



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 04:49 AM UTC

PDB ID : 3ND8 / pdb_00003nd8
Title : Structural characterization for the nucleotide binding ability of subunit A of the A1AO ATP synthase
Authors : Kumar, A.; Gruber, G.
Deposited on : 2010-06-07
Resolution : 2.40 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

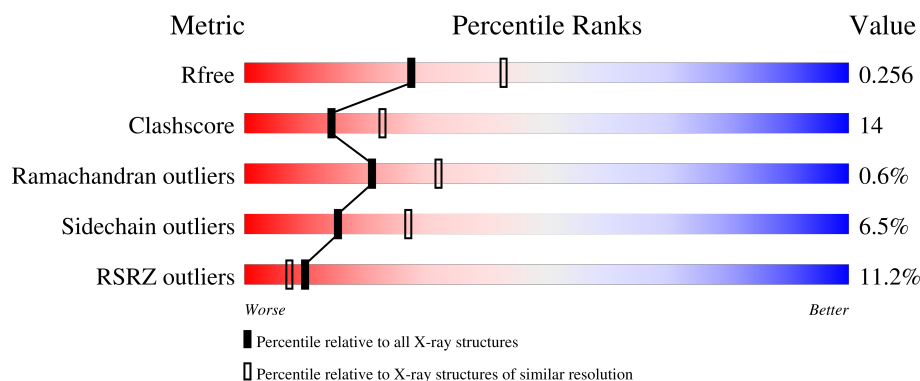
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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	588	10% 64% 20% • 13%

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 4350 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.

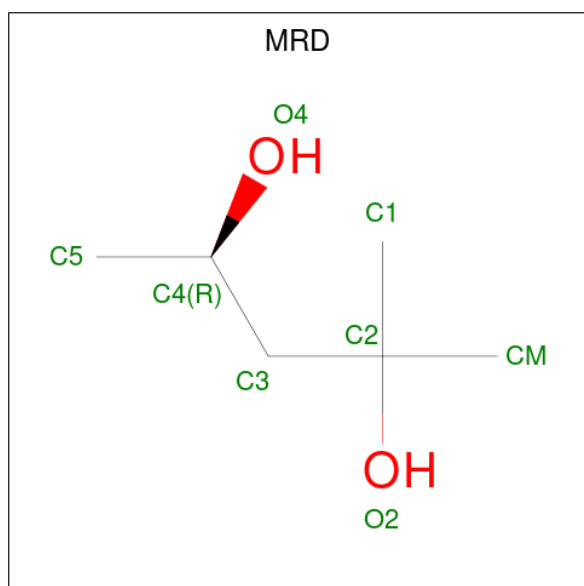
- Molecule 1 is a protein called V-type ATP synthase alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	510	4015	2567	686	746	16	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	79	ARG	GLY	engineered mutation	UNP O57728
A	240	ALA	LYS	engineered mutation	UNP O57728

- Molecule 2 is (4R)-2-METHYLPENTANE-2,4-DIOL (CCD ID: MRD) (formula: C₆H₁₄O₂).



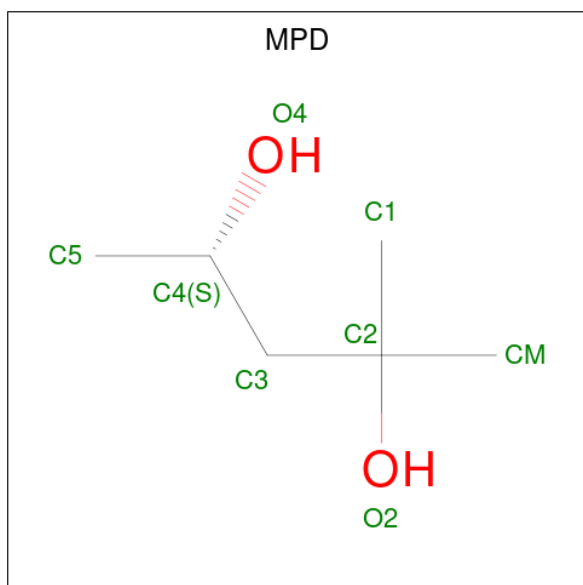
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			8	6	2		
2	A	1	Total	C	O	0	0
			8	6	2		

