

**BUFR Table C - Data description operators (Edition 3)**

TABLE REFERENCE F X	OPERAND	OPERATOR NAME	OPERATION DEFINITION	Status
2 01	YYY	Change data width	Add (Y-128) bits to the data width given for each data element in Table B, other than CCITT IA5 (character) data, code or flag tables.	Operational
2 02	YYY	Change scale	Add Y-128 to the scale for each data element in Table B, other than CCITT IA5 (character) data, code or flag tables.	Operational
2 03	YYY	Change reference values	Subsequent element descriptors define new reference values for corresponding Table B entries. Each new reference value is represented by Y bits in the Data section. Definition of new reference values is concluded by coding this operator with Y = 255. Negative reference values shall be represented by a positive integer with the left-most bit (bit 1) set to 1.	Operational
2 04	YYY	Add associated field	Precede each data element with Y bits of information. This operation associates a data field (e.g. quality control information) of Y bits with each data element.	Operational
2 05	YYY	Signify character	Y characters (CCITT International Alphabet No. 5) are inserted as a data field of Y x 8 bits in	Operational
2 06	YYY	Signify data width for the immediately following local descriptor	Y bits of data are described by the immediately following descriptor.	Operational
2 21	YYY	Data not present	Data values present in section 4 (Data section) corresponding to the following YYY descriptors shall be limited to data from classes 1-9, and class 31.	Operational
2 22	000	Quality information follows	The values of class 33 elements which follow relate to the data defined by the data present bit-map.	Operational
2 23	000	Substituted values operator	The substituted values which follow relate to the data defined by the data present bit-map.	Operational
2 23	255	Substituted values marker operator	This operator shall signify a data item containing a substituted value; the element descriptor for the substituted value is obtained by the application of the data present bit-map associated with the substituted values operator.	Operational
2 24	000	First order statistical values follow	The statistical values which follow relate to the data defined by the data present bit-map.	Operational
2 24	255	First order statistical values marker operator	This operator shall signify a data item containing a first order statistical value of the type indicated by the preceding 0 08 023 element descriptor; the element descriptor to which the first order statistic relates is obtained by the application of the data present bit-map associated with the first order statistical values follow operator; first order statistical values shall be represented as defined by this element descriptor.	Operational
2 25	000	Difference statistical values follow	The statistical values which follow relate to the data defined by the data present bit-map.	Operational

TABLE REFERENCE F X	OPERAND	OPERATOR NAME	OPERATION DEFINITION	Status
2 25	255	Difference statistical values marker operator	This operator shall signify a data item containing a difference statistical value of the type indicated by the preceding 0 08 024 element descriptor; the element descriptor to which the difference statistical value relates is obtained by the application of the data present bit-map associated with the difference statistical values follow operator; difference statistical values shall be represented as defined by this element descriptor, but with a reference value of -2 and a data width of (n+1), where n is the data width given by the original descriptor. This special reference value allows the statistical difference values to be centred around zero.	Operational
2 32	000	Replaced/retained values follow	The replaced/retained values which follow relate to the data defined by the data present bit-map.	Operational
2 32	255	Replaced/retained value marker operator	This operator shall signify a data item containing the original of an element which has been replaced by a substituted value. The element descriptor for the retained value is obtained by the application of the data present bit-map associated with the substituted values operator.	Operational
2 35	000	Cancel backward data reference	This operator terminates all previously defined back-ward reference and cancels any previously defined data present bit-map; it causes the next data present bit-map to refer to the data descriptors which immediately precede the operator to which it relates.	Operational
2 36	000	Define data present bit-map	This operator defines the data present bit-map which follows for possible re-use; only one data present bitmap may be defined between this operator and the cancel use defined data present bit-map operator.	Operational
2 37	000	Use defined data present bit-map	This operator causes the defined data present bit-map to be used again.	Operational
2 37	255	Cancel use defined data present bit-map	This operator cancels the re-use of the defined data present bit-map.	Operational

Notes: (see)

