



Full wwPDB/EMDatabank EM Map/Model Validation Report ⓘ

May 7, 2019 – 03:04 AM EDT

PDB ID : 6OGE
EMDB ID: : EMD-20055
Title : Cryo-EM structure of Her2 extracellular domain-Trastuzumab Fab-
Pertuzumab Fab complex
Authors : Hao, Y.; Yu, X.; Bai, Y.; Huang, X.
Deposited on : 2019-04-02
Resolution : 4.36 Å(reported)

This is a Full wwPDB/EMDatabank EM Map/Model Validation Report
for a publicly released PDB/EMDB entry.

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

MolProbity : 4.02b-467
Mogul : 1.8.0 (224370), CSD as540be (2019)
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20031633

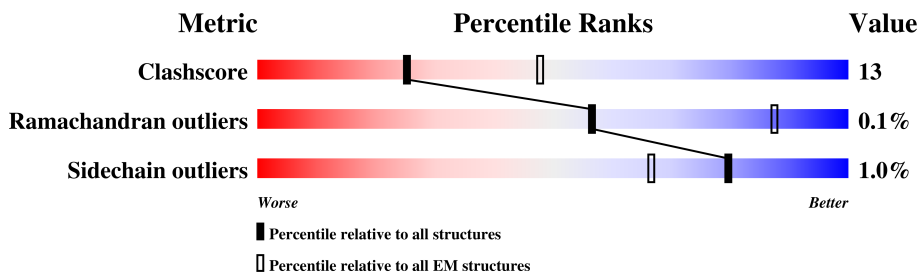
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.36 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)	EM structures (#Entries)
Clashscore	136327	1886
Ramachandran outliers	132723	1663
Sidechain outliers	132532	1531

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain	
1	A	622	72%	27% .
2	B	214	72%	28%
3	C	222	68%	31%
4	D	214	64%	36%
5	E	220	60%	39%

2 Entry composition i

There are 8 unique types of molecules in this entry. The entry contains 11494 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Receptor tyrosine-protein kinase erbB-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	619	4755	2953	849	897	56	0	0

- Molecule 2 is a protein called Pertuzumab FAB LIGHT CHAIN.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	214	1656	1043	272	335	6	0	0

- Molecule 3 is a protein called Pertuzumab FAB HEAVY CHAIN.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	222	1665	1051	280	327	7	0	0

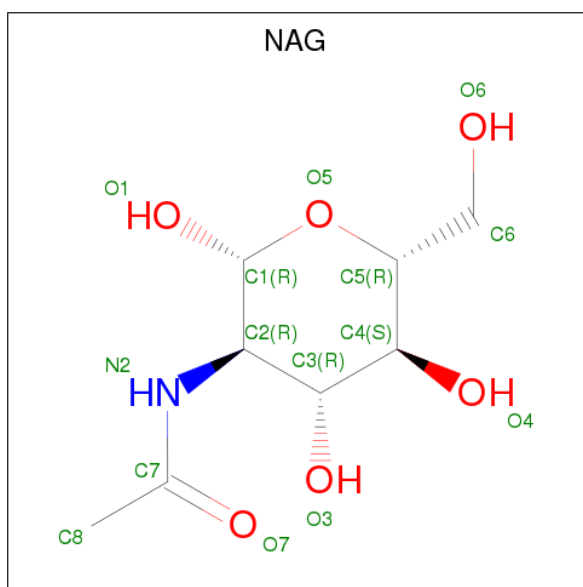
- Molecule 4 is a protein called Trastuzumab FAB LIGHT CHAIN.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	214	1649	1032	277	334	6	0	0

- Molecule 5 is a protein called Trastuzumab FAB HEAVY CHAIN.

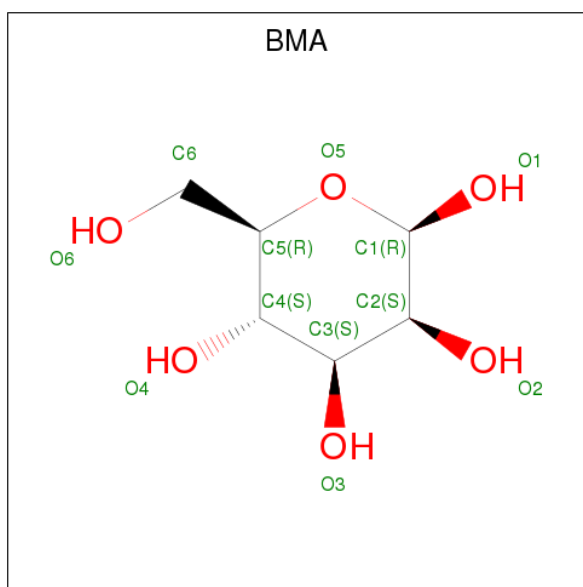
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	220	1649	1042	278	323	6	0	0

- Molecule 6 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C₈H₁₅NO₆).



