

survitec

# F-35 PILOT FLIGHT EQUIPMENT

FIT FOR THE WORLD'S MOST ADVANCED  
5TH GENERATION WARFIGHTER



# THE BEATING HEART OF THE F-35 PROGRAM

**The F-35 Lightning II Program was established to create the world's foremost multi-role warfighter. A new, faster, smarter and more lethal platform capable of meeting the stringent demands of all branches of the Military, including Navy, Air Force and Marines.**

In order to harness this revolutionary technology Survitec were selected, following competitive down selection in 2003, to provide the next generation of pilot flight equipment (PFE). This was to simultaneously maximise protection against all potential hazards and fully optimize pilot stamina, strength and cognitive decision making. Leveraging over 90 years expertise and experience gained on other multinational aircraft programs, Survitec employed a complete system approach, developing a new fully integrated, modular solution. Survitec F-35 PFE was proven to grant pilots significant performance

improvements over the current legacy equipment whilst introducing a new level of sustainment and reduced maintenance burden.

Today, Survitec protect every pilot operating globally. We protect every life that steps inside an F-35 aircraft, through the application of innovation, applied to create a safer, more efficient suite of equipment. We are there at the beginning of their journey and through every critical step, from the assessment and delivery of their own perfect fitting PFE, to familiarisation training, escape procedures and through-life sustainment.





Protecting every  
F-35 pilot,  
operating globally



# DELIVERING INCREASED PILOT PROTECTION AND PERFORMANCE

## Lethality

- Reduced fatigue & increased performance
- Significantly reduces physiological workload

## Affordability

- Over double the lifespan of current legacy
- Lowest through-life cost available today

## Supportability

- Through-life support, from fitting to aircraft integration and in-service sustainment
- Qualified and selectable multi-mission equipment from a common ensemble

## Survivability

- Only system certified to 600 knots keeping pilots safe during rapid escape manoeuvres
- Qualified for 103 - 245lbs, case 1 – 8 accommodating a broader range of pilot types



Survitec is a world leading design authority of PFE. Over our 90 years' experience we have developed an unrivalled, flexible, global supply network for the provision of through-life capability for aircrew protection and survival equipment. Our extensive research and development facilities offer multi-disciplined design capability to meet every demand from initial concept to testing, qualification, manufacture, delivery and support. Survitec continues to provide robust and cost effective PFE through a combination of product advancements, efficient supplier network management and unparalleled in-service support.

The Survitec F-35 PFE offers significant advancements over legacy solutions, such as greater UV solar protection, optimized cockpit integration and stringent laundering tolerance. Our

unique modular approach enables garments to be integrated to provide multi mission capability from a common ensemble. Each garment has been designed using the latest anthropometric data available. These have been used to develop a sizing methodology applied to all processes.

## 100% BERRY Compliant

We employ over 3000 individuals worldwide dedicated to delivering safety and survival solutions. Our F-35 manufacturing facility in Ohio, US ensures customer specific design, development and certification services are achieved each and every time. Maintaining the highest quality standards, Survitec is approved to numerous global standards including ISO9001 approval.

# FULL RANGE OF QUALIFIED SELECTABLE EQUIPMENT FOR EVERY MISSION PROFILE

EQUIPMENT	SUMMER	SUMMER CHEMICAL & BIOLOGICAL	WINTER	WINTER CHEMICAL & BIOLOGICAL	FEATURES/BENEFITS
<b>Cooling Garment</b>	Optional	Optional	Optional	Optional	Reduced fluid loss, less fatigue, reduced thermal burden. High laundering tolerance – 300+ cycles.
<b>Thermal Protection Layer</b>		X	X		Lightweight and comfortable 4-way stretch material. Retains thermal protection post laundering.
<b>Lightweight Coverall c/w AREL</b>	X				Arm restraint system, restrains arm on ejection. Over 2000lbs maximum load achieved post 150 washing cycles.
<b>Cold Water Immersion Garment</b>			X	X	Lightweight, moisture vapor permeable (fully integrated with the CB liquid cooling system) optimized for fast jet applications.
<b>Flight Use Protective Layer</b>	X		X		Lightweight hermetically sealed, optimized for fast jet applications.
<b>Lower G Garment (Skeletal/Full Coverage)</b>	X	X	X	X	Higher burst pressure than current PFE after stringent combination qualification tests. Skeletal 75,355 cycles, burst pressure over 26 psig. Full Coverage 107,650 cycles, burst pressure over 24 psig.
<b>Sleeved &amp; Sleeveless Flight Jacket/LPU/ARS</b>	Optional	X	X	X	Low maintenance, economical lightweight. Automatic Inflation Unit negates the need for a JSAM carrier waistcoat. Integrates with JSAM and all pilot mounted hardware.
<b>Breathing Gas Hose Assembly</b>	X	X	X	X	Flexible and adjustable.
<b>Boots</b>	X	X	X	X	High impact toe protection variant on customer request. Dual density soles to improve durability and provide shock attenuation.
<b>Pilot Cooling Unit</b>	X	X	X	X	Extends mission duration. Portable, first of its kind for fast jet applications
<b>HMD Transit bag</b>	X	X	X	X	Protects HMD and visor against damage and moisture.
<b>Single Seat Liferaft</b>	X	X	X	X	Excellent thermal properties. Extremely compact and lightweight design for compatibility with ejection seats and other space-critical platforms*

