Full wwPDB X-ray Structure Validation Report (i)

Feb 8, 2024 – 08:39 AM EST

PDB ID	:	2HOZ
Title	:	Inter-subunit signaling in GSAM
Authors	:	Stetefeld, J.
Deposited on	:	2006-07-17
Resolution	:	2.20 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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	Percentile Ranks	Value
Rfree		0.243
Clashscore		22
Ramachandran outliers		0.2%
Sidechain outliers		5.0%
RSRZ outliers		0.7%

Worse   *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
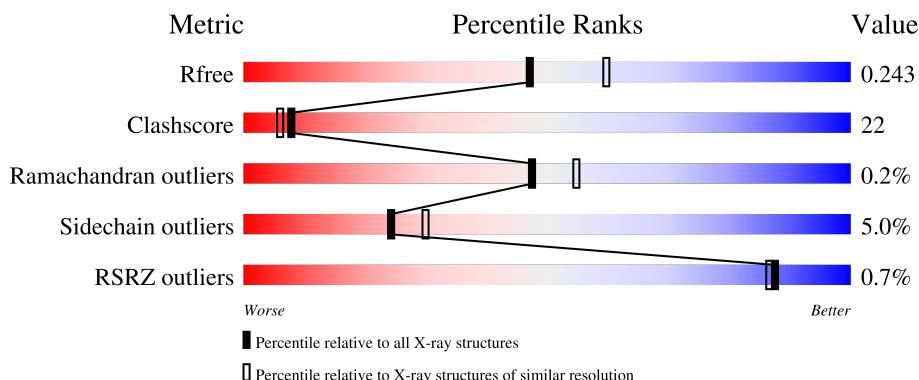
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 <=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	432	68% 28% ··
1	B	432	.% 65% 31% ··
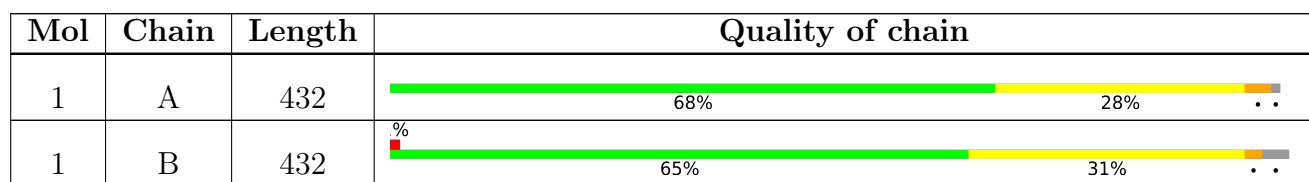
2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 7001 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 Glutamate-1-semialdehyde 2,1-aminomutase (GSAM) pmp-form.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	427	Total	C	N	O	S	0	0	0
			3202	2043	535	605	19			
1	B	420	Total	C	N	O	S	0	0	0
			3161	2018	528	596	19			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1108	ASN	ILE	conflict	UNP P24630
A	1133	ILE	LEU	conflict	UNP P24630
A	1172	SER	ASP	conflict	UNP P24630
A	1179	LYS	SER	conflict	UNP P24630
A	1187	THR	ALA	conflict	UNP P24630
A	1327	GLY	ALA	conflict	UNP P24630
B	2108	ASN	ILE	conflict	UNP P24630
B	2133	ILE	LEU	conflict	UNP P24630
B	2172	SER	ASP	conflict	UNP P24630
B	2179	LYS	SER	conflict	UNP P24630
B	2187	THR	ALA	conflict	UNP P24630
B	2327	GLY	ALA	conflict	UNP P24630

- Molecule 2 is 4'-DEOXY-4'-AMINOPYRIDOXAL-5'-PHOSPHATE (three-letter code: PMP) (formula: $C_8H_{13}N_2O_5P$).
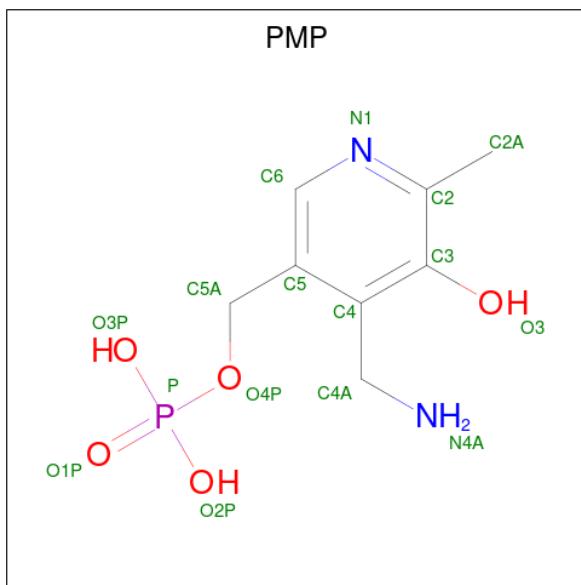
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			16	8	2	5	1		
2	B	1	Total	C	N	O	P	0	0
			16	8	2	5	1		

