

DESIGN OF WATER SUPPLY PIPE NETWORKS SOLUTION MANUAL

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How to design a water distribution network? This method consists of assuming a distribution of flow in the network in such a way that the principle of continuity is satisfied at each junction. A correction to these assumed flows is then computed successively for each pipe loop in the network, until the correction is reduced to an acceptable magnitude.

How to design a pipe network? The design of a pipe network requires careful analysis of the hydraulic performance, which depends on factors such as pipe diameter, length, roughness, elevation, pressure, flow rate, and head loss.

How to design water supply pipe?

What is the optimal design of a water distribution network? Optimal design of a water distribution network is formulated as a two-stage decomposition model. The master (outer) problem is nonsmooth and nonconvex, while the inner problem is linear. A semi-infinite linear dual problem is presented, and an equivalent finite linear problem is developed.

What are the 4 types of water distribution networks? There are four types of municipal water distribution systems: dead-end, grid iron, circular, and radial. The dead-end water distribution system is where the main pipeline runs through the central part of an area. It is also referred to as the tree distribution system.

What software is used for water distribution networking? EPANET is a software application used throughout the world to model water distribution systems.

What is the formula for pipe design? $P = (2 S t / D) \times F \times E \times T$ P = Design pressure in pounds per square inch (kPa) gauge. S = Yield strength in pounds per square inch (kPa) determined in accordance with § 192.107. D = Nominal outside diameter of the pipe in inches (millimeters). t = Nominal wall thickness of the pipe in inches (millimeters).

What are the two types of pipe networks? There are, in general, four different types of pipe networks; any one of which either singly or in combinations, can be used for a particular place. They are: Grid, Ring, Radial and Dead End System.

What are the four components of the pipe network system? The unit is formed by a pipe network, valves, their connection systems, water manometers and anodized aluminum structure where the pipes network is located and the subsection panel of the manometers.

How to calculate water supply pipe size? Choose a suitable water velocity based on material, pressure, and application (typically 3-8 feet per second). Use the formula: Flow Rate (GPM) = Pipe Area (square inches) x Velocity (ft/sec). Calculate the pipe diameter based on the desired flow rate and chosen velocity.

What is a water distribution layout? The distribution layout of a water system includes disinfection treatment facilities, pipelines (mains and services), and appurtenances like valves and fire hydrants.

What is the best pipe for a water supply company? Chlorinated Polyvinyl Chloride (CPVC) is one of the most popular piping materials in India. FlowGuard® CPVC has been used around the world for more than 55 years. One of CPVC's primary competitors in certain parts of the world is polypropylene (PPR) or green pipe.

What is the problem of water distribution network? Water Distribution System Challenges. Challenges: Aging Infrastructure: Many water distribution systems suffer from outdated pipelines, leading to leaks and inefficiencies. Contamination Risks: Aging pipes and cross-connections pose contamination risks, affecting water quality.

What is the best distribution system in the water supply? Radial System Then, from the distribution reservoir to the houses, supply pipes are laid radially. This water

distribution technology is ideal for high-rise projects. Water supply outages are uncommon during maintenance or repair operations. The radial system delivers water at a high flow rate with less head loss.

What is the dead end method? Dead-end or tree distribution system In the dead end system (also called tree system), one main pipeline runs through the centre of the populated area and sub-mains branch off from both sides. The sub-mains divide into several branch lines from which service connections are provided.

What is the difference between water supply and water distribution? A water distribution system is a part of water supply network with components that carry potable water from a centralized treatment plant or wells to consumers to satisfy residential, commercial, industrial and fire fighting requirements.

What are the 3 main groups of pipe material used in a clean water network?

What are the three major components of a water distribution system? Fundamentally, a water supply system may be described as consisting of three basic components: the source of supply, the processing or treatment of the water, and the distribution of water to the users.

What is the best free pipe drawing software?

What is the best water distribution software? OpenFlows Water is a user-friendly hydraulic modeling application trusted by thousands of engineers every day to understand their water distribution systems and make better decisions.

What is the SCADA system for water distribution system? A SCADA system is a widely distributed computerized system primarily used to remotely control and monitor the condition of field-based assets from a central location. Field-based assets include wells, pump stations, valves, treatment plants, tanks, and reservoirs (Bentley, 2004).

