



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 04:02 AM UTC

PDB ID : 4HN3 / pdb_00004hn3
Title : The crystal structure of a sex pheromone precursor (lmo1757) from *Listeria monocytogenes* EGD-e
Authors : Tan, K.; Makowska-Grzyska, M.; Kwon, K.; Anderson, W.F.; Joachimiak, A.; Center for Structural Genomics of Infectious Diseases (CSGID)
Deposited on : 2012-10-18
Resolution : 2.05 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

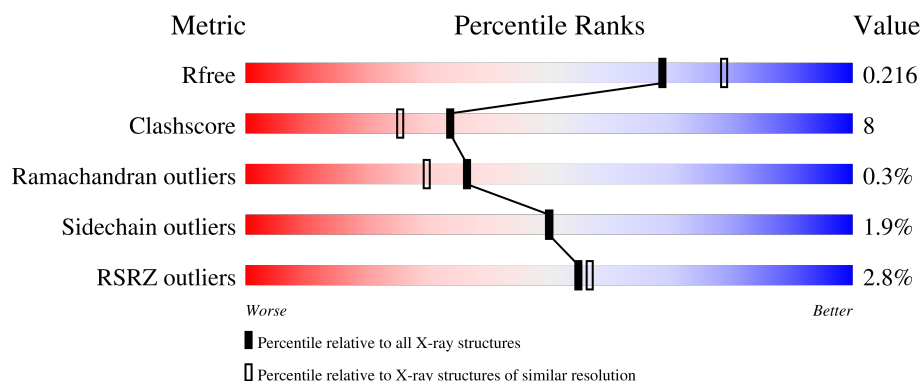
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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}	180053	2260 (2.04-2.04)
Clashscore	190562	2333 (2.04-2.04)
Ramachandran outliers	187476	2318 (2.04-2.04)
Sidechain outliers	187428	2318 (2.04-2.04)
RSRZ outliers	180081	2260 (2.04-2.04)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	350	2% 85% 9% • 5%
1	B	350	2% 83% 12% • 5%
1	C	350	% 83% 10% • 6%
1	D	350	5% 78% 16% • 6%

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	GOL	B	401	-	-	X	-
2	GOL	B	405	-	-	X	-
3	PEG	A	403	-	-	X	-
3	PEG	A	405	-	-	X	-
3	PEG	B	407	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11113 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 Lmo1757 protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	332	Total	C	N	O	Se	0	3	0
			2622	1650	441	527	4			
1	B	334	Total	C	N	O	Se	0	1	0
			2619	1646	443	526	4			
1	C	328	Total	C	N	O	Se	0	1	0
			2582	1623	433	522	4			
1	D	330	Total	C	N	O	Se	0	2	0
			2600	1636	436	524	4			

There are 12 discrepancies between the modelled and reference sequences:

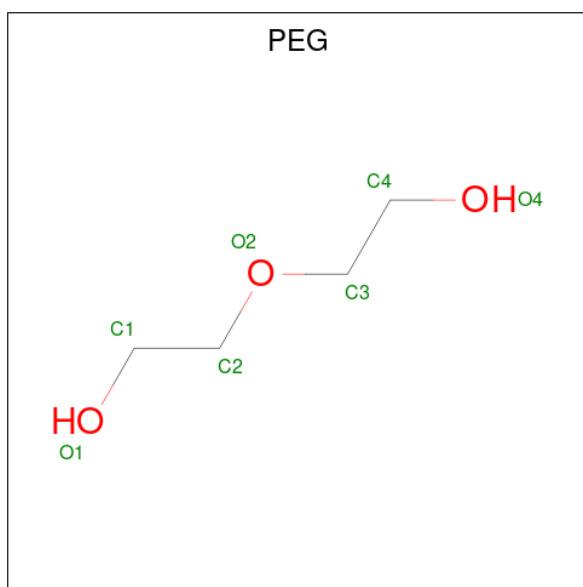
Chain	Residue	Modelled	Actual	Comment	Reference
A	22	SER	-	expression tag	UNP Q8Y6D1
A	23	ASN	-	expression tag	UNP Q8Y6D1
A	24	ALA	-	expression tag	UNP Q8Y6D1
B	22	SER	-	expression tag	UNP Q8Y6D1
B	23	ASN	-	expression tag	UNP Q8Y6D1
B	24	ALA	-	expression tag	UNP Q8Y6D1
C	22	SER	-	expression tag	UNP Q8Y6D1
C	23	ASN	-	expression tag	UNP Q8Y6D1
C	24	ALA	-	expression tag	UNP Q8Y6D1
D	22	SER	-	expression tag	UNP Q8Y6D1
D	23	ASN	-	expression tag	UNP Q8Y6D1
D	24	ALA	-	expression tag	UNP Q8Y6D1

