20 September 2016
EMA/CVMP/QWP/49477/2017
Committee for Medicinal Products for Veterinary Use (CVMP)

Guideline on the chemistry of active substances

Draft

Draft agreed by Quality Working Party	20 September 2016
Adopted by CVMP for release for consultation	10 November 2016
Start of public consultation	13 February 2017
End of consultation (deadline for comments)	13 August 2017

This guideline replaces “Note for guidance on chemistry of new active substances” (EMEA/CVMP/541/03/Final) and “Chemistry of active substances” (3AQ5a).

Comments should be provided using this template. The completed comments form should be sent to vet-guidelines@ema.europa.eu

Keywords	Active Substance, Chemistry, Guideline

30 Churchill Place ● Canary Wharf ● London E14 5EU ● United Kingdom
Telephone +44 (0)20 3660 6000 **Facsimile** +44 (0)20 3660 5555
Send a question via our website www.ema.europa.eu/contact

Guideline on the chemistry of active substances

Table of contents

Executive summary

Guideline concerning the application of Directive 2001/82/EC with a view to the granting of a marketing authorisation for a veterinary medicinal product. This guideline replaces the 'Note for guidance on chemistry of new active substances' (EMEA/CVMP/541/03/Final) and 'Chemistry of active substances' (3AQ5a). It has been revised to cover new and existing active substances in one guideline.

1. Introduction (background)

This guideline has been prepared in accordance with the structure mainly used for the active substance part in the quality part of the dossier (CTD format). The subheadings have been included for the sake of clarity. Several references to ICH guidelines are included in the guideline. Whilst veterinary products are outside the scope of these ICH guidelines there are no corresponding VICH guidelines and the principles outlined in these ICH guidelines may also be relevant to veterinary products. By inclusion of these references it is not the intention to introduce any additional requirements for veterinary medicinal products, on the contrary they are included in order to facilitate flexibility and to allow the applicant the option of using different approaches to product development.

2. Scope

The purpose of this guideline is to set out the type of information required for the manufacture and control of active substances (existing or new chemical entities) used in a veterinary medicinal product. The differences in requirements for new or existing active substances are clarified in the relevant paragraphs of the guideline where applicable. For the purposes of this guideline, an existing active substance is one that has been authorised previously in a medicinal product for veterinary use within the European Union. This guideline is not applicable to herbal, biological, biotechnological products, radiopharmaceuticals and radiolabelled products. The guideline does not apply to contents of submissions during the clinical research stages of drug development. Nevertheless, the development principles presented in this guideline are important to consider during the investigational stages.

This guideline is applicable to active substances that have been developed following a "traditional" or an "enhanced" approach, as described in ICH Q8-11 (Refs 1-4), or a combination of these. However, when an "enhanced" approach is used or a design space claimed, the information provided in sections 3.2.S.2.2 to 3.2.S.2.6., should be prepared and organised according to ICH Q11 (Ref 4).

ASMFs and CEPs:

As an acceptable alternative to submission of detailed active substance information in the application for marketing authorisation, the Active Substance Master File (ASMF) or the Certification of Suitability to the Monographs of the European Pharmacopoeia (CEP) procedures may be used as described in 'Guideline on the Summary of Requirements for the Active substance in the Quality Part of the Dossier, EMEA/CVMP/1069/02 (Ref 5). The requirements are the same regardless of the route of submission of

30 Churchill Place ● Canary Wharf ● London E14 5EU ● United Kingdom
Telephone +44 (0)20 3660 6000 **Facsimile** +44 (0)20 3660 5555
Send a question via our website www.ema.europa.eu/contact

data on the active substance. For procedural aspects and format of the ASMF, please refer to the Guideline on Active Substance Master File procedure EMEA/CVMP/134/02 (Ref 6).

3. Legal basis

This guideline has to be read in conjunction with the introduction and general principles section (2) of Annex I to Directive 2001/82/EC.

