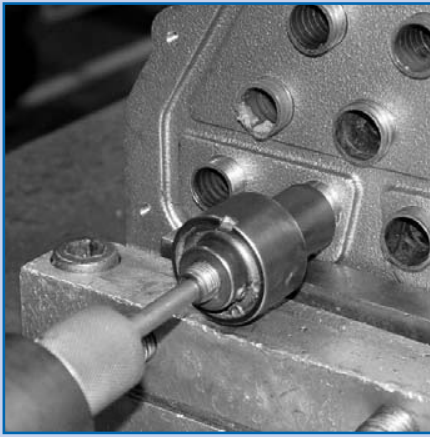
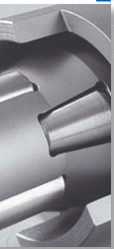


A C C E S S O R I E S

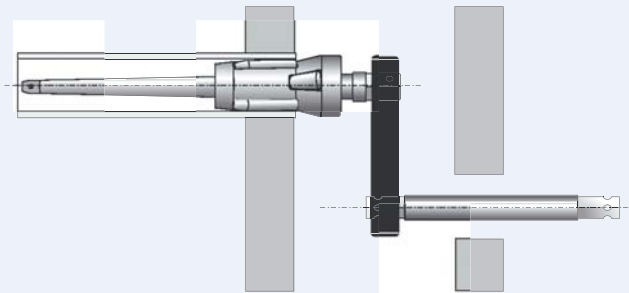




Joists and Extensions

Verbindungsstückes und Erweiterung
Przedłużki i złączki

Parallel Gear Drive



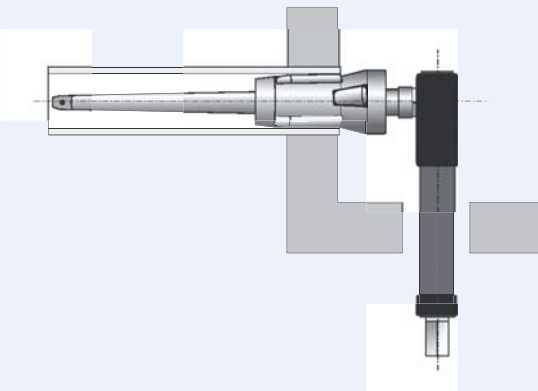
Tool Werkzeuge Narzędzie	For Square drive Vierkant / Kwadrat	
	[inch]	[mm]
P-Drive-127	1/2" x 1/2"	12,7 x 12,7
P-Drive-190	3/4" x 3/4"	19 x 19
P-Drive-254	1" x 1"	25,4 x 25,4

Parallel Gear Drive - designed for use inside the header boxes where hand holes are not in line with tube centerline.

Parallelzahnradgetriebe – entworfen zur Anwendung an schwer zugänglichen Stellen sowie wenn Rohre nicht mittig mit der Kammeröffnung liegen..

Przekładnia zębata równoległa - zaprojektowana do użycia w trudno dostępnych miejscach oraz kiedy rury nie są w osi z otworem komory.

Right Angle Gear Drive



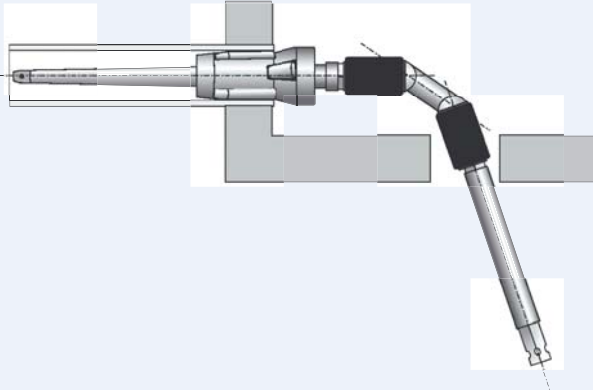
Right Angle Gear Drive - designed for use inside header boxes where handholds are at right angle to the tube centerline. For hand and power use.

Kegelradgetriebe – entworfen zur Anwendung an schwer zugänglichen Stellen, wenn Rohre senkrecht zur Kammerachse angebracht sind.

Przekładnia kątowna - zaprojektowana do użycia w trudno dostępnych miejscach, kiedy rury są umieszczone prostopadłe do osi komory.

Tool Werkzeuge Narzędzie	For Square drive Vierkant / Kwadrat	
	[inch]	[mm]
RA-Drive-127	1/2" x 1/2"	12,7 x 12,7
RA-Drive-190	3/4" x 3/4"	19 x 19
RA-Drive-254	1" x 1"	25,4 x 25,4

Double Universal Joint



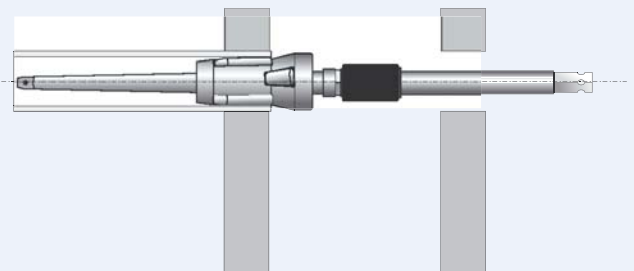
Square drive Vierkant Kwadrat	Tool Werkzeuge Nerzędzie	Chuck Halter Uchwyt
[inch]		
3/8"	KS-DUJ-3/8	-
	KS-DUJ-3/8-QCC	QCC
1/2"	KS-DUJ-1/2	-
	KS-DUJ-1/2-QCC	QCC
3/4"	KS-DUJ-3/4	FxF; FxM; MxM
1"	KS-DUJ-1	FxF; FxM; MxM

Double Universal Joint and Double Universal Joint with Quick Change Chuck

Doppeluniversalgelenke, einfach und schnellanschiessbar (QCC)

Przeguby uniwersalne podwójne, zwykłe oraz szybkozłączne (QCC)

Extensions



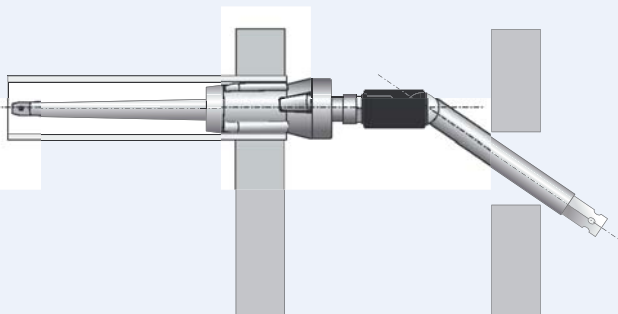
Extensions and Extensions with Quick Change Chuck (QCC), Single and Double

Verlängerungsstücke sowie schnellanschiessbare Verlängerungsstücke, einzeln und verdoppelt

