

METAL

Random Packing



YOU CAN RELY ON US.

 KOCH-GLITSCH®

Random Packing

For improved performance in new and existing towers.

For over 50 years random packings have been successfully used as an inexpensive but very effective means to increase a tower's capacity and/or efficiency. The original Raschig rings have been superseded by new generations of improved products. And today, whatever your application, genuine Koch-Glitsch designed random packings are available in the size and materials—metal, plastic, or ceramic—to provide optimum performance.

Process Advantages of Random Packing

There are numerous process advantages that can be realized by using random packing in various applications. The predominant reasons to use tower packings are to:

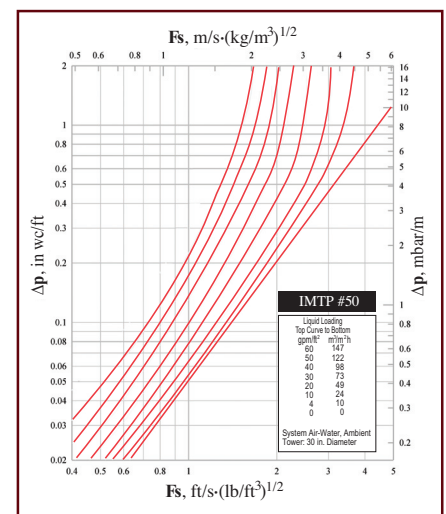
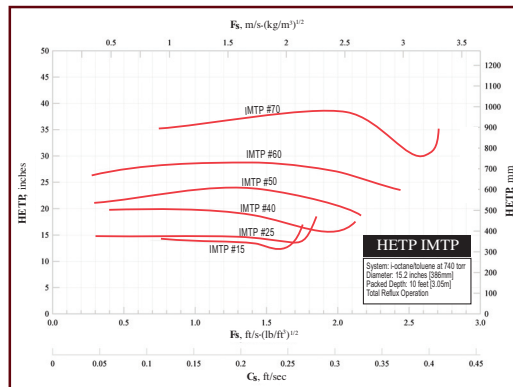
- Reduce pressure drop through the column
- Increase the capacity compared to trays at the same efficiency and/or
- Reduce liquid holdup in the column

Koch-Glitsch process engineers can help improve performance in new and existing towers. Through its work on thousands of towers worldwide, Koch-Glitsch has developed significant knowledge and experience for selection of the proper mix of packing combined with the appropriate tower internals and tower arrangement to best satisfy specific requirements.



Quick Sizing Packed Columns

This brochure provides information for quick sizing of packed columns using metal random packings. Information in the included charts enables hydraulic rating and provides relative packing efficiencies in terms of the K_{Ca} value for the absorption of CO_2 into a standard caustic solution and HETP for low relative volatility hydrocarbon distillation.



KG-TOWER® Hydraulic Rating Software

In addition to the charts available in this brochure, Koch-Glitsch offers KG-TOWER® hydraulic rating software that may be downloaded from the Koch-Glitsch Web site, www.koch-glitsch.com/software/. This electronic design tool can assist in the specification of Koch-Glitsch mass transfer equipment, including conventional and high performance random and structured tower packings, severe service grid packing, and conventional and high performance valve trays.



A Tower Packing for Any Application

Koch-Glitsch is unsurpassed in offering the widest range of sizes and styles of traditional and high performance random packings.

Koch-Glitsch recognizes that while packings provide many valuable benefits, not all applications are demanding. The various packings in this brochure are of ring or saddle type construction and offer a variety of performance levels from conventional to high performance. Considerations in choosing a specific packing style are:

- Specific process requirements
- Direct replacement of an existing packing
- Familiarity with the packing type and its performance
- Past experience using a specific packing in a particular application
- Use in a licensed process

Each packing family offers several sizes to enable the process engineer to optimize the system for efficiency and cost. As the packing size increases within the family, the packing offers greater capacity and lower pressure drop at the expense of efficiency.

As there are differences in packing types, Koch-Glitsch recognizes that packed tower applications have different liquid and vapor distribution requirements. For less demanding services, traditional distributors are specified with the packings in this brochure. Working with you, our process engineers will help to select the proper packing and match it with the appropriate tower internals to satisfy your process requirements.

When mass or heat transfer process requirements are stringent, INTALOX® Packed Tower Systems are recommended. For more information on INTALOX Packed Tower Systems, the combination of high performance packing with state-of-the-art liquid and vapor distributors as well as other column internals, please ask for our brochure, Packed Tower Internals.

Typical Applications

- Absorbers
 - CO₂ and H₂S selective absorption
 - Air pollution control scrubbers
 - Ammonia absorption
 - FCC absorbers
- Strippers
 - EO / EG
 - Water deaeration and decarbonation
 - Sour water stripper
- Heat transfer
 - Direct contact air cooler
- Quench columns
- Light ends fractionators
 - Demethanizers
 - Deethanizer
- Degassing
- Liquid/liquid extraction



Materials of Construction

In addition to the size and style options, these packings are also offered in various materials of construction.

- Carbon steel
- Stainless steels, including austenitic, ferritic, martensitic; types 409/410/430, 304 and 316
- Duplex stainless steels
- Nickel and nickel alloys
- Aluminum
- Copper and copper alloys
- Titanium and zirconium