4. Body of Data

4.1. General Information 3.2.S.1

This section deals with the identity, nomenclature and chemical structure of the active substance which is the subject of the application for marketing authorisation. Only brief information of physical characteristics should be listed, as full details and proof of structure are required in a separate section (see 3.2.S.3.1).

4.1.1. Nomenclature 3.2.S.1.1

Information on the nomenclature of the active substance should be provided, if relevant:

- International Non-proprietary Name (INN);
- Compendial (e.g. European Pharmacopoeia) name;
- National Approved Names: BAN, DCF, DCIT, JAN, USAN;
- Company or laboratory code;
- Systematic Chemical Name(s) (IUPAC nomenclature);
- Other Names (e.g. proprietary);
- Other non-proprietary name(s); and
- Chemical Abstracts Service (CAS) registry number (RN).

4.1.2. Structure 3.2.S.1.2

The structural formula, including relative and absolute stereochemistry, the molecular formula, and the relative molecular mass should be provided. Along with the stoichiometric formula and relative molecular mass (M_r), the structural formula should display the stereochemistry of the active substance (indicated conventionally). If this information is not available a detailed description of the nature of the substance should be given. If appropriate, the M_r of the therapeutically active moiety should also be included.

4.1.3. General Properties 3.2.S.1.3

The appearance of the material should be described briefly. A list of physicochemical and other relevant properties of the active substance should be provided, in particular physico-chemical properties that affect pharmacological efficacy and toxicological safety such as solubilities, acid

dissociation constant (pKa), polymorphism, isomerism, partition coefficient (logP), permeability, hygroscopicity and any other relevant properties (Ref 7).

4.2. Manufacture 3.2.S.2

4.2.1. Manufacturer(s) 3.2.S.2.1

The name, address, and responsibility of each manufacturer, including contractors, and each proposed production site or facility involved in manufacturing and testing should be provided for the production steps after introduction of the starting material(s).

4.2.2. Description of Manufacturing Process and Process Controls 3.2.S.2.2

The description of the active substance manufacturing process represents the applicant's commitment for the manufacture of the active substance. Information should be provided to adequately describe the manufacturing process, including special unit operations and process controls. Optional processes, alternative processes and reprocessing with associated controls that may be completed by the intermediate or active substance manufacturer, should also be described. Particular emphasis should be placed on steps of the process having an impact on the quality of the active substance or intermediates and which are classified as 'critical' (see also under 3.2.S.2.4).

Schematic representation of the manufacturing process

Graphical representations of the synthetic process(es) should be provided. These should comprise of reaction schemes that include chemical structures and molecular formulae of starting materials, intermediates and the active substance, as well as the reagents, catalysts and solvents used as applicable. It should be clear whether intermediates are isolated or non-isolated. The structures should reflect the stereochemistry of the molecules in question. A block flow diagram that identifies operating conditions, unit operations, weights, yield ranges etc. can be provided optionally.

Sequential procedural narrative

A sequential procedural narrative of the manufacturing process should be submitted. This narrative should include the quantities (or ranges) of materials, (starting materials, intermediates, solvents, catalysts and reagents and process aids), used in a current representative production scale batch. The narrative should describe each step in the manufacturing process, and identify critical steps, critical process parameters, process controls employed, and ranges for process parameters (e.g.: temperature, pressure, pH, time, flow-rate, etc.).

The control of critical steps and intermediates should be described in 3.2.S.2.4.

The description of the process should indicate the scale of manufacture and the range for which the considered process may be used. Yields or yield ranges for each stage should be provided.

Alternative processes

Alternative processes should be explained and described with the same level of detail as the primary process. The process description should fully define the method of synthesis. However, if alternative steps or solvents are proposed they should be justified by providing sufficient evidence that the final quality of the material (i.e.: active substance or isolated intermediate) obtained remains unchanged if the submission of data is *via* a CEP and/or an ASMF.