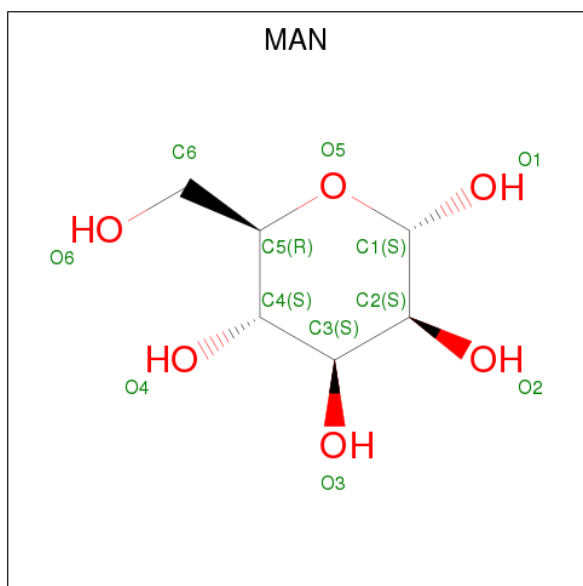
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
6	A	1	Total	C	N	O	0
			98	56	7	35	
6	A	1	Total	C	N	O	0
			98	56	7	35	
6	A	1	Total	C	N	O	0
			98	56	7	35	
6	A	1	Total	C	N	O	0
			98	56	7	35	
6	A	1	Total	C	N	O	0
			98	56	7	35	
6	A	1	Total	C	N	O	0
			98	56	7	35	

- Molecule 7 is BETA-D-MANNOSE (three-letter code: BMA) (formula: $C_6H_{12}O_6$).



Mol	Chain	Residues	Atoms			AltConf
7	A	1	Total	C	O	0
			11	6	5	

- Molecule 8 is ALPHA-D-MANNOSE (three-letter code: MAN) (formula: C₆H₁₂O₆).

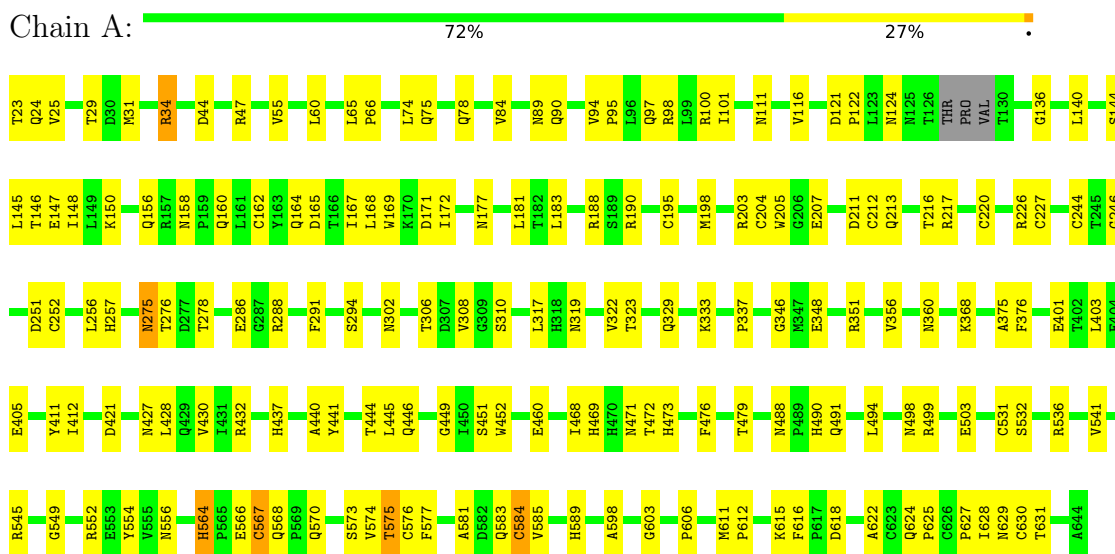


Mol	Chain	Residues	Atoms			AltConf
8	A	1	Total	C	O	0
			11	6	5	

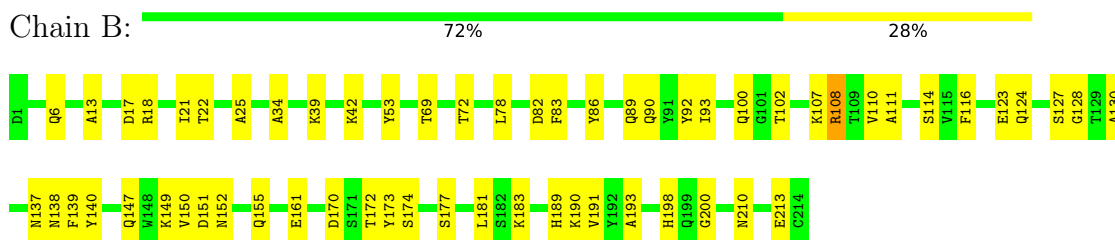
3 Residue-property plots [i](#)

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

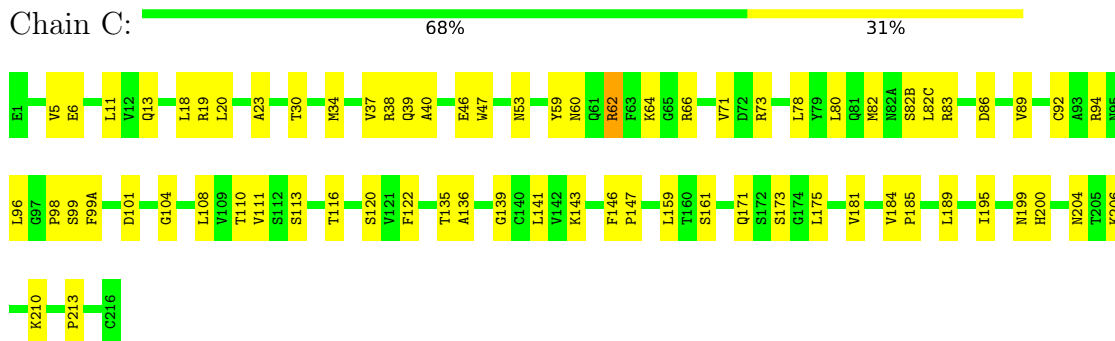
- Molecule 1: Receptor tyrosine-protein kinase erbB-2



