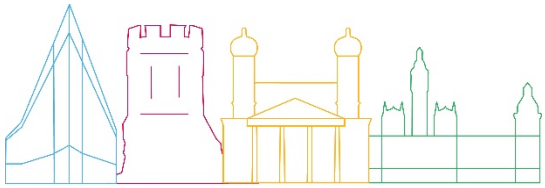
ARCH

ARCH State-of-the-Art-Report 6

Existing standards and regulatory frameworks



Deliverable no.	D7.1
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This document has been prepared in the framework of the European project ARCH – Advancing Resilience of Historic Areas against Climate-related and other Hazards. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 820999.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 820999.

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List of Abbreviations

Abbreviation	Meaning
AWI	Approved new Work Item
CD	Committee Draft
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CWA	CEN Workshop Agreement
DIN	German Institute for Standardisation
DIS	Draft International Standard
EN	European Standard
ETSI	European Telecommunication Standards Institute
FDIS	Final Draft International Standard
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardisation
ITU	International Telecommunication Union
JTC	Joint Technical Committee
NP	New Proposal
SyC	System Committee
WD	Working Draft
WG	Working Group
WSC	World Standards Cooperation

Executive Summary

The aim of this report is to disseminate knowledge about existing standards and standardisation activities among the project partners and to raise awareness of possible missing standards. Thus this document will present and summarize the current 'resilience of historic areas' standardisation landscape, specifically taking into consideration aspects related to climate change, and will list and briefly assess the standards relevant for the ARCH project.

In summary, it can be said that a great variety of technical committees, and the organisations behind them, are committed to the 'resilience of historic areas' and related issues such as climate change, hazards and disaster or crisis management. An extensive list of standards has been identified following the ARCH kick off meeting, including keyword identification and the exchange with project partners. The standards search has been conducted by the use of the standards database Perinorm. An initial classification of the project-relevant standards was carried out and 107 standards have been considered within the scope of the further activities of the ARCH project (T2.6 "Standardisation activities"). Standards have been categorised following their thematic classification. The vast majority of the standards assessed as being relevant for the project belong to the categories 'Climate change', 'Management systems', 'Heritage', 'Resilience' and 'Cities and communities'. Much less relevant standards are included in the categories 'Techniques' and 'Drones'.

Furthermore, the analysis of the standards has provided an important basis for the forthcoming work in Task 2.6 where the main objective is to develop a standardisation strategy for the ARCH project and to initiate new standardisation activities. The results of this report will be compared with the identified project needs for standardisation in order to support the identification of the standardisation potential within ARCH and thus close the gap in existing standardisation processes (D2.4).

1. Introduction

1.1. Background information and aim of this report

This part of the deliverable D7.1 titled 'A report describing the existing standards and standardisation activities' has the objective to gather and disseminate knowledge about relevant existing standards and standardisation activities amongst project partners and to support awareness raising regarding potentially missing standards under the topic: ‘resilience of historic areas’. Thus this document presents the current 'resilience of historic areas' standardisation landscape, specifically taking into consideration climate change aspects and investigating the standards and technical committees relevant for the ARCH project. The list of standards includes aspects such as resilience, historic areas, heritage, disaster management systems and climate change, as these are the topics requested by the project partners. However, the focus of this standards’ research is on formal standards established by recognised standardisation organisations, such as ISO at international, CEN at European and DIN at German national level. However, since other reports deal with relevant regulations/policies, we are focusing on standardization documents here.

1.2. Relation to other SotA reports and deliverables

This report is one of a series of six SotA reports.

- SotA 1: Historic areas, conservation practices, and relevant regulations / policies.

Connection to this report: Harmonized standards are possible results of mandates.

- SotA 5: Gender aspects in conservation and regulation of historic areas, disaster risk management, emergency protocols, postdisaster response techniques, and techniques for building back better.

Connection to this report: Our report takes into account the SotA 5 guidelines with regard to gender aspects.

This deliverable is connected to the activities carried out in WP2 'Outreach'. More specifically to the following deliverable: D2.4 Standardisation Strategy and conducted activities.

1.3. Structure of this report

This document is structured as follows. Firstly, section 3 provides an introduction about the structure of the standardisation system. The following part (section 4) provides basic information about the current status of the 'resilience of historic areas' standardisation landscape and describes briefly the context in which this document has been developed, while it explains the methodology used for the analysis of the relevant standards. The results of the standards research are placed in section 4.3. Section 5 gives a brief overview in which work packages, or aspects of the project, the results of this report may be used. The final part of the document (section 6) draws conclusions regarding the general status of the standardisation landscape of 'resilience of historic areas' and the identified list of standards.

2. Definitions

No key concepts and specialist terms to be covered in the report.

3. Standardisation system

The standardisation system comprises of organisations responsible of standardisation activities conducted on national, European as well as international level (see Figure 1). European and international standards are developed according to the national delegation principle, with each country sending a delegation of experts to represent the national standpoint. In Germany's case, DIN sends the delegation. This standpoint is drawn up in national committees that "mirror" the committees at European (CEN, CENELEC, ETSI) or international level (ISO, IEC, ITU). Stakeholders can thus work together in their own native language. The national delegation principle gives stakeholders a direct line to European and international standardisation, while at the same time supporting self-regulation by industry.

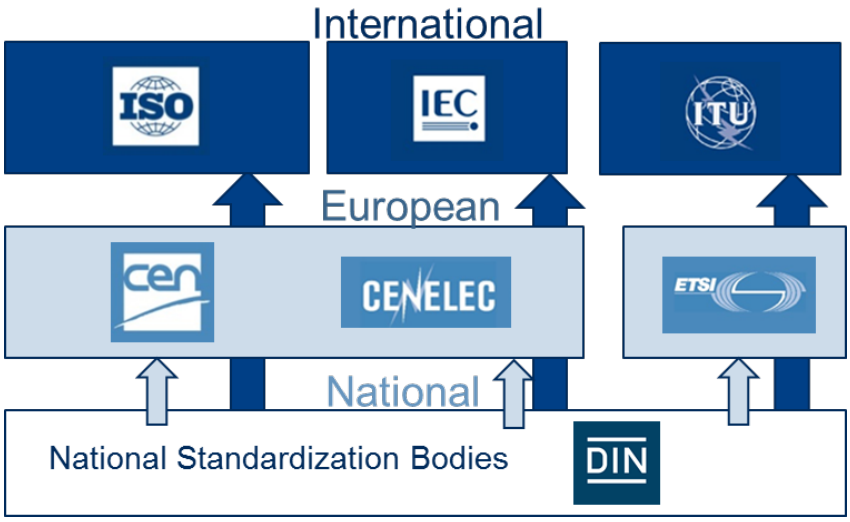

Figure 1: Standardisation system structure

3.1. European standardisation

The European Committee for Standardisation (CEN) and the European Committee for Electrotechnical Standardisation (CENELEC) as well as the European Telecommunication Standards Institute (ETSI) carry out the standardisation work on European level. Common standards applied across the whole of the European single market ensures protection of consumers and interoperability of products, encourage innovation and technological development. CEN and CENELEC provide the platform for European standardisation.

The following European Technical Committees (TC) are the most relevant ones to be considered in the context of ARCH:

- CEN/TC 346 Conservation of cultural property
- CEN/TC 391 Societal and citizen security

- CEN/TC 389 Innovation management
- CEN/TC 250/SC 8 Eurocode 8: Earthquake resistance design of structures
- CEN/TC 442 Building information modelling

3.2. International standardisation

The International Organisation for Standardisation (ISO) as well as the International Electrotechnical Commission (IEC) are the responsible standardisation organisations at global level. The United Nations specialized agency in terms of information and telecommunication technologies is the International Telecommunications Union (ITU). ISO, IEC and ITU established the World Standards Cooperation (WSC) in 2001, in order to strengthen and advance their voluntary consensus-based international standards systems.

Currently 164 national standards bodies are ISO members. This means 'Codes of practices' have to be established in order to allow a smooth operation of the standardisation process on international as well as on European level. Therefore the Vienna and Dresden Agreements have been concluded. Those agreements between CEN and ISO (Vienna), CENELEC and IEC (Dresden) got the objective, to carry out work at one level of standardisation (where possible), and use parallel voting procedures to achieve simultaneous adoption as ISO/IEC and EN standards.

The following International Technical Committees (TC) are the most relevant ones to be considered in the context of ARCH:

- ISO/TC 292 Security
- ISO/TC 207 Environmental management
- ISO/TC 20 Aircraft and space vehicles
- ISO/TC 182 Geotechnics
- ISO/TC 46 Information and documentation
- ISO/TC 279 Innovation management
- ISO/TC 268 Sustainable development in communities

3.3. Types of standards

A standard is a consensus based document that is approved by a recognised body, like for example the German Institute for Standardisation (DIN), which is an official member of the European and international standardisation system. It provides rules, guidelines or characteristics for activities or their results, reflecting the state-of-the-art. It should be based in the consolidated results of science, technology and experience, aiming at the promotion of the optimum community benefits.

A published standard is the last stage of a process that commonly starts with the proposal of new work within a technical committee. Here are some abbreviations used for marking a standard with its status:

- NP New Proposal (e.g. ISO/NP 22300)
- AWI Approved new Work Item (e.g. ISO/AWI 22342)
- WD Working Draft (e.g. ISO/WD 22340)
- CD Committee Draft (e.g. ISO/CD 22341)
- DIS Draft International Standard (e.g. ISO/DIS 22383)
- FDIS Final Draft International Standard (e.g. ISO/FDIS 37123)
- prEN Draft European Standard (e.g. prEN 16163)
- FprEN Final Draft European Standard (e.g. FprEN 17135)

Different standardisation documents are available, e.g. ISO, EN, CEN/TR, CEN/TS, CWA. Each of them represents a different level of consensus. While developing a European Standard (EN), the standstill policy applies. This means that during work on a European standard and after its publication, CEN/CENELEC members agree not to publish national standards which are not in line with it. This is done to prevent any situation occurring during the preparation or after publication of a standard which could impair or undermine harmonization. National standards which are in conflict or duplicate EN standards have to be withdrawn. One special type of EN is the mandated European Standard (Harmonised EN), which is applied in the context of the New Legislative Framework (a.k.a. New Approach) and developed on the basis of a mandate from the European Commission to set out the Essential Requirements for the product or service that are specified in an EC Directive. These Essential Requirements deal in particular with the health and safety of users and other fundamental matters. Harmonised Standards do not have a special designation, except from a note in the foreword.

A European Technical Specifications (CEN/TS) aims to aid market development and growth for products or methods that are still in the development and/or trial phase, and European Technical Reports (CEN/TR) provide specifications of a recommendatory and explanatory nature. Special specifications, which are developed with the rapid consensus of expert stakeholders (no full consensus needed), can be found in CEN Workshop Agreements (CWA) or Publicly Available Specification (PAS), a standardisation document that closely resembles a formal standard in structure and format but which has a different development model. All document types differ in their development procedures and binding forces.

4. Standardisation landscape

4.1. Search methodology

The research on relevant standards was conducted by DIN with the help of the ARCH project partners taking part in T7.1. The whole identification and evaluation process is visualized in Figure 2.

As a result out of this information sharing and as a first step to the analysis of existing standards and standardisation activities, keywords have been collected from ARCH partners through a questionnaire taking into consideration any keyword that might be relevant to identify standardisation documents related to the project (see process overview in Figure 2). DIN summarised these keywords in a list and added terms that could be relevant for further analysis.

The standards search was conducted with the database Perinorm. Perinorm is the world's leading bibliographic database containing technical standards published by more than 200 standards publishing organisations in 23 countries.

Beside the standards of the organisations DIN, CEN, CENELEC, ISO and IEC other technical documents, regulations and reports on national, European and international level have been considered. Especially in the case of national standards due to language barriers mostly those that were providing at least an English title were considered.

Next, the standards were clustered into different categories to ensure avoiding redundancy and to enhance the clarity and efficiency of the analysis.

Project partners were asked to assess the individual relevance and importance of each identified standard with regard to their activities. This has been done through assessing the standards' scope's and contents' overlap with tasks being implemented or foreseen within the ARCH project. The project partners classified each standard individually and the results have been analysed and merged in order to produce a broad assessment result. The project partners were asked the following question: Does the standard have an impact on ARCH (yes/no/don't know)? Priority during disagreements on the assessment was given to the majority of yes or no answers.

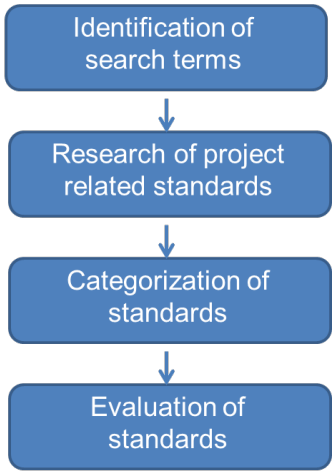

Figure 2: Search methodology

The standard's analysis resulted in a comprehensive list of standards and in an overview of technical committees relevant for the ARCH project.

