



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:42 PM UTC

PDB ID : 4Q7J / pdb_00004q7j
Title : Complex structure of viral RNA polymerase
Authors : Takeshita, D.
Deposited on : 2014-04-25
Resolution : 2.90 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:

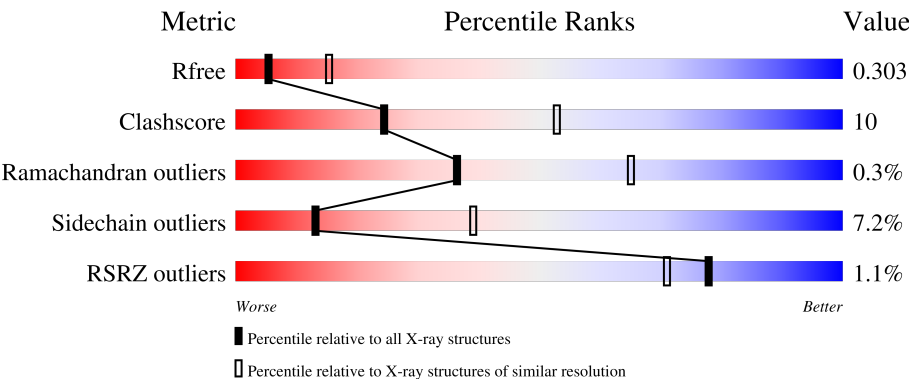
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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	282	74%24%..
1	E	282	% 77%21%..
2	B	393	64%27%•8%
2	F	393	% 63%28%•7%
3	C	594	70%20%•8%

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Mol	Chain	Length	Quality of chain
3	G	594	% 69%22%8%
4	D	281	2% 41%19%37%
4	H	281	3% 41%21%37%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 21369 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 Elongation factor Ts.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	278	Total	C	N	O	S	0	0	0
			2093	1314	359	409	11			
1	E	280	Total	C	N	O	S	0	0	0
			2107	1323	361	412	11			

- Molecule 2 is a protein called Elongation factor Tu 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	362	Total	C	N	O	S	0	0	0
			2790	1769	477	531	13			
2	F	364	Total	C	N	O	S	0	0	0
			2802	1776	479	534	13			

- Molecule 3 is a protein called Q beta replicase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	547	Total	C	N	O	S	0	0	0
			4300	2723	750	807	20			
3	G	545	Total	C	N	O	S	0	0	0
			4287	2716	747	804	20			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	589	HIS	-	expression tag	UNP Q8LTE0
C	590	HIS	-	expression tag	UNP Q8LTE0
C	591	HIS	-	expression tag	UNP Q8LTE0
C	592	HIS	-	expression tag	UNP Q8LTE0
C	593	HIS	-	expression tag	UNP Q8LTE0
C	594	HIS	-	expression tag	UNP Q8LTE0
G	589	HIS	-	expression tag	UNP Q8LTE0
G	590	HIS	-	expression tag	UNP Q8LTE0

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Chain	Residue	Modelled	Actual	Comment	Reference
G	591	HIS	-	expression tag	UNP Q8LTE0
G	592	HIS	-	expression tag	UNP Q8LTE0
G	593	HIS	-	expression tag	UNP Q8LTE0
G	594	HIS	-	expression tag	UNP Q8LTE0

- Molecule 4 is a protein called 30S ribosomal protein S1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	D	177	Total	C	N	O	0	0	0
			1359	855	233	271			
4	H	177	Total	C	N	O	0	0	0
			1358	855	232	271			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	274	LEU	-	expression tag	UNP P0AG67
D	275	GLU	-	expression tag	UNP P0AG67
D	276	HIS	-	expression tag	UNP P0AG67
D	277	HIS	-	expression tag	UNP P0AG67
D	278	HIS	-	expression tag	UNP P0AG67
D	279	HIS	-	expression tag	UNP P0AG67
D	280	HIS	-	expression tag	UNP P0AG67
D	281	HIS	-	expression tag	UNP P0AG67
H	274	LEU	-	expression tag	UNP P0AG67
H	275	GLU	-	expression tag	UNP P0AG67
H	276	HIS	-	expression tag	UNP P0AG67
H	277	HIS	-	expression tag	UNP P0AG67
H	278	HIS	-	expression tag	UNP P0AG67
H	279	HIS	-	expression tag	UNP P0AG67
H	280	HIS	-	expression tag	UNP P0AG67
H	281	HIS	-	expression tag	UNP P0AG67

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total	O	S	0	0
			5	4	1		
5	C	1	Total	O	S	0	0
			5	4	1		
5	G	1	Total	O	S	0	0
			5	4	1		
5	G	1	Total	O	S	0	0
			5	4	1		

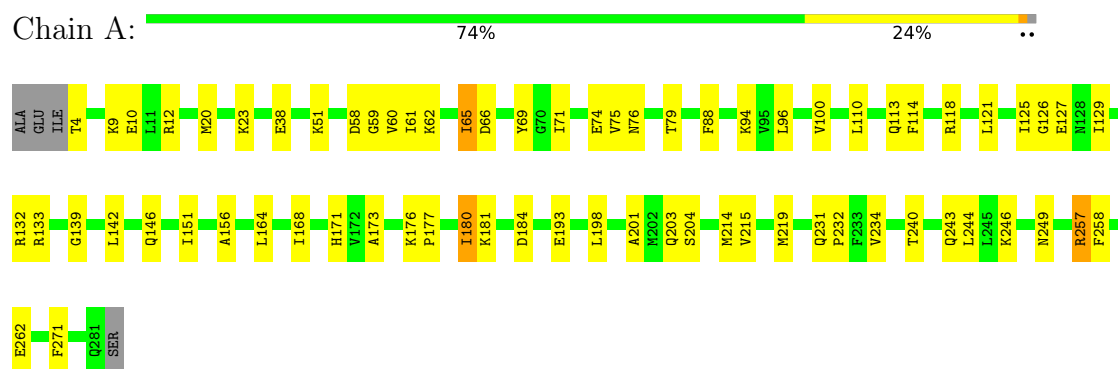
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	30	Total	O	0	0
			30	30		
6	B	36	Total	O	0	0
			36	36		
6	C	65	Total	O	0	0
			65	65		
6	D	9	Total	O	0	0
			9	9		
6	E	28	Total	O	0	0
			28	28		
6	F	27	Total	O	0	0
			27	27		
6	G	52	Total	O	0	0
			52	52		
6	H	6	Total	O	0	0
			6	6		

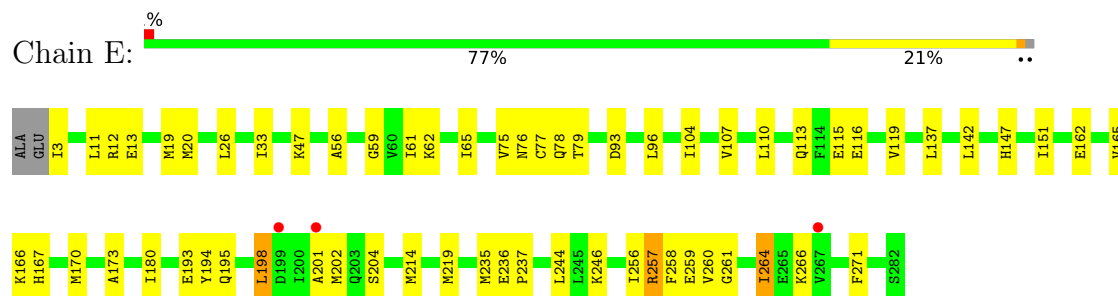
3 Residue-property plots [i](#)

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.

