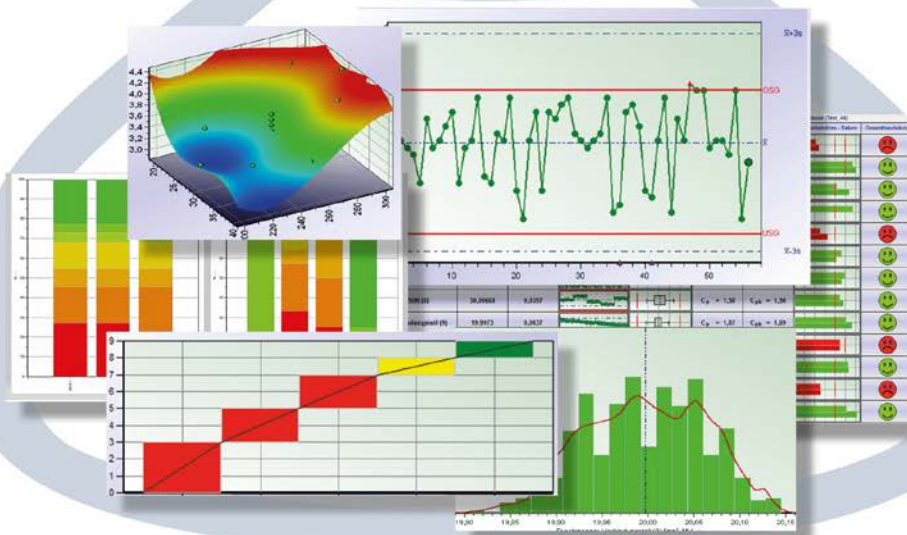


Erweitertes Qualitätsdatenaustauschformat (AQDEF)

Advanced Quality Data Exchange Format (AQDEF)

Advanced Quality Data Exchange Format

Measuring instruments store data
in the AQDEF format



DAIMLER



MAGNA



GETRAG



FESTO



B/S/H/



BOSCH

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If the document or text passages are changed independently, the changes must be marked explicitly in order to avoid confusion!

Changes

No.	Page	Version	Change	Date	Name
001	II	2.0	Adjustment of the list of work group members	2008-04-02	Q-DAS
002	3 - 9	2.0	Expansion of the K-Field-List New K-Fields are marked with "New in Version 2.0" in the column "Remarks"	2008-04-02	Q-DAS
003	3	2.01	Field K0013 is not applicable in the version 2.0.1	2008-11-28	WG
004	5	2.01	Fields K2030 and K2031 are not applicable in version 2.0.1, in future use K-Field range K5xxx for grouping	2008-11-28	WG
005	9	2.01	Write File Modes well-defined	2008-11-28	WG
006	10	2.01	Wording for catalogue integration in Chapter <u>4.3</u> adapted to the requirement of Chapter <u>4.6</u>	2008-11-28	WG
007	3-7	2.01	K-Field-list categorised	2008-11-28	WG
008	7	2.01	Explanations regarding the categories added to the legend	2008-11-28	WG
009	8-10	2.01	Case studies adapted to the categories	2008-11-28	WG
010	II	3.0	Modification of the list of participants	2010-03-02	WG
011	3-4	3.0	Expansion of the K-Field-List New K-Fields are marked with "New in Version 3.0" in the column "Remarks"	2010-03-02	WG
012	13	3.0	Expansion of Chapter <u>4.9</u> regarding the certification after category Q for the requirement of test examples for initial commissioning	2010-03-02	WG
013	II	3.01	Modification of the list of participants	2011-03-16	WG
014	2	3.01	"Q" changed to "R" for QRK	2011-03-16	WG
015	3, 7	3.01	"C" changed to "K" to mark fields bases on the Q-DAS catalogue	2011-03-16	WG
016	14	3.01	End user acceptance for category „Q“ certificates	2011-03-16	WG
017	3	3.01	K-Field K0100 must be generated from the system automatically	2011-03-16	WG
018	all	3.01	„Automotive Quality Data Exchange Format“ changed to „Advanced Quality Data Exchange Format“	2011-03-16	WG
019	2, 8	3.02	Added text: "including the estimators for the variation" to the descriptions of the reduced format for the K8xxx-Fields, English translation re-worded.	2012-09-11	WG
020	5, 7	3.02	Added text: "must be generated from the system automatically" for K2004/K2008/K2009/K5001/K5002/K5101/K5102/ K5103/K5111/K5112/K5113	2012-09-11	WG
021	7	3.02	K5101 removed	2012-09-11	WG

No.	Page	Version	Change	Date	Name
022	7	3.02	K8xxx: R only for K8010 and K8110	2012-09-11	WG
023	4	3.02	K2008: x added (controlling function)	2012-09-11	WG
024	5	3.02	K2101/K2110/K2111/K2112/K2113: remark added that all 5 fields have to be written, but a combination of only 3 may be displayed to the user.	2012-09-11	WG
025	4	3.02	K2006: fields content to be written reduced to 0 and 1	2012-09-11	WG
026	5	3.02	Added text: "must be generated from the system automatically based on the selected measurement system analysis study, and the selected settings" For K2202/K2205/ K2220/K2221/K2222	2012-09-11	WG
027	3 – 6	3.02	OR-remarks removed for K0010/K0053/K1053/K1081/K1082/K1085 /K1086/K1087/K1202/K1202/K1206/K2301/K2302/K2303/K2311/K2312/K2401/K2402	2012-09-11	WG
028	5	3.02	Added text: "To be supported in case of a measurement -system -analysis studies only" for K2202/K2205/K2220/K2221/K2222/K2211/ K2212/K2213	2012-09-11	WG
029	3	3.02	K0005 and K0011: remark added as "more than 1 entry can be written"	2012-09-11	WG
030	3, 4	3.02	I5 / I10 – remark removed for additional data fields	2012-09-11	WG
031	5, 7	3.02	Status set to 1 for all K-fields with a "must be generated from the system automatically" remark (see changes 020 and 026)	2012-09-11	WG
032	7	3.02	Remark removed for K8501.	2013-01-23	WG
033	10	3.02	GM Type 2, GM Type 3, Ford Type 4 and Ford Type 5 removed. Type 2 and 3 must be written with reference measurements.	2013-01-23	WG
034	9, 10	3.02	Changed Text in Chapter 3.1 and 3.2	2013-01-23	WG
035	II	3.02	Modification of the list of participants	2013-01-23	WG
036	3, 5	4.0	Expansion of the K-Field-List K0016/K0017/K0054/K0055/K0056/K0057 K0058/K0059/K0060/K0061/K0062/K0063 K2062/K2063/K2064/K2065/K2066/K2067 K2068	2013-09-24	WG
037	8	4.0	K8505 removed	2013-09-24	WG
038		4.0	Reduced number of MSA use cases	2014-12-11	WG
039	11	4.1	Clear name for catalogue fields in chapter 4.10		
040	II	4.1	New contact person BSH Hausgeräte GmbH, Getrag Corporate Group	2015-06-02	WG

