WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Oct 17, 2023 – 03:28 PM EDT

PDB ID : 1JL8

Title : Complex of alpha-amylase II (TVA II) from Thermoactinomyces vulgaris R-47 with beta-cyclodextrin based on a co-crystallization with methyl beta-cyclodextrin

Authors : Yokota, T.; Tonozuka, T.; Shimura, Y.; Ichikawa, K.; Kamitori, S.; Sakano, Y.

Deposited on : 2001-07-16

Resolution : 3.20 Å(reported)

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

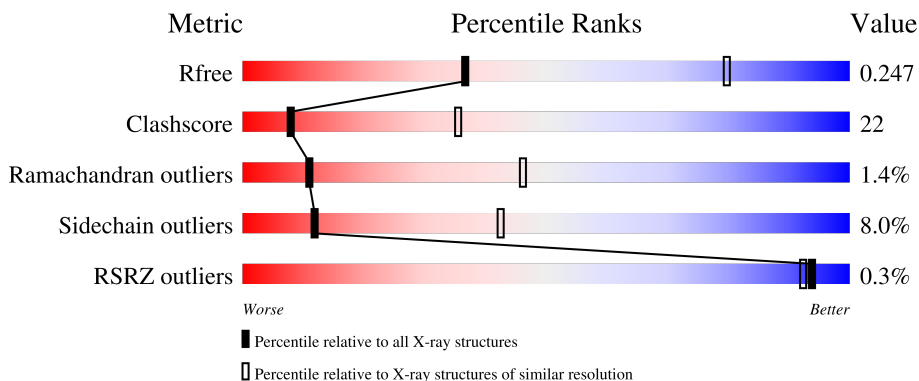|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 3.20 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	Percentile Ranks	Value
Rfree		0.247
Clashscore		22
Ramachandran outliers		1.4%
Sidechain outliers		8.0%
RSRZ outliers		0.3%

Worse   *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)
RSRZ outliers	127900	1095 (3.20-3.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% 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	585	60% 35% 5%
1	B	585	58% 37% •
2	C	7	100%
2	D	7	100%

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	GLC	C	7	-	-	-	X

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 9706 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.
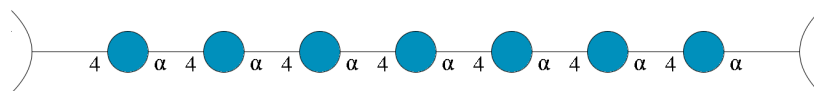
- Molecule 1 is a protein called ALPHA-AMYLASE II.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	585	Total 4776	C 3056	N 832	O 873	S 15	0	0	0
1	B	585	Total 4776	C 3056	N 832	O 873	S 15	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	325	ASN	ASP	engineered mutation	UNP Q08751
B	325	ASN	ASP	engineered mutation	UNP Q08751

- Molecule 2 is an oligosaccharide called Cycloheptakis-(1-4)-(alpha-D-glucopyranose).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	C	7	Total 77	C 42	O 35	0	0	0
2	D	7	Total 77	C 42	O 35	0	0	0

3 Residue-property plots ⓘ

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. T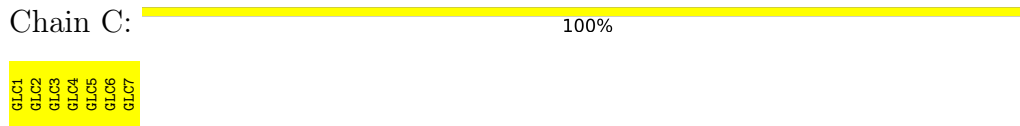he second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue 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: ALPHA-AMYLASE II

Chain A:

• Molecule 1: ALPHA-AMYLASE II

Chain B:

H202 K203 Y204 D205 T206 Y209 I212 F216 G217 D218 L219 P220 T221 F222 R223 R224 L225 V226 I234 K235 L238 V241 F242 N243 H244 A245 G246 D247 Q248 F249 R253 D254 V255 L256 R263 D266 F269 I270 E271 D272 F273 P274 V275 S276 K277 T278 S279 R280 T281 N282

Y283 E284 T285 F286 A292 M293 P294 K295 L296 R297 T298 E299 N300 V303 L307 V310 A311 R312 F313 Q317 G318 I319 D320 G321 W322 R323 L324 N325 V326 A327 N328 E329 V330 D331 F334 W335 R339 K343 A349 W356 L363 S370 N373 Y374 L375 F376 R377

E378 S379 V380 I381 R382 T386 G387 E388 I389 H390 A391 E392 R393 F394 E397 L398 Y405 Q408 L416 F425 L426 N432 E433 A434 K435 F436 R437 L438 A439 V440 L441 F442 Q443 M444 T445 Y446 L447 G448 I452 Y453 Y454 E457 A461 D465 P466 D467 C468 R469 R470

W474 E478 F486 Y487 K488 L493 R494 L500 T501 R502 G503 R506 K512 N515 F519 V523 Q524 V528 G529 V530 V531 L532 N533 N534 R535 G536 E537 K538 V541 L542 L543 Q544 V545 P546 E547 S548 G549 G550 K551 T552 W553 L554 D555 C556 L557 T558 G559 E560

E561 V562 H563 G564 K565 Q566 G567 Q568 L569 L573 R574 P575 Y576 Q577 G578 M579 I580 L581 R585

- Molecule 2: Cycloheptakis-(1-4)-(alpha-D-glucopyranose)

Chain C: 100%

GLC1 GLC2 GLC3 GLC4 GLC5 GLC6 GLC7

- Molecule 2: Cycloheptakis-(1-4)-(alpha-D-glucopyranose)

Chain D: 100%

GLC1 GLC2 GLC3 GLC4 GLC5 GLC6 GLC7

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	118.02Å 120.36Å 113.52Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.50 – 3.20 81.82 – 3.20	Depositor EDS
% Data completeness (in resolution range)	85.2 (39.50-3.20) 85.2 (81.82-3.20)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.81 (at 3.19Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.189 , 0.255 0.187 , 0.247	Depositor DCC
R_{free} test set	2302 reflections (9.88%)	wwPDB-VP
Wilson B-factor (Å^2)	54.6	Xtriage
Anisotropy	0.134	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.26 , 40.6	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.004 for k,h,-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	9706	wwPDB-VP
Average B, all atoms (Å^2)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.77% of the height of the origin peak. No significant pseudotranslation is detected.*

---

[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	0/4906	0.68	0/6641
1	B	0.47	0/4906	0.68	0/6641
All	All	0.48	0/9812	0.68	0/13282

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	A	4776	0	4609	199	0
1	B	4776	0	4609	216	0
2	C	77	0	63	0	0
2	D	77	0	63	0	0
All	All	9706	0	9344	410	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 22.

All (410) 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:44:ARG:HE	1:A:112:GLN:HE21	1.06	1.00
1:B:408:GLN:H	1:B:408:GLN:HE21	1.06	0.95
1:A:378:GLU:OE2	1:A:382:ARG:HD3	1.69	0.93
1:B:558:THR:HG23	1:B:559:GLY:H	1.36	0.90
1:B:392:GLU:HG3	1:B:512:LYS:HB2	1.52	0.89
1:B:551:LYS:NZ	1:B:551:LYS:HB2	1.88	0.89
1:A:44:ARG:NE	1:A:112:GLN:HE21	1.71	0.88
1:B:408:GLN:H	1:B:408:GLN:NE2	1.72	0.88
1:A:282:ASN:H	1:A:282:ASN:HD22	1.15	0.88
1:A:44:ARG:HE	1:A:112:GLN:NE2	1.73	0.86
1:A:145:ASP:O	1:A:148:ASN:ND2	2.09	0.86
1:A:247:ASP:HB3	1:A:292:ALA:HA	1.60	0.84
1:A:382:ARG:HH11	1:A:389:ILE:HG21	1.42	0.83
1:B:282:ASN:HD22	1:B:282:ASN:H	1.25	0.83
1:A:57:ALA:HB2	1:A:71:ALA:HB2	1.60	0.83
1:B:548:SER:O	1:B:550:GLY:N	2.11	0.82
1:B:380:VAL:HG23	1:B:381:ILE:HD12	1.63	0.80
1:B:546:PRO:O	1:B:548:SER:N	2.14	0.80
1:A:386:THR:OG1	1:A:388:GLU:HG3	1.82	0.80
1:B:158:LYS:O	1:B:158:LYS:HD3	1.82	0.79
1:B:269:PHE:HB2	1:B:284:GLU:HB2	1.66	0.77
1:A:3:LEU:HA	1:A:6:ILE:HD12	1.66	0.76
1:A:288:VAL:HG23	1:A:289:GLN:H	1.48	0.76
1:B:282:ASN:HD22	1:B:282:ASN:N	1.84	0.76
1:B:280:ARG:NH1	1:B:280:ARG:HA	1.99	0.76
1:A:218:ASP:OD1	1:A:220:PRO:HD2	1.87	0.75
1:A:282:ASN:H	1:A:282:ASN:ND2	1.86	0.74
1:B:253:ARG:HG3	1:B:253:ARG:HH11	1.53	0.73
1:B:408:GLN:HE21	1:B:408:GLN:N	1.84	0.72
1:B:546:PRO:C	1:B:548:SER:H	1.92	0.72
1:A:282:ASN:HD22	1:A:282:ASN:N	1.86	0.72
1:B:416:LEU:HD23	1:B:416:LEU:H	1.56	0.71
1:A:89:PRO:HG2	1:A:90:GLN:HE21	1.55	0.71
1:A:381:ILE:O	1:A:385:ALA:HB3	1.91	0.71
1:B:538:LYS:HG2	1:B:575:PRO:HD3	1.73	0.71
1:A:332:HIS:HD2	1:A:367:GLN:HE22	1.37	0.71
1:B:551:LYS:HB2	1:B:551:LYS:HZ2	1.55	0.70
1:A:24:ARG:HH21	1:A:72:LEU:HD23	1.56	0.70
1:B:2:LEU:HD23	1:B:4:GLU:HG2	1.73	0.69
1:A:280:ARG:HG2	1:A:281:THR:N	2.08	0.69
1:A:505:VAL:HG22	1:A:521:ARG:CD	2.22	0.68
1:B:296:LEU:HD23	1:B:307:LEU:HD11	1.74	0.68

