



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 29, 2023 – 03:24 AM EDT

PDB ID : 3NBY
Title : Crystal structure of the PKI NES-CRM1-RanGTP nuclear export complex
Authors : Guttler, T.; Madl, T.; Neumann, P.; Deichsel, D.; Corsini, L.; Monecke, T.;
Ficner, R.; Sattler, M.; Gorlich, D.
Deposited on : 2010-06-04
Resolution : 3.42 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35
buster-report : 1.1.7 (2018)
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) : 2.35

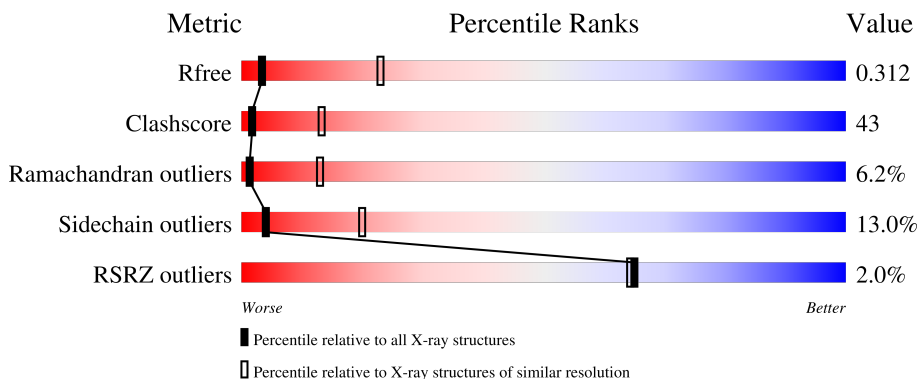
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.42 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}	130704	1486 (3.50-3.34)
Clashscore	141614	1572 (3.50-3.34)
Ramachandran outliers	138981	1534 (3.50-3.34)
Sidechain outliers	138945	1535 (3.50-3.34)
RSRZ outliers	127900	1395 (3.50-3.34)

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	B	361	 22% 40% 12% 2% 25%
1	E	361	 30% 36% 10% 2% 23%
2	C	176	 35% 52% 9% 2%
2	F	176	 39% 46% 11% 2%
3	A	1073	 33% 52% 11% 2%

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Mol	Chain	Length	Quality of chain
3	D	1073	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a small red segment (3%), a green segment (32%), a yellow segment (53%), and a small orange segment (11%). The segments are labeled with their respective percentages below the bar.</p>

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 24084 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 Snurportin-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	272	2193	1398	376	405	14	0	0	0
1	E	277	2221	1416	380	410	15	0	0	0

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-1	GLY	-	expression tag	UNP O95149
B	0	SER	-	expression tag	UNP O95149
B	1	LEU	-	expression tag	UNP O95149
B	2	ASN	-	expression tag	UNP O95149
B	3	GLU	-	expression tag	UNP O95149
B	4	LEU	-	expression tag	UNP O95149
B	5	ALA	-	expression tag	UNP O95149
B	6	LEU	-	expression tag	UNP O95149
B	7	LYS	-	expression tag	UNP O95149
B	8	LEU	-	expression tag	UNP O95149
B	9	ALA	-	expression tag	UNP O95149
B	10	GLY	-	expression tag	UNP O95149
B	11	LEU	-	expression tag	UNP O95149
B	12	ASP	-	expression tag	UNP O95149
B	13	ILE	-	expression tag	UNP O95149
E	-1	GLY	-	expression tag	UNP O95149
E	0	SER	-	expression tag	UNP O95149
E	1	LEU	-	expression tag	UNP O95149
E	2	ASN	-	expression tag	UNP O95149
E	3	GLU	-	expression tag	UNP O95149
E	4	LEU	-	expression tag	UNP O95149
E	5	ALA	-	expression tag	UNP O95149
E	6	LEU	-	expression tag	UNP O95149
E	7	LYS	-	expression tag	UNP O95149
E	8	LEU	-	expression tag	UNP O95149

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Chain	Residue	Modelled	Actual	Comment	Reference
E	9	ALA	-	expression tag	UNP O95149
E	10	GLY	-	expression tag	UNP O95149
E	11	LEU	-	expression tag	UNP O95149
E	12	ASP	-	expression tag	UNP O95149
E	13	ILE	-	expression tag	UNP O95149

- Molecule 2 is a protein called GTP-binding nuclear protein Ran.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	171	Total	C	N	O	S	0	0	0
			1389	904	243	237	5			
2	F	171	Total	C	N	O	S	0	0	0
			1389	904	243	237	5			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	69	LEU	GLN	engineered mutation	UNP P62826
F	69	LEU	GLN	engineered mutation	UNP P62826

