



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 15, 2023 – 10:50 PM EDT

PDB ID : 8EG6  
Title : huCaspase-6 in complex with inhibitor 2a  
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Deposited on : 2022-09-11  
Resolution : 1.82 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
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) : 2.36

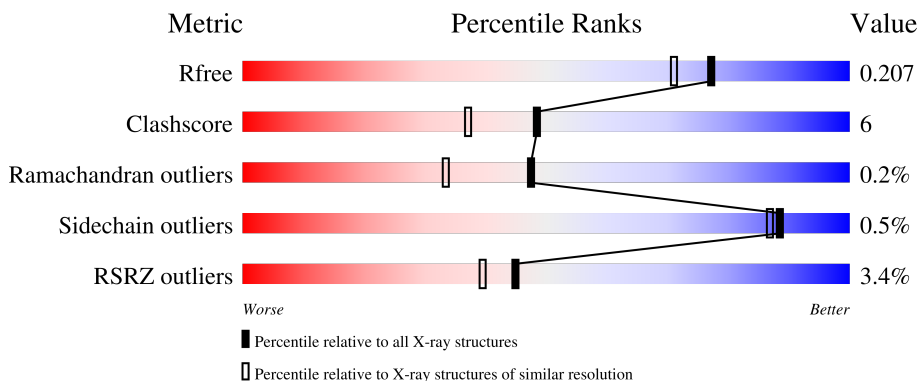
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.82 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	7484 (1.84-1.80)
Clashscore	141614	8401 (1.84-1.80)
Ramachandran outliers	138981	8290 (1.84-1.80)
Sidechain outliers	138945	8290 (1.84-1.80)
RSRZ outliers	127900	7371 (1.84-1.80)

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  $\geq 3$ , 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	150	3% 85% 13% ..
1	C	150	% 89% 7% .
1	E	150	2% 87% 11% .
1	G	150	2% 88% 10% .

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Mol	Chain	Length	Quality of chain
2	B	109	<p>5% 78% 10% 11%</p>
2	D	109	<p>6% 79% 10% 11%</p>
2	F	109	<p>2% 78% 9% 13%</p>
2	H	109	<p>6% 85% 11%</p>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	EDO	A	202	-	-	X	-
4	EDO	A	203	-	-	X	-

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 9056 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 Caspase-6 subunit p18.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	147	Total	C	N	O	S	0	7	0
			1229	783	222	215	9			
1	C	144	Total	C	N	O	S	0	2	0
			1176	750	211	207	8			
1	E	147	Total	C	N	O	S	0	5	0
			1218	778	217	213	10			
1	G	147	Total	C	N	O	S	0	4	0
			1212	775	216	212	9			

- Molecule 2 is a protein called Caspase-6 subunit p11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	97	Total	C	N	O	S	0	4	0
			791	513	128	142	8			
2	D	97	Total	C	N	O	S	0	3	0
			785	508	127	142	8			
2	F	95	Total	C	N	O	S	0	3	0
			778	505	128	137	8			
2	H	97	Total	C	N	O	S	0	2	0
			781	504	127	142	8			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	193	MET	-	initiating methionine	UNP P55212
B	294	LEU	-	expression tag	UNP P55212
B	295	GLU	-	expression tag	UNP P55212
B	296	HIS	-	expression tag	UNP P55212
B	297	HIS	-	expression tag	UNP P55212
B	298	HIS	-	expression tag	UNP P55212
B	299	HIS	-	expression tag	UNP P55212
B	300	HIS	-	expression tag	UNP P55212

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Chain	Residue	Modelled	Actual	Comment	Reference
B	301	HIS	-	expression tag	UNP P55212
D	193	MET	-	initiating methionine	UNP P55212
D	294	LEU	-	expression tag	UNP P55212
D	295	GLU	-	expression tag	UNP P55212
D	296	HIS	-	expression tag	UNP P55212
D	297	HIS	-	expression tag	UNP P55212
D	298	HIS	-	expression tag	UNP P55212
D	299	HIS	-	expression tag	UNP P55212
D	300	HIS	-	expression tag	UNP P55212
D	301	HIS	-	expression tag	UNP P55212
F	193	MET	-	initiating methionine	UNP P55212
F	294	LEU	-	expression tag	UNP P55212
F	295	GLU	-	expression tag	UNP P55212
F	296	HIS	-	expression tag	UNP P55212
F	297	HIS	-	expression tag	UNP P55212
F	298	HIS	-	expression tag	UNP P55212
F	299	HIS	-	expression tag	UNP P55212
F	300	HIS	-	expression tag	UNP P55212
F	301	HIS	-	expression tag	UNP P55212
H	193	MET	-	initiating methionine	UNP P55212
H	294	LEU	-	expression tag	UNP P55212
H	295	GLU	-	expression tag	UNP P55212
H	296	HIS	-	expression tag	UNP P55212
H	297	HIS	-	expression tag	UNP P55212
H	298	HIS	-	expression tag	UNP P55212
H	299	HIS	-	expression tag	UNP P55212
H	300	HIS	-	expression tag	UNP P55212
H	301	HIS	-	expression tag	UNP P55212

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

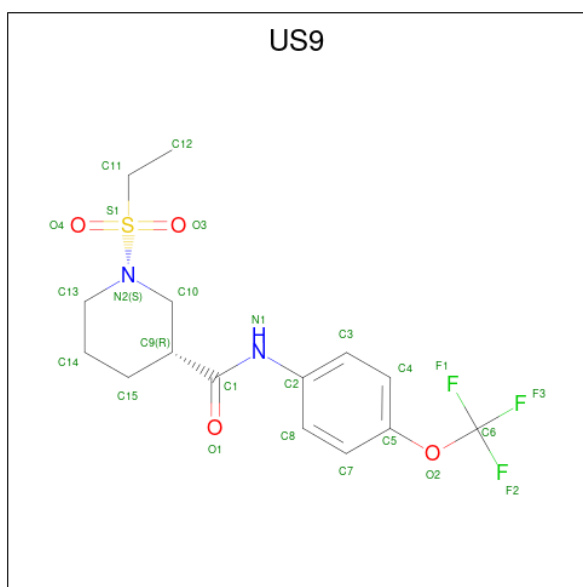
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Cl 1 1	0	0
3	B	1	Total Cl 1 1	0	0
3	E	2	Total Cl 2 2	0	0
3	G	1	Total Cl 1 1	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



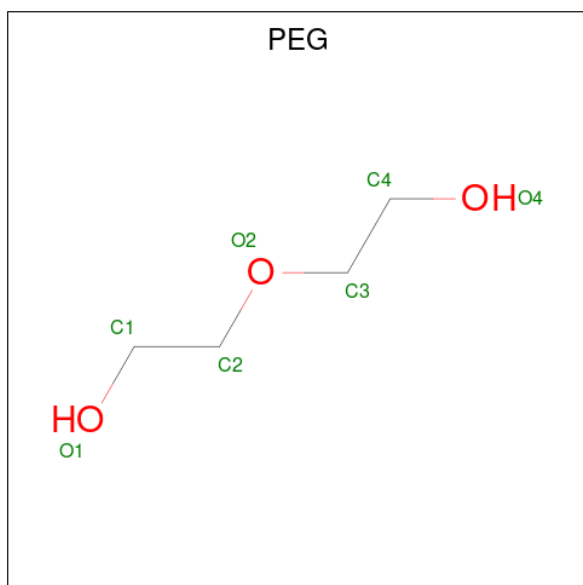
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	E	1	Total C O 4 2 2	0	0
4	E	1	Total C O 4 2 2	0	0
4	F	1	Total C O 4 2 2	0	0
4	G	1	Total C O 4 2 2	0	0
4	H	1	Total C O 4 2 2	0	0
4	H	1	Total C O 4 2 2	0	0

