Information about the reject (c_qc(ii)(1:1))

Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
A	Altitude error	yes	acftobs_qc.f	poschek_qc	An altitude discrepancy is defined as duplicate manAIREPs with similar times (idt_difs are =), latitudes, longitudes (within 0.125 deg), but altitudes that differ by more than 1000'. If reports on either side of the pair are available and are adequately close, an attempt is made to choose the duplicate that fits best with those reports. If neither report fits well enough to be chosen, or if neighboring report(s) are not available, both duplicate reports are rejected (c_qc(1:1) = A and c_qc(5:5) = B).
B	report declared bad in decoder or aircraft id = XX999 or bad Airbus re-encoded AIREP	yes	call_acftqc_tfile_all.f	n/a	if a non-alphanumeric character is found in the flight id or tail number
					if the temp precision is NOT 100, 50, 25, 10, or -99
					if the data relay system is NOT 3
					if the position QC is NOT 0 (zero)
					if the flight phase is other than 3, 5, 6, 7, or 9
					if the wind instrument is other than 4 (0, 8, and 12 are also valid, but haven't been seen in the data by NRL)
					if the roll angle QC flag is other than 0, 1, 3, 9
					if the MR QC flag is other than 0-9 or -9
					if the ACARS interpolation flag is other than 0, 2, 3, 9 (1 is also valid, but hasn't been seen in the data by NRL)
			acftobs_qc.f	invalid_qc	if the aircraft id = XX999 (normally occurs only for manual AIREPs and indicates that the flight id was missing
					tail number is blank
					tail number is a truncated German AMDAR
					report was marked bad in the decoder
				grchek_qc	if manual AIREP is a near-sfc UAL report (altitude < 5K' and temp is missing) -- these are actually erroneous reports from UAL Airbus A320/A319 aircraft that Tinker has incorrectly re-encoded into AIREP format. In these reports, the altitude is divided by 10, temp is missing, the values listed as wind speed are actually wind direction, and it's not clear what's listed as wind direction.

d	near duplicate	yes	acftobs_qc.f	dupchek_qc	if report is a near duplicate (close position (< 0.125 deg lat/lon or for manAIREPs, neither lat nor lon = zero), close values). idt_dif < 90 sec. An effort is made to keep the better of the two reports, e.g., MDCRS over AIREP, AMDAR over AIREP, AIREP over manAIREP, full ids over truncated ids, reports w/ missing temp/winds are rejected if the duplicate has temp/winds, MDCRS w/ the roll angle qc flag marked bad are rejected, etc.
				ordchek_qc	if the report is a manAIREP location duplicate. The report and its neighbor are both manAIREPs, their lat/lons are within 0.015 deg of each other, and the altitude of the report in question is > 21kft. If the altitudes are close, the airspeeds are not consistent, or there are discrepancies in the altitude differences compared to other reports, the report in question may be a manAIREP location duplicate.
D	exact duplicate	yes	acftobs_qc.f	dupchek_qc	if report is an exact duplicate (very close positions, very close values). Lat/lon dif < 0.015 deg, or one rpt has zero lat or zero lon. Pressure dif < 0.05 mb, altitude dif < 0.5', temp dif < 0.05 K, wdir dif < 2.5 deg, or both wdirs are missing, wspd dif < 0.05 m/s. For exact duplicates, choose MDCRS over ACARS, MDCRS/ACARS over AIREP, AMDAR over AIREP, automated AIREP over manAIREP, 7-character flight num over 6 character flight num, present over missing flight/tail number, nonzero over zero lat/lon.
e	encode error -- report rejected with missing winds	yes	acftobs_qc.f	dupchek_qc	Applies to manAIREPs only. If report is a close duplicate w.r.t. position, with the same aircraft id, in which the temps differ by a large amount and the winds are missing in the rejected report. This seems to be some sort of systematic error associated with manual AIREPs. The report with the missing winds is generally the one with the bad temp.

