Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide

Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide **derakane epoxy vinyl ester resins chemical resistance guide** is essential for engineers, fabricators, and chemical processing professionals who want to select the right materials for harsh environments. These resins are widely known for their outstanding durability and resistance to corrosive chemicals, making them a popular choice in industries ranging from marine to chemical storage. In this guide, we'll explore the chemical resistance properties of Derakane epoxy vinyl ester resins, why they are preferred, and practical advice on their application, helping you make informed decisions when working with these versatile materials.

Understanding Derakane Epoxy Vinyl Ester Resins

Derakane is a brand name representing a family of epoxy vinyl ester resins, developed to combine the superior mechanical properties of epoxies with the chemical resistance and processability of vinyl esters. These resins cure into highly crosslinked networks that provide excellent toughness, adhesion, and resistance to degradation by chemicals. Unlike polyester resins, Derakane epoxy vinyl esters offer enhanced resistance to solvents,

acids, alkalis, and elevated temperatures. This makes them ideal for use in environments where exposure to aggressive chemicals is routine, such as in chemical storage tanks, pipes, and industrial linings.

What Makes Derakane Resins Chemically Resistant?

At a molecular level, the chemical resistance of Derakane epoxy vinyl ester resins comes from their unique chemical structure: - **Epoxy backbone:** Provides strong covalent bonds that improve mechanical strength and chemical inertness. - **Vinyl ester groups:** Offer flexibility and resistance to hydrolysis and oxidation. - **Crosslinked network:** Once cured, the resin forms a densely crosslinked polymer that limits the penetration of chemicals. This combination enables Derakane resins to withstand harsh chemicals, including strong acids and bases, better than many traditional resins.

Chemical Resistance Properties

When choosing materials for chemical exposure, understanding how Derakane epoxy vinyl ester resins interact with various substances is crucial. These resins exhibit excellent resistance to a broad range of chemicals, but performance can vary depending on concentration, temperature, and exposure duration.

Resistance to Acids and Alkalis

Derakane resins are well-regarded for their resilience against many acidic and alkaline solutions: - **Strong acids:** Hydrochloric acid, sulfuric acid, and nitric acid at moderate concentrations are

generally well tolerated. However, extremely concentrated acids or elevated temperatures can reduce resistance. - **Alkalis:** Sodium hydroxide (caustic soda) and potassium hydroxide are commonly encountered in industrial processes. Derakane resins resist these bases effectively, making them suitable for caustic storage and transport. Understanding the limits of chemical concentration and temperature is key. For instance, prolonged exposure to hot, concentrated acids may require specialized resin formulations or protective coatings.

Solvent Resistance

Solvent resistance is another important consideration, especially where cleaning agents or organic solvents come into contact with resin surfaces. - **Alcohols and ketones:** Derakane epoxy vinyl ester resins generally resist alcohols like methanol and ethanol, as well as ketones such as acetone. - **Aromatic hydrocarbons:** Benzene, toluene, and xylene are partially resisted, but prolonged or high-temperature exposure can affect the resin integrity. - **Chlorinated solvents:** Chemicals like trichloroethylene and methylene chloride tend to be more aggressive and may cause swelling or degradation over time. In applications involving solvents, it’s advisable to consult detailed chemical resistance charts or conduct compatibility tests under actual service conditions.

Water and Moisture Resistance

Water resistance is a notable feature of Derakane epoxy vinyl ester resins. They demonstrate low water absorption and good dimensional stability, which is critical in marine applications and in environments with high humidity or immersion. - **Saltwater exposure:** These resins withstand seawater and brine solutions without significant degradation, making them popular for boat hulls,

offshore platforms, and desalination equipment. - **Freshwater:** Exposure to fresh water does not compromise mechanical properties, which ensures longevity in potable water systems or storage tanks.

