



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 13, 2023 – 03:47 PM JST

PDB ID : 5XLV  
Title : Mycobacterium tuberculosis Pantothenate kinase mutant F254A  
Authors : Paul, A.; Kumar, P.; Surolia, A.; Vijayan, M.  
Deposited on : 2017-05-11  
Resolution : 1.80 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

---

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

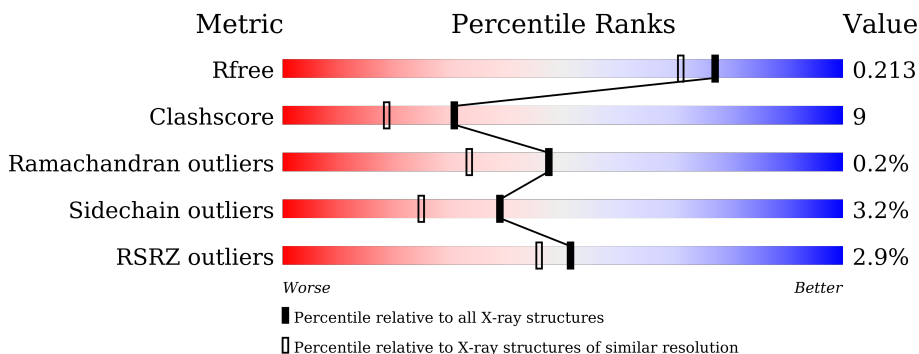
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.80 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))
$R_{free}$	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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 of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. 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	312	 3% 82% 14% . .
1	B	312	 3% 78% 13% . 8%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	EDO	B	406	-	-	X	-
4	EDO	B	413	-	-	X	-
4	EDO	B	420	-	-	-	X

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 5648 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.

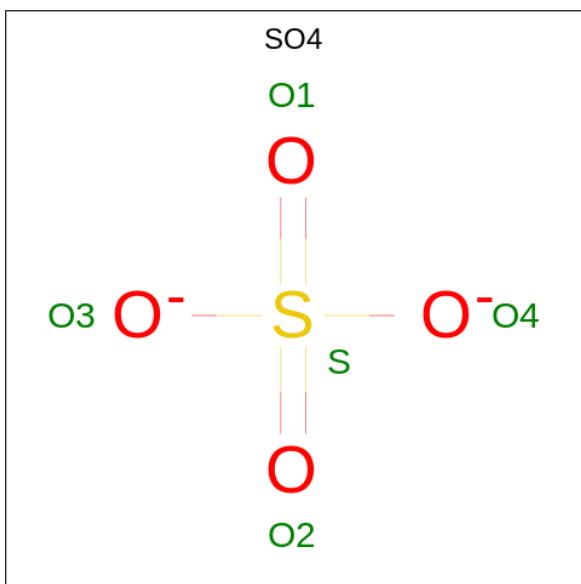
- Molecule 1 is a protein called Pantothenate kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	306	Total 2479	C 1578	N 451	O 443	S 7	0	6	0
1	B	288	Total 2326	C 1482	N 423	O 414	S 7	0	4	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	254	ALA	PHE	engineered mutation	UNP P9WPA7
B	254	ALA	PHE	engineered mutation	UNP P9WPA7

- Molecule 2 is SULFATE ION (three-letter code: SO<sub>4</sub>) (formula: O<sub>4</sub>S).



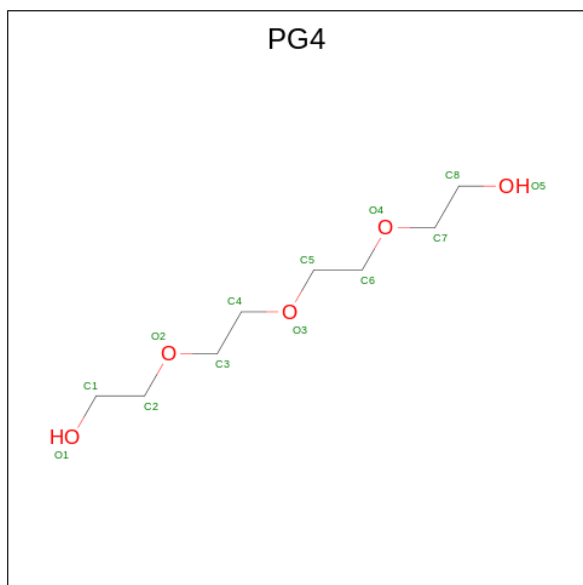
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	S		
2	A	1	Total 5	O 4	S 1	0	0

*Continued on next page...*

Continued from previous page...