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



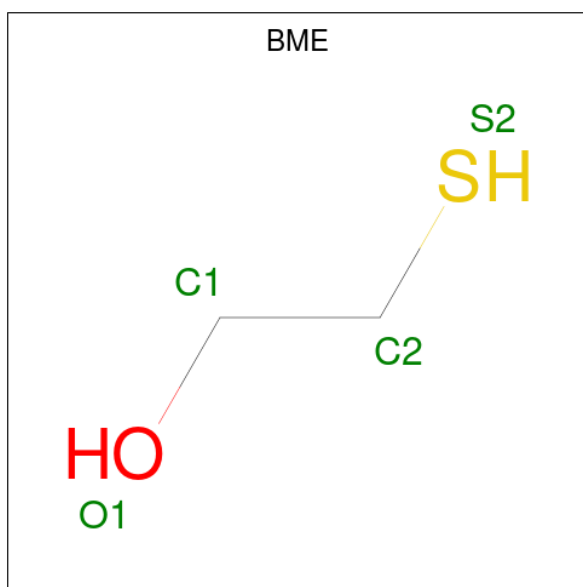
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			6	3	3		
2	A	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		
2	C	1	Total	C	O	0	0
			6	3	3		
2	C	1	Total	C	O	0	0
			6	3	3		
2	C	1	Total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

- Molecule 3 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			7	4	3		
3	A	1	Total	C	O	0	0
			7	4	3		
3	A	1	Total	C	O	0	0
			7	4	3		
3	B	1	Total	C	O	0	0
			7	4	3		
3	B	1	Total	C	O	0	0
			7	4	3		
3	C	1	Total	C	O	0	0
			7	4	3		
3	D	1	Total	C	O	0	0
			7	4	3		
3	D	1	Total	C	O	0	0
			7	4	3		
3	D	1	Total	C	O	0	0
			7	4	3		

- Molecule 4 is BETA-MERCAPTOETHANOL (CCD ID: BME) (formula: C₂H₆OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	O	S	0	0
			4	2	1	1		

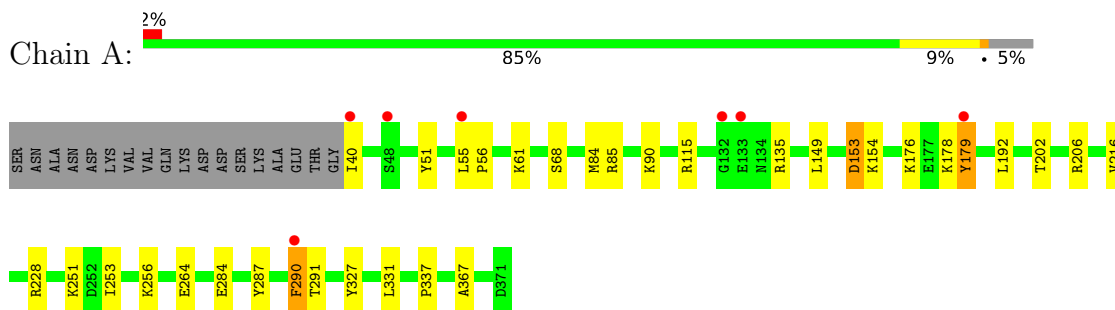
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	195	Total	O	0	0
			195	195		
5	B	116	Total	O	0	0
			116	116		
5	C	156	Total	O	0	0
			156	156		
5	D	78	Total	O	0	0
			78	78		

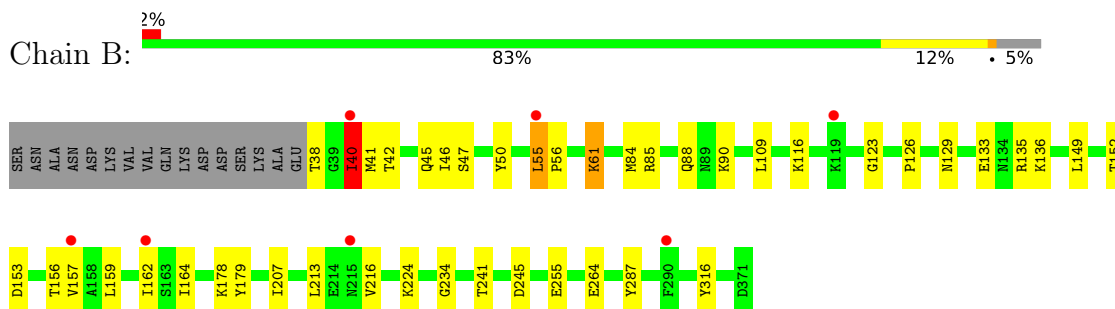
3 Residue-property plots [i](#)

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 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.