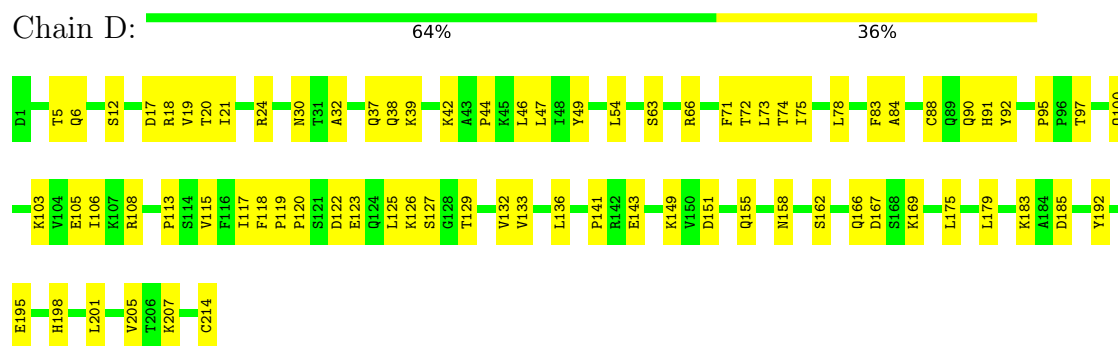
- Molecule 2: Pertuzumab FAB LIGHT CHAIN



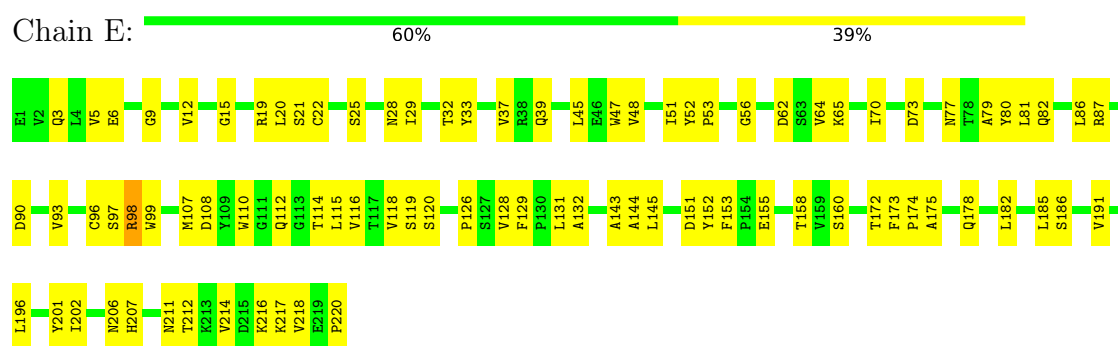
- Molecule 3: Pertuzumab FAB HEAVY CHAIN



- Molecule 4: Trastuzumab FAB LIGHT CHAIN



- Molecule 5: Trastuzumab FAB HEAVY CHAIN



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	398409	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	45	Depositor
Minimum defocus (nm)	-3500	Depositor
Maximum defocus (nm)	-1500	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor

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: BMA, NAG, MAN

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 >2	RMSZ	# Z >2
1	A	0.49	2/4869 (0.0%)	0.69	1/6629 (0.0%)
2	B	0.41	0/1694	0.60	0/2301
3	C	0.44	0/1706	0.61	0/2324
4	D	0.37	0/1686	0.65	2/2292 (0.1%)
5	E	0.38	0/1691	0.61	0/2306
All	All	0.44	2/11646 (0.0%)	0.65	3/15852 (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	A	0	1
5	E	0	1
All	All	0	2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	584	CYS	CB-SG	13.20	2.04	1.82
1	A	567	CYS	CB-SG	6.42	1.93	1.82

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	584	CYS	CA-CB-SG	15.31	141.55	114.00
4	D	54	LEU	CA-CB-CG	6.11	129.36	115.30
4	D	151	ASP	CB-CG-OD1	5.21	122.99	118.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	564	HIS	Peptide
5	E	155	GLU	Peptide

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	4755	0	4532	107	0
2	B	1656	0	1604	35	0
3	C	1665	0	1623	44	0
4	D	1649	0	1600	56	0
5	E	1649	0	1606	54	0
6	A	98	0	89	0	0
7	A	11	0	9	0	0
8	A	11	0	10	0	0
All	All	11494	0	11073	283	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 13.

