Full wwPDB X-ray Structure Validation Report ⓘ

Nov 9, 2024 – 10:37 PM EST

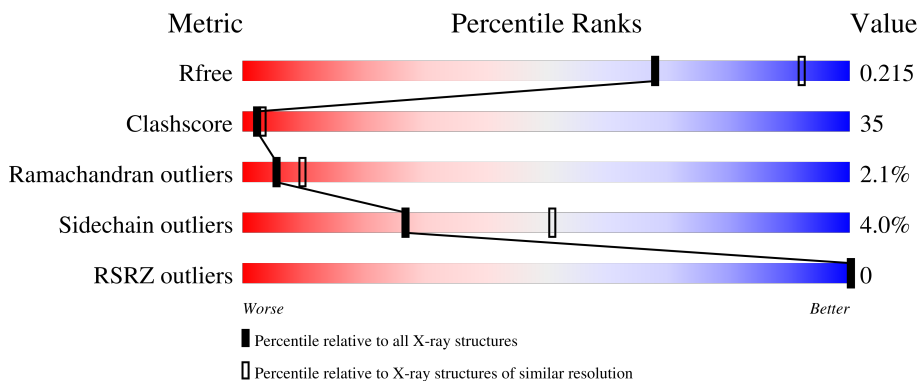|		
PDB ID	:	1KPS
Title	:	Structural Basis for E2-mediated SUMO conjugation revealed by a complex between ubiquitin conjugating enzyme Ubc9 and RanGAP1
Authors	:	Bernier-Villamor, V.; Sampson, D.A.; Matunis, M.J.; Lima, C.D.
Deposited on	:	2002-01-02
Resolution	:	2.50 Å(reported)

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 2.50 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	Percentile Ranks	Value
Rfree		0.215
Clashscore		35
Ramachandran outliers		2.1%
Sidechain outliers		4.0%
RSRZ outliers		0

Worse   *Better*

▮ Percentile relative to all X-ray structures

◫ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5504 (2.50-2.50)
Clashscore	180529	6282 (2.50-2.50)
Ramachandran outliers	177936	6191 (2.50-2.50)
Sidechain outliers	177891	6193 (2.50-2.50)
RSRZ outliers	164620	5504 (2.50-2.50)

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 <=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	159	42% 56% •
1	C	159	47% 48% • •
2	B	171	42% 46% • 9%
2	D	171	50% 36% • • 9%

WORLDWIDE
wwPDB
PROTEIN DATA BANK

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 5537 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 Ubiquitin-like protein SUMO-1 conjugating enzyme.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	159	Total	C	N	O	S	0	0	0
			1274	818	219	229	8			
1	C	156	Total	C	N	O	S	0	0	0
			1254	807	216	224	7			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	cloning artifact	UNP P63279
C	0	SER	-	cloning artifact	UNP P63279

- Molecule 2 is a protein called Ran-GTPase activating protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	156	Total	C	N	O	S	0	0	0
			1206	781	201	219	5			
2	D	155	Total	C	N	O	S	0	0	0
			1198	777	200	216	5			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	419	SER	-	cloning artifact	UNP P46061
D	419	SER	-	cloning artifact	UNP P46061

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	C	1	Total 5	O 4	S 1	0	0
3	D	1	Total 5	O 4	S 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	163	Total 163	O 163	0	0
4	B	130	Total 130	O 130	0	0
4	C	154	Total 154	O 154	0	0
4	D	138	Total 138	O 138	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: Ubiquitin-like protein SUMO-1 conjugating enzyme
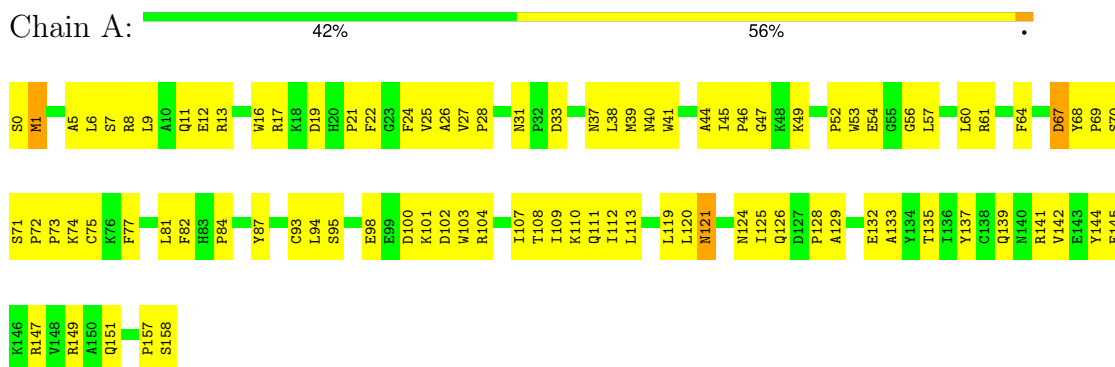
Chain A:

