



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 09:11 PM UTC

PDB ID : 4F5E / pdb_00004f5e
Title : Crystal structure of ERIS/STING
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Deposited on : 2012-05-13
Resolution : 2.60 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
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

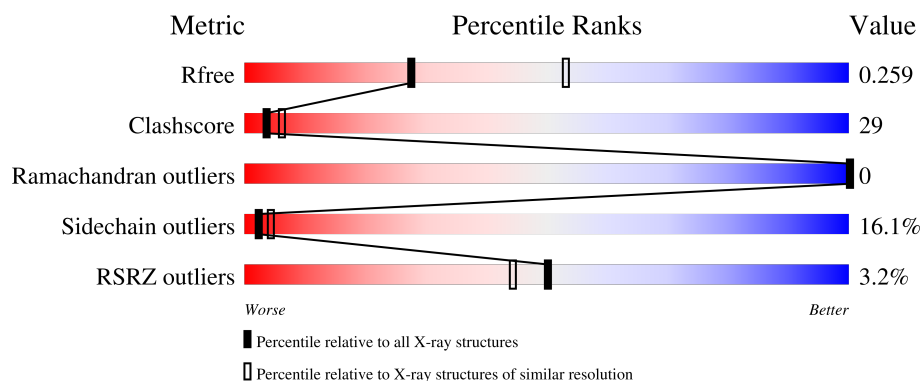
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	256	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 1543 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 Transmembrane protein 173.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	186	Total	C	N	O	S	0	0	0
			1497	940	266	285	6			

There are 19 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	124	GLY	-	expression tag	UNP Q86WV6
A	125	SER	-	expression tag	UNP Q86WV6
A	126	HIS	-	expression tag	UNP Q86WV6
A	127	MET	-	expression tag	UNP Q86WV6
A	128	ALA	-	expression tag	UNP Q86WV6
A	129	SER	-	expression tag	UNP Q86WV6
A	130	MET	-	expression tag	UNP Q86WV6
A	131	THR	-	expression tag	UNP Q86WV6
A	132	GLY	-	expression tag	UNP Q86WV6
A	133	GLY	-	expression tag	UNP Q86WV6
A	134	MET	-	expression tag	UNP Q86WV6
A	135	GLY	-	expression tag	UNP Q86WV6
A	136	ARG	-	expression tag	UNP Q86WV6
A	137	GLY	-	expression tag	UNP Q86WV6
A	138	SER	-	expression tag	UNP Q86WV6
A	139	MET	-	expression tag	UNP Q86WV6
A	140	MET	-	expression tag	UNP Q86WV6
A	230	ALA	GLY	engineered mutation	UNP Q86WV6
A	232	ARG	HIS	SEE REMARK 999	UNP Q86WV6

- Molecule 2 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (CCD ID: EPE) (formula: $C_8H_{18}N_2O_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

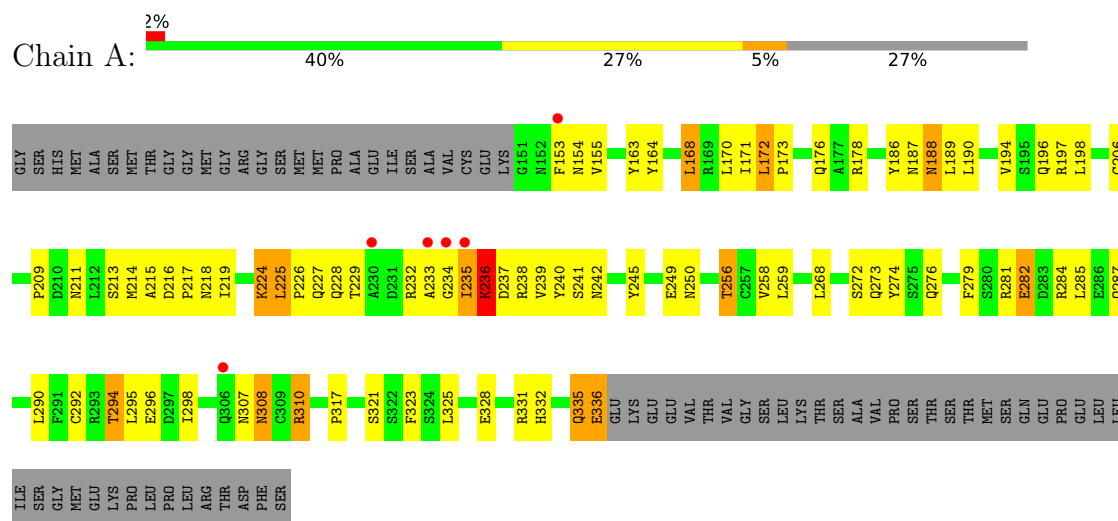
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	31	Total	O	0	0
			31	31		

