



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 10:26 AM GMT

PDB ID : 3LSU
Title : Crystal Structure of SOD2 from *Saccharomyces cerevisiae*
Authors : Sheng, Y.; Cascio, D.; Valentine, J.S.
Deposited on : 2010-02-12
Resolution : 1.90 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

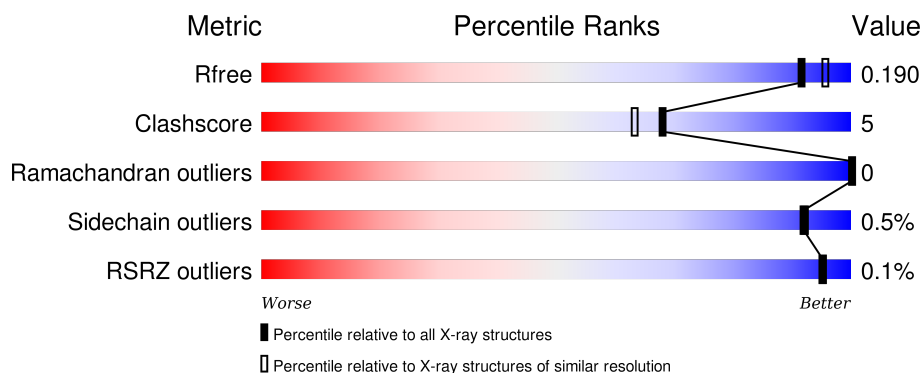
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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}	91344	4755 (1.90-1.90)
Clashscore	102246	5398 (1.90-1.90)
Ramachandran outliers	100387	5338 (1.90-1.90)
Sidechain outliers	100360	5339 (1.90-1.90)
RSRZ outliers	91569	4766 (1.90-1.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	207	<div> <div style="width: 92%;"></div> <div style="width: 7%;"></div> </div>
1	B	207	<div> <div style="width: 92%;"></div> <div style="width: 8%;"></div> </div>
1	C	207	<div> <div style="width: 91%;"></div> <div style="width: 9%;"></div> </div>
1	D	207	<div> <div style="width: 91%;"></div> <div style="width: 9%;"></div> </div>

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
3	GOL	B	209	-	-	-	X
3	GOL	C	210	-	-	-	X
3	GOL	D	209	-	-	-	X
3	GOL	D	210	-	-	-	X

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 7111 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 Superoxide dismutase [Mn], mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	206	Total	C	N	O	S	0	1	0
			1665	1082	276	304	3			
1	B	207	Total	C	N	O	S	0	0	0
			1668	1084	277	305	2			
1	C	206	Total	C	N	O	S	0	0	0
			1660	1078	276	304	2			
1	D	207	Total	C	N	O	S	0	0	0
			1668	1084	277	305	2			

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Mn	0	0
			1	1		
2	A	1	Total	Mn	0	0
			1	1		
2	D	1	Total	Mn	0	0
			1	1		
2	C	1	Total	Mn	0	0
			1	1		

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	C	O	0	0
			6	3	3		
3	C	1	Total	C	O	0	0
			6	3	3		
3	D	1	Total	C	O	0	0
			6	3	3		
3	D	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	1	Total	Na	0	0
			1	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	108	Total	O	0	0
			108	108		
5	B	104	Total	O	0	0
			104	104		
5	C	107	Total	O	0	0
			107	107		
5	D	102	Total	O	0	0
			102	102		

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

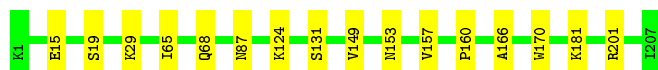
- Molecule 1: Superoxide dismutase [Mn], mitochondrial

Chain A:  92% 7%



- Molecule 1: Superoxide dismutase [Mn], mitochondrial

Chain B:  92% 8%



- Molecule 1: Superoxide dismutase [Mn], mitochondrial

Chain C:  91% 9%



- Molecule 1: Superoxide dismutase [Mn], mitochondrial

Chain D:  91% 9%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	63.66Å 64.93Å 66.55Å 109.36° 106.35° 109.68°	Depositor
Resolution (Å)	32.38 – 1.90 37.01 – 1.90	Depositor EDS
% Data completeness (in resolution range)	89.2 (32.38-1.90) 76.6 (37.01-1.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.31 (at 1.89Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.5_2)	Depositor
R, R_{free}	0.162 , 0.195 0.155 , 0.190	Depositor DCC
R_{free} test set	3029 reflections (5.05%)	DCC
Wilson B-factor (Å ²)	23.1	Xtriage
Anisotropy	0.251	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 39.5	EDS
Estimated twinning fraction	0.008 for k,h,-h-k-l 0.005 for -k,-h,-l 0.010 for -h,-k,h+k+l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 59989 reflections	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7111	wwPDB-VP
Average B, all atoms (Å ²)	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.58% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, MN, MLY, NA