Regarding new active substances, if differences in impurity profiles are encountered, they should be analysed with validated methods and shown to be toxicologically acceptable.

Reprocessing

The cases where routine reprocessing is carried out should be identified and justified. Any data to support this justification should be either referenced or presented in 3.2.S.2.5. The reprocessing method should be clearly described and the criteria for deciding when re-processing can be performed should be provided.

Recovery

Recovery (e.g. from mother liquors or filtrates) of solvents, reactants, intermediates or the active substance is considered acceptable according to EU GMP Part II (Ref 8). Where these materials are re-introduced into the process, suitable specifications for the intended use should be provided.

Re-working

Re-working procedures should not be included in the dossier and should be carried out according to EU GMP Part II (Ref 8).

4.2.3. Control of Materials 3.2.S.2.3

Materials used in the manufacture of the active substance (starting materials, solvents, reagents, catalysts, process aids, etc.) should be listed identifying where each material is used in the process. Adequate specifications for these materials should be provided and should include an identification test. The specifications should address the characteristics of the material and its suitability for the intended use.

Biologically-sourced materials

Information on the source, processing, characterisation and control of all materials of biological origin (human or animal) must be provided, including viral and/or TSE safety data.

Active Substance (AS) Starting Material(s)

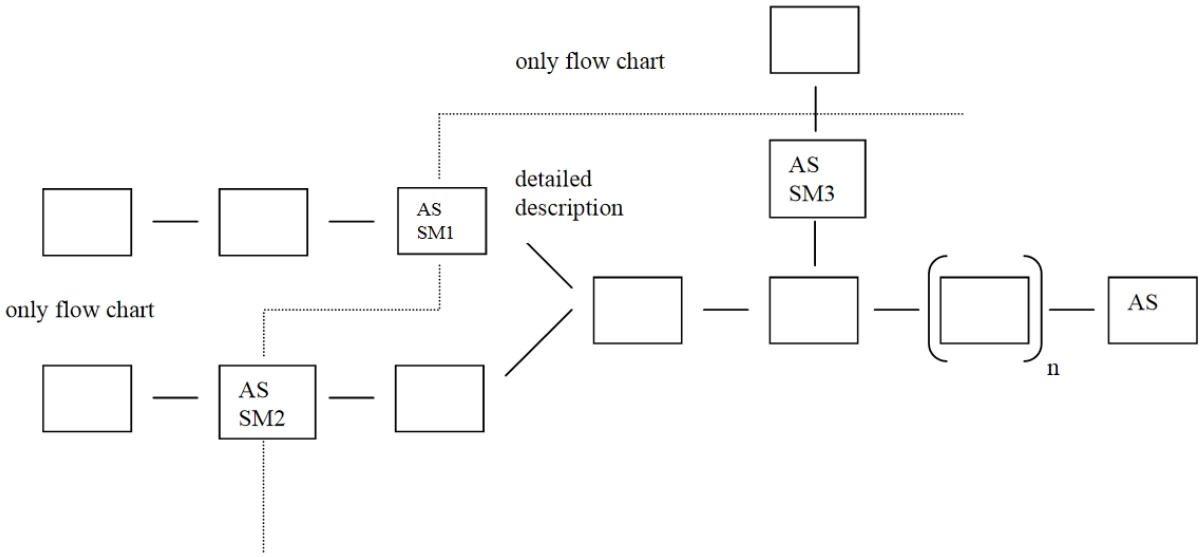
The requirements of ICH Q11 (Ref 4) in relation to the selection of starting materials are relevant to all active substances, regardless of the type of development approach. Reflection paper on the requirements for selection and justification of starting materials for the manufacture of chemical active substances (Ref 9) should also be consulted.

Generally, the description of the process and the synthesis schematic should include all the steps of the process, proceeding from the starting material(s) to the intermediates, and ultimately to the active substance. The use of starting materials marks the beginning of the description of the process and manufacture under GMP. Typically, multiple chemical transformation steps should separate the starting material from the final active substance. The full description of the process should cover all the synthetic steps critical to the quality of the active substance.