- Molecule 1: Ubiquitin-like protein SUMO-1 conjugating enzyme
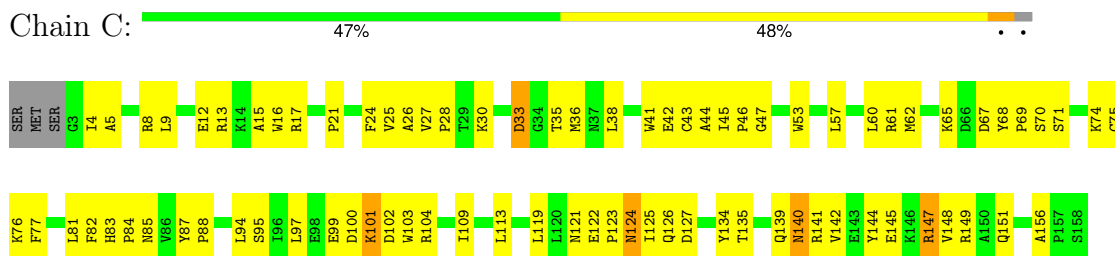
Chain C:

- Molecule 2: Ran-GTPase activating protein 1
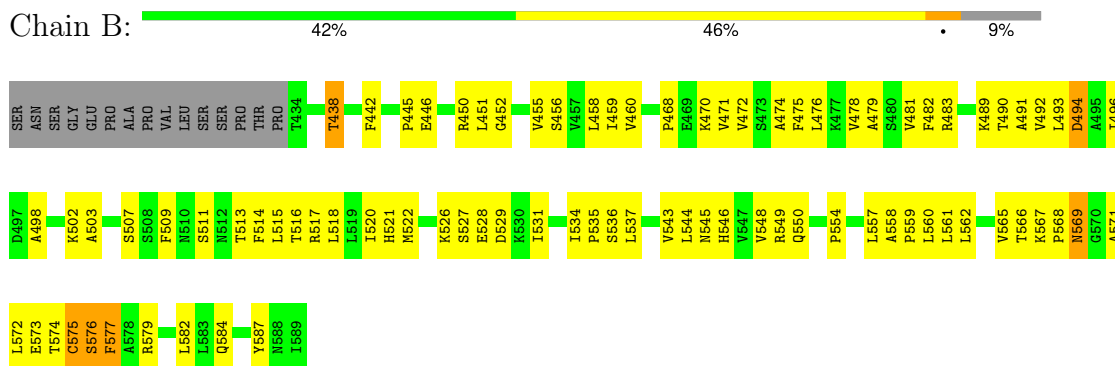
Chain B:

- Molecule 2: Ran-GTPase activating protein 1

Chain D:

50%   36%   · ·   9%

SER ASN SER GLY GLU PRO ALA PRO VAL LEU SER SER PRO THR PRO THR D435 L436 S437 T438 F439 L440 P445 E446 K447 L448 L449 R450 L451 V455 I459 V460 Q461 Q462 T463 D464 T465 S466 D467 P468 E469 K470 V471 K477 V481 F482 R483 D484 D485 K489 L493 D494

L499 K502 A503 N512 T513 F514 L515 T516 R517 L518 L519 D529 K530 I531 K532 L537 H538 G539 P540 L541 M542 V543 L544 N545 V548 R549 Q550 D551 P554 K555 A556 L557 A558 P559 L560 L561 L562 T566 G570 A571 L572 E573 T574 C575 A578 R579 L583 L586

I589

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	86.53Å 126.51Å 72.64Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.25 – 2.50 19.25 – 2.50	Depositor EDS
% Data completeness (in resolution range)	96.6 (19.25-2.50) 96.3 (19.25-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.46 (at 2.49Å)	Xtriage
Refinement program	CNS 0.9	Depositor
R, R_{free}	0.223 , 0.300 0.228 , 0.215	Depositor DCC
R_{free} test set	1370 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	33.0	Xtriage
Anisotropy	0.339	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 64.7	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	5537	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 42.72 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.9575e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: 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	0.36	0/1311	0.58	0/1776
1	C	0.36	0/1291	0.59	0/1750
2	B	0.37	0/1230	0.60	0/1667
2	D	0.36	0/1222	0.57	0/1656
All	All	0.36	0/5054	0.59	0/6849

There are no bond length outliers.

There are no bond angle outliers.

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	1274	0	1274	88	0
1	C	1254	0	1252	92	0
2	B	1206	0	1257	101	0
2	D	1198	0	1253	74	0
3	B	10	0	0	0	0
3	C	5	0	0	0	0
3	D	5	0	0	0	0
4	A	163	0	0	30	0
4	B	130	0	0	34	1

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	154	0	0	35	0
4	D	138	0	0	23	0
All	All	5537	0	5036	346	1

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 35.