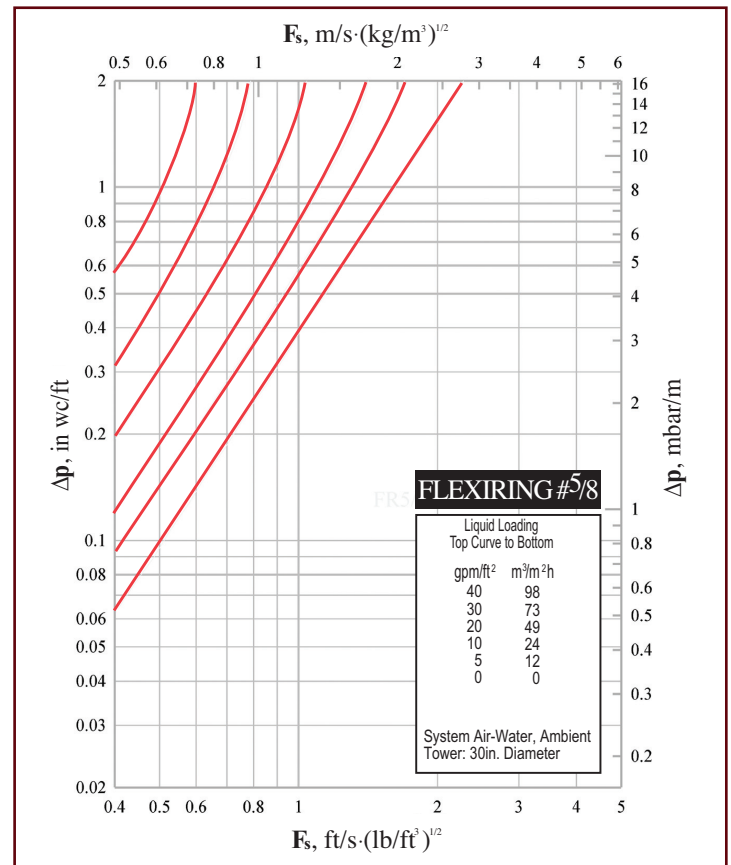
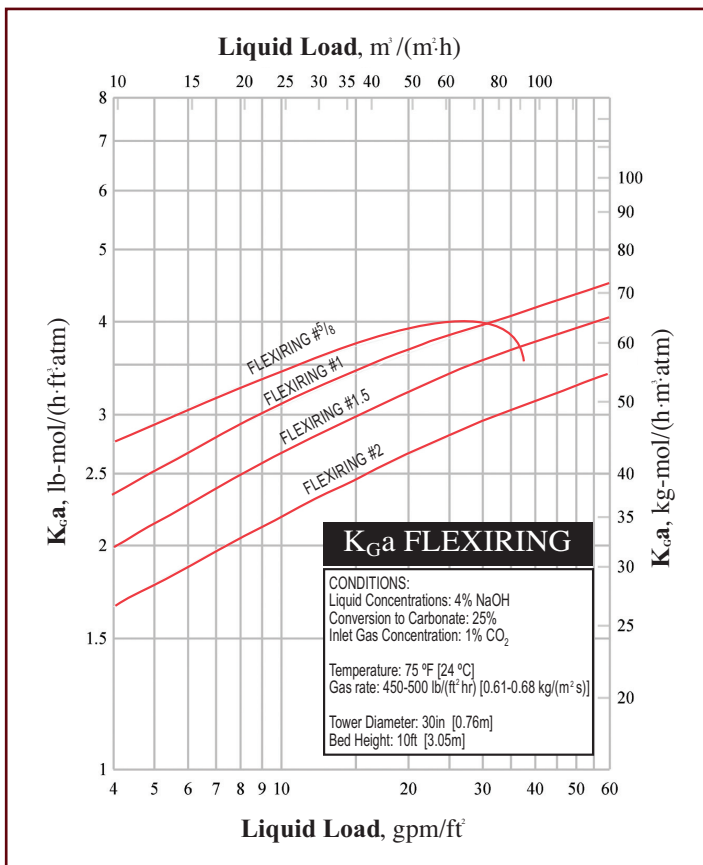
FLEXIRING® Random Packing

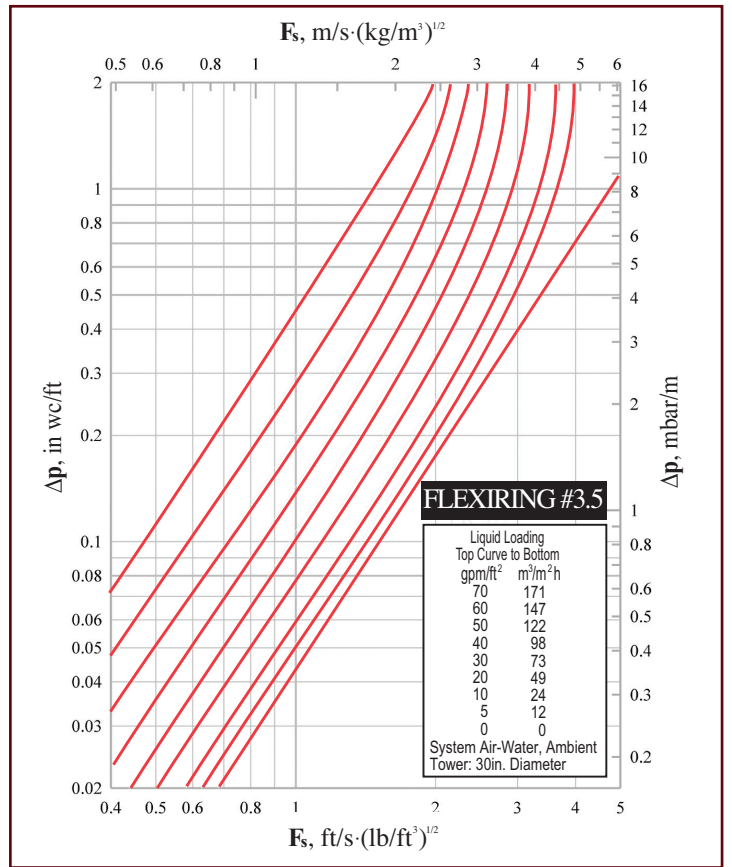
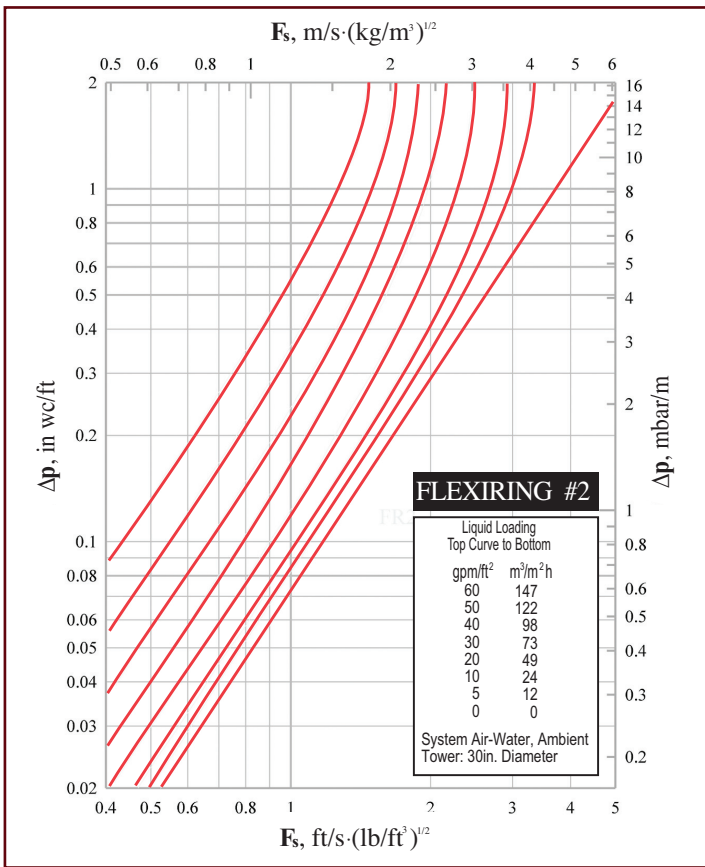