The marketing authorisation applicant should propose and justify which substance should be considered as the AS starting material (SM), e.g. incorporated as a significant structural fragment into the structure of the active substance. Non-isolated compounds are not considered appropriate to be selected as starting materials. The name and address of the starting material manufacturers should be provided. Information, in the form of a flow chart, indicating the synthetic process prior to the

introduction of the starting material (including details of reagents, solvents and catalysts used), is necessary to evaluate the suitability of the proposed starting material and its specifications.

Schematic description (illustrative only):



Starting materials should be substances with defined chemical properties and structures. Complete specifications should be provided, including limits for impurities. The possibility that any kind of impurity, for example isomeric impurities, present in a starting material may be carried through the synthetic process unchanged or as derivatives should be discussed. Such impurities should, if relevant, be controlled in the starting material by appropriate acceptance criteria with suitably validated methods. Acceptance criteria should be established by the applicant based on evaluation of the fate of impurities present in the starting material, when subjected to the normal processing conditions. Relevant viral safety and / or TSE data must be provided if any animal-derived material is used during the active substance manufacturing process (e.g. arising from fermentation, enzymes, amino acids, etc.).

Materials of plant origin

Information on the source, processing, characterisation and control of starting materials of plant origin must be provided to ascertain suitability. A contaminant profile should be established and submitted. Information on the scientific name (genus, species, variety and author) of the plant and plant part used should be specified, as should the solvents in the extraction process. The specification of the starting material of herbal origin should follow the principles set out in the European Pharmacopoeia monographs and the potential presence of foreign matter, pesticides, microbiological contamination, total ash, heavy metals, mycotoxins, radioactive contamination, residual solvents, and other relevant impurities should be discussed. Information on the geographical origin, collection or cultivation, harvesting, and post-harvest treatments (possible pesticides and fumigants used and possible radioactive contamination) may be appropriate depending on the subsequent synthetic steps (Ref 10).

Solvents, Reagents and other materials

Specifications for all materials (solvents, reagents, catalysts, processing aids etc.) used in synthesis should be submitted. Materials used in the final stages of the active substance synthesis may require greater control (i.e.: tighter specifications) than those used in earlier stages.

If water is used as solvent in the last purification/crystallisation step, the water quality required depends on pharmaceutical form of the Drug Product in which the active substance will be used (Refs 7, 11).

4.2.4. Control of Critical Steps and Intermediates 3.2.S.2.4

Critical Steps: Tests and acceptance criteria performed at critical steps identified in 3.2.S.2.2 of the manufacturing process should be described, and justified based on relevant experimental data. A critical step is defined as one where the process conditions, test requirements or other relevant parameters must be controlled within predetermined limits to ensure that the AS meets its specification.

Critical steps could be, for instance:

- Mixing of multiple components;
- Phase change and phase separation steps;
- Steps where control of temperature and pH are critical;
- Steps which introduce an essential molecular structural element or result in a major chemical transformation;
- Steps which introduce (or remove) significant impurities to (or from) the active substance. For those impurities not controlled in the active substance, suitable in-process controls should be carried out with justified ranges and documented;
- The final purification step.

Steps which have an impact on solid-state properties and homogeneity of the active substance are generally considered as critical, particularly, if the active substance is used within a solid dosage form, since they may adversely affect dissolution of the active substance from the dosage form and thereby affect bioavailability. Proper justification should be provided when these properties do not impact performance of the finished product.

Intermediates:

Information on the quality and control of intermediates isolated during the process should be provided. If non-compendial methods are used to control the intermediate, they should be suitably validated. Validation data is not expected unless the test in question is essential for the control strategy of the active substance (e.g. removal of a mutagenic impurity). Information on the characterisation of these intermediates should be provided (Ref 7).

