



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 06:11 PM UTC

PDB ID : 3E00 / pdb_00003e00
Title : Intact PPAR gamma - RXR alpha Nuclear Receptor Complex on DNA bound with GW9662, 9-cis Retinoic Acid and NCOA2 Peptide
Authors : Chandra, V.; Huang, P.; Hamuro, Y.; Raghuram, S.; Wang, Y.; Burris, T.P.; Rastinejad, F.
Deposited on : 2008-07-30
Resolution : 3.10 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
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
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

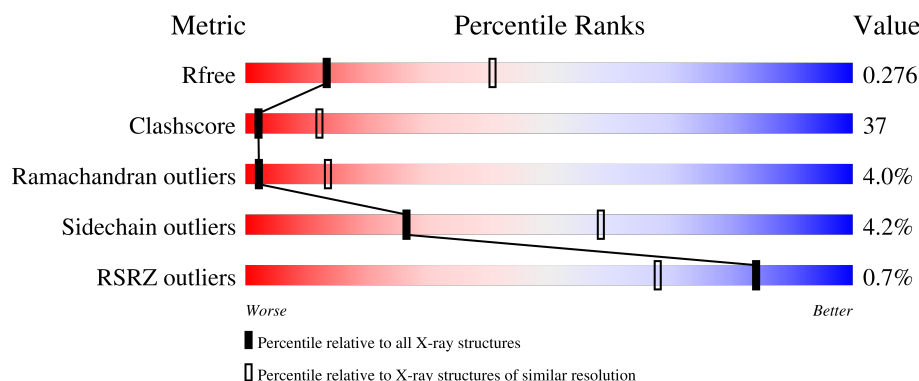
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 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	1456 (3.10-3.10)
Clashscore	190562	1539 (3.10-3.10)
Ramachandran outliers	187476	1467 (3.10-3.10)
Sidechain outliers	187428	1467 (3.10-3.10)
RSRZ outliers	180081	1456 (3.10-3.10)

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	467	 27% 29% 6% 38%
2	D	419	 35% 42% 9% 13%
3	C	20	 15% 80% 5%
4	F	20	 20% 80%

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Mol	Chain	Length	Quality of chain
5	E	13	
5	G	13	

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 6244 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 Retinoic acid receptor RXR-alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	289	Total	C	N	O	S	0	0	0
			2309	1458	417	413	21			

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	MET	-	expression tag	UNP P19793
A	-3	ALA	-	expression tag	UNP P19793
A	-2	HIS	-	expression tag	UNP P19793
A	-1	HIS	-	expression tag	UNP P19793
A	0	HIS	-	expression tag	UNP P19793
A	1	HIS	-	expression tag	UNP P19793
A	2	HIS	-	expression tag	UNP P19793
A	3	HIS	-	expression tag	UNP P19793
A	4	VAL	-	expression tag	UNP P19793
A	5	ASP	-	expression tag	UNP P19793
A	6	ASP	-	expression tag	UNP P19793
A	7	ASP	-	expression tag	UNP P19793
A	8	ASP	-	expression tag	UNP P19793
A	9	LYS	-	expression tag	UNP P19793
A	10	MET	-	expression tag	UNP P19793

- Molecule 2 is a protein called Peroxisome proliferator-activated receptor gamma.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	363	Total	C	N	O	S	0	0	0
			2911	1859	498	532	22			

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	59	MET	-	expression tag	UNP P37231

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Chain	Residue	Modelled	Actual	Comment	Reference
D	60	ALA	-	expression tag	UNP P37231
D	61	HIS	-	expression tag	UNP P37231
D	62	HIS	-	expression tag	UNP P37231
D	63	HIS	-	expression tag	UNP P37231
D	64	HIS	-	expression tag	UNP P37231
D	65	HIS	-	expression tag	UNP P37231
D	66	HIS	-	expression tag	UNP P37231
D	67	VAL	-	expression tag	UNP P37231
D	68	ASP	-	expression tag	UNP P37231
D	69	ASP	-	expression tag	UNP P37231
D	70	ASP	-	expression tag	UNP P37231
D	71	ASP	-	expression tag	UNP P37231
D	72	LYS	-	expression tag	UNP P37231
D	73	MET	-	expression tag	UNP P37231

- Molecule 3 is a DNA chain called DNA (5'-D(*DCP*DAP*DAP*DAP*DCP*DTP*DAP*DG*GDP*DTP*DCP*DAP*DAP*DAP*GDP*GDP*DTP*DCP*DAP*DG)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	20	Total	C	N	O	P	0	0	0
			411	196	83	113	19			

- Molecule 4 is a DNA chain called DNA (5'-D(*DCP*DTP*GDP*DAP*DCP*DCP*DTP*DT*DT*GDP*DAP*DCP*DCP*DT*DT*GDP*DT*DT*DT*DG)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	20	Total	C	N	O	P	0	0	0
			403	195	66	123	19			

- Molecule 5 is a protein called NCOA2 Peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	G	9	Total	C	N	O	0	0	0
			79	51	16	12			
5	E	10	Total	C	N	O	0	0	0
			86	54	17	15			

- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn).

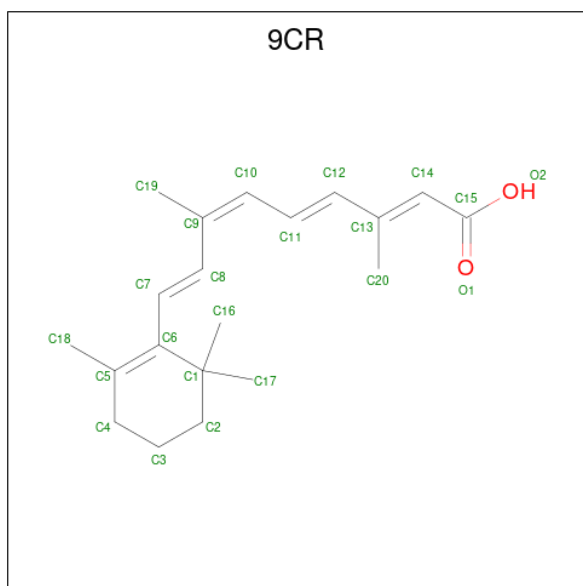
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	Zn	0	0
			2	2		

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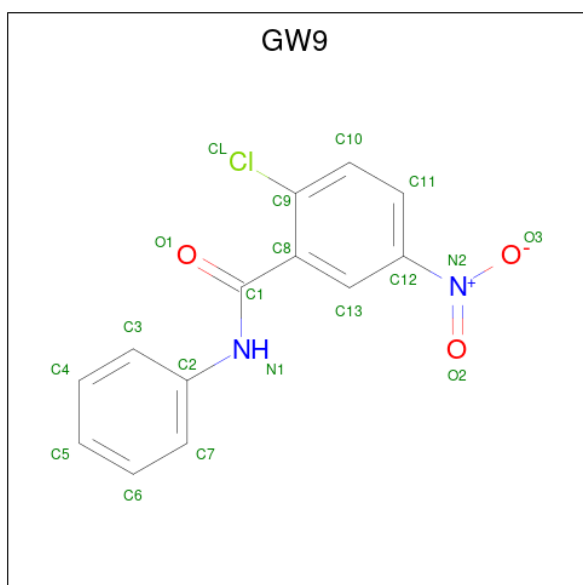
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	D	2	Total	Zn	0	0
			2	2		

- Molecule 7 is (9cis)-retinoic acid (CCD ID: 9CR) (formula: $C_{20}H_{28}O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			22	20	2		

- Molecule 8 is 2-chloro-5-nitro-N-phenylbenzamide (CCD ID: GW9) (formula: $C_{13}H_9ClN_2O_3$).

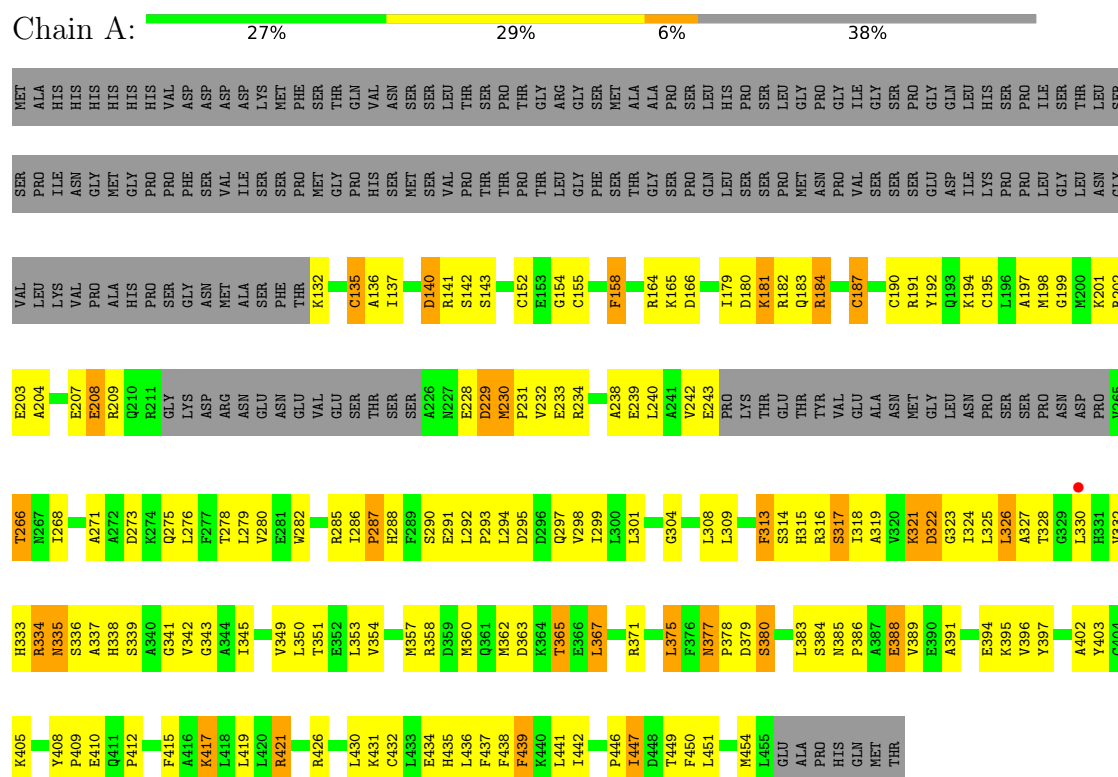


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Cl	N	O		
8	D	1	19	13	1	2	3	0	0

