WORLDWIDE PDB

PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

May 2, 2023 – 01:34 pm BST

PDB ID	:	8OV2
Title	:	SARS-CoV-2 nsp10-16 methyltransferase in complex with Sangivamycin
Authors	:	Kremling, V.; Sprenger, J.; Oberthuer, D.
Deposited on	:	2023-04-25
Resolution	:	1.86 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	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.32.2
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)	:	2.32.2

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 1.86 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.
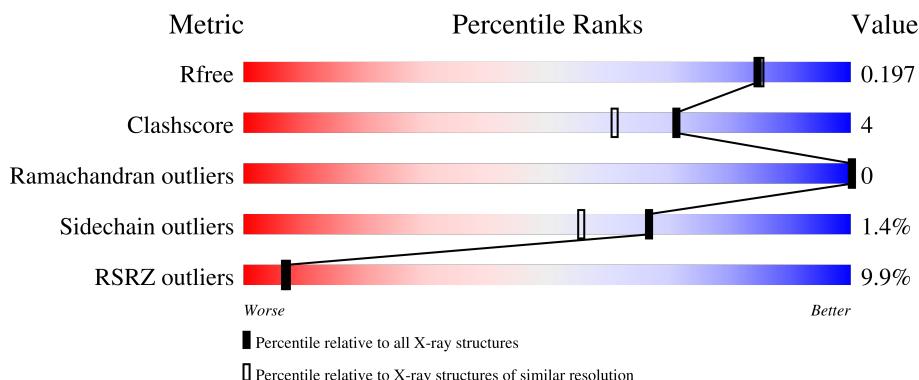
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2469 (1.86-1.86)
Clashscore	141614	2625 (1.86-1.86)
Ramachandran outliers	138981	2592 (1.86-1.86)
Sidechain outliers	138945	2592 (1.86-1.86)
RSRZ outliers	127900	2436 (1.86-1.86)

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	304	3% / 90% / 8% ··
2	B	140	22% / 76% / 5% · / 19%
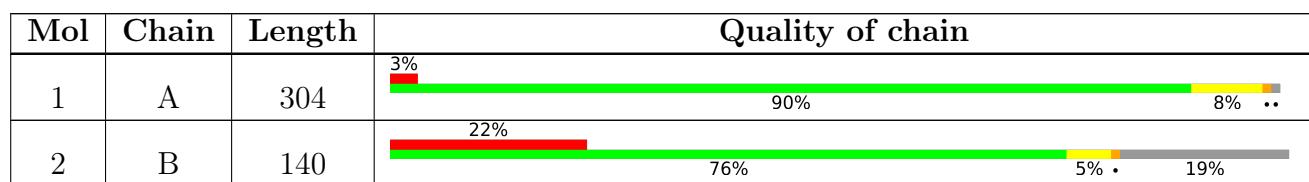
2 Entry composition ⓘ

There are 7 unique types of molecules in this entry. The entry contains 7009 atoms, of which 3358 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 2'-O-methyltransferase nsp16.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	301	Total 4830	C 1548	H 2396	N 408	O 461	S 17	0	9	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	7097	GLU	-	expression tag	UNP P0DTD1
A	7098	ASN	-	expression tag	UNP P0DTD1
A	7099	LEU	-	expression tag	UNP P0DTD1
A	7100	TYR	-	expression tag	UNP P0DTD1
A	7101	PHE	-	expression tag	UNP P0DTD1
A	7102	GLN	-	expression tag	UNP P0DTD1

- Molecule 2 is a protein called Non-structural protein 10.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	114	Total 1645	C 524	H 802	N 142	O 162	S 15	0	1	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	4253	GLY	-	expression tag	UNP P0DTD1

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).