E	encode error -- report rejected outright	yes	acftobs_qc.f	dupchek_qc	Applies to manAIREPs only. If an encode error is detected, that is the report is a close duplicate w.r.t. position, with the same aircraft id, in which either the temps differ by more than 2.05K or the winds differ by more than 1.25 m/s or 10 deg. (Close duplicates with the same aircraft id and with temp differences less than 2.05K are marked as near duplicates.)
					report has a short id
N	duplicate check or stuck value check not performed	no	acftobs_qc.f	dupchek_qc	if report cannot be checked for duplicates (this happens only for the first report) -- DON'T REJECT REPORT
O	isolated off-track point	yes	acftobs_qc.f	ordchek_qc	if an isolated off-track point is found (c_qc(ii)(3:4) then = 'II')
p	point closer to last rejected point than to current point	yes	acftobs_qc.f	ordchek_qc	if the report is closer to the last rejected point than to the last accepted point (c_qc(ii)(3:4) then = 'II')
P	unrealistic airspeed	yes	acftobs_qc.f	ordchek_qc	if unrealistic airspeed is found (aspd > 525 m/s, or aspd > 350 m/s for manAIREPs or for a time difference > 10 mins, or aspd > 700 m/s for Concorde AIREPs) -- c_qc(ii)(3:4) then = 'II'
r	redundant report	yes	acftobs_qc.f	poschek_qc	if the report is redundant, diagnosed as multiple reports on the ground or multiple reports with the same altitude below 8K', which occurs during descents. idt_dif <= 60 sec, ht_dif < 2 ft
				ordchek_qc	if track doubles back on itself (c_qc(ii)(3:4) then = 'II')
s	small flight - too few reports to check	yes	acftobs_qc.f	suspect_qc	if only one or two reports are available from a flight, except for man AIREP flights
S	suspect reports (too many rejects for the flight)	yes	acftobs_qc.f	suspect_qc	if more than half of the available reports for a flight (or tail number for non-manAIREP flights) were previously rejected

t	time error	yes	acftobs_qc.f	poschek_qc	A time discrepancy is defined as duplicate manAIREPs with similar latitudes, longitudes, and altitudes, but the times differ by more than 60 sec. If the reports are within 30 mins, the time is averaged in the report that is retained. If reports on either side of the pair are available and are adequately close, an attempt is made to choose the duplicate the fits best with those reports. The duplicate closest to the interpolated value calculated from its neighbors will be chosen. If neither report fits well enough to be chosen or if neighboring reports are not available, both duplicate reports are rejected. (c_qc(ii)(2:2) then = 'B' or 'R' (R if avg time is used for the report))
v	report failed bounce test	yes	acftobs_qc.f	ordchek_qc	Applies to non-generic MDCRS report (type ne i_mdcrs) only. Occurs if report and neighbors fail the bounce test of both vspds being > 6000'/min and having opposite signs. Also, c_qc(ii)(5:5) then = 'I' and if c_qc(ii)(5:5) was 'R', then c_qc(ii)(5:5) now = 'i'. (** Note: ** Generic MDCRS failing the bounce test are taken to be UPS position reports, and c_qc(2:2) = I - see "Time Info" spreadsheet. (1:1) is not set to v in this case.)
V	unrealistic vertical speed	yes	acftobs_qc.f	ordchek_qc	if an unrealistic vertical speed is found. An unrealistic vertical speed is defined as > 10K'/min, or > 6,667'/min for a time difference > 10 minutes. Also, if an ascent discontinuity is found, where both vspd > 5K'/min and a descending segment are found in the ascent. Also set c_qc(ii)(5:5) to 'I'. If c_qc(ii)(5:5) was 'R', then change it to 'i'.

W	waypoint error	yes	acftobs_qc.f	poschek_qc	A waypoint discrepancy is defined as duplicate manAIREPs with similar times and altitudes but with lat/lons differing by 0.5 deg or more. If the two locations are within 115km, the positions are averaged together in the report that is retained. If reports on either side of the pair are available and are adequately close (i.e., within 2500 km), a position is interpolated to the time of the duplicates. The report closest to the interpolated position is retained; the other report is rejected. If only one neighboring report is avaialble and its time is witnin 90 minutes of the duplicate pair, the distances between the neighoring report and each duplicate is computed. If one is less than 1500 km and the other is greater than 1500 km from the neighbors, the nearer one is retained. If none of these methods are applicable, both duplicates are rejected. If a waypoint error occurs, c_qc(ii)(3:4) is set to BB and to RR if an averaged position is used for the report being retained.
X	isolated min/max altitude	yes	acftobs_qc.f	ordchek_qc	if altitude is an isolated min/max. If so, set c_qc(ii)(5:5) = I.
					if track makes more than a 75 degree turn. If so, set c_qc(ii)(3:4) - 'II'
2	second flight with same id found	no	acftobs_qc.f	ordchek_qc	if the rejected reports form a second flight
. <dot>	good report (passed all checks)	no	acftobs_qc.f	dupchek_qc	if report is good and is retained in duplicate check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).
-	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '-----------'.

Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
Time Info (c_qc(ii)(2:2))					
B	bad	yes	acftobs_qc.f	spike_qc	the report's time is out of bounds (< 1 or > max_min, which is currently set to 361 (code can handle 6h time window + 1 sec))
				grchek_qc	if the report is rejected as having a time error (see also c_qc(ii)(1:1) = 't')
				suspect_qc	if suspect time is rejected
b	bad	n/a	n/a	n/a	n/a
E	encode error	n/a	n/a	n/a	n/a
I	inconsistent	yes	acftobs_qc.f	ordchek_qc	Applies to generic MDCRS (type = i_mdcrs) reports only. Occurs if the report is a UPS position report. These reports are performed every 5 minutes even during high-res ascents and descents. The time on the position report is often out-of sync with the time on the high-res reports, so these reports are often out of order.
i	inconsistent	n/a	n/a	n/a	n/a
K	constant (stuck) values	yes	acftobs_qc.f	stk_val_ck	Does not apply to manAIREPs. Occurs if time is constant within 1 second for the whole flight (or a portion of the flight with three or more constant time reports) and either: 1.) time equals zero, 2.) altitudes vary less than 100', or 3.) altitudes vary more than 9K ft (to permit constant time for the bottom of a high -resolution sounding).
				poschek_qc	if the time is stuck for a shorter flight segment than previously diagnosed in stk_val_ck
				ordchek_qc	if report has a previously missed stuck clock
M	missing	yes	acftobs_qc.f	invalid_qc	if time is missing
N	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '----------'
R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')	no	acftobs_qc.f	poschek_qc	if an averaged time is used for the report
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')	n/a	n/a	n/a	n/a
S	suspect	no	acftobs_qc.f	grchek_qc	if time is equal to 00Z (mark as suspect to be checked later)
s	suspect	n/a	n/a	n/a	n/a

-	not checked	n/a	n/a	n/a	n/a
. <dot>	passed checks	no	acftobs_qc.f	grchek_qc	time passes the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).
				ordchek_qc	if a report with suspect time is accepted as part of a track (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

Latitude Info (c_qc(ii)(3:3))					
Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
B	bad	yes	acftobs_qc.f	invalid_qc	if the latitude and longitude are both zero(< 0.001), then c_qc(ii)(3:4) ='BB'
				grchek_qc	if the latitude is greater than 90 or less than -90
				poschek_qc	A waypoint discrepancy is defined as duplicate manAIREPs with similar times and altitudes (< 1.5' difference) but with lat/lons differing by 0.5 deg (0.125 ????) or more. If the two locations are within 115km, the positions are averaged together in the report that is retained. If reports on either side of the pair are available and are adequately close (i.e., within 2500 km), a position is interpolated, using the neighboring points, to the time of the duplicates. The report closest to the interpolated position is retained; the other report is rejected. If only one neighboring report is available and its time is witnin 90 minutes of the duplicate pair, the distances between the neighoring report and each duplicate are computed. If one is less than 1500 km and the other is greater than 1500 km from the neighboring point, the nearer one is retained. If none of these methods is applicable, both duplicates are rejected. If a waypoint error occurs, c_qc(ii)(3:4) is set to BB and to RR if an averaged position is used for the report being retained. (see c_qc(ii) (1:1) = W)
				ordchek_qc	if an airspeed violation is associated with a latitude of zero
					if an isolated off-track point is found (c_qc(ii)(3:4) then = 'II') (see c_qc(ii)(1:1) = O)
					if track doubles back on itself (c_qc(ii)(3:4) then = 'II') (see c_qc(ii)(1:1) = r
				suspect_qc	if suspect latitude is rejected
b	bad				
E	encode error				
I	inconsistent	yes	acftobs_qc.f	ordchek_qc	if the report is closer to the last rejected point than to the last accepted point (c_qc(ii)(3:4) then = 'II') (see c_qc(ii)(1:1) = p)

					if unrealistic airspeed is found (aspd > 525 m/s, or aspd > 350 m/s for manAIREPs or for a time difference > 10 mins, or aspd > 700 m/s for Concorde AIREPs) -- c_qc(ii)(3:4) then = 'II' (see c_qc(ii)(1:1) = P
					if track makes more than a 75 degree turn (c_qc(ii)(3:4) = 'II', also see c_qc(ii)(1:1) = X)
i	inconsistent				
K	constant (stuck) values	yes	acftobs_qc.f	stk_val_qc	Does not apply to manAIREPs. Occurs if the latitude is constant within 0.005 deg for the whole flight (but the latitude is not rounded to the nearest whole degree), the flight lasts more than 30 min, and either: 1.) the latitude = zero (< 0.005 deg), 2.) altitudes vary less than 100', or 2.) altitudes vary more than 9000'. Then c_qc(3:3) = 'K'.
					Does not apply to manAIREPs. Both lat (3:3) and lon (4:4) are marked as K if the latitude and longitude are both within 0.015 deg for the whole flight (or for a portion of the flight with three or more constant position reports) and either: 1.) lat is constant at 0, 2.) lon is constant at 0, 3.) altitudes vary less than 100', or 3.) altitudes vary more than 9000' for non-AMDAR reports, more than 12000' for AMDAR reports.
M	missing	yes	acftobs_qc.f	invalid_qc	if latitude is missing
N	not checked				
R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')				
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')				
S	suspect	no	acftobs_qc.f	grchek_qc	if the latitude is zero (marked as suspect to be checked later)
s	suspect				
-	not checked				
. <dot>	passed checks	no	acftobs_qc.f	grchek_qc	if latitude passes the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

| | | | | ordchek_qc | if a report with suspect latitude is accepted as part of a track (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.). |

