Knovel

研究流程的最佳辅助利器

Knovel交互式工程数据分析数据库

飞资得信息技术

2012/11/14

内容

Knovel简介：为实务工作中的问题提供最佳答案

权威的内容、**优化的检索**以及**数据分析工具**

- 在此一章节我们将体验Knovel独特的三项重要功能

如何使用–**内容浏览**

- 以Knovel Critical Tables为例

如何使用–**数据查询**

- 在此一章节我们将学习到如何透过数据分析工具的查询来找到问题的答案

如何使用–**基本检索**

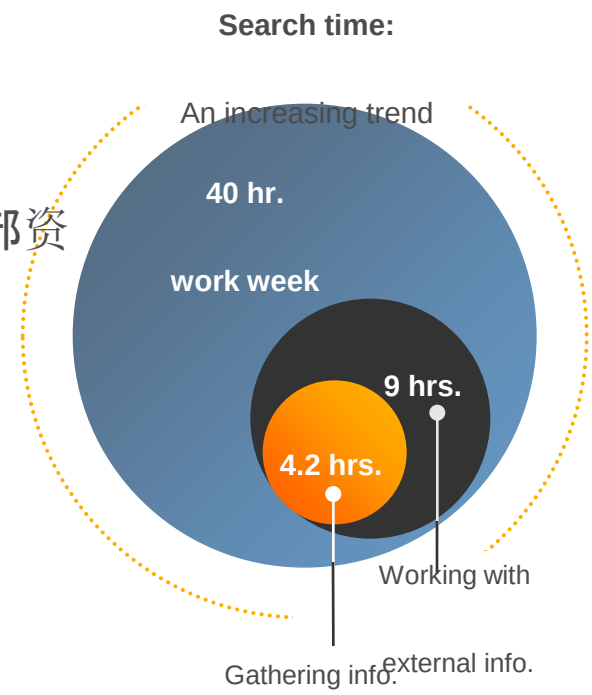
- 在此一章节我们将了解如何自超过2千种手册及参考工具书中发现答案。在说明中会强调如何整合文字于数字化的内容中。

个人化的Knovel – myKNOVEL

- 在此一章节中我们将说明如何让个别的教授和学生可以在Knovel中建立自己的空间

High Performance Culture: Engineers Knowledge

- 科学信息(Science information)每15-20年增加一倍*
- 工程师所需的知识有83%是在毕业后才习得
- 工程师经常需要重新组织所获得的新知识**
- 工程师每周花费25%的工作时间(约9小时)在处理外部资讯…在这个数字中,
- 48%是花在收集资讯, . 而这个数字呈上升趋势！
- 每10个网络检索, 就有4个是失败的 (~38%)



* Communication Patterns of Engineers, Tenopir, et al, IEEE 2004

** Outsell

Knovel协助教师达成帮助学生从实务问题中学习解决方案的目标

- **什么是Knovel?** Knovel数据库由Knovel公司开发，透过领先的技术提供数据深度挖掘的分析和检索工具，与工程、化工相关学科的整合信息与数据，为相关领域的学者、学生、和工程师提供值得信赖的答案并藉此创造出全新的解决方案
- Knovel同时关注企业、政府、学术三界的工程学、化工社群动态，并致力与其合作，希望成为工程师解决问题时的首选资源
- **历史:**
  - 在过去10年中，Knovel成功帮助全球知名机构的工程师，发挥创意执行节省成本的项目。
  - 高达9成的续订率
- **使用Knovel的单位:**
  - 超过700家技术独步全球的学术机构、研究机构及企业使用Knovel，其中有74家企业名列全球前500大企业。
  - 超过340家全球顶尖高校采用Knovel辅助教学及研究，其中有12家名列全美前15大工程学院，10家名列全球15强机械顶尖、航空航天、制造工程高校。
  - 亚太地区使用Knovel的知名学术机构日益增加，包括新加坡南洋理工大学、澳洲雪梨大学、香港科技大学、韩国浦项科技大学以及中国的中国科学院、清华大学和浙江大学。
  - 工程学领域学会，包括ASME, AIChE, and ICHEME等前10大主要学会都与Knovel合作。

*Based on the survey of 469 ASME and 285 AIChE members

We have a **distinguished** customer list - the world's leading **BUSINESSES**

- **> 300** Universities in 40 countries
- 62% of Top 50 Universities in the World
- 12 of Top 15 US Engineering Schools

- **>300** Corporate & Government Customers
- **74** of Fortune 500 companies
- **Above 90%**renewal rate

Regionally

- **Tsinghua University, China**
- **University of Sydney, Australia**
- **University of Hong Kong, China**
- **Hong Kong University of Science & Technology, China**
- **Nanyang Technological University, Singapore**
- **Hanyang University, Korea**
- **National Institute of Technologies, India**

Worldwide

We have a **distinguished** customer list - the world's leading **BUSINESSES**

Knovel的内容–来自于50多家国际顶尖出版社与学会组织

AASHTO美国州公路和运输官员协会	DECHEMA德国化工与生物技术学会	National Ground Water Association美国地下水协会
AIAA美国航天学会	FASEB美国实验生物学联会	PMI国际项目管理学会
AIChE美国化学工程师学会	IFIS国际食品信息服务	RSC英国皇家化学学会
AMACOM美国管理协会	IABSE国际桥梁与结构工程协会	SAE International国际自动机工程学会
AOCS美国油脂化学学会	IChemE化学工程师学会	SIAM美国工业与应用数学学会
ASHRAE美国冷凍空调协会	IET国际工程技术学会	SME矿冶与探测学会
ASME美国机械工程学会	ISA国际自动化协会	SNAME美国造船暨轮机工程学会
ASM International美国材料信息学会	IOP英国物理学会	SPE国际塑料工程师学会
AEE美国能源工程师协会	TMS美国矿冶与材料学会	SVC美国真空镀膜协会
ASTM International美国材料试验协会	NACE International美国防蚀工程学会	SPIE国际光学工程学会
AWWA美国水行业协会	NCRP美国辐射防护与度量委员会	TRB美国运输研究委员会
		WEF水环境协会

Knovel持续的努力在在线服务领域获得卓越的国际奖项

- **Knovel**is regularly featured in top **engineering & content publications**

- **Knovel2010 Awards**

2010 SIIA //CODiE// WINNER

GOLDEN MOUSETRAP Best New Products AWARDS FINALIST 2010

AMERICAN BUSINESS AWARDS STEVIES 2010 FINALIST

- **KnovelQuotes by Industry Reporters**

Industrial Engineer April 2010 .....

"Think of Knovel's website as a digital library – subscribers search for and find information on virtually any technical topic."– Jessie Jeppsson

Desktop Engineering March 2010 .....

"Like a Google for engineers, this one-stop technical source streamlines the process of finding trusted content for increased productivity and accuracy." – Pamela Waterman

Information Today December 2009.....

"With continuous content additions & enhancements in features & functions, (Knovel) has become an online resource that really helps engineers find reliable technical information faster."– Paula J. Hane

Knovel不同于纸本书或电子书的特性

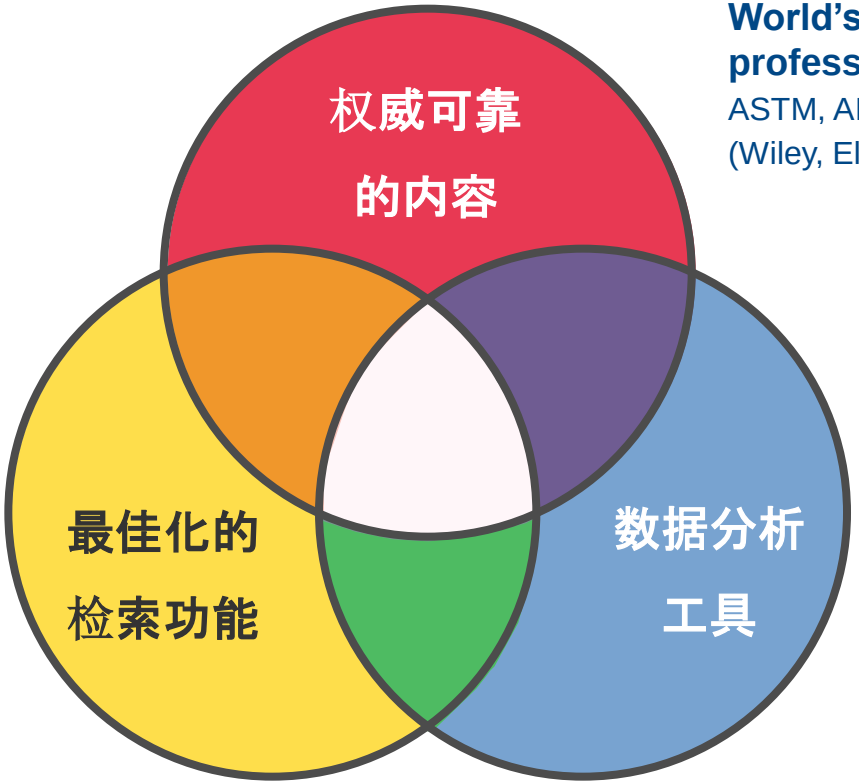
	Knovel	E Book Company	E book via Google	Print Book
所有的内容皆出自可信任的来源	✓			
内容专注于工程人员研究者的需求	✓			
整合文字检索与交互式内容	✓			
提供可互动的表格、图解和公式以获得更好的输出应用	✓			
在表格、图解和公式中搜寻数据–不仅文字	✓			
转换度量单位以搜寻更多相关结果	✓			
可以查询特定的数值或范围	✓			
在工程与材料主题中执行优化检索以获得具体的结果	✓			

9

KNOVEL helps engineers make informed decisions

透过领先的技术，提供数据深度挖掘的分析和检索工具，与工程、化工相关学科的整合信息与数据。

检索文字或数据
-Materials材料
-Chemical Substances化学物质
-Corrosion rate腐蚀速率
-Thermal Conductivity热传导率
-Stress Concentration应力集中
-Melting Point熔点
-Tensile Strength拉伸强度
-Fracture Toughness – 断裂韧性
-Adsorption Capacity吸附能力
-Boiling Point沸点
-Alloys合金



World's leading engineering professional societies (ASME, ASHRA ASTM, AICHE) **and** global **publishers** (Wiley, Elsevier)

使用工作流程工具来分析结果
-互动式图表、表格及方程
-直接汇出至桌面
-直接汇出至书目管理软体，
例如 Endnote

What if ? What is ? How do I?

KNOVEL delivers significant value

"KNOVEL is the missing link to complete my journey to becoming a superman."

- Engineer at Top 5 Engineering Design Firm

专案设计&发展 Project Design & Development

- "材料选择，类型相似的设计，和公式或法则"
- "下水道的问题，基础建设，钢铁，公路，混凝土配合比设计"
- "蒸汽热负荷，蒸汽表，产品密度信息，HVAC计算等."

过程改善 Process Improvement

- "过程信息，优势表格，公式"
- "石油和天然气的过程，化学过程"
- "这个提供一站式的多种类型数据，我不需浪费时间联系制造商或上网进行搜索"

安全 & 制度遵守 Safety & Compliance

- "石油和天然气设施相关的技术设计。监督管理和环境方面的考虑。监督管理和环境方面的考虑。"
- "准备测试和认证"
- "建设规划和管理，调度，项目控制，施工性研究"

Validated Content from Major Publishers & Societies

权威可靠的内容

- Established, accepted science sourced from recognized societies & publishing partners
- Stringent selection process driven by customer requests and vetted by industry experts
- Editorial Advisory Board provides deep engineering experience & leadership ensuring depth & breadth of content meets customer needs

American Water Works Association
The Authoritative Resource on Safe Water

ASHRAE

AIChE

The Association of Energy Engineers

ISA

PennWell®

AASHTO 1914

ASTM INTERNATIONAL
Standards Worldwide - Home

ASME
SETTING THE STANDARD

IOP

Over the past 12 months the engineers of ONE major aerospace company accessed **64,000 chapters** via Knovel

收录在超过25个工程学领域的可被信任的权威内容

- Adhesives, Coatings, Sealants & Inks
- Aerospace & Radar Technology
- Biochemistry, Biology & Biotechnology
- Ceramics & Ceramic Engineering
- Chemistry & Chemical Engineering
- Civil Engineering & Construction Materials
- Computer Hardware Engineering
- Earth Sciences
- Electrical & Power Engineering
- Electronics & Semiconductors
- Environment & Environmental Engineering
- Food Science
- General Engineering & Engineering Management
- Industrial Engineering & Operations Management
- Mechanics & Mechanical Engineering
- Metals & Metallurgy
- Mining Engineering & Extractive Metallurgy
- Nanotechnology
- Oil & Gas Engineering
- Optics & Photonics
- Pharmaceuticals, Cosmetics & Toiletries
- Plastics & Rubber
- Process Design, Control & Automation
- Safety & Industrial Hygiene
- Sustainable Energy & Development
- Textiles
- Transportation Engineering
- Welding Engineering & Materials Joining

专为工程师设计的优化搜索引擎 – *TEXT & DATA*

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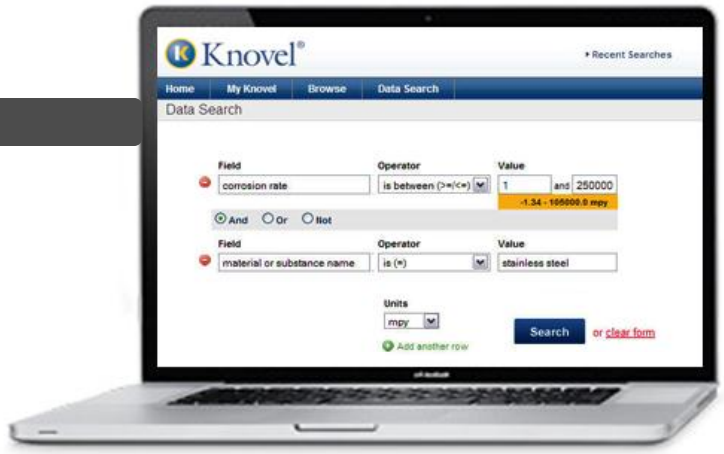
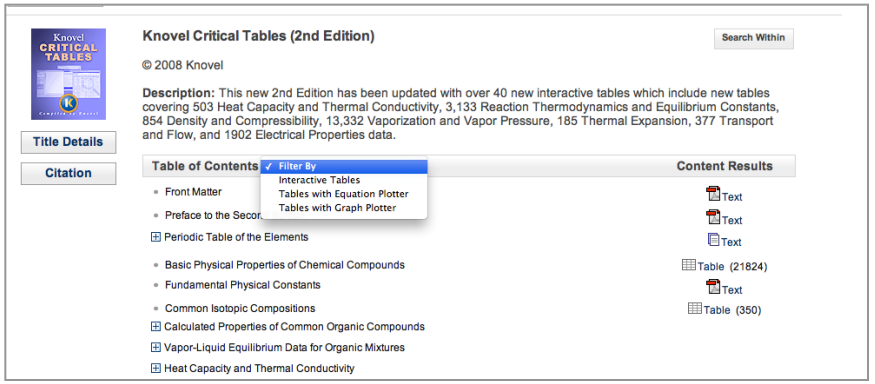
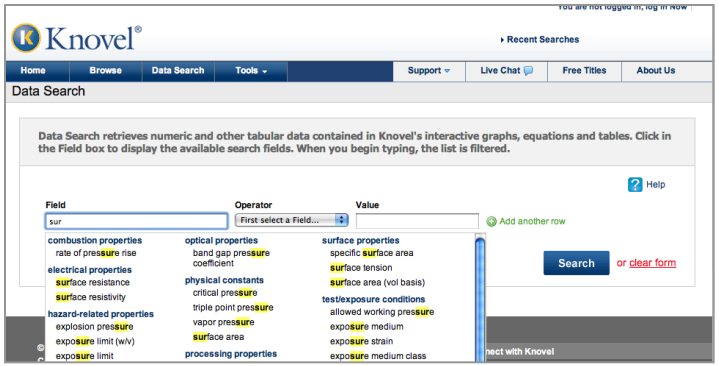
为工程师设计的最佳化搜寻

- **搜寻隐藏在表格、图和公式中的数据资料**
- **“了解”工程师的语言**
- **提供数值或数值范围的搜寻**
- **自动化的度量单位转换**
- **可以执行多个栏位的查询**

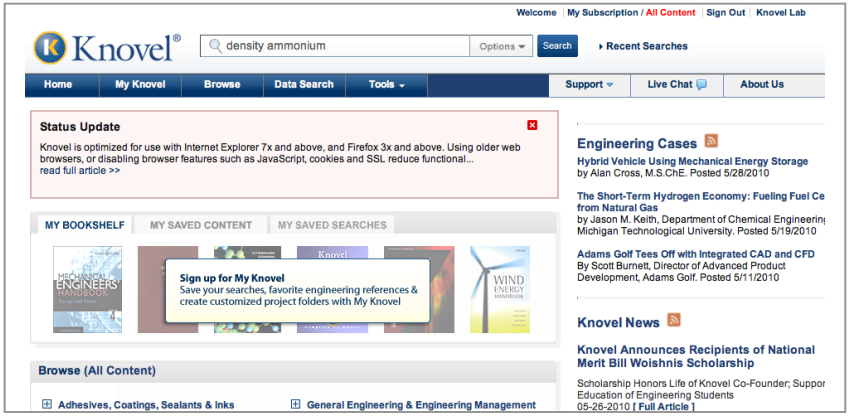


直接从内容页(content page)中使用超过95,000个已数字化的交互式表格、图与方程式





搜寻数据数据：
在超过95,000个已数字化的表格、图与公式中搜寻



搜寻文字：
整合搜寻超过2,000种的手册、参考书以及95,000个相关的数字化表格、图解和公式

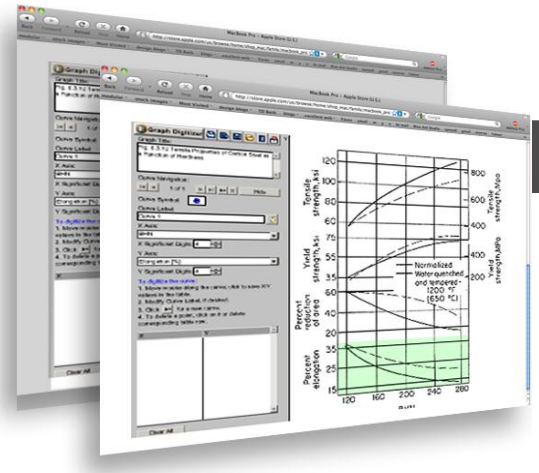
将数据分析工具整合在工程师的工作流程中

Validated Content

- Established, accepted science sourced from recognized societies & publishing partners
- Stringent selection process driven by customer requests and vetted by industry experts
- 7 member Editorial Advisory Board provides deep engineering experience & leadership ensuring depth & breadth of content meets customer needs

Search Optimized for Engineers

- Finds hidden data, hidden tables, graphs, and equations
- "Understands" engineering language
- Allows numeric range search
- Automatically performs unit conversion
- Performs multi-variable search



将数据分析工具 整合在工程师的工作流程中

- 简单的工具可做初步的计算与信息的整合
- 超过95,000种互动表格、图和公式
- 可以客制化并操作数据呈现方式，同时可以轻松的在工作表中排序
- 可以直接在图表中绘制一个或多个数据点和曲线
- 可以导出数据到指定的格式(Excel, MathCAD)

Chemistry & Chemical Engineering

Analytical Chemistry | Catalysis | Dispersion & Aggregation | Electrochemistry | Environmental Chemistry

General References | Industrial Chemistry & Chemicals | Industrial Safety | Physical Chemistry

Plant Design, Operation & Energy Efficiency | Polymer Chemistry | Separation | Transport Processes

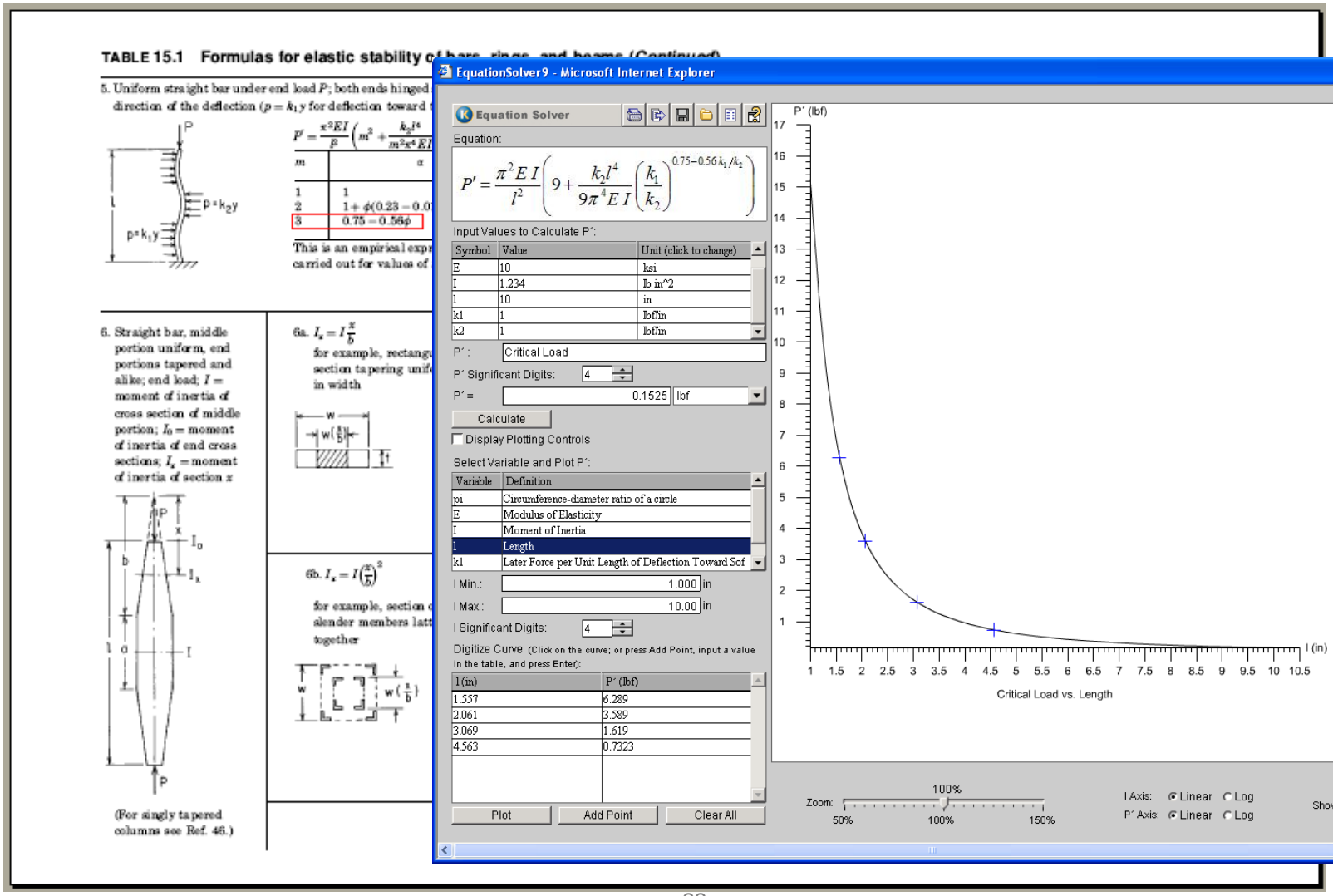
General References

All Titles | **Titles with Interactive Tools**

显示已有数字化的表格、图和公式

- Chemical Properties Handbook
- Chemical Reaction Engineering (3rd Edition) Updated
- Chemistry of the Elements (2nd Edition)
- DIPPR 882 - Transport Properties and Related Thermodynamic Data of Binary Mixtures, Parts 1-4
- DIPPR Project 801 - Full Version
- Dean's Analytical Chemistry Handbook (2nd Edition)
- Dean's Handbook of Organic Chemistry (2nd Edition)
- Handbook of Inorganic Chemicals
- Hawley's Condensed Chemical Dictionary (14th Edition)
- International Critical Tables of Numerical Data, Physics, Chemistry and Technology (1st Electronic Edition)
- Knovel Critical Tables (2nd Edition)
- Knovel Steam Tables

数据分析工具-公式的套用



数据分析工具-互动表格

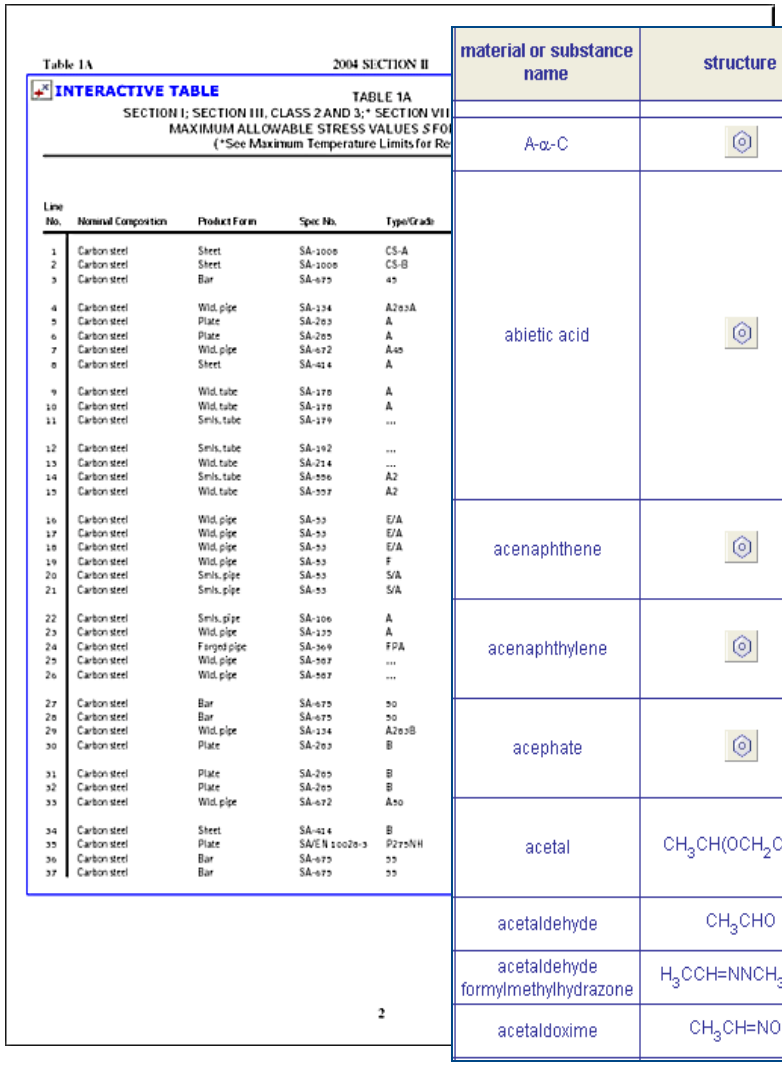


Table 1A 2004 SECTION II

INTERACTIVE TABLE

TABLE 1A

SECTION I; SECTION III, CLASS 2 AND 3;* SECTION VII

MAXIMUM ALLOWABLE STRESS VALUES *S* FOR

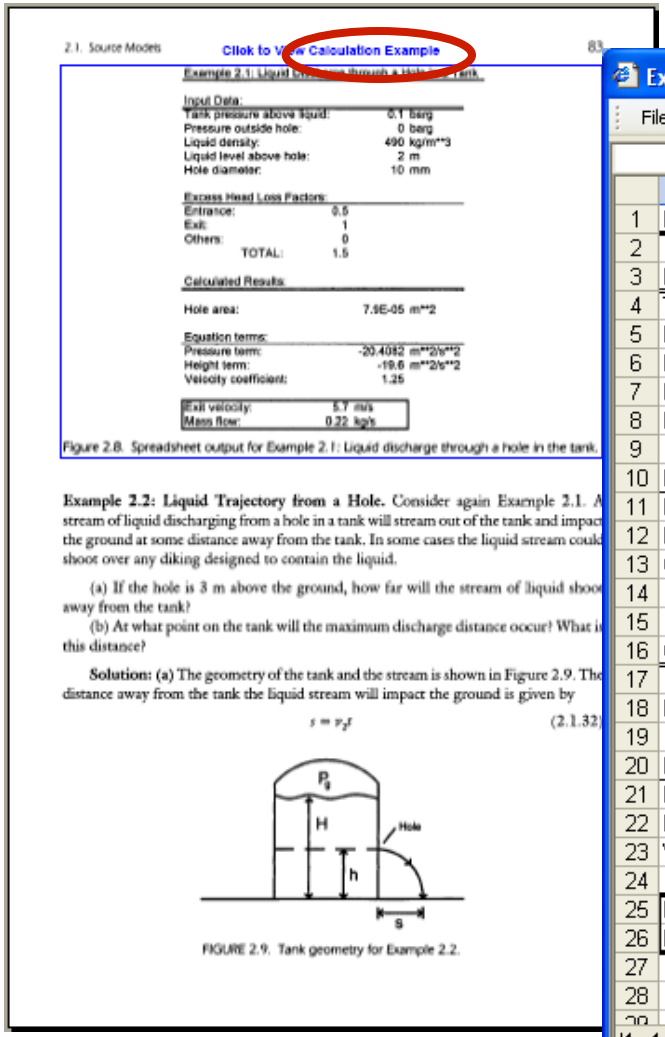
(*See Maximum Temperature Limits for Re

Line No.	Nominal Composition	Product Form	Spec No.	Type/Grade
1	Carbon steel	Sheet	SA-1008	CS-A
2	Carbon steel	Sheet	SA-1008	CS-B
3	Carbon steel	Bar	SA-675	45
4	Carbon steel	Wld. pipe	SA-134	A283A
5	Carbon steel	Plate	SA-283	A
6	Carbon steel	Plate	SA-285	A
7	Carbon steel	Wld. pipe	SA-672	A45
8	Carbon steel	Sheet	SA-414	A
9	Carbon steel	Wld. tube	SA-178	A
10	Carbon steel	Wld. tube	SA-178	A
11	Carbon steel	Smls. tube	SA-179	...
12	Carbon steel	Smls. tube	SA-192	...
13	Carbon steel	Wld. tube	SA-214	...
14	Carbon steel	Smls. tube	SA-556	A2
15	Carbon steel	Wld. tube	SA-557	A2
16	Carbon steel	Wld. pipe	SA-53	E/A
17	Carbon steel	Wld. pipe	SA-53	E/A
18	Carbon steel	Wld. pipe	SA-53	E/A
19	Carbon steel	Wld. pipe	SA-53	F
20	Carbon steel	Smls. pipe	SA-53	S/A
21	Carbon steel	Smls. pipe	SA-53	S/A
22	Carbon steel	Smls. pipe	SA-106	A
23	Carbon steel	Wld. pipe	SA-135	A
24	Carbon steel	Forged pipe	SA-369	FPA
25	Carbon steel	Wld. pipe	SA-587	...
26	Carbon steel	Wld. pipe	SA-587	...
27	Carbon steel	Bar	SA-675	50
28	Carbon steel	Bar	SA-675	50
29	Carbon steel	Wld. pipe	SA-134	A283B
30	Carbon steel	Plate	SA-283	B
31	Carbon steel	Plate	SA-285	B
32	Carbon steel	Plate	SA-285	B
33	Carbon steel	Wld. pipe	SA-672	A50
34	Carbon steel	Sheet	SA-414	B
35	Carbon steel	Plate	SA/EN 10028-3	P275NH
36	Carbon steel	Bar	SA-675	55
37	Carbon steel	Bar	SA-675	55

2

material or substance name	structure	mol. formula	mol. weight	CAS Registry no.	RTECS no.	EINECS no.	melting point (°C)	boiling point (°C)	flash point (°C)	sp. gravity
A-α-C		$C_{11}H_9N_3$	183.21	26148-68-5			202			
abietic acid		$C_{20}H_{30}O_2$	302.46	514-10-3		208-178-3 (technical)	172-175 (monoclinic plates from alcohol plus water), commercial abietic acid may be glassy or partly crystalline and may melt as low as 85			
acenaphthene		$C_{12}H_{10}$	154.21	83-32-9	AB 1000000	201-469-6	93-95	279		1.0242 at 90°C with respect to water at 4°C
acenaphthylene		$C_{12}H_8$	152.20	208-96-8	AB 1254000	205-917-1	92-93	265-275		0.899 at 16° C with respect to water at 2°C
acephate		$C_4H_{10}NO_3PS$	183.17	30560-19-1	TB 4760000	250-241-2	88-90; 82-93 (technical grade)			1.35 (temperature unspecified)
acetal	$CH_3CH(OCH_2CH_3)_2$	$C_6H_{14}O_2$	118.18	105-57-7	AB 2800000	203-310-6	-100	102.7	-20.5	0.8254 at 20°C with respect to water at 4°C
acetaldehyde	CH_3CHO	C_2H_4O	44.05	75-07-0	AB 1925000	200-836-8	-123.5	20.2	-27	0.783 at 20° C
acetaldehyde formylmethylhydrazone	$H_3CCH{=}NNCH_3CHO$	$C_4H_8N_2O$	100.12	16568-02-8	LQ 8500000		5			
acetaldoxime	$CH_3CH{=}NOH$	C_2H_5NO	59.07	107-29-9	AB 2975000	203-479-6	47	115		

数据分析工具公式的套用- EXCEL



2.1. Source Models — Click to View Calculation Example — 83

Example 2.1: Liquid Discharge through a Hole in a Tank

Input Data:

Tank pressure above liquid:	0.1	barg
Pressure outside hole:	0	barg
Liquid density:	490	kg/m**3
Liquid level above hole:	2	m
Hole diameter:	10	mm

Excess Head Loss Factors:

Entrance:	0.5	
Exit:	1	
Others:	0	
TOTAL:	1.5	

Calculated Results:

Hole area:	7.9E-05	m**2

Equation terms:

Pressure term:	-20.4082	m**2/s**2
Height term:	-19.6	m**2/s**2
Velocity coefficient:	1.25	

Exit velocity:	5.7	m/s
Mass flow:	0.22	kg/s

Figure 2.8. Spreadsheet output for Example 2.1: Liquid discharge through a hole in the tank.