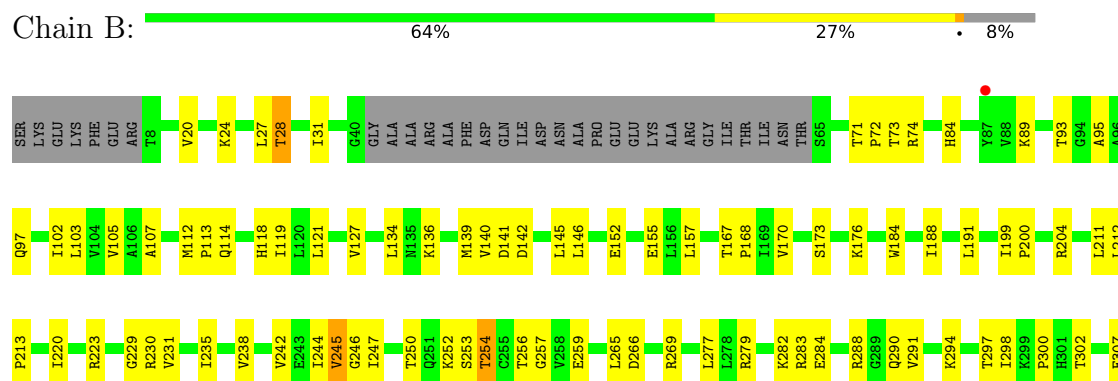
• Molecule 1: Elongation factor Ts

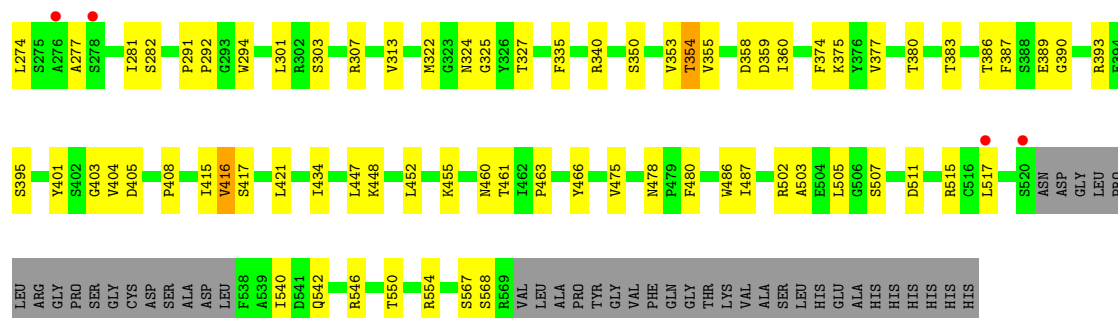


• Molecule 1: Elongation factor Ts



• Molecule 2: Elongation factor Tu 1





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	132.19Å 150.83Å 189.78Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.98 – 2.90 19.98 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.1 (19.98-2.90) 98.7 (19.98-2.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.48 (at 2.91Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.255 , 0.309 0.254 , 0.303	Depositor DCC
R_{free} test set	4184 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å ²)	52.6	Xtriage
Anisotropy	0.212	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 41.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.36$, $\langle L^2 \rangle = 0.19$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	21369	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.91% 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	0.30	0/2114	0.74	0/2837
1	E	0.30	0/2128	0.74	0/2856
2	B	0.28	0/2842	0.75	0/3848
2	F	0.29	0/2854	0.76	0/3865
3	C	0.29	0/4395	0.76	2/5960 (0.0%)
3	G	0.30	0/4382	0.76	2/5942 (0.0%)
4	D	0.29	0/1374	0.81	3/1855 (0.2%)
4	H	0.30	0/1373	0.80	0/1854
All	All	0.30	0/21462	0.76	7/29017 (0.0%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	390	GLY	CA-C-N	5.76	125.44	119.56
3	G	390	GLY	C-N-CA	5.76	125.44	119.56
4	D	48	ILE	CA-C-N	5.23	124.55	118.85
4	D	48	ILE	C-N-CA	5.23	124.55	118.85
4	D	51	GLU	CB-CA-C	-5.13	110.64	116.54
3	C	390	GLY	CA-C-N	5.04	124.70	119.56
3	C	390	GLY	C-N-CA	5.04	124.70	119.56

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	2093	0	2140	44	0
1	E	2107	0	2156	32	0
2	B	2790	0	2808	65	0
2	F	2802	0	2817	77	0
3	C	4300	0	4241	80	0
3	G	4287	0	4233	82	0
4	D	1359	0	1366	31	0
4	H	1358	0	1367	41	0
5	C	10	0	0	0	0
5	G	10	0	0	1	0
6	A	30	0	0	6	0
6	B	36	0	0	5	0
6	C	65	0	0	7	0
6	D	9	0	0	0	0
6	E	28	0	0	3	0
6	F	27	0	0	5	0
6	G	52	0	0	5	0
6	H	6	0	0	0	0
All	All	21369	0	21128	416	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 10.