Longitude Info (c_qc(ii)(4:4))						
Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
B	bad	yes	acftobs_qc.f	invalid_qc	if the latitude and longitude are both zero(< 0.001), then c_qc(ii)(3:4) ='BB'
				grchek_qc	if the longitude is greater than 360 or less than 0
				poschek_qc	A waypoint discrepancy is defined as duplicate manAIREPs with similar times and altitudes (< 1.5' difference) but with lat/lons differing by 0.5 deg (0.125 ????) or more. If the two locations are within 115km, the positions are averaged together in the report that is retained. If reports on either side of the pair are available and are adequately close (i.e., within 2500 km), a position is interpolated, using the neighboring points, to the time of the duplicates. The report closest to the interpolated position is retained; the other report is rejected. If only one neighboring report is available and its time is witnin 90 minutes of the duplicate pair, the distances between the neighoring report and each duplicate are computed. If one is less than 1500 km and the other is greater than 1500 km from the neighboring point, the nearer one is retained. If none of these methods is applicable, both duplicates are rejected. If a waypoint error occurs, c_qc(ii)(3:4) is set to BB and to RR if an averaged position is used for the report being retained. (see c_qc(ii) (1:1) = W)
				ordchek_qc	if an airspeed violation is associated with a latitude of zero
					if an isolated off-track point is found (c_qc(ii)(3:4) then = 'II') (see c_qc(ii)(1:1) = O)
					if track doubles back on itself (c_qc(ii)(3:4) then = 'II') (see c_qc(ii)(1:1) = r
				suspect_qc	if suspect longitude is rejected
b	bad				
E	encode error				
I	inconsistent	yes	acftobs_qc.f	ordchek_qc	if the report is closer to the last rejected point than to the last accepted point (c_qc(ii)(3:4) then = 'II') (see c_qc(ii)(1:1) = p)

					if unrealistic airspeed is found (aspd > 525 m/s, or aspd > 350 m/s for manAIREPs or for a time difference > 10 mins, or aspd > 700 m/s for Concorde AIREPs) -- c_qc(ii)(3:4) then = 'II' (see c_qc(ii)(1:1) = P
					if track makes more than a 75 degree turn (c_qc(ii)(3:4) = 'II', also see c_qc(ii)(1:1) = X)
i	inconsistent				
K	constant (stuck) values	yes	acftobs_qc.f	stk_val_qc	Does not apply to manAIREPs. Occurs if the longitude is constant within 0.005 deg for the whole flight (but the longitude is not rounded to the nearest whole degree), the flight lasts more than 30 min, and either: 1.) the longitude = zero (< 0.005 deg), 2.) altitudes vary less than 100', or 2.) altitudes vary more than 9000'. Then c_qc(4:4) = 'K'.
					Does not apply to manAIREPs. Both lat (3:3) and lon (4:4) are marked as K if the latitude and longitude are both within 0.015 deg for the whole flight (or for a portion of the flight with three or more constant position reports) and either: 1.) lat is constant at 0, 2.) lon is constant at 0, 3.) altitudes vary less than 100', or 3.) altitudes vary more than 9000' for non-AMDAR reports, more than 12000' for AMDAR reports.
M	missing	yes	acftobs_qc.f	invalid_qc	if longitude is missing
N	not checked				
R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')				
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')				
S	suspect	no	acftobs_qc.f	grchek_qc	if the longitude is zero (marked as suspect to be checked later)
s	suspect				
-	not checked				
. <dot>	passed checks	no	acftobs_qc.f	grchek_qc	if longitude passes the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

				ordchek_qc	if a report with suspect longitude is accepted as part of a track (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