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	0/1537	0.49	0/2109
1	B	0.37	0/1537	0.50	0/2110
1	C	0.36	0/1529	0.50	0/2099
1	D	0.36	0/1537	0.50	0/2110
All	All	0.36	0/6140	0.50	0/8428

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 [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	1665	0	1632	22	0
1	B	1668	0	1634	12	0
1	C	1660	0	1624	13	0
1	D	1668	0	1636	27	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	B	6	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	6	0	8	0	0
3	D	12	0	16	1	0
4	C	1	0	0	0	0
5	A	108	0	0	1	0
5	B	104	0	0	0	0
5	C	107	0	0	2	0
5	D	102	0	0	1	0
All	All	7111	0	6558	62	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 5.

All (62) 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:72:MLY:HH23	1:D:68:GLN:HE22	1.28	0.95
1:D:87:ASN:HD22	1:D:201:ARG:HH12	1.17	0.91
1:A:87:ASN:HD22	1:A:201:ARG:HH12	1.21	0.88
1:B:87:ASN:HD22	1:B:201:ARG:HH12	1.24	0.85
1:C:87:ASN:HD22	1:C:201:ARG:HH12	1.27	0.82
1:A:46:GLN:HE22	1:D:46:GLN:HE22	1.26	0.82
1:D:45:PHE:HD1	1:D:67:ILE:HD11	1.50	0.76
1:D:45:PHE:CD1	1:D:67:ILE:HD11	2.22	0.74
1:A:87:ASN:HD21	1:A:166:ALA:H	1.35	0.73
1:D:87:ASN:HD21	1:D:166:ALA:H	1.34	0.73
1:C:116:GLU:OE2	1:C:119:MLY:HH22	1.89	0.72
1:A:64[A]:MET:HE3	1:D:71:ILE:HG21	1.74	0.69
1:D:48:LEU:HD12	1:D:67:ILE:HD13	1.73	0.68
1:B:87:ASN:HD21	1:B:166:ALA:H	1.42	0.67
1:B:149:VAL:HG11	1:B:157:VAL:HG11	1.76	0.66
1:A:45:PHE:CE2	1:D:45:PHE:HD2	2.14	0.65
1:A:87:ASN:ND2	1:A:166:ALA:H	1.94	0.65
1:C:87:ASN:HD21	1:C:166:ALA:H	1.45	0.64
1:A:72:MLY:HH23	1:D:68:GLN:NE2	2.09	0.62
1:D:87:ASN:ND2	1:D:166:ALA:H	1.98	0.61
1:D:87:ASN:HD22	1:D:201:ARG:NH1	1.95	0.59
1:C:182:MLY:HH13	5:C:235:HOH:O	2.02	0.58
1:A:45:PHE:CZ	1:D:45:PHE:HD2	2.20	0.58
1:B:87:ASN:ND2	1:B:166:ALA:H	2.02	0.57
1:C:87:ASN:ND2	1:C:166:ALA:H	2.03	0.56
1:A:45:PHE:HD1	1:A:64[A]:MET:HE1	1.71	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:158:THR:HA	1:D:62:ARG:NH2	2.20	0.55
1:A:52:LEU:HD22	1:A:64[B]:MET:SD	2.50	0.52
1:A:45:PHE:HD1	1:A:64[A]:MET:CE	2.23	0.51
1:D:163:PRO:HG2	1:D:207:ILE:HG21	1.93	0.51
1:A:46:GLN:NE2	1:D:46:GLN:HE22	2.01	0.50
1:C:105:MLY:HH13	1:C:109:GLU:HG3	1.93	0.50
1:A:45:PHE:CD1	1:A:64[A]:MET:HE1	2.48	0.48
1:B:65:ILE:O	1:B:68:GLN:HG3	2.13	0.48
1:A:45:PHE:CD1	1:A:64[A]:MET:CE	2.96	0.48
1:D:45:PHE:CB	1:D:67:ILE:HD11	2.45	0.47
1:A:1:MLY:HD3	1:A:1:MLY:HH12	1.69	0.47
5:A:366:HOH:O	1:B:29:MLY:HH13	2.14	0.46
1:D:65:ILE:O	1:D:68:GLN:HG3	2.16	0.46
1:C:8:MLY:HD2	1:C:8:MLY:HH23	1.70	0.45
1:C:2:VAL:HG23	1:C:35:VAL:HG13	1.99	0.44
1:D:145:MLY:HH22	1:D:145:MLY:HD2	1.72	0.44
1:B:181:MLY:HD2	1:B:181:MLY:HH12	1.84	0.44
1:A:45:PHE:CZ	1:D:45:PHE:CD2	3.05	0.43
1:D:16:PRO:HG2	3:D:210:GOL:H31	1.99	0.43
1:A:130:GLY:HA3	1:B:153:ASN:ND2	2.33	0.43
1:C:29:MLY:HH13	5:D:212:HOH:O	2.18	0.43
1:B:15:GLU:HG2	1:B:19:SER:HA	2.01	0.43
1:C:181:MLY:HD3	5:C:259:HOH:O	2.19	0.42
1:D:159:GLY:HA3	1:D:160:PRO:HD3	1.85	0.42
1:C:145:MLY:HH22	1:C:145:MLY:HD2	1.87	0.42
1:B:87:ASN:HD22	1:B:201:ARG:NH1	2.05	0.42
1:D:115:ASP:O	1:D:119:MLY:HG2	2.20	0.42
1:A:71:ILE:HD13	1:D:45:PHE:CZ	2.55	0.41
1:A:64[A]:MET:CE	1:D:71:ILE:HD13	2.50	0.41
1:B:131:SER:HB3	1:B:170:TRP:CE2	2.55	0.41
1:C:72:MLY:HH13	1:C:155:ASP:OD2	2.21	0.41
1:B:124:MLY:HD3	1:B:124:MLY:HH22	1.76	0.41
1:D:45:PHE:HA	1:D:67:ILE:HD11	2.02	0.41
1:A:131:SER:HB3	1:A:170:TRP:CE2	2.56	0.41
1:D:45:PHE:CA	1:D:67:ILE:HD11	2.51	0.41
1:C:124:MLY:HH12	1:C:124:MLY:HD2	1.84	0.40

