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INTERNATIONAL SPACE STATION

EMERGENCY OPERATIONS
ДАС ЭО

ISS

2000

Revision Log

1 E	20 Oct 00	3—5 E	20 Oct 00
2 E	20 Oct 00	3—6 E	20 Oct 00
3 E	20 Oct 00	3—7 E	20 Oct 00
4 E	20 Oct 00	3—8 E	20 Oct 00
5 E	20 Oct 00	3—9 E	20 Oct 00
6 E	20 Oct 00	3—10 E	20 Oct 00
7 E	20 Oct 00	3—11 E	20 Oct 00
1—1 E	20 Oct 00	3—12 E	20 Oct 00
2—1 E	20 Oct 00	3—13 E	20 Oct 00
2—2 E	20 Oct 00	3—14 E	20 Oct 00
2—3 E	20 Oct 00	3—15 E	20 Oct 00
2—4 E	20 Oct 00	3—16 E	20 Oct 00
2—5 E	20 Oct 00	3—17 E	20 Oct 00
2—6 E	20 Oct 00	3—18 E	20 Oct 00
2—7 E	20 Oct 00	3—19 E	20 Oct 00
2—8 E	20 Oct 00	3—20 E	20 Oct 00
2—9 E	20 Oct 00	3—21 E	20 Oct 00
2—10 E	20 Oct 00	3—22 E	20 Oct 00
2—11 E	20 Oct 00	3—23 E	20 Oct 00
2—12 E	20 Oct 00	3—24 E	20 Oct 00
2—13 E	20 Oct 00	3—25 E	20 Oct 00
2—14 E	20 Oct 00	4—1 E	20 Oct 00
2—15 E	20 Oct 00	4—2 E	20 Oct 00
2—16 E	20 Oct 00	4—3 E	20 Oct 00
2—17 E	20 Oct 00	4—4 E	20 Oct 00
2—18 E	20 Oct 00	4—5 E	20 Oct 00
2—19 E	20 Oct 00	4—6 E	20 Oct 00
2—20 E	20 Oct 00	5—1 E	20 Oct 00
2—21 E	20 Oct 00	5—2 E	20 Oct 00
2—22 E	20 Oct 00	5—3 E	20 Oct 00
2—23 E	20 Oct 00	5—4	20 Oct 00
2—24 E	20 Oct 00	5—5	20 Oct 00
2—25 E	20 Oct 00	5—6	20 Oct 00
3—1 E	20 Oct 00	5—7	20 Oct 00
3—2 E	20 Oct 00	5—8	20 Oct 00
3—3 E	20 Oct 00	5—9	20 Oct 00
3—4 E	20 Oct 00	6—1 E	20 Oct 00
		7—1 E	20 Oct 00

TABLE OF CONTENTS

INTRODUCTION	5
1. GENERAL INSTRUCTIONS	1—1
2. DEPRESSURIZATION	2—1
2.1. T.res DETERMINATION NOMOGRAPHS	2—1
2.2. RESPONSE TO $\Delta P/ \Delta T$ AND ATM PRESS ALARM SIGNALS.....	2—3
2.3. SOYUZ PREPARATION FOR UNMANNED UNDOCKING (SOYUZ IS LEAKING)	2—4
2.4. [CA] LEAK CHECK (SOYUZ IS LEAKING T.res>500 min)	2—4
2.5. LEAK PINPOINT	2—5
2.5.1. ISS DEACTIVATION.....	2—6
2.5.2. PROGRESS ISOLATION.....	2—7
2.5.3. SM ПpK ISOLATION	2—8
2.5.4. SM ISOLATION ([PO] IS LEAKING).....	2—9
2.5.5. SM ПxO ISOLATION	2—10
2.5.6. FGB ISOLATION (ΠΓO IS LEAKING)	2—11
2.5.7. FGB ΓA ISOLATION	2—12
2.6. LEAK PINPOINT USING PRESSURE GAUGE [MB]	2—13
2.6.1. RS LEAK CHECK	2—13
2.6.2. PROGRESS LEAK CHECK	2—14
2.6.3. FGB LEAK CHECK (SOYUZ ON SM ПpK)	2—15
2.6.4. SM ПxO LEAK CHECK (SOYUZ ON SM ПpK)	2—15
2.6.5. [PO] LEAK CHECK (SOYUZ ON SM ПpK).....	2—16
2.6.6. ΓA LEAK CHECK (SOYUZ ON SM ПpK)	2—16
2.6.7. SM LEAK CHECK (SOYUZ ON FGB ΓA).....	2—17
2.6.8. ΠΓO LEAK CHECK (SOYUZ ON FGB ΓA).....	2—17
2.6.9. ПpK LEAK CHECK (SOYUZ ON FGB ΓA)	2—18
2.6.10. [PO] LEAK CHECK (SOYUZ ON FGB ΓA).....	2—18
2.6.11. US SEGMENT LEAK CHECK	2—19
2.6.12. NODE 1/PMA 1 LEAK CHECK.....	2—20
2.6.13. MPLM LEAK CHECK	2—21
2.6.14. PMA 1 ISOLATION	2—22
2.6.15. NODE 1 ISOLATION.....	2—22
2.6.16. LAB ISOLATION	2—22
2.6.17. MPLM ISOLATION.....	2—23
2.6.18. NODE 1/LAB VESTIBULE ISOLATION.....	2—23
2.6.19. NODE 1/MPLM VESTIBULE ISOLATION	2—23
2.7. UTILIZE US SEGMENT ATMOSPHERE (PRE CCS) (1.603).....	2—23
2.8. NODE 1 EQUIPMENT SAFING AND RETRIEVAL (1.801).....	2—25
3. FIRE	3—1
3.1. CREW OBSERVED BURNING ODOR OR FIRE – INITIAL RESPONSE	3—1
3.2. SMOKE ALARM ON RS	3—3
3.3. FIRE ALARM – INITIAL RESPONSE	3—3
3.3.1. FIRE IN SM.....	3—5
3.3.2. FIRE IN FGB.....	3—5
3.3.3. FIRE IN SOYUZ.....	3—6
3.3.4. FIRE IN PROGRESS	3—6
3.3.5. FIRE IN NODE 1 (1.305).....	3—7
3.3.6. NODE1 FIRE SOURCE LOCATION SAMPLING (1.313).....	3—9
3.4. ISS ATMOSPHERE RECOVERY AFTER FIRE IN RS	3—13
3.5. NODE 1 POST FIRE CLEANUP.....	3—16

4. TOXIC RELEASE	4—1
4.1. TOXIC RELEASE RESPONSE (1.701)	4—1
4.2. ISS EMERGENCY EGRESS (1.501).....	4—5
4.3. ISS CONTINGENCY EGRESS (1.401)	4—6
5. VERIFYING ISS READINESS FOR EMERGENCY EGRESS	5—1
6. SCHEMATIC OF RESPONSE TO DEPRESS	6—1
7. SCHEMATIC OF LEAK PINPOINT	7—1

INTRODUCTION

These crew procedures are intended for trained crew members that have completed the full training course and simulations

RSC-E developed Sections 1, 2 procedures 2.1 - 2.6.10, Section 3 procedures 3.2, 3.3.1 – 3.3.4, 3.4

NASA developed Section 2 procedures.2.6.11 - 2.8, Section 3 procedures 3.3.5, 3.3.6, 3.5 and Section 4. Section 4 was not concurred by RSC-E

NASA and RSC-E jointly developed Section 3 procedures 3.1, 3.3, Section 5

These crew procedures determine initial order of expedition crew actions in case of depress and fire at the ISS-1 flight stage

These crew procedures may be updated during ISS assembly, pending systems modification and procedure validation at simulators and training facilities

ACRONYMS AND ABBREVIATIONS

ABK	-	emergency vacuum valve
AK-1M	-	air sampling adsorber
AC	-	USOS
ACУ	-	toilet
БКВ	-	command output unit
БИ	-	flight engineer
б/и	-	crew procedures
БМП	-	micropurification unit
БНП	-	portable repress tank
БО	-	orbital module on Soyuz
БОА	-	atmosphere purification unit
БРУБ	-	BO switch panel
БРУС	-	CA switch panel
БРТК	-	onboard radio communication system
ВВ	-	air duct fan
ВД	-	air duct
ВКЛ	-	activate
ВН	-	air heater
ГА	-	pressurized adapter
ГЖА	-	gas-liquid unit
ДнаЗ	-	Report to MCC
ДСД	-	pressure alarm sensor
загл	-	cap
ЗвП ВЧ	-	high-pitch warble
ЗвП НЧ	-	low-pitch warble
ЗУП	-	circuit breaker
ИнПУ	-	integrated control panel
ИП-1	-	directional air flow sensor
ИПД	-	Draeger tube air sampler
ИПК-1	-	gas mask
ИРС	-	Integrated Russian segment
КВД	-	pressure equalization valve
ККС	-	small cavity valve
ККТ	-	pressure monitoring valve
Кл	-	valve
клав	-	pushbutton
КСД	-	depress valve
КСС	-	rescue aids

КЭ	-	CDR
КЭИ	-	multifunction parameters display
МОК	-	condensate line
МВ	-	pressure gauge
МКС	-	International Space Station, ISS
МСС	-	Docking and Stowage Module
НЭП	-	Science Power Platform
ОСП4	-	backpack fire extinguisher
ОТКЛ	-	off, turn off, deactivate
ОТКР	-	open, opened
п.	-	procedure
ПА	-	comm panel
ПБК	-	[CA] depress command inhibit
ПГО	-	instrumentation cargo compartment
пл	-	plane
П.О.	-	TBD
ПП	-	flow converter
ППС	-	system power panel
ПрК	-	SM transfer tunnel
ПСС	-	caution and warning panel
ПУ	-	control panel
ПУВН	-	cabin air heaters control panel
ПУРВ	-	condensate water processor control panel
ПУС	-	Signal control panel
ПУСОА	-	atmospheric purification unit control panel
поУЗ	-	On MCC GO
ПхО	-	SM transfer compartment
Р	-	pressure
Р.МВ	-	ISS pressure per pressure gauge
РБС	-	universal power outlet
РРЖ	-	liquid flow control valve
РРСТ	-	undocking inhibit override
РС	-	Russian segment
СА	-	Soyuz descent module
СвД	-	LED
СЖО	-	life support system
СК	-	Sokol
СМ	-	Service Module
см	-	ref.
СОГС	-	atmosphere revitalization subsystem
СПГС	-	gas mixture supply system
СРВ-К	-	condensate water processor
СРО	-	work lights
ССВП	-	docking and internal transfer system
СтА	-	docking assembly
СУ	-	docking mechanism
ТК	-	Soyuz
ТКГ	-	Progress
Т.рез	-	time remaining until P=490 mmHg in the overall station volume
Т.рез Союза	-	time remaining until P=490 mmHg in Soyuz compartment volume
t.1мм	-	pressure drop time per 1 mm Hg
УКВ	-	VHF
УСМ	-	Universal Docking Module
ФВП	-	harmful contaminants filter
ФГБ	-	Functional Cargo Block
ХСА	-	cooler/dryer

ЦП	-	SM central post
ЦУП	-	Mission Control Center
ЦУП-М	-	Mission Control Center-Moscow
шт.	-	ea., each
ЩО	-	lighting panel
ЭЛВК	-	electric vacuum valve
ЭО	-	expedition crew
ЭП	-	visiting crew
AR	-	Atmosphere revitalization subsystem
ССАА	-	Common cabin air assembly
ССС	-	Command and Control Software
СДМК	-	Carbon dioxide monitoring kit
ССА-СР	-	Compound specific analyzer for combustion products
HEPA filter	-	High efficiency particle air filter
PBA	-	Portable breathing apparatus
GMT		Greenwich Mean Time
GSC		Grab sample container

SYMBOLS

□	-	illuminated
■	-	not illuminated
◻	-	blinking
↓	-	press pushbutton
⏴	-	press pushbutton to lock
⏵	-	press pushbutton to release
ⓞ	-	sw →Off (i.e. down relative to label on panel)
ⓧ	-	sw →On (i.e. up relative to label on panel)
△	-	verify
△△	-	continuously monitor
👂		verify aurally
√	-	check (in case of discrepancy attempt a corrective action one time only)
→	-	place physical device in designated position
↔	-	disconnect
→←	-	connect
15:46:28	-	15 h 46 min 28 sec
min	-	minutes
mmHg.	-	millimeters of mercury

1. GENERAL INSTRUCTIONS

In case of emergency situation the crew is responsible to record GMT and **report to MCC** at earliest available comm pass

The crew bears all responsibility for any actions performed in departure from the crew procedures

ISS CDR is responsible for crew and station safety, ISS CDR directs and coordinates all crew activities

Crew member in charge of a station segment is responsible for performance of all the segment-related actions

Double failures, simultaneous leaks in two compartments are considered very low probability abnormalities and are not described in the crew procedures

Emergency Ops crew procedure book is located:

CDR's and flight engineer's copies – at SM central post

Pilot's copy (with pocket) – in orbital module

Radiogram Form 14 should be placed daily into cover pocket of Emergency Ops in orbital module

After audio signal АВАРИЯ (Emergency) (high-pitch warble) deactivate hardware being operated, go to central post, determine АВАРИЯ on caution and warning panel

During hatch closure:

Ensure there are no foreign objects in the hatchway

If time permits, clean hatch rubber seals

Crew actions should provide possible ingress into their spacecraft

Expedition crew is responsible for fire extinguishing on ISS, visiting crew may be involved

Fire extinguishing is performed by team (not less than 2 crew members)