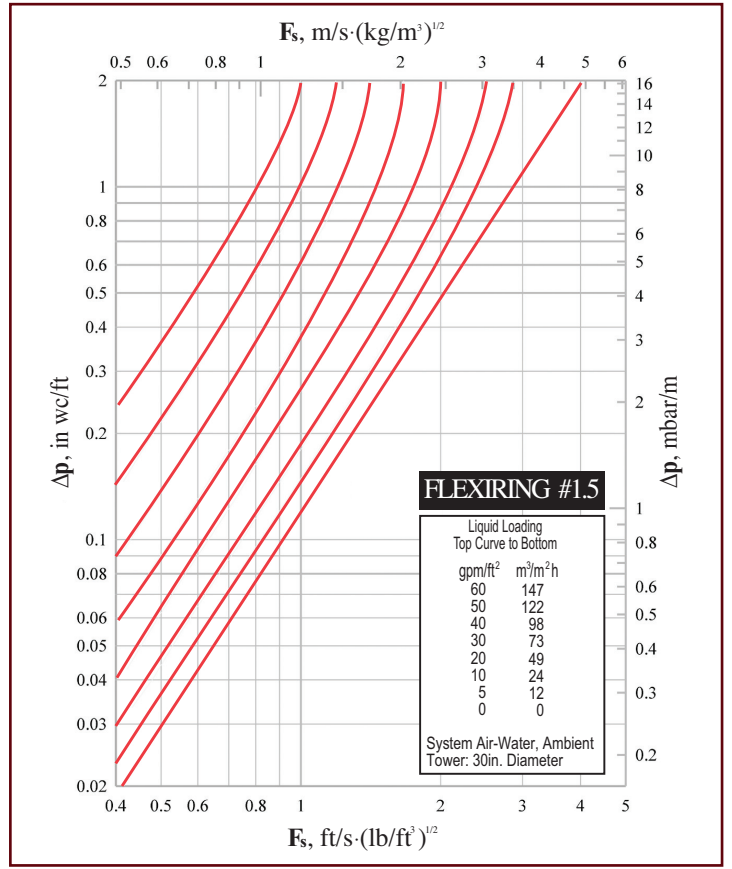
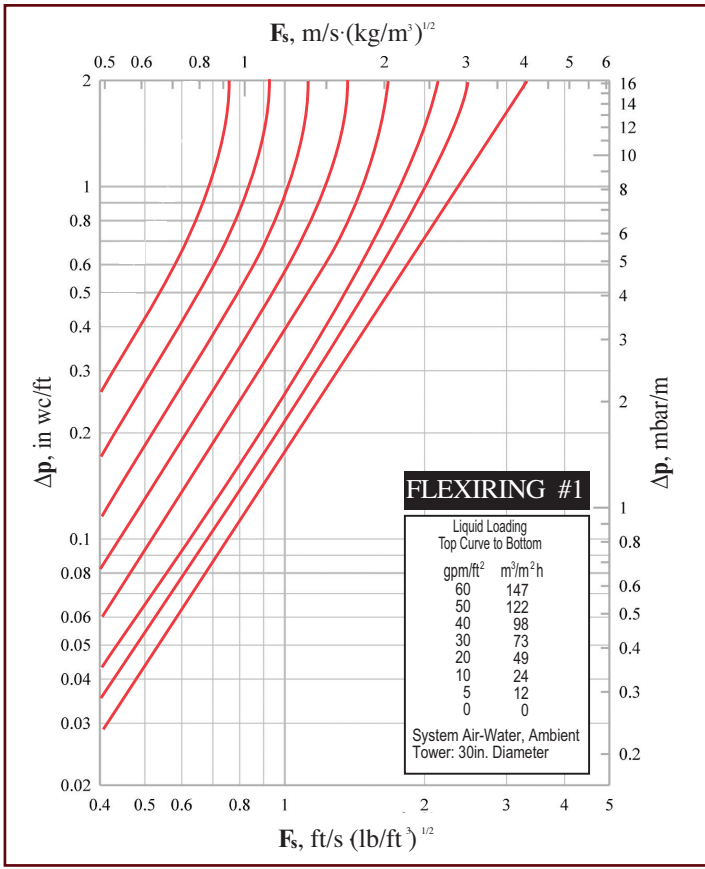
An economical and versatile industry standard with well-known performance characteristics.