EDO

O2
OH

C1

C2

HO

O1

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0

W O R L D W I D E
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	A	1	Total 10	C 2	H 6	O 2	0	0
3	B	1	Total 10	C 2	H 6	O 2	0	0

- Molecule 4 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: $C_6H_{13}NO_4S$).
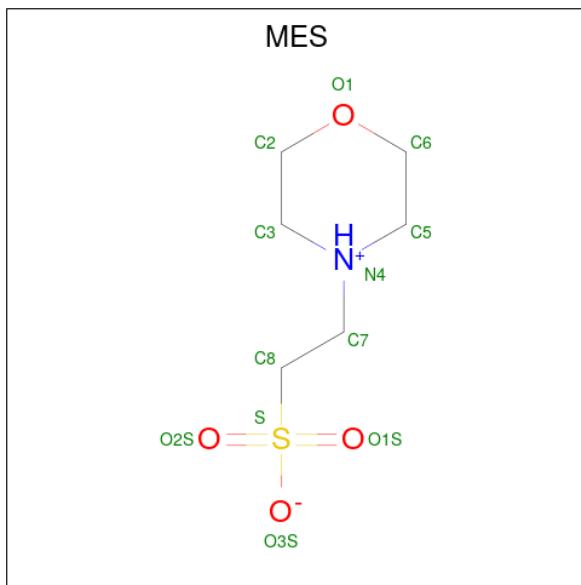
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	A	1	Total 25	C 6	H 13	N 1	O 4	S 1	0	0

- Molecule 5 is SANGIVAMYCIN (three-letter code: SGV) (formula: $C_{12}H_{15}N_5O_5$) (labeled as "Ligand of Interest" by depositor).
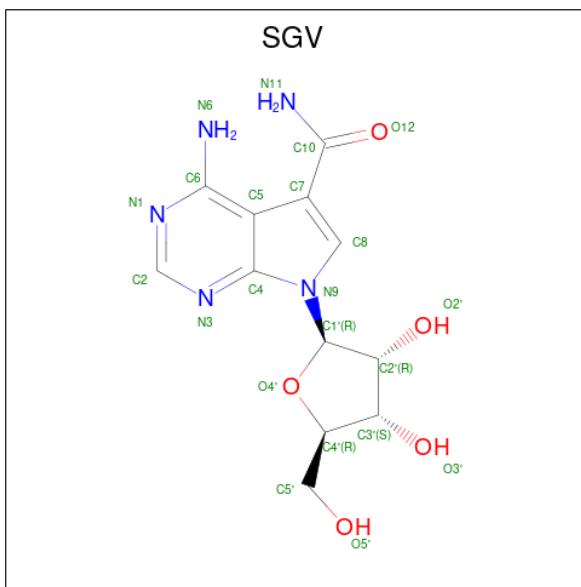
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total 37	C 12	H 15	N 5	O 5	0	0

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 7 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	199	Total 199	O 199	0	0
7	B	51	Total 51	O 51	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: 2'-O-methyltransferase nsp16

Chain A:
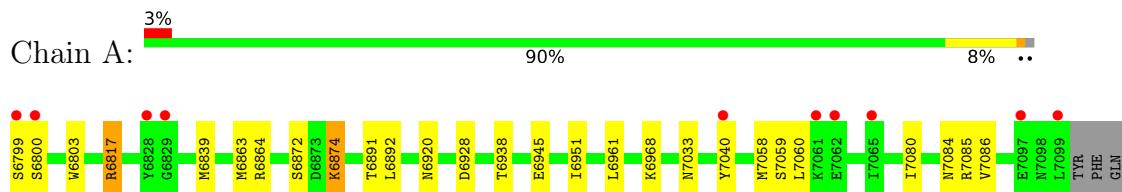
• Molecule 2: Non-structural protein 10