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:143:ASN:OD1	1:A:148:ASN:ND2	2.27	0.67
1:A:373:ASN:ND2	1:A:376:PHE:HB2	2.10	0.67
1:B:253:ARG:HG3	1:B:253:ARG:NH1	2.07	0.67
1:A:496:ARG:HH11	1:A:496:ARG:HB2	1.60	0.67
1:A:129:LYS:HD2	1:A:502:ARG:HH12	1.59	0.66
1:A:311:ALA:O	1:A:315:MET:HG3	1.96	0.66
1:B:245:ALA:O	1:B:294:PRO:HD2	1.94	0.65
1:B:247:ASP:HB2	1:B:277:LYS:HE2	1.79	0.65
1:A:377:ARG:HA	1:A:380:VAL:HG22	1.78	0.64
1:B:198:SER:HB3	1:B:203:LYS:HD2	1.80	0.64
1:B:143:ASN:CG	1:B:169:GLY:O	2.36	0.63
1:B:373:ASN:ND2	1:B:376:PHE:HB2	2.14	0.63
1:A:2:LEU:HD13	1:B:2:LEU:HD21	1.79	0.63
1:A:193:THR:HB	1:A:194:PRO:HD2	1.80	0.62
1:A:20:GLU:OE1	1:A:118:ARG:HG2	2.00	0.62
1:B:558:THR:HG23	1:B:559:GLY:N	2.10	0.62
1:B:503:GLY:CA	1:B:523:VAL:HG23	2.29	0.62
1:B:198:SER:HB3	1:B:203:LYS:CD	2.29	0.62
1:A:515:ASN:ND2	1:A:534:ASN:HB3	2.14	0.61
1:B:435:LYS:HG2	1:B:576:TYR:CE2	2.35	0.61
1:A:190:LEU:HD13	1:A:234:ILE:HG21	1.82	0.61
1:A:104:GLU:OE2	1:A:107:LYS:HG3	2.01	0.61
1:B:381:ILE:HD12	1:B:425:PHE:HE1	1.65	0.61
1:B:503:GLY:HA2	1:B:523:VAL:HG23	1.83	0.61
1:B:551:LYS:HB2	1:B:551:LYS:HZ3	1.66	0.60
1:B:140:ARG:HG2	1:B:469:ARG:O	2.01	0.60
1:B:275:VAL:HA	1:B:282:ASN:OD1	2.01	0.60
1:A:163:ARG:HB2	1:A:166:SER:OG	2.01	0.60
1:A:280:ARG:HG2	1:A:281:THR:H	1.66	0.60
1:B:62:SER:HB3	1:B:67:ASP:HA	1.83	0.60
1:B:202:HIS:HB2	1:B:204:TYR:HD2	1.67	0.60
1:B:89:PRO:HB2	1:B:90:GLN:OE1	2.02	0.60
1:B:255:VAL:HG12	1:B:275:VAL:HG21	1.84	0.60
1:A:433:GLU:HG2	1:A:437:ARG:HD2	1.83	0.59
1:B:273:PHE:HB3	1:B:274:PRO:HA	1.84	0.59
1:B:426:LEU:HD23	1:B:461:ALA:HB2	1.83	0.59
1:A:273:PHE:CB	1:A:274:PRO:HA	2.33	0.58
1:B:282:ASN:H	1:B:282:ASN:ND2	1.98	0.58
1:A:297:ARG:HG2	1:A:300:ASN:HB2	1.84	0.58
1:B:143:ASN:ND2	1:B:169:GLY:O	2.36	0.58
1:A:274:PRO:O	1:A:275:VAL:C	2.42	0.58

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:324:LEU:HD13	1:A:335:TRP:CZ3	2.39	0.58
1:B:311:ALA:HA	1:B:322:TRP:CH2	2.38	0.57
1:A:317:GLN:N	1:A:317:GLN:HE21	2.03	0.57
1:B:579:MET:CE	1:B:581:LEU:HD11	2.34	0.57
1:B:144:GLY:HA3	1:B:173:LYS:HD2	1.86	0.57
1:A:273:PHE:HB3	1:A:274:PRO:HA	1.87	0.57
1:A:3:LEU:HA	1:A:6:ILE:CD1	2.35	0.57
1:A:273:PHE:CB	1:A:274:PRO:CA	2.82	0.57
1:A:117:HIS:HB3	1:B:299:GLU:OE2	2.05	0.57
1:A:241:VAL:CG1	1:A:325:ASN:HD22	2.18	0.57
1:A:373:ASN:HB2	1:A:413:LEU:HB3	1.87	0.57
1:B:500:LEU:CD2	1:B:528:VAL:HG21	2.35	0.57
1:A:190:LEU:HD13	1:A:234:ILE:CG2	2.35	0.57
1:B:273:PHE:CB	1:B:274:PRO:HA	2.35	0.57
1:B:47:SER:O	1:B:50:GLU:HG2	2.04	0.57
1:A:336:ARG:HD3	1:A:366:ASP:OD2	2.04	0.56
1:A:401:ALA:O	1:A:404:LEU:HB2	2.05	0.56
1:A:324:LEU:HD13	1:A:335:TRP:CH2	2.40	0.56
1:B:398:LEU:HD21	1:B:442:PHE:HZ	1.70	0.56
1:B:273:PHE:CB	1:B:274:PRO:CA	2.83	0.56
1:B:408:GLN:NE2	1:B:408:GLN:N	2.50	0.56
1:B:538:LYS:HA	1:B:573:LEU:O	2.06	0.56
1:B:377:ARG:HG2	1:B:381:ILE:HD13	1.87	0.56
1:B:547:GLU:O	1:B:549:GLY:N	2.34	0.56
1:A:416:LEU:HB3	1:A:451:LEU:HD23	1.87	0.55
1:A:467:ASP:OD2	1:A:470:ARG:HD3	2.07	0.55
1:A:270:ILE:HG21	1:A:273:PHE:CD1	2.41	0.55
1:A:328:ASN:HB3	1:A:355:ILE:HG13	1.87	0.55
1:A:281:THR:HG23	1:A:289:GLN:HE21	1.71	0.55
1:A:545:VAL:CG1	1:A:569:LEU:HD13	2.37	0.55
1:A:223:ARG:HD3	1:A:317:GLN:HG3	1.88	0.55
1:B:386:THR:OG1	1:B:388:GLU:HG3	2.08	0.55
1:A:20:GLU:CD	1:A:118:ARG:HG2	2.27	0.54
1:A:523:VAL:O	1:A:523:VAL:HG13	2.07	0.54
1:B:503:GLY:HA2	1:B:523:VAL:CG2	2.36	0.54
1:A:545:VAL:O	1:A:545:VAL:HG23	2.06	0.54
1:B:271:GLU:HB2	1:B:282:ASN:O	2.08	0.54
1:B:537:GLU:CA	1:B:575:PRO:HG3	2.38	0.54
1:B:562:VAL:HG22	1:B:562:VAL:O	2.08	0.54
1:A:245:ALA:O	1:A:294:PRO:HD2	2.08	0.54
1:B:41:TYR:HB3	1:B:82:TYR:HB3	1.90	0.54