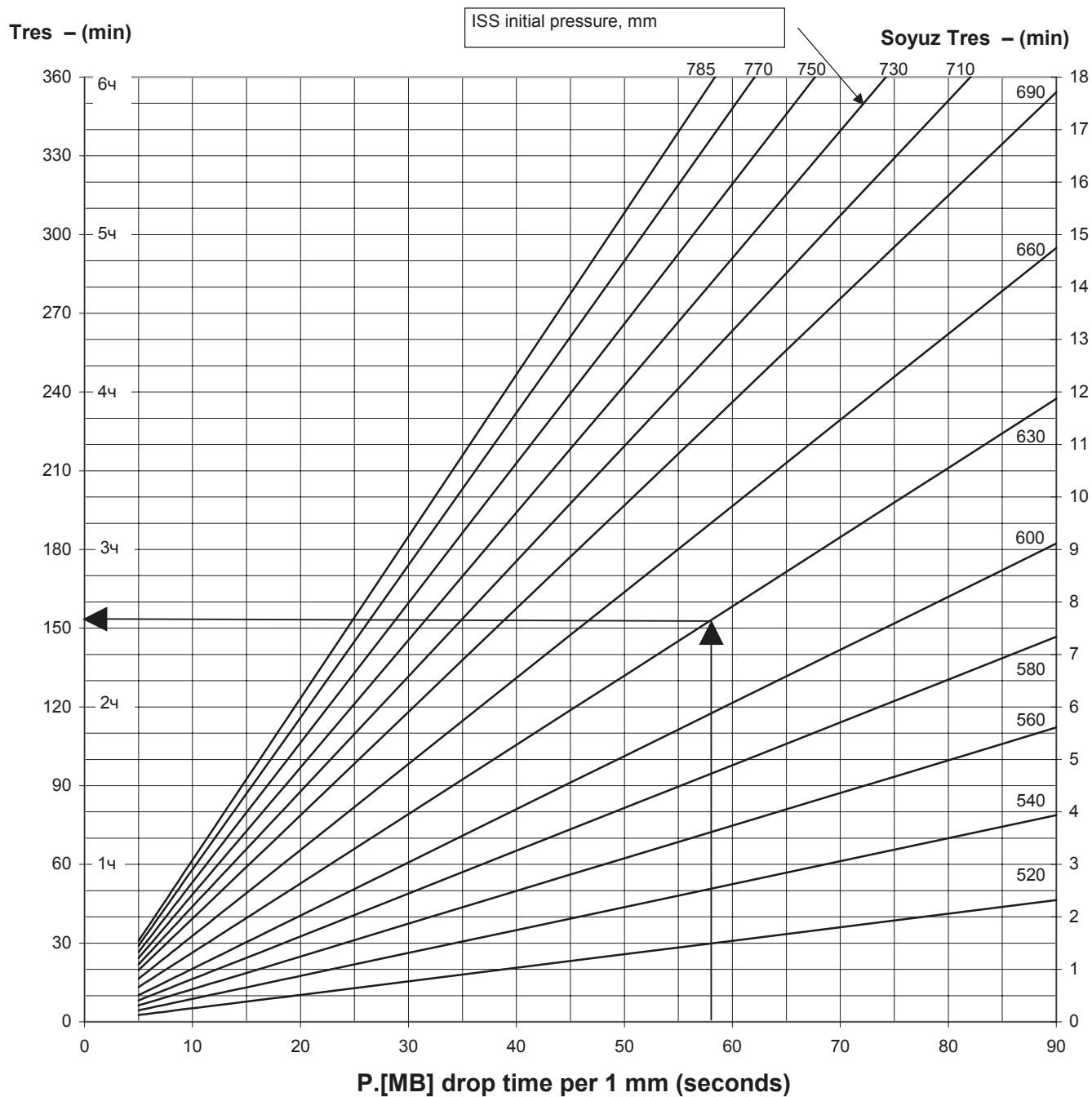
In case of fire on spacecraft, the crew responsible for the spacecraft (with the seat liners) will extinguish fire

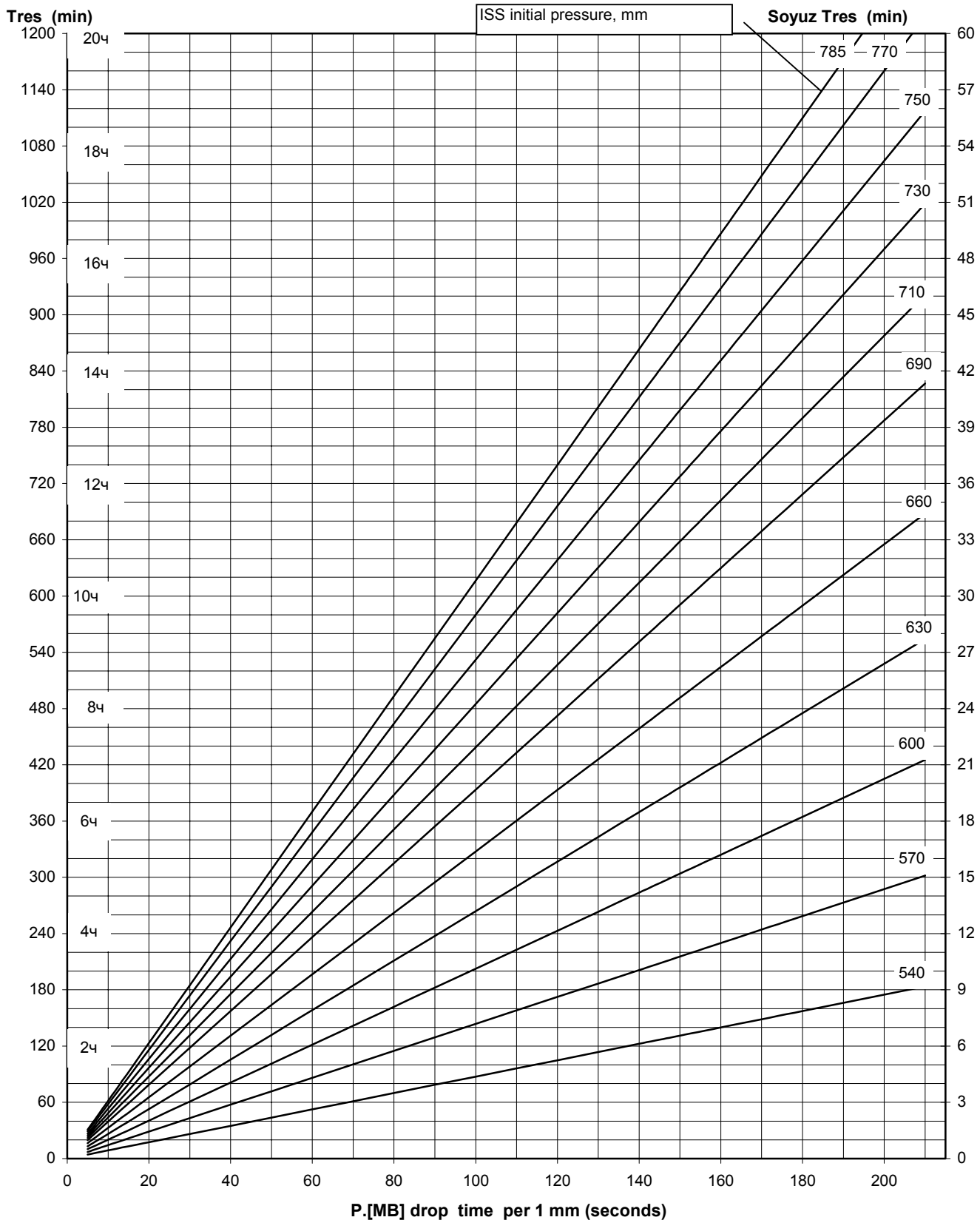
Schematics of response to depress are given for reference

T.res values (2.1) are given for reference and intended for current pressure of 750 mmHg

2. DEPRESSURIZATION

2.1. T.res DETERMINATION NOMOGRAPHS





2.3. SOYUZ PREPARATION FOR UNMANNED UNDOCKING (SOYUZ IS LEAKING)

If time allows, transfer spacesuits and seat liners into SM

If necessary, use portable repress tank (БНП)

If time available, deactivate and remove ВД, ВН, ВВ and plate with ЗУП-86-I and БВК-Б-I, stow in ISS

БРУС	☺ [CPO CA] ([CA] Lights)	
ПК 7	↓ ПУЛЬТ ВКЛ (Panel On)	
БРУС	☺ РАЗРЕШ РРСТ (Undocking Inhibit Override)	☐ РАЗРЕШ РРСТ, ЗВУК
Ф3	АВТОМАТ КСС (Rescue Aids Automatic Equipment)	
ПК 8	↓ ПУЛЬТ ОТКЛ (Panel Off)	
БРУС	☺ [CPO CA] ([CA] Lights)	
	Close CA-BO hatch (if possible)	
	√ КВД БО-СУ — ОТКР (Open)	
	ККТ → ОТКР (Open)	
	√ КСД БО — ЭЛЕКТ УПР (Electrical Control)	
БРУБ	☺ СРО БО ([BO] Lights)	
	КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД	
	Close БО-СУ hatch from the ISS side (if possible)	
	If БО-СУ hatch closure was not successful	
	Simulate hatch sealing manually (6-7 turns of hatch tool)	
	Close ПрК-СУ (ГА-СУ) hatch	
	↙↙ P.[MB], ΔP = 0	
	Report to MCC	

2.4. [CA] LEAK CHECK (SOYUZ IS LEAKING T res>500 min)

ISS CDR and Soyuz commander stay in BO, flight engineer ingresses [CA], taking pressure gauge [MB] along

БРУС	☺ [CPO CA] ([CA] Lights)
	Shut (but do not latch) CA-BO hatch
	↙↙ P.[MB]

P.[MB] drops – [CA] is leaking	P.[MB] is stable - BO is leaking
Open CA-BO hatch	КВД CA-BO → ОТКР (Open)
Perform 2.3, p. 2—4 SOYUZ PREPARATION FOR UNMANNED UNDOCKING	Open CA-BO hatch
	КВД CA-BO → ЗАКР (Close)
	Perform 2.5.1, p. 2—6 ISS DEACTIVATION

2.5. LEAK PINPOINT

ПА 3(228) XMIT

LED XMIT 1,2

228

Reconfigure Pressure Alarm Sensor (ДСД):
sw → 510

WARNING

After signal ATM PRESS, **ЗВУК** (high and low-pitch warble) (from ДСД) or
T.res < 10 min:

Stop work

Close hatch of pressurized compartments

√ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД

Close ПрК-СУ (ГА-СУ) hatch

Close БО-СУ hatch

Perform SOYUZ: В/С, 4, p. 51 РАСКОНСЕРВ ТК, 1.3, p. 17

ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8, p. 59 ПОДГОТОВКА к

РАССТЫК

Report to MCC

RS Laptop	ПУСОА
CM:СЖО:СОГС	ПУСОА ↓ POWER PANEL ON
<input type="checkbox"/> VAC V CLOSED	<input checked="" type="checkbox"/> VAC V OP
БМП emergency vacuum valve CLOSED	If <input type="checkbox"/> VAC V OP
Vacuum valve CLOSED	Close VAC V manually
	↓ POWER PANEL OFF
	425

If $\Delta P / \Delta t$ and ATM PRESS (do not monitor VAC V, БМП emergency vacuum valve and vacuum valve)

ПСС ↓ MANUAL ALARM $\Delta P / \Delta t$

MANUAL, **ЗВУК** (low-pitch warble)
 $\Delta P / \Delta t$
 SM (FGB)

If БС (onboard computer system) procedures do not run

ИНПУ SM: СОЖ CONTROL

COMMAND INHIBITED **OFF** (INHIBIT IS REMOVED)
CLOSE VACUUM VALVES **ON**

ПСС SM (FGB)(USOS)

RS Laptop

Decompression

T.res _____

(if present)

Pressure drop rate _____

(if present)

Determine the leaking compartment (~5 min after ALARM)

Isolate the leaking compartment per Table

Compartment	Reference
ПрК	2.5.3 p. 2—8
[РО]	2.5.4 p. 2—9
ПхО	2.5.5 p. 2—10
ПГО	2.5.6 p. 2—11
ГА	2.5.7 p. 2—12
PMA	2.6.11 p. 2—19

If time available, deactivate and remove ВД, ВН, ВВ and plate with ЗУП-86-I and ББК-Б-I in Soyuz, stow into ISS

If the leaking compartment is not determined on RS Laptop
Perform 2.6, p. 2—13 LEAK PINPOINT USING PRESSURE GAUGE [MB]

2.5.1. ISS DEACTIVATION

Deactivation time = 31.5 min

If Progress is present perform 2.5.2, p. 2—7 PROGRESS ISOLATION

NODE 1 √ Aft Port (Aft Stbd) IMV vlvs (two) — CL

PMA 1 Close NODE 1 Aft hatch

ГА Disconnect ВД FGB-NODE 1

Remove ИП-1 on ГА-PMA 1

Remove protective cover

Close ГА-PMA 1 hatch

ПА 3(228) If there was comm pass with **MCC-M**
| √ XMIT ■ LED XMIT 1,2

If time available, deactivate and remove ВД, ВН, ВВ and plate with ЗУП-86-I and ББК-Б-I, stow in ISS

Soyuz on SM ПрК		Soyuz on FGB ГА	
FGB	☞ РБС (all)	SM	☞ РБС (all)
ПСС	☞ POWER	ПУ АСУ	☞ PANEL PWR
	Deactivate lighting	ПУВН	↓ PANEL PWR OFF (two)
ПхО	Disconnect ВД FGB-SM	ПУРВ-К	↓ PANEL POWER OFF
	Remove ИП-1 on ПхО-СУ (SM)	ИнПУ	↓ POWER OFF
	Close ПГО-СУ (FGB) hatch	ПСС	☞ POWER
	Remove protective cover		Deactivate lighting
	Close ПхО-СУ (SM) hatch	ПхО	Disconnect ВД FGB-SM
SM	☞ РБС (all)		Remove ИП-1 on ПхО-СУ (SM)
ПСС	☞ POWER		Remove protective cover
ИнПУ	↓ POWER OFF	ПГО	Close ПхО-СУ (SM) hatch
ПУРВ-К	↓ PANEL POWER OFF		Close ПГО-СУ (FGB) hatch
ПУВН	↓ PANEL PWR OFF (two)	FGB	☞ РБС (all)
ПУ АСУ	☞ PANEL PWR	ПСС	☞ POWER
	Deactivate lighting		Deactivate lighting