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: Transmembrane protein 173



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	60.82Å 60.82Å 120.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.99 – 2.60 19.99 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.9 (19.99-2.60) 98.6 (19.99-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.63 (at 2.61Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, R_{free}	0.211 , 0.255 0.221 , 0.259	Depositor DCC
R_{free} test set	735 reflections (10.01%)	wwPDB-VP
Wilson B-factor (Å ²)	67.3	Xtriage
Anisotropy	0.143	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 68.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	1543	wwPDB-VP
Average B, all atoms (Å ²)	84.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.37% 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: EPE

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	0.82	1/1526 (0.1%)	0.80	1/2069 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	219	ILE	CA-CB	-5.12	1.48	1.54

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	236	LYS	N-CA-C	8.15	123.82	113.55

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	1497	0	1463	87	0
2	A	15	0	16	1	0
3	A	31	0	0	3	0
All	All	1543	0	1479	87	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 29.

All (87) 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:236:LYS:HD3	1:A:236:LYS:C	1.46	1.38
1:A:236:LYS:HD3	1:A:236:LYS:O	1.54	1.05
1:A:236:LYS:C	1:A:236:LYS:CD	2.31	1.02
1:A:235:ILE:H	1:A:235:ILE:CD1	1.71	1.01
1:A:153:PHE:CD1	1:A:154:ASN:N	2.30	0.99
1:A:235:ILE:H	1:A:235:ILE:HD13	1.24	0.98
1:A:335:GLN:OE1	1:A:336:GLU:HB2	1.64	0.95
1:A:235:ILE:CD1	1:A:235:ILE:N	2.30	0.90
1:A:229:THR:HG23	1:A:239:VAL:HG11	1.57	0.86
1:A:236:LYS:HD3	1:A:237:ASP:N	1.92	0.84
1:A:227:GLN:NE2	1:A:239:VAL:HB	1.97	0.80
1:A:235:ILE:N	1:A:235:ILE:HD12	1.98	0.79
1:A:153:PHE:CG	1:A:154:ASN:N	2.53	0.77
1:A:290:LEU:O	1:A:294:THR:HG22	1.86	0.76
1:A:335:GLN:OE1	1:A:335:GLN:C	2.30	0.74
1:A:224:LYS:HZ3	1:A:241:SER:HA	1.54	0.73
1:A:236:LYS:O	1:A:236:LYS:CD	2.36	0.71
1:A:176:GLN:HG3	1:A:196:GLN:HE22	1.58	0.69
1:A:178:ARG:HD2	1:A:226:PRO:O	1.96	0.66
1:A:194:VAL:HA	1:A:256:THR:HG23	1.78	0.65
1:A:328:GLU:O	1:A:332:HIS:HD2	1.79	0.65
1:A:211:ASN:ND2	1:A:213:SER:OG	2.30	0.65
1:A:213:SER:O	1:A:216:ASP:C	2.39	0.65
1:A:171:ILE:HD11	1:A:242:ASN:HD21	1.60	0.65
1:A:227:GLN:CD	1:A:239:VAL:HB	2.21	0.64
1:A:224:LYS:HD2	1:A:242:ASN:O	1.99	0.62
1:A:272:SER:HA	1:A:279:PHE:HB3	1.81	0.61
1:A:308:ASN:N	1:A:308:ASN:OD1	2.30	0.61
1:A:233:ALA:HB3	1:A:238:ARG:HH21	1.66	0.60