If an intermediate in the proposed synthesis of the active substance is itself an active substance covered by a monograph of the European Pharmacopoeia (Ph. Eur.) covered by a valid CEP, then the CEP can be submitted as an alternative to submitting its process description. Documentation on the additional chemical transformation steps from the intermediate to the active substance should be provided in 3.2.S.2.2. The manufacturers involved in the process covered by the CEP should be listed in module 3.2.S.2.1 and the QP declaration (Ref 12).

If an intermediate in the proposed synthesis of the active substance is itself an active substance already included in a finished product authorised in the EU and documented in an ASMF or in module 3, then this can be referenced. Complete information on the manufacturing process (3.2.S.2), starting

with the starting materials will still need to be submitted, either as part of a new ASMF or in the dossier.

4.2.5. Process Validation and/or Evaluation 3.2.S.2.5

Even if no process validation data is provided in the application, the active substance manufacturing process must be validated before commercial distribution. Process validation data and/or evaluation studies for aseptic processing and sterilisation should be provided (Refs 4, 8).

4.2.6. Manufacturing Process Development 3.2.S.2.6

A description and discussion of any significant changes made to the manufacturing process and/or manufacturing sites of the active substance used in producing non-clinical, clinical, scale-up, pilot, and, if available, production scale batches, should be provided.

Reference should be made to the active substance data provided in section 3.2.S.4.4.

For existing active substances, all provided data might be obtained on production scale batches manufactured according to the presented manufacturing description. A description of the manufacturing process development is not necessary in these cases but will often add to the understanding of the control strategy.

4.3. Characterisation 3.2.S.3

4.3.1. Elucidation of Structure and other Characteristics 3.2.S.3.1

Section 3.2.S.3.1 describes the information which is expected for a new chemical entity. For existing active substances, not all items may be necessary to prove the identity of the material, especially if the identity can be verified by a specific test in comparison to an official standard.

This section should include the research and development program performed to verify the structure and the chemical and physico-chemical properties of the active substance. Relevant results described in this section should be reflected in the control tests on the active substance to check batch-to-batch uniformity.

Evidence of chemical structure

Confirmation of structure based on e.g., synthetic route and spectral analyses, information regarding the potential for isomerism, identification of stereochemistry, or potential for forming polymorphs should be included.

A scientific discussion of the chemistry of the active substance should be provided, including unequivocal proof of structure, configuration and potential isomerism. This should include a presentation of the stereochemical properties of the molecule (Ref 13). It is important that the evidence of structure should be related to the actual material to be used in the marketed product, especially for highly complex molecular structures.

If the data included in this section originates from a synthetic process other than the one covered by the application (i.e. different routes), evidence may be required to confirm the structural identity of the materials from different origin. This is particularly important where toxicological studies have been carried out on material from different origin.

Publication references may be included if the synthetic route and structure of the intermediates are cited as structural evidence.

The information will normally include such evidence as:

- Elemental analysis with theoretical values;
- Infra-red spectra with interpretation;
- Nuclear magnetic resonance spectra with interpretation;
- Discussion on UV characteristics including pH dependent shifts;
- Mass spectra with interpretation and discussion of results;
- Discussion of the synthetic route as evidence of structure;
- Evidence or structure of key intermediates (e.g. using IR, NMR, etc.);
- Characteristic chemical reactions which are diagnostic of the structure of the molecule;
- X-ray crystallography with interpretation and discussion of results;
- Evidence of the indicated relative molecular mass determined by mass spectrometry or other analytical techniques.

The relevance of the eventual or possible isomers regarding biological/pharmacological activity should be discussed (Ref 13).

Physico-chemical Characteristics

Information set out under the relevant headings below should cover aspects of physicochemical characteristics which have been investigated, whether or not they are included in the specification for the active substance.

There are many ways of modifying the solid state physico-chemical properties of an active substance such as making salts, solvates, cocrystals, or selecting for a given polymorphic form, which can influence biologically-relevant properties of said active substance. Information on the proposed commercial solid state form should be provided in 3.2.S.3.1. This information should be related to the in vivo performance of the finished product in 3.2.P.2.1.

