

Pour-Thru Cell Kit, DR/2400, DR 2700, DR 2800 and DR 3800

Safety information

Please read this entire document before unpacking, setting up, or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired, do not use or install this equipment in any manner other than that specified in this document.

Use of Hazard Information

DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury.

Important Note: Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

Note: Information that supplements points in the main text.

Precautionary Labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol, if noted on the instrument, will be included with a danger or caution statement in the manual.



Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user.

Note: For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment, producer-supplied electrical accessories, and all auxiliary items for proper disposal.

General information

CAUTION

Chemical Hazard. Do not use the Pour-Thru cell in tests that call for the use of organic solvents such as alcohols, toluene, chloroform, trichloroethane or cyclohexanone. These solvents may not be compatible with the plastic components of the Pour-Thru cell creating the potential for equipment damage and chemical exposure for the analyst.

The Pour-Thru Cell Kit is an optional accessory for the DR/2400, DR 2700/2800/3800 Spectrophotometers. The Pour-Thru cell kit contains a sample cell that remains in the instrument while samples are poured through it by means of a funnel and tubing.

The Pour-Thru cell improves measurement accuracy, as zeroing, measurements, and measurement comparisons are carried out under the same optical conditions. As the samples all flow through the same cell, errors attributable to the different optical characteristics of individual cells are excluded. The Pour-Thru is designed to allow the sample to be introduced into the cell without having to handle the cell in any way.

The Pour-Thru cell can be oriented to provide two pathlengths; a 1-inch pathlength and a 1-cm pathlength. The Pour-Thru cell can be used over the entire wavelength range.

Specifications

Specifications are subject to change without notice.

Path length	2.54 cm (approximately 1 inch), 1 cm (0.394 inch)
Wavelength range	DR/2400: 400–800 nm
	DR 2700/2800: 340–990 nm
	DR 3800: 320–1100 nm
Rinsing volume	25 mL

Pour-Thru assembly

The Pour-Thru cell must be assembled and installed before use. [Figure 1](#) illustrates the assembled unit. If any of these items are missing or damaged, refer to the manufacturer or a sales representative immediately.

Note: Tubing supplied with the kit may be cut to fit as needed.