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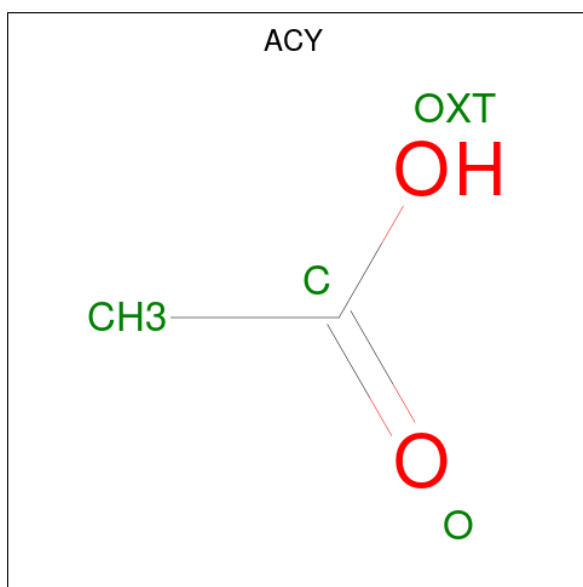
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			8	6	2		
2	A	1	Total	C	O	0	0
			8	6	2		

- Molecule 3 is (4S)-2-METHYL-2,4-PENTANEDIOL (CCD ID: MPD) (formula: C₆H₁₄O₂).



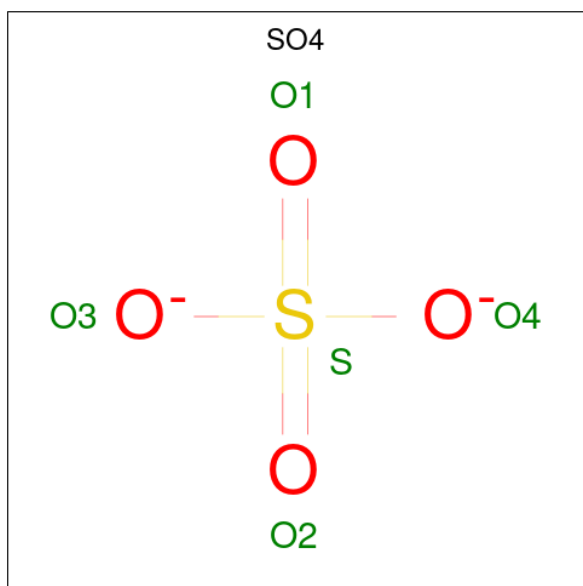
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			8	6	2		
3	A	1	Total	C	O	0	0
			8	6	2		

- Molecule 4 is ACETIC ACID (CCD ID: ACY) (formula: C₂H₄O₂).