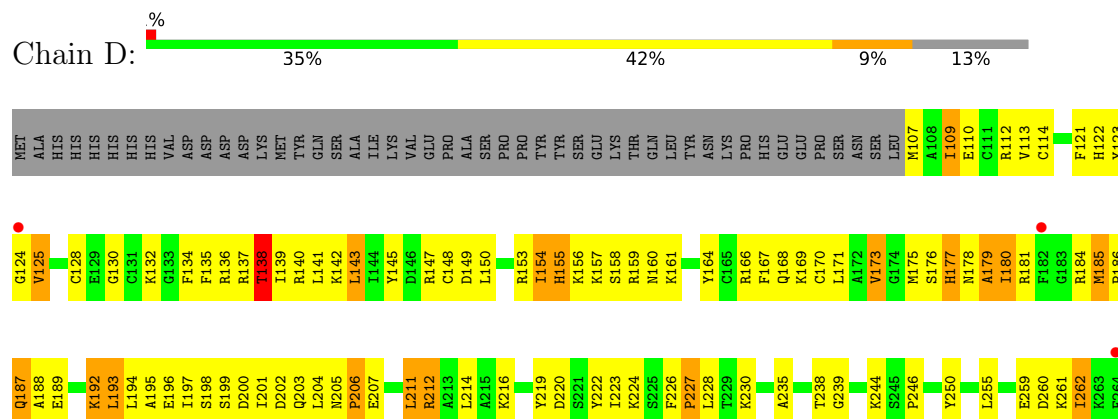
3 Residue-property plots

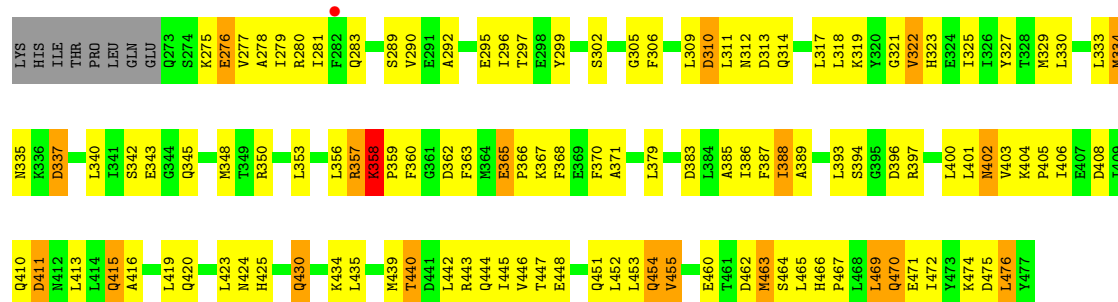
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Retinoic acid receptor RXR-alpha



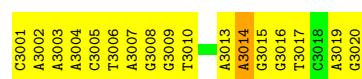
• Molecule 2: Peroxisome proliferator-activated receptor gamma





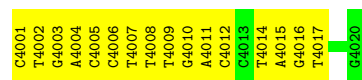
- Molecule 3: DNA (5'-D(*DCP*DAP*DAP*DAP*DCP*DTP*DAP*DGP*DGP*DTP*DCP*DAP*DAP*DAP*DGP*DGP*DTP*DCP*DAP*DG)-3')

Chain C: 15% 80% 5%



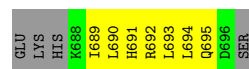
- Molecule 4: DNA (5'-D(*DCP*DTP*DGP*DAP*DCP*DCP*DTP*DTP*DTP*DGP*DAP*DCP*DCP*DTP*DAP*DGP*DTP*DTP*DTP*DG)-3')

Chain F: 20% 80%



- Molecule 5: NCOA2 Peptide

Chain G: 15% 54% 31%



- Molecule 5: NCOA2 Peptide

Chain E: 31% 31% 15% 23%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	63.59Å 146.78Å 67.23Å 90.00° 115.52° 90.00°	Depositor
Resolution (Å)	46.76 – 3.10 46.76 – 3.10	Depositor EDS
% Data completeness (in resolution range)	92.3 (46.76-3.10) 92.3 (46.76-3.10)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.50 (at 3.06Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.214 , 0.276 0.214 , 0.276	Depositor DCC
R_{free} test set	1970 reflections (9.81%)	wwPDB-VP
Wilson B-factor (Å ²)	61.5	Xtriage
Anisotropy	0.413	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 86.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.039 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	6244	wwPDB-VP
Average B, all atoms (Å ²)	88.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.23% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, GW9, 9CR

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	0.47	0/2348	1.03	15/3152 (0.5%)
2	D	0.47	0/2960	1.00	20/3972 (0.5%)
3	C	0.36	0/463	0.80	1/713 (0.1%)
4	F	0.35	0/449	0.89	0/691
5	E	0.41	0/86	1.23	2/112 (1.8%)
5	G	0.42	0/79	0.76	0/104
All	All	0.45	0/6385	0.99	38/8744 (0.4%)

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
3	C	0	1

There are no bond length outliers.

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	184	ARG	N-CA-C	-9.71	101.57	113.41
1	A	365	THR	N-CA-C	-8.80	102.12	113.12
2	D	469	LEU	N-CA-C	-7.94	102.58	111.71
5	E	690	LEU	N-CA-C	-7.66	102.87	112.90
1	A	229	ASP	N-CA-C	-7.48	103.61	112.89
1	A	377	ASN	CA-C-N	6.69	126.32	119.56
1	A	377	ASN	C-N-CA	6.69	126.32	119.56
1	A	421	ARG	N-CA-C	-6.49	105.40	113.38
5	E	691	HIS	N-CA-C	-6.46	103.52	111.33
1	A	439	PHE	N-CA-C	-6.42	106.08	114.04

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	154	ILE	N-CA-C	6.17	115.73	106.42
1	A	449	THR	N-CA-C	5.99	117.68	111.03
2	D	211	LEU	N-CA-C	-5.82	104.94	111.28
1	A	230	MET	CA-C-N	5.79	126.08	119.83
1	A	230	MET	C-N-CA	5.79	126.08	119.83
2	D	358	LYS	CA-C-N	-5.78	114.28	120.47
2	D	358	LYS	C-N-CA	-5.78	114.28	120.47
1	A	351	THR	N-CA-C	5.75	119.48	112.23
2	D	305	GLY	N-CA-C	5.72	123.25	115.30
2	D	177	HIS	N-CA-C	-5.68	106.67	113.21
2	D	260	ASP	N-CA-C	-5.57	105.27	112.68
1	A	266	THR	N-CA-C	-5.56	105.99	112.89
2	D	357	ARG	N-CA-C	5.54	118.32	110.50
2	D	193	LEU	N-CA-C	-5.54	105.83	112.59
2	D	310	ASP	CB-CA-C	5.48	116.54	109.80
2	D	454	GLN	N-CA-C	-5.42	104.24	112.04
2	D	199	SER	N-CA-C	-5.33	106.55	113.16
1	A	158	PHE	N-CA-C	-5.30	105.19	110.97
2	D	138	THR	N-CA-C	-5.26	105.46	111.14
2	D	360	PHE	N-CA-C	5.23	119.51	113.18
3	C	3013	DA	N9-C1'-C2'	5.21	121.31	113.50
2	D	192	LYS	N-CA-C	-5.14	106.60	112.92
2	D	235	ALA	N-CA-C	-5.14	105.58	111.07
2	D	334	MET	N-CA-C	5.11	118.00	110.59
2	D	337	ASP	N-CA-C	5.09	119.54	113.23
1	A	447	ILE	N-CA-C	-5.04	100.27	107.78
1	A	181	LYS	N-CA-C	-5.03	105.93	111.71
2	D	198	SER	N-CA-C	-5.01	107.02	113.23

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	3014	DA	Sidechain

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	2309	0	2339	166	0
2	D	2911	0	2970	246	0
3	C	411	0	225	30	0
4	F	403	0	230	27	0
5	E	86	0	93	14	0
5	G	79	0	88	6	0
6	A	2	0	0	0	0
6	D	2	0	0	0	0
7	A	22	0	27	3	0
8	D	19	0	9	0	0
All	All	6244	0	5981	456	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 37.