All (346) 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)
2:D:499:LEU:HD21	4:D:710:HOH:O	1.60	1.02
2:B:572:LEU:HA	4:B:611:HOH:O	1.63	0.98
2:B:572:LEU:HD23	2:B:579:ARG:HD2	1.47	0.97
1:A:94:LEU:HD13	1:A:119:LEU:HD22	1.47	0.93
1:C:147:ARG:HH11	1:C:147:ARG:HB3	1.35	0.92
1:C:94:LEU:HD13	1:C:119:LEU:HD22	1.54	0.90
2:D:541:LEU:HD11	2:D:572:LEU:HD11	1.56	0.88
1:C:9:LEU:HD13	1:C:38:LEU:O	1.74	0.87
1:C:36:MET:HG2	4:C:736:HOH:O	1.77	0.83
2:B:567:LYS:HG2	4:B:691:HOH:O	1.79	0.83
1:C:87:TYR:HB3	4:C:748:HOH:O	1.78	0.82
1:C:84:PRO:HG2	4:C:709:HOH:O	1.80	0.81
2:D:570:GLY:HA3	4:D:662:HOH:O	1.81	0.81
2:B:545:ASN:O	2:B:549:ARG:HG3	1.81	0.80
2:B:576:SER:HB3	2:B:579:ARG:HB3	1.64	0.80
2:B:451:LEU:HD12	2:B:455:VAL:HG13	1.64	0.79
2:B:557:LEU:HD13	4:B:720:HOH:O	1.82	0.79
2:B:516:THR:O	2:B:520:ILE:HG12	1.83	0.79
1:A:74:LYS:HG3	4:A:252:HOH:O	1.82	0.78
2:B:468:PRO:HA	2:B:509:PHE:HE1	1.49	0.77
1:A:46:PRO:HB2	4:A:302:HOH:O	1.83	0.77
2:B:482:PHE:O	2:B:483:ARG:HG3	1.84	0.77
1:C:76:LYS:NZ	1:C:76:LYS:HB3	2.00	0.77
1:C:103:TRP:O	1:C:104:ARG:HG3	1.84	0.77
1:C:17:ARG:HG3	4:C:752:HOH:O	1.85	0.77
1:C:4:ILE:HG12	4:C:740:HOH:O	1.85	0.76
2:B:455:VAL:O	2:B:459:ILE:HG12	1.85	0.76
2:D:586:LEU:O	2:D:589:ILE:HG22	1.85	0.76
1:C:45:ILE:HD11	1:C:113:LEU:HD22	1.68	0.75
2:D:541:LEU:HB3	4:D:724:HOH:O	1.86	0.74
2:B:515:LEU:HB2	4:B:720:HOH:O	1.86	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:128:PRO:O	2:B:526:LYS:HE2	1.87	0.74
1:A:57:LEU:HD12	1:A:157:PRO:HG3	1.70	0.73
1:A:9:LEU:HD23	4:A:293:HOH:O	1.86	0.73
1:A:125:ILE:HB	4:A:256:HOH:O	1.88	0.73
2:B:566:THR:O	2:B:568:PRO:HD3	1.88	0.73
1:A:103:TRP:O	1:A:104:ARG:HD2	1.89	0.73
2:B:571:ALA:O	2:B:573:GLU:HG3	1.88	0.73
1:C:68:TYR:CD1	1:C:69:PRO:HA	2.24	0.72
2:B:491:ALA:HA	4:B:719:HOH:O	1.89	0.72
2:B:543:VAL:HG11	4:B:700:HOH:O	1.88	0.72
1:C:144:TYR:O	1:C:148:VAL:HG23	1.89	0.71
1:C:147:ARG:HH11	1:C:147:ARG:CB	2.04	0.71
2:D:455:VAL:HG11	4:D:618:HOH:O	1.89	0.71
1:C:156:ALA:HB1	4:C:716:HOH:O	1.91	0.71
1:C:145:GLU:HG2	4:C:657:HOH:O	1.92	0.70
2:B:503:ALA:HB1	4:B:717:HOH:O	1.92	0.70
1:C:30:LYS:HG2	4:C:736:HOH:O	1.89	0.69
2:B:554:PRO:HG2	2:B:557:LEU:CD1	2.22	0.69
2:B:472:VAL:HG11	2:B:521:HIS:HD2	1.58	0.69
1:A:24:PHE:CE2	1:A:45:ILE:HG23	2.28	0.69
1:C:147:ARG:HB3	1:C:147:ARG:NH1	2.06	0.69
4:A:168:HOH:O	2:D:574:THR:HG21	1.93	0.68
1:C:141:ARG:O	1:C:145:GLU:HG3	1.92	0.68
1:C:33:ASP:OD1	1:C:35:THR:HG22	1.94	0.68
2:D:459:ILE:O	2:D:463:THR:HG23	1.93	0.68
2:D:575:CYS:HA	4:D:689:HOH:O	1.94	0.68
2:B:445:PRO:HA	2:B:481:VAL:HG13	1.76	0.68
1:C:127:ASP:HB2	4:C:606:HOH:O	1.93	0.67
1:C:84:PRO:HB3	4:C:695:HOH:O	1.94	0.67
1:A:81:LEU:HB3	4:A:321:HOH:O	1.95	0.67
1:A:112:ILE:HD12	4:A:296:HOH:O	1.95	0.66
2:D:532:LYS:O	2:D:532:LYS:HD3	1.93	0.66
2:D:545:ASN:O	2:D:549:ARG:HG3	1.95	0.66
1:A:142:VAL:HG13	4:A:305:HOH:O	1.94	0.66
2:B:511:SER:HB2	2:B:557:LEU:HD11	1.76	0.66
1:A:0:SER:HA	4:A:280:HOH:O	1.96	0.65
1:A:72:PRO:HB3	1:A:103:TRP:CD2	2.32	0.65
2:B:577:PHE:N	2:B:577:PHE:CD2	2.63	0.65
1:C:46:PRO:HB3	4:C:693:HOH:O	1.97	0.65
1:A:98:GLU:OE1	1:A:101:LYS:HD2	1.97	0.65
2:B:584:GLN:HG3	4:D:682:HOH:O	1.97	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:62:MET:CE	1:C:109:ILE:HG23	2.27	0.64
2:D:513:THR:HG23	4:D:706:HOH:O	1.97	0.64
2:B:492:VAL:O	2:B:496:ILE:HG12	1.97	0.64
1:A:124:ASN:HB2	4:A:257:HOH:O	1.97	0.64
2:B:489:LYS:HE3	2:B:493:LEU:HD12	1.80	0.64
2:D:461:GLN:HA	4:D:692:HOH:O	1.98	0.64
2:B:455:VAL:HA	4:B:695:HOH:O	1.99	0.63
2:B:554:PRO:HG2	2:B:557:LEU:HD12	1.79	0.63
2:B:562:LEU:O	2:B:566:THR:HG22	1.99	0.62
1:A:60:LEU:HD12	1:A:75:CYS:HB3	1.82	0.62
2:D:532:LYS:HD2	4:D:614:HOH:O	1.99	0.62
1:C:46:PRO:HB3	4:C:714:HOH:O	2.00	0.61
1:A:135:THR:OG1	2:B:560:LEU:HD23	2.01	0.61