- Molecule 5 is (3R)-1-(ethanesulfonyl)-N-[4-(trifluoromethoxy)phenyl]piperidine-3-carboxamide (three-letter code: US9) (formula: C<sub>15</sub>H<sub>19</sub>F<sub>3</sub>N<sub>2</sub>O<sub>4</sub>S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf		
			Total	C	F	N	O			S	
5	B	1	Total	25	15	3	2	4	1	0	0
5	D	1	Total	25	15	3	2	4	1	0	0
5	F	1	Total	25	15	3	2	4	1	0	0
5	H	1	Total	25	15	3	2	4	1	0	0

- Molecule 6 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula:  $C_4H_{10}O_3$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	E	1	Total	C	O	0	0
			7	4	3		

- Molecule 7 is water.

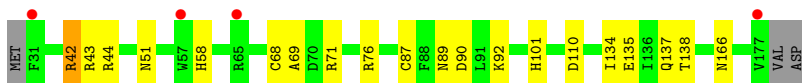
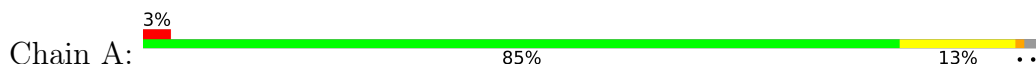
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	164	Total	O	0	0
			164	164		
7	B	84	Total	O	0	1
			85	85		
7	C	135	Total	O	0	3
			138	138		
7	D	71	Total	O	0	0
			71	71		
7	E	179	Total	O	0	2
			181	181		
7	F	95	Total	O	0	1
			96	96		
7	G	121	Total	O	0	1
			122	122		
7	H	71	Total	O	0	2
			73	73		



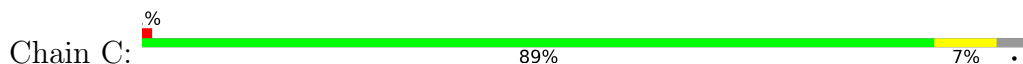
### 3 Residue-property plots [i](#)

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.

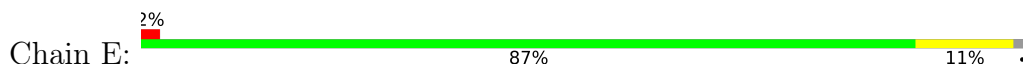
- Molecule 1: Caspase-6 subunit p18



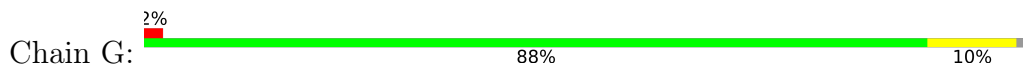
- Molecule 1: Caspase-6 subunit p18



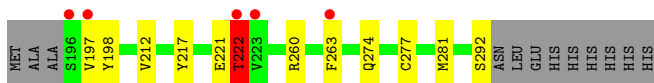
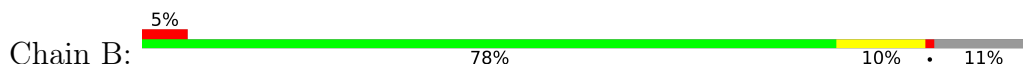
- Molecule 1: Caspase-6 subunit p18



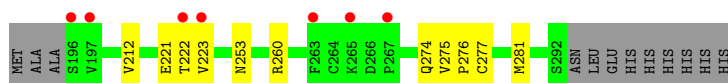
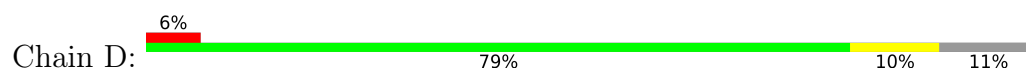
- Molecule 1: Caspase-6 subunit p18



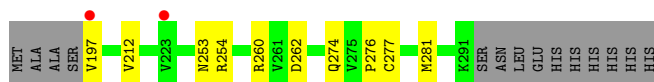
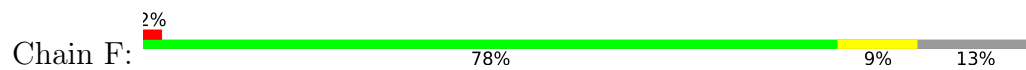
- Molecule 2: Caspase-6 subunit p11



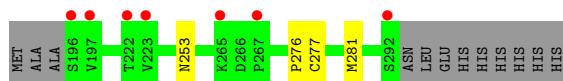
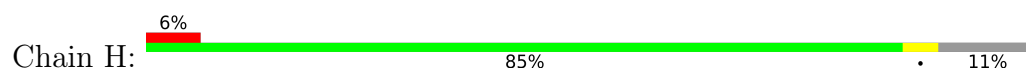
- Molecule 2: Caspase-6 subunit p11



- Molecule 2: Caspase-6 subunit p11



- Molecule 2: Caspase-6 subunit p11



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	84.58Å 60.73Å 101.70Å 90.00° 91.04° 90.00°	Depositor
Resolution (Å)	49.38 – 1.82 49.33 – 1.82	Depositor EDS
% Data completeness (in resolution range)	99.9 (49.38-1.82) 99.9 (49.33-1.82)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.95 (at 1.82Å)	Xtrriage
Refinement program	REFMAC 5.8.0238	Depositor
R, $R_{free}$	0.165 , 0.201 0.174 , 0.207	Depositor DCC
$R_{free}$ test set	4599 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	22.7	Xtrriage
Anisotropy	0.421	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 46.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.050 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	9056	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.03% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PEG, CL, EDO, US9

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	0.70	0/1276	0.83	1/1719 (0.1%)
1	C	0.69	0/1211	0.80	0/1632
1	E	0.71	0/1262	0.83	0/1699
1	G	0.68	0/1254	0.83	0/1690
2	B	0.72	0/822	0.86	1/1106 (0.1%)
2	D	0.73	0/813	0.80	1/1095 (0.1%)
2	F	0.77	0/806	0.92	3/1085 (0.3%)
2	H	0.74	0/806	0.81	0/1085
All	All	0.71	0/8250	0.83	6/11111 (0.1%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	260	ARG	NE-CZ-NH1	6.05	123.33	120.30
2	F	254[A]	ARG	NE-CZ-NH2	-5.36	117.62	120.30
2	F	254[B]	ARG	NE-CZ-NH2	-5.36	117.62	120.30
1	A	44	ARG	NE-CZ-NH2	-5.27	117.66	120.30
2	D	260	ARG	NE-CZ-NH2	-5.09	117.76	120.30
2	B	260	ARG	NE-CZ-NH1	5.02	122.81	120.30