All (416) 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:G:274:LEU:HB2	3:G:277:ALA:HB2	1.64	0.80
2:B:235:ILE:HD12	2:B:269:ARG:HD2	1.65	0.77
4:H:116:VAL:HG12	4:H:117:LYS:H	1.47	0.77
4:D:87:GLU:HG3	4:D:91:ARG:HD3	1.67	0.76
3:C:382:ASN:HD21	3:C:384:LYS:HG2	1.50	0.76
3:C:272:VAL:HG13	3:C:360:ILE:HB	1.68	0.75
2:B:229:GLY:HA2	3:C:515:ARG:HH11	1.53	0.73
3:C:269:LEU:O	3:C:393:ARG:NH2	2.22	0.72
4:H:117:LYS:O	4:H:119:GLY:N	2.22	0.71
2:F:132:VAL:HB	2:F:169:ILE:HG12	1.73	0.71
2:F:373:ARG:HG3	2:F:387:VAL:HG22	1.73	0.71
1:A:132:ARG:NH2	1:A:262:GLU:O	2.23	0.71
2:F:206:ILE:HG23	2:F:235:ILE:HD11	1.73	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:220:ILE:HB	2:B:223:ARG:HB3	1.74	0.70
3:G:463:PRO:HD3	3:G:475:VAL:HB	1.74	0.70
3:C:274:LEU:HB3	3:C:277:ALA:HB2	1.74	0.69
1:A:118:ARG:NH2	1:A:129:ILE:O	2.25	0.69
3:G:179:THR:HG22	3:G:228:ASN:HD21	1.57	0.69
1:E:193:GLU:HG3	1:E:219:MET:HE1	1.74	0.68
3:G:387:PHE:O	3:G:393:ARG:NH2	2.26	0.68
2:B:390:LYS:NZ	2:B:391:VAL:O	2.27	0.67
2:B:318:ARG:NH1	2:B:378:GLU:OE1	2.28	0.67
3:G:266:THR:HG23	3:G:268:ASN:H	1.60	0.67
1:A:177:PRO:HG3	1:A:231:GLN:HE22	1.59	0.67
3:C:15:ARG:O	3:C:19:ASN:ND2	2.28	0.66
2:B:140:VAL:HG11	2:B:146:LEU:HG	1.77	0.66
2:B:327:ARG:HG2	2:B:340:THR:HG22	1.76	0.66
3:C:109:LEU:O	4:D:128:ARG:NH2	2.29	0.65
3:G:131:ARG:NH2	4:H:164:ASN:O	2.29	0.65
4:H:130:PHE:HB3	4:H:167:VAL:HG12	1.78	0.65
2:F:246:GLY:HA3	2:F:290:GLN:HG2	1.79	0.65
3:C:355:VAL:HG22	3:C:360:ILE:HG23	1.78	0.64
3:G:355:VAL:HG22	3:G:360:ILE:HG23	1.78	0.64
4:H:157:ILE:HB	4:H:167:VAL:HG23	1.78	0.64
3:G:272:VAL:HG13	3:G:360:ILE:HB	1.80	0.64
2:B:254:THR:HG23	2:B:279:ARG:HB3	1.80	0.63
1:A:171:HIS:HD1	1:A:234:VAL:HG23	1.62	0.63
1:A:180:ILE:HG13	1:A:181:LYS:HG3	1.79	0.63
3:C:317:GLU:HG3	4:D:86:ARG:HH22	1.64	0.63
1:E:113:GLN:NE2	6:E:315:HOH:O	2.31	0.63
2:B:246:GLY:HA3	2:B:290:GLN:HG2	1.80	0.62
2:F:318:ARG:NH1	2:F:320:THR:O	2.32	0.62
3:G:118:PHE:HA	3:G:375:LYS:HE3	1.81	0.62
2:F:210:PHE:HB3	2:F:294:LYS:HD2	1.81	0.62
4:H:147:LEU:HB3	4:H:150:LYS:HD2	1.80	0.62
3:G:265:VAL:O	3:G:267:ASN:ND2	2.32	0.62
4:H:88:LYS:O	4:H:92:HIS:ND1	2.32	0.62
2:B:307:GLU:HG2	2:B:357:LYS:HG2	1.82	0.61
1:A:20:MET:HE3	2:B:140:VAL:HA	1.82	0.61
1:A:62:LYS:NZ	6:A:311:HOH:O	2.33	0.61
2:B:333:ARG:NH2	6:B:407:HOH:O	2.32	0.61
1:A:125:ILE:HG22	1:A:127:GLU:H	1.66	0.60
1:A:4:THR:N	6:A:307:HOH:O	2.34	0.60
2:B:140:VAL:HG21	2:B:146:LEU:HD21	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:35:ASP:OD2	3:C:448:LYS:NZ	2.27	0.60
4:H:117:LYS:C	4:H:119:GLY:H	2.10	0.60
4:H:143:ASP:HA	4:H:146:HIS:HB2	1.83	0.60
2:B:157:LEU:HD22	2:B:167:THR:HG21	1.84	0.60
2:B:142:ASP:HB3	2:B:145:LEU:HD13	1.83	0.60
2:F:201:GLU:OE2	2:F:204:ARG:NH1	2.35	0.59
4:H:116:VAL:HG12	4:H:117:LYS:HG3	1.84	0.59
1:A:51:LYS:NZ	1:A:126:GLY:O	2.35	0.59
2:F:142:ASP:HB3	2:F:145:LEU:HD13	1.84	0.59
2:F:123:ARG:NH1	6:F:420:HOH:O	2.34	0.59
2:F:273:ASN:HB3	3:G:515:ARG:HD2	1.83	0.59
2:F:319:HIS:CE1	3:G:568:SER:H	2.21	0.59
4:D:81:GLU:HB3	4:D:88:LYS:HE2	1.85	0.58
3:G:273:ASP:H	3:G:386:THR:HG22	1.68	0.58
3:C:273:ASP:H	3:C:386:THR:HG22	1.69	0.58
3:C:244:ARG:NH2	6:C:743:HOH:O	2.35	0.58
4:D:57:GLN:HA	4:D:61:GLU:HG3	1.85	0.58
2:F:208:LYS:HD2	2:F:233:ARG:HD3	1.86	0.58
2:B:213:PRO:HA	2:B:291:VAL:HG12	1.85	0.58
4:D:101:ALA:O	4:D:105:ALA:HA	2.04	0.58
4:H:157:ILE:HD11	4:H:169:SER:HB2	1.86	0.57
3:C:180:PRO:HA	3:C:202:ILE:HD11	1.85	0.56
3:C:264:SER:OG	3:C:403:GLY:N	2.31	0.56
2:F:381:ARG:NH2	6:F:402:HOH:O	2.38	0.56
4:H:23:ILE:HG23	4:H:69:ASP:HB3	1.86	0.56
2:B:136:LYS:HB3	2:B:139:MET:HE3	1.88	0.56
3:G:43:SER:OG	3:G:71:LYS:NZ	2.38	0.56
3:G:448:LYS:NZ	6:G:723:HOH:O	2.38	0.56
1:E:147:HIS:HB3	1:E:151:ILE:HG23	1.88	0.56
2:B:204:ARG:NH2	6:B:409:HOH:O	2.39	0.56
1:E:194:TYR:HA	1:E:219:MET:HE3	1.86	0.56
3:G:87:THR:OG1	3:G:88:GLU:N	2.39	0.56
3:G:502:ARG:NH2	3:G:550:THR:O	2.37	0.56
4:D:134:SER:O	4:D:171:ARG:NH2	2.39	0.55
2:F:303:LYS:HG3	2:F:361:THR:HG22	1.87	0.55
3:G:455:LYS:H	3:G:455:LYS:HD2	1.69	0.55
1:A:61:ILE:HD12	1:A:258:PHE:HB3	1.88	0.55
3:C:43:SER:OG	3:C:71:LYS:NZ	2.39	0.55
1:A:23:LYS:NZ	6:A:316:HOH:O	2.38	0.55
2:B:31:ILE:HD13	2:B:188:ILE:HG23	1.88	0.55
3:C:450:ARG:HH11	3:C:458:GLN:HB3	1.70	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:542:GLN:NE2	6:G:717:HOH:O	2.35	0.55
1:A:71:ILE:HB	1:A:100:VAL:HG22	1.87	0.55
2:B:337:VAL:HG11	2:B:366:ILE:HG13	1.88	0.55
3:G:340:ARG:HG2	3:G:350:SER:HB3	1.88	0.55
3:G:224:GLU:OE1	3:G:303:SER:OG	2.20	0.55
2:B:343:LEU:HD23	2:B:347:VAL:HG13	1.89	0.55
3:C:110:TYR:HB3	3:C:111:ARG:HD3	1.89	0.55