1:A:72:PRO:HD3	1:A:103:TRP:CD1	2.35	0.61
2:B:458:LEU:HD12	4:B:695:HOH:O	2.01	0.61
2:B:561:LEU:O	2:B:565:VAL:HG23	1.99	0.61
2:B:507:SER:HB3	4:B:726:HOH:O	2.01	0.61
2:D:465:THR:HB	4:D:685:HOH:O	1.99	0.61
2:B:557:LEU:HB3	4:B:720:HOH:O	1.99	0.61
1:A:132:GLU:HB3	4:A:189:HOH:O	2.01	0.61
1:A:49:LYS:HG3	1:A:54:GLU:OE2	2.01	0.61
1:C:30:LYS:HE3	4:C:736:HOH:O	2.01	0.61
1:C:28:PRO:HG3	1:C:41:TRP:CE2	2.35	0.60
2:D:436:LEU:HD23	2:D:462:GLN:HG3	1.82	0.60
2:B:438:THR:HG22	4:B:681:HOH:O	2.01	0.60
2:D:467:ASP:HB3	2:D:470:LYS:HB2	1.83	0.60
1:C:124:ASN:HB2	4:C:727:HOH:O	2.01	0.60
2:B:451:LEU:HB3	4:B:695:HOH:O	2.00	0.60
2:D:450:ARG:O	2:D:450:ARG:HG2	2.01	0.60
2:B:520:ILE:HG22	4:B:679:HOH:O	2.01	0.60
1:C:24:PHE:CE1	1:C:46:PRO:HD2	2.37	0.60
1:C:151:GLN:HG3	4:C:609:HOH:O	2.01	0.60
2:D:477:LYS:HA	4:D:697:HOH:O	2.01	0.60
1:A:16:TRP:CE2	1:A:26:ALA:HB3	2.37	0.60
1:C:8:ARG:HH12	1:C:12:GLU:CD	2.04	0.60
2:D:464:ASP:OD2	2:D:467:ASP:HB2	2.02	0.60
2:B:544:LEU:HD11	4:B:707:HOH:O	2.00	0.60
1:C:76:LYS:HB3	1:C:76:LYS:HZ3	1.66	0.59
2:B:574:THR:HG22	1:C:126:GLN:HG2	1.84	0.59
1:C:135:THR:OG1	2:D:560:LEU:HD23	2.03	0.59
2:D:529:ASP:O	2:D:531:ILE:HG12	2.02	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:9:LEU:HB3	1:A:38:LEU:HB3	1.85	0.59
2:D:436:LEU:HD21	2:D:459:ILE:HG22	1.85	0.58
2:D:513:THR:O	2:D:517:ARG:HB2	2.04	0.58
1:A:126:GLN:HB2	4:A:265:HOH:O	2.04	0.58
2:D:465:THR:HG22	2:D:465:THR:O	2.03	0.58
2:B:520:ILE:HD12	2:B:527:SER:HB3	1.86	0.58
2:B:471:VAL:HG21	4:B:717:HOH:O	2.04	0.57
2:B:470:LYS:HD3	4:B:697:HOH:O	2.04	0.57
1:C:46:PRO:CB	4:C:714:HOH:O	2.52	0.57
2:B:472:VAL:CG1	2:B:521:HIS:HD2	2.16	0.57
1:C:57:LEU:HD13	4:C:723:HOH:O	2.04	0.57
1:A:25:VAL:HB	1:A:44:ALA:HB3	1.87	0.57
1:A:31:ASN:N	4:A:314:HOH:O	2.38	0.57
1:A:68:TYR:CD1	1:A:69:PRO:HA	2.40	0.56
1:C:134:TYR:HA	4:C:695:HOH:O	2.03	0.56
1:C:149:ARG:HD3	4:C:704:HOH:O	2.05	0.56
2:B:483:ARG:HG3	2:B:483:ARG:HH11	1.69	0.56
1:A:22:PHE:O	1:A:24:PHE:HD1	1.88	0.56
1:C:57:LEU:HD22	4:C:723:HOH:O	2.06	0.56
2:D:562:LEU:O	2:D:566:THR:HG22	2.05	0.56
2:D:544:LEU:O	2:D:548:VAL:HG23	2.06	0.55
1:A:24:PHE:CD1	1:A:46:PRO:HD2	2.42	0.55
1:C:103:TRP:CG	1:C:104:ARG:N	2.74	0.55
1:C:147:ARG:HD2	4:C:607:HOH:O	2.06	0.55
2:B:456:SER:O	2:B:460:VAL:HG23	2.06	0.55
1:A:9:LEU:HD13	1:A:38:LEU:O	2.06	0.55
1:A:145:GLU:HB2	4:A:247:HOH:O	2.07	0.55
2:B:452:GLY:O	2:B:455:VAL:HG23	2.06	0.55
1:C:65:LYS:HD3	4:C:747:HOH:O	2.06	0.55
1:C:121:ASN:HA	4:C:721:HOH:O	2.07	0.55
2:D:493:LEU:HD12	4:D:725:HOH:O	2.07	0.55
1:A:93:CYS:HA	4:A:264:HOH:O	2.07	0.55
1:C:5:ALA:HB3	4:C:613:HOH:O	2.07	0.55
1:C:12:GLU:OE1	1:C:12:GLU:HA	2.07	0.55
2:D:438:THR:HG22	4:D:688:HOH:O	2.06	0.55
1:C:62:MET:HE1	1:C:109:ILE:HG23	1.88	0.54
1:A:67:ASP:HB2	1:A:71:SER:OG	2.06	0.54
1:A:110:LYS:HE2	4:A:224:HOH:O	2.06	0.54
2:B:548:VAL:HB	4:B:693:HOH:O	2.07	0.54
1:C:61:ARG:O	1:C:75:CYS:HA	2.08	0.54
2:D:554:PRO:HG2	2:D:557:LEU:HD12	1.88	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:515:LEU:HD22	4:B:720:HOH:O	2.07	0.54
1:C:97:LEU:HB3	4:C:632:HOH:O	2.08	0.54
2:D:541:LEU:HD13	4:D:724:HOH:O	2.08	0.54
1:A:101:LYS:HD3	4:A:317:HOH:O	2.07	0.54
2:B:470:LYS:HD2	4:B:614:HOH:O	2.08	0.54
1:A:109:ILE:HA	4:A:296:HOH:O	2.07	0.53
1:A:125:ILE:HG21	1:A:137:TYR:CD2	2.42	0.53
1:A:24:PHE:CE1	1:A:46:PRO:HD2	2.44	0.53
2:B:545:ASN:HB2	4:B:624:HOH:O	2.08	0.53
1:A:95:SER:HB3	4:A:183:HOH:O	2.08	0.53
2:B:575:CYS:HB2	1:C:125:ILE:HG21	1.89	0.53
2:D:449:LEU:C	2:D:451:LEU:H	2.12	0.53
2:B:476:LEU:CD2	4:B:706:HOH:O	2.57	0.53
2:B:557:LEU:HD22	4:B:720:HOH:O	2.08	0.53
1:C:62:MET:HE3	1:C:109:ILE:HG23	1.90	0.53
1:C:67:ASP:O	1:C:70:SER:HB2	2.09	0.53
2:B:518:LEU:HG	2:B:522:MET:HE1	1.89	0.53
2:B:522:MET:HB3	2:B:537:LEU:HD21	1.89	0.52
2:D:539:GLY:O	2:D:543:VAL:HG23	2.09	0.52