**BUFR Table C - Data description operators (Edition 4)**

TABLE REFERENCE F X	OPERAND	OPERATOR NAME	OPERATION DEFINITION	Status
2 01	YYY	Change data width	Add (Y-128) bits to the data width given for each data element in Table B, other than CCITT IA5 (character) data, code or flag tables.	Operational
2 02	YYY	Change scale	Add Y-128 to the scale for each data element in Table B, other than CCITT IA5 (character) data, code or flag tables.	Operational
2 03	YYY	Change reference values	Subsequent element descriptors define new reference values for corresponding Table B entries. Each new reference value is represented by Y bits in the Data section. Definition of new reference values is concluded by coding this operator with Y = 255. Negative reference values shall be represented by a positive integer with the left-most bit (bit 1) set to 1.	Operational
2 04	YYY	Add associated field	Precede each data element with Y bits of information. This operation associates a data field (e.g. quality control information) of Y bits with each data element.	Operational
2 05	YYY	Signify character	Y characters (CCITT International Alphabet No. 5) are inserted as a data field of Y x 8 bits in	Operational
2 06	YYY	Signify data width for the immediately following local descriptor	Y bits of data are described by the immediately following descriptor.	Operational
2 07	YYY	Increase scale, reference value and data width	For Table B elements, which are not CCITT IA5 (character data), code tables, or flag tables: 1. Add Y to the existing scale factor 2. Multiply the existing reference value by $10^Y$ 3. Calculate $((10 \times Y) + 2) \div 3$ , disregard any fractional remainder and add the result to the existing bit width.	Operational
2 08	YYY	Change width of CCITT IA5 field	Y characters from CCITT International Alphabet #5 (representing Y x 8 bits in length) replace the specified data width given for each CCITT IA5 element in Table B.	Operational
2 09	YYY	IEEE floating point representation	"For elements in Table B other than CCITT IA5, Code Tables, Flag Tables and delayed descriptor replication factors, this operator shall indicate that values are represented in YYY bits IEEE floating point, where YYY can be set to 032 (single precision) or 064 (double precision). This operator shall override the scaling, reference value and data width from Table B. An operand of YYY=000 shall reinstate the Table B scaling, reference value and data width. (see note 21)	Validation
2 21	YYY	Data not present	Data values present in section 4 (Data section) corresponding to the following YYY descriptors shall be limited to data from classes 1-9, and class 31.	Operational
2 22	000	Quality information follows	The values of class 33 elements which follow relate to the data defined by the data present bit-map.	Operational
2 23	000	Substituted values operator	The substituted values which follow relate to the data defined by the data present bit-map.	Operational
2 23	255	Substituted values marker operator	This operator shall signify a data item containing a substituted value; the element descriptor for the substituted value is obtained by the application of the data present bit-map associated with the substituted values operator.	Operational

TABLE REFERENCE F X	OPERAND	OPERATOR NAME	OPERATION DEFINITION	Status
2 24	000	First order statistical values follow	The statistical values which follow relate to the data defined by the data present bit-map.	Operational
2 24	255	First order statistical values marker operator	This operator shall signify a data item containing a first order statistical value of the type indicated by the preceding 0 08 023 element descriptor; the element descriptor to which the first order statistic relates is obtained by the application of the data present bit-map associated with the first order statistical values follow operator; first order statistical values shall be represented as defined by this element descriptor.	Operational
2 25	000	Difference statistical values follow	The statistical values which follow relate to the data defined by the data present bit-map.	Operational
2 25	255	Difference statistical values marker operator	This operator shall signify a data item containing a difference statistical value of the type indicated by the preceding 0 08 024 element descriptor; the element descriptor to which the difference statistical value relates is obtained by the application of the data present bit-map associated with the difference statistical values follow operator; difference statistical values shall be represented as defined by this element descriptor, but with a reference value of -2 and a data width of (n+1), where n is the data width given by the original descriptor. This special reference value allows the statistical difference values to be centred around zero.	Operational
2 32	000	Replaced/retained values follow	The replaced/retained values which follow relate to the data defined by the data present bit-map.	Operational
2 32	255	Replaced/retained value marker operator	This operator shall signify a data item containing the original of an element which has been replaced by a substituted value. The element descriptor for the retained value is obtained by the application of the data present bit-map associated with the substituted values operator.	Operational
2 35	000	Cancel backward data reference	This operator terminates all previously defined back-ward reference and cancels any previously defined data present bit-map; it causes the next data present bit-map to refer to the data descriptors which immediately precede the operator to which it relates.	Operational
2 36	000	Define data present bit-map	This operator defines the data present bit-map which follows for possible re-use; only one data present bitmap may be defined between this operator and the cancel use defined data present bit-map operator.	Operational
2 37	000	Use defined data present bit-map	This operator causes the defined data present bit-map to be used again.	Operational
2 37	255	Cancel use defined data present bit-map	This operator cancels the re-use of the defined data present bit-map.	Operational
2 41	000	Define event	This operator denotes the beginning of the definition of an eve (see Note 19).	Operational
2 41	255	Cancel define event	This operator denotes the conclusion of the event definition that was begun via the previous 2-41-000 operator.	Operational
2 42	000	Define conditioning event	This operator denotes the beginning of the definition of a conditioning event (see Note 19).	Operational
2 42	255	Cancel define conditioning event	This operator denotes the conclusion of the conditioning event definition that was begun via the previous 2-42-000 operator.	Operational

TABLE REFERENCE F X	OPERAND	OPERATOR NAME	OPERATION DEFINITION	Status
2 43	000	Categorical forecast values follow	The values which follow are categorical forecast values (see Note 20).	Operational
2 43	255	Cancel categorical forecast values follow	This operator denotes the conclusion of the definition of categorical forecast values that was begun via the previous 2-43-000 operator.	Operational

Notes: (see)