



# Full wwPDB X-ray Structure Validation Report ⓘ

May 28, 2020 – 12:26 am BST

PDB ID : 4H62  
Title : Structure of the *Saccharomyces cerevisiae* Mediator subcomplex  
Med17C/Med11C/Med22C  
Authors : Lariviere, L.; Plaschka, C.; Seizl, M.; Wenzek, L.; Kurth, F.; Cramer, P.  
Deposited on : 2012-09-19  
Resolution : 3.00 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 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 : 2.11  
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) : 2.11

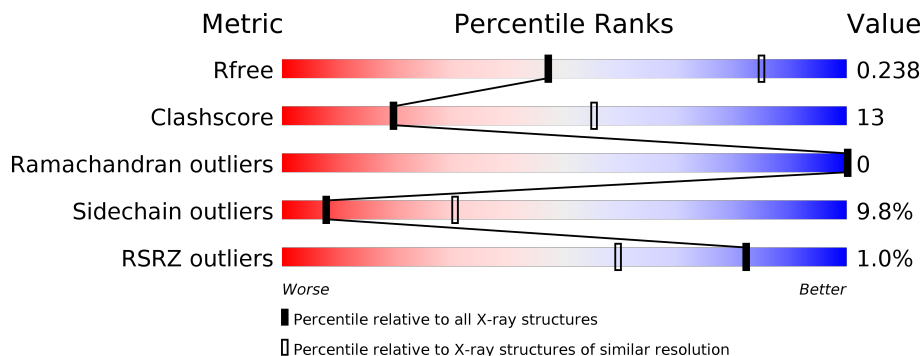
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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 on 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	K	40	
2	V	31	
3	Q	312	

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 2556 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 Mediator of RNA polymerase II transcription subunit 11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	Se			
1	K	19	151	93	22	35	1	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	80	GLY	-	EXPRESSION TAG	UNP Q99278
K	81	SER	-	EXPRESSION TAG	UNP Q99278
K	82	HIS	-	EXPRESSION TAG	UNP Q99278
K	83	MSE	-	EXPRESSION TAG	UNP Q99278
K	116	GLY	-	LINKER	UNP Q99278
K	117	ALA	-	LINKER	UNP Q99278
K	118	GLY	-	LINKER	UNP Q99278
K	119	SER	-	LINKER	UNP Q99278

- Molecule 2 is a protein called Mediator of RNA polymerase II transcription subunit 22.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	V	22	179	110	26	42	1	0	0	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
V	91	GLY	-	LINKER	UNP P32570
V	92	ALA	-	LINKER	UNP P32570
V	93	GLY	-	LINKER	UNP P32570
V	94	SER	-	LINKER	UNP P32570
V	95	GLY	-	LINKER	UNP P32570

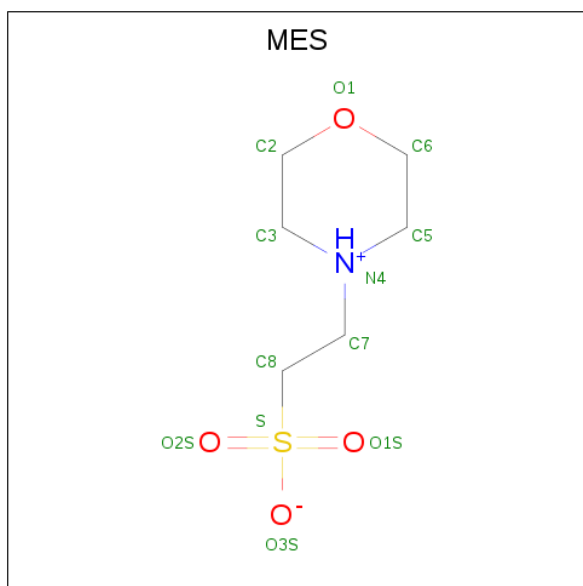
- Molecule 3 is a protein called Mediator of RNA polymerase II transcription subunit 17.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	N	O	S				Se
3	Q	271	2214	1433	368	406	2	5	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	376	MSE	-	EXPRESSION TAG	UNP P32569

- Molecule 4 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: C<sub>6</sub>H<sub>13</sub>NO<sub>4</sub>S).




Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
4	Q	1	12	6	1	4	1	0	0

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

These plots are drawn for all protein, RNA and DNA 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: Mediator of RNA polymerase II transcription subunit 11

Chain K: 



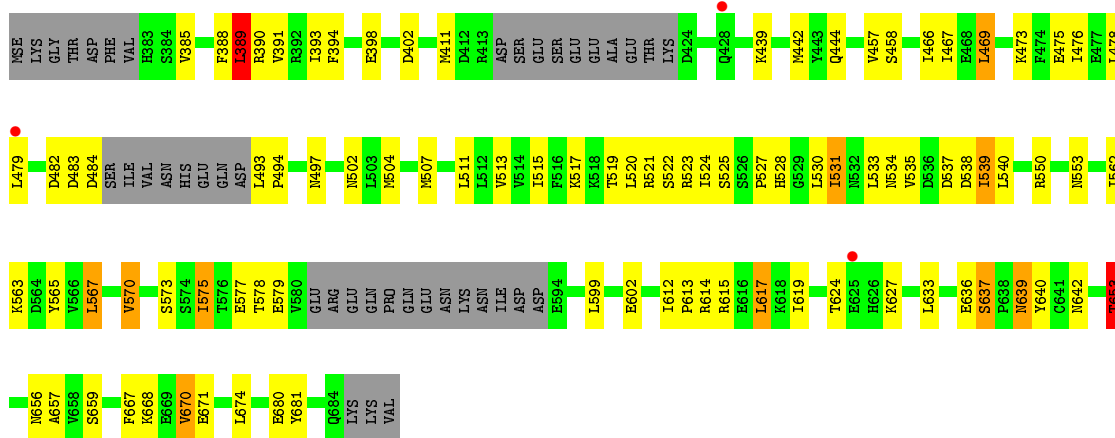
- Molecule 2: Mediator of RNA polymerase II transcription subunit 22

Chain V: 



- Molecule 3: Mediator of RNA polymerase II transcription subunit 17

Chain Q: 



## 4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	261.23Å 261.23Å 47.74Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	65.31 – 3.00 130.62 – 3.00	Depositor EDS
% Data completeness (in resolution range)	99.9 (65.31-3.00) 100.0 (130.62-3.00)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	0.06	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.00 (at 3.01Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, $R_{free}$	0.204 , 0.229 0.213 , 0.238	Depositor DCC
$R_{free}$ test set	622 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	115.3	Xtrriage
Anisotropy	0.157	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 112.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	2556	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	144.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.51% 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: 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	K	0.26	0/150	0.50	0/200
2	V	0.30	0/179	0.46	0/239
3	Q	0.35	0/2239	0.61	2/3002 (0.1%)
All	All	0.34	0/2568	0.60	2/3441 (0.1%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	Q	653	THR	N-CA-C	-5.19	96.99	111.00
3	Q	389	LEU	CA-CB-CG	5.01	126.82	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	K	151	0	146	4	0
2	V	179	0	170	3	0
3	Q	2214	0	2332	61	0
4	Q	12	0	12	3	0
All	All	2556	0	2660	66	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 13.