No.	Page	Version	Change	Date	Name
041	1	4.1	Illustrated data model adapted / K5xxx entry deleted	2015-06-02	WG
042	2	4.1	Described key structure adapted / K5000 – K5999 – “only if required“ note added to structure information	2015-06-02	WG
043	5	4.1	Content of K2008's note field adapted / “K5xxx (multivariate characteristics)“ replaced by “structure information”	2015-08-18	WG
044	8	4.1	K-fields 5001+5002 were replaced by K2030 and K2031 under structure information. K-field 5113 deleted.	2015-08-18	WG
045	10	4.1	Modified requirements for machine and process qualification <ul style="list-style-type: none"> • attribute characteristics became discrete characteristics (binary characteristics/ good – bad) • Error log sheet deleted <p>Error log sheet is no longer a requirement in chapter 3.1.</p>	2015-08-18	WG
046	11	4.1	Support of the following types of analysis is no longer needed (analyses were deleted) <ul style="list-style-type: none"> • Linearity • Stability <p>Attribute analyses</p>	2015-08-18	WG
047	13	4.1	Axes are provided by default in case of positional tolerances	2015-08-18	WG
048	12	4.1	Selection of catalogue/sub-catalogue on the part level and system level	2015-08-18	WG
049	8	5.0	The following K-fields were removed from the AQDEF specification: K8014/K8015/K8114/K8115/K8520/K8521 K8522/K8523/K8600/K8610/K8611/K8612 K8613	2017-03-06	WG
050	II	5.0	List of participants and company logos were adapted	2017-03-06	WG
051	14	5.0	The following aspects were added: - Customer specifies the definition of a characteristic - AQDEF category is established according to bilateral agreement	2017-03-06	WG
052	13	5.0	AQDEF categories Q + X were deleted	2017-03-08	WG
053		5.0	Coding is now described	2017-03-08	WG
054		5.01	Spelling correction	2017-04-20	Q-DAS

Changes to be made to the document in the future will be published on the Q-DAS® website at www.q-das.de/en/service/certification/certification/advanced-quality-data-exchange-format-aqdef/.

Preface

Online data recording is becoming more and more important. A major advantage is the accurate and reliable recording of data within a minimum of time. This creates the foundation for fast and concise evaluations based on data collected online, and enables validated decision taking.

These possibilities help create more transparency and improve the analysis of internal and external procedures and processes. Thus, online data transfer helps to improve process quality and efficiency as well as to increase customer satisfaction.

More and more diversified online applications are realised and implemented for internal as well as external networks, because of the great results possible. This opens up further possibilities like for example, the use of database systems with the known advantages. However, along with the growing possibilities, also the number of possibilities and variations for a multitude of solutions and the degree of complexity increases.

The existing procedure results in a large number of different company and plant specific individual solutions, which basically have a similar structure, like for example the SPC control of a production process or the acceptance of a facility.

For this reason, the measurement device manufacturers have to invest plenty of time and effort for customer specific adaptations, as well as during the specification and control phase at the customers and with regard to investment cost for implementation or license fees.

With the objective to find a satisfactory solution for all parties involved, a number of users of the software function "Data Interface" from the automotive production and supplier industry joined forces to create a standardised and coordinated specification. The objective was to include a group of users in this work group as big as possible, in order to get a representative cross-section through the scope and interpretation of the key fields and their application. The result is a standardised catalogue of the data fields important to every user. This scope is also the basis for a new, unified and comprehensive certification, which needs to be carried out only once for all the users.

Over the years, this data interface has increasingly spread also outside of the automotive industry and their suppliers. That is why in 2011 the data interface "Automotive Quality Data Exchange Format" has been renamed into "Advanced Quality Data Exchange Format" (AQDEF).

In order to display the existing varied structures and procedures of the individual companies, the possibility exists to enable the necessary K-fields or disable those not required over the total range of fields.

It was also emphasised that Q-DAS[®] products (qs-STAT[®], solara.MP[®], procella[®] etc.) could be used directly depending on the situation, e.g. for the acceptance of a measuring equipment, machines and production facilities, for process analysis or the assessment of different improvements and intended SPC control charting.

Target of the unification of the data interface is to improve the safety of the data transfer and to optimise the effort and cost for all involved parties.

We kindly ask you to play an active part in the continuous improvement process by sending suggestions to the committee for future development.