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	A	1229	0	1225	28	0
1	C	1176	0	1160	10	0
1	E	1218	0	1212	18	0
1	G	1212	0	1202	18	0
2	B	791	0	802	8	0
2	D	785	0	789	11	0
2	F	778	0	787	8	0
2	H	781	0	780	4	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	E	2	0	0	0	0
3	G	1	0	0	1	0
4	A	8	0	12	14	0
4	B	4	0	6	0	0
4	D	8	0	12	2	0
4	E	8	0	12	4	0
4	F	4	0	6	0	0
4	G	4	0	6	0	0
4	H	8	0	12	0	0
5	B	25	0	0	0	0
5	D	25	0	0	0	0
5	F	25	0	0	0	0
5	H	25	0	0	0	0
6	E	7	0	10	3	0
7	A	164	0	0	3	0
7	B	85	0	0	3	0
7	C	138	0	0	0	1
7	D	71	0	0	2	0
7	E	181	0	0	3	0
7	F	96	0	0	2	0
7	G	122	0	0	4	1
7	H	73	0	0	1	0
All	All	9056	0	8033	97	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 6.

All (97) 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:G:71:ARG:HD2	1:G:87[B]:CYS:SG	2.16	0.85
1:E:71:ARG:HD2	1:E:87[B]:CYS:SG	2.20	0.80
1:A:101:HIS:CD2	1:G:58[B]:HIS:HE1	2.03	0.76
1:A:76:ARG:HD3	7:A:362:HOH:O	1.86	0.74
1:A:92:LYS:HE3	4:A:203:EDO:H12	1.71	0.72
1:A:101:HIS:CD2	1:G:58[B]:HIS:CE1	2.79	0.70
2:F:212[B]:VAL:HG12	2:F:274:GLN:HG3	1.73	0.70
4:E:203:EDO:H11	2:F:281[A]:MET:SD	2.34	0.67
1:A:135:GLU:H	4:A:202:EDO:H11	1.59	0.67
2:D:221:GLU:OE2	7:D:501:HOH:O	2.12	0.66
1:G:68:CYS:HB2	7:G:390:HOH:O	1.94	0.66
1:A:134:ILE:HA	4:A:202:EDO:H11	1.76	0.65
2:D:212[A]:VAL:HG22	4:D:403:EDO:H21	1.78	0.65
1:E:60:THR:HA	7:E:378:HOH:O	1.95	0.65
1:A:42[B]:ARG:HG3	1:A:43[B]:ARG:HG3	1.79	0.64
1:C:51:ASN:HD22	1:C:89:ASN:HD22	1.47	0.62
1:G:51:ASN:HD22	1:G:89:ASN:HD22	1.46	0.62
1:A:71:ARG:HD2	1:A:87[B]:CYS:SG	2.39	0.62
2:B:281[B]:MET:SD	2:F:277:CYS:SG	2.98	0.61
1:G:71:ARG:CD	1:G:87[B]:CYS:SG	2.88	0.61
1:E:76[A]:ARG:NE	7:E:302:HOH:O	2.30	0.61
2:F:262:ASP:OD2	7:F:501:HOH:O	2.16	0.61
1:G:76:ARG:NH2	7:G:301:HOH:O	2.35	0.60
1:A:51:ASN:HD22	1:A:89:ASN:HD22	1.48	0.60
1:C:71:ARG:HD2	1:C:87[B]:CYS:SG	2.42	0.60
2:D:212[B]:VAL:CG1	2:D:274:GLN:HG3	2.31	0.60
1:E:51:ASN:HD22	1:E:89:ASN:HD22	1.50	0.59
1:E:71:ARG:CD	1:E:87[B]:CYS:SG	2.90	0.59
1:E:123:GLU:HA	6:E:205:PEG:H32	1.85	0.58
1:G:58[B]:HIS:CE1	7:G:334:HOH:O	2.55	0.58
1:A:138[A]:THR:HG21	4:A:202:EDO:O2	2.02	0.58
1:G:71:ARG:HH21	1:G:89:ASN:HD21	1.51	0.56
2:F:212[B]:VAL:CG1	2:F:274:GLN:HG3	2.35	0.56
4:E:204:EDO:H11	7:E:433:HOH:O	2.06	0.55
2:B:212[B]:VAL:CG1	2:B:274:GLN:HG3	2.37	0.55
1:A:135:GLU:HB2	4:A:202:EDO:H21	1.87	0.55
2:D:223:VAL:HG12	7:D:549:HOH:O	2.06	0.55
2:B:212[B]:VAL:HG12	2:B:274:GLN:HG3	1.88	0.54
1:G:51:ASN:HD22	1:G:89:ASN:ND2	2.05	0.54
2:D:281[B]:MET:SD	2:H:277:CYS:SG	3.05	0.54
1:A:51:ASN:HD22	1:A:89:ASN:ND2	2.05	0.54
1:C:48:LEU:HD21	1:C:103:VAL:HG21	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:164:ARG:C	6:E:205:PEG:H41	2.29	0.53
1:G:99:LYS:HG2	7:G:319:HOH:O	2.09	0.52
1:G:46:ILE:HG21	1:G:48[B]:LEU:HD23	1.91	0.51
1:G:46:ILE:CG2	1:G:48[B]:LEU:HD23	2.39	0.51
1:A:71:ARG:HH21	1:A:89:ASN:HD21	1.58	0.51
2:D:275:VAL:HG13	2:H:281[B]:MET:HG2	1.93	0.51
1:C:51:ASN:HD22	1:C:89:ASN:ND2	2.09	0.50
1:A:68[A]:CYS:SG	1:A:69:ALA:N	2.85	0.50
1:E:71:ARG:HH21	1:E:89:ASN:ND2	2.09	0.50
1:E:51:ASN:HD22	1:E:89:ASN:ND2	2.08	0.50
1:E:71:ARG:HH21	1:E:89:ASN:HD21	1.59	0.50
1:A:92:LYS:HG3	4:A:203:EDO:H12	1.94	0.49
1:E:48[A]:LEU:HD21	1:E:103:VAL:HG21	1.94	0.49
1:G:88:PHE:CZ	1:G:99:LYS:HE2	2.47	0.49
1:A:71:ARG:HH21	1:A:89:ASN:ND2	2.10	0.49
2:B:277:CYS:SG	2:F:281[B]:MET:SD	3.09	0.49
1:A:137:GLN:NE2	1:A:138[A]:THR:HG23	2.27	0.49
2:D:212[B]:VAL:HG12	2:D:274:GLN:HG3	1.94	0.49
1:G:137:GLN:NE2	1:G:138[A]:THR:HG23	2.28	0.48
1:C:137:GLN:NE2	1:C:138[A]:THR:HG23	2.28	0.48
2:F:197:VAL:N	7:F:504:HOH:O	2.46	0.48
2:B:221:GLU:O	2:B:222:THR:HB	2.14	0.47
2:D:212[A]:VAL:HG22	4:D:403:EDO:C2	2.43	0.47
1:G:71:ARG:HH21	1:G:89:ASN:ND2	2.11	0.47
3:G:201:CL:CL	7:H:510:HOH:O	2.58	0.46
1:C:71:ARG:HH21	1:C:89:ASN:ND2	2.14	0.46
1:E:175:LEU:O	1:E:176:ASP:HB2	2.15	0.46
1:E:153:GLY:HA3	4:E:204:EDO:C2	2.46	0.46
2:B:263:PHE:HA	7:B:569:HOH:O	2.16	0.46
7:B:541:HOH:O	1:E:174:PRO:HD3	2.16	0.45
1:A:58:HIS:CE1	1:G:101:HIS:CG	3.05	0.44
1:A:135:GLU:H	4:A:202:EDO:C1	2.26	0.44
1:E:153:GLY:HA3	4:E:204:EDO:H21	1.98	0.44
1:A:101:HIS:HB2	1:G:58[B]:HIS:NE2	2.33	0.43
1:C:56:PHE:CE1	1:E:94[B]:GLU:HG3	2.53	0.43
1:C:71:ARG:CD	1:C:87[B]:CYS:SG	3.06	0.43
4:A:202:EDO:H22	7:A:416:HOH:O	2.17	0.43
1:A:138[B]:THR:HG1	4:A:202:EDO:C2	2.32	0.43
2:D:253:ASN:HA	2:D:276:PRO:HD2	2.01	0.42
1:E:123:GLU:HA	6:E:205:PEG:C3	2.50	0.42
1:A:166:ASN:HA	2:B:217:TYR:CZ	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:202:EDO:H12	7:A:416:HOH:O	2.19	0.42
2:H:253:ASN:HA	2:H:276:PRO:HD2	2.02	0.42
1:A:92:LYS:CE	4:A:203:EDO:H12	2.46	0.41
1:A:71:ARG:CD	1:A:87[B]:CYS:SG	3.05	0.41
1:A:135:GLU:N	4:A:202:EDO:H11	2.32	0.41
1:A:135:GLU:H	4:A:202:EDO:H21	1.86	0.41
2:D:277:CYS:SG	2:H:281[B]:MET:CE	3.09	0.41
1:C:66:GLY:HA2	2:D:223:VAL:O	2.21	0.41
2:F:253:ASN:HA	2:F:276:PRO:HD2	2.03	0.41
1:C:71:ARG:HD3	1:C:89:ASN:HD21	1.86	0.40
1:A:42[B]:ARG:HG2	1:A:110:ASP:HB2	2.02	0.40
2:B:197:VAL:HG23	2:B:198:TYR:CD2	2.57	0.40
7:B:535:HOH:O	1:E:144:LYS:HD3	2.20	0.40
1:A:90:ASP:O	4:A:203:EDO:H11	2.20	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)
7:C:309:HOH:O	7:G:406:HOH:O[1_565]	2.18	0.02