4.2. Categorisation of standards

To conduct the standards research and analysis, the project partners of T7.1 prepared a list of relevant search terms. At the same time, the identified words have been assigned to one of

the below relevant to the ARCH project categories (see Table 1). The categories were chosen according to the keywords given by the grant agreement and the project partners of task 7.1.

Table 1: Categories with keywords/ search terms

Categories	Keywords/ search terms
Resilience	organisational resilience resilience guidelines adaptation options adaptation planning adaptation monitoring adaptive capacity coping capacity
Climate change	climatology and climate change climate impacts climate change adaptation climate services extreme weather events air pollution
Drones	unmanned aircraft system
Techniques	geo-information and spatial data analysis environmental monitoring autonomous systems 3D scanning vulnerability and risk analysis
Heritage	heritage preservation tangible and intangible cultural heritage structural properties of materials materials conservation simulation heritage
Management systems	risk management disaster risk reduction disaster and/or emergency management security management systems management system management of urban areas
Cities and communities	infrastructure societal security sustainable cities

The identification of existing standards and ongoing standardisation activities resulted in a list of 107 standards and other technical documents, regulations and reports on national, European and international level which are to a certain extent important for the ARCH project. Figure 3 shows the distribution (absolute numbers) of relevant standards per category in percentage.

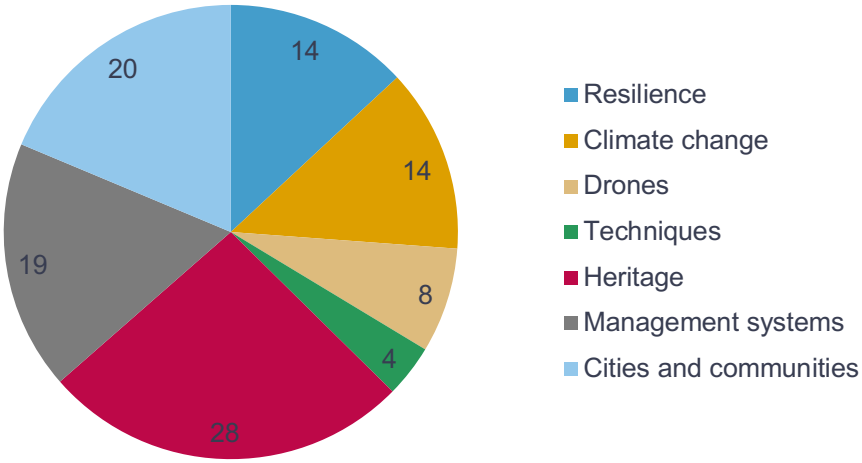

Figure 3: Relevant standards per category

The chart below (Figure 4) shows the total amount of initially identified standards per category in comparison to the relevance of the standards in each category. Standards were clustered as relevant, not relevant as well as potentially relevant. The latter refers to an undecided rating - some project partners felt like the standard is relevant and others did not. In total 107 standards are relevant for the ARCH project (90 standards under "Relevant" and 17 standards under "Potentially relevant").

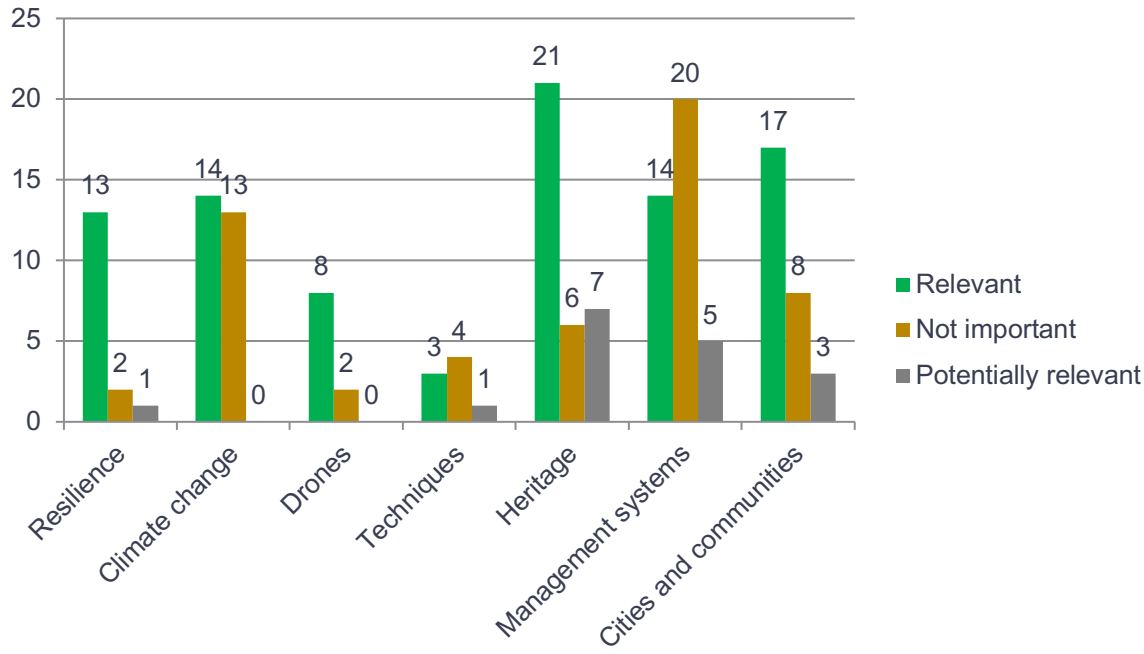

Figure 4: Evaluation results

The chart in Figure 3 shows that there are quite a lot relevant standards and standardisation activities within the categories of 'Resilience' 'Climate change', 'Heritage', 'Management

Systems' and 'Cities and Communities'. The reason for that could be that these topics have drawn high attention within the landscape of EU legislation and society in general as well as research in the last couple of years, e.g. through the EU Climate Action or the UN Sustainable Development Goals[1].

The categories 'Drones' and 'Techniques' are somehow special in that context because the topic was quite restricted in the frame of cities and heritages. Most of the standards found are guidelines, which mean that the respective documents contain specific information, principles or frameworks. The second most common document types are requirements, which mean that they enable the users to develop and implement policies, objectives, or programs.

4.3. Tables with ARCH relevant standards

The overview of relevant standardisation documents and current standardisation activities in this section is structured as follows: Number of document (Document No.), title of document (Title), abstract/summary of the document in English (Abstract) if available and publication date of the document (Date of publication).

In addition, the evaluation contains standards which were suggested by project partners as relevant standards from newly defined relevant fields at the end of the identification and evaluation process.

The following tables contain standards which were considered relevant for the project. Standards which are potentially relevant are marked in grey.

[1] https://ec.europa.eu/clima/citizens/eu_en, https://sustainabledevelopment.un.org/, https://ec.europa.eu/eurostat/web/products-statistical-books/-/KS-02-19-165

4.3.1. Standards - Category 'Resilience'

The analysis of existing standards for the category 'Resilience' resulted in the identification of 15 relevant or potentially relevant standards, which are listed in the following table. Identified standards that are of high or potential relevance for the work in ARCH are e.g. the CWA 17300 series City resilience development. It defines an operational framework for cities which will provide guidance on local resilience planning, a path and requirements for an information system in the resilience-building process.

Table 2: List of identified standards – Category 'Resilience'

Document No.	Title	Abstract	Committee	Date of publication
ISO 22319	Security and resilience — Community resilience — Guidelines for planning the involvement of spontaneous volunteers	ISO 22319:2017 provides guidelines for planning the involvement of spontaneous volunteers (SVs) in incident response and recovery. It is intended to help organisations to establish a plan to consider whether, how and when SVs can provide relief to a coordinated response and recovery for all identified hazards. It helps identify issues to ensure the plan is risk-based and can be shown to prioritize the safety of SVs, the public they seek to assist and incident response staff. ISO 22319:2017 is intended for use by organisations with responsibility for, or involvement in, part or all of the planning for working with SVs. It is applicable to all types and sizes of organisations that are involved in the planning for, and management of, SVs (e.g. local, regional, and national governments, statutory bodies, international and non-governmental organisations, businesses and public and community groups).	ISO/TC 292 Security	2017-04-00

ISO 22326	Security and resilience — Emergency management — Guidelines for monitoring facilities with identified hazards	This document gives guidelines for monitoring hazards within a facility as a part of an overall emergency management and continuity programme by establishing the process for hazard monitoring at facilities with identified hazards. It includes recommendations on how to develop and operate systems for the purpose of monitoring facilities with identified hazards. It covers the entire process of monitoring facilities. This document is generic and applicable to any organisation. The application depends on the operating environment, the complexity of the organisation and the type of identified hazards.	ISO/TC 292 Security	2018-10-00
ISO 22327	Security and resilience — Emergency management — Guidelines for implementation of a community-based landslide early warning system	This document gives guidelines for monitoring hazards within a facility as a part of an overall emergency management and continuity programme by establishing the process for hazard monitoring at facilities with identified hazards. It includes recommendations on how to develop and operate systems for the purpose of monitoring facilities with identified hazards. It covers the entire process of monitoring facilities.	ISO/TC 292 Security	2018-10-00
ISO/DIS 22392	Security and resilience — Community resilience — Guidelines for conducting peer reviews	This document gives guidelines for organisations to design, organize, conduct, receive feedback from, and learn from a peer review of their disaster risk reduction (DRR) policy and practices. It is intended for use by organisations with the responsibility for, or involvement in, managing such activities including policy and preparedness, response and recovery operations, and designing preventative measures (e.g. for the effects of environmental changes such as those from climate change). It is applicable to all types, structures and sizes of organisations such as local, regional and national governments; statutory bodies; non-governmental organisations; businesses; and public and community groups. The focus of this document is on how to initiate, conduct and learn from a peer review to enhance DRR but the peer review process can also be applied to enhance resilience and risk reduction.	ISO/TC 292 Security	2019-05-00

ISO 22395	Security and resilience — Community resilience — Guidelines for supporting vulnerable persons in an emergency	This document gives guidelines for organisations to identify, involve, communicate with and support individuals who are the most vulnerable to natural and human-induced (both intentional and unintentional) emergencies. It also includes guidelines for continually improving the provision of support to vulnerable persons in an emergency. It is intended for use by organisations with the responsibility for, or involvement in, part or all of the planning for working with vulnerable persons in an emergency.	ISO/TC 292 Security	2018-10-00
ISO 22315	Societal security — Mass evacuation — Guidelines for planning	ISO 22315:2014 provides guidelines for mass evacuation planning in terms of establishing, implementing, monitoring, evaluating, reviewing, and improving preparedness. It establishes a framework for each activity in mass evacuation planning for all identified hazards. It will help organisations to develop plans that are evidence-based and that can be evaluated for effectiveness. ISO 22315:2014 is intended for use by organisations with responsibility for, or involvement in, part or all of the planning for mass evacuation. It is applicable to all types and sizes of organisations that are involved in the planning for mass evacuation, such as local, regional, and national governments; statutory bodies; international and non-governmental organisations; businesses; and public and social groups. ISO 22315:2014 covers planning for mass evacuation in order to gain a more effective response during the actual evacuation. It will assist organisations to meet their obligation of saving human life and reducing suffering.	ISO/TC 292 Security	2014-12-00
ISO/DIS 22396	Security and resilience — Community resilience — Guidelines for information exchange between organisations	This document provides guidelines for information exchange. It includes principles, a framework and a process for information exchange. It identifies mechanisms for information exchange that allow a participating organisation to learn from others' experiences, mistakes and successes. It can be used to guide the maintenance of the information exchange arrangement in order to increase commitment and engagement. It provides measures that enhance the ability of the participating organisation to cope with disruption risk. This document does not cover technical aspects, but focuses on methodology issues.	ISO/TC 292 Security	2019-03-00

DS 3001	Organisational resilience: Security, preparedness, and continuity management systems — Requirements with guidance for use	This Standard specifies requirements for an organisational resilience (OR) management system to enable an organisation to develop and implement policies, objectives, and programs taking into account legal requirements and other requirements to which the organisation subscribes, information about significant hazards and threats that might impact it and its stakeholders', and protection of critical assets (physical, intangible, environmental, and human).This Standard applies to risks and/or their impacts that the organisation identifies as those it can control, influence, or reduce.	S-457 (n)	2009-10-24
CWA 17300	City Resilience Development — Operational Guidance	This CEN Workshop Agreement (CWA) defines an operational framework for cities which will provide guidance on local resilience planning and support their efforts in building resilience. This document is intended to be used by policy and decision-makers at city level and councilors working on climate change adaptation and resilience in their city, as well as by any other city stakeholder working on resilience (for example, but not limited to: critical infrastructure managers, service providers, emergency services, the media, civil society associations, non-governmental organisations, academic and research institutions as well as consultancies).	CEN European Committee for Standardisation	2018-08-00
CWA 17301	City Resilience Development — Maturity Model	This CEN Workshop Agreement provides a framework for describing the ideal path in the resilience-building process of a city. This framework is based on the maturity stages through which a city should proceed. This document is intended to be used by policy and decision-makers at city level and councilors working for resilience in their city, as well as by any other city stakeholders working on resilience (for example, but not limited to: critical infrastructure providers, service providers, emergency services, individuals, the media, non-governmental organisations, academic and research institutions as well as consultancies).	CEN European Committee for Standardisation	2018-08-00