The committee

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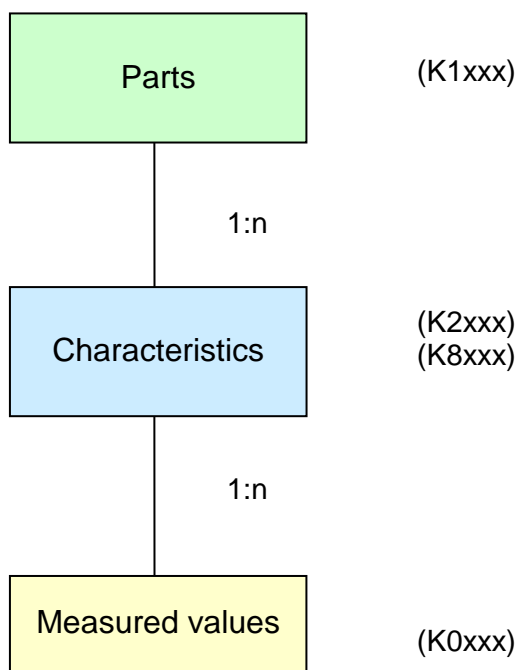
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1 Introduction

The quality data exchange format is distinguished by:

- simple, transparent structure (pure ASCII, variable)
- flexible
- space saving
- easily copied and compacted
(all information may be saved in one file)
- easily transferred
- language independent because of allocation of an explicit key (Kxxxx) to a field

The basic data model has the following structure:



Kxxxx: Key for the characteristics definition of an element

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The characteristics of the individual elements of the data model are described through the use of so-called key fields with the basic key structure as shown below:

K0001	...	K0999	Description of value formats / measurement values
K1000	...	K1999	Parts data
K2000	...	K2999	Characteristics data
K5000	...	K5999	Structure information (only if required)
K8000	...	K8999	QCC

The list of supported keys is included in the K field list below (see chapter 2). The respective fields are allocated to categories. Each category corresponds to a typical case study (see chapter 3). This gives every gage manufacturer the possibility to choose the category for certification of his interface. He should make his choice according to the specifications of his customer.

In addition, a status 1 or 2 is allocated to every field. This means:

1. Field must exist
2. Field must exist, however the user has the option to deactivate it.

Note:

If fields do not have to be supported because of their allocation to category B, C, D, E, ..., this requirement will not apply.

The column "Misc." shows the following information:

1. Fields marked with an "x" are control-fields
2. Fields marked with an "o" have a defined field contents (see documentation "Q-DAS ASCII-Transfer Format")
3. In case of a catalogue field, the corresponding catalogue is specified under "Remarks" (designation "K").
4. Fields marked with "R" are for the evaluation of quality control charts for location and variation. Creating and filling in the information recorded in the fields is a time-consuming task. This is why for fields marked with "R", you have the option to either fill these fields out completely according to the Q-DAS® ASCII Transfer format, or to allocate a limited field content only. If you choose the limited content, you must specify at least the quality control chart type for location chart and variation chart including the estimators for the variation. For the control and warning limits it is sufficient if the numerical values are recorded into the corresponding fields.

A complete description of the technical structure as well as sample data sets are available for download at www.q-das.de/en/service/certification/certification/advanced-quality-data-exchange-format-agdef/.

1.1 Coding description

The files generated by the writing system have to be provided in the ASCII / ANSI format.

In addition, the files generated by the writing system can also be available in the Unicode format.

When you use the Unicode format, the following coding must also be supported:

- UTF8
- Big-Endian UTF16
- Little-Endian UTF 16

1.1.1 Byte order

Each file first needs the BOM (byte order mark) written as follows:

- | | |
|-----------------------|---------------------------------|
| • ANSI | no BOM required |
| • UTF8 | EF BB BF (239 187 191, 3 bytes) |
| • Big-Endian UTF16 | FE FF (254 255, 2 bytes) |
| • Little-Endian UTF16 | FF FE (255 254, 2 bytes) |

2 K-field list

Key	Field Type	max. Length	Field Name	Required for Certification after:					Status	Misc.	Remarks
				Category A	Category B	Category C	Category D	Category E			
MEASUREMENT VALUES / ADDITIONAL DATA											
K0001	F	22	Measured value	X	X	X			1		
K0002	I5	5	Attribute	X	X	X	X		1	x o	i.e. 0 = valid, 255 = empty data field etc.
K0004	D	-	Date/Time	X	X	X	X		1		
K0005	S	-	Event	X	X	X	X		2	K	Catalo see K2060 More than 1 entry can be written
K0006	A	14	Batch number	X	X	X	X		2		
K0007	I10	10	Cavity number	X	X	X	X		2	K	
K0008	I10	10	Operator name	X	X	X	X		2	K	
K0009	A	255	Text	X	X	X	X		2		
K0010	I10	10	Machine number	X	X	X	X		2	K	
K0011	S	-	Process parameter	X	X	X	X		2	K	catalogue see K2061 more than 1 entry can be written
K0012	I10	10	Gage number	X	X	X	X		2	K	
K0014	A	40	Part ID	X	X	X	X		2		
K0015	I5	5	Reason for test	X	X	X	X		2	o	
K0016	A	30	Production number	X	X	X	X		2		New in Version 4.0
K0017	A	30	Work piece fixture number	X	X	X	X		2		New in Version 4.0
K0020	I5	5	Subgroup size	X			X		1		with attribute tests only
K0021	I5	5	Number of errors	X			X		1		with attribute tests only
K0053	A	20	Order	X	X	X	X		2		
K0054	A	30	K0054	X	X	X	X		2		New in Version 4.0
K0055	A	30	K0055	X	X	X	X		2		New in Version 4.0
K0056	A	30	K0056	X	X	X	X		2		New in Version 4.0
K0057	A	30	K0057	X	X	X	X		2		New in Version 4.0
K0058	A	30	K0058	X	X	X	X		2		New in Version 4.0
K0059	A	30	K0059	X	X	X	X		2		New in Version 4.0
K0060	A	30	K0060	X	X	X	X		2		New in Version 4.0
K0061	I10	10	K0061	X	X	X	X		2	K	New in Version 4.0
K0062	I10	10	K0062	X	X	X	X		2	K	New in Version 4.0
K0063	I10	10	K0063	X	X	X	X		2	K	New in Version 4.0
CONTROL DATA											
K0100	I5	5	Total no. of characteristics in file	X	X	X	X	X	1	x	must be generated from the system automatically
PARTS DATA											
K1001	A	30	Part number	X	X	X	X	X	1		
K1002	A	80	Part description	X	X	X	X	X	1		