- Molecule 3 is (4S)-4,5-DIAMINOPENTANOIC ACID (three-letter code: HOZ) (formula: $C_5H_{12}N_2O_2$).
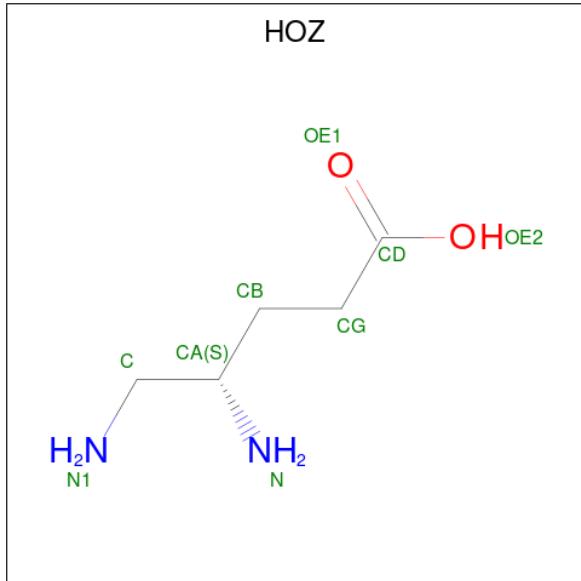
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			9	5	2	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	301	Total O 301 301		0	0
4	B	296	Total O 296 296		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: Glutamate-1-semialdehyde 2,1-aminomutase (GSAM) pmp-form
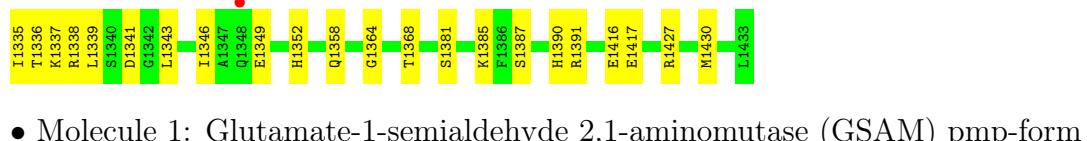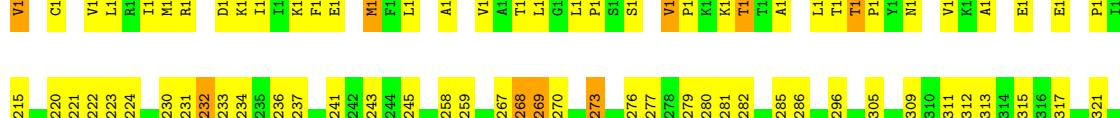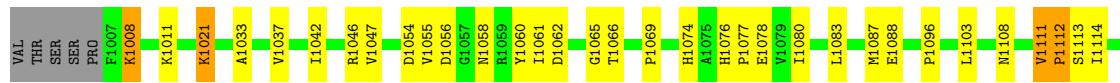
• Molecule 1: Glutamate-1-semialdehyde 2,1-aminomutase (GSAM) pmp-form
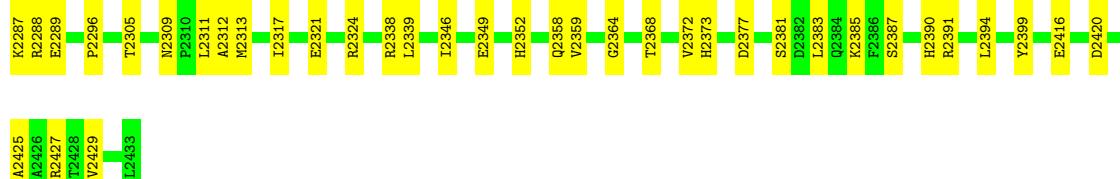
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	65.42Å 107.78Å 121.06Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	22.98 – 2.20 22.98 – 2.17	Depositor EDS
% Data completeness (in resolution range)	94.4 (22.98-2.20) 94.6 (22.98-2.17)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	4.54 (at 2.17Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.197 , 0.250 0.189 , 0.243	Depositor DCC
R_{free} test set	2173 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	15.6	Xtriage
Anisotropy	0.563	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 55.8	EDS
L-test for twinning [2]	$<|L|> = 0.50$, $<L^2> = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	7001	wwPDB-VP
Average B, all atoms (Å^2)	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.35% of the height of the origin peak. No significant pseudotranslation is detected.*

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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: HOZ, PMP

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	0.33	0/3271	0.61	1/4430 (0.0%)
1	B	0.33	0/3229	0.61	0/4371
All	All	0.33	0/6500	0.61	1/8801 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1061	ILE	N-CA-C	-5.69	95.63	111.00

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	3202	0	3182	153	0
1	B	3161	0	3138	144	0
2	A	16	0	11	0	0
2	B	16	0	11	0	0
3	A	9	0	11	4	0
4	A	301	0	0	3	0
4	B	296	0	0	6	0
All	All	7001	0	6353	275	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 22.