- Molecule 3 is a protein called Exportin-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	1041	Total	C	N	O	S	0	0	0
			8413	5397	1413	1549	54			
3	D	1041	Total	C	N	O	S	0	0	0
			8413	5397	1413	1549	54			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP Q6P5F9
A	0	SER	-	expression tag	UNP Q6P5F9
D	-1	GLY	-	expression tag	UNP Q6P5F9
D	0	SER	-	expression tag	UNP Q6P5F9

- Molecule 4 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
4	C	1	32	10	5	14	3	0	0
4	F	1	32	10	5	14	3	0	0

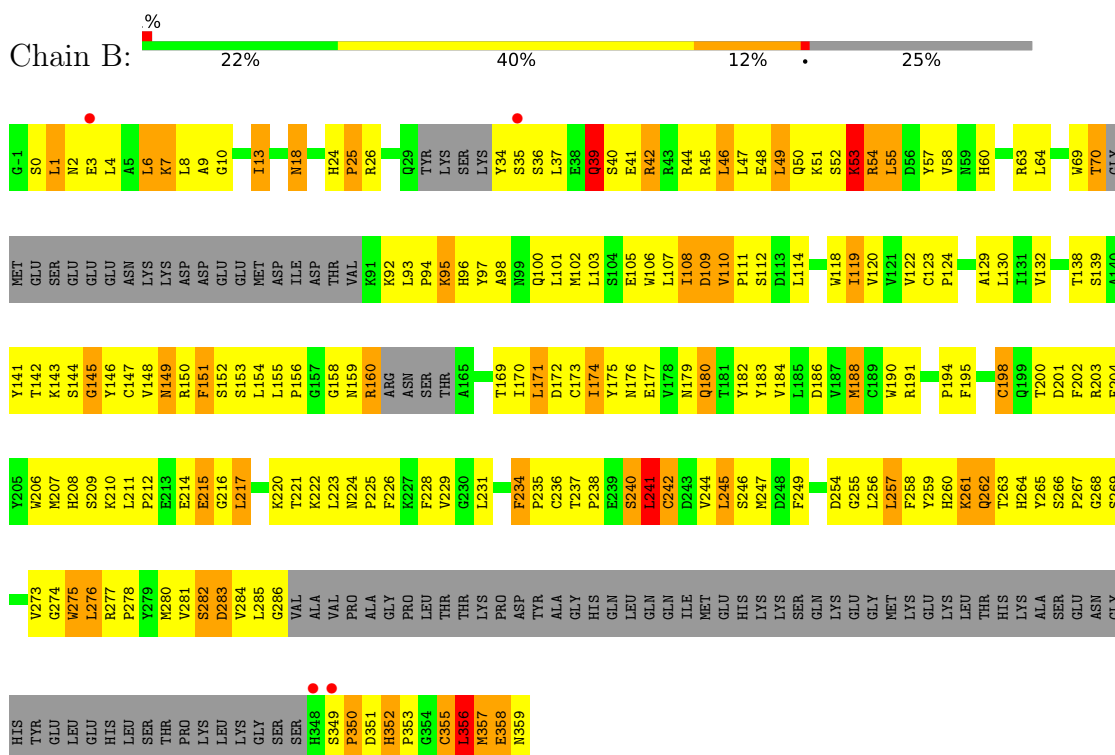
- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
5	C	1	1	1	0	0
5	F	1	1	1	0	0

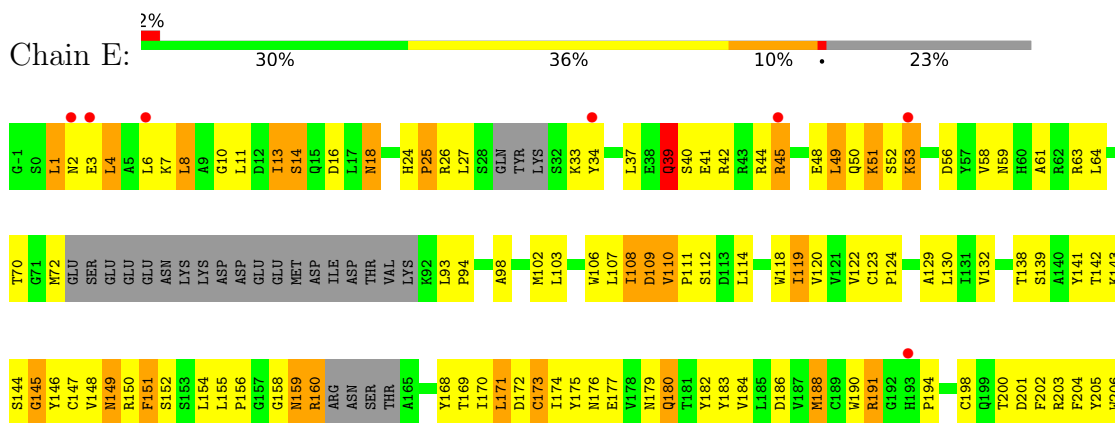
3 Residue-property plots [i](#)