2:D:572:LEU:HB3	4:D:608:HOH:O	2.09	0.52
1:A:17:ARG:HD2	4:A:315:HOH:O	2.09	0.52
1:C:77:PHE:CE1	1:C:81:LEU:HD12	2.45	0.52
1:A:103:TRP:CE3	1:A:107:ILE:HD12	2.44	0.52
1:A:135:THR:O	1:A:139:GLN:HG3	2.09	0.52
1:C:47:GLY:HA3	1:C:53:TRP:O	2.10	0.52
1:A:57:LEU:CD1	1:A:157:PRO:HG3	2.40	0.52
1:C:60:LEU:HB2	4:C:710:HOH:O	2.09	0.52
2:D:436:LEU:HB3	2:D:462:GLN:HE21	1.74	0.52
2:D:466:SER:HB2	4:D:727:HOH:O	2.10	0.51
2:B:445:PRO:CA	2:B:481:VAL:HG13	2.41	0.51
2:B:475:PHE:HD2	4:B:706:HOH:O	1.92	0.51
2:B:576:SER:HB3	2:B:579:ARG:CB	2.38	0.51
2:D:445:PRO:HA	2:D:481:VAL:HG13	1.93	0.51
2:D:537:LEU:O	2:D:540:PRO:HG2	2.11	0.51
1:C:60:LEU:HD12	1:C:75:CYS:HB3	1.92	0.51
2:B:476:LEU:HD23	4:B:706:HOH:O	2.10	0.51
2:B:479:ALA:HB2	4:B:700:HOH:O	2.12	0.50
2:D:515:LEU:O	2:D:519:LEU:HG	2.10	0.50
1:A:87:TYR:CD2	1:A:129:ALA:HB1	2.47	0.50
1:A:132:GLU:H	1:A:132:GLU:CD	2.13	0.50
1:A:47:GLY:HA3	1:A:53:TRP:O	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:521:HIS:CE1	2:B:531:ILE:HG21	2.47	0.50
2:B:535:PRO:HG2	2:B:536:SER:H	1.76	0.50
2:B:575:CYS:HB2	1:C:125:ILE:CG2	2.42	0.50
2:D:539:GLY:N	2:D:540:PRO:HD2	2.25	0.50
1:C:24:PHE:CD1	1:C:46:PRO:HD2	2.47	0.50
1:C:124:ASN:C	1:C:124:ASN:HD22	2.14	0.50
2:D:447:LYS:O	2:D:451:LEU:HB2	2.12	0.50
1:A:61:ARG:HH11	1:A:61:ARG:HG3	1.76	0.50
2:B:518:LEU:HG	2:B:522:MET:CE	2.41	0.50
1:A:113:LEU:HB2	4:A:306:HOH:O	2.12	0.49
1:C:76:LYS:NZ	1:C:76:LYS:CB	2.73	0.49
1:A:84:PRO:HD3	1:A:133:ALA:HB1	1.93	0.49
1:C:25:VAL:O	1:C:43:CYS:HB3	2.12	0.49
2:D:482:PHE:CE1	2:D:489:LYS:HG3	2.47	0.49
2:B:442:PHE:HB3	4:B:619:HOH:O	2.12	0.49
2:D:573:GLU:OE1	2:D:574:THR:N	2.45	0.49
2:D:555:LYS:HD2	2:D:589:ILE:HD11	1.94	0.49
1:C:99:GLU:O	1:C:101:LYS:N	2.44	0.49
2:D:562:LEU:HD13	2:D:586:LEU:HB2	1.94	0.49
1:A:53:TRP:CH2	1:A:120:LEU:HD22	2.48	0.49
2:D:436:LEU:CD2	2:D:462:GLN:HG3	2.43	0.49
2:D:579:ARG:NH1	4:D:603:HOH:O	2.40	0.49
1:C:13:ARG:NH1	4:C:642:HOH:O	2.39	0.48
1:A:61:ARG:HG3	1:A:61:ARG:NH1	2.26	0.48
2:B:490:THR:O	2:B:494:ASP:OD1	2.31	0.48
1:C:76:LYS:HB3	1:C:76:LYS:HZ2	1.78	0.48
1:A:104:ARG:H	1:A:107:ILE:HD12	1.78	0.48
2:B:445:PRO:HA	2:B:481:VAL:CG1	2.43	0.48
1:C:99:GLU:C	1:C:101:LYS:H	2.17	0.48
2:D:460:VAL:CG1	2:D:502:LYS:HD2	2.44	0.47
1:A:103:TRP:C	1:A:104:ARG:HD2	2.34	0.47
2:B:518:LEU:HD21	4:B:707:HOH:O	2.13	0.47
1:C:8:ARG:NH1	1:C:12:GLU:CD	2.68	0.47
2:D:558:ALA:HB3	2:D:559:PRO:CD	2.44	0.47
1:A:53:TRP:CZ3	1:A:120:LEU:HD22	2.50	0.47
1:A:52:PRO:HB3	1:A:149:ARG:HG3	1.97	0.47
1:C:25:VAL:HB	1:C:44:ALA:HB3	1.96	0.47
2:D:460:VAL:HG13	2:D:502:LYS:CD	2.45	0.47
2:B:483:ARG:HG3	2:B:483:ARG:NH1	2.28	0.47
2:B:546:HIS:O	2:B:550:GLN:HG2	2.15	0.47
1:C:61:ARG:HG3	1:C:61:ARG:HH11	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:31:ASN:HB2	1:A:33:ASP:OD1	2.15	0.47
2:B:521:HIS:HA	4:B:679:HOH:O	2.15	0.47
2:B:518:LEU:HD11	4:B:707:HOH:O	2.15	0.47
1:A:72:PRO:HB3	1:A:103:TRP:CE3	2.50	0.46
2:D:436:LEU:HD23	2:D:462:GLN:CG	2.43	0.46
2:B:534:ILE:HD11	2:B:537:LEU:HD23	1.96	0.46
2:D:460:VAL:HG13	2:D:502:LYS:HD2	1.97	0.46
2:B:528:GLU:HA	4:B:664:HOH:O	2.15	0.46
1:C:42:GLU:HG2	1:C:61:ARG:HH12	1.81	0.46
2:B:562:LEU:HD11	2:B:587:TYR:CZ	2.51	0.46
2:B:568:PRO:HG2	2:D:574:THR:HA	1.97	0.46
2:D:467:ASP:O	2:D:471:VAL:HG23	2.15	0.46
2:D:575:CYS:SG	2:D:575:CYS:O	2.74	0.46
2:B:474:ALA:O	2:B:478:VAL:HG23	2.16	0.45
1:C:95:SER:HB2	4:C:734:HOH:O	2.16	0.45
2:D:574:THR:HG22	2:D:574:THR:O	2.15	0.45
2:B:569:ASN:HB2	4:B:691:HOH:O	2.17	0.45
1:C:85:ASN:CG	4:C:709:HOH:O	2.54	0.45
1:C:142:VAL:HA	1:C:145:GLU:OE2	2.16	0.45
2:D:459:ILE:HA	2:D:462:GLN:HB2	1.98	0.45
1:A:64:PHE:CD2	1:A:73:PRO:HB3	2.51	0.45
1:A:121:ASN:HB2	4:A:216:HOH:O	2.17	0.45
1:A:8:ARG:O	1:A:12:GLU:HB2	2.17	0.45
1:A:37:ASN:HB2	4:A:314:HOH:O	2.17	0.45