All (275) 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:B:2131:LEU:HD12	1:B:2134:MET:HE3	1.36	1.03
1:A:1131:LEU:HA	1:A:1134:MET:HE2	1.43	0.98
1:A:1309:ASN:HD22	1:A:1312:ALA:H	1.12	0.95
1:B:2037:VAL:HG23	1:B:2387:SER:HA	1.51	0.91
1:A:1259:GLN:HE22	1:A:1269:THR:HG21	1.39	0.86
1:A:1083:LEU:O	1:A:1087:MET:HG2	1.77	0.85
1:B:2055:VAL:HB	4:B:7219:HOH:O	1.77	0.85
1:A:1190:ASN:HD21	1:A:1224:ASP:H	1.25	0.84
1:A:1037:VAL:HG21	1:A:1390:HIS:HB3	1.59	0.83
1:A:1190:ASN:ND2	1:A:1224:ASP:H	1.77	0.82
1:B:2190:ASN:HD21	1:B:2224:ASP:H	1.25	0.82
1:A:1134:MET:HE3	1:A:1143:ILE:HD12	1.60	0.81
1:B:2106:MET:CE	1:B:2324:ARG:HH22	1.92	0.81
1:A:1130:VAL:O	1:A:1134:MET:HG3	1.81	0.80
1:B:2259:GLN:HE22	1:B:2269:THR:HG21	1.44	0.80
1:B:2106:MET:HE2	1:B:2324:ARG:HH22	1.44	0.80
1:A:1179:LYS:HA	1:B:2179:LYS:HE3	1.64	0.80
1:A:1188:PRO:HB3	3:A:1:HOZ:HN11	1.47	0.80
1:A:1180:THR:HA	1:B:2180:THR:HG22	1.65	0.79
1:B:2190:ASN:ND2	1:B:2224:ASP:H	1.81	0.78
1:A:1037:VAL:HG23	1:A:1387:SER:HA	1.69	0.73
1:A:1273:LYS:HE3	1:B:2305:THR:HG21	1.69	0.73
1:A:1309:ASN:HD21	1:A:1311:LEU:HB2	1.54	0.73
1:B:2309:ASN:HD22	1:B:2312:ALA:H	1.36	0.73
1:B:2042:ILE:HD11	1:B:2399:TYR:HE1	1.53	0.72
1:B:2338:ARG:NH1	1:B:2420:ASP:OD1	2.22	0.72
1:B:2011:LYS:HB2	1:B:2055:VAL:HG13	1.72	0.72
1:A:1338:ARG:NH2	1:A:1416:GLU:HG3	2.05	0.71
1:B:2267:ASP:HA	1:B:2287:LYS:HE3	1.70	0.71
1:A:1083:LEU:HB3	1:B:2087:MET:HE1	1.71	0.71
1:A:1130:VAL:O	1:A:1133:ILE:HG22	1.91	0.71
1:A:1008:LYS:HD3	4:A:7270:HOH:O	1.91	0.70
1:B:2154:ALA:HB1	1:B:2156:MET:HE3	1.73	0.70
1:A:1131:LEU:HD11	1:A:1143:ILE:HG21	1.73	0.70
1:B:2338:ARG:NH2	1:B:2416:GLU:HG3	2.07	0.70
1:B:2037:VAL:HG21	1:B:2390:HIS:HB3	1.74	0.69
1:B:2232:ARG:HH12	1:B:2267:ASP:CG	1.95	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2131:LEU:HA	1:B:2134:MET:HE2	1.73	0.69
1:A:1131:LEU:HD12	1:A:1134:MET:HE1	1.77	0.67
1:A:1114:ILE:CG2	1:A:1117:VAL:HG13	2.25	0.66
1:A:1173:SER:O	1:A:1176:VAL:HG13	1.96	0.66
1:A:1268:LEU:HD12	1:A:1286:GLY:HA3	1.77	0.66
1:A:1281:VAL:HG12	1:A:1282:GLY:H	1.61	0.66
1:B:2232:ARG:O	1:B:2232:ARG:HD3	1.96	0.65
1:B:2213:PRO:HB2	1:B:2258:VAL:HG11	1.79	0.65
1:A:1309:ASN:ND2	1:A:1312:ALA:H	1.90	0.65
1:A:1279:LEU:O	1:A:1281:VAL:HG23	1.97	0.64
1:B:2317:ILE:O	1:B:2321:GLU:HG3	1.97	0.64
1:A:1185:LEU:HD12	1:A:1185:LEU:N	2.12	0.63
1:B:2066:THR:HG23	1:B:2069:PRO:HD2	1.80	0.63
1:A:1168:LEU:HB3	1:A:1170:LEU:HG	1.81	0.62
1:A:1021:LYS:NZ	1:A:1021:LYS:HB3	2.15	0.62
1:A:1188:PRO:HG3	3:A:1:HOZ:HA	1.81	0.62
1:A:1296:PRO:HD3	1:B:2030:PRO:HA	1.81	0.62
1:B:2054:ASP:HB3	1:B:2056:ASP:H	1.65	0.61
1:A:1134:MET:CE	1:A:1143:ILE:HD12	2.31	0.60
1:B:2338:ARG:HH22	1:B:2416:GLU:HG3	1.66	0.60
1:B:2190:ASN:HD21	1:B:2224:ASP:N	1.98	0.60
1:A:1281:VAL:HG12	1:A:1282:GLY:N	2.15	0.60
1:B:2017:ALA:HA	1:B:2020:GLN:HE21	1.64	0.60
1:B:2131:LEU:HA	1:B:2134:MET:CE	2.32	0.60
1:B:2230:GLY:O	1:B:2234:ILE:HG23	2.01	0.60
1:A:1232:ARG:O	1:A:1232:ARG:HD3	2.00	0.60
1:B:2135:ARG:HD3	1:B:2141:ASP:O	2.01	0.60
1:A:1062:ASP:OD1	1:A:1074:HIS:HE1	1.85	0.60
1:A:1080:ILE:HD12	1:B:2088:GLU:OE1	2.01	0.60
1:A:1346:ILE:HA	1:A:1349:GLU:HG2	1.84	0.60
1:B:2106:MET:HE2	1:B:2324:ARG:NH2	2.16	0.59
1:A:1179:LYS:HB3	1:B:2179:LYS:O	2.03	0.59
