Full wwPDB X-ray Structure Validation Report ⓘ

Jun 13, 2024 – 10:16 AM EDT

PDB ID	:	4I46
Title	:	Crystal structure of 31kD Heat Shock Protein, VcHsp31 from Vibrio cholerae
Authors	:	Sen, U.; Das, S.
Deposited on	:	2012-11-27
Resolution	:	2.50 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:

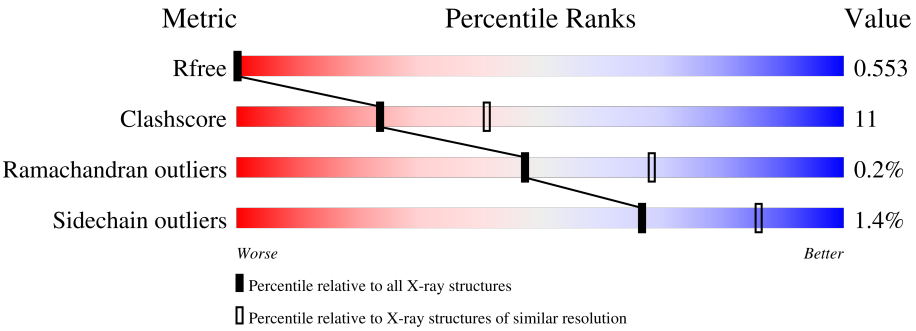
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (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%

Mol	Chain	Length	Quality of chain
1	A	286	72% 26% •
1	B	286	81% 17% •
1	C	286	77% 20% • •
1	D	286	76% 22% •
1	E	286	71% 27% •
1	F	286	73% 25% •

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	MPD	B	5001	-	X	-	-
2	MPD	F	301	-	-	X	-

2 Entry composition

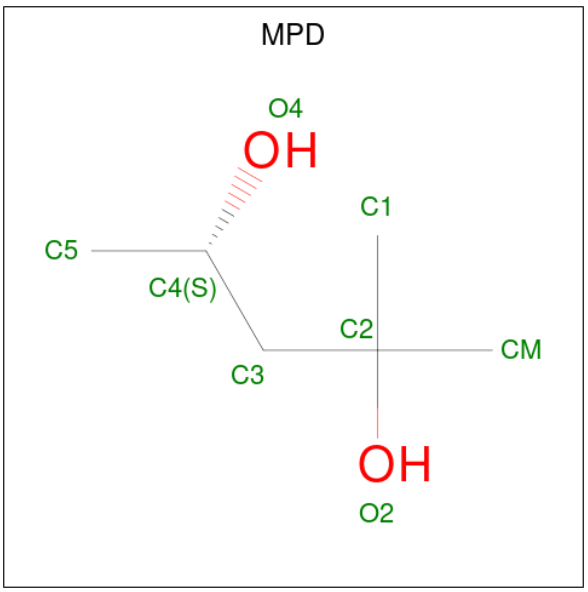
There are 3 unique types of molecules in this entry. The entry contains 13718 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Intracellular protease/amidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	281	Total	C	N	O	S	0	0	0
			2163	1390	352	411	10			
1	B	281	Total	C	N	O	S	0	0	0
			2163	1390	352	411	10			
1	C	281	Total	C	N	O	S	0	0	0
			2163	1390	352	411	10			
1	D	281	Total	C	N	O	S	0	0	0
			2163	1390	352	411	10			
1	E	281	Total	C	N	O	S	0	0	0
			2163	1390	352	411	10			
1	F	281	Total	C	N	O	S	0	0	0
			2163	1390	352	411	10			

- Molecule 2 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula: $C_6H_{14}O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 8 6 2	0	0
2	B	1	Total C O 8 6 2	0	0
2	B	1	Total C O 8 6 2	0	0
2	D	1	Total C O 8 6 2	0	0
2	E	1	Total C O 8 6 2	0	0
2	F	1	Total C O 8 6 2	0	0

- Molecule 3 is water.

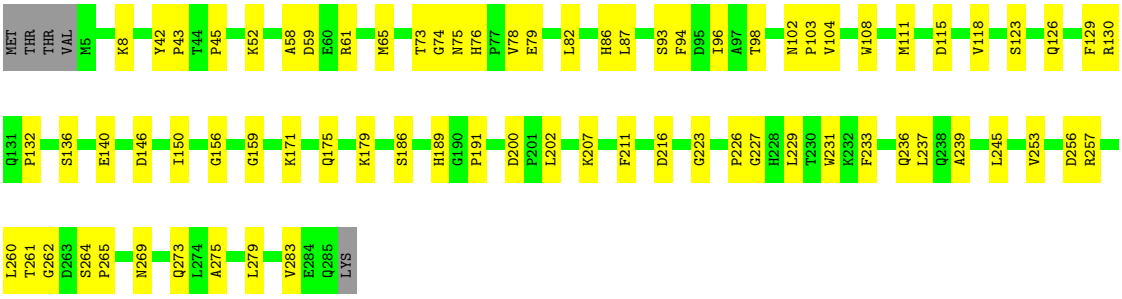
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	131	Total O 131 131	0	0
3	B	131	Total O 131 131	0	0
3	C	113	Total O 113 113	0	0
3	D	123	Total O 123 123	0	0
3	E	91	Total O 91 91	0	0
3	F	103	Total O 103 103	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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.