## 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	152/150 (101%)	146 (96%)	6 (4%)	0	100	100
1	C	144/150 (96%)	142 (99%)	2 (1%)	0	100	100
1	E	150/150 (100%)	147 (98%)	3 (2%)	0	100	100
1	G	149/150 (99%)	146 (98%)	3 (2%)	0	100	100
2	B	99/109 (91%)	96 (97%)	2 (2%)	1 (1%)	15	5

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	D	98/109 (90%)	95 (97%)	2 (2%)	1 (1%)	15	5
2	F	96/109 (88%)	93 (97%)	3 (3%)	0	100	100
2	H	97/109 (89%)	94 (97%)	3 (3%)	0	100	100
All	All	985/1036 (95%)	959 (97%)	24 (2%)	2 (0%)	47	33

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	222	THR
2	B	222	THR

### 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	A	136/132 (103%)	134 (98%)	2 (2%)	65	55
1	C	128/132 (97%)	128 (100%)	0	100	100
1	E	134/132 (102%)	134 (100%)	0	100	100
1	G	133/132 (101%)	132 (99%)	1 (1%)	81	77
2	B	90/96 (94%)	88 (98%)	2 (2%)	52	39
2	D	89/96 (93%)	89 (100%)	0	100	100
2	F	87/96 (91%)	87 (100%)	0	100	100
2	H	88/96 (92%)	88 (100%)	0	100	100
All	All	885/912 (97%)	880 (99%)	5 (1%)	88	83

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

Mol	Chain	Res	Type
1	A	42[A]	ARG
1	A	42[B]	ARG
2	B	222	THR
2	B	292	SER

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Mol	Chain	Res	Type
1	G	54	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	58	HIS
1	A	89	ASN
1	A	101	HIS
1	A	168	HIS
2	B	219	HIS
1	C	58	HIS
1	C	89	ASN
2	D	219	HIS
1	E	58	HIS
1	E	89	ASN
1	G	89	ASN
2	H	219	HIS

### 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 21 ligands modelled in this entry, 5 are monoatomic - leaving 16 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	EDO	A	202	-	3,3,3	0.37	0	2,2,2	1.03	0
6	PEG	E	205	-	6,6,6	0.23	0	5,5,5	0.13	0
5	US9	D	401	2	26,26,26	0.59	1 (3%)	38,38,38	0.85	2 (5%)
4	EDO	A	203	-	3,3,3	0.16	0	2,2,2	0.44	0
4	EDO	E	203	-	3,3,3	0.30	0	2,2,2	0.21	0
4	EDO	D	403	-	3,3,3	0.40	0	2,2,2	0.47	0
4	EDO	D	402	-	3,3,3	0.10	0	2,2,2	0.34	0
4	EDO	H	403	-	3,3,3	0.37	0	2,2,2	0.53	0
5	US9	B	401	2	26,26,26	0.59	0	38,38,38	1.12	3 (7%)
5	US9	H	401	2	26,26,26	0.55	1 (3%)	38,38,38	0.90	2 (5%)
4	EDO	E	204	-	3,3,3	0.28	0	2,2,2	0.35	0
4	EDO	H	402	-	3,3,3	0.32	0	2,2,2	0.02	0
5	US9	F	401	2	26,26,26	0.59	0	38,38,38	1.23	5 (13%)
4	EDO	B	403	-	3,3,3	0.45	0	2,2,2	0.41	0
4	EDO	G	202	-	3,3,3	0.11	0	2,2,2	0.16	0
4	EDO	F	402	-	3,3,3	0.58	0	2,2,2	0.39	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. <sup>1,2</sup> means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	A	202	-	-	1/1/1/1	-
6	PEG	E	205	-	-	3/4/4/4	-
5	US9	D	401	2	-	0/22/32/32	0/2/2/2
4	EDO	A	203	-	-	0/1/1/1	-
4	EDO	E	203	-	-	1/1/1/1	-
4	EDO	D	403	-	-	0/1/1/1	-
4	EDO	D	402	-	-	0/1/1/1	-
4	EDO	H	403	-	-	1/1/1/1	-
5	US9	B	401	2	-	0/22/32/32	0/2/2/2
5	US9	H	401	2	-	0/22/32/32	0/2/2/2
4	EDO	E	204	-	-	0/1/1/1	-
4	EDO	H	402	-	-	0/1/1/1	-
5	US9	F	401	2	-	1/22/32/32	0/2/2/2
4	EDO	B	403	-	-	0/1/1/1	-
4	EDO	G	202	-	-	1/1/1/1	-
4	EDO	F	402	-	-	0/1/1/1	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	D	401	US9	C11-S1	2.10	1.79	1.76
5	H	401	US9	C10-N2	-2.02	1.45	1.47