There are no symmetry-related clashes.

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	191/207 (92%)	187 (98%)	4 (2%)	0	100	100
1	B	190/207 (92%)	186 (98%)	4 (2%)	0	100	100
1	C	190/207 (92%)	188 (99%)	2 (1%)	0	100	100
1	D	190/207 (92%)	186 (98%)	4 (2%)	0	100	100
All	All	761/828 (92%)	747 (98%)	14 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	154/154 (100%)	153 (99%)	1 (1%)	90	90
1	B	154/154 (100%)	153 (99%)	1 (1%)	90	90
1	C	153/154 (99%)	152 (99%)	1 (1%)	88	88
1	D	154/154 (100%)	154 (100%)	0	100	100
All	All	615/616 (100%)	612 (100%)	3 (0%)	92	92

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	21	GLN
1	B	160	PRO
1	C	150	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	87	ASN
1	A	153	ASN
1	B	87	ASN
1	B	153	ASN
1	C	87	ASN
1	C	153	ASN
1	D	46	GLN
1	D	68	GLN
1	D	87	ASN
1	D	153	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

64 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	MLY	A	1	1	9,10,11	1.01	1 (11%)	9,11,13	0.99	0
1	MLY	A	105	1	9,10,11	1.20	1 (11%)	9,11,13	1.08	0
1	MLY	A	119	1	9,10,11	1.13	1 (11%)	9,11,13	0.97	0
1	MLY	A	124	1	9,10,11	0.99	1 (11%)	9,11,13	0.93	0
1	MLY	A	138	1	9,10,11	0.89	0	9,11,13	0.71	0
1	MLY	A	145	1	9,10,11	1.13	1 (11%)	9,11,13	0.89	0
1	MLY	A	181	1	9,10,11	0.97	1 (11%)	9,11,13	0.72	0
1	MLY	A	182	1	9,10,11	1.14	1 (11%)	9,11,13	1.09	1 (11%)
1	MLY	A	187	1	9,10,11	1.16	1 (11%)	9,11,13	0.95	0
1	MLY	A	196	1	9,10,11	1.06	1 (11%)	9,11,13	0.84	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	MLY	A	206	1	9,10,11	1.33	1 (11%)	9,11,13	1.32	1 (11%)
1	MLY	A	29	1	9,10,11	1.07	1 (11%)	9,11,13	0.80	0
1	MLY	A	54	1	9,10,11	1.04	1 (11%)	9,11,13	0.97	1 (11%)
1	MLY	A	63	1	9,10,11	1.09	1 (11%)	9,11,13	0.98	1 (11%)
1	MLY	A	72	1	9,10,11	1.01	1 (11%)	9,11,13	0.95	0
1	MLY	A	8	1	9,10,11	1.25	1 (11%)	9,11,13	1.02	0
1	MLY	B	1	1	9,10,11	1.28	1 (11%)	9,11,13	1.12	0
1	MLY	B	105	1	9,10,11	1.19	1 (11%)	9,11,13	0.99	0
1	MLY	B	119	1	9,10,11	1.11	1 (11%)	9,11,13	1.04	0
1	MLY	B	124	1	9,10,11	0.94	0	9,11,13	1.02	0
1	MLY	B	138	1	9,10,11	0.95	0	9,11,13	1.16	1 (11%)
1	MLY	B	145	1	9,10,11	0.86	0	9,11,13	0.85	0
1	MLY	B	181	1	9,10,11	0.95	1 (11%)	9,11,13	0.84	0
