



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2018 – 08:41 am GMT

PDB ID : 1HO5
Title : 5'-NUCLEOTIDASE (E. COLI) IN COMPLEX WITH ADENOSINE AND PHOSPHATE
Authors : Knoefel, T.; Straeter, N.
Deposited on : 2000-12-08
Resolution : 2.10 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 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

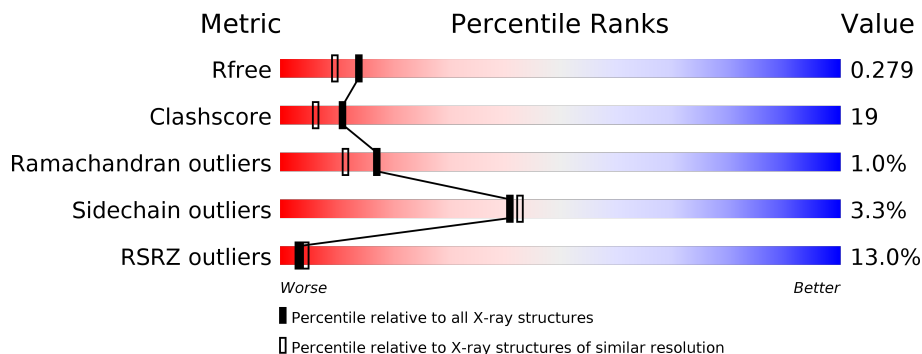
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	4608 (2.10-2.10)
Clashscore	122126	5109 (2.10-2.10)
Ramachandran outliers	120053	5059 (2.10-2.10)
Sidechain outliers	120020	5060 (2.10-2.10)
RSRZ outliers	108989	4497 (2.10-2.10)

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 ≥ 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	525	
1	B	525	

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 8607 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.

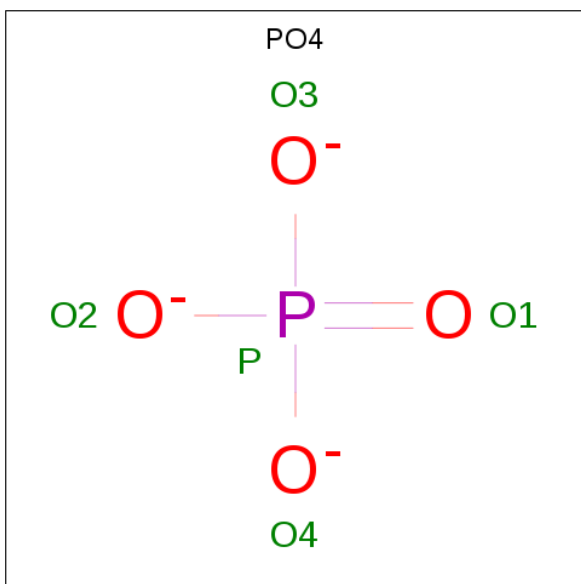
- Molecule 1 is a protein called 5'-NUCLEOTIDASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	525	4100	2590	703	790	17	0	0	0
1	B	525	4100	2590	703	790	17	0	0	0

- Molecule 2 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

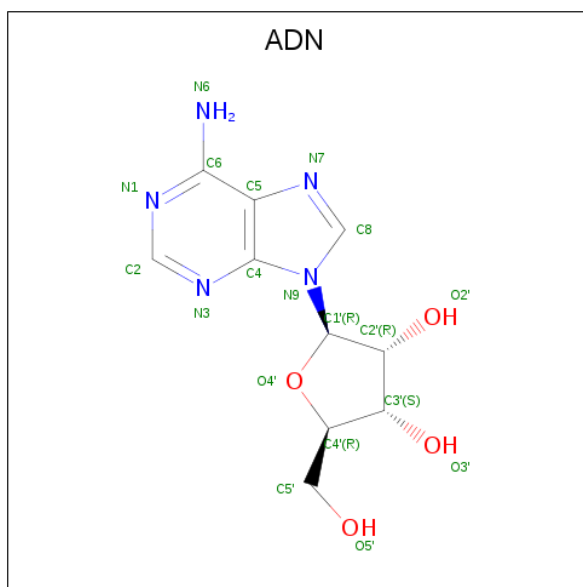
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	2	Total	Mn	0	0
			2	2		
2	A	2	Total	Mn	0	0
			2	2		

- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula: O₄P).



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

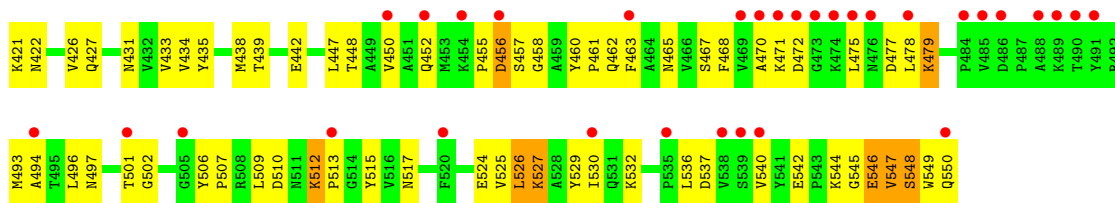
- Molecule 4 is ADENOSINE (three-letter code: ADN) (formula: C₁₀H₁₃N₅O₄).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C N O 19 10 5 4	0	0
4	B	1	Total C N O 19 10 5 4	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	238	Total O 238 238	0	0
5	B	117	Total O 117 117	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	69.90Å 75.70Å 221.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.56 – 2.10 29.56 – 1.99	Depositor EDS
% Data completeness (in resolution range)	99.5 (29.56-2.10) 98.9 (29.56-1.99)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.59 (at 1.98Å)	Xtrriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.238 , 0.279 0.238 , 0.279	Depositor DCC
R_{free} test set	2116 reflections (2.61%)	wwPDB-VP
Wilson B-factor (Å ²)	31.5	Xtrriage
Anisotropy	0.121	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 50.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	8607	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.99% 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: ADN, PO4, MN