1:E:61:ILE:HD12	1:E:258:PHE:HB3	1.88	0.55
2:F:69:TYR:HH	2:F:78:HIS:HD1	1.55	0.54
3:C:279:ASP:HA	3:C:318:LYS:HD3	1.89	0.54
1:A:132:ARG:NH1	6:A:302:HOH:O	2.40	0.54
2:B:318:ARG:NE	2:B:320:THR:O	2.39	0.54
3:G:22:ILE:HD11	3:G:452:LEU:HD12	1.89	0.54
3:G:106:ASN:OD1	3:G:282:SER:OG	2.26	0.54
1:A:271:PHE:HZ	2:B:28:THR:HG21	1.73	0.54
3:G:132:ARG:HG2	4:H:117:LYS:NZ	2.23	0.54
1:A:171:HIS:ND1	1:A:234:VAL:HG23	2.23	0.53
2:B:245:VAL:HG22	2:B:367:ALA:HB2	1.89	0.53
1:E:62:LYS:HB3	1:E:96:LEU:HG	1.90	0.53
2:F:308:VAL:HG12	2:F:386:GLY:HA3	1.90	0.53
4:H:155:LYS:HE3	4:H:173:VAL:HG22	1.90	0.53
1:A:201:ALA:O	1:A:204:SER:OG	2.25	0.53
2:F:235:ILE:HD12	2:F:269:ARG:HG2	1.90	0.53
2:F:223:ARG:NH2	6:F:401:HOH:O	2.41	0.53
2:B:238:VAL:HG12	2:B:257:GLY:HA2	1.90	0.53
2:B:288:ARG:NH1	3:C:547:SER:O	2.42	0.53
3:C:374:PHE:HB3	3:C:379:PHE:HB2	1.89	0.53
2:F:355:ASN:ND2	6:F:413:HOH:O	2.41	0.52
3:G:461:THR:N	3:G:478:ASN:OD1	2.42	0.52
4:D:93:GLU:HA	4:D:96:ILE:HD12	1.91	0.52
1:E:59:GLY:HA3	1:E:76:ASN:HA	1.90	0.52
1:E:202:MET:SD	6:E:303:HOH:O	2.58	0.52
3:G:221:ILE:HD12	3:G:322:MET:HB3	1.90	0.52
2:F:310:ILE:O	2:F:353:GLY:HA2	2.09	0.52
4:D:79:PHE:O	4:D:83:LEU:N	2.42	0.52
3:G:66:ARG:NE	3:G:405:ASP:O	2.40	0.52
1:A:132:ARG:HD2	1:A:133:ARG:HG3	1.91	0.52
2:B:31:ILE:HD11	2:B:191:LEU:HD23	1.91	0.52
2:B:114:GLN:O	2:B:118:HIS:ND1	2.38	0.52
1:A:74:GLU:OE2	1:A:133:ARG:NE	2.43	0.52
1:E:137:LEU:HD22	1:E:256:ILE:HG12	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:114:GLN:O	2:F:118:HIS:ND1	2.43	0.52
2:F:205:ALA:HA	2:F:208:LYS:HE3	1.91	0.52
1:A:71:ILE:HD12	1:A:100:VAL:HA	1.91	0.51
2:B:253:SER:OG	2:B:279:ARG:O	2.27	0.51
4:H:89:ALA:HA	4:H:92:HIS:CE1	2.45	0.51
4:D:159:LEU:HD13	4:D:161:GLN:HG2	1.92	0.51
3:C:213:LYS:HB2	3:C:219:ARG:HB2	1.91	0.51
3:C:207:LYS:NZ	6:C:708:HOH:O	2.32	0.51
1:A:61:ILE:O	1:A:146:GLN:NE2	2.44	0.51
1:E:214:MET:HE1	3:G:434:ILE:HD13	1.92	0.51
3:C:171:LYS:NZ	6:C:705:HOH:O	2.41	0.51
3:G:159:THR:HG22	3:G:225:PRO:HA	1.92	0.51
2:B:230:ARG:NH1	6:B:432:HOH:O	2.40	0.51
1:E:201:ALA:O	1:E:204:SER:OG	2.27	0.51
2:F:323:PHE:HB2	3:G:486:TRP:CE2	2.46	0.51
3:G:88:GLU:OE1	3:G:210:THR:OG1	2.25	0.51
1:A:12:ARG:NH2	2:B:152:GLU:OE2	2.45	0.50
2:B:256:THR:HB	2:B:277:LEU:HB3	1.92	0.50
2:B:347:VAL:HG11	2:B:356:ILE:HD11	1.92	0.50
3:C:192:SER:HA	4:D:8:LEU:HD22	1.93	0.50
1:E:173:ALA:O	1:E:257:ARG:NH1	2.44	0.50
3:C:86:ASP:OD1	3:C:86:ASP:N	2.37	0.50
2:F:305:GLU:HG2	2:F:390:LYS:HB3	1.92	0.50
3:G:40:TYR:CG	3:G:67:ILE:HG13	2.46	0.50
2:F:260:MET:HG3	2:F:274:VAL:HG12	1.92	0.50
4:H:12:SER:O	4:H:16:ILE:HG12	2.09	0.50
3:C:500:ARG:HD3	3:C:554:ARG:HB2	1.93	0.50
2:F:327:ARG:HG2	2:F:340:THR:HG22	1.93	0.50
1:A:271:PHE:CZ	2:B:28:THR:HG21	2.47	0.50
2:F:67:VAL:HG23	2:F:78:HIS:HB3	1.93	0.50
3:G:138:ILE:HG12	3:G:294:TRP:CE2	2.47	0.50
3:G:73:GLU:O	3:G:76:SER:OG	2.26	0.50
4:H:86:ARG:H	4:H:86:ARG:HD2	1.77	0.50
2:B:71:THR:OG1	2:B:74:ARG:O	2.28	0.50
4:H:112:ILE:HD13	4:H:131:LEU:HD22	1.93	0.50
4:H:116:VAL:HG21	4:H:121:THR:HG23	1.93	0.50
3:C:160:THR:OG1	3:C:176:GLN:OE1	2.29	0.49
2:F:31:ILE:HD13	2:F:188:ILE:HG23	1.94	0.49
3:G:161:ASN:OD1	3:G:176:GLN:NE2	2.34	0.49
3:C:352:GLU:HB3	3:C:363:PRO:HD3	1.95	0.49
4:H:37:LEU:HD23	4:H:47:ALA:HB2	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:160:THR:OG1	3:C:161:ASN:N	2.45	0.49
3:C:40:TYR:CD2	3:C:67:ILE:HG13	2.48	0.49
4:H:82:THR:HB	4:H:88:LYS:HD2	1.94	0.49
3:C:224:GLU:OE1	3:C:303:SER:OG	2.24	0.49
3:C:317:GLU:OE1	3:C:317:GLU:N	2.39	0.49
3:C:496:HIS:ND1	3:C:556:THR:OG1	2.39	0.49
4:D:126:GLY:O	4:D:128:ARG:NH1	2.46	0.49
1:E:271:PHE:HZ	2:F:28:THR:HG21	1.77	0.49
2:F:230:ARG:HD3	3:G:546:ARG:HH22	1.77	0.49
4:H:160:ASP:HB3	4:H:163:ARG:O	2.13	0.49
3:G:109:LEU:O	4:H:128:ARG:NH2	2.46	0.48
2:B:107:ALA:HB2	2:B:134:LEU:HD12	1.94	0.48
2:F:115:THR:HA	2:F:118:HIS:ND1	2.28	0.48
3:C:273:ASP:OD1	3:C:274:LEU:N	2.47	0.48
1:E:246:LYS:NZ	6:E:312:HOH:O	2.40	0.48
2:F:254:THR:HG23	2:F:279:ARG:HB3	1.95	0.48
4:D:157:ILE:HD11	4:D:169:SER:HB2	1.94	0.48
1:A:246:LYS:NZ	6:A:318:HOH:O	2.47	0.48
1:A:249:ASN:O	1:A:249:ASN:ND2	2.43	0.48
3:C:160:THR:OG1	3:C:161:ASN:OD1	2.22	0.48
3:C:420:ASP:OD1	3:C:420:ASP:N	2.43	0.48
1:A:214:MET:HE1	3:C:434:ILE:HD13	1.95	0.48
2:F:27:LEU:O	2:F:31:ILE:HG12	2.13	0.48
3:C:140:ASP:OD1	4:D:163:ARG:NH1	2.47	0.48
3:C:142:PRO:HG3	3:C:297:VAL:HG21	1.95	0.48
3:C:382:ASN:ND2	3:C:384:LYS:HG2	2.25	0.48
1:E:20:MET:HA	1:E:20:MET:HE2	1.96	0.48
1:A:59:GLY:HA3	1:A:76:ASN:HA	1.96	0.48
2:B:211:LEU:HD12	2:B:298:ILE:HG13	1.94	0.48
3:C:40:TYR:CG	3:C:67:ILE:HG13	2.48	0.48
