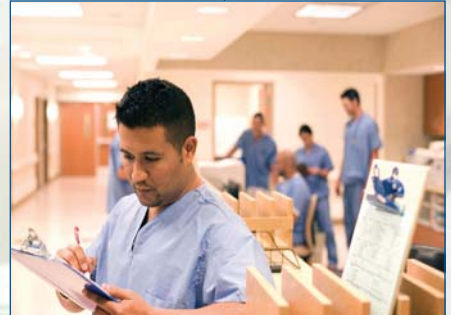


DRI-STEEM Dispersion High-efficiency Tubes

for Ultra-sorb® and Rapid-sorb® dispersion — new or retrofit

Reduce wasted energy by up to 85%
Reduce airstream heat gain
Reduce condensate



DRI-STEEM®
The humidification experts

Ultra-sorb and Rapid-sorb: The best get better!

Dispersion panels with high-efficiency tubes



Ultra-sorb XV



Ultra-sorb LV



Ultra-sorb LH



Rapid-sorb

High-efficiency tubes are insulated with polyvinylidene fluoride (PVDF) insulation and reduce wasted energy up to 85% by reducing downstream heat gain and condensate production.

- Standard on Ultra-sorb XV
- Available as an option on new or retrofit Ultra-sorb LV & LH and Rapid-sorb

Guaranteed short absorption with significant energy savings!

Others have never come close to Ultra-sorb and Rapid-sorb's proven and guaranteed absorption capabilities. If you must achieve absorption within a short or critical distance, there is no better choice than DRI-STEEM's Ultra-sorb and Rapid-sorb dispersion systems.

DRI-STEEM takes this industry-leading performance one step further with its revolutionary patent-pending high-efficiency tubes. Standard on Ultra-sorb XV, high-efficiency tubes are also available as an option on new or retrofit Ultra-sorb LV & LH and Rapid-sorb dispersion panels.

High-efficiency tube benefits are staggering: Significant energy savings, sizable reduction in downstream heat gain, and substantial reduction in dispersion-generated condensate!



Steam releases heat as it condenses

Ultra-sorb and Rapid-sorb dispersion assemblies typically disperse steam into 50-55 °F airstreams. This cool air flowing across uninsulated hot dispersion tubes causes some steam inside the tubes to condense. Steam gives up heat as it condenses. This heat passes easily through uninsulated stainless steel dispersion tubes into the airstream, increasing downstream air temperature. The amount of condensate produced is directly proportional to downstream air heat gain.

Unwanted downstream heat gain wastes resources:

- Every gallon (8.33 pounds) of condensate produced wastes over 8,000 Btus — the energy originally used to change that water into steam.
- Heat added to downstream air increases the cooling load in applications that humidify and cool simultaneously, wasting energy cooling the unnecessarily heated air.
- Unnecessary condensate production can cause a humidification system to not meet set point when steam expected to meet the humidification load becomes condensate. This can require specifying a higher-capacity steam generator.
- Condensate sent to a drain wastes water and water treatment chemicals (e.g., softened water, deionized or reverse-osmosis treated water, water treated with boiler chemicals). Note that not all humidification systems return condensate to the steam generator.

Revolutionary PVDF insulation reduces heat gain significantly!

The PVDF insulation on high-efficiency dispersion tubes allows up to an 85% reduction in wasted energy by significantly reducing airstream heat gain and condensate production. The energy savings can yield payback in less than one year.

DRI-STEEM co-developed PVDF insulation for humidification applications when no available material could provide significant insulating results, withstand the environmental challenges of steam humidification, and meet strict plenum requirements.

Advanced insulation meets stringent requirements

PVDF is an advanced material commonly used in chemical, semiconductor, medical, defense, and aerospace industries and has the following characteristics:

- **Approved for use in plenums:** Flame spread/smoke developed values are 0/0, exceeding UL 723 (ASTM E84) requirement of 25/50.
- **Rated for high-temperature operation:** Rated for 300 °F (149 °C) continuous operation.
- **Closed-cell structure will not absorb water or support microbial growth.**
- **Will not shift or slip on tubes:** Advanced manufacturing process ensures insulation attaches securely to tubes.
- **Odor free:** virtually no measurable outgassing.
- **Resistant to UV light.**
- **Rugged and durable:** No particle erosion per ASTM C1071 erosion resistance test; does not contain fiberglass.