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	F	401	US9	O4-S1-O3	3.70	122.78	118.98
5	D	401	US9	C10-N2-S1	-3.56	113.49	119.73
5	B	401	US9	C10-N2-S1	-3.32	113.90	119.73
5	H	401	US9	C10-N2-S1	-2.97	114.52	119.73
5	F	401	US9	C12-C11-S1	-2.94	108.79	112.93
5	F	401	US9	O3-S1-C11	-2.78	103.75	108.55
5	H	401	US9	C10-C9-C1	-2.74	104.93	110.07
5	B	401	US9	C12-C11-S1	-2.63	109.22	112.93
5	F	401	US9	C10-C9-C1	-2.57	105.25	110.07
5	F	401	US9	C10-N2-S1	-2.38	115.55	119.73
5	D	401	US9	C10-C9-C1	-2.35	105.65	110.07
5	B	401	US9	O4-S1-N2	2.30	109.17	107.23

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	E	205	PEG	O1-C1-C2-O2
6	E	205	PEG	O2-C3-C4-O4
4	H	403	EDO	O1-C1-C2-O2
6	E	205	PEG	C1-C2-O2-C3
4	E	203	EDO	O1-C1-C2-O2
4	G	202	EDO	O1-C1-C2-O2
4	A	202	EDO	O1-C1-C2-O2
5	F	401	US9	C12-C11-S1-O4

There are no ring outliers.

6 monomers are involved in 23 short contacts:

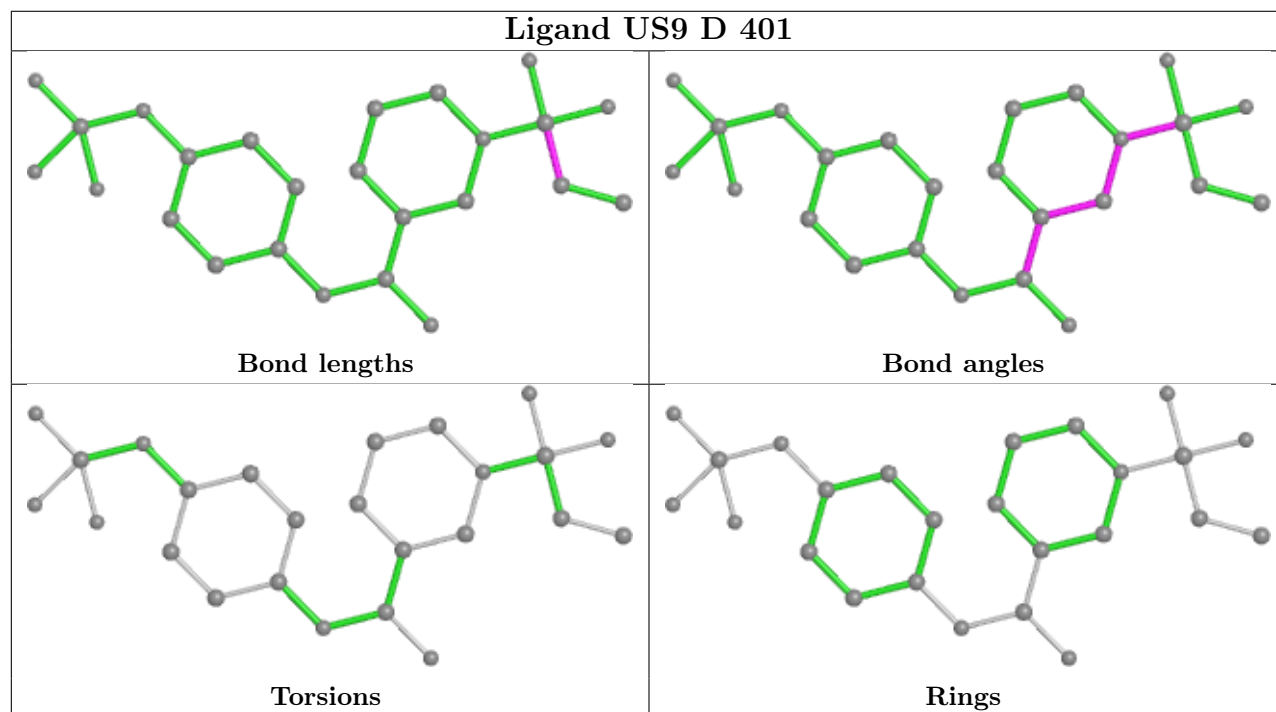
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	202	EDO	10	0
6	E	205	PEG	3	0
4	A	203	EDO	4	0
4	E	203	EDO	1	0