1:A:46:PRO:HA	1:A:56:GLY:O	2.17	0.45
1:C:139:GLN:O	1:C:140:ASN:HB2	2.17	0.45
1:A:8:ARG:HA	1:A:11:GLN:HG2	1.99	0.44
1:A:13:ARG:HG3	4:A:315:HOH:O	2.17	0.44
1:C:124:ASN:C	1:C:124:ASN:ND2	2.70	0.44
1:A:37:ASN:CB	4:A:314:HOH:O	2.65	0.44
2:B:476:LEU:HD11	2:B:521:HIS:HB2	2.00	0.44
2:D:450:ARG:HA	4:D:619:HOH:O	2.16	0.44
2:D:471:VAL:O	4:D:710:HOH:O	2.21	0.44
2:B:558:ALA:N	2:B:559:PRO:HD2	2.32	0.44
2:D:465:THR:HG22	2:D:503:ALA:HA	2.00	0.44
1:C:101:LYS:HB3	1:C:102:ASP:H	1.51	0.44
1:A:28:PRO:HG3	1:A:41:TRP:CE2	2.53	0.44
1:A:158:SER:HB2	4:A:304:HOH:O	2.18	0.43
1:C:21:PRO:HB2	1:C:24:PHE:CD1	2.53	0.43
2:D:469:GLU:OE1	2:D:517:ARG:HG2	2.18	0.43
1:A:82:PHE:CE1	1:A:133:ALA:HA	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:451:LEU:HB2	2:B:455:VAL:HG22	2.00	0.43
1:A:5:ALA:C	1:A:7:SER:H	2.21	0.43
2:B:481:VAL:CG1	2:B:481:VAL:O	2.66	0.43
2:D:481:VAL:O	2:D:481:VAL:CG1	2.65	0.43
2:B:575:CYS:SG	1:C:134:TYR:CZ	3.11	0.43
1:C:67:ASP:HB2	1:C:71:SER:OG	2.18	0.43
1:C:88:PRO:HD2	4:C:748:HOH:O	2.18	0.43
1:C:122:GLU:HG2	4:C:621:HOH:O	2.18	0.43
2:D:483:ARG:HB3	4:D:670:HOH:O	2.18	0.43
1:A:13:ARG:O	1:A:17:ARG:HG3	2.19	0.43
2:D:572:LEU:O	2:D:573:GLU:O	2.36	0.43
2:B:476:LEU:HD22	2:B:534:ILE:HG21	2.01	0.42
2:D:440:LEU:HD13	4:D:716:HOH:O	2.19	0.42
1:A:64:PHE:CE2	1:A:73:PRO:HB3	2.53	0.42
2:B:450:ARG:HA	4:B:730:HOH:O	2.18	0.42
1:A:37:ASN:OD1	1:A:39:MET:HB2	2.20	0.42
1:A:40:ASN:HD21	1:A:61:ARG:HE	1.66	0.42
1:A:67:ASP:HB3	1:A:70:SER:OG	2.19	0.42
2:B:574:THR:HG22	1:C:126:GLN:CG	2.47	0.42
1:C:27:VAL:O	1:C:27:VAL:HG23	2.19	0.42
1:C:16:TRP:HD1	4:C:752:HOH:O	2.02	0.42
2:D:435:ASP:N	2:D:438:THR:HG1	2.17	0.42
2:B:482:PHE:CD2	2:B:482:PHE:C	2.93	0.42
1:C:124:ASN:ND2	4:C:717:HOH:O	2.51	0.42
1:A:103:TRP:CZ3	1:A:107:ILE:HB	2.54	0.42
1:C:123:PRO:HB2	4:C:709:HOH:O	2.19	0.42
2:D:465:THR:HG21	2:D:502:LYS:HB3	2.00	0.42
1:A:77:PHE:CE1	1:A:81:LEU:HD12	2.54	0.42
1:C:57:LEU:HD23	1:C:57:LEU:HA	1.94	0.42
1:A:5:ALA:C	1:A:7:SER:N	2.72	0.42
1:A:108:THR:O	1:A:111:GLN:HB2	2.19	0.42
2:B:446:GLU:CD	2:B:450:ARG:HH21	2.23	0.42
2:B:558:ALA:HB3	2:B:559:PRO:CD	2.50	0.42
1:A:27:VAL:HA	1:A:28:PRO:HD3	1.88	0.41
2:B:496:ILE:HA	4:B:701:HOH:O	2.20	0.41
2:B:509:PHE:CZ	2:B:514:PHE:HB2	2.55	0.41
2:B:511:SER:O	2:B:514:PHE:HB3	2.20	0.41
1:A:100:ASP:HB3	4:A:212:HOH:O	2.18	0.41
1:A:151:GLN:HG3	4:A:163:HOH:O	2.19	0.41
2:B:562:LEU:HD11	2:B:587:TYR:CE1	2.55	0.41
2:D:440:LEU:O	2:D:477:LYS:HD3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:579:ARG:O	2:D:583:LEU:HG	2.20	0.41
2:B:544:LEU:HD23	2:B:544:LEU:HA	1.90	0.41
4:A:193:HOH:O	2:B:526:LYS:HG2	2.21	0.41
1:A:5:ALA:O	1:A:7:SER:N	2.54	0.41
2:B:460:VAL:CG1	2:B:502:LYS:HD2	2.50	0.41
1:C:83:HIS:CE1	1:C:85:ASN:HB2	2.54	0.41
1:C:74:LYS:HE2	1:C:76:LYS:HD2	2.01	0.41
1:A:1:MET:HG2	4:A:318:HOH:O	2.21	0.41
1:A:21:PRO:HG2	1:A:24:PHE:HB2	2.03	0.41
2:D:551:ASP:HA	4:D:735:HOH:O	2.21	0.41
2:B:460:VAL:HG21	2:B:498:ALA:HB1	2.02	0.41
2:B:522:MET:HB3	2:B:537:LEU:CD2	2.49	0.41
1:C:15:ALA:HB2	4:C:729:HOH:O	2.21	0.41
1:C:82:PHE:CD1	1:C:147:ARG:NH1	2.89	0.41
2:D:465:THR:HG21	2:D:502:LYS:CG	2.51	0.41
2:D:469:GLU:OE1	2:D:517:ARG:CG	2.68	0.41
2:B:452:GLY:O	2:B:455:VAL:CG2	2.69	0.41
2:D:578:ALA:C	4:D:724:HOH:O	2.59	0.41
1:A:52:PRO:HB3	1:A:149:ARG:CG	2.51	0.40
1:A:141:ARG:O	1:A:144:TYR:HB3	2.21	0.40
2:B:517:ARG:O	2:B:520:ILE:HB	2.21	0.40
2:D:562:LEU:HD13	2:D:586:LEU:CB	2.51	0.40
1:C:16:TRP:CE2	1:C:26:ALA:HB3	2.56	0.40
1:C:45:ILE:HA	1:C:46:PRO:HD3	1.82	0.40
1:C:45:ILE:HD11	1:C:113:LEU:CD2	2.46	0.40
1:A:8:ARG:HA	1:A:11:GLN:HE21	1.86	0.40
1:A:125:ILE:H	1:A:125:ILE:HG13	1.61	0.40
2:B:565:VAL:HG11	2:B:582:LEU:HD23	2.03	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:682:HOH:O	4:B:682:HOH:O[2_565]	1.75	0.45

