

Sample Environment

Standard Cryostats, Cryocoolers, Cryofurnaces not assigned to Instruments

Code	Temperature Range (K)	Material in the beam (thickness mm)	Sample Dimension (mm) diameter-length	Other
49APCC25	20-320	A5-AG3	25	Bottom loading
52ILHV49	1.5-320	A5-AG3	49-106	Top loading
58APCC70	20-320	A5-AG3	70	Bottom loading
63ILHV70	1.5-320	A5-AG3	70 (H.P.)	Top loading
71ILHV49	1.5-500	A5-AG3	49	Top loading
81ILHV16	1.5-320	A5-AG3	16-160	Top loading
82ILV100	1.5-320	A5-AG3	100-265 (H.P.)	Top loading
103ILHV49	4.2-300	A5-AG3	49 (T.U.)	Top loading
106ILHV49	1.5-500	A5-AG3	49-112	Top loading
110ILHV49	1.5-320	A5-AG3	49-129	Top loading
111ILHV49	1.5-320	A5-AG3	49-150	Top loading
132ILHV49	1.5-320	A5-AG3	49-152	Top loading
141ILHV49	1.5-500	A5-AG3	49-110	Top loading
145ILHV69	1.5-320	A5-AG3	69-195	Top loading
114EDCC49	15-320	A5-AG3	49	Top loading
138APCC49	1.8-320	A5-AG3	49	Top loading
119ILHV49	1.5-500	A5-AG3	49	Top loading
CRYOPAD2	-	Nb AG3	Ø180 access for sample environment	
126ILHV49	1.5-320	A5-AG3	49	For CRYOPAD
128LECC100	20-300	Sapphire	20	Sapphire windows



Internal view of the 3K cryogen-free cryostat hosting the Paris-Edinburg pressure cell.



Head of the 15 mK dilution fridge Orange cryostat.

Very Low Temperature Equipment

The tailoring of these systems to individual experiments requires a considerable amount of effort and the choice of system and scheduling of experiment must be made in conjunction with the Service. For this reason we also ask users to contact the staff at least one month prior to the date of the experiment preferably in conjunction with their local contact.

Cryostats

Code	Temperature Range (K)	Material in Beam (thickness mm)	Sample Dimension (mm) diameter-length	Other
68IL3H100	350 mK-300 K	A5-AG3	150/190	Bottom loading
95ILDIL80	15 mK-300 K	A5-AG3	80/60	Bottom loading
144ILDIL80	15 mK-300 K	A5-AG3	80/105	Bottom loading
154IL3H115	400 mK-300 K	A5-AG3	115/160	Bottom loading

Sample Environment

Inserts

Code	Temperature Range (K)	Material in Beam (thickness mm)	Sample Dimension (mm) diameter-length	Other
I37IL3H59	400 mK-320 K	A5	59/155	for cryostats Ø70
I61ILDIL35	40 mK-300 K	A5	35/110	for 6T magnet I56OXHV54
I62ILDIL20	15 mK-300 K	A5	20/180	for 15T vertical magnet I58OXHV26
I65ILDIL32	40 mK-300 K	A5	32/100	for 10T magnet I39OXHV42
501	50 mK-4 K	A5	42/70	for magnet 96OXHV50
502	50 mK-4 K	A5	42/70	for standard cryostats Ø49
504	50 mK-4 K	A5	42/70	for standard cryostats Ø70
505	50 mK-4 K	A5	30/110	for 3.8T horizontal magnet I34OXHV38

Superconducting Magnets

Code	Magnetic Field (T)	Field Direction	Gap (mm)	Sample Dimensions (mm) diam/height	Temperature Range (K)	Other
I56OXHV19	5	horizontal	50	19/60	1.5-300	
I74TRHV35	7	vertical	14	35/135	1.5-300	
I90ILHV49	2,5	vertical (asymmetric)	30	49/130	1.5-300	very low temperature insert available
I96OXHV50	5	vertical (asymmetric)	40	50/250	1.5-300	very low temperature insert available
I139OXHV42	10	vertical	10	10/10	1.5-650	+5° to -25° vertical access, very low temperature insert available
I158OXHV26	15	vertical	20	26/285	1.5-300	very low temperature insert available
I134OXHV38	3,8	horizontal	40	38/140	1.5-300	
I146ILHV49	2	vertical	-	-	-	
I156OXHV54	6	vertical (asymmetric)	40	54/130	1.5-300	very low temperature insert available
IN22 - CRG	12	vertical (asymmetric)	-	30/20	1.8-300	+10° to -3° vertical access, very low temperature insert available