CWA 17302	City Resilience Development — Information Portal	This CWA provides a list of requirements for how municipalities can equip an information system that facilitates resilience building through collaboration, communication, and engagement. This marks the functional specification of a Resilience Information Portal. The portal is a platform for communication within a local government, between a local government and its overall stakeholders, and between a local government and citizens. Requirements aim towards a broad-purpose, easy-to-use platform that provides versatility and flexibility.	CEN European Committee for Standardisation	2018-08-00
ISO/DIS 20887	Sustainability in buildings and civil engineering works — Design for disassembly and adaptability — Principles, requirements and guidance	This document provides an overview of Design for Disassembly and Adaptibility (DfD/A) principles and potential strategies for integrating these principles into the design process. DfD/A can be used to identify design approaches and potential waste-reduction solutions, to develop system-specific disassembly- and adaptibility-conscious details, and to adopt specific strategies for building structure or parts thereof (e.g. the envelope) as well as infrastructure.	ISO/TC 59 Building construction	2019-01-00
ISO 22316	Security and resilience — Organisational resilience — Principles and attributes	ISO 22316:2017 provides guidance to enhance organisational resilience for any size or type of organisation. It is not specific to any industry or sector. ISO 22316:2017 can be applied throughout the life of an organisation. ISO 22316:2017 does not promote uniformity in approach across all organisations, as specific objectives and initiatives are tailored to suit an individual organisation's needs.	ISO/TC 292 Security	2017-03-00
ISO 22380	Security and resilience — Authenticity, integrity and trust for products and documents — General principles for product fraud risk and countermeasures	This document establishes general principles for an organisation to identify the risks related to various types of product fraud and product fraudsters. It provides guidance on how organisations can establish strategic, business countermeasures to prevent or reduce any harm, tangible or intangible loss and cost from such fraudulent attacks in a cost-effective manner. This document is intended to promote common understanding in the field of product-related fraud risk and its countermeasures.	ISO/TC 292 Security	2018-08-00

ISO 22300	Security and resilience — Vocabulary	This document defines terms used in security and resilience standards.	ISO/TC 292 Security	2018-02-00

4.3.2. Standards - Category 'Climate Change'

The standards analysis for the category 'Climate Change' resulted in a list of 14 standards that might be relevant for the project work are e. g. the CEN/CENELEC Guide 32 that addresses aspects of climate change adaptation in European standardization documents; and the ASTM E 3032 'Standard Guide for Climate Resiliency Planning and Strategy' that refers to efforts by entities, organisations, or individuals to prepare for or adjust to future extreme weather and related physical conditions.

Table 3: List of identified standards – Category 'Climate Change'

Document No.	Title	Abstract	Committee	Date of publication
DIN SPEC 35810	Stakeholder Engagement — Guidelines for decision making processes dealing with climate change	This DIN SPEC (PAS) provides guidance and recommendations in stakeholder engagement in climate change decision-making. This DIN SPEC is applicable to organisations from the public and private sectors, including federal and local governmental agencies, companies, firms, industries, communities and non-governmental organisations. It is developed in a user-friendly manner, setting out principles and instructions in a straightforward step-by-step guide with which organisations can engage stakeholders in the decision-making process. DIN SPEC 3581 has been prepared within the research project REGKLAM (Regional Climate Change Adaptation Program for the Dresden model region; FKZ: 01 LR 0802), which was funded by the German Ministry for Research and Education (BMBF).	German Institute for Standardisation	2014-11-00

DIN SPEC 35811	Scenario Planning — Guidelines for decision making processes dealing with climate change	DIN SPEC 35811 will assist (small and medium sized) enterprises from all fields to adapt to future challenges. It is applicable to companies, industries, and private and public sector organisations. Companies without a strategy department are especially set to benefit from the application. Within a scenario process companies identify future challenges that might shape their business, such as climate change, demographic change, or technological change. They develop possible pictures of the future, based on these, derive potential adaptation measures. In this multistep process, the companies are optionally accompanied by consultants. The process itself can be implemented either individually or within a group of companies. Furthermore, the PAS is related to the ISO 14000 Standard series on environmental management systems, especially DIN EN ISO 14001. DIN SPEC 35811 has been prepared within the research project REGKLAM (Regional Climate Change Adaptation Program for the Dresden model region; FKZ: 01 LR 0802), which was funded by the German Ministry for Research and Education (BMBF).	German Institute for Standardisation	2014-08-00
CEN/CENELEC Guide 32	Guide for adressing climate change adaptation in standards	This Guide provides guidance on addressing aspects of climate change adaptation in European standardisation documents. This Guide is applicable to product (including design), service, infrastructure and testing standards. For the purposes of this Guide, the definition of the term “product” has been expanded to cover all these aspects.	CEN European Committee for Standardisation	2016-04-00

ASTM E 3032	Standard Guide for Climate Resiliency Planning and Strategy	Overview- For the purposes of this guide, 'resiliency' refers to efforts by entities, organisations, or individuals to prepare for or adjust to future extreme weather and related physical conditions. The primary purpose is to reduce negative economic impacts associated with extreme weather. This guide presents a generalized, systematic approach to voluntary assessment and risk management of extreme climate related events and conditions. It helps the user structure their understanding of the climate related vulnerabilities and consequences they seek to manage. It helps the user identify adaptive actions of both an institutional (legal), as well as engineering (physical) nature. Options for analysis provide a priority ranking system to address the "worst first" risks of a municipality, local area or facility, addressing practicality and cost-benefit. Users may approach this analysis having initially undertaken a risk assessment to determine what they are seeking to manage, or use the guide to help determine the likely areas of greatest need.	American Society for Testing and Materials (ASTM)	2015-00-00
ASTM E 3136	Standard Guide for Climate Resiliency in Water Resources	Overview- Water resources in North America and other areas are subject to various impacts from chronic weather patterns, as well as more frequent extreme weather events. These include drought, flooding, changes in stream patterns, increased or decreased run-off, and changes in water quality. Water resources include both man-made and natural reservoirs, rivers, streams, groundwater, and storage ponds. The infrastructure for water supply, wastewater treatment, fire-fighting and agricultural uses are also subject to chronic weather patterns and more frequent extreme weather related events. This guide will provide an explanation of techniques users may employ to build resiliency and a planning outline for municipalities, states and private industry in order to ensure safe, future, effective availability of water resources.	American Society for Testing and Materials (ASTM)	2018-00-00
DIN SPEC 35220	Adaption to climate change — Projections on climate change and ways for handling uncertainties	This specification should encourage and support the discussion about climate protection and adaptation to climate change as one of the major challenge for all social circles.	German Institute for Standardisation	2015-11-00
DIN SPEC 35220 Beiblatt 1	Adaptation to climate change — Projections on climate change and ways for handling uncertainties	This supplement contains an application example for DIN SPEC 35220:2015-11, in which the summer thermal insulation of buildings in the event of a heat wave is examined as an example and a vulnerability analysis is carried out. The supplement is aimed primarily at standard writers, including planners, manufacturers and other users of standards.	German Institute for Standardisation	2018-08-00

VDI 4710 Blatt 3	Meteorological data for the building services — t,x correlations from 1991 to 2005 for 15 climatic zones in Germany	Since 1979, it has been common practice, particularly in DIN 4710, to compile the basic data of outdoor-air temperature (t) and water vapour content (x) in the form of t-x correlations. Initially, the data from 1951 to 1970 served as the basis for West Germany. When the standard was revised in 2003, in cooperation with the DWD (German Meteorological Service), the data gathered at 15 stations between 1961 and 1990 were published. The concept for the compilation of the correlation tables of air temperature and water vapour content in air, the so-called t-x correlations, so far consisted in using the respective hourly values measured over the 30 years of the currently completed climate normal period, i. e. presently from 1961 to 1990. Since the end of the nineteen-eighties, the air temperature has kept rising. To give better consideration to the obvious climate change in the air-temperature regime when planning building services, the t-x correlations have been re-calculated, and published in this VDI guideline, for the 15-year period from 1991 to 2005, which corresponds to half of the current climate normal period.	VDI Society Civil Engineering and Building Services	2011-03-00
ISO 14090	Adaptation to climate change — Principles, requirements and guidelines	This document describes principles, requirements and guidelines for adaption to climate change. This includes the integration of adaption within or across organisations, understanding impacts and uncertainties and how these can be used to inform decisions.	ISO/TC 207 Environmental management	2019-03-00
ITU-T L Supplement 24	ITU-T L.1500 — Overview of climate change effects and possible impacts	In light of the historic Paris Agreement to combat climate change and unleash actions and investment towards a low carbon, resilient and sustainable future agreed by 195 countries in Paris on 12 December 2015. This Supplement includes information on identifying and describing climate change effects that can affect the information and ommunication technology (ICT) sector and other sectors. It also provides a general introduction to the identified climate change effects and describes possible impacts of climate change effects on the ICT sector, human behaviours, human health and the energy sector.	ITU International Telecommunication Union	2016-04-00

ITU-T L.1500	Framework for information and communication technologies and adaptation to the effects of climate change	This framework identifies and defines the basis for development of the following recommendations: how countries can utilize ICTs to adapt to the effects of climate change, how to adapt the ICT infrastructure to the effects of climate change, how ICTs can help cities to adapt to the effects of climate change.	ITU International Telecommunication Union	2014-06-00
ITU-T L.1501	Best practices on how countries can utilize ICTs to adapt to the effects of climate change	The Recommendation describes the complexity of climate change and explains why countries need to adapt. It also describes the role of ICTs in helping countries respond to the effects of climate change by looking at how various sectors use ICTs; including the ICT sector. It is designed to be a guide for regulators and policymakers to minimize the impact of climate change and provides a 'multi-level framework for ICTs integration in climate change adaption' to assist countries in integrating ICTs in their national climate change adaptation strategies.	ITU International Telecommunication Union	2014-12-00
ITU-T L.1502	Adapting information and communication technology infrastructure to the effects of climate change	Recommendation ITU-T L.1502 identifies direct and indirect threats of climate change on ICT services and provides options for adaptation and mitigation. These threats include extreme rainfall, flooding, landslides, extreme wind, lightning, extreme humidity, drought, ice storms and heavy snowfall.	ITU International Telecommunication Union	2015-11-00
ITU-T L.1503	Use of information and communication technology for climate change adaptation in cities	This Recommendation is aimed at a broad audience of stakeholders interested in information and communication technologies (ICTs), climate change adaptation, and smart sustainable cities (SSCs), including city decision-makers and planners. Urban stakeholders, including mayors and city planners, are invited to consider novel approaches to sustainability by integrating the use of ICTs in their climate change adaptation strategies and policies. The following are the key steps: assess climate change risks and vulnerabilities, develop an action plan, identify the role of ICTs and infrastructure in the adaptation plan, implement adaptation actions, monitor and evaluate adaptation actions using ICT.	ITU International Telecommunication Union	2016-06-00

4.3.3. Standards - Category 'Drones'

In total 8 standards have been found that are related to the category 'Drones'. Basic information about these standards can be found in the following table.