Przedłużki oraz przedłużki szybkozłączne, pojedyncze oraz podwójne

Square drive Vierkant Kwadrat	Tool Werkzeuge Nerzędzie	Chuck Halter Uchwyt		QCC
		[inch]	[mm]	
3/8"	KS-Ext-3/8	8; 12; 24; 36	200; 300; 600; 900	-
	KS-Ext-3/8-QCC	8; 12; 24; 36	200; 300; 600; 900	1
	KS-Ext-3/8-2QCC	8; 12; 24; 36	200; 300; 600; 900	2
1/2"	KS-Ext-1/2	8; 12; 24; 36	200; 300; 600; 900	-
	KS-Ext-1/2-QCC	8; 12; 24; 36	200; 300; 600; 900	1
	KS-Ext-1/2-2QCC	8; 12; 24; 36	200; 300; 600; 900	2
3/4"	KS-Ext-3/4	8; 12; 24; 36	200; 300; 600; 900	-
1"	KS-Ext-1	8; 12; 24; 36	200; 300; 600; 900	-

Single Universal Joint



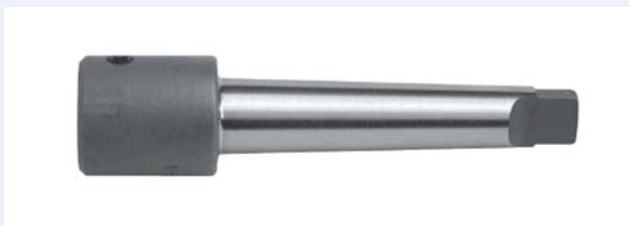
Square Vielkant Kwadrat	Tool Werkzeuge Narzędzie	Available lengths Länge Dostępne długości		Chuck Halter Uchwyt
		[inch]	[mm]	
3/8	KS-SUJ-3/8	8;12;24;36	200; 300; 600; 900	-
	KS-SUJ-3/8-QCC	8;12;24;36	200; 300; 600; 900	+
1/2	KS-SUJ-1/2	8;12;24;36	200; 300; 600; 900	-
	KS-SUJ-1/2-QCC	8;12;24;36	200; 300; 600; 900	+
3/4	KS-SUJ-3/4	8;12;24	200; 300; 600	-
1	KS-SUJ-1	8;12;24	200; 300; 600	-

Single Universal Joint and Single Universal joint with Quick Change Chuck (QCC)

Einzeluniversalgelenke, einfach und schnellanschiessbar (QCC)

Przeguby uniwersalne pojedyncze zwykłe i szybkozłączne (QCC)

Motor Coupling



Motor coupling and **Motor coupling** with Quick Change Chuck (QCC)

Morsekegel mit Schnellanschluss (QCC) bzw. Anschluss für Aufweitwerkzeuge

Stożek Morse'a z szybkozłączem (QCC) lub złączem do rozwalcówek.

MT-2x3/8"; MT-2x3/8"-QCC; MT-2x1/2"; MT-2x1/2"-QCC; MT-2x3/8"; MT-3x1/2"; MT-3x3/4"; MT-4x1"

Tube Guide

Rohr-Pilot
Pilot do rur



Tube O.D. / Aussen ϕ Sred. zewnetrzna		Tube Gauge Stärke Grubość ścianki	Tube Guide Führung Prowadnica
[inch]	[mm]		
1/2	12,7	16-18	TG-1
		19-20	TG-2
		21-23	TG-3
5/8	15,88	12_13	TG-4
		14-16	TG-5
		17-20	TG-6
		22-24	TG-7
3/4	19,05	10_12	TG-8
		13-16	TG-9
		17-20	TG-10
		21-22	TG-11
7/8	22,2	10_12	TG-12
		13-16	TG-13
		17-20	TG-14
		22-24	TG-15
1	25,4	8_9	TG-16
		10_12	TG-17
		13-16	TG-18
		17-20	TG-19
		21-23	TG-20
1-1/4"	31,7	15.	TG-21
		16-	TG-22
1-1/2"	38,1	15.	TG-23
		16-	TG-24

The Tube Guide consist of a steel or aluminium or plastic tapered head and an replaceable nylon brush, and it's used to guide tubes through the sheets and the tube support plates during tube bundles assembling. The nylon brush fits in the tube end, holding pilot firmly in place.

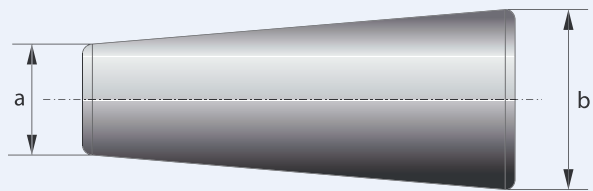
Dieser Rohr-Pilot hat eine kleine kegelförmige Spitze aus Stahl, Aluminium, Nylon, und einem austauschbaren Nylon-Ausputzer. Damit können Rohre durch Stützplatten in Kondensatoren und Wärmetauschern eingeführt werden. Die schräge Bohrung in der konischen Kopfsteite erleichtert das Herausziehen des Rohr-Piloten.

Pilot do rur. Składa sie ze stożka wykonanego ze stali, aluminium lub plastiku oraz nylonowej szczotki. Służy do wkładania rur do den sitowych, w szczególności do ich przepychania przez ściany grodziowe.

Tube plugs

Zapfen für Rohren

Zaślepki do rur



Ideal for sealing leaky tubes in condenser and heat exchangers. It is recommended to use our ortc one revolution tube cutter to puncture the tube to ensure that pressure can not build up in the tube and cause the plug loosen or blow out.

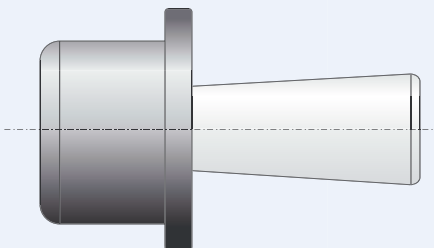
Kegelstifte dienen zur Verblenden von undichten Rohren an Wärmeaustauschern und Kondensatoren. Vor dem Rohrverblenden soll man das undichte Rohr mit den ortc-Meißeln durchschneiden, um den Luftdruckanstieg im Rohr sowie das Herausfallen bzw. Abschießen der Stifte aus den Rohren zu vermeiden.

Kołki stożkowe służą do zaślepiania nieszczelnych rur w wymiennikach ciepła i kondensatorach. Przed zaślepieniem rur należy przeciąć nieszczelną rurę przy pomocy przecianków ortc w celu uniknięcia wzrostu ciśnienia w rurze i spowodowania wypadnięcia lub wystrzelenia kołek z rur.