\*Stowed in the Seat Survival Kit and donned post ejection



Summer



Summer Chemical & Biological



Winter

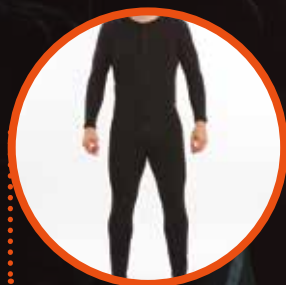


Winter Chemical & Biological

# SURVITEC F-35 PILOT FLIGHT EQUIPMENT



COOLING GARMENT



THERMAL  
PROTECTION LAYER



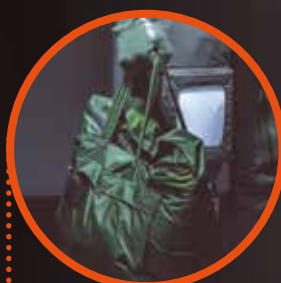
ARM RESTRAINT



FLIGHT JACKET,  
SLEEVED/SLEEVELESS



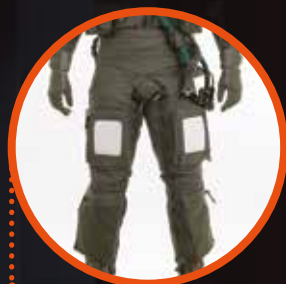
BREATHING GAS  
HOSE ASSEMBLY



HMD TRANSIT BAG



SKELETAL  
ANTI-G TROUSERS



FULL COVERAGE  
ANTI-G GARMENT



PILOT COOLING  
UNIT



BOOTS,  
STEEL/NON-STEEL TOE

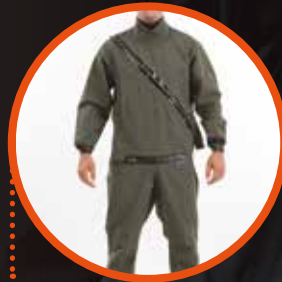




NOTE:  
Helmet shown  
for reference  
purpose  
only



LIGHTWEIGHT  
COVERALL



COLD WATER  
IMMERSION  
GARMENT



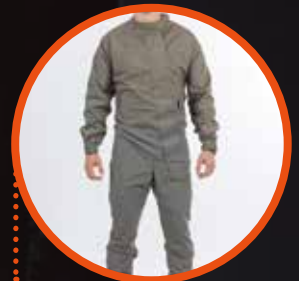
COLD WATER  
IMMERSION COOLING  
GARMENT BREAKOUT



SINGLE SEAT  
LIFERAFT



BREATHING GAS HOSE  
ASSEMBLY, CHEMICAL  
& BIOLOGICAL



CHEMICAL & BIOLOGICAL  
PROTECTIVE LAYER



CHEMICAL & BIOLOGICAL  
PROTECTIVE LAYER  
(TRANSIT USE, OPTIONAL)

“  
**Modular, fully integrated and  
interchangeable for maximum  
readiness and effectiveness**  
”

# FROM MISSION, TO HOME

HOLISTIC PROTECTION ACROSS AIR, LAND AND SEA



Image courtesy of Martin Baker

## G-PROTECTION

A fully optimised system, working in unison to protect up to 9g+

## SAFE EJECTION

An ensemble designed to perform & protect at 600knots





# SEA SURVIVAL

First-rate life preserver offering 350NB with single seat liferaft

# SERE

Over 15 critical modular pockets that will aid escape and evasion procedures

# UNPARALLELED TECHNICAL CAPABILITY

## FOR A FULLY QUALIFIED, TRIED AND TESTED SOLUTION

**Survitec has a high competency in the innovative design, integration, qualification and servicing of Pilot Flight Equipment. We employ a market leading qualification program which surpasses the current levels of testing conducted on PFE.**

We are the only company to employ simultaneous combination testing, resulting in a new standard of product integrity. Qualification of F-35 PFE has included over 100 ejection tests, UV exposure, ozone testing, rapid and explosive decompression testing and temperature testing.