Factors Influencing Chemical Resistance

While Derakane epoxy vinyl ester resins are inherently chemically resistant, several factors can influence their performance:

Temperature

Chemical resistance often decreases as temperature rises. Elevated temperatures can accelerate chemical reactions that degrade resin networks or cause softening. - Operating temperatures should be considered when selecting resin grades. - Some Derakane formulations are optimized for higher temperature resistance, suitable for process environments exceeding 150°C.

Chemical Concentration and Exposure Time

The concentration of chemicals and duration of exposure impact resistance: - Short-term contact with aggressive chemicals may not damage the resin significantly. - Continuous immersion or long-term exposure to concentrated chemicals can lead to swelling, cracking, or erosion. It’s important to assess the specific conditions of use before finalizing material selection.

Resin Formulation and Curing

Different Derakane grades vary in their chemical resistance properties based on their chemical makeup and curing process: - Some formulations include additives or modifiers to enhance resistance to specific chemicals. - Proper curing ensures a fully crosslinked network, which maximizes chemical resistance. Consulting technical datasheets and working with resin suppliers can help identify the best resin variant for your application.

Applications Benefiting from Derakane Epoxy Vinyl Ester Resins

Given their robust chemical resistance, Derakane epoxy vinyl ester resins are favored in diverse industries:

1. **Chemical storage tanks:** Their resistance to acids and alkalis prevents corrosion and leakage.
2. **Piping and fittings:** Durable in transporting aggressive fluids in chemical plants.
3. **Marine industry:** Protects hulls and structures from saltwater corrosion and biofouling.
4. **Wastewater treatment:** Handles exposure to various contaminants without degradation.
5. **Coatings and linings:** Provides a protective barrier against chemical attack on metal surfaces.

These applications highlight the versatility and reliability of Derakane resins in challenging environments.

Tips for Maximizing Chemical Resistance

To get the most out of Derakane epoxy vinyl ester resins' chemical resistance, consider these practical tips:

1. **Ensure proper curing:** Follow manufacturer guidelines on temperature and time to achieve optimal polymer crosslinking.
2. **Use compatible additives:** Incorporate fillers or inhibitors that enhance resistance to specific chemicals.
3. **Regular inspection:** Monitor equipment for early signs of chemical attack or mechanical wear.
4. **Design for maintenance:** Allow for easy access and replacement of resin-lined components when necessary.
5. **Test under actual conditions:** Conduct lab or field tests simulating real-world chemical exposure before full-scale use.

By adhering to these guidelines, the longevity and effectiveness of Derakane epoxy vinyl ester resin applications can be significantly improved.

Comparing Derakane Resins to Other Materials

When considering chemical resistance, it's useful to compare Derakane epoxy vinyl ester resins with alternatives like polyester resins, epoxies, or thermoplastics. - **Polyester resins:** More economical but generally less resistant to harsh chemicals and heat. - **Standard epoxies:** Excellent adhesion and mechanical strength but may be less flexible and harder to process. - **Thermoplastics (e.g., PVC, PTFE):** High chemical resistance but limited by temperature stability and mechanical properties. Derakane epoxy

vinyl ester resins often strike the best balance between chemical resistance, mechanical performance, and ease of fabrication, making them a top choice for many industrial applications. Exploring the chemical resistance of Derakane epoxy vinyl ester resins reveals why these materials are trusted in demanding environments. Their unique chemistry, combined with proper application and maintenance, provides reliable protection against a wide range of aggressive chemicals. Whether you're designing a chemical storage solution or specifying materials for marine construction, understanding the nuances of Derakane resin resistance ensures your projects stand the test of time.

Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide **derakane epoxy vinyl ester resins chemical resistance guide** serves as an essential resource for engineers, chemists, and industry professionals seeking to understand the performance capabilities of these advanced thermosetting polymers in harsh chemical environments. Known for their exceptional mechanical strength, corrosion resistance, and durability, Derakane epoxy vinyl ester resins occupy a critical niche in applications ranging from chemical storage tanks to marine and aerospace components. This article delves into the chemical resistance profile of Derakane resins, examining their behavior against various aggressive substances, and provides a nuanced understanding of their suitability across different industrial contexts.