Two Piece Tube Plugs - see chart on next page

Zweiteiliger Rohrkegelstift - siehe Tabelle nächste Seite

Kołek dwuczęściowy do rur - tabela na następnej stronie



TUBE O.D. Aussen ϕ Śred. zewnętrzna		TUBE GAUGE Stärke Grubość ścianki	a		b		Tube Plug Stopfen Zaślepka
[inch]	[mm]		[inch]	[mm]	[inch]	[mm]	
3/8"	9,5	15-22	0,176	4,47	0,388	9,86	TP-1-**
1/2"	12,7	11-14	0,176	4,48	0,388	9,87	TP-1-**
		15-22	0,301	7,65	0,513	13,00	TP-2-**
5/8"	15,8	11-14	0,301	7,66	0,513	13,01	TP-2-**
		15-22	0,426	10,82	0,638	16,20	TP-3-**
3/4"	19,05	11-14	0,426	10,83	0,638	16,21	TP-3-**
		15-22	0,551	14,00	0,763	19,38	TP-4-**
7/8"	22,22	11-14	0,551	14,01	0,763	19,39	TP-4-**
		15-22	0,676	17,17	0,888	22,56	TP-5-**
1	25,4	11-14	0,676	17,18	0,888	22,57	TP-5-**
		15-22	0,801	20,35	1,013	25,73	TP-6-**
1-1/8"	28,6	11-14	0,801	20,36	1,013	25,74	TP-6-**
		15-22	0,926	23,52	1,138	28,9	TP-7-**
1-1/4"	31,7	11-14	0,926	23,53	1,138	28,10	TP-7-**
		15-22	1,015	25,78	1,263	32,08	TP-8-**
1-3/8"	34,9	11-14	1,015	25,79	1,263	32,09	TP-8-**
		15-22	1,176	29,87	1,388	35,87	TP-9-**
1-1/2"	38,1	11-14	1,176	29,88	1,388	35,88	TP-9-**
		15-22	1,301	32,66	1,513	38,93	TP-10-**

** - SPECIFY MATERIAL	AL - ALUMINIUM
S= STEEL	SS= STAINLESS STEEL
B= BRASS	M= MONEL

TUBE SIZE				Brass			Carbon Steel			Stainless Steel	
O.D.	Gage	I.D.	Price	Ring	Pin	Price	Ring	Pin	Price	Ring	Pin
5/8"	13	0,44		T8TP445BR	TP3BP		T8TP445CS	TP3CSP		T8TP445SS	TP3SSP
	14	0,46		T8TP469BR	TP3BP		T8TP469CS	TP3CSP		T8TP469SS	TP3SSP
	15	0,48		T8TP491BR	TP3BP		T8TP491CS	TP3CSP		T8TP491SS	TP3SSP
	16	0,5		T8TP505BR	TP4BP		T8TP505CS	TP4CSP		T8TP505SS	TP4SSP
	17	0,51		T8TP519BR	TP4BP		T8TP519CS	TP4CSP		T8TP519SS	TP4SSP
	18	0,53		T8TP537BR	TP4BP		T8TP537CS	TP4CSP		T8TP537SS	TP4SSP
	19	0,54		T8TP551BR	TP4BP		T8TP551CS	TP4CSP		T8TP551SS	TP4SSP
	20	0,56		T8TP571BR	TP4BP		T8TP571CS	TP4CSP		T8TP571SS	TP4SSP
	21	0,56		T8TP571BR	TP4BP		T8TP571CS	TP4CSP		T8TP571SS	TP4SSP
	22	0,57		T8TP571BR	TP4BP		T8TP571CS	TP4CSP		T8TP571SS	TP4SSP
3/4"	12	0,53		T8TP537BR	TP4BP		T8TP537CS	TP4CSP		T8TP537SS	TP4SSP
	13	0,56		T8TP571BR	TP4BP		T8TP571CS	TP4CSP		T8TP571SS	TP4SSP
	14	0,58		T8TP594BR	TP5BP		T8TP594CS	TP5CSP		T8TP594SS	TP5SSP
	15	0,61		T8TP616BR	TP5BP		T8TP616CS	TP5CSP		T8TP616SS	TP5SSP
	16	0,62		T8TP630BR	TP5BP		T8TP630CS	TP5CSP		T8TP630SS	TP5SSP
	17	0,63		T8TP644BR	TP5BP		T8TP644CS	TP5CSP		T8TP644SS	TP5SSP
	18	0,65		T8TP662BR	TP5BP		T8TP662CS	TP5CSP		T8TP662SS	TP5SSP
	19	0,67		T8TP676BR	TP5BP		T8TP676CS	TP5CSP		T8TP676SS	TP5SSP
	20	0,68		T8TP696BR	TP6BP		T8TP696CS	TP6CSP		T8TP696SS	TP6SSP
	21	0,69		T8TP696BR	TP6BP		T8TP696CS	TP6CSP		T8TP696SS	TP6SSP
	22	0,69		T8TP696BR	TP6BP		T8TP696CS	TP6CSP		T8TP696SS	TP6SSP
7/8"	12	0,66		T8TP662BR	TP6BP		T8TP662CS	TP6CSP		T8TP662SS	TP6SSP
	13	0,69		T8TP696BR	TP6BP		T8TP696CS	TP6CSP		T8TP696SS	TP6SSP
	14	0,71		T8TP719BR	TP6BP		T8TP719CS	TP6CSP		T8TP719SS	TP6SSP
	15	0,73		T8TP741BR	TP6BP		T8TP741CS	TP6CSP		T8TP741SS	TP6SSP
	16	0,75		T8TP755BR	TP6BP		T8TP755CS	TP6CSP		T8TP755SS	TP6SSP
	17	0,76		T8TP769BR	TP6BP		T8TP769CS	TP6CSP		T8TP769SS	TP6SSP
	18	0,78		T8TP787BR	TP7BP		T8TP787CS	TP7CSP		T8TP787SS	TP7SSP
	19	0,79		T8TP801BR	TP7BP		T8TP801CS	TP7CSP		T8TP801SS	TP7SSP
	20	0,81		T8TP821BR	TP7BP		T8TP821CS	TP7CSP		T8TP821SS	TP7SSP
	21	0,81		T8TP821BR	TP7BP		T8TP821CS	TP7CSP		T8TP821SS	TP7SSP
	22	0,82		T8TP821BR	TP7BP		T8TP821CS	TP7CSP		T8TP821SS	TP7SSP
1"	12	0,78		T8TP787BR	TP7BP		T8TP787CS	TP7CSP		T8TP787SS	TP7SSP
	13	0,81		T8TP821BR	TP7BP		T8TP844CS	TP7CSP		T8TP844SS	TP7SSP
	14	0,83		T8TP844BR	TP7BP		T8TP844CS	TP7CSP		T8TP844SS	TP7SSP
	15	0,86		T8TP866BR	TP7BP		T8TP866CS	TP7CSP		T8TP866SS	TP7SSP
	16	0,87		T8TP880BR	TP8BP		T8TP880CS	TP8CSP		T8TP880SS	TP8SSP
	17	0,88		T8TP894BR	TP8BP		T8TP894CS	TP8CSP		T8TP894SS	TP8SSP
	18	0,9		T8TP912BR	TP8BP		T8TP912CS	TP8CSP		T8TP912SS	TP8SSP
	19	0,92		T8TP926BR	TP8BP		T8TP926CS	TP8CSP		T8TP926SS	TP8SSP
	20	0,93		T8TP946BR	TP8BP		T8TP946CS	TP8CSP		T8TP946SS	TP8SSP
	21	0,94		T8TP946BR	TP8BP		T8TP946CS	TP8CSP		T8TP946SS	TP8SSP
	22	0,94		T8TP946BR	TP8BP		T8TP946CS	TP8CSP		T8TP946SS	TP8SSP

Vacuum Leak Tester KVLD-3000

Vakuu-Rohrdichtigkeitsdetektor KVLD-3000

Próżniowy detektor szczelności rur KVLD-3000

The vacuum leak tester KVLD-3000 is a simple, precise method of testing tubes in boilers, condensers, and heat exchangers. It is the fastest, most accurate means of locating leaky tubes for plugging or replacement.