Pall ring random packing is still widely used today. It is specified in a number of licensed processes and has been tested by various researchers over the years. FLEXIRING® packing from Koch-Glitsch is the industry recognized Pall ring packing equivalent. Koch-Glitsch offers a unique high strength FLEXIRING packing, with lower weight and improved mechanical strength, which provides an alternative to the 2-inch FLEXIRING packing. The mechanical strength of the high strength FLEXIRING packing is attained through its engineered shape.

FLEXIRING® Packing Size							High Strength
Nominal Size		5/8	1	1½	2	3½	2
	mm	16	25	38	50	90	50
	inch	5/8	1	1½	2	3½	2
Void Fraction	%	93	96	97	98	98	98
Bulk Weight*	kg/m³	535	325	208	198	135	141
	lb/ft³	33.4	20.3	13.0	12.4	8.4	8.8

* for stainless steel with standard material thickness





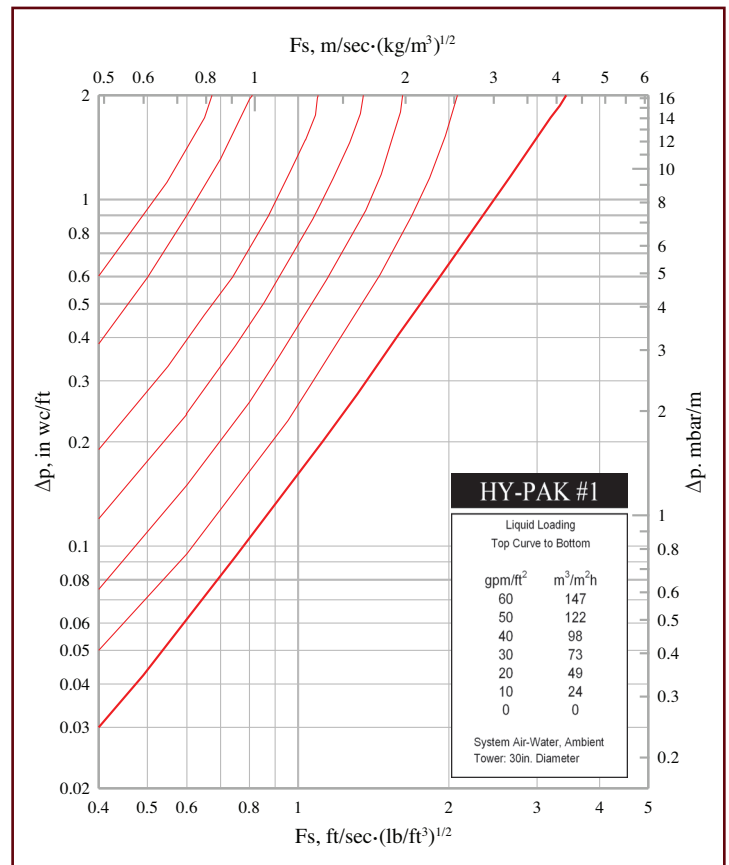
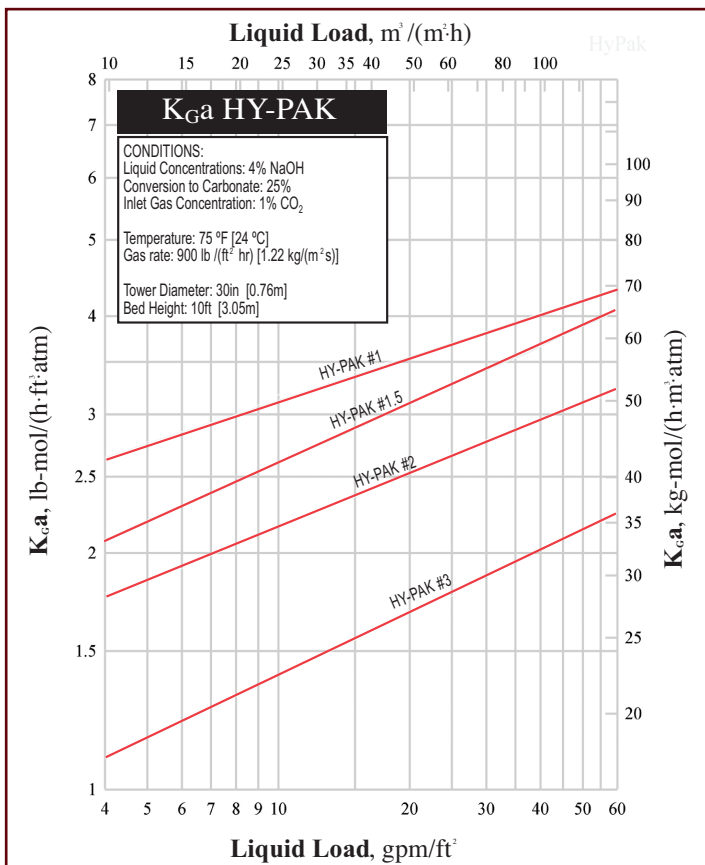
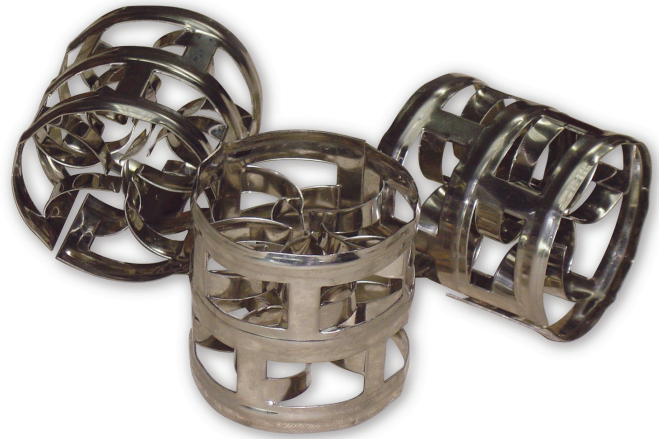
HY-PAK® Random Packing

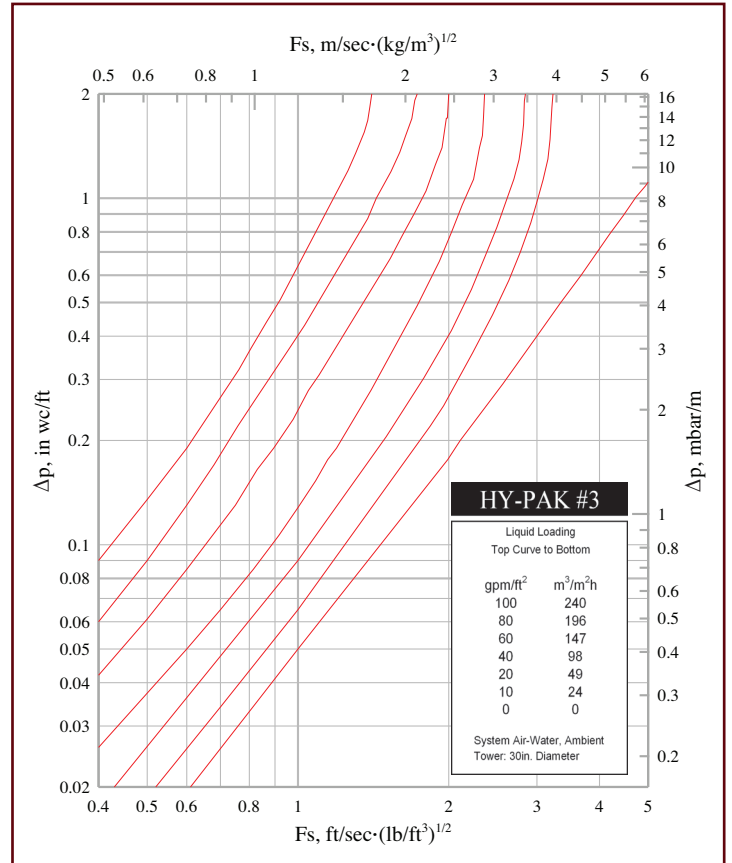
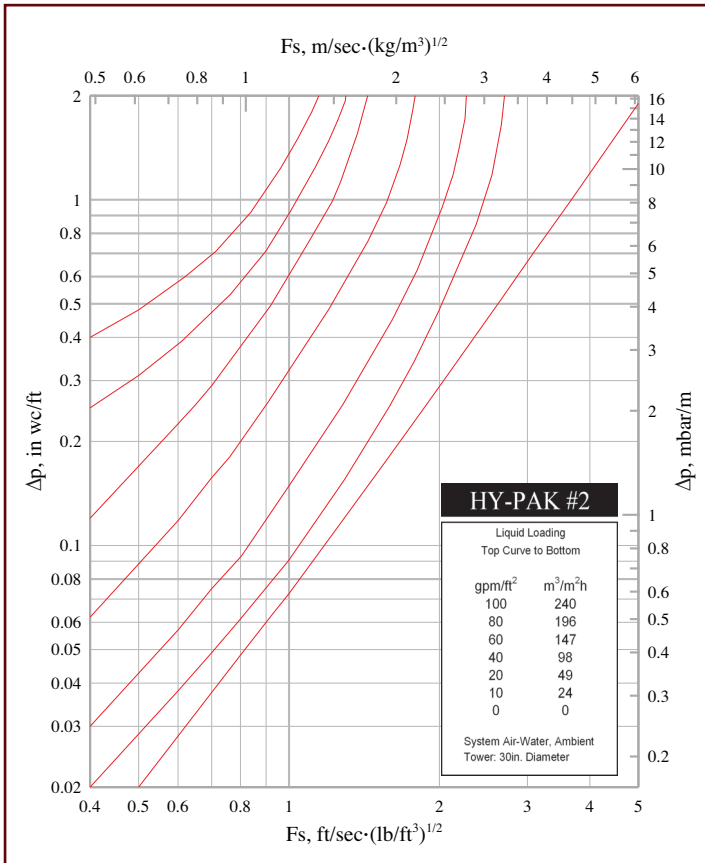
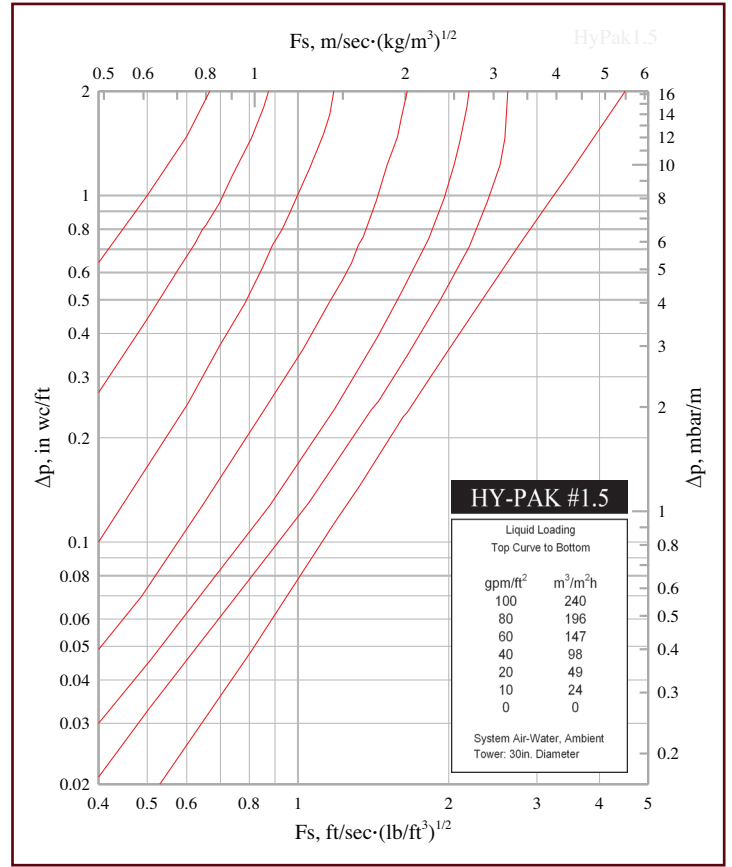
An improved alternative to FLEXIRING® or Pall type ring packing.