Pressure/Altitude Info (c_qc(ii)(5:5))						
Value	Meaning		Reject report if this flag is set?	Program	subroutine	reason
B	bad		yes	acftobs_qc.f	invalid_qc	if pressure is too small (< 116 mb) or altitude is too high (>= 50K') ** Note: Air France and British Airways manAIREPs above 50K' are valid and allowed (Concorde)
						if the pressure altitude is small (<600') and the report is an AIREP or manAIREP. The AIREP format does not allow negatives, so AMDAR reports with negative altitudes are re-encoded as AIREPs with a positive altitude.
						if altitude (ht_ft) = zero and winds also = zero. (report is "empty" and temp and winds are either missing or zero. Pressure is marked as bad, winds are marked as missing (M), and temp is marked as 'not checked' (N).
					grchek_qc	if the pressure is greater than 1080 mb and or less than 50 mb
					poschek_qc	if the pressure /altitude on the ground is invalid. These reports are from UAL, which uses 2K' as its lowest report. They are detected as being within 5 min of a report at 2K', with a temp > than that in the 2K' report, and with an altitude difference > 6K'. Applies to data prior to 1998010100.
						An altitude discrepancy is defined as duplicate manAIREPs with similar times, latitudes, longitudes, (same idt, lat/lon within 0.125 deg) but altitudes that differ by more than 1000'. If reports on either side of the pair are available and are adequately close, an attempt is made to choose the duplicate that fits best with those reports. If neither report fits well enough to be chosen, or if neighboring report(s) are not available, both duplicate reports are rejected (c_qc(1:1) = A and c_qc(5:5) = B)
					suspect_qc	if suspect altitude is rejected
b	bad					
E	encode error					

I	inconsistent	yes	acftobs_qc.f	grchek_qc	if the altitude computed from the pressure differs from the reported altitude by more than 25'
				ordchek_qc	if the non-generic MDCRS report (type ne i_mdcrs) fails the bounce test of both vspds being > 6000'/min and having opposite signs. Also, c_qc(ii)(5:5) then = 'I' and if c_qc(ii)(5:5) was 'R', then c_qc(ii)(5:5) now = 'i'. (** Note: ** Generic MDCRS failing the bounce test are taken to be UPS position reports, and c_qc(2:2) = I - see "Time Info" spreadsheet. (1:1) is not set to v in this case.)
					if an unrealistic vertical speed is found. An unrealistic vertical speed is defined as > 10K'/min, or > 6,667'/min for a time difference > 10 minutes. Also, if an ascent discontinuity is found, where both vspd > 5K'/min and a descending segment are found in the ascent. Also set c_qc(ii)(5:5) to 'I'. If c_qc(ii)(5:5) was 'R', then change it to 'i'.
					if an anomalous point is found at the beginning of an ascent or the end of a descent. (These points have a higher/lower altitude than the following point in the ascent/descent and occur primarily in AMDAR/AIREP reports.) If c_qc(ii)(5:5) = R, then change it to i.
					if an altitude is an isolated max/min. (See c_qc(ii)(1:1)=X)
i	inconsistent	yes	acftobs_qc.f	ordchek_qc	if the non-generic MDCRS report (type ne i_mdcrs) fails the bounce test of both vspds being > 6000'/min and having opposite signs. Also, c_qc(ii)(5:5) then = 'I' and if c_qc(ii)(5:5) was 'R', then c_qc(ii)(5:5) now = 'i'. (** Note: ** Generic MDCRS failing the bounce test are taken to be UPS position reports, and c_qc(2:2) = I - see "Time Info" spreadsheet. (1:1) is not set to v in this case.)
					if an unrealistic vertical speed is found. An unrealistic vertical speed is defined as > 10K'/min, or > 6,667'/min for a time difference > 10 minutes. Also, if an ascent discontinuity is found, where both vspd > 5K'/min and a descending segment are found in the ascent. Also set c_qc(ii)(5:5) to 'I'. If c_qc(ii)(5:5) was 'R', then change it to 'i'.

					if an anomalous point is found at the beginning of an ascent or the end of a descent. (These points have a higher/lower altitude than the following point in the ascent/descent and occur primarily in AMDAR/AIREP reports.) If c_qc(ii)(5:5) = R, then change it to i.
K	constant (stuck) values	yes	acftobs_qc.f	stk_val_qc	if pressure is constant within 0.05mb for the whole flight, the pressure is greater than 750 mb, and the flight lasts more than 30 min.
					if altitude is constant within 10' for the whole flight, the altitude is less than 8K', and the flight lasts more than 30 min
M	missing	yes	acftobs_qc.f	invalid_qc	if both pressure and altitude are missing
N	not checked				
R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')	no	call_acftqc_tfile_all.f	n/a	if pressure is read and altitude computed
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')	no	call_acftqc_tfile_all.f	n/a	if altitude is read and pressure computed
S	suspect				
s	suspect				
-	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '-----------'.
. <dot>	passed checks	no	acftobs_qc.f	grchek_qc	if pressure/altitude pass the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).
				ordchek_qc	if a report with suspect altitude is accepted as part of a track (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