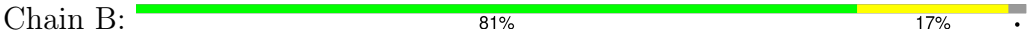
• Molecule 1: Intracellular protease/amidase

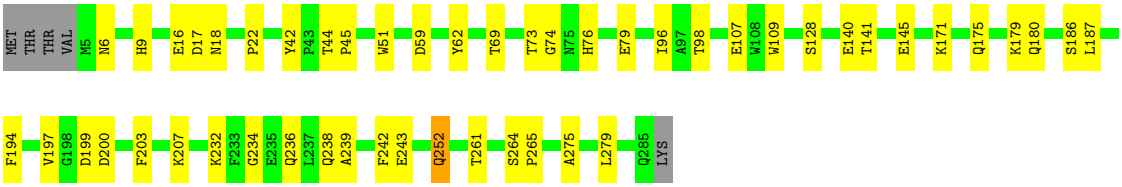
Chain A:



• Molecule 1: Intracellular protease/amidase

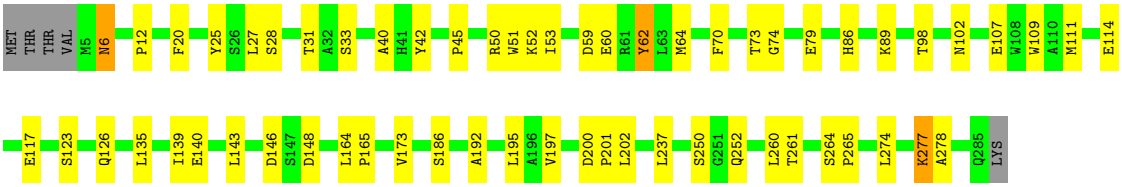
Chain B:





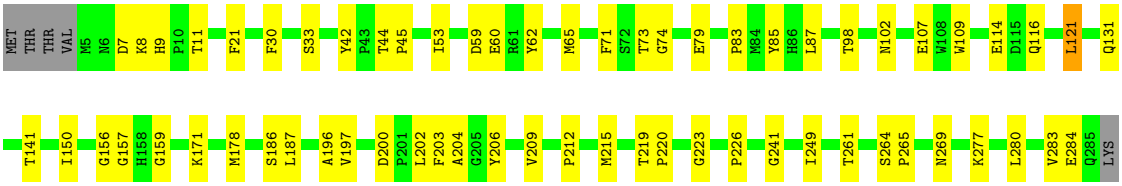
• Molecule 1: Intracellular protease/amidase

Chain C:



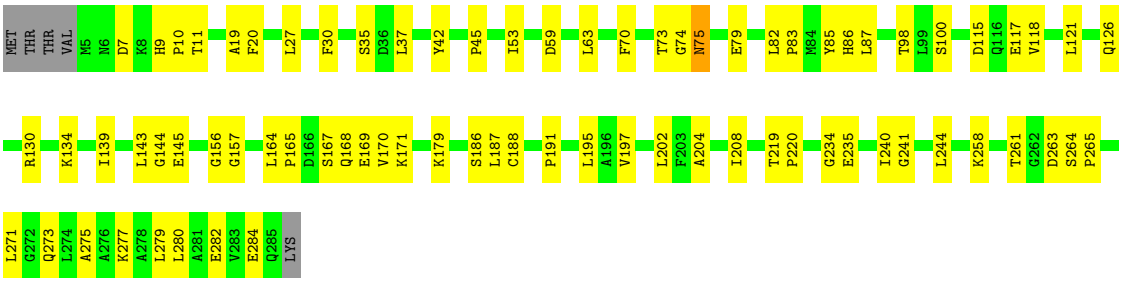
• Molecule 1: Intracellular protease/amidase

Chain D:



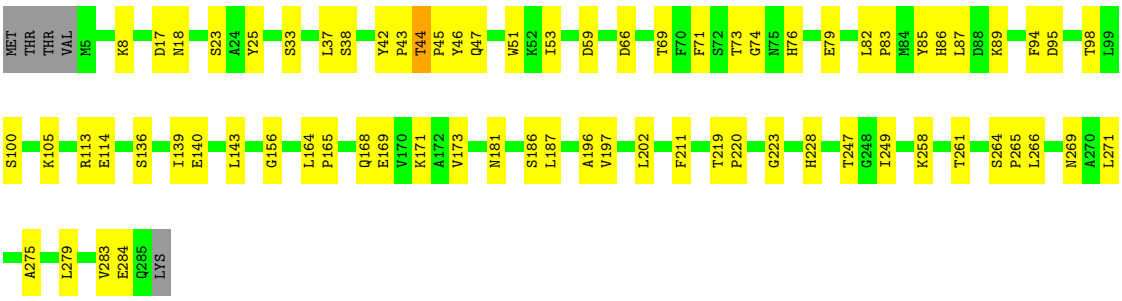
• Molecule 1: Intracellular protease/amidase

Chain E:



• Molecule 1: Intracellular protease/amidase

Chain F:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	73.29Å 80.03Å 133.04Å 90.00° 95.36° 90.00°	Depositor
Resolution (Å)	29.65 – 2.50 66.23 – 1.58	Depositor EDS
% Data completeness (in resolution range)	91.6 (29.65-2.50) 15.1 (66.23-1.58)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.09 (at 1.58Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.199 , 0.259 0.558 , 0.553	Depositor DCC
R_{free} test set	1573 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	2.9	Xtriage
Anisotropy	2.292	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 14.3	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	0.24	EDS
Total number of atoms	13718	wwPDB-VP
Average B, all atoms (Å^2)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.15% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: MPD

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	0.38	0/2225	0.65	0/3023
1	B	0.39	0/2225	0.65	0/3023
1	C	0.39	0/2225	0.64	0/3023
1	D	0.38	0/2225	0.65	0/3023
1	E	0.37	0/2225	0.64	1/3023 (0.0%)
1	F	0.38	0/2225	0.59	0/3023
All	All	0.38	0/13350	0.64	1/18138 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1
1	D	0	1
All	All	0	2

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	E	157	GLY	N-CA-C	-5.20	100.09	113.10

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	62	TYR	Sidechain

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Mol	Chain	Res	Type	Group
1	D	62	TYR	Sidechain

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	2163	0	2072	50	0
1	B	2163	0	2072	36	0
1	C	2163	0	2072	41	0
1	D	2163	0	2072	48	0
1	E	2163	0	2072	61	0
1	F	2163	0	2072	60	0
2	A	8	0	14	3	0
2	B	16	0	28	3	0
2	D	8	0	14	4	0
2	E	8	0	14	4	0
2	F	8	0	14	6	0
3	A	131	0	0	5	0
3	B	131	0	0	2	0
3	C	113	0	0	1	0
3	D	123	0	0	4	0
3	E	91	0	0	5	0
3	F	103	0	0	6	0
All	All	13718	0	12516	287	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 11.