Chain B:
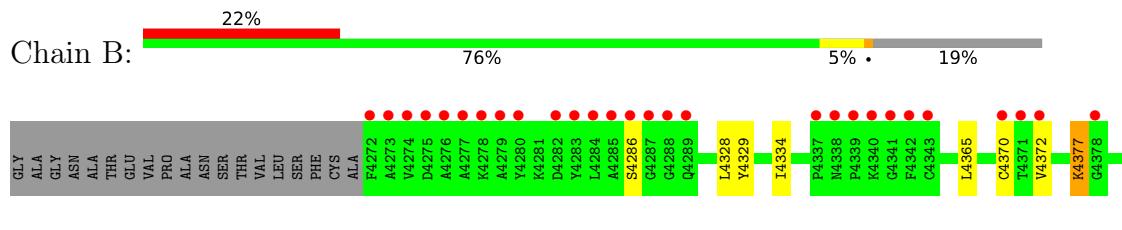
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	168.02Å 168.02Å 51.58Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.62 – 1.86 48.62 – 1.86	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.62-1.86) 100.0 (48.62-1.86)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.50 (at 1.86Å)	Xtriage
Refinement program	PHENIX 1.07	Depositor
R, R_{free}	0.177 , 0.198 0.177 , 0.197	Depositor DCC
R_{free} test set	734 reflections (1.05%)	wwPDB-VP
Wilson B-factor (Å^2)	35.6	Xtriage
Anisotropy	0.107	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.38 , 46.0	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.022 for -h,-k,l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	7009	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.03% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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: ZN, SGV, EDO, MES

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	0.52	0/2492	0.68	0/3380
2	B	0.45	0/868	0.64	0/1177
All	All	0.51	0/3360	0.67	0/4557

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	2434	2396	2392	17	1
2	B	843	802	796	6	0
3	A	84	126	126	1	1
3	B	4	6	6	0	0
4	A	12	13	13	0	0
5	A	22	15	14	1	0
6	B	2	0	0	0	0
7	A	199	0	0	1	0
7	B	51	0	0	1	0
All	All	3651	3358	3347	24	1

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 4.

All (24) 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)
5:A:7222:SGV:HN6A	5:A:7222:SGV:HN11	1.26	0.82
1:A:7058:MET:CE	1:A:7060:LEU:HD11	2.21	0.70
1:A:6863:MET:HB3	1:A:6891:THR:HG23	1.80	0.62
2:B:4328:LEU:HD22	2:B:4365:LEU:HD11	1.83	0.59
1:A:6864:ARG:NH2	1:A:7084:ASN:O	2.37	0.58
1:A:6920[A]:ASN:ND2	1:A:7085:ARG:O	2.37	0.57
2:B:4370:CYS:HB2	2:B:4377:LYS:HD3	1.88	0.55
2:B:4370:CYS:SG	2:B:4372:VAL:HG12	2.51	0.51
1:A:6928:ASP:OD1	1:A:6968[B]:LYS:HD3	2.11	0.50
1:A:6945[B]:GLU:OE2	7:A:7301:HOH:O	2.20	0.49
1:A:6872:SER:HB2	1:A:6874:LYS:HD2	1.96	0.48
1:A:6892:LEU:HD12	1:A:7086:VAL:HG21	1.97	0.46
1:A:6803:TRP:HA	1:A:7040[B]:TYR:CD2	2.52	0.45
1:A:6803:TRP:HD1	1:A:7040[B]:TYR:CZ	2.35	0.45
1:A:6961:LEU:HB2	1:A:7080:ILE:HB	1.99	0.45
1:A:6839:MET:HG3	7:B:4507:HOH:O	2.17	0.44
2:B:4329:TYR:HA	2:B:4334:ILE:HG12	2.01	0.43
2:B:4370:CYS:SG	2:B:4372:VAL:CG1	3.07	0.42
2:B:4377:LYS:HD2	2:B:4377:LYS:HA	1.93	0.42
1:A:7033:ASN:OD1	3:A:7217:EDO:H22	2.20	0.41
1:A:6951:ILE:HD13	1:A:6951:ILE:HA	1.96	0.41
1:A:6817:ARG:HE	1:A:6817:ARG:HB3	1.69	0.41
1:A:6872:SER:CB	1:A:6874:LYS:HD2	2.50	0.41
1:A:6799:SER:O	1:A:6800:SER:CB	2.69	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:6938:THR:O	3:A:7201:EDO:HO2[1_556]	1.54	0.06