Polymorphism

Polymorphism is the property of a solid state chemical substance to exist in the solid state in different crystalline forms. Some active substances exist in different polymorphs possessing different physico-chemical properties. These forms may affect processability, stability, dissolution and bioavailability of the drug product.

Examples of analytical methods commonly used to determine the existence of multiple polymorphic forms are:

- Melting point (including hot-stage microscopy);
- Solid state IR and NIRS;
- X-ray powder diffraction;

- Thermal analysis procedures such as differential scanning calorimetry (DSC), thermogravimetric analysis (TGA) and differential thermal analysis (DTA);
- Raman spectroscopy;
- Scanning electron microscopy;
- Solid state NMR spectroscopy.

The presence of polymorphic forms and solvates and the methods of detection and control should be discussed. Similarly, amorphous forms should be characterised and detection and control methods described if not otherwise justified (Ref 7).

Solubility

Numeric solubility values (e.g. mg/ml) for the active substance in water at various temperatures and in aqueous buffer at physiologically relevant pHs should be provided, as well as the corresponding pH values for the equilibrium solubility test solutions. Data for solubility in other solvents may also be provided. The test procedures used for solubilities should be described.

Physical characteristics

Physical properties should be stated here and, if significant, information on particle size (distribution), solvation, melting point, hygroscopicity and boiling point should be added.

pKa and pH values

The pKa values of the active substance and the pH in solutions of defined concentration should be stated. In the case of a salt, the corresponding values of the base or acid should be stated.

Other characteristics

Information is to be provided concerning the following:

- Partition properties (oil/water partition coefficient, octanol/water partition coefficient, log P, etc.); and
- Physical properties of significance may be stated.

4.3.2. Impurities 3.2.S.3.2

Information on impurities and their carry-over should be provided. This includes related substances, residual solvents, elemental impurities, reagents and those derived from reagents. The related substances considered as potential impurities arising from the synthesis and degradation products should be discussed and described briefly including an indication of their origin. The mutagenic potential of impurities should be addressed. In each case, it should be stated whether actual samples of impurities have been synthesized or isolated for test purposes. Structural analysis data for identified impurities should be provided unless identity is proved by other means.

Possible routes of degradation should also be discussed - please see section 3.2.S.7.1.

The analytical methods (with limits of detection (LOD) and limits of quantitation (LOQ) used to detect each of the likely impurities considered above or other related impurities, the exact identities of which may be unknown, should be described. Copies of relevant chromatograms should be provided. A summary should be given on the nature and levels of the actual impurities detected in the batch samples of the material. Justification should be provided for selecting the limits based on safety and

toxicity data, as well as on the methods used for the control of impurities (see 3.2.S.4.4.). For qualification of impurities, refer to 3.2.S.4.5 (Refs 7, 14-17).

4.4. Control of the Active Substance 3.2.S.4

4.4.1. Specification 3.2.S.4.1

The active substance specification should be provided.

The following tests should be performed as a minimum required and appropriate acceptance criteria applied:

- Description;
- Identification;
- Impurities;
- Assay and/or potency.

Additional tests may be required depending on the nature of the active substance or its subsequent use (e.g. polymorphic form, enantiomeric purity, particle size, microbiological purity, bacterial endotoxins, etc. (Refs 7, 15-17).

4.4.2. Analytical Procedures 3.2.S.4.2

Details of the analytical procedures used for testing the active substance should be provided. They should be described in such a way that they can be repeated by an Official Medicines Control Laboratory (Ref 18).

Analytical Development

Any critical aspects of significance concerning analytical development in regard to the active substance specification should be mentioned. The discussion here should highlight any unusual aspects concerning the tests dealing with the specification of the active substance. Tests for purity and impurity levels can be discussed under the section on impurities. Orthogonal analytical methods, (methods using different principles and providing different selectivities), should be developed in cases where a lack in specificity and/or selectivity leads to an inadequate control strategy for the affected impurities. If biological control procedures are necessary, then particular emphasis should be placed on the discussion of the test precision and accuracy.

