



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 09:08 PM UTC

PDB ID : 2NIP / pdb_00002nip
Title : NITROGENASE IRON PROTEIN FROM AZOTOBACTER VINELANDII
Authors : Komiya, H.; Georgiadis, M.M.; Chakrabarti, P.; Woo, D.; Kornuc, J.J.; Rees, D.C.
Deposited on : 1998-05-11
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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

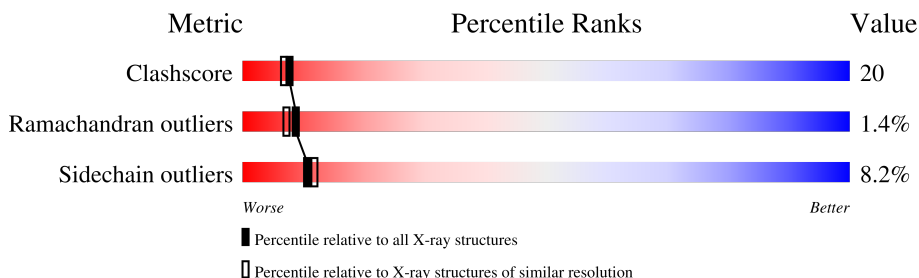
1 Overall quality at a glance

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))
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	289	 60% 33% 6% ..
1	B	289	 62% 34% ..

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 4735 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 NITROGENASE IRON PROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	286	Total	C	N	O	S	40	0	0
			2161	1349	366	425	21			
1	B	289	Total	C	N	O	S	38	1	0
			2194	1368	372	433	21			

- Molecule 2 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	Fe	S	0	0
			8	4	4		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	214	Total	O	0	0
			214	214		

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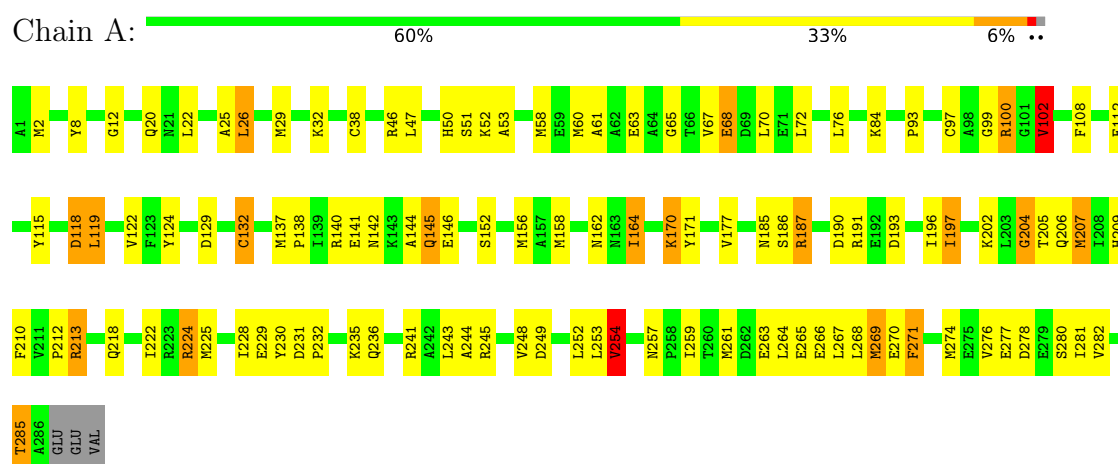
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	158	Total	O	0	0
			158	158		

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. 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. 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.

Note EDS was not executed.