What is the rule of thumb for piping design? The general rule of thumb is to maintain a velocity below 5 ft/s (1.5 m/s). Gravity (g) and the slope of the pipe. An increase in slope decreases the pressure due to gravity. Pipe Diameter (D): The larger the pipe diameter is, the slower the flow velocity will be.

How do you calculate flow in a pipe line?

How do you make a piping design?

How do you size a water distribution system?

What are the four components of a water distribution system? Most piped systems have the same basic components: pipes, valves, fire hydrants, service connections, and reservoirs.

What is the layout method of water distribution? It is also called a circular system; In this system, a closed ring, either circular or rectangular, of the main pipes, is formed around the area to be served. The distribution area is divided into rectangular or circular blocks, and the main water pipes are laid on the periphery of the blocks.

What is the basis for the design of the water distribution system for a place? The system is designed based on the maximum demand for water, which is determined based on factors such as peak hourly demand and coincident of draft.

How do you calculate pipe size for water supply? Choose a suitable water velocity based on material, pressure, and application (typically 3-8 feet per second). Use the formula: $\text{Flow Rate (GPM)} = \text{Pipe Area (square inches)} \times \text{Velocity (ft/sec)}$. Calculate the pipe diameter based on the desired flow rate and chosen velocity.

What is the rule of thumb for pipe sizes? The rule of thumb is twice the diameter equals four times the flow. You can see in the figure that four 1" pipes can fit inside a 2" pipe. To estimate the pipe size required for a certain flow rate, the following formula can be used.

What is the best distribution system in the water supply? Radial System Then, from the distribution reservoir to the houses, supply pipes are laid radially. This water distribution technology is ideal for high-rise projects. Water supply outages are uncommon during maintenance or repair operations. The radial system delivers water at a high flow rate with less head loss.

What is the difference between a water supply system and a water distribution system? A water distribution system is a part of water supply network with components that carry potable water from a centralized treatment plant or wells to consumers to satisfy residential, commercial, industrial and fire fighting requirements.

What are the components of water supply networks? Fundamentally, a water supply system may be described as consisting of three basic components: the source of supply, the processing or treatment of the water, and the distribution of water to the users.

What is the minimum pressure for a water distribution system? Water must always be delivered under proper pressure (at least 20 pounds per square inch). 5. The system must be properly operated, maintained and protected from damage and contamination.

How to design a pipeline for water supply?

How to design a water supply system?

How to distribute water equally? In an automatic water supply system, from the main reservoir and different water sources through an inlet pipe water reaches the main water tank. From the main water tank, it will be equally distributed to every house using a different sensor like a flow meter and solenoid valve.

What is the layout of distribution of water? A closed ring either circular or rectangular, of the main pipe is formed around the area to be served. The distribution area is divided into rectangular or circular gniadlo blocks. The main pipes are laid on the periphery of these blocks. Suitable for Towns and Cities having well planned roads.

How do you write a water supply project? Writing a proposal for a water project requires a comprehensive approach that outlines the project's goals, benefits, implementation plan, and expected outcomes.

What is the difference between transmission and distribution water lines? Transmission pipes generally run in straight lines, have few side connections, and

aren't tapped for customer services. 4. Distribution mains carry water from transmission lines and distribute it throughout a community. These pipes have many side connections and are frequently tapped for customer connections.

Which year of UNSW handbook to follow? Students must follow the Handbook of the year they commenced their degree. UNSW publishes a revised version of the Handbook every year, so make sure you only use the latest Handbook to choose your courses.

How do I find books in UTS library? go to the Library home page and sign into My Library. search the Library catalogue and find the book you need.

How many times can you fail a subject at UNSW? A student who fails the same course rule for the fourth time will be discontinued from that program of study unless they successfully appeal to the appropriate Re-Enrolment Appeal Committee. A student must meet any program-specific progression requirements as specified in the rules of their program.

What are the best subjects at UNSW? UNSW ranked number one in Australia for 10 subjects, up from five in 2023 - Civil & Structural Engineering; Electrical & Electronic Engineering; Mechanical, Aeronautical & Manufacturing Engineering; Materials Sciences; Mathematics; Accounting & Finance; Business & Management Studies; Marketing; and equal first in ...