		Reject report if this flag is set?			
Value	**Meaning**		**Program**	**subroutine**	**reason**
B	bad	yes	acftobs_qc.f	grchek_qc	if a cold temperature with missing winds is found. This is a systematic error that is not always caught by the gross check. The temperatures in this case are generally less than 200K; a threshold of 205K is used in the test.
					if temperature fails the Moninger gross check. This is often a result of a bad altitude rather than a bad temperature, so the entire report is rejected to play it safe. 35k' tests???
b	bad	reject temp. only	acftobs_qc.f	stk_val_qc	if temperature was marked bad to account for having been measured in whole degrees C and reported as if in tenths. Reject temp for non-MDCRS reports, but not entire report. For MDCRS reports, recompute temp.
				grchek_qc	if temperature was marked bad to account for having been measured in whole degrees C and reported as if in tenths (AIREP). Reject temp but not entire report.
E	encode error	reject temp. only	acftobs_qc.f	dupchek_qc	if a temperature encode error is detected, one report is rejected (c_qc(ii)(1:1)=E) and the other report has the temperature marked bad with E. Occurs when temp is a duplicate by position but the temps differ by more than 2.05K.
I	inconsistent	reject temp. only	acftobs_qc.f	invalid_qc	if the temperature equals -9C and would be rejected by the gross check or three consecutive reports from the same flight have a temperature of -9C (two in a row at the beginning or end of a flight).
i	inconsistent				
K	constant (stuck) values	yes	acftobs_qc.f	stk_val_qc	if temperature is constant within 0.05K for the whole flight and either the altitude varies by more than 1500' or the max altitude is greater than 25K' AND WINDS ARE CONSTANT AS WELL
		reject temp. only			if temperature is constant within 0.05K for the whole flight and either the altitude varies by more than 1500' or the max altitude is greater than 25K' and winds are NOT constant

Temperature Info (c_qc(ii)(6:6)) ** If both the temperature and winds are bad, stuck, or missing, reject the whole report

M	missing	yes	acftobs_qc.f	invalid_qc	if the report is "empty" -- temp and winds are either missing (applies to all rpt types) or zero (applies to manAIREP only). If either situation occurs, c_qc(ii)(6:8) = MMM.
					if the altitude and winds are zero (applies to all report types)
		reject temp. only		grchek_qc	if temperature is missing
N	not checked	no (but qc marks on 5:9 will cause rejection	acftobs_qc.f	invalid_qc	if altitude (ht_ft) = zero and winds also = zero. Pressure is marked as bad, winds are marked as missing (M), and temp is marked as 'not checked' (N).
R	rehabilitated	no	acftobs_qc.f	stk_val_qc	if temperature was recomputed to account for having been measured in whole degrees C and reported as if in tenths (MDCRS/ACARS). Don't reject temp, but change temp. precision to 1.00. If report type is non-MDCRS/ACARS, then the temperature is marked as bad.
				grchek_qc	if temperature was recomputed to account for having been measured in whole degrees C and reported as if in tenths (MDCRS/ACARS). Don't reject temp, but change temp. precision to 1.00. If report type is non-MDCRS/ACARS, then the temperature is marked as bad.
r	rehabilitated				
S	suspect				
s	suspect				
-	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '-----------'.
. <dot>	passed checks	no	acftobs_qc.f	grchek_qc	if temp passed the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
B	bad	reject winds only	acftobs_qc.f	grchek_qc	if the wind direction is less than 0 or greater than 360
				invalid_qc	if neither neighbor has a northerly (or southerly) component or the report is isolated without any neighbors to which the report can be compared, and the wind direction = 0/360 (or 180). Concern is for erroneously reported north (or south) wind directions.
b	bad				
E	encode error	reject wind direction only	acftobs_qc.f	dupchek_qc	if a wind direction encode error is detected, one report is rejected (c_qc(ii)(1:1)=E) and the other report has the wind direction marked bad with E. This occurs when the report is a duplicate with respect to position, but the wind direction differs by more than 10 degrees.
I	inconsistent	reject winds only	acftobs_qc.f	grchek_qc	if the wind speed is missing but the direction isn't
i	inconsistent				
K	constant (stuck) values	yes	acftobs_qc.f	stk_val_qc	if wind direction is constant within 0.5 degrees for the whole flight (but the direction is not rounded to the nearest ten degrees) and either the altitudes vary less than 100' or more than 9K' AND THE TEMPERATURE IS CONSTANT AS WELL
		reject wind direction only			if wind direction is constant within 0.5 degrees for the whole flight (but the direction is not rounded to the nearest ten degrees) and either the altitudes vary less than 100' or more than 9K' and the temperature is NOT constant.
M	missing	yes	acftobs_qc.f	invalid_qc	if the report is "empty" -- temp and winds are either missing (applies to all rpt types) or zero (applies to manAIREP only). If either situation occurs, c_qc(ii)(6:8) = MMM.
					if the altitude and winds are zero (applies to all report types)
		reject winds		grchek_qc	if the wind direction is missing
N	not checked				

Wind direction Info (c_qc(ii)(7:7)) ** If both the temperature and winds are bad, stuck, or missing, reject the whole report