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

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

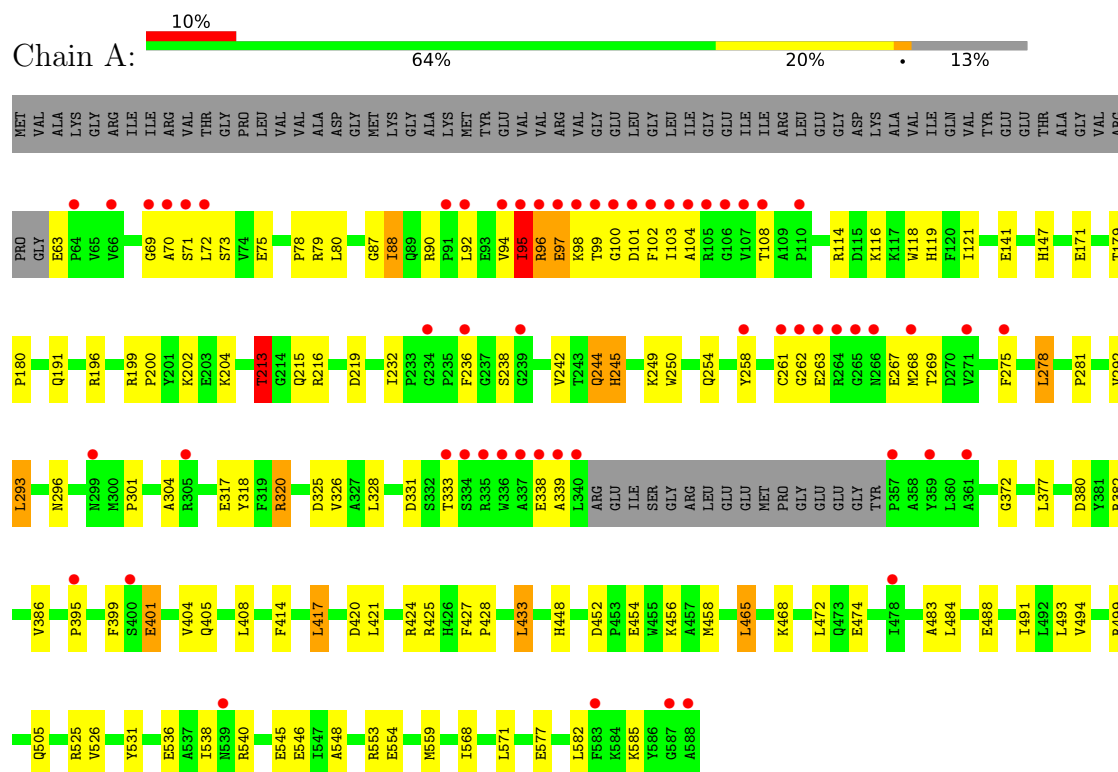
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	278	Total 278	O 278	0	0

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: V-type ATP synthase alpha chain



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	127.81Å 127.81Å 104.10Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	22.08 – 2.40 22.08 – 2.40	Depositor EDS
% Data completeness (in resolution range)	99.5 (22.08-2.40) 99.4 (22.08-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.63 (at 2.41Å)	Xtriage
Refinement program	REFMAC 5.5.0072	Depositor
R, R_{free}	0.216 , 0.259 0.215 , 0.256	Depositor DCC
R_{free} test set	1717 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	48.5	Xtriage
Anisotropy	0.060	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 54.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4350	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.24% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MPD, SO4, ACY, MRD

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	0.75	0/4102	0.96	8/5556 (0.1%)

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	96	ARG	N-CA-C	8.49	123.68	109.76
1	A	96	ARG	N-CA-CB	-6.55	99.71	110.52
1	A	213	THR	N-CA-C	-6.06	106.01	113.41
1	A	108	THR	N-CA-C	5.25	121.97	110.80
1	A	213	THR	N-CA-CB	-5.24	102.82	110.47
1	A	95	ILE	CB-CA-C	-5.23	102.71	111.29
1	A	63	GLU	CA-C-N	5.20	126.54	120.98
1	A	63	GLU	C-N-CA	5.20	126.54	120.98

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	4015	0	4056	112	0
2	A	32	0	56	5	0
3	A	16	0	28	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	4	0	3	0	0
5	A	5	0	0	0	0
6	A	278	0	0	13	0
All	All	4350	0	4143	116	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 14.