Example 2.2: Liquid Trajectory from a Hole. Consider again Example 2.1. A stream of liquid discharging from a hole in a tank will stream out of the tank and impact the ground at some distance away from the tank. In some cases the liquid stream could shoot over any diking designed to contain the liquid.

(a) If the hole is 3 m above the ground, how far will the stream of liquid shoot away from the tank?

(b) At what point on the tank will the maximum discharge distance occur? What is this distance?

Solution: (a) The geometry of the tank and the stream is shown in Figure 2.9. The distance away from the tank the liquid stream will impact the ground is given by

$$s = v_x t \qquad (2.1.32)$$

FIGURE 2.9. Tank geometry for Example 2.2.

Example 2.1 Liquid Discharge through a Hole in a Tank - Microsoft Internet Explorer

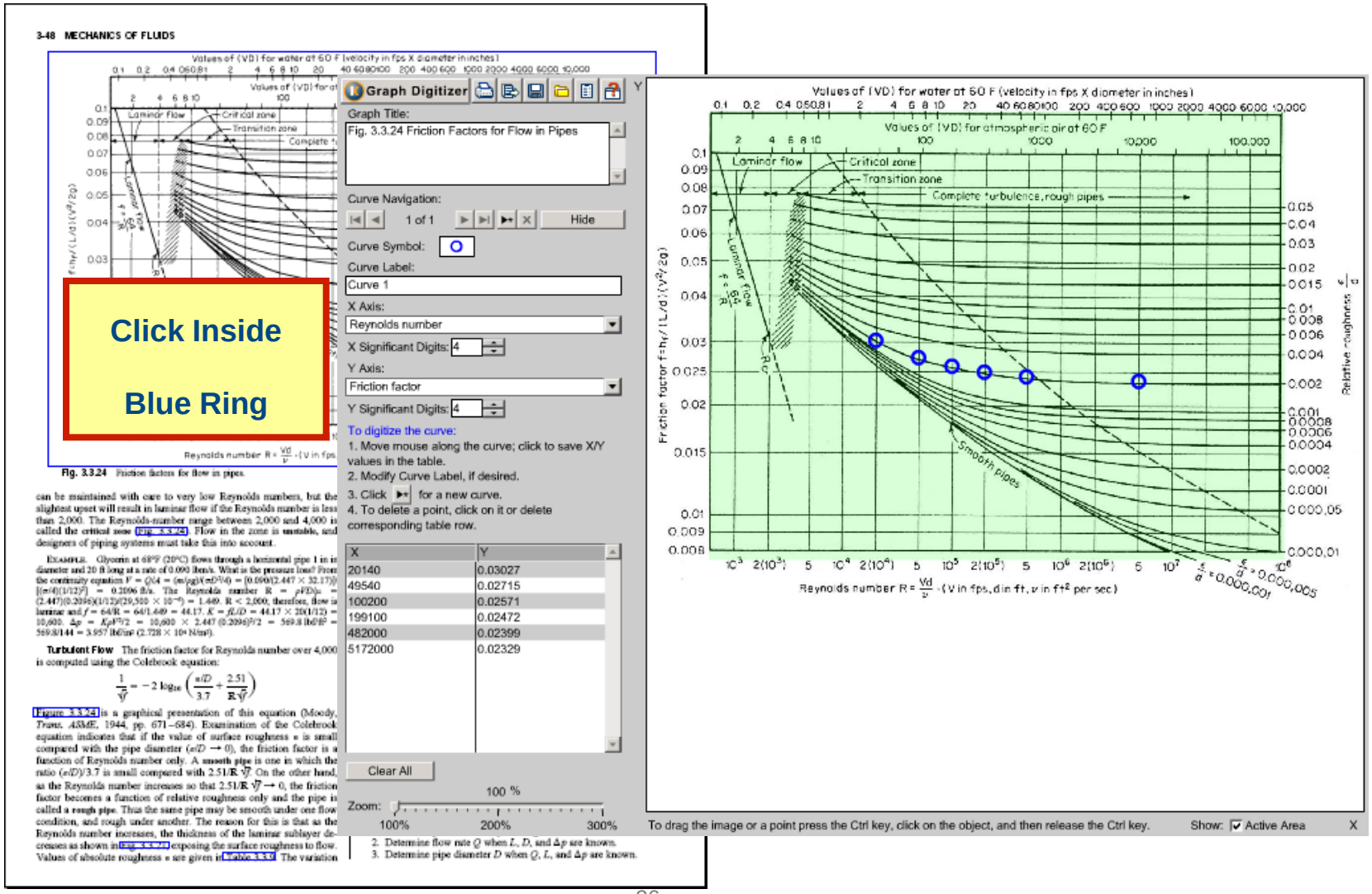
File Edit View Favorites Tools Help

A31

	A	B	C	D	E
1	Example 2.1: Liquid Discharge through a Hole in a Tank				
2					
3	Input Data:				
4	Tank pressure above liquid:			0.1	barg
5	Pressure outside hole:			0	barg
6	Liquid density:			490	kg/m**3
7	Liquid level above hole:			2	m
8	Hole diameter:			10	mm
9					
10	Excess Head Loss Factors:				
11	Entrance:		0.5		
12	Exit:		1		
13	Others:		0		
14		TOTAL:	1.5		
15					
16	Calculated Results:				
17					
18	Hole area:			7.85E-05	m**2
19					
20	Equation terms:				
21	Pressure term:			-20.4082	m**2/s**2
22	Height term:			-19.6	m**2/s**2
23	Velocity coefficient:			1.25	
24					
25	Exit velocity:		5.7	m/s	
26	Mass flow:		0.22	kg/s	
27					
28					

EX2-1

数据分析工具数字化的图表

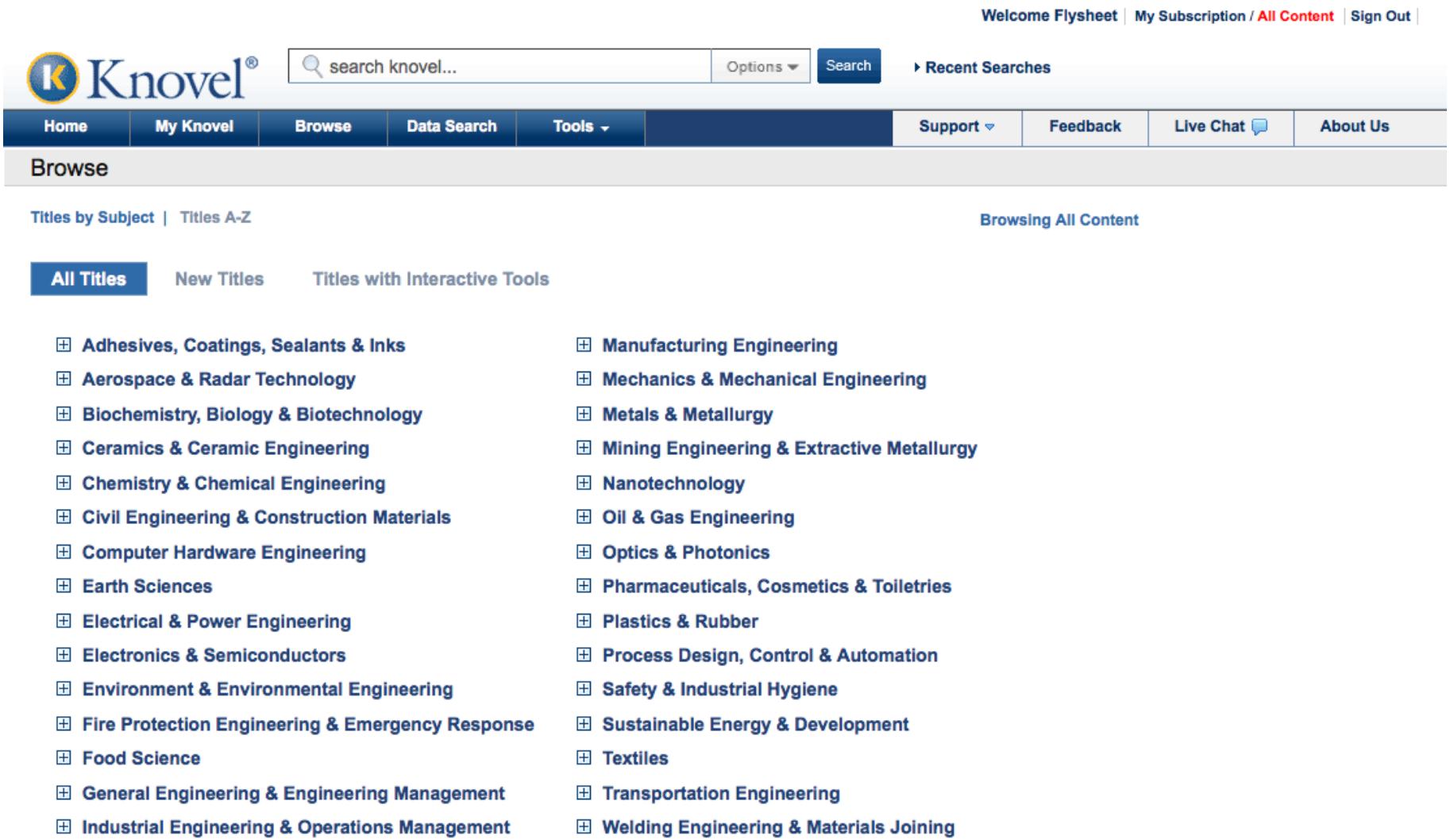


Real World Problems, *Real World* Solutions

Browse

Knovel Critical Tables.导览页面

可依照学科分类、书名浏览



Knovel Critical Tables.内容浏览页面

Title Details

Citation

Knovel Critical Tables (2nd Edition)

Search Within

直接在这本书里找信息

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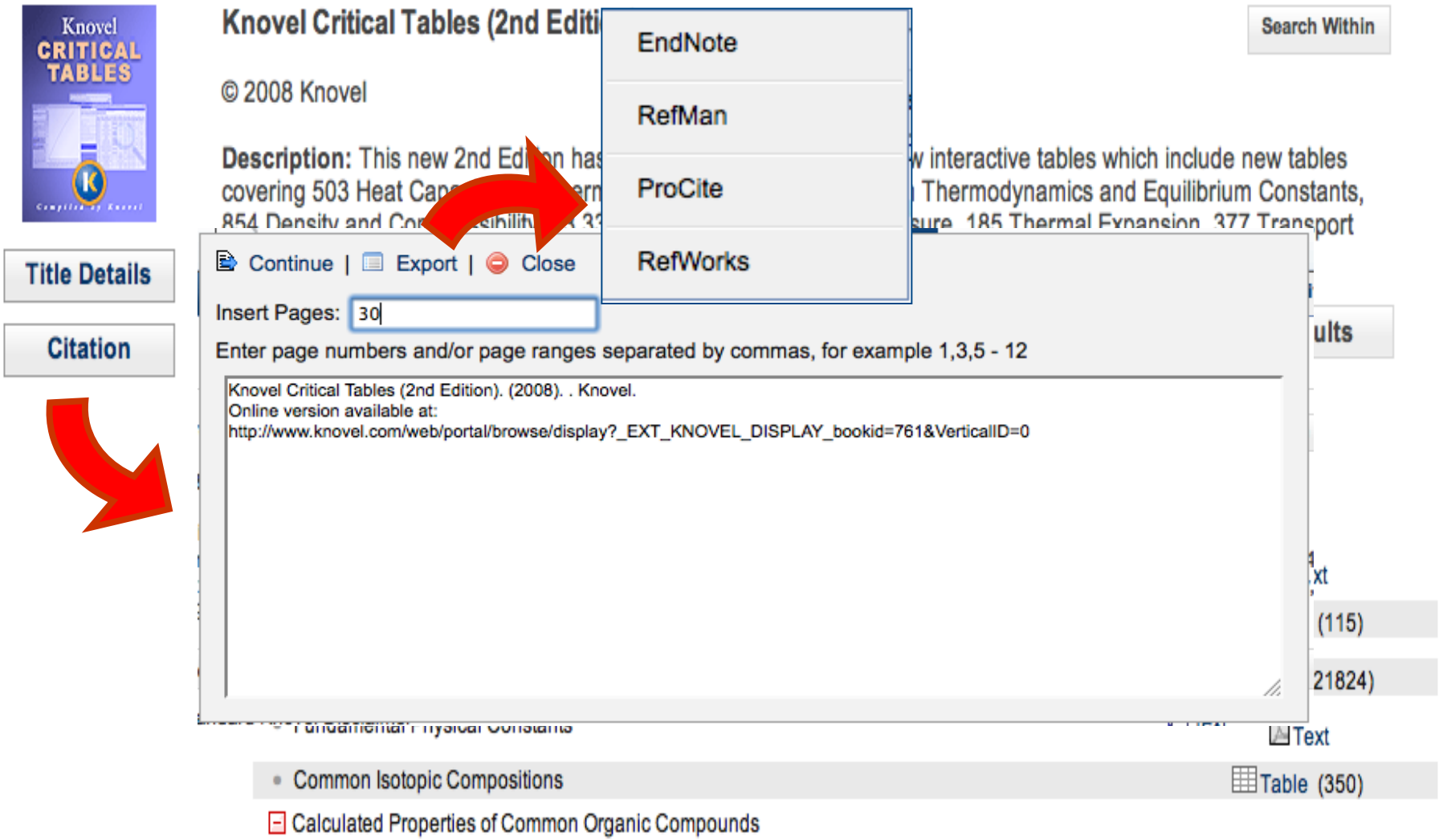
Description: This new 2nd Edition has been updated with over 40 new interactive tables which include new tables covering 503 Heat Capacity and Thermal Conductivity, 3,133 Reaction Thermodynamics and Equilibrium Constants, 854 Density and Compressibility, 13,332 Vaporization and Vapor Pressure, 185 Thermal Expansion, 377 Transport and Flow, and 1902 Electrical Properties data.

Table of Contents (Filter By: Interactive Tables / Tables with Equation Plotter / Tables with Graph Plotter)	Content Results
• Front Matter	Text
• Preface to the Second Edition	Text
− Periodic Table of the Elements	Text
• Introduction	Text
− Properties of the Elements	Table (115)
• Basic Physical Properties of Chemical Compounds	Table (21824)
• Fundamental Physical Constants	Text
• Common Isotopic Compositions	Table (350)
− Calculated Properties of Common Organic Compounds	

29

Knovel Critical Tables.内容浏览页面



30

Knovel Critical Tables -交互式表格直接来自于内容浏览页

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Interactive Table 4.10 Viscosity, Dielectric Constant, Dipole Moment, and S...

Table: Interactive Table 4.10 Viscosity, Dielectric Constant, Dipole Moment, and Surface Tension of Selected Organic Substances
Table Type: Interactive Table
Search Query: (*surface tension* >= 25 mN/m) and (*dynamic viscosity* <= 0.5 mPa s)
Total Number of Search Hits: 35
Total Number of Rows: 1359

Pages:
Jump to: 1 of 1
Display: Data Found | **All Data**

Interactive Table 4.10 Viscosity, Dielectric Constant, Dipole Moment, and Surface Tension of Selected Organic Substances

Select Rows | Filter Data | Print Table | Export Table | View Table Notes | Unit Converter | Help

no.	material or substance name	viscosity ($mN\ s/m^2$)	dielectric const.	dipole moment (D)	surface tension, coeff *a* (dyne/cm)	surface tension, coeff *b* (dyne/cm)
402	*trans*-1,2-Dichloroethylene	0.423 @ 15°C		0.7 @ 25°C; benzene	25 @ 20°C	
408	Dichloromethane	0.449 @ 15°C		1.6, gas	30.41	0.1284
458	Diethyl sulfide	0.446 @ 20°C		1.52, gas	27.33	0.1106
491	Dimethylamine	0.207 @ 15°C	6.32 @ 0°C	1.03, gas	29.5	0.1265
539	Dimethyl sulfide	0.289 @ 20°C	6.2 @ 20°C	1.45 @ 25°C; benzene	26.07	0.0805
599	Ethanethiol	0.00316, gas	6.9 @ 15°C	1.57, gas	25.06	0.0793
614	Ethyl acetate	0.473 @ 15°C	6.11 @ 20°C	1.78, gas	26.29	0.1161
656	Ethylene oxide	0.3 @ 0°C	14 @ -1°C	1.88, gas	27.66	0.1664
660	Ethyl formate	0.419 @ 15°C	7.16 @ 25°C	1.94, gas	26.47	0.1315

Sort Ascending
Sort Descending
Columns

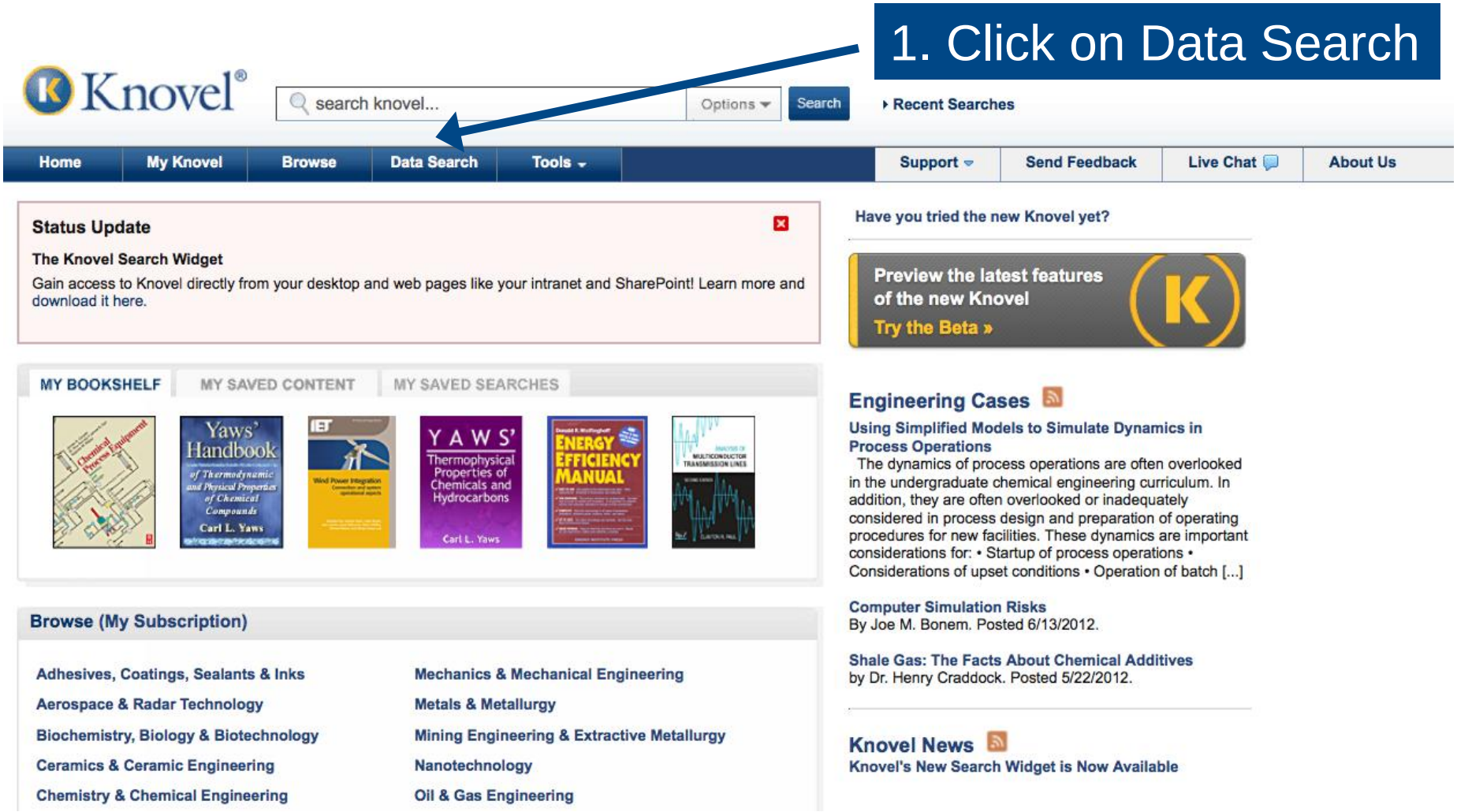
Dean's Handbook of Organic Chemistry (2nd Edition)

Done

Real World Problems, *Real World* Solutions

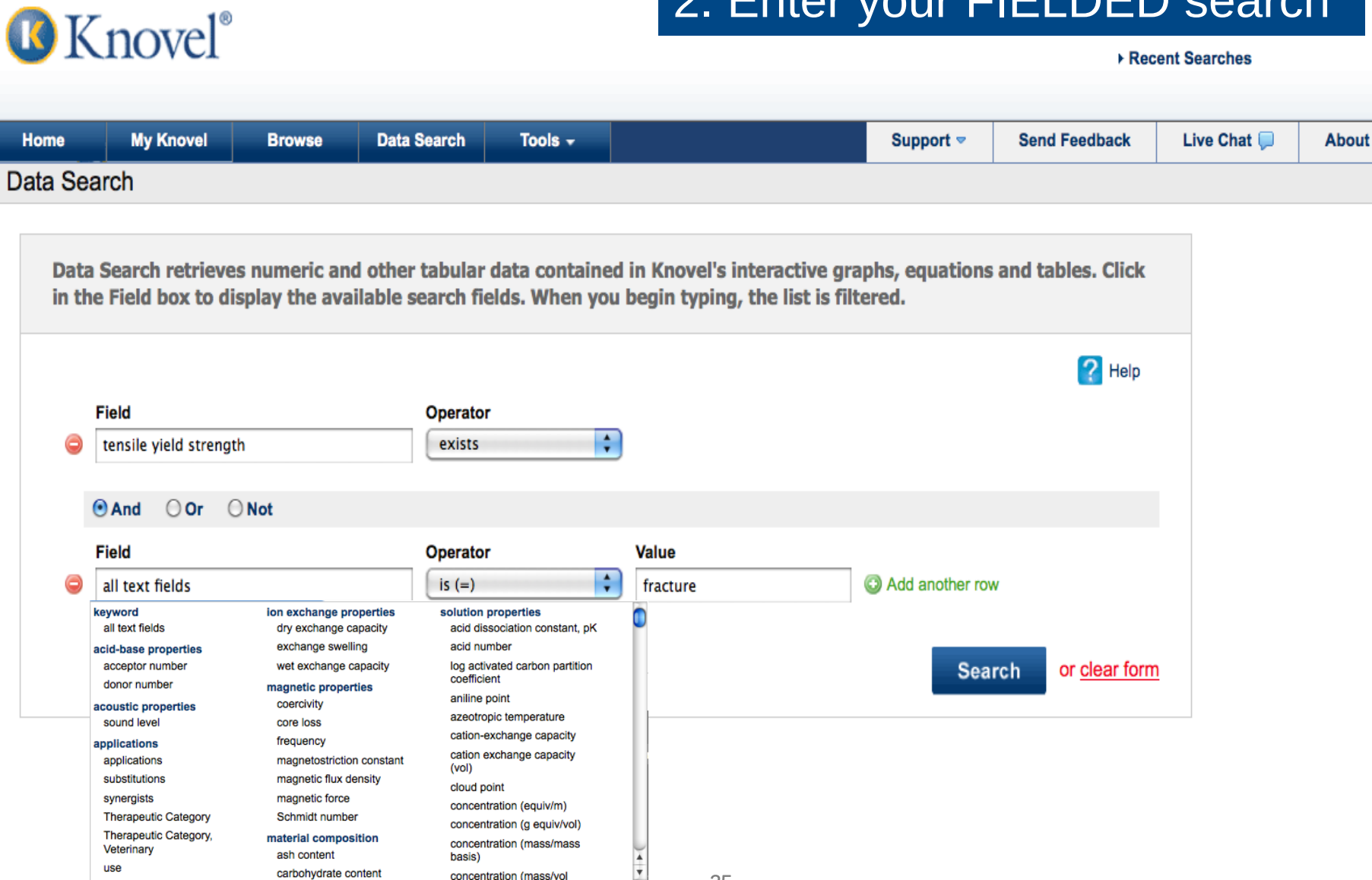
Data Search

Real World Problems, *Real World* Solutions



Real World Problems, *Real World* Solutions

2. Enter your FIELDED search



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3. Review the Interactive Results

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Number of Titles Retrieved: 7 **Page:** 1 of 1 — Back to Data Search

You searched for *(tensile yield strength EXISTS) and (fracture)*

Add Search to My Knovel

Titles: **Relevancy**

Aluminum Alloy Database 100 %

Add Book to My Knovel | Search Within

Sections	Relevancy	Content Type
Table 12a. Representative Fracture Parameters for Wrought and Cast Aluminum Alloys (US Customary Units)	100 %	Table (112)
Table 12b. Representative Fracture Parameters for Wrought and Cast Aluminum Alloys (Metric Units)	99 %	Table (110)

ASM Handbook, Volume 13A - Corrosion: Fundamentals, Testing, and Protection Updated 100 %

Standard Handbook of Machine Design (3rd Edition) 99 %

ASM Handbook, Volume 20 - Materials Selection and Design 99 %

ASM Handbook, Volume 01 - Properties and Selection: Irons, Steels, and High-Performance Alloys 99 %

Magnesium Alloy Database 94 %

4. Manipulate the interactive tables/export to desk top

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Add to My Knovel

Table 12a. Representative Fracture Parameters for Wrought and Cast Aluminum...

Table: Table 12a. Representative Fracture Parameters for Wrought and Cast Aluminum Alloys (US Customary Units)
Table Type: Interactive Table
Search Query: (*tensile yield strength* EXISTS) and (fracture)
Total Number of Search Hits: 112
Total Number of Rows: 113

Pages: « 1 2 3 »
Jump to: 1 of 3
Display: Data Found | **All Data**

Table 12a. Representative Fracture Parameters for Wrought and Cast Aluminum Alloys (US Customary Units)

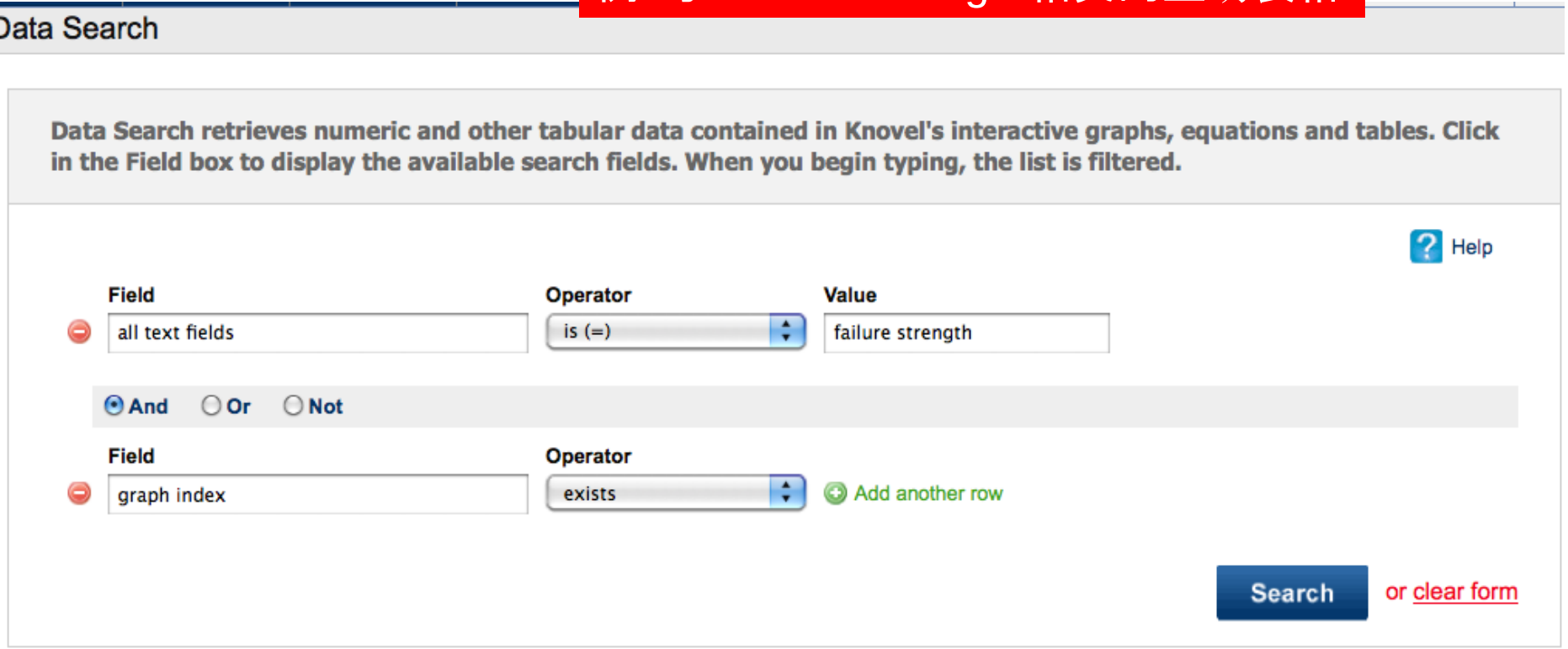
Select Rows | Filter Data | Print Table | Export Table | View Table Notes | Unit Converter | Help

no.	alloy type	product type	alloy name	UNS no.	temper	tensile yield stre... (ksi)	unit propagation... (lbf in/in^2)	plane strain frac... (ksi in$^{1/2}$)	plane strain frac... (ksi in$^{1/2}$)	relative crit. crac... (in)	ob
1	Aluminum Alloy ...	premium streng...	224.0	A02240	T7	41.4	~200	30.2	30	0.73	
2	Aluminum Alloy ...	sand castings	240.0	A02400	F	26	~75		16	0.62	
3	Aluminum Alloy ...	sand castings	242.0	A02420	F	20.4	~120		21	1.03	
4	Aluminum Alloy ...	premium streng...	249.0	A02490	T7	49.2	~200	29.7	30	0.6	
5	Aluminum Alloy ...	sand castings	295.0	A02950	T6	27.1	~250		>35	>1.67	
6	Aluminum Alloy ...	sand castings	308.0	A03080	F	18.5	~250		19	1.03	
7	Aluminum Alloy ...	permanent mol...	354.0	A03540	T62	44.9	128		22	0.49	
8	Aluminum Alloy ...	premium streng...	354.0	A03540	T6	43	~125	18	18	0.42	
9	Aluminum Alloy ...	permanent mol...	356.0	A03560	T7	22	168		30	1.36	

Data Search

Searching for Numeric & Tabular Data

查询某一特性的互动表格数据
例：与Failure Strength相关的互动表格



Data Search

Searching for Numeric & Tabular Data

查询某材料某种状态下的数据
例：钢材在柠檬酸的腐蚀速度Rate of Corrosion

Data Search retrieves numeric and other tabular data contained in Knovel's interactive graphs, equations and tables. Click in the Field box to display the available search fields. When you begin typing, the list is filtered.