An improvement to the FLEXIRING packing geometry is in the HY-PAK® random packing, introduced to the market in the late 1960s. Maintaining a 1:1 aspect ratio, the number of fingers were doubled. The mechanical strength was enhanced through the introduction of circumferential stiffening ribs. The new geometry allowed the rings to be made slightly larger, effectively providing a new packing with increased capacity, reduced pressure drop, and no noticeable reduction in efficiency. HY-PAK packing is widely used as a direct replacement for FLEXIRING or Pall ring random packings of equivalent size in many applications to gain capacity or reduce pressure drop.

HY-PAK® Packing Size					
Nominal Size		1	1.5	2	3
	mm	30	45	60	90
	inch	1.18	1.75	2.37	3.5
Void Fraction	%	97	98	98	98
Bulk Weight*	kg/m ³	262	180	161	181
	lb/ft ³	16.4	11.2	10.0	11.3

* for stainless steel with standard material thickness





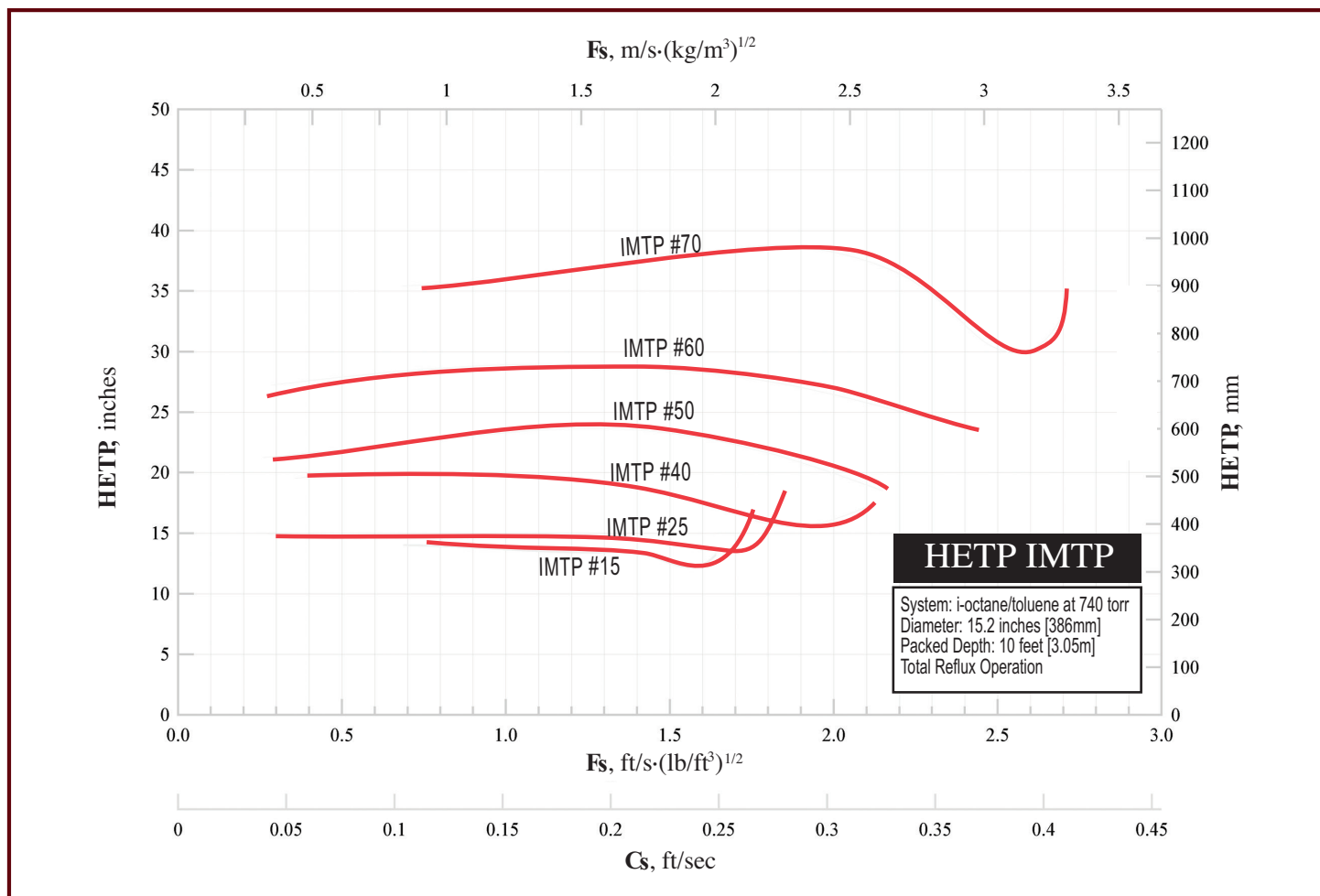
IMTP® Packing

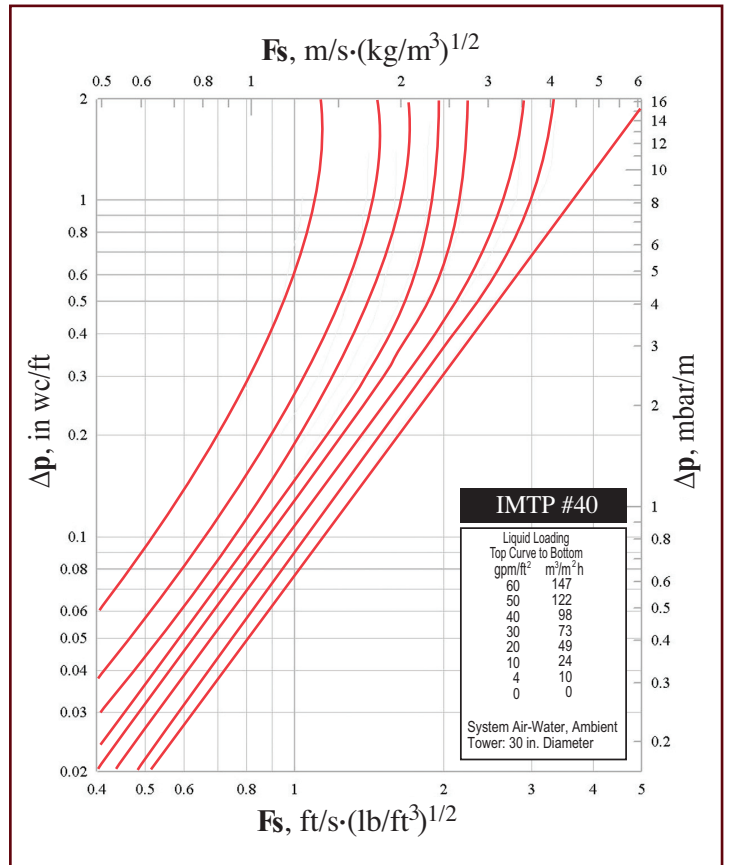
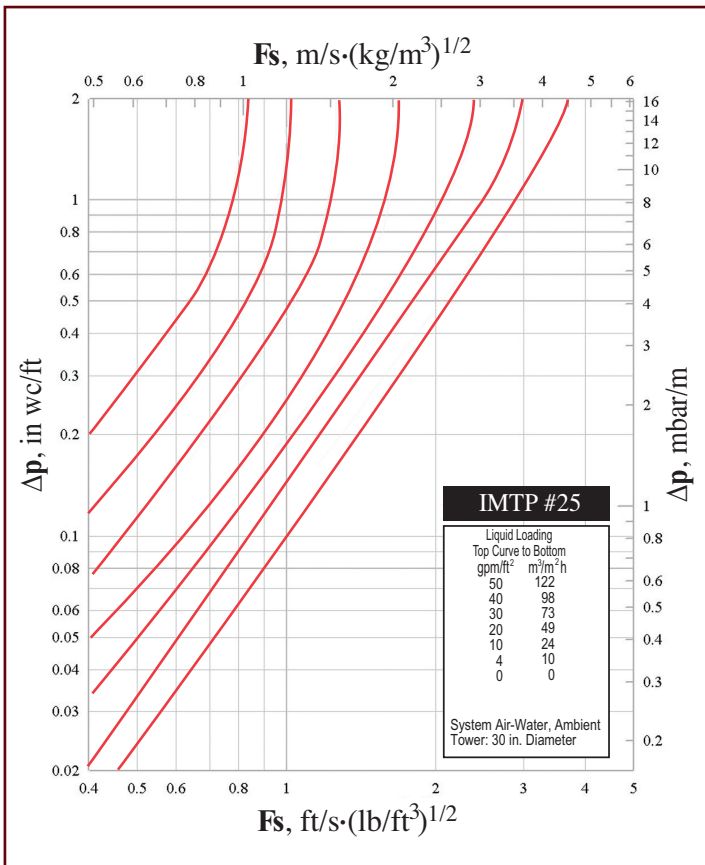
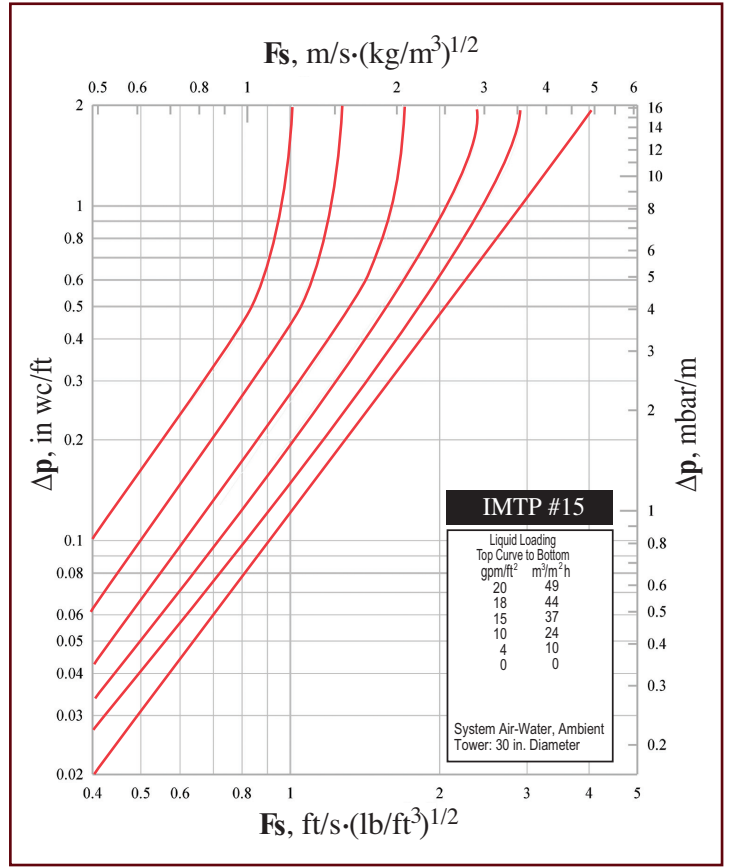
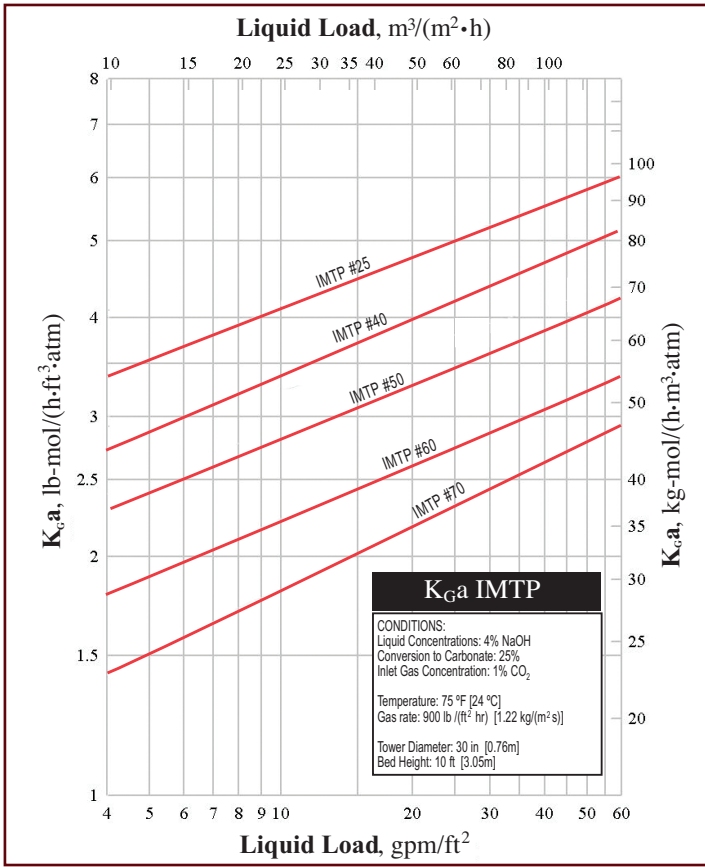
Provides low pressure drop and high efficiency.