Table 4: List of identified standards – Category 'Drone'

Document No.	Title	Abstract	Committee	Date of publication
DIN 5452-2	Unmanned aircraft systems (UAS) — Part 2: Requirements for pilots	Part 2 of DIN 5452 defines the requirements for pilots controlling unmanned aircraft systems (UAS). The use of UAS in commercial and civil application areas is considered, but not in the military field. The use of the aircraft is considered for various areas of application and application scenarios, such as flying within sight/ out of sight of the pilot.	Aerospace Standards Committee	2019-03-00
VDI 2879	Inspection of installations and buildings with UAVs (unmanned aerial vehicles)	Unmanned aerial vehicles (UAVs) are workload carrying, remote-controllable components for remote sensing used on land, in water or in the air. For the purpose of this standard, UAVs are flying drones, i.e. multicopters and remote airplanes of various designs, sizes and utilisation, which are used for remote sensing of technical objects with help of different attached sensors. The acronym UAV - for unmanned aerial vehicle - means the unmanned aircraft itself. A drone is a flying component of an UAS (unmanned aerial system) or RPAS (remotely piloted aerial system). A UAV system, in addition of the drone, also includes the predictor for controlling the drone, the sensors, systems for data transmission (ground/air or other recipients of exploration results) as well as components for operation, maintenance and transportation.	VDI Society Production and Logistics	2018-09-00
CSA ANSI/CAN/UL 3030	Unmanned Aircraft Systems	Scope 1.1 These requirements cover the electrical system of unmanned aircraft systems (UASs), as defined in this Standard, used in flight for commercial applications or flight incidental to business applications. UASs covered by these requirements are intended to be operated by certified UAS pilots as identified in the Federal Regulations, where the unmanned aircraft is less than 25 kg (55 lbs). The UAS is intended to be provided with an internal lithium ion battery that is charged from an external source. UASs are intended	Underwriters' Laboratories of Canada (ULC)	2018-09-18

		to have an operating voltage of not greater than 100 V dc, and are intended for outdoor operation.		
prEN 4709-001	Aerospace series — Unmanned Aircraft Systems — Product requirements and verification for the Open category	This document provides means of compliance with Parts 1 to 6 of Commission delegated (EU) .../... of XXX on making available on the market of unmanned aircraft intended for use in the `open' category and on third-country UAS operators proposed in the Opinion 01/2018. This includes compliance with product requirements for all UAS authorized to operate in the `open' category (class C0, C1, C2, C3 and C4 UAS) and the electronic identification system. T	ASD-STAN AeroSpace and Defence Industrie Association of Europe - Standardisation	2019-01-00
CWA 17357	Urban search and rescue (USaR) robotic platform technical and procedural interoperability - Guide	This CWA provides recommendations to enable technical interoperability (hardware, software) between urban search and rescue (USaR) robotic platforms and the equipment, sensors and tools that are attached to them. This CWA also provides guidance on the principles for enabling USaR robotic platforms (various types of them such as drones, snake-like, robots with wheels, legs, etc.) to operate in all ground search environments. In this way a generic platform can be adapted, designed and built for any possible search and rescue (SaR) scenario on the ground.	CEN European Committee for Standardisation	2019-02-00
ISO/DIS 21384-1	Unmanned aircraft systems — Part 1: General specification	This document specifies the general requirements for UAS for civil applications including commercial. This document provides the foundation and common terms, definitions and references relevant to the whole standard, the purpose of which is to provide a safety quality standard for the safe operation of all UAS through the provision of synergistic standards for manufacturing and operations.	ISO/TC 20 Aircraft and space vehicles	2019-04-00
ISO/DIS 21384-3	Unmanned aircraft systems — Part 3: Operational procedures	This document outlines requirements for UA operational procedures which, when applied together with Part 2, form a robust UA safety and quality standard. This document applies to all UA regardless of size, categorization, application or location and represents the international best practice for the safe operation of all UA.	ISO/TC 20 Aircraft and space vehicles	2018-11-00

ISO/DIS 21384-4	Unmanned aircraft systems — Part 4: Terms and definitions	This document defines terms and definitions relating to Unmanned Aircraft Systems that are widely used in science and technology.	ISO/TC 20 Aircraft and space vehicles	2019-04-00

4.3.4. Standards - Category 'Techniques'

In total 4 standards have been identified that are related to the category 'Techniques'. The list of standards can be found in the table below.

Table 5: List of identified standards – Category 'Techniques'

Document No.	Title	Abstract	Committee	Date of publication
CEN-CENELEC Guide 33	Guide for addressing environmental issues in testing standards	This Guide gives guidance about environmental improvement of testing processes described in testing standards. The intention of this Guide is to reduce the environmental impact of testing by providing guidance on how to address environmental issues in testing standards. This Guide is only applicable to the testing procedure. This Guide does not describe how sampling should be done. It should help to identify environmental impacts of sampling where it is necessary. The following is excluded from the scope: the general operating conditions of laboratories unless specified as part of the test; the life cycle of testing equipment (NOTE 1 Testing equipment is regarded as a product. For environmental issues of products see CEN Guide 4); testing that is part of the production process (NOTE 2 Testing that is part of the production process (for example functional or quality testing) is already considered under CEN Guide 4); the environmental impact of test reports (e.g. use of paper, on which the report is written). Environmental improvement of the product to be tested is not considered in this Guide but in CEN Guide 4. Climate change considerations are not part of this document and are dealt with in the "CEN/CENELEC Guide for addressing climate change adaptation in standards". Workers protection and Occupational health and safety conditions are out of scope of this Guide.	CEN European Committee for Standardisation	2016-04-00

ISO/TR 19815	Information and documentation — Management of the environmental conditions for archive and library collections	This document provides information on recent discussions and changes in recommendations and guidance on environmental management within the cultural heritage field. Conservation research on preventive methodologies and passive control provided by specific construction methods and renovations, developments in technology for controlling the environment, and energy and climate change issues are included. This document is intended for archives and libraries and other institutions with large volumes of collections that are based on paper. Archives and libraries also have collections that include film, magnetic media, leather, and other organic, inorganic or composite materials. These institutions have a unique challenge of extending the lifespan of these materials for access and use in the present and for future generations. The environment plays a key role in extending the lifespan of all of these materials. This document is intended for use in preservation planning and ongoing environmental management of permanent storage conditions for archives and library collections and applies to all collections being permanently stored for an institution.	ISO/TC 46 Information and documentation	2018-07-00
CEN/TR 15449-2	Geographic information — Spatial data infrastructures — Part 2: Best practices	This part of the Technical Report provides best practices regarding Spatial Data Infrastructures (SDIs), referencing to the outcomes of the projects in the frame of the European Union funding programmes. It summarises the deliverables of projects, structured according to the reference model defined in Part 1 of this Technical Report, to be made available in an on-line repository where the relevant outcomes are collected and classified in order to provide a structured sets of recommendations for implementing SDIs at the European, national and sub-national levels. This collection refers mainly to the projects funded by the European Union funding programmes: this choice is driven by the wide vision and analysis which such kind of projects can provide and the wide numbers of stakeholders which have been involved. The outcomes delivered by these relevant practices are collected into a document registry available through the CEN/TC 287 web site. This part of the Technical Report defines the processes and the content of these projects and documents registries, which will help making them more accessible and re-usable. It provides the relevant project deliverables addressing the main SDI issues as	CEN/TC 287 Geographic Information	2012-10-00

		described in the other parts of this Technical Report. The intended readership of this Technical Report are those people who are responsible for creating frameworks for SDI, experts contributing to INSPIRE, experts in information and communication technologies and e-government that need to familiarize themselves with geographic information and SDI concepts, and standards developers and writers.		
ITU-T X.1521	Common vulnerability scoring system	Recommendation ITU-T X.1521 on the common vulnerability scoring system (CVSS) provides an open framework for communicating the characteristics and impacts of information and communication technologies (ICT) vulnerabilities in the commercial or open source software used in communications networks, end user devices, or any of the other types of ICT capable of running software. The goal of the Recommendation is to enable ICT managers, vulnerability bulletin providers, security vendors, application vendors and researchers to speak from a common language of scoring ICT vulnerabilities.	ITU International Telecommunication Union	2016-03-00

4.3.5. Standards - Category 'Heritage'

The standards analysis for the category 'Heritage' resulted in the following list of 28 (potentially) relevant standards. Identified standards within this topic that might need special attention in the ARCH project work are e. g. the EN 15757 'Conservation of cultural property' that specifies temperature and relative humidity levels to limit climate-induced physical damage of heritages; and EN 15759-2 'Conservation of cultural heritage' that gives guidelines to improve the preservation conditions of cultural heritage buildings and their collections. The ISO 21127 'Information and documentation — A reference ontology for the interchange of cultural heritage information' exchanges information between cultural heritage institutions like museums, libraries and archives.

Table 6: List of identified standards – Category 'Heritage'

Document No.	Title	Abstract	Committee	Date of publication
VDI 3798 Blatt 1	Material cultural heritage — Identification, examination, preservation, and environmental impact	This standard broadly refers to material cultural heritage with focus on the systematic identification, examination and preservation, taking into account natural and anthropogenic environmental impacts. It provides a basis for the systematic planning, implementation and documentation of conservation and restoration measures. The standard is addressed to all those who act in the field of material cultural heritage and are responsible in research and practice, in particular owners, building and property managers, planners, architects, engineers, conservators, craftsmen as well as museums and monument authorities.	VDI/DIN-Commission on Air Pollution Prevention (KRdL) - Standards Committee	2019-05-00
EN 15757	Conservation of Cultural Property — Specifications for temperature and relative humidity to limit climate-induced mechanical damage in organic hygroscopic materials	This European Standard is a guide specifying temperature and relative humidity levels to limit climate-induced physical damage of hygroscopic, organic materials, kept in long-term storage or exhibition (more than one per year) in indoor environments of museums, galleries, storage areas, archives, libraries, churches and modern or historical buildings.	CEN/TC 346 Conservation of cultural property	2010-09-00
EN 15758	Conservation of Cultural Property — Procedures and instruments for measuring temperatures of the air and the surfaces of objects	This European Standard recommends the procedures for measuring the temperature of the air and of the surfaces of cultural property in indoor and outdoor environments, as well as specifying the minimum characteristics of instruments for such measurements. This document contains recommendations for accurate measurements to ensure the safety of objects and it is addressed to any people with the responsibility of the environment, its diagnosis, the conservation or maintenance of buildings, collections, or single object.	CEN/TC 346 Conservation of cultural property	2010-09-00
EN 15759-2	Conservation of cultural heritage — Indoor climate — Part 2: Ventilation management for the protection of cultural	This European Standard gives guidelines for ventilation management in order to improve the preservation conditions of cultural heritage buildings and their collections. At the same time, it is aimed to create an indoor environment for a sustainable use of these buildings and their collections. This standard is a	CEN/TC 346 Conservation of cultural property	2018-01-00

	heritage buildings and collections	complement to existing general standards for ventilation that are focused on human comfort. This European Standard is the second part of a standard on indoor climate in cultural heritage buildings, i.e. EN 15759-1:2011. It should be used together with the first part when considering selection of heating strategies and heating systems for cultural heritage buildings, or buildings housing collections. It may be also used when considering other issues, e. g. assessment of buildings, interiors and contents, or improvements for the energy performance.		
EN 15801	Conservation of cultural property — Test methods — Determination of water absorption by capillarity	This European Standard specifies a method for determining the water absorption by capillarity of porous inorganic materials used for and constituting cultural property. The method may be applied to porous inorganic materials either untreated or subjected to any treatment or ageing.	CEN/TC 346 Conservation of cultural property	2009-12-00
EN 15802	Conservation of cultural property — Test methods — Determination of static contact angle	This European Standard specifies a method for the measurement of the static contact angle of a water drop on porous inorganic materials used for and constituting cultural property. The method may be applied to porous inorganic materials either untreated or subjected to any treatment or ageing.	CEN/TC 346 Conservation of cultural property	2009-12-00
EN 15803	Conservation of cultural property — Test methods — Determination of water vapour permeability (δp)	This European Standard specifies a method for determining the water vapour permeability (WVP) of porous inorganic materials used for and constituting cultural property. The method may be applied to porous inorganic materials either untreated or subjected to any treatment or ageing.	CEN/TC 346 Conservation of cultural property	2009-12-00

EN 15886	Conservation of cultural property — Test methods — Colour measurement of surfaces	This European Standard describes a test method to measure the surface colour of porous inorganic materials, and their possible chromatic changes. No reference to the appearance of glossy surfaces is described. The method may be applied to porous inorganic materials either untreated or subjected to any treatment or ageing. The method is suitable for the measurement of colour coordinates of: representative surfaces of specimens, see 3.11; representative surfaces of objects, indoors or outdoors.	CEN/TC 346 Conservation of cultural property	2010-09-00
EN 15898	Conservation of cultural property — Main general terms and definitions	This European Standard defines the main general terms used in the field of conservation of cultural property with particular attention to those terms which have wide use or significance.	CEN/TC 346 Conservation of cultural property	2011-10-00
EN 16085	Conservation of Cultural property — Methodology for sampling from materials of cultural property — General rules	This European Standard provides a methodology and criteria for sampling cultural property materials for their scientific investigation. It covers, for example, how to characterize the material(s), assess the condition, determine the deterioration causes and/or mechanism(s) and decide on and/or evaluate the conservation treatment(s). Apart from sampling, this document also provides requirements for documentation, and handling of sample(s). This European Standard does not deal with the decision making process for taking a sample nor how the sample is to be used.	CEN/TC 346 Conservation of cultural property	2012-08-00
EN 16095	Conservation of cultural property — Condition recording for movable cultural heritage	This European Standard sets out the purpose and context of condition recording for movable cultural heritage and provides a framework for a condition report. It specifies the status of a condition report and its essential contents. This European Standard applies to all kinds of movable cultural heritage, whether individual objects or whole collections. It can also be used for immovable features in buildings or monuments.	CEN/TC 346 Conservation of cultural property	2012-08-00