1:B:2131:LEU:HD11	1:B:2143:ILE:HG21	1.82	0.59
1:A:1114:ILE:HG23	1:A:1117:VAL:HG13	1.83	0.59
1:B:2040:GLN:HA	1:B:2040:GLN:NE2	2.18	0.59
1:A:1037:VAL:O	1:A:1037:VAL:HG22	2.03	0.59
1:A:1222:VAL:HG13	1:A:1223:PRO:HD2	1.84	0.59
1:B:2042:ILE:HD11	1:B:2399:TYR:CE1	2.36	0.59
1:A:1190:ASN:HD21	1:A:1224:ASP:N	1.97	0.58
1:B:2346:ILE:HA	1:B:2349:GLU:HG2	1.84	0.58
4:A:7325:HOH:O	1:B:2074:HIS:HD2	1.85	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2220:PHE:HB3	1:B:2364:GLY:HA3	1.86	0.58
1:B:2352:HIS:HD2	1:B:2385:LYS:NZ	2.01	0.58
1:A:1190:ASN:HD21	1:A:1223:PRO:HA	1.69	0.57
1:B:2011:LYS:HD2	1:B:2055:VAL:O	2.03	0.57
1:B:2368:THR:HB	1:B:2381:SER:HA	1.85	0.57
1:A:1309:ASN:O	1:A:1313:MET:HG2	2.05	0.57
1:A:1042:ILE:CG2	1:A:1054:ASP:OD1	2.52	0.57
1:B:2130:VAL:HA	1:B:2133:ILE:HG22	1.85	0.57
1:A:1066:THR:HG23	1:A:1069:PRO:HD2	1.86	0.57
1:A:1171:PRO:HB3	1:A:1176:VAL:HG22	1.86	0.57
1:B:2309:ASN:HD21	1:B:2311:LEU:HB2	1.69	0.57
1:A:1054:ASP:OD1	1:A:1060:TYR:HE1	1.88	0.57
1:A:1131:LEU:HD12	1:A:1134:MET:CE	2.35	0.56
1:A:1281:VAL:HG22	1:A:1312:ALA:HB1	1.88	0.56
1:A:1335:ILE:HG13	1:A:1336:THR:N	2.21	0.56
1:A:1368:THR:HB	1:A:1381:SER:HA	1.87	0.56
1:B:2195:VAL:HG12	1:B:2234:ILE:HD11	1.87	0.56
1:A:1215:VAL:HB	1:A:1221:ILE:HB	1.88	0.56
1:A:1276:GLY:CA	1:A:1281:VAL:HG21	2.36	0.56
1:A:1179:LYS:HG3	1:B:2183:ASN:HD21	1.71	0.55
1:A:1352:HIS:HD2	1:A:1385:LYS:NZ	2.04	0.55
1:A:1276:GLY:HA3	1:A:1281:VAL:HG21	1.88	0.55
1:B:2233:GLU:O	1:B:2237:GLU:HG3	2.05	0.55
1:B:2130:VAL:O	1:B:2133:ILE:HG22	2.07	0.55
1:B:2248:MET:HE3	4:B:7410:HOH:O	2.06	0.55
1:B:2215:VAL:HB	1:B:2221:ILE:HB	1.87	0.55
1:A:1179:LYS:HB3	1:B:2179:LYS:HG2	1.88	0.55
1:A:1220:PHE:HB3	1:A:1364:GLY:HA3	1.87	0.55
1:B:2131:LEU:HD22	1:B:2156:MET:SD	2.47	0.55
1:A:1146:PHE:CD1	1:A:1187:THR:HG23	2.41	0.54
1:A:1232:ARG:HH12	1:A:1267:ASP:CG	2.11	0.54
1:A:1338:ARG:HH22	1:A:1416:GLU:HG3	1.72	0.54
1:A:1349:GLU:OE2	1:A:1427:ARG:HD3	2.07	0.54
1:B:2154:ALA:HB1	1:B:2156:MET:CE	2.35	0.54
1:B:2106:MET:HE3	1:B:2324:ARG:HH22	1.71	0.54
1:A:1165:VAL:HG12	1:A:1168:LEU:HD22	1.90	0.54
1:B:2381:SER:O	1:B:2383:LEU:HD12	2.08	0.54
1:A:1037:VAL:HG21	1:A:1390:HIS:CB	2.35	0.53
1:A:1142:LYS:HE2	1:A:1205:GLU:OE1	2.07	0.53
1:A:1130:VAL:HA	1:A:1133:ILE:HG22	1.91	0.53
1:B:2349:GLU:CD	1:B:2427:ARG:HH11	2.12	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2372:VAL:HA	1:B:2377:ASP:HB3	1.90	0.53
1:B:2111:VAL:HG11	1:B:2114:ILE:HD12	1.89	0.53
1:B:2037:VAL:HG23	1:B:2387:SER:CA	2.34	0.53
1:A:1134:MET:SD	1:A:1243:VAL:HG21	2.48	0.53
1:A:1054:ASP:HB3	1:A:1056:ASP:H	1.74	0.53
1:A:1117:VAL:HG12	1:A:1285:GLY:HA3	1.91	0.53
1:A:1167:THR:HG22	1:A:1167:THR:O	2.08	0.53
1:B:2108:ASN:OD1	1:B:2114:ILE:HG22	2.08	0.53
1:B:2008:LYS:HE3	1:B:2056:ASP:O	2.09	0.52
1:B:2222:VAL:HG13	1:B:2223:PRO:HD2	1.91	0.52
1:B:2114:ILE:HG21	1:B:2117:VAL:HG13	1.92	0.52
1:B:2190:ASN:HD21	1:B:2223:PRO:HA	1.73	0.52
1:B:2180:THR:HG21	4:B:7470:HOH:O	2.08	0.52
1:B:2040:GLN:HA	1:B:2040:GLN:HE21	1.73	0.52
1:A:1108:ASN:OD1	1:A:1114:ILE:HG22	2.10	0.51
1:B:2021:LYS:NZ	1:B:2021:LYS:HB3	2.25	0.51
1:A:1188:PRO:HB3	3:A:1:HOZ:N1	2.22	0.51
1:B:2146:PHE:CD1	1:B:2187:THR:HG23	2.45	0.51
1:B:2213:PRO:HB2	1:B:2258:VAL:CG1	2.40	0.51