Help

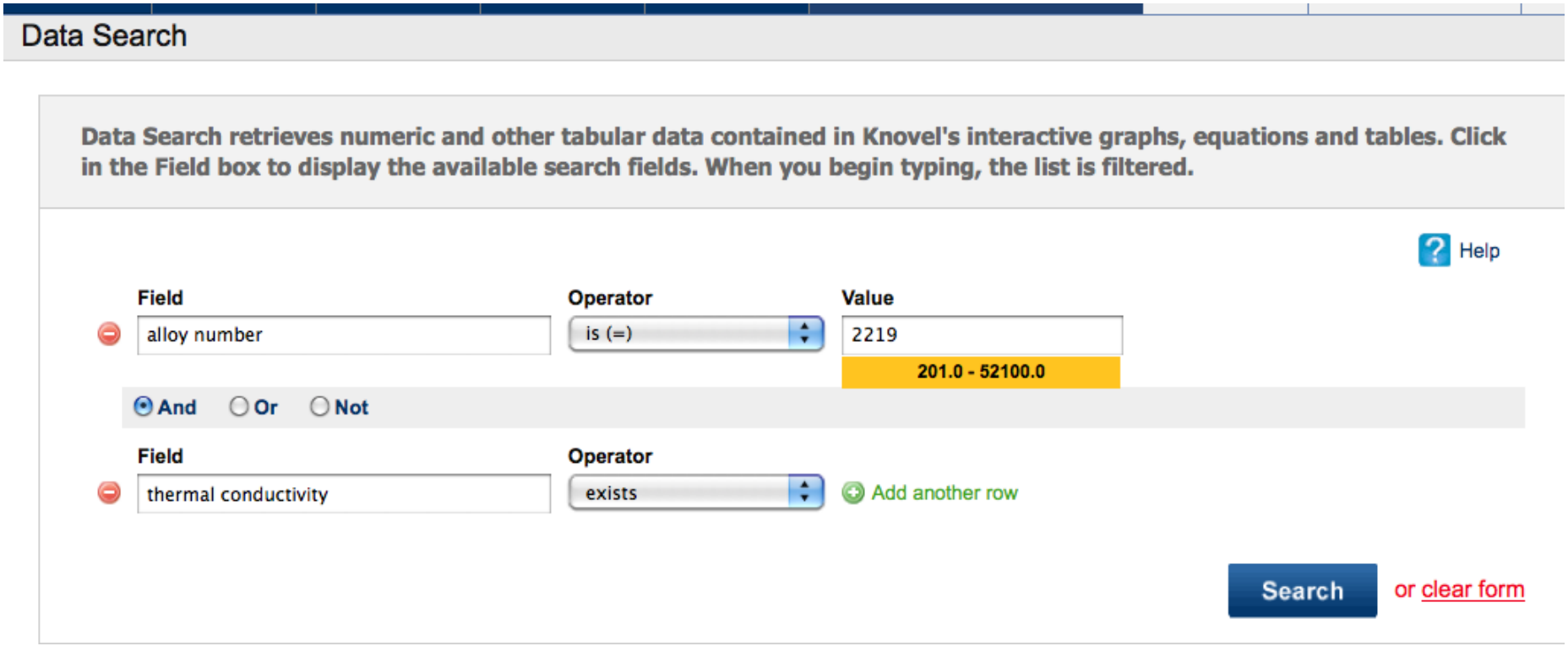
Field	Operator	Value	Units
material or substance name	is (=)	steel	
And Or Not			
corrosion rate	less than or equal to (·	20	mpy
		-1.34 - 105000.0 mpy	
And Or Not			
exposure medium	is (=)	citric acid	

Search or clear form

Data Search

Searching for Numeric & Tabular Data

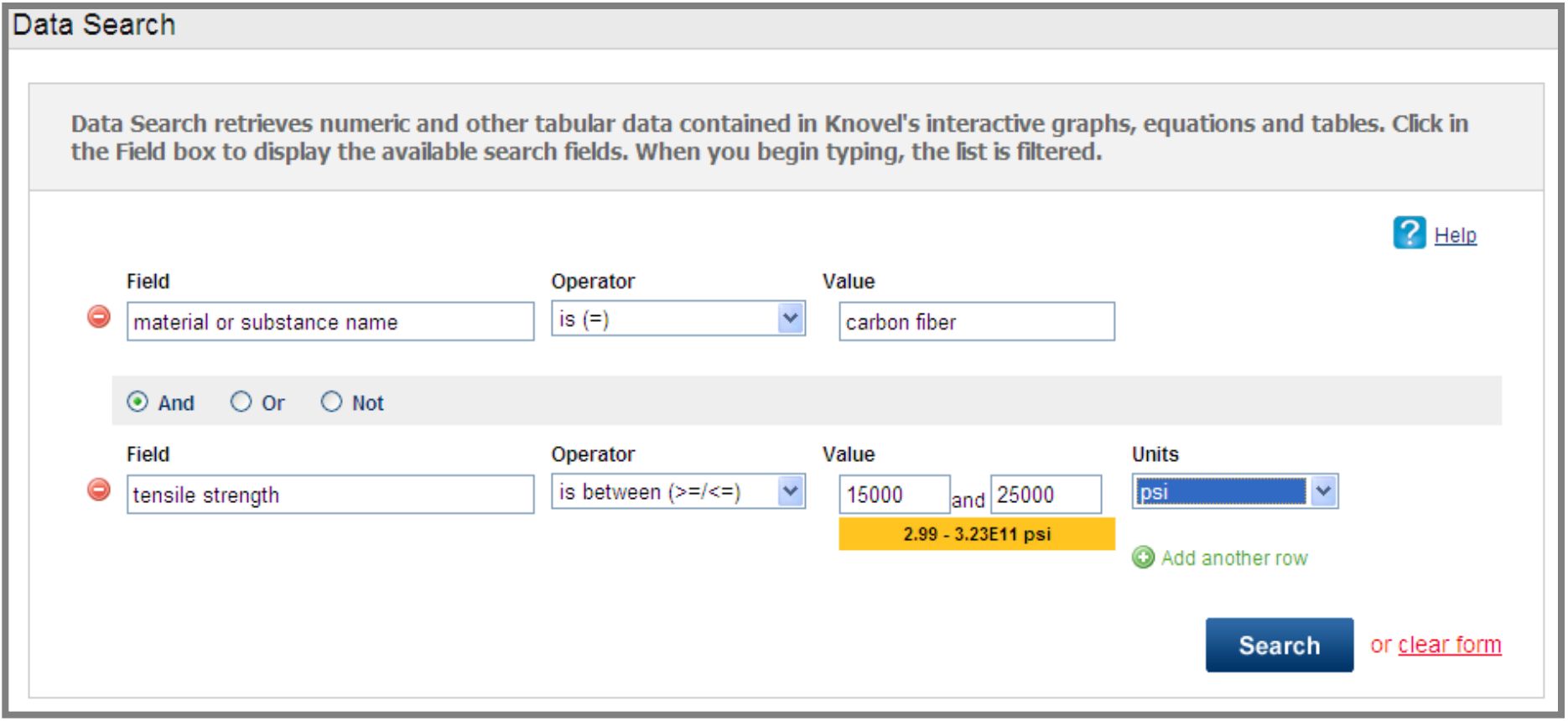
查询某材料某一特性的数据
例：2219合金的导热率Thermal Conductivity



Data Search

Searching for Numeric & Tabular Data

查询某材料某一特性的数据
例：碳纤维的拉伸强度范围Tensile Strength



Case Study 1

问题

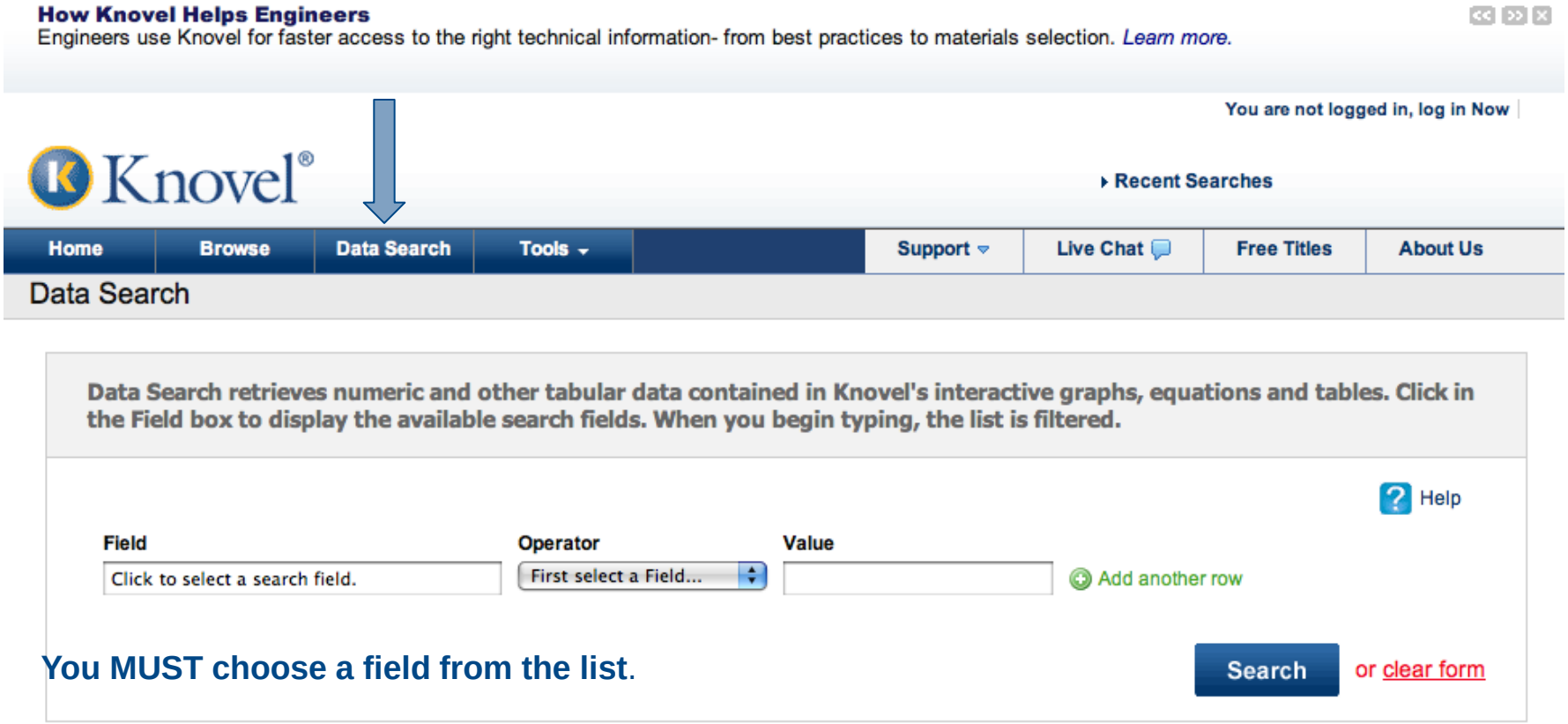
某工程师正研发一款清洗生产过程中使用的各式容器的改良洗洁液，该工程师知道具有高表面张力和低黏度的溶液可制造出较好的清洗剂。他找寻具有下列特性的所有溶液来制作洗洁剂：

- **表面张力>=25 milliNewtons per metre**
- **动力粘度 <=0.5 milliPascal per second**

方案

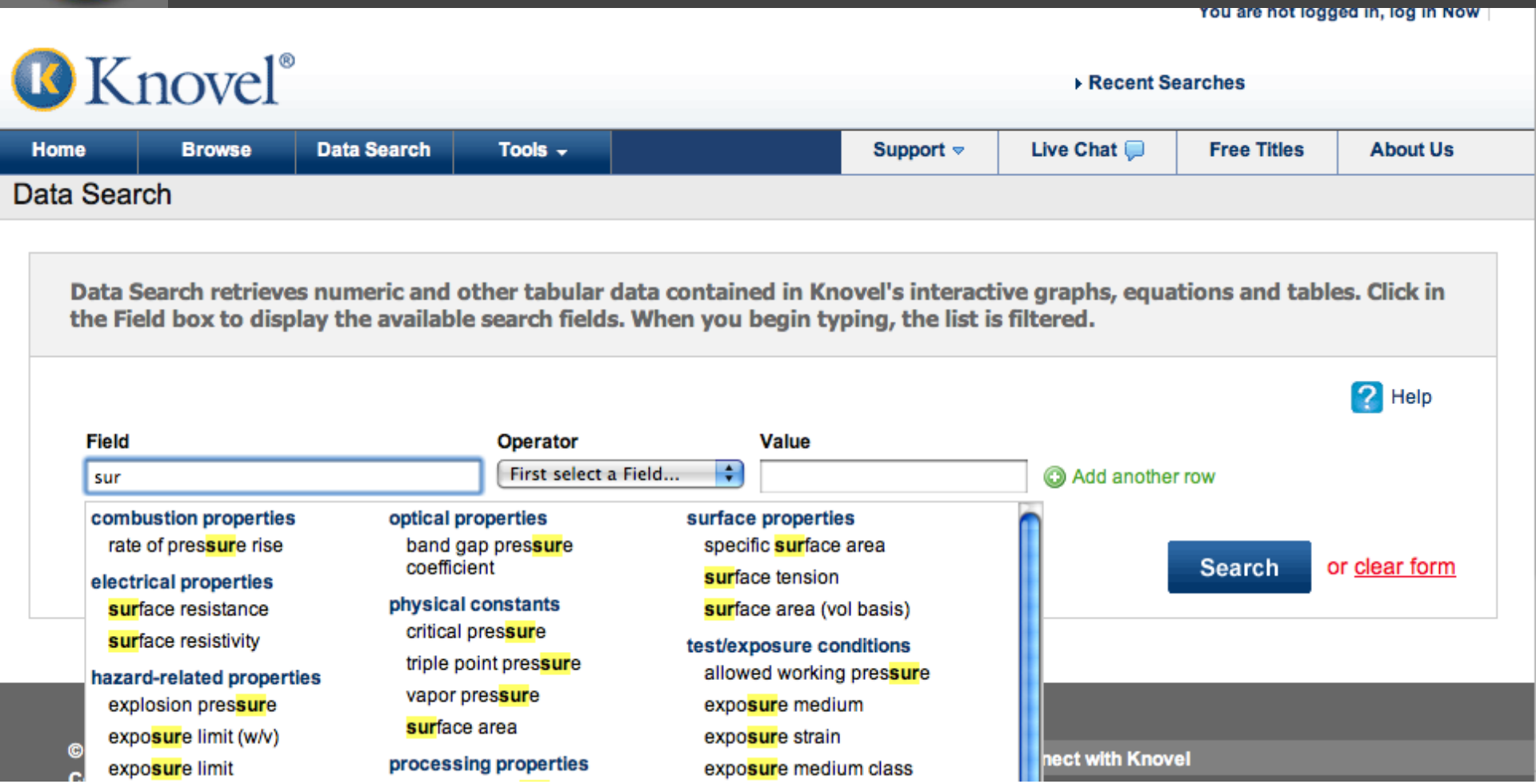
- **使用Knovel的data search工具找出具有此特性的所有材料**

选择DATA SEARCH

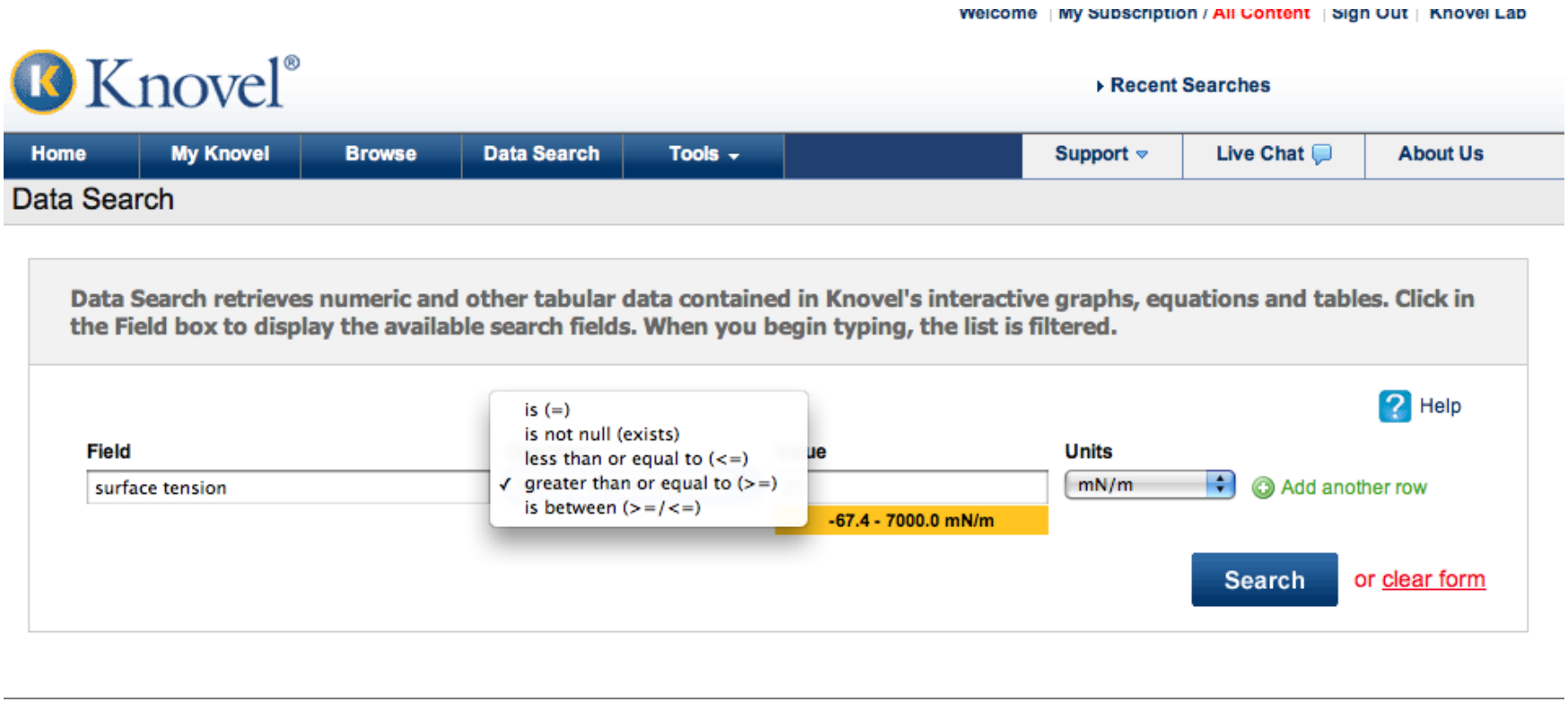


You MUST choose a field from the list.

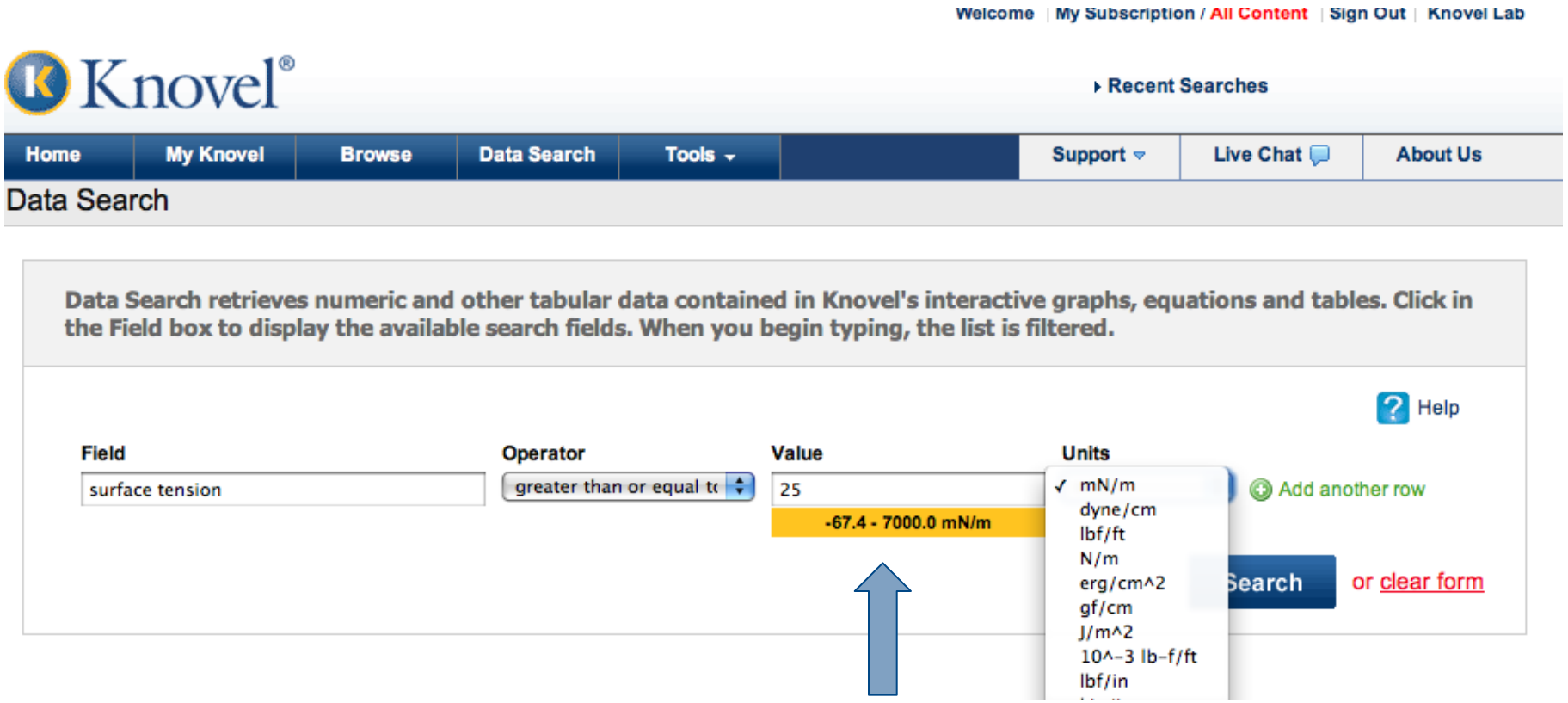
输入要查询的特性，当输入词汇时，系统会自动筛选出适合的名称



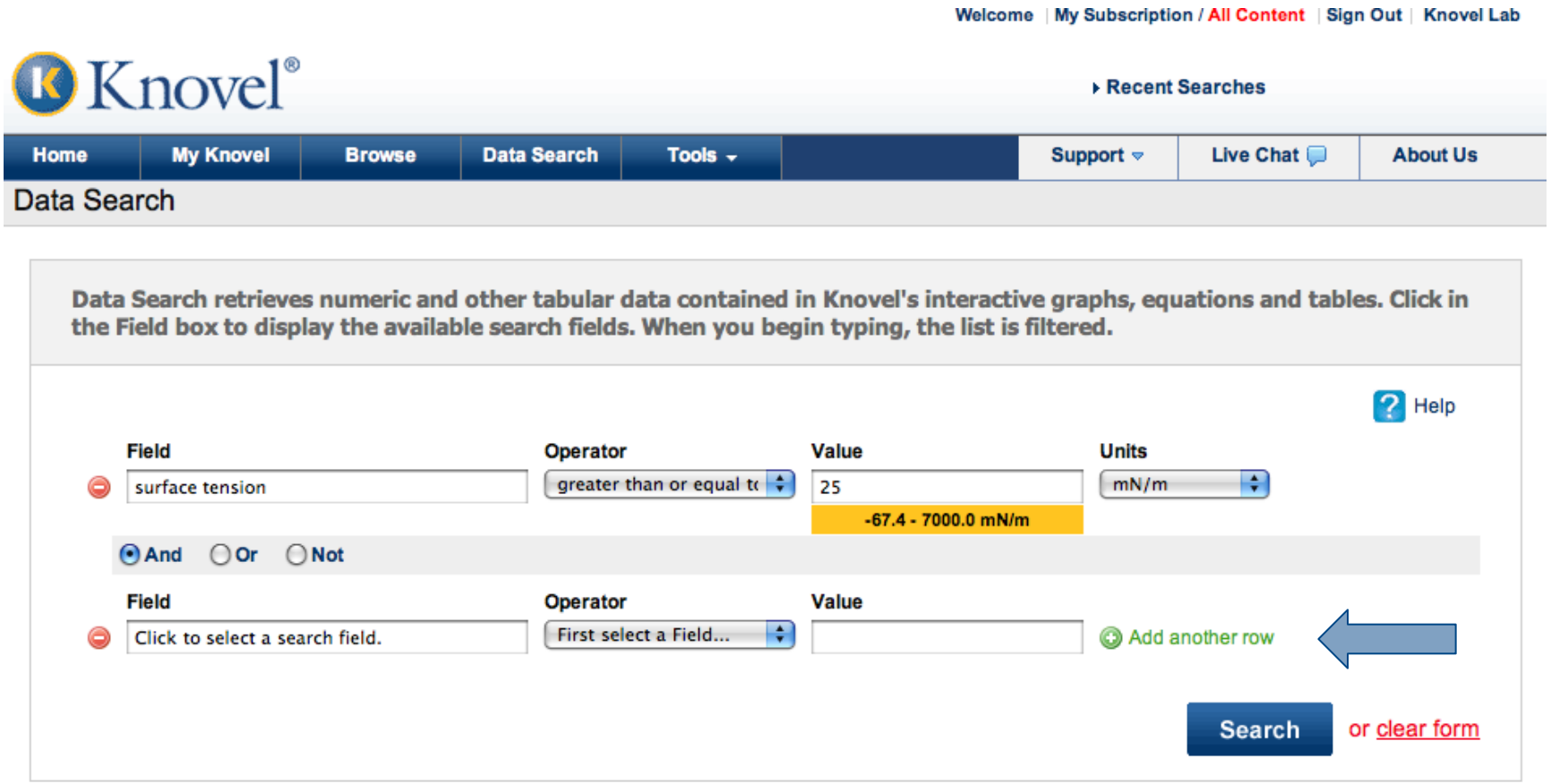
确认要运算的规则，以此例来说，选择greater than or equal to (>=)



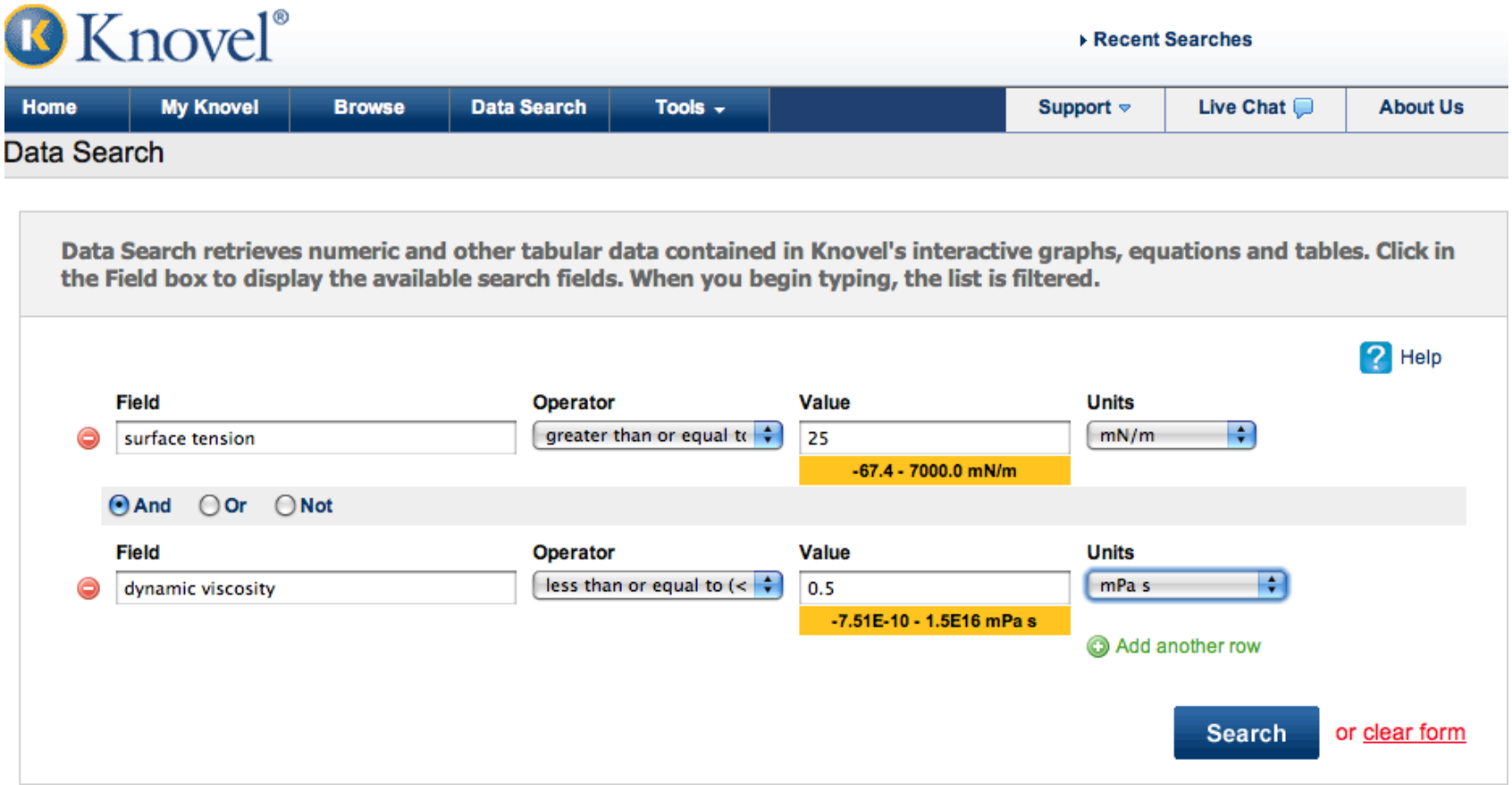
输入数值范围，依据选择的单位会显示适用的最大值与最小值



点选 ‘Add Another Row”可以加入另一个检索条件



输入新的检索数据与数值后执行查询



检索结果显示在最前面两本书并标示出来

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COLLAPSE ALL Number of Titles Retrieved: 8 Page: 1 of 1 Back to Data Search