All (283) 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:584:CYS:SG	1:A:584:CYS:CB	2.04	1.45
5:E:173:PHE:H	5:E:186:SER:H	1.33	0.76
4:D:19:VAL:HB	4:D:75:ILE:H	1.51	0.74
4:D:129:THR:H	4:D:183:LYS:HD3	1.55	0.71
1:A:23:THR:HG22	1:A:25:VAL:H	1.55	0.70
1:A:449:GLY:HA2	1:A:472:THR:H	1.58	0.69
5:E:87:ARG:N	5:E:90:ASP:OD2	2.23	0.69
4:D:127:SER:H	4:D:183:LYS:HE2	1.59	0.68
3:C:135:THR:HA	3:C:185:PRO:HA	1.75	0.67
4:D:117:ILE:HG13	4:D:119:PRO:HD3	1.77	0.67
1:A:576:CYS:HA	1:A:584:CYS:H	1.60	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:6:GLN:H	2:B:100:GLN:HE22	1.42	0.66
1:A:31:MET:HA	1:A:34:ARG:HH21	1.61	0.65
4:D:125:LEU:HA	4:D:183:LYS:HG2	1.79	0.65
1:A:531:CYS:SG	1:A:532:SER:N	2.70	0.64
2:B:161:GLU:HA	2:B:177:SER:HA	1.80	0.63
4:D:167:ASP:OD2	4:D:169:LYS:NZ	2.31	0.63
1:A:308:VAL:O	3:C:53:ASN:ND2	2.31	0.62
4:D:46:LEU:HD21	4:D:49:TYR:HB3	1.81	0.62
2:B:151:ASP:OD2	2:B:189:HIS:ND1	2.32	0.62
3:C:39:GLN:NE2	3:C:40:ALA:O	2.34	0.61
4:D:5:THR:HB	4:D:24:ARG:HB3	1.81	0.61
4:D:118:PHE:HB2	4:D:133:VAL:HB	1.82	0.61
1:A:100:ARG:HD2	1:A:144:SER:HB3	1.82	0.60
2:B:149:LYS:HB2	2:B:193:ALA:HB3	1.83	0.60
1:A:499:ARG:HH21	1:A:503:GLU:HG2	1.66	0.60
1:A:150:LYS:HG2	1:A:177:ASN:HD21	1.67	0.60
1:A:564:HIS:HB3	1:A:581:ALA:HB2	1.84	0.60
2:B:34:ALA:HB3	2:B:89:GLN:HB3	1.84	0.59
4:D:90:GLN:NE2	4:D:95:PRO:O	2.36	0.59
3:C:171:GLN:NE2	3:C:173:SER:OG	2.36	0.58
4:D:115:VAL:HG12	4:D:207:LYS:HD2	1.85	0.58
1:A:306:THR:HB	1:A:310:SER:H	1.67	0.58
3:C:66:ARG:NH1	3:C:82(B):SER:O	2.33	0.58
4:D:185:ASP:OD2	4:D:192:TYR:OH	2.20	0.57
1:A:171:ASP:HA	1:A:217:ARG:HE	1.70	0.57
1:A:60:LEU:HB3	1:A:84:VAL:HG22	1.86	0.57
1:A:356:VAL:HA	1:A:360:ASN:HD21	1.70	0.57
3:C:120:SER:HB2	3:C:143:LYS:HB3	1.87	0.57
5:E:62:ASP:HA	5:E:65:LYS:HB2	1.87	0.56
5:E:33:TYR:HB2	5:E:99:TRP:HB2	1.85	0.56
1:A:627:PRO:HG2	1:A:628:ILE:HD12	1.86	0.56
4:D:38:GLN:NE2	4:D:42:LYS:O	2.37	0.56
1:A:220:CYS:SG	1:A:227:CYS:N	2.79	0.56
1:A:286:GLU:O	1:A:288:ARG:NH1	2.39	0.56
2:B:210:ASN:HB2	2:B:213:GLU:HB2	1.88	0.56
4:D:162:SER:HA	5:E:174:PRO:HD2	1.88	0.56
1:A:430:VAL:HG12	1:A:460:GLU:HB3	1.87	0.56
2:B:150:VAL:HG23	2:B:155:GLN:HB2	1.88	0.56
3:C:5:VAL:HB	3:C:23:ALA:HB3	1.87	0.56
4:D:90:GLN:HE21	4:D:97:THR:HG23	1.71	0.56
1:A:323:THR:HA	1:A:329:GLN:HE22	1.70	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:18:ARG:NH1	4:D:20:THR:OG1	2.39	0.55
4:D:44:PRO:O	5:E:110:TRP:NE1	2.40	0.55
5:E:20:LEU:HB2	5:E:81:LEU:HB3	1.88	0.55
3:C:11:LEU:HG	3:C:110:THR:HB	1.89	0.55
5:E:86:LEU:HD13	5:E:118:VAL:HG21	1.89	0.55
1:A:203:ARG:HB3	1:A:213:GLN:HB3	1.89	0.54
1:A:317:LEU:O	1:A:319:ASN:ND2	2.40	0.54
1:A:205:TRP:N	1:A:211:ASP:O	2.40	0.54
1:A:437:HIS:HB3	1:A:441:TYR:HB2	1.90	0.54
2:B:114:SER:HB2	2:B:137:ASN:HB3	1.89	0.54
1:A:401:GLU:O	1:A:427:ASN:ND2	2.40	0.53
1:A:405:GLU:OE2	1:A:432:ARG:NE	2.37	0.53
1:A:94:VAL:O	1:A:97:GLN:NE2	2.40	0.53
2:B:111:ALA:HB3	2:B:139:PHE:HA	1.89	0.53
2:B:78:LEU:HD21	2:B:83:PHE:HE1	1.74	0.53
3:C:122:PHE:HB2	3:C:141:LEU:HB3	1.89	0.53
2:B:138:ASN:N	2:B:173:TYR:O	2.42	0.53
1:A:66:PRO:HA	1:A:90:GLN:HB2	1.90	0.53