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

- Molecule 3 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C<sub>8</sub>H<sub>18</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	8	5		
3	B	1	Total	C	O	0	0
			13	8	5		

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0

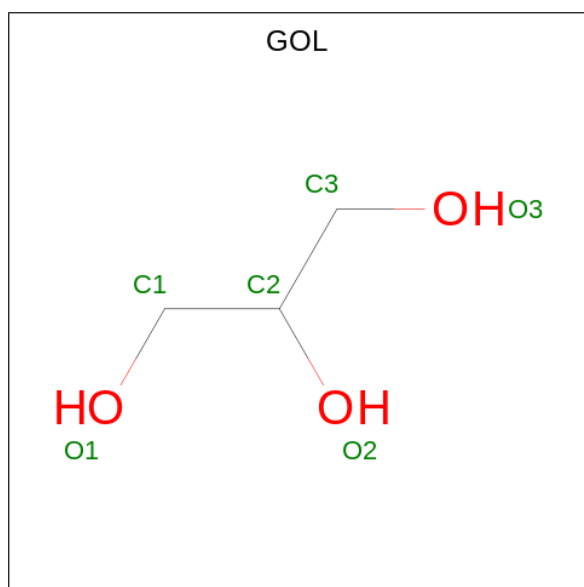
*Continued on next page...*



Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 6 is water.

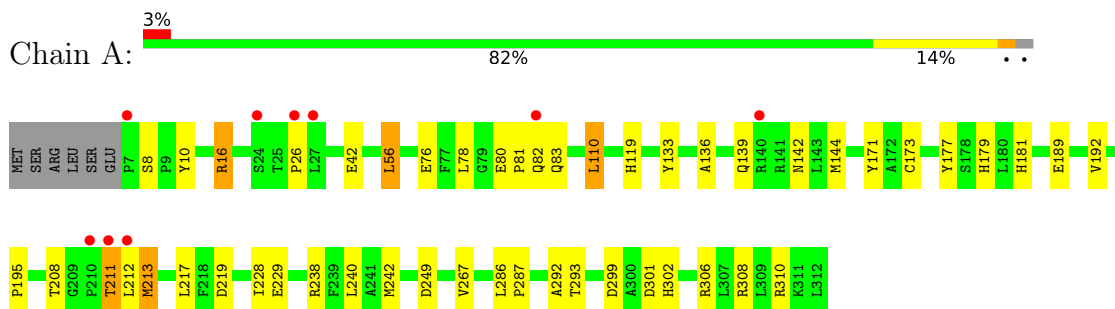
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	331	Total	O	0	0
			331	331		
6	B	296	Total	O	0	0
			296	296		



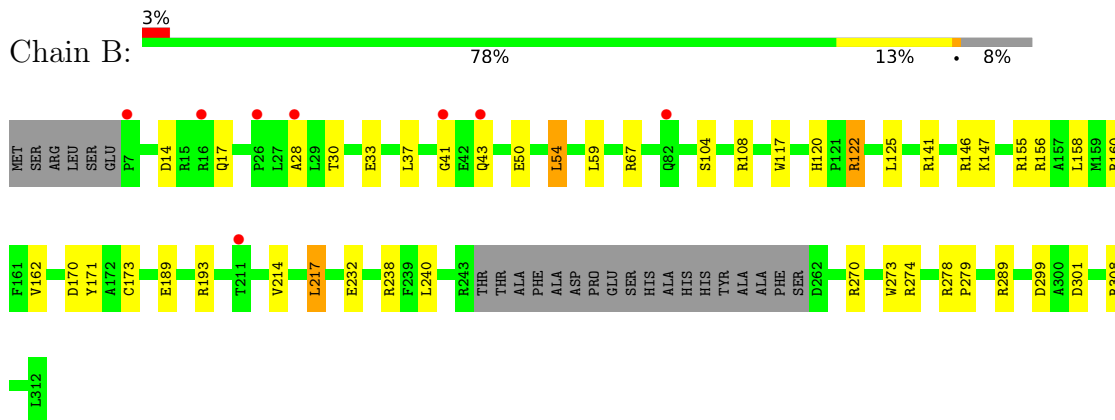
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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: Pantothenate kinase