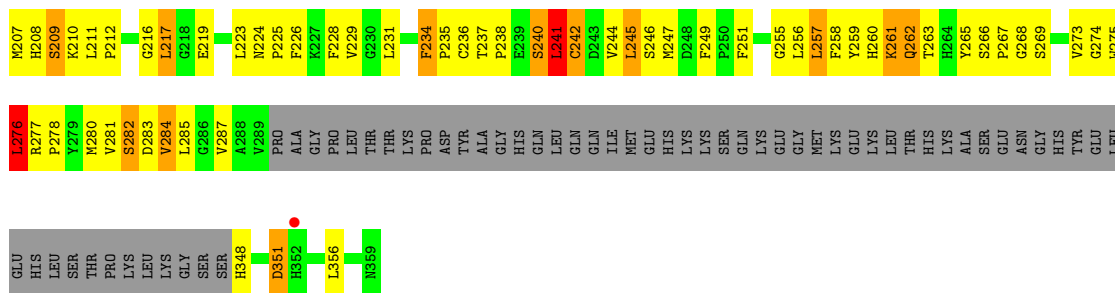
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Snurportin-1

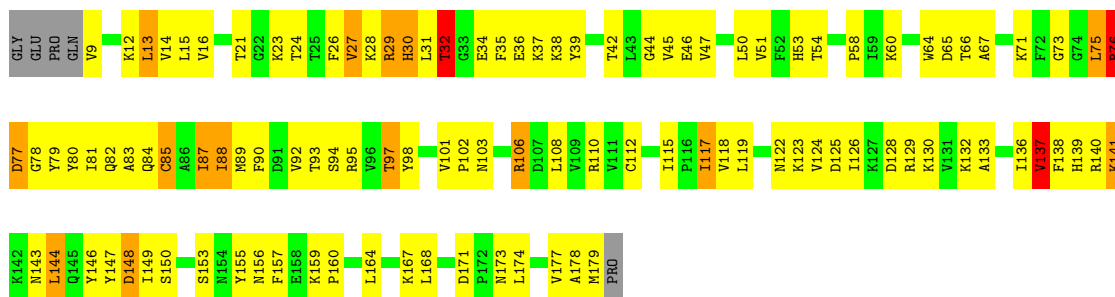


- Molecule 1: Snurportin-1





• Molecule 2: GTP-binding nuclear protein Ran



A1036	A1028	D1029	T1030	S1031	I032	L1033	F1034	L1035	E1036	E1037	R1038	A1041	L1042	R1043	Q1044	E1047	E1048	K1049	H1050	K1051	L1052	Q1053	R1054	S1055	VAL	PRO	GLY	ILE	LEU	ASN	PRO	HIS	GLU	ILE	PRO	GLU	GLU	MET	CYS	ASP	R62	V63	D64	T65	I66	LEU	GLU	PHE	S70	R71	N72	M73	N74	T75	K76	Y77	G78	G79	L80	Q81	I82	R80	W91	K92	L93	L94	P95	R96	N97	Q98	C99	E100	E101	I102	K103	K104	Y105	V106	V107	G108	L109	I110	I111	K112	T113	D116	P117	T118	C119	V120	E121	K122	E123	K124	V125	Y126	I127	K128	K129	K130	N131	M132	I133	L134	V135	Q136	I137	M138	K139	Q140	E141	M142	P143	K144	H145	W146	P147	T148	F149	I150	S151	D152	L153	V154	G155	A156	S157	L158	L159	S160	F232	L233	E161	S162	L163	C164	Q165	N166	M167	N301	Y240	N303	M168	V169	I170	L171	K172	S175	E176	E177	F179	I186	T187	F254	Q188	M189	K190	A191	M259	F260	S387	N261	V263	S264	L265	K266	C267	E201	F202	E270	I271	A272	L208	C209	G273	E280	E281	P220	L221	Q282	F283	E284	T285	L286	F287	E227	L228	L229	L230	F232	L233	N234	W235	L238	G239	Y240	T302	N303	L241	F242	E243	L244	K245	A307	Y308	K312	D313	T249	L250	L251	Y252	N317	F318	L255	M256	L324	F325	L326	C327	F328	F329	L330	K331	E332	H333	G334	Q335	L336	L337	R340	L341	N342	G343	L344	L347	M348	E349	A350	L351	H352	Y353	L356	E362	T363	E364	I365	F366	Q367	I368	E371	Y372	N373	N374	H375	L376	A377	A378	E379	L380	A307	Y381	L246	Y382	E383	S384	M457	R458	E459	T460	S389	A390	S391	P392	L393	L394	T465	G396	Q398	H399	F400	D401	L402	P403	R404	R405	R406	Q407	L408	Y409	R417	M420	S422	R423	M424	A425	K426	P427	E428	E429	W429	V430	L431	V432	W433	W434	E434	N435	D436	Q437	I368	E438	E439	V440	D512	E513	K514	R515	F516	F517	L517	V518	F519	V520	I451	N452	K522	L525	G526	L527	C528	T460	O529	O530	K531	B606	V607	F610	L611	D612	E613	L614	L615	N616	N617	L618	N619	L620	L621	L622	C623	D624	L625	P626	F627	F628	P629	V630	L631	H631	F705	F706	F633	L634	L635	L636	L637	L638	L639	L640	L641	L642	L643	L644	L645	L646	L647	Q650	E651	L652	L653	L654	L655	L656	L657	L658	L659	L660	P661	N662	O593	S667	L668	Q671	A672	V600	N675	L676	D677	L678	L679	K680	D681	F682	E683	T684	Q687	L689	L690	L691	L692	K693	T694	N695	N696	R697	W698	A701	W702	S703	H704	T632	F705	F706	W707	L708	Q709	R712	W784	L715	N640	D716	M717	L718	N719	W720	W721	K722	G723	L724	S729	A730	L732	Q733	G736	E737	N738	W739	P743	L744	L745	R746	S747	R748	R749	T750	W751	K752	R753	E754	T755	L759	W762	W763	S766	N767	D768	F769	Y841	R842	E843	H844	R845	T846	R847	F848	F849	L850	L851	L852	Q853	R854	L855	N856	S857	H858	C859	F860	P861	A865	L866	P867	K870	F871	K872	L873	N874	L875	D876	S877	L878	L879	M880	A881	F882	T885	N886	R887	H888	W889	A890	D891	T892	