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:86:LEU:HB2	1:B:94:VAL:HG23	1.90	0.54
1:B:546:PRO:C	1:B:548:SER:N	2.52	0.54
1:B:191:TYR:CZ	1:B:323:ARG:HD3	2.43	0.53
1:A:21:THR:CG2	1:A:21:THR:O	2.56	0.53
1:A:148:ASN:ND2	1:A:171:ASP:OD2	2.41	0.53
1:A:14:TYR:HD1	1:A:26:ARG:HB3	1.74	0.53
1:A:21:THR:O	1:A:21:THR:HG22	2.08	0.53
1:B:143:ASN:ND2	1:B:171:ASP:OD2	2.42	0.53
1:A:528:VAL:HA	1:A:581:LEU:O	2.08	0.53
1:A:432:ASN:OD1	1:A:435:LYS:HG3	2.08	0.52
1:B:129:LYS:HD2	1:B:502:ARG:NH1	2.24	0.52
1:A:44:ARG:HH21	1:A:112:GLN:NE2	2.07	0.52
1:A:40:LEU:HA	1:A:53:ALA:O	2.09	0.52
1:A:44:ARG:HA	1:A:81:LYS:HG2	1.90	0.52
1:A:185:LEU:O	1:A:185:LEU:HD12	2.10	0.52
1:A:246:GLY:HA2	1:A:292:ALA:O	2.09	0.52
1:A:447:LEU:HB2	1:A:505:VAL:HG21	1.91	0.52
1:B:313:PHE:O	1:B:317:GLN:HG2	2.09	0.52
1:B:378:GLU:O	1:B:382:ARG:HG3	2.09	0.52
1:A:545:VAL:HG11	1:A:569:LEU:HD13	1.90	0.52
1:A:562:VAL:O	1:A:562:VAL:HG13	2.09	0.52
1:B:219:LEU:HB3	1:B:220:PRO:HD3	1.92	0.52
1:B:437:ARG:O	1:B:440:VAL:HG22	2.09	0.52
1:B:154:GLU:OE1	1:B:163:ARG:NH1	2.43	0.52
1:B:162:PRO:HG2	1:B:470:ARG:HA	1.90	0.52
1:A:325:ASN:ND2	1:A:326:VAL:HG23	2.25	0.52
1:B:19:SER:OG	1:B:22:GLN:HG2	2.09	0.52
1:A:542:LEU:HD23	1:A:570:LYS:HA	1.91	0.51
1:A:257:GLN:HE21	1:A:257:GLN:HA	1.75	0.51
1:B:256:LEU:HD11	1:B:277:LYS:HD2	1.92	0.51
1:B:467:ASP:CG	1:B:470:ARG:HH21	2.13	0.51
1:A:446:TYR:CG	1:A:447:LEU:N	2.79	0.51
1:B:273:PHE:HB3	1:B:275:VAL:H	1.76	0.51
1:B:325:ASN:HD22	1:B:326:VAL:H	1.59	0.51
1:B:135:GLN:HG3	1:B:191:TYR:CD2	2.46	0.51
1:B:235:LYS:HG2	1:B:320:ASP:CG	2.31	0.51
1:B:377:ARG:HG2	1:B:381:ILE:CD1	2.41	0.51
1:A:77:THR:O	1:A:78:LYS:HB2	2.11	0.50
1:A:245:ALA:O	1:A:293:MET:HA	2.11	0.50
1:A:354:GLU:C	1:A:355:ILE:HD12	2.32	0.50
1:A:26:ARG:HD2	1:A:70:GLU:OE2	2.12	0.50

