A	2.07	0.51
1:A:1:ASP:OD2	5:A:551:HOH:O	2.19	0.51
1:B:222:HIS:HD2	1:B:224:GLU:H	1.58	0.51
1:A:57:ASN:C	1:A:57:ASN:HD22	2.15	0.51
1:B:217:SER:HA	2:B:401:NAP:O1A	2.12	0.49
1:B:129:ILE:HD12	3:B:402:STR:C1	2.42	0.49
1:A:118:PHE:CE1	1:A:308:LEU:HD23	2.49	0.48
1:B:129:ILE:CD1	3:B:402:STR:H12	2.42	0.48
1:A:134:ASN:HB2	1:A:136:LYS:HD3	1.96	0.48
1:A:9:LYS:H	1:B:6:GLN:NE2	2.13	0.47
3:B:402:STR:H111	3:B:402:STR:H182	1.58	0.46
3:A:402:STR:H182	3:A:402:STR:H111	1.55	0.45
2:B:401:NAP:C3D	2:B:401:NAP:H6N	2.47	0.44
2:A:401:NAP:C3D	2:A:401:NAP:H6N	2.46	0.44
1:B:279:GLN:NE2	2:B:401:NAP:H62A	2.15	0.44
1:A:15:PHE:HB2	1:B:4:LYS:HD2	1.99	0.43
1:A:280:ASN:HD21	2:A:401:NAP:H61A	1.65	0.43
1:B:24:TYR:OH	3:B:402:STR:H72	2.19	0.43
1:A:217:SER:HA	2:A:401:NAP:O1A	2.18	0.43
1:B:57:ASN:HD22	1:B:57:ASN:C	2.20	0.43
1:B:86:TRP:CG	1:B:87:SER:N	2.86	0.42
1:A:86:TRP:CG	1:A:87:SER:N	2.88	0.42
1:A:161:LYS:HD3	5:A:609:HOH:O	2.19	0.42
1:B:216:TYR:CE1	1:B:306[B]:LEU:HD12	2.55	0.41
1:A:35:LEU:HD12	1:A:64:ALA:HB2	2.03	0.41
1:A:129:ILE:CD1	3:A:402:STR:H61	2.50	0.41
2:B:401:NAP:H51N	5:B:515:HOH:O	2.19	0.41
1:A:51:SER:HG	1:A:55:TYR:HD2	1.70	0.40
1:B:308:LEU:HD11	3:B:402:STR:H213	2.03	0.40
1:A:188:CYS:HA	1:A:212:VAL:O	2.22	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	324/325 (100%)	316 (98%)	8 (2%)	0	100	100
1	B	324/325 (100%)	315 (97%)	9 (3%)	0	100	100
All	All	648/650 (100%)	631 (97%)	17 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	288/287 (100%)	282 (98%)	6 (2%)	56	70
1	B	288/287 (100%)	284 (99%)	4 (1%)	69	82
All	All	576/574 (100%)	566 (98%)	10 (2%)	63	77

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	54	VAL
1	A	57	ASN
1	A	127	GLU
1	A	136	LYS
1	A	246	LYS
1	A	308	LEU
1	B	57	ASN
1	B	93	GLU

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Mol	Chain	Res	Type
1	B	247	LYS
1	B	285	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	105	ASN
1	A	279	GLN
1	A	280	ASN
1	B	57	ASN
1	B	105	ASN
1	B	222	HIS
1	B	279	GLN
1	B	280	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

6 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAP	A	401	-	44,52,52	2.36	15 (34%)	53,80,80	1.96	16 (30%)
3	STR	A	402	-	26,26,26	1.46	4 (15%)	42,42,42	1.85	8 (19%)
4	SO4	A	403	-	4,4,4	2.06	2 (50%)	6,6,6	0.85	0
2	NAP	B	401	-	44,52,52	2.18	15 (34%)	53,80,80	2.20	19 (35%)
3	STR	B	402	-	26,26,26	1.45	4 (15%)	42,42,42	2.44	16 (38%)
4	SO4	B	403	-	4,4,4	0.42	0	6,6,6	1.13	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAP	A	401	-	-	0/27/67/67	0/5/5/5
3	STR	A	402	-	-	0/4/62/62	0/4/4/4
4	SO4	A	403	-	-	0/0/0/0	0/0/0/0
2	NAP	B	401	-	-	0/27/67/67	0/5/5/5
3	STR	B	402	-	-	0/4/62/62	0/4/4/4
4	SO4	B	403	-	-	0/0/0/0	0/0/0/0