All (116) 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:559:MET:HE2	1:A:568:ILE:CG2	1.79	1.12
1:A:458:MET:HE1	1:A:525:ARG:HG2	1.22	1.10
1:A:559:MET:HE2	1:A:568:ILE:HG23	1.05	1.02
1:A:238:SER:HB3	6:A:764:HOH:O	1.59	1.02
1:A:559:MET:CE	1:A:568:ILE:HG23	1.89	1.02
1:A:191:GLN:OE1	1:A:199:ARG:NH2	2.05	0.89
1:A:244:GLN:HE21	1:A:244:GLN:H	1.20	0.88
1:A:79:ARG:HG2	1:A:118:TRP:CZ2	2.08	0.88
1:A:395:PRO:HD2	1:A:401:GLU:HG2	1.55	0.88
1:A:213:THR:HG22	1:A:215:GLN:H	1.37	0.87
1:A:458:MET:CE	1:A:525:ARG:HG2	2.06	0.84
1:A:216:ARG:H	1:A:505:GLN:HE22	1.22	0.83
1:A:90:ARG:NH2	1:A:95:ILE:O	2.13	0.82
1:A:213:THR:HG23	1:A:215:GLN:HG2	1.66	0.78
1:A:79:ARG:HG2	1:A:118:TRP:CH2	2.23	0.74
1:A:454:GLU:HG3	6:A:871:HOH:O	1.88	0.72
1:A:114:ARG:NH1	1:A:171:GLU:OE2	2.23	0.71
1:A:79:ARG:CG	1:A:118:TRP:HZ2	2.02	0.71
1:A:262:GLY:HA2	1:A:333:THR:OG1	1.91	0.71
1:A:244:GLN:HG2	1:A:245:HIS:CD2	2.26	0.71
1:A:458:MET:HE1	1:A:525:ARG:CG	2.11	0.70
1:A:244:GLN:H	1:A:244:GLN:NE2	1.89	0.70
1:A:216:ARG:H	1:A:505:GLN:NE2	1.90	0.70
1:A:79:ARG:HG2	1:A:118:TRP:HZ2	1.57	0.70
1:A:97:GLU:HG2	1:A:98:LYS:N	2.06	0.70
1:A:526:VAL:HG21	1:A:559:MET:HE1	1.72	0.70
1:A:559:MET:HE3	1:A:571:LEU:HD12	1.74	0.69
1:A:448:HIS:HE1	1:A:456:LYS:H	1.41	0.67
1:A:499:ARG:NH2	6:A:622:HOH:O	2.26	0.67
1:A:97:GLU:OE1	6:A:827:HOH:O	2.15	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:95:ILE:HA	1:A:96:ARG:HH11	1.61	0.64
1:A:254:GLN:HE22	1:A:325:ASP:H	1.44	0.64
1:A:99:THR:HG21	1:A:339:ALA:HB1	1.82	0.62
1:A:204:LYS:HD2	1:A:372:GLY:HA3	1.82	0.62
1:A:261:CYS:H	1:A:331:ASP:HB3	1.65	0.62
1:A:317:GLU:O	1:A:320:ARG:HG3	1.99	0.62
1:A:249:LYS:HE2	2:A:589:MRD:O4	2.00	0.61
1:A:141:GLU:OE1	1:A:147:HIS:HD2	1.84	0.60
1:A:468:LYS:HD3	1:A:491:ILE:HD13	1.82	0.60
1:A:536:GLU:O	1:A:540:ARG:HG3	2.01	0.59
1:A:147:HIS:HE1	1:A:318:TYR:OH	1.86	0.59
1:A:420:ASP:OD1	1:A:424:ARG:NH1	2.36	0.58
1:A:87:GLY:HA3	1:A:304:ALA:O	2.03	0.58
1:A:78:PRO:O	1:A:79:ARG:HB2	2.03	0.58
1:A:79:ARG:CG	1:A:118:TRP:CZ2	2.79	0.58
1:A:100:GLY:C	1:A:102:PHE:H	2.13	0.57
1:A:425:ARG:NH2	6:A:740:HOH:O	2.38	0.56
1:A:254:GLN:NE2	1:A:325:ASP:H	2.03	0.56
1:A:546:GLU:HG3	1:A:582:LEU:HD11	1.88	0.55
1:A:70:ALA:HB2	1:A:103:ILE:HG23	1.89	0.55
1:A:399:PHE:HD2	1:A:404:VAL:HG21	1.72	0.54
1:A:216:ARG:N	1:A:505:GLN:HE22	2.00	0.54
1:A:97:GLU:HG2	1:A:98:LYS:H	1.71	0.54
1:A:401:GLU:O	1:A:404:VAL:HG12	2.08	0.54
1:A:548:ALA:O	1:A:553:ARG:NH1	2.38	0.54
1:A:196:ARG:HG3	1:A:196:ARG:HH11	1.73	0.54
2:A:590:MRD:H1C1	6:A:717:HOH:O	2.08	0.53
1:A:472:LEU:HD21	1:A:488:GLU:HG2	1.91	0.53
1:A:245:HIS:HB3	6:A:807:HOH:O	2.09	0.53