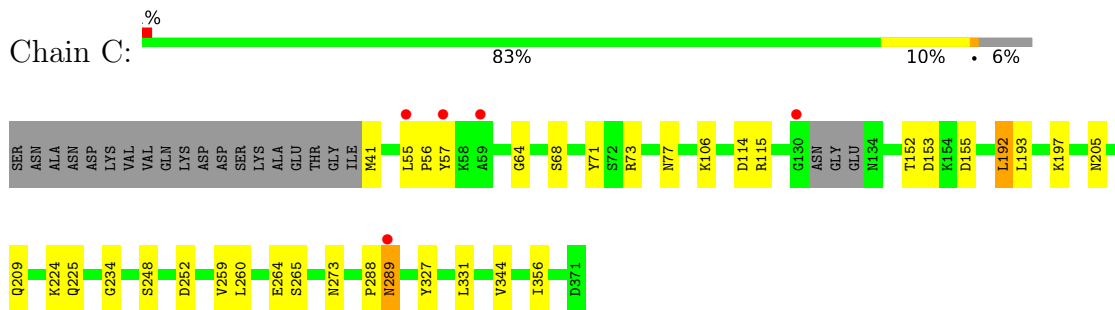
- Molecule 1: Lmo1757 protein



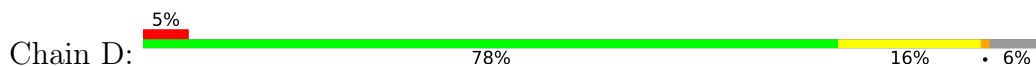
- Molecule 1: Lmo1757 protein

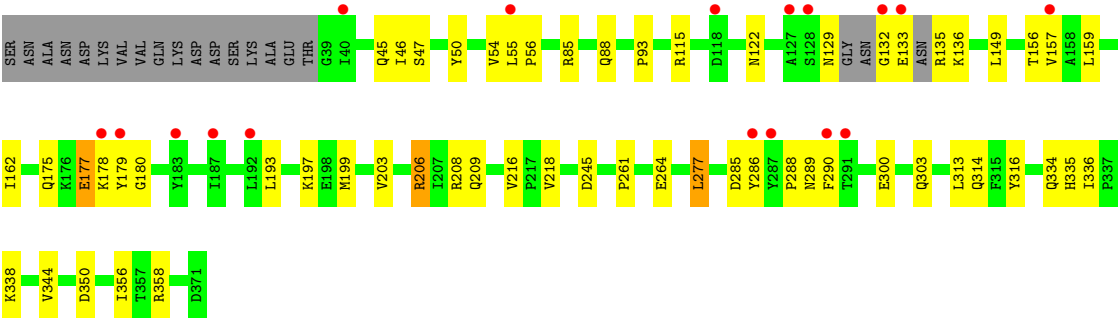


- Molecule 1: Lmo1757 protein



- Molecule 1: Lmo1757 protein





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	149.09Å 99.32Å 104.61Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.01 – 2.05 36.01 – 2.05	Depositor EDS
% Data completeness (in resolution range)	99.1 (36.01-2.05) 99.2 (36.01-2.05)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.95 (at 2.05Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.1_743)	Depositor
R, R_{free}	0.181 , 0.221 0.178 , 0.216	Depositor DCC
R_{free} test set	4879 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	36.1	Xtriage
Anisotropy	0.362	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 56.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.016 for -h,l,k	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11113	wwPDB-VP
Average B, all atoms (Å ²)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.48% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 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: BME, GOL, PEG

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	0.49	0/2677	0.74	0/3625
1	B	0.44	0/2668	0.73	2/3613 (0.1%)
1	C	0.44	0/2631	0.73	0/3565
1	D	0.38	0/2650	0.73	0/3585
All	All	0.44	0/10626	0.73	2/14388 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	287	TYR	CA-C-N	5.37	125.44	119.32
1	B	287	TYR	C-N-CA	5.37	125.44	119.32

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	2622	0	2540	39	0
1	B	2619	0	2525	49	0
1	C	2582	0	2479	32	0
1	D	2600	0	2511	46	0
2	A	12	0	16	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	30	0	40	13	0
2	C	24	0	32	1	0
2	D	12	0	16	3	0
3	A	21	0	30	16	0
3	B	14	0	20	8	0
3	C	7	0	10	3	0
3	D	21	0	30	5	0
4	A	4	0	6	0	0
5	A	195	0	0	5	0
5	B	116	0	0	2	0
5	C	156	0	0	1	0
5	D	78	0	0	1	0
All	All	11113	0	10255	161	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 8.