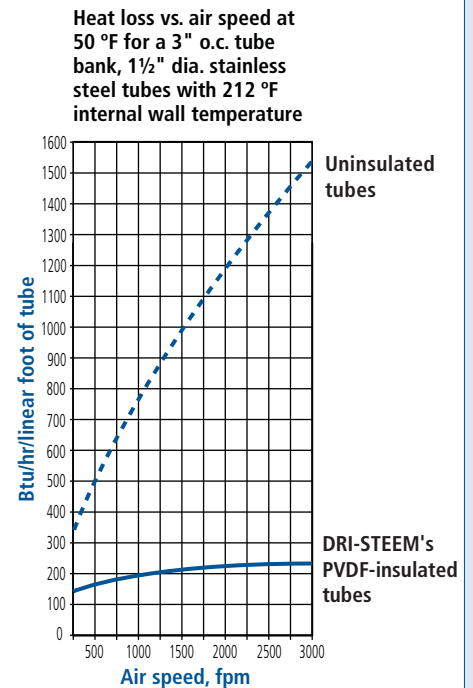
See our white paper

For complete details on the breakthrough performance of high-efficiency tubes, see our white paper *Reducing energy use, airstream heat gain, and condensate production*, on the **Education & Resources** page at www.drsteem.com (or [click here](#)).

mc_042508_1320

The obvious solution to the problem of unwanted heat gain and resource waste is high-efficiency dispersion tubes.

Dispersion tube heat loss vs. airspeed

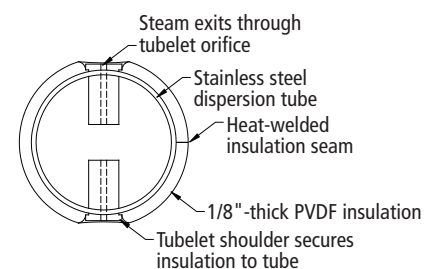


Notes:

- Heat loss calculations based on the following references: Zhukauskas, A. 1987. *Convective Heat Transfer in Cross Flow*. In S. Kakac, R.K. Shah, and W. Ang, eds. *Handbook of Single-Phase Convective Heat Transfer*. New York: John Wiley & Sons, pp. 6.1-6.45.
- PVDF insulation on tube is 1/8" thick and has a thermal conductivity of 0.0185 Btu/hr-ft-F.

mc_042508_1321

High-efficiency dispersion tube cross section



mc_042808_0830

Significant energy savings can yield payback in less than one year

For more information visit our [High-efficiency Tube option web page](#) at www.dristeem.com

Expect quality from the industry leader

For more than 40 years, DRI-STEEM has been leading the industry with creative and reliable humidification solutions. Our focus on quality is evident in the construction of our high-efficiency tubes, which feature a two-year limited warranty.

DRI-STEEM Corporation

An ISO 9001:2000 certified corporation

U.S. Headquarters:
14949 Technology Drive • Eden Prairie, MN 55344
800-328-4447 • 952-949-2415
952-229-3200 (fax)
www.dristeem.com
sales@dristeem.com

European office:
Marc Briers
Grote Hellekensstraat 54 b
B-3520 Zonhoven
Belgium
+3211823595 (voice)
+3211817948 (fax)
E-mail: marc.briers@dristeem.com

Continuous product improvement is a policy of DRI-STEEM Corporation; therefore, product features and specifications are subject to change without notice.

For the most recent product information, visit the literature section of our web site, www.dristeem.com

Ultra-sorb is covered by the following Patents, with additional patents pending: United States Patent numbers 5,126,080; 5,277,849; 5,372,753; 5,376,312; 5,543,090

DRI-STEEM, Rapid-sorb, and Ultra-sorb are registered trademarks of DRI-STEEM Corporation and are filed for trademark registration in Canada and the European community.

© 2008 DRI-STEEM Corporation

Form No. High-Eff-Tube-Brochure-0408

The performance you expect from DRI-STEEM

Of course, the real test of high-efficiency tubes is performance:

- **High-efficiency tubes reduce airstream heat gain and condensate production by up to 85% compared to uninsulated tubes** — regardless of load or airstream temperature.
- **Condensate reduction correlates directly to energy savings.** Every pound of condensate that does not drain from the dispersion assembly saves about 1,000 Btus — the amount of energy required to boil a pound of water into steam.
- **Condensate reduction allows using smaller steam generators.** With a higher percentage of generated steam meeting the humidification load rather than draining from the dispersion assembly as condensate, steam generators can be downsized in many cases.
- **Adding PVDF insulation to dispersion tubes causes no excessive airflow pressure drop** — the dense, closed-cell insulation provides exceptionally high performance at 1/8" thickness.
- **Energy savings provides product payback in less than one year** for electric humidification systems, and in about 1½ years for natural gas systems.

mc_042508_1322

Retrofitting is easy

Instructions are provided in the *Retrofit High-efficiency Tube Option Brochure* on the DRI-STEEM web site (www.dristeem.com). Just search the site for “retrofit brochure” (or [click here](#)).

For more information contact: