



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:33 PM UTC

PDB ID : 6P74 / pdb_00006p74
Title : OLD nuclease from Thermus Scotoductus
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Deposited on : 2019-06-04
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

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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

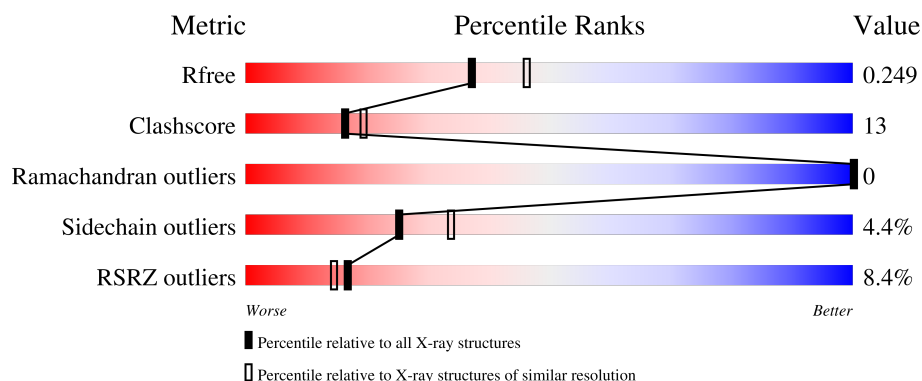
1 Overall quality at a glance

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}	180053	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (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 of the lower bar indicate the fraction of residues that contain outliers for ≥ 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	528	8% 71% 23% • •

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 4287 atoms, of which 51 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 Putative ATP-dependent endonuclease of the OLD family.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	512	Total	C	N	O	S	0	1	0
			4082	2578	732	756	16			

- Molecule 2 is PLATINUM (II) ION (CCD ID: PT) (formula: Pt).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Pt	0	2
			2	2		

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



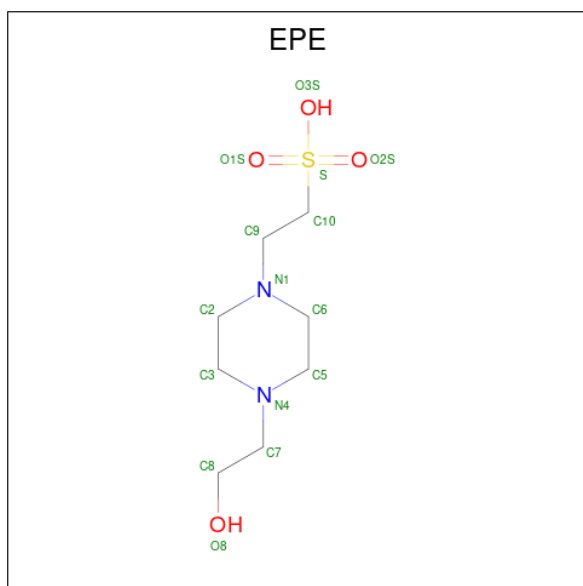
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		

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

- Molecule 4 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (CCD ID: EPE) (formula: $C_8H_{18}N_2O_4S$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	A	1	Total	C	H	N	O	S	0	0
			32	8	17	2	4	1		
4	A	1	Total	C	H	N	O	S	0	0
			32	8	17	2	4	1		
4	A	1	Total	C	H	N	O	S	0	0
			32	8	17	2	4	1		

- Molecule 5 is SAMARIUM (III) ION (CCD ID: SM) (formula: Sm).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total 1	Sm 1	0	0

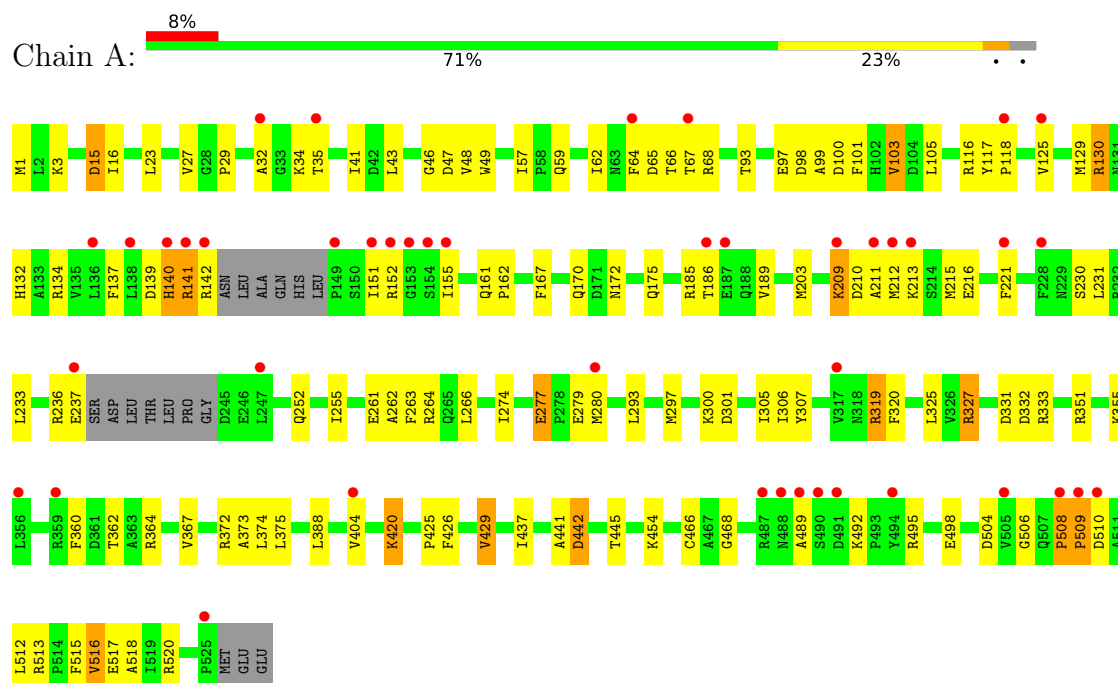
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	66	Total 66	O 66	0	0

3 Residue-property plots

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: Putative ATP-dependent endonuclease of the OLD family



4 Data and refinement statistics

Property	Value	Source
Space group	I 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	83.36Å 101.74Å 202.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	101.38 – 2.20 101.38 – 2.20	Depositor EDS
% Data completeness (in resolution range)	98.8 (101.38-2.20) 98.9 (101.38-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.03 (at 2.12Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.193 , 0.229 0.214 , 0.249	Depositor DCC
R_{free} test set	2069 reflections (2.34%)	wwPDB-VP
Wilson B-factor (Å ²)	64.6	Xtriage
Anisotropy	0.163	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 54.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	4287	wwPDB-VP
Average B, all atoms (Å ²)	91.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.74% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SM, PT, EPE, SO4

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	0.40	0/4158	0.69	14/5616 (0.2%)

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	320	PHE	N-CA-C	-9.23	102.15	113.50
1	A	508	PRO	CA-N-CD	-7.95	100.87	112.00
1	A	509	PRO	CA-N-CD	-7.89	100.96	112.00
1	A	141	ARG	N-CA-C	-6.88	103.78	112.93
1	A	508	PRO	N-CA-CB	6.48	109.37	103.08
1	A	140	HIS	CB-CA-C	5.95	120.41	110.88
1	A	140	HIS	N-CA-C	-5.90	99.19	108.63
1	A	468	GLY	N-CA-C	-5.85	105.40	112.48
1	A	509	PRO	N-CA-CB	5.81	109.35	103.25
1	A	16	ILE	N-CA-CB	5.74	119.48	111.05
1	A	97	GLU	N-CA-C	-5.38	100.92	109.59
1	A	185	ARG	CB-CA-C	5.25	120.08	111.41
1	A	15	ASP	CB-CA-C	5.08	118.47	109.89
1	A	319	ARG	N-CA-C	-5.06	97.66	107.62

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	4082	0	4094	108	0
2	A	2	0	0	0	0
3	A	40	0	0	2	0
4	A	45	51	51	1	0
5	A	1	0	0	0	0
6	A	66	0	0	0	0
All	All	4236	51	4145	108	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 13.