Can public use the UTS Library? Members of the public can visit the UTS Blake Library (levels 7 to 9), Attila Brungs Reading Room (levels 5 and 6) and the informal learning spaces of UTS Central (building 2) during session.

How many levels is the UTS Library? UTS Library is located at the heart of the campus in UTS Central (building 2), levels 7 to 9.

How do I return a book to the UTS Library? Return Chutes are available on Level 5 (located near entrance to Reading Room) and Level 7 (located outside entrance to UTS Library) of UTS Central. Place borrowed items in the returns chute by the due date to avoid fines. 5.2.

What is a passing grade at UNSW? Pass: An acceptable level of performance; mark range 50-64. Indicates that the student has addressed the assessment

requirements of the course and has demonstrated an acceptable understanding of the issues entailed.

What is the fail rule for UNSW? If you fail the same course or course rule four times, your enrolment in your program will be terminated.

How long do I have to finish my degree at UNSW? Maximum time to complete program For example, the maximum time to complete a four-year undergraduate degree is 10 years. For postgraduate coursework award programs, the maximum time to complete is 10 years.

What is UTS ranked in the world? UTS ranked 9th in Australia and 88th in the world in the QS World University Rankings 2025. The rankings are based on research, teaching, employability and internationalisation.

What is UNSW famous for? Six of UNSW's subjects are in the world's top 20, including accounting & finance, environmental sciences, and several engineering specialisations. UNSW also offers the world's first bachelor's degree in quantum engineering as well as Australia's most in-demand medicine degrees.

Which is better, University of Sydney or UNSW? The University of Sydney has a higher level of recognition outside of Australia. There is no essential distinction in recognition between the two universities within Australia. UNSW offers slightly fewer majors compared to USYD.

What is the ranking of UNSW information systems? The School of Information Systems and Technology Management is ranked 1st in Australia, 3rd in the Asia-Pacific Region and 14th worldwide by the Association for Information Systems (AIS). UNSW is also home to the #1 Business School in Australia, as voted by AFR BOSS for the last two years in a row*.

What is the standard UNSW declaration of originality? 'I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, ...

What is the dean's list for UNSW? Undergraduate students who achieve outstanding Academic Excellence and are in the top 3% of their single or double degrees are eligible to receive the Dean's List Award. This award is based on Academic performance from the previous calendar year.

How do I find my UNSW timetable? Log into myUNSW and go to the My Student Profile tab > My Student Services channel (at left) > Enrolment > Class Timetable.

What is the outline of the government of the United States? The Federal Government is composed of three distinct branches: legislative, executive, and judicial, whose powers are vested by the U.S. Constitution in the Congress, the President, and the Federal courts, respectively.

What outlines structure of US government? The Constitution of the United States divides the federal government into three branches: legislative, executive, and judicial. This ensures that no individual or group will have too much power.

What is the document that outlines the U.S. government? The Constitution of the United States set up the foundation of the U.S. government, including its purpose and structure. The Constitutional Convention adopted the Constitution on September 17, 1787.

What is the blueprint of the American government? The foundation of our American Government, its purpose, form and structure are found in the Constitution of the United States. The Constitution, written in 1787, is the “supreme law of the land” because no law may be passed that contradicts its principles.

What are the 15 federal departments? The Cabinet includes the Vice President and the heads of 15 executive departments — the Secretaries of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, Housing and Urban Development, Interior, Labor, State, Transportation, Treasury, and Veterans Affairs, as well as the ...

What is the basic outline or structure of the US Constitution? The United States Constitution Beginning with the words “We the People,” the U.S. Constitution is composed of the Preamble, seven articles, and 27 amendments. The first 10 amendments are known as the Bill of Rights.

Who runs the United States? The President is both the head of state and head of government of the United States of America, and Commander-in-Chief of the armed forces. Under Article II of the Constitution, the President is responsible for the execution and enforcement of the laws created by Congress.

Which best describes US government structure? While often categorized as a democracy, the United States is more accurately defined as a constitutional federal republic.

What is the hierarchy in government? Our federal government has three parts. They are the Executive, (President and about 5,000,000 workers) Legislative (Senate and House of Representatives) and Judicial (Supreme Court and lower Courts). The President of the United States administers the Executive Branch of our government.