2:B:331:TYR:HB3	2:B:375:ALA:HB3	1.96	0.48
3:G:324:ASN:OD1	3:G:325:GLY:N	2.47	0.48
1:E:167:HIS:CD2	1:E:235:MET:HE3	2.49	0.47
3:G:190:ARG:HH11	3:G:198:ARG:NH2	2.12	0.47
3:G:73:GLU:HG3	3:G:408:PRO:HG3	1.94	0.47
3:C:286:CYS:SG	3:C:319:ILE:HG13	2.54	0.47
2:B:259:GLU:OE2	3:C:194:HIS:NE2	2.47	0.47
1:E:166:LYS:HG2	1:E:170:MET:HE3	1.96	0.47
2:B:294:LYS:O	2:B:297:THR:OG1	2.25	0.47
2:F:195:LEU:HD12	2:F:199:ILE:HD13	1.95	0.47
3:G:171:LYS:HA	3:G:176:GLN:HE21	1.80	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:109:LEU:HD21	3:C:377:VAL:HA	1.96	0.47
4:D:77:ASP:HB3	4:D:80:GLY:H	1.79	0.47
4:D:130:PHE:O	4:D:167:VAL:HA	2.15	0.47
3:G:478:ASN:HD22	3:G:480:PHE:H	1.62	0.47
1:A:173:ALA:O	1:A:257:ARG:NH1	2.47	0.47
2:B:173:SER:HB3	2:B:176:LYS:HB2	1.96	0.47
2:F:90:ASN:HA	2:F:93:THR:HG22	1.96	0.47
4:H:158:LYS:H	4:H:167:VAL:HG23	1.80	0.47
3:C:218:ASP:OD1	6:C:701:HOH:O	2.20	0.47
4:D:159:LEU:HB3	4:D:166:VAL:HG22	1.96	0.47
2:F:210:PHE:HA	2:F:233:ARG:O	2.15	0.47
4:H:110:GLY:HA3	4:H:124:LEU:HG	1.97	0.47
4:D:51:GLU:HB3	4:D:52:GLN:H	1.56	0.46
3:G:161:ASN:HD22	3:G:165:TYR:HB3	1.80	0.46
1:E:12:ARG:NH1	2:F:111:PRO:O	2.48	0.46
3:G:146:GLY:HA2	3:G:149:ARG:HG2	1.97	0.46
3:G:554:ARG:NE	6:G:727:HOH:O	2.47	0.46
3:G:359:ASP:OD1	3:G:395:SER:OG	2.23	0.46
3:G:259:ARG:HD3	3:G:354:THR:HG21	1.96	0.46
3:G:199:ILE:HD11	3:G:202:ILE:HG12	1.97	0.46
2:B:323:PHE:H	3:C:486:TRP:CD1	2.34	0.46
3:G:37:LEU:O	3:G:41:GLY:N	2.48	0.46
3:G:401:TYR:O	3:G:404:VAL:HG22	2.15	0.46
2:F:211:LEU:HD12	2:F:298:ILE:HG13	1.98	0.46
2:B:282:LYS:NZ	6:B:405:HOH:O	2.28	0.46
3:C:78:TYR:CE2	3:C:80:ASP:HB3	2.51	0.46
2:F:230:ARG:NH1	2:F:271:GLY:O	2.49	0.46
3:G:256:ASN:OD1	3:G:354:THR:OG1	2.22	0.46
3:C:103:ALA:HB2	3:C:317:GLU:HG2	1.98	0.46
3:C:123:GLY:O	3:C:127:ILE:HG12	2.16	0.46
3:C:267:ASN:ND2	3:C:389:GLU:O	2.41	0.46
2:F:319:HIS:HE1	3:G:568:SER:H	1.60	0.46
2:B:308:VAL:HG12	2:B:386:GLY:HA3	1.97	0.46
4:H:132:PRO:HG2	4:H:135:LEU:HD12	1.97	0.46
4:D:48:ILE:HA	4:D:49:PRO:HD3	1.83	0.45
3:G:142:PRO:HD3	3:G:294:TRP:CD1	2.51	0.45
2:F:318:ARG:NH2	3:G:486:TRP:O	2.49	0.45
3:G:416:VAL:HG23	3:G:417:SER:H	1.82	0.45
3:C:159:THR:HG22	3:C:225:PRO:HA	1.97	0.45
2:F:163:PRO:HB2	2:F:166:ASP:HB2	1.97	0.45
3:G:117:ASP:OD1	3:G:118:PHE:N	2.44	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:H:155:LYS:HB2	4:H:172:ALA:HB1	1.98	0.45
1:A:60:VAL:HG22	1:A:88:PHE:HE2	1.82	0.45
1:E:110:LEU:HD23	1:E:110:LEU:H	1.81	0.45
2:F:71:THR:HG22	2:F:74:ARG:HB2	1.99	0.45
2:F:102:ILE:HA	2:F:131:ILE:HG22	1.97	0.45
1:A:139:GLY:HA3	1:A:156:ALA:HB1	1.98	0.45
2:B:283:ARG:HH22	3:C:502:ARG:NH1	2.14	0.45
3:C:289:LEU:HD21	3:C:338:LEU:HD13	1.98	0.45
3:C:478:ASN:HD21	3:C:480:PHE:HB2	1.81	0.45
3:G:229:MET:HA	3:G:232:GLN:HB2	1.99	0.45
4:D:52:GLN:HB2	4:D:57:GLN:HB2	1.99	0.45
3:G:15:ARG:NH1	6:G:709:HOH:O	2.41	0.45
3:C:102:CYS:O	3:C:106:ASN:HB2	2.16	0.45
3:C:160:THR:HG21	3:C:176:GLN:HA	1.98	0.45
2:B:173:SER:OG	6:B:406:HOH:O	2.21	0.45
3:C:161:ASN:CG	3:C:176:GLN:HE22	2.25	0.45
3:C:277:ALA:HA	3:C:280:SER:HB2	1.98	0.45
3:G:110:TYR:CE2	4:H:87:GLU:HB3	2.52	0.45
4:D:86:ARG:O	4:D:90:LYS:HD3	2.17	0.44
2:F:19:HIS:HD2	2:F:112:MET:SD	2.39	0.44
4:H:154:PHE:HB3	4:H:168:VAL:HG11	1.99	0.44
3:C:158:THR:HG23	3:C:171:LYS:HE2	1.98	0.44
3:C:243:LEU:HD11	3:C:333:LEU:HB2	1.98	0.44
3:C:375:LYS:NZ	6:C:706:HOH:O	2.41	0.44
2:F:114:GLN:N	2:F:114:GLN:OE1	2.50	0.44
1:E:56:ALA:HB1	1:E:77:CYS:C	2.43	0.44
1:E:162:GLU:HA	1:E:165:VAL:HG22	2.00	0.44
2:F:215:GLU:OE1	3:G:515:ARG:NH1	2.48	0.44
2:B:93:THR:HG23	2:B:95:ALA:H	1.82	0.44
3:C:482:LYS:NZ	6:C:720:HOH:O	2.51	0.44
2:B:89:LYS:HE2	2:B:309:TYR:CE1	2.53	0.44
2:B:103:LEU:HD22	2:B:119:ILE:HD11	2.00	0.44
4:D:82:THR:HA	4:D:88:LYS:HG2	1.99	0.44
2:F:319:HIS:HE1	3:G:567:SER:HB2	1.83	0.44
3:C:261:HIS:NE2	3:C:403:GLY:O	2.51	0.44
2:F:27:LEU:HD21	2:F:102:ILE:HD11	2.00	0.44
2:F:332:PHE:O	2:F:334:THR:N	2.49	0.44
1:A:76:ASN:OD1	1:A:76:ASN:N	2.51	0.43
4:H:107:THR:HG22	4:H:155:LYS:HE2	2.01	0.43
2:F:210:PHE:HA	2:F:234:GLY:HA3	1.99	0.43
1:E:61:ILE:HG12	1:E:260:VAL:HG23	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:194:TYR:O	1:E:198:LEU:HB2	2.18	0.43
2:F:111:PRO:HB3	2:F:156:LEU:HD12	2.00	0.43
3:G:291:PRO:HA	3:G:292:PRO:HD3	1.87	0.43
4:D:116:VAL:HG12	4:D:117:LYS:H	1.82	0.43
1:A:193:GLU:HG3	1:A:219:MET:HE1	2.00	0.43
3:C:146:GLY:HA2	3:C:149:ARG:HG2	2.01	0.43
3:G:460:ASN:HD22	3:G:478:ASN:HD21	1.67	0.43
2:B:309:TYR:HE2	2:B:311:LEU:HD23	1.82	0.43
2:F:344:PRO:HD3	2:F:357:LYS:O	2.19	0.43
3:G:511:ASP:O	3:G:515:ARG:HG2	2.19	0.43
2:F:170:VAL:HG21	2:F:191:LEU:HB2	2.00	0.43