[СУ] tunnel is leaking	БО is leaking
Ingress Soyuz	Ingress Soyuz, taking pressure gauge [MB] along
√ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД	√ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД
Close ПрК-СУ (ГА-СУ) hatch	Perform SOYUZ: Н/С, р. 16 ПОЛЕТ в СВЯЗКЕ
Close БО-СУ hatch	(descent if БО is leaking)
Perform SOYUZ: В/С, 4, р. 51 РАСКОНСЕРВ	Report to MCC
ТК, 1.3, р. 17 ВЕДЕНИЕ СВЯЗИ	
в ПОЛЕТЕ, 8, р. 59 ПОДГОТОВКА к РАССТЫК	
Report to MCC	

2.5.2. PROGRESS ISOLATION

Progress isolation time = 11.5 min

PREPARATION FOR UNDOCKING

	If time available, deactivate and remove ВД, ВВ and plate with ЗУП-86-I and БВК-Б-I, temp secure in ISS
ПБК	Disconnect ВД from ТКГ-ПрК (ГА) hatch ☞ БЛ РРСТ
	Manual valve ГЖА ТКГ — ГЖА ВКЛ (ГЖА On)
ЩО	√ КСД БО — ЭЛЕКТ УПР (Electrical Control)
СУ ТКГ	↓ Off (two)
	КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД
	Remove ИП-1 on ГА-СУ (ПрК-СУ)
	Remove docking interface clamps, if Progress is on ПрК
	Close ТКГ-СУ hatch (if possible)
	If ТКГ-СУ hatch closure was not successful
	Simulate hatch sealing manually (6-7 turns of hatch tool)
	Close ГА-СУ (ПрК-СУ) hatch
	↙↙ P([MB]), ΔP = 0
	Report to MCC

2.5.3. SM ПрК ISOLATION

If Progress is present perform 2.5.2, p. 2—7 PROGRESS ISOLATION

ISOLATION (SOYUZ on SM ПрК) ПрК isolation time = 11 min	ISOLATION (SOYUZ on FGB ГА) ПрК isolation time = 9.5 min
<p>FGB DEACTIVATION</p> <p>ПСС ⊕ РБС (all) ⊕ POWER Deactivate lighting (prior to egress from FGB)</p> <p>SM DEACTIVATION</p> <p>ПСС ⊕ РБС (all) ИнПУ ⊕ POWER ↓ POWER OFF ПурВ-К ↓ PANEL POWER OFF ПУВН ↓ PANEL PWR OFF (two) ПУ АСУ ⊕ PANEL PWR ППС-23 ⊕ ВПрК ППС-24 ⊕ ВВПрК Disconnect ВД РО–ПрК Remove ИП-1 on РО–ПрК Remove safety ring Close РО–ПрК hatch</p> <p>СУ ТК Deactivate lighting √ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД If necessary, use БНП (portable repress tank) Close ПрК–СУ hatch (if possible) Close БО–СУ hatch ↙↙ Р.[МВ] (БО), ΔР = 0 Perform SOYUZ: В/С 5.2, p. 53, АВТОМАТИЧЕСКОЕ ЗАКРЫТИЕ КРЫШКИ (if ПрК-СУ hatch is not closed manually), 4, p.51 РАСКОНСЕРВ ТК, 1.3, p.17 ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8, p. 59 ПОДГОТОВКА к РАССТЫК Report to MCC</p>	<p>ПрК ⊕ РБС Disconnect ВД РО–ПрК Remove ИП-1 on РО–ПрК Remove safety ring Deactivate lighting Close РО–ПрК hatch</p> <p>↙↙ Р.[МВ], ΔР = 0 Report to MCC</p>

2.5.4. SM ISOLATION ([PO] IS LEAKING)

If Progress is present perform 2.5.2, p. 2—7 PROGRESS ISOLATION

<u>ISOLATION (SOYUZ on SM ПрК)</u> SM isolation time = 12.5 min	<u>ISOLATION (SOYUZ on FGB ГА)</u> SM isolation time = 12.5 min
<p><u>FGB DEACTIVATION</u></p> <p>ПСС ☉ РБС (all) ☉ POWER Deactivate lighting (prior to egress from FGB)</p> <p><u>SM DEACTIVATION</u></p> <p>ПСС ☉ РБС (all) ☉ POWER ИнПУ ↓ POWER OFF ПурВ-К ↓ PANEL POWER OFF ПувВ ↓ PANEL PWR OFF (two) Пу АСУ ☉ PANEL PWR</p> <p>ПхО Disconnect ВД FGB–SM Close ПГО–СУ (SM) hatch</p> <p>SM СУ ТК Deactivate lighting √ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД If necessary, use БНП (portable repress tank) Close ПрК–СУ hatch (if possible) Close БО–СУ hatch</p> <p>↙↙ Р.[МВ], ΔР = 0 Perform SOYUZ: В/С, 5.2, p. 53 АВТОМАТИЧЕСКОЕ ЗАКРЫТИЕ КРЫШКИ (if ПрК-СУ hatch is not closed manually), 4, p. 51, РАСКОНСЕРВ ТК, 1.3, p. 17 ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8, р. 59 ПОДГОТОВКА к РАССТЫК Report to MCC</p>	<p><u>SM DEACTIVATION</u></p> <p> ☉ РБС (all) ПУ АСУ ☉ PANEL PWR ПувВ ↓ PANEL PWR OFF (two) ПурВ-К ↓ PANEL POWER OFF ИнПУ ↓ POWER OFF ПСС ☉ POWER ПхО Disconnect ВД FGB–SM SM Deactivate lighting ПГО Close ПГО–СУ (SM) hatch</p> <p><u>FGB DEACTIVATION</u></p> <p> ☉ РБС (all) ПСС ☉ POWER FGB Deactivate lighting СУ ТК √ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД Close ГА–СУ hatch Close БО–СУ hatch ↙↙ Р.[МВ], ΔР = 0 Perform SOYUZ: В/С, 4, p.51 РАСКОНСЕРВ ТК, 1.3, p. 17 ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8, р. 59 ПОДГОТОВКА к РАССТЫК</p>

2.5.5. SM ПхО ISOLATION

If Progress is present perform 2.5.2, p. 2—7 PROGRESS ISOLATION

ISOLATION (SOYUZ on SM ПpK) ПхО isolation time = 12.5 min	ISOLATION (SOYUZ on FGB ГA) ПхО isolation time = 15 min
<p><u>FGB DEACTIVATION</u></p> <p>ПСС ☞ РБС (all) ☞ POWER</p> <p>FGB Deactivate lighting</p> <p>ПхО Disconnect ВД FGB–SM Close ПГО–СУ (SM) hatch Disconnect ВД РО–ПхО Deactivate lighting</p> <p>РО Remove ИП-1 on РО–ПхО Close РО–ПхО hatch</p> <p>ППС-21 ☞ ВПхО ППС-22 ☞ ВВПхО</p> <p>⚡⚡ P.[MB], ΔP = 0 Report to MCC</p>	<p><u>SM DEACTIVATION</u></p> <p> ☞ РБС (all)</p> <p>ПУ АСУ ☞ PANEL PWR ПУВН ↓ PANEL PWR OFF (two) ПУРВ-К ↓ PANEL POWER OFF ИнПУ ↓ POWER OFF ПСС ☞ POWER</p> <p>ППС-21 ☞ ВПхО ППС-22 ☞ ВВПхО Disconnect ВД РО–ПхО Remove ИП-1 on РО–ПхО Deactivate lighting</p> <p>ПхО Close РО–ПхО hatch</p> <p> Disconnect ВД FGB–SM Deactivate lighting (ПхО) Close ПГО–СУ (SM) hatch</p> <p><u>FGB DEACTIVATION</u></p> <p>ПСС ☞ РБС (all) ☞ POWER</p> <p> Remove ИП-1 on ГA–СУ Deactivate lighting</p> <p>СУ ТК √ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ Close ГA–СУ hatch Close БО–СУ hatch ⚡⚡ P.[MB], ΔP = 0 Report to MCC</p>

2.5.6. FGB ISOLATION (ПГО IS LEAKING)

If Progress is present perform 2.5.2, p. 2—7 PROGRESS ISOLATION

<u>ISOLATION (SOYUZ on SM ПРК)</u> FGB isolation time = 12.5 min	<u>ISOLATION (SOYUZ on FGB ГА)</u> ПхО isolation time = 15 min
<p><u>FGB DEACTIVATION</u></p> <p>NODE 1 √ Aft Port (Aft Stbd) IMV valves (two) — CL</p> <p>PMA 1 Close NODE 1 Aft hatch ☞ РБС (all)</p> <p>ПСС ☞ POWER Deactivate FGB lighting</p> <p>ПхО Disconnect ВД FGB–SM Remove ИП-1 on ПхО–СУ (SM) Close ПхО–СУ (SM) hatch</p> <p> <<< P.[MB], ΔP = 0 Report to MCC</p>	<p><u>SM DEACTIVATION</u></p> <p> ☞ РБС (all)</p> <p>ПУ АСУ ☞ PANEL PWR</p> <p>ПУВН ↓ PANEL PWR OFF (two)</p> <p>ПУРВ-К ↓ PANEL POWER OFF</p> <p>ИНПУ ↓ POWER OFF</p> <p>ПСС ☞ POWER</p> <p>ПхО Disconnect ВД FGB–SM Remove ИП-1 on ПхО–СУ (SM) Deactivate SM lighting</p> <p>ПГО Close ПхО–СУ (SM) hatch</p> <p><u>FGB DEACTIVATION</u></p> <p> ☞ РБС (all)</p> <p>ПСС ☞ POWER Deactivate ПГО lighting</p> <p>NODE 1 √ Aft Port (Aft Stbd) IMV valves (two) — CL</p> <p>PMA 1 Close NODE 1 Aft hatch Deactivate ГА lighting</p> <p>СУ ТК √ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ If necessary, use БНП (portable repress tank) Close ГА–СУ hatch (if possible) Close БО–СУ hatch <<< P.[MB], ΔP = 0 Perform SOYUZ: В/С , 4, p. 51 РАСКОНСЕРВ ТК, 1.3, p. 17 ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8 p. 59 ПОДГОТОВКА к РАССТЫК Report to MCC</p>

2.5.7. FGB ГА ISOLATION

If Progress is present perform 2.5.2, p. 2—7 PROGRESS ISOLATION

<u>ISOLATION (SOYUZ on SM ПРК)</u> ГА isolation time = 11.5 min	<u>ISOLATION (SOYUZ on FGB ГА)</u> ГА isolation time = 14 min
<p>NODE 1 √ Aft Port (Aft Stbd) IMV valves (two) — CL</p> <p>PMA 1 Close NODE 1 Aft hatch Deactivate ГА lighting</p> <p>ПГО Disconnect ВД ПГО–ГА Remove ИП-1 on ПГО–ГА Remove safety ring Close ПГО–ГА hatch</p> <p> <<< P.[MB] , ΔP = 0 Report to MCC</p>	<p><u>SM DEACTIVATION</u></p> <p> ⊕ РБС (all)</p> <p>ПУ АСУ ⊕ PANEL PWR</p> <p>ПУВН ↓ PANEL PWR OFF (two)</p> <p>ПУРВ-К ↓ PANEL POWER OFF</p> <p>ИНПУ ↓ POWER OFF</p> <p>ПСС ⊕ POWER Deactivate SM lighting</p> <p><u>FGB DEACTIVATION</u></p> <p> ⊕ РБС (all)</p> <p>ПСС ⊕ POWER</p> <p>ПГО Disconnect ВД ПГО–ГА Remove ИП-1 on ПГО–ГА Remove safety ring Deactivate lighting in ПГО</p> <p>NODE 1 √ Aft Port (Aft Stbd) IMV valves (two) — CL</p> <p>PMA 1 Close NODE 1 Aft hatch</p> <p>ГА Close ПГО–ГА hatch Deactivate lighting</p> <p>СУ ТК √ КСД cap <+> fitting labeled МЕСТО ЗАГЛУШКИ If necessary use БНП (portable repress tank) Close ГА–СУ hatch (if possible) Close БО–СУ hatch <<< P.[MB] , ΔP = 0 Perform SOYUZ: В/С, 4, p. 51 РАСКОНСЕРВ ТК, 1.3, p.17 ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8, p. 59 ПОДГОТОВКА к РАССТЫК Report to MCC</p>

2.6. LEAK PINPOINT USING PRESSURE GAUGE [MB]

GENERAL INSTRUCTIONS ON LEAK PINPOINT

Crew member task assignments:

Flight engineer:

Monitor compartments pressure integrity using pressure gauge ([MB]) until ΔP becomes ≥ 2 mmHg or until the monitoring time interval has elapsed (see Table)

Pressure drop time for 1 mmHg (P[(MB)]) (t.1mm)	< 30 sec	31-60 sec	> 60 sec
Monitoring time interval P[(MB)]	1min	2min	2·(t.1mm)

Compartment is leaking when $\Delta P \geq 2$ mmHg

Compartment is not leaking when $\Delta P < 2$ mmHg within monitoring time interval P[(MB)]

Report monitoring results and info on leaking compartment to ISS CDR

Pilot:

Execute flight engineer's commands: Close and open hatches and KBД valves, perform other tasks on ISS

2.6.1. RS LEAK CHECK

NODE 1 √ Aft Port (Aft Stbd) IMV vlvs (two) — CL

PMA 1 Close Node 1 Aft hatch

◀◀ P.[MB]