All (66) 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:Q:469:LEU:HB3	4:Q:701:MES:H62	1.65	0.78
3:Q:388:PHE:HB2	3:Q:411:MSE:HE3	1.67	0.76
3:Q:519:THR:HG22	3:Q:533:LEU:HD11	1.71	0.73
3:Q:534:ASN:HB2	3:Q:537:ASP:HB2	1.73	0.71
3:Q:563:LYS:HA	3:Q:567:LEU:HB2	1.77	0.66
3:Q:466:ILE:HG22	3:Q:475:GLU:HG2	1.76	0.65
3:Q:402:ASP:OD1	3:Q:402:ASP:N	2.30	0.65
3:Q:389:LEU:HD23	3:Q:442:MSE:HE2	1.80	0.63
3:Q:614:ARG:NH2	3:Q:636:GLU:OE1	2.33	0.61
3:Q:517:LYS:NZ	3:Q:602:GLU:OE1	2.33	0.60
2:V:100:ASP:N	2:V:103:GLN:OE1	2.34	0.59
3:Q:565:TYR:CZ	3:Q:671:GLU:HB3	2.38	0.58
3:Q:523:ARG:HA	3:Q:527:PRO:HG3	1.84	0.58
3:Q:394:PHE:HB2	3:Q:473:LYS:HG2	1.83	0.58
3:Q:521:ARG:HB2	3:Q:599:LEU:HD23	1.87	0.57
3:Q:562:ILE:HD11	3:Q:633:LEU:HD22	1.86	0.56
3:Q:522:SER:O	3:Q:527:PRO:HD3	2.06	0.56
3:Q:653:THR:O	3:Q:657:ALA:N	2.39	0.55
3:Q:476:ILE:HD11	3:Q:504:MSE:HE2	1.89	0.55
3:Q:393:ILE:HD12	3:Q:497:ASN:HB3	1.89	0.54
1:K:108:ILE:HD13	3:Q:502:ASN:HB3	1.90	0.54
3:Q:613:PRO:HG2	3:Q:637:SER:HB2	1.90	0.54
3:Q:394:PHE:CD2	3:Q:473:LYS:HE2	2.44	0.53
3:Q:579:GLU:HG3	3:Q:615:ARG:HH12	1.74	0.52
3:Q:385:VAL:HG11	3:Q:439:LYS:NZ	2.23	0.52
3:Q:504:MSE:HA	3:Q:507:MSE:HE3	1.91	0.52
3:Q:653:THR:O	3:Q:656:ASN:N	2.44	0.51
3:Q:442:MSE:HE1	3:Q:476:ILE:HG22	1.91	0.51
3:Q:493:LEU:N	3:Q:494:PRO:HD3	2.25	0.51
3:Q:627:LYS:HD3	3:Q:653:THR:HG22	1.93	0.51
3:Q:511:LEU:O	3:Q:515:ILE:HG13	2.12	0.50
3:Q:562:ILE:HD13	3:Q:619:ILE:HD11	1.92	0.50
3:Q:667:PHE:HA	3:Q:670:VAL:HG13	1.94	0.49
3:Q:457:VAL:HG22	3:Q:467:ILE:HG12	1.95	0.49
3:Q:570:VAL:HG22	3:Q:573:SER:HB3	1.95	0.48
3:Q:577:GLU:HB3	3:Q:617:LEU:HD12	1.95	0.47
1:K:95:THR:O	1:K:99:GLU:HG2	2.14	0.47

*Continued on next page...*



Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:Q:535:VAL:O	3:Q:539:ILE:HG22	2.15	0.47
3:Q:653:THR:HG23	3:Q:656:ASN:HB3	1.95	0.47
3:Q:444:GLN:OE1	3:Q:539:ILE:HD11	2.15	0.46
3:Q:531:ILE:HG12	3:Q:531:ILE:H	1.39	0.45
3:Q:442:MSE:HE3	3:Q:478:LEU:HB2	1.99	0.45
3:Q:520:LEU:O	3:Q:524:ILE:HG12	2.17	0.45
1:K:106:SER:HB3	2:V:107:LEU:HD21	1.99	0.45
3:Q:482:ASP:OD1	3:Q:483:ASP:N	2.50	0.45
3:Q:385:VAL:HG11	3:Q:439:LYS:HZ1	1.82	0.44
3:Q:511:LEU:HD23	3:Q:511:LEU:HA	1.73	0.44
3:Q:612:ILE:HG23	3:Q:637:SER:O	2.17	0.44
3:Q:639:ASN:O	3:Q:640:TYR:HB2	2.17	0.43
3:Q:567:LEU:HD21	3:Q:575:ILE:HG22	2.01	0.43
3:Q:539:ILE:HG23	3:Q:539:ILE:O	2.17	0.43
3:Q:667:PHE:O	3:Q:671:GLU:HG3	2.18	0.43
3:Q:550:ARG:HB3	3:Q:550:ARG:HE	1.43	0.43
4:Q:701:MES:H82	4:Q:701:MES:H31	1.54	0.43
2:V:100:ASP:O	2:V:104:ILE:HG13	2.19	0.43
3:Q:398:GLU:N	3:Q:398:GLU:OE1	2.51	0.42
3:Q:674:LEU:HD23	3:Q:674:LEU:HA	1.79	0.42
1:K:98:MSE:HB2	3:Q:513:VAL:HG11	2.00	0.42
3:Q:624:THR:OG1	3:Q:627:LYS:O	2.22	0.42
3:Q:639:ASN:OD1	3:Q:642:ASN:ND2	2.52	0.42
3:Q:389:LEU:HD23	3:Q:442:MSE:CE	2.48	0.42
3:Q:553:ASN:HD21	4:Q:701:MES:H51	1.84	0.42
3:Q:680:GLU:HB2	3:Q:681:TYR:CD1	2.55	0.41
3:Q:515:ILE:O	3:Q:519:THR:HG23	2.20	0.40
3:Q:567:LEU:HA	3:Q:573:SER:OG	2.21	0.40
3:Q:680:GLU:HG2	3:Q:680:GLU:H	1.71	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	K	17/40 (42%)	17 (100%)	0	0	100	100
2	V	20/31 (64%)	19 (95%)	1 (5%)	0	100	100
3	Q	263/312 (84%)	252 (96%)	11 (4%)	0	100	100
All	All	300/383 (78%)	288 (96%)	12 (4%)	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	K	18/31 (58%)	16 (89%)	2 (11%)	6	25
2	V	21/26 (81%)	19 (90%)	2 (10%)	8	32
3	Q	256/289 (89%)	231 (90%)	25 (10%)	8	30
All	All	295/346 (85%)	266 (90%)	29 (10%)	8	30

