



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2019 – 02:05 PM EST

PDB ID : 5O7P  
Title : HER3 in complex with Fab MF3178  
Authors : De Nardis, C.; Gros, P.  
Deposited on : 2017-06-09  
Resolution : 4.50 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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.7.3 (157068), CSD as539be (2018)  
Xtriage (Phenix) : 1.13  
EDS : rb-20031633  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Refmac : 5.8.0158  
CCP4 : 7.0 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20031633

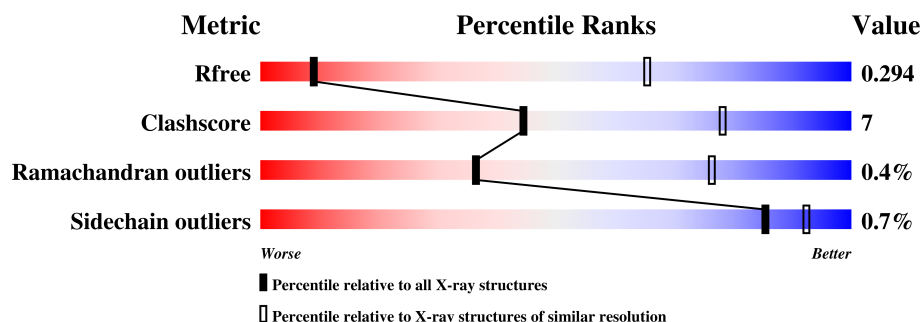
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 4.50 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))
$R_{free}$	111664	1068 (5.30-3.70)
Clashscore	122126	1013 (5.28-3.72)
Ramachandran outliers	120053	1085 (5.30-3.70)
Sidechain outliers	120020	1067 (5.30-3.70)

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  $\geq 3$ , 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	C	649	 72%                      17%                      • 10%
2	A	214	 88%                      11%
3	B	250	 78%                      9%                      13%

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 7902 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 Receptor tyrosine-protein kinase erbB-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	C	582	Total	C	N	O	S	0	0	0
			4465	2758	811	837	59			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	644	HIS	-	expression tag	UNP P21860
C	645	HIS	-	expression tag	UNP P21860
C	646	HIS	-	expression tag	UNP P21860
C	647	HIS	-	expression tag	UNP P21860
C	648	HIS	-	expression tag	UNP P21860
C	649	HIS	-	expression tag	UNP P21860

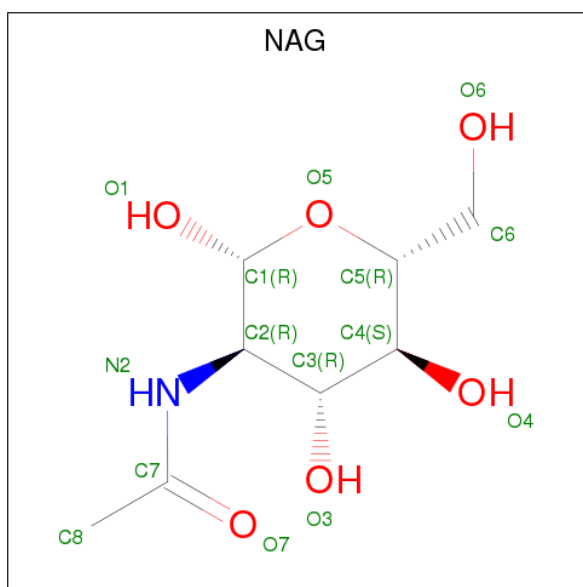
- Molecule 2 is a protein called MF3178 FAB light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	A	213	Total	C	N	O	S	0	0	0
			1629	1017	272	335	5			

- Molecule 3 is a protein called MF3178 FAB heavy chain.

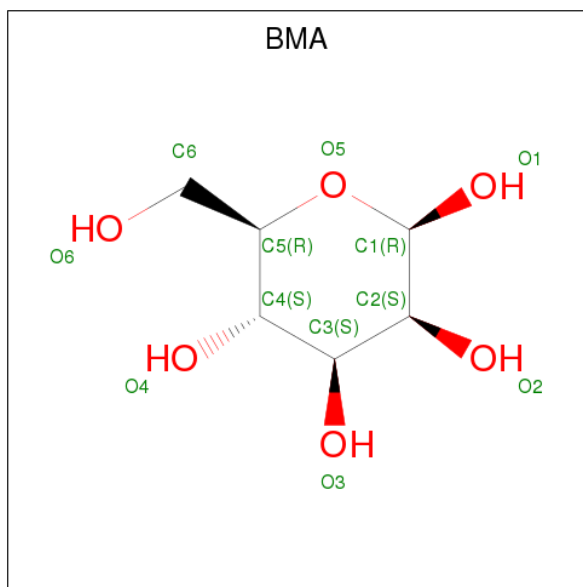
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	B	218	Total	C	N	O	S	0	0	0
			1671	1059	286	318	8			