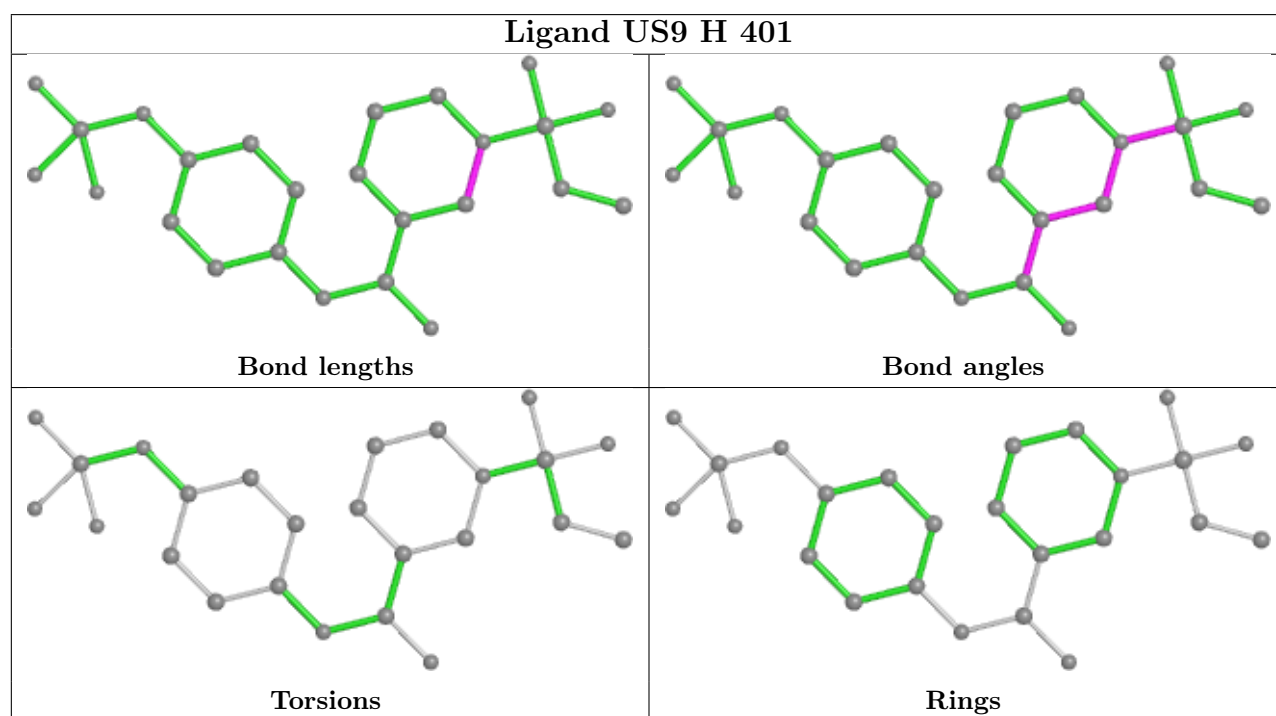
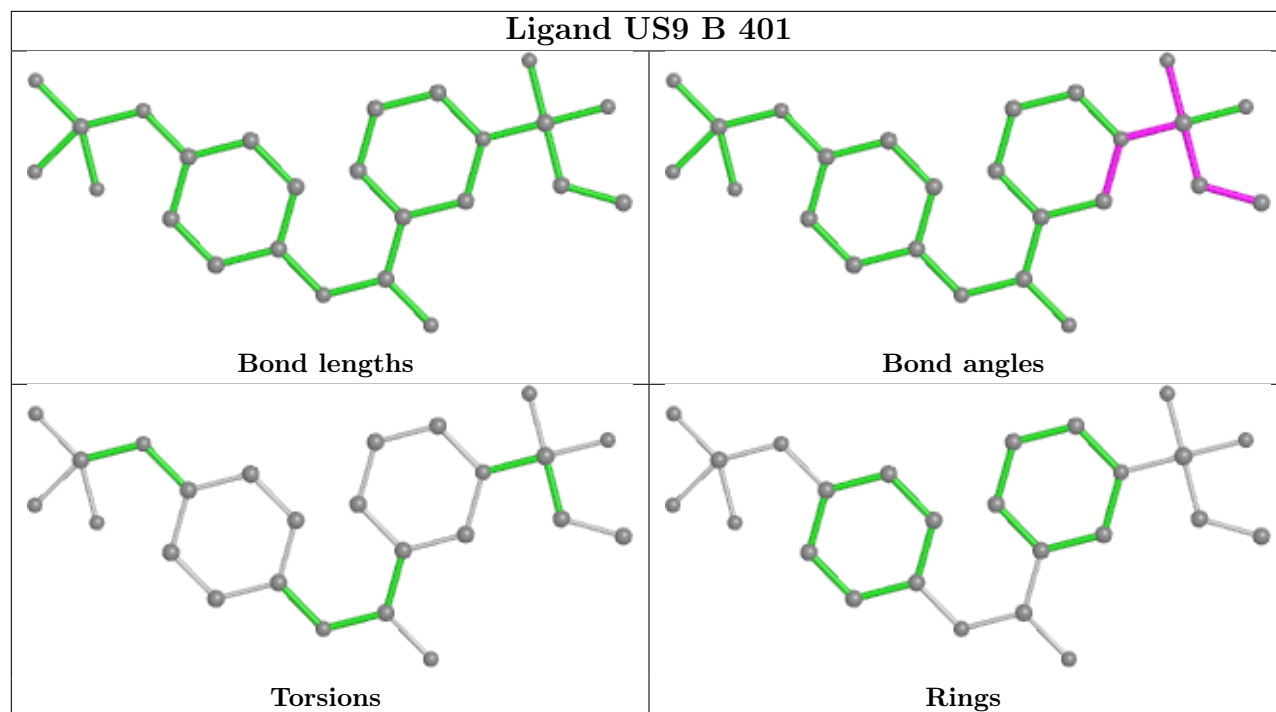
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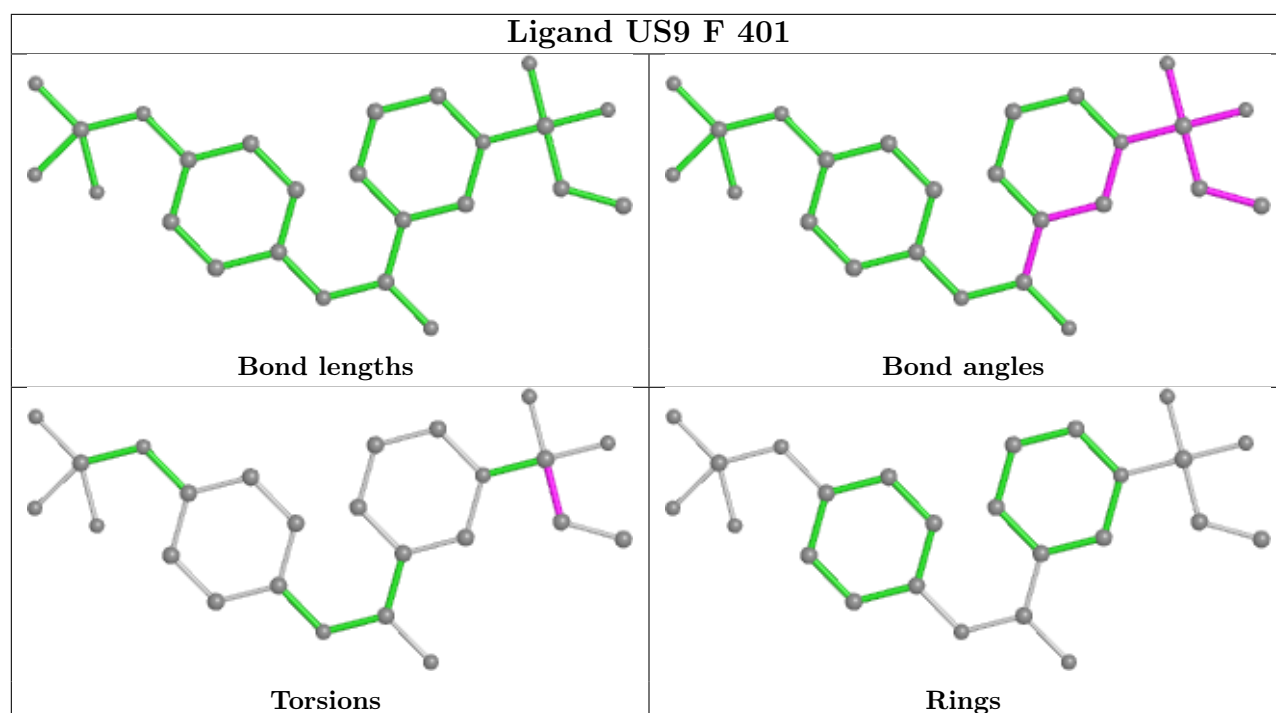
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	403	EDO	2	0
4	E	204	EDO	3	0