Powered by compressed air the vacuum leak detector pulls a vacuum in a tube to a desired reading on a gauge. A steady reading on the gauge would indicate that the tube doesn't leak. If the reading on the gauge drops you have pinpointed the leaking tube.

Der Vakuu-Rohrdichtigkeitsdetektor KVLD-3000 ist ein einfaches und sehr präzises Gerät zur Prüfung der Rohrdichtigkeit in Wärmetauschern, Kondensatoren und Kesseln. Die Vakuumprüfung ist die schnellste und genaueste Methode der Lokalisierung von undichten, leckenden Röhren.

Das Gerät KVLD-3000 wird mit Pressluft angetrieben, die in dem zu prüfenden Rohrabschnitt einen entsprechenden Unterdruck erzeugt. Der stets gleich bleibende Unterdruck bedeutet, dass das Rohr im guten Zustand ist. Fällt der Unterdruck, ist das Rohr auszuwechseln oder zu verstopfen.

Próżniowy detektor szczelności rur KVLD-3000 jest prostym, i bardzo precyzyjnym narzędziem do badania szczelności rur w wymiennikach ciepła, kondensatorach i kotłach. Badanie próżniowe jest najszybszą i najdokładniejszą metodą lokalizacji nieszczelnych, przeciekających rur.

Urządzenie KVLD-3000 jest napędzane sprężonym powietrzem, które wytwarza określone podciśnienie w badanej rurze. Utrzymujące się na stałym poziomie podciśnienie oznacza, że rura jest w dobrym stanie, jeżeli podciśnienie spada rurę należy wymienić lub zakołkować.



FEATURES

- Only one tool necessary for testing multiple tube sizes.
- Built-in easy to read vacuum gauge.
- Muffled exhaust for quiet operation.
- Lightweight, easy to use.

VORTEILE VON KVLD-3000

- Ein einziges Gerät kann zur Prüfung von verschiedenen Rohrdurchmessern verwendet werden
- Eingebauter Vakuummeter
- Das Gerät ist mit einem Auspuffdämpfer zur Schallreduzierung ausgestattet
- Leichtes Gewicht und einfache Bedienung

ZALETY KVLD-3000

- jedno narzędzie może być stosowane do testów wielu rozmiarów rur
- wbudowany wakuometr
- urządzenie posiada tłumik wydechowy w celu zmniejszenia hałasu
- lekki i łatwy w obsłudze



OPERATING INSTRUCTIONS

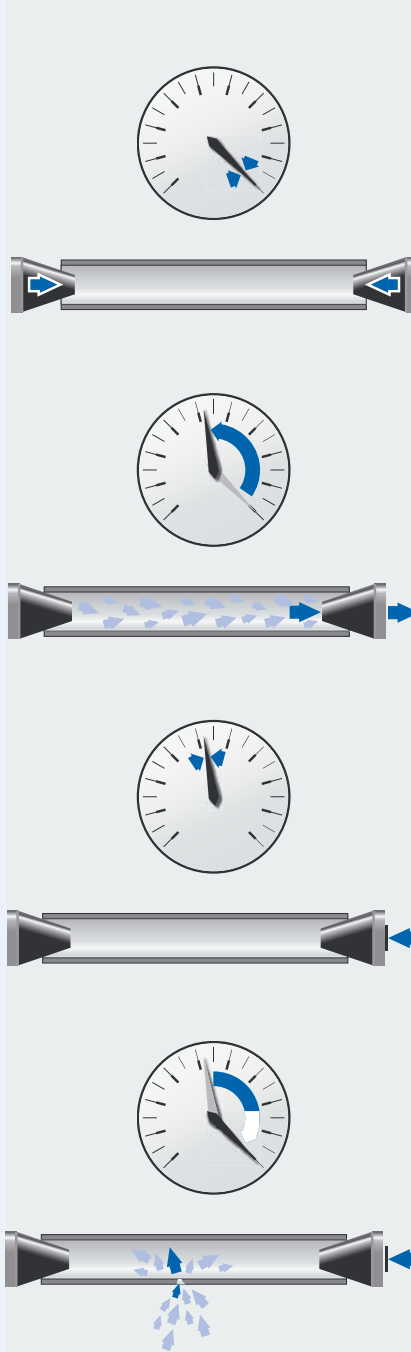
1. Seal far end of tube to be tested with "t" handle type tube plug or optional snap type tube plug.
2. Place nozzle of tester into near end of tube.
3. Squeeze trigger of test unit until gauge reaches desired reading.
4. Release trigger and observe gauge.
5. A steady reading on gauge indicates no leaks.
6. Move to next tube and repeat.

FUNKTIONSBESCHREIBUNG VON KVLD-3000

1. Ein Rohrende mit Hilfe eines Verschlusspropfens abschließen.
2. Das Prüfstück in das andere Rohrende stecken.
3. Die Luftzufuhr mit einem Hebel einschalten. Das betätigte Prüfstück so lange halten, bis der gewünschte Unterdruck erreicht wird.
4. Den Hebel auslösen (die Luftzufuhr stoppen) und den Vakuummeter beobachten.
5. Stabiler Unterdruck bedeutet dichtes Rohr.

OPIS DZIAŁANIA KVLD-3000

1. Przy pomocy rękojeści zaślepiającej należy zatkać jeden koniec rury.
2. Do drugiego końca włożyć tester.
3. Za pomocą dźwigni włączyć dopływ powietrza. Uruchomiony tester trzymać włączony do momentu osiągnięciażądanego podciśnienia.
4. Zwolnić dźwignię (zatrzymać dopływ powietrza) i obserwować wakuometr.
5. Stabilne podciśnienie oznacza że rura jest szczelna.