EN 16096	Conservation of cultural property — Condition survey and report of built cultural heritage	This European Standard provides guidelines for a condition survey of built cultural heritage. It states how the condition of the built cultural heritage should be assessed, documented, recorded and reported on. It encompasses evaluation of the condition of a building or other structure mainly by visual observation, together - when necessary - with simple measurements. The relevant data and documentation on the built cultural heritage should be collected and included in the report. This European Standard can be applied to all built cultural heritage such as buildings, ruins, bridges and other standing structures. Built cultural heritage comprises both protected and non-protected significant buildings and structures. Archaeological sites and cultural landscapes are not dealt with in this standard. This European Standard does not specify how to carry out a diagnosis (3.7) of the built cultural heritage. For listed/protected immovable heritage, specific national rules for expert documentation and works may apply. This European Standard may be applied in order to: a) identify maintenance measures and the need for further investigation and diagnostics of damage; b) define procurement needs and the requirement for detailed specification; c) provide a unified method to obtain comparative data, when carrying out a condition survey for a group of buildings or a region.	CEN/TC 346 Conservation of cultural property	2012-08-00
EN 16141	Conservation of cultural heritage — Guidelines for management of environmental conditions — Open storage facilities: definitions and characteristics of collection centres dedicated to the preservation and management of cultural heritage	This European Standard defines the characteristics of specific areas dedicated to the preservation, storage, management of, and access to collections. It lists the considerations that should be taken into account to achieve optimum storage and accessibility.	CEN/TC 346 Conservation of cultural property	2012-11-00

EN 16242	Conservation of cultural heritage — Procedures and instruments for measuring humidity in the air and moisture exchanges between air and cultural property	This European Standard gives guidance and specifies procedures and instruments for the measurement of relative humidity (RH) in air, in outdoor or indoor environments. It indicates how RH can be directly measured or how it can be calculated from air temperature, wet-bulb temperature and dew-point temperature. This standard contains recommendations for accurate measurements of ambient conditions and moisture exchanges between air and cultural heritage objects. It is addressed to anyone in charge of environmental diagnosis, conservation or maintenance of buildings, collections or single objects.	CEN/TC 346 Conservation of cultural property	2012-11-00
EN 16322	Conservation of Cultural Heritage — Test methods — Determination of drying properties	This European Standard specifies a method for the determination of the drying behaviour of porous inorganic materials used for and constituting cultural property. The method may be applied to porous inorganic materials either untreated or subjected to any treatment or ageing.	CEN/TC 346 Conservation of cultural property	2013-10-00
EN 16572	Conservation of cultural heritage — Glossary of technical terms concerning mortars for masonry, renders and plasters used in cultural heritage	This European Standard describes the terminology for mortars used in the field of cultural heritage. NOTE In addition to terms used in the three official CEN languages (English, French and German), this European Standard gives the equivalent terms in Dutch, Italian, Greek, Swedish and Spanish; these are published under the responsibility of the member body/National Committee for NEN, UNI, ELOT, SIS and AENOR and are given for information only. Only the terms and definitions given in the official languages can be considered as CEN terms and definitions.	CEN/TC 346 Conservation of cultural property	2015-07-00
EN 16682	Conservation of cultural heritage — Methods of measurement of moisture content, or water content, in materials constituting immovable cultural heritage	This European Standard is aimed to inform and assist users in the choice and use of the most appropriate method to obtain reliable measurements of the moisture content, or water content, in wood and masonry (including brickwork, stonework, concrete, gypsum, mortars, etc.) in the specific case of the built cultural heritage. It provides a basic framework to take and interpret this kind of measurements on the above cultural heritage materials that have undergone weathering, pest attack, salt migration or other transformations over time. It specifies four absolute methods (i.e. gravimetric, Karl Fischer titration, azeotropic distillation and calcium carbide); explains their characteristics, pros and cons, and gives specifications for the transformation of readings into the same unit to make measurements taken with different methods comparable. It specifies the	CEN/TC 346 Conservation of cultural property	2017-03-00

		three principal relative methods (i.e. electrical resistance, capacitance, and relative humidity in equilibrium with the material), pointing out their characteristics and uncertainties when used in the field of cultural heritage. In addition, it provides an informative overview of ten other relative methods, their characteristics, pros and cons. It gives specifications for the calibration of the various methods. It also compares the above methods in relation to their accuracy, sampling requirement, sample size, laboratory or field use, and other problems encountered in the field of cultural heritage to prevent instrument misuse, reduce uncertainties and avoid reading misinterpretation.		
EN 16790	Conservation of cultural heritage — Integrated pest management (IPM) for protection of cultural heritage	This European Standard defines Integrated Pest Management (IPM) and describes a comprehensive methodology for managing pest problems for protection of cultural heritage. This European Standard applies to objects and buildings, housing collections, such as museums, archives, libraries, historic houses and buildings, places of worship, art dealers and auction rooms, art transport and storage companies. This European Standard does not apply to caves, gardens, and parks.	CEN/TC 346 Conservation of cultural property	2016-06-00
EN 16853	Conservation of cultural heritage — Conservation process — Decision making, planning and implementation	This European Standard specifies the process of decision-making, planning and implementing the conservation of tangible cultural heritage. It applies to material expressions of tangible cultural heritage such as individual objects, collections, the built environment, historic sites, archaeological sites and cultural landscapes. NOTE This European Standard does not cover how to identify cultural heritage nor who or what competences are required to undertake decisions or other parts of the process.	CEN/TC 346 Conservation of cultural property	2017-04-00
EN 16873	Conservation of cultural heritage — Guidelines for the management of waterlogged wood on archaeological terrestrial sites	This European standard provides guidelines for safeguarding waterlogged wood on terrestrial sites of archaeological or historical significance. It deals with the protection of archaeological and historical waterlogged wood, from the time of exposure during and after excavation, until it reaches the conservation laboratory. The standard cannot be applied to the management of controlled reburial, in situ preservation, long term post excavation storage or excavations under water. Composite artefacts, and other waterlogged materials are specifically excluded from this standard.	CEN/TC 346 Conservation of cultural property	2016-11-00

EN 16883	Conservation of cultural heritage — Guidelines for improving the energy performance of historic buildings	This European Standard provides guidelines for sustainably improving the energy performance of historic buildings, e. g. historically, architecturally or culturally valuable buildings, while respecting their heritage significance. The use of this standard is not limited to buildings with statutory heritage designation, it applies to historic buildings of all types and ages. This European Standard presents a normative working procedure for selecting measures to improve energy performance, based on an investigation, analysis and documentation of the building including its heritage significance. The procedure assesses the impact of those measures in relation to preserving the character-defining elements of the building.	CEN/TC 346 Conservation of cultural property	2017-05-00
FprEN 17135	Conservation of cultural heritage — General terms for describing the alterations of objects	This document defines terms used in the field of conservation of cultural heritage for the description of alteration of objects with particular attention to those terms which are applied to many types of objects. This document applies to all types of material changes that can be observed.	CEN/TC 346 Conservation of cultural property	2019-05-00
EN 16302	Conservation of cultural heritage — Test methods — Measurement of water absorption by pipe method	This European Standard specifies a method to measure water absorption of porous inorganic materials used for and constituting cultural property by pipe method. The method may be used on porous inorganic materials which are untreated or have been subjected to any treatment or ageing. The method may be used both in the laboratory and in situ due to its non destructive nature.	CEN/TC 346 Conservation of cultural property	2013-02-00
EN 16515	Conservation of Cultural Heritage — Guidelines to characterize natural stone used in cultural heritage	This European Standard specifies a methodology for the characterization of sound or deteriorated stones by using the most appropriate analytical techniques on samples taken from the object. This European Standard contains guidelines for the selection of methods to determine mineralogical, textural, physical, chemical and mechanical properties of natural stone used in cultural heritage monuments and objects. This information is used to define rock typology and to evaluate the stone's condition with respect to its conservation as well as for understanding of deterioration processes of natural stone. Where possible existing standards are referred to and guidance provided where different specimens are required and additional methods used. The methods described are generally destructive, however,	CEN/TC 346 Conservation of cultural property	2015-04-00

		non-destructive (NDT) methods are always preferable to methods with a minimum of destruction and those are always preferable to destructive methods. Methods used for stone analysis can vary depending upon the objectives of the work. All investigation and analysis need be proportional to the significance of the building or artefact being investigated, its condition and the likely level of intervention. This European Standard will be used to determine the kind, extent, and objectives of the examination to be made.		
EN 17114	Conservation of cultural heritage — Surface protection for porous inorganic materials — Technical and chemical data sheets of water repellent product	This document specifies the information contained in the technical data sheet of the product in order to allow a preliminary selection of the most suitable products to use in a specific case of intervention.	CEN/TC 346 Conservation of cultural property	2018-11-00
ISO/IEC 15897	Information technology — User interfaces — Procedures for the registration of cultural elements	ISO/IEC 15897:2011 specifies the information that can appear in a Cultural Specification and defines the procedures for registering such specifications. The Cultural Specifications can include freeform Narrative Cultural Specifications and Repertoiremaps as described in ISO/IEC 15897:2011, POSIX Locales and Charmaps conforming to ISO/IEC/IEEE 9945, and other machine-parsable specifications such as FDCC-sets, Repertoiremaps and Charmaps following the recommendations of ISO/IEC TR 14652, and Cultural Specifications formatted using SGML or XML. The registry is in printed and electronic form. ISO/IEC 15897:2011 sets out the procedures for registering cultural elements, both as narrative text and in a more formal manner, using the techniques of ISO/IEC/IEEE 9945, and other machine-processable formats such as those specified in ISO/IEC TR 14652.	ISO/IEC JTC 1/SC 35 User interfaces	2011-10-00
ISO 21110	Information and documentation — Emergency preparedness and response	This document provides a context for emergency planning, response and recovery for all types of an archive, library or museum collections in light of other existing plans. It provides responders and other stakeholders with an outline for planning, responding and recovering. This document does not address the causes of a critical event, but the consequences and wider impacts. This document outlines a cycle for developing, exercising and reviewing a plan, and how to present a plan. It aims to encourage responders to develop their capabilities in emergency preparedness and touches on some elements of response and recovery, where relevant, by highlighting indicators of good practice.	ISO/TC 46 Information and documentation	2019-04-00

		It is not intended to be an operations manual as there is no single approach that meets the needs of every site, nor is there one single set of organisational arrangements that is appropriate to each and every type of emergency.		
ISO 21127	Information and documentation — A reference ontology for the interchange of cultural heritage information	ISO 21127:2014 establishes guidelines for the exchange of information between cultural heritage institutions. In simple terms, this can be defined as the information managed by museums, libraries, and archives. The intended scope of this ISO 21127:2014 is defined as the exchange and integration of heterogeneous scientific documentation relating to museum collections. This definition requires further elaboration.	ISO/TC 46 Information and documentation	2014-10-00

4.3.6. Standards - Category 'Management Systems'

The standards analysis for the category 'Management Systems' resulted in the following list of 19 standards. Identified standards within this topic that might need special attention in the ARCH project work are e. g. the CWA 16267 'Guidelines for sustainable development of historic and cultural cities' that describes the commitments of the local authority in term of sustainable management of cultural and natural heritages; the ISO/TS 22375 'Security and resilience - Guidelines for complexity assessment process ' that allows an organisation to identify potential hidden vulnerabilities of its system and to provide an early indication of risk resulting from complexity; and ISO 22325 'Security and resilience - Emergency management - Guidelines for capability assessment' that provides guidelines for an organisation in assessing its emergency management capability.