3:G:132:ARG:HG2	4:H:117:LYS:HZ2	1.82	0.43
2:B:84:HIS:CE1	2:B:121:LEU:HD23	2.53	0.43
3:C:371:ARG:HB2	3:C:381:THR:HG21	2.01	0.43
3:C:476:LEU:HD12	3:C:476:LEU:H	1.84	0.43
4:D:116:VAL:N	4:D:119:GLY:O	2.52	0.43
2:F:326:TYR:HB3	2:F:341:ILE:HG12	2.01	0.43
1:A:176:LYS:HG2	1:A:257:ARG:CZ	2.49	0.43
2:F:304:PHE:CE2	2:F:388:VAL:HG12	2.54	0.43
4:H:122:VAL:HB	4:H:129:ALA:HB3	2.01	0.43
1:A:65:ILE:HD13	1:A:65:ILE:H	1.83	0.42
1:A:184:ASP:OD1	1:A:184:ASP:N	2.52	0.42
4:D:94:ALA:O	4:D:97:THR:OG1	2.27	0.42
3:G:374:PHE:HA	3:G:377:VAL:HG22	2.01	0.42
2:B:27:LEU:O	2:B:31:ILE:HG12	2.19	0.42
3:C:149:ARG:NH2	6:C:726:HOH:O	2.43	0.42
1:E:236:GLU:HA	1:E:237:PRO:HD2	1.89	0.42
3:G:78:TYR:O	3:G:215:SER:OG	2.32	0.42
3:G:149:ARG:NH1	6:G:710:HOH:O	2.34	0.42
1:A:66:ASP:N	1:A:69:TYR:O	2.51	0.42
2:F:342:GLU:HB2	2:F:359:VAL:HB	2.02	0.42
2:B:176:LYS:HB3	2:B:184:TRP:CD1	2.55	0.42
2:F:306:SER:HB2	2:F:387:VAL:O	2.20	0.42
3:G:149:ARG:HA	3:G:517:LEU:HD22	2.01	0.42
1:E:261:GLY:HA2	1:E:264:ILE:HG13	2.01	0.42
2:F:39:TYR:CD2	2:F:72:PRO:HD3	2.54	0.42
3:G:324:ASN:HB3	3:G:327:THR:HB	2.00	0.42
4:H:160:ASP:OD1	4:H:163:ARG:NE	2.53	0.42
2:F:331:TYR:HB3	2:F:375:ALA:HB3	2.02	0.42
1:A:125:ILE:HD12	2:B:113:PRO:HG2	2.01	0.42
2:B:24:LYS:O	2:B:28:THR:HG22	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:384:LYS:H	3:C:384:LYS:HD3	1.84	0.42
3:C:422:ILE:HG23	3:C:471:LEU:HD23	2.01	0.42
3:C:503:ALA:O	3:C:507:SER:OG	2.22	0.42
2:F:26:THR:HG21	2:F:175:LEU:HD22	1.99	0.42
3:G:219:ARG:HD3	3:G:322:MET:HE2	2.02	0.42
1:A:127:GLU:OE1	6:A:301:HOH:O	2.22	0.42
3:C:28:LEU:HD23	3:C:415:ILE:HD11	2.02	0.42
3:C:104:LEU:HD13	3:C:104:LEU:HA	1.92	0.42
1:E:115:GLU:O	1:E:119:VAL:HG13	2.18	0.42
1:E:257:ARG:NH2	1:E:259:GLU:OE2	2.45	0.42
4:H:19:ARG:HA	4:H:20:PRO:HD3	1.82	0.42
2:B:223:ARG:HE	2:B:277:LEU:HD11	1.85	0.42
3:C:398:LYS:HB3	3:C:400:TYR:CE2	2.55	0.42
2:F:245:VAL:HG22	2:F:367:ALA:HB2	2.01	0.42
2:F:319:HIS:NE2	5:G:602:SO4:O2	2.53	0.42
3:G:23:GLU:OE2	3:G:23:GLU:N	2.52	0.42
3:G:503:ALA:O	3:G:507:SER:OG	2.28	0.42
1:E:11:LEU:HD22	1:E:26:LEU:HD13	2.01	0.42
1:E:19:MET:HE1	2:F:148:LEU:HD23	2.02	0.42
3:G:264:SER:OG	3:G:403:GLY:N	2.44	0.42
4:H:96:ILE:HG22	4:H:100:LYS:HE3	2.02	0.42
1:A:125:ILE:HG23	2:B:114:GLN:HE22	1.85	0.41
3:C:259:ARG:NH1	3:C:352:GLU:O	2.53	0.41
2:F:160:TYR:O	2:F:162:PHE:HD2	2.03	0.41
2:F:340:THR:OG1	2:F:361:THR:OG1	2.38	0.41
3:G:53:SER:OG	3:G:54:PHE:N	2.52	0.41
3:G:262:GLU:O	3:G:266:THR:HG22	2.19	0.41
2:B:199:ILE:HA	2:B:200:PRO:HD3	1.85	0.41
2:B:300:PRO:HA	2:B:367:ALA:HA	2.02	0.41
2:B:363:ILE:HD12	2:B:363:ILE:HA	1.92	0.41
3:G:129:MET:HG2	4:H:116:VAL:HG13	2.02	0.41
1:E:116:GLU:HA	1:E:119:VAL:HG22	2.02	0.41
4:H:112:ILE:HG12	4:H:122:VAL:HG22	2.01	0.41
4:H:115:LYS:HG2	4:H:116:VAL:O	2.20	0.41
4:H:117:LYS:C	4:H:119:GLY:N	2.75	0.41
1:A:110:LEU:HA	1:A:113:GLN:HB3	2.02	0.41
2:B:71:THR:HB	2:B:72:PRO:HD2	2.02	0.41
3:G:307:ARG:HD2	3:G:313:VAL:HG12	2.02	0.41
3:G:463:PRO:HG2	3:G:466:TYR:CD2	2.55	0.41
3:C:290:LEU:HD11	3:C:330:LEU:HD11	2.03	0.41
2:F:319:HIS:CE1	3:G:567:SER:HB2	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:227:TRP:O	3:C:230:PHE:HB3	2.20	0.41
3:C:322:MET:HE3	3:C:322:MET:HB3	1.91	0.41
2:F:167:THR:HA	2:F:168:PRO:HD3	1.89	0.41
4:H:90:LYS:HA	4:H:90:LYS:HD3	1.63	0.41
2:B:266:ASP:OD1	2:B:266:ASP:N	2.54	0.41
4:D:125:ASN:HB3	4:D:126:GLY:H	1.58	0.41
4:D:139:ARG:HA	4:D:140:PRO:HD3	1.91	0.41
1:E:26:LEU:HD12	1:E:26:LEU:HA	1.91	0.41
2:F:247:ILE:HG23	2:F:364:HIS:ND1	2.36	0.41
2:F:323:PHE:HB2	3:G:486:TRP:NE1	2.36	0.41
2:B:167:THR:HA	2:B:168:PRO:HD3	1.84	0.41
4:D:16:ILE:HD13	4:D:19:ARG:HH21	1.86	0.41
4:D:60:LEU:HD22	4:D:60:LEU:HA	1.95	0.41
2:F:73:THR:HG23	2:F:74:ARG:HG3	2.02	0.41
2:F:111:PRO:HG2	2:F:152:GLU:HG2	2.02	0.41
2:F:307:GLU:HG2	2:F:357:LYS:HG2	2.03	0.41
2:F:336:ASP:OD2	2:F:377:ARG:NH2	2.53	0.41
2:B:344:PRO:O	2:B:347:VAL:HG12	2.21	0.41
3:C:27:ASN:HD22	3:C:30:LEU:HB2	1.86	0.41
4:D:19:ARG:HA	4:D:20:PRO:HD3	1.79	0.41
3:G:335:PHE:HE2	3:G:358:ASP:HA	1.85	0.41
1:A:94:LYS:HD2	1:A:114:PHE:HE2	1.86	0.40
1:A:198:LEU:HA	1:A:215:VAL:HG21	2.04	0.40
3:C:232:GLN:HG2	3:C:326:TYR:HE1	1.86	0.40
4:D:23:ILE:HG13	4:D:70:VAL:C	2.45	0.40
1:A:9:LYS:HG3	1:A:10:GLU:N	2.37	0.40
1:A:232:PRO:HA	1:A:240:THR:HA	2.03	0.40
2:B:245:VAL:HG13	2:B:291:VAL:HG23	2.03	0.40
1:E:47:LYS:HB2	1:E:47:LYS:HE2	1.78	0.40
3:C:161:ASN:N	3:C:161:ASN:OD1	2.53	0.40
2:F:241:GLU:HG2	2:F:254:THR:HB	2.03	0.40
4:H:133:GLY:HA2	4:H:136:VAL:HG23	2.03	0.40
2:F:157:LEU:O	2:F:162:PHE:HB2	2.22	0.40
2:F:259:GLU:OE1	6:F:427:HOH:O	2.22	0.40