1	MLY	B	182	1	9,10,11	0.99	1 (11%)	9,11,13	1.18	2 (22%)
1	MLY	B	187	1	9,10,11	1.17	1 (11%)	9,11,13	1.11	1 (11%)
1	MLY	B	196	1	9,10,11	1.28	1 (11%)	9,11,13	1.06	0
1	MLY	B	206	1	9,10,11	1.05	1 (11%)	9,11,13	1.15	1 (11%)
1	MLY	B	29	1	9,10,11	1.00	1 (11%)	9,11,13	0.82	0
1	MLY	B	54	1	9,10,11	1.09	1 (11%)	9,11,13	1.07	1 (11%)
1	MLY	B	63	1	9,10,11	1.04	1 (11%)	9,11,13	0.94	0
1	MLY	B	72	1	9,10,11	1.24	1 (11%)	9,11,13	1.03	0
1	MLY	B	8	1	9,10,11	1.19	1 (11%)	9,11,13	1.21	1 (11%)
1	MLY	C	1	1	9,10,11	1.16	1 (11%)	9,11,13	1.14	1 (11%)
1	MLY	C	105	1	9,10,11	1.26	1 (11%)	9,11,13	1.01	0
1	MLY	C	119	1	9,10,11	1.29	1 (11%)	9,11,13	1.05	0
1	MLY	C	124	1	9,10,11	0.83	0	9,11,13	0.90	1 (11%)
1	MLY	C	138	1	9,10,11	0.95	0	9,11,13	0.82	0
1	MLY	C	145	1	9,10,11	1.14	1 (11%)	9,11,13	1.10	1 (11%)
1	MLY	C	181	1	9,10,11	0.80	0	9,11,13	0.68	0
1	MLY	C	182	1	9,10,11	1.28	1 (11%)	9,11,13	1.14	1 (11%)
1	MLY	C	187	1	9,10,11	1.32	1 (11%)	9,11,13	0.99	0
1	MLY	C	196	1	9,10,11	1.14	1 (11%)	9,11,13	1.14	1 (11%)
1	MLY	C	206	1	9,10,11	1.18	1 (11%)	9,11,13	1.28	1 (11%)
1	MLY	C	29	1	9,10,11	1.13	1 (11%)	9,11,13	0.81	0
1	MLY	C	54	1	9,10,11	1.00	1 (11%)	9,11,13	1.02	1 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	MLY	C	63	1	9,10,11	0.98	1 (11%)	9,11,13	0.93	0
1	MLY	C	72	1	9,10,11	1.09	1 (11%)	9,11,13	0.87	0
1	MLY	C	8	1	9,10,11	1.08	1 (11%)	9,11,13	0.89	0
1	MLY	D	1	1	9,10,11	1.12	1 (11%)	9,11,13	1.10	0
1	MLY	D	105	1	9,10,11	1.19	1 (11%)	9,11,13	1.00	0
1	MLY	D	119	1	9,10,11	1.09	1 (11%)	9,11,13	1.09	1 (11%)
1	MLY	D	124	1	9,10,11	1.00	1 (11%)	9,11,13	0.74	0
1	MLY	D	138	1	9,10,11	0.98	1 (11%)	9,11,13	0.72	0
1	MLY	D	145	1	9,10,11	1.05	1 (11%)	9,11,13	0.95	0
1	MLY	D	181	1	9,10,11	0.83	0	9,11,13	0.68	0
1	MLY	D	182	1	9,10,11	1.17	1 (11%)	9,11,13	1.07	1 (11%)
1	MLY	D	187	1	9,10,11	1.04	1 (11%)	9,11,13	0.86	0
1	MLY	D	196	1	9,10,11	1.11	1 (11%)	9,11,13	0.96	1 (11%)
1	MLY	D	206	1	9,10,11	1.21	1 (11%)	9,11,13	1.40	2 (22%)
1	MLY	D	29	1	9,10,11	1.31	1 (11%)	9,11,13	0.80	0
1	MLY	D	54	1	9,10,11	1.14	1 (11%)	9,11,13	1.13	2 (22%)
1	MLY	D	63	1	9,10,11	1.08	1 (11%)	9,11,13	1.07	0
1	MLY	D	72	1	9,10,11	1.03	1 (11%)	9,11,13	1.00	0
1	MLY	D	8	1	9,10,11	1.12	1 (11%)	9,11,13	0.99	1 (11%)