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	0.69	0/4188	0.79	1/5666 (0.0%)
1	B	0.53	0/4188	0.73	2/5666 (0.0%)
All	All	0.62	0/8376	0.76	3/11332 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	256	PRO	N-CA-C	-6.45	95.33	112.10
1	A	256	PRO	N-CA-C	-6.33	95.65	112.10
1	B	295	VAL	N-CA-C	-5.60	95.88	111.00

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	4100	0	4019	150	0
1	B	4100	0	4019	163	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	5	0	0	0	0
3	B	5	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	19	0	13	1	0
4	B	19	0	13	1	0
5	A	238	0	0	2	0
5	B	117	0	0	1	0
All	All	8607	0	8064	313	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 19.

All (313) 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:218:MET:CE	1:A:218:MET:SD	2.02	1.47
1:A:444:ILE:HG12	1:A:478:LEU:HD23	1.46	0.97
1:A:345:MET:HE1	1:A:348:LEU:HD23	1.48	0.96
1:A:368:ASN:HD22	1:A:537:ASP:HA	1.36	0.89
1:A:521:ILE:HB	1:A:524:GLU:HG3	1.58	0.85
1:B:206:THR:HG23	1:B:207:GLU:HG2	1.59	0.83
1:B:114:ILE:HG12	1:B:138:LEU:O	1.80	0.82
1:B:345:MET:CE	1:B:348:LEU:HD23	2.09	0.82
1:B:345:MET:HE2	1:B:349:LEU:HG	1.59	0.82
1:B:477:ASP:O	1:B:479:LYS:HD2	1.79	0.82
1:B:234:VAL:HG13	1:B:280:GLN:HG3	1.61	0.81
1:A:512:LYS:HB3	1:A:513:PRO:HD2	1.62	0.80
1:B:345:MET:HE1	1:B:348:LEU:HD23	1.63	0.80
1:A:345:MET:HE2	1:A:349:LEU:HD21	1.63	0.80
1:B:363:LYS:NZ	1:B:366:GLU:HB3	1.95	0.80
1:B:363:LYS:HZ1	1:B:366:GLU:HB3	1.48	0.79
1:A:379:ARG:HD2	1:A:458:GLY:HA2	1.64	0.79
1:A:423:VAL:HG13	1:A:526:LEU:HD23	1.64	0.79
1:B:197:LYS:HG2	1:B:240:LEU:HD23	1.65	0.79
1:B:374:ASP:HB2	1:B:377:LYS:HD3	1.65	0.78
1:B:202:GLU:O	1:B:206:THR:HG22	1.85	0.76
1:B:357:LYS:HE3	1:B:361:GLU:OE2	1.86	0.76
1:B:144:GLN:HB2	1:B:151:LEU:HD21	1.67	0.75
1:A:434:VAL:HG12	1:A:517:ASN:HA	1.70	0.73
1:A:451:ALA:HB1	1:A:549:TRP:HE1	1.53	0.73
1:A:114:ILE:HD11	1:A:137:LEU:HB3	1.70	0.72
1:A:322:LYS:HE2	1:A:332:ARG:NH1	2.05	0.71
1:B:455:PRO:O	1:B:456:ASP:HB3	1.89	0.71
1:A:401:PHE:CZ	1:A:493:MET:HB2	2.26	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:363:LYS:HZ3	1:B:417:ASP:CG	1.95	0.70
1:B:303:ARG:O	1:B:306:GLU:HG2	1.92	0.70
1:A:345:MET:HE3	1:A:349:LEU:HG	1.74	0.69
1:B:530:ILE:HD12	1:B:536:LEU:HD11	1.73	0.69
1:A:46:PHE:HA	1:A:56:LEU:HD22	1.76	0.68
1:B:31:THR:OG1	1:B:303:ARG:HD2	1.93	0.68
1:A:467:SER:HB3	1:A:546:GLU:HB2	1.76	0.67
1:B:141:ASN:ND2	1:B:192:PRO:HG3	2.10	0.67
1:A:345:MET:CE	1:A:349:LEU:HG	2.25	0.67
1:A:410:ARG:HG3	1:A:428:PRO:CD	2.25	0.66
1:A:411:ASP:O	1:A:426:VAL:HG22	1.95	0.66
1:A:345:MET:HE2	1:A:349:LEU:CD2	2.25	0.66
1:B:392:ALA:HA	1:B:529:TYR:CD1	2.30	0.66
1:A:444:ILE:HG12	1:A:478:LEU:CD2	2.22	0.66
1:B:130:GLU:HG2	1:B:137:LEU:HD22	1.77	0.65
1:A:180:ASN:HD21	1:A:182:GLU:CG	2.09	0.65
1:A:507:PRO:O	1:A:509:LEU:HD13	1.97	0.65
1:A:404:MET:SD	1:A:409:ILE:HD11	2.37	0.65
1:B:547:VAL:O	1:B:548:SER:HB3	1.97	0.64
1:B:114:ILE:CD1	1:B:137:LEU:HB3	2.28	0.64
1:A:180:ASN:ND2	1:A:182:GLU:HG2	2.12	0.64
1:B:57:ALA:HA	1:B:345:MET:HG2	1.80	0.64
1:B:98:GLU:N	1:B:99:PRO:HD2	2.13	0.64
1:A:127:ARG:O	1:A:131:LYS:HG3	1.98	0.63
1:A:367:THR:HA	1:A:536:LEU:HB2	1.80	0.63
1:A:438:MET:HB2	1:A:442:GLU:HB2	1.81	0.63
1:A:364:ILE:HG12	1:A:418:ILE:O	1.99	0.62
1:A:403:VAL:HG23	1:A:462:GLN:O	1.98	0.62
1:A:452:GLN:OE1	1:A:452:GLN:HA	2.00	0.62
1:A:379:ARG:HD2	1:A:458:GLY:CA	2.30	0.62
1:A:431:ASN:HB2	1:A:522:ASP:OD2	2.00	0.62
1:A:368:ASN:ND2	1:A:537:ASP:HA	2.13	0.61
1:B:370:ARG:HG3	1:B:414:GLU:HA	1.81	0.61
1:A:480:ILE:O	1:A:481:LYS:HB2	2.00	0.61
1:A:431:ASN:OD1	4:A:1604:ADN:H2	2.00	0.61
1:A:468:PHE:CZ	1:A:547:VAL:HG13	2.36	0.60
1:A:527:LYS:O	1:A:530:ILE:HG12	2.02	0.60