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:426:LEU:CD2	1:A:431:GLY:HA2	2.41	0.50
1:A:455:GLY:N	1:A:457:GLU:OE1	2.42	0.50
1:A:508:TRP:HB2	1:A:520:VAL:HG23	1.94	0.50
1:B:330:VAL:HG21	1:B:334:PHE:HD1	1.77	0.50
1:A:245:ALA:HB2	1:A:296:LEU:HD11	1.94	0.50
1:B:273:PHE:HB3	1:B:274:PRO:CA	2.41	0.50
1:A:14:TYR:CD1	1:A:26:ARG:HB3	2.46	0.50
1:B:8:HIS:CG	1:B:9:GLU:N	2.80	0.50
1:A:122:PHE:HE2	1:A:124:THR:HG22	1.76	0.50
1:B:328:ASN:N	1:B:328:ASN:HD22	2.09	0.50
1:A:115:TYR:CZ	1:B:295:LYS:HE2	2.47	0.50
1:A:273:PHE:HB3	1:A:275:VAL:H	1.76	0.49
1:A:277:LYS:HG2	1:A:291:PRO:HB3	1.94	0.49
1:B:202:HIS:HB2	1:B:204:TYR:CD2	2.46	0.49
1:A:244:HIS:HE2	1:A:293:MET:HE3	1.76	0.49
1:B:87:THR:HA	1:B:92:GLU:O	2.12	0.49
1:B:139:GLU:OE2	1:B:167:PHE:HA	2.12	0.49
1:B:555:ASP:CG	1:B:558:THR:HG22	2.32	0.49
1:B:57:ALA:HB2	1:B:71:ALA:HB2	1.92	0.49
1:B:325:ASN:ND2	1:B:326:VAL:N	2.60	0.49
1:B:515:ASN:ND2	1:B:534:ASN:HB3	2.27	0.49
1:B:444:MET:O	1:B:494:ARG:NH1	2.45	0.49
1:A:342:VAL:HG11	1:A:351:ILE:HD11	1.95	0.49
1:B:2:LEU:CD2	1:B:4:GLU:HG2	2.42	0.49
1:B:282:ASN:N	1:B:282:ASN:ND2	2.54	0.49
1:A:192:PHE:O	1:A:239:ASP:HB2	2.13	0.49
1:B:209:TYR:HB3	1:B:310:VAL:HG11	1.95	0.49
1:B:467:ASP:OD2	1:B:470:ARG:NE	2.46	0.49
1:A:137:PHE:CE1	1:A:469:ARG:HD3	2.47	0.49
1:A:533:ASN:O	1:A:576:TYR:HA	2.13	0.49
1:B:38:GLU:HB2	1:B:85:LEU:HB3	1.94	0.49
1:B:241:VAL:HG13	1:B:325:ASN:HB3	1.95	0.49
1:B:500:LEU:HD21	1:B:528:VAL:HG21	1.95	0.49
1:A:82:TYR:O	1:A:110:VAL:HG23	2.13	0.48
1:A:551:LYS:O	1:A:562:VAL:HG23	2.14	0.48
1:A:35:VAL:HG22	1:A:87:THR:O	2.13	0.48
1:A:117:HIS:CD2	1:B:331:ASP:HB3	2.47	0.48
1:B:164:HIS:HD1	1:B:466:PRO:HG3	1.77	0.48
1:A:135:GLN:O	1:A:454:TYR:HB3	2.13	0.48
1:B:538:LYS:CG	1:B:575:PRO:HD3	2.43	0.48
1:B:377:ARG:HA	1:B:380:VAL:HG22	1.96	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2:LEU:HD12	1:A:30:LYS:HD2	1.95	0.48
1:A:475:GLU:O	1:A:479:GLN:HG3	2.12	0.48
1:A:213:ASP:OD1	1:A:215:GLN:HB3	2.14	0.48
1:A:458:ILE:HG13	1:A:460:MET:HG3	1.95	0.48
1:A:493:LEU:HD21	1:A:556:CYS:HB3	1.96	0.48
1:B:256:LEU:CD1	1:B:277:LYS:HD2	2.44	0.48
1:B:195:ILE:HG13	1:B:195:ILE:O	2.13	0.48
1:B:297:ARG:HD2	1:B:300:ASN:HB2	1.96	0.48
1:B:248:GLN:O	1:B:253:ARG:HD3	2.14	0.48
1:B:548:SER:O	1:B:549:GLY:C	2.52	0.48
1:B:441:LEU:HD13	1:B:578:GLY:HA3	1.96	0.48
1:A:132:VAL:H	1:A:188:THR:HB	1.79	0.47
1:B:270:ILE:HD12	1:B:275:VAL:HG11	1.96	0.47
1:B:444:MET:CE	1:B:452:ILE:HD11	2.44	0.47
1:A:8:HIS:HD2	1:A:26:ARG:O	1.96	0.47
1:A:175:VAL:HG11	1:A:192:PHE:HZ	1.78	0.47
1:A:355:ILE:HG22	1:A:357:HIS:H	1.79	0.47
1:A:324:LEU:HD22	1:A:335:TRP:CH2	2.49	0.47
1:B:30:LYS:O	1:B:33:ASP:HB2	2.15	0.47
1:B:129:LYS:HD2	1:B:502:ARG:HH12	1.79	0.47
1:A:273:PHE:HB3	1:A:274:PRO:CA	2.44	0.47
1:A:191:TYR:CZ	1:A:323:ARG:HD3	2.50	0.47
1:A:504:ASN:O	1:A:521:ARG:HA	2.15	0.47
1:B:40:LEU:HA	1:B:53:ALA:O	2.15	0.47
1:A:245:ALA:CB	1:A:296:LEU:HD11	2.44	0.47
1:A:260:GLU:OE1	1:A:260:GLU:N	2.46	0.47
1:B:555:ASP:OD1	1:B:558:THR:HG22	2.15	0.47
1:B:435:LYS:HG2	1:B:576:TYR:HE2	1.78	0.47
1:B:544:GLN:O	1:B:546:PRO:HD3	2.15	0.47
1:B:249:PHE:O	1:B:253:ARG:HG2	2.14	0.47
1:B:398:LEU:HD21	1:B:442:PHE:CZ	2.49	0.47
1:B:432:ASN:OD1	1:B:434:ALA:HB3	2.15	0.47
1:A:277:LYS:HG2	1:A:277:LYS:O	2.14	0.47
1:B:193:THR:O	1:B:195:ILE:HG23	2.15	0.46
1:B:579:MET:HE1	1:B:581:LEU:HD11	1.96	0.46
1:B:452:ILE:HD12	1:B:487:TYR:HE2	1.80	0.46
1:B:561:GLU:C	1:B:563:HIS:H	2.17	0.46
1:A:104:GLU:HB3	1:A:107:LYS:HB2	1.97	0.46
1:B:49:GLU:H	1:B:49:GLU:HG2	1.57	0.46
1:B:390:HIS:CD2	1:B:512:LYS:HG3	2.50	0.46
1:B:519:PHE:CE1	1:B:530:VAL:HB	2.50	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:195:ILE:HD12	1:B:212:ILE:HD12	1.97	0.46
1:B:273:PHE:HB3	1:B:275:VAL:N	2.30	0.46
1:A:35:VAL:HG23	1:A:36:ARG:HG2	1.98	0.46
1:B:18:ILE:HG13	1:B:22:GLN:HG3	1.98	0.46
1:A:336:ARG:CD	1:A:366:ASP:OD2	2.64	0.46
1:B:178:ARG:HG3	1:B:474:TRP:CZ2	2.51	0.46
1:B:536:GLY:HA2	1:B:575:PRO:HB3	1.98	0.46
1:A:458:ILE:HD12	1:A:473:ILE:HB	1.98	0.46
1:B:377:ARG:O	1:B:381:ILE:HD13	2.16	0.46
1:A:60:ALA:HB1	1:A:506:ARG:NH2	2.31	0.45
1:A:398:LEU:HD21	1:A:442:PHE:CZ	2.51	0.45
1:B:523:VAL:HG12	1:B:524:GLN:HG2	1.98	0.45
1:B:202:HIS:O	1:B:202:HIS:ND1	2.49	0.45
1:B:327:ALA:O	1:B:330:VAL:HG13	2.16	0.45
1:B:247:ASP:HB3	1:B:292:ALA:HA	1.99	0.45
1:B:574:ARG:HE	1:B:574:ARG:HB3	1.53	0.45
1:A:31:LYS:HA	1:A:67:ASP:OD2	2.15	0.45
1:A:244:HIS:HE2	1:A:293:MET:CE	2.29	0.45
1:B:537:GLU:HA	1:B:575:PRO:HG3	1.99	0.45
1:A:140:ARG:HG2	1:A:469:ARG:O	2.17	0.45
1:B:382:ARG:HH12	1:B:397:GLU:CD	2.20	0.45
1:B:392:GLU:HG3	1:B:512:LYS:CB	2.35	0.45
1:B:565:LYS:HG2	1:B:566:GLN:HG2	1.98	0.45
1:A:356:TRP:HA	1:A:356:TRP:CE3	2.52	0.45
1:A:552:THR:HG23	1:A:562:VAL:HB	1.99	0.45
1:B:300:ASN:HB3	1:B:303:VAL:HG23	1.98	0.45
1:A:122:PHE:CE2	1:A:124:THR:HG22	2.52	0.45
1:A:355:ILE:HD12	1:A:355:ILE:N	2.32	0.45
1:A:445:THR:O	1:A:521:ARG:NH2	2.49	0.45
1:B:88:GLY:HA3	1:B:92:GLU:OE1	2.17	0.45
1:B:253:ARG:HH11	1:B:253:ARG:CG	2.22	0.45
1:B:416:LEU:H	1:B:416:LEU:CD2	2.28	0.45
1:B:535:ARG:NE	1:B:535:ARG:HA	2.31	0.44
1:B:538:LYS:HG2	1:B:574:ARG:HA	1.98	0.44
1:B:398:LEU:HG	1:B:446:TYR:OH	2.16	0.44
1:B:158:LYS:HD3	1:B:158:LYS:C	2.37	0.44
1:B:448:GLY:O	1:B:494:ARG:NH2	2.51	0.44
1:B:561:GLU:OE1	1:B:561:GLU:HA	2.18	0.44
1:A:326:VAL:HG12	1:A:326:VAL:O	2.17	0.44
1:A:420:HIS:O	1:A:468:CYS:SG	2.75	0.44
1:A:416:LEU:H	1:A:416:LEU:HD23	1.82	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:18:ILE:CG1	1:B:22:GLN:HG3	2.47	0.44