1:A:227:GLN:NE2	1:A:240:TYR:O	2.34	0.60
1:A:216:ASP:OD2	1:A:218:ASN:N	2.30	0.60
1:A:282:GLU:H	1:A:282:GLU:CD	2.08	0.59
1:A:213:SER:HA	1:A:216:ASP:O	2.03	0.59
1:A:229:THR:HG23	1:A:239:VAL:CG1	2.32	0.59
1:A:224:LYS:HZ3	1:A:242:ASN:H	1.51	0.58
1:A:216:ASP:OD2	1:A:217:PRO:N	2.37	0.58
1:A:216:ASP:C	1:A:216:ASP:OD2	2.46	0.57
1:A:227:GLN:HE22	1:A:240:TYR:H	1.53	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:197:ARG:HH11	1:A:310:ARG:HG3	1.69	0.57
1:A:171:ILE:CD1	1:A:242:ASN:HD21	2.17	0.57
1:A:188:ASN:C	1:A:188:ASN:HD22	2.13	0.57
1:A:171:ILE:HD11	1:A:242:ASN:ND2	2.20	0.56
1:A:211:ASN:ND2	1:A:213:SER:H	2.04	0.56
1:A:274:TYR:CE2	1:A:276:GLN:HB2	2.42	0.55
1:A:233:ALA:HB3	1:A:238:ARG:NH2	2.22	0.55
1:A:285:LEU:HD12	3:A:520:HOH:O	2.06	0.55
1:A:307:ASN:C	1:A:307:ASN:OD1	2.50	0.54
1:A:211:ASN:O	1:A:214:MET:CG	2.56	0.54
1:A:225:LEU:HD23	1:A:226:PRO:HD2	1.90	0.54
1:A:224:LYS:NZ	1:A:242:ASN:H	2.07	0.52
1:A:317:PRO:HG2	1:A:321:SER:HB3	1.90	0.52
1:A:227:GLN:HB3	1:A:229:THR:OG1	2.09	0.52
1:A:323:PHE:CZ	1:A:328:GLU:HG3	2.46	0.51
1:A:209:PRO:HG2	1:A:215:ALA:HB2	1.93	0.50
1:A:335:GLN:OE1	1:A:335:GLN:O	2.30	0.50
1:A:211:ASN:O	1:A:214:MET:HG2	2.11	0.50
1:A:284:ARG:HD2	3:A:520:HOH:O	2.11	0.50
1:A:294:THR:O	1:A:298:ILE:HG13	2.12	0.49
1:A:307:ASN:OD1	1:A:307:ASN:O	2.30	0.49
1:A:164:TYR:HA	1:A:168:LEU:HB2	1.95	0.49
1:A:176:GLN:HG3	1:A:196:GLN:NE2	2.28	0.48
1:A:187:ASN:ND2	1:A:189:LEU:H	2.12	0.48
1:A:170:LEU:HD13	1:A:235:ILE:HG21	1.96	0.48
1:A:163:TYR:HD1	2:A:401:EPE:H31	1.78	0.48
1:A:236:LYS:HD3	1:A:237:ASP:CA	2.44	0.47
1:A:224:LYS:NZ	1:A:241:SER:HA	2.26	0.46
1:A:170:LEU:HD13	1:A:235:ILE:CG2	2.45	0.46
1:A:213:SER:O	1:A:216:ASP:O	2.33	0.46
1:A:335:GLN:OE1	1:A:336:GLU:CB	2.50	0.46
1:A:194:VAL:HA	1:A:256:THR:CG2	2.46	0.45
1:A:211:ASN:O	1:A:214:MET:HG3	2.15	0.45
1:A:336:GLU:HA	1:A:336:GLU:OE1	2.17	0.44
1:A:236:LYS:O	1:A:237:ASP:C	2.62	0.43
1:A:279:PHE:HZ	1:A:287:GLN:HG3	1.84	0.43
1:A:168:LEU:O	1:A:172:LEU:HB2	2.19	0.43
1:A:249:GLU:O	1:A:250:ASN:HB2	2.20	0.42
1:A:245:TYR:CD2	1:A:259:LEU:HB3	2.54	0.42
1:A:237:ASP:HB2	1:A:240:TYR:OH	2.20	0.42
1:A:310:ARG:NH2	1:A:332:HIS:O	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:LYS:O	1:A:238:ARG:O	2.38	0.41
1:A:172:LEU:N	1:A:173:PRO:CD	2.84	0.41
1:A:206:CYS:HB2	1:A:284:ARG:HD3	2.02	0.41
1:A:237:ASP:O	1:A:238:ARG:C	2.63	0.41
1:A:258:VAL:HG12	3:A:504:HOH:O	2.19	0.41
1:A:292:CYS:O	1:A:296:GLU:HG2	2.21	0.41
1:A:234:GLY:C	1:A:235:ILE:O	2.59	0.41
1:A:224:LYS:HZ3	1:A:242:ASN:N	2.18	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	184/256 (72%)	171 (93%)	13 (7%)	0	100	100