All (161) 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:85:ARG:HE	2:B:401:GOL:H12	1.33	0.93
1:B:178:LYS:NZ	2:B:405:GOL:H12	1.92	0.84
1:C:77:ASN:HD21	3:C:405:PEG:H12	1.42	0.84
1:A:206:ARG:HH21	3:A:405:PEG:H42	1.39	0.83
1:B:178:LYS:NZ	3:B:407:PEG:H31	1.94	0.82
1:A:85:ARG:HE	3:A:403:PEG:H11	1.44	0.81
1:B:264:GLU:HG2	5:B:561:HOH:O	1.82	0.78
1:B:85:ARG:HE	2:B:401:GOL:C1	1.99	0.76
1:D:47:SER:HB3	1:D:50:TYR:CD2	2.21	0.75
1:A:202:THR:HG23	3:A:405:PEG:H41	1.68	0.75
1:D:316:TYR:CE1	3:D:404:PEG:H31	2.22	0.74
1:B:178:LYS:HZ3	3:B:407:PEG:H31	1.49	0.74
2:A:401:GOL:H11	1:B:316:TYR:CE1	2.23	0.73
1:B:178:LYS:NZ	3:B:407:PEG:H12	2.03	0.73
1:D:334:GLN:HB2	1:D:335:HIS:HD2	1.53	0.72
1:D:85:ARG:HD2	2:D:401:GOL:H11	1.70	0.71
1:B:90:LYS:HE3	1:B:241:THR:HG21	1.72	0.70
1:B:55:LEU:HA	1:B:56:PRO:C	2.16	0.70
1:D:115:ARG:NH1	1:D:136:LYS:O	2.25	0.69
1:A:206:ARG:NH2	3:A:405:PEG:H22	2.09	0.68
1:C:56:PRO:HG2	5:C:649:HOH:O	1.93	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:133:GLU:HA	1:D:135:ARG:N	2.10	0.67
1:B:85:ARG:NE	2:B:401:GOL:H12	2.09	0.67
1:A:206:ARG:HH21	3:A:405:PEG:H22	1.60	0.67
1:B:41:MSE:HG2	1:B:42:THR:O	1.95	0.66
1:B:40:ILE:H	1:B:40:ILE:HD12	1.59	0.66
1:A:85:ARG:NE	3:A:403:PEG:H11	2.10	0.66
1:B:41:MSE:SE	5:B:586:HOH:O	2.64	0.65
1:C:41:MSE:N	1:C:55:LEU:H	1.94	0.65
1:C:55:LEU:HB3	1:D:286:TYR:HE2	1.62	0.65
1:D:129:ASN:HD21	1:D:136:LYS:H	1.45	0.64
1:A:206:ARG:NH2	3:A:405:PEG:H42	2.11	0.64
1:A:135:ARG:NH2	2:A:402:GOL:H32	2.13	0.64
1:A:85:ARG:HE	3:A:403:PEG:C1	2.09	0.63
1:D:54:VAL:HG21	1:D:149:LEU:HD22	1.81	0.62
1:B:153:ASP:OD1	1:B:156:THR:HG22	1.99	0.62
1:B:40:ILE:HD13	1:B:55:LEU:HD12	1.82	0.61
1:B:153:ASP:CG	1:B:156:THR:HG22	2.25	0.61
1:D:303:GLN:HB2	3:D:405:PEG:H22	1.81	0.61
1:D:156:THR:HA	3:D:403:PEG:H22	1.81	0.61
1:B:255:GLU:OE2	2:B:401:GOL:H11	2.00	0.61
2:B:405:GOL:H31	1:C:68:SER:O	2.00	0.61
1:A:264:GLU:OE1	5:A:646:HOH:O	2.16	0.61
1:B:152:THR:OG1	1:B:156:THR:HG23	2.02	0.59
1:D:149:LEU:HB3	1:D:157:VAL:HG22	1.83	0.59
1:B:178:LYS:HZ2	2:B:405:GOL:H12	1.67	0.59
1:B:126:PRO:HB2	1:B:136:LYS:HE3	1.85	0.58
1:D:129:ASN:HD21	1:D:136:LYS:N	2.01	0.58
1:B:159:LEU:HD23	1:B:216:VAL:HG11	1.86	0.58
1:A:178:LYS:O	1:A:179:TYR:HB2	2.03	0.58
1:B:38:THR:CB	1:B:156:THR:HA	2.33	0.58
1:D:129:ASN:ND2	1:D:136:LYS:H	2.03	0.56
1:A:256:LYS:NZ	1:A:264:GLU:OE2	2.30	0.56
1:A:206:ARG:HE	3:A:405:PEG:H42	1.69	0.56
1:B:40:ILE:H	1:B:40:ILE:CD1	2.18	0.56
1:D:199:MSE:O	1:D:203:VAL:HG23	2.06	0.55
1:B:178:LYS:CE	2:B:405:GOL:H12	2.36	0.55
1:C:55:LEU:HA	1:C:57:TYR:N	2.21	0.55
1:B:129:ASN:OD1	1:B:136:LYS:HG3	2.07	0.55
3:B:407:PEG:H11	1:C:71:TYR:CE1	2.42	0.55
1:D:122:ASN:O	1:D:206:ARG:NH1	2.38	0.54
1:A:55:LEU:HA	1:A:56:PRO:C	2.33	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:55:LEU:HA	1:D:56:PRO:C	2.33	0.54
3:A:403:PEG:O1	3:A:403:PEG:H32	2.08	0.53
1:A:51:TYR:H	1:A:84:MSE:HE2	1.74	0.53
1:A:206:ARG:HE	3:A:405:PEG:C4	2.22	0.53
1:A:135:ARG:HH21	2:A:402:GOL:H32	1.73	0.53
1:A:153:ASP:CG	1:A:154:LYS:N	2.67	0.52
1:C:115:ARG:HH21	2:C:402:GOL:H2	1.75	0.51
1:A:216:VAL:HG13	5:A:610:HOH:O	2.10	0.51
1:B:40:ILE:HD13	1:B:55:LEU:CD1	2.40	0.51
1:C:41:MSE:N	1:C:55:LEU:HB2	2.26	0.51
1:C:77:ASN:ND2	3:C:405:PEG:H12	2.21	0.51
2:B:404:GOL:H12	1:C:106:LYS:NZ	2.26	0.51
1:B:90:LYS:NZ	2:B:402:GOL:O3	2.41	0.50
1:C:55:LEU:HA	1:C:56:PRO:C	2.36	0.50
1:D:132:GLY:N	5:D:565:HOH:O	2.43	0.50
1:A:115:ARG:HH21	2:A:402:GOL:H2	1.75	0.50
1:B:178:LYS:HZ1	2:B:405:GOL:H12	1.75	0.50
1:A:337:PRO:HG2	5:A:630:HOH:O	2.11	0.49
1:D:334:GLN:CB	1:D:335:HIS:HD2	2.22	0.49
1:B:84:MSE:O	1:B:88:GLN:HG3	2.12	0.49
1:C:153:ASP:C	1:C:155:ASP:H	2.20	0.49
2:B:404:GOL:H12	1:C:106:LYS:HZ3	1.78	0.49