$\Delta P \geq 2$ mmHg (RS and PMA 1 are leaking)		$\Delta P < 2$ mmHg (USOS is leaking)	
GA	Disconnect ВД FGB-NODE 1 Remove ИП-1 on ГА-PMA 1 Remove protective cover Close ГА-PMA 1 hatch ◀◀ P.[MB]		◀ T.res > 00:10:00 Open Node 1 Aft hatch Perform 2.6.11, p 2—19 US SEGMENT LEAK CHECK If T.res \leq 00:10:00 Close ГА-PMA 1 hatch
$\Delta P \geq 2$ mm - RS is leaking		$\Delta P < 2$ mm - PMA 1 is leaking	
KBД ГА-NODE1 → OPEN ◀ T.res > 00:10:00 Perform 2.6.2, p. 2—14 PROGRESS LEAK CHECK On MCC GO to increase T.res Perform 2.7, p. 2—23 UTILIZE US SEGMENT ATMOSPHERE		Do not open ГА-PMA 1 hatch Report to MCC	

2.6.2. PROGRESS LEAK CHECK

PREPARATION FOR UNDOCKING

ПБК	If time available, deactivate and remove ВД, ВВ and plate with ЗУП-86-I and БВК-Б-I, temp secure in ISS Disconnect ВД from ТКГ–ПрК (ГА) hatch ☉ БЛ РРСТ Manual valve ГЖА ТКГ — ГЖА ВКЛ (On) √ КСД БО — ЭЛЕКТ УПР (Electrical Control)
ЩО СУ ТКГ	↓ Off (two) КСД cap ←+→ fitting labeled МЕСТО ЗАГЛУШКИ КСД Remove ИП-1 on ГА–СУ (ПрК–СУ) Remove docking interface clamps if Progress is on ПрК Close ТКГ–СУ hatch (if possible) If ТКГ–СУ hatch closure was not successful – Progress is leaking Simulate hatch sealing manually (6-7 turns of hatch tool) Close ГА–СУ (ПрК–СУ) hatch << P.[MB]

$\Delta P \geq 2$ mmHg (FGB and SM are leaking)		$\Delta P < 2$ mmHg (Progress or [СУ] is leaking)	
Do not open ГА–СУ (ПрК–СУ) hatch < T.res > 00:10:00		Do not open ГА–СУ (ПрК–СУ) hatch Obtain FGB pressure gauge [MB] √ ККТ ГА (ПрК)–SOYUZ — CLOSE cap ←+→ ККТ FGB pressure gauge [MB] → ← ККТ ККТ → OPEN << P.[MB]	
Soyuz is on SM ПрК	Soyuz is on FGB ГА		
Perform 2.6.3, p. 2—15 FGB LEAK CHECK	Perform 2.6.7, p. 2—17 SM LEAK CHECK		
		$\Delta P \geq 2$ mmHg ([СУ] is leaking)	$\Delta P < 2$ mmHg (Progress is leaking)
		Do not open ГА–СУ (ПрК–СУ) hatch ККТ → CLOSE FGB pressure gauge [MB] ←+→ ККТ cap → ← ККТ Report to MCC	

2.6.3. FGB LEAK CHECK (SOYUZ ON SM Прк)

ПСС	☞ РБС (all) ☞ POWER
ПхО	Deactivate FGB lighting Disconnect ВД FGB– SM Remove ИП-1 on ПхО - СУ (FGB) Remove protective cover Close ПхО - СУ (FGB) hatch ◀◀ Р.[МВ]

$\Delta P \geq 2$ mmHg (SM is leaking)	$\Delta P < 2$ mmHg (FGB and [СУ] are leaking)
КВД ПхО-СУ (FGB) → ОТКРЫТО (Open) Open ПхО-СУ (FGB) hatch КВД ПхО-СУ (FGB) → ЭЛЕКТ УПР (Electrical Control) Close ПГО–СУ (SM) hatch ◀ T.res > 00:10:00, perform 2.6.4, p. 2—15 SM ПхО LEAK CHECK	◀ T.res > 00:10:00 КВД ПхО-СУ (FGB) → ОТКРЫТО (Open) Open ПхО-СУ (FGB) hatch КВД ПхО-СУ (FGB) → ЭЛЕКТ УПР (Electrical Control) Activate lighting in ПГО Perform 2.6.6, p. 2—16 ГА LEAK CHECK

2.6.4. SM ПхО LEAK CHECK (SOYUZ ON SM Прк)

Disconnect ВД РО – ПхО
Remove ИП-1 on РО – ПхО
Deactivate ПхО lighting
Close РО – ПхО hatch
◀◀ Р.[МВ]

$\Delta P \geq 2$ mm ([РО] and Прк are leaking)	$\Delta P < 2$ mm (ПхО is leaking)
КВД РО-ПхО → ОТКРЫТО (Open) ◀ T.res > 00:10:00, perform 2.6.5, p. 2—16 [РО] LEAK CHECK	Do not open РО-ПхО hatch ППС-21 ☞ ВПхО ППС-22 ☞ ВВПхО Report to MCC

2.6.5. [PO] LEAK CHECK (SOYUZ ON SM ПрК)**SM DEACTIVATION**

	⊕ РБС (all)
ПСС	⊕ POWER
ИнПУ	↓ POWER OFF
ПУРВ-К	↓ PANEL POWER OFF
ПУВН	↓ PANEL PWR OFF (two)
ПУ АСУ	⊕ PANEL PWR
	Deactivate lighting (prior to egress from SM)
	Disconnect ВД РО-ПрК
	Remove ИП-1 on РО-ПрК
	Remove safety ring
СУ ТК	√ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ КСД
	Close РО-ПрК hatch
	◀◀ Р.[МВ]

$\Delta P \geq 2$ mmHg (ПрК is leaking)	$\Delta P < 2$ mmHg ([РО] is leaking)
Do not open РО-ПрК hatch	КВД ПрК-РО → ОТКР (Open)

ПрК	Deactivate lighting If necessary use БНП (portable repress tank) Close ПрК-СУ hatch (if possible) Close БО-СУ hatch Perform SOYUZ: В/С, 5.2, p. 53 АВТОМАТИЧЕСКОЕ ЗАКРЫТИЕ КРЫШКИ (if ПрК-СУ hatch is not closed manually), 4, p. 51 РАСКОНСЕРВ ТК ,1.3, p. 17, ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8, p. 59 ПОДГОТОВКА к РАССТЫК Report to MCC
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2.6.6. ГА LEAK CHECK (SOYUZ ON SM ПрК)

ПГО	Disconnect ВД ПГО-ГА Remove ИП-1 on ПГО-ГА Remove safety ring
ПГО	Close ПГО-ГА hatch ◀◀ Р.[МВ]

$\Delta P \geq 2$ mmHg (ПГО and [СУ] are leaking)	$\Delta P < 2$ mmHg (ГА is leaking)
ПГО КВД ПГО-ГА → ОТКРЫТО (Open) Deactivate lighting Close ПГО-СУ (SM) hatch ◀◀ Р.[МВ]	Do not open ПГО-ГА hatch Report to MCC

$\Delta P \geq 2$ mmHg ([СУ] is leaking)	$\Delta P < 2$ mmHg (ПГО is leaking)
Close ПхО-СУ (FGB) hatch Report to MCC	Open ПГО-СУ (SM) hatch Close ПхО-СУ (FGB) hatch Report to MCC

2.6.7. SM LEAK CHECK (SOYUZ ON FGB ГА)**SM DEACTIVATION**

	☉ РБС (all)
ПУ АСУ	☉ PANEL PWR
ПУВН	↓ PANEL PWR OFF (two)
ПУРВ-К	↓ PANEL POWER OFF
ИнПУ	↓ POWER OFF
ПСС	☉ POWER
	Deactivate SM lighting
ПГО	Disconnect ВД FGB–SM
	Close ПГО–СУ (SM) hatch
	⚡⚡ P([MB])

$\Delta P \geq 2$ mmHg (FGB is leaking)	$\Delta P < 2$ mmHg (SM and СУ are leaking)
КВД ПГО–СМ → ОТКРЫТО (Open)	⚡ T.res > 00:10:00
Open ПГО–СУ (SM) hatch	КВД ПГО–СМ → ОТКРЫТО (Open)
КВД ПГО–СМ → ЭЛЕКТ УПР (Electrical Control)	Open ПГО–СУ (SM) hatch
Close ПГО–СУ (FGB) hatch	КВД ПГО–СМ → ЭЛЕКТ УПР (Electrical Control)
FGB DEACTIVATION	Perform 2.6.9, p. 2—18 ПрК LEAK CHECK
☉ РБС (all)	
ПСС	☉ POWER
⚡ T.res > 00:10:00, perform 2.6.8, p. 2—17	
ПГО LEAK CHECK	

2.6.8. ПГО LEAK CHECK (SOYUZ ON FGB ГА)

ПГО	Disconnect ВД ПГО–ГА
	Remove ИП-1 on ПГО–ГА
	Remove safety ring
	Deactivate lighting in ПГО
ГА	Close ПГО–ГА hatch
	⚡⚡ P([MB])

$\Delta P \geq 2$ mmHg (ГА is leaking)	$\Delta P < 2$ mmHg (ПГО is leaking)
Do not open ПГО–ГА hatch	КВД ГА–ПГО → ОТКР (Open)

ГА	Deactivate lighting
	If necessary use БНП (portable repress tank)
СУ ТК	√ КСД cap ↔ fitting labeled МЕСТО ЗАГЛУШКИ
	Close ГА–СУ hatch (if possible)
	Close БО–СУ hatch
	Perform SOYUZ: В/С, 4, p. 51 РАСКОНСЕРВ ТК 1.3, p. 17 ВЕДЕНИЕ СВЯЗИ в ПОЛЕТЕ, 8, p. 59, ПОДГОТОВКА к РАССТЫК
	Report to MCC

2.6.9. ПpK LEAK CHECK (SOYUZ ON FGB GA)

Activate lighting in [PO]
 Disconnect ВД PO-ПpK
 Remove ИП-1 on PO-ПpK
 Remove safety ring
 Close PO-ПpK hatch
 << P.[MB]

$\Delta P \geq 2$ mmHg ([PO] and ПxO are leaking)	$\Delta P < 2$ mmHg (ПpK is leaking)
КВД PO-ПpK → ОТКРЫТО (Open) < T.res > 00:10:00, perform 2.6.10, p. 2—18 [PO] LEAK CHECK	Do not open PO-ПxO hatch ППС-23 Ⓢ ВПpK ППС-24 Ⓢ ВВПpK Report to MCC

2.6.10. [PO] LEAK CHECK (SOYUZ ON FGB GA)

ППС-21 Ⓢ ВПxO
 ППС-22 Ⓢ ВВПxO
 Disconnect ВД PO-ПxO
 Remove ИП-1 on PO-ПxO
 Deactivate lighting in [PO]
 Close PO-ПxO hatch
 << P.[MB]

$\Delta P \geq 2$ mmHg (ПxO and [CY] are leaking)	$\Delta P < 2$ mmHg ([PO] is leaking)
Do not open PO-ПxO hatch Close ПxO-CY (FGB) hatch << P.[MB]	КВД ПxO-PO → ОТКР (Open) Close ПГО-CY (SM) hatch Report to MCC
$\Delta P \geq 2$ mmHg ([CY] is leaking)	$\Delta P < 2$ mmHg (ПxO is leaking)
Close ПГО-CY (SM) hatch << P.[MB] $\Delta P = 0$, Report to MCC	Open ПxO-CY (FGB) hatch Close ПГО-CY (SM) hatch Report to MCC

2.6.11. US SEGMENT LEAK CHECK

WARNING

After each hatch closure, if ISS T.res < 10 minutes,
evacuate US Segment and close FGB ГA-PMA 1 hatch

If module location of leak known, perform 2.6.14 - 19 to isolate leaking compartment, p. 2-23.

If MPLM available
Perform MPLM LEAK CHECK (see 2.6.13)

If time available, perform LAB EQUIPMENT SAFING AND RETRIEVAL

If Lab available

Close Lab Aft hatch

◀◀ P[MB]

Hatch closes or $\Delta P \geq 2$ (N1 or N1/Lab Vest Leak)	Hatch opens (Lab Leak)
Close Node 1 Fwd hatch √Node 1 Fwd Port(Fwd Stbd) IMV valves (two) – CL	√Node 1 Fwd MPEV— CL
	Perform ECLSS SSR-3: LAB LOSS OF TOTAL PRESSURE EQUIPMENT SAFING (SODF: ECLSS: CORRECTIVE: ACS)
Hatch opens or $\Delta P \geq 2$ (Node 1 or PMA 1 Leak)	Hatch closes or $\Delta P = 0$ (Vest leak)

<p>If PMA 2 pressurized or Lab present Node 1 Fwd MPEV→ OP</p> <p>Cap Node1 Stbd&Port PPRVs(two)</p> <p>If PMA 3 pressurized Node 1 Deck MPEV→OP</p> <p>If time available, perform 2.8, p. 2—25 NODE 1 EQUIPMENT SAFING AND RETRIEVAL</p> <p>Proceed to 2.6.12, p. 2—20, perform NODE 1/PMA 1 LEAK CHECK</p> <p>Perform ECLSS SSR-2: Node 1 LOSS OF TOTAL PRESSURE EQUIPMENT SAFING, (SODF: ECLSS: CORRECTIVE: ACS)</p> <p>Report to MCC</p>	<p>√Node 1 Fwd MPEV – CL</p> <p>Report to MCC</p>
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2.6.12. NODE 1/PMA 1 LEAK CHECK

Close Node 1 Aft hatch

◀◀ P.[MB]

$\Delta P \geq 2$ mm Hg (PMA 1 is leaking)	Hatch opens (Node 1 is leaking)
Remove ИП-1 on ГА-PMA 1 hatch	
Close ГА-PMA 1 hatch	

2.6.13. MPLM LEAK CHECKISOLATE MPLM

Close MPLM hatch

◀◀ P[MB]

Hatch closes or $\Delta P \geq 2$ (Node 1 or Node 1/MPLM Vest Leak)		Hatch opens (MPLM Leak)
Close Node 1 Deck hatch √Node 1 Deck Aft (Deck Fwd) IMV valves (two) – CL ◀◀ P[MB]		MPLM MPEV→OP Close Node 1 Deck hatch √Node 1 Deck Aft (Deck Fwd) IMV valves (two) – CL Report to MCC
Hatch closes (Vest Leak)	Hatch opens or $\Delta P \geq 2$ (Node 1 or Lab Leak)	
√Node 1 Deck MPEV – CL Report to MCC	Perform 2.6.11 US SEGMENT LEAK CHECK	

2.6.14. PMA 1 ISOLATION

PMA 1	Close Node 1 Aft hatch √Node 1 Aft MPEV – OP
	Remove ИП-1 on ГА-PMA 1 hatch
FGB	Close FGB ГА-PMA 1 hatch

2.6.15. NODE 1 ISOLATION**NOTE**

Expect PCS messages for IMV valve failure when configuring valves to open/closed position.