1:B:300:PHE:HB3	1:B:307:MET:HE2	1.82	0.60
1:A:345:MET:HE2	1:A:349:LEU:CG	2.32	0.60
1:B:389:ILE:HG12	1:B:526:LEU:HD21	1.83	0.60
1:A:510:ASP:HA	1:A:515:TYR:CD2	2.35	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:345:MET:HE3	1:B:348:LEU:HD23	1.82	0.60
1:A:380:PHE:HA	1:A:455:PRO:HB3	1.84	0.59
1:A:403:VAL:HA	1:A:462:GLN:O	2.02	0.59
1:A:257:VAL:HG23	1:A:287:GLN:HB3	1.85	0.59
1:B:114:ILE:HD11	1:B:137:LEU:HB3	1.85	0.59
1:B:402:ALA:HB2	1:B:494:ALA:HB3	1.85	0.58
1:A:364:ILE:CD1	1:A:530:ILE:HD11	2.33	0.58
1:B:114:ILE:CG1	1:B:139:SER:HB2	2.34	0.58
1:B:467:SER:OG	1:B:479:LYS:HG2	2.04	0.58
1:B:379:ARG:HD2	1:B:458:GLY:HA2	1.85	0.58
1:B:545:GLY:O	1:B:547:VAL:O	2.21	0.57
1:B:388:LEU:HD21	1:B:530:ILE:HD11	1.86	0.57
1:B:60:LYS:HE2	1:B:106:LEU:HG	1.87	0.57
1:B:388:LEU:O	1:B:388:LEU:HD23	2.04	0.57
1:B:371:LEU:HA	1:B:384:ASN:HD21	1.69	0.57
1:B:200:ILE:HD12	1:B:240:LEU:HD22	1.87	0.56
1:B:28:GLN:HG3	5:B:2712:HOH:O	2.04	0.56
1:B:450:VAL:O	1:B:461:PRO:HG2	2.04	0.56
1:B:526:LEU:O	1:B:530:ILE:HG12	2.04	0.56
1:B:363:LYS:NZ	1:B:417:ASP:HA	2.20	0.56
1:B:300:PHE:HB3	1:B:307:MET:CE	2.34	0.56
1:B:371:LEU:HA	1:B:384:ASN:ND2	2.21	0.56
1:B:439:THR:OG1	1:B:442:GLU:HG3	2.05	0.56
1:B:173:ASP:OD2	1:B:191:LYS:HD3	2.05	0.56
1:B:385:MET:O	1:B:389:ILE:HG13	2.05	0.56
1:A:382:GLN:HA	1:A:462:GLN:HE22	1.70	0.56
1:B:433:VAL:HG21	1:B:525:VAL:HG21	1.86	0.56
1:A:495:THR:HG23	1:A:496:LEU:N	2.21	0.56
1:B:496:LEU:HD22	1:B:496:LEU:N	2.21	0.56
1:A:376:ASP:OD1	1:A:377:LYS:HG2	2.06	0.55
1:A:379:ARG:CD	1:A:458:GLY:HA2	2.35	0.55
1:A:98:GLU:HG3	1:A:132:TRP:CE2	2.42	0.55
1:A:454:LYS:HB3	1:A:455:PRO:CD	2.37	0.55
1:A:471:LYS:HE2	1:A:550:GLN:HE21	1.70	0.54
1:B:401:PHE:CE2	1:B:493:MET:HE3	2.41	0.54
1:B:373:GLY:HA3	1:B:411:ASP:O	2.08	0.54
1:B:345:MET:CE	1:B:349:LEU:HG	2.35	0.54
1:B:363:LYS:HZ2	1:B:417:ASP:HA	1.72	0.54
1:A:180:ASN:ND2	1:A:182:GLU:CG	2.70	0.54
1:A:201:GLN:HG2	1:A:205:GLN:NE2	2.23	0.53
1:B:447:LEU:HD21	1:B:493:MET:HE3	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:388:LEU:HD22	1:B:526:LEU:HD11	1.90	0.53
1:A:410:ARG:HD2	1:A:429:PHE:CE2	2.44	0.53
1:B:427:GLN:NE2	1:B:526:LEU:HD23	2.24	0.53
1:A:459:ALA:CB	1:A:504:ASP:HB3	2.38	0.53
1:A:364:ILE:HD12	1:A:530:ILE:HD11	1.91	0.53
1:B:390:LEU:O	1:B:394:MET:HB2	2.07	0.53
1:A:548:SER:O	1:A:549:TRP:HB2	2.09	0.53
1:B:51:TYR:HB3	1:B:332:ARG:HD2	1.90	0.53
1:B:115:GLY:O	1:B:118:GLU:HB2	2.09	0.52
1:B:502:GLY:HA2	1:B:506:TYR:O	2.08	0.52
1:B:298:ALA:HA	1:B:309:MET:HE1	1.91	0.52
1:B:98:GLU:HG3	1:B:132:TRP:CE2	2.45	0.52
1:A:410:ARG:HA	1:A:410:ARG:HE	1.74	0.52
1:B:329:LYS:HG2	1:B:330:SER:N	2.25	0.52
1:B:76:SER:HB3	1:B:160:ARG:HD2	1.92	0.52
1:A:470:ALA:HB3	1:A:549:TRP:HA	1.92	0.52
1:A:98:GLU:N	1:A:99:PRO:HD2	2.25	0.52
1:A:345:MET:CE	1:A:349:LEU:CG	2.88	0.51
1:A:486:ASP:OD2	1:A:489:LYS:HG2	2.10	0.51
1:B:371:LEU:HD12	1:B:413:ILE:HB	1.92	0.51
1:B:461:PRO:HB2	1:B:463:PHE:CE1	2.45	0.51
1:B:290:GLU:HG3	1:B:291:TRP:CG	2.44	0.51
1:A:549:TRP:O	1:A:550:GLN:HB3	2.09	0.51
1:A:368:ASN:HB2	1:A:538:VAL:H	1.75	0.51
1:B:325:TRP:O	1:B:328:GLY:N	2.41	0.51
1:B:393:GLN:HE22	1:B:496:LEU:HD21	1.76	0.51
1:A:401:PHE:CE1	1:A:493:MET:HB2	2.46	0.51
1:A:439:THR:OG1	1:A:442:GLU:HG3	2.11	0.51
1:B:379:ARG:CD	1:B:458:GLY:HA2	2.40	0.51
1:A:174:ASP:O	1:A:178:ILE:HG12	2.11	0.51
1:B:413:ILE:HG21	1:B:418:ILE:HG12	1.93	0.51
1:B:542:GLU:O	1:B:544:LYS:HG3	2.11	0.51
1:A:438:MET:HG3	1:A:443:VAL:CG2	2.42	0.50
1:A:546:GLU:CD	1:A:546:GLU:H	2.14	0.50
1:B:298:ALA:CA	1:B:309:MET:HE1	2.41	0.50
1:B:332:ARG:HH11	1:B:332:ARG:HG2	1.76	0.50
1:A:394:MET:HG3	1:A:402:ALA:HB2	1.93	0.50
1:B:115:GLY:N	1:B:118:GLU:OE1	2.45	0.50
1:B:529:TYR:HA	1:B:532:LYS:HE2	1.92	0.50