Q893	L894	Q895	N903	N904	A911	Q912	Q913	F914	Y915	Y916	Y917	Y918	Y919	Y920	Y921	Y922	L923	Q924	H925	F926	F927	F928	P861	A865	L866	P867	K870	F871	K872	L873	N874	L875	D876	S877	L878	L879	M880	A881	F882	T885	N886	R887	H888	W889	A890	E954	E955	I956	S959	T960	P961	L962	N963	P964	G965	N966	Q967	V968	N969	N970	Q971	N972	F973	I974	Q975	F914	Y915	Y916	Y917	Y918	Y919	Y920	Y921	Y922	L923	Q924	H925	F926	F927	F928	P861	A865	L866	P867	K870	F871	K872	L873	N874	L875	D876	S877	L878	L879	M880	A881	F882	T885	N886	R887	H888	W889	A890	E954	E955	I956	S959	T960	P961	L962	N963	P964	G965	N966	Q967	V968	N969	N970	Q971	N972	F973	I974	Q975	F914	Y915	Y916	Y917	Y918	Y919	Y920	Y921	Y922	L923	Q924	H925	F926	F927	F928	P861	A865	L866	P867	K870	F871	K872	L873	N874	L875	D876	S877	L878	L879	M880	A881	F882	T885	N886	R887	H888	W889	A890
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4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	72.09Å 223.73Å 163.06Å 90.00° 100.63° 90.00°	Depositor
Resolution (Å)	38.63 – 3.42 38.63 – 2.95	Depositor EDS
% Data completeness (in resolution range)	99.7 (38.63-3.42) 88.9 (38.63-2.95)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.80 (at 2.95Å)	Xtrriage
Refinement program	PHENIX 1.6.1_357	Depositor
R, R_{free}	0.258 , 0.315 0.257 , 0.312	Depositor DCC
R_{free} test set	5238 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	37.9	Xtrriage
Anisotropy	0.412	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 6.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.26$	Xtrriage
Estimated twinning fraction	0.115 for h,-k,-h-l	Xtrriage
F_o, F_c correlation	0.82	EDS
Total number of atoms	24084	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.75% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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	B	0.62	0/2250	0.85	3/3046 (0.1%)
1	E	0.59	1/2278 (0.0%)	0.81	4/3084 (0.1%)
2	C	0.58	0/1423	0.74	0/1921
2	F	0.57	0/1423	0.74	1/1921 (0.1%)
3	A	0.56	2/8584 (0.0%)	0.73	1/11627 (0.0%)
3	D	0.57	0/8584	0.74	0/11627
All	All	0.58	3/24542 (0.0%)	0.76	9/33226 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	173	CYS	CB-SG	-5.71	1.72	1.81
3	A	491	TRP	NE1-CE2	5.53	1.44	1.37
3	A	528	CYS	CB-SG	-5.08	1.73	1.81

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	E	42	ARG	NE-CZ-NH1	-11.62	114.49	120.30
1	B	42	ARG	NE-CZ-NH2	-11.22	114.69	120.30
1	B	42	ARG	NE-CZ-NH1	10.86	125.73	120.30
1	E	42	ARG	NE-CZ-NH2	10.83	125.72	120.30
2	F	31	LEU	CA-CB-CG	5.93	128.93	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	2193	0	2138	241	0
1	E	2221	0	2170	208	0
2	C	1389	0	1419	128	0
2	F	1389	0	1419	121	0
3	A	8413	0	8480	753	0
3	D	8413	0	8480	731	0
4	C	32	0	12	8	0
4	F	32	0	12	0	0
5	C	1	0	0	0	0
5	F	1	0	0	0	0
All	All	24084	0	24130	2091	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 43.