- Molecule 4 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		

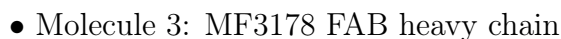
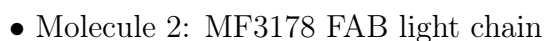
- Molecule 5 is BETA-D-MANNOSE (three-letter code: BMA) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



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



- Molecule 1: Receptor tyrosine-protein kinase erbB-3



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 64 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	141.13Å 141.13Å 320.82Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.99 – 4.50 48.99 – 4.50	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.99-4.50) 100.0 (48.99-4.50)	Depositor EDS
$R_{merge}$	0.20	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.98 (at 4.45Å)	Xtriage
Refinement program	PHENIX (1.11_2567: ???)	Depositor
R, $R_{free}$	0.247 , 0.296 0.247 , 0.294	Depositor DCC
$R_{free}$ test set	631 reflections (5.31%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	175.6	Xtriage
Anisotropy	0.548	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.27 , 198.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.43$ , $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.88	EDS
Total number of atoms	7902	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	248.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.35% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, NAG

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	C	0.27	0/4573	0.47	0/6204
2	A	0.25	0/1664	0.44	0/2260
3	B	0.24	0/1719	0.44	0/2343
All	All	0.26	0/7956	0.46	0/10807

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

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	C	4465	0	4229	81	0
2	A	1629	0	1583	16	0
3	B	1671	0	1607	14	0
4	C	126	0	115	2	0
5	C	11	0	10	0	0
All	All	7902	0	7544	108	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 7.

