Instruction Sheet

DR2800/DR3800 Pour-Thru Cell

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.

To ensure 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.*

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 module is an optional accessory for the instrument. The module contains a sample cell that remains in the instrument while samples are poured through the cell by means of a funnel and tubing. Working with the module improves measurement accuracy, as zeroing, measurements and measurement comparisons are completed 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 module 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 used over the entire wavelength spectrum of the and can be oriented to provide two pathlengths:

- Approximately 1-inch cell
- 1 cm

These two cell types can be used over the whole wavelength spectrum.

Specifications

Specifications are subject to change without notice.

Path length	2.54 cm (approximately 1 inch), 1 cm (0.394 inch)
Wavelength range	DR2800: 340–990 nm DR3800: 320–1100 nm
Rinsing volume	DR2800: At least 20 mL for 1-inch path length At least 10 mL for 1-cm path length DR3800: At least 25 mL

Pour-Thru Cell Assembly

The Pour-Thru Cell Assembly must be assembled and installed before use. Figure 1 illustrates the assembled unit.

Note: *Tubing supplied with the kit may be cut to fit as needed. However, care should be taken to set up the tubing first, to make sure that pieces are not cut too short.*

Note: *If any of these items are missing or damaged, contact the manufacturer or a sales representative immediatly.*

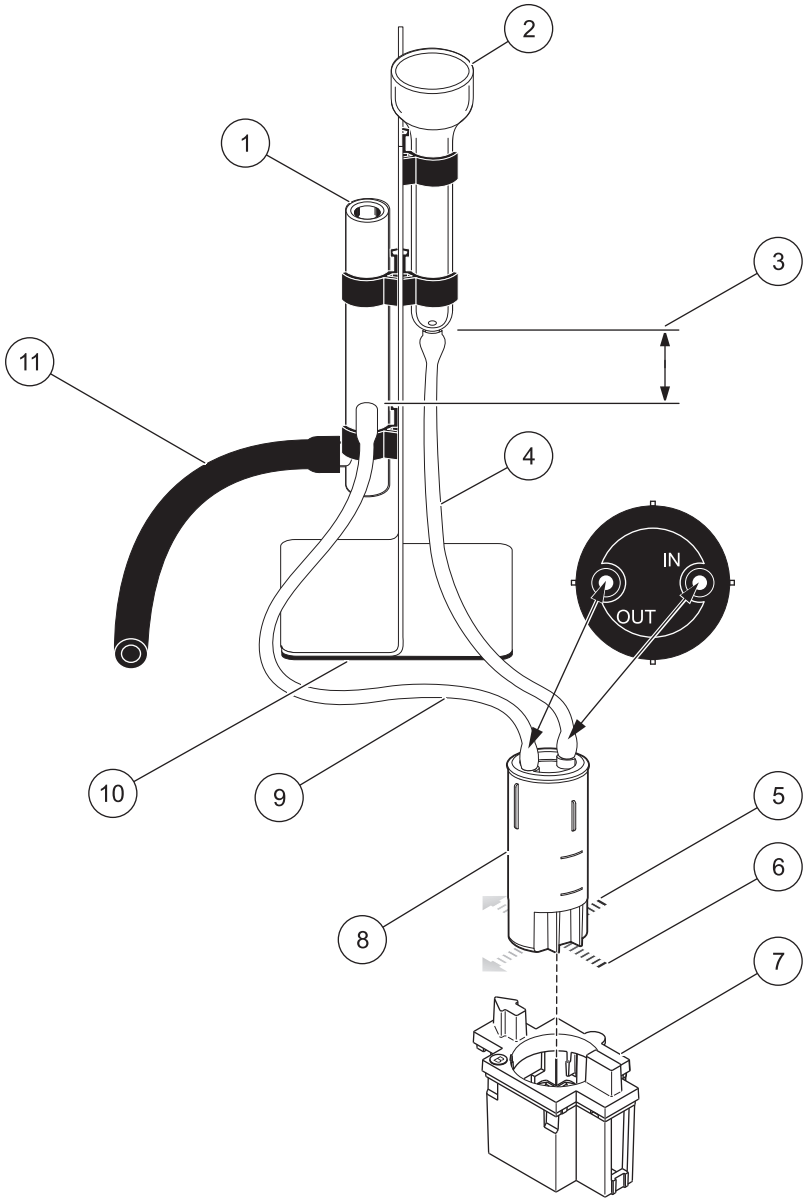

Figure 1 Pour-Thru Cell Assembly

1	Stand Pipe	**7**	Cell Adapter B
2	Glass Funnel	**8**	Pour-Thru Cell
3	Tube Assembly and Funnel alignment	**9**	1/8 in. I.D. Plastic Tubing (6 ft)
4	1/8 in. I.D. Plastic Tubing (6 ft)	**10**	Stand Assembly
5	22-mm (approximately 1-inch) Pathlength	**11**	¼ in. I.D. Rubber Drain Tubing (12 ft)
6	1-cm Pathlength		

Installation of the Pour-Thru module

1. Open the cell compartment.

2. Insert the Pour-Thru Cell Adapter B in cell compartment #2 so that the light path arrow on the adapter points left.

   Note: *Do not use Adapter C. It places the cell too low and does not prevent rotation of the Pour-Thru Cell.*

3. Connect the 1/8 in. Cell Inflow and Outflow Tubes to the Pour-Thru Cell (Figure 1).

4. Wipe the Pour-Thru Cell with a lint-free cloth and insert it fully into 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 (Figure 2).

   Note: *The light path of the optical system of the instrument passes right to left as viewed from the front of the instrument.*

5. 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.

6. Connect the Outflow Tube to the top fitting of the stand pipe. Minimize the tubing length to eliminate air bubbles and improve flow.

   Note: *Make sure there are no kinks in tubes that will impair flow and retain bubbles.*

7. Connect the Drain Tube (rubber tube) to the bottom fitting of the stand pipe and clamp the stand pipe to the stand.

8. Connect the free 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.*