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Key	Field Type	max. Length	Field Name	Required for Certification after:					Status	Misc.	Remarks
				Category A	Category B	Category C	Category D	Category E			
K1003	A	20	Part abbreviation	X	X	X	X	X	2		
K1004	A	20	Part Amendment status	X	X	X	X	X	1		
K1005	A	40	Product	X	X	X	X	X	2		
K1007	A	20	Part number – Abbreviation	X	X	X	X	X	2		New in Version 2.0
K1008	A	20	Part type	X	X	X	X	X	2		New in Version 3.0
K1009	A	20	Part code	X	X	X	X	X	2		New in Version 3.0
K1011	A	20	Variant	X	X	X	X	X	2		New in Version 3.0
K1022	A	80	Manufacturer name	X	X	X	X	X	2		
K1041	A	30	Drawing number	X	X	X	X	X	2		
K1042	A	20	Drawing Amendment	X	X	X	X	X	2		
K1053	A	40	Contract	X	X	X	X	X	2		
K1072	A	40	Supplier Description	X	X	X	X	X	2		New in Version 2.0
K1081	A	24	Machine Number	X	X	X	X	X	2		
K1082	A	40	Machine Description	X	X	X	X	X	2		
K1083	I	10	Machine Number	X	X	X	X	X	2		Catalo field New in Version 2.0
K1085	A	40	Machine Location	X	X	X	X	X	2		
K1086	A	40	Work Cycle / Operation	X	X	X	X	X	2		
K1087	A	40	Work Cycle Description	X	X	X	X	X	2		
K1100	A	40	Plant Sector	X	X	X	X	X	2		
K1101	A	40	Department	X	X	X	X	X	2		
K1102	A	40	Workshop	X	X	X	X	X	2		New in Version 2.0
K1103	A	40	Cost centre	X	X	X	X	X	2		
K1110	A	20	Order number	X	X	X	X	X	2		New in Version 2.0
K1201	A	24	Test Facility Number	X	X	X	X	X	2		
K1202	A	40	Test Facility Description	X	X	X	X	X	2		
K1203	A	80	Reason for Test	X	X	X	X	X	2		
K1206	A	40	Test Location	X	X	X	X	X	2		
K1209	A	20	Inspection type	X	X	X	X	X	2		see K0015
K1230	A	40	Gage room	X	X	X	X	X	2		New in Version 3.0
K1231	A	20	Measuring program number	X	X	X	X	X	2		
K1232	A	20	Measuring program version	X	X	X	X	X	2		
K1303	A	40	plant	X	X	X	X	X	2		see K1100
K1343	A	20	Test Plan Development Date	X	X	X	X	X	2		
K1344	A	40	Test Plan Developer	X	X	X	X	X	2		
K1802	A	255	user field content 1	X	X	X	X	X	2		no selection field!
K1900	A	255	Remark	X	X	X	X	X	1		

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Key	Field Type	max. Length	Field Name	Required for Certification after:					Status	Misc.	Remarks
				Category A	Category B	Category C	Category D	Category E			
CHARACTERISTICS DATA											
K2001	A	20	Characteristic Number	X	X	X	X	X	1		
K2002	A	80	Characteristic Description	X	X	X	X	X	1		
K2003	A	20	Characteristic Abbreviation	X	X	X	X	X	2		
K2004	I5	5	Characteristic Type	X	X	X	X	X	1	x o	must be generated from the system automatically i.e. variable, attribute, ELS etc.
K2005	I5	5	Characteristics Class	X	X	X	X	X	1	x o	classes: 0, 1, 2, 3, 4
K2006	I5	5	Control Item	X	X	X	X	X	1	o	Reduced list: 0 = No ; 1 = Yes
K2007	I5	5	Control Type	X	X	X	X	X	2	o	
K2008	I5	5	Group type	X	X		X	X	1	x o	see also K5xxx (multivariate characteristics) must be generated from the system automatically
K2009	I5	5	Measured quantity	X	X	X	X	X	1	x o	criterion for characteristic type (i.e. length, shape, location etc.) must be generated from the system automatically
K2015	I3	3	Tool wear type (Trend)	X	X	X	X	X	2	x o	no trend, upwards, downwards
K2016	I	3	100% Measurement	X	X	X	X	X	2	x o	0=no, 1=yes, New in Version 2.0
K2022	I5	5	Decimal Places	X	X	X	X	X	1		
K2043	A	40	Measuring Device Name	X	X	X	X	X	2		New in Version 2.0
K2060	I5	5	Events Catalo	X	X	X	X	X	2		required with the use of K0005 Syntax with /0 possible, selection on "part level/system level" available
K2061	I5	5	Process Parameter Catalo	X	X	X	X	X	2		required with the use of K0011 Syntax with /0 possible, selection on "part level/system level" available
K2062	I5	5	Cavity catalogue	X	X	X	X	X	2		required with the use of K0007 New in Version 4.0 Syntax with /0 possible, selection on "part level/system level" available
K2063	I5	5	Machine catalogue	X	X	X	X	X	2		required with the use of K0010 New in Version 4.0 Syntax with /0 possible, selection on "part level/system level" available
K2064	I5	5	Gage catalogue	X	X	X	X	X	2		required with the use of K0012 New in Version 4.0 Syntax with /0 possible, selection on "part level/system level" available
K2065	I5	5	Operator catalogue	X	X	X	X	X	2		required with the use of K0008 New in Version 4.0 Syntax with /0 possible, selection on "part level/system level" available