All (108) 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:A:375:LEU:HD22	1:A:404:VAL:HG11	1.47	0.96
1:A:375:LEU:CD2	1:A:404:VAL:HG11	2.02	0.90
1:A:105:LEU:HD23	1:A:125:VAL:HG11	1.55	0.88
1:A:236:ARG:O	1:A:237:GLU:CB	2.22	0.87
1:A:364:ARG:O	1:A:367:VAL:HG23	1.78	0.82
1:A:489:ALA:HA	1:A:492:LYS:HD2	1.64	0.79
1:A:375:LEU:CD2	1:A:404:VAL:CG1	2.60	0.78
1:A:513:ARG:O	1:A:517[B]:GLU:HG3	1.85	0.77
1:A:105:LEU:CD2	1:A:125:VAL:HG11	2.18	0.74
1:A:375:LEU:HD23	1:A:404:VAL:CG1	2.19	0.73
1:A:210:ASP:HA	1:A:211:ALA:C	2.16	0.71
1:A:186:THR:OG1	1:A:189:VAL:HG23	1.91	0.71
1:A:375:LEU:HD22	1:A:404:VAL:CG1	2.20	0.70
1:A:508:PRO:HG3	1:A:516:VAL:HG21	1.74	0.69
1:A:41:ILE:HG21	1:A:274:ILE:HD11	1.74	0.69
1:A:375:LEU:HD23	1:A:404:VAL:HG12	1.76	0.67
1:A:508:PRO:HG3	1:A:516:VAL:CG2	2.25	0.66
1:A:105:LEU:CG	1:A:125:VAL:HG11	2.26	0.66
1:A:46:GLY:O	1:A:130:ARG:NH2	2.29	0.66
1:A:67:THR:HG22	1:A:67:THR:O	1.97	0.64
1:A:29:PRO:HG2	3:A:607:SO4:O2	1.98	0.64
1:A:151:ILE:HD11	1:A:255:ILE:HG21	1.79	0.63
1:A:32:ALA:HB1	1:A:327:ARG:HA	1.80	0.62
1:A:167:PHE:CE2	1:A:170:GLN:HG3	2.34	0.62
1:A:105:LEU:HD23	1:A:125:VAL:CG1	2.29	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:35:THR:N	3:A:603:SO4:O2	2.24	0.62
1:A:262:ALA:O	1:A:266:LEU:HD23	1.99	0.62
1:A:137:PHE:CE1	1:A:139:ASP:HB3	2.37	0.59
1:A:509:PRO:HG2	1:A:512:LEU:HB2	1.84	0.58
1:A:140:HIS:HE1	1:A:277:GLU:HB2	1.67	0.58
1:A:151:ILE:CD1	1:A:255:ILE:HG21	2.33	0.58
1:A:372:ARG:HG3	1:A:425:PRO:HB2	1.84	0.58
1:A:151:ILE:HD11	1:A:255:ILE:CG2	2.34	0.57
1:A:59:GLN:HA	1:A:64:PHE:CE1	2.40	0.57
1:A:161:GLN:N	1:A:162:PRO:HD2	2.19	0.57
1:A:517[A]:GLU:OE1	1:A:520:ARG:HD2	2.05	0.56
1:A:441:ALA:HB1	1:A:445:THR:OG1	2.06	0.55
1:A:151:ILE:CG2	1:A:252:GLN:HG2	2.38	0.54
1:A:151:ILE:CD1	1:A:255:ILE:CG2	2.86	0.54
1:A:442:ASP:OD1	1:A:445:THR:HG23	2.08	0.53
1:A:93:THR:O	1:A:103:VAL:HA	2.08	0.53
1:A:62:ILE:HD13	1:A:68:ARG:NH1	2.23	0.53
1:A:374:LEU:HD11	1:A:429:VAL:HG23	1.91	0.52
1:A:155:ILE:HD11	1:A:263:PHE:HE2	1.75	0.52
1:A:513:ARG:HG2	1:A:517[B]:GLU:CD	2.35	0.51
1:A:509:PRO:HG2	1:A:512:LEU:CB	2.40	0.51
1:A:211:ALA:O	1:A:212:MET:HB3	2.09	0.51
1:A:211:ALA:C	1:A:213:LYS:H	2.18	0.51
1:A:140:HIS:NE2	1:A:280:MET:SD	2.83	0.51
1:A:129:MET:O	1:A:132:HIS:HB3	2.11	0.51
1:A:429:VAL:HG22	1:A:518:ALA:CB	2.41	0.50
1:A:319:ARG:HG3	4:A:612:EPE:H62	1.93	0.50
1:A:420:LYS:HD3	1:A:466:CYS:O	2.11	0.50
1:A:429:VAL:HG22	1:A:518:ALA:HB1	1.92	0.50
1:A:137:PHE:HE1	1:A:139:ASP:HB3	1.76	0.50