1:C:260:LEU:HD12	1:C:260:LEU:N	2.27	0.49
1:C:55:LEU:HB3	1:D:286:TYR:CE2	2.44	0.49
1:B:116:LYS:HE2	1:B:123:GLY:O	2.13	0.49
1:C:73[A]:ARG:NH2	3:C:405:PEG:O1	2.46	0.49
1:D:178:LYS:HE2	1:D:179:TYR:CZ	2.47	0.49
1:D:175:GLN:NE2	1:D:180:GLY:O	2.41	0.49
1:A:228:ARG:HH12	3:A:404:PEG:C1	2.25	0.48
1:D:129:ASN:HD22	1:D:136:LYS:HG3	1.79	0.48
1:D:336:ILE:HG22	1:D:358:ARG:NH2	2.29	0.48
1:B:178:LYS:HZ1	3:B:407:PEG:H31	1.73	0.48
1:D:344:VAL:HB	1:D:356:ILE:HB	1.94	0.48
1:D:193:LEU:O	1:D:197:LYS:HG3	2.14	0.48
1:C:152:THR:O	1:C:153:ASP:HB3	2.15	0.47
3:B:407:PEG:H11	1:C:71:TYR:CD1	2.50	0.46
1:D:45:GLN:O	1:D:46:ILE:HB	2.14	0.46
1:D:336:ILE:HG22	1:D:358:ARG:HH22	1.81	0.46
1:D:149:LEU:HD12	1:D:149:LEU:N	2.30	0.46
1:A:149:LEU:HD12	1:A:149:LEU:N	2.31	0.46
1:B:38:THR:CB	1:B:157:VAL:H	2.29	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:367:ALA:HB3	1:B:46:ILE:HG12	1.98	0.46
1:A:178:LYS:O	1:A:179:TYR:CB	2.63	0.46
1:B:85:ARG:HB3	2:B:401:GOL:H32	1.98	0.46
1:B:162:ILE:HD11	1:B:207:ILE:HD13	1.98	0.46
1:B:179:TYR:OH	3:B:407:PEG:H21	2.15	0.46
1:A:253:ILE:HG23	3:A:403:PEG:H31	1.97	0.46
1:A:251:LYS:HB2	1:A:251:LYS:HE2	1.73	0.45
1:B:207:ILE:HG23	1:B:213:LEU:HD13	1.98	0.45
1:D:159:LEU:HD23	1:D:216:VAL:HG21	1.99	0.45
1:D:129:ASN:ND2	1:D:136:LYS:HG3	2.31	0.45
1:A:327:TYR:CE2	1:A:331:LEU:HD11	2.52	0.45
1:B:149:LEU:N	1:B:149:LEU:HD12	2.31	0.45
1:C:192:LEU:HD11	1:C:224:LYS:HG3	1.98	0.45
1:D:193:LEU:HG	1:D:197:LYS:HE3	1.98	0.44
1:A:287:TYR:HB3	1:A:290:PHE:CE2	2.53	0.44
1:C:288:PRO:O	1:C:289:ASN:CB	2.64	0.44
1:A:85:ARG:CD	3:A:403:PEG:H11	2.47	0.44
1:B:45:GLN:NE2	1:B:50:TYR:O	2.47	0.44
1:C:327:TYR:CE2	1:C:331:LEU:HD11	2.52	0.44
1:B:178:LYS:O	1:B:179:TYR:HB2	2.17	0.44
1:D:290:PHE:CE1	1:D:313:LEU:HD22	2.51	0.44
1:C:56:PRO:HA	1:D:286:TYR:CE2	2.53	0.44
1:C:344:VAL:HB	1:C:356:ILE:HB	1.99	0.43
1:C:193:LEU:HD11	1:C:197:LYS:HE3	2.01	0.43
1:C:265:SER:OG	1:C:273:ASN:OD1	2.34	0.43
1:D:288:PRO:O	1:D:289:ASN:CB	2.67	0.43
1:A:90:LYS:HD3	1:A:90:LYS:HA	1.83	0.43
1:A:176:LYS:N	5:A:609:HOH:O	2.43	0.43
1:A:264:GLU:HB2	5:A:556:HOH:O	2.18	0.43
1:D:129:ASN:HD21	1:D:135:ARG:HA	1.83	0.43
1:A:206:ARG:NE	3:A:405:PEG:H42	2.34	0.43
1:A:228:ARG:HH12	3:A:404:PEG:H11	1.83	0.43
1:B:116:LYS:HE3	1:B:116:LYS:HB2	1.87	0.43
1:A:192:LEU:C	1:A:192:LEU:HD12	2.44	0.43
1:C:224:LYS:O	1:C:234:GLY:HA3	2.19	0.43
1:D:85:ARG:CD	2:D:401:GOL:H11	2.45	0.43
1:A:68:SER:OG	1:D:177:GLU:HG3	2.19	0.42
1:C:73[B]:ARG:NH1	1:D:350:ASP:OD1	2.52	0.42
1:D:162:ILE:CG2	1:D:218:VAL:HG22	2.48	0.42
1:B:153:ASP:OD1	1:B:153:ASP:C	2.63	0.42
1:D:88:GLN:HG2	1:D:93:PRO:HD3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:64:GLY:HA3	3:D:404:PEG:H12	2.01	0.42
1:D:300:GLU:CD	2:D:401:GOL:H12	2.45	0.42
1:C:264:GLU:H	1:C:264:GLU:CD	2.28	0.42
1:D:261:PRO:HB3	1:D:277:LEU:HD13	2.01	0.42
1:B:133:GLU:C	1:B:135:ARG:H	2.28	0.41
1:B:224:LYS:O	1:B:234:GLY:HA3	2.20	0.41
1:A:284:GLU:HG2	1:A:291:THR:HG22	2.02	0.41
1:D:149:LEU:HD23	1:D:157:VAL:HG13	2.02	0.41
1:B:178:LYS:HZ3	3:B:407:PEG:H12	1.82	0.41
1:C:205:ASN:O	1:C:209:GLN:HG2	2.21	0.41
1:B:109:LEU:HD23	1:B:109:LEU:HA	1.83	0.41
1:D:157:VAL:HG12	3:D:403:PEG:H21	2.03	0.41
1:B:162:ILE:HD12	1:B:164:ILE:HD11	2.03	0.41
1:A:61:LYS:HA	1:A:61:LYS:HD3	1.91	0.41
1:D:208:ARG:HD3	1:D:208:ARG:HA	1.93	0.41
1:C:259:VAL:C	1:C:260:LEU:HD12	2.46	0.40
1:B:61:LYS:HD3	1:B:61:LYS:HA	1.88	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	333/350 (95%)	327 (98%)	6 (2%)	0	100	100
1	B	333/350 (95%)	325 (98%)	7 (2%)	1 (0%)	36	30
1	C	325/350 (93%)	317 (98%)	6 (2%)	2 (1%)	21	13
1	D	326/350 (93%)	317 (97%)	8 (2%)	1 (0%)	36	30
All	All	1317/1400 (94%)	1286 (98%)	27 (2%)	4 (0%)	36	30