All (40) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	NAP	C8A-N9A	-6.36	1.29	1.36
2	B	401	NAP	C8A-N9A	-5.36	1.30	1.36
2	A	401	NAP	P2B-O2B	-5.15	1.49	1.59
2	B	401	NAP	P2B-O2X	-4.70	1.35	1.54
2	B	401	NAP	C8A-N7A	-4.28	1.26	1.34
2	B	401	NAP	P2B-O2B	-4.27	1.51	1.59
2	A	401	NAP	P2B-O2X	-4.20	1.37	1.54
2	A	401	NAP	P2B-O1X	-4.04	1.37	1.50
2	A	401	NAP	C8A-N7A	-3.97	1.27	1.34
2	B	401	NAP	PN-O2N	-3.72	1.37	1.55
2	A	401	NAP	PA-O2A	-3.67	1.37	1.55
2	A	401	NAP	PA-O1A	-3.59	1.37	1.50
2	A	401	NAP	PN-O2N	-3.56	1.37	1.55
2	A	401	NAP	PN-O1N	-3.32	1.38	1.50
2	B	401	NAP	PN-O1N	-3.27	1.39	1.50
2	B	401	NAP	PA-O2A	-3.26	1.39	1.55
2	A	401	NAP	C5A-N7A	-3.19	1.28	1.39
3	B	402	STR	C10-C9	-3.07	1.50	1.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	401	NAP	P2B-O1X	-3.03	1.40	1.50
2	A	401	NAP	C4N-C3N	-3.03	1.34	1.39
2	B	401	NAP	PA-O1A	-3.02	1.39	1.50
3	A	402	STR	C12-C13	-3.00	1.48	1.54
3	A	402	STR	C1-C10	-2.89	1.48	1.54
2	A	401	NAP	O7N-C7N	-2.82	1.18	1.24
2	A	401	NAP	C4A-N3A	-2.71	1.31	1.35
2	B	401	NAP	P2B-O3X	-2.64	1.44	1.54
3	A	402	STR	C13-C14	-2.64	1.49	1.55
3	A	402	STR	C13-C17	-2.63	1.51	1.56
3	B	402	STR	C1-C10	-2.56	1.49	1.54
3	B	402	STR	C19-C10	-2.56	1.50	1.54
2	B	401	NAP	C5A-N7A	-2.49	1.31	1.39
2	A	401	NAP	P2B-O3X	-2.48	1.44	1.54
4	A	403	SO4	O1-S	-2.42	1.32	1.45
2	A	401	NAP	O4B-C4B	-2.39	1.39	1.45
3	B	402	STR	C10-C5	-2.39	1.48	1.52
4	A	403	SO4	O2-S	-2.30	1.33	1.45
2	B	401	NAP	O4B-C1B	-2.21	1.38	1.41
2	B	401	NAP	O4D-C4D	-2.15	1.40	1.45
2	B	401	NAP	O2D-C2D	-2.15	1.37	1.43
2	B	401	NAP	C5N-C4N	-2.11	1.34	1.38

All (59) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	402	STR	C16-C17-C20	-8.42	102.07	114.26
2	B	401	NAP	N3A-C2A-N1A	-7.74	122.24	128.86
2	A	401	NAP	N3A-C2A-N1A	-6.25	123.51	128.86
2	B	401	NAP	C5N-C4N-C3N	-5.92	113.40	120.35
3	A	402	STR	C11-C12-C13	-5.47	103.31	112.79
2	A	401	NAP	C4A-C5A-N7A	-4.59	104.97	109.41
3	B	402	STR	C18-C13-C12	-4.53	103.24	110.59
3	B	402	STR	C11-C12-C13	-4.48	105.02	112.79
2	A	401	NAP	O7N-C7N-C3N	-4.05	114.55	119.62
3	B	402	STR	C14-C8-C9	-3.38	104.53	109.09
2	B	401	NAP	O7N-C7N-C3N	-3.30	115.49	119.62
2	B	401	NAP	O2X-P2B-O2B	-3.06	92.27	105.99
3	A	402	STR	C12-C13-C14	-3.04	102.53	107.26
3	B	402	STR	C11-C9-C8	-2.90	107.52	111.76
2	A	401	NAP	C5N-C4N-C3N	-2.85	117.00	120.35
3	B	402	STR	O20-C20-C17	-2.68	117.58	121.72