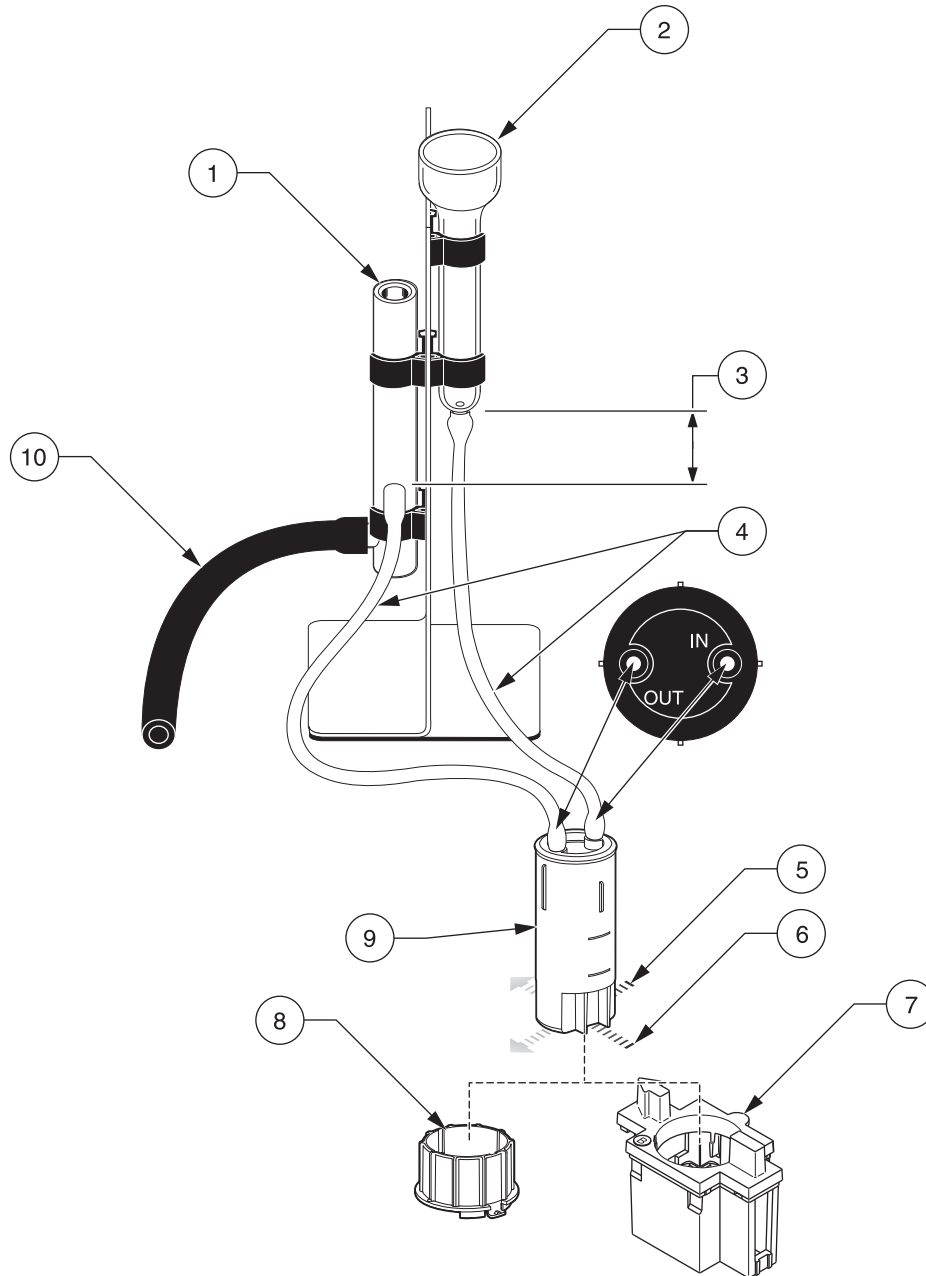


Figure 1 Pour-Thru cell assembly

1 Overflow tube assembly	6 1-cm path length
2 Glass funnel	7 Cell Adapter B for DR 2700/2800/3800
3 Tube assembly and funnel alignment	8 Cell Adapter for DR/2400
4 1/8 in. I.D. Inflow and Outflow tubing (6 ft)	9 Pour-Thru cell
5 22-mm (approximately 1-inch) path length	10 Drain Tube (rubber tube)

Pour-Thru installation

1. Insert the cell adapter into the spectrophotometer:

DR/2400: Place the multi-pathlength cell adapter (59466-00) into the instrument. Align the tabs on the adapter with the alignment recesses in the round-cell holder. Turn the adapter clockwise until the adapter alignment marks line up to the base alignment marks on the instrument. The adapter will snap into place. See *Installing Sample Cell Adapters* in the DR/2400 Instrument Manual for more information.

DR 2700/2800/3800: Insert the Pour-Thru cell Adapter B in Cell Compartment #2 so that the light path arrow on the adapter points left. See *Installing Sample Cell Adapters* in the Spectrophotometer User Manual for more information.

Do not use Adapter C. Adapter C places the cell too low and does not prevent rotation of the Pour-Thru cell.

2. Connect the $\frac{1}{8}$ in. cell inflow and outflow tubes to the Pour-Thru cell. See [Figure 1](#).
3. Wipe the Pour-Thru cell with a lint-free cloth and insert it fully in the cell holder to lock in position so that the cell is oriented for the necessary pathlength and cannot rotate in the adapter. For the 22-mm orientation, the inlet and outlet fittings are parallel to the light path. For the 1-cm orientation, the inlet and outlet fittings are perpendicular to the light path. See [Figure 1](#).

Note: The light of the optical system of the instrument passes right to left as viewed from the front of the instrument. If using the 1-cm pathlength with the DR/2400, the outlet port of the cell must be at the back of the cell compartment for proper installation.

4. Connect the inflow tube to the fitting at the bottom of the glass funnel and clamp the glass funnel to the stand. Minimize the tubing length to eliminate air bubbles and improve flow.
5. Connect the outflow tube to the top fitting of the overflow tube assembly. Minimize the tubing length to eliminate air bubbles and improve flow.

Note: Do not kink or bend the tubing sharply.

6. Connect the drain tube (black rubber tube) to the bottom fitting of the overflow tube assembly. Connect the other end of the drain tube to an appropriate waste vessel.

Note: The drain tube must flow freely to the waste vessel. Keep the drain pipe horizontal and below the outlet of the stand pipe. Shorten tubes to minimize flow restrictions.