You searched for *(surface tension >= 25 mN/m) and (dynamic viscosity <= 0.5 mPa s)*

Add Search to My Knovel

Titles: **Relevancy**

Knovel Solvents - A Properties Database 100 %

Add Book to My Knovel | Search Within

Sections	Relevancy	Content Type
Physical Properties	100 %	Table (18)

Perry's Chemical Engineers' Handbook (7th Edition) 100 %

Add Book to My Knovel | Search Within

Sections	Relevancy	Content Type
Table 2-352 Saturated Water Substance-Temperature (SI units)	100 %	Table (39)

Heat Transfer Handbook 99 %

Pumping Station Design (Revised 3rd Edition) 98 %

Mechanical Engineers' Handbook - Energy and Power (3rd Edition) 97 %

2009 ASHRAE Handbook - Fundamentals (I-P Edition) 97 %

检索的条件会以蓝色标示出来，所有的字段都可以排序和移动

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Table 2-352 Saturated Water Substance-Temperature (SI units)

Table: Table 2-352 Saturated Water Substance-Temperature (SI units)
Table Type: Interactive Table
Search Query: (*surface tension* >= 25 mN/m) and (*dynamic viscosity* <= 0.5 mPa s)
Total Number of Search Hits: 39
Total Number of Rows: 71

Pages:
Jump to: 1 of 1
Display: Data Found | **All Data**

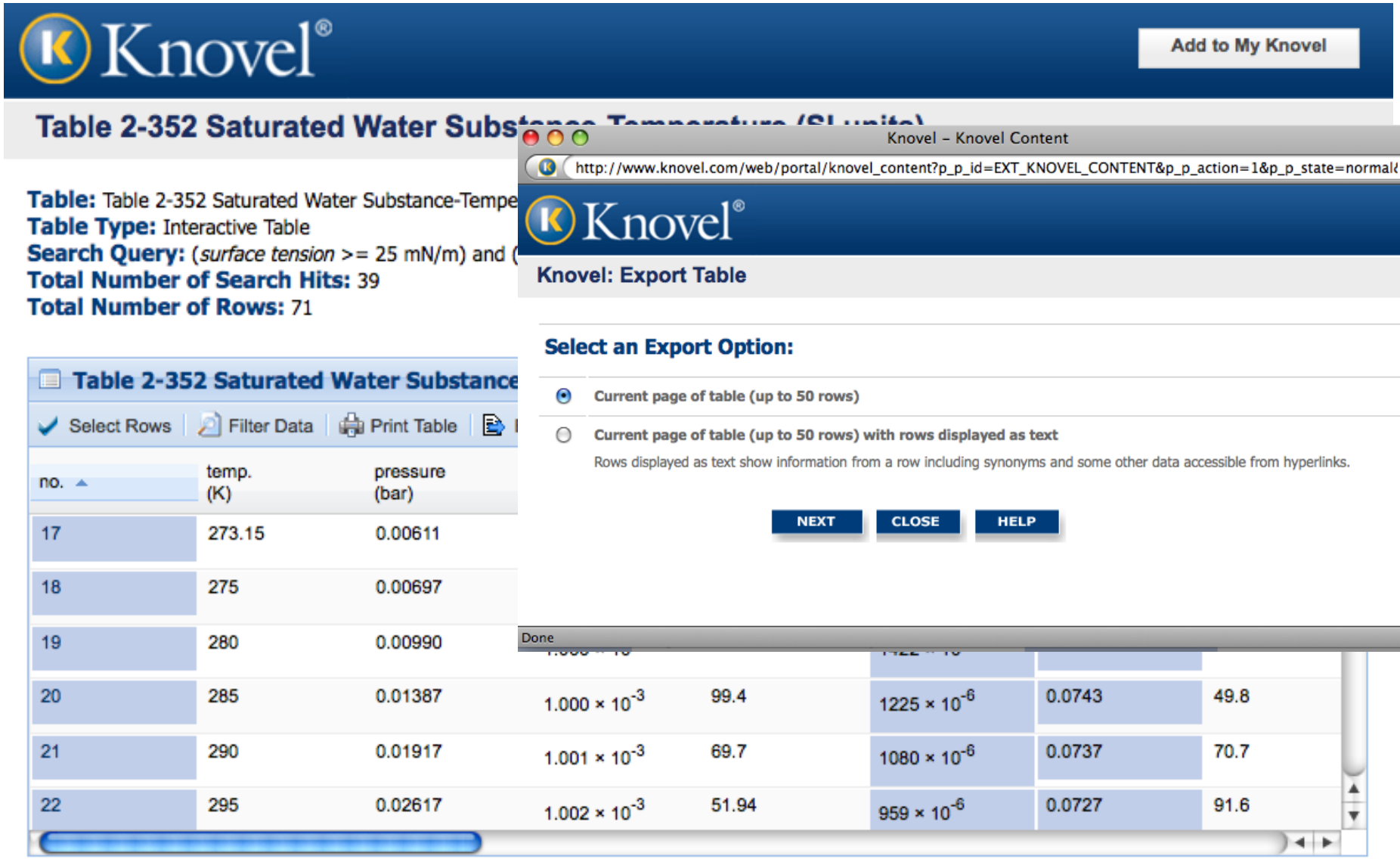
Table 2-352 Saturated Water Substance-Temperature (SI units)

Select Rows | Filter Data | Print Table | Export Table | View Associated Text | Unit Converter | Help

no.	temp. (K)	pressure (bar)	volume, liq. (ma… (m^3/kg)	volume, gas (m… (m^3/kg)	viscosity, liq. (Pa s)	surface tension, … (N/m)	enthalpy of fusio… (kJ/kg)
17	273.15	0.00611	1.000×10		1750×10^{-6}	0.0755	0.0
18	275	0.00697	1.000×10		1652×10^{-6}	0.0753	7.8
19	280	0.00990	1.000×10^{-3}	130.4	1422×10^{-6}	0.0748	28.8
20	285	0.01387	1.000×10^{-3}	99.4	1225×10^{-6}	0.0743	49.8
21	290	0.01917	1.001×10^{-3}	69.7	1080×10^{-6}	0.0737	70.7
22	295	0.02617	1.002×10^{-3}	51.94	959×10^{-6}	0.0727	91.6

Sort Ascending
Sort Descending
Columns

检索结果可以汇出以提供脱机浏览



选择文件类型(FILETYPE)

Knovel®

Add to My Knovel

Table 2-352 Saturated Water Substance-Temperature (SI units)

Table: Table 2-352 Saturated Water Substance-Tempera
Table Type: Interactive Table
Search Query: (*surface tension* >= 25 mN/m) and (*d*
Total Number of Search Hits: 39
Total Number of Rows: 71

Knovel – Knovel Content

http://www.knovel.com/web/portal/knovel_content?p_p_id=EXT_KNOVEL_CONTENT&p_p_action=1&p_p_state=normal&

Knovel®

Knovel: Export Table

Select a File Type:

- (•) Microsoft Excel
- ( ) HTML
- ( ) PDF
- ( ) Text (tab-delimited)

BACK | EXPORT | CLOSE | HELP

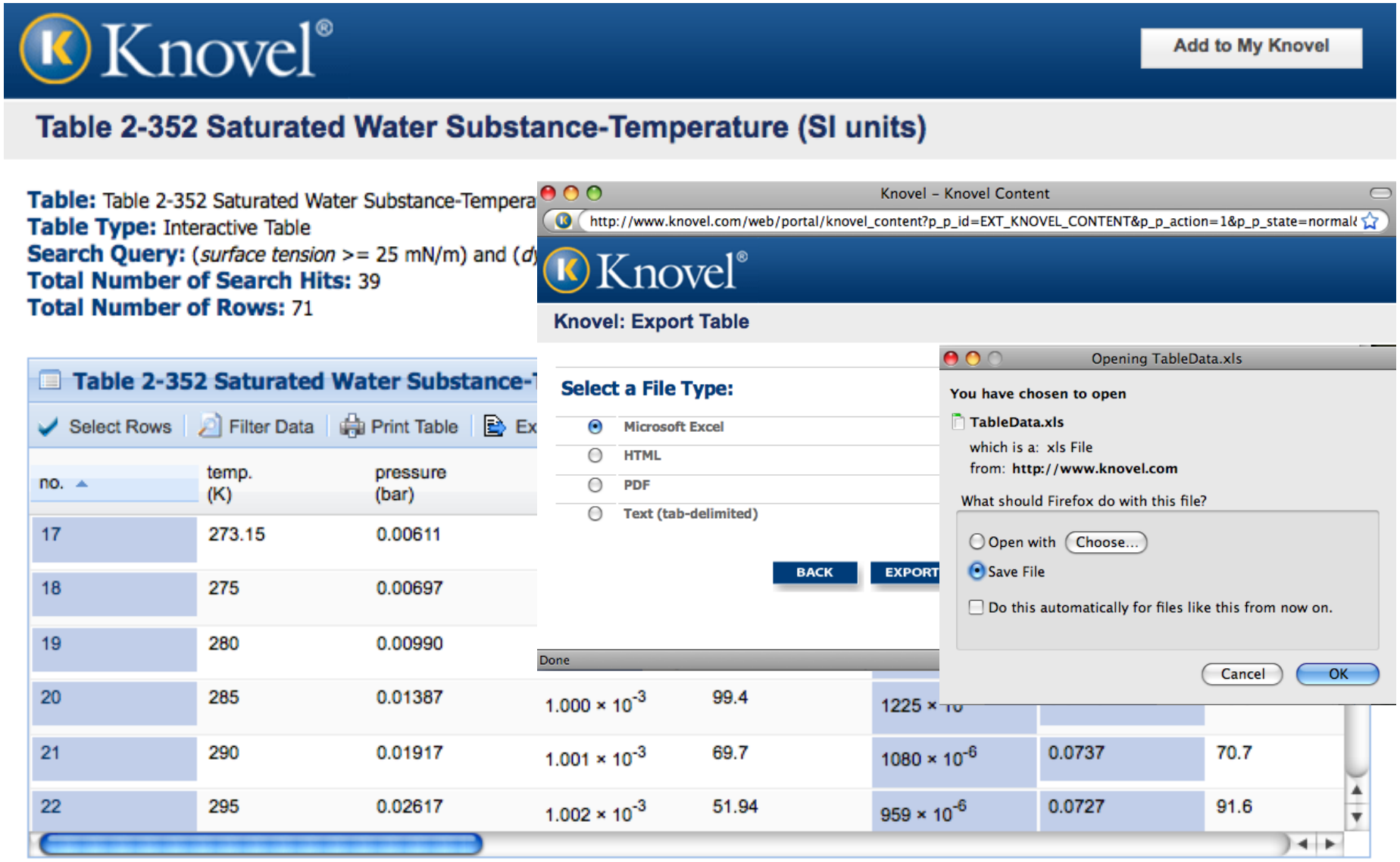
Done

Table 2-352 Saturated Water Substance-T

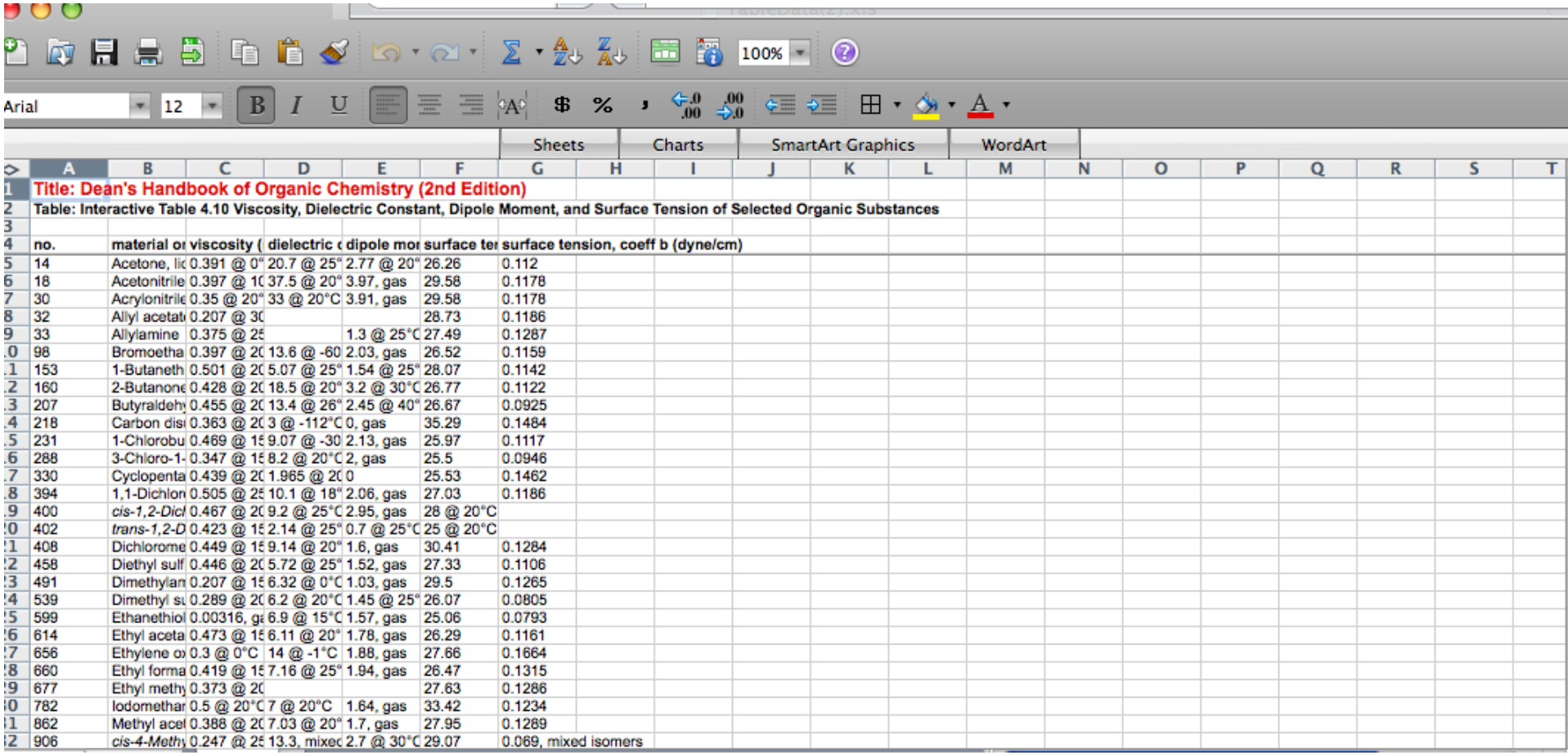
Select Rows | Filter Data | Print Table | Ex

no.	temp. (K)	pressure (bar)					
17	273.15	0.00611					
18	275	0.00697					
19	280	0.00990					
20	285	0.01387	1.000×10^{-3}	99.4	1225×10^{-6}	0.0743	49.8
21	290	0.01917	1.001×10^{-3}	69.7	1080×10^{-6}	0.0737	70.7
22	295	0.02617	1.002×10^{-3}	51.94	959×10^{-6}	0.0727	91.6

决定要打开或储存Excel



现在检索结果已经储存在个人计算机里供后续分析应用



Title: Dean's Handbook of Organic Chemistry (2nd Edition)

Table: Interactive Table 4.10 Viscosity, Dielectric Constant, Dipole Moment, and Surface Tension of Selected Organic Substances

no.	material or	viscosity (	dielectric c	dipole mor	surface ter	surface tension, coeff b (dyne/cm)
14	Acetone, lic	0.391 @ 0°	20.7 @ 25°	2.77 @ 20°	26.26	0.112
18	Acetonitrile	0.397 @ 1(	37.5 @ 20°	3.97, gas	29.58	0.1178
30	Acrylonitrile	0.35 @ 20°	33 @ 20°C	3.91, gas	29.58	0.1178
32	Allyl acetat	0.207 @ 3(			28.73	0.1186
33	Allylamine	0.375 @ 2!		1.3 @ 25°C	27.49	0.1287
98	Bromoetha	0.397 @ 2(	13.6 @ -60	2.03, gas	26.52	0.1159
153	1-Butaneth	0.501 @ 2(	5.07 @ 25°	1.54 @ 25°	28.07	0.1142
160	2-Butanone	0.428 @ 2(	18.5 @ 20°	3.2 @ 30°C	26.77	0.1122
207	Butyraldeh	0.455 @ 2(	13.4 @ 26°	2.45 @ 40°	26.67	0.0925
218	Carbon disi	0.363 @ 2(	3 @ -112°C	0, gas	35.29	0.1484
231	1-Chlorobu	0.469 @ 1!	9.07 @ -30	2.13, gas	25.97	0.1117
288	3-Chloro-1-	0.347 @ 1!	8.2 @ 20°C	2, gas	25.5	0.0946
330	Cyclopenta	0.439 @ 2(	1.965 @ 2(	0	25.53	0.1462
394	1,1-Dichlor	0.505 @ 2!	10.1 @ 18°	2.06, gas	27.03	0.1186
400	*cis-1,2-Dicl*	0.467 @ 2(	9.2 @ 25°C	2.95, gas	28 @ 20°C	
402	*trans-1,2-D*	0.423 @ 1!	2.14 @ 25°	0.7 @ 25°C	25 @ 20°C	
408	Dichlorome	0.449 @ 1!	9.14 @ 20°	1.6, gas	30.41	0.1284
458	Diethyl sulf	0.446 @ 2(	5.72 @ 25°	1.52, gas	27.33	0.1106
491	Dimethylan	0.207 @ 1!	6.32 @ 0°C	1.03, gas	29.5	0.1265
539	Dimethyl su	0.289 @ 2(	6.2 @ 20°C	1.45 @ 25°	26.07	0.0805
599	Ethanethiol	0.00316, ga	6.9 @ 15°C	1.57, gas	25.06	0.0793
614	Ethyl aceta	0.473 @ 1!	6.11 @ 20°	1.78, gas	26.29	0.1161
656	Ethylene ox	0.3 @ 0°C	14 @ -1°C	1.88, gas	27.66	0.1664
660	Ethyl forma	0.419 @ 1!	7.16 @ 25°	1.94, gas	26.47	0.1315
677	Ethyl methy	0.373 @ 2(			27.63	0.1286
782	Iodomethar	0.5 @ 20°C	7 @ 20°C	1.64, gas	33.42	0.1234
862	Methyl acet	0.388 @ 2(	7.03 @ 20°	1.7, gas	27.95	0.1289
906	*cis-4-Methy*	0.247 @ 2!	13.3, mixed	2.7 @ 30°C	29.07	0.069, mixed isomers

数据后续的加值与应用

Title: Knovel Solvents - A Properties Database

Table: Physical Properties

no.	name	IUPAC Name	CAS Registry no.	molecular weight	freezing temperature (°C)	boiling temperature (°C)	evaporatio	color	dielectric constant	surface tension (mN/m)	viscosity (
20	Acetyl chloride	acetyl chloride	75-36-5	78.5	-112	51		colorless	15.8	26.7	0.369
32	Acrylonitrile	prop-2-enenitrile	107-13-1	53.1	-84	77		colorless		27.3	0.34
157	Butyraldehyde	butanal	123-72-8	72.1	-99	75	7.8	colorless	13.4	29.9	0.43
163	Carbon disulfide	methanedithione	75-15-0	76.1	-110.8	46.3		colorless	2.6	32	0.36
288	Dichloromethane	dichloromethane	75-09-2	84.94	-94.92	39.6	14.5	colorless	9.1	27.89	0.4043
345	Dimethyl sulfide	methylsulfanylmethane	75-18-3	62.1	-98	37		colorless	6.3	26.5	0.28
717	Methyl formate	methyl formate	107-31-3	60.05	-100	32		colorless	8.5	25	0.328
730	Methyl propyl ketone	pentan-2-one	107-87-9	86.15	-78	102	2.4	colorless	13.6	33.87	0.489
966	Solvon ACS			122.99		71		colorless		25.9	0.49
967	Solvon AER			122.99		71		colorless		25.9	0.49
968	Solvon DR					70				25.9	0.49
969	Solvon IP					68				25.9	0.49
970	Solvon PB					70				25.9	0.49
1004	Tetrahydrofuran	oxolane	109-99-9	72.12	-108.4	65.9	6.3	colorless	7.58	26.4	0.46
1199	Lenium RV					71				25.9	0.49
1200	Lenium XS					71				25.9	0.49
1238	Eastman methyl acetate		79-20-9	74.09	-98	55.8	6			25.8	0.4
1412	Triagen					71				25.9	0.49

Case Study 2

问题

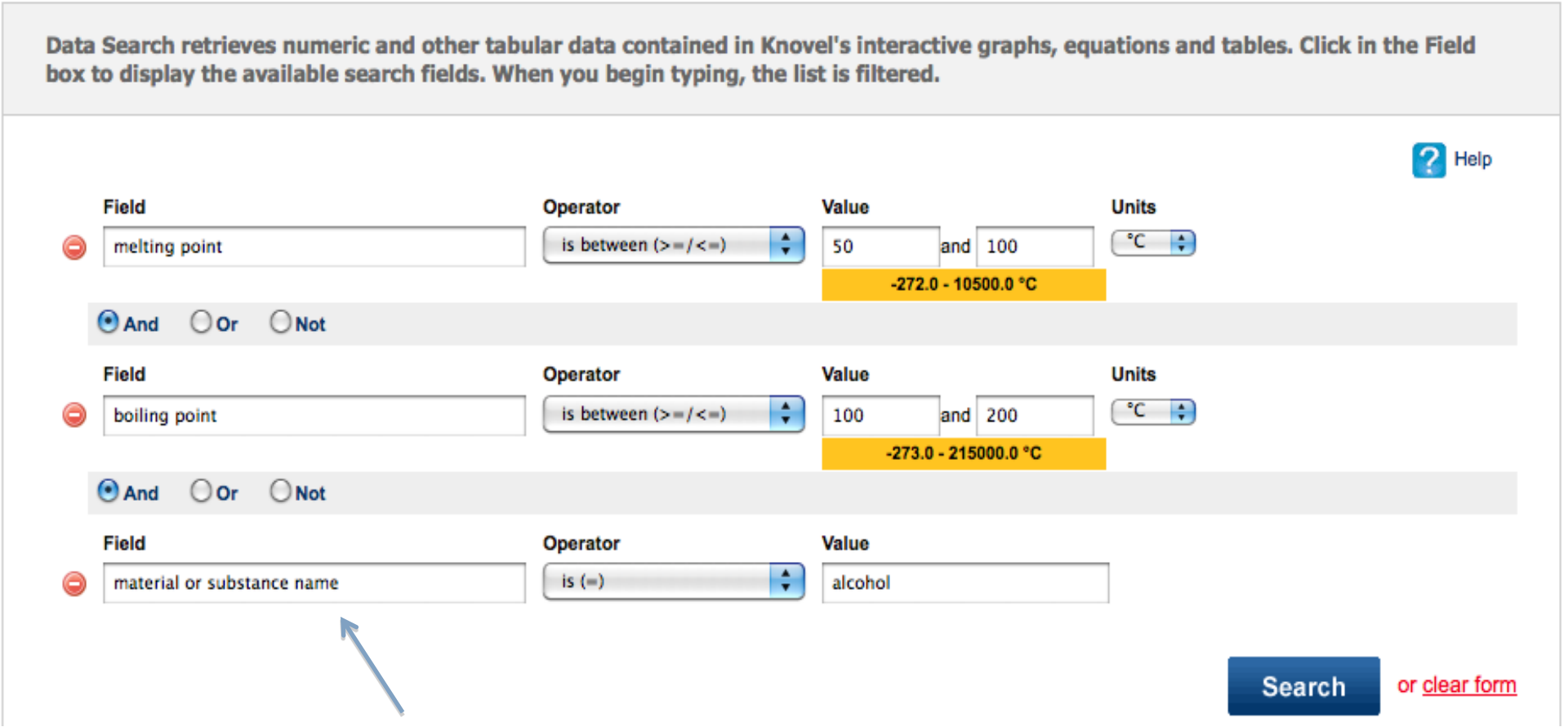
一个香水调香师正设计一款新的香水配方，希望能找到一种共溶剂(可能是醇)，以确认所有的成分都能充分混合且液体为透明的。他在考虑寻找醇类拥有

- **沸点介于摄氏100-200度**
- **熔点介于摄氏50-100度**

方案

- **使用Knovel的data search工具找出具有此特性的所有材料**

Search Example: 找寻答案的检索方式如下



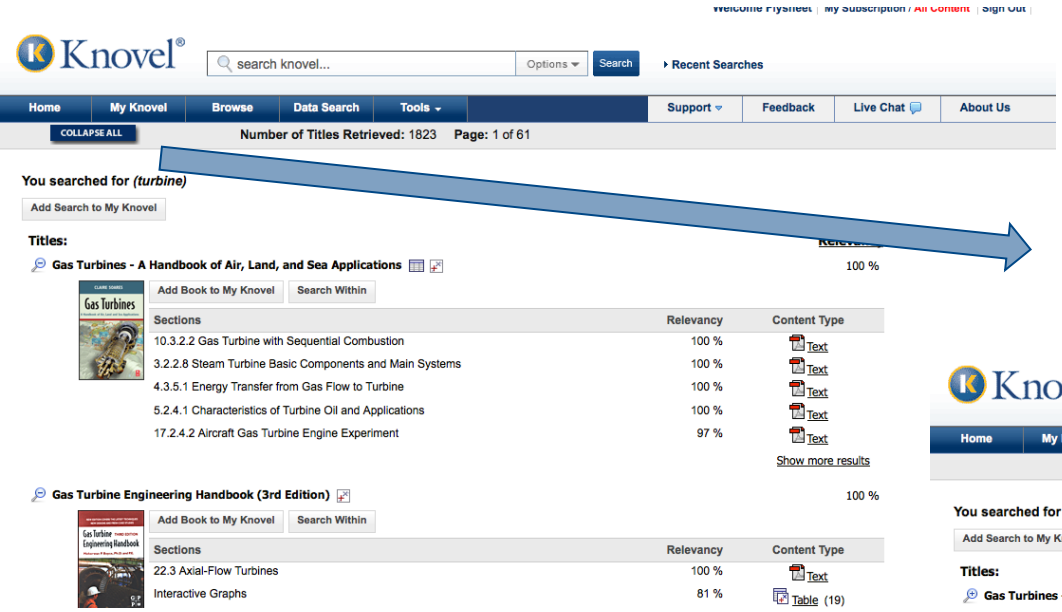
选择材料名称

即可找到所有在范围内的醇

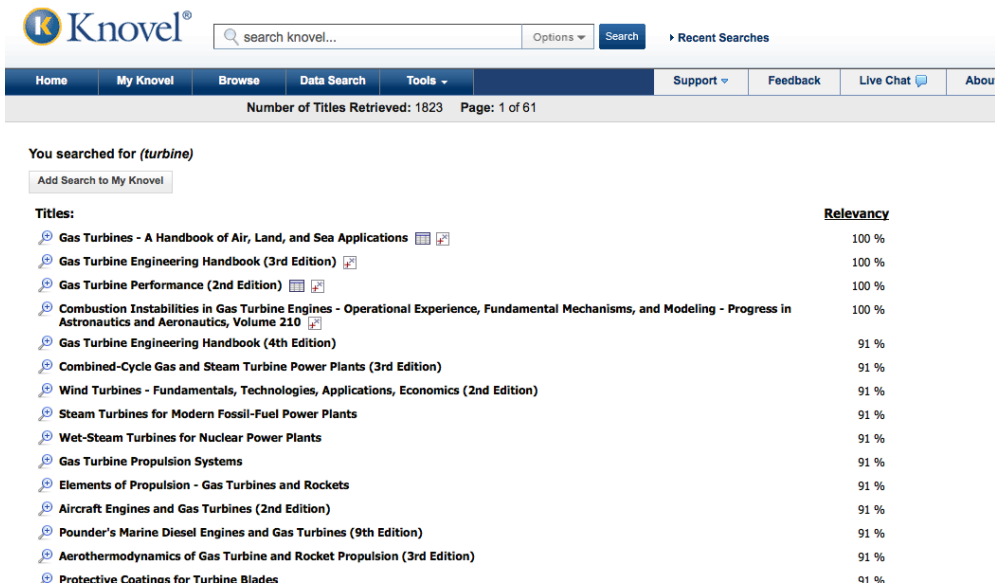
Lets Go Live

Basic Search/
Case Study

查询turbine后将结果展开

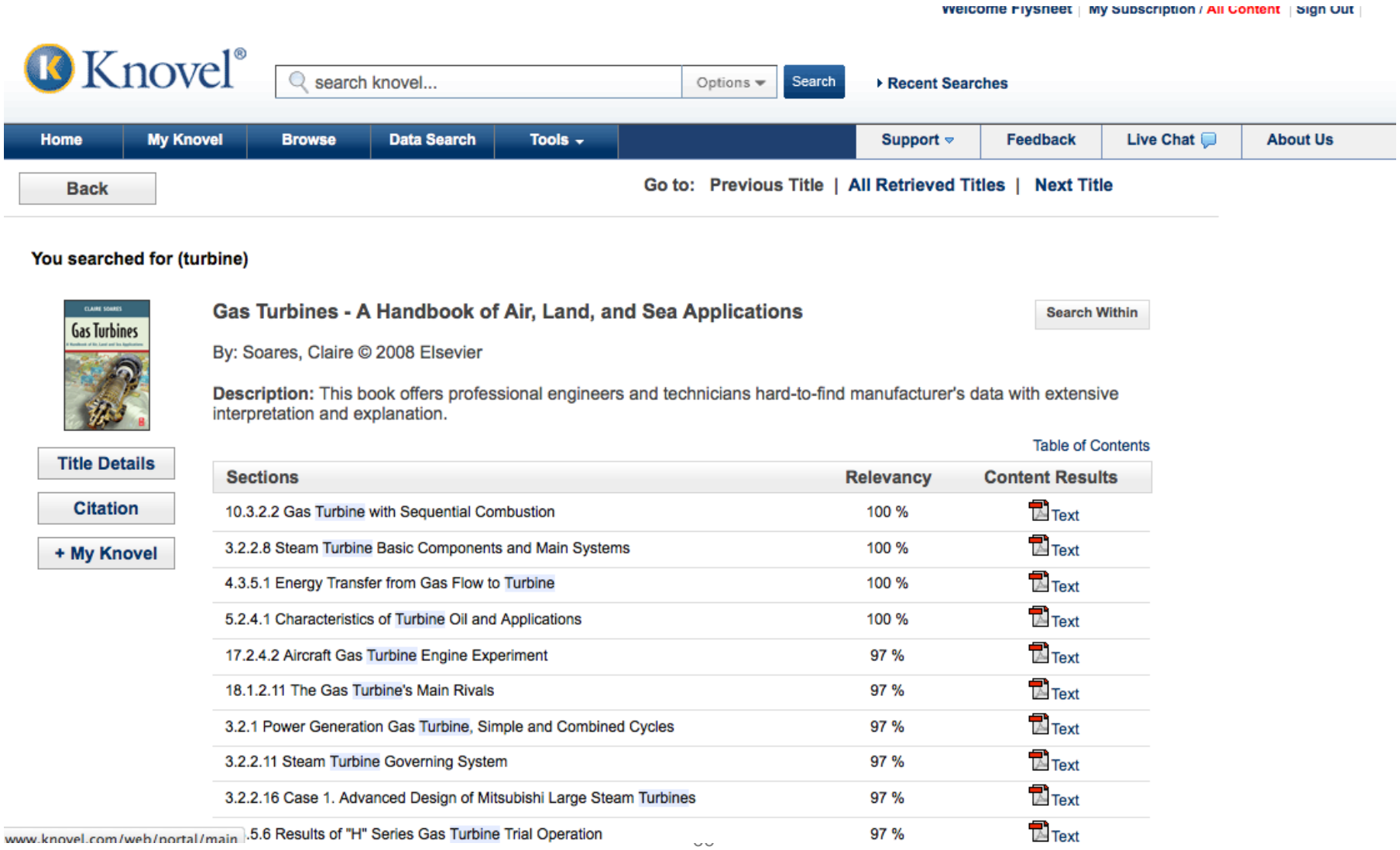


查询turbine后将结果收起，只留清单



Basic Search

点选书名，查看这本书的内容，并用色彩强调查询词汇



案例说明:情境

问题

一个石油工程师要设计一个横跨整个厂房来运输天然气的管路。厂方提供要求如下:

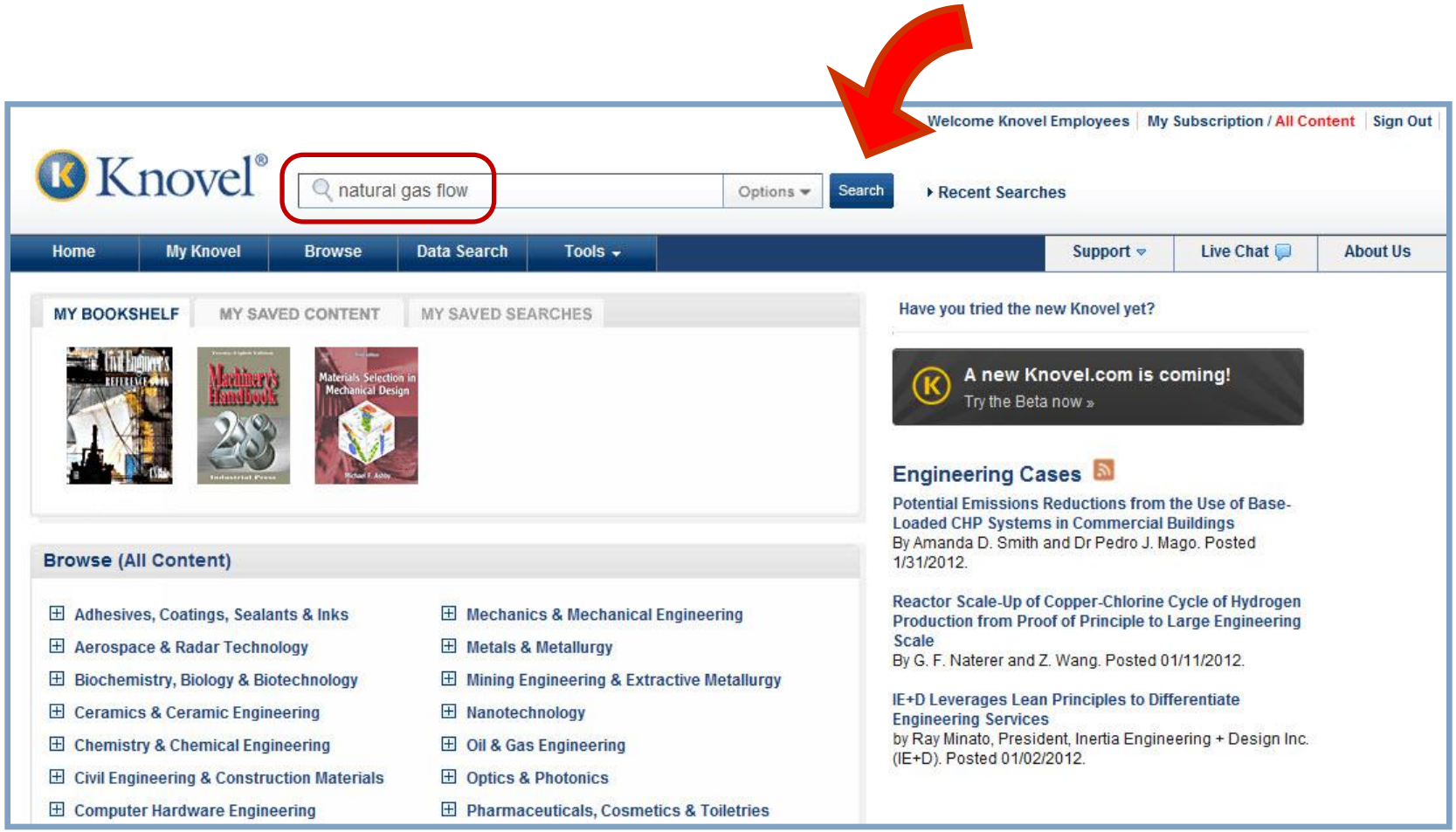
- **运输管路将长达10英哩**
- **运输管路的内部直径为6.1英吋**

方案

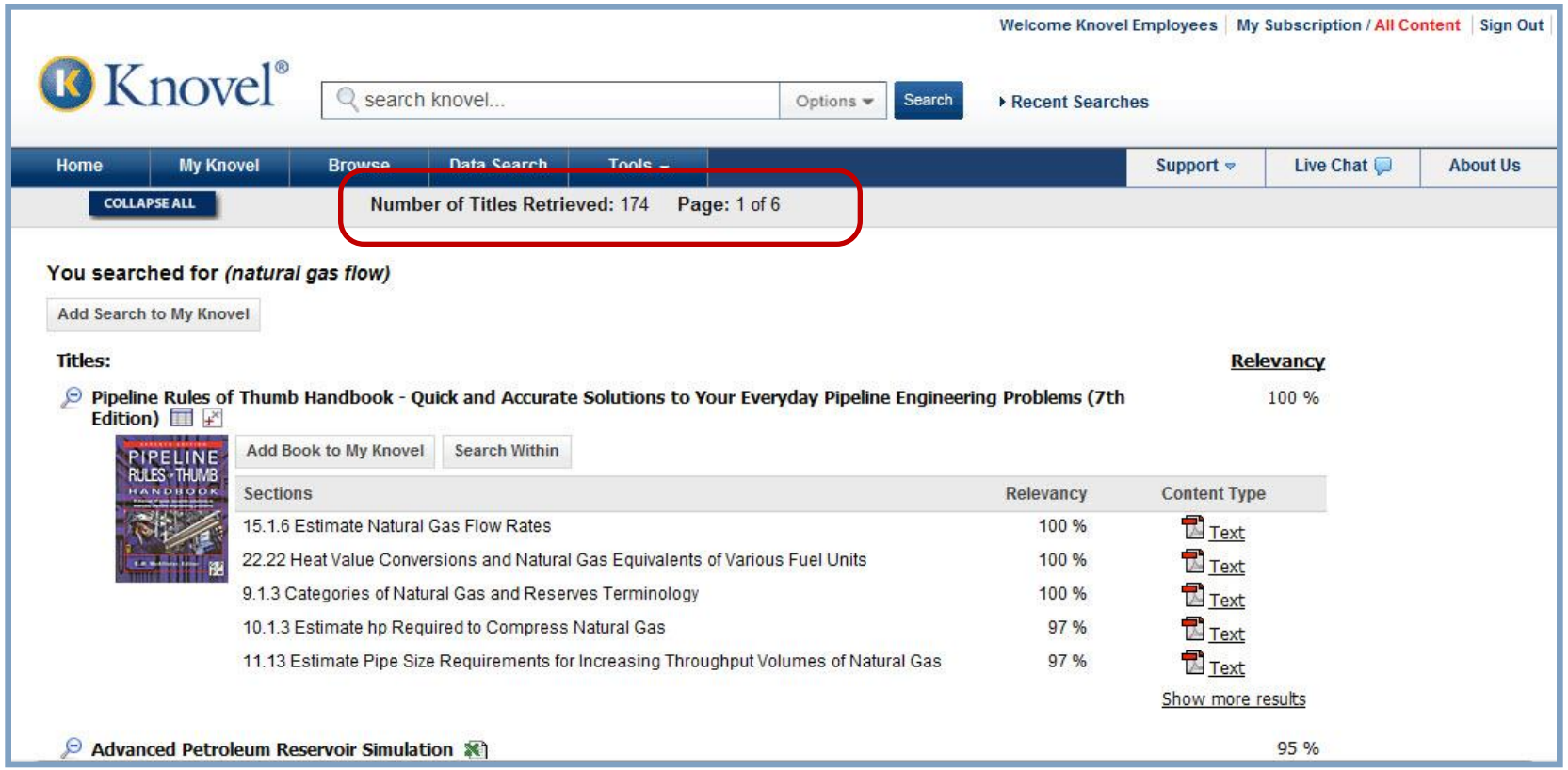
- **使用Knovel来看解决方案**

Basic Search

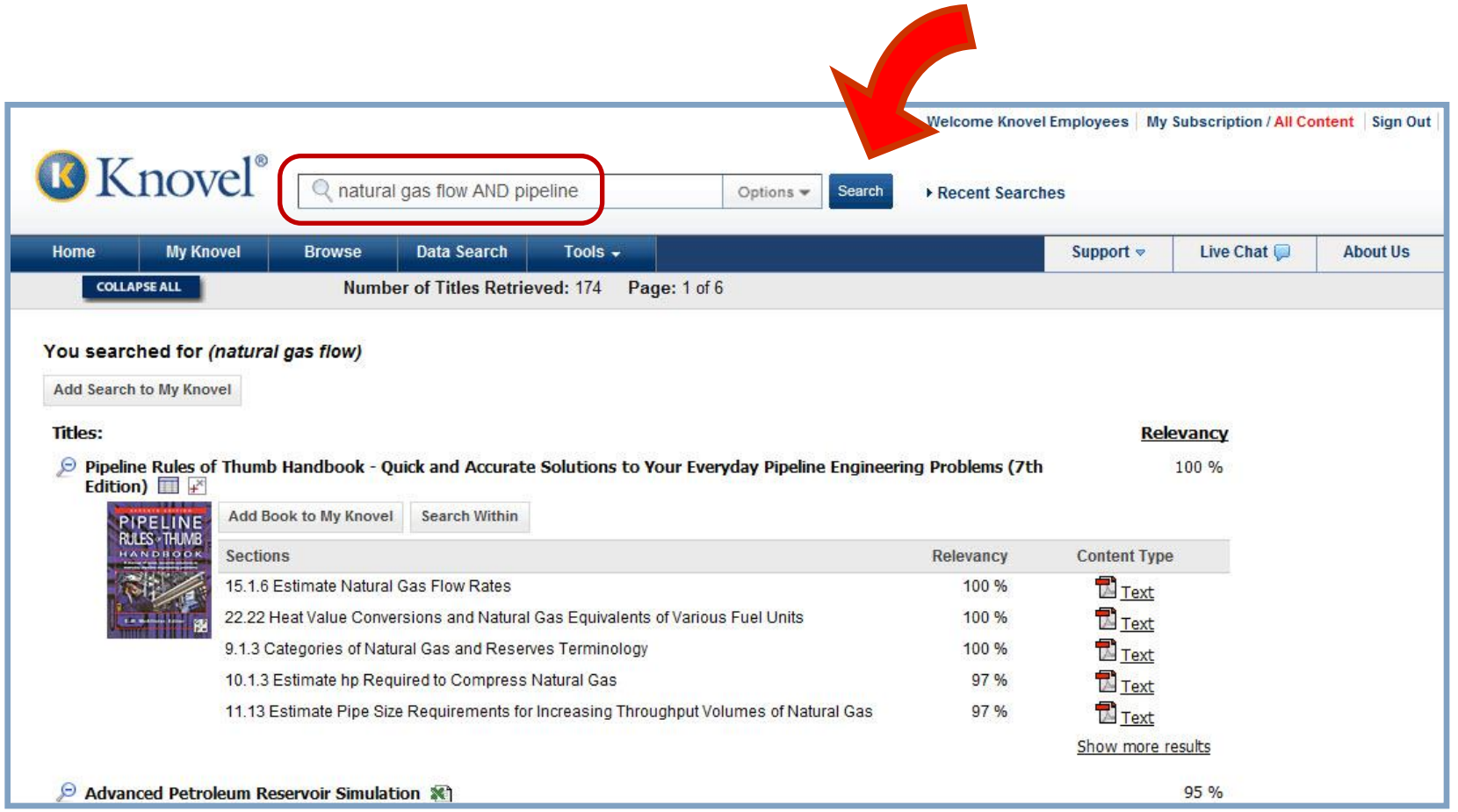
检索natural gas flow



Knovel检索结果–显示gas flow rate有174笔资料

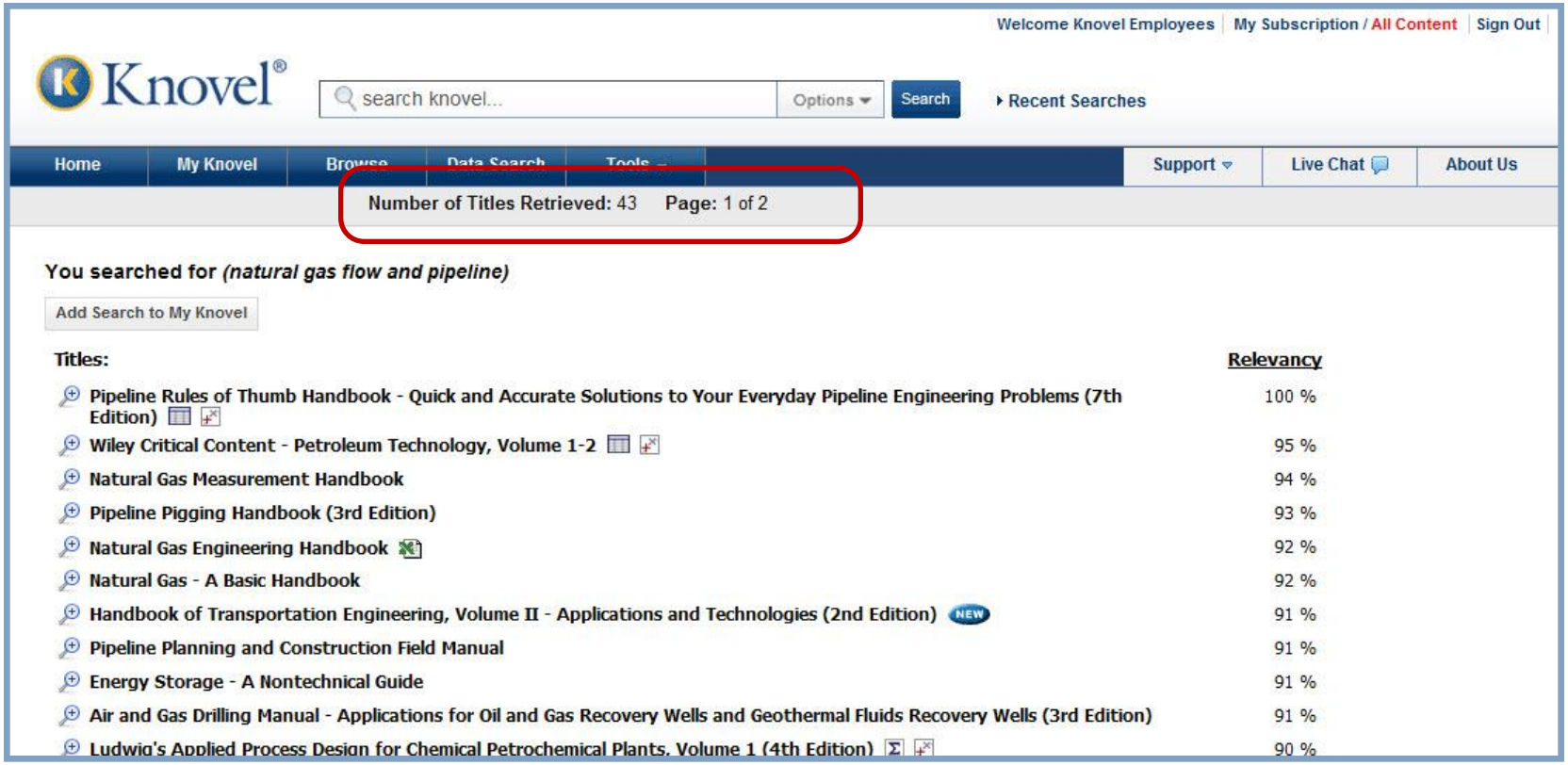


增加检索natural gas flow and pipeline



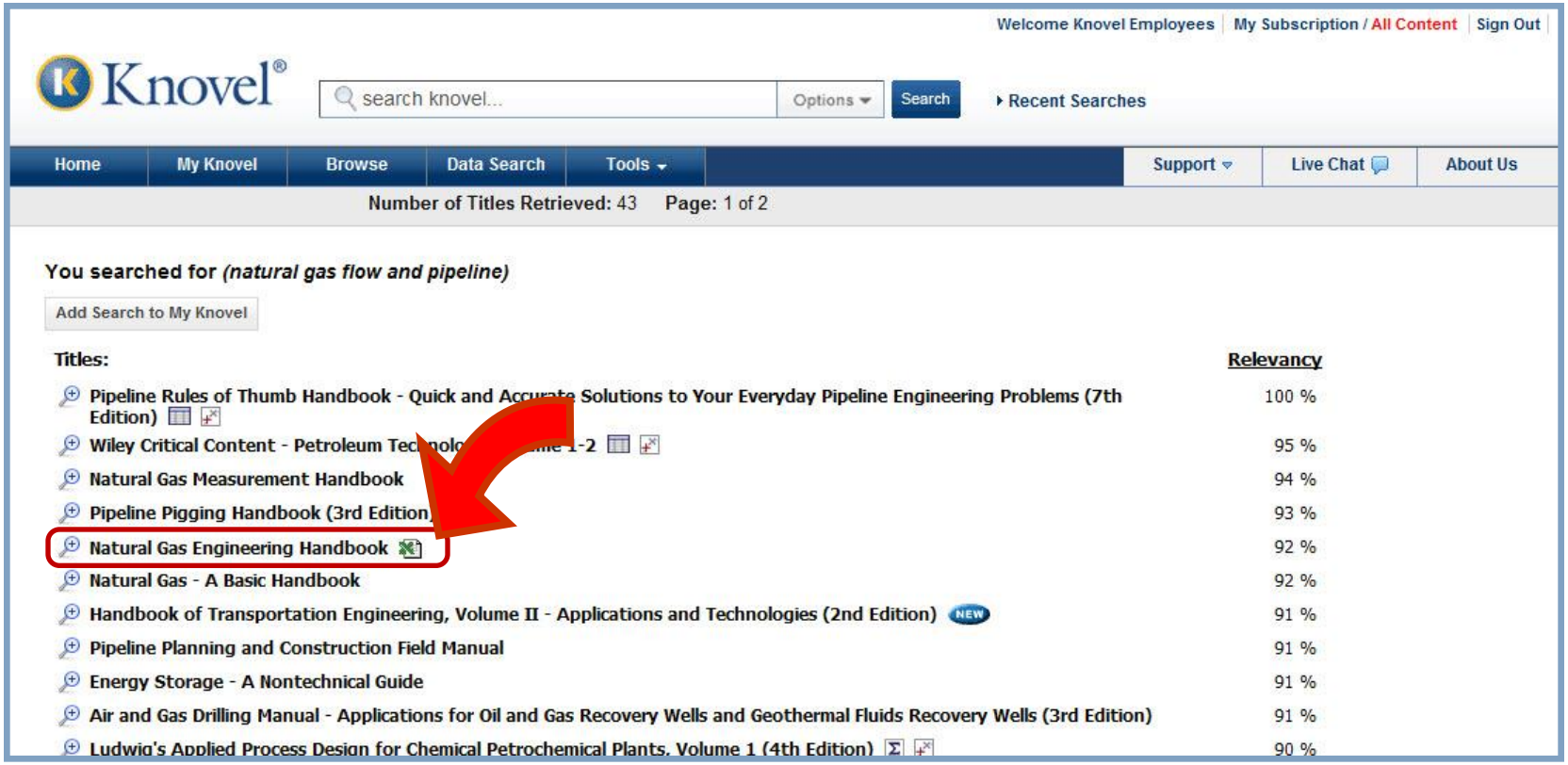
Search Results

共有43笔



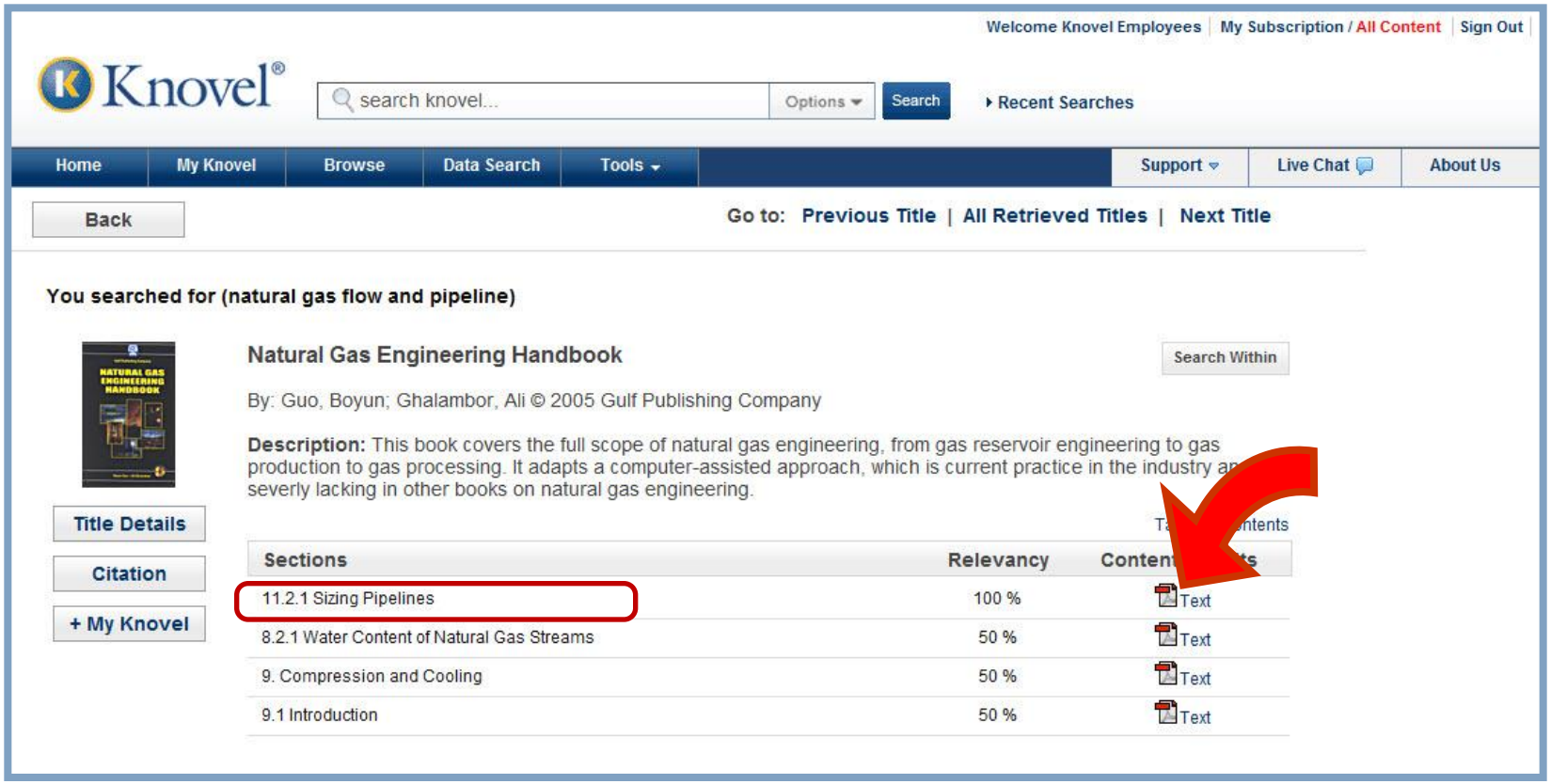
Search Results

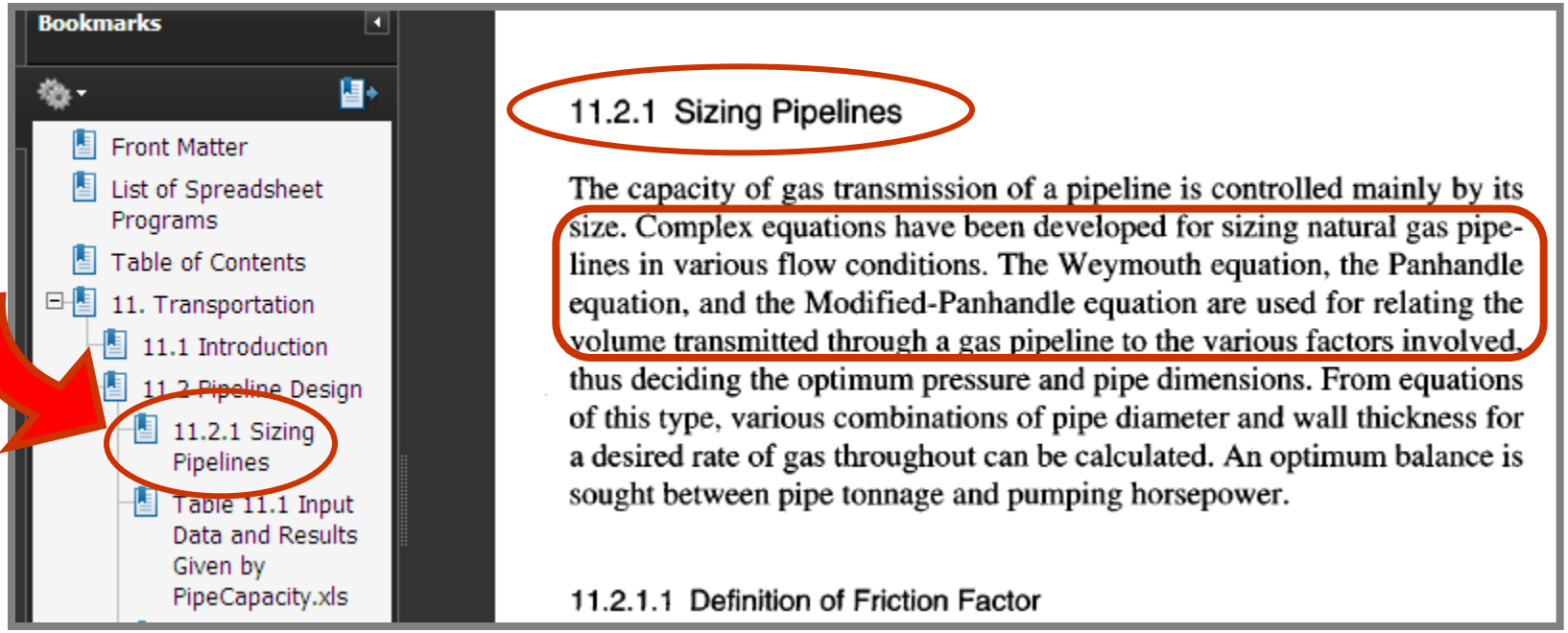
找到与Natural Gas相关且含互动表格的书，点选这本书



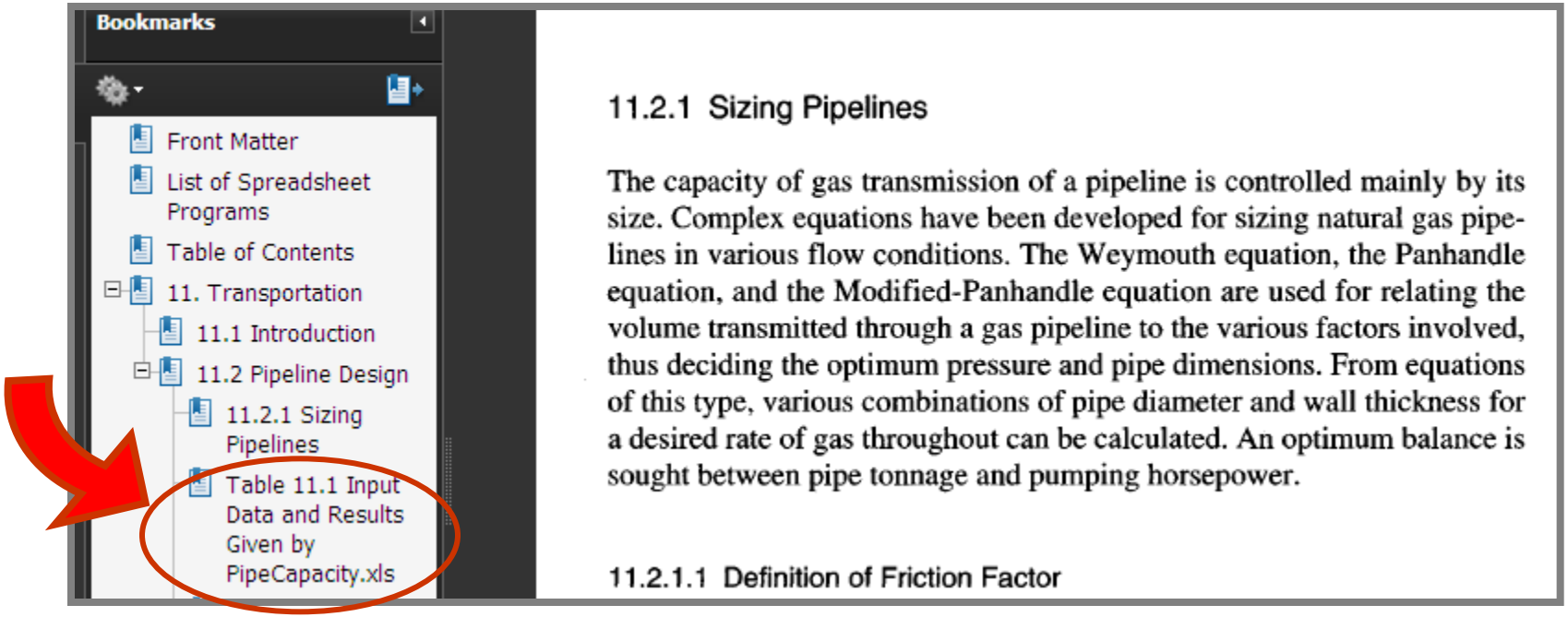
Search Results

最相关的结果为**Section 11.2.1 – Sizing Pipelines**

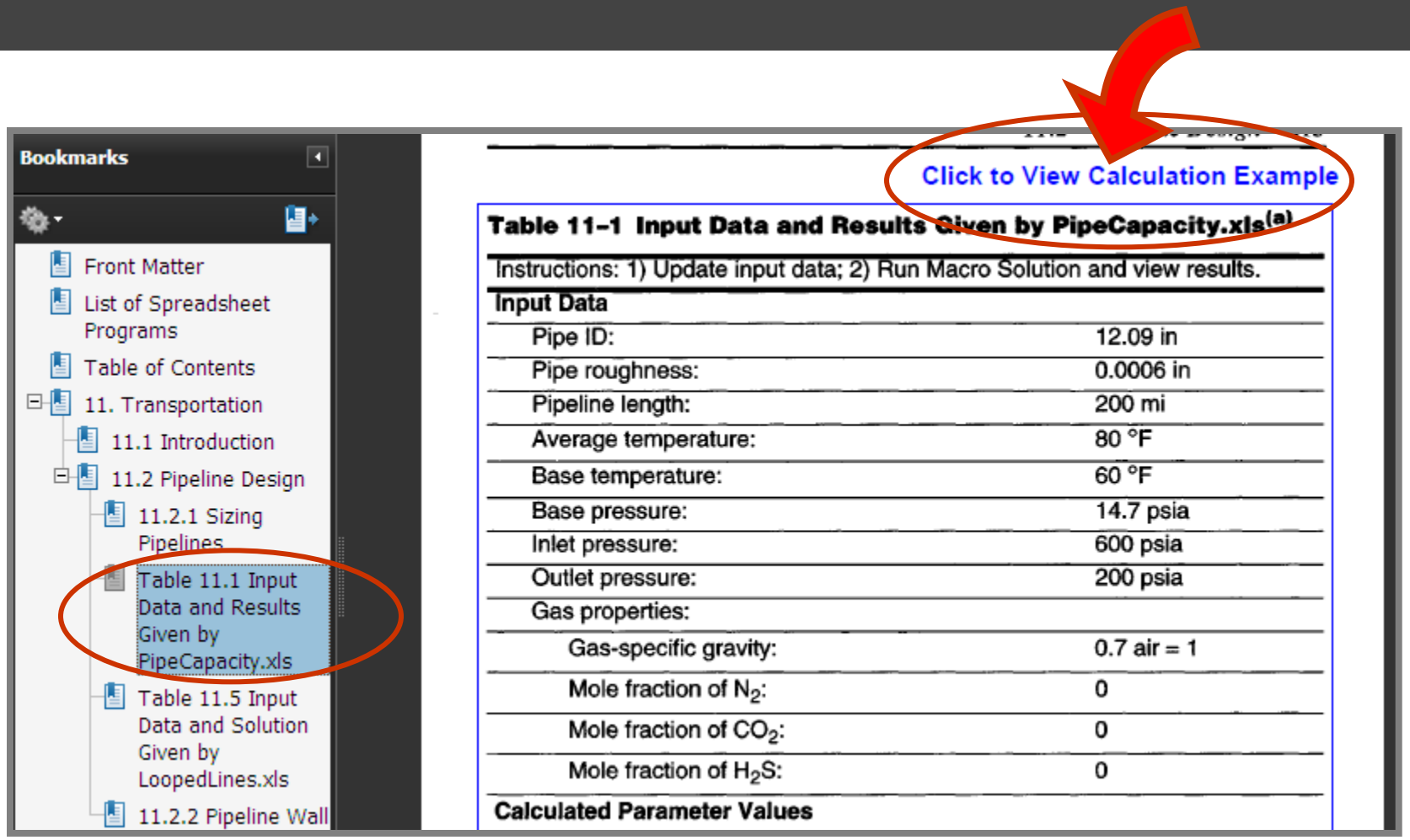



Bookmarks
Front Matter
List of Spreadsheet Programs
Table of Contents
11. Transportation
11.1 Introduction
11.2 Pipeline Design
11.2.1 Sizing Pipelines
Table 11.1 Input Data and Results Given by PipeCapacity.xls
11.2.1 Sizing Pipelines
The capacity of gas transmission of a pipeline is controlled mainly by its size. Complex equations have been developed for sizing natural gas pipelines in various flow conditions. The Weymouth equation, the Panhandle equation, and the Modified-Panhandle equation are used for relating the volume transmitted through a gas pipeline to the various factors involved, thus deciding the optimum pressure and pipe dimensions. From equations of this type, various combinations of pipe diameter and wall thickness for a desired rate of gas throughout can be calculated. An optimum balance is sought between pipe tonnage and pumping horsepower.
11.2.1.1 Definition of Friction Factor

Knovel Content– Sizing Pipelines –进而选择PipeCapacity.xls



Knovel Content–点选PipeCapacity.xls



通常电子书查询到这边就无法继续提供其他加值功能。

Knovel可以提供互动表表格(蓝框标示的范围)来应用于工作流程中

Knovel交互式表格– PipeCapacity.xls

	A	B	C	D	E	F	G
1	**PipeCapacity.xls**						
2	**This spreadsheet computes capacity of gas pipelines.**						
3		**Instructions:** 1. Update input data in blue; 2. Run Macro Solution; 3. View results.					
4	**Input Data:**						
5		Pipe I.D.:				12.09	in.
6		Pipe roughness:				0.0006	in.
7		Pipeline length:				200	miles
8		Average temperature:				80	°F
9		Base temperature:				60	°F
10		Base pressure:				14.7	psia
11		Inlet pressure:				600	psia
12		Outlet pressure:				200	psia
13		Gas properties:					
14			Gas specific gravity:			0.7	air = 1
15			Mole fraction of N_2:			0	
16			Mole fraction of CO_2:			0	
17			Mole fraction of H_2S:			0	

44					
45	B) Use Weymouth Equation:				
46					
47	Pipeline flow capacity =	$q_h = \frac{18.062 T_b}{p_b}\sqrt{\frac{(p_1^2 - p_2^2) D^{16/3}}{\gamma_g \bar{T} \bar{z} L}}$	1,076,035	cfh	
48					
49					

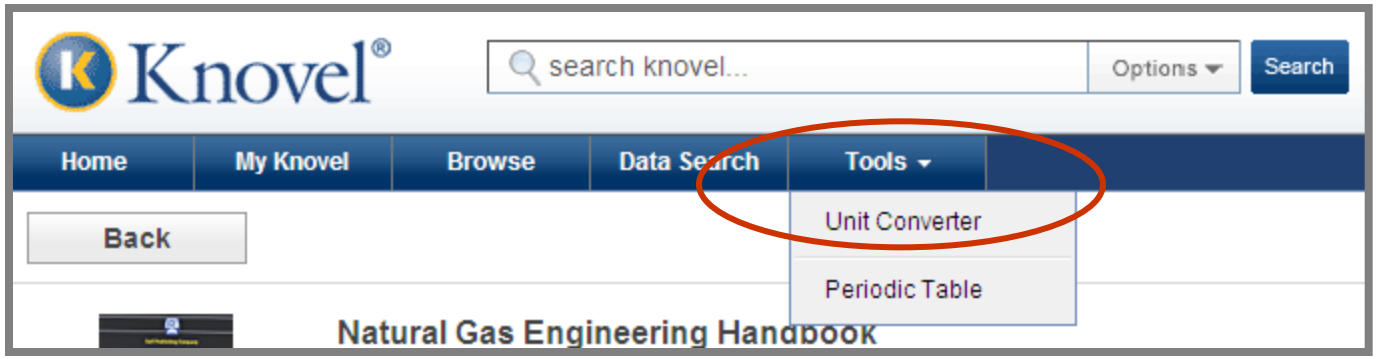
Knovel交互式表格– PipeCapacity.xls –变更为工程师实际要计算的数据

	A	B	C	D	E	F	G
1	**PipeCapacity.xls**						
2	**This spreadsheet computes capacity of gas pipelines.**						