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
1	MLY	A	1	1	-	0/7/9/11	0/0/0/0
1	MLY	A	105	1	-	0/7/9/11	0/0/0/0
1	MLY	A	119	1	-	0/7/9/11	0/0/0/0
1	MLY	A	124	1	-	0/7/9/11	0/0/0/0
1	MLY	A	138	1	-	0/7/9/11	0/0/0/0
1	MLY	A	145	1	-	0/7/9/11	0/0/0/0
1	MLY	A	181	1	-	0/7/9/11	0/0/0/0
1	MLY	A	182	1	-	0/7/9/11	0/0/0/0
1	MLY	A	187	1	-	0/7/9/11	0/0/0/0
1	MLY	A	196	1	-	0/7/9/11	0/0/0/0
1	MLY	A	206	1	-	0/7/9/11	0/0/0/0
1	MLY	A	29	1	-	0/7/9/11	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	MLY	A	54	1	-	0/7/9/11	0/0/0/0
1	MLY	A	63	1	-	0/7/9/11	0/0/0/0
1	MLY	A	72	1	-	0/7/9/11	0/0/0/0
1	MLY	A	8	1	-	0/7/9/11	0/0/0/0
1	MLY	B	1	1	-	0/7/9/11	0/0/0/0
1	MLY	B	105	1	-	0/7/9/11	0/0/0/0
1	MLY	B	119	1	-	0/7/9/11	0/0/0/0
1	MLY	B	124	1	-	0/7/9/11	0/0/0/0
1	MLY	B	138	1	-	0/7/9/11	0/0/0/0
1	MLY	B	145	1	-	0/7/9/11	0/0/0/0
1	MLY	B	181	1	-	0/7/9/11	0/0/0/0
1	MLY	B	182	1	-	0/7/9/11	0/0/0/0
1	MLY	B	187	1	-	0/7/9/11	0/0/0/0
1	MLY	B	196	1	-	0/7/9/11	0/0/0/0
1	MLY	B	206	1	-	0/7/9/11	0/0/0/0
1	MLY	B	29	1	-	0/7/9/11	0/0/0/0
1	MLY	B	54	1	-	0/7/9/11	0/0/0/0
1	MLY	B	63	1	-	0/7/9/11	0/0/0/0
1	MLY	B	72	1	-	0/7/9/11	0/0/0/0
1	MLY	B	8	1	-	0/7/9/11	0/0/0/0
1	MLY	C	1	1	-	0/7/9/11	0/0/0/0
1	MLY	C	105	1	-	0/7/9/11	0/0/0/0
1	MLY	C	119	1	-	0/7/9/11	0/0/0/0
1	MLY	C	124	1	-	0/7/9/11	0/0/0/0
1	MLY	C	138	1	-	0/7/9/11	0/0/0/0
1	MLY	C	145	1	-	0/7/9/11	0/0/0/0
1	MLY	C	181	1	-	0/7/9/11	0/0/0/0
1	MLY	C	182	1	-	0/7/9/11	0/0/0/0
1	MLY	C	187	1	-	0/7/9/11	0/0/0/0
1	MLY	C	196	1	-	0/7/9/11	0/0/0/0
1	MLY	C	206	1	-	0/7/9/11	0/0/0/0
1	MLY	C	29	1	-	0/7/9/11	0/0/0/0
1	MLY	C	54	1	-	0/7/9/11	0/0/0/0
1	MLY	C	63	1	-	0/7/9/11	0/0/0/0
1	MLY	C	72	1	-	0/7/9/11	0/0/0/0
1	MLY	C	8	1	-	0/7/9/11	0/0/0/0
1	MLY	D	1	1	-	0/7/9/11	0/0/0/0
1	MLY	D	105	1	-	0/7/9/11	0/0/0/0
1	MLY	D	119	1	-	0/7/9/11	0/0/0/0
1	MLY	D	124	1	-	0/7/9/11	0/0/0/0
1	MLY	D	138	1	-	0/7/9/11	0/0/0/0
1	MLY	D	145	1	-	0/7/9/11	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	MLY	D	181	1	-	0/7/9/11	0/0/0/0
1	MLY	D	182	1	-	0/7/9/11	0/0/0/0
1	MLY	D	187	1	-	0/7/9/11	0/0/0/0
1	MLY	D	196	1	-	0/7/9/11	0/0/0/0
1	MLY	D	206	1	-	0/7/9/11	0/0/0/0
1	MLY	D	29	1	-	0/7/9/11	0/0/0/0
1	MLY	D	54	1	-	0/7/9/11	0/0/0/0
1	MLY	D	63	1	-	0/7/9/11	0/0/0/0
1	MLY	D	72	1	-	0/7/9/11	0/0/0/0
1	MLY	D	8	1	-	0/7/9/11	0/0/0/0