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	40	ILE
1	C	248	SER
1	C	289	ASN
1	D	285	ASP

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	280/295 (95%)	276 (99%)	4 (1%)	59	60
1	B	277/295 (94%)	272 (98%)	5 (2%)	51	51
1	C	274/295 (93%)	270 (98%)	4 (2%)	57	58
1	D	277/295 (94%)	269 (97%)	8 (3%)	37	33
All	All	1108/1180 (94%)	1087 (98%)	21 (2%)	50	50

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	ILE
1	A	153	ASP
1	A	179	TYR
1	A	290	PHE
1	B	40	ILE
1	B	47	SER
1	B	55	LEU
1	B	61	LYS
1	B	245	ASP
1	C	114	ASP
1	C	192	LEU
1	C	225	GLN
1	C	252	ASP
1	D	177	GLU
1	D	206	ARG
1	D	209	GLN
1	D	245	ASP
1	D	264	GLU

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Mol	Chain	Res	Type
1	D	277	LEU
1	D	314	GLN
1	D	338	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	257	ASN
1	A	326	GLN
1	B	44	ASN
1	B	69	ASN
1	B	131	ASN
1	B	142	HIS
1	B	257	ASN
1	B	303	GLN
1	C	77	ASN
1	D	129	ASN
1	D	209	GLN
1	D	225	GLN
1	D	269	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