1:B:256:PRO:HD3	1:B:289:HIS:CG	2.45	0.50
1:B:390:LEU:HD21	1:B:462:GLN:O	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:392:ALA:HA	1:A:529:TYR:CD1	2.47	0.50
1:A:477:ASP:O	1:A:477:ASP:CG	2.50	0.49
1:A:372:GLU:CD	1:A:377:LYS:HG3	2.33	0.49
1:A:432:VAL:HG11	1:A:517:ASN:OD1	2.12	0.49
1:B:140:ALA:C	1:B:195:GLU:HG2	2.32	0.49
1:B:323:VAL:O	1:B:330:SER:HA	2.12	0.49
1:A:371:LEU:HD13	1:A:388:LEU:CD2	2.43	0.49
1:A:65:GLY:O	1:A:69:GLU:HG3	2.12	0.49
1:B:388:LEU:HD23	1:B:388:LEU:C	2.33	0.49
1:A:539:SER:HA	1:A:542:GLU:OE2	2.12	0.49
1:A:502:GLY:HA2	1:A:506:TYR:O	2.12	0.49
1:A:379:ARG:HD2	1:A:457:SER:C	2.32	0.48
1:A:434:VAL:HB	1:A:516:VAL:O	2.13	0.48
1:A:495:THR:HG23	1:A:496:LEU:O	2.14	0.48
1:A:419:SER:O	1:A:422:ASN:HB2	2.14	0.48
1:A:439:THR:OG1	1:A:441:LYS:HB3	2.13	0.48
1:B:468:PHE:C	1:B:468:PHE:CD1	2.86	0.48
1:A:57:ALA:HA	1:A:345:MET:HG2	1.94	0.48
1:A:389:ILE:CD1	1:A:409:ILE:HD12	2.42	0.48
1:A:470:ALA:O	1:A:549:TRP:O	2.32	0.48
1:B:452:GLN:O	1:B:452:GLN:HG2	2.14	0.48
1:A:466:VAL:HG12	1:A:467:SER:N	2.29	0.48
1:A:321:LYS:HB3	1:A:335:TYR:CZ	2.49	0.48
1:A:114:ILE:CD1	1:A:137:LEU:HB3	2.42	0.47
1:A:358:ALA:O	1:A:362:VAL:HG23	2.14	0.47
1:A:378:VAL:HG11	1:A:409:ILE:HG21	1.96	0.47
1:A:218:MET:CG	1:A:218:MET:CE	2.91	0.47
1:B:168:ILE:HG22	1:B:169:GLY:N	2.29	0.47
1:B:312:TYR:CD1	1:B:313:GLN:N	2.83	0.47
1:A:371:LEU:HD23	1:A:384:ASN:ND2	2.29	0.47
1:B:141:ASN:N	1:B:195:GLU:HG2	2.29	0.47
1:B:170:LEU:HB3	1:B:192:PRO:HB3	1.97	0.47
1:B:394:MET:HE1	1:B:402:ALA:N	2.30	0.47
1:B:510:ASP:HA	1:B:515:TYR:CD2	2.49	0.47
1:A:521:ILE:HD13	1:A:521:ILE:N	2.30	0.47
1:B:322:LYS:HG2	1:B:332:ARG:NH1	2.30	0.47
1:B:84:ASP:CG	1:B:217:HIS:CE1	2.87	0.47
1:A:53:GLU:HG2	1:A:318:ASN:O	2.15	0.47
1:A:471:LYS:HE2	1:A:550:GLN:NE2	2.29	0.47
1:B:117:HIS:NE2	3:B:2603:PO4:O1	2.48	0.47
1:A:375:ARG:NE	1:A:379:ARG:NH2	2.63	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:470:ALA:HB3	1:B:549:TRP:CD1	2.50	0.46
1:A:459:ALA:HB2	1:A:504:ASP:HB3	1.97	0.46
1:A:420:TYR:CD1	1:A:527:LYS:HD3	2.49	0.46
1:B:363:LYS:HZ2	1:B:366:GLU:HB3	1.79	0.46
1:A:446:TYR:CE1	1:A:509:LEU:HD11	2.51	0.46
1:B:448:THR:HA	1:B:475:LEU:HD11	1.96	0.46
1:B:394:MET:SD	1:B:465:ASN:ND2	2.88	0.46
1:B:524:GLU:O	1:B:527:LYS:HG3	2.15	0.46
1:B:345:MET:HE3	1:B:348:LEU:HB3	1.97	0.46
1:B:368:ASN:ND2	1:B:537:ASP:HA	2.30	0.46
1:B:545:GLY:O	1:B:547:VAL:N	2.49	0.46
1:B:204:GLN:OE1	1:B:204:GLN:HA	2.15	0.46
1:B:170:LEU:HD11	1:B:196:ALA:HB2	1.98	0.46
1:B:56:LEU:HD23	1:B:103:GLY:HA3	1.97	0.46
1:A:385:MET:HE1	1:A:426:VAL:HG11	1.98	0.46
1:A:467:SER:CB	1:A:546:GLU:HB2	2.45	0.46
1:B:141:ASN:CG	1:B:192:PRO:HG3	2.37	0.46
1:B:298:ALA:HB1	1:B:309:MET:CE	2.46	0.46
1:B:114:ILE:HG12	1:B:139:SER:HB2	1.97	0.45
1:B:368:ASN:OD1	1:B:369:GLY:N	2.49	0.45
1:B:130:GLU:CG	1:B:137:LEU:HD22	2.42	0.45
1:B:251:GLY:HA2	1:B:287:GLN:CD	2.37	0.45
1:A:125:VAL:O	1:A:129:GLN:HG3	2.16	0.45
1:A:475:LEU:HD13	1:A:478:LEU:HD13	1.97	0.45
1:B:380:PHE:CE2	1:B:456:ASP:HA	2.51	0.45
1:A:385:MET:HE2	1:A:389:ILE:HD11	1.97	0.45
1:A:364:ILE:HD11	1:A:530:ILE:HD11	1.97	0.45
1:A:401:PHE:HB2	1:A:466:VAL:CG2	2.46	0.45
1:B:302:PHE:HB2	1:B:307:MET:CE	2.46	0.45
1:A:508:ARG:HD2	1:A:510:ASP:OD1	2.17	0.45
1:B:150:ARG:NH2	1:B:195:GLU:OE2	2.47	0.45
1:B:456:ASP:OD1	1:B:456:ASP:C	2.54	0.45
1:A:367:THR:HG23	1:A:415:ALA:HA	1.99	0.45
1:A:438:MET:HG3	1:A:443:VAL:HG22	1.98	0.45
1:B:167:VAL:HA	1:B:213:ILE:O	2.16	0.45
1:A:486:ASP:HB3	1:A:489:LYS:HB2	1.98	0.44
1:A:90:PRO:O	1:A:94:LEU:HG	2.17	0.44
1:A:375:ARG:HA	1:A:378:VAL:HG22	1.99	0.44
1:B:377:LYS:HD2	1:B:377:LYS:N	2.32	0.44
1:A:155:TRP:CE3	1:A:199:VAL:HG13	2.52	0.44