3		**Instructions:** 1. Update input data in blue; 2. Run Macro Solution; 3. View results.					
4	**Input Data:**						
5		Pipe I.D.:				6.1	in.
6		Pipe roughness:				0.0006	in.
7		Pipeline length:				10	miles
8		Average temperature:				80	°F
9		Base temperature:				60	°F
10		Base pressure:				14.7	psia
11		Inlet pressure:				600	psia
12		Outlet pressure:				200	psia
13		Gas properties:					
14			Gas specific gravity:			0.7	air = 1
15			Mole fraction of N_2:			0	
16			Mole fraction of CO_2:			0	
17			Mole fraction of H_2S:			0	

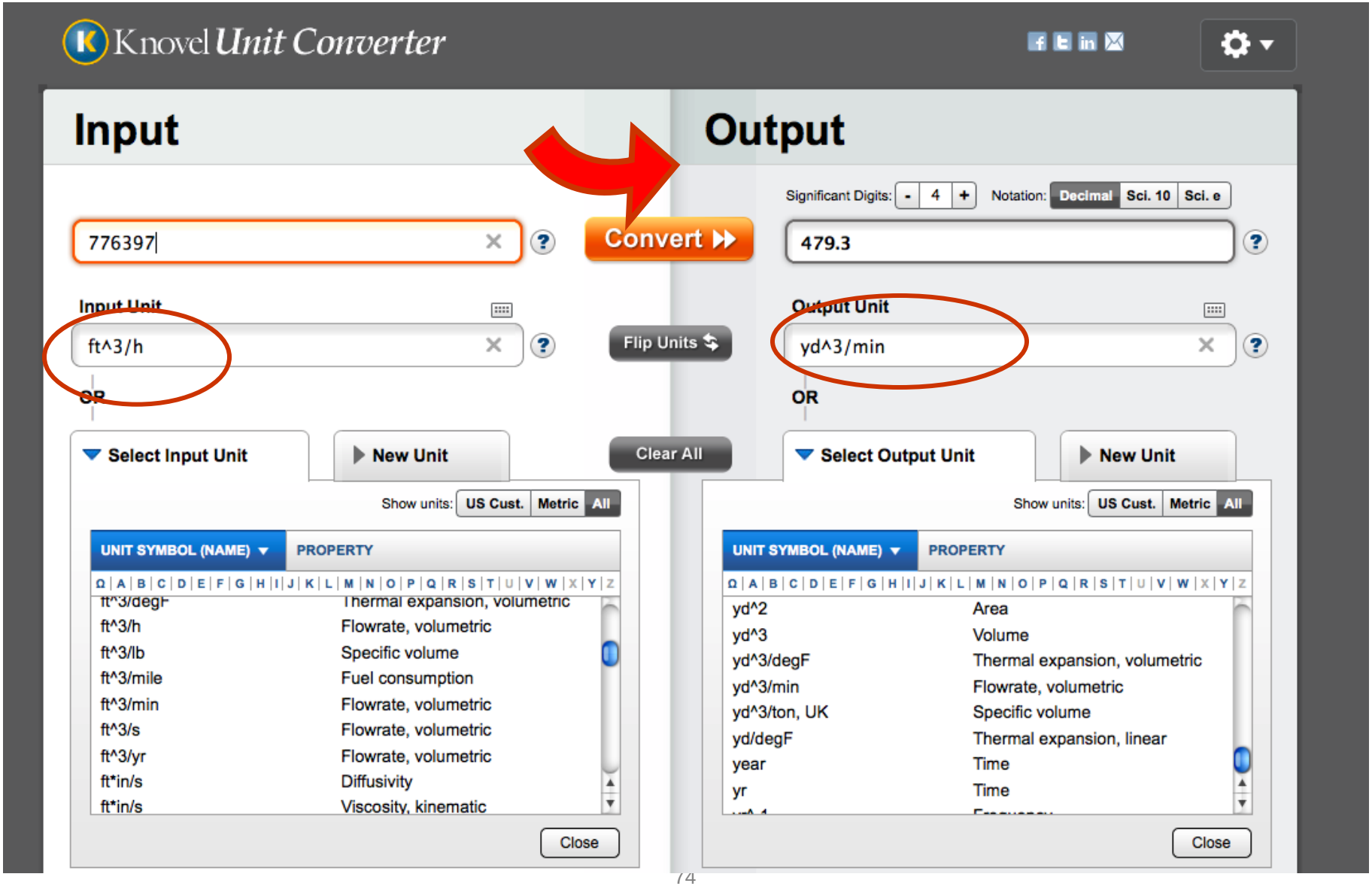
44							
45		B) Use Weymouth Equation:					
46							
47		Pipeline flow capacity =	$q_h = \frac{18.062 T_b}{p_b}\sqrt{\frac{(p_1^2 - p_2^2)D^{16/3}}{\gamma_g \bar{T} \bar{z} L}}$			776,397	cfh
48							
49							

转换单位– Knovel Unit Converter

44					
45	B) Use Weymouth Equation:				
46					
47	Pipeline flow capacity =	$q_h = \frac{18.062 T_b}{p_b} \sqrt{\frac{\left(p_1^2 - p_2^2\right) D^{16/3}}{\gamma_g \bar{T} \bar{z} L}}$		776,397	cfh
48					
49					



Results– Unit Converter (cfh to cym)



Scenario

Problem

一个航空航天工程师被要求调查喷气发动机过热的问题。

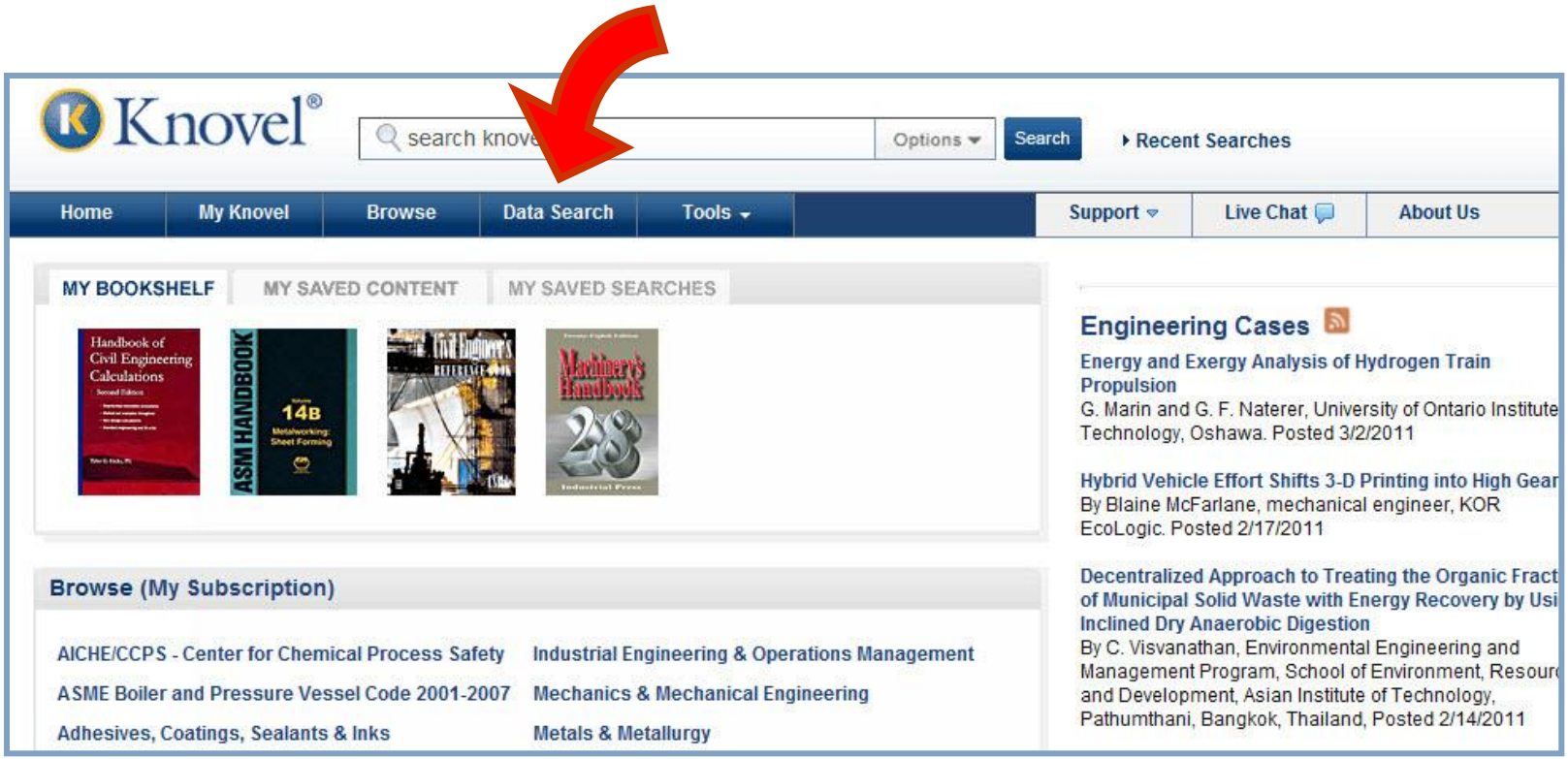
调查后发现一个由铝合金2219制成的零件，显示出在400至500 F 有失效的迹象。

Solution

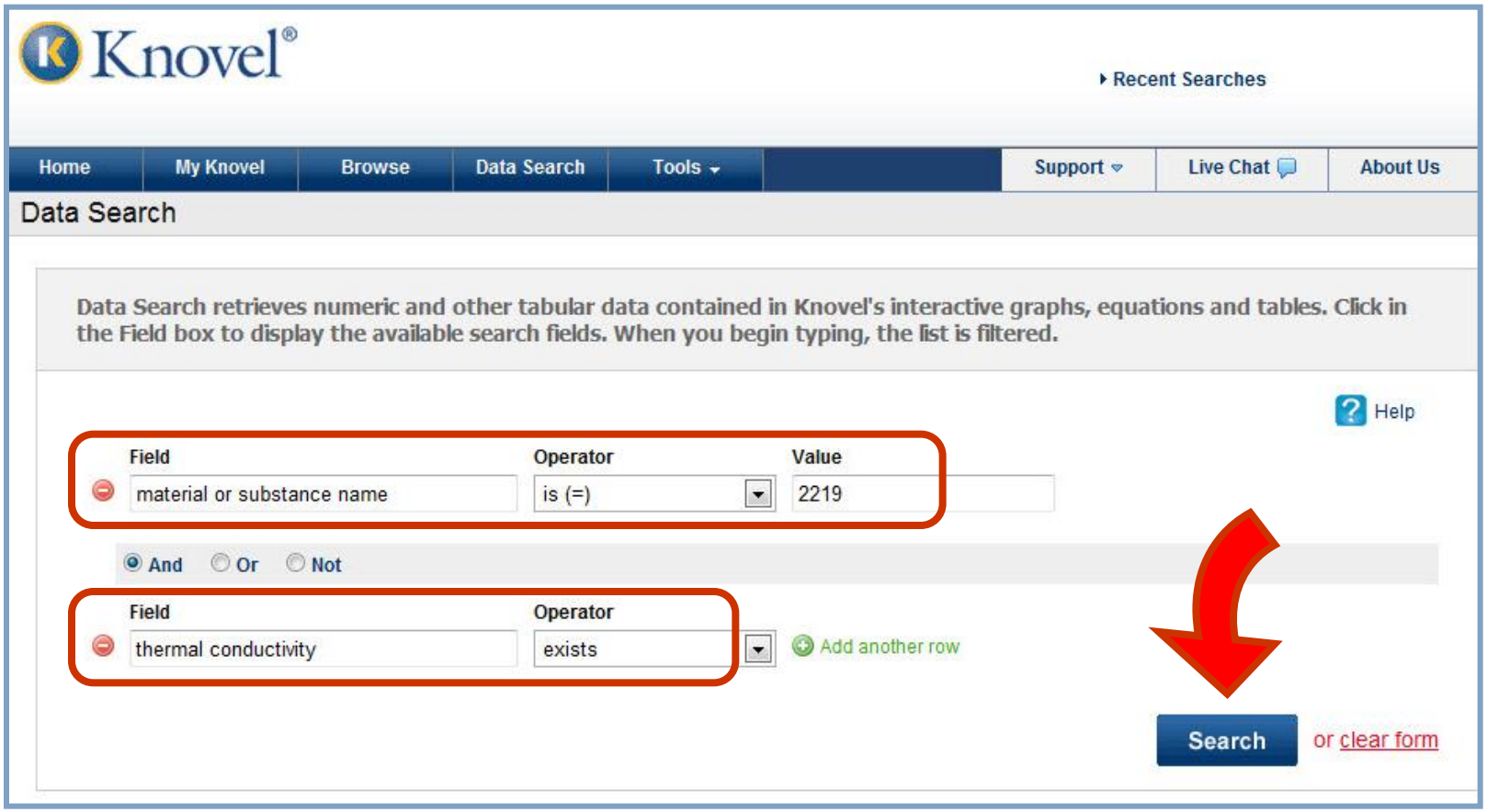
这个工程师需要 ...

- 评估2219合金的熱导系数(Thermal Conductivity) 。
- 找出另一个具较高热导率的合金。
- 在升高的温度下，比较2合金的热导率。

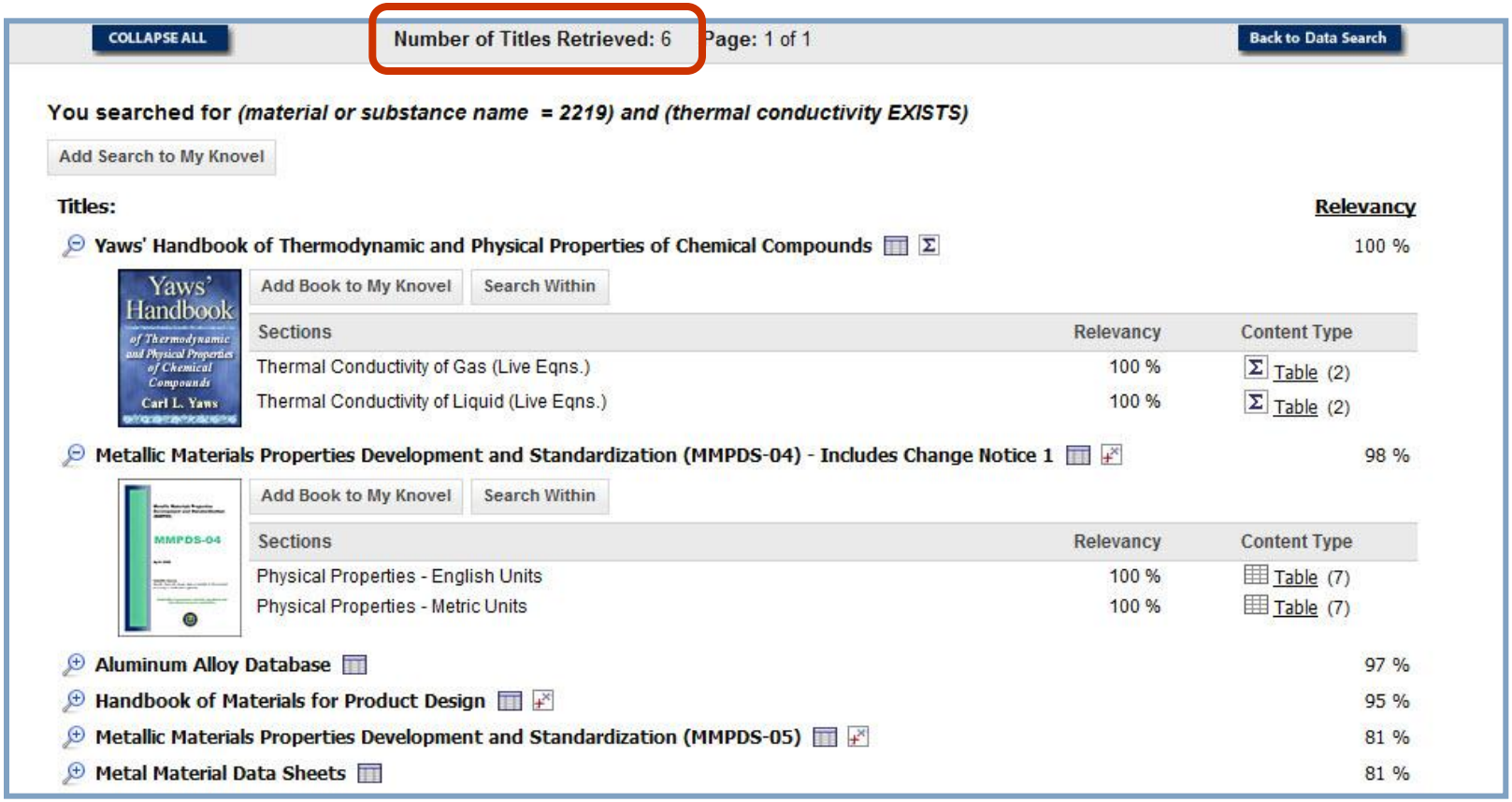
点击Data Search



Material or Substance name = 2219
And
Thermal Conductivity exists



Number of Relevant Titles



找到较相关性较高的书 - Aluminum Alloy Database

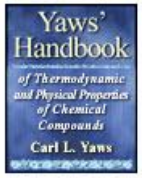
COLLAPSE ALL Number of Titles Retrieved: 6 Page: 1 of 1 Back to Data Search

You searched for *(material or substance name = 2219) and (thermal conductivity EXISTS)*

Add Search to My Knovel

Titles: **Relevancy**

Yaws' Handbook of Thermodynamic and Physical Properties of Chemical Compounds 100 %



Add Book to My Knovel | Search Within

Sections	Relevancy	Content Type
Thermal Conductivity of Gas (Live Eqns.)	100 %	Table (2)
Thermal Conductivity of Liquid (Live Eqns.)	100 %	Table (2)

Metallic Materials Properties Development and Standardization (MMPDS-04) - Includes Change Notice 1 98 %

Add Book to My Knovel | Search Within

Sections	Relevancy	Content Type
Physical Properties - English Units	100 %	Table (7)
Physical Properties - Metric Units	100 %	Table (7)

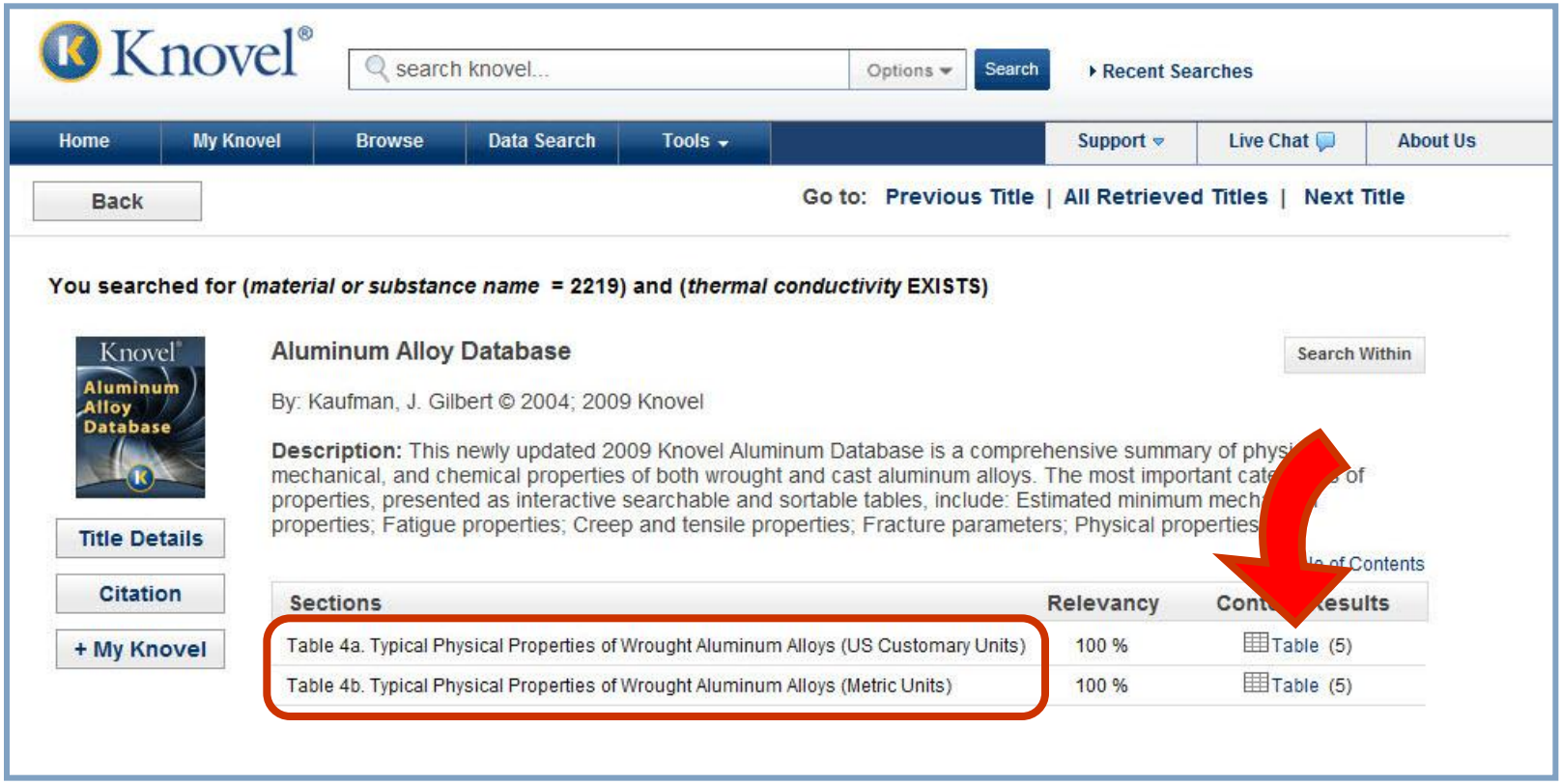
Aluminum Alloy Database 97 %

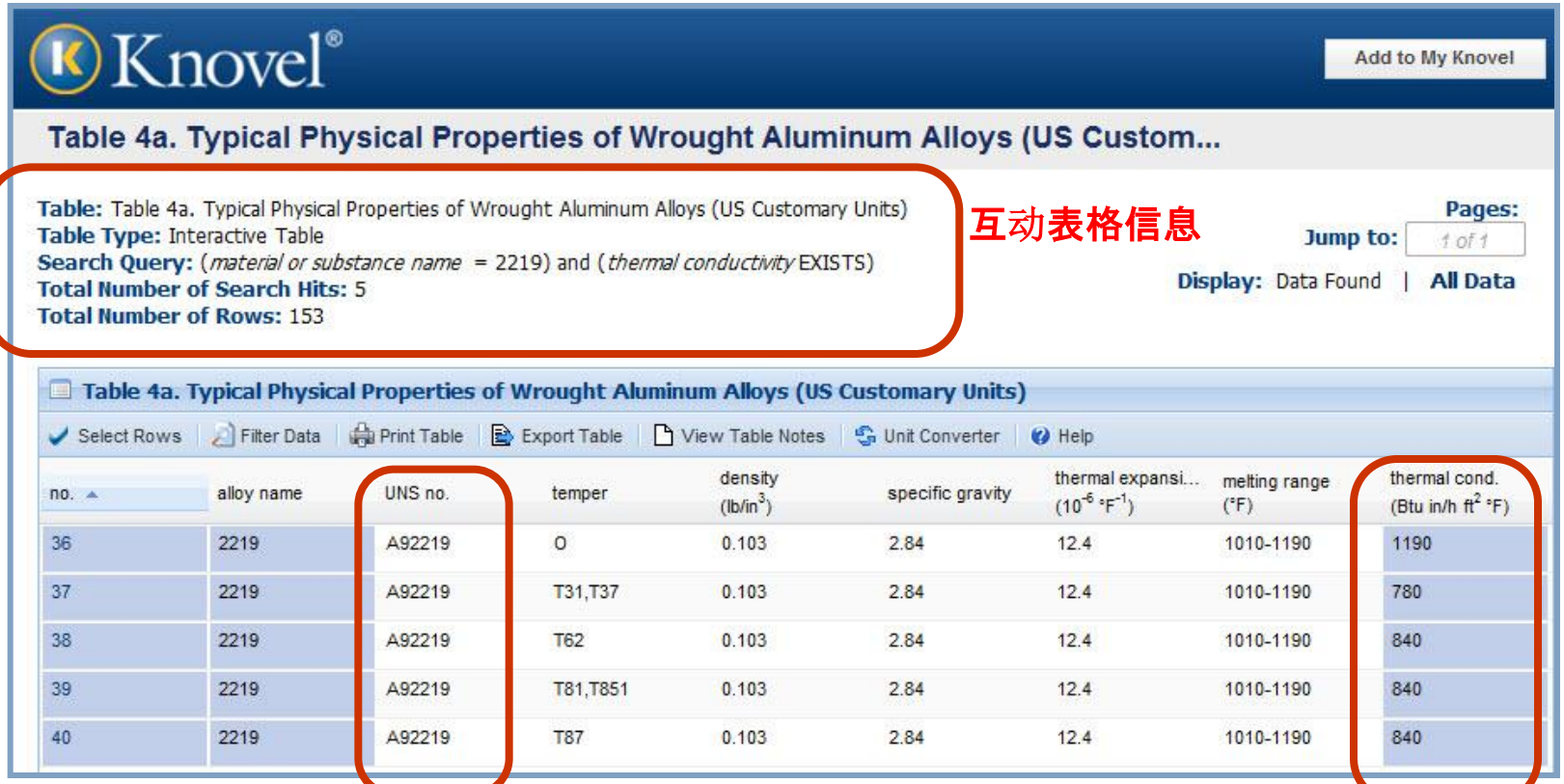
Handbook of Materials for Product Design 95 %

Metallic Materials Properties Development and Standardization (MMPDS-05) 81 %

Metal Material Data Sheets 81 %

找出最相关的表格并打开





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Add to My Knovel

Table 4a. Typical Physical Properties of Wrought Aluminum Alloys (US Custom...