- Molecule 1: Pantothenate kinase



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	120.82Å 120.82Å 125.48Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	24.58 – 1.80 24.58 – 1.80	Depositor EDS
% Data completeness (in resolution range)	99.8 (24.58-1.80) 99.8 (24.58-1.80)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 1.80Å)	Xtrriage
Refinement program	REFMAC 5.8.0049	Depositor
R, $R_{free}$	0.178 , 0.213 0.178 , 0.213	Depositor DCC
$R_{free}$ test set	4891 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	21.8	Xtrriage
Anisotropy	0.143	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 50.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.023 for -h,-k,l	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	5648	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.40% 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: EDO, SO4, PG4, GOL

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	0/2556	0.99	4/3476 (0.1%)
1	B	0.96	0/2383	1.04	7/3240 (0.2%)
All	All	0.96	0/4939	1.01	11/6716 (0.2%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	146	ARG	NE-CZ-NH2	-7.58	116.51	120.30
1	A	110	LEU	CB-CG-CD1	7.47	123.70	111.00
1	B	155	ARG	NE-CZ-NH1	7.45	124.03	120.30
1	B	146	ARG	NE-CZ-NH1	6.44	123.52	120.30
1	A	56	LEU	CB-CG-CD1	6.02	121.24	111.00
1	B	122	ARG	NE-CZ-NH2	-5.74	117.43	120.30
1	A	219	ASP	CB-CG-OD2	5.64	123.38	118.30
1	B	270	ARG	NE-CZ-NH2	-5.50	117.55	120.30
1	A	16	ARG	NE-CZ-NH2	-5.33	117.64	120.30
1	B	155	ARG	NE-CZ-NH2	-5.31	117.64	120.30
1	B	67	ARG	CB-CG-CD	-5.23	98.01	111.60

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	2479	0	2488	35	0
1	B	2326	0	2348	36	0
2	A	10	0	0	0	0
2	B	10	0	0	0	0
3	A	13	0	18	1	0
3	B	13	0	18	6	0
4	A	76	0	114	14	0
4	B	76	0	114	27	0
5	A	12	0	16	3	0
5	B	6	0	8	0	0
6	A	331	0	0	9	0
6	B	296	0	0	17	0
All	All	5648	0	5124	93	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 9.

All (93) 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)
4:A:421:EDO:H11	6:A:756:HOH:O	1.54	1.06
1:B:141:ARG:HH12	4:B:404:EDO:H21	1.40	0.86
4:B:415:EDO:H12	6:B:672:HOH:O	1.76	0.84
1:B:299:ASP:OD1	1:B:301:ASP:OD1	1.96	0.84
1:B:160:ARG:HH22	4:B:406:EDO:H21	1.43	0.82
4:B:417:EDO:O1	6:B:501:HOH:O	1.95	0.80
5:A:423:GOL:O2	6:A:501:HOH:O	2.04	0.76
1:B:28:ALA:O	1:B:33:GLU:HG3	1.88	0.73
1:A:308:ARG:HH12	4:A:405:EDO:H21	1.56	0.70
4:B:412:EDO:C1	6:B:593:HOH:O	2.38	0.70
4:B:412:EDO:H12	6:B:593:HOH:O	1.92	0.70
3:B:403:PG4:H82	6:B:741:HOH:O	1.92	0.68
1:B:173[B]:CYS:SG	1:B:189:GLU:HB2	2.34	0.67
1:A:16:ARG:HH11	1:A:16:ARG:HG2	1.59	0.67
1:B:274:ARG:NH2	6:B:502:HOH:O	2.28	0.67
1:A:144:MET:HB2	4:A:407:EDO:H21	1.76	0.67
1:A:8:SER:HA	6:A:504:HOH:O	1.94	0.66
1:A:171:TYR:CZ	1:A:173[A]:CYS:SG	2.90	0.65
1:B:278:ARG:HH12	4:B:415:EDO:H11	1.61	0.65
1:A:173[B]:CYS:SG	1:A:189:GLU:HB2	2.37	0.65
4:A:416:EDO:H12	6:A:578:HOH:O	1.99	0.62
1:A:42:GLU:O	5:A:424:GOL:H31	2.00	0.61