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	308/304 (101%)	301 (98%)	7 (2%)	0	100	100
2	B	113/140 (81%)	110 (97%)	3 (3%)	0	100	100
All	All	421/444 (95%)	411 (98%)	10 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	270/264 (102%)	267 (99%)	3 (1%)	73	65
2	B	94/113 (83%)	92 (98%)	2 (2%)	53	38
All	All	364/377 (97%)	359 (99%)	5 (1%)	67	55

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6817	ARG
1	A	6874	LYS
1	A	7059	SER
2	B	4286	SER
2	B	4377	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	6826	GLN
1	A	6827	ASN

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 ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 26 ligands modelled in this entry, 2 are monoatomic - leaving 24 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	#$|Z| > 2$
3	EDO	A	7216	-	3,3,3	0.52	0	2,2,2	0.27	0
3	EDO	A	7209	-	3,3,3	0.50	0	2,2,2	0.48	0
3	EDO	A	7218	-	3,3,3	0.61	0	2,2,2	0.14	0
3	EDO	A	7210	-	3,3,3	0.59	0	2,2,2	0.13	0
4	MES	A	7203	-	12,12,12	1.79	1 (8%)	14,16,16	1.65	3 (21%)
3	EDO	A	7214	-	3,3,3	0.64	0	2,2,2	0.10	0
3	EDO	A	7201	-	3,3,3	0.51	0	2,2,2	0.44	0
3	EDO	B	4401	-	3,3,3	0.33	0	2,2,2	0.84	0
3	EDO	A	7207	-	3,3,3	0.67	0	2,2,2	0.22	0
3	EDO	A	7202	-	3,3,3	0.31	0	2,2,2	0.68	0
3	EDO	A	7211	-	3,3,3	0.51	0	2,2,2	0.25	0
3	EDO	A	7220	-	3,3,3	0.72	0	2,2,2	0.22	0
3	EDO	A	7208	-	3,3,3	0.45	0	2,2,2	0.63	0
3	EDO	A	7223	-	3,3,3	0.60	0	2,2,2	0.12	0
3	EDO	A	7217	-	3,3,3	0.59	0	2,2,2	0.32	0
3	EDO	A	7204	-	3,3,3	0.49	0	2,2,2	1.19	0
3	EDO	A	7205	-	3,3,3	0.55	0	2,2,2	0.16	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\lvert Z\rvert > 2$	Counts	RMSZ	$\#\lvert Z\rvert > 2$
3	EDO	A	7206	-	3,3,3	0.49	0	2,2,2	0.37	0
3	EDO	A	7212	-	3,3,3	0.55	0	2,2,2	0.14	0
3	EDO	A	7221	-	3,3,3	0.68	0	2,2,2	0.12	0
3	EDO	A	7219	-	3,3,3	0.41	0	2,2,2	0.44	0
3	EDO	A	7213	-	3,3,3	0.56	0	2,2,2	0.36	0
3	EDO	A	7215	-	3,3,3	0.55	0	2,2,2	0.25	0
5	SGV	A	7222	-	22,24,24	4.04	12 (54%)	23,36,36	2.27	7 (30%)