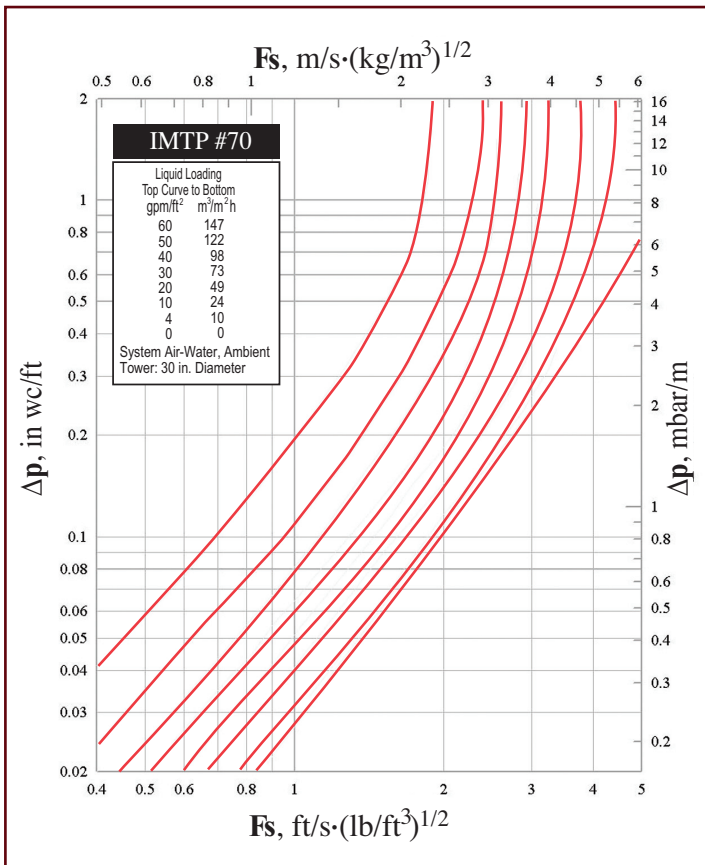
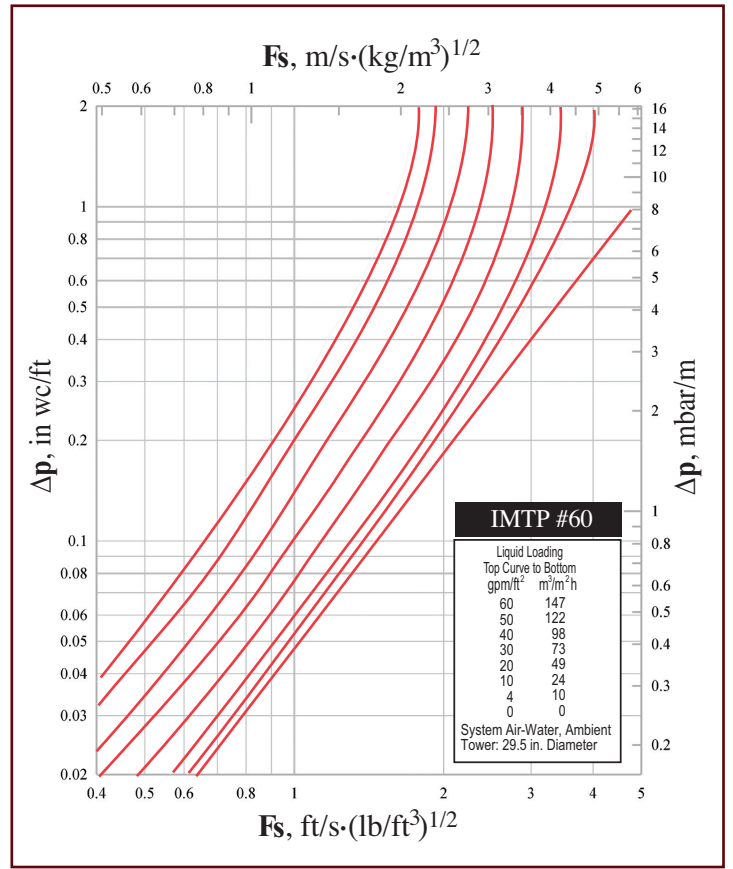
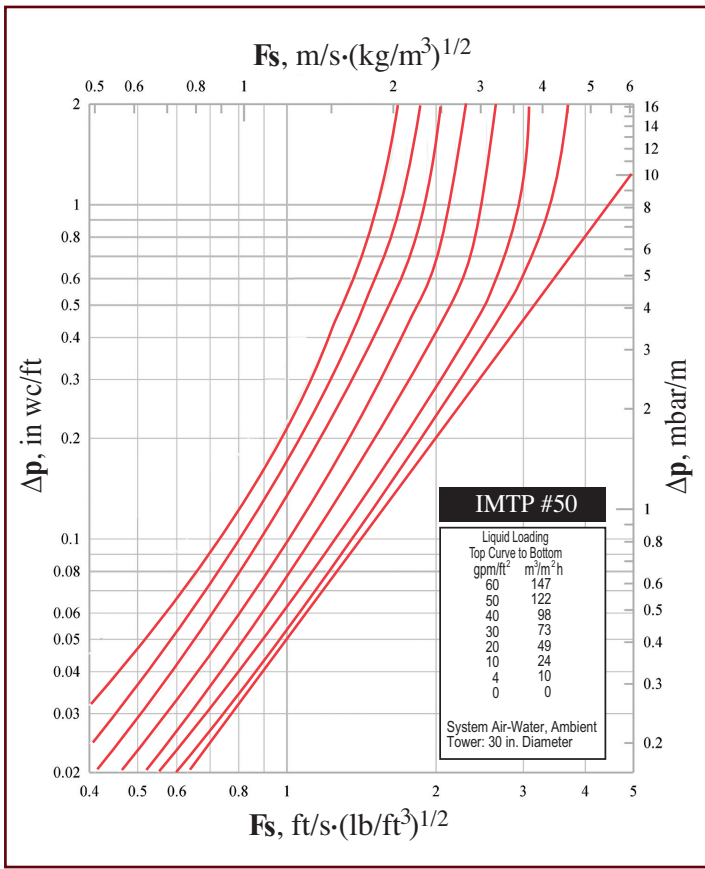
Developed in the late 1970s, IMTP® random packing combines the advantages of the saddle shape packing with that of modern high performance ring type packings. The inherent shape provides a lower pressure drop at the same vapor and liquid loads compared to previous generation packings. IMTP random packing has been applied in numerous distillation and absorption columns around the world. For demanding applications, combining IMTP random packing with state-of-the-art INTALOX Packed Tower Systems column internals is recommended. For more information on INTALOX Packed Tower Systems technology, refer to our brochure, Packed Tower Internals.