All (108) 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:C:305:CYS:SG	1:C:320:CYS:HB2	2.02	0.99
1:C:426:ARG:O	1:C:428:PHE:N	2.15	0.79
1:C:321:GLU:HG3	1:C:322:PRO:HD2	1.66	0.78
1:C:305:CYS:SG	1:C:320:CYS:CB	2.76	0.73
1:C:321:GLU:HG3	1:C:322:PRO:CD	2.19	0.72
1:C:194:CYS:HB3	1:C:202:CYS:HB3	1.73	0.71
1:C:321:GLU:CG	1:C:322:PRO:N	2.55	0.70
2:A:189:HIS:O	2:A:211:ARG:NH1	2.24	0.70
1:C:124:ASN:OD1	1:C:127:SER:N	2.26	0.69
1:C:352:VAL:HG11	4:C:705:NAG:H82	1.75	0.69
2:A:62:PHE:HA	2:A:75:ILE:HG22	1.78	0.66
1:C:539:GLU:HB2	1:C:540:PRO:HD3	1.79	0.65
1:C:471:THR:HG22	1:C:478:THR:HG21	1.77	0.65
3:B:97:ALA:HB1	3:B:111:PHE:HB3	1.80	0.63
1:C:360:ASN:HB3	1:C:396:TYR:CE1	2.33	0.63
1:C:541:ARG:NH1	1:C:559:MET:O	2.31	0.62
3:B:51:ILE:HD11	3:B:70:MET:HB2	1.80	0.62
1:C:134:LEU:HG	1:C:155:LEU:HD11	1.82	0.60
1:C:266:ASN:HB3	1:C:269:THR:HG22	1.82	0.59
3:B:206:ILE:HG12	3:B:221:ARG:HG2	1.85	0.58
1:C:27:ALA:HB1	1:C:57:GLU:HB2	1.85	0.58
2:A:145:LYS:HB3	2:A:197:THR:HB	1.86	0.58
1:C:321:GLU:HG3	1:C:322:PRO:N	2.19	0.58
2:A:6:GLN:HE21	2:A:102:THR:HG23	1.69	0.58
2:A:21:ILE:HD11	2:A:73:LEU:HD23	1.86	0.57
1:C:427:GLY:HA3	1:C:453:ARG:HH21	1.67	0.57
1:C:273:GLU:HG3	1:C:274:PRO:HD2	1.86	0.57
2:A:37:GLN:HB2	2:A:47:LEU:HD11	1.86	0.57
1:C:253:GLY:HA2	4:C:702:NAG:H3	1.89	0.55
1:C:119:VAL:HG12	1:C:152:ASN:HD21	1.72	0.54
1:C:310:MET:C	1:C:320:CYS:HB3	2.29	0.53
3:B:91:THR:HG23	3:B:121:THR:HA	1.92	0.52
1:C:104:VAL:HG11	1:C:245:ALA:HB2	1.91	0.52
1:C:433:MET:HG3	1:C:434:LYS:HG2	1.92	0.52
2:A:96:PRO:HD2	3:B:47:TRP:CE3	2.46	0.51
1:C:186:CYS:HB3	1:C:192:GLY:HA2	1.92	0.51
1:C:534:ASN:ND2	1:C:540:PRO:HD2	2.26	0.51
1:C:281:GLN:HB2	1:C:300:SER:HB3	1.91	0.51
1:C:163:TRP:HB3	1:C:174:ILE:HD13	1.91	0.51
1:C:396:TYR:CD1	1:C:424:TYR:HB2	2.46	0.51
1:C:168:ARG:NH2	1:C:216:GLY:O	2.37	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:177:LYS:O	1:C:179:ASN:ND2	2.44	0.50
1:C:605:ASP:HB3	1:C:609:GLU:H	1.77	0.50
1:C:396:TYR:CE1	1:C:424:TYR:HD1	2.30	0.49
1:C:124:ASN:ND2	1:C:127:SER:OG	2.46	0.49
1:C:310:MET:O	1:C:320:CYS:HB3	2.11	0.49
1:C:321:GLU:HG2	1:C:322:PRO:N	2.27	0.49
1:C:235:CYS:HB3	1:C:243:CYS:SG	2.54	0.48
1:C:525:ARG:NH1	1:C:542:GLU:OE2	2.48	0.47
2:A:11:LEU:HD23	2:A:104:VAL:HG12	1.97	0.47
1:C:447:LYS:NZ	1:C:518:LEU:O	2.48	0.47
1:C:99:LEU:HD13	1:C:102:LEU:HD22	1.96	0.47
1:C:209:ILE:HG22	1:C:210:CYS:H	1.81	0.46
2:A:6:GLN:NE2	2:A:102:THR:HG23	2.30	0.46
1:C:310:MET:O	1:C:320:CYS:CB	2.64	0.46
3:B:70:MET:HG2	3:B:81:MET:HG3	1.96	0.46
1:C:334:THR:N	1:C:360:ASN:O	2.49	0.46
1:C:444:ARG:HB2	1:C:515:GLY:O	2.16	0.45
1:C:82:GLU:HG2	1:C:104:VAL:HB	1.99	0.45
1:C:520:CYS:SG	1:C:524:SER:HB3	2.55	0.45
2:A:113:PRO:HD3	2:A:198:HIS:ND1	2.31	0.45
3:B:11:VAL:HG21	3:B:158:PRO:HG3	1.98	0.45
1:C:321:GLU:HG2	1:C:322:PRO:O	2.16	0.45
1:C:81:ARG:NH1	1:C:82:GLU:OE2	2.49	0.45
1:C:121:LEU:N	1:C:152:ASN:OD1	2.50	0.45
3:B:100:HIS:CE1	3:B:110:GLY:H	2.35	0.45
1:C:427:GLY:O	1:C:453:ARG:HB2	2.17	0.44
1:C:309:LYS:HG2	1:C:322:PRO:HA	1.99	0.44
1:C:602:LYS:HG2	1:C:612:PRO:HA	1.99	0.44
1:C:416:THR:HA	1:C:446:LEU:HA	1.99	0.44
2:A:93:SER:OG	2:A:95:PRO:HD2	2.18	0.44
1:C:262:PRO:HA	1:C:278:THR:HG21	1.99	0.43
1:C:93:GLU:O	1:C:129:HIS:HB3	2.17	0.43
1:C:121:LEU:HD21	1:C:151:LYS:HD3	2.00	0.43
1:C:326:LEU:HD12	1:C:326:LEU:HA	1.85	0.43
3:B:47:TRP:CH2	3:B:49:GLY:HA2	2.53	0.43
1:C:614:HIS:CD2	1:C:614:HIS:H	2.37	0.43
1:C:419:GLY:O	1:C:450:SER:HB3	2.19	0.43
2:A:136:LEU:HD21	2:A:196:VAL:HG21	2.00	0.42
1:C:194:CYS:CB	1:C:202:CYS:HB3	2.43	0.42
1:C:309:LYS:HB3	1:C:321:GLU:O	2.19	0.42
1:C:540:PRO:O	1:C:542:GLU:HG3	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:23:LYS:NZ	3:B:76:ILE:O	2.51	0.42
1:C:230:GLU:OE2	1:C:257:PRO:HG3	2.20	0.42
2:A:61:ARG:O	2:A:75:ILE:HA	2.20	0.42
1:C:360:ASN:OD1	1:C:396:TYR:N	2.40	0.42
1:C:431:LEU:HD11	3:B:105:PHE:CZ	2.55	0.42
3:B:98:ARG:NH1	3:B:112:ASP:OD2	2.40	0.42
3:B:174:VAL:HA	3:B:193:VAL:HG22	2.02	0.42
1:C:296:VAL:HB	1:C:319:MET:CB	2.49	0.42
1:C:403:PRO:HA	1:C:404:PRO:HD3	1.90	0.42
1:C:81:ARG:HG2	1:C:82:GLU:HG3	2.02	0.42
1:C:576:CYS:SG	1:C:580:ARG:HG2	2.61	0.41
1:C:106:ARG:O	1:C:143:LEU:HB3	2.20	0.41
1:C:310:MET:C	1:C:320:CYS:CB	2.88	0.41
1:C:536:LEU:O	1:C:541:ARG:NH1	2.52	0.41
2:A:96:PRO:HD2	3:B:47:TRP:CD2	2.55	0.41
1:C:534:ASN:HD22	1:C:540:PRO:HD2	1.85	0.41
1:C:542:GLU:HG2	1:C:551:SER:HA	2.02	0.41
1:C:466:HIS:ND1	1:C:490:ARG:HG2	2.36	0.41
1:C:515:GLY:HA2	1:C:528:VAL:HA	2.02	0.41
2:A:6:GLN:HG3	2:A:99:GLY:HA3	2.03	0.41
1:C:140:THR:HG22	1:C:141:GLU:HG3	2.03	0.41
1:C:291:PRO:HB2	1:C:294:PHE:CD1	2.56	0.41
1:C:571:ASP:OD1	1:C:583:PRO:HB2	2.21	0.41
2:A:94:THR:O	2:A:96:PRO:HD3	2.21	0.40
1:C:625:GLU:HB2	1:C:627:GLN:HG2	2.02	0.40
1:C:82:GLU:OE1	1:C:106:ARG:NH2	2.55	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	C	578/649 (89%)	521 (90%)	53 (9%)	4 (1%)	24	66
2	A	211/214 (99%)	200 (95%)	11 (5%)	0	100	100
3	B	214/250 (86%)	205 (96%)	9 (4%)	0	100	100
All	All	1003/1113 (90%)	926 (92%)	73 (7%)	4 (0%)	36	76