The worst 5 of 2091 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)
3:A:328:THR:HA	3:A:331:LYS:HD3	1.27	1.14
3:D:328:THR:HA	3:D:331:LYS:HD3	1.33	1.09
3:D:961:PRO:HG2	3:D:973:PHE:HD2	1.16	1.09
1:B:3:GLU:O	1:B:7:LYS:HB2	1.53	1.07
3:D:996:LEU:HD13	3:D:1035:LEU:HD12	1.37	1.06

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	B	262/361 (73%)	206 (79%)	38 (14%)	18 (7%)	1	11
1	E	267/361 (74%)	211 (79%)	39 (15%)	17 (6%)	1	12
2	C	169/176 (96%)	139 (82%)	23 (14%)	7 (4%)	3	22
2	F	169/176 (96%)	138 (82%)	24 (14%)	7 (4%)	3	22
3	A	1037/1073 (97%)	760 (73%)	206 (20%)	71 (7%)	1	11
3	D	1037/1073 (97%)	755 (73%)	220 (21%)	62 (6%)	1	13
All	All	2941/3220 (91%)	2209 (75%)	550 (19%)	182 (6%)	1	13

5 of 182 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	39	GLN
1	B	145	GLY
1	B	180	GLN
1	B	217	LEU
2	C	76	ARG

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	B	244/323 (76%)	199 (82%)	45 (18%)	1	7
1	E	247/323 (76%)	210 (85%)	37 (15%)	3	15
2	C	150/154 (97%)	129 (86%)	21 (14%)	3	17
2	F	150/154 (97%)	125 (83%)	25 (17%)	2	10
3	A	945/973 (97%)	838 (89%)	107 (11%)	6	25
3	D	945/973 (97%)	831 (88%)	114 (12%)	5	23
All	All	2681/2900 (92%)	2332 (87%)	349 (13%)	4	20

5 of 349 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	F	137	VAL
3	D	401	ASP
3	D	23	LEU
3	D	189	VAL
3	D	515	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 101 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	208	HIS
3	D	223	HIS
3	D	1006	GLN
1	E	262	GLN
3	D	47	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 2 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
4	GTP	F	217	5	26,34,34	1.13	2 (7%)	32,54,54	1.73	6 (18%)
4	GTP	C	217	5	26,34,34	1.00	2 (7%)	32,54,54	1.75	8 (25%)

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	GTP	F	217	5	-	1/18/38/38	0/3/3/3
4	GTP	C	217	5	-	9/18/38/38	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	F	217	GTP	C5-C6	-3.70	1.39	1.47
4	C	217	GTP	C2-N3	2.31	1.38	1.33
4	C	217	GTP	C5-C6	-2.26	1.42	1.47
4	F	217	GTP	C2-N3	2.01	1.38	1.33

The worst 5 of 14 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	F	217	GTP	PA-O3A-PB	-4.73	116.60	132.83
4	C	217	GTP	PA-O3A-PB	-4.34	117.93	132.83
4	C	217	GTP	C8-N7-C5	4.01	110.63	102.99
4	F	217	GTP	PB-O3B-PG	-3.64	120.32	132.83
4	F	217	GTP	C8-N7-C5	3.37	109.41	102.99