SPECIFICATIONS

- Cover wide range of tubes with one unit (tube sizes: 1/4" (6,3) to 3" (76,2 mm))
- Requires 90 PSI (6,2 bar) compressed air
- Air consumption: 26 C.F.M. (720 l/min)
- Carrying case measures: 16" x 12" x 4" (410 x 300 x 85 mm)
- Tool weight: 4,4 lbs (1,2 kg)
- Approximate shipping weight: 6,6 lbs (3,0 kg)

TECHNISCHE DATEN VON KVLD-3000

- Anwendungsbereich von 6,3 mm bis 76 mm
- Betriebsdruck 6 atm
- Luftverbrauch 760 l/min
- Lieferung in einem 410x300x80 mm großen Kunststoffkoffer
- Gewicht 1,2 kg
- Gewicht mit Verpackung 3 kg

DANE TECHNICZNE KVLD-3000

- Zakres działania od 6,3 mm to 76 mm
- Ciśnienie robocze 6 atm
- Zużycie powietrza 720 litrów/min.
- Costarczany w plastikowej walizce o wymiarach 410x300x80 mm
- Waga urządzenia 1,2 kg
- Waga z opakowaniem 3 kg

NOZZLES AVAILABLE LIEFERBARE DÜSEN DOSTĘPNE CZĘŚCI

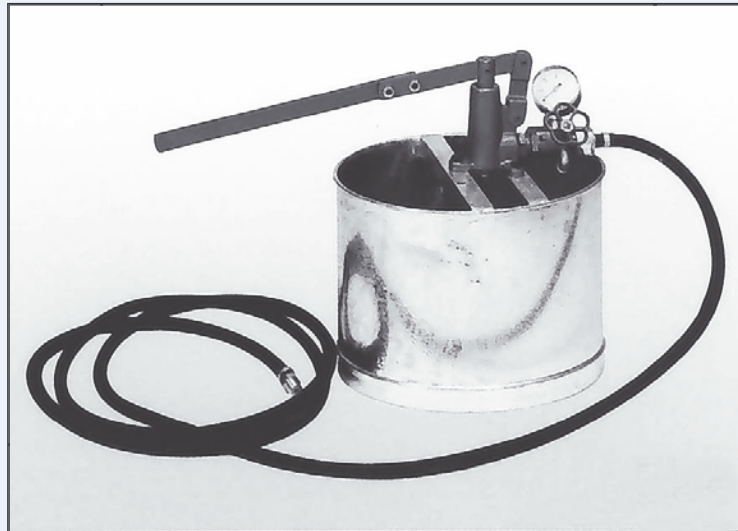
PART NUMBER	TUBE OD SIZE
K-1002	1/4" (6,3 mm) - 3/4" (19 mm)
K-1003	5/8" (15,9 mm) - 1 1/4" (31,7 mm)
K-1004	1 1/8" (28,6 mm) - 2" (50,8 mm)
K-1005	1 7/8" (47,6 mm) - 3" (76,2 mm)



Hand operated testing pumps

Handbediente Testpumpen

Ręcznie obsługiwane pompy testujące



Model	Code Kode Kod	Service pressure Betriebsdruck Ciśnienie pracy		Diameter Durchmesser Średnica mm	Stroke Vorschub Posuw mm	Volume per stroke Volumen pro Schub Objętość na suw		Tank capacity Behälterkapazität Poj. zbiornika		Weight Gewicht Waga	
		bar	psi			cm ³	in ³	litres	U.S.G	kg	lbs
PEM 30	94501000	30	400	14	400	61	3,7	-	-	4,2	9,3
PEM 40	94501500	60	850	20	34	10	0,6	14	3,7	6,3	14
PEM 50	94502000	50	700	30	40	28	1,7	45	11,9	13	29
PEM 100	94504000	100	1400	22	40	15	0,9	45	11,9	13	29
PEM 200	94506000	200	2800	50x16	40	78x8	48x0,5	45	11,9	18	40
PEM 600	94508000	600	8500	32x12	40	32x4	2x0,25	60	15,9	35	77,8
PEM 1000	94509000	1000	14000	32x8	40	32x2	2x0,12	60	15,9	35	77,8

All our hand operated testing pumps are delivered „ready for use” and equipped with:

- Tank (Except PEM 30)
- Pressure gauge
- Drain valve
- Flexible hose. 16” long.(3” for PEM 30 / 6” for PEM 40)

The seals used are made for usage with water, fluid oil or gas-oil

Please call us any other liquids

Alle handbedienten Testpumpen werden als einsatzfertig geliefert und sind ausgerüstet mit:

- Behälter (außer PEM 30)
- Druckanzeige
- Ablassventil
- Elastischem 16” langem Schlauch (3” für PEM / 6” für PEM 40)

Die Dichtungen sind bestimmt für die Anwendung in der Wasser- und Ölumgebung.

Wir bitten um Kontakt, falls andere Flüssigkeiten verwendet werden sollten.

Wszystkie nasze ręcznie obsługiwane pompy testujące są dostarczane jako gotowe do użycia oraz wyposażone w:

- Zbiornik (oprócz PEM 30)
- Wskaźnik ciśnienia
- Zawór spustowy
- Elastyczny przewód. 16” długi.(3” dla PEM 30 / 6” dla PEM 40)

Uszczelki są przeznaczone do użytkowania z wodą lub olejem.

Prosimy kontaktować się z nami w przypadku używania innych cieczy

USEFUL CHARTS



1	1.430	1.426	1.402	1.398	1.374	1.350
1 1/8	1.672	1.658	1.642	1.622	1.607	1.587
1 1/4	1.680	1.666	1.652	1.634	1.620	1.600
1 3/8	1.922	1.908	1.892	1.872	1.857	1.837
1 1/2	1.930	1.916	1.902	1.884	1.870	1.850
1 5/8	2.172	2.158	2.142	2.122	2.107	2.087
1 3/4	2.180	2.166	2.152	2.134	2.120	2.100
1 7/8	2.422	2.408	2.392	2.372	2.357	2.337
2	2.430	2.416	2.402	2.384	2.370	2.350
2 1/8	2.672	2.658	2.642	2.622	2.607	2.587
2 1/4	2.680	2.666	2.652	2.634	2.620	2.600
2 3/8	2.922	2.908	2.892	2.872	2.857	2.837
2 1/2	2.930	2.916	2.902	2.884	2.870	2.850
2 5/8	3.172	3.158	3.142	3.122	3.107	3.087
2 3/4	3.180	3.166	3.152	3.134	3.120	3.100
2 7/8	3.422	3.408	3.392	3.372	3.357	3.337
3	3.430	3.416	3.402	3.384	3.370	3.350
3 1/8	3.672	3.658	3.642	3.622	3.607	3.587
3 1/4	3.680	3.666	3.652	3.634	3.620	3.600
3 3/8	3.922	3.908	3.892	3.872	3.857	3.837
3 1/2	3.930	3.916	3.902	3.884	3.870	3.850
3 5/8	4.172	4.158	4.142	4.122	4.107	4.087
3 3/4	4.180	4.166	4.152	4.134	4.120	4.100
3 7/8	4.422	4.408	4.392	4.372	4.357	4.337
4	4.430	4.416	4.402	4.384	4.370	4.350