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Key	Field Type	max. Length	Field Name	Required for Certification after:					Status	Misc.	Remarks
				Category A	Category B	Category C	Category D	Category E			
K2066	I5	5	Sub-catalogue K0061	X	X	X	X	X	2		required with the use of K0061 New in Version 4.0 Syntax with /0 possible, selection on "part level/system level" available
K2067	I5	5	Sub-catalogue K0062	X	X	X	X	X	2		required with the use of K0062 New in Version 4.0 Syntax with /0 possible, selection on "part level/system level" available
K2068	I5	5	Sub-catalogue K0063	X	X	X	X	X	2		required with the use of K0063 New in Version 4.0 Syntax with /0 possible, selection on "part level/system level" available
K2092	A	50	Characteristic text	X	X	X	X	X	2		New in Version 2.0
K2093	A	80	Processing status	X	X	X	X	X	2		
K2100	F	22	Target value	X	X	X	X	X	2		
K2101	F	22	Nominal Value	X	X	X	X	X	1		Only one combination can be shown to the user: K2101 / K2110 / K2111 or K2101 / K2112 / K2113 but all 5 fields have to be written into the dataset. Plausibility test to each other
K2110	F	22	Lower Specification Limit	X	X	X	X	X	1		
K2111	F	22	Upper Specification Limit	X	X	X	X	X	1		
K2112	F	22	Lower Allowance	X	X	X	X	X	1		
K2113	F	22	Upper Allowance	X	X	X	X	X	1		
K2114	F	22	Lower Scrap Limit	X	X	X	X	X	2		Plausibility test
K2115	F	22	Upper Scrap Limit	X	X	X	X	X	2		
K2120	I3	3	Lower Boundary Type	X	X	X	X	X	1	x o	natural limit or limit value
K2121	I3	3	Upper Boundary Type	X	X	X	X	X	1	x o	natural limit or limit value
K2130	F	22	Lower Plausibility Limit	X	X	X	X	X	2		Plausibility test
K2131	F	22	Upper Plausibility Limit	X	X	X	X	X	2		
K2142	A	20	Unit	X	X	X	X	X	1		Text
K2202	I3	3	Evaluation Type	X	X	X	X	X	1	x	i.e. type 1, type 2 etc. must be generated from the system automatically based on the selected measurement system analysis study, and the selected settings. To be supported in case of a measurement -system -analysis studies only.
K2205	I5	5	Number of Parts	X	X	X	X	X	1		must be generated from the system automatically based on the selected measurement system analysis study, and the selected settings. To be supported in case of a measurement -system -analysis studies only.

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Key	Field Type	max. Length	Field Name	Required for Certification after:					Status	Misc.	Remarks
				Category A	Category B	Category C	Category D	Category E			
K2211	A	40	Master Number	X	X	X	X	X	1		To be supported in case of a measurement -system -analysis studies only
K2212	A	40	Master Description	X	X	X	X	X	1		To be supported in case of a measurement -system -analysis studies only
K2213	F	22	Standard actual value	X	X	X	X	X	1		To be supported in case of a measurement -system -analysis studies only
K2220	I5	5	Number of Operators	X	X	X	X	X	1		must be generated from the system automatically based on the selected measurement system analysis study, and the selected settings. To be supported in case of a measurement -system -analysis studies only.
K2221	I5	5	No. of Trials	X	X	X	X	X	1		must be generated from the system automatically based on the selected measurement system analysis study, and the selected settings. To be supported in case of a measurement -system -analysis studies only.
K2222	I5	5	Number of reference measurements	X	X	X	X	X	1		must be generated from the system automatically based on the selected measurement system analysis study, and the selected settings. To be supported in case of a measurement -system -analysis studies only.
K2281	A	40	Calibration Part Number middle	X	X	X	X	X	2		New in Version 2.0
K2301	A	20	Machine number	X	X	X	X	X	2		
K2302	A	40	Machine Description	X	X	X	X	X	2		
K2303	A	40	Department/Cost centre	X	X	X	X	X	2		
K2311	A	20	Production Type (Operation)	X	X	X	X	X	2		
K2312	A	40	Production Type Description	X	X	X	X	X	2		
K2320	A	20	Contract Number	X	X	X	X	X	2		New in Version 2.0
K2401	A	40	Gage Number	X	X	X	X	X	2		
K2402	A	40	Gage Description	X	X	X	X	X	2		
K2403	A	20	Gage Group	X	X	X	X	X	2		New in Version 2.0
K2404	F	22	Gage Resolution	X	X	X	X	X	1		
K2406	A	40	Gage Manufacturer	X	X	X	X	X	2		
K2407	A	20	SPC device number	X	X	X	X	X	2		
K2408	A	40	SPC device manufacturer	X	X	X	X	X	2		
K2409	A	20	SPC device type	X	X	X	X	X	2		
K2410	A	40	Test Location	X	X	X	X	X	2		
K2411	A	40	Test Begin	X	X	X	X	X	2		
K2415	A	20	Gage serial number	X	X	X	X	X	2		New in Version 2.0
K2440	A	40	Assembly Component	X	X	X	X	X	2		New in Version 2.0
K2505	A	20	View description	X	X	X	X	X	2		New in Version 2.0
K2506	I	3	Sheet number	X	X	X	X	X	2		New in Version 2.0
K2630	F	22	Calibration uncertainty	X	X	X	X	X	1		
K2900	A	255	Remark	X	X	X	X	X	1		