There are no symmetry-related clashes.

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	276/282 (98%)	268 (97%)	8 (3%)	0	100	100
1	E	278/282 (99%)	265 (95%)	12 (4%)	1 (0%)	30	59
2	B	358/393 (91%)	341 (95%)	17 (5%)	0	100	100
2	F	360/393 (92%)	344 (96%)	14 (4%)	2 (1%)	21	51
3	C	543/594 (91%)	521 (96%)	22 (4%)	0	100	100
3	G	541/594 (91%)	523 (97%)	18 (3%)	0	100	100
4	D	175/281 (62%)	160 (91%)	14 (8%)	1 (1%)	21	51
4	H	175/281 (62%)	155 (89%)	17 (10%)	3 (2%)	7	26
All	All	2706/3100 (87%)	2577 (95%)	122 (4%)	7 (0%)	36	65

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	264	ILE
4	H	117	LYS
4	H	118	GLY
2	F	333	ARG
4	H	116	VAL
4	D	116	VAL
2	F	247	ILE

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	216/219 (99%)	200 (93%)	16 (7%)	13	38
1	E	218/219 (100%)	201 (92%)	17 (8%)	11	35
2	B	301/325 (93%)	275 (91%)	26 (9%)	10	30
2	F	302/325 (93%)	285 (94%)	17 (6%)	19	50
3	C	468/508 (92%)	439 (94%)	29 (6%)	16	46
3	G	467/508 (92%)	442 (95%)	25 (5%)	20	51
4	D	146/239 (61%)	124 (85%)	22 (15%)	3	10
4	H	146/239 (61%)	136 (93%)	10 (7%)	14	42
All	All	2264/2582 (88%)	2102 (93%)	162 (7%)	13	39