Node 1 Stbd, Port Hatches	Cap Node 1 Stbd, Port PPRVs (two)
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If time available, perform 2.8, p. 2—25 NODE 1 EQUIPMENT SAFING AND RETRIEVAL

Lab Aft	If Lab is present √Lab Aft Port(Aft Stbd) IMV valves (two) – CL Close Lab Aft hatch √Lab Aft MPEV – CL
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MPLM	If MPLM is present Close MPLM hatch √MPLM MPEV – CL
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Node 1	If PMA 3 is pressurized Node 1 Deck MPEV → OP
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FGB	Close FGB ГА-PMA 1 hatch
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PCS	Perform ECLSS SSR-2: NODE 1 LOSS OF TOTAL PRESSURE EQUIPMENT SAFING (SODF: ECLSS: CORRECTIVE: ACS).
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2.6.16. LAB ISOLATION

If time available, perform LAB EQUIPMENT SAFING AND RETRIEVAL

Node 1	√Node 1 Fwd Port(Fwd Stbd) IMV valves (two) – CL Close Node 1 Fwd hatch √Node 1 Fwd MPEV – CL
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PCS	Perform ECLSS SSR-3: LAB LOSS OF TOTAL PRESSURE EQUIPMENT SAFING (SODF: ECLSS: CORRECTIVE: ACS)
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2.6.17. MPLM ISOLATION

MPLM Close MPLM hatch
 MPLM MPEV → OP
 If time available, disconnect vestibule jumpers.

Node 1 Close Node 1 Deck hatch
 √Node 1 Deck MPEV – CL

2.6.18. NODE 1/LAB VESTIBULE ISOLATION

Lab √Lab Aft Port(Aft Stbd) IMV vlvs (two) – CL
 Close Lab Aft hatch
 √Lab Aft MPEV – CL

Node 1 √Node 1 Fwd Port(Fwd Stbd) IMV vlvs (two) – CL
 Close Node 1 Fwd hatch
 √Node 1 Fwd MPEV – CL

2.6.19. NODE 1/MPLM VESTIBULE ISOLATION

MPLM Close MPLM hatch
 √MPLM MPEV – CL
 If time available, disconnect vestibule jumpers.

Node 1 Close Node 1 Deck hatch
 √Node 1 Deck MPEV – CL

2.7. UTILIZE US SEGMENT ATMOSPHERE (PRE CCS) (1.603)

<p><u>NOTE</u> If comm available, MCC-H will perform commanding.</p>
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PCS 1. [RELEASING ISOLATION](#)
 Node 1: ECLSS: FDIR
 Node 1 FDIR
 'Node 1-1 MDM'
 'IMV Isolation'

 1.1 **cmd** Release (√Status – Released)
 'Node 1-2 MDM'
 'IMV Isolation'

 1.2 **cmd** Release (√Status – Released)

2. OPENING IMV VALVES TO FEED LEAK

Node 1: ECLSS: IMV Aft Stbd Vlv

Node 1: ECLSS: IMV Aft Stbd Vlv

'Node 1 IMV Aft Stbd Vlv'

'Position'

'Open'

2.1 **cmd** Open – Arm (√Armed)

Wait 25 seconds.

2.2 **cmd** Open (√Op)

If necessary or **On MCC GO**, open Aft Stbd IMV valve to further increase reserve time.

Node 1: ECLSS: IMV Aft Port Vlv

Node 1: ECLSS: IMV Aft Port Vlv

'Node 1 IMV Aft Port Vlv'

'Position'

'Open'

cmd Open – Arm (√Armed)

Wait 25 seconds.

cmd Open (√Op)

NOTE

Terminate activity by performing step 3 upon the following criteria:

1. Upon isolation of SM with FGB.
2. When Node 1 total pressure < 10.5 psia.
3. Sufficient reserve time acquired.
4. On **MCC-H** call.

NOD1: ECLSS

NOD 1: ECLSS

PCS

3. ISOLATING US SEGMENT FROM LEAK

Node 1: ECLSS: FDIR

Node 1 FDIR

'Node 1-1 MDM'

'IMV Isolation'

3.1 **cmd** Arm (√Status – Armed)

3.2 **cmd** Isolate (√Status – Isolated)

2.8. NODE 1 EQUIPMENT SAFING AND RETRIEVAL (1.801)NOTE

1. Relocate all equipment to FGB(minimum), SM(desirable).
2. Perform if time available.

EQUIPMENT RETRIEVAL

1. Disconnect CD Library and OCA and relocate to SM.
2. Remove PBAs and PFEs from Locker and relocate to SM.

PEP Locker

3. FIRE

3.1. CREW OBSERVED BURNING ODOR OR FIRE – INITIAL RESPONSE

ПСС

↓ MANUAL ALARM FIRE

 MANUAL, **ЗВУК** (low-pitched warble) FIRE SM (FGB)

GMT _____

Obtain emergency equipment: US PBA or ИПК-1, flashlights and CSA-CP

Locate fire source and remove local electrical power, if possible

CAUTION

Do not use Orbiter Halon fire extinguishers

NOTE

Use fire extinguisher from affected module: US PFE in USOS, or ОСП-4 in RS

Perform atmosphere test using CSA-CP, record CSA-CP readings as time allows

GMT		
Location		
Contaminant concentration		CSA-CP readings
CO	200 ppm	
HCl	10 ppm	
HCN	5 ppm	

Don US PBA or ИПК-1 if visible smoke or flames present, or if CSA-CP readings exceed concentration of contaminant given in Table

Configure Condensate Collector on SM

201 7Кл4 → В СБОРНИК КОНДЕНСАТА (To Condensate Collector)

401 7Кл3 → ЗАКРЫТ (Closed)

Report to MCC

If fire continues, perform fire procedure for affected module per Table

SM	3.3.1, p. 3—5
FGB	3.3.2, p. 3—5
Soyuz	3.3.3, p. 3—6
Progress	3.3.4, p. 3—6
NODE 1	3.3.5, p. 3—7

If fire confirmation cues are not present, perform ECLSS SSR-1 FALSE FIRE RECOVERY
(SODF:ECLSS:CORRECTIVE:FDS)>>

Perform ISS ATMOSPHERE RECOVERY AFTER FIRE IN RS 3.4, p. 3—13

3.2. SMOKE ALARM ON RS

ПСС SMOKE, **3ВУК** (high and low-pitch warble) GMT _____

Locate source of fire and remove local electrical power, if possible

ПУС	<input checked="" type="checkbox"/> LED DETECTOR SIGNAL Determine location of activated smoke sensor according to the Table in ПУС area	ПУС	<input checked="" type="checkbox"/> LED DETECTOR SIGNAL US Fire Summ PCS Fire Display Determine location of activated smoke sensor in FGB
-----	--	-----	--

If there is no smoke – false activation

Locate source of dust

ПУС LED DETECTOR SIGNAL

ПСС FIRE, SMOKE

RS Laptop CM:СЖО:Signal-VM

proc: F26_APS_1 (*Fire detection mode Deactivation*)

Execute

proc: F26_APS_0 (*Fire detection mode Activation*)

Execute

Report to MCC



Perform 3.3, p. 3—3 FIRE ALARM

3.3. FIRE ALARM – INITIAL RESPONSE

Go to SM Central Post GMT _____

Locate source of fire and remove local electrical power, if possible

ПСС FIRE, **3ВУК** (high-pitch warble) SM (FGB)(USOS)

RS Laptop (<input type="checkbox"/> SM) CM:СЖО:Signal-VM Determine location of activated smoke sensor in SM ДС  1 and  2,3 (↓)	ПУС (<input type="checkbox"/> SM) <input checked="" type="checkbox"/> LED DETECTOR SIGNAL (1 st activated smoke detector (ДС)) <input type="checkbox"/> LED DETECTOR SIGNAL (2 nd and next activated ДС) Determine location of activated ДС according to the Table in ПУС area	PCS (<input type="checkbox"/> USOS) (FGB) Fire Summ Fire Display Determine location of activated smoke sensors in FGB or USOS
--	--	---

Obtain emergency equipment: US PBA or ИПК-1, flashlights and CSA-CP

CAUTION

Do not use Orbiter fire extinguishers

NOTE

Use fire extinguisher from affected module: US PFE in USOS, or ОСП-4 in RS

Perform atmosphere test using CSA-CP, record CSA-CP readings as time allows

GMT		
Location		
Contaminant concentration		CSA-CP readings
CO	200 ppm	
HCl	10 ppm	
HCN	5 ppm	

Don US PBA or ИПК-1 if visible smoke or flames present, or if CSA-CP readings exceed concentration of contaminant given in Table

Perform the procedure for affected module per Table

SM	3.3.1, p. 3—5
FGB	3.3.2, p. 3—5
Soyuz	3.3.3, p. 3—6
Progress	3.3.4, p. 3—6
NODE 1	3.3.5, p. 3—7

3.3.3. FIRE IN SOYUZ

ISOLATE USOS:

Soyuz on SM ПpК	Soyuz on FGB ГA
Disconnect ВД FGB–SM	NODE 1 √ Aft Port (Aft Stbd) IMV valves
Remove ИП-1 on ПxO–CY (FGB)	(two) — CL
Shut (but do not seal) ПxO–CY (FGB) hatch	PMA 1 Close NODE 1 Aft hatch
Ingress Soyuz, taking a flashlight	
БРУБ ⚙ CPO БО	
БРУС ⚙ [CPO CA]	
	⚙ BCA (CA fan)
ПК7 ↓ ПУЛЬТ ВКЛ (Panel pwr on)	
У3 ВКЛ □ ВЕНТ XCA CA ОТКЛ (On □ CA Cooler/Dryer Fan Off)	
Transfer spacesuits, seat liners and personal things to ISS	
	Deactivate XCA БО (BO cooler/dryer)
	Use OCP-4 to extinguish the fire

Fire is extinguished	Fire continues
Identify the damaged hardware, visually estimate the damage	БРУС ⚙ РАЗРЕШ [PPCT] □ РАЗРЕШ [PPCT], ЗВУК (Undocking Inhibit Override)
У4 ОТКЛ ■ ВЕНТ XCA CA ОТКЛ (Off ■ CA Cooler/Dryer Fan Off)	⚙ [CPO CA]
ПК8 ↓ ПУЛЬТ ОТКЛ (Panel pwr off)	ПК8 ↓ ПУЛЬТ ОТКЛ (Panel pwr off)
БРУС ⚙ BCA (CA fan)	Close CA–BO hatch
⚙ CPO CA	√ КСД БО → ЭЛЕКТ УПР (Electrical Control)
БРУБ ⚙ CPO БО	БРУБ ⚙ CPO БО
Perform 3.4, p. 3—13 ISS	Disconnect ВД ТК–ПpК (ГA)
ATMOSPHERE RECOVERY AFTER	КСД cap ←→ fitting labeled МЕСТО ЗАГЛУШКИ
FIRE IN RS	КСД
	Close БО–CY hatch from the ISS side
	Close ПpК–CY (ГA–CY) hatch
	Report to MCC

3.3.4. FIRE IN PROGRESS

Isolate USOS, if Progress is on FGB ГA:

NODE 1	√ Aft Port (Aft Stbd) IMV valves (two) — CL
PMA 1	Close NODE 1 Aft hatch
Progress plane IV	If there is gas supply from CPK (oxygen supply facility)
ПБК	РПК-1,2,3,4 → ЗАКР (Close) (four)
	⚙ БЛ PPCT (Undocking Inhibit Override)
	√ КСД БО — ЭЛЕКТ УПР (Electrical Control)

Use OCP-4 to extinguish the fire

Fire is extinguished	Fire continues
Identify the damaged hardware, visually estimate the damage	ЩО ↓ Off (two)
Manual valve ГЖА ТКГ — ГЖА ВКЛ (On)	Remove ИП-1 on ПpК–CY (ГA–CY)
Perform 3.4, p. 3—13 ISS	Disconnect ВД ТКГ–ПpК (ГA)
ATMOSPHERE RECOVERY AFTER	КСД cap ←→ fitting labeled МЕСТО ЗАГЛУШКИ КСД
FIRE IN RS	Remove docking interface clamps, if Progress is on ПpК
	Close ТКГ–CY hatch
	Close ПpК–CY (ГA–CY) hatch
	Report to MCC

3.3.5. FIRE IN NODE 1 (1.305)

PCS

A1. SC1 ACTIONS IN SAFE HAVEN FIRE ISOLATION VERIFICATION
 Fire Summ

 'Navigation'
 sel Fire Toxic Isolation

 'Intermodule Ventilation'
 √Aft Port Fan Spd, rpm ~ 7164 (fan off)
 √Aft Port Vlv Status – Isolated or Closed
 √Aft Stbd Vlv Status – Isolated or Closed
 'Node 1'
 √Cabin Fan Spd, rpm ~ 2000 (fan off)

A2. If SC2 and SC3 do not find smoke, fire or burning odor
 Go to {ECLSS SSR-6: FALSE FIRE ISOLATION RECONFIGURATION} (SODF: ISS MAL: CORRECTIVE: ECLSS) >>
 If SC2 and SC3 find smoke or burning order, but cannot locate fire source
 Go to 3.3.6, p. 3—8 NODE 1 FIRE SOURCE LOCATION SAMPLING
 On call from SC2, SC3 “Perform Node 1 Load Shed.”