Understanding Derakane Epoxy Vinyl Ester Resins

Derakane epoxy vinyl ester resins are a class of unsaturated polyester resins modified with epoxy functionality, combining the advantageous properties of both epoxy and vinyl ester chemistries. Manufactured primarily by companies like Ashland, these resins are

prized for their excellent adhesion, toughness, and resistance to hydrolysis and chemical attack. The chemical resistance of Derakane resins is influenced by their molecular structure, degree of crosslinking, and curing process, which together determine how well the material withstands exposure to acids, alkalis, solvents, and other corrosive agents.

Chemical Resistance Characteristics

The hallmark of Derakane epoxy vinyl ester resins lies in their broad chemical resistance spectrum. Their molecular backbone, enriched with epoxy groups and vinyl esters, offers enhanced resistance to hydrolysis and oxidative degradation compared to standard polyester resins. This makes them particularly suitable for environments where exposure to strong acids (such as sulfuric and hydrochloric acids) and aggressive solvents is routine. However, the extent of resistance can vary depending on factors such as concentration, temperature, and exposure duration. For example, Derakane resins exhibit excellent resistance to dilute acids and alkalis but may degrade faster when subjected to concentrated caustic solutions at elevated temperatures. Similarly, prolonged exposure to ketones and aromatic hydrocarbons might lead to swelling or softening, necessitating careful selection based on the specific application.

Comparative Chemical Resistance: Derakane vs. Other Resins

When weighing Derakane epoxy vinyl ester resins against other common resin systems—such as standard unsaturated polyester

resins or pure epoxy resins—their chemical resistance profile often stands out. Traditional polyester resins tend to be vulnerable to hydrolysis and chemical attack, especially under acidic or alkaline conditions. Epoxy resins, while chemically resistant, can be brittle and lack the flexibility needed for some applications. Derakane resins blend the toughness of epoxy with the flexibility and chemical resistance of vinyl esters, resulting in a balanced material that often outperforms either resin alone. For instance, in applications requiring resistance to sulfuric acid at varying concentrations, Derakane typically exhibits superior long-term stability compared to standard polyesters. Moreover, their resistance to water absorption and osmotic blistering surpasses many epoxies, making them a prime choice for marine and corrosive chemical environments.

Performance in Specific Chemicals

1. **Acids:** Derakane resins show excellent resistance to dilute and moderate concentrations of acids like sulfuric, hydrochloric, and nitric acid. At high concentrations, especially above 50%, and elevated temperatures, some degradation may occur over extended exposure periods.
2. **Alkalis:** Moderate resistance to alkaline solutions is typical, but concentrated caustics (e.g., sodium hydroxide above 30%) can cause resin swelling and eventual degradation, particularly under heat stress.
3. **Solvents:** Alcohols and esters generally have minimal effect on Derakane resins, while exposure to ketones and aromatic hydrocarbons should be limited, as these can induce softening or swelling.
4. **Water and Steam:** High resistance to hydrolytic degradation makes Derakane resins suitable for wet environments, including immersion applications and steam exposure at moderate temperatures.

Factors Influencing Chemical Resistance

Understanding the chemical resistance of Derakane epoxy vinyl ester resins requires considering variables beyond the resin's intrinsic properties. The cured resin’s crosslink density plays a pivotal role; higher crosslinking generally enhances resistance but may reduce flexibility. Additionally, the presence of fillers, reinforcements, and additives can modify the resin’s behavior under chemical attack. Environmental factors such as temperature and mechanical stress further influence performance. Elevated temperatures accelerate chemical reactions, potentially leading to faster degradation. Similarly, cyclic mechanical loading combined with chemical exposure can exacerbate material fatigue and crack formation.