1:B:320:ASP:O	1:B:349:ALA:HA	2.18	0.44
1:B:382:ARG:NH1	1:B:397:GLU:OE1	2.49	0.44
1:B:579:MET:HB3	1:B:581:LEU:CD1	2.48	0.44
1:A:133:ILE:HD13	1:A:189:ALA:HB3	1.99	0.44
1:A:330:VAL:HB	1:A:335:TRP:NE1	2.33	0.44
1:A:332:HIS:CD2	1:A:367:GLN:HE22	2.27	0.44
1:B:503:GLY:CA	1:B:523:VAL:CG2	2.95	0.44
1:B:545:VAL:HG23	1:B:567:GLY:C	2.38	0.44
1:B:562:VAL:O	1:B:562:VAL:HG13	2.17	0.44
1:A:241:VAL:HG12	1:A:325:ASN:HD22	1.82	0.44
1:B:325:ASN:HD22	1:B:326:VAL:N	2.16	0.44
1:A:25:VAL:CG1	1:A:84:PHE:HZ	2.31	0.44
1:A:256:LEU:HD11	1:A:277:LYS:HE3	2.00	0.44
1:B:552:THR:HG22	1:B:562:VAL:HG23	2.00	0.44
1:A:65:ARG:NH1	1:A:65:ARG:HG3	2.33	0.43
1:A:82:TYR:C	1:A:110:VAL:HG23	2.39	0.43
1:A:205:ASP:HB2	1:A:246:GLY:HA2	2.01	0.43
1:B:271:GLU:HB3	1:B:272:ASP:H	1.60	0.43
1:B:446:TYR:CG	1:B:447:LEU:N	2.86	0.43
1:A:335:TRP:HA	1:A:335:TRP:CE3	2.53	0.43
1:A:392:GLU:HG3	1:A:512:LYS:N	2.34	0.43
1:A:447:LEU:HB2	1:A:505:VAL:CG2	2.47	0.43
1:B:164:HIS:ND1	1:B:466:PRO:HG3	2.32	0.43
1:B:515:ASN:HD22	1:B:534:ASN:HB3	1.84	0.43
1:A:2:LEU:HD11	1:B:2:LEU:HD11	2.01	0.43
1:A:244:HIS:NE2	1:A:293:MET:CE	2.81	0.43
1:B:374:TYR:CE2	1:B:375:LEU:HD22	2.53	0.43
1:A:7:PHE:HE2	1:A:14:TYR:CE2	2.35	0.43
1:A:282:ASN:ND2	1:A:282:ASN:N	2.51	0.43
1:A:444:MET:O	1:A:494:ARG:NH1	2.49	0.43
1:B:139:GLU:C	1:B:140:ARG:HD2	2.39	0.43
1:B:224:ARG:HH11	1:B:224:ARG:HG2	1.84	0.43
1:B:454:TYR:CG	1:B:454:TYR:O	2.71	0.43
1:B:465:ASP:OD2	1:B:466:PRO:HA	2.18	0.43
1:A:16:TYR:HA	1:A:17:PRO:HD3	1.74	0.43
1:A:288:VAL:HG23	1:A:289:GLN:N	2.25	0.43
1:A:438:LEU:HD12	1:A:441:LEU:HD23	2.01	0.43
1:B:579:MET:HE2	1:B:581:LEU:HD11	2.01	0.43
1:A:274:PRO:O	1:A:274:PRO:HG2	2.19	0.43
1:B:551:LYS:NZ	1:B:551:LYS:CB	2.71	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:440:VAL:CG2	1:B:486:PHE:HE1	2.31	0.43
1:A:281:THR:HG23	1:A:289:GLN:NE2	2.33	0.42
1:A:205:ASP:HB2	1:A:246:GLY:CA	2.49	0.42
1:A:563:HIS:O	1:A:565:LYS:N	2.52	0.42
1:B:377:ARG:O	1:B:380:VAL:HG22	2.19	0.42
1:B:394:PHE:O	1:B:398:LEU:HB2	2.19	0.42
1:A:40:LEU:HD22	1:A:54:HIS:ND1	2.34	0.42
1:A:247:ASP:N	1:A:292:ALA:O	2.52	0.42
1:A:382:ARG:HB3	1:A:389:ILE:HG12	2.01	0.42
1:B:536:GLY:HA2	1:B:576:TYR:CE1	2.54	0.42
1:A:62:SER:HB3	1:A:67:ASP:OD1	2.20	0.42
1:A:457:GLU:H	1:A:457:GLU:HG3	1.52	0.42
1:A:149:ASP:HA	1:A:150:PRO:HD3	1.83	0.42
1:A:222:PHE:O	1:A:226:VAL:HG23	2.19	0.42
1:A:527:HIS:CE1	1:A:548:SER:HG	2.35	0.42
1:A:143:ASN:OD1	1:A:169:GLY:O	2.37	0.42
1:A:377:ARG:HD2	1:A:417:LEU:O	2.20	0.42
1:A:454:TYR:O	1:A:454:TYR:CG	2.72	0.42
1:B:95:TYR:CE2	1:B:105:ARG:HB2	2.54	0.42
1:B:493:LEU:HD21	1:B:556:CYS:HB3	2.00	0.42
1:A:43:ASP:OD2	1:A:79:ARG:NH2	2.52	0.42
1:A:82:TYR:N	1:A:82:TYR:CD2	2.88	0.42
1:B:381:ILE:CD1	1:B:425:PHE:HE1	2.32	0.42
1:A:374:TYR:CZ	1:A:375:LEU:HD22	2.55	0.42
1:A:505:VAL:HG22	1:A:521:ARG:NE	2.35	0.42
1:B:52:LEU:HD11	1:B:105:ARG:HE	1.84	0.42
1:B:541:VAL:HG22	1:B:542:LEU:N	2.34	0.42
1:A:212:ILE:CD1	1:A:222:PHE:HB2	2.50	0.42
1:A:277:LYS:HG3	1:A:283:TYR:OH	2.20	0.42
1:A:560:GLU:C	1:A:561:GLU:HG2	2.41	0.41
1:B:190:LEU:HD13	1:B:234:ILE:HG21	2.01	0.41
1:B:438:LEU:HD22	1:B:532:LEU:HD23	2.01	0.41
1:A:505:VAL:HG22	1:A:521:ARG:HD3	2.00	0.41
1:B:218:ASP:OD2	1:B:220:PRO:HD2	2.20	0.41
1:A:149:ASP:OD2	1:A:149:ASP:N	2.53	0.41
1:A:312:ARG:O	1:A:316:GLU:HG2	2.21	0.41
1:B:339:ARG:O	1:B:343:LYS:HG2	2.20	0.41
1:A:264:TYR:O	1:A:267:TRP:HB2	2.21	0.41
1:A:273:PHE:HB3	1:A:275:VAL:N	2.35	0.41
1:A:311:ALA:HA	1:A:322:TRP:CZ2	2.55	0.41
1:A:377:ARG:O	1:A:380:VAL:HG22	2.20	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:542:LEU:HD21	1:A:570:LYS:HG3	2.03	0.41
1:A:577:GLN:HG2	1:A:578:GLY:N	2.35	0.41
1:B:206:THR:HG21	1:B:209:TYR:CG	2.55	0.41
1:B:16:TYR:HA	1:B:17:PRO:HD3	1.94	0.41
1:A:84:PHE:HB2	1:A:96:PHE:HB3	2.02	0.41
1:A:257:GLN:HA	1:A:257:GLN:NE2	2.36	0.41
1:B:172:LEU:O	1:B:173:LYS:C	2.58	0.41
1:B:381:ILE:HD12	1:B:381:ILE:N	2.36	0.41
1:A:314:TRP:O	1:A:319:ILE:HG23	2.21	0.41
1:B:444:MET:HE2	1:B:452:ILE:HD11	2.03	0.41
1:B:545:VAL:HG22	1:B:569:LEU:HD13	2.02	0.41
1:B:242:PHE:CD1	1:B:307:LEU:HD22	2.56	0.41
1:A:256:LEU:HD23	1:A:256:LEU:O	2.21	0.41
1:B:36:ARG:HG3	1:B:36:ARG:HH11	1.86	0.41
1:B:39:VAL:HG22	1:B:84:PHE:CD2	2.56	0.41
1:B:85:LEU:HD13	1:B:95:TYR:CE2	2.55	0.41
1:B:238:LEU:HD22	1:B:319:ILE:HG21	2.02	0.41
1:B:325:ASN:ND2	1:B:326:VAL:H	2.18	0.41
1:B:547:GLU:H	1:B:547:GLU:HG3	1.60	0.41
1:A:542:LEU:CD2	1:A:570:LYS:HG3	2.51	0.41
1:B:488:LYS:HB3	1:B:488:LYS:HE2	1.75	0.41
1:A:528:VAL:HG23	1:A:528:VAL:O	2.20	0.40
1:B:330:VAL:HG21	1:B:334:PHE:CD1	2.54	0.40
1:B:330:VAL:HG22	1:B:335:TRP:NE1	2.35	0.40
1:B:438:LEU:HD23	1:B:438:LEU:HA	1.86	0.40
1:A:499:SER:HB2	1:A:528:VAL:HG22	2.04	0.40
1:B:118:ARG:HG3	1:B:118:ARG:HH11	1.87	0.40
1:B:198:SER:HB3	1:B:203:LYS:HD3	2.02	0.40
1:B:558:THR:CG2	1:B:559:GLY:N	2.80	0.40
1:A:257:GLN:HE21	1:A:257:GLN:CA	2.35	0.40
1:A:326:VAL:H	1:A:354:GLU:HG2	1.87	0.40
1:A:382:ARG:HH11	1:A:389:ILE:HD13	1.85	0.40
1:B:171:ASP:HB2	1:B:216:PHE:O	2.21	0.40
1:A:60:ALA:N	1:A:68:TYR:O	2.52	0.40
1:A:552:THR:HA	1:A:562:VAL:HG23	2.04	0.40
1:B:31:LYS:HE2	1:B:63:ASP:O	2.21	0.40
1:B:60:ALA:HA	1:B:506:ARG:CZ	2.50	0.40
1:B:222:PHE:O	1:B:226:VAL:HG23	2.21	0.40
1:B:142:ALA:O	1:B:174:GLY:HA3	2.22	0.40
1:B:145:ASP:HA	1:B:146:PRO:HD2	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	583/585 (100%)	542 (93%)	33 (6%)	8 (1%)	11	46
1	B	583/585 (100%)	534 (92%)	41 (7%)	8 (1%)	11	46
All	All	1166/1170 (100%)	1076 (92%)	74 (6%)	16 (1%)	11	46