• Molecule 1: NITROGENASE IRON PROTEIN



• Molecule 1: NITROGENASE IRON PROTEIN



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	73.12Å 90.53Å 91.21Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.20	Depositor
% Data completeness (in resolution range)	92.9 (50.00-2.20)	Depositor
R_{merge}	0.09	Depositor
R_{sym}	0.09	Depositor
Refinement program	X-PLOR 3.8	Depositor
R, R_{free}	0.223 , 0.290	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4735	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: SF4

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	0.85	1/2185 (0.0%)	1.17	16/2943 (0.5%)
1	B	0.82	1/2222 (0.0%)	1.23	13/2991 (0.4%)
All	All	0.83	2/4407 (0.0%)	1.20	29/5934 (0.5%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	132	CYS	CB-SG	7.08	2.04	1.81
1	B	132	CYS	CB-SG	-5.13	1.64	1.81

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	72	LEU	CB-CA-C	-12.33	92.80	112.03
1	B	69	ASP	O-C-N	-10.76	108.29	122.59
1	B	73	GLU	N-CA-C	-10.72	87.97	110.80
1	B	255	ILE	N-CA-C	-9.63	97.29	107.60
1	B	61	ALA	N-CA-C	-8.79	100.43	113.61
1	A	278	ASP	N-CA-C	-8.43	100.04	110.41
1	A	164	ILE	N-CA-C	-7.46	103.52	110.53
1	B	72	LEU	N-CA-CB	6.84	119.81	110.57
1	A	102	VAL	CB-CA-C	-6.58	103.25	112.14
1	A	231	ASP	CA-C-N	6.57	126.50	119.28
1	A	231	ASP	C-N-CA	6.57	126.50	119.28
1	A	207	MET	N-CA-C	-6.37	97.27	108.23
1	A	254	VAL	N-CA-C	6.32	118.27	109.29
1	A	269	MET	N-CA-C	-6.18	104.23	110.97
1	A	51	SER	N-CA-C	5.91	119.29	110.14
1	A	197	ILE	N-CA-C	-5.91	104.60	110.62
1	A	213	ARG	N-CA-C	-5.83	101.85	110.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	63	GLU	N-CA-C	-5.82	105.19	112.93
1	A	12	GLY	N-CA-C	5.80	123.83	114.90
1	A	204	GLY	N-CA-C	-5.75	106.53	115.67
1	A	124	TYR	N-CA-C	-5.61	100.15	109.46
1	B	52	LYS	N-CA-C	-5.57	104.71	112.45
1	A	129	ASP	N-CA-C	-5.47	105.47	111.82
1	B	17	THR	N-CA-C	-5.37	105.51	111.36
1	B	112	GLU	N-CA-C	-5.32	106.38	112.92
1	B	217	VAL	N-CA-C	-5.22	105.62	110.53
1	A	271	PHE	N-CA-C	5.13	119.23	112.92
1	B	197	ILE	N-CA-C	-5.12	105.50	110.42
1	B	155	MET	N-CA-C	5.04	117.17	111.02

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	2161	0	2176	88	0
1	B	2194	0	2206	85	0
2	A	8	0	0	1	0
3	A	214	0	0	22	0
3	B	158	0	0	12	0
All	All	4735	0	4382	171	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 20.

All (171) 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:132:CYS:CB	1:A:132:CYS:SG	2.04	1.44
1:B:72:LEU:HB3	1:B:76:LEU:HB3	1.25	1.15
1:A:118:ASP:O	3:A:322:HOH:O	1.77	1.01