Testing and Standards

To accurately assess chemical resistance, standardized testing methodologies are employed, including immersion testing, chemical exposure cycles, and mechanical property evaluation post-exposure. ASTM standards such as ASTM D543 (Resistance of Plastics to Chemical Reagents) provide frameworks for systematic evaluation. Data from such tests help in predicting service life and guiding material selection tailored to specific chemical environments.

Applications Leveraging

Derakane’s Chemical Resistance

The robust chemical resistance of Derakane epoxy vinyl ester resins makes them indispensable in sectors requiring durable materials resistant to corrosive media.

1. **Chemical Processing Equipment:** Storage tanks, pipes, and liners exposed to acidic or alkaline chemicals benefit from Derakane’s resistance to corrosion and hydrolysis.
2. **Marine Industry:** Derakane resins’ resistance to seawater, salt spray, and biofouling supports their use in boat hulls, offshore structures, and underwater components.
3. **Aerospace and Automotive:** Components subjected to fuel, lubricants, and environmental chemicals leverage the mechanical strength combined with chemical durability of these resins.
4. **Infrastructure:** Bridges and chemical containment structures utilize Derakane for its longevity and minimal maintenance requirements under chemical exposure.

Pros and Cons of Derakane Epoxy Vinyl Ester Resins in Chemical Environments

1. **Pros:**
    1. Excellent resistance to a wide range of chemicals including acids and alkalis.
    2. Superior mechanical properties and toughness compared to standard polyesters.
    3. Good resistance to hydrolysis and environmental degradation.
    4. Versatile curing options allowing tailored performance.
2. **Cons:**
    1. Potential vulnerability to concentrated caustic solutions at

high temperatures.
2. Susceptibility to swelling in solvents like ketones and aromatic hydrocarbons.
3. Higher cost compared to conventional polyester resins.

Optimizing Chemical Resistance in Application

Maximizing the chemical resistance of Derakane epoxy vinyl ester resins involves strategic formulation and processing. Selecting the appropriate resin grade and curing agent, controlling cure temperature and time, and incorporating chemical-resistant fillers can enhance performance. Additionally, surface treatments and protective coatings applied post-curing may extend service life in extremely aggressive environments. Engineers and materials scientists often conduct compatibility testing under simulated service conditions to validate the resin's performance before deployment. Such assessments help mitigate risks associated with unexpected chemical interactions or environmental stressors. The **derakane epoxy vinyl ester resins chemical resistance guide** continues to evolve as new formulations emerge and industries demand higher standards of durability. Its role in guiding material selection and application design remains pivotal to ensuring safety, cost-effectiveness, and longevity in chemically demanding settings.

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Questions & Answers About derakane epoxy vinyl ester resins chemical resistance guide

No	Question	Answer
1	What is Derakane epoxy vinyl ester resin?	Derakane epoxy vinyl ester resin is a type of thermosetting polymer known for its excellent chemical resistance, mechanical strength, and durability, commonly used in corrosion-resistant applications such as chemical storage tanks and piping.
2	How does Derakane epoxy vinyl ester resin perform against acids?	Derakane epoxy vinyl ester resins generally exhibit excellent resistance to a wide range of acids, including sulfuric, hydrochloric, and nitric acids, especially at moderate concentrations and temperatures.
3	Is Derakane epoxy vinyl ester resin resistant to alkalis?	Yes, Derakane epoxy vinyl ester resins show good resistance to alkalis like sodium hydroxide and potassium hydroxide, although resistance may decrease at higher concentrations and elevated temperatures.
4	Can Derakane epoxy vinyl ester resin withstand solvents?	Derakane epoxy vinyl ester resins have good chemical resistance to many solvents such as ketones, esters, and alcohols, but some aggressive solvents like aromatic hydrocarbons and chlorinated solvents may cause degradation over time.