All (456) 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:362:MET:HE3	1:A:367:LEU:HB2	1.32	1.05
4:F:4004:DA:H1'	4:F:4005:DC:H5'	1.42	1.00
2:D:109:ILE:HG22	2:D:110:GLU:H	1.28	0.97
1:A:182:ARG:O	1:A:183:GLN:HG2	1.71	0.90
1:A:454:MET:HE1	5:G:690:LEU:HD22	1.53	0.90
1:A:234:ARG:HD2	1:A:287:PRO:HG3	1.54	0.89
2:D:402:ASN:O	2:D:405:PRO:HD2	1.73	0.88
2:D:363:PHE:CD1	2:D:452:LEU:HD21	2.08	0.88
1:A:228:GLU:OE1	1:A:231:PRO:HA	1.74	0.87
2:D:430:GLN:O	2:D:434:LYS:HG3	1.74	0.87
2:D:306:PHE:HA	2:D:309:LEU:HD12	1.57	0.84
3:C:3003:DA:H1'	3:C:3004:DA:H5'	1.61	0.83
2:D:125:VAL:HG11	2:D:175:MET:HG2	1.60	0.83
2:D:107:MET:HG3	2:D:192:LYS:HZ2	1.44	0.82
1:A:362:MET:CE	1:A:367:LEU:HB2	2.10	0.81
1:A:266:THR:HG23	1:A:446:PRO:HG2	1.61	0.80
3:C:3007:DA:H1'	3:C:3008:DG:H5'	1.64	0.79
2:D:180:ILE:O	2:D:180:ILE:HG13	1.83	0.79
1:A:179:ILE:HD13	1:A:191:ARG:HA	1.62	0.79
2:D:170:CYS:HB2	2:D:175:MET:HG3	1.64	0.77
1:A:322:ASP:HB3	1:A:334:ARG:HH12	1.49	0.77
2:D:314:GLN:HG2	5:E:694:LEU:HD13	1.65	0.77
4:F:4006:DC:H2''	4:F:4007:DT:OP2	1.82	0.77
1:A:316:ARG:NH2	1:A:327:ALA:HB2	1.99	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:4008:DT:H2''	4:F:4009:DT:H5'	1.68	0.76
2:D:181:ARG:HH12	2:D:185:MET:HE3	1.50	0.76
1:A:338:HIS:HA	1:A:343:GLY:HA3	1.67	0.76
3:C:3005:DC:H2'	3:C:3006:DT:H71	1.68	0.75
5:E:693:LEU:HD12	5:E:693:LEU:H	1.51	0.75
1:A:164:ARG:HH22	3:C:3015:DG:H3'	1.52	0.74
2:D:276:GLU:OE2	2:D:279:ILE:HD13	1.88	0.74
2:D:358:LYS:HB3	2:D:359:PRO:HD3	1.70	0.74
1:A:333:HIS:HD2	1:A:335:ASN:HD22	1.36	0.73
2:D:216:LYS:HE3	2:D:220:ASP:OD1	1.87	0.73
2:D:277:VAL:HG13	2:D:278:ALA:N	2.04	0.73
2:D:259:GLU:OE2	2:D:280:ARG:HD2	1.89	0.72
2:D:463:MET:HG3	2:D:464:SER:H	1.55	0.72
1:A:313:PHE:C	1:A:313:PHE:CD2	2.67	0.72
1:A:402:ALA:O	1:A:405:LYS:HB3	1.88	0.72
3:C:3014:DA:H2''	3:C:3015:DG:OP2	1.90	0.71
2:D:107:MET:HG3	2:D:192:LYS:NZ	2.05	0.71
2:D:227:PRO:HD3	2:D:295:GLU:OE1	1.91	0.70
2:D:200:ASP:C	2:D:202:ASP:H	1.99	0.70
1:A:447:ILE:HG23	1:A:451:LEU:HD13	1.74	0.70
2:D:169:LYS:O	2:D:173:VAL:HG22	1.92	0.70
2:D:206:PRO:HG2	2:D:207:GLU:H	1.56	0.69
2:D:330:LEU:O	2:D:334:MET:HG3	1.92	0.69
1:A:313:PHE:C	1:A:313:PHE:HD2	2.00	0.69
2:D:153:ARG:H	2:D:153:ARG:HD2	1.56	0.69
2:D:404:LYS:HB3	2:D:405:PRO:HD3	1.75	0.69
3:C:3005:DC:C2'	3:C:3006:DT:H71	2.22	0.69
2:D:244:LYS:H	2:D:244:LYS:HD2	1.58	0.69
1:A:229:ASP:HB2	1:A:395:LYS:HD2	1.74	0.69
2:D:159:ARG:HG3	2:D:160:ASN:N	2.07	0.68
1:A:201:LYS:HZ3	2:D:239:GLY:HA2	1.58	0.68
2:D:138:THR:HG21	2:D:167:PHE:CD1	2.28	0.68
2:D:443:ARG:O	2:D:447:THR:HG23	1.93	0.68
2:D:322:VAL:HG21	2:D:472:ILE:HD13	1.76	0.67
2:D:203:GLN:C	2:D:205:ASN:H	2.01	0.66
2:D:109:ILE:HG22	2:D:110:GLU:N	2.06	0.66
3:C:3001:DC:HO5'	3:C:3001:DC:H6	1.43	0.66
1:A:135:CYS:HB2	1:A:152:CYS:H	1.61	0.66
3:C:3006:DT:H2''	3:C:3007:DA:N7	2.11	0.65
2:D:176:SER:C	2:D:178:ASN:H	2.03	0.65
2:D:255:LEU:HD22	2:D:281:ILE:HD11	1.78	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:135:CYS:HB2	1:A:152:CYS:N	2.11	0.65
1:A:430:LEU:HD11	2:D:444:GLN:HG3	1.77	0.65
4:F:4004:DA:H1'	4:F:4005:DC:C5'	2.23	0.65
2:D:279:ILE:HG23	2:D:283:GLN:HG3	1.79	0.65
1:A:437:PHE:C	1:A:439:PHE:H	2.04	0.65
2:D:333:LEU:HB3	2:D:340:LEU:HB2	1.79	0.64
1:A:240:LEU:O	1:A:243:GLU:HG2	1.97	0.64
2:D:453:LEU:O	2:D:453:LEU:HD23	1.97	0.64
2:D:211:LEU:HD21	2:D:415:GLN:HG2	1.79	0.64
2:D:261:LYS:O	2:D:262:ILE:HB	1.96	0.64
1:A:322:ASP:HB3	1:A:334:ARG:NH1	2.13	0.63
1:A:438:PHE:O	1:A:442:ILE:HG13	1.99	0.63
2:D:220:ASP:O	2:D:224:LYS:HD3	1.99	0.63
1:A:362:MET:HE3	1:A:367:LEU:CB	2.18	0.63
1:A:308:LEU:HD11	1:A:375:LEU:HD23	1.81	0.63
1:A:383:LEU:O	1:A:386:PRO:HD3	1.99	0.63
2:D:393:LEU:HD12	2:D:413:LEU:HD11	1.79	0.63
1:A:321:LYS:HD2	1:A:321:LYS:O	1.99	0.62
1:A:242:VAL:O	1:A:242:VAL:HG22	1.99	0.62
2:D:342:SER:O	2:D:343:GLU:HB2	1.99	0.62
2:D:122:HIS:CE1	2:D:132:LYS:HD2	2.34	0.62
1:A:313:PHE:CD2	1:A:314:SER:N	2.68	0.62
1:A:279:LEU:HD21	1:A:308:LEU:HD13	1.82	0.62
5:E:688:LYS:HD2	5:E:688:LYS:N	2.14	0.62
3:C:3009:DG:H1'	3:C:3010:DT:H5'	1.81	0.61
2:D:114:CYS:O	2:D:155:HIS:HA	2.01	0.61
1:A:333:HIS:CD2	1:A:335:ASN:HD22	2.19	0.60
2:D:153:ARG:HD2	2:D:153:ARG:N	2.15	0.60
2:D:317:LEU:HD21	2:D:406:ILE:HD13	1.81	0.60
2:D:121:PHE:CE2	2:D:124:GLY:HA2	2.36	0.60
2:D:137:ARG:HH11	2:D:137:ARG:HB3	1.66	0.60
2:D:181:ARG:NH1	2:D:185:MET:HE3	2.16	0.60
2:D:358:LYS:CB	2:D:359:PRO:CD	2.79	0.60
1:A:318:ILE:HG23	1:A:319:ALA:N	2.17	0.60
4:F:4007:DT:H1'	4:F:4008:DT:H5''	1.83	0.60
1:A:408:TYR:N	1:A:409:PRO:HD3	2.17	0.59
2:D:388:ILE:HG22	2:D:389:ALA:N	2.16	0.59
4:F:4011:DA:H1'	4:F:4012:DC:H5''	1.83	0.59
3:C:3017:DT:H6	3:C:3017:DT:H5'	1.68	0.59
1:A:441:LEU:O	1:A:442:ILE:HD13	2.02	0.59
2:D:277:VAL:HG13	2:D:278:ALA:H	1.67	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:262:ILE:HG22	2:D:262:ILE:O	2.03	0.59
2:D:275:LYS:O	2:D:276:GLU:HB2	2.03	0.59
1:A:410:GLU:O	1:A:412:PRO:HD3	2.03	0.59
2:D:370:PHE:HB2	2:D:445:ILE:HD11	1.84	0.58
1:A:232:VAL:HG11	1:A:403:TYR:CD2	2.38	0.58
2:D:123:TYR:HA	2:D:180:ILE:HG22	1.84	0.58
2:D:309:LEU:O	2:D:310:ASP:C	2.45	0.58
1:A:180:ASP:OD2	1:A:182:ARG:HG2	2.02	0.58
2:D:276:GLU:HB3	2:D:279:ILE:HB	1.85	0.58
2:D:318:LEU:CD1	5:E:694:LEU:HD21	2.33	0.58
1:A:294:LEU:O	1:A:294:LEU:HD23	2.03	0.58
2:D:114:CYS:HA	2:D:154:ILE:O	2.04	0.57
2:D:358:LYS:CB	2:D:359:PRO:HD3	2.33	0.57
1:A:197:ALA:HB1	2:D:250:TYR:CE2	2.38	0.57
2:D:107:MET:CG	2:D:192:LYS:HZ2	2.15	0.57
2:D:318:LEU:O	2:D:319:LYS:C	2.46	0.57
1:A:365:THR:HG21	1:A:403:TYR:CE2	2.39	0.57
2:D:261:LYS:HG2	2:D:262:ILE:HD13	1.85	0.57
2:D:357:ARG:NH2	2:D:460:GLU:OE1	2.37	0.57
2:D:393:LEU:HD12	2:D:413:LEU:CD1	2.34	0.57
4:F:4008:DT:H2''	4:F:4009:DT:C5'	2.34	0.57
1:A:316:ARG:C	1:A:318:ILE:H	2.12	0.57
1:A:317:SER:HB3	1:A:324:ILE:HA	1.85	0.57
2:D:358:LYS:HB3	2:D:359:PRO:CD	2.35	0.57
2:D:135:PHE:HB2	2:D:175:MET:HE1	1.86	0.57
2:D:463:MET:HG3	2:D:464:SER:N	2.20	0.56
1:A:383:LEU:HD13	1:A:389:VAL:HG21	1.86	0.56
1:A:426:ARG:HD2	2:D:444:GLN:HB2	1.86	0.56
2:D:159:ARG:HG3	2:D:160:ASN:H	1.71	0.56
1:A:290:SER:HA	1:A:297:GLN:NE2	2.21	0.56
2:D:158:SER:O	2:D:161:LYS:HB2	2.06	0.56
1:A:350:LEU:O	1:A:354:VAL:HB	2.05	0.56
2:D:147:ARG:HG2	2:D:148:CYS:N	2.20	0.56
2:D:434:LYS:NZ	2:D:434:LYS:HB3	2.19	0.56
1:A:192:TYR:O	1:A:195:CYS:HB2	2.06	0.56
1:A:385:ASN:O	1:A:388:GLU:HB3	2.06	0.56
2:D:139:ILE:HG22	2:D:140:ARG:N	2.19	0.56
2:D:219:TYR:O	2:D:223:ILE:HG12	2.06	0.56
2:D:136:ARG:O	2:D:140:ARG:HB2	2.05	0.55
2:D:310:ASP:OD2	2:D:312:ASN:HB2	2.06	0.55
1:A:379:ASP:O	1:A:380:SER:C	2.50	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:147:ARG:HG2	2:D:148:CYS:H	1.71	0.55
2:D:393:LEU:O	2:D:410:GLN:HB2	2.06	0.55
2:D:277:VAL:CG1	2:D:278:ALA:N	2.69	0.55
2:D:462:ASP:O	2:D:463:MET:C	2.49	0.55
1:A:339:SER:C	1:A:341:GLY:H	2.13	0.55
1:A:230:MET:HG2	1:A:396:VAL:HG22	1.89	0.55