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:106:ILE:HD12	1:B:137:MET:HE1	1.59	0.85
1:A:76:LEU:HD21	1:A:84:LYS:HD3	1.60	0.82
1:B:72:LEU:HB3	1:B:76:LEU:CB	2.09	0.81
1:A:206:GLN:HG2	1:A:252:LEU:HD23	1.63	0.80
1:A:271:PHE:HB3	3:A:467:HOH:O	1.81	0.79
1:A:193:ASP:O	1:A:197:ILE:HG13	1.83	0.78
1:B:103:ILE:HA	1:B:137:MET:HE2	1.65	0.77
1:A:118:ASP:O	1:A:119:LEU:HD12	1.87	0.74
1:A:218:GLN:O	1:A:222:ILE:HG13	1.87	0.73
1:B:48:ILE:HG21	1:B:85:CYS:SG	2.30	0.72
1:A:142:ASN:HD22	1:A:177:VAL:HG23	1.54	0.72
1:A:20:GLN:HE22	1:A:47:LEU:H	1.37	0.71
1:A:61:ALA:HB2	1:A:67:VAL:HG12	1.72	0.70
1:B:106:ILE:HB	3:B:374:HOH:O	1.92	0.70
1:B:223:ARG:HH11	1:B:223:ARG:HG3	1.54	0.69
1:B:140:ARG:HG3	1:B:171:TYR:CE2	2.28	0.69
1:B:72:LEU:CB	1:B:76:LEU:HB3	2.13	0.68
1:B:8:TYR:HB3	1:B:164:ILE:HD13	1.74	0.68
1:B:223:ARG:HB3	1:B:225:MET:SD	2.35	0.67
1:A:202:LYS:HG2	1:A:259:ILE:CG2	2.25	0.66
1:B:39:ASP:HB3	3:B:372:HOH:O	1.94	0.66
1:B:50:HIS:CE1	1:B:225:MET:HB3	2.32	0.65
1:B:57:ILE:HD12	1:B:105:ALA:HB2	1.77	0.65
1:B:76:LEU:HD21	1:B:84:LYS:HD3	1.79	0.64
1:A:270:GLU:HB2	3:A:465:HOH:O	1.99	0.63
1:B:146:GLU:HG2	1:B:253:LEU:HD11	1.79	0.63
1:B:32:LYS:HD2	1:B:118:ASP:O	1.99	0.63
1:B:137:MET:HB3	1:B:138:PRO:HD3	1.79	0.62
1:A:245:ARG:HB3	3:A:404:HOH:O	1.99	0.62
1:B:80:TYR:CE2	1:B:229:GLU:HB2	2.34	0.62
1:A:102:VAL:HG22	3:A:339:HOH:O	2.00	0.61
1:A:97:CYS:HA	2:A:290:SF4:S2	2.40	0.61
1:B:48:ILE:CG2	1:B:85:CYS:SG	2.89	0.60
1:B:202:LYS:HE2	3:B:417:HOH:O	2.01	0.60
1:A:140:ARG:NH1	3:A:341:HOH:O	2.33	0.60
1:A:261:MET:O	1:A:265:GLU:HG3	2.02	0.59
1:A:156:MET:HG3	3:B:290:HOH:O	2.02	0.59
1:A:187:ARG:NH1	3:A:315:HOH:O	2.36	0.59
1:A:235:LYS:HG2	3:A:378:HOH:O	2.03	0.59
1:A:202:LYS:HG2	1:A:259:ILE:HG22	1.85	0.58
1:B:223:ARG:HH11	1:B:223:ARG:CG	2.15	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:45:THR:HB	1:B:85:CYS:HB3	1.85	0.58
1:A:8:TYR:HB3	1:A:164:ILE:HD13	1.86	0.57
1:B:57:ILE:HD12	1:B:105:ALA:CB	2.33	0.57
1:B:36:VAL:HA	1:B:86:VAL:CG2	2.34	0.57
1:B:186:SER:HB2	1:B:210:PHE:CZ	2.40	0.57
1:A:100:ARG:NH1	3:A:421:HOH:O	2.37	0.56
1:B:261:MET:O	1:B:265:GLU:HG3	2.05	0.56
1:A:118:ASP:HB3	3:A:322:HOH:O	2.04	0.56
1:B:26:LEU:HD13	1:B:244:ALA:HB1	1.88	0.56
1:A:252:LEU:HD21	3:A:448:HOH:O	2.06	0.56
1:A:191:ARG:NH1	1:A:271:PHE:HA	2.22	0.55
1:B:7:ILE:HD13	1:B:148:TYR:HB2	1.88	0.55
1:B:36:VAL:HA	1:B:86:VAL:HG22	1.89	0.54
1:B:141:GLU:HB3	1:B:143:LYS:HE2	1.88	0.54
1:A:50:HIS:HE1	1:A:229:GLU:OE1	1.90	0.54
1:A:118:ASP:O	1:A:119:LEU:CD1	2.54	0.54