All (287) 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:D:33:SER:HB2	1:D:114:GLU:HG3	1.42	1.00
1:E:126:GLN:HE21	1:E:130:ARG:NH1	1.66	0.93
1:E:126:GLN:HE21	1:E:130:ARG:CZ	1.85	0.88
2:B:5002:MPD:HM3	3:B:5198:HOH:O	1.74	0.86
1:A:58:ALA:H	1:A:75:ASN:HD21	1.31	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:249:ILE:CD1	2:F:301:MPD:H31	2.13	0.78
1:C:40:ALA:O	1:C:89:LYS:HD3	1.85	0.76
1:C:140:GLU:HB3	1:F:143:LEU:HB2	1.68	0.76
1:D:85:TYR:HA	1:D:121:LEU:HD13	1.68	0.74
1:A:58:ALA:H	1:A:75:ASN:ND2	1.89	0.70
1:D:186:SER:O	1:D:261:THR:HA	1.91	0.70
1:E:10:PRO:HB3	3:E:406:HOH:O	1.93	0.68
1:E:208:ILE:HB	1:E:261:THR:HG21	1.75	0.68
1:C:200:ASP:OD2	1:C:202:LEU:HB2	1.94	0.68
1:D:204:ALA:HA	1:D:241:GLY:HA3	1.74	0.68
1:D:42:TYR:O	1:D:45:PRO:HD3	1.95	0.67
1:B:186:SER:O	1:B:261:THR:HA	1.96	0.66
1:A:229:LEU:HA	3:A:484:HOH:O	1.94	0.66
1:C:264:SER:HB2	1:C:265:PRO:CD	2.26	0.66
1:E:126:GLN:NE2	1:E:130:ARG:NH1	2.42	0.65
1:D:53:ILE:HD13	1:D:87:LEU:HD13	1.78	0.65
1:A:186:SER:O	1:A:261:THR:HA	1.96	0.65
1:D:280:LEU:O	1:D:284:GLU:HG3	1.97	0.65
1:E:188:CYS:O	1:E:191:PRO:HD2	1.95	0.65
1:D:202:LEU:H	1:D:202:LEU:HD23	1.62	0.65
1:B:141:THR:HG22	3:B:5132:HOH:O	1.96	0.64
1:E:42:TYR:O	1:E:45:PRO:HD3	1.96	0.64
1:E:134:LYS:HE3	3:F:489:HOH:O	1.96	0.64
1:D:197:VAL:HG11	1:D:202:LEU:HD21	1.80	0.64
1:E:53:ILE:HD13	1:E:87:LEU:HD13	1.79	0.64
1:F:169:GLU:O	1:F:173:VAL:HG23	1.99	0.63
1:B:42:TYR:O	1:B:45:PRO:HD3	1.99	0.63
1:A:179:LYS:HD3	3:A:480:HOH:O	1.98	0.62
1:E:264:SER:HB2	1:E:265:PRO:CD	2.28	0.62
1:E:37:LEU:HD21	1:E:85:TYR:CE2	2.34	0.62
1:C:277:LYS:HE2	3:C:345:HOH:O	1.98	0.62
1:E:53:ILE:CD1	1:E:87:LEU:HD13	2.30	0.62
1:C:186:SER:O	1:C:261:THR:HA	2.00	0.61
1:D:116:GLN:HG2	3:D:519:HOH:O	2.00	0.61
1:D:264:SER:HB2	1:D:265:PRO:CD	2.31	0.61
1:B:232:LYS:O	1:B:236:GLN:HG2	2.01	0.61
1:E:280:LEU:O	1:E:284:GLU:HG2	2.00	0.61
1:C:192:ALA:O	1:C:195:LEU:HB2	2.02	0.60
1:C:139:ILE:HD11	1:C:173:VAL:CG2	2.33	0.59
1:F:265:PRO:HD2	2:F:301:MPD:H12	1.84	0.59
1:C:264:SER:HB2	1:C:265:PRO:HD2	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:249:ILE:HD11	2:F:301:MPD:H31	1.85	0.58
1:A:211:PHE:HE1	2:A:301:MPD:C1	2.16	0.58
1:E:126:GLN:NE2	1:E:130:ARG:CZ	2.64	0.58
1:E:277:LYS:HE3	3:E:484:HOH:O	2.02	0.58
1:F:76:HIS:HE1	3:F:499:HOH:O	1.86	0.57
1:B:275:ALA:O	1:B:279:LEU:HD13	2.03	0.57
1:B:18:ASN:ND2	1:B:69:THR:HA	2.19	0.57
1:E:164:LEU:HB2	1:E:165:PRO:HD3	1.88	0.56
1:C:139:ILE:HD11	1:C:173:VAL:HG23	1.88	0.56
1:A:136:SER:O	1:A:140:GLU:HG3	2.06	0.56
1:C:33:SER:HB2	1:C:114:GLU:HG3	1.86	0.56
1:D:59:ASP:HB3	1:D:98:THR:HB	1.86	0.56
1:D:249:ILE:CD1	2:D:301:MPD:HM1	2.35	0.56
1:E:264:SER:HB2	1:E:265:PRO:HD2	1.88	0.56
1:E:85:TYR:HD1	1:E:121:LEU:HD22	1.71	0.56
1:F:37:LEU:HD21	1:F:85:TYR:CE2	2.41	0.56
1:F:187:LEU:HB3	1:F:271:LEU:HD22	1.88	0.55
1:F:53:ILE:CD1	1:F:87:LEU:HD13	2.37	0.55
1:C:164:LEU:HB2	1:C:165:PRO:HD3	1.88	0.55
1:F:171:LYS:HB2	1:F:196:ALA:O	2.06	0.55
1:F:164:LEU:HB2	1:F:165:PRO:HD3	1.87	0.55
1:C:27:LEU:O	1:C:31:THR:HB	2.05	0.55
1:A:130:ARG:HH22	1:B:18:ASN:HD22	1.54	0.54
1:F:42:TYR:O	1:F:45:PRO:HD3	2.07	0.54
1:F:220:PRO:HG2	1:F:228:HIS:CD2	2.43	0.54
1:A:211:PHE:HE1	2:A:301:MPD:H13	1.73	0.54