1:A:23:LEU:HD12	1:A:305:ILE:HB	1.95	0.49
1:A:139:ASP:O	1:A:141:ARG:N	2.45	0.49
1:A:404:VAL:HG13	1:A:404:VAL:O	2.10	0.49
1:A:274:ILE:HA	1:A:306:ILE:O	2.12	0.49
1:A:293:LEU:C	1:A:293:LEU:HD23	2.38	0.49
1:A:57:ILE:N	1:A:57:ILE:HD12	2.28	0.49
1:A:375:LEU:HA	1:A:404:VAL:CG1	2.43	0.49
1:A:47:ASP:HB3	1:A:134:ARG:HH21	1.77	0.48
1:A:49:TRP:CZ3	1:A:130:ARG:HD3	2.49	0.48
1:A:495:ARG:NH1	1:A:498:GLU:OE2	2.45	0.48
1:A:116:ARG:CZ	1:A:116:ARG:HB3	2.44	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:300:LYS:O	1:A:300:LYS:HG2	2.13	0.48
1:A:351:ARG:O	1:A:355:LYS:HG3	2.13	0.47
1:A:372:ARG:CG	1:A:425:PRO:HB2	2.44	0.47
1:A:67:THR:O	1:A:67:THR:CG2	2.61	0.47
1:A:117:TYR:HB3	1:A:118:PRO:HD2	1.96	0.47
1:A:1:MET:HE3	1:A:3:LYS:HE2	1.96	0.47
1:A:62:ILE:HG21	1:A:68:ARG:HH11	1.79	0.47
1:A:152:ARG:HD3	1:A:231:LEU:O	2.15	0.47
1:A:355:LYS:HD2	1:A:360:PHE:HZ	1.80	0.46
1:A:510:ASP:OD1	1:A:513:ARG:NH1	2.48	0.46
1:A:508:PRO:HB3	1:A:516:VAL:HG11	1.96	0.46
1:A:293:LEU:O	1:A:297:MET:HG3	2.16	0.46
1:A:374:LEU:HD11	1:A:429:VAL:CG2	2.45	0.46
1:A:105:LEU:HG	1:A:125:VAL:HG11	1.98	0.46
1:A:186:THR:OG1	1:A:189:VAL:CG2	2.64	0.45
1:A:489:ALA:HA	1:A:492:LYS:CD	2.42	0.45
1:A:216:GLU:HA	1:A:216:GLU:OE2	2.17	0.45
1:A:277:GLU:O	1:A:279:GLU:N	2.50	0.45
1:A:141:ARG:O	1:A:142:ARG:O	2.36	0.44
1:A:167:PHE:HE2	1:A:170:GLN:HG3	1.78	0.43
1:A:141:ARG:O	1:A:142:ARG:C	2.61	0.43
1:A:27:VAL:HG23	1:A:325:LEU:HD13	2.01	0.43
1:A:66:THR:HB	1:A:101:PHE:HE2	1.82	0.43
1:A:125:VAL:O	1:A:125:VAL:HG13	2.18	0.43
1:A:305:ILE:HG22	1:A:307:TYR:HD2	1.83	0.43
1:A:161:GLN:N	1:A:162:PRO:CD	2.80	0.43
1:A:209:LYS:HE3	1:A:209:LYS:HB2	1.78	0.43
1:A:62:ILE:O	1:A:65:ASP:HB2	2.19	0.42
1:A:100:ASP:OD1	1:A:100:ASP:N	2.51	0.42
1:A:261:GLU:OE1	1:A:264:ARG:NH2	2.52	0.42
1:A:373:ALA:O	1:A:426:PHE:HA	2.19	0.42
1:A:203:MET:N	1:A:203:MET:HE2	2.35	0.42
1:A:504:ASP:C	1:A:506:GLY:N	2.77	0.42
1:A:331:ASP:O	1:A:332:ASP:HB2	2.20	0.41
1:A:98:ASP:HA	1:A:99:ALA:HA	1.53	0.41
1:A:212:MET:HG2	1:A:215:MET:CE	2.50	0.41
1:A:15:ASP:HB3	1:A:333:ARG:NH2	2.35	0.41
1:A:43:LEU:HA	1:A:43:LEU:HD23	1.90	0.41
1:A:495:ARG:HD2	1:A:495:ARG:HA	1.74	0.41
1:A:454:LYS:HA	1:A:454:LYS:HD3	1.80	0.41
1:A:210:ASP:HA	1:A:211:ALA:O	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:388:LEU:CD1	1:A:515:PHE:HD2	2.35	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	507/528 (96%)	485 (96%)	22 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	437/452 (97%)	418 (96%)	19 (4%)	26	35