A3. NODE 1 LOAD SHED

NOTE

1. Expect alarms during load shed.
2. Load shed will take 2 --- 3 minutes to complete.
3. Early Comm may be brought down. If so, establish alternative comm link via Russian VHF.

PCS

 sel Power Isolation (bottom left)

 Inform SC2, SC3 that Node 1 lights will turn off.
 'Load Shed Status'
cmd Activate
 On call from SC2, SC3, “Fire not extinguished.”

SC1 Actions continued on next page

SC2, SC3 ACTIONS IN NODE 1

B1. Verify observable indication of smoke or fire.

B2. If fire or smoke burning odor not present, inform SC1.
 Perform {ECLSS SSR-6: FALSE FIRE ISOLATION RECONFIGURATION} (SODF: ISS MAL: CORRECTIVE: ECLSS) >>
 If smoke or burning odor is present but fire source cannot be located, inform SC1.
 Perform 3.3.6, p. 3—8 NODE 1 FIRE SOURCE LOCATION SAMPLING
 Remove electrical power from fire source locally (light switch, UOP).
 If fire extinguished, go to step B7.

B3. Inform SC1, “Perform Node 1 Load Shed.”

NOTE

During Load Shed, Node 1 lights will turn off, flashlights will be required. Load shed will take 2 --- 3 minutes to complete.

B4. Evaluate effect of load shed on fire prior to next step, and inform SC1, time permitting.

WARNING

1. Wear mask during/after extinguisher discharge.
2. Discharge may be propulsive.
3. Extinguisher bottle and nozzle temp will be < 0 deg C.

B5. If fire still continues
 Use USOS PFE as required on fire source.

B6. EGRESS NODE 1
 If time and circumstances permit,
 Remove OCA from Node 1 and all emergency equipment from NOD1P2-14 PEP Locker and NOD1S2-14 PEP Locker (MPLM PEP Locker) per 2.8, p. 2—25 Node 1 Equipment Safing and Retrieval procedure
 Record CSA-CP readings in Node 1 cabin atmosphere.
 CO _____
 HCN _____
 HCl _____

SC2, SC3 Actions continued on next page

SC1 ACTIONS (CONTINUED)

- A4. If SC2/SC3 determine fire still continues after PFE discharge, go to step A6 and Power Down Node 1.
- A5. If fire has been extinguished, go to step A7.

WARNING

Evaluate the effect of previous extinguishing efforts on the fire before performing the next step. Step A6 will power down the Node 1-2 MDM, causing potential MDM transition. Consultation with **MCC-H** is highly desirable, but not required, before proceeding.

A6. NODE 1 POWERDOWN

PCS

Z1:EPS:DDCU Z13B

DDCU Z13B

sel Converter

DDCU Z13B Converter

'Converter Off'

cmd Off (single step **cmd**, **Arm** not required)

√Output Voltage < 10 volts

PCS

Z1:EPS:DDCU Z14B

DDCU Z14B

sel Converter

DDCU Z14B Converter

'Converter Off'

cmd Off (single step **cmd**, **Arm** not required)

√Output Voltage < 10 volts

- A7. Go to 3.5, p. 3—16 NODE 1 POST FIRE CLEANUP.

SC2, SC3 ACTIONS COMPLETE

SC2, SC3 ACTIONS (CONTINUED)

If Orbiter docked,

Close Node 1 Fwd Hatch per decal.

√Node 1 Fwd Hatch MPEV - Closed, uncapped

√Fwd Port and Fwd Stbd IMV valves closed

Close Node 1 Deck Hatch per decal.

√Node 1 Deck Hatch MPEV - Closed, uncapped

√Deck Fwd and Deck Aft IMV valves closed

√Aft Port and Aft Stbd IMV valves closed

√Node 1 Aft Hatch MPEV - Closed, uncapped

Close Node 1 Aft Hatch per decal.

Inform SC1 "Node 1 egress complete", and give status of whether or not fire is extinguished.

- B7. Record CSA-CP readings in PMA1, FGB cabin, and SM cabin atmospheres.

Record readings in Table 2 of 3.3.6, p. 3—8 NODE 1 FIRE

SOURCE LOCATION SAMPLING

Relay readings to **MCC** at next communication opportunity.

SC2, SC3 ACTIONS COMPLETE

3.3.6. NODE1 FIRE SOURCE LOCATION SAMPLING (1.313)

SC1 ACTIONS

PCS A1. [REVIEW DATA FOR FIRESOURCE LOCATION](#)
 C&W Summary

 √Advisories - ON
 Inform SC2, SC3 of RPC trips, and direct them to sample fireports nearest the failed equipment and/or physical location of tripped RPC (see Table 1).

 If RPC trip occurred
 Node 1: EPS

 Navigate to tripped RPC.
 √RPC position – Open

PCS A2. On call "open RPCs for fireport x"
[OPEN RPCs](#)
 Node 1: EPS

 Navigate to RPCs for the affected fireport (see Table 1).
 √RPC position – Op
 Inform SC2, SC3 "RPCs open."
 On call "Perform Node 1 Load Shed."

<u>NOTE</u>
1. Expect multiple alarms during load shed.
2. Load shed will take 2 --- 3 minutes to complete.
3. Early Comm may be brought down. If so, establish alternative comm link via Russian VHF.

PCS A3. [NODE 1 LOAD SHED](#)

 sel Power Isolation (bottom left)

 Inform SC2, SC3 that Node 1 lights will turn off.
 'Load Shed Status'
 cmd Activate

SC1 ACTIONS CONTINUED ON NEXT PAGE
SC2, SC3 ACTIONS

FGB
426/427

NOD1

B1. [CSA-CP ASSEMBLY AND ACTIVATION](#)
 Unstow from CSA-CP Stowage Kit: Backup CSA-CP, Sampling Pump, Sample Probe, Probe Handle with flex tubing.

MODE pb → Press, hold until 'RELEASE' displayed. This initiates a 1 minute self check.
 Continue with assembly during self-check.

Loosen Velcro straps on Sampling Pump.
 Sampling Pump bracket →|← CSA-CP as far forward (toward pump inlet) as possible with CSA-CP oriented so display visible.

Tighten Velcro straps firmly around CSA-CP.
 Sample Probe →|← Probe Handle with flex tubing
 Free end of the flex tubing →|← sampling pump inlet
 Sampling Pump sw → On

Verify display indicates readings for OXYGEN, HCN, HCL, CO (after self check complete).

B2. Sample Node 1 cabin atm for 1 minute and record this reading in Table 2 as the cabin background level.

<u>NOTE</u>
1. Insert Sample Probe into fireport and sample fireport for 30 seconds prior to recording CO reading.
2. Sample cabin atm for 30 seconds before sampling next fireport. This action clears the sensors.
3. Upon finding elevated CO behind a fireport, sample adjacent fireports as required to define extent of fire.
4. Instrument's upper CO range is 500 ppm.

B3. Sample Node 1 fireports and record initial CO levels in Table 1. Use a fireport sampling strategy in following priority order:
 1. Near highest CO/visible smoke concentration.
 2. Near equipment powered by tripped RPC(s) as directed by SC1.
 3. In order shown in Table 1.
 B4. If fireport shows elevated CO levels (> 10 % above background) Inform SC1 "Open RPCs for fireport x."
 On call "RPCs open" sample fireport for 5 minutes and record values every 30 seconds in Table 2.

SC2, SC3 ACTIONS CONTINUED ON NEXT PAGE

SC1 ACTIONS (CONTINUED)

- A4. If SC2 and SC3 determine fire still continues after PFE discharge, proceed with Node 1 Power Down per step A6.
- A5. If fire is extinguished, go to step A8.

WARNING
Evaluate the effect of previous extinguishing efforts on the fire before performing the next step. Step A6 will remove power from the Node 1-2 MDM, causing potential MDM transition. Consultation with MCC-H is highly desirable, but not required, prior to proceeding.

A6. **NODE 1 POWERDOWN**

Z1:EPS:DDCU Z13B

DDCU Z13B

sel Converter

DDCU Z13B Converter

'Converter Off'

cmd Off (single step **cmd**, **Arm** not required)

√Output Voltage < 10 volts

Z1:EPS:DDCU Z14B

DDCU Z14B

sel Converter

DDCU Z14B Converter

'Converter Off'

cmd Off (single step **cmd**, **Arm** not required)

√Output Voltage < 10 volts

- A7. Perform 3.5, p. 3—16 **NODE 1 POST FIRE CLEANUP**

SC1 ACTIONS COMPLETE

SC2, SC3 ACTIONS (CONTINUED)

If fireport shows increasing CO levels or if CO reading is > 500 ppm

- B6. Inform SC1 "Perform Node 1 Load Shed."

NOTE
During Load Shed, Node 1 lights will turn off, flashlights will be required. Load shed may take 2 --- 3 minutes to complete.

- B7. On call "Node 1 Load Shed complete" Sample fireport for 5 minutes and record values every 30 seconds in Table 2.

WARNING
1. Wear Gas Mask during/after extinguisher discharge.
2. Discharge may be propulsive.
3. Bottle and nozzle temps will drop below 0° C.

If fireport still shows increasing CO or CO reading is > 500 ppm

- B8. Discharge PFE through fireport.

B9. **EGRESS NODE 1**

If time and circumstances permit,

Remove OCA from Node 1 and all emergency equipment from NOD1P2-14 PEP Locker and NOD1S2-14 PEP Locker (MPLM PEP Locker) per 2.8, p.2—25 **NODE 1 EQUIPMENT SAFING AND RETRIEVAL** procedure

If Orbiter docked,

- Close Node 1 Fwd Hatch per decal.
- √Node 1 Fwd Hatch MPEV – Closed, uncapped
- √Fwd Port and Fwd Stbd IMV valves closed
- Close Node 1 Deck Hatch per decal.
- √Node 1 Deck Hatch MPEV – Closed, uncapped
- √Deck Fwd and Deck Aft IMV valves closed
- √Aft Port and Aft Stbd IMV valves closed
- √Node 1 Aft Hatch MPEV – Closed, uncapped
- Close Node 1 Aft Hatch per decal.

Inform SC1 "Node 1 egress complete," and give status of whether fire is extinguished or not.

- B10. Sample air in PMA1, FGB cabin, and SM cabin. Record readings in Table 2. Relay readings to **MCC** at next communication opportunity.

SC2, SC3 ACTIONS COMPLETE

TABLE 1 - NODE 1 FIREPORT MATRIX

CO Reading	Fireport	Open These RPCs	RPCs Power This Hardware	Powerlines Behind Fireport
	NOD1O1-1	None	RPCM N1RS1, RPCM N14B	PMA1-A/C, RACU 6, A/L-1, DDCU Z14B
	NOD1P0-1	N13B C RPC 14	N1 IMV FWD PORT VLV	PMA1-A/C, RACU 6
	NOD1P1-1	N13B B RPC 02 N14B B RPC 02 N13B C RPC 15	Emer Lt PS N1 3B4B B (<i>Deck Emer Lt Bat Chgr</i>) Emer Lt N1 3B4B B (<i>Deck Emer Lt Bat Chgr</i>) CUP RAMV	PMA1-A/C, MPLM
	NOD1P1-2	N1RS1 A RPC 05 N1RS1 A RPC 06	N1 1 SDO CARD 1A (<i>SDS Deck/Select Vlvs</i>) N1 1 SDO CARD 1B (<i>SDS Fwd Vlv</i>)	PMA1-A/C, MPLM
	NOD1P1-3	N13B C RPC 16	N1 IMV PORT FWD FAN	PMA1-A/C, RACU 6, MPLM
	NOD1D1-1	N13B A RPC 01 N14B A RPC 01	Emer Lt PS N1 3B4B A (<i>FWD Emer Lt Bat Chgr</i>) Emer Lt N1 3B4B A (<i>FWD Emer Lt Bat Chgr</i>)	MPLM
	NOD1D1-2	None	RPCM N1RS2	RACU 5, A/L-1
	NOD1D1-3	None	RPCM N13B	DDCU Z14B
	NOD1S0-1	N13B C RPC 13	N1 IMV FWD STBD VLV	PMA1-B/D, RACU 5, A/L 1
	NOD1P2-11	N14B C RPC 14	N1 IMV PORT FWD VLV	None
	NOD1P2-31	N1RS1 A RPC 06	N1 1 SDO CARD 1B (<i>SDS Stbd Vlv</i>)	A/L-1
	NOD1D2-11	N13B B RPC 16	N1 DECK FWD VLV	None
	NOD1D2-31	N13B B RPC 15	N1 DECK AFT VLV	A/L-1
	NOD1S2-11	N14B A RPC 16	N1 STBD FWD VLV	None
	NOD1OP3-1	N14B C RPC 02	LT INT NOD1OP4	PMA1-A/C, RACU 6, A/L-1
	NOD1P3-1	N14B B RPC 17	N1 CAB FAN	A/L-1
	NOD1P3-2	N14B B RPC 16	N1 RAMV	A/L-1
	NOD1S3-1	N13B A RPC 04	N1 IMV STBD AFT FAN	None
	NOD1S3-31	N14B C RPC 13	N1 IMV STBD AFT VLV	None
	NOD1OS3-1	N13B C RPC 01	LT INT NOD1OS4	PMA1-B/D, RACU 5
	NOD1P4-1	N13B C RPC 02 N14B C RPC 01	Emer Lt N1 3B4B C (<i>Aft Emer Lt Bat Chgr</i>) Emer Lt PS N1 3B4B C (<i>Aft Emer Lt Bat Chgr</i>)	PMA1-A/C, RACU 6
	NOD1P4-2	N14B C RPC 05	N1 IMV AFT PORT VLV	PMA1-A/C, RACU 6
	NOD1P4-3	N14B C RPC 12	N1 IMV AFT PORT FAN	PMA1-A/C, RACU 6
	NOD1PD4-1	N13B A RPC 17	UOP NOD1PD	None
	NOD1SD4-1	N14B C RPC 17	UOP NOD1SD	None
	NOD1S5-1	N14B C RPC 04	N1 IMV AFT STBD VLV	PMA1-B/D, RACU 5