R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')				
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')				
S	suspect				
s	suspect	no	acftobs_qc.f	suspect_qc	if roll angle QC flag is set to bad (set winds to suspect/c_qc(ii)(7:8) = ss
-	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '-----------'.
. <dot>	passed checks	no	acftobs_qc.f	grchek_qc	if the wind direction passes the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
Wind speed Info (c_qc(ii)(8:8)) ** If both the temperature and winds are bad, stuck, or missing, reject the whole report					
A	Anomalous wind speed	**????**	acftobs_qc.f	ordchek_qc	Occurs at the end of descents, when report times are within 30 min, the altitudes are within 1000', and the wind speeds differ by more than 10 m/s.
B	bad	reject winds only	acftobs_qc.f	grchek_qc	if the wind speed is negative
					if the wind speed fails the Moninger gross check (> wmax)
					if the winds are calm (< 0.05)
				suspect_qc	if suspect winds are rejected
b	bad				
E	encode error	reject wind direction only	acftobs_qc.f	dupchek_qc	if a wind speed encode error is detected, one report is rejected (c_qc(ii)(1:1)=E) and the other report has the wind speed marked bad with E. Occurs when the report is a duplicate in position but the wind speed differs from those of neighboring reports by more than 1.25 m/s.
I	inconsistent	reject winds only	acftobs_qc.f	grchek_qc	if the wind direction is missing but speed isn't
i	inconsistent				
K	constant (stuck) values	yes	acftobs_qc.f	stk_val_qc	if wind speed is constant within 0.05 m/s for the whole flight (but the direction is not rounded to the nearest ten degrees) and either the altitudes vary less than 100' or more than 9K' AND THE TEMPERATURE IS CONSTANT AS WELL
		reject winds only			if wind speed is constant within 0.05 m/s for the whole flight (but the direction is not rounded to the nearest ten degrees) and either the altitudes vary less than 100' or more than 9K' and the temperature is NOT constant.
M	missing	yes	acftobs_qc.f	invalid_qc	if the report is "empty" -- temp and winds are either missing (applies to all rpt types) or zero (applies to manAIREP only). If either situation occurs, c_qc(ii)(6:8) = MMM.
					if the altitude and winds are zero (applies to all report types)
		reject winds		grchek_qc	if the wind speed is missing
N	not checked				

R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')				
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')				
S	suspect	no	acftobs_qc.f	suspect_qc	if the wind speed is zero above 700 mb (marked as suspect to be checked later)
s	suspect	no	acftobs_qc.f	suspect_qc	if roll angle QC flag is set to bad (set winds to suspect/c_qc(ii)(7:8) = ss
-	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '-----------'.
. <dot>	passed checks	no	acftobs_qc.f	grchek_qc	if the wind speed passes the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

Moisture Info (c_qc(ii)(9:9))					
Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
2	Small RH	reject moisture only	acftobs_qc.f	?????	RH is small, and ichk_q = -2
3	Element is wet	reject moisture only	acftobs_qc.f	?????	Element is wet, and ichk_q = -3
B	bad	reject only moisture	acftobs_qc.f	grchek_qc	if MR/moisture? QC flag indicates a bad value (reject mixing ratio only). QC flag in ichk_q array will = -4 thru -8.
b	bad				
E	encode error				
I	inconsistent				
i	inconsistent				
K	constant (stuck) values	reject only moisture	acftobs_qc.f	stk_val_qc	if MR/moisture? is constant within 0.005 for the whole flight, the mixing ration is greater than zero (zero is assumed to be missing), and either the altitudes vary less than 100' or more than 9K' (reject only MR/moisture?)
M	missing	no	acftobs_qc.f	grchek_qc	if MR/moisture? Is missing (missing is defined as truly missing (ob_q = amiss) or zero (q< 0.005 and ichk_q = -7)).
				invalid_qc	if the report is "empty" and the moisture IS missing. An "empty" report is defined as one where the temp and winds are missing or zero, or where the altitude and winds are both zero.
N	not checked	no	acftobs_qc.f	invalid_qc	if report is "empty" (see above) and moisture is not missing
				grchek_qc	if the MR supersaturation check can't be performed
R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')				
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')				
S	suspect	no	acftobs_qc.f	grchek_qc	if the MR is supersaturated (marked as suspect to be checked later)
s	suspect				

-	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '-----------'.
. <dot>	passed checks	no	call_acftqc_tfile_all.f	grchek_qc	if MR passes the gross check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
Black List Info (c_qc(ii)(10:10)) ** If both the temperature and winds are bad, stuck, or missing, reject the whole report					
C	aircraft reports temp in whole degrees C	no, flag is for information only	acftobs_qc.f	grchek_qc	if temperature is on the list of aircraft that measure temperature in whole degrees C (used in NRL processing prior to 1999 10 01 00Z)
F	aircraft reports flipped winds (not checked here)				
L	aircraft reports decimal lat/lon (not checked here)				
T	temperature blacklisted	not used at present	acftobs_qc.f	grchek_qc	if temperature is black-listed (not used at present)
W	winds blacklisted	not used at present	acftobs_qc.f	grchek_qc	if wind is black-listed (not used at present)
O	both temperature and winds blacklisted	no used at present	acftobs_qc.f	grchek_qc	if both temperature and winds are black-listed
. <dot>	passed black-list checks	no	acftobs_qc.f	grchek_qc	if temperature passes the blacklist check (Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.).