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
3	EDO	A	7216	-	-	1/1/1/1	-
3	EDO	A	7209	-	-	1/1/1/1	-
3	EDO	A	7218	-	-	1/1/1/1	-
3	EDO	A	7210	-	-	0/1/1/1	-
4	MES	A	7203	-	-	4/6/14/14	0/1/1/1
3	EDO	A	7214	-	-	1/1/1/1	-
3	EDO	A	7201	-	-	0/1/1/1	-
3	EDO	B	4401	-	-	1/1/1/1	-
3	EDO	A	7207	-	-	0/1/1/1	-
3	EDO	A	7202	-	-	0/1/1/1	-
3	EDO	A	7211	-	-	1/1/1/1	-
3	EDO	A	7220	-	-	1/1/1/1	-
3	EDO	A	7208	-	-	1/1/1/1	-
3	EDO	A	7223	-	-	0/1/1/1	-
3	EDO	A	7217	-	-	1/1/1/1	-
3	EDO	A	7204	-	-	1/1/1/1	-
3	EDO	A	7205	-	-	0/1/1/1	-
3	EDO	A	7206	-	-	0/1/1/1	-
3	EDO	A	7212	-	-	0/1/1/1	-
3	EDO	A	7221	-	-	1/1/1/1	-
3	EDO	A	7219	-	-	0/1/1/1	-
3	EDO	A	7213	-	-	1/1/1/1	-
3	EDO	A	7215	-	-	0/1/1/1	-
5	SGV	A	7222	-	-	0/3/26/26	0/3/3/3

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	7222	SGV	O4'-C1'	9.92	1.54	1.41
5	A	7222	SGV	C3'-C2'	-8.98	1.28	1.53
5	A	7222	SGV	C3'-C4'	6.60	1.69	1.53
5	A	7222	SGV	C10-N11	6.10	1.44	1.33
4	A	7203	MES	C8-S	-5.74	1.69	1.77
5	A	7222	SGV	O4'-C4'	-5.70	1.32	1.45
5	A	7222	SGV	C2'-C1'	4.23	1.60	1.53
5	A	7222	SGV	O2'-C2'	3.26	1.50	1.43
5	A	7222	SGV	C8-N9	-3.10	1.33	1.38
5	A	7222	SGV	C6-N6	3.03	1.45	1.34
5	A	7222	SGV	C7-C10	2.35	1.54	1.50
5	A	7222	SGV	O12-C10	-2.24	1.19	1.24
5	A	7222	SGV	O3'-C3'	2.00	1.47	1.43

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	A	7222	SGV	O4'-C1'-C2'	-4.58	100.23	106.93
5	A	7222	SGV	C7-C5-C4	-4.34	104.07	107.54
5	A	7222	SGV	C3'-C2'-C1'	4.10	107.15	100.98
5	A	7222	SGV	N3-C2-N1	-3.86	122.65	128.68
4	A	7203	MES	O2S-S-C8	3.51	111.14	106.92
5	A	7222	SGV	C7-C10-N11	3.10	123.01	118.28
5	A	7222	SGV	O12-C10-N11	-3.10	118.17	122.58
4	A	7203	MES	C5-N4-C3	2.54	114.54	108.83
4	A	7203	MES	O3S-S-C8	2.18	109.30	105.77
5	A	7222	SGV	O3'-C3'-C4'	-2.14	104.87	111.05

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	7203	MES	C7-C8-S-O3S
3	A	7204	EDO	O1-C1-C2-O2
3	A	7208	EDO	O1-C1-C2-O2
3	A	7218	EDO	O1-C1-C2-O2
3	A	7221	EDO	O1-C1-C2-O2
4	A	7203	MES	C7-C8-S-O1S
4	A	7203	MES	C7-C8-S-O2S
3	A	7211	EDO	O1-C1-C2-O2
3	A	7217	EDO	O1-C1-C2-O2
3	B	4401	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	A	7203	MES	C8-C7-N4-C5
3	A	7214	EDO	O1-C1-C2-O2
3	A	7209	EDO	O1-C1-C2-O2
3	A	7213	EDO	O1-C1-C2-O2
3	A	7220	EDO	O1-C1-C2-O2
3	A	7216	EDO	O1-C1-C2-O2

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	7201	EDO	0	1
3	A	7217	EDO	1	0
5	A	7222	SGV	1	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 then 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.