1:A:390:LEU:HD11	1:A:404:MET:HG2	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:469:VAL:HG23	1:A:477:ASP:HB3	1.99	0.44
1:A:26:TYR:N	5:A:1809:HOH:O	2.49	0.44
1:A:394:MET:CG	1:A:402:ALA:HB2	2.48	0.44
1:B:394:MET:HA	1:B:399:ALA:HB3	2.00	0.44
1:B:99:PRO:HB3	1:B:352:PHE:CD2	2.53	0.44
1:A:221:TYR:O	1:A:222:ASP:C	2.56	0.44
1:A:213:ILE:HG12	1:A:247:MET:HG2	1.99	0.43
1:A:528:ALA:HA	1:A:531:GLN:OE1	2.17	0.43
1:B:49:ASN:HB3	1:B:54:TYR:CE1	2.53	0.43
1:A:476:ASN:O	1:A:477:ASP:HB3	2.18	0.43
1:A:375:ARG:O	1:A:379:ARG:HB2	2.19	0.43
1:B:302:PHE:HB2	1:B:307:MET:HE3	2.01	0.43
1:B:512:LYS:HG3	1:B:513:PRO:HD2	2.00	0.43
1:B:98:GLU:N	1:B:99:PRO:CD	2.79	0.43
1:A:439:THR:O	1:A:443:VAL:HG23	2.18	0.43
1:B:321:LYS:HB3	1:B:335:TYR:CZ	2.53	0.43
1:B:380:PHE:CZ	1:B:456:ASP:HA	2.53	0.43
1:A:170:LEU:HD11	1:A:196:ALA:HB2	2.00	0.43
1:A:378:VAL:O	1:A:460:TYR:HD2	2.02	0.43
1:A:369:GLY:HA2	1:A:415:ALA:HB2	2.01	0.43
1:B:438:MET:HB2	1:B:442:GLU:HB2	2.01	0.43
1:A:379:ARG:HD2	1:A:458:GLY:N	2.34	0.43
1:A:511:ASN:OD1	1:A:512:LYS:HG3	2.19	0.43
1:B:301:GLU:HG3	1:B:310:VAL:HG11	2.01	0.43
1:A:267:VAL:O	1:A:268:ASP:HB2	2.20	0.42
1:A:454:LYS:HB3	1:A:455:PRO:HD2	2.00	0.42
1:A:405:SER:HB3	1:A:458:GLY:O	2.19	0.42
1:B:348:LEU:O	1:B:348:LEU:HG	2.20	0.42
1:B:545:GLY:O	1:B:546:GLU:C	2.57	0.42
1:A:493:MET:HG2	1:A:494:ALA:N	2.35	0.42
1:B:115:GLY:CA	1:B:118:GLU:OE1	2.68	0.42
1:B:255:ASP:O	1:B:287:GLN:HG2	2.19	0.42
1:B:106:LEU:HD21	1:B:344:GLN:HG2	2.02	0.42
1:B:357:LYS:C	1:B:359:GLN:H	2.22	0.42
1:B:345:MET:CE	1:B:348:LEU:HB3	2.50	0.42
1:B:359:GLN:HA	1:B:359:GLN:NE2	2.35	0.42
1:A:401:PHE:HB2	1:A:466:VAL:HG23	2.02	0.42
1:B:434:VAL:HG12	1:B:517:ASN:HA	2.01	0.42
1:B:312:TYR:CD1	1:B:312:TYR:C	2.93	0.42
1:A:384:ASN:HD22	1:A:538:VAL:HG13	1.83	0.41
1:B:431:ASN:OD1	4:B:2604:ADN:H2	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:260:ALA:HB2	1:B:266:GLN:HA	2.02	0.41
1:B:379:ARG:HD2	1:B:458:GLY:CA	2.49	0.41
1:B:460:TYR:HA	1:B:461:PRO:HD3	1.69	0.41
1:B:507:PRO:O	1:B:509:LEU:HD13	2.20	0.41
1:B:86:ASN:HD21	1:B:129:GLN:HE22	1.69	0.41
1:B:96:ASP:O	1:B:97:ALA:HB3	2.20	0.41
1:A:474:LYS:HE3	1:A:474:LYS:HB2	1.91	0.41
1:B:86:ASN:ND2	1:B:129:GLN:HE22	2.18	0.41
1:B:155:TRP:CE3	1:B:199:VAL:HG13	2.56	0.41
1:A:389:ILE:O	1:A:393:GLN:HG3	2.21	0.41
1:A:360:LEU:HD12	1:A:421:LYS:HB2	2.01	0.41
1:A:401:PHE:N	1:A:401:PHE:CD1	2.89	0.41
1:A:521:ILE:HB	1:A:524:GLU:CG	2.41	0.41
1:A:389:ILE:HD12	1:A:409:ILE:HD12	2.03	0.41
1:A:360:LEU:HD11	1:A:424:LEU:HD12	2.03	0.41
1:B:379:ARG:HD2	1:B:457:SER:C	2.41	0.41
1:A:84:ASP:CG	1:A:217:HIS:CE1	2.94	0.41
1:A:401:PHE:CG	1:A:480:ILE:HD12	2.55	0.41
1:B:371:LEU:O	1:B:412:SER:HB3	2.21	0.41
1:B:435:TYR:HA	1:B:493:MET:O	2.20	0.41
1:A:57:ALA:CA	1:A:345:MET:HG2	2.51	0.41
1:A:167:VAL:HA	1:A:213:ILE:O	2.21	0.41
1:A:226:HIS:NE2	5:A:1684:HOH:O	2.37	0.41
1:B:91:GLU:OE2	1:B:421:LYS:HD2	2.20	0.41
1:B:123:LEU:HA	1:B:123:LEU:HD12	1.89	0.41
1:B:151:LEU:HA	1:B:151:LEU:HD23	1.90	0.41
1:B:326:GLU:C	1:B:328:GLY:H	2.22	0.41
1:B:422:ASN:O	1:B:426:VAL:HG23	2.21	0.41
1:B:497:ASN:O	1:B:501:THR:HG23	2.21	0.41
1:B:475:LEU:HD13	1:B:478:LEU:HD13	2.04	0.40
1:B:471:LYS:HE2	1:B:550:GLN:HG3	2.03	0.40
1:B:86:ASN:HD21	1:B:129:GLN:NE2	2.19	0.40
1:A:468:PHE:CE1	1:A:547:VAL:HG13	2.55	0.40
1:B:540:VAL:HG12	1:B:540:VAL:O	2.21	0.40
1:B:173:ASP:N	1:B:173:ASP:OD1	2.53	0.40
1:B:141:ASN:CA	1:B:195:GLU:HG2	2.52	0.40
1:A:26:TYR:CE1	1:A:304:ASN:HA	2.57	0.40
1:B:44:GLY:HA2	1:B:100:ASP:OD2	2.21	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	523/525 (100%)	490 (94%)	29 (6%)	4 (1%)	21	16
1	B	523/525 (100%)	481 (92%)	36 (7%)	6 (1%)	16	10
All	All	1046/1050 (100%)	971 (93%)	65 (6%)	10 (1%)	17	12