Table 7: List of identified standards – Category 'Management Systems'

Document No.	Title	Abstract	Committee	Date of publication
CEN/TS 16555-4	Innovation management — Part 4: Intellectual property management	This Technical Specification provides guidance to assist an organisation to identify, capture, and safeguard intellectual property, in order to: - provide organisations with an overview of the fundamental principles of intellectual property management, in the context of the innovation process; - promote best practices in intellectual property matters that result in efficiently acquiring	CEN/TC 389 Innovation Management	2014-12-00

		intellectual property, while increasing the organisations' ability to effectively address intellectual property owned by third parties. This Technical Specification is applicable to all types of organisation, including the public sector. Special consideration has been given to the needs of SMEs.		
ISO 56003	Innovation management — Tools and methods for innovation partnership — Guidance	This document provides a guidance for innovation partnerships. It describes the innovation partnership framework (see Clause 4 to Clause 8) and the sample corresponding tools (see Annex A to Annex E) to — decide whether to enter an innovation partnership, — identify, evaluate and select partners, — align the perceptions of value and challenges of the partnership, — manage the partner interactions.	ISO/TC 279 Innovation management	2018-03-00
ISO/DIS 22313	Security and resilience — Business continuity management systems — Guidance	This document provides guidance, where appropriate, on the requirements specified in ISO 22301:201x Security and resilience – Business continuity management systems – Requirements and provides recommendations (‘should’) and permissions (‘may’) in relation to them. It is not the intention of this document to provide general guidance on all aspects of business continuity.	ISO/TC 292 Security	2019-04-00
CWA 16267	Guidelines for sustainable development of historic and cultural cities. Qualicities	The present referent document describes the commitments of the local authority in term of sustainable management of cultural (tangible and intangible) and natural heritages. Although it is systematically clarified in the text, all the described commitments are to be considered under the heritage point of view only. If, according to the local or regional organisation, the community has no authority on some of the fields covered by the commitments, it must prove that it did everything it could to get as close as it could to the required level. The referent document establishes the criteria in order to obtain the label of this CWA “Guidelines for Sustainable Development of Historic and Cultural Cities - Qualicities®”. It applies to any cultural and heritage city or territory, at the local or regional level.	CEN European Committee for Standardisation	2011-02-01

CEN/TS 17091	Crisis management — Guidance for developing a strategic capability	This document provides guidance on good practice for crisis management to help the strategic decision makers of an organisation to plan, implement, establish, operate, monitor, review, maintain and continually improve a crisis management capability. It is intended for any organisation regardless of location, size, type, industry, structure, or sector. While it is important to be aware of human and cultural factors as they can cause stress when working as individuals and as part of groups, it is not the purpose of this document to examine aspects of these areas in detail. This document provides guidance for:- understanding the context and challenges of crisis management; - developing an organisation's crisis management capability through preparedness; - recognising the complexities facing a crisis team in action; - communicating successfully during a crisis; and; - reviewing and learning.	CEN/TC 391 Societal and citizen security	2018-10-00
CWA 17335	Terminologies in crisis and disaster management	This CEN Workshop Agreement analyses definitions of terms used in crisis and disaster management as well as the scopes of the related source. Both scopes and definitions from different sources are compiled and compared regarding several aspects such as their context and envisaged audience. Sources could be a terminology standard or web services. The focus is set in responses to large scale critical events. Small scale incidents managed by daily routine processes of stakeholders are also covered but are not the main focus of this CWA. Selected terminologies predominantly from the domains crisis and disaster management are used for the analysis and are included in the document. The CEN Workshop Agreement includes terminologies and taxonomies, but no ontologies.	CEN European Committee for Standardisation	2018-09-00
ISO 22320	Security and resilience — Emergency management — Guidelines for incident management	This document gives guidelines for incident management, including — principles that communicate the value and explain the purpose of incident management, — basic components of incident management including process and structure, which focus on roles and responsibilities, tasks and management of resources, and — working together through joint direction and cooperation.	ISO/TC 292 Security	2018-11-00
ISO 22322	Societal security — Emergency management — Guidelines for public warning	ISO 22322:2015 provides guidelines for developing, managing, and implementing public warning before, during, and after incidents. This International Standard is applicable to any organisation responsible for public warning. It is applicable at all levels, from local up to international. Before planning and implementing the public warning system, risks and consequences of potential hazards are assessed.	ISO/TC 292 Security	2015-05-00

ISO/TS 22331	Security and resilience — Business continuity management systems — Guidelines for business continuity strategy	This document gives guidance for business continuity strategy determination and selection. It is applicable to all organisations regardless of type, size and nature, whether in the private, public or not-for-profit sectors. It is intended for use by those responsible for, or participating in, strategy determination and selection.	ISO/TC 292 Security	2018-10-00
ISO/TS 22375	Security and resilience — Guidelines for complexity assessment process	This document gives guidelines for the application of principles and a process for a complexity assessment of an organisation's systems to improve security and resilience. A complexity assessment process allows an organisation to identify potential hidden vulnerabilities of its system and to provide an early indication of risk resulting from complexity.	ISO/TC 292 Security	2018-10-00
ANSI/ASIS SPC.2	Auditing Management Systems — Risk, Resilience, Security and Continuity — Guidance for Application	This Standard provides guidance for conducting resilience, security, crisis, continuity and other risk-based audits within the context of management systems and includes practical advice on conducting audits. It will provide guidance on the management of audit programs, conduct of internal or external audits of risk and resilience based management systems such as security, crisis, continuity, and emergency management, including the competence and evaluation of auditors.	American National Standards Institute (ANSI)	2014-00-00
ISO 22398	Societal security — Guidelines for exercises	ISO 22398:2013 recommends good practice and guidelines for an organisation to plan, conduct, and improve its exercise projects which may be organized within an exercise programme. It is applicable to all organisations regardless of type, size or nature, whether private or public. The guidance can be adapted to the needs, objectives, resources, and constraints of the organisation. It is intended for use by anyone with responsibility for ensuring the competence of the organisation's personnel, particularly the leadership of the organisation, and those responsible for managing exercise programmes and exercise projects.	ISO/TC 292 Security	2013-09-00
ISO 22325	Security and resilience — Emergency management — Guidelines for capability assessment	ISO 22325:2016 provides guidelines for an organisation in assessing its emergency management capability. It includes — an assessment model with a hierarchy of four levels; — eight indicators; — an assessment process, explaining how to plan, collect, analyse and report.	ISO/TC 292 Security	2016-10-00

FprCEN/TS 17091	Crisis management — Guidance for developing a strategic capability	This document provides guidance on good practice for crisis management to help the strategic decision makers of an organisation to plan, implement, establish, operate, monitor, review, maintain and continually improve a crisis management capability. It is intended for any organisation regardless of location, size, type, industry, structure, or sector. While it is important to be aware of human and cultural factors as they can cause stress when working as individuals and as part of groups, it is not the purpose of this document to examine aspects of these areas in detail. This document provides guidance for:- understanding the context and challenges of crisis management; - developing an organisation's crisis management capability through preparedness; - recognising the complexities facing a crisis team in action; - communicating successfully during a crisis; and; - reviewing and learning.	CEN/TC 391 Societal and citizen security	2018-01-00
CWA 15931-1	Disaster and emergency management — Shared situation awareness — Part 1: Message structure	The context of this CEN Workshop Agreement (CWA) is disaster and emergency management, and it aims to assist organisations involved by providing a message structure for the transfer of information between computer based systems in such a way that it can be reliably decoded. This is done by encoding the information in an XML Schema. The companion CWA-Part 2 provides a system of terms relating to disasters and emergencies and their encoding. Many of the XML fields are required to use a term from the companion CWA-Part 2, rather than free text, so that the information is well defined, and can be automatically translated into language appropriate to the user.	CEN European Committee for Standardisation	2009-04-01
CWA 15537	Network Enabled Abilities — Service-Oriented Architecture for civilian and military crisis management	This CWA specifies services and other items mandatory or optional for a Network Enabled Abilities environment. It also includes an inventory of standards and standard-like specifications applicable to each such item. These items include recommended general principles and framework for system design, overall architectures, generic functionality to be considered, concepts, conventions and terminology in order to ensure an optimum multi-purpose interoperability, in particular of national and multi-national military and civil operations.	EN European Committee for Standardisation	2006-04-01
ONR 49002-3	Risk Management for Organisations and Systems — Part 3: Guidelines for emergency, crisis and business continuity management — Implementation of ISO 31000	This ONR describes the emergency, crisis and business continuity management of an organisation. This system is based on risk scenarios that may occur suddenly as a residual risk despite preventive measures, unexpected and with significant effects on the organisation. The application of this ONR does not extend to the guidance and the operation of public emergency organisations such as fire brigade, police, military and	ASI/Committee 252 Risk management, Business Continuity Management	2014-01-01

		emergency services. However, this should be taken into account in the assessment of emergency and crisis scenarios and in emergency and crisis planning for all organisations involved in emergency exercises.	and Corporate Security Management	
ITU-T E.100 Supplement 1	ITU-T E.100 series — Framework of disaster management for disaster relief system	No abstract available.	ITU International Telecommunication Union	2019-02-00
ISO/DIS 22328-1	Security and resilience — Emergency management — Community-based disaster early warning system — Part 1: Guidelines for implementation of a community-based disaster early warning system	This document provides guidelines for the implementation of a disaster early warning system. It provides a definition, aims to improve understanding, and describes methods and procedures to be implemented. It is applicable to communities vulnerable to disasters, without taking secondary effects into consideration.	ISO/TC 292 Security	2019-05-00

4.3.7. Standards - Category 'Cities and communities'

The standards analysis for the category 'Cities and communities' resulted in the following list of 20 standards. Identified standards within this topic that might need special attention in the ARCH project work are e. g. the ISO/TR 37121 'Sustainable development in communities - Inventory of existing guidelines and approaches on sustainable development and resilience in cities' that provides an inventory of existing guidelines and approaches on sustainable development and resilience in cities; and ISO/DIS 37123 ' Sustainable cities and communities - Indicators for resilient cities' that defines methodologies for a set of indicators on resilience in cities.

Table 8: List of identified standards – Category 'Cities and communities'

Document No.	Title	Abstract	Committee	Date of publication
ISO/TR 37152	Smart community infrastructures — Common	ISO/TR 37152:2016 outlines the basic concept of a common framework for the development and operation of smart community infrastructures. The framework describes the planning, development, operation and maintenance	ISO/TC 268 Sustainable development	2016-08-00

	framework for development and operation	methodology to facilitate the harmonization of each infrastructure as a part of a smart community and ensures that the interactions between multiple infrastructures are well orchestrated. The framework is applicable to all processes of smart community infrastructures' life cycle (from conceptual design through planning, development, operation, maintenance, redevelopment and feedback). The infrastructures to be covered are energy, water, transportation, waste management, ICT and others.	in communities	
ISO 37153	Smart community infrastructures — Maturity model for assessment and improvement	ISO 37153:2017 provides the basis, requirements and guidance for a maturity model for the assessment of technical performance, process and interoperability of community infrastructure(s) as well as its contribution to the community, and guidance for future improvements.	ISO/TC 268 Sustainable development in communities	2017-12-00
ISO 37100	Sustainable cities and communities — Vocabulary	ISO 37100:2016 defines terms relating to sustainable development in communities, smart community infrastructure and related subjects.	ISO/TC 268 Sustainable development in communities	2016-12-00
ISO 37101	Sustainable development in communities — Management system for sustainable development — Requirements with guidance for use	ISO 37101:2016 establishes requirements for a management system for sustainable development in communities, including cities, using a holistic approach, with a view to ensuring consistency with the sustainable development policy of communities. ISO 37101:2016 can be used in whole or in part to improve the management of sustainable development in communities. Claims of conformity to ISO 37101:2016, however, are not acceptable unless all its requirements are incorporated into an organisation's management system for sustainable development in communities and fulfilled without exclusion.	ISO/TC 268 Sustainable development in communities	2016-07-00
ISO 37104	Sustainable cities and communities — Transforming our cities — Guidance for	This document provides guidance on how to implement and maintain a management system for sustainable development based on ISO 37101 principles, specifically in the context of cities, but applicable to other forms of settlement. This document:	ISO/TC 268 Sustainable development	2019-04-00

	practical local implementation of ISO 37101	— provides guidance for practical implementation of a management system for sustainable development in cities and other settlements, based on ISO 37101; — establishes a methodological framework for the systematic evaluation of the sustainable development schemes and achievements in the city or other settlements, based on the cross-analysis of the six purposes of sustainability and the 12 areas of action of ISO 37101;	in communities	
ISO/DIS 37105	Sustainable cities and communities — Descriptive framework for cities and communities	This international standard specifies requirements for a descriptive framework including an associated foundational ontology of the anatomical structure of a city or community. The descriptive framework has the following qualities: timeless, i.e., compatible with any human settlement at any time in history; acultural, i.e., valid for any culture and any type of city; scalable, i.e., valid for a metropolis, a city, a small town, or a village; and generic, so that anything we could define as a "human settlement", such as a "smart city", would have a place in this structure.	ISO/TC 268 Sustainable development in communities	2018-07-00
ISO 37106	Sustainable cities and communities — Guidance on establishing smart city operating models for sustainable communities	This document gives guidance for leaders in smart cities and communities (from the public, private and voluntary sectors) on how to develop an open, collaborative, citizen-centric and digitally-enabled operating model for their city that puts its vision for a sustainable future into operation.	ISO/TC 268 Sustainable development in communities	2018-07-00
ISO 37120	Sustainable cities and communities — Indicators for city services and quality of life	This document gives guidance for leaders in smart cities and communities (from the public, private and voluntary sectors) on how to develop an open, collaborative, citizen-centric and digitally-enabled operating model for their city that puts its vision for a sustainable future into operation. This document provides proven tools that cities can deploy when operationalizing the vision, strategy and policy agenda they have developed following the adoption of ISO 37101, the management system for sustainable development of communities. It can also be used, either in whole or in part, by cities that have not committed to deployment of the ISO 37101 management system.	ISO/TC 268 Sustainable development in communities	2018-07-00
ISO/TR 37121	Sustainable development in communities — Inventory of existing guidelines and approaches on sustainable	ISO/TR 37121:2016 provides an inventory of existing guidelines and approaches on sustainable development and resilience in cities. ISO/TR 37121:2016 focuses on resilience understood as the ability of a city, system, community, local government or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a	ISO/TC 268 Sustainable development in communities	2017-01-00