5	What factors affect the chemical resistance of Derakane epoxy vinyl ester resins?	Chemical resistance depends on factors such as resin formulation, curing process, exposure temperature, chemical concentration, and duration of exposure.
6	Are there specific Derakane resin grades designed for enhanced chemical resistance?	Yes, Derakane offers various grades of epoxy vinyl ester resins tailored for specific chemical environments, including improved resistance to acids, alkalis, and solvents.
7	How should one select the right Derakane resin for a particular chemical environment?	Selection should be based on the chemical resistance guide provided by the manufacturer, considering factors like chemical type, concentration, temperature, and exposure time, and consulting technical datasheets or experts if needed.
8	Where can I find the Derakane epoxy vinyl ester resins chemical resistance guide?	The chemical resistance guide is typically available on the manufacturer's website or in product technical datasheets provided by producers such as Ashland, which offers detailed compatibility charts and recommendations.

derakane resin properties, vinyl ester resin chemical resistance, epoxy vinyl ester corrosion resistance, derakane vinyl ester applications, chemical compatibility vinyl ester, derakane resin datasheet, epoxy vinyl ester durability, chemical resistance chart vinyl ester, derakane resin guide, vinyl ester resin performance

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Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide eBooks serve as dependable reference materials for long-term use.

This environmental benefit aligns with broader digital transformation initiatives.

Logical sequencing reduces confusion.

Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide eBooks support continuous professional and personal development.

By offering structured content, Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide eBooks help learners build foundational knowledge before advancing to more complex topics.

Learners using Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide eBooks often report improved focus due to the organized presentation of information.

Many learners report improved focus when using Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide eBooks due to structured presentation.

Organizing Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide

Organizing Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide in digital form is an essential step to ensure long-term usability, efficiency, and easy access. As your digital library grows, unorganized files can quickly become difficult to manage, leading to wasted time searching for documents and potential loss of important information. A well-structured organization system helps you maintain control over your collection and improves productivity.

One of the simplest and most effective methods of organization is

using clearly labeled folders. Create a main folder dedicated to Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide and divide it into subfolders based on categories such as subject, author, year, edition, or format. For example, you might organize folders by topics, academic level, or personal vs professional use. Consistent folder structures make navigation intuitive and reduce confusion.

File naming conventions play a crucial role in organization. Instead of generic file names, use descriptive and consistent naming formats. Including details such as title, author, version, and date can make files easier to identify at a glance. For example, using a format like “Title_Author_Edition_Year.pdf” ensures clarity and avoids duplicate confusion. Consistency is key—choose a naming system and apply it uniformly across all Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide files.

Tagging files is another powerful organizational strategy. Many operating systems and cloud storage platforms support file tags or labels. Tags allow you to categorize Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide across multiple dimensions without duplicating files. For example, a single document can be tagged as “study,” “reference,” “important,” or “exam prep.” This makes retrieval faster when searching your library.

For collections involving multiple volumes or editions, version control is essential. Keeping track of revisions ensures that you always know which version is the most current or authoritative. You can use version numbers in file names or create a separate folder for archived editions. This practice is especially important for academic, technical, or professional Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide materials that may be updated regularly.

Using cloud storage for organization

Cloud storage services such as Google Drive, Dropbox, and OneDrive offer advanced tools for organizing Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide. These platforms allow folder hierarchies, tagging, search functionality, and cross-device access. Cloud storage also provides automatic backups, reducing the risk of data loss due to device failure.

Search functionality within cloud platforms is particularly valuable. Many services can search not only file names but also text within PDFs, making it easy to locate specific content inside Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide documents. This feature saves significant time, especially when working with large libraries or research materials.

Sharing controls in cloud storage further enhance organization. You can manage access permissions, track shared links, and maintain privacy. This is useful when collaborating with others or distributing selected Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide files while keeping the rest of your library private.

Offline Access

Offline access is one of the most important advantages of digital copies of Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide. Downloading files for offline reading ensures uninterrupted access regardless of internet availability. This is especially useful during travel, commuting, or in locations with limited or unreliable connectivity.