23 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and

the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	PEG	A	405	-	6,6,6	0.63	0	5,5,5	0.82	0
3	PEG	D	404	-	6,6,6	0.66	0	5,5,5	0.79	0
2	GOL	C	403	-	5,5,5	0.40	0	5,5,5	0.23	0
2	GOL	B	403	-	5,5,5	0.39	0	5,5,5	0.34	0
2	GOL	C	402	-	5,5,5	0.35	0	5,5,5	0.28	0
2	GOL	D	401	-	5,5,5	0.36	0	5,5,5	0.26	0
2	GOL	C	404	-	5,5,5	0.42	0	5,5,5	0.15	0
4	BME	A	406	-	3,3,3	0.27	0	2,2,2	0.28	0
2	GOL	A	402	-	5,5,5	0.36	0	5,5,5	0.33	0
2	GOL	C	401	-	5,5,5	0.35	0	5,5,5	0.37	0
3	PEG	D	403	-	6,6,6	0.63	0	5,5,5	0.79	0
2	GOL	B	405	-	5,5,5	0.44	0	5,5,5	0.35	0
3	PEG	D	405	-	6,6,6	0.59	0	5,5,5	0.74	0
3	PEG	A	404	-	6,6,6	0.64	0	5,5,5	0.73	0
2	GOL	B	402	-	5,5,5	0.36	0	5,5,5	0.33	0
2	GOL	B	404	-	5,5,5	0.37	0	5,5,5	0.30	0
2	GOL	A	401	-	5,5,5	0.40	0	5,5,5	0.32	0
3	PEG	A	403	-	6,6,6	0.58	0	5,5,5	0.75	0
3	PEG	C	405	-	6,6,6	0.64	0	5,5,5	0.74	0
2	GOL	D	402	-	5,5,5	0.38	0	5,5,5	0.28	0
3	PEG	B	407	-	6,6,6	0.60	0	5,5,5	0.77	0
3	PEG	B	406	-	6,6,6	0.62	0	5,5,5	0.81	0
2	GOL	B	401	-	5,5,5	0.39	0	5,5,5	0.36	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	PEG	A	405	-	-	2/4/4/4	-
3	PEG	D	404	-	-	1/4/4/4	-
2	GOL	C	403	-	-	2/4/4/4	-
2	GOL	B	403	-	-	2/4/4/4	-
2	GOL	C	402	-	-	0/4/4/4	-
2	GOL	D	401	-	-	1/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GOL	C	404	-	-	2/4/4/4	-
4	BME	A	406	-	-	1/1/1/1	-
2	GOL	A	402	-	-	2/4/4/4	-
2	GOL	C	401	-	-	2/4/4/4	-
3	PEG	D	403	-	-	1/4/4/4	-
2	GOL	B	405	-	-	4/4/4/4	-
3	PEG	D	405	-	-	3/4/4/4	-
3	PEG	A	404	-	-	0/4/4/4	-
2	GOL	B	402	-	-	2/4/4/4	-
2	GOL	B	404	-	-	2/4/4/4	-
2	GOL	A	401	-	-	2/4/4/4	-
3	PEG	A	403	-	-	1/4/4/4	-
3	PEG	C	405	-	-	1/4/4/4	-
2	GOL	D	402	-	-	3/4/4/4	-
3	PEG	B	407	-	-	3/4/4/4	-
3	PEG	B	406	-	-	3/4/4/4	-
2	GOL	B	401	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	GOL	O1-C1-C2-C3
2	B	401	GOL	O1-C1-C2-C3
2	B	402	GOL	O1-C1-C2-C3
2	B	403	GOL	O1-C1-C2-C3
2	B	404	GOL	O1-C1-C2-C3
2	B	405	GOL	O1-C1-C2-C3
2	C	401	GOL	O1-C1-C2-C3
2	C	403	GOL	O1-C1-C2-C3
2	C	404	GOL	O1-C1-C2-C3
2	D	402	GOL	O1-C1-C2-O2
2	D	402	GOL	O1-C1-C2-C3
2	A	402	GOL	O1-C1-C2-O2
3	A	405	PEG	O1-C1-C2-O2
3	D	404	PEG	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
2	A	402	GOL	O1-C1-C2-C3
2	B	405	GOL	C1-C2-C3-O3
2	B	401	GOL	O1-C1-C2-O2
2	B	402	GOL	O1-C1-C2-O2
2	B	403	GOL	O1-C1-C2-O2
2	B	404	GOL	O1-C1-C2-O2
2	C	403	GOL	O1-C1-C2-O2
2	C	404	GOL	O1-C1-C2-O2
3	B	407	PEG	O2-C3-C4-O4
3	B	406	PEG	O1-C1-C2-O2
3	D	405	PEG	O2-C3-C4-O4
2	A	401	GOL	O1-C1-C2-O2
2	B	405	GOL	O1-C1-C2-O2
2	C	401	GOL	O1-C1-C2-O2
4	A	406	BME	O1-C1-C2-S2
3	D	403	PEG	O2-C3-C4-O4
2	B	405	GOL	O2-C2-C3-O3
2	D	401	GOL	O1-C1-C2-O2
2	D	402	GOL	O2-C2-C3-O3
3	D	405	PEG	C4-C3-O2-C2
3	A	405	PEG	C4-C3-O2-C2
3	A	403	PEG	O1-C1-C2-O2
3	B	406	PEG	C4-C3-O2-C2
3	D	405	PEG	C1-C2-O2-C3
3	B	407	PEG	O1-C1-C2-O2
3	B	407	PEG	C1-C2-O2-C3
3	B	406	PEG	C1-C2-O2-C3
3	C	405	PEG	O1-C1-C2-O2

There are no ring outliers.