Is God mentioned in the Constitution? While the U.S. Constitution does not mention God, nearly all state constitutions reference either God or the divine, according to a 2017 analysis. God also appears in the Declaration of Independence, the Pledge of Allegiance and on U.S. currency.

What are the 10 constitutional Rights of America?

What are the three main principles on which our government was based? The Constitution can be said to be based on three principles: 1) Separation of powers. 2) Checks and balances. 3) The federal division of power.

What are the six big ideas of the American government? Teaching Six Big Ideas in the Constitution - Students engage in a study of the U.S. Constitution and the significance of six big ideas contained in it: limited government; republicanism; checks and balances; federalism; separation of powers; and popular sovereignty.

What is the US government format? The U.S. federal government is composed of three distinct branches: legislative, executive, and judicial, whose powers are vested by the U.S. Constitution in the Congress, the president, and the federal courts, respectively.

Are there any laws against AI? Laws/Regulations directly regulating AI (the “AI Regulations”) Currently, there is no comprehensive federal legislation or regulations in the US that regulate the development of AI or specifically prohibit or restrict their use. However, there are existing federal laws that concern AI albeit with limited application.

What are the 5 requirements to be president?

How can Congress override an executive order? Congress has the power to overturn an executive order by passing legislation that invalidates it, and can also refuse to provide funding necessary to carry out certain policy measures contained with the order or legitimize policy mechanisms.

What are the 3 largest categories of federal government? Major expenditure categories are healthcare, Social Security, and defense; income and payroll taxes are the primary revenue sources.

What are the three words of self-government? The first three words of the Constitution are “We the People.” In other words, the American people govern themselves and are not ruled by a king. When the Founding Fathers wrote the Constitution in 1787, they created the structure of the federal government that we have today.

Which branch of government makes the laws? The legislative branch is made up of the House and Senate, known collectively as the Congress. Among other powers, the legislative branch makes all laws, declares war, regulates interstate and foreign commerce and controls taxing and spending policies.

Which state has the most signers to the Constitution? Which state has the most signers to the Constitution? Pennsylvania. There were 34 delegates to the Continental and Confederation Congress who signed the United States Constitution, eight of whom hailed from Pennsylvania.

What describes the government of the United States? While often categorized as a democracy, the United States is more accurately defined as a constitutional federal republic.

What is the system of government in the United States? The federal government of the United States (U.S. federal government or U.S. government) is the national government of the United States, a federal republic located primarily in North America, composed of 50 states, five major self-governing territories, several island possessions, and the federal district (national ...

What outlined the first form of government for the United States? The Articles of Confederation were adopted by the Continental Congress on November 15, 1777. This document served as the United States' first constitution.

What does the outline of the government in a state's Constitution include? The Basics Therefore, in basic structure state constitutions much resemble the U.S. Constitution. They contain a preamble, a bill of rights, articles that describe separation of powers between the executive, legislative and judicial branches, and a framework for setting up local governments.

What was James Cook famous for exploring? James Cook was a British naval captain, navigator, and explorer who sailed the seaways and coasts of Canada and conducted three expeditions to the Pacific Ocean (1768–71, 1772–75, and 1776–79), ranging from the Antarctic ice fields to the Bering Strait and from the coasts of North America to Australia and New Zealand.

Who made Westfalia? Mobile passion with history. 1844: The beginning of the Westfalia company. On 1 October 1844, Johann Bernhard Knöbel started a forge, thus laying the foundation stone for a long-lasting history. He originally built heavy horse-drawn carts to transport goods arriving at the new train station.

How many voyages did James Cook undertake? In 1768, when Captain James Cook set sail on the first of three voyages to the South Seas, he carried with him secret orders from the British Admiralty to seek 'a Continent or Land of great extent' and to take possession of that country 'in the Name of the King of Great Britain'.

What happened to James Cook on his first voyage? First voyage After the astronomical observations were completed, Cook sailed south to 40°S, but failed to find any land. He then headed for New Zealand, which he circumnavigated, establishing that there were two principal islands. From New Zealand he sailed to

New Holland, which he first sighted in April 1770.