	development and resilience in cities	timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. Resilience indicators are intended to assess the extent to which cities are helping residents, businesses, institutions, and infrastructure resist, absorb, accommodate to and recover from the effects of hazards in a timely and efficient manner.		
ISO 37122	Sustainable cities and communities — Indicators for smart cities	This document specifies and establishes definitions and methodologies for a set of indicators for smart cities. As accelerating improvements in city services and quality of life is fundamental to the definition of a smart city, this document, in conjunction with ISO 37120, is intended to provide a complete set of indicators to measure progress towards a smart city. This is represented in Figure 1.	ISO/TC 268 Sustainable development in communities	2019-05-00
ISO/DIS 37123	Sustainable cities and communities — Indicators for resilient cities	This International Standard defines and methodologies for a set of indicators on resilience in cities. This ISO is applicable to any city, municipality or local government that undertakes to measure ist performance in a comparable and verifiable manner, irrespective of size and location. Maintaining, enhancing and accelerating progress towards improved city services and quality of life is fundamental to the definition of a Resilient City, so this standard shall therefore be implemented in conjunction with ISO 37120.	ISO/TC 268 Sustainable development in communities	2018-11-00
ISO/TR 37150	Smart community infrastructures — Review of existing activities relevant to metrics	ISO/TR 37150:2014 provides a review of existing activities relevant to metrics for smart community infrastructures. In ISO/TR 37150:2014, the concept of smartness is addressed in terms of performance relevant to technologically implementable solutions, in accordance with sustainable development and resilience of communities, as defined in ISO/TC 268. ISO/TR 37150:2014 addresses community infrastructures such as energy, water, transportation, waste and information and communications technology (ICT). It focuses on the technical aspects of existing activities which have been published, implemented or discussed. Economic, political or societal aspects are not analysed in ISO/TR 37150:2014.	ISO/TC 268 Sustainable development in communities	2014-02-00
ISO/TS 37151	Smart community infrastructures — Principles and requirements for performance metrics	ISO/TS 37151:2015 gives principles and specifies requirements for the — definition, — identification, — optimization, and — harmonization	ISO/TC 268 Sustainable development in communities	2015-05-00

		of community infrastructure performance metrics, and gives recommendations for analysis, including — smartness, — interoperability, — synergy, — resilience, — safety, and — security of community infrastructures. Community infrastructures include, but are not limited to, energy, water, transportation, waste, and ICT. In ISO/TS 37151:2015, the concept of smartness is addressed in terms of performance relevant to technologically implementable solutions, in accordance with sustainable development and resilience of communities as defined in ISO/TC 268.		
CWA 17381	The Description and Assessment of Good Practices for Smart City solutions	This CEN Workshop Agreement (CWA) defines requirements to describe and assess good practices of Smart City Solutions. This document is intended to support the decision-making of smart cities in the interest of their citizens, and of those who advise them, such as companies providing products and services, consultants, and associations.	CEN European Committee for Standardisation	2019-02-00
ISO/IEC 30182	Smart city concept model — Guidance for establishing a model for data interoperability	ISO/IEC 30182:2017 describes, and gives guidance on, a smart city concept model (SCCM) that can provide the basis of interoperability between component systems of a smart city, by aligning the ontologies in use across different sectors. It includes: — concepts (e.g. ORGANISATION, PLACE, COMMUNITY, ITEM, METRIC, SERVICE, RESOURCE); and — relationships between concepts (e.g. ORGANISATION has RESOURCEs, EVENT at a PLACE). ISO/IEC 30182:2017 is aimed at organisations that provide services to communities in cities, and manage the resulting data, as well as decision-makers and policy developers in cities.1). It does not cover the data standards that are relevant to each concept in the SCCM and does not attempt to list or recommend the sources of identifiers and categorizations that cities map to the SCCM. The SCCM has been devised to communicate the meaning of data. It does not attempt to provide concepts to describe the metadata of a dataset, for example, validity and provenance of data. It	ISO/IEC JTC 1 ISO/IEC Joint Technical Commitee for Information Technology	2017-05-00

		covers semantic interoperability that is, defining the meaning of data, particularly from many sources. It does not cover other barriers to interoperability, some of which are described at 3.2.		
ITU-T Y Supplement 34	ITU-T Y.4000 series — Smart sustainable cities — Setting the stage for stakeholders' engagement	Supplement 34 to the ITU-T Y-series Recommendations is addressed to a broad audience of city decision makers and practitioners involved in the design and implementation of SSC. It is intended to be as general and inclusive as possible, applicable and relevant to any city, regardless of its size or location, in both developed and developing countries. The concepts and definitions presented in this Supplement are in alignment with the series of Supplements to the Y.4000 series.	ITU International Telecommunication Union	2016-01-00
ITU-T L.1600	Overview of key performance indicators in smart sustainable cities	Recommendation ITU-T Y.4900/L.1600 gives a general guidance to cities and provides an overview of key performance indicators (KPIs) in the context of smart sustainable cities (SSCs).	ITU International Telecommunication Union	2016-06-00
ITU-T L.1601/Y.4901	Key performance indicators related to the use of information and communication technology in smart sustainable cities	This Recommendation ITU-T L.1601 gives a general guidance to cities and provides the definitions of key performance indicators (KPIs) related to the use of information and communication technology (ICT) in the context of Smart Sustainable Cities (SSCs).	ITU International Telecommunication Union	2016-06-00
ITU-T Y.4902/L.1602	Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities	Recommendation ITU-T Y.4902/L.1602 gives a general guidance to cities and provides the definitions of key performance indicators (KPIs) related to the sustainability impact of information and communication technology (ICT) in the context of smart sustainable cities (SSCs).	ITU International Telecommunication Union	2016-06-00
PAS 184	Smart Cities. Developing project proposals for delivering smart city solutions. Guide	It gives practical guidance on how to develop project proposals for smart city solutions, using case studies to illustrate good practice in smart city procurement. The content reflects current good practice as identified by a broad range of public, private and voluntary sector practitioners engaged in developing smart city solutions.	British Standards Institution	2017-03-31

4.3.8. Standards under development

The following table lists standards related to the ARCH project that are currently under development. For some of them no detailed information is currently available.

Table 9: Standards from CEN/TC 346 Conservation of Cultural Heritage

Document No.	Title	Abstract
prEN 17121	Conservation of cultural heritage — Historic timber structures — Guidelines for the on-site assessment of load-bearing timber structures	This document gives guidelines on the criteria to be used for the on-site assessment of load-bearing timber structures in heritage buildings. It is intended for all those concerned with the conservation of heritage buildings which contain wooden elements, from the building owners or authorities who are responsible for them to the professionals employed. It should also help decision-making regarding the need for immediate measures. Its aim is to guarantee that condition survey and assessment provide the necessary data for historical analysis, structural safety assessment and planning of intervention works. This document is applicable to any kind of timber member and to any kind of historic timber structures. It is not applicable to timber members made of engineered wood based panels and glued laminated timber. This document provides a comprehensive procedure for the on-site assessment.
FprEN 15898	Conservation of cultural heritage — Main general terms and definitions	This document defines the main general terms used in the field of conservation of cultural heritage with particular attention to those terms which have wide use or significance.
FprEN 17135	Conservation of cultural heritage — Generale terms for describing the alterations of objects	This document defines terms used in the field of conservation of cultural heritage for the description of alteration of objects with particular attention to those terms which are applied to many types of objects. This document applies to all types of material changes that can be observed.
prEN 16141 rev	Conservation of cultural heritage — Guidelines for management of environmental conditions — Open storage facilities: definitions and characteristics of collection centres dedicated to the preservation and management of cultural heritage	This European Standard defines the characteristics of specific areas dedicated to the preservation, storage, management of, and access to collections. It lists the considerations that should be taken into account to achieve optimum storage and accessibility.

prEN 16163	Conservation of Cultural Heritage — Guidelines and procedures for choosing appropriate lighting for indoor exhibitions	This NWI proposes a review of CEN/TS-16163:2014 aimed at updating its contents to meet requirements for conversion in EN Standard.
prEN 17187	Conservation of Cultural Heritage — Characterization of mortars used in cultural heritage	This document specifies a methodology for the characterization of mortars by using the most appropriate analytical techniques on samples taken from cultural heritage structures and objects. This document contains guidelines for the selection of methods to determine mineralogical, textural, physical, chemical and mechanical properties of mortars used in cultural heritage structures and objects. This information is used to define mortar typology and to evaluate the mortar condition with respect to its conservation as well as for understanding of the ongoing deterioration processes.
prEN 17429	Conservation of cultural heritage — Procurement of conservation services and works	This document outlines the principles, processes and best practice for procuring conservation services and works for cultural heritage. This can embrace any conservation action or measure, whether it be a preventive measure, a remedial treatment, investigation, planning, policy, or project management, etc. The means of procuring such work will vary depending, among other things, on the scale of the work envisaged. This document is not intended to override or conflict with European and national legislation covering procurement. Rather, it is to be read alongside relevant regulations covering procurement and is technically specific to the conservation of cultural heritage. This document is intended to be used - by buyers or commissioners of conservation work (e.g. custodians, public or private individuals, collecting institutions, conservation specialists, conservation funding organisations etc.) and - by those individuals and enterprises seeking to carry out conservation work. It is not intended to be used by institutional custodians as a means of directing work to their own staff. NOTE In this document the term "object" is used for object, objects and collections.

Table 10: Standards from CEN/TC 391 Societal and citizen security

Document No.	Title	Abstract
FprCEN/TS 17091	Crisis management - Guidance for developing a strategic capability	Crises present unique challenges that can be dynamic, unpredictable and difficult to manage. To plug a gap in advice for private sector organisations, this document provides organisations with invaluable material on how to develop their crisis management capability. It will help strategic decision makers plan, implement, establish, operate, monitor, review, maintain and continually improve a crisis management capability.

Table 11: Standards from ISO/TC 292 Security and resilience

Document No.	Title	Abstract
ISO/NP 22300	Security and resilience — Vocabulary	There is no abstract available due to the current development stage.
ISO/FDIS 22301	Security and resilience — Business continuity management systems — Requirements	There is no abstract available due to the current development stage.
ISO/DIS 22313	Security and resilience — Business continuity management systems — Guidance	There is no abstract available due to the current development stage.
ISO/DIS 22328-1	Security and resilience — Emergency management — Part 1: General guidelines for the implementation of a community-based disaster early warning system	There is no abstract available due to the current development stage.
ISO/AWI 22329	Security and resilience — Emergency management — Guidelines for the use of social media in emergencies	There is no abstract available due to the current development stage.
ISO/AWI TS 22332	Security and resilience — Business continuity management systems -— - Guidance for developing business continuity procedures	There is no abstract available due to the current development stage.
ISO/WD 22340	Security and resilience — Protective security — Architecture, framework and guidelines	There is no abstract available due to the current development stage.

ISO/CD 22341	Security and resilience — Protective security — Guidance for security and crime prevention by urban design and management	There is no abstract available due to the current development stage.
ISO/AWI 22342	Security and resilience — Protective security — Guidelines for the development of a security plan for an organisation	There is no abstract available due to the current development stage.
ISO/DTR 22370	Security and resilience — Framework and principles for urban resilience	There is no abstract available due to the current development stage.
ISO/DIS 22383	Security and resilience — Authenticity, integrity and trust for products and documents — Guidelines and performance criteria for authentication solutions for material goods	There is no abstract available due to the current development stage.
ISO/DIS 22384	Security and resilience — Authenticity, integrity and trust for products and documents — Guidelines to establish and monitor a protection plan and its implementation	There is no abstract available due to the current development stage.
ISO/DIS 22392	Security and resilience — Community resilience — Guidelines for conducting peer reviews	There is no abstract available due to the current development stage.
ISO/DIS 22396	Security and resilience — Community resilience — Guidelines for information exchange between organisations	There is no abstract available due to the current development stage.