Table: Table 4a. Typical Physical Properties of Wrought Aluminum Alloys (US Customary Units)
Table Type: Interactive Table
Search Query: (*material or substance name* = 2219) and (*thermal conductivity* EXISTS)
Total Number of Search Hits: 5
Total Number of Rows: 153

互动表格信息

Pages:
Jump to: 1 of 1
Display: Data Found | All Data

Table 4a. Typical Physical Properties of Wrought Aluminum Alloys (US Customary Units)

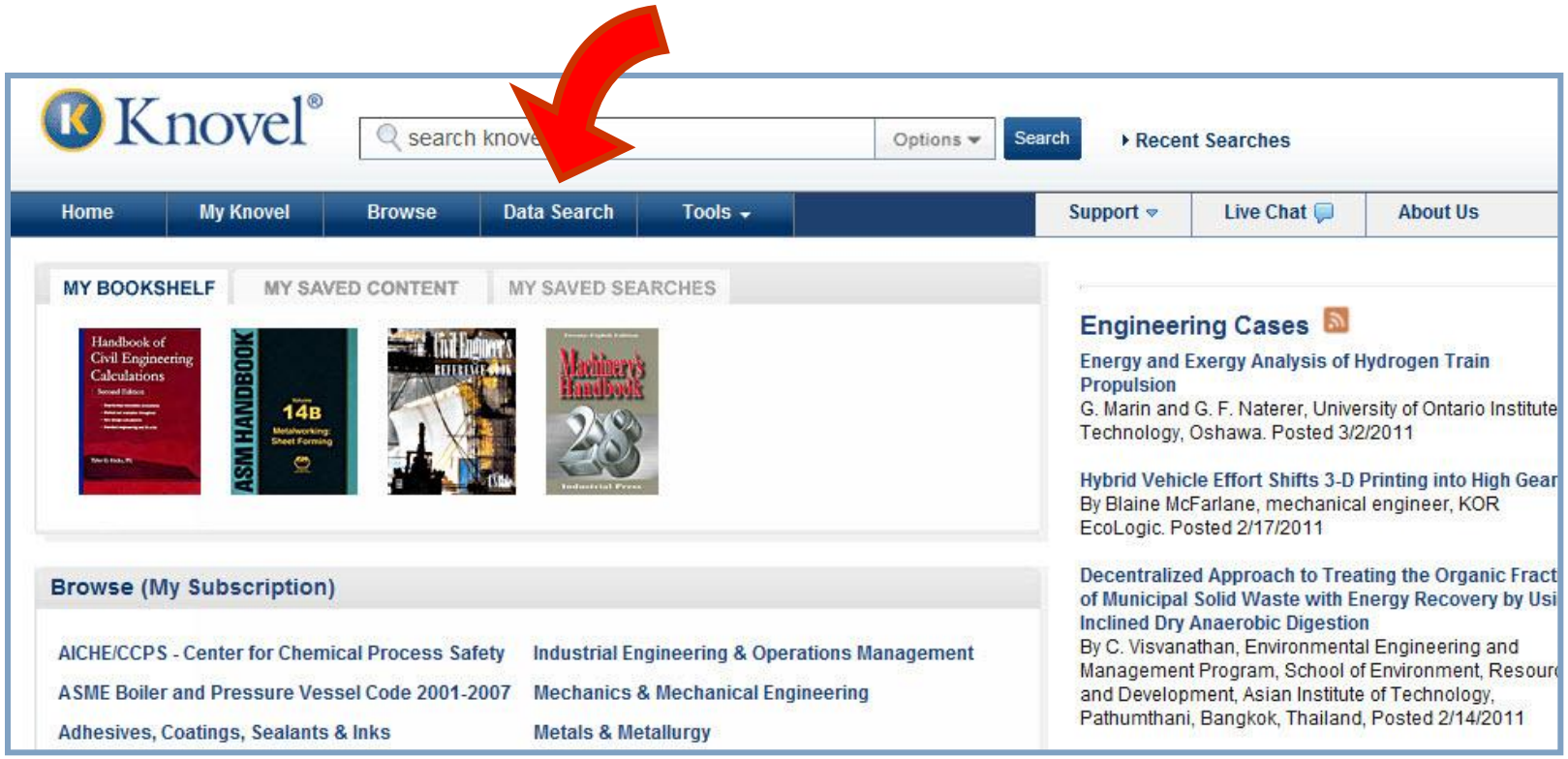
Select Rows | Filter Data | Print Table | Export Table | View Table Notes | Unit Converter | Help

no.	alloy name	UNS no.	temper	density (lb/in^3)	specific gravity	thermal expansi... ($10^{-6}\ °F^{-1}$)	melting range (°F)	thermal cond. (Btu in/h ft^2 °F)
36	2219	A92219	O	0.103	2.84	12.4	1010-1190	1190
37	2219	A92219	T31,T37	0.103	2.84	12.4	1010-1190	780
38	2219	A92219	T62	0.103	2.84	12.4	1010-1190	840
39	2219	A92219	T81,T851	0.103	2.84	12.4	1010-1190	840
40	2219	A92219	T87	0.103	2.84	12.4	1010-1190	840

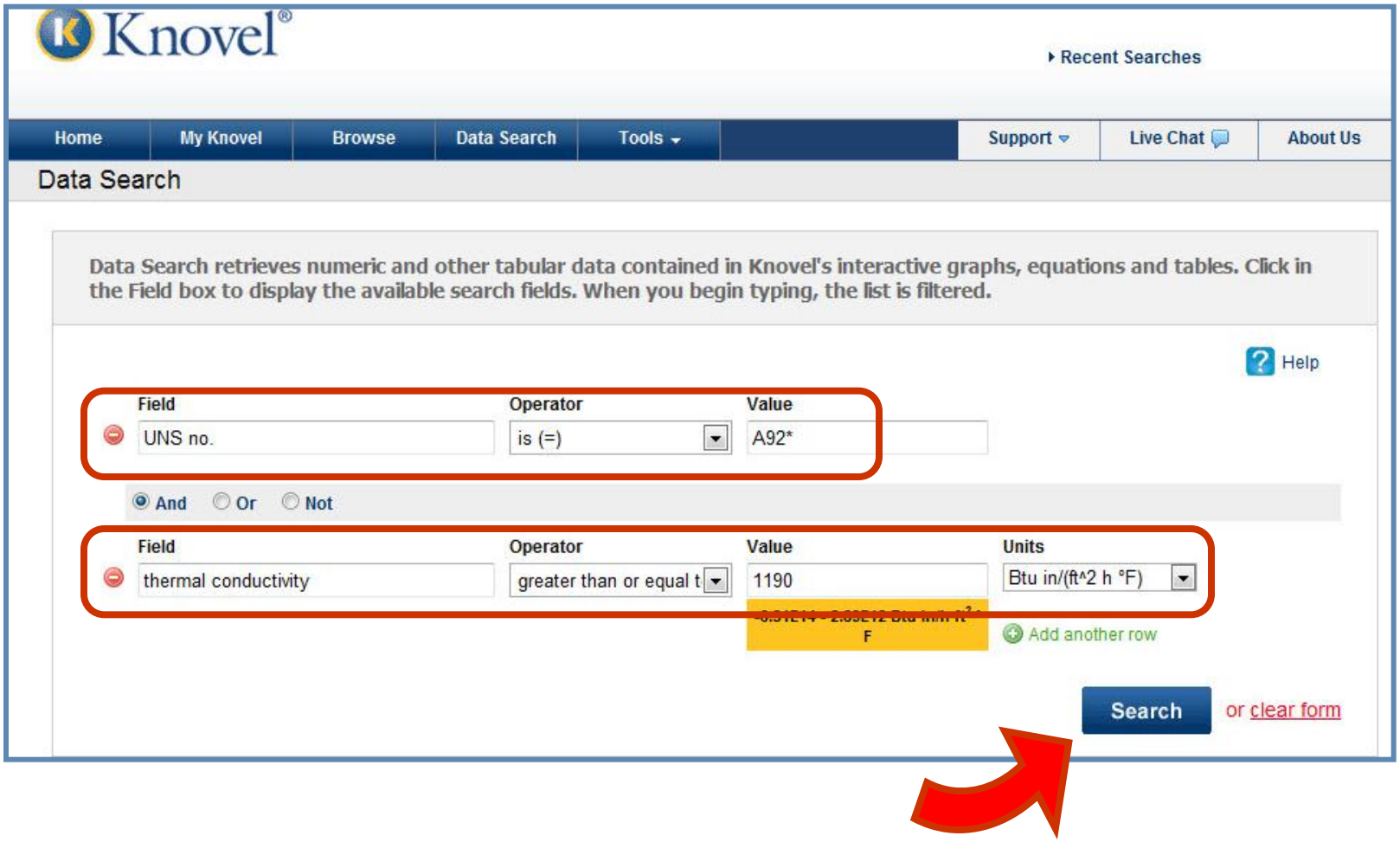
UNS no. is A92＊

发现其热导率**Thermal Conductivity**范围：**780 – 1190**

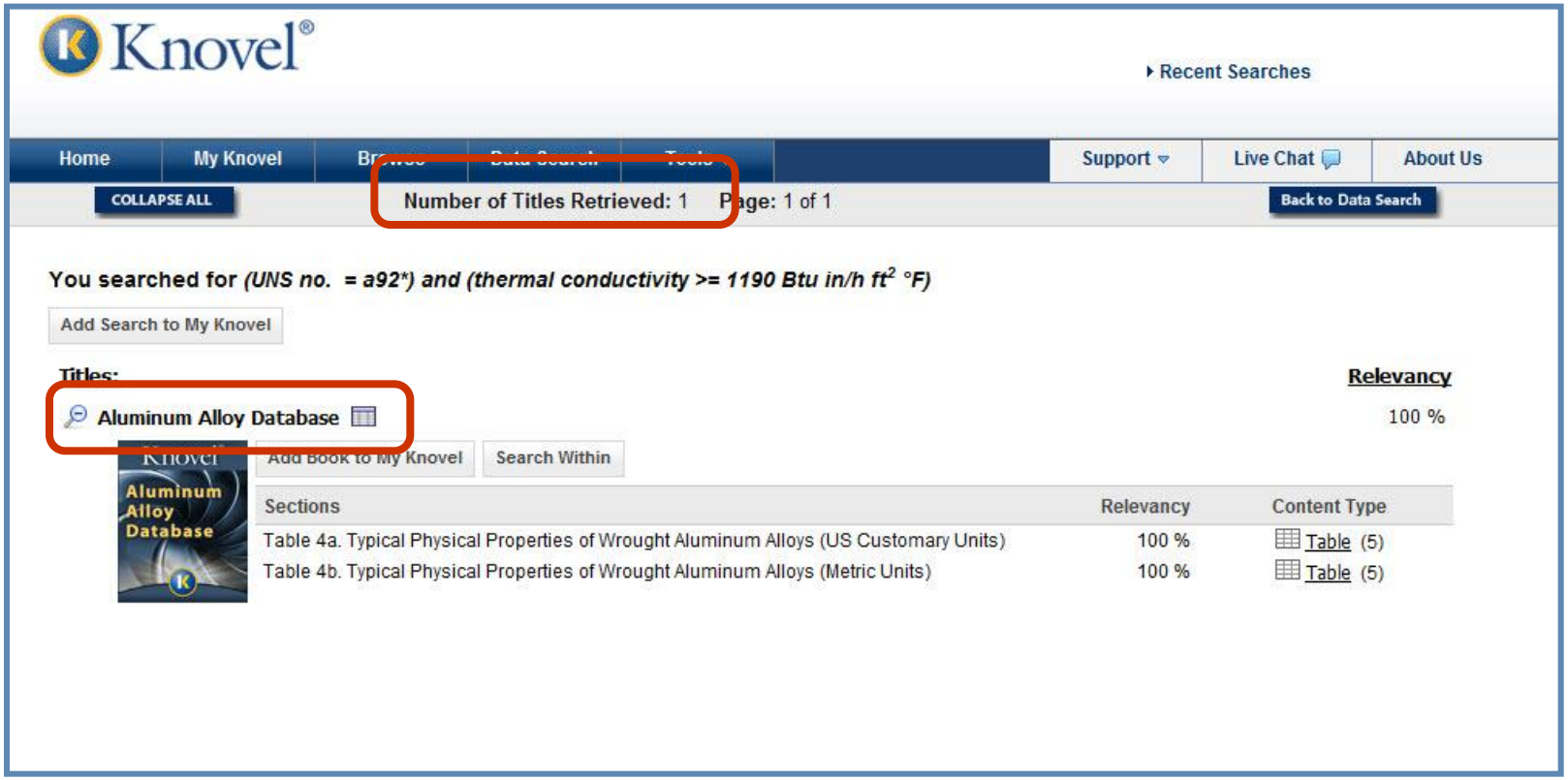
再到Data Search 寻找相似的铝合金



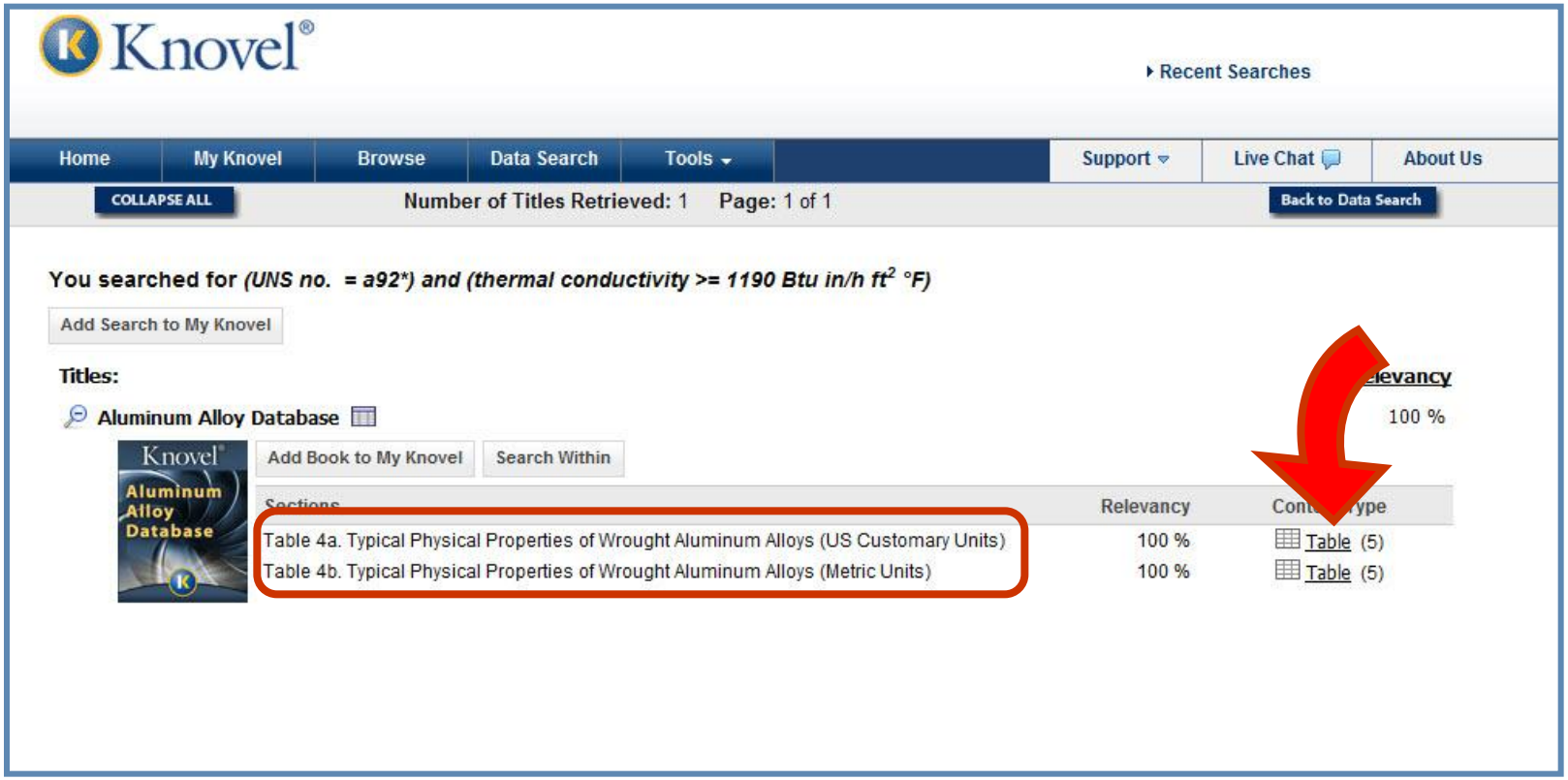
UNS no. = A92* (using wildcard)
And
Thermal Conductivity >= 1190 Btu in/(ft^2 h °F)



Most Relevant Title is **Aluminum Alloy Database**



找出最相关的表格并打开



2014, 2017 and 2024 具较高的热导率Higher Thermal Conductivity
我们从中选择(2014) 做进一步的检验

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Table 4a. Typical Physical Properties of Wrought Aluminum Alloys (US Custom...

Table: Table 4a. Typical Physical Properties of Wrought Aluminum Alloys (US Customary Units)
Table Type: Interactive Table
Search Query: (*UNS no.* = a92*) and (*thermal conductivity* >= 1190 Btu in/h ft^2 °F)
Total Number of Search Hits: 5
Total Number of Rows: 153

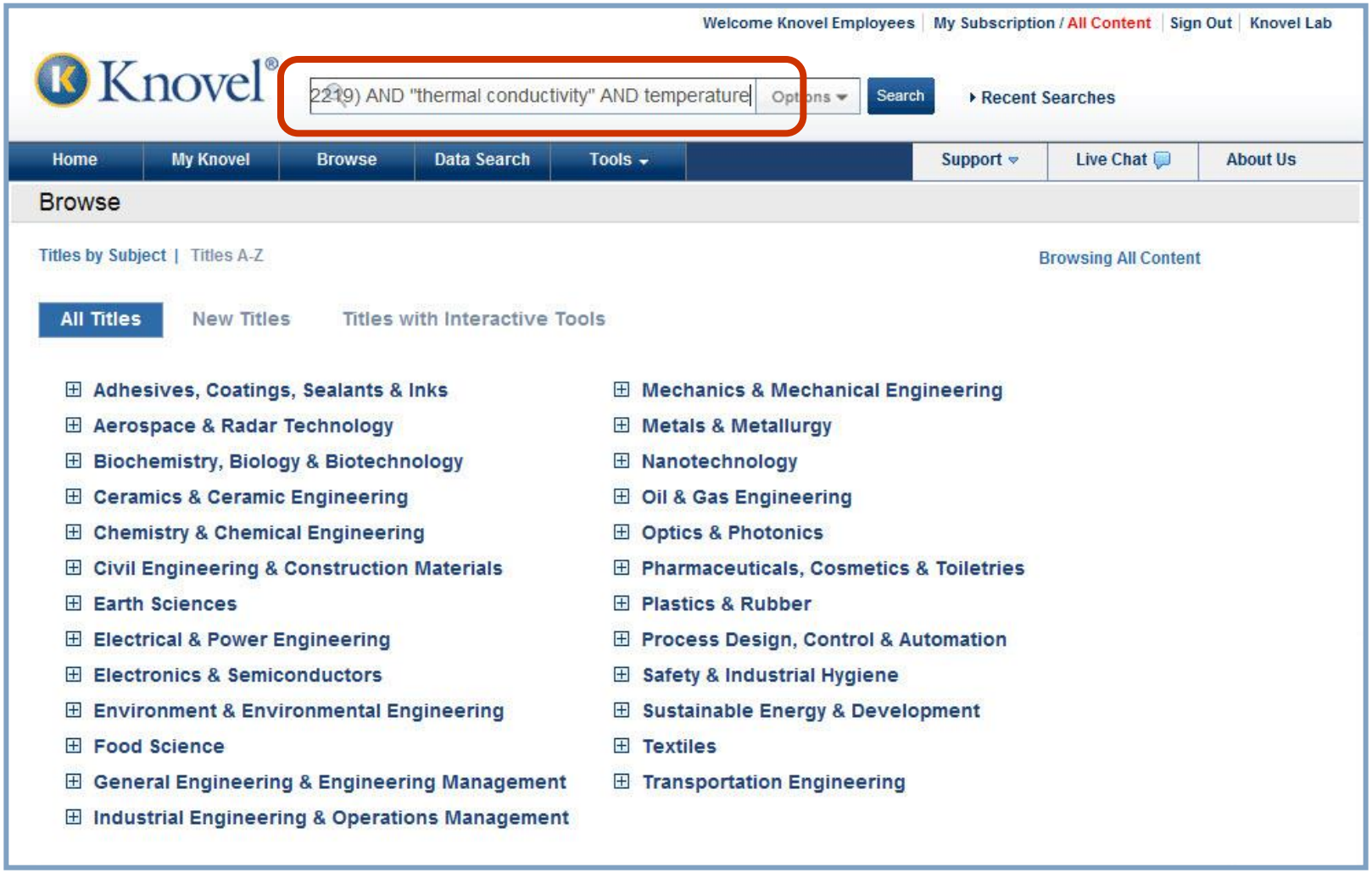
Pages: **Jump to:** 1 of 1
Display: Data Found | **All Data**

Table 4a. Typical Physical Properties of Wrought Aluminum Alloys (US Customary Units)

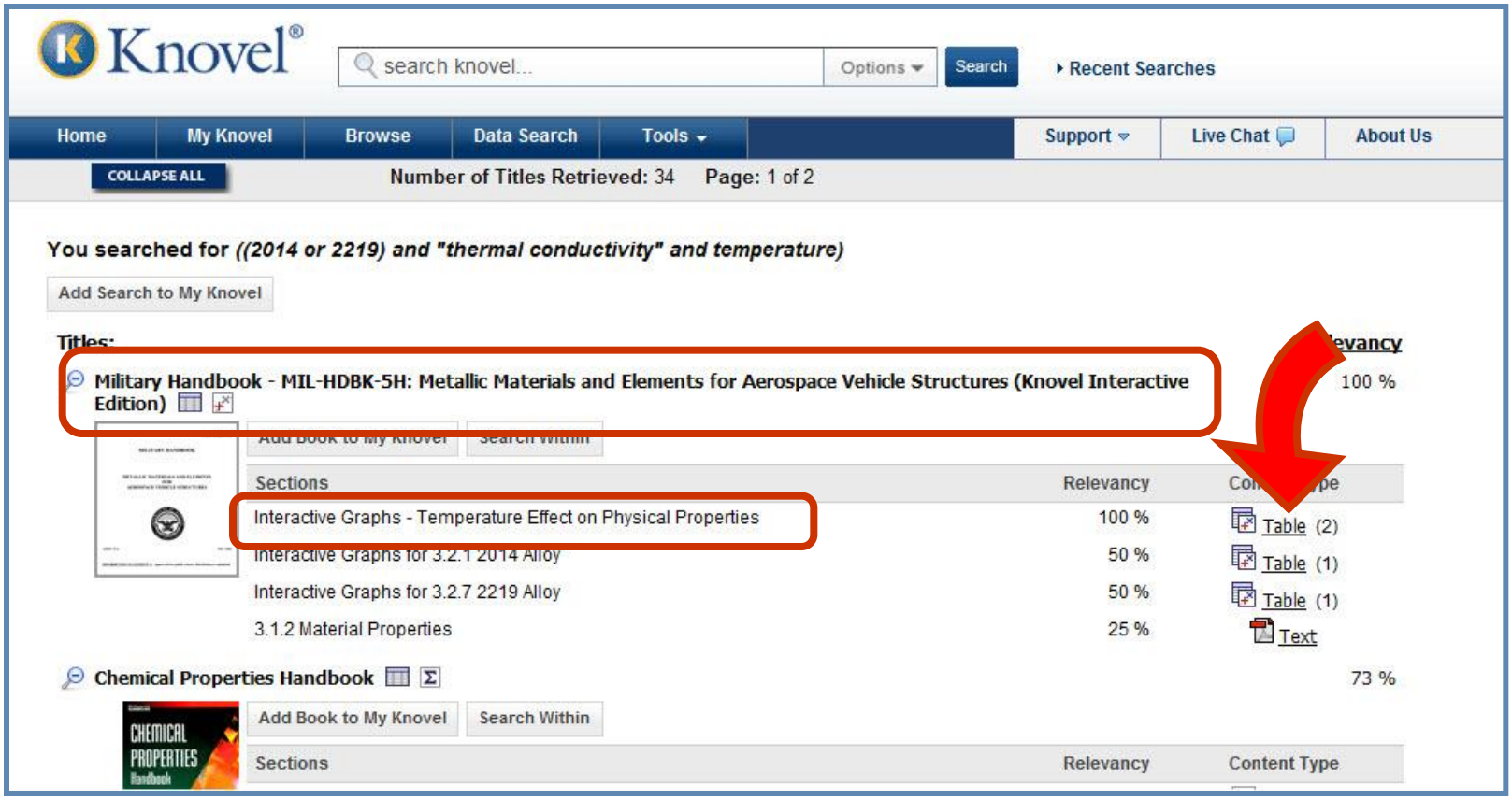
Select Rows | Filter Data | Print Table | Export Table | View Table Notes | Unit Converter | Help

no.	alloy name	UNS no.	temper	density (lb/in^3)	specific gravity	thermal expansi... (10^{-6} °F^{-1})	melting range (°F)	thermal cond. (Btu in/h ft^2 °F)
19	2011	A92011	T8	0.102	2.83	12.7	1005-1190	1190
20	2014	A92014	O	0.101	2.8	12.8	945-1180	1340
24	2017	A92017	O	0.101	2.79	13.1	955-1185	1340
26	2024	A92024	O	0.1	2.78	12.9	935-1180	1340
36	2219	A92219	O	0.103	2.84	12.4	1010-1190	1190

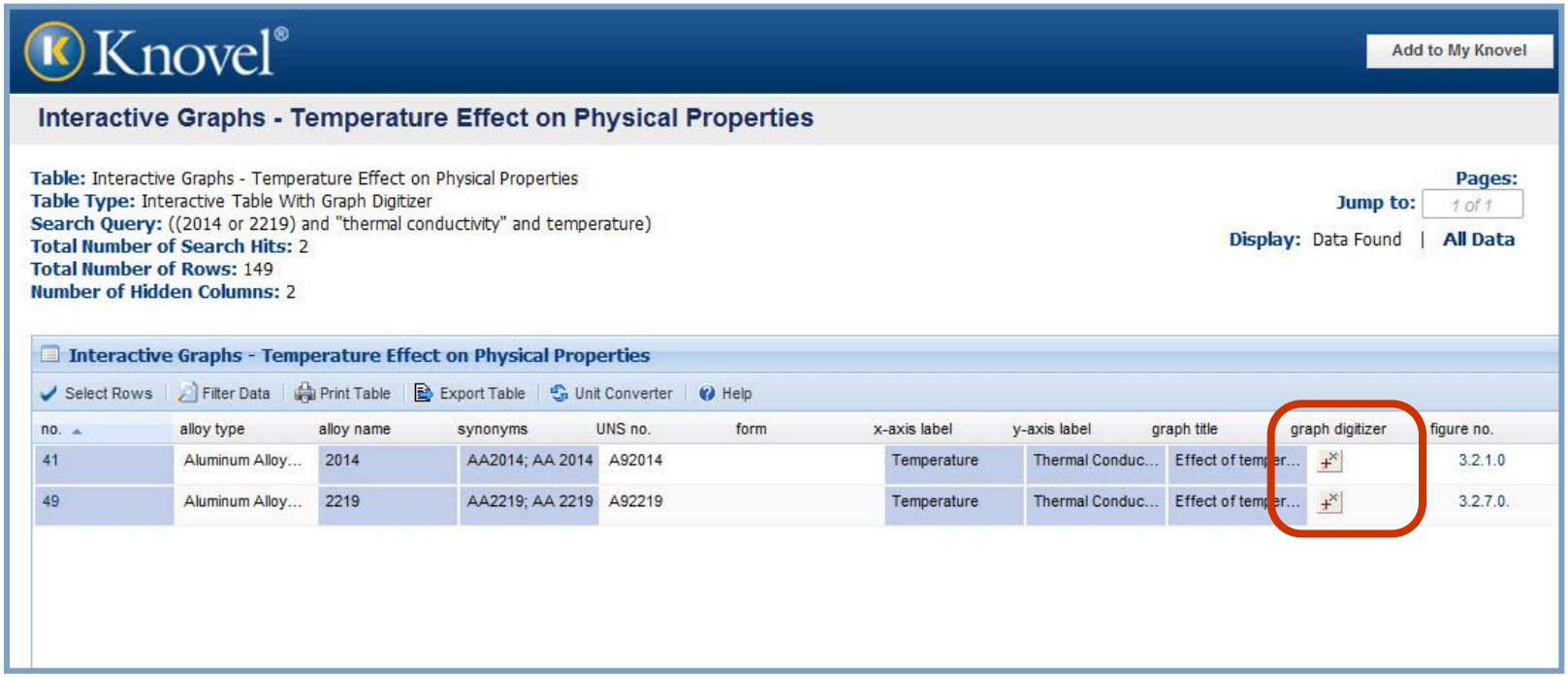
Basic Search: **(2014 OR 2219) AND "thermal conductivity" AND temperature**