7. For proper drainage, adjust the heights of the overflow tube assembly and funnel as shown in [Figure 1](#), item 3. The funnel height determines the speed of sample flow through the cell. The higher the funnel, the faster the flow. To minimize air bubbles, adjust the funnel so that it drains completely with the final level of liquid in the tube about 5 cm (2 inches) below the tip of the funnel.
8. Pour 50 to 100 mL of deionized, degassed water into the funnel and allow the funnel to drain. If necessary, move the overflow tube assembly up or down until the funnel drains smoothly and stops draining at the correct level.

Use of the Pour-Thru cell

The Pour-Thru cell is intended primarily for those methods that specifically call for its use. These methods use liquid reagents, which prevent turbidity from un-dissolved reagents, and are typically denoted as ULR or Rapid Liquid methods. The step-by-step procedure can be followed directly for these methods with no modification. The Pour-Thru cell provides constant optical characteristics and excellent precision and sensitivity.

Samples are poured into the funnel of the Pour-Thru cell and measurements are taken when the flow has stopped. The next 25-mL sample flushes out the previous sample and only the last few milliliters remain in the cell for measurement. This small volume prevents contamination and dilution between samples. After measurement, solution from the cell flows into the overflow tube assembly and then to a waste container.

Note: Inaccuracies or drift in sample readings can be caused by an insufficient amount of sample being used to rinse out the cell. If this occurs, either rinse the cell with 50 to 100 mL of deionized, degassed water or shorten the inflow and outflow tubes.

It may be possible to use the Pour-Thru cell for methods that specify a different sample cell. Methods that use a 10-mL sample volume must be adjusted as described under [Adjustments for 10-mL Sample Methods](#) so that a minimum of 25 mL sample is prepared. In addition, methods that use a 1-inch square sample cell in the DR 2700/2800/3800 Spectrophotometer must use a conversion factor as described under [Adjustments for DR 2700/2800/3800 1-inch Square Sample Cell Methods](#).

The 22-mm Pour-Thru cell path length ([Figure 1 on page 3](#)) should be used for any DR/2400 or DR 2700/2800/3800 method that specifies a 1-inch or 22-mm sample cell. The 10-mm (1-cm) path length can be used where higher ranges or a shorter path length is required. The cell must be oriented correctly for the desired path length as described in [Pour-Thru installation](#).

The methods listed in [Table 1](#) cannot be used with the Pour-Thru cell due to problems caused by the chemistry or other complications. Use the sample cell specified in the procedure for these methods.

Table 1 Methods that cannot be used with the Pour-Thru cell

Aluminum ECR	Arsenic	Barium	Boron, Carmine
Cyanuric Acid	Fluoride	Formaldehyde	Lead, LeadTrak
Mercury	Nickel, Heptoxime	Nitrite, HR	PCB
Phenols	Potassium	Selenium	Silver
Suspended Solids	Sulfate	TPH	Volatile Acids
Zinc	Surfactants, Anionic (Detergents)		

The methods listed in [Table 2](#) require extra rinsing or purging of the Pour-Thru cell with deionized or distilled water between samples.

Table 2 Methods that require additional rinsing or purging

Aluminum, Aluminon	Chlorine Dioxide, LR	Cobalt, PAN
Copper, Porphyrin	Hardness, Calmagite	Manganese, LR, PAN
Nickel, PAN	Nitrate, MR	Nitrate, HR

The Pour-Thru cell can also be used for the Nessler Method for Ammonia and TKN if cleaned properly. Clean the cell by pouring a few sodium thiosulfate pentahydrate crystals into the funnel with some water so the crystals flow into the cell. Rinse out the crystals with deionized water.

Adjustments for 10-mL Sample Methods

The Pour-Thru cell requires a minimum volume of 25 mL for proper flushing of any previous solution from the cell—so methods that use a 10-mL sample volume cannot be used directly. Triple the sample and reagent volumes on these methods (or use 25-mL reagents and sample volumes). For example, use 30 mL sample and 3 powder pillows (or 3 times the specified reagent volume) for every reagent specified in the method. Methods that specify a 1-inch square sample cell for the DR 2700/ 2800/ 3800 Spectrophotometers require a conversion for the difference in pathlength between the specified sample cell and Pour-Thru cell.

Adjustments for DR 2700/2800/3800 1-inch Square Sample Cell Methods

The Pour-Thru cell has a slightly shorter pathlength than the 1-inch square cells for which most DR 2700/ 2800/ 3800 methods are calibrated. Therefore, it is necessary to multiply the results by a conversion factor of 1.08, or to perform a standard adjustment as described in the Spectrophotometer User Manual. Always confirm results with a standard solution, to make sure modifications have been performed correctly.