9. To ensure proper drainage for the funnel, adjust the relative heights of the stand pipe 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.

10. Pour 25 to 50 mL of deionized water into the funnel and allow the funnel to drain. If necessary, move the stand pipe up or down until the funnel drains smoothly and stops draining at the correct level

Figure 2 Installation Pour-Thru Cell kit

1	Pour-Thru Cell	**5**	Glass funnel
2	Cell outflow tube	**6**	Stand, including mountings for glass funnel and stand pipe
3	Drain tube (rubber tube)	**7**	Cell inflow tube
4	Stand pipe for outflow liquid	**8**	Pour-Thru Cell adapter C in cell compartment #2

Use of the Pour-Thru Cell

The Pour-Thru Cell is intended primarily for those methods that specifically call for its use. These use liquid reagents and are typically denoted as ULR or Rapid Liquid methods. These methods obtain maximum benefit from the Pour-Thru Cell by avoiding turbidity from un-dissolved reagents and provide the precision and sensitivity required to determine very low concentrations. These methods require no modification when the Pour-Thru Cell is used.

It is possible to use the Pour-Thru Cell for other methods, with a few minor modifications. The cell requires a minimum volume of 25 mL for proper flushing of any previous solution from the cell - so methods that utilize a 10 mL sample volume cannot be used directly. Tripling the sample and reagent volumes on these methods (or use of 25 mL reagents and sample volumes) will provide enough liquid to use the cell - however, an additional modification is needed. Since the Pour-Thru Cell has a slightly shorter 1-inch pathlength than the square cells for which most methods are calibrated, it is necessary to multiply the results by a pathlength factor of 0.95 or to perform a standard adjustment (see manual) on any method that utilizes 1-inch square cells. Always confirm results with a standard solution, to make sure modifications have been performed correctly.

The methods listed in Table 1 require extra rinsing or purging of the Pour-Thru Cell with deionized or distilled water between samples.

Table 1 Methods that require additional 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 cell. Rinse out the crystals with deionized water.

The methods listed in Table 2 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 2 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)		

Pour-Thru Cell Maintenance

Note: *Do not use solvents (e.g. alcohols or acetone) to clean the Pour-Thru Cell. Use of aceton may damage the 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 mL of a detergent solution into the cell. Let it soak for several minutes. Rinse thoroughly with deionized 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.

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
Vinthundsvägen 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. Leonida, nr. 13
Sector 2
RO-020555 Bucuresti
Tel. +40 (0) 21 201 92 43
Fax +40 (0) 21 201 92 43
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.E.
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

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