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

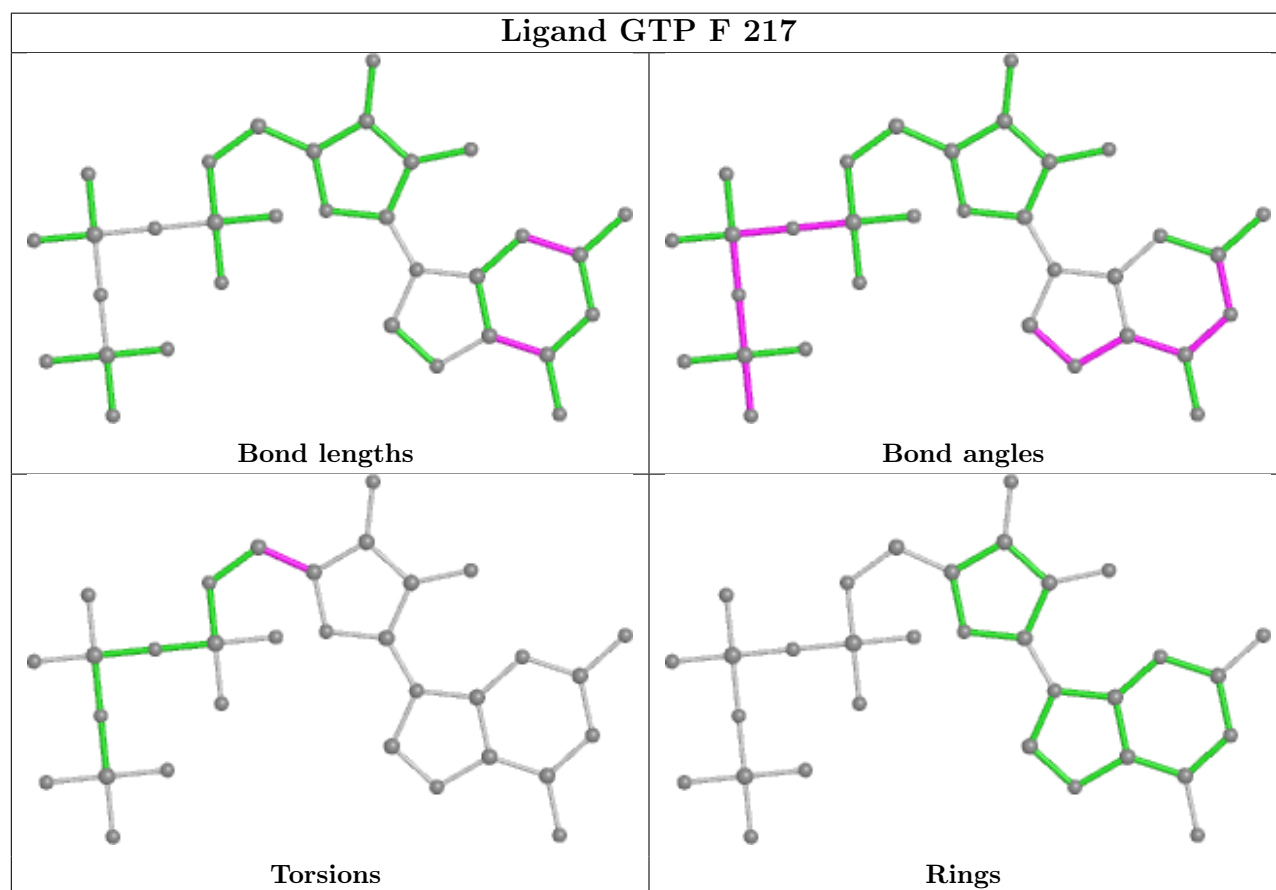
Mol	Chain	Res	Type	Atoms
4	C	217	GTP	PB-O3B-PG-O3G
4	C	217	GTP	C5'-O5'-PA-O1A
4	C	217	GTP	C5'-O5'-PA-O2A
4	C	217	GTP	C3'-C4'-C5'-O5'
4	C	217	GTP	O4'-C4'-C5'-O5'

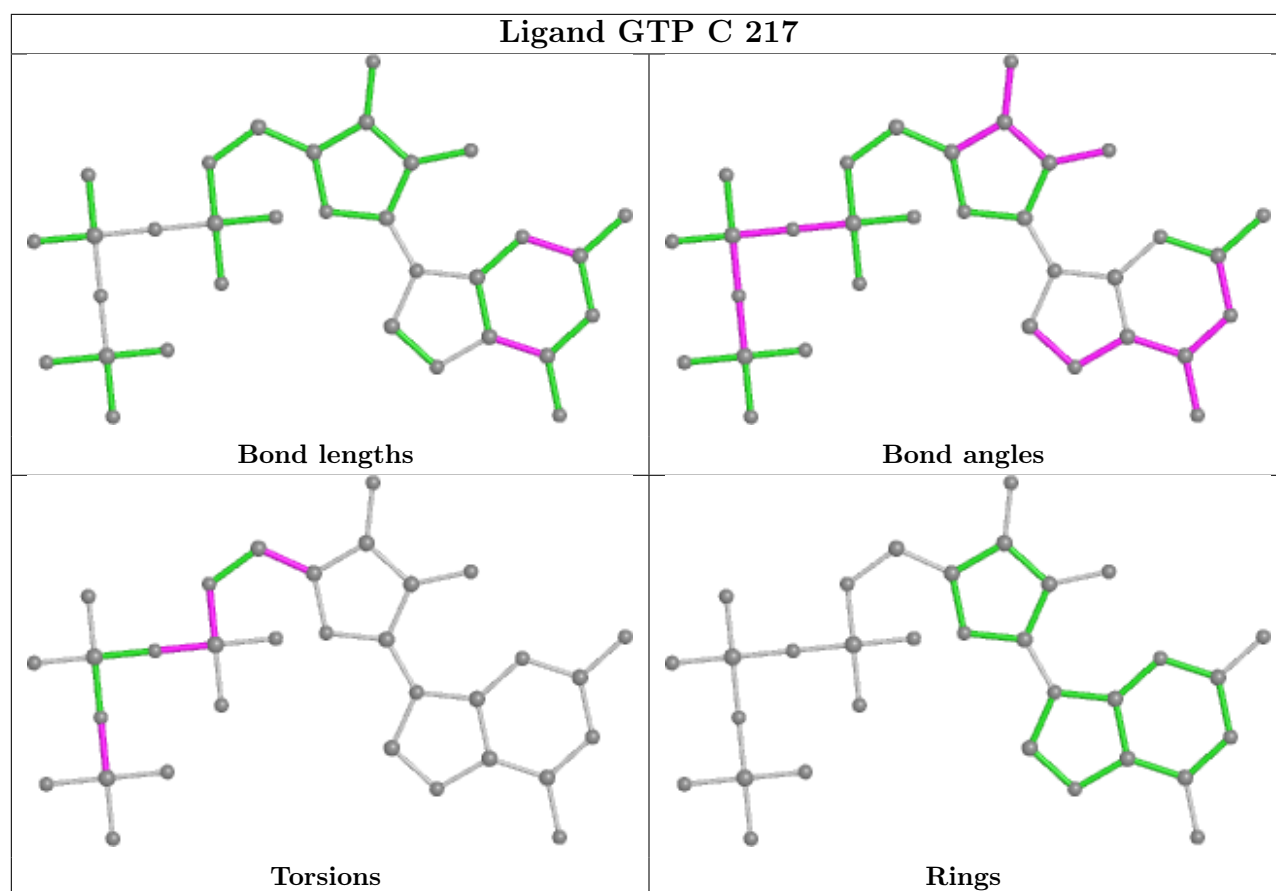
There are no ring outliers.