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	157/159 (99%)	143 (91%)	12 (8%)	2 (1%)	10	19
1	C	154/159 (97%)	138 (90%)	13 (8%)	3 (2%)	6	12
2	B	154/171 (90%)	140 (91%)	12 (8%)	2 (1%)	10	19
2	D	153/171 (90%)	133 (87%)	14 (9%)	6 (4%)	2	3
All	All	618/660 (94%)	554 (90%)	51 (8%)	13 (2%)	5	10

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	569	ASN
2	D	573	GLU
1	C	100	ASP
1	C	140	ASN
2	D	465	THR
2	D	575	CYS
1	C	101	LYS
2	D	450	ARG
2	D	530	LYS
2	D	574	THR
1	A	6	LEU
1	A	19	ASP
2	B	576	SER

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	138/138 (100%)	133 (96%)	5 (4%)	30	56
1	C	135/138 (98%)	132 (98%)	3 (2%)	47	73
2	B	138/152 (91%)	132 (96%)	6 (4%)	25	48
2	D	137/152 (90%)	129 (94%)	8 (6%)	17	34
All	All	548/580 (94%)	526 (96%)	22 (4%)	27	51

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	67	ASP
1	A	102	ASP
1	A	121	ASN
1	A	147	ARG
2	B	438	THR
2	B	494	ASP
2	B	513	THR
2	B	529	ASP
2	B	575	CYS
2	B	577	PHE
1	C	33	ASP
1	C	124	ASN
1	C	147	ARG
2	D	463	THR
2	D	485	ASP
2	D	494	ASP
2	D	512	ASN
2	D	517	ARG
2	D	532	LYS
2	D	573	GLU
2	D	575	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	11	GLN
1	A	121	ASN
1	A	139	GLN
2	B	461	GLN
2	B	521	HIS