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:267:VAL:HG12	4:A:420:EDO:H22	1.82	0.60
1:B:156:ARG:HH12	4:B:406:EDO:H11	1.67	0.59
1:A:16:ARG:HG2	1:A:16:ARG:NH1	2.16	0.59
4:B:412:EDO:H11	6:B:593:HOH:O	2.02	0.58
1:A:238:ARG:O	1:A:242:MET:HG2	2.04	0.58
1:B:41:GLY:C	1:B:43:GLN:H	2.05	0.57
1:A:306:ARG:HH22	4:A:405:EDO:H11	1.69	0.56
1:B:117:TRP:CE2	4:B:405:EDO:H12	2.40	0.56
1:A:177:TYR:CE2	3:A:403:PG4:H81	2.41	0.56
3:B:403:PG4:H81	6:B:747:HOH:O	2.06	0.56
4:B:413:EDO:H12	6:B:762:HOH:O	2.07	0.55
1:A:81:PRO:HB2	1:A:83:GLN:OE1	2.07	0.55
1:B:41:GLY:C	1:B:43:GLN:N	2.61	0.54
1:B:14:ASP:OD1	1:B:17:GLN:HG3	2.08	0.54
1:B:160:ARG:HH22	4:B:406:EDO:C2	2.18	0.53
1:A:211:THR:OG1	1:A:212:LEU:N	2.41	0.53
4:B:418:EDO:C2	6:B:552:HOH:O	2.58	0.52
1:A:293:THR:HA	1:A:310[A]:ARG:HG3	1.92	0.52
3:B:403:PG4:H21	6:B:620:HOH:O	2.10	0.52
1:B:170:ASP:H	4:B:422:EDO:H21	1.75	0.52
4:B:413:EDO:H21	6:B:762:HOH:O	2.10	0.51
1:B:125:LEU:HG	4:B:417:EDO:H21	1.91	0.51
3:B:403:PG4:H32	6:B:620:HOH:O	2.09	0.50
4:A:411:EDO:H21	6:A:533:HOH:O	2.11	0.50
1:B:278:ARG:HH12	4:B:415:EDO:C1	2.25	0.49
1:B:160:ARG:NH2	4:B:406:EDO:H21	2.22	0.49
4:B:413:EDO:C2	6:B:762:HOH:O	2.61	0.49
4:A:414:EDO:H21	6:A:510:HOH:O	2.11	0.49
1:A:267:VAL:HG12	4:A:420:EDO:C2	2.44	0.48
1:A:171:TYR:OH	1:A:173[A]:CYS:SG	2.58	0.48
1:B:173[B]:CYS:SG	1:B:189:GLU:OE1	2.71	0.48
1:A:16:ARG:NH2	4:A:422:EDO:O1	2.46	0.47
1:A:179:HIS:CG	5:A:423:GOL:H2	2.50	0.47
1:B:50:GLU:HA	1:B:54:LEU:HD22	1.97	0.47
1:A:229:GLU:H	1:A:229:GLU:CD	2.17	0.46
1:A:299:ASP:OD1	1:A:301:ASP:OD1	2.32	0.46
1:B:162:VAL:HG12	1:B:217:LEU:HD23	1.97	0.46
4:B:413:EDO:C1	6:B:762:HOH:O	2.62	0.46
1:B:122:ARG:NH2	1:B:193:ARG:O	2.46	0.45
1:A:308:ARG:NH1	4:A:405:EDO:H21	2.27	0.45
1:B:240:LEU:HD22	4:B:411:EDO:H22	1.98	0.45