Most eBook platforms and cloud storage services allow users to mark files for offline access. Once downloaded, Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide can be read, annotated, and bookmarked without an active internet connection.

Changes made offline are often synced automatically once the device reconnects to the internet, ensuring continuity across devices.

Syncing devices enhances the offline experience. When your devices are connected to the same account, progress, bookmarks, highlights, and notes can be synchronized seamlessly. This means you can start reading Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide on one device and continue on another without losing your place. Synchronization is particularly valuable for users who switch between smartphones, tablets, and computers.

To optimize offline access, it is important to manage storage space effectively. Large PDF libraries can consume significant storage, especially on mobile devices. Regularly reviewing downloaded files and removing those no longer needed helps maintain sufficient space while keeping essential Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide materials available offline.

Backup strategies for offline libraries

Even with offline access, backups remain essential. Maintaining copies of your Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide library on external drives or secondary cloud accounts provides additional protection against data loss. Periodic backups ensure that your organized collection remains safe and recoverable in case of device failure or accidental deletion.

Interactive Elements

Some digital versions of Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide go beyond static text by incorporating interactive elements designed to enhance engagement and retention. These features transform traditional reading into a more dynamic and immersive experience, particularly for educational and

instructional content.

Interactive elements may include multimedia such as embedded audio, video explanations, animations, or hyperlinks to additional resources. These features provide context, demonstrations, and real-world examples that support deeper understanding. For learners, multimedia content can make complex topics easier to grasp and more memorable.

Quizzes and exercises are another common interactive feature. These elements allow readers to test their understanding of Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide content immediately after reading. Interactive quizzes provide instant feedback, reinforcing learning and helping identify areas that need further review. This approach is especially effective for students, trainees, and self-learners.

Some interactive Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide editions also include clickable tables of contents, internal navigation links, and progress indicators. These tools improve usability by allowing readers to move quickly between sections and track their progress. Enhanced navigation is particularly valuable for long or complex documents.

Device and platform compatibility

Interactive features may require specific apps or platforms to function properly. Not all PDF readers or eBook apps support advanced multimedia or interactive elements. Before downloading or purchasing an interactive version of Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide, it is important to verify compatibility with your devices and preferred reading software.

Interactive content may also increase file size and resource usage.

Devices with limited storage or processing power may experience slower performance. Understanding these requirements helps ensure a smooth reading experience without technical issues.

Balancing interactivity and focus

While interactive elements enhance engagement, moderation is important. Too many distractions can interrupt reading flow and reduce concentration. Choosing interactive Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide editions that balance content and features ensures that interactivity supports learning rather than detracting from it.

Some readers prefer to disable certain interactive features or use simplified reading modes when focusing on deep study. The flexibility to customize the reading experience allows users to adapt Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide to different contexts, such as quick review versus in-depth learning.

Best practices for managing interactive Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide

- Keep interactive files organized separately if they require specific apps or platforms. - Test interactive features before relying on them for study or teaching. - Ensure offline availability if interactive content is needed without internet access. - Maintain updated software to support multimedia and security features. - Balance interactive use with focused reading sessions.

Long-term organization strategies

As your collection of Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide grows, periodically reviewing and reorganizing your library helps maintain efficiency. Removing outdated files, updating versions, and refining folder structures keeps your system clean and functional. Long-term organization is not a one-time task

but an ongoing process that evolves with your needs.

Final thoughts on organizing Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide

Effective organization, reliable offline access, and thoughtful use of interactive elements significantly enhance the value of digital Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide. By implementing structured folders, consistent naming, cloud synchronization, and backup strategies, users can maintain a clean and accessible library. Interactive features further enrich the reading experience when used appropriately. Together, these practices ensure that Derakane Epoxy Vinyl Ester Resins Chemical Resistance Guide remains easy to manage, enjoyable to read, and highly effective as a long-term digital resource.