FILTERING EFFECTS

A look at filtration technologies, filter products and filter media — along with how they are tested and certified in accordance with NSF/ANSI Standard 50.

Swimming is a critical life skill that can save your life as well as provide a lifetime of enjoyment. Filtration is an important precursor to swimming because it removes contaminants from the water, increasing the safety of the water and protecting the health swimmers. That's why its important to have filters that you know you can trust to perform well and protect health.

Since 1960, NSF has evaluated and tested filters for burst and safety performance, health effects, and contaminant removal and reduction claims. NSF tests traditional filters as well as innovative and novel product and system designs (pre-filters, drum filters, etc.) to help advance technology and improve best practices in the recreational water industry.

In the late 1950s, the pool industry trade association National Swimming Pool Institute (NSPI) requested that standards writer, testing lab, and product certifier National Sanitation Foundation (NSF) create uniform nationally acceptable standards for pool and spa equipment, chemicals, and supplies. Due to this request, NSF worked with NSPI members, manufacturers, public health officials to create true consensus standards for evaluation, testing, and certification of filters, filter media, and virtually all other pool, spa, and water-park product types. NSF took the lead and networked with the industry to create requirements for virtually all product types.

The first such standard dictated that product types to be NSF Certified were pre-coat (aka DE) filters in 1960. Since then sand/granular and cartridge filters, pre-filters, alternative filters and media have been addressed using NSF/ANSI Standard 50-Equipment for Pool, Spas, Hot-Tubs and Other Recreational Water Facilities.

Each product type must meet certain shared criteria as well as product specific criteria. Some of the common filter evaluation and testing criteria are:

- Material safety and health, (toxicology formulation review)
- Corrosion resistance (dissimilar metals, polymers, etc)
- Design and construction, (such as drains, air release, etc)
- Accessibility of the filter and cleanability of the filter media
- Burst or vacuum pressure tests (such as working pressure/burst/cyclic)
- Product performance tests (such as filtration efficacy, turbidity reduction),
- Capacity and sizing (such as flow rates and filtration area)
- Product marking and user instructions for installation and opertion

NSF's testing and certification of filters and filter media verifies that the products meet stringent performance criteria. The evaluation includes materials health, strength and design criteria as well as a series of pressure and vacuum service tests to assess the durability

and strength of the vessel. NSF is able to achieve pressures as high as 3,000 psi, and flow rates in excess of 6,000 gpm or 8.6 million gallons per day (mgd). So you can see, NSF has the infrastructure and capacity to test any filter. NSF also assesses filter hydraulics by evaluation and testing pressure loss, turbidity reduction, filter media clean ability, media longevity, media size and uniformity, filter area, particulate reduction, and total suspended solids removal as well as other criteria.

Here is a table to help public officials, facility operators, and service technicians understand how filters and filter media are evaluated, tested, and certified by NSF International as well as the different requirements as they apply to different products.

After a filter becomes Certified, NSF subsequently performs annual unannounced monitoring inspections at the product facility. NSF also conducts periodic re-testing of filters and filter media to ensure they continue to comply with NSF criteria.

Today users can easily find thousands of filters and filter media that NSF has tested and certified in accordance with NSF-50. The use of certified products assures buyers that the product will perform well for the certified application and conditions.

You can find all types of filters and filter media such as cellulose, perlite, glass, sand, and zeolite media that comply with NSF/ANSI Standard 50 on NSF's listing Web page: *www.nsf.org/certified/pools*. For further information contact NSF International at *pools@nsf.org* or +1.734.769.8010. ■

NSF Filter & Filter Media Evaluation Criteria

NSF Recreational Water Filter & Filter Media Evaluation Criteria	Pressure Sand & Granular Filter	Vacuum Sand & Granular Filter	Pressure Pre-Coat Filter	Vacuum Pre-Coat Filter	Cartridge Filter	Pre-Filter	Alternative Filter	Sand & Granular Media	Pre-Coat Media	Cartridge Media
Material formulation	•	•	•	•	•	•	•	•	•	•
Corrosion resistance	•	•	•	•	•	•	•			
Design and construction	•	•	•	•	•	•	•			
Filter tank-pressure 4:1 design	•	•	•	•	•	•*	•*			
1.5xWorking pressure	•		•		•	•*	•*			
20,000 low-high pressure	•		•		•	•*	•*			
2.0xWorking pressure	•		•		•	•*	•*			
Filter tanks (vacuum)	•	•		•		•*	•*			
1.5x water weight vacuum	•	•		•		•*	•*			
25in Hg vacuum	•	•		•		•*	•*			
Internal component deformation	•	•	•	•	•	•*	•*			
Initial head loss curve/pressure loss	•	•	•	•	•	•*	•*	•	•	•
Accessibility, drains, air release	•		•		•	•*	•*			
Filter media cleanability & head loss	•	•	•	•	•	•	•	•	•	•
Filtration area calculation	•	•	•	•	•	•	•			•
Filtration rate value	•	•	•	•	•					
Clearance, spacing, baffles, waste/screen			•	•	•					
Turbidity limits precoat operation			•	•						
Cartridge removal, alignment, & waste					•					
Upper distribution system	•	•								
Lower distribution system	•	•								
Filter media behavior/migration	•	•								
Sieve size and uniformity co-efficient	•	•						•		
Cellulose media longevity test									•*	
Turbidity reduction 70% ratio/5 turn	•	•	•	•	•	•	•	•	•	•
Particulate removal size range	•**	•**	•**	•**	•**	•	•	•**	•**	•**
Total suspended solids analysis	•**	•**	•**	•**	•**	•	•	•**	•**	•**
Installation and operating instructions	•	•	•	•	•	•	•	•	•	•
Data plate marking requirements	•	•	•	•	•	•	•	•	•	•

* If applicable to product **Optional quantitative testing