Ligand SGV A 7222

Bond lengths

Bond angles

Torsions

Rings
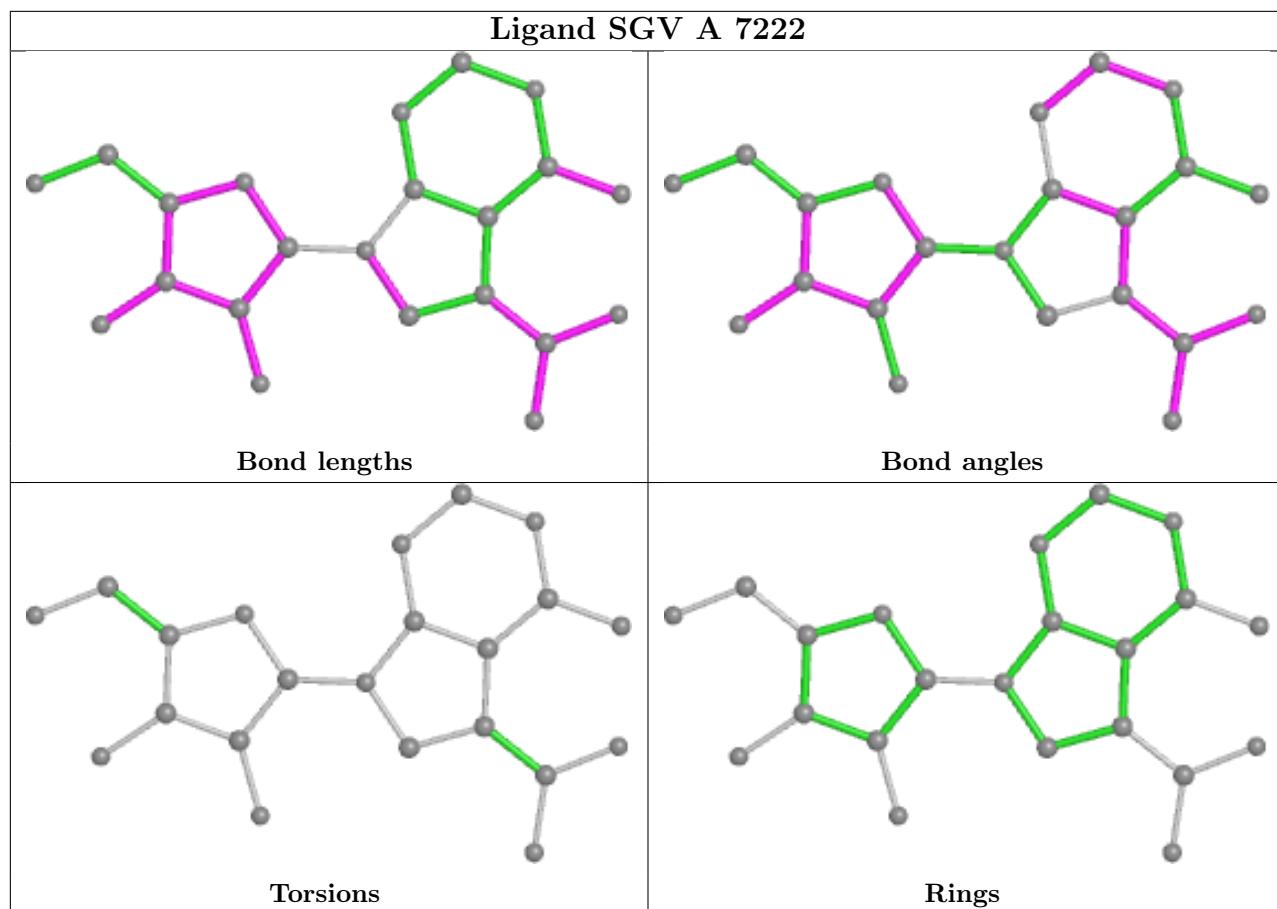
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

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	301/304 (99%)	0.05	10 (3%)	46	44	26, 35, 71, 107	1 (0%)
2	B	114/140 (81%)	1.19	31 (27%)	0	0	30, 51, 104, 141	0
All	All	415/444 (93%)	0.36	41 (9%)	7	7	26, 38, 87, 141	1 (0%)