1:B:76:HIS:CD2	1:B:79:GLU:HG3	2.43	0.54
1:B:145:GLU:HG3	1:F:284:GLU:C	2.27	0.54
1:A:59:ASP:HB3	1:A:98:THR:HB	1.89	0.54
1:D:264:SER:HB2	1:D:265:PRO:HD2	1.90	0.54
1:F:249:ILE:HD12	2:F:301:MPD:H31	1.89	0.53
1:C:200:ASP:C	1:C:202:LEU:H	2.10	0.53
1:D:171:LYS:HG3	1:D:197:VAL:HA	1.90	0.53
1:F:136:SER:O	1:F:140:GLU:HG3	2.08	0.53
1:B:96:ILE:HD12	1:B:128:SER:CB	2.38	0.53
1:A:279:LEU:O	1:A:283:VAL:HG22	2.09	0.53
1:E:63:LEU:O	1:E:70:PHE:HA	2.08	0.53
1:A:87:LEU:HB2	1:A:94:PHE:HZ	1.74	0.52
1:B:140:GLU:HB3	3:F:416:HOH:O	2.09	0.52
1:F:18:ASN:ND2	1:F:69:THR:HA	2.25	0.52
1:A:189:HIS:HE1	1:A:216:ASP:OD2	1.93	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:186:SER:O	1:E:261:THR:HA	2.09	0.52
1:D:171:LYS:HB2	1:D:196:ALA:O	2.10	0.52
1:E:37:LEU:HD11	1:E:85:TYR:CD2	2.44	0.52
1:D:215:MET:O	1:D:219:THR:HG23	2.10	0.52
1:E:258:LYS:NZ	1:E:282:GLU:OE2	2.41	0.51
1:C:135:LEU:O	1:C:139:ILE:HG12	2.10	0.51
3:A:464:HOH:O	1:B:17:ASP:HB2	2.10	0.51
1:F:82:LEU:HD23	1:F:269:ASN:N	2.25	0.51
1:A:211:PHE:CE1	2:A:301:MPD:H13	2.45	0.51
1:A:253:VAL:HG12	1:A:262:GLY:HA2	1.93	0.51
1:D:249:ILE:HD11	2:D:301:MPD:HM1	1.92	0.51
1:F:46:TYR:O	1:F:47:GLN:HG3	2.11	0.51
1:F:82:LEU:HB3	1:F:83:PRO:HD3	1.93	0.51
1:A:8:LYS:O	1:A:223:GLY:HA3	2.11	0.51
1:E:115:ASP:OD1	1:E:117:GLU:HB2	2.11	0.51
1:E:168:GLN:HB3	3:E:482:HOH:O	2.11	0.51
1:E:195:LEU:HD23	1:E:240:ILE:HD13	1.92	0.51
1:F:186:SER:O	1:F:261:THR:HA	2.12	0.50
1:F:47:GLN:NE2	3:F:490:HOH:O	2.45	0.50
1:B:207:LYS:HE3	1:B:243:GLU:OE1	2.11	0.50
1:C:73:THR:OG1	1:C:74:GLY:N	2.45	0.50
1:A:42:TYR:OH	1:A:86:HIS:HD2	1.94	0.50
1:C:277:LYS:HG3	1:C:278:ALA:N	2.26	0.49
1:B:107:GLU:HB3	1:B:109:TRP:CE2	2.47	0.49
1:E:79:GLU:OE1	1:E:156:GLY:HA3	2.13	0.49
1:F:219:THR:N	1:F:220:PRO:CD	2.75	0.49
1:E:30:PHE:CG	2:E:301:MPD:H11	2.48	0.49
1:F:187:LEU:N	1:F:187:LEU:HD23	2.28	0.49
1:F:171:LYS:HG3	1:F:197:VAL:HA	1.94	0.49
1:F:264:SER:HB2	1:F:265:PRO:CD	2.42	0.49
1:A:65:MET:HG3	1:A:226:PRO:HG2	1.95	0.49
1:C:42:TYR:OH	1:C:86:HIS:HD2	1.96	0.49
1:B:96:ILE:HD12	1:B:128:SER:HB3	1.93	0.48
1:A:171:LYS:O	1:A:175:GLN:HG3	2.12	0.48
1:B:199:ASP:OD1	1:B:200:ASP:N	2.46	0.48
1:B:51:TRP:HA	1:B:51:TRP:CE3	2.48	0.48
1:D:7:ASP:OD2	1:D:9:HIS:HB2	2.14	0.48
1:A:79:GLU:OE2	1:A:265:PRO:HG3	2.13	0.48
1:F:264:SER:HB2	1:F:265:PRO:HD2	1.95	0.48
1:F:275:ALA:O	1:F:279:LEU:HD13	2.13	0.48
1:F:73:THR:OG1	1:F:74:GLY:N	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:95:ASP:HA	3:F:425:HOH:O	2.12	0.48
1:C:60:GLU:OE1	1:D:102:ASN:HB3	2.13	0.48
1:F:197:VAL:HG11	1:F:202:LEU:HD21	1.96	0.48
1:E:167:SER:OG	1:E:170:VAL:HG23	2.13	0.47
1:E:167:SER:CB	1:E:170:VAL:HG23	2.45	0.47
1:F:266:LEU:HD21	2:F:301:MPD:H51	1.96	0.47
1:C:59:ASP:HB3	1:C:98:THR:HB	1.96	0.47
1:E:11:THR:O	1:E:20:PHE:HA	2.14	0.47
1:E:167:SER:HB3	1:E:170:VAL:CG2	2.45	0.47
1:A:96:ILE:HD13	1:A:129:PHE:CE1	2.49	0.47
1:D:79:GLU:O	1:D:83:PRO:HG2	2.14	0.47
1:D:187:LEU:N	1:D:187:LEU:HD23	2.29	0.47
1:A:275:ALA:O	1:A:279:LEU:HD13	2.15	0.47
1:D:107:GLU:HB3	1:D:109:TRP:CE2	2.49	0.47
1:E:235:GLU:HB3	3:E:440:HOH:O	2.15	0.47
1:D:8:LYS:O	1:D:223:GLY:HA3	2.14	0.47
1:E:85:TYR:CD1	1:E:121:LEU:HD22	2.50	0.46
1:B:264:SER:HB2	1:B:265:PRO:CD	2.46	0.46
1:C:42:TYR:O	1:C:45:PRO:HD3	2.15	0.46