1:A:200:PRO:HG2	1:A:377:LEU:HD11	1.92	0.52
1:A:261:CYS:HB3	1:A:331:ASP:O	2.09	0.52
1:A:458:MET:HE1	1:A:525:ARG:HA	1.92	0.51
1:A:275:PHE:HA	1:A:278:LEU:HD23	1.92	0.50
1:A:96:ARG:HG3	1:A:301:PRO:HG3	1.93	0.50
1:A:258:TYR:HB3	1:A:293:LEU:HD22	1.93	0.50
1:A:494:VAL:HG11	1:A:531:TYR:HB2	1.92	0.50
1:A:380:ASP:OD2	1:A:382:ARG:HD3	2.12	0.50
1:A:546:GLU:CG	1:A:582:LEU:HD11	2.41	0.49
1:A:483:ALA:HB3	6:A:658:HOH:O	2.12	0.49
1:A:88:ILE:HG23	1:A:88:ILE:O	2.12	0.48
1:A:328:LEU:C	1:A:328:LEU:HD23	2.37	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:268:MET:O	1:A:268:MET:HE3	2.13	0.48
1:A:245:HIS:CD2	1:A:245:HIS:H	2.30	0.48
1:A:96:ARG:HA	1:A:301:PRO:HG2	1.96	0.47
1:A:213:THR:HB	1:A:219:ASP:OD1	2.14	0.47
1:A:433:LEU:CD2	2:A:590:MRD:H1C3	2.44	0.47
1:A:242:VAL:HA	1:A:245:HIS:CD2	2.50	0.47
1:A:99:THR:HG21	1:A:339:ALA:CB	2.45	0.47
1:A:102:PHE:HD1	1:A:103:ILE:H	1.64	0.46
1:A:202:LYS:NZ	6:A:798:HOH:O	2.49	0.46
1:A:244:GLN:HG3	6:A:862:HOH:O	2.14	0.45
1:A:427:PHE:HA	1:A:428:PRO:C	2.40	0.45
1:A:420:ASP:OD2	2:A:590:MRD:H5C2	2.16	0.45
1:A:545:GLU:CD	1:A:545:GLU:H	2.25	0.45
1:A:232:ILE:CG1	1:A:417:LEU:HD22	2.48	0.44
1:A:119:HIS:HD2	1:A:121:ILE:HD11	1.83	0.44
1:A:448:HIS:HA	1:A:452:ASP:O	2.17	0.44
1:A:232:ILE:HG12	1:A:417:LEU:HD22	2.00	0.44
1:A:244:GLN:HE21	1:A:244:GLN:N	2.01	0.44
1:A:245:HIS:CE1	6:A:862:HOH:O	2.69	0.44
1:A:261:CYS:C	1:A:263:GLU:H	2.25	0.44
1:A:103:ILE:CG2	1:A:104:ALA:N	2.80	0.43
3:A:592:MPD:HM3	6:A:778:HOH:O	2.18	0.43
1:A:585:LYS:O	1:A:585:LYS:HG2	2.18	0.43
1:A:236:PHE:C	1:A:238:SER:H	2.26	0.43
1:A:213:THR:CG2	1:A:215:GLN:HG2	2.45	0.43
1:A:69:GLY:C	1:A:71:SER:H	2.26	0.43
1:A:215:GLN:HA	1:A:505:GLN:HE22	1.84	0.42
1:A:94:VAL:CG1	1:A:95:ILE:H	2.33	0.42
1:A:408:LEU:HD21	1:A:414:PHE:CD1	2.54	0.42
2:A:590:MRD:H1C2	2:A:590:MRD:H4	1.77	0.42
1:A:458:MET:HE3	3:A:592:MPD:H32	2.02	0.42
1:A:75:GLU:OE1	1:A:114:ARG:NH2	2.53	0.41
3:A:596:MPD:HM3	6:A:704:HOH:O	2.19	0.41
1:A:242:VAL:HA	1:A:245:HIS:HD2	1.84	0.41
1:A:250:TRP:CH2	1:A:281:PRO:HB2	2.55	0.41
1:A:465:LEU:HD21	1:A:494:VAL:HG12	2.00	0.41
1:A:79:ARG:HG3	1:A:118:TRP:HZ2	1.83	0.41
1:A:420:ASP:CG	1:A:424:ARG:NH1	2.79	0.41
1:A:80:LEU:O	1:A:292:VAL:HG22	2.21	0.41
1:A:179:THR:HB	1:A:180:PRO:HD2	2.03	0.41
1:A:458:MET:CE	1:A:525:ARG:HA	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:GLY:C	1:A:102:PHE:N	2.79	0.41
1:A:261:CYS:HA	1:A:296:ASN:HB2	2.02	0.41
1:A:103:ILE:HG22	1:A:104:ALA:N	2.36	0.40
1:A:320:ARG:HG2	1:A:386:VAL:HG23	2.03	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	506/588 (86%)	470 (93%)	33 (6%)	3 (1%)	21	32