IMTP® Packing Size							
Nominal Size		15	25	40	50	60	70
	mm	15	25	40	50	60	70
	inch	$\frac{5}{8}$	1	1½	2	2¾	2¾
Void Fraction	%	96	97	98	98	99	98
Bulk Weight*	kg/m³	283	224	153	166	137	124
	lb/ft³	17.7	14.0	9.6	10.4	8.6	7.7

* for stainless steel with standard material thickness







Reasonable Minimum Wetting Rates

Operating limits for a column are set by the wetting rate (lower limit) and flooding (upper limit).

With IMTP random packing, distillation towers operate successfully in the range of 20-90% of flood. Estimated minimum wetting rates for aqueous systems are shown below. Lower wetting rates are possible with hydrocarbon systems. Packing efficiency remains relatively constant over 80% of the operating range.



Minimum Wetting Rates		
SURFACE	gpm/ft ²	m ³ /m ² h
Carbon steel or copper	0.3	0.7
Stainless steel, tantalum, other alloys	1.2	3.0

The above values are based on a packing with a specific surface area > 43 ft²/ft³ [141 m²/m³]. When operating below these values, as in vacuum distillation, new packings should be chosen that have better wetting characteristics.

- If materials with poorer wetting properties must be specified, the bed height may have to be increased and/or a more efficient packing should be used.
- As an alternative, structured packing may also be considered. For more information on Koch-Glitsch structured packing, please request our brochure, Structured Packing.
- The minimum liquid rate also depends on liquid distributor type and design. Please refer to the Packed Tower Internals brochure.

Turnaround Support and Services

Comprehensive services for turnarounds and shutdowns.

Downtime is critical for both planned and unplanned turnarounds. Koch-Glitsch is available 24/7 to offer equipment and comprehensive support and services to get your tower up and running as quickly as possible. Our response teams are strategically located around the world and are ready to serve you at any time.

Services include:

- Inspection
- Hardware trailers and lockers
- AHOP® Automated Hardware Ordering Program
- Equipment Support Services (ESS) technicians

Combined with Koch Specialty Plant Services, Koch-Glitsch goes a step further with its ability to deliver unique, value-driven turnkey equipment and installation solutions to provide faster, safer revamps, which often result in shorter duration turnarounds.



Emergency Delivery

Emergencies happen . . .

Koch-Glitsch has a wide variety of products to provide optimum performance whatever the application. Many common materials are in stock, and equipment can be quickly manufactured to meet your requirements regardless of original equipment manufacturer.

With strategically located manufacturing facilities and warehouses, Koch-Glitsch leads the industry with its on-time performance for delivery of emergency trays and hardware, packing and internals, and mist elimination equipment.

For emergencies, call the Hotline of your nearest Koch-Glitsch office:

- In the US and Latin America, call 1-888-KOCH-911 (mass transfer), 1-316-207-7935 (mist elimination), or your local Koch-Glitsch office.
- In Canada, call 1-905-852-3381 (Uxbridge, Ontario).
- In Europe, call +39-06-928-911 (Italy), +44-1782-744561 (UK), or your local Koch-Glitsch office.
- In Asia, call +65-6831-6500 (Singapore) or your local Koch-Glitsch office.

Koch-Glitsch Corporate Offices

Worldwide Headquarters

Koch-Glitsch, LP

4111 East 37th Street North | Wichita, KS 67220 - United States | tel: (316) 828-5110 | fax: (316) 828-7985

Europe

Koch-Glitsch Italia S.r.l.

Via Torri Bianche, 3A | 20871 Vimercate MB - Italy | tel: +39-039-6386010 | fax: +39-039-6386011

Asia

Koch Chemical Technology Group Singapore Pte. Ltd.

260 Orchard Road, #11-01/09
The Heeren | Singapore 238855 | tel: +65-6831-6500 | fax: +65-6835-2031

Koch-Glitsch (a division of Koch Chemical Technology Group India Pvt. Ltd.)

10th Floor, Corporate Park II
Sion-Trombay Road | Chembur, Mumbai 400 071 - India | tel: +91-22-6771-7171 | fax: +91-22-6771-7161

For a complete list of our offices and facilities, visit us on the Web at www.koch-glitsch.com.



Emergency Numbers

United States/Latin America: 1-888-KOCH-911 (mass transfer), 1-316-207-7935 (mist elimination),
or your local Koch-Glitsch office.

Canada: 1-905-852-3381 (Uxbridge, Ontario).

Europe/Middle East/Africa: +39-06-928-911 (Italy), +44-1782-744561 (UK),
or your local Koch-Glitsch office.

Asia: +65-6831-6500 (Singapore) or your local Koch-Glitsch office.

Trademarks

The following registered trademarks are owned by Koch-Glitsch, LP in the United States and may be registered in other jurisdictions: AHOP® Automated Hardware Ordering Program, FLEXIRING® random packing, HY-PAK® random packing, IMTP® random packing, INTALOX® Packed Tower Systems, KG-TOWER® software, KOCH-GLITSCH, and "K" KOCH-GLITSCH. The following trademarks are owned by Koch-Glitsch, LP in the United States and may be registered in other jurisdictions: YOU CAN RELY ON US. All other trademarks, service marks, or registered trademarks that appear in this document are the trademarks or service marks of their respective owners.

For related trademark information, visit <http://www.koch-glitsch.com/trademarks>.

Legal Notice

The information contained in this bulletin is believed to be accurate and reliable, but is not to be construed as implying any warranty or guarantee of performance.