Sample Environment

Listed in this section are all sample environment components available at the ILL. Most components are maintained and upgraded by the **Service for Advanced Neutron Environment (SANE)**, however, some are the property of individual instruments and thus maintained by that instrument. Equipment is listed under the following headings:

Low Temperature Equipment
Very Low Temperature Equipment
Superconducting Magnets
High Temperature Equipment
High Pressure Equipment

Detailed information can alternatively be found on the Neutron Environment web page: <http://www.ill.fr/DPT/SANE>

ILL has about 125 major pieces of sample environment equipment.

If you plan to use a furnace or cryostat in your experiment please read the General Information available on the above web address and contact the Service well in advance (sane@ill.fr).

IMPORTANT: ALL USERS BRINGING THEIR OWN HIGH-PRESSURE EQUIPMENT TO THE ILL MUST PRODUCE THE NECESSARY SAFETY CERTIFICATES.

Low Temperature Equipment

Top-loading cryostats have a centre stick with an M8 threaded stud at its bottom end (the sample is supported from above). The sample to cryostat or furnace interface is supplied by the user but we are happy to advise.

Liquid Helium Distribution

The ILL does not have its own helium liquefier. Liquid helium is shipped to ILL in 100 and 250 litre dewars for immediate consumption. All requests for liquid helium should be made at least 48 hours in advance. Please arrange with your local contact to order your helium.

The transfer of liquid helium between dewar and cryostat is a rather tricky operation. If you are not familiar with transferring, do not hesitate to call for assistance from your local contact or directly from the Cryogenics Laboratory.

All ILL low-temperature equipment is coded in the form I2-AB-CD-34.

Code Information

- the leading two or three numbers denote internal ILL order number
- the 1st and 2nd letter denotes manufacturer's code:

IL	ILL ORANGE
OX	OXFORD INSTRUMENTS
TH	THOR
AP	AIR PRODUCTS
ED	EDWARDS

- the following letters denote code of the refrigerant mode:

H	⁴ He
F	with furnace (T>300 K)
N	nitrogen
M	with magnetic field
V	gas flow
3H	³ He
DIL	dilution refrigerator
CC	closed cycle refrigerator
CF	cryofurnace
JT	Joule Thomson device

- the last two numbers indicate maximum sample diameter in mm.

Standard Cryocoolers and Cryofurnaces assigned to Instruments

These cryostats are assigned to specific instruments. The scientific and technical staff of the instruments concerned are in charge of their upkeep. However major repairs and modifications are carried out in the Cryogenics Laboratory.



3K cryogen-free top-loading cryostat.