4.4.3. Validation of Analytical Procedures 3.2.S.4.3

Analytical validation data, including experimental results for the analytical procedures used for the control of the active substance, should be provided unless methods of the respective drug substance monograph in Ph. Eur. are referred to and the tests of the monograph have been demonstrated suitable to control the substance. Validation of analytical tests concerning the active substance should be performed according to the requirements of the current Guidelines (Ref 18).

4.4.4. Batch Analyses 3.2.S.4.4

Description of batches and results of batch analyses should be provided as follows:

- Batches of material used in the pre-clinical tests and clinical studies reported in support of the application;
- Data illustrating the actual results obtained from routine quality control of the active substance. Results from at least three recent consecutive batches from each manufacturing site, manufactured according to the proposed process at not less than 10% of maximum production scale at the time of submission should be provided. These results should demonstrate that routine production material falls within the specification limits cited for the purpose covered by the marketing authorisation.

The results should include:

- Date of manufacture;
- Batch size and number;
- Place of manufacture (data from all manufacturing sites must be provided);
- Results of analytical determination; and
- Use of batches.

Presentation of this information in tabular form is recommended for improved clarity. Test results should be expressed numerically e.g. impurity levels. Results which merely state that the material "complies" with the test are insufficient. The batch analyses should include all the tests in the specification. There may, however, be cases where previous batches were tested using a slightly different specification. In these cases, a brief explanatory note should be included. Any apparently inconsistent or anomalous results in the batch analyses should be explained (Refs 7, 14- 16)

4.4.5. Justification of Specification 3.2.S.4.5

Justification for the control strategy and active substance specification should be provided. The specification should be based on results from preclinical, clinical and, where applicable, production scale batches and taking into account the qualification of impurities and the overall control strategy.

The requirements of the general monograph of the European Pharmacopoeia *Substances for Pharmaceutical Use* (2034) should be met, where applicable. For existing active substances, the respective monograph of Ph. Eur. or, in default of this, the respective monograph of the pharmacopoeia of an EU Member State should be the basis of the active substance specification. Supplementation by additional tests, (e.g., impurity tests) might be necessary. For existing active substances not covered by Ph. Eur. or a pharmacopoeia of an EU member state, impurity levels above the VICH GL10 qualification thresholds are subject to toxicological evaluation (Refs 7, 14-17).

4.5. Reference Standards or Materials 3.2.S.5

Information on the reference standards or reference materials used for testing of the active substance should be provided: specifications, full analytical and physico-chemical characterizations, impurities profile, etc. Chemical reference substances (Ph. Eur. CRS) are qualified as primary reference standards and do not need to be further qualified, provided they are used for their intended purpose. The criteria for establishing the primary reference substances should be given with full analytical profiles. The procedure for establishing secondary reference standards or materials normally used for routine analysis should be stated (Ref 7).

4.6. Container Closure System 3.2.S.6

A brief description of the storage container closure system(s), including specifications with suitable identity test(s) and details of materials of construction should be provided. If the storage container closure system is critical for assuring the quality of the active substance, its suitability should be justified. Depending on nature of the active substance, aspects that may need justification include choice of the primary packaging materials, protection from light and/or moisture, compatibility with the active substance including sorption to material and leaching and/or any safety aspects. Reference to stability data can be additional supportive information to justify suitability of the proposed container closure system. The information should cover the whole packaging including the primary packaging material (e.g. polyethylene bag) and secondary packaging (e.g. fibre or metal drum).

Compliance of the primary packaging with any current applicable regulatory requirements (e.g. food grade materials) should be provided (Ref 19).