THICKNESS OF WALL IN BIRMINGHAM WIRE GAGE AND IN DECIMAL INCHES

TUBE		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
O.D.	I.D.	.035	.042	.049	.058	.065	.072	.083	.095	.109	.120	.134	.148	.165	.180	.203	.220	.238	.259	.284	.300	.340
1/2	Min.	.422	.408	.392	.373	.357	.342	.318	.291	.260	.236											
	Nom.	.430	.416	.402	.384	.370	.356	.334	.310	.282	.260											
5/8	Min.	.547	.533	.517	.498	.482	.467	.443	.417	.385	.361	.330	.299	.262	.229							
	Nom.	.555	.541	.527	.509	.495	.481	.459	.435	.407	.385	.357	.329	.295	.265							
3/4	Min.	.672	.658	.642	.623	.607	.592	.568	.542	.510	.486	.455	.424	.387	.354	.303	.266	.226	.180			
	Nom.	.680	.666	.652	.634	.620	.606	.584	.560	.532	.510	.482	.454	.420	.390	.344	.310	.274	.232			
7/8	Min.	.797	.783	.767	.747	.732	.717	.693	.666	.636	.611	.580	.549	.512	.479	.428	.391	.351	.305			
	Nom.	.805	.791	.777	.759	.745	.731	.709	.685	.657	.635	.607	.579	.545	.515	.469	.435	.399	.357			
1	Min.	.922	.908	.892	.873	.857	.842	.818	.791	.761	.736	.706	.675	.637	.604	.553	.516	.476	.430	.375	.340	.252
	Nom.	.930	.916	.902	.884	.870	.856	.834	.810	.782	.760	.732	.704	.670	.640	.594	.560	.524	.482	.432	.400	.320
1-1/8	Min.	1.047	1.033	1.017	.997	.982	.967	.943	.916	.886	.861	.831	.800	.762	.729	.678	.641	.601	.555	.500	.465	.377
	Nom.	1.055	1.041	1.027	1.009	.995	.981	.959	.935	.907	.885	.857	.829	.795	.765	.719	.685	.649	.607	.557	.525	.445
1-1/4	Min.	1.172	1.158	1.142	1.122	1.107	1.092	1.068	1.041	1.011	.986	.956	.925	.887	.854	.803	.766	.726	.680	.625	.590	.502
	Nom.	1.180	1.166	1.152	1.134	1.120	1.106	1.084	1.060	1.032	.1010	.982	.954	.920	.890	.844	.810	.774	.732	.682	.650	.570
1-3/8	Min.	1.297	1.283	1.267	1.247	1.232	1.217	1.192	1.166	1.136	.111	1.081	.049	1.012	.979	.928	.891	.851	.805	.750	.715	.627
	Nom.	1.305	1.291	1.277	1.259	1.245	1.231	1.209	1.185	1.157	1.135	1.107	.079	1.045	1.015	.969	.935	.899	.857	.807	.775	.695
1-1/2	Min.	1.422	1.408	1.392	1.372	1.357	1.342	1.318	1.291	1.260	1.236	1.205	1.174	1.137	1.104	1.053	1.016	.976	.930	.875	.840	.752
	Nom.	1.430	1.426	1.402	1.384	1.370	1.356	1.334	1.310	1.282	1.260	1.232	1.204	1.170	1.140	1.094	1.060	1.024	.982	.932	.900	.820
1-3/4	Min.	1.672	1.658	1.642	1.622	1.607	1.592	1.568	1.541	1.510	1.486	1.455	1.424	1.387	1.354	1.303	1.266	1.226	1.180	1.125	1.090	1.002
	Nom.	1.680	1.666	1.652	1.634	1.620	1.606	1.584	1.560	1.532	1.510	1.482	1.454	1.420	1.390	1.344	1.310	1.274	1.232	1.182	1.150	1.070
2	Min.	1.922	1.908	1.892	1.872	1.857	1.842	1.817	1.791	1.760	1.736	1.705	1.674	1.637	1.604	1.553	1.516	1.476	1.430	1.375	1.340	1.252
	Nom.	1.930	1.916	1.902	1.884	1.870	1.856	1.834	1.810	1.782	1.760	1.732	1.704	1.670	1.640	1.594	1.560	1.524	1.482	1.432	1.400	1.320
2-1/4	Min.	2.172	2.158	2.142	2.122	2.107	2.092	2.067	2.041	2.010	1.986	1.955	1.924	1.887	1.854	1.803	1.766	1.726	1.680	1.625	1.590	1.502
	Nom.	2.180	2.166	2.152	2.134	2.120	2.106	2.084	2.060	2.032	2.010	1.982	1.954	1.920	1.890	1.844	1.810	1.774	1.732	1.682	1.650	1.570
2-1/2	Min.	2.422	2.408	2.392	2.372	2.357	2.342	2.317	2.291	2.260	2.236	2.205	2.174	2.137	2.104	2.053	2.016	1.976	1.930	1.875	1.840	1.752
	Nom.	2.430	2.416	2.402	2.384	2.370	2.356	2.334	2.310	2.282	2.260	2.232	2.204	2.170	2.140	2.094	2.060	2.024	1.982	1.932	1.900	1.820
2-3/4	Min.	2.672	2.658	2.642	2.622	2.607	2.592	2.567	2.541	2.510	2.486	2.455	2.424	2.387	2.354	2.303	2.266	2.226	2.180	2.125	2.090	2.002
	Nom.	2.680	2.666	2.652	2.634	2.620	2.606	2.584	2.560	2.532	2.510	2.482	2.454	2.420	2.390	2.344	2.310	2.274	2.232	2.182	2.150	2.070
3	Min.	2.922	2.908	2.892	2.872	2.857	2.842	2.817	2.791	2.760	2.736	2.705	2.674	2.637	2.604	2.553	2.516	2.476	2.430	2.375	2.340	2.252
	Nom.	2.930	2.916	2.902	2.884	2.870	2.856	2.834	2.810	2.782	2.760	2.732	2.704	2.670	2.640	2.594	2.560	2.524	2.482	2.432	2.400	2.320
3-1/4	Min.	3.172	3.158	3.142	3.122	3.107	3.092	3.067	3.041	3.010	2.986	2.955	2.924	2.887	2.854	2.803	2.766	2.726	2.680	2.625	2.590	2.502
	Nom.	3.180	3.166	3.152	3.134	3.120	3.106	3.084	3.060	3.032	3.010	2.982	2.954	2.920	2.890	2.844	2.810	2.774	2.732	2.682	2.650	2.570
3-1/2	Min.	3.422	3.408	3.392	3.372	3.357	3.342	3.317	3.291	3.260	3.236	3.205	3.174	3.137	3.104	3.053	3.016	2.976	2.930	2.875	2.840	2.752
	Nom.	3.430	3.416	3.402	3.384	3.370	3.356	3.334	3.310	3.282	3.260	3.232	3.204	3.170	3.140	3.094	3.060	3.024	2.982	2.932	2.900	2.820
3-3/4	Min.	3.672	3.658	3.642	3.622	3.607	3.592	3.567	3.541	3.510	3.486	3.455	3.424	3.387	3.354	3.303	3.266	3.226	3.180	3.125	3.090	3.002
	Nom.	3.680	3.666	3.652	3.634	3.620	3.606	3.584	3.560	3.532	3.510	3.482	3.454	3.420	3.390	3.344	3.310	3.274	3.232	3.182	3.150	3.070
4	Min.	3.922	3.908	3.892	3.872	3.857	3.842	3.817	3.791	3.760	3.736	3.705	3.674	3.637	3.604	3.553	3.516	3.476	3.430	3.375	3.340	3.252
	Nom.	3.930	3.916	3.902	3.884	3.870	3.856	3.834	3.810	3.782	3.760	3.732	3.704	3.670	3.640	3.594	3.560	3.524	3.482	3.432	3.400	3.320
4-1/2	Min.	4.422	4.408	4.392	4.372	4.357	4.342	4.317	4.291	4.260	4.236	4.205	4.174	4.137	4.104	4.053	4.016	3.976	3.930	3.875	3.840	3.752
	Nom.	4.430	4.416	4.402	4.384	4.370	4.356	4.334	4.310	4.282	4.260	4.232	4.204	4.170	4.140	4.094	4.060	4.024	3.982	3.932	3.900	3.820
5	Min.	4.922	4.908	4.892	4.872	4.857	4.842	4.817	4.791	4.760	4.736	4.705	4.674	4.637	4.604	4.553	4.516	4.476	4.430	4.375	4.340	4.252
	Nom.	4.930	4.916	4.902	4.884	4.870	4.856	4.834	4.810	4.782	4.760	4.732	4.704	4.670	4.640	4.594	4.560	4.524	4.482	4.432	4.400	4.320