Sample Environment

Instrument	Code	Temperature Range (K)	Sample Diameter (mm)	Type
ADAM	-	10-600	30	Cryorefrigerator
D1A	531LHV49	1.5-320	49	ILL std
D1A	148ILJT49	1.8-300	49	Joule Thomson
D1B	691LHV25	1.5-320	25	ILL vanadium tail
D2B	971LHV49	1.5-500	49	ILL cryofurnace
D2B	1091LHV49	1.5-320	49	ILL std
D2B	147ILCC49	with insert 20-650 without insert 3.5-320	with insert 29 without insert 49	Pulse Tube
D3	1011LHV19	1.5-320	10	ILL thin tail
D3	CRYOPAD3		-	Ø290 access for sample environment
D4	541LHV25	1.5-320	25	ILL vanadium tail
D4	-	-20°C to 80°C	-	Vanadium heater
D7	1021LHV49	1.5-320	49	ILL std
D7	159ILCC49	3-320	49	Pulse Tube
D9	88APCC15	20-320	15	Displex 20I 4-circle
D9	151ILJTHV22	1.8-300	22	Bottom loading
D9	1301LHV24	1.8-300	24	4-circle He flow
D10	791LHV49	1.5-320	49	ILL std
D10	1121LHV25	1.8-450	25	4-circle He flow
D10	121DIL35	0.15-300	35	4-circle He flow dilution
D10	641LHV49	1.5-320	-	Coils @ 1.5-5K
D11/D17/D22	551LHV49	1.5-320	45 dep. on cryostat	Small angle sapphire
D11/D17/D22	1071LHV49	1.5-320	45 dep. on cryostat	Small angle sapphire
D15	731LHV49	1.5-320	49	ILL std
D19	104ILCC15	20-320	15	Displex 20I 4-circle
D20	1551LHV25	1.8-320	25 (50 possible)	ILL vanadium tail
IN1	651LHV49	1.5-320	49	Large tail
IN3	1051LHV48	1.5-320	48	Small tail
IN4	1351LHV70	1.5-320	70	Large tail
IN5/IN6	1311LHV69	1.8-500	69	Large tail
IN5/IN6	611LHV70	1.5-320	70	ILL Std 70 mm
IN5	991LHV70	1.5-320	70	ILL Std 70 mm
IN6	701LHV70	1.5-320	70	ILL Std 70 mm
IN8	921LHV49	1.5-320	49	Large tail
IN10	911LNV40F	80-700	40	LN2 cryofurnace
IN10	871LHV49	1.5-500	49	ILL cryofurnace
IN10	981LHV69	1.5-320	69	Long tail
IN11	801LHV49	1.5-320	49	ILL std no magnetic pieces
IN11	1571LHV49	1.5-500	49	ILL cryofurnace
IN12	721LHV49	1.5-320	49	Small tail
IN13	115EDCC49	15-400	-	Top loading
IN13	1171LHV49	1.8-500	-	-
IN14	1131LHV49	1.5-320	49	Large tail
IN15	1361LHV49	1.5-320	49	ILL std
IN16	1181LHV49	1.8-500	48	ILL cryofurnace
IN20	661LHV49	1.5-320	49	Large tail
IN20	SPIN-ECHO	-	-	TASSE option
IN22	CRYOPAD3	-	-	Ø180 access for sample environment
S42	11STH20	1.5-320	-	ILL thin tail
LADI	1401LHV25	2-320	-	He flow
LAUTER	1161LHV49	1.5-320	-	Sapphire windows
VIVALDI	1491LHV49	1.5-320	-	ILL std

ILL std = ILL standard



Sample Environment

High-Temperature Equipment

We list below the furnaces assigned to particular instruments but which are supported by the High Temperature Laboratory. Other furnaces not supported by the group may be available for certain instruments. In all cases requests should be made through the instrument responsible or technician.

Furnaces Assigned to Instruments

Instrument	Code	Max. Temp. (°C)	Max. Sample Dimension diameter-length (mm)	Material in the Beam
D1B	I7TLI3AV20	1000	15/50	Al/V
D2B	I6TL05A12	250	10/50	Al
D2B, D1A	07TLI3AV50	1000	35/50	Al/V
D3	-	250	10/15	A5/AG3
D4	I2BDI4V20	1100	15/50	V
D11, D22 SANS furnace	08SA15SA50	1250	30/30	Sapphire exit angle: +3.5° to -3.5°
D20	I1BDI3AV20	1000	15/50	Al/V
IN1	I5TLI3AN60	1000	45/50	Al/Nb
IN5	03TL08AV70	500	60/20	Al/V or Al/Nb
IN5, IN6	03TLI7AN50	1400	35/40	Al/Nb
IN11	I8BD04A60	450	60/50	Al
IN16, IN10	01TLI3AN60	1000	45/50	Al/Nb