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Key	Field Type	max. Length	Field Name	Required for Certification after:					Status	Misc.	Remarks
				Category A	Category B	Category C	Category D	Category E			
STRUCTURE INFORMATIONEN											
K2030	A	30	Group number (Text)	X	X			X	1		must be generated from the system automatically or K5xxx
K2031	A	80	Group description	X	X			X	1		must be generated from the system automatically or K5xxx
K5102	I5	5	Characteristic as part of a group	X	X			X	1	x	must be generated from the system automatically or K2030/K2031
K5103	I5	5	Group as part of a group	X	X			X	1	x	must be generated from the system automatically or K2030/K2031
K5111	I5	5	Parts group	X	X			X	1	x	must be generated from the system automatically or K2030/K2031
K5112	I5	5	Characteristics group	X	X			X	1	x	must be generated from the system automatically or K2030/K2031
QUALITY CONTROL CHARTS											
K8010	S	-	Chart type (location) + additional attributes	X	X	X	X	X	2		The first position of the string indicates the respective type of location chart. K8010/1 23 1 13 / original value 23 / median value 33 / average The second position of the string is always 1 since it indicates the estimator of variation. K8010/1 23 1
K8011	F	22	Central position (location)	X	X	X	X	X	2		The user has to be able to make both entries manually.
K8012	F	22	lower Control Limit (location)	X	X	X	X	X	2		The user has to be able to make both entries manually.
K8013	F	22	upper Control Limit (location)	X	X	X	X	X	2		The user has to be able to make both entries manually.
K8110	S	-	Chart Type (variation) + additional attributes	X	X	X	X	X	2		The first position of the string indicates the respective type of variation chart. K8110/1 53 1 53 / location card 63 / variation card The second position of the string is always 1 since it indicates the estimator of variation. K8110/1 53 1

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Key	Field Type	max. Length	Field Name	Required for Certification after:					Status	Misc.	Remarks
				Category A	Category B	Category C	Category D	Category E			
K8111	F	22	Central Position (variation)	X	X	X	X	X	2		The user has to be able to make both entries manually.
K8112	F	22	lower Control lim. (variation)	X	X	X	X	X	2		The user has to be able to make both entries manually.
K8113	F	22	upper Control Limit (variation)	X	X	X	X	X	2		The user has to be able to make both entries manually.
K8500	I5	5	Subgroup size	X	X	X	X	X	1		
K8501	I3	3	Subgroup type	X	X	X	X	X	1	x o	
K8502	A	40	Subgroup frequency	X	X	X	X	X	2		
K8503	I3	3	Subgroup type (attribute)	X			X	X	2	o	with attribute tests only
K8504	I5	5	Subgroup frequency	X	X	X	X	X	2		

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Field type

A	alpha-numeric
D	date/time format
F	floating point number
I3	integer (1 Byte)
I5	integer (2 Byte)
I10	integer (4 Byte)
S	special coding

Miscellaneous

x	control fields
o	Defined field contents (see documentation "Q-DAS ASCII-Transfer Format")
K	catalogue reference / takeover from Q-DAS catalogue

Category

Category A	Variable and attribute characteristics including positional tolerances
Category B	Variable characteristics including positional tolerances
Category C	Variable characteristics
Category D	Attribute characteristics
Category E	Header data

Status

1	Mandatory field for calculated or recorded value
2	mandatory field must exist, with possibility to deactivate

If any field is not required because of its allocation to a certain category, this field must not be supported.

The website of Q-DAS GmbH (www.q-das.de/en/service/certification/advanced-quality-data-exchange-format-aqdef/) provides you with all documents of the work group and further information about certification.

The Q-DAS ASCII transfer format manual and a categorised list of required K-fields (AQDEF K-field list) are available on this website.

3 Applications

The support of the different applications for machine and process qualification as well as inspection process capability requires the consideration of specific field contents and field relations. The background to the applications may be found in the corresponding guidelines of the companies participating in the work group.

Depending on the application, – e.g. pre-run study (machine capability), process capability, SPC, gage and measurement process acceptance - it must be possible to set default target directories and naming conventions for the created ASCII files (also see user specification <http://www.q-das.de/en/service/certification/advanced-quality-data-exchange-format-aqdef/>).

The following applications must be taken into account for the quality data exchange format (“Q-DAS® ASCII Transfer Format“ manual at www.q-das.de/en/service/certification/certification/advanced-quality-data-exchange-format-aqdef/):

3.1 Machine and process qualification

Depending on category the following requirements must be met:

- variable characteristics with the
 - unilateral / bilateral limited characteristics
 - fixed / moving subgroup size
- positional tolerances
- Quality Control Chart (must be written at files of the process capability / SPC)
 - discrete characteristics (binary characteristics / good or bad)

Pre-run study files / Sample Analysis:

Files for pre-run studies and machine capability study do not deviate in content and K-field scope from files for process capability and SPC, but only in the number of measurements (see chapter [3.3](#)) and the storage location.

- pre-run study (1-part/5-parts)
- cold start test
- tool change

3.2 Gauge capability / inspection process capability

Depending on category the following studies must be supported:

- Type 1 Study
- Type 2 Study
- Type 3 Study
- GM Type 1A Study (only for fastening and assembly processes)

You do not have to realise the different writing modes for the capability of measurement and test processes. It is required to realise only one notation (dfq or dfd/dfx pair, one file per study).

In case of procedures where reference measurements are available (e.g. Type 2 or Type 3 study), an input mask for the reference values of each generated characteristic must be available to the user.

3.3 Categories

Depending on the respective application, sometimes it is neither sensible nor possible for the interface to support all data fields. For this reason the categories below were created:

Category A Full certificate	Variable and attribute characteristics including positional tolerances
Category B	Variable characteristics including positional tolerances
Category C	Variable characteristics
Category D	Discrete characteristics (only discrete characteristics, no ELS)
Category E	Header data
Category Q	see chapter 4.9 (deleted)

Please consider that category [Q] has been deleted from the AQDEF specification since version V5.0. Certificates that have already been issued for the removed AQDEF category remain valid.