16 monomers are involved in 53 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	405	PEG	8	0
3	D	404	PEG	2	0
2	C	402	GOL	1	0
2	D	401	GOL	3	0
2	A	402	GOL	3	0
3	D	403	PEG	2	0
2	B	405	GOL	5	0
3	D	405	PEG	1	0
3	A	404	PEG	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	402	GOL	1	0
2	B	404	GOL	2	0
2	A	401	GOL	1	0
3	A	403	PEG	6	0
3	C	405	PEG	3	0
3	B	407	PEG	8	0
2	B	401	GOL	5	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	328/350 (93%)	-0.21	7 (2%) 63 65	20, 36, 74, 108	3 (0%)
1	B	330/350 (94%)	0.09	7 (2%) 63 65	21, 45, 81, 116	1 (0%)
1	C	324/350 (92%)	-0.08	5 (1%) 72 73	19, 40, 76, 132	1 (0%)
1	D	326/350 (93%)	0.26	17 (5%) 33 33	22, 52, 86, 117	2 (0%)
All	All	1308/1400 (93%)	0.02	36 (2%) 55 57	19, 42, 81, 132	7 (0%)

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	40	ILE	6.2
1	A	40	ILE	4.9
1	D	40	ILE	4.0
1	A	290	PHE	3.7
1	D	286	TYR	3.5
1	D	127	ALA	3.4
1	A	133	GLU	3.2
1	D	55	LEU	3.1
1	D	287	TYR	3.1
1	C	130	GLY	3.1
1	D	290	PHE	3.0
1	D	128	SER	3.0
1	C	59	ALA	2.9
1	D	133	GLU	2.9
1	B	290	PHE	2.8
1	B	55	LEU	2.8
1	D	118	ASP	2.8
1	B	119	LYS	2.7
1	A	179	TYR	2.7
1	D	187	ILE	2.6
1	D	132	GLY	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	55	LEU	2.5
1	C	289	ASN	2.4
1	D	179	TYR	2.3
1	D	183	TYR	2.3
1	D	178	LYS	2.3
1	B	157	VAL	2.3
1	A	55	LEU	2.2
1	D	291	THR	2.2
1	B	162	ILE	2.1
1	D	192	LEU	2.1
1	A	132	GLY	2.1
1	A	48	SER	2.1
1	D	157	VAL	2.0
1	B	215	ASN	2.0
1	C	57	TYR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides 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. 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	PEG	D	403	7/7	0.67	0.15	70,82,88,92	0
2	GOL	B	402	6/6	0.70	0.14	86,90,95,97	0
2	GOL	C	403	6/6	0.74	0.13	74,76,81,83	0
2	GOL	B	403	6/6	0.76	0.12	81,83,85,88	0
2	GOL	D	402	6/6	0.76	0.16	76,79,88,93	0
2	GOL	B	404	6/6	0.76	0.13	84,87,89,89	0
2	GOL	C	404	6/6	0.79	0.13	63,74,83,84	0
3	PEG	B	406	7/7	0.80	0.15	62,63,65,65	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	GOL	C	402	6/6	0.80	0.15	69,74,75,78	0
3	PEG	C	405	7/7	0.81	0.16	83,86,92,92	0
3	PEG	B	407	7/7	0.82	0.13	66,83,86,88	0
3	PEG	D	405	7/7	0.82	0.14	70,79,81,82	0
2	GOL	B	405	6/6	0.85	0.13	53,57,67,70	0
2	GOL	A	402	6/6	0.85	0.15	72,73,76,77	0
3	PEG	A	403	7/7	0.85	0.14	48,57,62,65	0
2	GOL	A	401	6/6	0.85	0.13	57,58,68,69	0
3	PEG	A	404	7/7	0.86	0.14	80,85,87,87	0
3	PEG	A	405	7/7	0.87	0.14	43,57,74,74	0
2	GOL	C	401	6/6	0.87	0.18	63,72,75,76	0
3	PEG	D	404	7/7	0.89	0.11	54,58,72,75	0
2	GOL	B	401	6/6	0.91	0.14	58,67,71,72	0
4	BME	A	406	4/4	0.91	0.09	51,55,61,84	0
2	GOL	D	401	6/6	0.93	0.13	58,67,69,74	0

6.5 Other polymers [i](#)

There are no such residues in this entry.