2:B:108:ARG:NH2	2:B:170:ASP:O	2.42	0.53
4:D:21:ILE:HD12	4:D:73:LEU:HB3	1.91	0.53
5:E:178:GLN:HB2	5:E:182:LEU:HB2	1.91	0.53
4:D:198:HIS:HB3	4:D:201:LEU:HD13	1.91	0.52
5:E:37:VAL:HG22	5:E:47:TRP:HA	1.90	0.52
1:A:244:CYS:HA	1:A:252:CYS:HA	1.91	0.52
3:C:200:HIS:O	3:C:204:ASN:N	2.40	0.52
1:A:446:GLN:OE1	1:A:469:HIS:NE2	2.41	0.52
1:A:536:ARG:HD3	1:A:541:VAL:HG11	1.92	0.52
3:C:139:GLY:HA3	3:C:181:VAL:HA	1.91	0.52
4:D:90:GLN:OE1	4:D:92:TYR:N	2.42	0.52
1:A:346:GLY:HA2	1:A:351:ARG:HA	1.92	0.52
1:A:75:GLN:O	1:A:98:ARG:NH1	2.43	0.52
2:B:13:ALA:HB1	2:B:17:ASP:OD2	2.10	0.52
4:D:122:ASP:HA	4:D:125:LEU:HB2	1.91	0.52
1:A:302:ASN:HD21	1:A:432:ARG:HB3	1.75	0.51
4:D:123:GLU:O	4:D:126:LYS:NZ	2.42	0.51
2:B:130:ALA:N	2:B:181:LEU:O	2.40	0.51
1:A:376:PHE:HB2	1:A:412:ILE:HA	1.92	0.51
2:B:22:THR:HG22	2:B:72:THR:HA	1.93	0.51
4:D:12:SER:OG	4:D:105:GLU:OE1	2.28	0.51
4:D:30:ASN:O	4:D:66:ARG:NH2	2.44	0.51
5:E:175:ALA:HB2	5:E:185:LEU:HD23	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:630:CYS:SG	1:A:631:THR:N	2.84	0.51
2:B:25:ALA:H	2:B:69:THR:HB	1.74	0.51
3:C:189:LEU:HD11	3:C:213:PRO:HG3	1.92	0.51
3:C:34:MET:HB2	3:C:78:LEU:HD21	1.91	0.50
5:E:143:ALA:HB3	5:E:196:LEU:HD21	1.94	0.50
5:E:22:CYS:N	5:E:79:ALA:O	2.45	0.50
1:A:576:CYS:HA	1:A:583:GLN:H	1.77	0.50
5:E:160:SER:OG	5:E:202:ILE:O	2.28	0.50
5:E:153:PHE:HB2	5:E:182:LEU:HA	1.94	0.50
3:C:147:PRO:O	3:C:200:HIS:NE2	2.45	0.50
5:E:3:GLN:H	5:E:25:SER:HB3	1.76	0.50
4:D:39:LYS:NZ	4:D:83:PHE:O	2.44	0.49
1:A:368:LYS:HA	1:A:403:LEU:HA	1.94	0.49
4:D:126:LYS:H	4:D:183:LYS:HE3	1.77	0.49
1:A:121:ASP:OD1	1:A:124:ASN:ND2	2.45	0.49
2:B:138:ASN:HA	2:B:172:THR:HB	1.93	0.49
4:D:63:SER:HB3	4:D:74:THR:HB	1.95	0.49
5:E:93:VAL:HG22	5:E:115:LEU:HD13	1.93	0.49
3:C:38:ARG:O	3:C:46:GLU:N	2.45	0.49
1:A:148:ILE:N	1:A:172:ILE:O	2.46	0.49
4:D:21:ILE:H	4:D:72:THR:HG23	1.78	0.49
1:A:564:HIS:O	1:A:566:GLU:N	2.46	0.49
2:B:110:VAL:HA	2:B:140:TYR:HB3	1.95	0.49
3:C:6:GLU:OE2	3:C:92:CYS:HB3	2.12	0.49
4:D:83:PHE:HE1	4:D:105:GLU:HA	1.78	0.49
1:A:164:GLN:OE1	1:A:188:ARG:NH2	2.45	0.49
4:D:17:ASP:H	4:D:78:LEU:H	1.61	0.49
5:E:6:GLU:O	5:E:114:THR:OG1	2.28	0.49
1:A:146:THR:HG22	1:A:147:GLU:HG2	1.95	0.49
3:C:13:GLN:HG2	3:C:113:SER:HA	1.95	0.48
3:C:59:TYR:HE2	3:C:64:LYS:HA	1.78	0.48
3:C:96:LEU:HD13	3:C:101:ASP:OD2	2.14	0.48
5:E:5:VAL:HG13	5:E:112:GLN:HE22	1.77	0.48
1:A:577:PHE:H	1:A:584:CYS:N	2.11	0.48
5:E:9:GLY:HA3	5:E:116:VAL:HG22	1.94	0.48
5:E:172:THR:HG23	5:E:185:LEU:HD13	1.93	0.48
1:A:545:ARG:HB3	1:A:552:ARG:HD3	1.96	0.48
4:D:37:GLN:HB2	4:D:47:LEU:HD11	1.96	0.48
1:A:205:TRP:HB2	1:A:211:ASP:HB3	1.96	0.48
2:B:39:LYS:HB2	2:B:42:LYS:HB2	1.96	0.48
1:A:567:CYS:SG	1:A:576:CYS:N	2.68	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:19:ARG:HA	5:E:82:GLN:HA	1.95	0.48
1:A:111:ASN:HB3	1:A:181:LEU:HD11	1.96	0.48
4:D:63:SER:N	4:D:74:THR:O	2.47	0.48
5:E:218:VAL:HG12	5:E:220:PRO:HD3	1.96	0.48
4:D:149:LYS:HB2	4:D:195:GLU:HB3	1.96	0.47
1:A:568:GLN:OE1	1:A:570:GLN:NE2	2.47	0.47
3:C:30:THR:HG21	3:C:73:ARG:HH21	1.79	0.47
4:D:6:GLN:NE2	4:D:88:CYS:SG	2.82	0.47