1:A:1222:VAL:CG1	1:A:1223:PRO:HD2	2.40	0.51
1:B:2037:VAL:O	1:B:2037:VAL:HG22	2.11	0.51
1:B:2111:VAL:CG1	1:B:2114:ILE:HD12	2.41	0.51
1:B:2267:ASP:O	1:B:2268:LEU:HD12	2.10	0.51
1:A:1232:ARG:HD3	1:A:1232:ARG:C	2.31	0.50
1:B:2170:LEU:N	1:B:2170:LEU:HD22	2.27	0.50
1:B:2037:VAL:HG21	1:B:2390:HIS:CB	2.41	0.50
1:B:2383:LEU:HD12	1:B:2383:LEU:N	2.26	0.50
1:B:2042:ILE:HD13	1:B:2042:ILE:H	1.75	0.50
1:A:1245:ASP:HA	1:A:1270:THR:OG1	2.11	0.50
1:B:2338:ARG:NH1	1:B:2420:ASP:CG	2.65	0.50
1:B:2042:ILE:HD13	1:B:2042:ILE:N	2.27	0.49
1:B:2197:ALA:O	1:B:2201:GLU:HG3	2.11	0.49
1:A:1127:CYS:O	1:A:1130:VAL:HG12	2.12	0.49
1:A:1130:VAL:C	1:A:1133:ILE:HG22	2.33	0.49
1:A:1277:GLY:HA3	1:A:1315:ALA:HB1	1.93	0.49
1:A:1317:ILE:O	1:A:1321:GLU:HG3	2.12	0.49
1:B:2309:ASN:ND2	1:B:2311:LEU:HB2	2.28	0.49
1:B:2042:ILE:HD12	1:B:2394:LEU:HD21	1.93	0.49
1:B:2113:SER:OG	1:B:2269:THR:CG2	2.61	0.48
1:B:2185:LEU:HD12	1:B:2185:LEU:N	2.29	0.48
1:A:1179:LYS:HG3	1:B:2183:ASN:ND2	2.27	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1195:VAL:CG1	1:A:1234:ILE:HD12	2.44	0.48
1:A:1309:ASN:ND2	1:A:1311:LEU:HB2	2.24	0.48
1:B:2037:VAL:CG2	1:B:2390:HIS:HB3	2.43	0.48
1:A:1054:ASP:OD1	1:A:1060:TYR:CE1	2.66	0.48
1:A:1077:PRO:HA	1:A:1080:ILE:HG12	1.96	0.48
1:B:2145:LYS:O	1:B:2186:THR:HA	2.13	0.48
1:B:2372:VAL:HA	1:B:2377:ASP:CB	2.44	0.48
1:A:1309:ASN:HD21	1:A:1311:LEU:CB	2.25	0.48
1:A:1021:LYS:HB3	1:A:1021:LYS:HZ3	1.76	0.48
1:A:1114:ILE:HG21	1:A:1117:VAL:HG13	1.96	0.48
1:B:2127:CYS:O	1:B:2130:VAL:HG12	2.14	0.48
1:A:1074:HIS:HD2	4:B:7174:HOH:O	1.97	0.47
1:A:1309:ASN:ND2	1:A:1311:LEU:H	2.12	0.47
1:B:2195:VAL:HG12	1:B:2234:ILE:CD1	2.44	0.47
1:A:1296:PRO:HG3	1:B:2033:ALA:HB2	1.96	0.47
1:A:1145:LYS:O	1:A:1186:THR:HA	2.14	0.47
1:A:1113:SER:OG	1:A:1269:THR:CG2	2.63	0.47
1:A:1179:LYS:HG2	4:A:7358:HOH:O	2.15	0.47
1:A:1338:ARG:NH2	1:A:1416:GLU:CG	2.76	0.47
1:B:2195:VAL:CG1	1:B:2234:ILE:HD11	2.44	0.46
1:A:1352:HIS:HE1	1:A:1430:MET:O	1.99	0.46
1:B:2008:LYS:O	1:B:2008:LYS:HG3	2.16	0.46
1:B:2261:LYS:HE2	1:B:2359:VAL:HG13	1.98	0.46
1:A:1349:GLU:CD	1:A:1427:ARG:HH11	2.19	0.46
1:B:2116:MET:HE3	1:B:2288:ARG:HD3	1.98	0.46
1:B:2309:ASN:O	1:B:2313:MET:HG2	2.15	0.46
1:A:1230:GLY:O	1:A:1234:ILE:HG23	2.16	0.46
1:B:2077:PRO:HA	1:B:2080:ILE:HD11	1.98	0.46
1:B:2134:MET:SD	1:B:2243:VAL:HG21	2.55	0.46
1:A:1135:ARG:HD3	1:A:1141:ASP:O	2.16	0.46
1:A:1185:LEU:N	1:A:1185:LEU:CD1	2.79	0.46
1:A:1147:GLU:HG3	1:A:1161:ALA:HB3	1.97	0.46
1:A:1280:PRO:HB2	1:B:2280:PRO:HB2	1.98	0.46
1:A:1145:LYS:HG3	1:A:1186:THR:HG22	1.98	0.45
1:A:1267:ASP:O	1:A:1268:LEU:HD13	2.16	0.45
1:B:2114:ILE:CG2	1:B:2117:VAL:HG13	2.46	0.45
1:A:1054:ASP:CG	1:A:1058:ASN:HB2	2.37	0.45
1:B:2080:ILE:O	1:B:2084:LYS:HG3	2.17	0.45
1:B:2245:ASP:HA	1:B:2270:THR:OG1	2.17	0.45
1:A:1167:THR:O	1:A:1167:THR:CG2	2.64	0.45
1:B:2113:SER:O	1:B:2286:GLY:HA2	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1011:LYS:HB2	1:A:1055:VAL:HG13	1.99	0.45
1:B:2224:ASP:OD1	1:B:2373:HIS:HD2	1.97	0.45
1:A:1197:ALA:O	1:A:1201:GLU:HG3	2.17	0.45
1:A:1273:LYS:HE3	1:B:2305:THR:CG2	2.44	0.45
1:B:2200:ALA:O	1:B:2203:PRO:HD3	2.17	0.45
1:A:1231:LEU:HA	1:A:1234:ILE:CD1	2.47	0.45
1:B:2011:LYS:CB	1:B:2055:VAL:HG13	2.45	0.45