2:D:255:LEU:O	2:D:259:GLU:HB2	2.06	0.55
2:D:181:ARG:HH12	2:D:185:MET:CE	2.19	0.55
4:F:4011:DA:H2''	4:F:4012:DC:C5'	2.37	0.55
1:A:334:ARG:HG2	1:A:335:ASN:N	2.22	0.55
1:A:203:GLU:OE1	2:D:335:ASN:HB2	2.07	0.55
2:D:193:LEU:HB2	2:D:197:ILE:HG12	1.88	0.55
2:D:370:PHE:CZ	2:D:442:LEU:HD21	2.42	0.55
1:A:239:GLU:HG2	1:A:367:LEU:HD23	1.88	0.54
1:A:288:HIS:HA	1:A:291:GLU:CD	2.32	0.54
2:D:261:LYS:HG2	2:D:262:ILE:CD1	2.38	0.54
1:A:266:THR:CG2	1:A:446:PRO:HG2	2.33	0.54
1:A:426:ARG:HG3	1:A:426:ARG:HH11	1.70	0.54
4:F:4008:DT:H5'	4:F:4008:DT:H6	1.72	0.54
1:A:315:HIS:O	1:A:318:ILE:HB	2.08	0.54
2:D:176:SER:OG	2:D:178:ASN:HB2	2.08	0.54
2:D:124:GLY:O	2:D:125:VAL:HB	2.07	0.54
4:F:4011:DA:C2'	4:F:4012:DC:H5''	2.38	0.54
1:A:318:ILE:HD11	1:A:358:ARG:HA	1.89	0.54
1:A:353:LEU:O	1:A:357:MET:HG3	2.08	0.54
4:F:4008:DT:H1'	4:F:4009:DT:H5''	1.90	0.54
1:A:201:LYS:NZ	2:D:239:GLY:HA2	2.22	0.54
2:D:184:ARG:HG3	3:C:3004:DA:O4'	2.08	0.54
1:A:342:VAL:O	1:A:342:VAL:HG23	2.07	0.53
2:D:474:LYS:HG2	2:D:475:ASP:OD2	2.08	0.53
1:A:394:GLU:O	1:A:397:TYR:HB2	2.08	0.53
1:A:426:ARG:HD3	2:D:444:GLN:OE1	2.08	0.53
2:D:323:HIS:NE2	2:D:472:ILE:CG2	2.72	0.53
1:A:187:CYS:SG	1:A:190:CYS:HB2	2.48	0.53
5:G:691:HIS:O	5:G:695:GLN:HB2	2.09	0.53
2:D:134:PHE:HA	2:D:137:ARG:HH12	1.74	0.53
1:A:304:GLY:O	1:A:308:LEU:HG	2.08	0.53
2:D:141:LEU:HB2	2:D:143:LEU:HD22	1.91	0.53
5:G:690:LEU:O	5:G:694:LEU:HG	2.08	0.53
2:D:109:ILE:CG2	2:D:110:GLU:H	2.11	0.53
1:A:349:VAL:HG13	1:A:353:LEU:HD12	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:277:VAL:O	2:D:281:ILE:HG12	2.09	0.52
2:D:279:ILE:HG23	2:D:283:GLN:CG	2.38	0.52
2:D:394:SER:O	2:D:397:ARG:HG2	2.09	0.52
2:D:408:ASP:O	2:D:411:ASP:HB2	2.09	0.52
1:A:292:LEU:HB2	1:A:293:PRO:CD	2.39	0.52
1:A:318:ILE:O	1:A:358:ARG:HD3	2.09	0.52
2:D:379:LEU:HD11	2:D:435:LEU:HD13	1.91	0.52
1:A:135:CYS:SG	1:A:137:ILE:HB	2.50	0.52
1:A:209:ARG:NE	3:C:3015:DG:H4'	2.25	0.52
2:D:330:LEU:O	2:D:330:LEU:HG	2.10	0.52
1:A:154:GLY:HA2	4:F:4003:DG:H2'	1.91	0.51
1:A:179:ILE:CD1	1:A:191:ARG:HA	2.36	0.51
2:D:226:PHE:CD2	2:D:329:MET:HE1	2.45	0.51
2:D:226:PHE:HA	2:D:295:GLU:OE1	2.10	0.51
5:E:688:LYS:HA	5:E:691:HIS:ND1	2.25	0.51
1:A:426:ARG:CD	2:D:444:GLN:HB2	2.40	0.51
2:D:334:MET:HE3	2:D:371:ALA:HB2	1.91	0.51
2:D:275:LYS:HE2	2:D:275:LYS:HA	1.92	0.51
2:D:365:GLU:OE1	2:D:365:GLU:HA	2.11	0.51
1:A:279:LEU:HD21	1:A:308:LEU:CD1	2.41	0.51
1:A:142:SER:O	1:A:143:SER:HB2	2.10	0.51
2:D:130:GLY:HA2	4:F:4010:DG:H2'	1.92	0.51
2:D:277:VAL:CG1	2:D:278:ALA:H	2.24	0.51
1:A:437:PHE:C	1:A:439:PHE:N	2.69	0.50
2:D:193:LEU:HD13	2:D:197:ILE:HG23	1.94	0.50
3:C:3007:DA:H2''	3:C:3008:DG:O5'	2.12	0.50
2:D:318:LEU:HD12	5:E:694:LEU:HD21	1.94	0.50
3:C:3015:DG:H2''	3:C:3016:DG:H5'	1.92	0.50
1:A:330:LEU:O	1:A:332:VAL:HG23	2.11	0.50
2:D:466:HIS:CG	2:D:467:PRO:HD2	2.47	0.50
1:A:180:ASP:HB3	1:A:182:ARG:O	2.12	0.50
1:A:242:VAL:CG2	1:A:278:THR:HB	2.42	0.50
1:A:321:LYS:O	1:A:323:GLY:N	2.44	0.50
1:A:209:ARG:CZ	3:C:3015:DG:H4'	2.42	0.50
2:D:348:MET:SD	2:D:353:LEU:HD21	2.52	0.50
2:D:370:PHE:CB	2:D:445:ILE:HD11	2.41	0.50
2:D:176:SER:C	2:D:178:ASN:N	2.69	0.49
1:A:383:LEU:O	1:A:384:SER:C	2.54	0.49
1:A:132:LYS:N	1:A:141:ARG:HH21	2.10	0.49
1:A:339:SER:C	1:A:341:GLY:N	2.69	0.49
2:D:196:GLU:O	2:D:200:ASP:HB2	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:203:GLN:C	2:D:205:ASN:N	2.70	0.49
2:D:334:MET:HE1	2:D:367:LYS:HB3	1.93	0.49
2:D:335:ASN:C	2:D:335:ASN:OD1	2.54	0.49
1:A:279:LEU:HD23	1:A:279:LEU:O	2.13	0.49
2:D:193:LEU:CB	2:D:197:ILE:HG12	2.42	0.49
2:D:323:HIS:CD2	2:D:476:LEU:HD21	2.48	0.49
2:D:279:ILE:O	2:D:283:GLN:HG2	2.13	0.49
1:A:357:MET:SD	1:A:362:MET:CE	3.01	0.49
2:D:137:ARG:HH21	4:F:4009:DT:H72	1.76	0.49
2:D:246:PRO:HB3	2:D:345:GLN:C	2.38	0.49
2:D:350:ARG:HG3	2:D:368:PHE:CD2	2.48	0.49
2:D:471:GLU:OE1	5:E:689:ILE:HG22	2.13	0.49
3:C:3008:DG:H2''	3:C:3009:DG:OP2	2.13	0.49
1:A:136:ALA:O	1:A:198:MET:HG3	2.13	0.48
2:D:467:PRO:HA	2:D:470:GLN:HB2	1.94	0.48
1:A:179:ILE:HD12	1:A:194:LYS:CG	2.43	0.48
2:D:193:LEU:HD12	2:D:197:ILE:HG21	1.95	0.48
1:A:180:ASP:O	1:A:184:ARG:HB3	2.13	0.48
1:A:426:ARG:HG3	1:A:426:ARG:NH1	2.27	0.48
1:A:207:GLU:HB3	2:D:157:LYS:HE2	1.95	0.48
1:A:197:ALA:C	1:A:199:GLY:H	2.21	0.48
1:A:417:LYS:O	1:A:421:ARG:HG2	2.14	0.48
1:A:450:PHE:CE2	1:A:454:MET:HE3	2.48	0.48
1:A:316:ARG:NH2	7:A:7223:9CR:O1	2.46	0.48
3:C:3019:DA:H2''	3:C:3020:DG:O5'	2.13	0.48
1:A:334:ARG:HD3	1:A:338:HIS:CE1	2.48	0.48
1:A:388:GLU:O	1:A:391:ALA:HB3	2.14	0.48
2:D:153:ARG:H	2:D:153:ARG:CD	2.24	0.48
2:D:193:LEU:HD13	2:D:197:ILE:CG2	2.43	0.48
2:D:365:GLU:CB	2:D:366:PRO:HD3	2.44	0.48
2:D:149:ASP:O	2:D:150:LEU:C	2.57	0.48
3:C:3001:DC:H2''	3:C:3002:DA:C8	2.49	0.48
3:C:3016:DG:H1'	3:C:3017:DT:H5''	1.95	0.48
2:D:113:VAL:HG21	2:D:170:CYS:HB3	1.95	0.47
2:D:193:LEU:HB3	2:D:197:ILE:HG23	1.96	0.47
2:D:327:TYR:HE2	2:D:446:VAL:HG22	1.79	0.47
2:D:466:HIS:HB3	2:D:469:LEU:HG	1.96	0.47
1:A:318:ILE:HG13	1:A:358:ARG:HB2	1.96	0.47
1:A:403:TYR:CD1	1:A:403:TYR:C	2.91	0.47
2:D:335:ASN:OD1	2:D:337:ASP:N	2.43	0.47
2:D:342:SER:O	2:D:343:GLU:CB	2.62	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:447:THR:O	2:D:451:GLN:HG3	2.15	0.47
1:A:140:ASP:OD1	1:A:141:ARG:N	2.44	0.47
2:D:306:PHE:HA	2:D:309:LEU:CD1	2.39	0.47
1:A:201:LYS:NZ	2:D:239:GLY:CA	2.78	0.47
2:D:193:LEU:O	2:D:197:ILE:HG12	2.14	0.47
2:D:309:LEU:HD22	2:D:406:ILE:HG13	1.96	0.47
4:F:4015:DA:H2''	4:F:4016:DG:OP2	2.14	0.47
2:D:138:THR:HG23	2:D:145:TYR:CE2	2.50	0.47
2:D:166:ARG:C	2:D:168:GLN:H	2.23	0.47
2:D:317:LEU:HD11	2:D:406:ILE:HG12	1.97	0.47
1:A:367:LEU:O	1:A:367:LEU:HG	2.13	0.47
2:D:154:ILE:HD13	2:D:166:ARG:HA	1.97	0.47
2:D:187:GLN:O	2:D:188:ALA:C	2.58	0.47
1:A:294:LEU:O	1:A:298:VAL:HG23	2.15	0.46
1:A:335:ASN:O	1:A:336:SER:C	2.58	0.46
2:D:193:LEU:CD1	2:D:197:ILE:CG2	2.93	0.46
1:A:334:ARG:O	1:A:335:ASN:C	2.58	0.46
1:A:318:ILE:CG2	1:A:319:ALA:N	2.78	0.46
2:D:383:ASP:OD2	2:D:425:HIS:NE2	2.49	0.46
4:F:4011:DA:H2''	4:F:4012:DC:H5''	1.97	0.46
2:D:170:CYS:HB2	2:D:175:MET:HE2	1.97	0.46
4:F:4011:DA:C1'	4:F:4012:DC:H5''	2.45	0.46
1:A:426:ARG:HH21	2:D:440:THR:CG2	2.29	0.46
2:D:135:PHE:HE1	2:D:171:LEU:HD21	1.81	0.46
2:D:216:LYS:HE3	2:D:220:ASP:CG	2.40	0.46
2:D:113:VAL:HG22	2:D:170:CYS:HA	1.97	0.46
3:C:3005:DC:H2''	3:C:3006:DT:H71	1.97	0.46
2:D:297:THR:HG23	5:E:694:LEU:HD23	1.98	0.46
1:A:233:GLU:O	1:A:234:ARG:C	2.59	0.46
2:D:299:TYR:O	2:D:302:SER:OG	2.30	0.46
2:D:471:GLU:CD	5:E:688:LYS:N	2.74	0.46
1:A:238:ALA:C	1:A:240:LEU:H	2.24	0.46
2:D:325:ILE:O	2:D:329:MET:HG2	2.16	0.46
2:D:327:TYR:CE2	2:D:445:ILE:HG22	2.51	0.46
2:D:290:VAL:HG21	2:D:466:HIS:CD2	2.51	0.45
2:D:396:ASP:CG	2:D:443:ARG:HH22	2.24	0.45
4:F:4016:DG:H2''	4:F:4017:DT:OP2	2.16	0.45
1:A:360:MET:HE3	1:A:362:MET:HB2	1.97	0.45