All (41) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	4339	PRO	7.8
1	A	7099	LEU	6.0
2	B	4276	ALA	5.9
2	B	4342	PHE	5.8
2	B	4289	GLN	5.2
2	B	4383	CYS	5.1
2	B	4340	LYS	5.1
2	B	4337	PRO	4.9
2	B	4275	ASP	4.9
2	B	4285	ALA	4.6
2	B	4341	GLY	4.3
2	B	4278	LYS	4.1
2	B	4338	ASN	4.1
2	B	4274	VAL	4.0
2	B	4286	SER	4.0
2	B	4384	ASP	4.0
2	B	4272	PHE	4.0
2	B	4385	GLN	3.9
1	A	7062	GLU	3.8
2	B	4372	VAL	3.8
2	B	4287	GLY	3.8
2	B	4280	TYR	3.7
2	B	4284	LEU	3.6
2	B	4283	TYR	3.3

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Mol	Chain	Res	Type	RSRZ
2	B	4273	ALA	3.3
2	B	4279	ALA	3.0
1	A	6828	TYR	2.9
1	A	7040[A]	TYR	2.9
1	A	6800	SER	2.8
1	A	7097	GLU	2.7
1	A	7065	ILE	2.7
2	B	4282	ASP	2.6
1	A	7061	LYS	2.6
1	A	6829	GLY	2.6
2	B	4343[A]	CYS	2.3
1	A	6799	SER	2.3
2	B	4277	ALA	2.3
2	B	4288	GLY	2.2
2	B	4371	THR	2.1
2	B	4370	CYS	2.1
2	B	4378	GLY	2.0

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
3	EDO	A	7220	4/4	0.68	0.29	54,65,72,86	0
3	EDO	A	7221	4/4	0.69	0.29	56,67,73,88	0
3	EDO	A	7211	4/4	0.70	0.22	58,70,72,75	0
3	EDO	A	7215	4/4	0.71	0.25	77,92,102,102	0
3	EDO	A	7210	4/4	0.72	0.23	65,78,91,100	0
3	EDO	A	7223	4/4	0.82	0.16	42,52,77,77	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
6	ZN	B	4403	1/1	0.83	0.04	76,76,76,76	0
3	EDO	A	7213	4/4	0.84	0.22	55,67,80,81	0
3	EDO	A	7214	4/4	0.85	0.19	43,59,70,70	0
3	EDO	A	7217	4/4	0.86	0.17	54,65,73,74	0
3	EDO	A	7207	4/4	0.87	0.13	44,68,89,89	0
3	EDO	A	7206	4/4	0.88	0.15	46,75,79,95	0
3	EDO	A	7218	4/4	0.88	0.20	51,61,87,87	0
3	EDO	A	7204	4/4	0.89	0.14	49,62,76,76	0
3	EDO	A	7219	4/4	0.89	0.22	53,72,93,93	0
3	EDO	A	7209	4/4	0.91	0.16	48,70,75,84	0
3	EDO	A	7212	4/4	0.91	0.17	52,71,85,85	0
4	MES	A	7203	12/12	0.92	0.11	36,52,81,84	0
3	EDO	A	7216	4/4	0.92	0.16	63,76,91,92	0
3	EDO	A	7201	4/4	0.93	0.22	51,61,68,70	0
3	EDO	A	7205	4/4	0.93	0.09	41,56,67,67	0
3	EDO	A	7208	4/4	0.94	0.21	40,71,75,86	0
3	EDO	B	4401	4/4	0.94	0.17	57,69,77,79	0
5	SGV	A	7222	22/22	0.95	0.09	31,38,48,55	0
6	ZN	B	4402	1/1	0.98	0.07	48,48,48,48	0
3	EDO	A	7202	4/4	0.98	0.14	36,43,59,70	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 SGV A 7222:

$2mF_o$-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 ⓘ

There are no such residues in this entry.