1:B:2103:LEU:HG	1:B:2317:ILE:HG13	1.99	0.44
1:B:2281:VAL:HG22	1:B:2282:GLY:N	2.32	0.44
1:A:1276:GLY:HA3	1:A:1281:VAL:CG2	2.47	0.44
1:A:1337:LYS:HG2	1:A:1341:ASP:OD2	2.18	0.44
1:B:2130:VAL:O	1:B:2133:ILE:CG2	2.65	0.44
1:B:2202:ASN:HB2	1:B:2206:ILE:HD11	2.00	0.44
1:A:1130:VAL:CA	1:A:1133:ILE:HG22	2.48	0.44
1:B:2130:VAL:CA	1:B:2133:ILE:HG22	2.47	0.44
1:B:2144:ILE:HB	1:B:2209:VAL:HG22	1.99	0.44
1:A:1177:PRO:O	1:A:1180:THR:HG23	2.17	0.44
1:B:2131:LEU:HD13	1:B:2157:PHE:CZ	2.52	0.44
1:A:1259:GLN:HE22	1:A:1269:THR:CG2	2.21	0.44
1:A:1281:VAL:CG2	1:A:1312:ALA:HB1	2.47	0.44
1:A:1305:THR:HG21	1:B:2273:LYS:NZ	2.33	0.44
1:A:1037:VAL:CG2	1:A:1390:HIS:HB3	2.39	0.44
1:B:2045:ASP:OD1	1:B:2046:ARG:NH1	2.51	0.43
1:A:1145:LYS:CG	1:A:1186:THR:HG22	2.48	0.43
1:A:1232:ARG:HD2	1:A:1236:LEU:CD1	2.49	0.43
1:A:1156:MET:CE	1:A:1156:MET:H	2.32	0.43
1:A:1391:ARG:HD2	1:A:1391:ARG:HA	1.86	0.43
1:B:2142:LYS:HB2	1:B:2205:GLU:O	2.17	0.43
1:A:1046:ARG:HB3	1:B:2089:LYS:HB3	2.01	0.43
1:A:1182:ALA:HB3	1:B:2179:LYS:HD3	2.01	0.43
1:B:2062:ASP:OD1	1:B:2074:HIS:HE1	2.01	0.43
1:B:2383:LEU:HD12	1:B:2383:LEU:H	1.83	0.43
1:A:1047:VAL:HG23	1:A:1074:HIS:HB3	2.00	0.43
1:A:1111:VAL:HA	1:A:1112:PRO:HD3	1.84	0.43
1:A:1033:ALA:HB2	1:B:2296:PRO:HG3	2.00	0.42
1:A:1276:GLY:HA2	1:A:1281:VAL:HG21	2.02	0.42
1:B:2111:VAL:HA	1:B:2112:PRO:HD3	1.74	0.42
1:A:1213:PRO:HB2	1:A:1258:VAL:HG11	2.01	0.42
1:A:1309:ASN:ND2	1:A:1311:LEU:N	2.67	0.42
1:B:2148:GLY:O	1:B:2218:SER:HB3	2.20	0.42
1:B:2037:VAL:HG21	1:B:2390:HIS:CG	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2130:VAL:HA	1:B:2133:ILE:CG2	2.49	0.42
1:A:1008:LYS:HD2	1:A:1008:LYS:O	2.20	0.42
1:A:1179:LYS:HD3	1:B:2179:LYS:NZ	2.34	0.42
1:B:2142:LYS:HD2	1:B:2205:GLU:HB3	2.00	0.42
1:A:1127:CYS:HA	1:A:1130:VAL:HG12	2.01	0.42
1:A:1042:ILE:HG21	1:A:1054:ASP:OD1	2.19	0.42
1:A:1054:ASP:HB2	1:A:1058:ASN:HB2	2.02	0.42
1:B:2391:ARG:HD2	1:B:2391:ARG:HA	1.69	0.42
1:A:1176:VAL:HG22	1:A:1176:VAL:O	2.20	0.42
1:B:2287:LYS:HB2	1:B:2289:GLU:HG2	2.02	0.42
1:A:1179:LYS:CB	1:B:2179:LYS:HG2	2.50	0.41
1:A:1279:LEU:HD21	1:A:1311:LEU:HB3	2.03	0.41
1:A:1220:PHE:CB	1:A:1364:GLY:HA3	2.49	0.41
1:A:1076:HIS:CE1	1:A:1078:GLU:HB2	2.54	0.41
1:A:1231:LEU:O	1:A:1234:ILE:HG12	2.20	0.41
1:B:2185:LEU:N	1:B:2185:LEU:CD1	2.84	0.41
1:B:2220:PHE:CB	1:B:2364:GLY:HA3	2.50	0.41
1:A:1011:LYS:CB	1:A:1055:VAL:HG13	2.51	0.41
1:A:1179:LYS:CA	1:B:2179:LYS:HG2	2.50	0.41
1:A:1417:GLU:OE2	1:A:1417:GLU:N	2.46	0.41
1:B:2276:GLY:HA3	1:B:2281:VAL:HG11	2.03	0.41
1:B:2425:ALA:O	1:B:2429:VAL:HG23	2.21	0.41
1:A:1065:GLY:O	1:A:1066:THR:HG22	2.20	0.41
1:B:2232:ARG:NH1	1:B:2267:ASP:OD2	2.54	0.41
1:A:1037:VAL:HG21	1:A:1390:HIS:CG	2.56	0.40
1:A:1087:MET:HE3	1:B:2087:MET:HE1	2.03	0.40
1:B:2047:VAL:HB	1:B:2074:HIS:CG	2.56	0.40
1:A:1233:GLU:O	1:A:1237:GLU:HG3	2.20	0.40
1:A:1188:PRO:CG	3:A:1:HOZ:HA	2.50	0.40
1:A:1083:LEU:HD13	1:B:2087:MET:HE2	2.03	0.40
1:A:1096:PRO:HD3	4:B:7102:HOH:O	2.21	0.40
1:A:1147:GLU:HG3	1:A:1161:ALA:CB	2.51	0.40
1:B:2099:LEU:HG	4:B:7167: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	425/432 (98%)	401 (94%)	22 (5%)	2 (0%)	29	31
1	B	416/432 (96%)	395 (95%)	21 (5%)	0	100	100
All	All	841/864 (97%)	796 (95%)	43 (5%)	2 (0%)	47	55