1:D:85:TYR:HA	1:D:121:LEU:CD1	2.41	0.46
1:E:30:PHE:HB3	2:E:301:MPD:H31	1.98	0.46
1:F:82:LEU:CB	1:F:83:PRO:HD3	2.45	0.46
1:F:71:PHE:CD1	1:F:73:THR:HB	2.51	0.46
1:A:61:ARG:HH12	1:B:16:GLU:HG2	1.80	0.46
1:A:264:SER:HB2	1:A:265:PRO:CD	2.46	0.46
1:B:194:PHE:O	1:B:197:VAL:HG22	2.16	0.46
1:C:140:GLU:HA	1:F:140:GLU:HA	1.97	0.46
1:D:150:ILE:HG12	1:D:150:ILE:O	2.16	0.46
1:D:212:PRO:HG2	1:D:215:MET:HG3	1.98	0.46
1:D:30:PHE:CD1	2:D:301:MPD:H11	2.51	0.46
1:E:204:ALA:HA	1:E:241:GLY:HA3	1.98	0.46
1:F:8:LYS:HE2	1:F:25:TYR:CD2	2.50	0.46
1:A:42:TYR:O	1:A:45:PRO:HD3	2.16	0.46
1:A:73:THR:OG1	1:A:74:GLY:N	2.49	0.46
1:C:195:LEU:HD13	1:C:237:LEU:HD23	1.97	0.46
1:F:44:THR:HG23	3:F:421:HOH:O	2.16	0.46
1:A:76:HIS:CE1	1:A:78:VAL:HB	2.51	0.45
1:A:191:PRO:O	1:A:237:LEU:HD21	2.16	0.45
1:C:51:TRP:HA	1:C:148:ASP:O	2.16	0.45
1:D:197:VAL:CG1	1:D:202:LEU:HD21	2.46	0.45
1:F:105:LYS:HA	1:F:105:LYS:HD3	1.69	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:30:PHE:O	2:E:301:MPD:H52	2.16	0.45
1:E:143:LEU:HB3	1:E:144:GLY:H	1.51	0.45
1:F:89:LYS:HD3	1:F:89:LYS:HA	1.79	0.45
1:F:139:ILE:HG22	1:F:173:VAL:HG22	1.98	0.45
1:A:96:ILE:HD13	1:A:129:PHE:CD1	2.52	0.45
1:F:53:ILE:HD13	1:F:87:LEU:HD13	1.98	0.45
1:E:86:HIS:NE2	1:E:273:GLN:HG2	2.32	0.45
1:A:79:GLU:OE1	1:A:156:GLY:HA3	2.17	0.45
1:C:260:LEU:HD22	1:C:274:LEU:HD21	1.98	0.45
1:D:141:THR:HB	3:D:505:HOH:O	2.16	0.45
1:E:79:GLU:OE2	1:E:265:PRO:HG3	2.17	0.45
1:F:211:PHE:CE1	2:F:301:MPD:H11	2.52	0.45
1:A:43:PRO:HG2	3:A:494:HOH:O	2.15	0.45
1:E:30:PHE:CD1	2:E:301:MPD:H11	2.51	0.45
1:F:37:LEU:HD12	1:F:38:SER:N	2.32	0.45
1:F:87:LEU:HB2	1:F:94:PHE:HZ	1.82	0.45
1:A:102:ASN:HB3	1:A:103:PRO:HD2	1.99	0.45
1:B:171:LYS:O	1:B:175:GLN:HG3	2.16	0.45
1:B:187:LEU:N	1:B:187:LEU:HD23	2.32	0.44
1:E:100:SER:HB2	1:F:100:SER:HB3	1.99	0.44
1:A:104:VAL:HG23	1:A:132:PRO:HG3	1.98	0.44
1:A:227:GLY:HA2	3:A:513:HOH:O	2.16	0.44
1:A:269:ASN:O	1:A:273:GLN:HG3	2.18	0.44
1:F:23:SER:HB3	1:F:223:GLY:HA3	1.98	0.44
1:A:74:GLY:HA2	1:A:159:GLY:HA3	2.00	0.44
1:E:59:ASP:HB3	1:E:98:THR:HB	1.98	0.44
1:A:236:GLN:O	1:A:239:ALA:HB3	2.17	0.44
1:E:27:LEU:HD12	3:E:424:HOH:O	2.18	0.44
1:B:44:THR:O	1:B:44:THR:HG23	2.18	0.44
1:B:234:GLY:O	1:B:238:GLN:HG3	2.18	0.44
1:D:178:MET:HG3	1:D:202:LEU:HD12	2.00	0.44
1:E:197:VAL:HG11	1:E:202:LEU:HD21	2.00	0.44
1:B:203:PHE:CG	1:B:242:PHE:CZ	3.06	0.44
1:B:265:PRO:HB2	2:B:5001:MPD:H53	2.00	0.44
1:E:275:ALA:O	1:E:279:LEU:HD13	2.18	0.44
1:C:62:TYR:HB3	1:C:70:PHE:CD1	2.53	0.44
1:D:277:LYS:HB2	3:D:473:HOH:O	2.17	0.44
1:E:73:THR:HG23	1:E:74:GLY:N	2.33	0.44
1:A:123:SER:O	1:A:126:GLN:HG2	2.18	0.43
1:B:96:ILE:HD12	1:B:128:SER:HB2	2.00	0.43
1:A:115:ASP:HB3	1:A:118:VAL:HB	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:65:MET:HG3	1:D:226:PRO:HG2	2.00	0.43
1:E:171:LYS:HG3	1:E:197:VAL:HA	1.99	0.43
1:B:16:GLU:HB2	1:B:62:TYR:CE1	2.54	0.43
1:F:53:ILE:HB	1:F:94:PHE:CD1	2.54	0.43
1:C:64:MET:CE	1:D:131:GLN:HE21	2.32	0.43
1:D:73:THR:HG23	1:D:74:GLY:N	2.34	0.43
1:C:107:GLU:HB3	1:C:109:TRP:CE2	2.54	0.43
1:D:73:THR:OG1	1:D:74:GLY:N	2.52	0.43
1:A:108:TRP:CZ3	1:A:111:MET:CE	3.01	0.43
1:A:231:TRP:CZ3	1:A:233:PHE:HA	2.54	0.43
1:C:79:GLU:OE2	1:C:265:PRO:HG3	2.19	0.43