3.4. ISS ATMOSPHERE RECOVERY AFTER FIRE IN RS**NOTE**

Crew location during atmosphere scrubbing process is to be determined by CDR

201 7Кл4 → В СБОРНИК КОНДЕНСАТА (To condensate container)
401 7Кл3 → ЗАКРЫТ (Closed)

ППС-22 ☞ ВВПхО
ППС-24 ☞ ВВПрК

☞ FGB ventilation activation (20 min after FIRE)
☞ SM ventilation activation (automatic in max 30 min after FIRE)

Activate VOZDUKH – Perform RODF: SM СОГС, 6.9 VOZDUKH DEACTIVATION FOR BREAK IN OPERATION and 6.2 VOZDUKH ACTIVATION AFTER BREAK IN OPERATION

☞ БМП activates (automatic 30 min after FIRE) (RODF: SM СОГС, 7 MICROPURIFICATION UNIT (СБМП))

МСС-М activates ФВП in FGB

TEST ATMOSPHERE FOR TOXIC CONTENT (in area of fire)

Perform atmosphere test using CSA-CP, record readings into Table

Perform atmosphere test using Draeger tube air samplers (RODF:

SM СОГС, 11 AIR SAMPLE COLLECTION), record readings into Table

GMT					
Location					
Contaminant concentration		CSA-CP	Draeger tube air samplers		
			1	2	3
CO	200 ppm				
HCl	10 ppm				
HCN	5 ppm				
HF	TBD				
NO ₂	TBD				
NH ₃	TBD				
Formaldehyde	TBD				

1 - Pump counter indication, showing that color is changing

2 - Maximum indication of Draeger tube scale

3 - Pump counter indication with maximum scale indication

Perform air sample collection using adsorbers AK-1M (RODF: SM COFC, 11 AIR SAMPLE COLLECTION) and GSC

Go to safe place (CDR determines crew location during atmosphere scrubbing)
Obtain breathing masks (don them during atmosphere scrubbing) and
Draeger tube air samplers from SM

Shut (but do not latch) hatches:

ПрК(ГА)

Remove ИП-1 on ПрК – СУ (ГА– СУ)

Shut (but do not latch) ПрК – СУ hatch

Shut (but do not latch) ГА– СУ hatch

ПхО

←→ ВД FGB – SM

Remove ИП-1 on ПхО – СУ (FGB)

Shut (but do not latch) ПхО - СУ (FGB) hatch

Isolate USOS:

NODE 1

√ Aft Port (Aft Stbd) IMV vlvs (two) — CL

PMA 1

Close NODE 1 Aft hatch

When scrubbing is complete (after 2 hours) ingress affected module

TEST ATMOSPHERE FOR TOXIC CONTENT:

Perform atmosphere test using CSA-CP, record readings into Table

Perform atmosphere test using Draeger tube air samplers (RODF: SM COFC, 11 AIR SAMPLE COLLECTION), record readings into Table

GMT				
Location				
Contaminant concentration	CSA-CP	Draeger tube air samplers		
		1	2	3
CO	200 ppm			
HCl	10 ppm			
HCN	5 ppm			
HF	TBD			
NO ₂	TBD			
NH ₃	TBD			
Formaldehyde	TBD			

1 - Pump counter indication, showing that color is changing

2 - Maximum indication of Draeger tube scale

3 - Pump counter indication with maximum scale indication

Perform air sample collection using samplers AK-1M (RODF: SM COGC, 11 AIR SAMPLE COLLECTION) and GSC

RETURN SYSTEMS TO NOMINAL OPERATION MODE

ПСС
RS Laptop

◀ ■ FIRE, SMOKE (after sensor is no longer in alarm)

CM:СЖО: Signal-VM

proc: F26_APS_1 (*Fire detection mode Deactivation*)

Execute

proc: F26_APS_0 (*Fire detection mode Activation*)

Execute

On MCC GO:

201 7Кл4 → ЗАКРЫТ (Closed)

401 7Кл3 → В СРБК (To Condensate Water Processor)

Reassemble nominal airduct configuration

ППС-22 ⚙ ВВПХО

ППС-24 ⚙ ВВПРК

Report to MCC

3.5. NODE 1 POST FIRE CLEANUP

TOOLS AND EQUIPMENT REQUIRED

FGB 226	CO2 Removal Kit (CRK) Portable Fan Assy
NOD1S3	CRK Conical Adaptor Assy, LiOH Adaptor
NOD1P4 L2 or	
NOD1D4 D4	LiOH Canisters (2)
NOD1S3	Charcoal/HEPA Filters
FGB 426/427	CSA-CP
NOD1P4 A2	Carbon Dioxide Monitoring Kit (CDMK)
SM 411	AK-1M Russian Air Sampling Kit (2 pipes), including ACCURO Manual Pump, and Grab Sample Containers (GSC)
FGB 103/106	US Portable Breathing Apparatus and/or Russian Isolating Gas Mask (3)
FGB 112/113/226	Wet Wipes, Towels
	Flashlights (2)

MCC-M activate the Harmful Contaminants Filter (ФВП) in the FGB.

1. VERIFYING BREATHABLE ATMOSPHERE IN SAFE HAVEN

SM If the CSA-CP readings taken in PMA1, FGB or SM after SC2, SC3 egressed Node 1 (as called out in Fire In Node 1 or Node 1 Fire Source Location Sampling procedures) are below the levels in Table 1 below, doff PBAs or Russian gas masks.

Table 1. One Hour Contaminant Exposure Levels

GMT		
Location		
Contaminant concentration		CSA-CP readings
CO	200 ppm	
HCl	10 ppm	
HCN	5 ppm	

2. SM VENTILATION ACTIVATION

Verify SM ventilation activation by aural cue (automatically in 30 minutes after FIRE signal)

2.1 Activate the Micropurification Unit (БМП) (RODF: COFC: 7. MICROPURIFICATION UNIT (СБМП)).

2.2 Activate VOZDUKH system.
Perform {6.9 VOZDUKH DEACTIVATION FOR BREAK IN OPERATION} and {6.2 VOZDUKH ACTIVATION AFTER BREAK IN OPERATION}.

3. REACTIVATING NODE 1 SYSTEMS

If any equipment was manually powered off or if Load Shed was initiated
√**MCC-H** for electrical power reactivation steps

4. NODE 1 INGRESS AND DAMAGE ASSESSMENT

4.1 Obtain flashlights, AK-1M Russian Air Sampling Kit and ACCURO Manual Pump, CSA-CP, and CDMK.

Node Aft 4.2 Don US PBA, open Node 1 Aft Hatch per decal, and enter Node 1 with equipment gathered in step 4.1.

Node 1 4.3 Perform damage assessment, noting extent of damage and equipment capabilities lost.

If Charcoal filters are installed in return air registers,

4.4 To install HEPA filters in return duct air registers, perform {[NODE 1 BACTERIA/CHARCOAL FILTER R&R](#)} (SODF: ISS MAL: CORRECTIVE: ISS IFM).

4.5 Perform Node 1 air sample collection using AK-1M and ACCURO Manual Pump.

4.6 Obtain contaminant level readings in Node 1 using CSA-CP and record readings in Table 2.

4.7 To obtain CO₂ level in Node 1, perform {[CARBON DIOXIDE MONITOR: CDM - PERSONAL AND AREA](#)} (SODF: MED OPS: EHS), then: Record levels in Table 2.

4.8 Egress Node 1 and close Hatch per decal.
Doff PBAs if safe haven CSA-CP readings allow.

4.9 Relay damage assessment, readings to **MCC-H** at next communication opportunity.

Table 2.- Node 1 Contaminant Level Readings/GMT

Contaminant	1 Hr Exposure Levels	Step 4.6, 4.7/GMT	Step 6.3, 6.4/GMT	Step 8.3, 8.5/GMT	Step 8.3, 8.5/GMT	Step 8.3, 8.5/GMT
CO	200 ppm					
HCl	10 ppm					
HCN	5 ppm					
CO ₂	N/a					

If damage inspection indicates Node 1 Cabin Fan has been lost, perform {[ECLSS FRP-2: NODE 1 POST FIRE CLEAN-UP FOLLOWING LOSS OF CABIN FAN](#)} (SODF: ISS MAL: CORRECTIVE: ECLSS) >>

5. NODE 1 CABIN FAN ACTIVATION FOR PARTICULATE SCRUBBING

For each Node 1 smoke detector,

PCS

5.1 Node 1: ECLSS: Smoke Detector 1 (2)

Node 1 Smoke Detector 1 (2)

√RPC Position – Closed

'Monitoring'

cmd Inhibit

√Status – Inhibited

'Fire Status'

cmd Reset

Verify Status – blank

5.2 To activate fan, perform {NODE 1 CABIN FAN ACTIVATION/DEACTIVATION}, step 2 (SODF: ISS OPS: ECLSS PROCEDURES), then:

PCS

5.3 Node 1: ECLSS: Smoke Detector 1 (2)

Node 1 Smoke Detector 1 (2)

Note Smoke Detector 1 and 2 initial Scatter readings.

GMT _____ SD1 Scatter _____

GMT _____ SD2 Scatter _____

CAUTION

If Scatter readings increase markedly after fan activation plus 5 minutes, fire has restarted. Perform step 5.5 of this procedure immediately.

5.4 Verify SD 1 and 2 Scatter readings decrease as Cabin Fan runs.

5.5 To deactivate fan when Scatter readings stabilize, indicating that particulate removal is complete, or **ON MCC-H GO**, perform {NODE 1 CABIN FAN ACTIVATION/DEACTIVATION}, step 3 (SODF: ISS OPS: ECLSS PROCEDURES), then:

6. NODE 1 INGRESS AND ATMOSPHERIC SCRUBBING SET UP

6.1 Obtain flashlights, CSA-CP, CDMK, CRK, LiOH Canister, and two Charcoal filters.
Don PBA or Russian Isolating Gas Masks

6.2 Open Node 1 Aft Hatch per decal and ingress Node 1.

6.3 Obtain contaminant level readings in Node 1, using CSA-CP and record readings in Table 2.

6.4 To obtain CO₂ level in Node 1, perform {[CARBON DIOXIDE MONITOR: CDM - PERSONAL AND AREA](#)} (SODF: MED OPS: EHS), then:
Record levels in Table 2.

6.5 Relay CSA-CP and CDMK readings to **MCC-H** at next communications opportunity.

If CO₂ concentration in Node 1 from step 6.3 is greater than 1.3% or 13,000 ppm (10 mmHg at 760 mmHg total pressure), then:

Node 1 6.6 To set up and activate Carbon Dioxide Removal Kit in Node 1, perform {[ECLSS FRP-3: CARBON DIOXIDE REMOVAL KIT ACTIVATION/DEACTIVATION](#)} (SODF: ISS MAL: CORRECTIVE: ECLSS), then:

6.7 To replace starboard side HEPA filters with Charcoal filters, perform {[NODE 1 BACTERIA/CHARCOAL FILTER R&R](#)}, skip steps 1 and 10 (SODF: ISS MAL: CORRECTIVE: ECLSS), then:

6.8 Egress Node 1 and close Hatch per decal.
Doff PBAs if safe haven readings in step 2.1 allow.

7. [NODE 1 CABIN FAN REACTIVATION](#)

7.1 To activate fan, perform {[NODE 1 CABIN FAN ACTIVATION/DEACTIVATION](#)}, step 2 (SODF: ISS OPS: ECLSS PROCEDURES), then:

7.2 To deactivate fan, after a minimum of 5 hours of Cabin Fan run time, or **ON MCC-H GO**, perform {[NODE 1 CABIN FAN ACTIVATION/ DEACTIVATION](#)}, step 3 (SODF: ISS OPS: ECLSS PROCEDURES), then:

8. [NODE 1 INGRESS AND CONTAMINANT LEVEL ASSESSMENT](#)

8.1 Obtain CSA-CP, CDMK, replacement LiOH cannister, and two Charcoal filters, Russian kit AK-1M, ACCURO Manual Pump and Russian Draeger tube air samplers Don PBA or Russian Isolating Gas Masks.

8.2 Open Node 1 Aft Hatch per decal and enter Node 1.

Node 1 8.3 Obtain contaminant level readings in Node 1 using CSA-CP, then:
Record readings in Table 2.

- 8.4 Perform air sample collection using AK-1M, ACCURO Manual Pump and GSC. Perform atmosphere test using Draeger tube air samplers. Record readings into Table 3.

Table 3.- Draeger Tube Assessment

GMT				
Location				
Contaminant concentration		Draeger tube air samplers		
		1	2	3
CO	200 ppm			
HCl	10 ppm			
HCN	5 ppm			
HF	TBD			
NO ₂	TBD			
NH ₃	TBD			
Formaldehyde	TBD			

1. - Pump counter indication, showing that color is changing.
2. - Maximum indication of Draeger tube scale.
3. - Pump counter indication with maximum scale indication.