3:C:120:SER:N	3:C:143:LYS:O	2.37	0.47
5:E:33:TYR:HD2	5:E:99:TRP:HE3	1.61	0.47
3:C:18:LEU:H	3:C:82:MET:HB2	1.79	0.47
2:B:151:ASP:HA	2:B:191:VAL:HB	1.96	0.47
5:E:39:GLN:HB2	5:E:45:LEU:HD23	1.96	0.47
1:A:100:ARG:HH11	1:A:144:SER:HB3	1.80	0.47
1:A:140:LEU:HD11	1:A:167:ILE:HG13	1.95	0.47
1:A:204:CYS:HA	1:A:212:CYS:HA	1.96	0.47
1:A:616:PHE:N	1:A:624:GLN:O	2.47	0.47
3:C:6:GLU:OE2	3:C:104:GLY:HA3	2.15	0.47
1:A:168:LEU:H	1:A:213:GLN:HE22	1.63	0.47
1:A:411:TYR:HA	1:A:444:THR:HB	1.96	0.47
1:A:488:ASN:HD21	1:A:491:GLN:HG3	1.79	0.47
2:B:123:GLU:OE2	3:C:122:PHE:HA	2.15	0.47
3:C:20:LEU:HB2	3:C:80:LEU:HB3	1.97	0.47
1:A:116:VAL:O	1:A:158:ASN:ND2	2.47	0.46
3:C:116:THR:HG22	3:C:147:PRO:HD3	1.97	0.46
5:E:28:ASN:OD1	5:E:77:ASN:ND2	2.48	0.46
1:A:169:TRP:HA	1:A:172:ILE:HD12	1.98	0.46
5:E:97:SER:OG	5:E:107:MET:SD	2.68	0.46
4:D:132:VAL:HG21	4:D:179:LEU:HB3	1.96	0.46
1:A:322:VAL:O	1:A:329:GLN:NE2	2.48	0.46
4:D:108:ARG:NH1	4:D:169:LYS:O	2.49	0.46
1:A:25:VAL:HG22	1:A:55:VAL:HB	1.98	0.46
2:B:198:HIS:CD2	2:B:200:GLY:H	2.33	0.46
1:A:615:LYS:HE2	1:A:625:PRO:HG3	1.98	0.46
4:D:136:LEU:HD22	4:D:175:LEU:HB3	1.98	0.46
1:A:78:GLN:O	1:A:100:ARG:N	2.39	0.45
2:B:190:LYS:HG2	2:B:210:ASN:HB3	1.97	0.45
3:C:99:SER:OG	3:C:99(A):PHE:N	2.49	0.45
3:C:82(C):LEU:HD22	3:C:86:ASP:OD2	2.15	0.45
3:C:71:VAL:HG12	3:C:78:LEU:HB3	1.97	0.45
4:D:84:ALA:O	4:D:103:LYS:NZ	2.42	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:471:ASN:N	1:A:498:ASN:OD1	2.48	0.45
1:A:575:THR:HA	1:A:585:VAL:H	1.79	0.45
3:C:82(C):LEU:HD11	3:C:111:VAL:HG21	1.97	0.45
4:D:106:ILE:O	4:D:166:GLN:NE2	2.45	0.45
5:E:29:ILE:HA	5:E:32:THR:HB	1.99	0.45
1:A:317:LEU:HD23	3:C:96:LEU:HD11	1.98	0.45
4:D:141:PRO:O	4:D:198:HIS:NE2	2.50	0.45
2:B:147:GLN:NE2	2:B:155:GLN:O	2.48	0.45
1:A:216:THR:HB	1:A:226:ARG:HE	1.81	0.45
1:A:246:GLY:H	1:A:251:ASP:HB3	1.82	0.45
1:A:476:PHE:O	1:A:479:THR:OG1	2.28	0.45
1:A:337:PRO:HD3	2:B:53:TYR:CZ	2.53	0.44
1:A:421:ASP:N	1:A:421:ASP:OD1	2.48	0.44
1:A:74:LEU:HD12	1:A:95:PRO:HG2	2.00	0.44
1:A:449:GLY:O	1:A:473:HIS:ND1	2.38	0.44
2:B:82:ASP:O	2:B:86:TYR:OH	2.25	0.44
3:C:89:VAL:HG22	3:C:108:LEU:HB2	1.98	0.44
3:C:136:ALA:N	3:C:184:VAL:O	2.51	0.44
4:D:113:PRO:HG2	4:D:205:VAL:HB	1.99	0.44
1:A:445:LEU:HB2	1:A:468:ILE:HG12	2.00	0.44
1:A:65:LEU:N	1:A:89:ASN:OD1	2.51	0.44
3:C:195:ILE:HG12	3:C:210:LYS:HB3	1.98	0.44
1:A:549:GLY:O	1:A:552:ARG:NE	2.50	0.44
3:C:116:THR:HA	3:C:146:PHE:HD2	1.83	0.44
3:C:37:VAL:HG22	3:C:47:TRP:HA	2.00	0.44
5:E:126:PRO:HD2	5:E:212:THR:HB	1.99	0.44
5:E:201:TYR:HB2	5:E:217:LYS:HD2	1.98	0.44
2:B:90:GLN:OE1	2:B:92:TYR:N	2.51	0.44
5:E:214:VAL:HG12	5:E:216:LYS:HB3	2.00	0.44
5:E:131:LEU:HD12	5:E:220:PRO:HG3	2.00	0.44
4:D:143:GLU:O	4:D:198:HIS:NE2	2.51	0.44
4:D:129:THR:HG21	5:E:151:ASP:OD2	2.18	0.44
3:C:199:ASN:HA	3:C:206:LYS:HA	1.98	0.43
1:A:603:GLY:H	1:A:612:PRO:HG2	1.83	0.43
5:E:12:VAL:H	5:E:118:VAL:HG22	1.83	0.43
5:E:128:VAL:HG13	5:E:218:VAL:HG23	2.00	0.43
5:E:201:TYR:HB2	5:E:217:LYS:HB2	2.00	0.43
1:A:195:CYS:HA	1:A:207:GLU:HA	2.01	0.43
2:B:137:ASN:OD1	2:B:174:SER:OG	2.31	0.43