ADDITIONAL BIRMINGHAM WIRE GAGES

NUMBER	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	00	000	0000	00000
DECIMAL	.004	.005	.007	.008	.009	.010	.012	.013	.014	.016	.018	.020	.022	.025	.028	.032	.380	.425	.454	.500

THICKNESS OF WALL IN BIRMINGHAM WIRE GAGE IN MILLIMETERS

TUBE			20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Q.D. (IN.)	Q.D. (MM)	I.D.	.9	1.1	1.2	1.5	1.7	1.8	2.1	2.4	2.8	3.0	3.4	3.8	4.2	4.6	5.2	5.6	6.0	6.6	7.2	7.6	8.6
1/2	127	Min.	10.7	10.4	10.0	9.5	9.1	8.7	8.1	7.4	6.6	6.0											
		Nom.	10.9	10.6	10.2	9.8	9.4	9.0	8.5	7.9	7.2	6.6											
5/8	159	Min.	13.9	13.5	13.1	12.6	12.2	11.9	11.3	10.6	9.8	9.2	8.4	7.6	6.7	5.8							
		Nom.	14.1	13.7	13.4	12.9	12.6	12.2	11.7	11.0	10.3	9.8	9.1	8.4	7.5	6.7							
3/4	191	Min.	17.1	16.7	16.3	15.8	15.4	15.0	14.4	13.8	13.0	12.3	11.6	10.8	9.8	9.0	7.7	6.8	5.7	4.6			
		Nom.	17.3	16.9	16.6	16.1	15.7	15.4	14.8	14.2	13.5	13.0	12.2	11.5	10.7	9.9	8.7	7.9	7.0	5.9			
7/8	222	Min.	20.2	19.9	19.5	19.0	18.6	18.2	17.6	16.9	16.2	15.5	14.7	13.9	13.0	12.2	10.9	9.9	8.9	7.7			
		Nom.	20.4	20.1	19.7	19.3	18.9	18.6	18.0	17.4	16.7	16.1	15.4	14.7	13.8	13.1	11.9	11.0	10.1	9.1			
1	254	Min.	23.4	23.1	22.7	22.2	21.8	21.4	20.8	20.1	19.3	18.7	17.9	17.1	16.2	15.3	14.0	13.1	12.1	10.9	9.5	8.6	6.4
		Nom.	23.6	23.3	22.9	22.5	22.1	21.7	21.2	20.6	19.9	19.3	18.6	17.9	17.0	16.3	15.1	14.2	13.3	12.2	11.0	10.2	8.1
1-1/8	286	Min.	26.6	26.2	25.8	25.3	24.9	24.6	24.0	23.3	22.5	21.9	21.1	20.3	19.4	18.5	17.2	16.3	15.3	14.1	12.7	11.8	9.6
		Nom.	26.8	26.4	26.1	25.6	25.3	24.9	24.4	23.7	23.0	22.5	21.8	21.1	20.2	19.4	18.3	17.4	16.5	15.4	14.1	13.3	11.3
1-1/4	318	Min.	29.8	29.4	29.0	28.5	28.1	27.7	27.1	26.4	25.7	25.0	24.3	23.5	22.5	21.7	20.4	19.5	18.4	17.3	15.9	15.0	12.8
		Nom.	30.0	29.6	29.3	28.8	28.4	28.1	27.5	26.9	26.2	25.7	24.9	24.2	23.4	22.6	21.4	20.6	19.7	18.6	17.3	16.5	14.5
1-3/8	349	Min.	32.9	32.6	32.2	31.7	31.3	30.9	30.3	29.6	28.9	28.2	27.5	26.6	25.7	24.9	23.6	22.6	21.6	20.4	19.1	18.2	15.9
		Nom.	33.1	32.8	32.4	32.0	31.6	31.3	30.7	30.1	29.4	28.8	28.1	27.4	26.5	25.8	24.6	23.7	22.8	21.8	20.5	19.7	17.7
1-1/2	381	Min.	36.1	35.8	35.4	34.8	34.5	34.1	33.5	32.8	32.0	31.4	30.6	29.8	28.9	28.0	26.7	25.8	24.8	23.6	22.2	21.3	19.1
		Nom.	36.3	36.2	35.6	35.2	34.8	34.4	33.9	33.3	32.6	32.0	31.3	30.6	29.7	29.0	27.8	26.9	26.0	24.9	23.7	22.9	20.8
1-3/4	445	Min.	42.5	42.1	41.7	41.2	40.8	40.4	39.8	39.1	38.4	37.7	37.0	36.2	35.2	34.4	33.1	32.2	31.1	30.0	28.6	27.7	25.5
		Nom.	42.7	42.3	42.0	41.5	41.1	40.8	40.2	39.6	38.9	38.4	37.6	36.9	36.1	35.3	34.1	33.3	32.4	31.3	30.0	29.2	27.2
2	508	Min.	48.8	48.5	48.1	47.5	47.2	46.8	46.2	45.5	44.7	44.1	43.3	42.5	41.6	40.7	39.4	38.5	37.5	36.3	34.9	34.0	31.8
		Nom.	49.0	48.7	48.3	47.9	47.5	47.1	46.6	46.0	45.3	44.7	44.0	43.3	42.4	41.7	40.5	39.6	38.7	37.6	36.4	35.6	33.5
2-1/4	572	Min.	55.2	54.8	54.4	53.9	53.5	53.1	52.5	51.8	51.1	50.4	49.7	48.9	47.9	47.1	45.8	44.9	43.8	42.7	41.3	40.4	38.2
		Nom.	55.4	55.0	54.7	54.2	53.8	53.5	52.9	52.3	51.6	51.1	50.3	49.6	48.8	48.0	46.8	46.0	45.1	44.0	42.7	41.9	39.9
2-1/2	635	Min.	61.5	61.2	60.8	60.2	59.9	59.5	58.9	58.2	57.4	56.8	56.0	55.2	54.3	53.4	52.1	51.2	50.2	49.0	47.6	46.7	44.5
		Nom.	61.7	61.4	61.0	60.6	60.2	59.8	59.3	58.7	58.0	57.4	56.7	56.0	55.1	54.4	53.2	52.3	51.4	50.3	49.1	48.3	46.2
2-3/4	699	Min.	67.9	67.5	67.1	66.6	66.2	65.8	65.2	64.5	63.8	63.1	62.4	61.6	60.6	59.8	58.5	57.6	56.5	55.4	54.0	53.1	50.9
		Nom.	68.1	67.7	67.4	66.9	66.5	66.2	65.6	65.0	64.3	63.8	63.0	62.3	61.5	60.7	59.5	58.7	57.8	56.7	55.4	54.6	52.6
3	762	Min.	74.2	73.9	73.5	72.9	72.6	72.2	71.6	70.9	70.1	69.5	68.7	67.9	67.0	66.1	64.8	63.9	62.9	61.7	60.3	59.4	57.2
		Nom.	74.4	74.1	73.7	73.3	72.9	72.5	72.0	71.4	70.7	70.1	69.4	68.7	67.8	67.1	65.9	65.0	64.1	63.0	61.8	61.0	58.9
3-1/4	826	Min.	80.6	80.2	79.8	79.3	78.9	78.5	77.9	77.2	76.5	75.8	75.1	74.3	73.3	72.5	71.2	70.3	69.2	68.1	66.7	65.8	63.6
		Nom.	80.8	80.4	80.1	79.6	79.2	78.9	78.3	77.7	77.0	76.5	75.7	75.0	74.2	73.4	72.2	71.4	70.5	69.4	68.1	67.3	65.3
3-1/2	889	Min.	86.9	86.6	86.2	85.6	85.3	84.9	84.3	83.6	82.8	82.2	81.4	80.6	79.7	78.8	77.5	76.6	75.6	74.4	73.0	72.1	69.9
		Nom.	87.1	86.8	86.4	86.0	85.6	85.2	84.7	84.1	83.4	82.8	82.1	81.4	80.5	79.8	78.6	77.7	76.8	75.7	74.5	73.7	71.6
3-3/4	953	Min.	93.3	92.9	92.5	92.0	91.6	91.2	90.6	89.9	89.2	88.5	87.8	87.0	86.0	85.2	83.9	83.0	81.9	80.8	79.4	78.5	76.3
		Nom.	93.5	93.1	92.8	92.3	91.9	91.6	91.0	90.4	89.7	89.2	88.4	87.7	86.9	86.1	84.9	84.1	83.2	82.1	80.8	80.0	78.0
4	1016	Min.	99.6	99.3	98.9	98.3	98.0	97.6	97.0	96.3	95.5	94.9	94.1	93.3	92.4	91.5	90.2	89.3	88.3	87.1	85.7	84.8	82.6
		Nom.	99.8	99.5	99.1	98.7	98.3	97.9	97.4	96.8	96.1	95.5	94.8	94.1	93.2	92.5	91.3	90.4	89.5	88.4	87.2	86.4	84.3
4-1/2	1143	Min.	112.3	112.0	111.6	111.0	110.7	110.3	109.7	109.0	108.2	107.6	106.8	106.0	105.1	104.2	102.9	102.0	101.0	99.8	98.4	97.5	95.3
		Nom.	112.5	112.2	111.8	111.4	111.0	110.6	110.1	109.5	108.8	108.2	107.5	106.8	105.9	105.2	104.0	103.1	102.2	101.1	99.9	99.1	97.0
5	1273	Min.	125.0	124.7	124.3	123.7	123.4	123.0	122.4	121.7	120.9	120.3	119.5	118.7	117.8	116.9	115.6	114.7	113.7	112.5	111.1	110.2	108.0
		Nom.	125.2	124.9	124.5	124.1	123.7	123.3	122.8	122.2	121.5	120.9	120.2	119.5	118.6	117.9	116.7	115.8	114.9	113.8	112.6	111.8	109.7