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1273	LYS
1	A	1112	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	330/335 (98%)	312 (94%)	18 (6%)	21	26
1	B	326/335 (97%)	311 (95%)	15 (5%)	27	34
All	All	656/670 (98%)	623 (95%)	33 (5%)	24	30

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1008	LYS
1	A	1021	LYS
1	A	1088	GLU
1	A	1103	LEU

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Mol	Chain	Res	Type
1	A	1111	VAL
1	A	1117	VAL
1	A	1156	MET
1	A	1158	LEU
1	A	1176	VAL
1	A	1180	THR
1	A	1187	THR
1	A	1232	ARG
1	A	1241	LEU
1	A	1268	LEU
1	A	1269	THR
1	A	1339	LEU
1	A	1343	LEU
1	A	1358	GLN
1	B	2042	ILE
1	B	2053	TRP
1	B	2059	ARG
1	B	2088	GLU
1	B	2103	LEU
1	B	2111	VAL
1	B	2117	VAL
1	B	2156	MET
1	B	2158	LEU
1	B	2176	VAL
1	B	2234	ILE
1	B	2241	LEU
1	B	2269	THR
1	B	2339	LEU
1	B	2358	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1058	ASN
1	A	1074	HIS
1	A	1190	ASN
1	A	1309	ASN
1	A	1352	HIS
1	A	1358	GLN
1	A	1373	HIS
1	B	2020	GLN
1	B	2040	GLN