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:208:THR:HA	1:A:213:MET:SD	2.57	0.45
3:B:403:PG4:H52	6:B:620:HOH:O	2.18	0.44
1:B:30:THR:OG1	1:B:33:GLU:HG2	2.18	0.44
1:B:171:TYR:CE1	1:B:173[A]:CYS:SG	3.10	0.44
1:B:238:ARG:HA	4:B:409:EDO:H11	1.99	0.44
1:A:292:ALA:O	1:A:310[A]:ARG:NH1	2.51	0.44
1:B:156:ARG:NH1	4:B:406:EDO:C1	2.81	0.44
1:A:136:ALA:O	1:A:139:GLN:HB3	2.18	0.43
1:B:117:TRP:HB2	1:B:120:HIS:CE1	2.54	0.43
1:B:232:GLU:HG3	1:B:273:TRP:CD1	2.54	0.43
1:A:133:TYR:CD1	4:A:410:EDO:H21	2.54	0.42
1:A:301:ASP:O	1:A:302:HIS:HB2	2.20	0.42
1:B:156:ARG:NH1	4:B:406:EDO:O1	2.52	0.42
1:A:181:HIS:HE1	1:A:249:ASP:OD2	2.03	0.42
1:A:10:TYR:CE1	1:A:310[A]:ARG:HD3	2.55	0.42
1:B:156:ARG:HH12	4:B:406:EDO:C1	2.31	0.41
1:A:139:GLN:HE22	1:A:144:MET:HG3	1.85	0.41
1:A:181:HIS:HD2	6:A:801:HOH:O	2.04	0.41
1:B:289:ARG:HG2	4:B:416:EDO:H21	2.02	0.41
4:A:421:EDO:H22	6:B:722:HOH:O	2.20	0.41
1:B:158:LEU:HG	1:B:214:VAL:HG21	2.03	0.41
1:A:136:ALA:O	1:A:139:GLN:CB	2.69	0.41
1:A:192:VAL:HG13	1:A:195:PRO:HD3	2.03	0.40
1:A:228[A]:ILE:HG22	6:A:652:HOH:O	2.20	0.40
4:A:409:EDO:H12	6:A:621:HOH:O	2.21	0.40
1:B:104[A]:SER:OG	1:B:108:ARG:CZ	2.69	0.40
1:B:147:LYS:HG2	3:B:403:PG4:H62	2.03	0.40
1:A:286:LEU:N	1:A:287:PRO:CD	2.84	0.40
1:B:278:ARG:HB3	1:B:279:PRO:HD3	2.02	0.40
1:B:308:ARG:HH22	4:B:407:EDO:H21	1.86	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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	310/312 (99%)	302 (97%)	7 (2%)	1 (0%)	41	27
1	B	288/312 (92%)	284 (99%)	4 (1%)	0	100	100
All	All	598/624 (96%)	586 (98%)	11 (2%)	1 (0%)	47	33

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	26	PRO

### 5.3.2 Protein sidechains [i](#)

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	266/269 (99%)	254 (96%)	12 (4%)	27	13
1	B	250/269 (93%)	246 (98%)	4 (2%)	62	54
All	All	516/538 (96%)	500 (97%)	16 (3%)	39	25

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	56	LEU
1	A	76	GLU
1	A	78	LEU
1	A	80	GLU
1	A	82	GLN
1	A	110	LEU
1	A	119	HIS
1	A	142	ASN
1	A	211	THR
1	A	213	MET
1	A	217	LEU
1	A	240	LEU

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	37	LEU
1	B	54	LEU
1	B	59	LEU
1	B	217	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	181	HIS
1	B	82	GLN
1	B	190	GLN