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	401	NAP	O2B-P2B-O1X	-2.62	99.27	109.39
3	A	402	STR	C6-C5-C4	-2.60	116.58	120.87
2	B	401	NAP	C4A-C5A-N7A	-2.59	106.90	109.41
3	B	402	STR	C19-C10-C5	-2.57	104.13	108.35
3	A	402	STR	C16-C17-C13	-2.50	101.92	104.19
3	A	402	STR	C12-C11-C9	-2.42	108.90	113.13
2	A	401	NAP	O5B-PA-O1A	-2.33	99.96	109.07
3	A	402	STR	C15-C14-C13	-2.29	101.00	103.84
3	B	402	STR	C12-C11-C9	-2.29	109.12	113.13
3	A	402	STR	C5-C4-C3	-2.28	120.04	123.66
2	B	401	NAP	C4N-C3N-C7N	-2.23	115.09	121.08
2	B	401	NAP	O2B-P2B-O1X	-2.20	100.89	109.39
3	B	402	STR	C5-C4-C3	-2.17	120.22	123.66
2	B	401	NAP	O5B-C5B-C4B	2.05	116.14	109.00
2	B	401	NAP	O3D-C3D-C4D	2.06	117.02	111.06
2	A	401	NAP	O3X-P2B-O2X	2.14	116.04	107.59
2	B	401	NAP	O2A-PA-O1A	2.15	123.09	112.14
2	B	401	NAP	C4D-O4D-C1D	2.18	112.10	109.83
3	B	402	STR	C21-C20-C17	2.20	120.67	117.53
3	B	402	STR	C18-C13-C14	2.23	115.95	111.72
2	A	401	NAP	O2A-PA-O1A	2.33	123.99	112.14
2	A	401	NAP	C2N-C3N-C4N	2.39	121.02	118.26
2	B	401	NAP	C4B-O4B-C1B	2.40	112.33	109.83
2	A	401	NAP	C2A-N1A-C6A	2.42	122.86	118.75
2	B	401	NAP	O3X-P2B-O1X	2.42	120.05	110.60
2	A	401	NAP	C4B-O4B-C1B	2.43	112.36	109.83
2	A	401	NAP	O5D-C5D-C4D	2.43	117.44	109.00
2	B	401	NAP	C3N-C2N-N1N	2.43	122.85	120.41
2	A	401	NAP	O5B-C5B-C4B	2.44	117.49	109.00
3	B	402	STR	C10-C9-C8	2.58	116.70	112.73
2	B	401	NAP	O2N-PN-O1N	2.66	125.65	112.14
2	A	401	NAP	O3D-C3D-C4D	2.76	119.06	111.06
3	B	402	STR	C19-C10-C9	2.79	115.09	111.67
2	B	401	NAP	C2A-N1A-C6A	2.84	123.58	118.75
2	A	401	NAP	C3N-C2N-N1N	3.15	123.57	120.41
2	B	401	NAP	C5N-C6N-N1N	3.16	125.21	120.39
3	B	402	STR	C11-C9-C10	3.20	117.47	113.10
3	B	402	STR	C15-C14-C13	3.35	107.98	103.84
2	B	401	NAP	O5D-C5D-C4D	3.80	122.20	109.00
2	A	401	NAP	O7N-C7N-N7N	3.85	128.19	122.60
2	B	401	NAP	C2N-C3N-C4N	4.25	123.16	118.26
3	B	402	STR	C12-C13-C17	4.45	120.92	116.15

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Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
3	A	402	STR	C17-C13-C14	5.70	105.90	99.72

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 26 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	401	NAP	5	0
3	A	402	STR	4	0
2	B	401	NAP	11	0
3	B	402	STR	6	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.



## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	325/325 (100%)	-0.59	3 (0%) 84 83	3, 8, 26, 43	0
1	B	325/325 (100%)	-0.45	6 (1%) 68 66	5, 11, 25, 59	0
All	All	650/650 (100%)	-0.52	9 (1%) 75 73	3, 9, 26, 59	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	-1	SER	5.4
1	B	0	VAL	5.2
1	A	-1	SER	2.8
1	B	133	GLU	2.4
1	B	134	ASN	2.3
1	B	3	SER	2.2
1	A	0	VAL	2.2
1	A	133	GLU	2.0
1	B	28	GLU	2.0

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	STR	B	402	23/23	0.68	0.27	28,33,38,40	23
3	STR	A	402	23/23	0.87	0.17	30,38,41,47	0
2	NAP	A	401	48/48	0.94	0.12	6,9,14,16	0
4	SO4	B	403	5/5	0.94	0.18	18,21,27,30	0
2	NAP	B	401	48/48	0.95	0.10	8,10,15,17	0
4	SO4	A	403	5/5	0.99	0.12	11,12,14,15	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.