Furnaces not assigned to Instruments

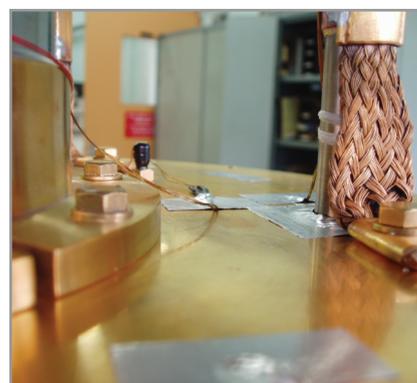
Code	Max. Temp. (°C)	Max. Sample Dimension diameter-length (mm)	Sample Fixation	Material in the Beam
02TLI3AN50	1000 (for > 1000 see Lab.)	35/50	centre-stick with M8 threaded stud	Al/Nb
04TL20AN50	1600 (for >1600 see Lab.)	35/50	centre-stick with M8 threaded stud	Al/Nb
05TL20AN50	1600 (for >1600 see Lab.)	35/50	centre-stick with M8 threaded stud	Al/Nb
06BDI3AN50	1000	35/50	placed on podium	Al/Nb
09TLI9AN50	1600	35/50	centre-stick with M8 threaded stud	Al/Nb
I0BDI8AN50	1500	35/50	placed on podium	Al/Nb
I3MFI9A10	1650 at atm. pressure	10/10	ceramic adhesive (alumina)	Al or none
I4SAI3SI50	1000	35/50	centre-stick with M8 threaded stud	Al or Si exit angle: + 25° to - 25°

High Pressure Equipment

The pressure cells can be divided into two categories: those in which the pressure is transmitted directly in situ from a pressure generator and clamped devices which must be pressurised away from the spectrometer.

Continuously Loaded High-Pressure Cells

Code	P _{max} (kbar)	Material	Thickness (mm)	Sample dimension (mm/mm)	Cryostat
01PG50AL15	5 @ 300K 4.7 @ 1.6K	Al 7049T6	32	15/30	63ILLHV70 Ø70
02PG25AL15	2.5 @ 300K 2.5 @ 1.6K	Al 7049T6	16	15/30	63ILLHV70 Ø70
03PG50TZ7	5 @ 300K 4.7 @ 1.6K	TiZr	15	7/30	ILL Std Ø50
04PG50CB6	5 @ 300K 4.7 @ 1.6K	CuBe	6	6/25	ILL Std Ø50
05PG50CB5	3 @ 500K 3 @ 1.6K	CuBe	7	5/25	ILL Cryofurnace Ø50



First stage of the 3K cryogen-free cryostat of the Paris-Edinburg pressure cell.

With standard cells the pressure can be adjusted continuously from 0 to P_{max} while the sample is in the beam. The cell is linked via a flexible high pressure capillary to a gas pressure generator, which can be positioned several meters away.

High Pressure Clamped Cells

Clamped cells are loaded to the desired pressure in a press (maximum load 200 kN) and then clamped using a locking nut before being transferred into the neutron beam, either directly or inside a cryostat.

Code	P _{max} (kbar)	Material	Thickness (mm)	Sample dimension mm / l mm	Cryostat	Liquid
01PCL100TZ6	10 @ 300K 7 @ 1.5K	TiZr	12	6/20	ILL Std Ø50	Fluorinert Fc75
02PCL100CB6	10 @ 300K 7 @ 1.5K	CuBe	8	6/20	ILL Std Ø50	Fluorinert Fc75
03PCL100SS6	10 @ 300K 7 @ 1.5K	Stainless Steel	6	6/20	ILL Std Ø50	Fluorinert Fc75
04PCL150TZ6	15 @ 300K 12 @ 1.5K	CuBe	9	5/20	ILL Std Ø50	Fluorinert Fc75
01PCH300AO3	30 @ 300K 25 @ 1.5K	Al ₂ O ₃	25	3/5	82ILLHV100	Fluorinert 50/50 Fc84/Fc87
02PCH200AO3	20 @ 300K 17 @ 1.5K	Al ₂ O ₃	25	4/5	82ILLHV100	Fluorinert 50/50 Fc84/Fc87

Uniaxial Stress

Uniaxial stress can be applied to single crystals. At present, 1 ton load can be transmitted to the sample at any temperature below room temperature. The pressure may be applied regardless of temperature with a maximum load of 3000 kg. The sample dimensions may be a maximum of diameter: 12 mm, length: 15 mm.