1 monomer is involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	217	GTP	8	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	B	272/361 (75%)	-0.02	4 (1%) 73 72	7, 30, 72, 91	4 (1%)
1	E	277/361 (76%)	0.02	8 (2%) 51 50	7, 30, 80, 111	7 (2%)
2	C	171/176 (97%)	-0.14	0 100 100	10, 28, 58, 84	1 (0%)
2	F	171/176 (97%)	-0.25	0 100 100	10, 27, 56, 80	0
3	A	1041/1073 (97%)	-0.01	19 (1%) 68 67	4, 35, 90, 141	6 (0%)
3	D	1041/1073 (97%)	0.01	28 (2%) 54 53	5, 35, 89, 147	13 (1%)
All	All	2973/3220 (92%)	-0.02	59 (1%) 65 64	4, 32, 85, 147	31 (1%)

The worst 5 of 59 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	D	70	SER	8.6
3	A	967	PRO	8.5
3	A	966	ASN	7.5
3	D	966	ASN	5.2
3	D	397	SER	5.0

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

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

6.3 Carbohydrates [i](#)

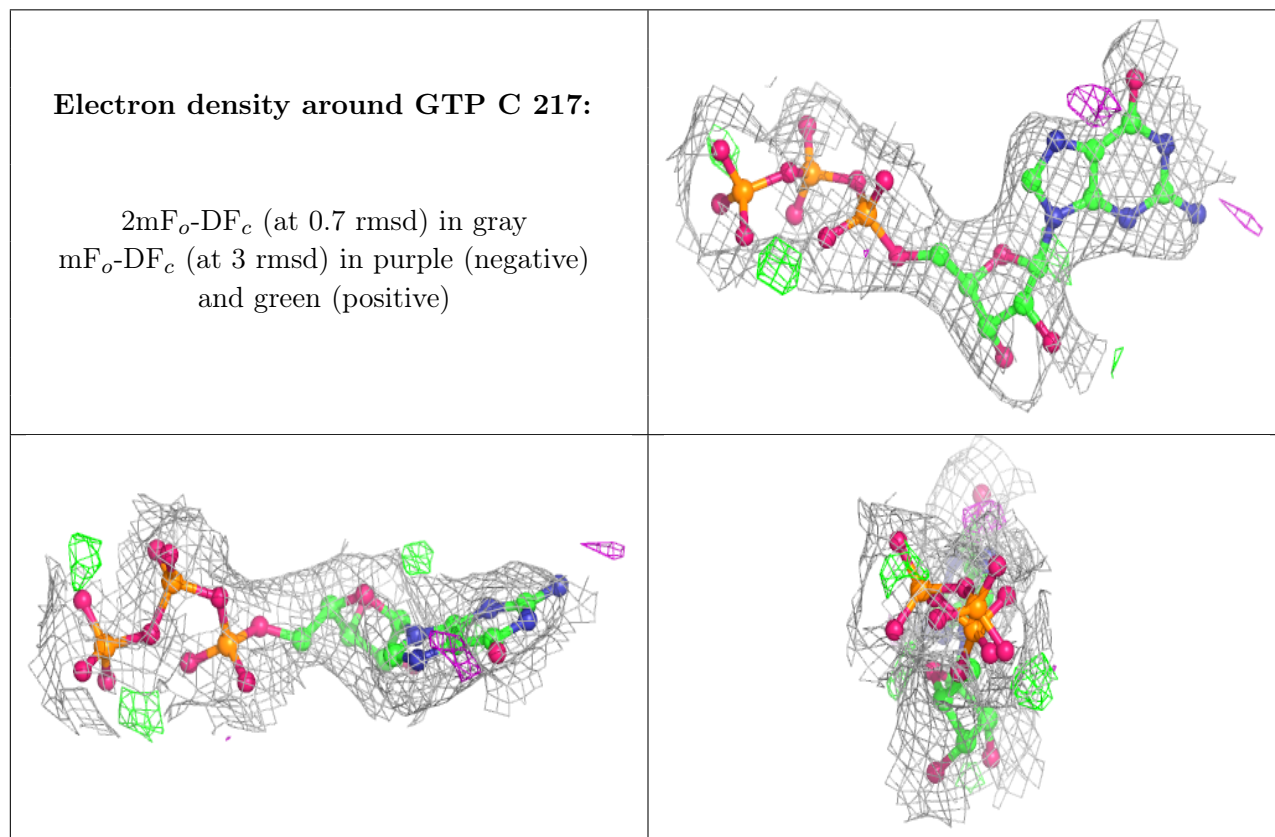
There are no monosaccharides in this entry.