Note: The DR/2400 Spectrophotometer does not require this conversion because the DR/2400 sample cells have the same pathlength as the Pour-Thru cell.

Waste management

Collect the liquid waste from the Pour-Thru cell in a waste vessel. Monitor the volume of waste collected so that the container does not overflow. Dispose of the waste according to local regulations. See Waste Management and Safety in the instrument procedures manual.

Pour-Thru cell maintenance

Note: Do not use solvents (e.g. alcohols or acetone) to clean the Pour-Thru cell. A dilute acid solution can be used for cleaning. Rinse thoroughly with deionized water.

Check the cell occasionally for an accumulation of film on the cell walls. If the walls appear dirty or hazy, or if bubbles form in the cell, pour 50 to 100 mL of a detergent solution into the cell, e.g. Liqui-Nox (2088153). Let it soak for several minutes. Rinse thoroughly with deionized, degassed water. Use a soft cloth to clean the sample cell walls. Paper towels and other paper products may scratch the plastic and should not be used.

Replace tubing when it becomes rigid or appears worn. When removing tubing from the Pour-Thru cell, firmly hold the black cell cap on the assembly to avoid separating the components. Separation could cause the cell to leak and become useless.

Replacement Parts

Description	Quantity	Catalog Number
Pour-Thru Cell Kit	each	59404-00
Kit Components:		
Pour-Thru cell	each	59410-00
Adapter, Multi-pathlength cell for DR/2400	each	59466-00
Stand assembly	each	19061-00
Overflow tube assembly	each	19062-00
Glass Funnel	each	48834-00
Tubing, Tygon, 1/32 in.wall, 1/8 in. I.D.	6 ft (1.8 m)	5179-37
Tubing, rubber, 3/32 in. wall, 1/4 in. I.D.	12 ft (3.6 m)	560-18
Adapter B, for DR 2700/2800/3800	each	LZV585
Detergent, Liqui-Nox (Phosphate Free), 946 mL	each	2088153

Contact Information

HACH Company World Headquarters

P.O. Box 389
Loveland, Colorado
80539-0389 U.S.A.
Tel (800) 227-HACH
(800) -227-4224
(U.S.A. only)
Fax (970) 669-2932
orders@hach.com
www.hach.com

Repair Service in the United States:

HACH Company
Ames Service
100 Dayton Avenue
Ames, Iowa 50010
Tel (800) 227-4224
(U.S.A. only)
Fax (515) 232-3835

Repair Service in Canada:

Hach Sales & Service
Canada Ltd.
1313 Border Street, Unit 34
Winnipeg, Manitoba
R3H 0X4
Tel (800) 665-7635
(Canada only)
Tel (204) 632-5598
Fax (204) 694-5134
canada@hach.com

Repair Service in Latin America, the Caribbean, the Far East, Indian Subcontinent, Africa, Europe, or the Middle East:

Hach Company World
Headquarters,
P.O. Box 389
Loveland, Colorado,
80539-0389 U.S.A.
Tel +001 (970) 669-3050
Fax +001 (970) 669-2932
intl@hach.com

HACH LANGE GMBH

Willstätterstraße 11
D-40549 Düsseldorf
Tel. +49 (0)2 11 52 88-320
Fax +49 (0)2 11 52 88-210
info@hach-lange.de
www.hach-lange.de

HACH LANGE LTD

Pacific Way
Salford
GB-Manchester, M50 1DL
Tel. +44 (0)161 872 14 87
Fax +44 (0)161 848 73 24
info@hach-lange.co.uk
www.hach-lange.co.uk

HACH LANGE LTD

Unit 1, Chestnut Road
Western Industrial Estate
IRL-Dublin 12
Tel. +353(0)1 46 02 5 22
Fax +353(0)1 4 50 93 37
info@hach-lange.ie
www.hach-lange.ie

HACH LANGE GMBH

Hütteldorferstr. 299/Top 6
A-1140 Wien
Tel. +43 (0)1 9 12 16 92
Fax +43 (0)1 9 12 16 92-99
info@hach-lange.at
www.hach-lange.at

DR. BRUNO LANGE AG

Juchstrasse 1
CH-8604 Hegnau
Tel. +41(0)44 9 45 66 10
Fax +41(0)44 9 45 66 76
info@hach-lange.ch
www.hach-lange.ch

HACH LANGE FRANCE S.A.S.