### 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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

47 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	$\# Z  > 2$
4	EDO	A	404	-	3,3,3	0.35	0	2,2,2	1.31	0
4	EDO	B	405	-	3,3,3	0.27	0	2,2,2	0.77	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	EDO	A	409	-	3,3,3	0.23	0	2,2,2	0.70	0
4	EDO	B	419	-	3,3,3	0.37	0	2,2,2	0.77	0
4	EDO	B	410	-	3,3,3	0.62	0	2,2,2	0.17	0
4	EDO	A	417	-	3,3,3	0.92	0	2,2,2	0.57	0
2	SO4	A	402	-	4,4,4	0.37	0	6,6,6	0.59	0
5	GOL	A	424	-	5,5,5	0.84	0	5,5,5	1.11	0
4	EDO	A	420	-	3,3,3	0.63	0	2,2,2	0.97	0
4	EDO	B	421	-	3,3,3	0.51	0	2,2,2	0.31	0
4	EDO	A	421	-	3,3,3	1.20	0	2,2,2	0.91	0
4	EDO	B	404	-	3,3,3	0.16	0	2,2,2	1.51	0
4	EDO	B	420	-	3,3,3	0.69	0	2,2,2	0.31	0
4	EDO	A	416	-	3,3,3	0.45	0	2,2,2	0.50	0
4	EDO	B	422	-	3,3,3	0.34	0	2,2,2	0.92	0
4	EDO	B	411	-	3,3,3	0.48	0	2,2,2	0.41	0
5	GOL	A	423	-	5,5,5	0.50	0	5,5,5	0.81	0
4	EDO	B	408	-	3,3,3	0.60	0	2,2,2	0.40	0
4	EDO	B	412	-	3,3,3	0.55	0	2,2,2	0.60	0
2	SO4	B	401	-	4,4,4	0.20	0	6,6,6	0.31	0
2	SO4	A	401	-	4,4,4	0.32	0	6,6,6	0.48	0
4	EDO	A	419	-	3,3,3	0.42	0	2,2,2	0.96	0
4	EDO	B	417	-	3,3,3	0.26	0	2,2,2	0.88	0
4	EDO	B	409	-	3,3,3	0.29	0	2,2,2	1.04	0
4	EDO	B	407	-	3,3,3	0.53	0	2,2,2	0.60	0
4	EDO	A	414	-	3,3,3	0.71	0	2,2,2	0.17	0
4	EDO	A	415	-	3,3,3	0.60	0	2,2,2	0.30	0
4	EDO	B	406	-	3,3,3	0.23	0	2,2,2	0.98	0
4	EDO	A	407	-	3,3,3	0.53	0	2,2,2	0.15	0
4	EDO	B	413	-	3,3,3	0.46	0	2,2,2	0.33	0
4	EDO	B	414	-	3,3,3	0.74	0	2,2,2	0.16	0
4	EDO	A	405	-	3,3,3	0.31	0	2,2,2	1.29	0
4	EDO	A	408	-	3,3,3	0.63	0	2,2,2	0.47	0
2	SO4	B	402	-	4,4,4	0.43	0	6,6,6	1.08	1 (16%)
3	PG4	B	403	-	12,12,12	0.70	0	11,11,11	1.68	3 (27%)
4	EDO	A	422	-	3,3,3	0.49	0	2,2,2	1.19	0
3	PG4	A	403	-	12,12,12	0.71	0	11,11,11	0.65	0
4	EDO	B	416	-	3,3,3	0.58	0	2,2,2	0.15	0
4	EDO	A	412	-	3,3,3	0.49	0	2,2,2	0.57	0
4	EDO	A	411	-	3,3,3	0.49	0	2,2,2	0.65	0
5	GOL	B	423	-	5,5,5	0.83	0	5,5,5	0.89	0
4	EDO	A	418	-	3,3,3	0.82	0	2,2,2	0.34	0
4	EDO	A	410	-	3,3,3	0.48	0	2,2,2	0.33	0
4	EDO	A	406	-	3,3,3	0.46	0	2,2,2	0.86	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	EDO	A	413	-	3,3,3	0.46	0	2,2,2	0.50	0
4	EDO	B	415	-	3,3,3	0.39	0	2,2,2	0.66	0
4	EDO	B	418	-	3,3,3	0.84	0	2,2,2	0.19	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
4	EDO	A	404	-	-	1/1/1/1	-
4	EDO	B	405	-	-	0/1/1/1	-
4	EDO	A	409	-	-	1/1/1/1	-
4	EDO	B	419	-	-	0/1/1/1	-
4	EDO	B	410	-	-	0/1/1/1	-
4	EDO	A	417	-	-	1/1/1/1	-
5	GOL	A	424	-	-	3/4/4/4	-
4	EDO	A	420	-	-	1/1/1/1	-
4	EDO	B	421	-	-	1/1/1/1	-
4	EDO	A	421	-	-	1/1/1/1	-
4	EDO	B	404	-	-	0/1/1/1	-
4	EDO	B	420	-	-	1/1/1/1	-
4	EDO	A	416	-	-	1/1/1/1	-
4	EDO	B	422	-	-	1/1/1/1	-
4	EDO	B	411	-	-	1/1/1/1	-
5	GOL	A	423	-	-	2/4/4/4	-
4	EDO	B	408	-	-	1/1/1/1	-
4	EDO	B	412	-	-	0/1/1/1	-
4	EDO	A	419	-	-	1/1/1/1	-
4	EDO	B	417	-	-	1/1/1/1	-
4	EDO	B	409	-	-	1/1/1/1	-
4	EDO	B	407	-	-	0/1/1/1	-
4	EDO	A	414	-	-	0/1/1/1	-
4	EDO	A	415	-	-	1/1/1/1	-
4	EDO	B	406	-	-	1/1/1/1	-
4	EDO	A	407	-	-	1/1/1/1	-
4	EDO	B	413	-	-	0/1/1/1	-
4	EDO	B	414	-	-	1/1/1/1	-
4	EDO	A	405	-	-	1/1/1/1	-
4	EDO	A	408	-	-	1/1/1/1	-
3	PG4	B	403	-	-	5/10/10/10	-
4	EDO	A	422	-	-	1/1/1/1	-