All (56) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	181	MLY	CB-CA	2.03	1.55	1.53
1	B	182	MLY	CB-CA	2.05	1.55	1.53
1	C	63	MLY	CB-CA	2.11	1.55	1.53
1	A	181	MLY	CB-CA	2.12	1.55	1.53
1	A	72	MLY	CB-CA	2.13	1.55	1.53
1	D	138	MLY	CB-CA	2.16	1.55	1.53
1	A	124	MLY	CB-CA	2.19	1.55	1.53
1	A	1	MLY	CB-CA	2.19	1.55	1.53
1	B	29	MLY	CB-CA	2.21	1.55	1.53
1	D	72	MLY	CB-CA	2.22	1.55	1.53
1	D	187	MLY	CB-CA	2.24	1.55	1.53
1	D	124	MLY	CB-CA	2.25	1.55	1.53
1	C	54	MLY	CB-CA	2.26	1.55	1.53
1	B	206	MLY	CB-CA	2.30	1.55	1.53
1	A	196	MLY	CB-CA	2.33	1.56	1.53
1	A	54	MLY	CB-CA	2.36	1.56	1.53
1	D	145	MLY	CB-CA	2.45	1.56	1.53
1	C	72	MLY	CB-CA	2.46	1.56	1.53
1	B	63	MLY	CB-CA	2.46	1.56	1.53
1	D	196	MLY	CB-CA	2.48	1.56	1.53
1	B	119	MLY	CB-CA	2.49	1.56	1.53
1	D	63	MLY	CB-CA	2.49	1.56	1.53
1	B	54	MLY	CB-CA	2.50	1.56	1.53
1	A	63	MLY	CB-CA	2.50	1.56	1.53
1	A	182	MLY	CB-CA	2.52	1.56	1.53
1	C	196	MLY	CB-CA	2.52	1.56	1.53
1	D	8	MLY	CB-CA	2.53	1.56	1.53
1	A	29	MLY	CB-CA	2.54	1.56	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	54	MLY	CB-CA	2.55	1.56	1.53
1	D	119	MLY	CB-CA	2.56	1.56	1.53
1	C	145	MLY	CB-CA	2.57	1.56	1.53
1	C	8	MLY	CB-CA	2.61	1.56	1.53
1	D	182	MLY	CB-CA	2.61	1.56	1.53
1	D	1	MLY	CB-CA	2.63	1.56	1.53
1	A	119	MLY	CB-CA	2.64	1.56	1.53
1	B	187	MLY	CB-CA	2.66	1.56	1.53
1	A	187	MLY	CB-CA	2.72	1.56	1.53
1	A	145	MLY	CB-CA	2.73	1.56	1.53
1	C	29	MLY	CB-CA	2.73	1.56	1.53
1	A	105	MLY	CB-CA	2.74	1.56	1.53
1	D	105	MLY	CB-CA	2.74	1.56	1.53
1	C	1	MLY	CB-CA	2.80	1.56	1.53
1	C	206	MLY	CB-CA	2.84	1.56	1.53
1	B	105	MLY	CB-CA	2.85	1.56	1.53
1	B	8	MLY	CB-CA	2.89	1.56	1.53
1	D	206	MLY	CB-CA	2.92	1.56	1.53
1	B	72	MLY	CB-CA	2.98	1.56	1.53
1	C	182	MLY	CB-CA	3.06	1.56	1.53
1	A	8	MLY	CB-CA	3.08	1.56	1.53
1	C	105	MLY	CB-CA	3.08	1.56	1.53
1	B	196	MLY	CB-CA	3.11	1.56	1.53
1	C	119	MLY	CB-CA	3.14	1.56	1.53
1	B	1	MLY	CB-CA	3.20	1.56	1.53
1	A	206	MLY	CB-CA	3.22	1.56	1.53
1	C	187	MLY	CB-CA	3.36	1.57	1.53
1	D	29	MLY	CB-CA	3.43	1.57	1.53