1:D:79:GLU:OE1	1:D:156:GLY:HA3	2.18	0.43
1:B:79:GLU:OE2	1:B:265:PRO:HG3	2.18	0.43
1:D:249:ILE:O	1:D:249:ILE:HG13	2.19	0.43
1:D:11:THR:HB	1:D:21:PHE:HB2	2.01	0.42
1:E:219:THR:N	1:E:220:PRO:CD	2.82	0.42
1:A:42:TYR:HA	1:A:43:PRO:HD2	1.85	0.42
1:A:256:ASP:O	1:A:257:ARG:HB2	2.18	0.42
1:B:6:ASN:HB3	1:B:9:HIS:NE2	2.34	0.42
1:C:6:ASN:HD22	1:C:6:ASN:HA	1.56	0.42
1:D:203:PHE:O	1:D:206:TYR:HB2	2.19	0.42
1:D:280:LEU:HA	1:D:283:VAL:HG22	2.01	0.42
1:C:50:ARG:HG3	1:C:148:ASP:OD1	2.19	0.42
1:E:35:SER:HB3	1:E:118:VAL:HG21	2.00	0.42
1:E:167:SER:HB3	1:E:170:VAL:HG23	2.02	0.42
1:D:71:PHE:CD1	1:D:73:THR:HB	2.54	0.42
1:A:200:ASP:C	1:A:202:LEU:H	2.21	0.42
1:D:157:GLY:C	1:D:159:GLY:H	2.23	0.42
1:A:82:LEU:HD23	1:A:269:ASN:HB2	2.02	0.42
1:E:7:ASP:OD2	1:E:9:HIS:HB2	2.19	0.42
1:E:139:ILE:HD11	1:E:169:GLU:O	2.20	0.42
1:A:52:LYS:HB3	1:A:93:SER:HB2	2.02	0.42
1:C:197:VAL:HG11	1:C:202:LEU:HD23	2.02	0.42
1:D:265:PRO:HG2	2:D:301:MPD:O4	2.19	0.42
1:F:79:GLU:OE1	1:F:156:GLY:HA3	2.20	0.42
1:C:52:LYS:C	1:C:53:ILE:HD12	2.40	0.42
1:E:75:ASN:HD22	1:E:75:ASN:HA	1.74	0.42
1:F:42:TYR:OH	1:F:86:HIS:HD2	2.01	0.42
1:F:51:TRP:HA	1:F:51:TRP:CE3	2.55	0.42
1:A:260:LEU:N	1:A:260:LEU:CD1	2.83	0.41
1:C:25:TYR:O	1:C:28:SER:HB3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:73:THR:OG1	1:E:74:GLY:N	2.50	0.41
1:F:37:LEU:HD12	1:F:38:SER:H	1.85	0.41
1:B:22:PRO:HG2	1:B:109:TRP:CZ3	2.54	0.41
1:B:179:LYS:HG3	1:B:180:GLN:NE2	2.35	0.41
1:D:269:ASN:HB3	3:D:416:HOH:O	2.21	0.41
1:E:19:ALA:HA	1:E:70:PHE:O	2.21	0.41
1:E:187:LEU:HB3	1:E:271:LEU:HD22	2.02	0.41
1:E:263:ASP:OD1	1:E:264:SER:N	2.53	0.41
1:C:140:GLU:HA	1:F:139:ILE:O	2.21	0.41
1:C:123:SER:O	1:C:126:GLN:HG2	2.20	0.41
1:E:42:TYR:OH	1:E:86:HIS:HD2	2.03	0.41
1:E:234:GLY:O	1:E:244:LEU:HD11	2.21	0.41
1:F:59:ASP:HB3	1:F:98:THR:HB	2.02	0.41
1:F:136:SER:O	1:F:139:ILE:HG12	2.21	0.41
1:B:236:GLN:O	1:B:239:ALA:HB3	2.21	0.41
1:C:143:LEU:HB2	1:F:140:GLU:HB3	2.03	0.41
1:F:53:ILE:HD12	1:F:94:PHE:CE1	2.56	0.41
1:A:108:TRP:CZ3	1:A:111:MET:HE2	2.56	0.41
1:A:150:ILE:HG12	1:A:150:ILE:O	2.21	0.41
1:F:33:SER:OG	1:F:114:GLU:HB2	2.20	0.41
1:B:59:ASP:HB3	1:B:98:THR:HB	2.03	0.41
1:B:252:GLN:HE21	1:B:252:GLN:HB2	1.76	0.41
1:C:102:ASN:HB3	1:D:60:GLU:OE1	2.21	0.41
1:C:12:PRO:HG3	1:C:20:PHE:HE1	1.85	0.41
1:C:200:ASP:O	1:C:202:LEU:N	2.45	0.41
1:A:207:LYS:HB3	1:A:245:LEU:HD11	2.03	0.40
1:D:200:ASP:CG	1:D:202:LEU:HD22	2.41	0.40
1:E:82:LEU:HB2	1:E:83:PRO:HD3	2.03	0.40
1:F:168:GLN:HE22	1:F:171:LYS:HD3	1.86	0.40
2:B:5001:MPD:O4	2:B:5001:MPD:C1	2.69	0.40
1:F:181:ASN:ND2	1:F:258:LYS:NZ	2.70	0.40
1:B:73:THR:HG23	1:B:74:GLY:N	2.36	0.40
1:C:40:ALA:HA	1:C:86:HIS:CD2	2.56	0.40
1:D:219:THR:N	1:D:220:PRO:CD	2.84	0.40
1:E:202:LEU:N	1:E:202:LEU:HD23	2.35	0.40
1:F:42:TYR:HA	1:F:43:PRO:HD2	1.95	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	279/286 (98%)	267 (96%)	12 (4%)	0	100 100
1	B	279/286 (98%)	262 (94%)	17 (6%)	0	100 100
1	C	279/286 (98%)	262 (94%)	15 (5%)	2 (1%)	22 39
1	D	279/286 (98%)	262 (94%)	17 (6%)	0	100 100
1	E	279/286 (98%)	264 (95%)	15 (5%)	0	100 100
1	F	279/286 (98%)	259 (93%)	19 (7%)	1 (0%)	34 54
All	All	1674/1716 (98%)	1576 (94%)	95 (6%)	3 (0%)	47 68