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	273	PHE
1	A	286	PHE
1	A	560	GLU
1	B	273	PHE
1	B	286	PHE
1	B	547	GLU
1	B	548	SER
1	B	549	GLY
1	B	562	VAL
1	A	275	VAL
1	A	547	GLU
1	B	271	GLU
1	B	278	THR
1	A	561	GLU
1	A	548	SER
1	A	546	PRO

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	493/493 (100%)	454 (92%)	39 (8%)	12	43
1	B	493/493 (100%)	453 (92%)	40 (8%)	11	42
All	All	986/986 (100%)	907 (92%)	79 (8%)	12	42

All (79) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	ARG
1	A	33	ASP
1	A	62	SER
1	A	81	LYS
1	A	90	GLN
1	A	92	GLU
1	A	122	PHE
1	A	124	THR
1	A	139	GLU
1	A	140	ARG
1	A	167	PHE
1	A	219	LEU
1	A	241	VAL
1	A	260	GLU
1	A	261	GLN
1	A	282	ASN
1	A	297	ARG
1	A	315	MET
1	A	317	GLN
1	A	337	GLU
1	A	340	ARG
1	A	354	GLU
1	A	356	TRP
1	A	360	SER
1	A	375	LEU
1	A	393	ARG
1	A	400	ARG
1	A	423	GLU
1	A	426	LEU
1	A	432	ASN
1	A	457	GLU
1	A	470	ARG
1	A	496	ARG
1	A	499	SER
1	A	512	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	534	ASN
1	A	569	LEU
1	A	574	ARG
1	A	581	LEU
1	B	2	LEU
1	B	4	GLU
1	B	19	SER
1	B	24	ARG
1	B	33	ASP
1	B	65	ARG
1	B	78	LYS
1	B	90	GLN
1	B	92	GLU
1	B	110	VAL
1	B	122	PHE
1	B	139	GLU
1	B	143	ASN
1	B	164	HIS
1	B	165	ASP
1	B	171	ASP
1	B	188	THR
1	B	201	HIS
1	B	223	ARG
1	B	238	LEU
1	B	241	VAL
1	B	244	HIS
1	B	263	ARG
1	B	266	ASP
1	B	271	GLU
1	B	275	VAL
1	B	282	ASN
1	B	323	ARG
1	B	328	ASN
1	B	356	TRP
1	B	363	LEU
1	B	370	SER
1	B	375	LEU
1	B	405	TYR
1	B	408	GLN
1	B	438	LEU
1	B	457	GLU
1	B	478	GLU

Continued from previous page...

Mol	Chain	Res	Type
1	B	547	GLU
1	B	554	LEU

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

Mol	Chain	Res	Type
1	A	8	HIS
1	A	90	GLN
1	A	112	GLN
1	A	135	GLN
1	A	215	GLN
1	A	243	ASN
1	A	257	GLN
1	A	261	GLN
1	A	282	ASN
1	A	289	GLN
1	A	317	GLN
1	A	325	ASN
1	A	332	HIS
1	A	390	HIS
1	A	411	GLN
1	A	443	GLN
1	A	513	GLN
1	A	534	ASN
1	B	22	GLN
1	B	117	HIS
1	B	135	GLN
1	B	143	ASN
1	B	257	GLN
1	B	289	GLN
1	B	325	ASN
1	B	328	ASN
1	B	390	HIS
1	B	408	GLN
1	B	509	HIS
1	B	539	GLN
1	B	566	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

14 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
2	GLC	C	1	2	11,11,12	1.68	3 (27%)	15,15,17	1.60	4 (26%)
2	GLC	C	2	2	11,11,12	1.63	3 (27%)	15,15,17	0.77	0
2	GLC	C	3	2	11,11,12	1.55	4 (36%)	15,15,17	1.20	2 (13%)
2	GLC	C	4	2	11,11,12	1.25	2 (18%)	15,15,17	0.63	0
2	GLC	C	5	2	11,11,12	1.35	1 (9%)	15,15,17	1.10	1 (6%)
2	GLC	C	6	2	11,11,12	1.66	2 (18%)	15,15,17	1.00	1 (6%)
2	GLC	C	7	2	11,11,12	1.91	5 (45%)	15,15,17	0.86	1 (6%)
2	GLC	D	1	2	11,11,12	1.54	2 (18%)	15,15,17	1.54	3 (20%)
2	GLC	D	2	2	11,11,12	1.54	4 (36%)	15,15,17	0.84	1 (6%)
2	GLC	D	3	2	11,11,12	1.58	3 (27%)	15,15,17	1.29	2 (13%)
2	GLC	D	4	2	11,11,12	1.55	4 (36%)	15,15,17	0.65	0
2	GLC	D	5	2	11,11,12	1.30	1 (9%)	15,15,17	1.02	1 (6%)
2	GLC	D	6	2	11,11,12	1.58	3 (27%)	15,15,17	1.05	1 (6%)
2	GLC	D	7	2	11,11,12	1.63	4 (36%)	15,15,17	0.82	1 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	C	1	2	-	1/2/19/22	0/1/1/1
2	GLC	C	2	2	-	2/2/19/22	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	C	3	2	-	0/2/19/22	0/1/1/1
2	GLC	C	4	2	-	2/2/19/22	0/1/1/1
2	GLC	C	5	2	-	2/2/19/22	0/1/1/1
2	GLC	C	6	2	-	0/2/19/22	0/1/1/1
2	GLC	C	7	2	-	2/2/19/22	0/1/1/1
2	GLC	D	1	2	-	1/2/19/22	0/1/1/1
2	GLC	D	2	2	-	2/2/19/22	0/1/1/1
2	GLC	D	3	2	-	0/2/19/22	0/1/1/1
2	GLC	D	4	2	-	0/2/19/22	0/1/1/1
2	GLC	D	5	2	-	0/2/19/22	0/1/1/1
2	GLC	D	6	2	-	0/2/19/22	0/1/1/1
2	GLC	D	7	2	-	0/2/19/22	0/1/1/1

All (41) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1	GLC	C4-C5	3.43	1.60	1.53
2	D	1	GLC	C4-C5	3.06	1.59	1.53
2	C	6	GLC	O5-C5	2.95	1.49	1.43
2	C	7	GLC	O5-C5	2.91	1.49	1.43
2	D	3	GLC	C4-C5	2.87	1.59	1.53
2	C	7	GLC	O5-C1	2.68	1.48	1.43
2	C	3	GLC	C4-C5	2.61	1.58	1.53
2	D	6	GLC	C4-C5	2.60	1.58	1.53
2	D	4	GLC	C2-C3	2.55	1.56	1.52
2	C	7	GLC	C4-C5	2.52	1.58	1.53
2	D	7	GLC	C4-C5	2.48	1.58	1.53
2	D	3	GLC	C2-C3	2.46	1.56	1.52
2	C	5	GLC	O5-C5	2.45	1.48	1.43
2	D	6	GLC	O5-C5	2.45	1.48	1.43
2	C	2	GLC	C4-C5	2.44	1.58	1.53
2	C	3	GLC	O5-C5	2.44	1.48	1.43
2	D	5	GLC	O5-C5	2.44	1.48	1.43
2	D	4	GLC	O5-C5	2.44	1.48	1.43
2	C	6	GLC	C4-C5	2.36	1.58	1.53
2	C	2	GLC	O5-C5	2.32	1.48	1.43
2	C	7	GLC	C2-C3	2.27	1.55	1.52
2	C	3	GLC	C4-C3	2.24	1.58	1.52
2	D	6	GLC	C1-C2	2.24	1.57	1.52
2	C	2	GLC	O5-C1	2.22	1.47	1.43
2	D	7	GLC	O5-C5	2.19	1.47	1.43

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	3	GLC	O5-C5	2.19	1.47	1.43
2	C	1	GLC	O5-C5	2.19	1.47	1.43
2	D	2	GLC	O5-C5	2.17	1.47	1.43
2	C	7	GLC	C1-C2	2.17	1.57	1.52
2	D	4	GLC	O5-C1	2.16	1.47	1.43
2	C	1	GLC	C1-C2	2.15	1.57	1.52
2	D	1	GLC	C2-C3	2.14	1.55	1.52
2	D	2	GLC	O5-C1	2.10	1.47	1.43
2	C	4	GLC	C1-C2	2.08	1.56	1.52
2	D	2	GLC	C2-C3	2.06	1.55	1.52
2	D	4	GLC	C1-C2	2.06	1.56	1.52
2	D	7	GLC	C1-C2	2.03	1.56	1.52
2	D	2	GLC	C4-C5	2.02	1.57	1.53
2	C	4	GLC	C4-C5	2.01	1.57	1.53
2	C	3	GLC	C2-C3	2.01	1.55	1.52
2	D	7	GLC	O5-C1	2.00	1.46	1.43

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	1	GLC	C1-O5-C5	4.15	117.82	112.19
2	C	1	GLC	C1-O5-C5	4.03	117.66	112.19
2	C	5	GLC	C1-O5-C5	3.38	116.77	112.19
2	D	6	GLC	C1-O5-C5	3.12	116.42	112.19
2	D	5	GLC	C1-O5-C5	3.09	116.38	112.19
2	C	6	GLC	C1-O5-C5	2.99	116.24	112.19
2	C	3	GLC	C1-O5-C5	2.77	115.95	112.19
2	D	3	GLC	C1-O5-C5	2.53	115.62	112.19
2	C	1	GLC	O5-C1-C2	-2.46	106.97	110.77
2	D	1	GLC	O5-C1-C2	-2.44	107.00	110.77
2	D	2	GLC	C1-O5-C5	2.39	115.43	112.19
2	D	3	GLC	O4-C4-C3	-2.34	104.93	110.35
2	D	7	GLC	C1-O5-C5	2.23	115.22	112.19
2	C	7	GLC	C1-O5-C5	2.23	115.22	112.19
2	C	1	GLC	O5-C5-C6	-2.22	103.72	107.20
2	D	1	GLC	O5-C5-C6	-2.20	103.75	107.20
2	C	1	GLC	O4-C4-C3	-2.12	105.46	110.35
2	C	3	GLC	O4-C4-C3	-2.02	105.67	110.35