2:D:419:LEU:HD11	2:D:423:LEU:HD11	1.98	0.45
1:A:295:ASP:O	1:A:299:ILE:HG13	2.16	0.45
2:D:137:ARG:HB3	2:D:137:ARG:NH1	2.28	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:164:TYR:O	2:D:168:GLN:HB2	2.16	0.45
1:A:276:LEU:HD23	1:A:309:LEU:HD11	1.99	0.45
1:A:327:ALA:O	1:A:328:THR:HG23	2.16	0.45
2:D:178:ASN:C	2:D:180:ILE:H	2.24	0.45
2:D:452:LEU:C	2:D:454:GLN:H	2.22	0.45
3:C:3003:DA:H1'	3:C:3004:DA:C5'	2.38	0.45
1:A:180:ASP:CG	1:A:181:LYS:N	2.75	0.45
2:D:184:ARG:O	2:D:186:PRO:HD3	2.16	0.45
1:A:165:LYS:O	1:A:166:ASP:C	2.59	0.45
1:A:317:SER:CB	1:A:324:ILE:HA	2.47	0.45
1:A:363:ASP:OD1	1:A:363:ASP:C	2.59	0.45
2:D:141:LEU:HB2	2:D:143:LEU:CD2	2.46	0.45
1:A:273:ASP:O	1:A:276:LEU:HB2	2.17	0.45
1:A:321:LYS:HD2	1:A:321:LYS:C	2.41	0.45
2:D:295:GLU:O	2:D:296:ILE:C	2.60	0.45
2:D:452:LEU:C	2:D:454:GLN:N	2.74	0.45
1:A:135:CYS:C	1:A:137:ILE:H	2.25	0.45
1:A:285:ARG:HG2	1:A:285:ARG:HH11	1.81	0.45
1:A:315:HIS:HB2	1:A:367:LEU:HD13	1.99	0.45
2:D:211:LEU:HD22	2:D:416:ALA:HA	1.98	0.44
1:A:337:ALA:C	1:A:339:SER:N	2.74	0.44
1:A:357:MET:SD	1:A:362:MET:HE1	2.58	0.44
2:D:238:THR:O	2:D:238:THR:HG22	2.17	0.44
1:A:240:LEU:C	1:A:242:VAL:H	2.26	0.44
1:A:275:GLN:HB3	1:A:309:LEU:CD2	2.47	0.44
1:A:179:ILE:HD12	1:A:194:LYS:HG2	1.99	0.44
1:A:325:LEU:HD23	1:A:326:LEU:O	2.17	0.44
1:A:326:LEU:C	1:A:328:THR:H	2.26	0.44
2:D:219:TYR:CE1	2:D:223:ILE:HD11	2.53	0.44
2:D:317:LEU:HD13	2:D:393:LEU:HD23	2.00	0.44
2:D:403:VAL:O	2:D:404:LYS:C	2.60	0.44
2:D:138:THR:HG21	2:D:167:PHE:CE1	2.52	0.44
2:D:128:CYS:C	2:D:130:GLY:H	2.25	0.44
2:D:192:LYS:O	2:D:192:LYS:HG3	2.18	0.44
2:D:322:VAL:HG23	2:D:323:HIS:H	1.83	0.44
2:D:453:LEU:HD11	2:D:465:LEU:HD21	2.00	0.44
1:A:333:HIS:CD2	1:A:335:ASN:ND2	2.84	0.43
2:D:159:ARG:HD2	4:F:4010:DG:OP1	2.18	0.43
2:D:357:ARG:HG3	2:D:357:ARG:HH11	1.83	0.43
2:D:134:PHE:HA	2:D:137:ARG:NH1	2.32	0.43
2:D:194:LEU:O	2:D:197:ILE:HG13	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:179:ILE:HD12	1:A:194:LYS:CB	2.48	0.43
1:A:313:PHE:HD2	1:A:314:SER:N	2.11	0.43
2:D:184:ARG:HG3	3:C:3004:DA:C4'	2.48	0.43
2:D:276:GLU:O	2:D:280:ARG:N	2.45	0.43
2:D:193:LEU:HB2	2:D:197:ILE:CG1	2.48	0.43
2:D:363:PHE:CE1	2:D:452:LEU:HD21	2.50	0.43
3:C:3016:DG:H2''	3:C:3017:DT:H5'	2.00	0.43
2:D:128:CYS:C	2:D:130:GLY:N	2.75	0.43
2:D:207:GLU:OE2	2:D:207:GLU:HA	2.19	0.43
2:D:309:LEU:HD22	2:D:406:ILE:CG1	2.48	0.43
1:A:268:ILE:HA	1:A:326:LEU:HD13	2.00	0.43
1:A:415:PHE:CZ	1:A:419:LEU:HD11	2.54	0.43
2:D:112:ARG:NH2	2:D:173:VAL:HB	2.34	0.43
2:D:230:LYS:HE2	2:D:379:LEU:O	2.17	0.43
2:D:467:PRO:C	2:D:470:GLN:HB2	2.43	0.43
1:A:271:ALA:HB1	7:A:7223:9CR:O2	2.19	0.43
2:D:313:ASP:OD1	2:D:400:LEU:HA	2.19	0.43
2:D:365:GLU:HB2	2:D:366:PRO:HD3	2.00	0.43
2:D:452:LEU:O	2:D:455:VAL:HB	2.17	0.43
2:D:465:LEU:H	2:D:465:LEU:HD12	1.83	0.43
1:A:326:LEU:N	1:A:326:LEU:HD23	2.33	0.43
2:D:314:GLN:HG2	5:E:694:LEU:CD1	2.44	0.43
2:D:318:LEU:HD11	5:E:694:LEU:HD21	2.00	0.43
2:D:386:ILE:O	2:D:387:PHE:C	2.61	0.43
1:A:155:CYS:HA	1:A:191:ARG:NH2	2.33	0.43
1:A:155:CYS:HA	1:A:191:ARG:HH21	1.84	0.43
1:A:345:ILE:CD1	1:A:432:CYS:SG	3.07	0.43
2:D:135:PHE:CB	2:D:175:MET:HE1	2.49	0.43
2:D:275:LYS:O	2:D:276:GLU:CB	2.67	0.43
2:D:401:LEU:HD12	2:D:401:LEU:HA	1.77	0.43
1:A:158:PHE:CE2	1:A:191:ARG:HG2	2.54	0.43
1:A:155:CYS:CA	1:A:191:ARG:HH21	2.31	0.42
2:D:357:ARG:HG3	2:D:357:ARG:NH1	2.33	0.42
2:D:135:PHE:HB2	2:D:175:MET:CE	2.48	0.42
2:D:279:ILE:O	2:D:283:GLN:CG	2.67	0.42
2:D:403:VAL:HG12	2:D:404:LYS:N	2.33	0.42
4:F:4004:DA:H2''	4:F:4005:DC:O5'	2.18	0.42
1:A:275:GLN:HB3	1:A:309:LEU:HD22	2.01	0.42
2:D:204:LEU:HG	2:D:204:LEU:O	2.20	0.42
4:F:4001:DC:H2''	4:F:4002:DT:H5'	2.01	0.42
2:D:404:LYS:HE2	2:D:404:LYS:HB2	1.92	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:3002:DA:H2''	3:C:3003:DA:OP2	2.19	0.42
1:A:132:LYS:HD2	1:A:132:LYS:HA	1.93	0.42
1:A:282:TRP:NE1	1:A:286:ILE:HD11	2.35	0.42
2:D:187:GLN:O	2:D:187:GLN:HG2	2.20	0.42
1:A:207:GLU:O	1:A:208:GLU:C	2.63	0.42
2:D:259:GLU:OE1	2:D:280:ARG:NH1	2.53	0.42
2:D:318:LEU:HD23	2:D:318:LEU:HA	1.90	0.42
2:D:420:GLN:OE1	2:D:424:ASN:HB2	2.20	0.42
5:G:689:ILE:O	5:G:692:ARG:HB3	2.20	0.42
1:A:280:VAL:HG21	5:G:693:LEU:HD22	2.02	0.41
2:D:276:GLU:OE1	2:D:357:ARG:HD3	2.20	0.41
2:D:322:VAL:HG23	2:D:323:HIS:N	2.34	0.41
2:D:466:HIS:ND1	2:D:467:PRO:N	2.68	0.41
3:C:3002:DA:H1'	3:C:3003:DA:H5'	2.01	0.41
2:D:179:ALA:O	2:D:181:ARG:N	2.53	0.41
2:D:188:ALA:O	2:D:189:GLU:C	2.63	0.41
2:D:214:LEU:HD23	2:D:416:ALA:HB2	2.01	0.41
1:A:297:GLN:O	1:A:301:LEU:HD12	2.19	0.41
1:A:435:HIS:C	1:A:437:PHE:N	2.78	0.41
2:D:246:PRO:HA	2:D:345:GLN:O	2.19	0.41
1:A:201:LYS:HZ2	2:D:239:GLY:HA3	1.85	0.41
1:A:275:GLN:HG3	7:A:7223:9CR:C15	2.50	0.41
1:A:431:LYS:HD2	1:A:431:LYS:HA	1.88	0.41
2:D:402:ASN:HD22	2:D:402:ASN:HA	1.60	0.41
4:F:4008:DT:H2'	4:F:4009:DT:H71	2.03	0.41
2:D:187:GLN:O	2:D:187:GLN:CG	2.68	0.41
2:D:222:TYR:CD2	2:D:385:ALA:HA	2.56	0.41
2:D:322:VAL:HG21	2:D:472:ILE:CD1	2.47	0.41
4:F:4009:DT:H2''	4:F:4010:DG:C8	2.56	0.41
1:A:337:ALA:O	1:A:339:SER:N	2.53	0.41
1:A:377:ASN:HA	1:A:378:PRO:HD2	1.86	0.41
3:C:3005:DC:H2''	3:C:3006:DT:C6	2.56	0.41
5:G:693:LEU:H	5:G:693:LEU:HD12	1.85	0.41
1:A:438:PHE:C	1:A:442:ILE:HG13	2.45	0.41
2:D:139:ILE:HG21	2:D:177:HIS:HD2	1.85	0.41
2:D:311:LEU:O	2:D:311:LEU:HD13	2.21	0.41
2:D:434:LYS:HB3	2:D:434:LYS:HZ2	1.86	0.41
3:C:3001:DC:H6	3:C:3001:DC:O5'	2.03	0.41
4:F:4014:DT:H2''	4:F:4015:DA:C8	2.55	0.41
1:A:389:VAL:C	1:A:391:ALA:N	2.78	0.41
2:D:212:ARG:HG3	2:D:212:ARG:NH1	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:255:LEU:CD2	2:D:281:ILE:HD11	2.49	0.41
4:F:4002:DT:H5'	4:F:4002:DT:H6	1.85	0.41
5:E:689:ILE:O	5:E:693:LEU:HD12	2.21	0.41
1:A:431:LYS:O	1:A:434:GLU:HB3	2.20	0.41
2:D:184:ARG:CD	3:C:3004:DA:H4'	2.50	0.41
5:E:690:LEU:O	5:E:691:HIS:C	2.64	0.41
1:A:239:GLU:OE1	1:A:367:LEU:HD21	2.20	0.40
1:A:441:LEU:C	1:A:442:ILE:HD13	2.46	0.40
2:D:356:LEU:HD23	2:D:356:LEU:HA	1.85	0.40
3:C:3015:DG:H2''	3:C:3016:DG:OP2	2.21	0.40
1:A:282:TRP:CZ2	1:A:371:ARG:HB3	2.57	0.40
2:D:444:GLN:O	2:D:448:GLU:HG3	2.22	0.40
1:A:202:ARG:C	1:A:204:ALA:N	2.80	0.40
1:A:349:VAL:O	1:A:353:LEU:HB2	2.21	0.40
1:A:436:LEU:HD23	1:A:436:LEU:HA	1.97	0.40
2:D:311:LEU:CD1	5:E:691:HIS:HD2	2.35	0.40
4:F:4011:DA:H2''	4:F:4012:DC:H5'	2.03	0.40
2:D:142:LYS:O	2:D:143:LEU:C	2.64	0.40
2:D:289:SER:O	2:D:292:ALA:HB3	2.22	0.40
2:D:321:GLY:O	2:D:322:VAL:C	2.64	0.40
3:C:3016:DG:H2''	3:C:3017:DT:C5'	2.51	0.40
4:F:4002:DT:H5'	4:F:4002:DT:C6	2.57	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	A	283/467 (61%)	228 (81%)	47 (17%)	8 (3%)	4	20
2	D	359/419 (86%)	280 (78%)	61 (17%)	18 (5%)	1	11
5	E	8/13 (62%)	5 (62%)	3 (38%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	G	7/13 (54%)	6 (86%)	1 (14%)	0	100	100
All	All	657/912 (72%)	519 (79%)	112 (17%)	26 (4%)	2	13