What was James Cook's famous quote? James Cook 1728–79 Ambition leads me not only farther than any other man has been before me, but as far as I think it possible for man to go.

Was Captain Cook a real captain? On his final, fatal, excursion (Resolution 1776-1780) he was, and we happily take guidance here from the Captain Cook Society, a "post-captain". The society's website states: "He never actually held the rank of captain, but in 1775 was promoted to the higher rank of post-captain."

Do they still make Westfalia? Its campers won't be Volkswagen-based, however Westfalia, the company that brought Americans a series of Volkswagen van-based campers equipped with a pop-up roof, will return to the American market in 2024 after a nearly two-decade-long hiatus.

What is the meaning of Westfalia? Westphalia in British English (w?st?fe?l??) noun. a historic region of NW Germany, now mostly in the state of North Rhine-Westphalia. German name: Westfalen.

Is Westfalia still in business? Best known for VW camper conversions, the company is coming back to our shores in 2024 with a new van based on a Ram ProMaster. Originally a VW-based brand, this new effort will be centered around Ram ProMaster vans.

Did James Cook have a wife? Elizabeth Batts was married to Capt. James Cook in the year 1762, to this marriage six children were born. Although Cook made great discoveries, the tragic life of Mrs. Cook has had little or no mention.

Who paid for James Cook's voyages? The first Cook voyage of 1768-71 was in a way co-sponsored by the Royal Society of London, who provided an astronomer and instructions for observing the transit, and more specifically, by a wealthy, young, paying passenger Joseph Banks, who put up the funds for the artists and naturalists and their supplies.

What route did James Cook take? Cook decided to take the route around Cape Horn, rather than dealing with the vicissitudes of the Strait of Magellan, to reach the Pacific. In mid-January, he anchored in what he called the Bay of Success, opposite

Staten Island, in the Strait of Le Maire, where the crew traded with the Fuegians.

How tall was Captain James Cook? Sir Walter Besant, a biographer of Cook, described Cook as being "over six feet high" with "dark brown hair", "bushy eyebrows" and "small brown eyes".

What did James Cook eat on his first voyage? On Cook's first Pacific voyage in 1768, the Navy wanted to trial the efficacy of sauerkraut in combatting scurvy. The Endeavour was provided with 7,860 pounds of sauerkraut, a ration of 2 pounds per man per week.

Where was Captain Cook buried? According to the history books, several days after the death of James Cook on the shore of Hawaii, a native priest delivered a parcel containing the Captain's remains to the Resolution, from whence they were ceremonially buried at sea in Kealahou Bay.

Why is James Cook so famous? Captain Cook is considered one of the greatest navigators and explorers of all time and, even before his death, was celebrated as a British national hero and icon. Cook mapped the east coast of Australia – this paved the way for British settlement 18 years later. He also proved some theories to be wrong.

What was James Cook's fate? A fatal encounter When Cook tried to take the king hostage after the theft of a ship's boat, the inhabitants became alarmed and during a struggle Cook was stabbed and killed on 14 February 1779.

What was James Cook's first job? At 17, he worked for a shopkeeper in Staithes near Whitby. Here he decided that a life at sea was what he wanted and he became apprenticed to a firm of Whitby coal shippers. At the age of 18, he first went to sea.

Are there any living descendants of James Cook? Two of the others (James and Nathaniel) died at sea whilst serving in the Royal Navy. The youngest of the family, Hugh Cook, died whilst at college at Cambridge. None of their children had married and had children of their own, so there are no descendants from the Cook family.

What race is Captain Cook? James Cook (1728-1779), navigator, was born on 27 October 1728 at Marton-in-Cleveland, Yorkshire, England, the son of a Scottish labourer and his Yorkshire wife.

What are some fun facts about James Cook?

Who bought Westfalia? In October 2016, Westfalia-Automotive trailer couplings was sold to the American trailer hitch manufacturer Horizon Global Corporation.

What is similar to a Westfalia? The Mercedes Metris Anacapa and the VW Westfalia are both fantastic mid-size campervan options. The Anacapa is a modern take on VW Westfalia which means everything from the van mechanics to the features is state-of-the-art and made by Mercedes Benz.

Does a Westfalia have a toilet? The large tent, probably a revision of the SO-22 awning model, has also been called the "privy tent" because most models seen today have a bathroom in the rear side wall.