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	LYS
1	A	48	VAL
1	A	103	VAL
1	A	130	ARG
1	A	172	ASN

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Mol	Chain	Res	Type
1	A	175	GLN
1	A	209	LYS
1	A	221	PHE
1	A	230	SER
1	A	233	LEU
1	A	277	GLU
1	A	301	ASP
1	A	327	ARG
1	A	362	THR
1	A	420	LYS
1	A	429	VAL
1	A	437	ILE
1	A	442	ASP
1	A	516	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	63	ASN
1	A	86	ASN
1	A	121	ASN
1	A	132	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 14 ligands modelled in this entry, 3 are monoatomic - leaving 11 for Mogul analysis.

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	EPE	A	613	-	15,15,15	0.96	1 (6%)	19,20,20	1.72	3 (15%)
3	SO4	A	607	-	4,4,4	0.21	0	6,6,6	0.13	0
4	EPE	A	612	-	15,15,15	1.25	1 (6%)	19,20,20	1.94	6 (31%)
3	SO4	A	605	-	4,4,4	0.24	0	6,6,6	0.08	0
3	SO4	A	610	-	4,4,4	0.24	0	6,6,6	0.16	0
3	SO4	A	603	-	4,4,4	0.22	0	6,6,6	0.09	0
3	SO4	A	604	-	4,4,4	0.24	0	6,6,6	0.09	0
3	SO4	A	606	-	4,4,4	0.22	0	6,6,6	0.12	0
3	SO4	A	609	-	4,4,4	0.25	0	6,6,6	0.09	0
4	EPE	A	611	-	15,15,15	0.78	1 (6%)	19,20,20	1.71	6 (31%)
3	SO4	A	608	-	4,4,4	0.23	0	6,6,6	0.09	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	EPE	A	613	-	-	7/9/19/19	0/1/1/1
4	EPE	A	611	-	-	6/9/19/19	0/1/1/1
4	EPE	A	612	-	-	3/9/19/19	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	612	EPE	C10-S	4.40	1.83	1.77
4	A	613	EPE	C10-S	3.38	1.82	1.77
4	A	611	EPE	C10-S	2.50	1.81	1.77

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	613	EPE	C5-N4-C3	4.82	119.23	108.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	612	EPE	C7-N4-C3	3.89	121.60	111.24
4	A	611	EPE	C6-N1-C2	3.81	117.05	108.84
4	A	612	EPE	C7-N4-C5	3.37	120.21	111.24
4	A	611	EPE	C7-N4-C5	3.03	119.32	111.24
4	A	613	EPE	C7-N4-C5	2.66	118.32	111.24
4	A	612	EPE	O1S-S-C10	2.63	110.70	106.73
4	A	612	EPE	O3S-S-C10	2.62	111.12	106.00
4	A	612	EPE	C5-N4-C3	2.61	114.46	108.84
4	A	611	EPE	C5-N4-C3	2.58	114.41	108.84
4	A	612	EPE	O2S-S-C10	2.49	110.49	106.73
4	A	613	EPE	O3S-S-C10	2.46	110.81	106.00
4	A	611	EPE	O1S-S-C10	2.43	110.41	106.73
4	A	611	EPE	C7-N4-C3	2.43	117.70	111.24
4	A	611	EPE	O2S-S-C10	2.09	109.88	106.73