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	513	PRO
1	B	546	GLU
1	A	87	THR
1	B	548	SER
1	B	289	HIS
1	B	87	THR
1	B	378	VAL
1	B	472	ASP
1	A	378	VAL
1	A	484	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	433/433 (100%)	419 (97%)	14 (3%)	42	44
1	B	433/433 (100%)	418 (96%)	15 (4%)	39	40
All	All	866/866 (100%)	837 (97%)	29 (3%)	41	43

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	56	LEU
1	A	84	ASP
1	A	118	GLU
1	A	235	GLU
1	A	307	MET
1	A	327	ASP
1	A	368	ASN
1	A	375	ARG
1	A	401	PHE
1	A	410	ARG
1	A	428	PRO
1	A	513	PRO
1	A	522	ASP
1	A	550	GLN
1	B	56	LEU
1	B	73	GLU
1	B	96	ASP
1	B	174	ASP
1	B	202	GLU
1	B	205	GLN
1	B	228	SER
1	B	390	LEU
1	B	401	PHE
1	B	456	ASP
1	B	479	LYS
1	B	512	LYS
1	B	526	LEU
1	B	527	LYS
1	B	547	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	28	GLN
1	A	180	ASN
1	A	204	GLN
1	A	368	ASN
1	A	462	GLN
1	A	476	ASN
1	A	550	GLN
1	B	86	ASN