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	250	SER
1	C	201	PRO
1	F	283	VAL

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	226/233 (97%)	225 (100%)	1 (0%)	91 97
1	B	226/233 (97%)	225 (100%)	1 (0%)	91 97
1	C	226/233 (97%)	220 (97%)	6 (3%)	44 71
1	D	226/233 (97%)	223 (99%)	3 (1%)	69 87

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	E	226/233 (97%)	223 (99%)	3 (1%)	69 87
1	F	226/233 (97%)	221 (98%)	5 (2%)	52 77
All	All	1356/1398 (97%)	1337 (99%)	19 (1%)	67 86

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	146	ASP
1	B	252	GLN
1	C	6	ASN
1	C	111	MET
1	C	117	GLU
1	C	146	ASP
1	C	252	GLN
1	C	277	LYS
1	D	44	THR
1	D	121	LEU
1	D	209	VAL
1	E	75	ASN
1	E	145	GLU
1	E	179	LYS
1	F	17	ASP
1	F	44	THR
1	F	66	ASP
1	F	113	ARG
1	F	247	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	75	ASN
1	A	86	HIS
1	A	181	ASN
1	A	189	HIS
1	B	18	ASN
1	B	29	GLN
1	B	76	HIS
1	B	86	HIS
1	B	131	GLN
1	B	180	GLN

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Mol	Chain	Res	Type
1	B	236	GLN
1	B	238	GLN
1	B	252	GLN
1	C	6	ASN
1	C	86	HIS
1	C	273	GLN
1	D	76	HIS
1	D	86	HIS
1	D	102	ASN
1	D	131	GLN
1	D	168	GLN
1	E	47	GLN
1	E	86	HIS
1	E	126	GLN
1	E	218	GLN
1	F	18	ASN
1	F	76	HIS
1	F	86	HIS
1	F	168	GLN
1	F	181	ASN
1	F	189	HIS

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

6 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	MPD	A	301	-	7,7,7	0.51	0	9,10,10	0.44	0
2	MPD	B	5001	-	7,7,7	1.31	1 (14%)	9,10,10	5.78	7 (77%)
2	MPD	D	301	-	7,7,7	0.44	0	9,10,10	0.26	0
2	MPD	B	5002	-	7,7,7	0.52	0	9,10,10	0.70	0
2	MPD	F	301	-	7,7,7	0.74	0	9,10,10	0.38	0
2	MPD	E	301	-	7,7,7	0.51	0	9,10,10	0.29	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
2	MPD	A	301	-	-	0/5/5/5	-
2	MPD	B	5001	-	-	1/5/5/5	-
2	MPD	D	301	-	-	0/5/5/5	-
2	MPD	B	5002	-	-	0/5/5/5	-
2	MPD	F	301	-	-	0/5/5/5	-
2	MPD	E	301	-	-	0/5/5/5	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	5001	MPD	CM-C2	-2.30	1.45	1.52

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	5001	MPD	O2-C2-C3	-10.85	68.69	109.27
2	B	5001	MPD	O2-C2-CM	-9.48	78.45	107.99
2	B	5001	MPD	CM-C2-C3	7.93	144.39	110.20
2	B	5001	MPD	C1-C2-C3	-3.67	94.35	110.20
2	B	5001	MPD	CM-C2-C1	-2.38	105.30	110.63
2	B	5001	MPD	O4-C4-C3	2.31	120.54	111.35
2	B	5001	MPD	O2-C2-C1	-2.24	101.02	107.99

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	5001	MPD	O2-C2-C3-C4

There are no ring outliers.

6 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	301	MPD	3	0
2	B	5001	MPD	2	0
2	D	301	MPD	4	0
2	B	5002	MPD	1	0
2	F	301	MPD	6	0
2	E	301	MPD	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

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.