4.7. Stability 3.2.S.7

4.7.1. Stability Summary and Conclusions 3.2.S.7.1

The types of studies conducted, protocols used, and the results of the studies should be summarized. The summary should include results, for example, from forced degradation studies and stress conditions (light stress, higher temperature, etc.), as well as conclusions with respect to storage conditions and retest date or expiry date as appropriate.

For active substances described in an official pharmacopoeial monograph (Ph. Eur. or the Pharmacopoeia of an EU member state), which covers the degradation products and for which suitable limits have been set, stability studies might not be necessary if it is demonstrated that the substance complies with the monograph (and any additional tests in the specification) immediately before manufacture of each batch of the finished product. For existing active substances, the Guideline on Stability testing of existing active substances and related finished products should be consulted (Refs 5, 20-22).

4.7.2. Post-approval Stability Protocol and Stability Commitment 3.2.S.7.2

A post-approval stability protocol and stability commitment should be provided if data for production scale batches covering the full proposed re-test period or expiry date is not available (Refs 5, 20-22).

4.7.3. Stability Data 3.2.S.7.3

Detailed results of the stability studies including forced degradation studies and stress conditions should be presented in an appropriate tabular or graphical format. Information on the analytical procedures used to generate the data and validation of these procedures should be included. The major degradation pathways of the active substance should be discussed. The storage conditions and the retest period should be defined (Refs 5, 13, 20-22).

References

1. ICH guideline Q8 (R2) on pharmaceutical development CHMP/ICH/167068/04
2. ICH guideline Q9 on quality risk management INS/GMP/79766/2011
3. ICH guideline Q10 on pharmaceutical quality system INS/GMP/79818/2011
4. ICH guideline Q11 on development and manufacture of drug substances (chemical entities and biotechnological/ biological entities) CHMP/ICH/425213/2011
5. Guideline on the Summary of Requirements for the Active substance in the Quality Part of the Dossier, EMEA/CVMP/1069/02
6. Guideline on Active Substance Master File procedure EMEA/CVMP/134/02
7. Specifications – Test Procedure and Acceptance Criteria for New Drug Substances and New Drug Products – Chemical Substances EMEA/CVMP/VICH/810/04 (VICH GL39)
8. EU GMP Part II: Basic Requirements for Active Substances used as Starting Materials
9. Reflection paper on the requirements for selection and justification of starting materials for the manufacture of chemical active substances EMA/448443/2014
10. Guideline on good agricultural and collection practice (GACP) for starting materials of herbal origin EMEA/HMPC/246816/2005
11. Note for guidance on quality of water for pharmaceutical use EMEA/CVMP/115/01
12. The QP declaration template EMA/334808/2014
13. Investigation of Chiral Active Substances EMEA/CVMP/128/95
14. Impurities in new veterinary drug substances EMEA/CVMP/VICH/837/99 (VICH GL10)
15. Impurities: residual solvents in new veterinary medicinal products, active substances and excipients EMA/CVMP/VICH/502/99 (VICH GL18)
16. Position paper on control of impurities of pharmacopoeial substances: compliance with the European Pharmacopoeia General Monograph “Substances for pharmaceutical use” and General Chapter “Control of impurities in substances for pharmaceutical use” EMEA/CVMP/059/04
17. Guideline on setting specifications for related impurities in antibiotics EMA/CHMP/CVMP/QWP/199250/2009
18. Validation of analytical procedures: definition and terminology CVMP/VICH/590/98 (VICH GL1) and Validation of analytical procedures: methodology CVMP/VICH/591/98 (VICH GL2)
19. Guideline on plastic immediate packaging materials EMEA/CVMP/205/04
20. Stability testing of new veterinary drug substances and medicinal products EMEA/CVMP/VICH/899/99 (VICH GL3)
21. Stability testing of existing active substances and related finished products EMEA/CVMP/QWP/846/99

22. Stability testing: photostability testing of new veterinary drug substances and medicinal products CVMP/VICH/901/00 (VICH GL5)