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

### 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	147/150 (98%)	-0.27	4 (2%) 54 49	16, 22, 40, 81	0
1	C	144/150 (96%)	-0.18	2 (1%) 75 72	20, 27, 41, 53	0
1	E	147/150 (98%)	-0.29	3 (2%) 65 61	16, 21, 41, 91	0
1	G	147/150 (98%)	-0.18	3 (2%) 65 61	18, 27, 42, 76	0
2	B	97/109 (88%)	0.03	5 (5%) 27 22	15, 21, 51, 75	0
2	D	97/109 (88%)	0.27	7 (7%) 15 12	18, 27, 70, 100	0
2	F	95/109 (87%)	-0.21	2 (2%) 63 59	14, 19, 45, 71	0
2	H	97/109 (88%)	0.02	7 (7%) 15 12	16, 24, 63, 82	0
All	All	971/1036 (93%)	-0.13	33 (3%) 45 39	14, 24, 50, 100	0

All (33) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	30	MET	11.5
2	D	263	PHE	8.6
2	D	196	SER	7.8
2	D	223	VAL	6.0
2	D	197	VAL	5.8
2	B	196	SER	5.8
1	E	57	TRP	4.8
2	H	197	VAL	4.7
2	H	196	SER	4.3
2	H	223	VAL	4.3
2	B	223	VAL	4.3
2	B	263	PHE	4.1
2	F	223	VAL	4.1
1	A	57	TRP	4.0
1	G	175	LEU	3.6
2	B	197	VAL	3.6

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Mol	Chain	Res	Type	RSRZ
2	D	265	LYS	3.5
2	F	197	VAL	3.2
2	H	222	THR	3.1
2	H	292	SER	3.1
2	B	222	THR	3.1
1	G	176	ASP	3.0
1	A	177	VAL	3.0
1	C	57	TRP	2.9
1	C	31	PHE	2.7
1	G	57	TRP	2.7
1	E	59	LEU	2.6
1	A	65	ARG	2.5
2	H	265	LYS	2.5
1	A	31	PHE	2.2
2	H	267	PRO	2.2
2	D	222	THR	2.2
2	D	267	PRO	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 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, 95<sup>th</sup> 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.

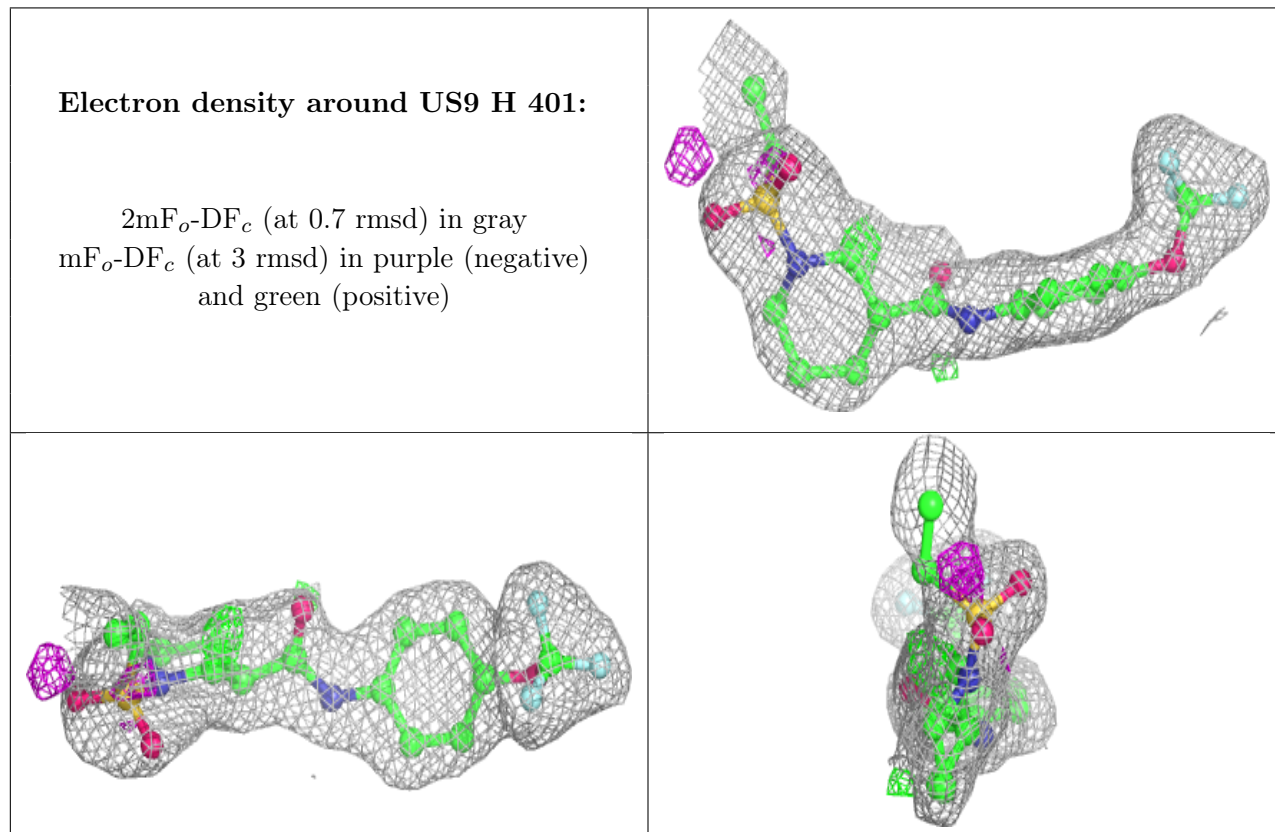
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	EDO	A	203	4/4	0.73	0.19	51,52,52,53	0
4	EDO	H	403	4/4	0.75	0.34	44,44,44,46	0
4	EDO	E	204	4/4	0.83	0.17	42,43,43,52	0
4	EDO	G	202	4/4	0.85	0.16	46,48,48,55	0
4	EDO	D	403	4/4	0.86	0.17	34,39,42,43	0
6	PEG	E	205	7/7	0.86	0.16	41,45,48,50	0