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Mol	Chain	Res	Type
1	B	2058	ASN
1	B	2074	HIS
1	B	2183	ASN
1	B	2190	ASN
1	B	2259	GLN
1	B	2292	GLN
1	B	2309	ASN
1	B	2352	HIS
1	B	2373	HIS
1	B	2384	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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

3 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	$\#|Z| > 2$
2	PMP	B	6000	-	16,16,16	2.68	6 (37%)	21,23,23	1.65	6 (28%)
2	PMP	A	5000	-	16,16,16	2.74	6 (37%)	21,23,23	1.57	6 (28%)
3	HOZ	A	1	-	7,8,8	1.38	1 (14%)	8,9,9	1.60	2 (25%)

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	PMP	B	6000	-	-	0/8/8/8	0/1/1/1
2	PMP	A	5000	-	-	3/8/8/8	0/1/1/1
3	HOZ	A	1	-	-	5/7/7/7	-

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	6000	PMP	C2-N1	8.63	1.50	1.33
2	A	5000	PMP	C2-N1	8.55	1.49	1.33
2	A	5000	PMP	C5-C4	3.63	1.45	1.40
2	B	6000	PMP	C5-C4	3.23	1.45	1.40
3	A	1	HOZ	CB-CA	2.90	1.57	1.53
2	A	5000	PMP	P-O3P	-2.69	1.44	1.54
2	A	5000	PMP	C2A-C2	2.58	1.54	1.50
2	B	6000	PMP	P-O3P	-2.50	1.45	1.54
2	B	6000	PMP	C2A-C2	2.47	1.54	1.50
2	A	5000	PMP	C3-C2	-2.36	1.38	1.40
2	B	6000	PMP	C3-C2	-2.12	1.38	1.40
2	A	5000	PMP	C6-N1	2.11	1.38	1.34
2	B	6000	PMP	C6-N1	2.06	1.38	1.34

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	6000	PMP	O3P-P-O4P	3.30	115.52	106.73
3	A	1	HOZ	CG-CB-CA	3.24	119.56	112.74
2	A	5000	PMP	O3P-P-O4P	2.87	114.36	106.73
2	A	5000	PMP	C3-C4-C5	2.60	121.22	118.72
2	B	6000	PMP	C3-C4-C5	2.52	121.14	118.72
2	A	5000	PMP	C5-C6-N1	-2.35	119.91	123.82
2	A	5000	PMP	O4P-P-O1P	-2.34	99.91	106.47
2	B	6000	PMP	O4P-P-O1P	-2.32	99.96	106.47
3	A	1	HOZ	CB-CA-C	2.32	113.07	109.56
2	B	6000	PMP	C6-C5-C4	2.26	119.72	118.12
2	A	5000	PMP	C6-C5-C4	2.24	119.70	118.12
2	B	6000	PMP	C5-C6-N1	-2.22	120.13	123.82
2	B	6000	PMP	C3-C2-N1	-2.15	117.98	120.77
2	A	5000	PMP	C3-C2-N1	-2.10	118.06	120.77

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1	HOZ	N1-C-CA-CB
3	A	1	HOZ	N1-C-CA-N
3	A	1	HOZ	C-CA-CB-CG
2	A	5000	PMP	C5-C4-C4A-N4A
3	A	1	HOZ	OE1-CD-CG-CB
3	A	1	HOZ	OE2-CD-CG-CB
2	A	5000	PMP	C5A-O4P-P-O2P
2	A	5000	PMP	C5A-O4P-P-O1P

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1	HOZ	4	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	427/432 (98%)	-0.46	1 (0%)	95	94	9, 16, 29, 37	0
1	B	420/432 (97%)	-0.38	5 (1%)	79	77	9, 16, 32, 49	0
All	All	847/864 (98%)	-0.42	6 (0%)	87	86	9, 16, 30, 49	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	2170	LEU	3.6
1	B	2178	LYS	2.9
1	B	2169	GLY	2.9
1	B	2161	ALA	2.5
1	B	2179	LYS	2.3
1	A	1348	GLN	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 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(Å^2)	Q<0.9
3	HOZ	A	1	9/9	0.83	0.31	29,30,34,35	0
2	PMP	B	6000	16/16	0.93	0.13	13,18,26,28	0
2	PMP	A	5000	16/16	0.94	0.11	12,14,17,27	0

6.5 Other polymers ⓘ

There are no such residues in this entry.