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	206	MLY	O-C-CA	-2.78	118.25	125.49
1	C	206	MLY	O-C-CA	-2.78	118.26	125.49
1	D	206	MLY	O-C-CA	-2.46	119.07	125.49
1	D	182	MLY	O-C-CA	-2.46	119.08	125.49
1	B	182	MLY	O-C-CA	-2.36	119.33	125.49
1	B	206	MLY	O-C-CA	-2.32	119.44	125.49
1	D	8	MLY	O-C-CA	-2.24	119.65	125.49
1	B	8	MLY	O-C-CA	-2.22	119.71	125.49
1	A	182	MLY	O-C-CA	-2.21	119.74	125.49
1	A	54	MLY	O-C-CA	-2.14	119.91	125.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	182	MLY	O-C-CA	-2.08	120.06	125.49
1	A	63	MLY	O-C-CA	-2.08	120.07	125.49
1	B	54	MLY	O-C-CA	-2.07	120.10	125.49
1	D	54	MLY	O-C-CA	-2.06	120.12	125.49
1	C	124	MLY	O-C-CA	-2.05	120.14	125.49
1	C	196	MLY	O-C-CA	-2.03	120.21	125.49
1	D	119	MLY	O-C-CA	-2.00	120.27	125.49
1	D	54	MLY	CD-CE-NZ	2.04	119.19	113.92
1	C	54	MLY	CD-CE-NZ	2.06	119.23	113.92
1	D	196	MLY	CD-CE-NZ	2.11	119.37	113.92
1	C	145	MLY	CD-CE-NZ	2.14	119.43	113.92
1	B	187	MLY	CD-CE-NZ	2.16	119.48	113.92
1	B	182	MLY	CD-CE-NZ	2.17	119.53	113.92
1	C	1	MLY	CD-CE-NZ	2.23	119.68	113.92
1	B	138	MLY	CD-CE-NZ	2.61	120.65	113.92
1	D	206	MLY	CD-CE-NZ	2.69	120.84	113.92

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

16 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	1	MLY	1	0
1	A	72	MLY	2	0
1	B	124	MLY	1	0
1	B	181	MLY	1	0
1	B	29	MLY	1	0
1	C	105	MLY	1	0
1	C	119	MLY	1	0
1	C	124	MLY	1	0
1	C	145	MLY	1	0
1	C	181	MLY	1	0
1	C	182	MLY	1	0
1	C	29	MLY	1	0
1	C	72	MLY	1	0
1	C	8	MLY	1	0
1	D	119	MLY	1	0
1	D	145	MLY	1	0

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

Of 9 ligands modelled in this entry, 5 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	GOL	B	209	-	5,5,5	0.36	0	5,5,5	0.28	0
3	GOL	C	210	4	5,5,5	0.34	0	5,5,5	0.32	0
3	GOL	D	209	-	5,5,5	0.40	0	5,5,5	0.64	0
3	GOL	D	210	-	5,5,5	0.41	0	5,5,5	0.38	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	B	209	-	-	0/4/4/4	0/0/0/0
3	GOL	C	210	4	-	0/4/4/4	0/0/0/0
3	GOL	D	209	-	-	0/4/4/4	0/0/0/0
3	GOL	D	210	-	-	0/4/4/4	0/0/0/0

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	210	GOL	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å ²)	Q<0.9
1	A	190/207 (91%)	-0.26	0	100 100	18, 23, 32, 43	0
1	B	191/207 (92%)	-0.44	0	100 100	17, 22, 34, 42	0
1	C	190/207 (91%)	-0.46	0	100 100	17, 22, 32, 41	0
1	D	191/207 (92%)	-0.28	1 (0%)	91 92	17, 22, 35, 44	0
All	All	762/828 (92%)	-0.36	1 (0%)	95 95	17, 22, 33, 44	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	45	PHE	3.1