3.4 Writing file modes

The following writing modes must be supported:

- *.DFQ (one file per job, time unit, study or similar)
- *.DFQ (one file per measurement)
- *.DFD/*.DFX (one file per job, time unit, study or similar)
- *.DFD/*.DFX (one file per measurement)
- *.DFD/*.DFX (count up mode)

4 Certification of the quality data exchange format

All suppliers of computer supported measurement and inspection systems (hereafter called "Suppliers") must understand the described data format and support it in the specified scope. Every supplier of such facilities must be able to show a certification of the data format according to the specifications of the customer. It is the responsibility of every supplier to contact Q-DAS[®] directly for this certification. The supplier decides which category will be applied for his certification.

Q-DAS[®] provides additional information material to all parties interested in the AQDEF data format certification. This includes, besides a general description, the current price list with a list of services included in every certification package.

4.1 Consultation service

If further consultation service should be required, Q-DAS[®] offers special workshops on this topic. The AQDEF data format will be discussed in detail and possible customer specific problems and requirements will be discussed.

4.2 Certification documents

After receipt of an order, Q-DAS[®] will send out the certification documents. You will receive a demo version for your own tests as well as a list for recording the K fields supported by the export interface. The demo version includes test examples as well as sample form sheets for test purposes. All modalities are detailed once more in a framework contract to be concluded between Q-DAS[®] as certification authority and the supplier.

4.3 Realisation of the export interface

The software technical realisation of the export interface will be carried out by the supplier. The following points must be taken into consideration:

- All the required data fields (K fields) must be supported by the export interface. For additional data recording. The measuring software must be expanded by the corresponding data recording screen masks. This applies especially to additional data, like for example machine or cavity numbers which may vary from measurement to measurement.
- The certified supplier of the writing system does not specify the intended AQDEF category (chapter 3.3.)
However, the AQDEF category is defined together with the certified supplier of the writing system.
- Users must be able to define the characteristic in the user interface. They select the measured values to be written as a test characteristic in the Q-DAS file. The customer defines test characteristics.
- For later selection and evaluation of the recorded data it is important to use standardised field records and reduce free text to a minimum. For this reason, some K fields use references to records in a catalogue file exclusively. This is why the Q-DAS catalogue file must be integrated into the measurement software and linked to the input fields there. (see chapter 4.10)

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You may select/specify available catalogue entries and sub-catalogue entries already on the part or system level in the measuring software.

The advantage is that you do not have to assign a catalogue or sub-catalogue to each characteristic.

When you specify a sub-catalogue on the part or characteristic level, only the respective subset of entries (e.g. machine/operator/result) is provided.

However, it is important that the respective catalogue entry (consecutive number) is written in the value string.

Example based on a catalogue/sub-catalogue for a machine catalogue

The main catalogue “machine catalogue/K4060“ includes a total of 10 entries:

```
K4060/0 Maschinenkatalog
K4062/1 001
K4063/1 M1
K4062/2 002
K4063/2 M2
K4062/3 003
K4063/3 M3
K4062/4 004
K4063/4 M4
K4062/5 005
K4063/5 M5
K4062/6 006
K4063/6 M6
K4062/7 007
K4063/7 M7
K4062/8 008
K4063/8 M8
K4062/9 009
K4063/9 M9
K4062/10 010
K4063/10 M10
K4060/1 Maschine_sub_1
K4061/1 1
K4061/1 3
K4061/1 5
K4060/2 Maschine_sub_2
K4061/2 7
K4061/2 9
K4061/2 10
```

You specified two sub-catalogues only containing a certain subset of all available catalogue entries.

```
K4060/0 Maschinenkatalog
K4062/1 001
K4063/1 M1
K4062/2 002
K4063/2 M2
K4062/3 003
K4063/3 M3
K4062/4 004
K4063/4 M4
K4062/5 005
K4063/5 M5
K4062/6 006
K4063/6 M6
K4062/7 007
K4063/7 M7
K4062/8 008
K4063/8 M8
K4062/9 009
K4063/9 M9
K4062/10 010
K4063/10 M10
K4060/1 Maschine_sub_1
K4061/1 1
K4061/1 3
K4061/1 5
K4060/2 Maschine_sub_2
K4061/2 7
K4061/2 9
K4061/2 10
```

- In order to avoid as many formal errors as possible in the data format from the beginning, the minimum that must be verified is the compliance with the field types and the maximum field length.
- On top of that, plausibility tests must be carried out during data input and incorrect entries must be intercepted.
- In case of positional tolerances, axes have to be provided by default in order to calculate true position values.
When you output e.g. maximum material condition / best-fit move groups, you always have to provide raw values / original measured values / coordinates written to a separate characteristic.
You may still output the already offset true position value / characteristic in case of maximum material conditions / best-fit moves. However, you need a separate characteristic in order not to change raw values / original measured values / coordinates. You have to provide this type of output to the customer as an option.

4.4 Create example data sets

The certification of the export interface is based mainly on the verification of sample files for conformity with the specifications of the AQDEF format. Because, depending on the individual application, different data fields and data field relations are relevant, several fields must be created and made available depending on the scope of the certification.

- one file per application scenario (see chapter 3), or alternatively, a file with characteristics of all the supported characteristics types (K2004)
- one file per supported group type (K2008), or alternatively, a file with characteristics from different group types
- one file with several characteristics per evaluation type (K2202) in Gage Capability
- application examples for different measurement value attributes (K0002) (behaviour in case of incomplete measuring cycles (attribute 255))
- examples of measurements with several events (K0005) and process parameters (K0011)
- examples of the required write file modes (Chapter 3.4)

4.5 Return of the certification documents

After realisation of the export interface, the gage supplier provides sample data sets to Q-DAS® and returns the certification documents to Q-DAS®:

- sample files per application
- list of supported data fields
- printouts of data input screen masks; documentation of the export interface
- exact description of the interface with version number
- counter-signed frame contract
- information regarding the required AQDEF certification category

4.6 Behaviour verification of the writing systems

Q-DAS[®] will verify the following aspects, based on the screen shots provided or on the installed system:

- possibility to record additional data (i.e. varying from measurement to measurement)
- integration and selection possibility of catalogue records (Q-DAS[®] catalogue file)
- identification of faulty data input records (i.e. incorrect field type or field length)
- identification of plausibility problems (i.e. $USL < LSL$)

4.7 Verification of contents and syntax of the sample data

The sample files are then verified for contents (verification of integrity and field relations) as well as for the syntax (diction verification) for the different applications and file write modes:

- K field sequence
- end-of-line identification
- conformity with field types and field length
- additional data and characteristics separators
- additional data sequence
- date / time format
- syntax of events and process parameters
- integrity of the mandatory fields according to the required AQDEF certification category
- plausibility and logic of field sequences or field relations
- printouts with all the supported fields

Not verified is the individual field contents for possible third-party requirements that are not part of the Q-DAS[®] specifications of the AQDEF format.