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	5	GLC	C4-C5-C6-O6
2	C	4	GLC	O5-C5-C6-O6
2	C	5	GLC	O5-C5-C6-O6
2	C	4	GLC	C4-C5-C6-O6
2	C	2	GLC	C4-C5-C6-O6
2	C	2	GLC	O5-C5-C6-O6
2	C	7	GLC	C4-C5-C6-O6
2	C	1	GLC	O5-C5-C6-O6
2	D	1	GLC	O5-C5-C6-O6
2	D	2	GLC	C4-C5-C6-O6
2	C	7	GLC	O5-C5-C6-O6
2	D	2	GLC	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings
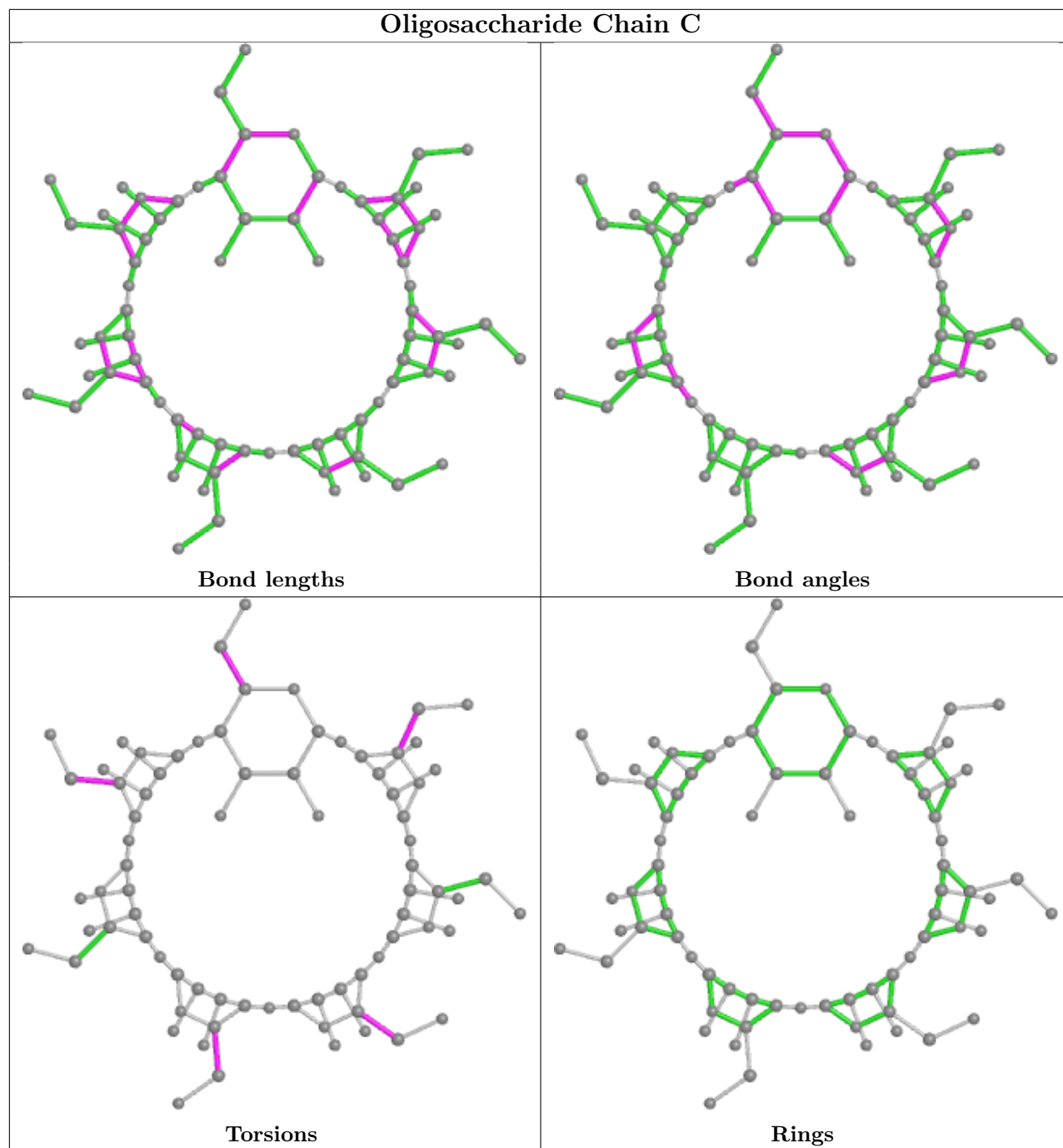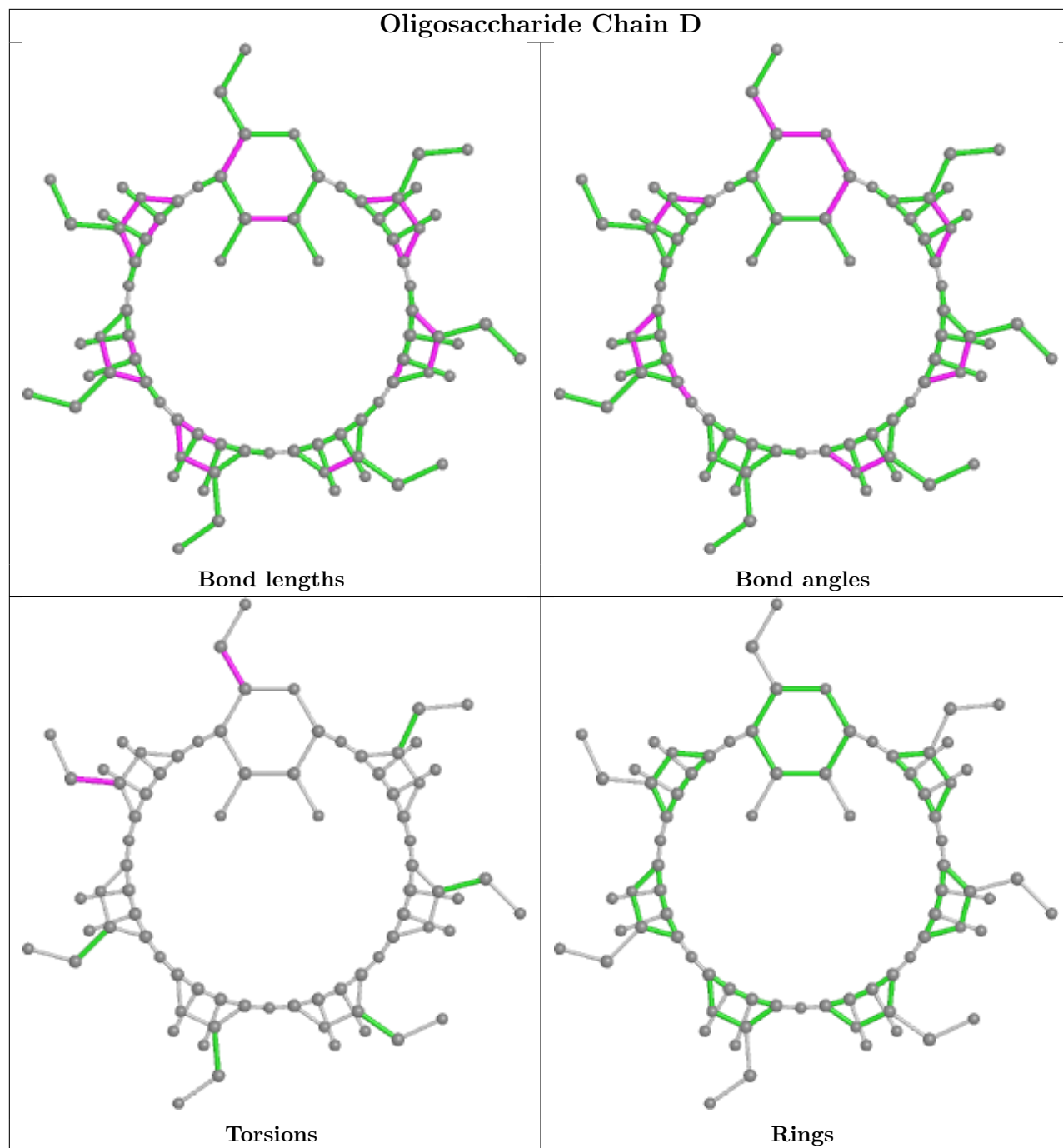
5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