ADDITIONAL BIRMINGHAM WIRE GAGES

NUMBER	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	00	000	0000	00000
MM	.1	.1	.2	.2	.2	.3	.3	.3	.4	.4	.5	.5	.6	.6	.7	.8	9.7	10.8	11.5	12.7

Weights / Gewicht / Waga

GIVEN	MULTIPLY BY	TO OBTAIN
Grams	0.001	Kilograms
Grams	0.0353	Ounces
Grams	0.0022	Pounds
Kilograms	1 000.0	Grams
Kilograms	35.2740	Ounces
Kilograms	2.2046	Pounds
Ounces	28.3495	Grams
Ounces	0.0283	Kilograms
Ounces	0.0625	Pounds
Pounds	453.5924	Grams
Pounds	0.4536	Kilograms
Pounds	16.0	Ounces

Flow Rate / Durchfluss / Przepływ

GIVEN	MULTIPLY BY	TO OBTAIN
Cubic feet per minute (CFM)	0.0283	Cubic meters per minute
Cubic feet per minute (CFM)	7.4805	Gallons per minute (GPM)
Cubic feet per minute (CFM)	28.3163	Liters per minute
Cubic meters per minute	35.3133	Cubic feet per minute (CFM)
Cubic meters per minute	264.170	Gallons per minute (GPM)
Cubic meters per minute	1 000.0	Liters per minute
Gallons per minute (GPM)	0.1337	Cubic feet per minute (CFM)
Gallons per minute (GPM)	0.0038	Cubic meters per minute
Gallons per minute (GPM)	3.7878	Liters per minute
Liters per minute	0.0353	Cubic feet per minute (CFM)
Liters per minute	0.001	Cubic meters per minute
Liters per minute	0.2641	Gallons per minute (GPM)

Measures / Länge / Długość

GIVEN	MULTIPLY BY	TO OBTAIN
Centimeters	0.0328	Feet
Centimeters	0.3937	Inches
Centimeters	10.0	Millimeters
Centimeters	0.01	Meters
Feet	30.4801	Centimeters
Feet	12.0	Inches
Feet	304.801	Millimeters
Feet	0.3048	Meters
Inches	2.5400	Centimeters
Inches	0.0833	Feet
Inches	25.400	Millimeters
Inches	0.0254	Meters
Millimeters	0.1	Centimeters
Millimeters	0.00328	Feet
Millimeters	0.03937	Inches
Millimeters	0.001	Meters
Meters	100.0	Centimeters
Meters	3.2808	Feet
Meters	39.370	Inches
Meters	1 000.0	Millimeters

Pressure / Druck / Ciśnienie

GIVEN	MULTIPLY BY	TO OBTAIN
Bar	1.0197	Kilograms per square centimeter
Bar	14.5038	Pounds per square inch
Kilograms per square centimeter	.9807	Bar
Kilograms per square centimeter	14.22	Pounds per square inch
Pounds per square inch	.0689	Bar
Pounds per square inch	.0703	Kilograms per square centimeter