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Mol	Chain	Res	Type
1	B	129	GLN
1	B	144	GLN
1	B	266	GLN
1	B	279	GLN
1	B	359	GLN
1	B	393	GLN
1	B	427	GLN
1	B	452	GLN
1	B	476	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](#)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	$\# Z > 2$
3	PO4	A	1603	2	4,4,4	1.14	0	6,6,6	0.48	0
4	ADN	A	1604	-	18,21,21	0.59	0	16,31,31	0.69	0
3	PO4	B	2603	2	4,4,4	1.24	0	6,6,6	0.38	0
4	ADN	B	2604	-	18,21,21	0.61	0	16,31,31	0.65	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
3	PO4	A	1603	2	-	0/0/0/0	0/0/0/0
4	ADN	A	1604	-	-	0/2/22/22	0/3/3/3
3	PO4	B	2603	2	-	0/0/0/0	0/0/0/0
4	ADN	B	2604	-	-	0/2/22/22	0/3/3/3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1604	ADN	1	0
3	B	2603	PO4	1	0
4	B	2604	ADN	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	525/525 (100%)	0.65	65 (12%) 4 5	16, 34, 76, 91	0
1	B	525/525 (100%)	0.82	72 (13%) 3 4	24, 48, 74, 86	0
All	All	1050/1050 (100%)	0.74	137 (13%) 3 4	16, 44, 75, 91	0