- 8.5 To obtain CO₂ level in Node 1, perform {**CARBON DIOXIDE MONITOR: CDM - PERSONAL AND AREA**} (SODF: MED OPS: EHS), then:
Record levels in Table 2.

- 8.6 Relay CSA-CP and CDMK readings to **MCC-H** at next communications opportunity.

- 8.7 If CO, HCN, or HCl levels are above the 1 hour Emergency Guidance Concentration levels, or if CO₂ level is above 1.3 % (13,000 ppm) (10 mmHg at 760 mmHg total pressure), then:

To replace starboard side Charcoal filters, perform {**NODE 1 BACTERIA/CHARCOAL FILTER R&R**}, skip steps 1 and 10 (SODF: ISS MAL: CORRECTIVE: ECLSS), then:

Deactivate CRK, replace LiOH cannister, and reactivate CRK.

Egress Node 1 and close Aft Hatch per decal.

Repeat steps 7 and 8 (all).

- 8.8 If CO, HCN, and HCl are below 1 hour Emergency Guidance Concentration High Levels and if CO₂ level is 1.3 % (13,000 ppm) or less:
Egress Node 1 leaving Aft Hatch open.
Doff Breathing masks.

9. RELEASE IMV ISOLATION

PCS

Node 1: ECLSS: FDIR

Node 1 FDIR

'IMV Isolation'

cmd Release

√Node 1-1 MDM IMV Isolation Status – Not Isolated

√Node 1-2 MDM IMV Isolation Status – Not Isolated

NOTE

MCC-H will provide Node 1 Cabin Fan and IMV equipment configuration for steps 10 --- 12.

10. ECLSS HARDWARE RECONFIGURATION**On MCC-H GO**

10.1 To replace starboard side Charcoal filters with HEPA filters, perform {[NODE 1 BACTERIA/CHARCOAL FILTER R&R](#)}, skip steps 1 and 10 (SODF: ISS MAL: CORRECTIVE: ISS IFM), then:

10.2 To activate the fan, perform {[NODE 1 CABIN FAN ACTIVATION/DEACTIVATION](#)}, step 2 (SODF: ISS OPS: ECLSS PROCEDURES), then:

11. REESTABLISHING USOS – RS INTERMODULE VENTILATION**On MCC-H GO**

11.1 To open the Node Aft Port and Node Aft Stbd Valves, perform {[NODE 1 IMV VALVE RECONFIGURATION PRE CCS](#)}, step 2 (SODF: ISS OPS: ECLSS PROCEDURES), then:

11.2 To turn on the Node Aft Port Fan, perform {[NODE 1 IMV FAN ACTIVATION/DEACTIVATION PRE CCS](#)}, steps 1 and 2 (SODF: ISS OPS: ECLSS PROCEDURES), then:

PMA1 11.3 √Grille Cover – Closed

12. MANUAL CLEAN-UP OF NODE 1

Node 1

12.1 Clean fluids, particulates, and soot from interior of Node 1 using materials such as Wet Wipes, towels, etc. and discard into Progress.

4. TOXIC RELEASE

4.1. TOXIC RELEASE RESPONSE (1.701)

LEVEL 4 (RED) MOST HAZARDOUS RELEASE (NONCONTAINABLE)

R1. Notify crew and **MCC** "Identify module(s) affected by release."

If shuttle crew in ISS

Inform shuttle crew to return to shuttle.

Close PMA APAS Hatch.

SM Pnl R2. ATM pb – press
338(FGB
Pnl 429,
Russian
Laptop)

CCPK R3. All crew don/activate emergency breathing apparatus and Silver Shield Gloves.

R4. Check **MCC** for Russian Segment steps.

R5. Check **MCC** in order to activate charcoal-based systems.

R6. If SM PO compartment affected by release
Perform 4.2, p. 4—5 **ISS EMERGENCY EGRESS**

R7. Isolate affected modules from ISS.

Level 3 (ORANGE) Actions on Next Page

LEVEL 3 (ORANGE) HAZARDOUS RELEASE (CONTAINABLE)

O1. Notify crew and **MCC** "Identify module(s) affected by release."

If shuttle crew in ISS

Inform shuttle crew to return to shuttle.

Close PMA APAS Hatch.

SM Pnl O2. ATM pb – press
338(FGB
Pnl 429,
Russian
Laptop)

CCPK O3. All crew don/activate emergency breathing apparatus and Silver Shield Gloves.

O4. Clean up spill with Dry Wipes.
Bag, label, discard.

O5. Check **MCC** for Russian Segment steps.

If cleanup fails, elevate release to Level 4 >>

O6. Deact/doff emergency breathing apparatus', gloves.
Discard gloves.

O7. Inform other crew, **MCC** – "Spill cleaned up."

Level 2 (YELLOW) Actions on Next Page

LEVEL 2 (YELLOW) HAZARDOUS RELEASE

Y1. Notify crew and **MCC** “Identify module(s) affected by release.”

SM Pnl Y2. ATM pb – press
338(FGB
Pnl 429,
Russian
Laptop)

CCPK Y3. All crew in vicinity don goggles, surgical masks, Silver Shield Gloves.

Y4. Clean up spill with Dry Wipes.
Bag, label, discard.

Y5. Check **MCC** for Russian Segment steps.

If clean up fails, elevate to a Level 4 release >>

Y6. Doff goggles, surgical masks, and gloves.
Discard gloves.

Y7. Inform other crew, **MCC** – “Release cleaned up.”

Level 1 (BLUE) Actions on Next Page

LEVEL 1 (BLUE) LEAST HAZARDOUS RELEASE

B1. Notify crew and **MCC** "Identify module(s) affected by release."

SM Pnl B2. ATM pb – press
338(FGB
Pnl 429,
Russian
Laptop)

CCPK B3. If required, all crew in vicinity don goggles, surgical masks, Latex gloves.

B4. Clean up spill with Dry Wipes.
Bag, label, discard.

B5. Check **MCC** for Russian Segment steps.

B6. If required, doff goggles, surgical masks, gloves.
Discard gloves.

B7. Inform other crew, **MCC** – "Release cleaned up."

LEVEL 0 (GREEN) NONHAZARDOUS RELEASE

G1. Notify crew and **MCC** "Identify module(s) affected by release."

CCPK G2. Clean up spill with Dry Wipes.
Bag, label, discard in wet trash.

G3. Check **MCC** for Russian Segment steps.

4.2. ISS EMERGENCY EGRESS (1.501)PMA2(3) (SHUTTLE DOCKED OPS ONLY)

- ODS Vestibule
1. Disconnect ISS/Shuttle Extension ducting.
Stow in PMA2(3).
 2. Remove Docking Target Baseplate Cover.
Install Docking Target Standoff Cross by hand.
Stow cover and Docking Target Standoff Cross Bag in PMA.
- PMA2(3)
3. Clear hatchway and close PMA2(3) APAS Hatch with APAS Hatch Tool.
 4. PMA2(3) APAS MPEV → CLOSE

RUSSIAN SEGMENT

5. √MCC

4.3. ISS CONTINGENCY EGRESS (1.401)PMA2(3) (SHUTTLE DOCKED OPS ONLY)

- ODS 1. Disconnect ISS/Shuttle Extension ducting
Stow in PMA2(3)
2. Remove Docking Target Baseplate Cover
Install Docking Target Standoff Cross by hand
Stow cover and Docking Target Standoff Cross Bag in PMA
- PMA2(3) 3. Clear hatchway and close PMA2(3) APAS Hatch with APAS Hatch Tool
4. PMA2(3) APAS MPEV → CLOSE

US LABORATORY

- Fwd 5. Clear hatchway and close Lab Fwd Hatch per decal.
- Aft 6. √Lab Aft Port, Aft Stbd IMV vlvs (two) – OPEN
7. Clear hatchway and close Lab Aft hatch per decal.
8. √Lab Aft MPEV – CLOSED, capped

NODE 1

- Deck 9. Clear hatchway and close Node 1 Deck Hatch per decal. |
10. √Node 1 Deck MPEV – CLOSED, uncapped
- Stbd,
Port 11. √PPRVs (two) – uncapped
- Aft 12. √Aft Port, Aft Stbd IMV vlvs (two) – OPEN
- PMA1 13. Clear hatchway and close Node 1 Aft Hatch per decal.

RUSSIAN SEGMENT

14. √MCC

5. VERIFYING ISS READINESS FOR EMERGENCY EGRESS

(On MCC GO) (t = TBD)

Verify integrity of all hatch rubber seals and hatch restraints in the hatchway
(if the hatches are not nominally secured, remove them and install on nominal restraints)

If there are any temporary cables running between compartments, remove them at earliest opportunity

Compare pressure readings on pressure gauges [MB] located in БО_____, FGB_____, SM_____
Report results to MCC

[CA] Check Sokols:
glass visors are protected with cloth shrouds, gloves are placed into Sokol pockets
Sokols are unfolded and stowed in nominal locations

SOYUZ: Нештатные ситуации — prominent location

√ КВД СА-БО — ЗАКР (Close)

БО √ КСД БО — ЗАКР (Close)
√ КВД БО-СУ — ОТКР (Open)
√ ККС-ККТ — ЗАКР (Close)

Verify hatch tool with adapter — next to БО-СУ hatch

КСД cap → ← fitting labeled МЕСТО ЗАГЛУШКИ КСД

EMERGENCY OPERATIONS (ДАС ЭО) book — prominent location

ГА √ КВД ГА-ТК — ELECTRIC
√ ККТ — CLOSED, cap ЗГ19 → ← ККТ

√ КВД ГА-NODE1 — ELECTRIC
√ ККТ — CLOSED, cap ЗГ19 → ← ККТ

Verify protective cover — ГА-РМА 1 hatch

√ КВД ГА-ПГО — CLOSED

Verify ОСП-4 status and attachment fixtures (ГА port)
ИПК status and attachment fixtures (ГА overhead)

ПГО √ КВД ПГО-ГА — ELECTRIC

√ safety ring — ПГО-ГА hatch

Verify ОСП-4 status and attachment fixtures (2 pcs – panels 404, 229)
ИПК status and attachment fixtures (2 pcs – panels 404, 230)

Pressure gauge [MB] is behind panel 407

Verify hatch tool with adapter — kit labeled
ПРИНАДЛЕЖНОСТИ СтА (Docking Assembly Accessories) (panel 230)

√ КВД ПГО-СМ — ELECTRIC
√ ККТ — CLOSED, cap 3Г19 →← ККТ

ПхО

√ КВД ПхО-СУ(FGB) — ELECTRIC
√ ККТ — CLOSED, cap 3Г19 →← ККТ
Verify protective cover — ПхО-СУ (FGB) hatch

√ КВД ПхО-СУ(SPP) — CLOSED
√ ККТ — CLOSED, cap 3Г19 →← ККТ

√ КВД ПхО-СУ(UDM) — CLOSED
√ ККТ — CLOSED, cap 3Г19 →← ККТ

√ КСД ПхО — CLOSED

√ КВД ПхО-РО — CLOSED

[РО]

√ КВД РО-ПхО — ELECTRIC

Verify ОСП-4 status and attachment fixtures (2 pcs – panels 408, plane IV, next to
ПрК hatch), ИПК status and attachment fixtures (3 pcs – panels 421, 221)

EMERGENCY OPERATIONS (ДАС ЭО) book (2 copies) — prominent location

Pressure gauge [MB] — pnl 449

√ КВД РО-ПрК — ELECTRIC

√ safety ring — РО-ПрК hatch

ПрК

Verify hatch tool with adapter — in kit labeled
ПРИНАДЛЕЖНОСТИ СтА (Docking Assembly Accessories)

√ КВД ПрК-РО — ЗАКР (Close)

√ КВД ПрК-ТК — ЭЛЕКТ УПР (Electrical Control)
√ ККТ — ЗАКР (Close), cap 3Г19 →← ККТ

Progress

Verify status of ТКГ-СМ interface clamps (if present)

КСД cap →← fitting labeled МЕСТО ЗАГЛУШКИ КСД

NODE 1 SYSTEMS CONFIGURATION

PEP Locker	√No obstruction to locker.
Fwd, Aft Hatch	√MPEV(two) – CL, uncapped.
Deck Hatch	√MPEV – CL, capped(pre-4A), uncapped(post-4A).
Ovhd Hatch	√MPEV – CL, capped
Aft Hatch	Remove transient cables through hatchway at the first opportunity.
Port, Stbd Hatch	√PPRV – NORMAL, uncapped(pre-5A) √PPRV – capped(post 5A) √PPRV Sample Port Valve – CLOSED, capped
NOD1 D4_D1	√PPRV caps location in locker(Pre-5A only) Perform US PORTABLE FIRE EXTINGUISHER (PFE) INSPECTION (SODF : ECLSS) for Node 1. Perform inspection of Node 1 fire ports by verifying accessibility and no obstructions. See Figure 1-5 for Node 1 fire ports. Perform US PORTABLE BREATHING APPARATUS (PBA) INSPECTION (SODF : ECLSS) for Node 1.

LAB SYSTEMS CONFIGURATION

PFE and PBA Locker	√No obstruction to locker.
Aft Hatch	√MPEV(two) – CL, uncapped.
Fwd Hatch	√PPRV - capped √PPRV Sample Port Valve – CLOSED, capped
Aft Hatch	Remove transient cables through hatchway at the first opportunity. Perform US PORTABLE FIRE EXTINGUISHER (PFE) INSPECTION (SODF : ECLSS) for Lab. Perform US PORTABLE BREATHING APPARATUS (PBA) INSPECTION (SODF : ECLSS) for Lab. Perform RACK FIRE INDICATOR TESTING (SODF : ECLSS)

6. SCHEMATIC OF RESPONSE TO DEPRESS