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	427	GLY
1	C	98	PRO
1	C	540	PRO
1	C	298	GLN

### 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	C	504/560 (90%)	499 (99%)	5 (1%)	78	89
2	A	188/189 (100%)	187 (100%)	1 (0%)	90	94
3	B	183/207 (88%)	183 (100%)	0	100	100
All	All	875/956 (92%)	869 (99%)	6 (1%)	85	92

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	124	ASN
1	C	127	SER
1	C	218	CYS
1	C	349	ASP
1	C	425	ASN
2	A	94	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	534	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](#)

10 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	$\# Z  > 2$
4	NAG	C	701	1	14,14,15	0.45	0	17,19,21	0.62	0
4	NAG	C	702	1,4	14,14,15	0.37	0	17,19,21	0.55	0
4	NAG	C	703	5,4	14,14,15	0.78	1 (7%)	17,19,21	0.76	0
5	BMA	C	704	4	11,11,12	0.59	0	15,15,17	1.57	3 (20%)
4	NAG	C	705	1	14,14,15	0.33	0	17,19,21	0.59	0
4	NAG	C	706	1	14,14,15	0.20	0	17,19,21	0.44	0
4	NAG	C	707	1	14,14,15	0.20	0	17,19,21	0.43	0
4	NAG	C	708	1	14,14,15	0.30	0	17,19,21	0.54	0
4	NAG	C	709	1	14,14,15	0.22	0	17,19,21	0.39	0
4	NAG	C	710	1	14,14,15	0.30	0	17,19,21	0.50	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
4	NAG	C	701	1	-	0/6/23/26	0/1/1/1
4	NAG	C	702	1,4	-	0/6/23/26	0/1/1/1
4	NAG	C	703	5,4	-	0/6/23/26	0/1/1/1
5	BMA	C	704	4	-	0/2/19/22	0/1/1/1
4	NAG	C	705	1	-	0/6/23/26	0/1/1/1
4	NAG	C	706	1	-	0/6/23/26	0/1/1/1
4	NAG	C	707	1	-	0/6/23/26	0/1/1/1
4	NAG	C	708	1	-	0/6/23/26	0/1/1/1
4	NAG	C	709	1	-	0/6/23/26	0/1/1/1
4	NAG	C	710	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	703	NAG	O5-C1	-2.80	1.39	1.43

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	704	BMA	C1-C2-C3	2.67	113.04	109.66
5	C	704	BMA	O5-C1-C2	2.90	115.30	110.78
5	C	704	BMA	C1-O5-C5	3.47	116.96	112.19

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	702	NAG	1	0
4	C	705	NAG	1	0

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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

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

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

### 6.3 Carbohydrates [i](#)

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

### 6.4 Ligands [i](#)

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

### 6.5 Other polymers [i](#)

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