Flight Phase Info (c_qc(ii)(11:11))

Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
a	low-resolution ascent	no	acftobs_qc.f	ordchek_qc	if the plane is in low-resolution ascent with height, time, and position consistent (small low-level maneuvers allowed). For non-manAIREPs, idt_dif < 1805 sec, for manAIREPs, idt_dif < 1805*2 sec, and altitude is increasing.
A	High-resolution ascent	no	acftobs_qc.f	ordchek_qc	if the plane is in high-resolution ascent with height, time, and position consistent (small low-level maneuvers allowed) (criteria listed below)
					Check if point is the start of an ascent. ht_dif < 100' from previous point, then 100' < ht_dif < 5000' for subsequent points, while idt_dif < 180 sec, and altitude increasing (point in question is then the start of ascent)
					Check if point is the end of/last point in an ascent. ht_dif < 100' from subsequent point, 100' < ht_dif < 5000' for prior points, while idt_dif < 180 sec, and altitude increasing (point in question is then at the end of ascent)
					point is part of an outright ascent. idt_dif < 180 sec, ht_dif > 100' and < 5000', altitude increasing
d	low-resolution descent	no	acftobs_qc.f	ordchek_qc	if the plane is in low-resolution descent with height, time, and position consistent (small low-level maneuvers allowed). For non-manAIREPs, idt_dif < 1805 sec, for manAIREPs, idt_dif < 1805*2 sec, and altitude is decreasing.
D	high-resolution descent	no	acftobs_qc.f	ordchek_qc	if the plane is in high-resolution descent with height, time, and position consistent (small low-level maneuvers allowed) (criteria listed below)
					Check if point is the start of an descent. ht_dif < 100' from previous point, then 100' < ht_dif < 5000' for subsequent points, while idt_dif < 180 sec, and altitude decreasing (point in question is then the start of descent)
					Check if point is the end of/last point in an descent. ht_dif < 100' from subsequent point, 100' < ht_dif < 5000' for prior points, while idt_dif < 180 sec, and altitude decreasing (point in question is then at the end of descent)

					point is part of an outright descent. idt_dif < 180 sec, ht_dif > 100' and < 5000', altitude decreasing
I	isolated report	no	acftobs_qc.f	ordchek_qc	if a report (or pair of reports) is isolated in time
L	level flight	no	acftobs_qc.f	ordchek_qc	if the plane is in level flight with height, time, and position consistent (criteria listed below)
					idt_dif < 180 sec, ht_dif < 100', and report is not the start of an ascent or descent
					idt_dif < 1805 sec for non-manAIREPs, idt_dif < 1805 sec * 3 for manAIREPs, and ht_dif < 150'
					if flt is a 2-report flight, idt_dif < 1805 sec for non-manAIREPs, idt_dif < 1805 sec * 2 for manAIREPs, and ht_dif < 150'
N	time difference is too great to permit check	no	acftobs_qc.f	ordchek_qc	if the time difference between the report and its neighbors is too great to permit check. For manAIREPs, idt_dif > 1805 * 2 sec, for non-manAIREPs, idt_dif > 1805*(2/3) sec
U	unknown	no	acftobs_qc.f	ordchek_qc	if the flight phase cannot be determined. Usually reports isolated in a one-report flight or isolated by time gaps, so that the neighboring reports are too far away for comparison.

Info (c_qc(ii)(:))					
Value	Meaning	Reject report if this flag is set?	Program	subroutine	reason
B	bad				
b	bad				
E	encode error				
I	inconsistent				
i	inconsistent				
K	constant (stuck) values				
M	missing				
N	not checked				
R	rehabilitated (if altitude is read and pressure computed, c_qc(ii)(5:5) = 'R')				
r	rehabilitated (if pressure is read and altitude computed, c_qc(ii)(5:5) = 'r')				
S	suspect				
s	suspect				
-	not checked	no	call_acftqc_tfile_all.f	n/a	c_qc(ii) is initialized to '-----------'.
. <dot>	passed checks				Originally, a space was used to indicate a good piece of data. As the NCEP BUFRLIB routine WRITLC will trim off spaces on the ends of the strings, the space is replaced with a dot/period in NCEP BUFR files to indicate a good observation in the NRLQC string.