33, Rue du Ballon
F-93165 Noisy Le Grand
Tél. +33 (0)1 48 15 68 70
Fax +33 (0)1 48 15 80 00
info@hach-lange.fr
www.hach-lange.fr

HACH LANGE SA

Motstraat 54
B-2800 Mechelen
Tél. +32 (0)15 42 35 00
Fax +32 (0)15 41 61 20
info@hach-lange.be
www.hach-lange.be

DR. LANGE NEDERLAND B.V.

Laan van Westroijen 2a
NL-4003 AZ Tiel
Tel. +31(0)344 63 11 30
Fax +31(0)344 63 11 50
info@hach-lange.nl
www.hach-lange.nl

HACH LANGE APS

Åkandevej 21
DK-2700 Brønshøj
Tel. +45 36 77 29 11
Fax +45 36 77 49 11
info@hach-lange.dk
www.hach-lange.dk

HACH LANGE AB

Vinhundsvägen 159A
SE-128 62 Sköndal
Tel. +46 (0)8 7 98 05 00
Fax +46 (0)8 7 98 05 30
info@hach-lange.se
www.hach-lange.se

HACH LANGE S.R.L.

Via Riccione, 14
I-20156 Milano
Tel. +39 02 39 23 14-1
Fax +39 02 39 23 14-39
info@hach-lange.it
www.hach-lange.it

HACH LANGE S.L.U.

Edif. Arteaga Centrum
C/Larrauri, 1C- 2ª Pl.
E-48160 Derio/Vizcaya
Tel. +34 94 657 33 88
Fax +34 94 657 33 97
info@hach-lange.es
www.hach-lange.es

HACH LANGE LDA

Av. do Forte nº8
Fracção M
P-2790-072 Carnaxide
Tel. +351 214 253 420
Fax +351 214 253 429
info@hach-lange.pt
www.hach-lange.pt

HACH LANGE SP.ZO.O.

ul. Opolska 143 a
PL-52-013 Wrocław
Tel. +48 (0)71 342 10-83
Fax +48 (0)71 342 10-79
info@hach-lange.pl
www.hach-lange.pl

HACH LANGE S.R.O.

Lešanská 2a/1176
CZ-141 00 Praha 4
Tel. +420 272 12 45 45
Fax +420 272 12 45 46
info@hach-lange.cz
www.hach-lange.cz

HACH LANGE S.R.O.

Roľnícka 21
SK-831 07 Bratislava –
Vajnory
Tel. +421 (0)2 4820 9091
Fax +421 (0)2 4820 9093
info@hach-lange.sk
www.hach-lange.sk

HACH LANGE KFT.

Hegyalja út 7-13.
H-1016 Budapest
Tel. +36 (06)1 225 7783
Fax +36 (06)1 225 7784
info@hach-lange.hu
www.hach-lange.hu

HACH LANGE S.R.L.

Str. Căminului nr. 3
Sector 2
RO-021741 București
Tel. +40 (0) 21 205 30 03
Fax +40 (0) 21 205 30 03
info@hach-lange.ro
www.hach-lange.ro

HACH LANGE

8, Kr. Sarafov str.
BG-1164 Sofia
Tel. +359 (0)2 963 44 54
Fax +359 (0)2 866 04 47
info@hach-lange.bg
www.hach-lange.bg

HACH LANGE SU ANALİZ SİSTEMLERİ LTD.ŞTİ.

Hilal Mah. 75. Sokak
Arman Plaza No: 9/A
TR-06550 Çankaya/ANKARA
Tel. +90 (0)312 440 98 98
Fax +90 (0)312 442 11 01
bilgi@hach-lange.com.tr
www.hach-lange.com.tr

HACH LANGE D.O.O.

Fajfarjeva 15
SI-1230 Domžale
Tel. +386 (0)59 051 000
Fax +386 (0)59 051 010
info@hach-lange.si
www.hach-lange.si

HACH LANGE E.Π.Ε.

Αυλίδος 27
GR-115 27 Αθήνα
Τηλ. +30 210 7777038
Fax +30 210 7777976
info@hach-lange.gr
www.hach-lange.gr

HACH LANGE E.P.E.

27, Avlidos str
GR-115 27 Athens
Tel. +30 210 7777038
Fax +30 210 7777976
info@hach-lange.gr
www.hach-lange.gr