3:C:66:ARG:HH12	3:C:82(C):LEU:HB3	1.83	0.43
5:E:145:LEU:HG	5:E:191:VAL:HG21	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:65:LEU:O	1:A:90:GLN:N	2.39	0.43
4:D:6:GLN:N	4:D:100:GLN:OE1	2.51	0.43
1:A:145:LEU:HB3	1:A:205:TRP:HH2	1.83	0.43
4:D:46:LEU:HB2	5:E:108:ASP:HB3	2.00	0.43
1:A:275:ASN:HB3	1:A:278:THR:H	1.84	0.42
1:A:494:LEU:HD23	1:A:494:LEU:HA	1.81	0.42
1:A:65:LEU:H	1:A:89:ASN:HA	1.84	0.42
1:A:348:GLU:HA	1:A:351:ARG:HH11	1.85	0.42
3:C:60:ASN:ND2	3:C:62:ARG:HB3	2.34	0.42
1:A:589:HIS:HB2	1:A:598:ALA:HA	2.00	0.42
4:D:38:GLN:HB2	4:D:44:PRO:HA	2.01	0.42
5:E:6:GLU:OE2	5:E:96:CYS:HB3	2.18	0.42
1:A:291:PHE:O	1:A:294:SER:OG	2.35	0.42
1:A:573:SER:OG	1:A:574:VAL:N	2.50	0.42
4:D:155:GLN:OE1	4:D:158:ASN:ND2	2.52	0.42
4:D:66:ARG:HG3	4:D:71:PHE:CE1	2.55	0.42
4:D:118:PHE:CZ	5:E:144:ALA:HB1	2.54	0.42
5:E:48:VAL:HG13	5:E:64:VAL:HG21	2.01	0.42
5:E:15:GLY:H	5:E:86:LEU:HB2	1.84	0.42
1:A:437:HIS:O	1:A:441:TYR:N	2.49	0.42
1:A:160:GLN:HA	1:A:190:ARG:HE	1.85	0.42
1:A:276:THR:O	3:C:64:LYS:NZ	2.37	0.42
2:B:149:LYS:NZ	2:B:152:ASN:O	2.40	0.42
5:E:98:ARG:NH2	5:E:108:ASP:OD1	2.42	0.42
2:B:124:GLN:HA	2:B:127:SER:HB2	2.02	0.42
5:E:119:SER:OG	5:E:120:SER:N	2.52	0.42
5:E:21:SER:HA	5:E:80:TYR:HD1	1.85	0.42
2:B:114:SER:HB3	2:B:116:PHE:HE2	1.85	0.41
4:D:214:CYS:HB2	5:E:132:ALA:HB2	2.02	0.41
3:C:18:LEU:N	3:C:82:MET:HB2	2.35	0.41
4:D:162:SER:HB3	4:D:175:LEU:HA	2.02	0.41
5:E:152:TYR:HB2	5:E:207:HIS:CE1	2.55	0.41
2:B:90:GLN:OE1	2:B:93:ILE:N	2.47	0.41
4:D:120:PRO:HB3	5:E:129:PHE:HB2	2.02	0.41
5:E:158:THR:HB	5:E:206:ASN:H	1.84	0.41
1:A:333:LYS:HG2	3:C:98:PRO:HD2	2.02	0.41
1:A:375:ALA:HA	1:A:411:TYR:HB3	2.03	0.41
1:A:577:PHE:N	1:A:583:GLN:HB2	2.35	0.41
2:B:13:ALA:O	2:B:107:LYS:N	2.37	0.41
2:B:128:GLY:HA2	2:B:183:LYS:HE3	2.01	0.41
1:A:24:GLN:HG3	1:A:25:VAL:HG23	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:618:ASP:HB2	1:A:622:ALA:HB3	2.03	0.41
2:B:21:ILE:HD13	2:B:102:THR:HG21	2.03	0.41
4:D:5:THR:HA	4:D:100:GLN:HE22	1.86	0.41
3:C:171:GLN:HG2	3:C:175:LEU:H	1.85	0.41
5:E:51:ILE:HD12	5:E:70:ILE:HG23	2.03	0.41
1:A:488:ASN:ND2	1:A:490:HIS:HB2	2.36	0.40
4:D:129:THR:N	4:D:183:LYS:HD3	2.29	0.40
1:A:44:ASP:OD1	1:A:47:ARG:NE	2.54	0.40
4:D:32:ALA:HB1	4:D:91:HIS:CD2	2.56	0.40
5:E:207:HIS:O	5:E:211:ASN:N	2.31	0.40
5:E:52:TYR:HA	5:E:53:PRO:HD3	1.92	0.40
5:E:73:ASP:O	5:E:77:ASN:N	2.55	0.40
1:A:101:ILE:HG13	1:A:147:GLU:O	2.22	0.40
1:A:121:ASP:HA	1:A:122:PRO:HD3	1.90	0.40
1:A:156:GLN:HE21	1:A:183:LEU:HD23	1.86	0.40
1:A:162:CYS:SG	1:A:190:ARG:NH1	2.94	0.40
1:A:403:LEU:HG	1:A:428:LEU:HD13	2.04	0.40
4:D:108:ARG:HD2	4:D:108:ARG:HA	1.96	0.40
1:A:451:SER:HB2	1:A:452:TRP:CE3	2.56	0.40
1:A:554:TYR:HE2	1:A:556:ASN:HB2	1.87	0.40
5:E:52:TYR:O	5:E:56:GLY:N	2.41	0.40
1:A:136:GLY:HA3	1:A:160:GLN:HB2	2.01	0.40
1:A:165:ASP:OD1	1:A:165:ASP:N	2.52	0.40
1:A:256:LEU:HD22	1:A:257:HIS:CE1	2.56	0.40
1:A:29:THR:HG22	1:A:440:ALA:HB2	2.04	0.40
3:C:159:LEU:HG	3:C:161:SER:H	1.86	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 PDB entries followed by that with respect to all EM entries.