*Continued on next page...*

*Continued from previous page...*

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PG4	A	403	-	-	2/10/10/10	-
4	EDO	B	416	-	-	0/1/1/1	-
4	EDO	A	412	-	-	1/1/1/1	-
4	EDO	A	411	-	-	1/1/1/1	-
5	GOL	B	423	-	-	2/4/4/4	-
4	EDO	A	418	-	-	1/1/1/1	-
4	EDO	A	410	-	-	0/1/1/1	-
4	EDO	A	406	-	-	1/1/1/1	-
4	EDO	A	413	-	-	1/1/1/1	-
4	EDO	B	415	-	-	1/1/1/1	-
4	EDO	B	418	-	-	0/1/1/1	-

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	403	PG4	C5-O3-C4	3.74	129.49	113.29
3	B	403	PG4	O1-C1-C2	-3.03	94.21	111.81
2	B	402	SO4	O4-S-O3	2.18	118.36	109.06
3	B	403	PG4	C3-O2-C2	-2.08	104.29	113.29

There are no chirality outliers.

All (41) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	423	GOL	C1-C2-C3-O3
5	A	423	GOL	O2-C2-C3-O3
5	A	424	GOL	C1-C2-C3-O3
5	B	423	GOL	O1-C1-C2-C3
5	A	424	GOL	O2-C2-C3-O3
3	B	403	PG4	O2-C3-C4-O3
5	A	424	GOL	O1-C1-C2-C3
5	B	423	GOL	O1-C1-C2-O2
4	A	404	EDO	O1-C1-C2-O2
4	A	407	EDO	O1-C1-C2-O2
4	A	408	EDO	O1-C1-C2-O2
4	A	409	EDO	O1-C1-C2-O2
4	A	411	EDO	O1-C1-C2-O2
4	A	412	EDO	O1-C1-C2-O2
4	A	415	EDO	O1-C1-C2-O2
4	A	416	EDO	O1-C1-C2-O2

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
4	A	417	EDO	O1-C1-C2-O2
4	A	418	EDO	O1-C1-C2-O2
4	A	419	EDO	O1-C1-C2-O2
4	A	420	EDO	O1-C1-C2-O2
4	B	409	EDO	O1-C1-C2-O2
4	B	421	EDO	O1-C1-C2-O2
3	A	403	PG4	O3-C5-C6-O4
4	A	413	EDO	O1-C1-C2-O2
4	B	406	EDO	O1-C1-C2-O2
4	B	408	EDO	O1-C1-C2-O2
4	A	406	EDO	O1-C1-C2-O2
4	A	421	EDO	O1-C1-C2-O2
4	B	414	EDO	O1-C1-C2-O2
3	B	403	PG4	C4-C3-O2-C2
3	B	403	PG4	C1-C2-O2-C3
4	B	417	EDO	O1-C1-C2-O2
4	A	422	EDO	O1-C1-C2-O2
4	B	420	EDO	O1-C1-C2-O2
4	B	422	EDO	O1-C1-C2-O2
3	A	403	PG4	C8-C7-O4-C6
4	B	415	EDO	O1-C1-C2-O2
3	B	403	PG4	C3-C4-O3-C5
4	A	405	EDO	O1-C1-C2-O2
4	B	411	EDO	O1-C1-C2-O2
3	B	403	PG4	O3-C5-C6-O4

There are no ring outliers.

27 monomers are involved in 51 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	405	EDO	1	0
4	A	409	EDO	1	0
5	A	424	GOL	1	0
4	A	420	EDO	2	0
4	A	421	EDO	2	0
4	B	404	EDO	1	0
4	A	416	EDO	1	0
4	B	422	EDO	1	0
4	B	411	EDO	1	0
5	A	423	GOL	2	0
4	B	412	EDO	3	0
4	B	417	EDO	2	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	409	EDO	1	0
4	B	407	EDO	1	0
4	A	414	EDO	1	0
4	B	406	EDO	7	0
4	A	407	EDO	1	0
4	B	413	EDO	4	0
4	A	405	EDO	3	0
3	B	403	PG4	6	0
4	A	422	EDO	1	0
3	A	403	PG4	1	0
4	B	416	EDO	1	0
4	A	411	EDO	1	0
4	A	410	EDO	1	0
4	B	415	EDO	3	0
4	B	418	EDO	1	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	306/312 (98%)	-0.42	9 (2%) 51 46	13, 21, 43, 86	0
1	B	288/312 (92%)	-0.48	8 (2%) 53 47	13, 20, 43, 57	1 (0%)
All	All	594/624 (95%)	-0.45	17 (2%) 51 46	13, 21, 43, 86	1 (0%)