1:A:276:VAL:HG23	3:A:470:HOH:O	2.06	0.54
1:B:233:LYS:O	1:B:233:LYS:HG2	2.07	0.54
1:A:202:LYS:HG2	1:A:259:ILE:HG21	1.90	0.54
1:A:38:CYS:SG	1:A:102:VAL:HG13	2.49	0.53
1:A:158:MET:SD	1:A:268:LEU:HD21	2.48	0.53
1:A:2:MET:HE1	1:A:115:TYR:HB3	1.91	0.53
1:A:204:GLY:O	1:A:254:VAL:HG21	2.09	0.53
1:B:263:GLU:O	1:B:266:GLU:HB3	2.08	0.53
1:A:241:ARG:HG2	3:A:340:HOH:O	2.07	0.53
1:B:2:MET:HE3	1:B:4:GLN:HG3	1.91	0.53
1:A:144:ALA:O	1:A:177:VAL:HG22	2.09	0.53
1:A:196:ILE:HG22	1:A:207:MET:HG3	1.91	0.53
1:A:209:HIS:HB3	1:A:243:LEU:HD13	1.91	0.53
1:B:23:VAL:HG13	1:B:33:VAL:HG11	1.90	0.53
1:B:173:ASN:ND2	3:B:386:HOH:O	2.41	0.53
1:A:187:ARG:HH11	1:A:187:ARG:HG3	1.74	0.52
1:B:187[A]:ARG:NH1	3:B:434:HOH:O	2.41	0.52
1:A:61:ALA:CB	1:A:67:VAL:HG12	2.38	0.52
1:A:137:MET:HE2	1:A:141:GLU:HG3	1.90	0.52
1:A:267:LEU:O	1:A:271:PHE:HD1	1.91	0.52
1:B:217:VAL:HG22	1:B:227:VAL:HG21	1.91	0.52
1:A:25:ALA:O	1:A:29:MET:HB2	2.10	0.52
1:A:72:LEU:HD12	1:A:108:PHE:HE2	1.73	0.52
1:B:49:LEU:O	1:B:50:HIS:HB2	2.09	0.52
1:B:102:VAL:HG12	1:B:137:MET:HE3	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:162:ASN:HB3	3:B:384:HOH:O	2.08	0.52
1:A:142:ASN:ND2	1:A:177:VAL:HG23	2.22	0.52
1:B:160:ALA:O	1:B:164:ILE:HG13	2.10	0.51
1:B:4:GLN:HG2	1:B:122:VAL:CG1	2.40	0.51
1:B:140:ARG:HD3	3:B:325:HOH:O	2.11	0.51
1:A:191:ARG:HH12	1:A:271:PHE:HA	1.76	0.51
1:A:186:SER:HB2	1:A:210:PHE:CZ	2.46	0.51
1:A:212:PRO:HG2	1:A:236:GLN:OE1	2.11	0.50
1:B:32:LYS:NZ	1:B:118:ASP:HB3	2.26	0.50
1:B:130:VAL:O	1:B:130:VAL:HG23	2.10	0.50
1:A:67:VAL:HA	1:A:70:LEU:HG	1.94	0.49
1:A:249:ASP:HB2	3:A:319:HOH:O	2.12	0.49
1:A:46:ARG:HB2	3:A:491:HOH:O	2.11	0.49
1:A:225:MET:HE2	1:A:230:TYR:HA	1.95	0.49
1:B:10:LYS:HG2	1:B:11:GLY:O	2.13	0.49
1:A:187:ARG:HH11	1:A:187:ARG:CG	2.25	0.49
1:A:225:MET:HG3	1:A:230:TYR:HB2	1.94	0.49
1:B:154:GLU:HG3	1:B:187[A]:ARG:HH22	1.78	0.48
1:A:99:GLY:O	1:A:102:VAL:HG23	2.13	0.48
1:B:56:THR:OG1	1:B:59:GLU:HG3	2.13	0.48
1:B:216:VAL:HG23	1:B:230:TYR:HE2	1.78	0.48
1:A:280:SER:HB2	3:A:477:HOH:O	2.13	0.47
1:A:281:ILE:O	1:B:223:ARG:HG3	2.14	0.47
1:B:76:LEU:HD21	1:B:84:LYS:CD	2.44	0.47
1:A:162:ASN:HD21	1:A:259:ILE:N	2.12	0.47
1:A:205:THR:HA	3:A:448:HOH:O	2.15	0.47
1:B:50:HIS:HE1	1:B:225:MET:HB3	1.76	0.47
1:A:20:GLN:HE22	1:A:47:LEU:N	2.10	0.47
1:B:75:VAL:HG11	1:B:108:PHE:HE2	1.80	0.46
1:A:187:ARG:HB3	1:A:187:ARG:CZ	2.45	0.46
1:A:26:LEU:HD13	1:A:244:ALA:HB1	1.98	0.46
1:B:76:LEU:HD23	1:B:76:LEU:O	2.15	0.46
1:A:145:GLN:HA	1:A:177:VAL:HA	1.98	0.46