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	101	ASP
1	A	338	GLU
1	A	95	ILE

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	428/492 (87%)	400 (94%)	28 (6%)	15	27

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	72	LEU
1	A	73	SER
1	A	88	ILE
1	A	92	LEU
1	A	95	ILE
1	A	97	GLU
1	A	116	LYS
1	A	213	THR
1	A	244	GLN
1	A	245	HIS
1	A	267	GLU
1	A	269	THR
1	A	278	LEU
1	A	293	LEU
1	A	320	ARG
1	A	326	VAL
1	A	401	GLU
1	A	405	GLN
1	A	417	LEU
1	A	421	LEU
1	A	433	LEU
1	A	465	LEU
1	A	474	GLU
1	A	484	LEU
1	A	493	LEU
1	A	538	ILE
1	A	554	GLU
1	A	577	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	147	HIS
1	A	244	GLN
1	A	245	HIS
1	A	254	GLN
1	A	426	HIS
1	A	448	HIS
1	A	504	GLN
1	A	505	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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	$\# Z > 2$
3	MPD	A	592	-	7,7,7	0.32	0	9,10,10	0.52	0
2	MRD	A	589	-	7,7,7	0.25	0	9,10,10	0.52	0
2	MRD	A	590	-	7,7,7	0.30	0	9,10,10	0.33	0
2	MRD	A	591	-	7,7,7	0.22	0	9,10,10	0.43	0
3	MPD	A	596	-	7,7,7	0.31	0	9,10,10	0.39	0
2	MRD	A	595	-	7,7,7	0.28	0	9,10,10	0.42	0
4	ACY	A	593	-	3,3,3	0.83	0	3,3,3	0.81	0
5	SO4	A	594	-	4,4,4	0.25	0	6,6,6	0.07	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	MPD	A	592	-	-	2/5/5/5	-
2	MRD	A	589	-	-	1/5/5/5	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	MRD	A	590	-	-	2/5/5/5	-
2	MRD	A	591	-	-	3/5/5/5	-
3	MPD	A	596	-	-	4/5/5/5	-
2	MRD	A	595	-	-	2/5/5/5	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	592	MPD	C2-C3-C4-C5
3	A	596	MPD	C2-C3-C4-O4
3	A	596	MPD	C2-C3-C4-C5
2	A	589	MRD	C2-C3-C4-O4
2	A	595	MRD	C2-C3-C4-O4
3	A	596	MPD	C1-C2-C3-C4
2	A	590	MRD	C2-C3-C4-C5
2	A	591	MRD	C2-C3-C4-C5
2	A	595	MRD	C2-C3-C4-C5
2	A	590	MRD	C2-C3-C4-O4
2	A	591	MRD	C2-C3-C4-O4
3	A	592	MPD	C2-C3-C4-O4
2	A	591	MRD	C1-C2-C3-C4
3	A	596	MPD	CM-C2-C3-C4