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	27	LEU	4.8
1	A	26	PRO	4.4
1	A	211	THR	3.3
1	B	26	PRO	3.2
1	B	28	ALA	3.0
1	A	210	PRO	2.9
1	A	7	PRO	2.8
1	B	211	THR	2.6
1	A	82	GLN	2.6
1	A	140	ARG	2.5
1	A	24	SER	2.4
1	B	41	GLY	2.3
1	B	7	PRO	2.2
1	B	82	GLN	2.2
1	B	16	ARG	2.1
1	A	212	LEU	2.1
1	B	43	GLN	2.1

### 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 monosaccharides 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
4	EDO	A	408	4/4	0.39	0.21	52,54,54,57	0
4	EDO	B	420	4/4	0.39	0.49	60,75,76,77	0
4	EDO	A	418	4/4	0.67	0.29	50,56,59,64	0
4	EDO	A	417	4/4	0.70	0.33	43,54,55,56	0
4	EDO	B	407	4/4	0.72	0.14	53,54,55,59	0
4	EDO	A	421	4/4	0.72	0.19	42,42,42,46	0
4	EDO	A	422	4/4	0.73	0.26	52,54,61,67	0
4	EDO	B	414	4/4	0.76	0.16	47,52,56,56	0
4	EDO	A	414	4/4	0.78	0.20	39,43,51,52	0
4	EDO	B	419	4/4	0.79	0.35	65,66,67,74	0
4	EDO	B	415	4/4	0.79	0.28	49,57,58,59	0
4	EDO	A	420	4/4	0.80	0.32	44,47,49,51	0
4	EDO	B	416	4/4	0.82	0.18	46,47,53,54	0
4	EDO	A	410	4/4	0.83	0.19	43,47,49,60	0
4	EDO	B	411	4/4	0.84	0.32	53,55,55,58	0
4	EDO	B	408	4/4	0.84	0.42	40,42,46,46	0
4	EDO	B	421	4/4	0.84	0.33	53,56,58,60	0
4	EDO	B	422	4/4	0.84	0.29	48,50,52,72	0
4	EDO	A	412	4/4	0.85	0.14	57,61,62,66	0
5	GOL	B	423	6/6	0.85	0.25	36,47,52,54	0
4	EDO	B	418	4/4	0.86	0.20	31,41,49,51	0
4	EDO	B	405	4/4	0.86	0.10	42,45,45,49	0
4	EDO	B	413	4/4	0.88	0.33	47,50,51,53	0
5	GOL	A	424	6/6	0.89	0.25	41,44,47,56	0
4	EDO	B	412	4/4	0.89	0.22	29,38,44,47	0
4	EDO	A	405	4/4	0.90	0.13	51,53,54,58	0
4	EDO	A	413	4/4	0.90	0.12	40,42,45,55	0
4	EDO	A	406	4/4	0.90	0.18	31,34,41,42	0
4	EDO	A	415	4/4	0.90	0.15	52,52,54,54	0
4	EDO	A	411	4/4	0.90	0.19	40,47,49,52	0
4	EDO	B	404	4/4	0.91	0.09	41,42,43,55	0
4	EDO	A	416	4/4	0.92	0.46	51,53,54,56	0

*Continued on next page...*

*Continued from previous page...*

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	EDO	A	419	4/4	0.92	0.17	39,42,45,50	0
4	EDO	A	407	4/4	0.93	0.22	42,42,47,48	0
4	EDO	A	409	4/4	0.94	0.28	29,40,45,51	0
3	PG4	B	403	13/13	0.94	0.18	25,27,33,34	0
5	GOL	A	423	6/6	0.94	0.12	31,50,54,58	0
4	EDO	B	410	4/4	0.94	0.24	34,42,45,47	0
4	EDO	B	406	4/4	0.94	0.12	47,48,50,50	0
4	EDO	A	404	4/4	0.95	0.14	27,37,39,54	0
3	PG4	A	403	13/13	0.95	0.15	24,28,35,36	0
4	EDO	B	409	4/4	0.95	0.34	37,45,49,59	0
4	EDO	B	417	4/4	0.96	0.27	39,39,46,50	0
2	SO4	B	402	5/5	0.98	0.11	37,39,50,52	0
2	SO4	A	402	5/5	0.98	0.15	33,39,44,51	0
2	SO4	A	401	5/5	1.00	0.06	16,16,18,18	0
2	SO4	B	401	5/5	1.00	0.06	14,15,15,16	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.