If deviations from the AQDEF format specification are found during the verification, then the gage supplier will receive feedback including trouble shooting suggestions. After error correction, Q-DAS[®] will use new sample data to verify the compliance with the specifications.

4.8 Issuing the AQDEF certificate

After all the requirements are met, Q-DAS[®] issues an AQDEF certificate (see appendix) which confirms the conformity of the interface with the requirements described here. The AQDEF certificate shows:

- the category (see appendix)
- the name of the company
- the exact description of the interface
- the version of the AQDEF specification
- the confirmation by Q-DAS[®]

The issued certificates will be published on the Q-DAS[®] website (<http://www.q-das.de/en/service/certification/certified-companies>). The certificate is valid without time limit for the specific version of the verified interface. In case of a release change or any other changes which can affect the export interface, a renewed proof of conformity must be provided through a repeat certification.

4.9 Issuing a certificate relating to Q-DAS® products

AQDEF category Q was unanimously deleted from the AQDEF specification on 8 March 2017. See categories in [chapter 3.3](#) or amendment no. [052](#) under changes.

4.10 Catalogue columns to be supported

Key	Field Name	Length	Type	Remarks
K4060	Machine catalogue (Name of the main-/sub-catalogue)	[80]	A	applies to K-field K0010
K4061	Element allocation to the respective sub-catalogue	[5]	I5	
K4062	Machine number	[20]	A	
K4063	Machine name	[80]	A	
K4561	Identification of records which are out of use			0= in use, 1=out of use
K4070	Gage catalogue (Name of the main-/sub-catalogue)	[80]	A	applies to K-field K0012
K4071	Element allocation to the respective sub-catalogue	[5]	I5	
K4072	Gage number	[20]	A	
K4073	Gage name	[80]	A	
K4571	Identification of records which are out of use			0= in use, 1=out of use
K4090	Operator catalogue (Name of the main-/sub-catalogue)	[80]	A	applies to K-field K0008
K4091	Element allocation to the respective sub-catalogue	[5]	I5	
K4092	Operator name 1	[20]	A	
K4093	Operator name 2	[80]	A	
K4591	Identification of records which are out of use			0= in use, 1=out of use
K4220	Event catalogue (name of main-/ sub-catalogue)	[80]	A	applies to K-field K0005
K4221	Event catalogue element (allocation event <-> sub-catalogue)	[5]	I	
K4222	Event number	[20]	A	
K4223	Event text	[80]	A	
K4721	Special Identification of records			0= in use 1=obsolete 2=Process intervention event 3=obsolete process intervention event
K4240	Process parameter catalogue (name of main-/ sub-catalogue)	[80]	A	applies to K-field K0011
K4241	Catalo element (allocation process parameter <-> sub-catalogue)	[5]	I	
K4242	Process parameter number	[20]	A	
K4243	Process parameter name	[80]	A	

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Key	Field Name	Length	Type	Remarks
K4244	Process parameter short text	[20]	A	
K4245	Process parameter value - number	[20]	A	
K4246	Process parameter value – Text	[80]	A	
K4249	Allocation Process parameter <-> Process parameter values	[5]	I	
K4741	Identification of records which are out of use			0= in use, 1=out of use
K4250	Cavity catalogue (Name of the main-/sub-catalogue)	[80]	A	applies to K-field K0007
K4251	Element allocation to the respective sub-catalogue	[5]	I5	
K4252	Cavity number	[20]	A	
K4253	Cavity name	[80]	A	
K4751	Identification of records which are out of use			0= in use, 1=out of use
K4270	Catalo K0061 (Name of the main-/sub-catalogue)	[80]	A	applies to K-field K0061
K4271	Element allocation to the respective sub-catalogue	[5]	I	
K4272	K0061 – number	[20]	A	
K4273	K0061 – name	[80]	A	
K4771	Identification of records which are out of use			0= in use, 1=out of use
K4280	Catalo K0062 (Name of the main-/sub-catalogue)	[80]	A	applies to K-field K0062
K4281	Element allocation to the respective sub-catalogue	[5]	I	
K4282	K0062 – number	[20]	A	
K4283	K0062 – name	[80]	A	
K4781	Identification of records which are out of use			0= in use, 1=out of use
K4290	Catalo K0063 (Name of the main-/sub-catalogue)	[80]	A	applies to K-field K0063
K4291	Element allocation to the respective sub-catalogue	[5]	I	
K4292	K0063 – number	[20]	A	
K4293	K0063 – name	[80]	A	
K4791	Identification of records which are out of use			0= in use, 1=out of use

4.11 Sample certificate

AQDEF - Certificate

Category A / Full certificate

Variable and attribute characteristics
(no ELS) including positional tolerances

for

Mustermann GmbH
Musterstraße 1
12345 Musterhausen
Deutschland / Germany

for conformance of the Export Interface

Mustermann-Interface 1.0

This certificate confirms that this export interface meets the
demands of the following documents:
"Advanced Quality Data Exchange Format" (AQDEF) version 4.1

Weinheim, 2016-07-14

Q-DAS GmbH
M. Mustermann / General Manager