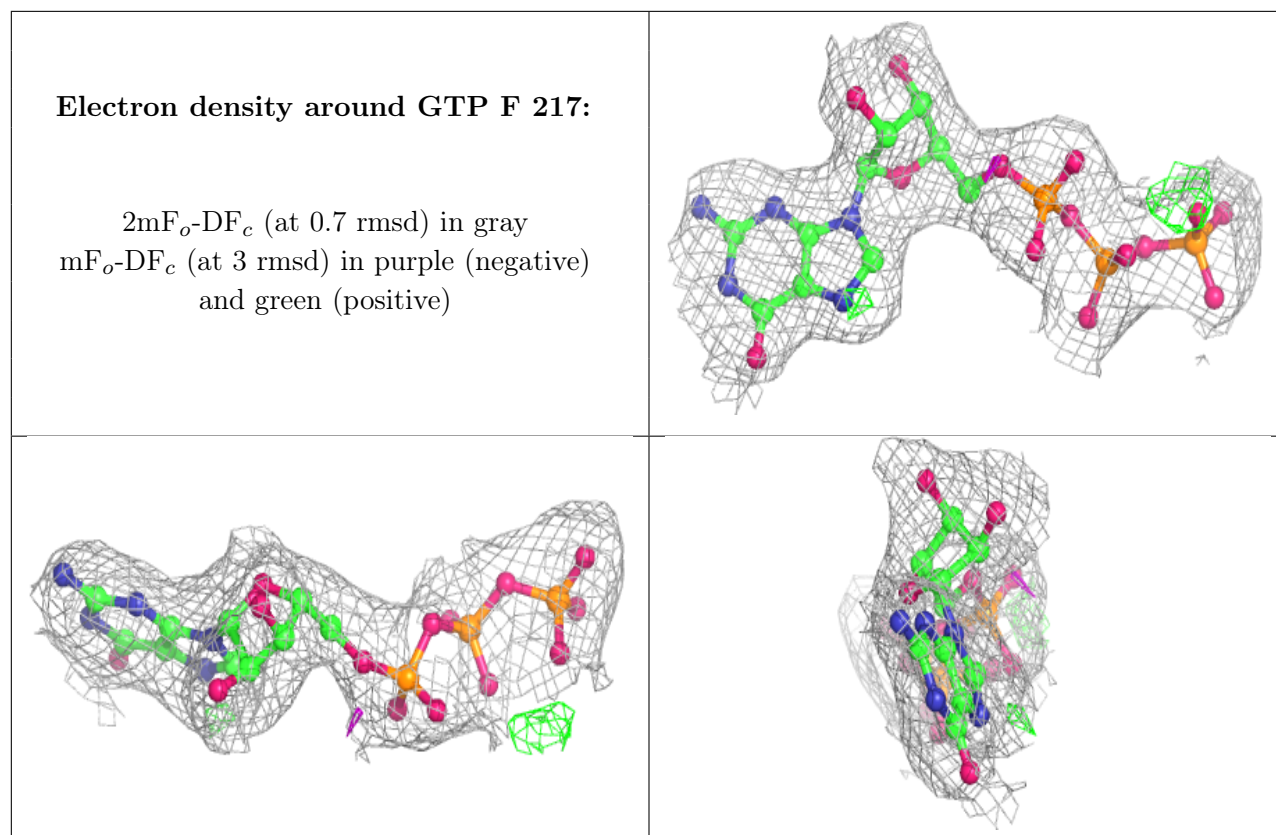
6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	GTP	C	217	32/32	0.94	0.19	10,21,47,63	0
4	GTP	F	217	32/32	0.96	0.17	7,18,30,35	0
5	MG	C	218	1/1	0.96	0.19	0,0,0,0	0
5	MG	F	218	1/1	0.96	0.13	6,6,6,6	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.





6.5 Other polymers [i](#)

There are no such residues in this entry.