There are no Ramachandran outliers to report.

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	161/220 (73%)	135 (84%)	26 (16%)	2	4

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	155	VAL
1	A	168	LEU
1	A	172	LEU
1	A	186	TYR
1	A	188	ASN
1	A	190	LEU
1	A	198	LEU
1	A	224	LYS
1	A	225	LEU
1	A	228	GLN
1	A	232	ARG
1	A	235	ILE
1	A	236	LYS
1	A	256	THR
1	A	268	LEU
1	A	273	GLN
1	A	281	ARG
1	A	282	GLU
1	A	294	THR
1	A	295	LEU
1	A	308	ASN
1	A	310	ARG
1	A	325	LEU
1	A	331	ARG
1	A	335	GLN
1	A	336	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	187	ASN
1	A	188	ASN
1	A	196	GLN
1	A	211	ASN
1	A	227	GLN
1	A	306	GLN
1	A	315	GLN
1	A	327	GLN
1	A	332	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

1 ligand is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	EPE	A	401	-	15,15,15	2.38	4 (26%)	19,20,20	4.65	9 (47%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	EPE	A	401	-	-	5/9/19/19	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	EPE	C10-S	-7.22	1.67	1.77
2	A	401	EPE	O8-C8	-3.76	1.22	1.42
2	A	401	EPE	O1S-S	2.35	1.51	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	EPE	O2S-S	2.32	1.51	1.45

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	401	EPE	O3S-S-O1S	-11.91	81.60	111.40
2	A	401	EPE	O2S-S-O1S	-9.86	81.77	113.82
2	A	401	EPE	O3S-S-O2S	9.77	135.85	111.40
2	A	401	EPE	C7-N4-C3	3.73	121.19	111.24
2	A	401	EPE	O2S-S-C10	3.54	112.08	106.73
2	A	401	EPE	O3S-S-C10	3.09	112.06	106.00
2	A	401	EPE	O1S-S-C10	2.90	111.11	106.73
2	A	401	EPE	C6-N1-C2	2.07	113.30	108.84
2	A	401	EPE	O8-C8-C7	2.03	119.58	111.22

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	EPE	C10-C9-N1-C2
2	A	401	EPE	C9-C10-S-O2S
2	A	401	EPE	C9-C10-S-O3S
2	A	401	EPE	C8-C7-N4-C5
2	A	401	EPE	C8-C7-N4-C3

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	401	EPE	1	0

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	186/256 (72%)	-0.06	6 (3%)	50 44	45, 76, 153, 194	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	234	GLY	3.2
1	A	153	PHE	2.6
1	A	235	ILE	2.3
1	A	306	GLN	2.3
1	A	230	ALA	2.2
1	A	233	ALA	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 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(Å ²)	Q<0.9
2	EPE	A	401	15/15	0.86	0.14	115,119,153,154	0

6.5 Other polymers [i](#)

There are no such residues in this entry.