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	322	ASP
2	D	125	VAL
2	D	206	PRO
2	D	358	LYS
1	A	334	ARG
2	D	179	ALA
2	D	227	PRO
2	D	262	ILE
2	D	276	GLU
2	D	430	GLN
1	A	335	ASN
2	D	156	LYS
2	D	195	ALA
1	A	208	GLU
1	A	380	SER
2	D	109	ILE
2	D	180	ILE
2	D	201	ILE
2	D	228	LEU
1	A	140	ASP
1	A	317	SER
2	D	463	MET
2	D	476	LEU
1	A	287	PRO
2	D	173	VAL
2	D	322	VAL

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	250/405 (62%)	241 (96%)	9 (4%)	31	62
2	D	322/375 (86%)	306 (95%)	16 (5%)	22	53
5	E	10/13 (77%)	10 (100%)	0	100	100
5	G	9/13 (69%)	9 (100%)	0	100	100
All	All	591/806 (73%)	566 (96%)	25 (4%)	26	58

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	135	CYS
1	A	187	CYS
1	A	313	PHE
1	A	321	LYS
1	A	326	LEU
1	A	367	LEU
1	A	375	LEU
1	A	388	GLU
1	A	417	LYS
2	D	138	THR
2	D	143	LEU
2	D	155	HIS
2	D	185	MET
2	D	187	GLN
2	D	212	ARG
2	D	362	ASP
2	D	365	GLU
2	D	388	ILE
2	D	402	ASN
2	D	411	ASP
2	D	415	GLN
2	D	439	MET
2	D	440	THR
2	D	455	VAL
2	D	470	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	133	HIS
1	A	183	GLN