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

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
1	MLY	B	196	11/12	0.94	0.19	-	21,26,55,58	0
1	MLY	A	206	11/12	0.82	0.31	-	34,45,60,64	0
1	MLY	C	124	11/12	0.96	0.09	-	19,23,41,44	0
1	MLY	A	124	11/12	0.95	0.10	-	19,20,39,44	0
1	MLY	C	54	11/12	0.97	0.08	-	17,24,37,38	0
1	MLY	C	72	11/12	0.93	0.14	-	20,23,40,40	0
1	MLY	C	119	11/12	0.92	0.14	-	22,25,40,42	0
1	MLY	B	54	11/12	0.89	0.23	-	43,47,63,65	0
1	MLY	C	196	11/12	0.94	0.13	-	21,30,49,52	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
1	MLY	B	63	11/12	0.97	0.10	-	23,28,47,50	0
1	MLY	D	182	11/12	0.95	0.10	-	18,21,33,37	0
1	MLY	A	196	11/12	0.95	0.10	-	20,22,32,33	0
1	MLY	C	63	11/12	0.94	0.12	-	22,25,44,47	0
1	MLY	D	8	11/12	0.93	0.13	-	28,30,39,39	0
1	MLY	D	181	11/12	0.97	0.08	-	17,20,23,26	0
1	MLY	A	8	11/12	0.92	0.13	-	24,27,39,40	0
1	MLY	A	54	11/12	0.96	0.11	-	21,25,42,47	0
1	MLY	C	187	11/12	0.93	0.15	-	19,22,47,52	0
1	MLY	D	206	11/12	0.95	0.10	-	27,30,43,49	0
1	MLY	C	145	11/12	0.95	0.12	-	19,21,31,39	0
1	MLY	B	145	11/12	0.97	0.09	-	16,19,31,33	0
1	MLY	B	1	11/12	0.95	0.09	-	20,26,39,45	0
1	MLY	D	119	11/12	0.96	0.12	-	20,24,44,44	0
1	MLY	B	206	11/12	0.94	0.14	-	22,27,39,46	0
1	MLY	A	145	11/12	0.94	0.11	-	19,22,34,39	0
1	MLY	B	138	11/12	0.95	0.11	-	16,18,25,28	0
1	MLY	D	138	11/12	0.97	0.09	-	17,20,25,25	0
1	MLY	B	8	11/12	0.97	0.12	-	22,31,37,42	0
1	MLY	D	54	11/12	0.93	0.35	-	38,44,69,72	0
1	MLY	B	181	11/12	0.92	0.12	-	19,23,35,38	0
1	MLY	A	105	11/12	0.92	0.28	-	21,28,55,57	0
1	MLY	A	1	11/12	0.88	0.25	-	31,37,57,58	0
1	MLY	C	8	11/12	0.94	0.13	-	24,26,41,48	0
1	MLY	B	119	11/12	0.95	0.19	-	20,26,55,56	0
1	MLY	C	105	11/12	0.91	0.25	-	26,31,59,59	0
1	MLY	D	72	11/12	0.94	0.12	-	20,23,40,40	0
1	MLY	B	72	11/12	0.95	0.11	-	17,20,40,41	0
1	MLY	C	206	11/12	0.85	0.22	-	31,41,69,71	0
1	MLY	D	105	11/12	0.94	0.16	-	21,29,66,67	0
1	MLY	C	182	11/12	0.96	0.09	-	17,20,41,47	0
1	MLY	A	72	11/12	0.93	0.14	-	20,24,50,52	0
1	MLY	C	29	11/12	0.96	0.09	-	17,20,33,33	0
1	MLY	A	63	11/12	0.96	0.08	-	23,26,47,49	0
1	MLY	A	181	11/12	0.96	0.10	-	19,24,41,45	0
1	MLY	A	182	11/12	0.93	0.13	-	16,22,46,46	0
1	MLY	D	196	11/12	0.91	0.23	-	21,32,58,60	0
1	MLY	A	29	11/12	0.98	0.08	-	17,20,36,38	0
1	MLY	A	138	11/12	0.97	0.08	-	16,18,28,29	0
1	MLY	B	124	11/12	0.95	0.11	-	19,22,40,44	0
1	MLY	D	145	11/12	0.97	0.09	-	19,22,42,42	0
1	MLY	A	187	11/12	0.93	0.18	-	21,24,68,69	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
1	MLY	A	119	11/12	0.92	0.19	-	22,26,57,58	0
1	MLY	D	124	11/12	0.96	0.09	-	18,21,35,38	0
1	MLY	D	29	11/12	0.97	0.08	-	19,22,37,38	0
1	MLY	D	187	11/12	0.96	0.13	-	17,21,57,57	0
1	MLY	B	29	11/12	0.94	0.10	-	18,21,38,40	0
1	MLY	D	1	11/12	0.91	0.13	-	25,30,47,53	0
1	MLY	B	105	11/12	0.96	0.14	-	22,28,58,60	0
1	MLY	B	182	11/12	0.93	0.13	-	19,20,43,46	0
1	MLY	C	181	11/12	0.92	0.14	-	19,21,40,46	0
1	MLY	D	63	11/12	0.95	0.13	-	29,33,51,55	0
1	MLY	B	187	11/12	0.92	0.19	-	18,24,66,67	0
1	MLY	C	1	11/12	0.85	0.21	-	32,42,59,63	0
1	MLY	C	138	11/12	0.97	0.07	-	19,22,30,30	0

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
3	GOL	D	209	6/6	0.93	0.14	4.26	23,24,28,30	0
3	GOL	C	210	6/6	0.90	0.14	3.51	29,32,35,43	0
3	GOL	B	209	6/6	0.91	0.13	3.28	33,37,38,43	0
3	GOL	D	210	6/6	0.88	0.12	3.16	24,35,37,42	0
2	MN	C	208	1/1	1.00	0.09	0.82	19,19,19,19	0
2	MN	B	208	1/1	1.00	0.08	-0.76	18,18,18,18	0
2	MN	D	208	1/1	1.00	0.08	-1.13	18,18,18,18	0
2	MN	A	208	1/1	1.00	0.09	-1.35	19,19,19,19	0
4	NA	C	209	1/1	0.93	0.08	-	32,32,32,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.