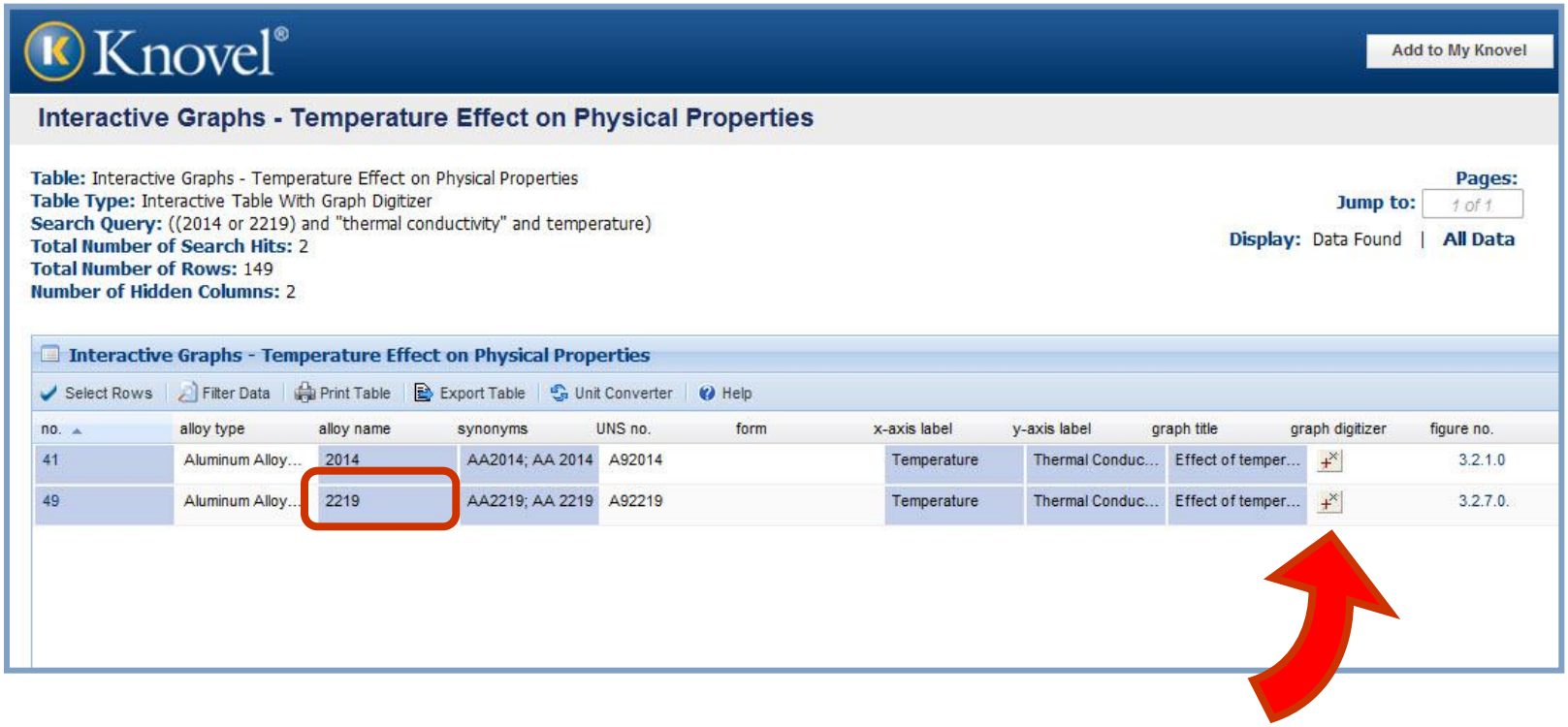
找到最相关的书-Military Handbook，并点选相关的互动表格



可以使用graph digitizer比较铝合金2014和2219在上升温度时的导热率Thermal Conductivity

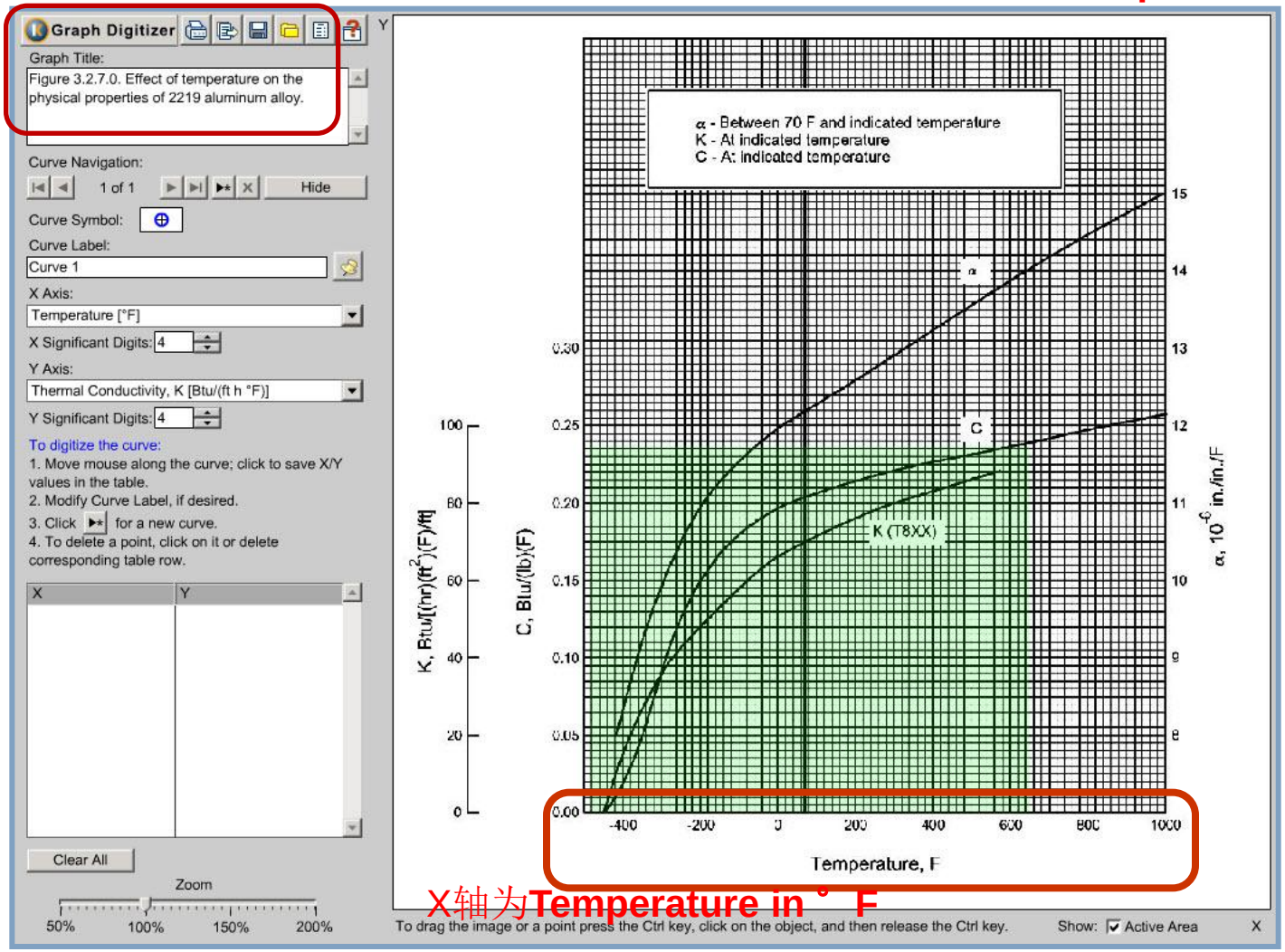


Select **Graph Digitizer for 2219**



Knovel's Graph Digitizer is Launches

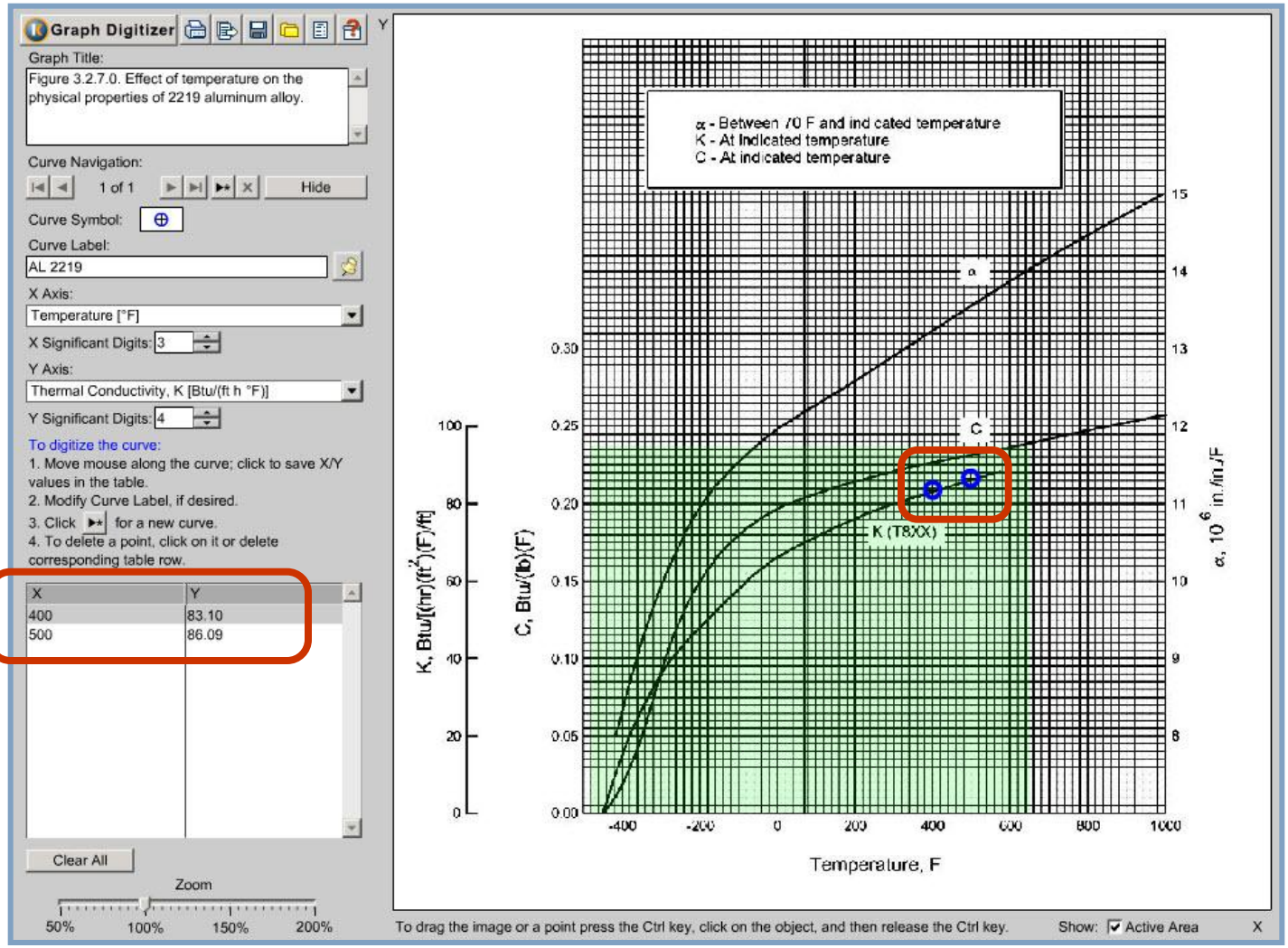
三条曲线分别代表不同单位的导热系数**Coefficient of Thermal Expansion**



X轴为**Temperature in ° F**

Interactive Content - Graph Digitizer – Plot points at 400 °F and 500 °F

找出导热系数K，并在上头点选温度400, 500，即可从动态表格上得出2219 (Original Material)的导热系数在这两个温度时为Thermal Conductivity Approx 82 - 86



数据可导出成为**HTML** or **Excel档**

Figure 3.2.7.0. Effect of temperature on the physical properties of 2219 aluminum alloy.

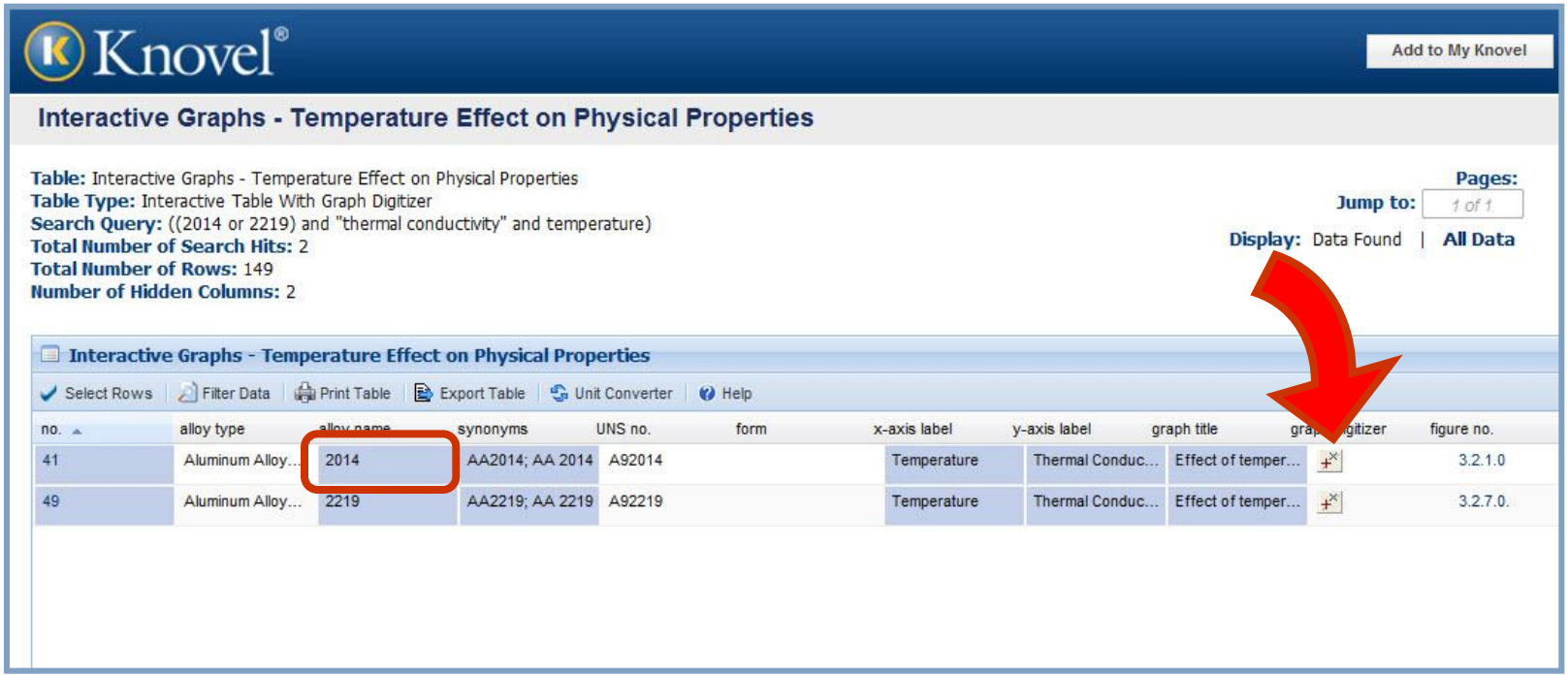
AL 2219

Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]
400.0	83.1
500.0	86.09

Military Handbook - MIL-HDBK-5H: Metallic Materials and Elements for Aerospace Vehicle Structures (Knovel Interactive Edition)
Works of the U.S. Department of Defense

	A	B	C	D	E	F	G	H
1	Figure 3.2.7.0. Effect of temperature on the physical properties of 2219 aluminum alloy.							
2	AL 2219							
3	Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]						
4	400	83.1						
5	500	86.09						
6								
7								
8	Military Handbook - MIL-HDBK-5H: Metallic Materials and Elements for Aerospace Vehicle Structures (Knovel Interactive Edition)							
9								
10								
11								
12								

选择合金2014的Graph Digitizer



找出导热系数K，并在上头点选温度400, 500，即可从动态表格上得出2214 (替代材料)
的导热系数在这两个温度时为Thermal Conductivity Approx 103-106

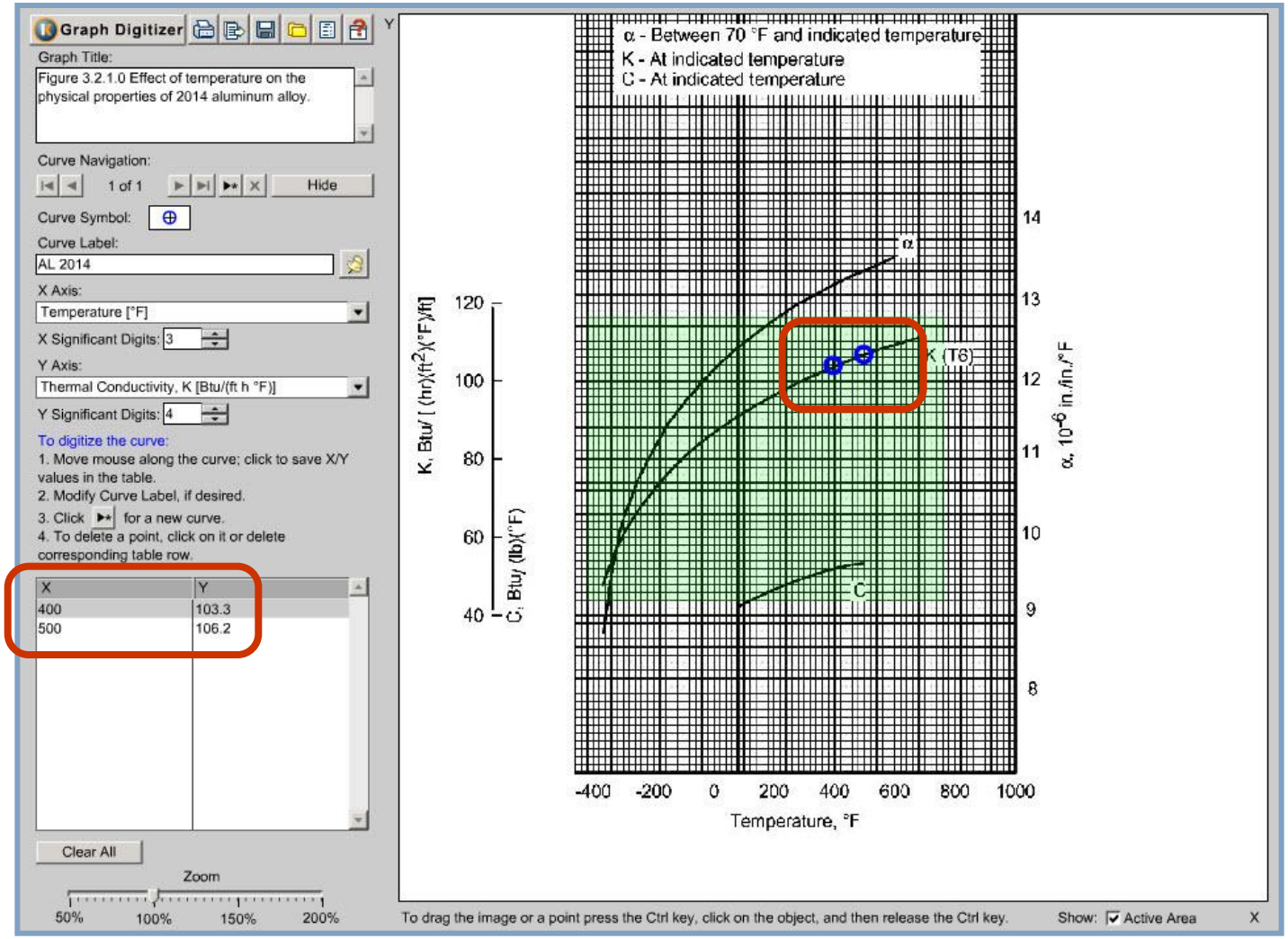


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Figure 3.2.1.0 Effect of temperature on the physical properties of 2014 aluminum alloy.

AL 2014

Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]
400.0	103.3
500.0	106.2

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	A	B	C	D	E	F	G	H
1	Figure 3.2.1.0 Effect of temperature on the physical properties of 2014 aluminum alloy.							
2	AL 2014							
3	Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]						
4	400	103.3						
5	500	106.2						
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我们可以发现若依照导热系数来看，合金2014与2219相比为较好的合金

Figure 3.2.7.0. Effect of temperature on the physical properties of 2219 aluminum alloy.

AL 2219

Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]
400.0	83.1
500.0	86.09

Military Handbook
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Figure 3.2.1.0 Effect of temperature on the physical properties of 2014 aluminum alloy.

AL 2014

Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]
400.0	103.3
500.0	106.2

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	A	B	C	D	E	F	G	H
1	Figure 3.2.7.0. Effect of temperature on the physical properties of 2219 aluminum alloy.							
2	AL 2219							
3	Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]						
4	400	83.1						
5	500	86.09						
6								
7								
8	Figure 3.2.1.0 Effect of temperature on the physical properties of 2014 aluminum alloy.							
9	AL 2014							
10	Temperature [Â°F]	Thermal Conductivity, K [Btu/(ft h Â°F)]						
11	400	103.3						
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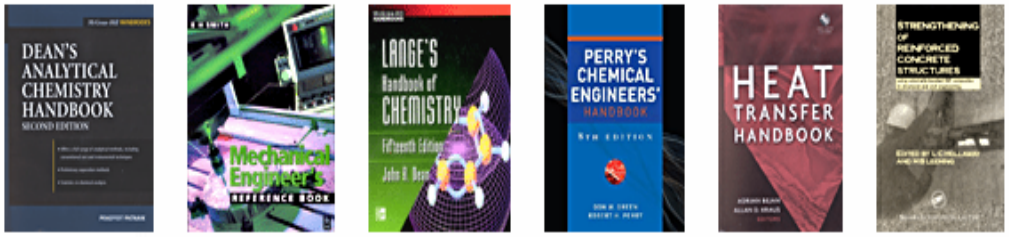

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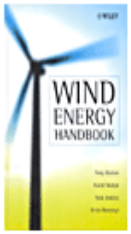

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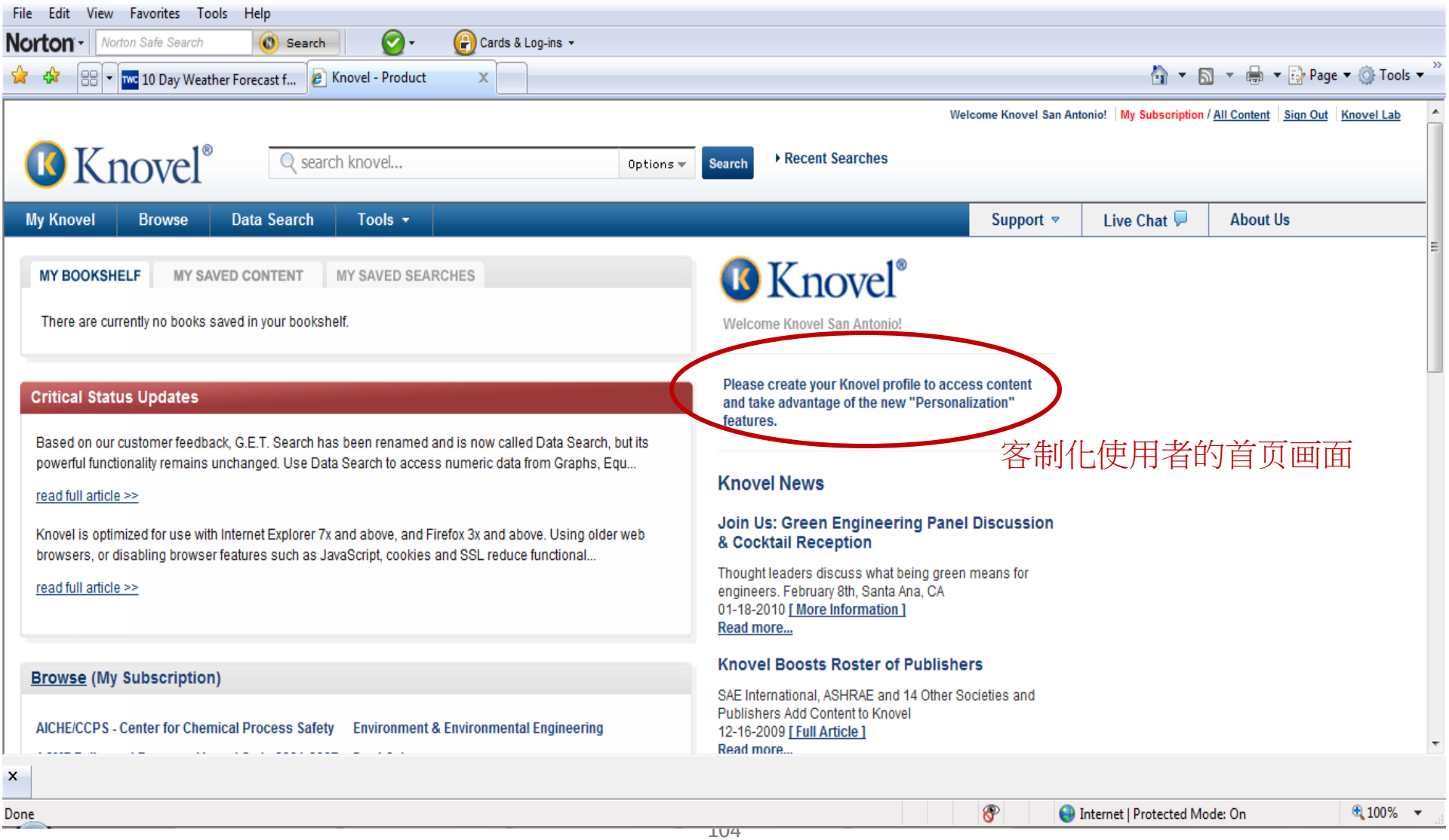

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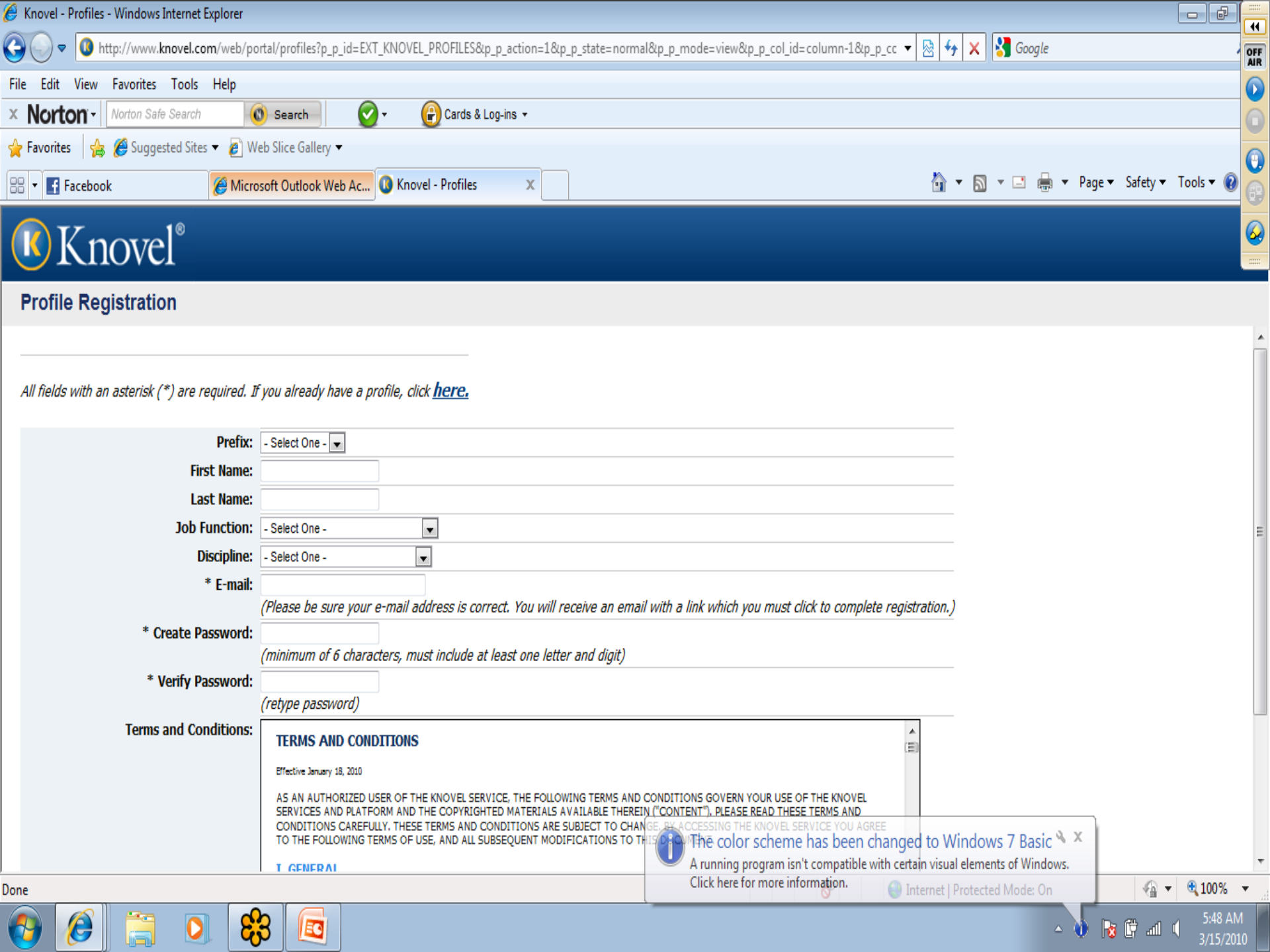
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