1:B:33:VAL:HG12	1:B:34:MET:N	2.31	0.45
1:B:223:ARG:CG	1:B:223:ARG:NH1	2.76	0.45
1:A:46:ARG:NH2	1:A:53:ALA:HB2	2.30	0.45
1:B:166:LYS:O	1:B:169:VAL:HB	2.16	0.45
1:B:275:GLU:HA	1:B:275:GLU:OE1	2.16	0.45
1:B:56:THR:O	1:B:60:MET:HG2	2.17	0.45
1:A:265:GLU:O	1:A:269:MET:HG3	2.17	0.45
1:A:76:LEU:HD21	1:A:84:LYS:HB3	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:162:ASN:HD21	1:A:259:ILE:H	1.65	0.45
1:B:141:GLU:CB	1:B:143:LYS:HE2	2.47	0.45
1:B:162:ASN:HD21	1:B:259:ILE:H	1.66	0.44
1:B:75:VAL:HG11	1:B:108:PHE:CE2	2.53	0.44
1:B:13:ILE:HG22	1:B:187[A]:ARG:HH11	1.83	0.44
1:B:218:GLN:O	1:B:222:ILE:HG13	2.18	0.44
1:B:80:TYR:CD1	1:B:80:TYR:C	2.96	0.44
1:B:246:LYS:O	1:B:250:ASN:HB2	2.17	0.44
1:A:46:ARG:CZ	1:A:52:LYS:O	2.66	0.44
1:B:260:THR:OG1	1:B:263:GLU:HG3	2.18	0.44
1:A:224:ARG:HD3	1:B:277:GLU:OE2	2.18	0.44
1:A:191:ARG:HB2	3:A:467:HOH:O	2.18	0.43
1:B:4:GLN:HG2	1:B:122:VAL:HG11	2.00	0.43
1:A:2:MET:SD	1:A:122:VAL:HG23	2.59	0.43
1:B:118:ASP:HA	3:B:324:HOH:O	2.19	0.43
1:B:4:GLN:HA	1:B:122:VAL:HG12	2.01	0.43
1:A:68:GLU:N	1:A:68:GLU:OE1	2.51	0.43
1:B:165:SER:O	1:B:169:VAL:HG23	2.19	0.43
1:A:72:LEU:HD12	1:A:108:PHE:CE2	2.53	0.42
1:A:137:MET:HB3	1:A:138:PRO:HD3	2.00	0.42
1:B:259:ILE:HB	1:B:263:GLU:HB2	2.01	0.42
1:B:275:GLU:HG3	3:B:408:HOH:O	2.19	0.42
1:B:244:ALA:O	1:B:248:VAL:HG23	2.20	0.42
1:A:32:LYS:HB2	3:A:406:HOH:O	2.19	0.42
1:A:187:ARG:HD2	3:A:440:HOH:O	2.19	0.42
1:A:60:MET:HB3	1:A:70:LEU:HD22	2.02	0.42
1:B:4:GLN:HA	1:B:122:VAL:CG1	2.49	0.42
1:B:262:ASP:HB2	3:B:306:HOH:O	2.18	0.42
1:B:170:LYS:NZ	3:B:437:HOH:O	2.52	0.42
1:B:36:VAL:HB	1:B:124:TYR:CD1	2.55	0.42
1:A:76:LEU:C	1:A:76:LEU:HD23	2.45	0.41
1:A:170:LYS:HE3	1:A:171:TYR:CZ	2.54	0.41
1:B:92:GLU:HA	1:B:93:PRO:HD3	1.91	0.41
1:A:244:ALA:O	1:A:248:VAL:HG23	2.21	0.41
1:A:269:MET:HA	1:A:274:MET:O	2.20	0.41
1:A:108:PHE:CZ	1:A:112:GLU:HG3	2.56	0.41
1:B:151:CYS:O	1:B:184:CYS:HA	2.20	0.41
1:A:146:GLU:HG2	1:A:253:LEU:HD11	2.03	0.41
1:A:152:SER:HB2	1:A:187:ARG:HG3	2.03	0.41
1:B:100:ARG:HA	1:B:103:ILE:HG22	2.03	0.41
1:B:216:VAL:HA	1:B:219:ARG:HB2	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:155:MET:HE2	1:B:264:LEU:HD22	2.03	0.40
1:A:228:ILE:O	1:A:232:PRO:HG3	2.21	0.40
1:A:102:VAL:HG21	3:A:328:HOH:O	2.21	0.40
1:A:257:ASN:HB3	3:A:492:HOH:O	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	284/289 (98%)	261 (92%)	21 (7%)	2 (1%)	18	19
1	B	288/289 (100%)	258 (90%)	24 (8%)	6 (2%)	5	3
All	All	572/578 (99%)	519 (91%)	45 (8%)	8 (1%)	9	7