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Mol	Chain	Res	Type
2	B	588	ASN
1	C	121	ASN
1	C	124	ASN
2	D	545	ASN
2	D	550	GLN
2	D	569	ASN
2	D	584	GLN

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 ⓘ

4 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	SO4	C	602	-	4,4,4	0.36	0	6,6,6	0.07	0
3	SO4	D	601	-	4,4,4	0.36	0	6,6,6	0.13	0
3	SO4	B	604	-	4,4,4	0.38	0	6,6,6	0.07	0
3	SO4	B	603	-	4,4,4	0.40	0	6,6,6	0.06	0

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.

No monomer is involved in short contacts.

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(Å²)	Q<0.9
1	A	159/159 (100%)	-0.37	0	100	100	17, 40, 68, 84	0
1	C	156/159 (98%)	-0.24	0	100	100	16, 45, 66, 76	0
2	B	156/171 (91%)	-0.30	0	100	100	18, 37, 66, 74	0
2	D	155/171 (90%)	-0.33	0	100	100	16, 38, 61, 74	0
All	All	626/660 (94%)	-0.31	0	100	100	16, 40, 66, 84	0

There are no RSRZ outliers to report.

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 monosaccharides in this entry.

6.4 Ligands ⓘ

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(Å²)	Q<0.9
3	SO4	B	604	5/5	0.74	0.12	121,121,122,122	0
3	SO4	B	603	5/5	0.80	0.12	93,93,94,94	0
3	SO4	C	602	5/5	0.81	0.18	156,156,157,157	0
3	SO4	D	601	5/5	0.86	0.10	93,94,94,95	0

6.5 Other polymers ⓘ

There are no such residues in this entry.