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	585/585 (100%)	-0.58	2 (0%)	94	92	11, 33, 69, 86	0
1	B	585/585 (100%)	-0.49	2 (0%)	94	92	10, 37, 72, 87	0
All	All	1170/1170 (100%)	-0.53	4 (0%)	94	92	10, 36, 71, 87	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	278	THR	3.1
1	A	279	SER	2.6
1	A	547	GLU	2.2
1	B	561	GLU	2.1

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

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

6.3 Carbohydrates ⓘ

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
2	GLC	C	7	11/12	0.65	0.61	100,101,101,101	0
2	GLC	C	3	11/12	0.72	0.35	84,87,89,90	0
2	GLC	C	1	11/12	0.81	0.39	96,98,99,99	0
2	GLC	D	3	11/12	0.82	0.45	93,94,95,95	0
2	GLC	C	2	11/12	0.84	0.29	92,94,95,95	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	GLC	D	4	11/12	0.85	0.40	92,94,95,95	0
2	GLC	D	7	11/12	0.85	0.36	88,90,91,91	0
2	GLC	C	6	11/12	0.86	0.29	94,96,97,99	0
2	GLC	D	5	11/12	0.88	0.29	93,94,94,94	0
2	GLC	D	6	11/12	0.88	0.35	91,93,94,94	0
2	GLC	D	2	11/12	0.88	0.36	87,89,90,91	0
2	GLC	C	4	11/12	0.89	0.34	83,86,86,87	0
2	GLC	D	1	11/12	0.89	0.34	86,88,89,89	0
2	GLC	C	5	11/12	0.92	0.38	88,90,91,92	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain C:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around Chain D:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
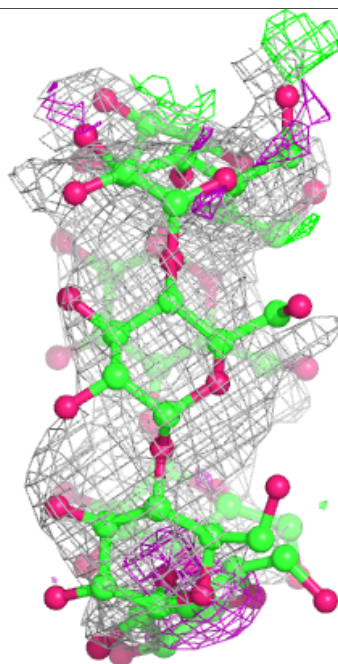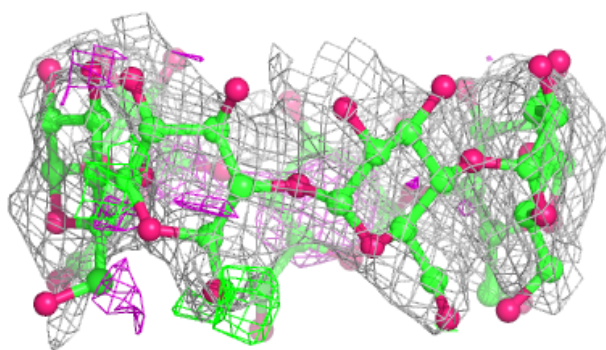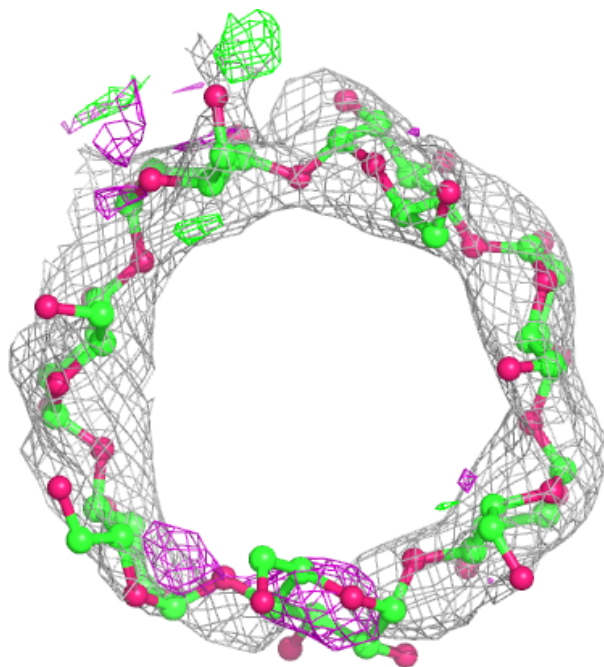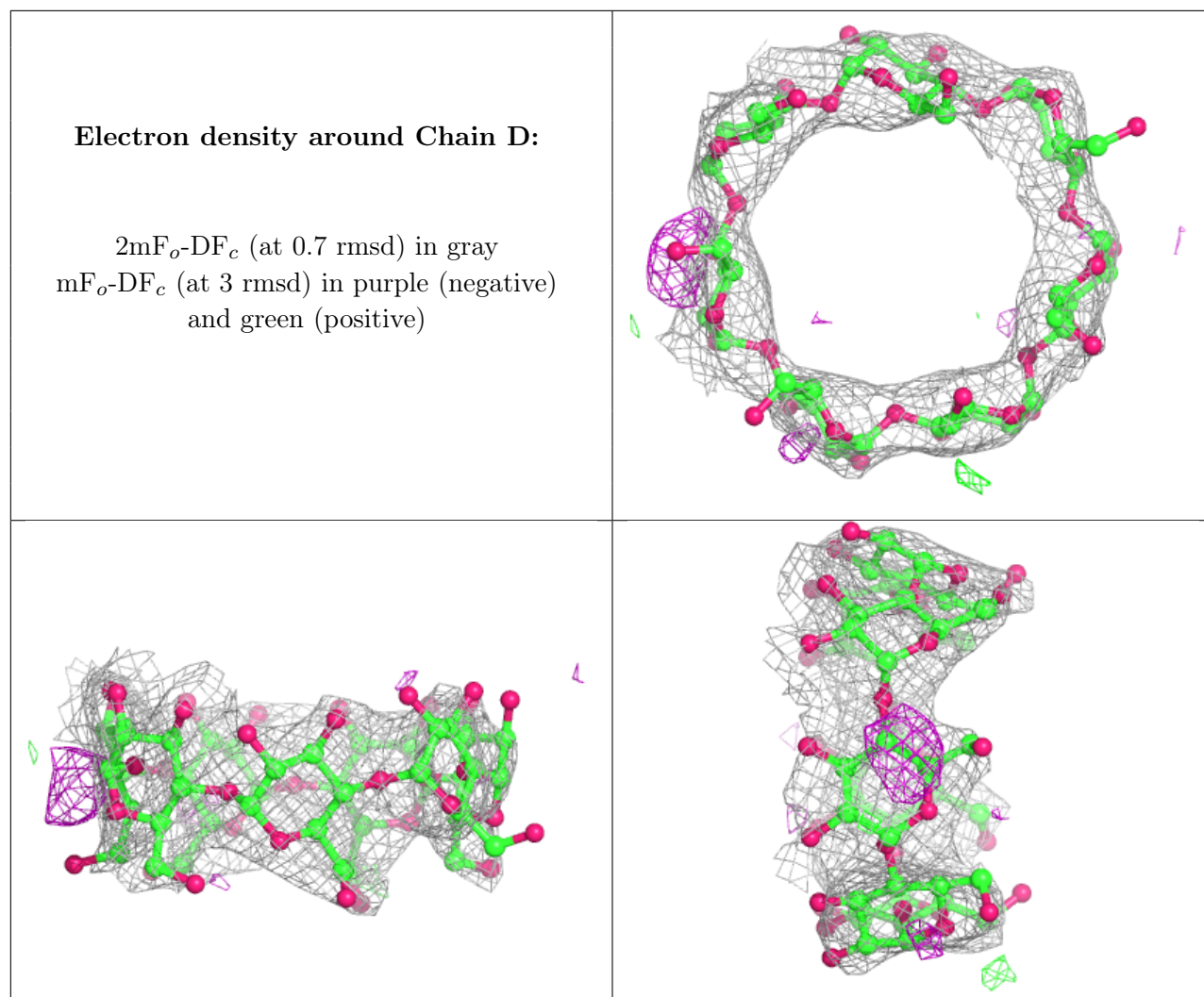
6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.