All (162) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	38	GLU
1	A	58	ASP
1	A	65	ILE
1	A	75	VAL
1	A	79	THR
1	A	96	LEU
1	A	121	LEU
1	A	142	LEU
1	A	151	ILE
1	A	164	LEU
1	A	168	ILE
1	A	180	ILE
1	A	203	GLN
1	A	243	GLN
1	A	244	LEU
1	A	257	ARG
2	B	20	VAL
2	B	28	THR
2	B	73	THR
2	B	97	GLN
2	B	102	ILE
2	B	105	VAL
2	B	112	MET
2	B	127	VAL
2	B	141	ASP
2	B	155	GLU
2	B	170	VAL

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Mol	Chain	Res	Type
2	B	212	LEU
2	B	231	VAL
2	B	242	VAL
2	B	244	ILE
2	B	245	VAL
2	B	247	ILE
2	B	250	THR
2	B	252	LYS
2	B	254	THR
2	B	265	LEU
2	B	284	GLU
2	B	302	THR
2	B	334	THR
2	B	337	VAL
2	B	361	THR
3	C	10	LEU
3	C	22	ILE
3	C	67	ILE
3	C	86	ASP
3	C	90	VAL
3	C	104	LEU
3	C	106	ASN
3	C	117	ASP
3	C	136	LYS
3	C	145	GLU
3	C	161	ASN
3	C	202	ILE
3	C	211	VAL
3	C	265	VAL
3	C	272	VAL
3	C	315	THR
3	C	333	LEU
3	C	338	LEU
3	C	353	VAL
3	C	354	THR
3	C	394	GLU
3	C	415	ILE
3	C	416	VAL
3	C	420	ASP
3	C	421	LEU
3	C	433	THR
3	C	455	LYS

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Mol	Chain	Res	Type
3	C	505	LEU
3	C	540	ILE
4	D	25	ARG
4	D	27	VAL
4	D	38	VAL
4	D	42	LEU
4	D	59	GLU
4	D	60	LEU
4	D	72	LEU
4	D	75	VAL
4	D	79	PHE
4	D	83	LEU
4	D	84	LEU
4	D	107	THR
4	D	111	VAL
4	D	116	VAL
4	D	117	LYS
4	D	122	VAL
4	D	141	VAL
4	D	153	GLU
4	D	159	LEU
4	D	161	GLN
4	D	163	ARG
4	D	168	VAL
1	E	3	ILE
1	E	13	GLU
1	E	33	ILE
1	E	65	ILE
1	E	75	VAL
1	E	78	GLN
1	E	79	THR
1	E	93	ASP
1	E	104	ILE
1	E	107	VAL
1	E	142	LEU
1	E	180	ILE
1	E	195	GLN
1	E	198	LEU
1	E	244	LEU
1	E	257	ARG
1	E	266	LYS
2	F	71	THR

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Mol	Chain	Res	Type
2	F	102	ILE
2	F	125	VAL
2	F	147	GLU
2	F	151	MET
2	F	156	LEU
2	F	231	VAL
2	F	244	ILE
2	F	250	THR
2	F	254	THR
2	F	264	LEU
2	F	294	LYS
2	F	302	THR
2	F	308	VAL
2	F	334	THR
2	F	337	VAL
2	F	369	ASP
3	G	10	LEU
3	G	22	ILE
3	G	67	ILE
3	G	90	VAL
3	G	111	ARG
3	G	199	ILE
3	G	209	VAL
3	G	211	VAL
3	G	235	ILE
3	G	265	VAL
3	G	272	VAL
3	G	281	ILE
3	G	301	LEU
3	G	353	VAL
3	G	354	THR
3	G	380	THR
3	G	383	THR
3	G	389	GLU
3	G	415	ILE
3	G	416	VAL
3	G	421	LEU
3	G	447	LEU
3	G	487	ILE
3	G	505	LEU
3	G	540	ILE
4	H	52	GLN

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Mol	Chain	Res	Type
4	H	54	LYS
4	H	72	LEU
4	H	75	VAL
4	H	83	LEU
4	H	137	ASP
4	H	151	GLU
4	H	159	LEU
4	H	166	VAL
4	H	171	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	203	GLN
1	A	231	GLN
2	B	159	GLN
3	C	150	HIS
3	C	176	GLN
3	C	382	ASN
3	C	548	ASN
4	D	113	ASN
1	E	39	ASN
1	E	89	GLN
1	E	197	GLN
1	E	243	GLN
2	F	13	ASN
3	G	119	ASN
3	G	413	HIS
3	G	460	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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 ligands are 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	$\# Z > 2$
5	SO4	C	602	-	4,4,4	0.22	0	6,6,6	0.17	0
5	SO4	G	602	-	4,4,4	0.22	0	6,6,6	0.17	0
5	SO4	C	601	-	4,4,4	0.21	0	6,6,6	0.14	0
5	SO4	G	601	-	4,4,4	0.23	0	6,6,6	0.14	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	G	602	SO4	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 ⓘ

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	278/282 (98%)	-0.13	0 100 100	44, 71, 97, 112	0
1	E	280/282 (99%)	0.12	3 (1%) 78 71	53, 78, 108, 132	0
2	B	362/393 (92%)	-0.26	1 (0%) 90 87	18, 49, 74, 92	0
2	F	364/393 (92%)	-0.11	2 (0%) 87 83	25, 52, 78, 98	0
3	C	547/594 (92%)	-0.13	2 (0%) 88 85	23, 48, 82, 113	0
3	G	545/594 (91%)	-0.04	6 (1%) 78 71	22, 54, 82, 101	0
4	D	177/281 (62%)	0.56	7 (3%) 42 34	52, 103, 143, 167	0
4	H	177/281 (62%)	0.53	8 (4%) 38 30	49, 111, 149, 163	0
All	All	2730/3100 (88%)	-0.01	29 (1%) 78 71	18, 60, 116, 167	0

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	118	PHE	4.4
3	G	278	SER	4.2
3	G	119	ASN	3.8
4	D	82	THR	3.4
4	D	84	LEU	3.3
2	F	96	ALA	3.2
4	H	77	ASP	3.1
4	D	60	LEU	3.1
4	D	83	LEU	3.1
1	E	199	ASP	2.9
4	H	174	ILE	2.9
3	C	99	GLU	2.8
4	H	147	LEU	2.6
3	G	520	SER	2.5
3	G	85	ILE	2.5
4	H	79	PHE	2.5

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Mol	Chain	Res	Type	RSRZ
2	B	87	TYR	2.5
3	G	276	ALA	2.2
4	D	147	LEU	2.2
4	H	138	VAL	2.2
1	E	267	VAL	2.2
4	D	97	THR	2.2
4	H	82	THR	2.1
1	E	201	ALA	2.1
4	H	60	LEU	2.1
4	D	179	SER	2.1
3	G	517	LEU	2.1
2	F	346	GLY	2.1
4	H	116	VAL	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($\text{\AA}^2$)	Q<0.9
5	SO4	C	602	5/5	0.77	0.10	86,90,99,121	0
5	SO4	G	602	5/5	0.82	0.13	89,92,98,111	0
5	SO4	C	601	5/5	0.93	0.06	50,51,66,67	0
5	SO4	G	601	5/5	0.95	0.07	48,48,50,70	0

6.5 Other polymers [i](#)

There are no such residues in this entry.