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	611	EPE	C10-C9-N1-C6
4	A	611	EPE	C8-C7-N4-C5
4	A	613	EPE	S-C10-C9-N1
4	A	613	EPE	C9-C10-S-O1S
4	A	613	EPE	C9-C10-S-O3S
4	A	613	EPE	C8-C7-N4-C5
4	A	611	EPE	C9-C10-S-O3S
4	A	611	EPE	C10-C9-N1-C2
4	A	611	EPE	C9-C10-S-O1S
4	A	611	EPE	C9-C10-S-O2S
4	A	613	EPE	C9-C10-S-O2S
4	A	612	EPE	C10-C9-N1-C2
4	A	612	EPE	C10-C9-N1-C6
4	A	613	EPE	C10-C9-N1-C2
4	A	613	EPE	C10-C9-N1-C6
4	A	612	EPE	C8-C7-N4-C5

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	607	SO4	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	612	EPE	1	0
3	A	603	SO4	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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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, 95th 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 ²)	Q<0.9
1	A	512/528 (96%)	0.65	43 (8%) 17 14	40, 82, 134, 195	1 (0%)

All (43) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	151	ILE	5.8
1	A	509	PRO	5.8
1	A	149	PRO	5.8
1	A	505	VAL	5.0
1	A	508	PRO	4.9
1	A	237	GLU	4.1
1	A	140	HIS	4.0
1	A	359	ARG	3.9
1	A	525	PRO	3.9
1	A	494	TYR	3.7
1	A	138	LEU	3.6
1	A	211	ALA	3.6
1	A	212	MET	3.6
1	A	404	VAL	3.6
1	A	32	ALA	3.6
1	A	142	ARG	3.4
1	A	510	ASP	3.2
1	A	154	SER	3.1
1	A	141	ARG	3.1
1	A	155	ILE	3.0
1	A	213	LYS	3.0
1	A	125	VAL	2.8
1	A	490	SER	2.8
1	A	152	ARG	2.7
1	A	186	THR	2.7
1	A	187	GLU	2.6
1	A	488	ASN	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	153	GLY	2.5
1	A	228	PHE	2.5
1	A	64	PHE	2.4
1	A	247	LEU	2.4
1	A	487	ARG	2.4
1	A	35	THR	2.3
1	A	67	THR	2.3
1	A	136	LEU	2.3
1	A	209	LYS	2.3
1	A	221	PHE	2.2
1	A	118	PRO	2.2
1	A	356	LEU	2.1
1	A	280	MET	2.1
1	A	317	VAL	2.1
1	A	489	ALA	2.0
1	A	491	ASP	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 oligosaccharides 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, 95th 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 ²)	Q<0.9
3	SO4	A	607	5/5	0.64	0.17	195,197,200,201	0
4	EPE	A	612	15/15	0.64	0.25	104,192,227,231	0
3	SO4	A	610	5/5	0.68	0.14	190,192,193,193	0
3	SO4	A	609	5/5	0.72	0.20	196,196,197,198	0
3	SO4	A	606	5/5	0.72	0.16	205,209,211,212	0
3	SO4	A	603	5/5	0.72	0.23	329,331,335,335	0
4	EPE	A	613	15/15	0.72	0.16	158,189,199,205	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EPE	A	611	15/15	0.75	0.30	182,234,257,258	0
3	SO4	A	608	5/5	0.81	0.13	184,185,186,188	0
3	SO4	A	604	5/5	0.83	0.20	193,194,196,196	0
2	PT	A	602[L]	1/1	0.84	0.22	82,82,82,82	1
2	PT	A	601[L]	1/1	0.90	0.13	87,87,87,87	1
3	SO4	A	605	5/5	0.91	0.14	155,156,157,158	5
5	SM	A	614	1/1	1.00	0.03	49,49,49,49	0

6.5 Other polymers [i](#)

There are no such residues in this entry.