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Mol	Chain	Res	Type
1	A	185	ASN
1	A	333	HIS
1	A	335	ASN
1	A	411	GLN
2	D	126	HIS
2	D	168	GLN
2	D	177	HIS
2	D	178	ASN
2	D	314	GLN
2	D	345	GLN
2	D	412	ASN
2	D	437	GLN

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](#)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	GW9	D	7123	-	20,20,20	2.18	8 (40%)	25,27,27	2.24	8 (32%)
7	9CR	A	7223	-	22,22,22	4.05	10 (45%)	30,30,30	2.34	11 (36%)

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
8	GW9	D	7123	-	-	1/10/12/12	0/2/2/2
7	9CR	A	7223	-	-	7/15/32/32	0/1/1/1

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	7223	9CR	C1-C6	12.99	1.70	1.53
7	A	7223	9CR	C5-C6	9.03	1.49	1.34
8	D	7123	GW9	C8-C9	4.56	1.45	1.39
7	A	7223	9CR	C2-C1	4.29	1.63	1.54
7	A	7223	9CR	C20-C13	4.24	1.59	1.50
7	A	7223	9CR	C16-C1	3.79	1.60	1.53
7	A	7223	9CR	C4-C5	3.54	1.57	1.51
8	D	7123	GW9	C3-C2	3.40	1.45	1.39
7	A	7223	9CR	C2-C3	3.06	1.59	1.52
8	D	7123	GW9	C9-CL	3.04	1.80	1.73
7	A	7223	9CR	C10-C9	2.80	1.42	1.35
8	D	7123	GW9	C13-C12	2.67	1.43	1.39
8	D	7123	GW9	C13-C8	2.64	1.43	1.39
8	D	7123	GW9	C7-C2	2.35	1.43	1.39
8	D	7123	GW9	C8-C1	2.27	1.54	1.50
7	A	7223	9CR	C14-C13	2.15	1.38	1.35
8	D	7123	GW9	C4-C3	2.06	1.42	1.38
7	A	7223	9CR	C14-C15	2.06	1.53	1.47

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	D	7123	GW9	C9-C8-C1	7.28	134.34	122.56
7	A	7223	9CR	C17-C1-C6	5.29	118.54	110.24
7	A	7223	9CR	C7-C8-C9	4.71	133.20	126.23
7	A	7223	9CR	C19-C9-C10	-4.21	116.00	122.82
7	A	7223	9CR	C20-C13-C12	4.10	124.36	118.09
7	A	7223	9CR	C19-C9-C8	3.72	123.77	118.09
7	A	7223	9CR	C8-C7-C6	3.42	136.13	127.00
7	A	7223	9CR	C1-C6-C5	-3.06	118.46	122.64
8	D	7123	GW9	C8-C1-N1	3.05	122.36	116.03
8	D	7123	GW9	C8-C13-C12	3.00	123.21	120.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	D	7123	GW9	C13-C8-C1	-2.60	109.83	117.21
7	A	7223	9CR	C18-C5-C6	2.53	127.25	124.48
8	D	7123	GW9	C11-C12-N2	2.49	121.51	119.34
8	D	7123	GW9	C3-C2-C7	-2.35	115.93	119.04
7	A	7223	9CR	C4-C5-C6	-2.30	119.60	122.70
7	A	7223	9CR	C7-C6-C5	2.20	126.62	121.56
8	D	7123	GW9	C4-C3-C2	2.20	122.26	119.73
7	A	7223	9CR	C2-C1-C6	2.17	113.59	110.44
8	D	7123	GW9	C3-C2-N1	2.08	127.41	120.41

There are no chirality outliers.

All (8) torsion outliers are listed below:

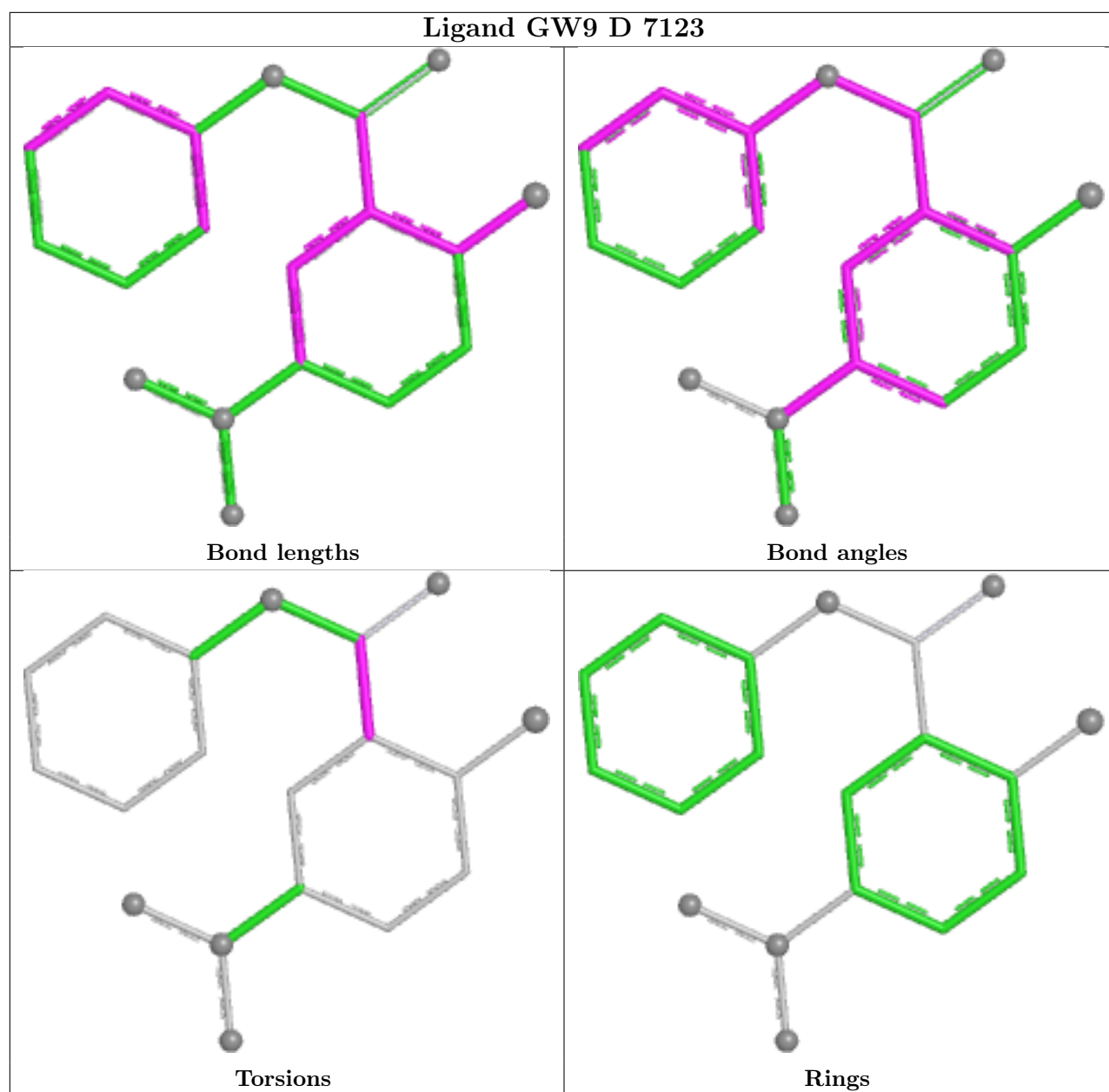
Mol	Chain	Res	Type	Atoms
7	A	7223	9CR	C6-C7-C8-C9
7	A	7223	9CR	C7-C8-C9-C10
7	A	7223	9CR	C7-C8-C9-C19
7	A	7223	9CR	C13-C14-C15-O2
7	A	7223	9CR	C13-C14-C15-O1
7	A	7223	9CR	C11-C10-C9-C19
7	A	7223	9CR	C11-C10-C9-C8
8	D	7123	GW9	N1-C1-C8-C9