All (137) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	473	GLY	7.2
1	A	469	VAL	7.2
1	B	358	ALA	7.2
1	A	549	TRP	7.0
1	B	185	THR	5.6
1	B	485	VAL	5.6
1	A	488	ALA	5.3
1	A	530	ILE	5.2
1	A	472	ASP	4.8
1	A	380	PHE	4.4
1	A	464	ALA	4.3
1	B	478	LEU	4.3
1	B	488	ALA	4.2
1	A	441	LYS	4.2
1	B	471	LYS	4.2
1	A	475	LEU	4.1
1	B	454	LYS	4.0
1	A	408	GLY	3.9
1	A	484	PRO	3.8
1	B	490	THR	3.8
1	B	489	LYS	3.7
1	A	513	PRO	3.7
1	B	390	LEU	3.7
1	A	470	ALA	3.7

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Mol	Chain	Res	Type	RSRZ
1	A	403	VAL	3.7
1	B	113	ALA	3.5
1	B	473	GLY	3.5
1	B	146	SER	3.5
1	B	249	VAL	3.5
1	A	463	PHE	3.5
1	A	358	ALA	3.5
1	B	215	ALA	3.5
1	B	418	ILE	3.4
1	A	444	ILE	3.4
1	A	544	LYS	3.3
1	A	474	LYS	3.3
1	A	548	SER	3.2
1	B	267	VAL	3.2
1	B	80	LEU	3.1
1	A	535	PRO	3.1
1	A	489	LYS	3.1
1	B	539	SER	3.1
1	B	530	ILE	3.1
1	B	452	GLN	3.1
1	A	550	GLN	3.1
1	A	368	ASN	3.1
1	B	469	VAL	3.0
1	A	482	GLY	3.0
1	B	144	GLN	3.0
1	B	369	GLY	2.9
1	B	187	ILE	2.9
1	B	85	ILE	2.9
1	B	550	GLN	2.9
1	B	484	PRO	2.9
1	B	368	ASN	2.8
1	A	515	TYR	2.8
1	A	496	LEU	2.8
1	B	264	LYS	2.8
1	A	390	LEU	2.8
1	B	81	SER	2.8
1	B	228	SER	2.7
1	B	413	ILE	2.7
1	A	491	TYR	2.7
1	B	403	VAL	2.7
1	B	247	MET	2.7
1	A	413	ILE	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	409	ILE	2.6
1	B	463	PHE	2.6
1	B	491	TYR	2.6
1	A	537	ASP	2.6
1	B	472	ASP	2.6
1	A	80	LEU	2.6
1	A	404	MET	2.6
1	B	82	GLY	2.6
1	A	389	ILE	2.6
1	A	249	VAL	2.5
1	A	478	LEU	2.5
1	B	186	ASP	2.5
1	B	501	THR	2.5
1	B	476	ASN	2.5
1	A	324	THR	2.5
1	A	512	LYS	2.5
1	B	474	LYS	2.5
1	B	513	PRO	2.5
1	A	480	ILE	2.5
1	A	476	ASN	2.4
1	A	438	MET	2.4
1	B	138	LEU	2.4
1	B	376	ASP	2.4
1	A	494	ALA	2.4
1	B	535	PRO	2.4
1	A	362	VAL	2.4
1	B	201	GLN	2.4
1	A	214	ALA	2.4
1	A	213	ILE	2.4
1	A	471	LYS	2.4
1	B	362	VAL	2.3
1	B	540	VAL	2.3
1	A	539	SER	2.3
1	B	456	ASP	2.3
1	B	354	ASN	2.3
1	A	36	VAL	2.3
1	A	485	VAL	2.3
1	B	286	VAL	2.3
1	A	367	THR	2.3
1	B	38	HIS	2.3
1	A	415	ALA	2.3
1	B	470	ALA	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	380	PHE	2.2
1	B	83	GLY	2.2
1	B	494	ALA	2.2
1	A	456	ASP	2.2
1	A	215	ALA	2.2
1	A	511	ASN	2.2
1	A	467	SER	2.2
1	B	505	GLY	2.2
1	B	409	ILE	2.2
1	B	170	LEU	2.2
1	A	429	PHE	2.2
1	B	538	VAL	2.2
1	B	486	ASP	2.2
1	A	83	GLY	2.1
1	B	357	LYS	2.1
1	B	450	VAL	2.1
1	B	214	ALA	2.1
1	B	37	LEU	2.1
1	B	475	LEU	2.1
1	A	490	THR	2.1
1	B	39	THR	2.1
1	B	227	GLY	2.1
1	A	543	PRO	2.0
1	B	520	PHE	2.0
1	A	483	GLU	2.0
1	A	410	ARG	2.0
1	A	167	VAL	2.0
1	A	495	THR	2.0
1	B	137	LEU	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, 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
4	ADN	B	2604	19/19	0.85	0.19	59,62,62,63	0
4	ADN	A	1604	19/19	0.89	0.22	46,52,56,57	0
3	PO4	B	2603	5/5	0.95	0.13	60,61,62,62	0
3	PO4	A	1603	5/5	0.96	0.12	23,31,37,39	0
2	MN	B	2602	1/1	0.98	0.10	41,41,41,41	0
2	MN	A	1602	1/1	0.99	0.13	23,23,23,23	0
2	MN	B	2601	1/1	0.99	0.10	38,38,38,38	0
2	MN	A	1601	1/1	1.00	0.17	25,25,25,25	0

6.5 Other polymers [i](#)

There are no such residues in this entry.