How much does a new Westfalia cost? Westfalia Americas' representatives tell me that not everyone is interested in a pop-top, but still want the Westfalia experience. The base price of \$155,333 is for a van without the pop-top. The addition of the top will cost you another \$10,374.

What year Westfalia is best? 1986-1991: These were the best of the Vanagons, mechanically speaking. They were easily identified by their rectangular (instead of round) headlights.

How many does a Westfalia sleep?

What technology did James Cook explore? On his second and third voyages, Captain Cook was fortunate to use K1, a version of Harrison's H4 that was made by London watchmaker Larcum Kendall. ** With these two tools—sextant and chronometer—Cook would literally change the map of the world.

Did James Cook explore the Arctic? On 11 August 1778, Captain James Cook, the preeminent navigator of his age, sailed north through Bering Strait into the Arctic Ocean in search of the Northwest Passage. A week later his progress was halted by “ice which was as compact as a Wall and seemed to be ten or twelve feet high at least” [from Cook's journal].

Why did the Great Journeys of Exploration occur? Some were seeking wealth and fame. Others wanted to claim new lands for their rulers. Many explorers struck out into the unknown simply for the personal thrill of discovery. They wanted to be the first people to set foot on strange territory.

Where did James Cook go on his second voyage? In the course of the voyage he visited Easter Island, the Marquesas, Tahiti, the Society Islands, Niue, the Tonga Islands, the New Hebrides, New Caledonia, Norfolk Island, Palmerston Island, South Sandwich Islands, and South Georgia, many of which he named in the process.

Who paid James Cook to explore? On 16 February 1768 the Royal Society petitioned King George III to finance a scientific expedition to the Pacific to study and observe the 1769 transit of Venus across the sun to enable the measurement of the distance from the Earth to the Sun.

Did Captain Cook have a wife? Elizabeth Batts was married to Capt. James Cook in the year 1762, to this marriage six children were born. Although Cook made great discoveries, the tragic life of Mrs. Cook has had little or no mention.

Did Cook use a sextant? Cook was looking to the skies every day and every night. "When he's making his calculations of longitude (east and west position), he's doing complex astronomical observations, including of the moons of Jupiter," Claire says. One of the tools he used for fixing the position of his ship was a sextant.

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How tall was Captain Cook? Sir Walter Besant, a biographer of Cook, described Cook as being "over six feet high" with "dark brown hair", "bushy eyebrows" and "small brown eyes".

What did James Cook hope to find? Exploration from the west coast Before 1776, all the explorers searching for the North-West Passage had been attempting to find it from the Atlantic (east) coast. Cook's plan was to find it from the Pacific (west) coast.

How did James Cook change the world? At his death, Cook had charted thousands of miles of coastline around the world and solved several mysteries of the South Pacific. He did all that and along the way lost only a few men to scurvy, a rampant problem at the time, by encouraging his sailors to eat their fruits and veggies.

Who discovered Africa? Portuguese explorer Prince Henry, known as the Navigator, was the first European to methodically explore Africa and the oceanic route to the Indies. From his residence in the Algarve region of southern Portugal, he directed successive expeditions to circumnavigate Africa and reach India.

What is the Age of Discovery grade 6? The Age of Exploration (also called the Age of Discovery) began in the 1400s and continued through the 1600s. It was a period of time when the European nations began exploring the world. They discovered new routes to India, much of the Far East, and the Americas.

How many times did James Cook sail around the world? He had three voyages around the world, any one of which would have put him on the map and put him in the pantheon of great explorers like Magellan. But there was just a kind of a probity and a kind of almost scientific approach that he applied to his voyages that was unusual for his time.

Was James Cook's third voyage successful? An Atlantic gale blew the expedition so far north that they first made landfall at Stromness in Orkney. The Resolution and Discovery arrived off Sheerness on 4 October 1780. The news of Cook's and Clerke's deaths had already reached London, so their homecoming was to a subdued welcome.

Why did Captain James Cook decide not to land on Antarctica? Stymied by pack ice and severe cold, barely escaping wrecking on a huge iceberg, Cook concluded there could be no habitable Southern Continent, only a frozen land nearer the pole.

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