Table 12: Standards from ISO/TC 268 Sustainable cities and communities

Document No.	Title	Abstract
ISO/FDIS 37105	Sustainable cities and communities — Descriptive framework for cities and communities	There is no abstract available due to the current development stage.
ISO/PRF TS 37107	Sustainable cities and communities — Maturity framework for sustainable and smart-enabled communities	There is no abstract available due to the current development stage.
ISO/AWI 37108	Sustainable cities and communities — Business districts — Guidance for practical local implementation of ISO 37101	There is no abstract available due to the current development stage.
ISO/FDIS 37123	Sustainable cities and communities — Indicators for resilient cities	There is no abstract available due to the current development stage.
ISO/FDIS 37155-1	Framework for integration and operation of smart community infrastructures — Part 1: Opportunities and challenges from interactions in smart community infrastructures from all aspects through the life-cycle	There is no abstract available due to the current development stage.
ISO/CD 37155-2	Framework for integration and operation of smart community infrastructures — Part 2: Holistic approach and the strategy for development, operation and maintenance of smart community infrastructures	There is no abstract available due to the current development stage.

ISO/DIS 37156	Smart community infrastructures — Guidelines on data exchange and sharing for smart community infrastructures	There is no abstract available due to the current development stage.
ISO/DIS 37162	Smart community infrastructures — Smart transportation for newly- developing areas	There is no abstract available due to the current development stage.

Table 13: Standardsfrom ISO/TC 59 Buildings and civil engineering works

Document No.	Title	Abstract
ISO/DIS 20887	Sustainability in buildings and civil engineering works - Design for disassembly and adaptability — Principles, requirements and guidance	There is no abstract available due to the current development stage.

Table 14: Standards from ISO/TC 20 Aircraft and space vehicles

Document No.	Title	Abstract
ISO/DIS 21384-1	Unmanned aircraft systems — Part 1: General specification	There is no abstract available due to the current development stage.
ISO/DIS 21384-3	Unmanned aircraft systems — Part 3: Operational procedures	There is no abstract available due to the current development stage.
ISO/DIS 21384-4	Unmanned aircraft systems — Part 4: Terms and definitions	There is no abstract available due to the current development stage.
ISO/DIS 21895	Categorisation and classification of civil unmanned aircraft systems	There is no abstract available due to the current development stage.

4.3.9. Standards – Recommended by partners

The following table lists standards added by individual ARCH partners after the formal standards identification process

Table 15: ***Standards recommended by partners***

Document No.	Title	Abstract	Committee	Date of publication
IEC 31010	Risk management — Risk assessment techniques	IEC 31010:2019 is published as a double logo standard with ISO and provides guidance on the selection and application of techniques for assessing risk in a wide range of situations. The techniques are used to assist in making decisions where there is uncertainty, to provide information about particular risks and as part of a process for managing risk. The document provides summaries of a range of techniques, with references to other documents where the techniques are described in more detail.	ISO/TC 262 Risk management	2009-06-00
ISO 31000	Risk management — Guidelines	ISO 31000:2018 describes a framework and a process for managing risk. It can be used by any organisation regardless of its size, activity or sector. Using ISO 31000 can help organisations increase the likelihood of achieving objectives, improve the identification of opportunities and threats and effectively allocate and use resources for risk treatment.	ISO/TC 262 Risk management	2018-02-00
ISO/TR 31004	Risk management — Guidance for the implementation of ISO 31000	ISO/TR 31004:2013 provides guidance for organisations on managing risk effectively by implementing ISO 31000:2009. It provides a structured approach for organisations to transition their risk management arrangements in order to be consistent with ISO 31000, in a manner tailored to the characteristics of the organization.	ISO/TC 262 Risk management	2013-10-00
EN 1998-1	Design of structures for earthquake resistance — Part 1: General rules, seismic actions and rules for buildings	EN 1998-1 applies to the design of buildings and civil engineering works in seismic regions. EN 1998-1 contains the basic performance requirements and compliance criteria applicable to buildings and civil engineering works in seismic regions. EN 1998-1 gives the rules for the representation of seismic actions and for their combination with other actions. Furthermore it contains general design rules relevant specifically to buildings which are material related.	CEN/TC 250/SC 8 Earthquake resistance design of structures	2004-12-00

EN 1998-2	Design of structures for earthquake resistance — Part 2: Bridges	This standard covers the seismic design of bridges in which the horizontal seismic actions are mainly resisted through bending of the piers or at the abutments; i.e. of bridges composed of vertical or nearly vertical pier systems supporting the traffic deck superstructure. It is also applicable to the seismic design of cable-stayed and arched bridges, although its provisions should not be considered as fully covering these cases.	CEN/TC 250/SC 8 Earthquake resistance design of structures	2005-11-00
EN 1998-3	Design of structures for earthquake resistance — Part 3: Assessment and retrofitting of buildings	The standard contents rules for the evaluation of the seismic performance of existing structures, the selection of corrective measures and the design of repair and/or strengthening measures with additional considerations for monuments and historic buildings.	CEN/TC 250/SC 8 Earthquake resistance design of structures	2005-06-00
EN 1998-4	Design of structures for earthquake resistance — Part 4: Silos, tanks and pipelines	This standard covers aspects of seismic design specific to pipelines and tanks on the basis of EN 1998-1 "Eurocode 8 - Design of structures for earthquake resistance - Part 1: General rules, seismic actions and rules for buildings". The design of these constructions refers to systems and plants with common risk to health, life and environment. For greater risk and for more complex structures further considerations on national level may be appropriate.	CEN/TC 250/SC 8 Earthquake resistance design of structures	2006-07-00
EN 1998-5	Design of structures for earthquake resistance Part 5: Foundations, retaining structures and geotechnical aspects	Additional rules for the design of various foundation systems, earth retaining structures and soil-structure interaction under seismic actions in conjunction with the structural design of buildings, bridges, towers, masts, chimneys, silos, tanks and pipelines.	CEN/TC 250/SC 8 Earthquake resistance design of structures	2004-11-00

EN 1998-6	Design of structures for earthquake resistance — Part 6: Towers, masts and chimneys	This standard contains design rules for the earthquake resistant design of tall, slender structures as e.g. towers, masts, and industrial chimneys.	CEN/TC 250/SC 8 Earthquake resistance design of structures	2005-06-00
ISO 29481-2	Building information models — Information delivery manual — Part 2: Interaction framework	This part of ISO 29481 specifies a methodology and format for describing coordination acts between actors in a building construction project during all life cycle stages. It therefore specifies a methodology that describes an interaction framework, an appropriate way to map responsibilities and interactions that provides a process context for information flow, a format in which the interaction framework should be specified. This part of ISO 29481 is intended to facilitate interoperability between software applications used in the construction process, to promote digital collaboration between actors in the building construction process, and to provide a basis for accurate, reliable, repeatable, and high-quality information exchange.	CEN/TC 442 Building Information Modelling (BIM)	2012-12-00
ISO 16739	Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries	ISO 16739:2013 specifies a conceptual data schema and an exchange file format for Building Information Model (BIM) data. The conceptual schema is defined in EXPRESS data specification language. The standard exchange file format for exchanging and sharing data according to the conceptual schema is using the Clear text encoding of the exchange structure. Alternative exchange file formats can be used if they conform to the conceptual schema. ISO 16739:2013 represents an open international standard for BIM data that is exchanged and shared among software applications used by the various participants in a building construction or facility management project. ISO 16739:2013 consists of the data schema, represented as an EXPRESS schema specification, and reference data, represented as definitions of property and quantity names and descriptions. A subset of the data schema and referenced data is referred to as a model view definition. A particular model view definition is defined to support one or many recognized workflows in the building construction and facility management industry sector. Each workflow identifies data exchange requirements for software applications. Conforming software applications need to identity the model view definition they conform to.	CEN/TC 442 Building Information Modelling (BIM)	2018-11-00

ISO 12006-3	Building construction — Organisation of information about construction works — Part 3: Framework for object-oriented information	This part of ISO 12006 specifies a language-independent information model which can be used for the development of dictionaries used to store or provide information about construction works. It enables classification systems, information models, object models and process models to be referenced from within a common framework.	CEN/TC 442 Building Information Modelling (BIM)	2007-04-00
ISO 19650-1	Organisation and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling — Part 1: Concepts and principles	This document outlines the concepts and principles for information management at a stage of maturity described as "building information modelling (BIM) according to the ISO 19650 series". This document provides recommendations for a framework to manage information including exchanging, recording, versioning and organizing for all actors. This document is applicable to the whole life cycle of any built asset, including strategic planning, initial design, engineering, development, documentation and construction, day-to-day operation, maintenance, refurbishment, repair and end-of-life. This document can be adapted to assets or projects of any scale and complexity, so as not to hamper the flexibility and versatility that characterize the large range of potential procurement strategies and so as to address the cost of implementing this document.	CEN/TC 442 Building Information Modelling (BIM)	2018-01-00
ISO 19650-2	Organisation and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling — Part 2: Delivery phase of the assets	This document specifies requirements for information management, in the form of a management process, within the context of the delivery phase of assets and the exchanges of information within it, using building information modelling. This document can be applied to all types of assets and by all types and sizes of organisations, regardless of the chosen procurement strategy.	CEN/TC 442 Building Information Modelling (BIM)	2018-12-00

ISO 29481-1	Building information models — Information delivery manual — Part 1: Methodology and format	ISO 29481-1:2016 specifies a methodology that links the business processes undertaken during the construction of built facilities with the specification of information that is required by these processes, and - a way to map and describe the information processes across the life cycle of construction works. ISO 29481-1:2016 is intended to facilitate interoperability between software applications used during all stages of the life cycle of construction works, including briefing, design, documentation, construction, operation and maintenance, and demolition. It promotes digital collaboration between actors in the construction process and provides a basis for accurate, reliable, repeatable and high-quality information exchange.	CEN/TC 442 Building Information Modelling (BIM)	2016-05-00

5. ARCH project issues and connections

The results in this deliverable will be mainly used for the implementation of T2.6 'Standardisation activities'. Additionally the Work Package 2 representatives such as DIN will attend most of the upcoming ARCH meetings within other Work Packages to gather information that will feed into the ongoing standardisation process, to spread awareness regarding ARCH standardisation activities and to provide additional input in the tools, methods, co-creation process and pathway development process within Work Packages 3 to 6. The standards and standardisation activities of this report will also be further observed, extended and analysed throughout the project's lifespan in order to support the future standardisation activities within ARCH. It is of great importance to reflect the state of the art standards and to incorporate the activities, results and main outcomes of the ARCH project into the European standards landscape.

6. Conclusion

This report presents the existence of a large number of standards and points to a variety of standardisation activities taking place especially at European and International level that cover the topics of crisis management, urban resilience, heritage and climate change and thus are relevant for the ARCH project. The comprehensive list of standards shows that the relevant standardisation activities are horizontally spread due to the interconnection between several thematic topics. In summary, it can be said that the result of the standardization analysis on the resilience of historic areas benefits from a large number of standards that encompass various aspects and cross-connections.

It is also noteworthy that the number of standards on 'Climate change', 'Management systems', 'Resilience' and 'Cities and communities', and 'Heritage' is relatively balanced. In this context, the categories 'Techniques' and 'Drones' are left out of the equation as the scope of the content is very limited to the city and heritage context. However, the standards currently being developed and the increasing efforts to standardise these issues show that there is a need for these standards and that the standards development organisations (SDOs) are addressing the issues in this area.

Through the work carried out under T7.1, the ARCH partners and project partners recognised the importance of standards and their justification and need for further dissemination and awareness of standardisation activities, in particular in the areas of resilience, crisis management and vulnerability assessment in the context of climate change. All standardisation efforts to improve urban resilience can lead to significant benefits in reducing climatic hazards and adverse events. Not only the existence of guides and requirements is crucial, but also their implementation at community or city level. The city representatives need to be informed and to be aware of existing standards in relation to main challenges and problematic issues their cities may face; in this way they may be able to adopt and use them when it comes to decision making processes and planning for the resilience of cultural heritage sites.

7. List of Figures

8. List of Tables

9. References

Not applicable for this report.

10. Annex – Key resources

For this report expertise about standardisation was provided by the following brochures:

Title: An Introduction to standardisation

- Author: published by DIN
- Weblink: An introduction to standardization
- Year of publication: 2016
- Brief summary about the content: How to take actively part in the standardization process as a company
- Why the resource is useful to the ARCH project: Project results need to be transferred into a standardization document
- Why the resource is useful in terms of heritage assets and resilience: It is useful to any kind of standard

Title: How to write a standard

- Author: published by ISO
- Weblink: How to write a standard
- Year of publication: 2016
- Brief summary about the content: designed to help people write clear, concise and user-friendly International Standards
- Why the resource is useful to the ARCH project: Project results need to be transferred into a standardization document
- Why the resource is useful in terms of heritage assets and resilience: It is useful to any kind of international standard

Title: CEN Guide 29

- Author: published by CEN
- Weblink: CEN Guide 29
- Year of publication: 2014
- Brief summary about the content: details the characteristics and the development processes of the 'CEN/CENELEC Workshop Agreement'
- Why the resource is useful to the ARCH project: Project results need to be transferred into a standardization document
- Why the resource is useful in terms of heritage assets and resilience: It is useful to any kind of CWA