There are no ring outliers.

4 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	592	MPD	2	0
2	A	589	MRD	1	0
2	A	590	MRD	4	0
3	A	596	MPD	1	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

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	510/588 (86%)	0.43	57 (11%) 10 7	27, 52, 110, 125	0

All (57) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	262	GLY	6.9
1	A	99	THR	6.4
1	A	94	VAL	6.0
1	A	107	VAL	5.5
1	A	95	ILE	5.2
1	A	70	ALA	5.1
1	A	334	SER	5.0
1	A	357	PRO	4.7
1	A	71	SER	4.6
1	A	92	LEU	4.6
1	A	234	GLY	4.4
1	A	337	ALA	4.4
1	A	69	GLY	4.4
1	A	339	ALA	4.3
1	A	98	LYS	4.3
1	A	103	ILE	4.2
1	A	72	LEU	4.0
1	A	338	GLU	3.9
1	A	104	ALA	3.8
1	A	108	THR	3.7
1	A	96	ARG	3.7
1	A	588	ALA	3.6
1	A	66	VAL	3.5
1	A	105	ARG	3.3
1	A	333	THR	3.3
1	A	261	CYS	3.3
1	A	106	GLY	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	97	GLU	3.2
1	A	335	ARG	3.1
1	A	275	PHE	3.1
1	A	110	PRO	3.1
1	A	336	TRP	3.0
1	A	263	GLU	2.9
1	A	102	PHE	2.8
1	A	64	PRO	2.7
1	A	340	LEU	2.7
1	A	361	ALA	2.6
1	A	265	GLY	2.6
1	A	101	ASP	2.5
1	A	264	ARG	2.5
1	A	400	SER	2.5
1	A	268	MET	2.4
1	A	100	GLY	2.4
1	A	239	GLY	2.4
1	A	236	PHE	2.4
1	A	299	ASN	2.4
1	A	478	ILE	2.3
1	A	271	VAL	2.3
1	A	583	PHE	2.3
1	A	395	PRO	2.2
1	A	587	GLY	2.2
1	A	266	ASN	2.1
1	A	258	TYR	2.1
1	A	359	TYR	2.1
1	A	305	ARG	2.1
1	A	91	PRO	2.1
1	A	539	ASN	2.1

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

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

6.3 Carbohydrates ⓘ

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
2	MRD	A	591	8/8	0.81	0.21	76,77,78,79	0
5	SO4	A	594	5/5	0.81	0.22	88,89,89,89	5
3	MPD	A	592	8/8	0.83	0.20	86,88,88,88	0
4	ACY	A	593	4/4	0.84	0.12	68,69,69,69	0
2	MRD	A	595	8/8	0.89	0.19	76,77,78,79	0
3	MPD	A	596	8/8	0.90	0.16	96,96,98,99	0
2	MRD	A	589	8/8	0.91	0.12	58,59,60,61	0
2	MRD	A	590	8/8	0.92	0.13	74,75,79,79	0

6.5 Other polymers [i](#)

There are no such residues in this entry.