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	96	GLU
1	K	104	LEU
2	V	109	ASP
2	V	120	THR
3	Q	389	LEU
3	Q	390	ARG
3	Q	391	VAL
3	Q	458	SER
3	Q	469	LEU
3	Q	479	LEU
3	Q	484	ASP
3	Q	525	SER
3	Q	528	HIS
3	Q	530	LEU
3	Q	531	ILE

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
3	Q	538	ASP
3	Q	539	ILE
3	Q	540	LEU
3	Q	567	LEU
3	Q	570	VAL
3	Q	575	ILE
3	Q	578	THR
3	Q	617	LEU
3	Q	637	SER
3	Q	639	ASN
3	Q	653	THR
3	Q	659	SER
3	Q	668	LYS
3	Q	670	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
3	Q	642	ASN

### 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 carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

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
4	MES	Q	701	-	12,12,12	2.33	1 (8%)	14,16,16	2.38	7 (50%)

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	MES	Q	701	-	-	5/6/14/14	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	Q	701	MES	C8-S	-7.84	1.66	1.77

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	Q	701	MES	C5-N4-C3	4.66	119.31	108.83
4	Q	701	MES	C2-C3-N4	-3.35	105.03	110.10
4	Q	701	MES	C6-C5-N4	-3.34	105.05	110.10
4	Q	701	MES	C7-N4-C5	2.94	118.75	111.23
4	Q	701	MES	C7-N4-C3	2.78	118.35	111.23
4	Q	701	MES	O2S-S-C8	2.26	109.63	106.92
4	Q	701	MES	O3S-S-C8	2.05	109.09	105.77

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	Q	701	MES	C8-C7-N4-C3
4	Q	701	MES	C8-C7-N4-C5
4	Q	701	MES	C7-C8-S-O1S
4	Q	701	MES	C7-C8-S-O2S
4	Q	701	MES	C7-C8-S-O3S

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	Q	701	MES	3	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, 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	K	18/40 (45%)	-0.25	0	100   100	137, 165, 218, 222	0
2	V	22/31 (70%)	-0.22	0	100   100	118, 159, 203, 218	0
3	Q	266/312 (85%)	-0.07	3 (1%)	80   56	90, 128, 223, 272	0
All	All	306/383 (79%)	-0.09	3 (0%)	82   59	90, 133, 220, 272	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	Q	479	LEU	2.6
3	Q	428	GLN	2.6
3	Q	625	GLU	2.3

### 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 carbohydrates 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	MES	Q	701	12/12	0.93	0.37	150,157,235,237	0

## 6.5 Other polymers

There are no such residues in this entry.