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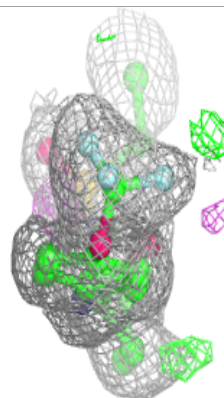
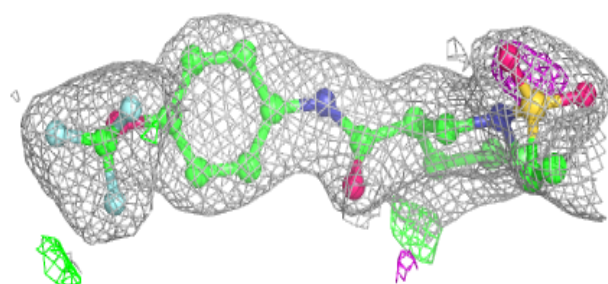
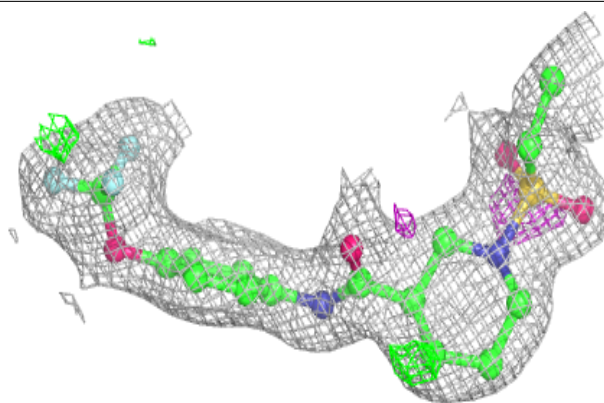
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	US9	H	401	25/25	0.90	0.13	30,43,56,60	0
4	EDO	A	202	4/4	0.91	0.21	31,32,33,38	0
3	CL	A	201	1/1	0.91	0.14	48,48,48,48	0
3	CL	E	202	1/1	0.92	0.15	51,51,51,51	0
5	US9	D	401	25/25	0.92	0.13	31,41,50,51	0
3	CL	G	201	1/1	0.93	0.08	56,56,56,56	0
4	EDO	H	402	4/4	0.93	0.12	23,26,28,32	0
5	US9	F	401	25/25	0.95	0.12	23,28,34,37	0
5	US9	B	401	25/25	0.95	0.13	24,33,41,41	0
4	EDO	E	203	4/4	0.95	0.21	51,52,52,53	0
4	EDO	B	403	4/4	0.96	0.09	22,24,24,27	0
3	CL	B	402	1/1	0.96	0.07	47,47,47,47	0
4	EDO	F	402	4/4	0.97	0.08	20,21,23,23	0
4	EDO	D	402	4/4	0.97	0.08	24,24,25,27	0
3	CL	E	201	1/1	0.97	0.07	45,45,45,45	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.

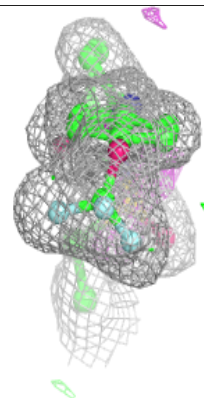
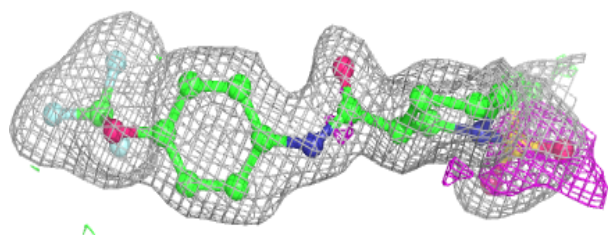
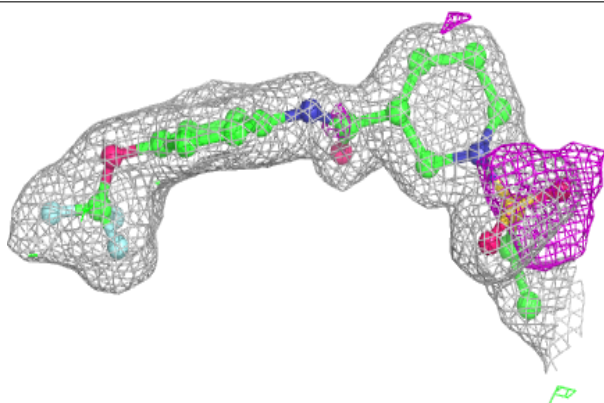


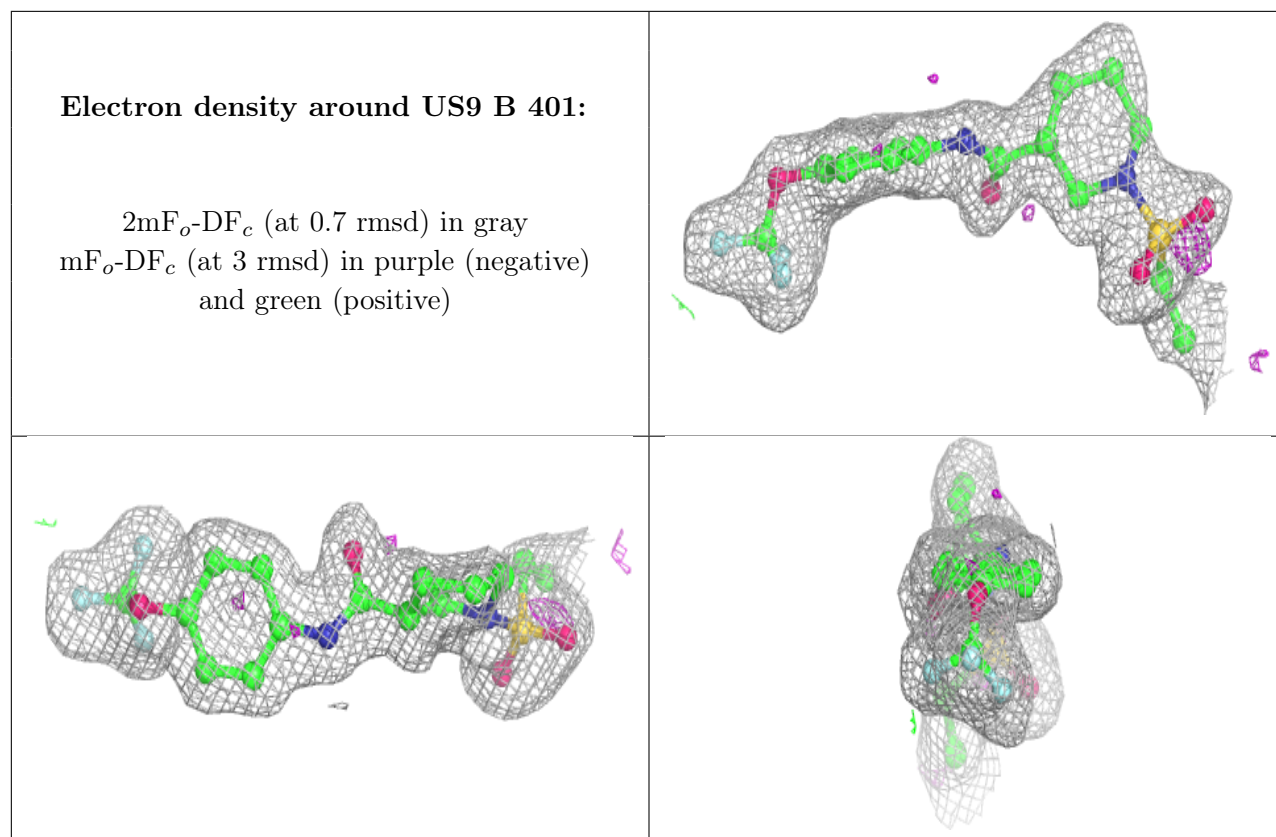
**Electron density around US9 D 401:**

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

**Electron density around US9 F 401:**

$2mF_o-DF_c$  (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.