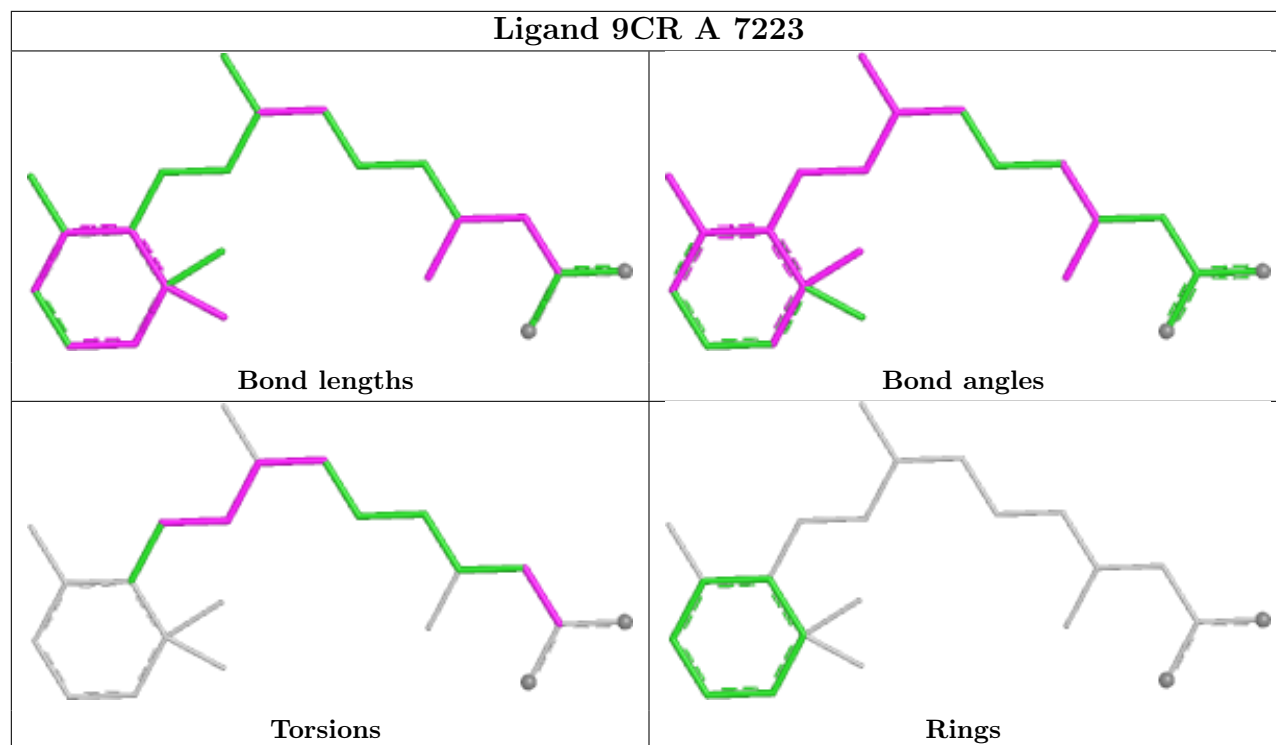
There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	7223	9CR	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





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 [i](#)

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

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	289/467 (61%)	-0.21	1 (0%) 90 80	32, 81, 140, 196	0
2	D	363/419 (86%)	-0.15	4 (1%) 78 59	40, 82, 151, 205	0
3	C	20/20 (100%)	-0.08	0 100 100	60, 82, 102, 110	0
4	F	20/20 (100%)	-0.18	0 100 100	56, 80, 95, 110	0
5	E	10/13 (76%)	-0.06	0 100 100	60, 82, 137, 163	0
5	G	9/13 (69%)	0.05	0 100 100	89, 103, 150, 169	0
All	All	711/952 (74%)	-0.17	5 (0%) 84 68	32, 82, 147, 205	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	264	PHE	4.1
1	A	330	LEU	2.4
2	D	124	GLY	2.4
2	D	182	PHE	2.3
2	D	282	PHE	2.1

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](#)

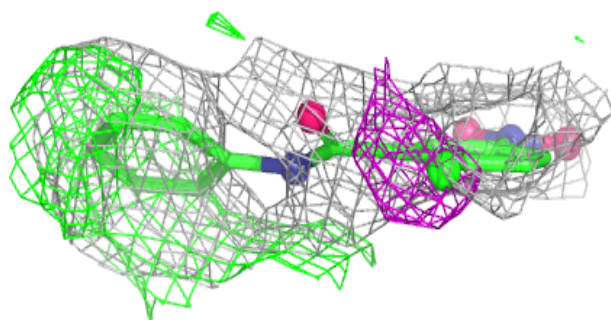
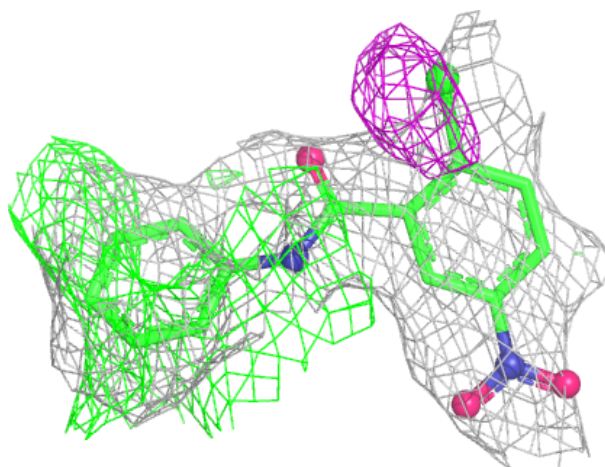
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

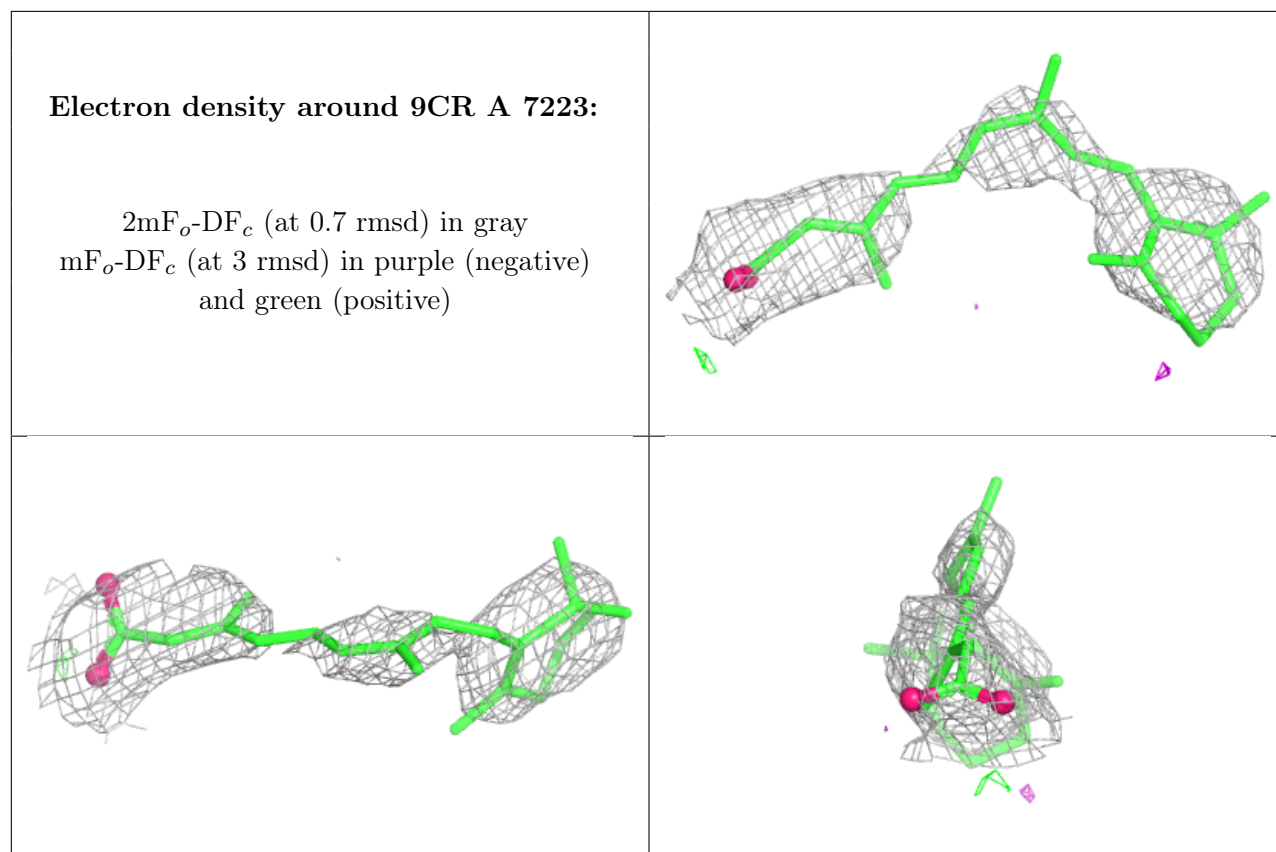
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
8	GW9	D	7123	19/19	0.62	0.29	111,111,111,111	0
7	9CR	A	7223	22/22	0.95	0.18	81,99,108,109	0
6	ZN	D	7122	1/1	0.99	0.03	83,83,83,83	0
6	ZN	A	7221	1/1	1.00	0.06	80,80,80,80	0
6	ZN	A	7222	1/1	1.00	0.05	69,69,69,69	0
6	ZN	D	7121	1/1	1.00	0.04	81,81,81,81	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around GW9 D 7123:

2mF_o-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





6.5 Other polymers [i](#)

There are no such residues in this entry.