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	615/622 (99%)	525 (85%)	89 (14%)	1 (0%)	49	84
2	B	212/214 (99%)	193 (91%)	19 (9%)	0	100	100
3	C	220/222 (99%)	200 (91%)	20 (9%)	0	100	100
4	D	212/214 (99%)	175 (82%)	37 (18%)	0	100	100
5	E	218/220 (99%)	183 (84%)	35 (16%)	0	100	100
All	All	1477/1492 (99%)	1276 (86%)	200 (14%)	1 (0%)	56	88

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	606	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 PDB entries followed by that with respect to all EM entries.

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	533/536 (99%)	527 (99%)	6 (1%)	76	87
2	B	188/188 (100%)	186 (99%)	2 (1%)	76	87
3	C	187/187 (100%)	183 (98%)	4 (2%)	56	78
4	D	189/189 (100%)	189 (100%)	0	100	100
5	E	181/181 (100%)	180 (99%)	1 (1%)	87	93
All	All	1278/1281 (100%)	1265 (99%)	13 (1%)	80	89

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	ARG
1	A	198	MET
1	A	275	ASN
1	A	575	THR
1	A	611	MET
1	A	629	ASN
2	B	18	ARG

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Mol	Chain	Res	Type
2	B	108	ARG
3	C	19	ARG
3	C	62	ARG
3	C	83	ARG
3	C	94	ARG
5	E	98	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	111	ASN
1	A	177	ASN
1	A	319	ASN
1	A	329	GLN
2	B	166	GLN
3	C	171	GLN
4	D	166	GLN
5	E	28	ASN
5	E	77	ASN

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

9 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
6	NAG	A	701	1	14,14,15	0.41	0	17,19,21	0.59	0
6	NAG	A	702	1	14,14,15	0.44	0	17,19,21	0.67	1 (5%)
6	NAG	A	703	1,6	14,14,15	0.53	0	17,19,21	0.58	0
6	NAG	A	704	7,6	14,14,15	0.41	0	17,19,21	1.01	1 (5%)
7	BMA	A	705	8,6	11,11,12	0.68	0	15,15,17	1.04	2 (13%)
8	MAN	A	706	7	11,11,12	1.01	1 (9%)	15,15,17	1.01	1 (6%)
6	NAG	A	707	1	14,14,15	0.86	1 (7%)	17,19,21	2.16	3 (17%)
6	NAG	A	708	1	14,14,15	0.34	0	17,19,21	0.44	0
6	NAG	A	709	1	14,14,15	0.56	0	17,19,21	0.69	1 (5%)

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
6	NAG	A	701	1	-	0/6/23/26	0/1/1/1
6	NAG	A	702	1	-	0/6/23/26	0/1/1/1
6	NAG	A	703	1,6	-	0/6/23/26	0/1/1/1
6	NAG	A	704	7,6	-	0/6/23/26	0/1/1/1
7	BMA	A	705	8,6	-	0/2/19/22	0/1/1/1
8	MAN	A	706	7	-	0/2/19/22	0/1/1/1
6	NAG	A	707	1	-	0/6/23/26	0/1/1/1
6	NAG	A	708	1	-	0/6/23/26	0/1/1/1
6	NAG	A	709	1	-	0/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	706	MAN	O5-C1	-2.44	1.39	1.43
6	A	707	NAG	C1-C2	2.55	1.56	1.52

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	A	706	MAN	O2-C2-C3	-2.81	104.67	110.16

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	705	BMA	O2-C2-C3	-2.09	106.07	110.16
7	A	705	BMA	C1-O5-C5	2.03	114.95	112.20
6	A	707	NAG	C8-C7-N2	2.08	119.68	116.10
6	A	709	NAG	C1-O5-C5	2.33	115.37	112.20
6	A	702	NAG	C1-O5-C5	2.36	115.41	112.20
6	A	704	NAG	C2-N2-C7	2.86	127.03	122.92
6	A	707	NAG	C1-C2-N2	3.39	116.28	110.49
6	A	707	NAG	C2-N2-C7	7.65	133.89	122.92

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.