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	67	VAL
1	B	71	GLU
1	A	65	GLY
1	B	70	LEU
1	A	285	THR
1	B	118	ASP
1	B	69	ASP
1	B	215	ASN

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	230/233 (99%)	206 (90%)	24 (10%)	7	7
1	B	234/233 (100%)	220 (94%)	14 (6%)	17	21
All	All	464/466 (100%)	426 (92%)	38 (8%)	10	12

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	LEU
1	A	26	LEU
1	A	58	MET
1	A	63	GLU
1	A	68	GLU
1	A	93	PRO
1	A	100	ARG
1	A	102	VAL
1	A	118	ASP
1	A	119	LEU
1	A	145	GLN
1	A	170	LYS
1	A	185	ASN
1	A	187	ARG
1	A	190	ASP
1	A	213	ARG
1	A	224	ARG
1	A	254	VAL
1	A	263	GLU
1	A	264	LEU
1	A	266	GLU
1	A	277	GLU
1	A	282	VAL
1	A	285	THR
1	B	26	LEU
1	B	60	MET
1	B	66	THR
1	B	68	GLU
1	B	72	LEU
1	B	75	VAL
1	B	116	GLU
1	B	119	LEU
1	B	138	PRO

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Mol	Chain	Res	Type
1	B	155	MET
1	B	194	GLU
1	B	215	ASN
1	B	223	ARG
1	B	261	MET

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	20	GLN
1	A	50	HIS
1	A	142	ASN
1	A	162	ASN
1	A	173	ASN
1	A	185	ASN
1	B	20	GLN
1	B	55	ASN
1	B	162	ASN
1	B	185	ASN
1	B	188	ASN
1	B	215	ASN

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 ⓘ

1 ligand is 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	$\# Z > 2$
2	SF4	A	290	1	0,12,12	-	-	-		

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
2	SF4	A	290	1	-	-	0/6/5/5

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	290	SF4	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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.