**Survitec F-35 PFE has been tested and qualified to the highest standards including:**

- PFE cleaning
- Ozone testing
- LGG endurance
- Pocket packing trials
- BGHA gas leakage
- LPU allowable leakage
- CG operating pressure/proof/burst/fluid migration
- Storage temperature conditions
- Surrounding air pressure and temperature altitude
- Transient temperatures
- Solar radiation and sand & dust
- Humidity and moisture

- Sulphur & nitrogen and salt sea
- Fungus testing
- Vibration/random/gunfire
- Fragility/transit shock
- Fluids contamination
- Limit loads
- Ejection testing
- Cockpit integration: CB, ground/flight operation, comfort and mobility, aircraft ingress/egress and emergency egress
- Man rating
- In water performance
- Thermal protection and thermal burden
- Parachute suspension trials
- Land and sea dragging
- Winching trials
- Cyclic endurance DON / DOFF
- Crash loads

**In-House testing facilities include:**

- Stratospheric chamber
- Thermal chamber
- Environmental test chamber
- Explosive decompression chamber
- Low pressure pneumatics lab
- Simulated breathing facility
- Centrifuge rate up to 25g
- Harness test rigs – up to 60g
- Materials testing facilities lab
- Extensive anthropometric databases



**Over 100 ejection tests completed**

# TOTAL COMPATIBILITY WITH ALL MAJOR FAST JET PLATFORMS

## THE F-35 STANDARD, ON EVERY FLIGHT

F-35 PFE is the most advanced pilot flight equipment (PFE) in the world. Designed specifically to meet the high operating requirements of the F-35 aircraft, the F-35 ensemble has set a new standard in pilot protection and performance, with a large number of critical advancements over Legacy PFE. This includes superior GLOC performance, intelligent thermal management, best in class comfort, and stringent laundering tolerance equating up to 2.5x the lifespan of Legacy.

From its inception the F-35 PFE philosophy focused heavily on platform compatibility to ensure pilots operating on all major fast jet programmes could benefit from the same high standard achieved through the 5th generation F-35 Lightning II. As a result Survitec has the experience, expertise and capability to harmonise the F-35 PFE to all major in-service fast jet platforms where required.



# ASSET READINESS ASSURED

## Survitec AGILE+

Specifically developed to support F-35 Pilot Flight Equipment, Survitec AGILE+ is a web based secure data environment to facilitate selection, management and logistical support. In order to ensure low costs and flight readiness, the Agile Communication Environment provides instant seamless logistical support worldwide. Designed to integrate with the F-35 program data management tool, Survitec AGILE+ provides worldwide online management via secure web connections.

AGILE+ enables users to record pilot bio-measurements, automatically select sized equipment, track usage and schedule maintenance throughout its full life cycle.

- No distributed software, totally web driven.
- Pilot anthropometric data is captured securely
- Predicts sizing of individual items
- Tracks orders in maintenance process by location
- Automatic notification of required maintenance/certification
- Online manuals and maintenance schedules



## Pilot Fit facility

Utilizing many years of flight equipment experiences from prior services in the USAF, USMC and RAF, the Survitec are deployed at LM PFF in the US. Personnel are all veterans of the life support career field.

Each pilot is fitted and kitted with PFE including measuring/ marking of the Oxygen Gas Breathing and Anti G-Suit hoses as well as the fitting of the Arm Restraint Extension lines. All schedules and configurations are then tested in the dedicated F-35 ejection seat at the facility. Every pilot leaves the facilities with their 'Perfect Fit' PFE, which is a key enabler allowing them to optimise performance safely.





# THE PERFECT FIT

Designed especially for the F-35 program, The first of its kind, Perfect Fit ensures pilots are kitted out faster, understand every element of their equipment, and have a flight suit designed to their exact measurements. Standard aviation suits that do not fit properly can be dangerous. Each garment needs to fit the pilot's individual physique otherwise it won't function to its fullest. An improperly fitted anti-G suit will not provide the appropriate protection or inflation pressure to protect the pilot against the different forces of G. This can result in G-LOC or create in-flight distractions.

Survitec gathers and analyzes numerous anthropometric measurements to ensure the warfighter benefits from maximum comfort and highest level of protection. Completing this task at the Pilot Fit Facilities (PFF) is a two-day process for pilots and their PFE will be declared fit for flight within a matter of days.



## STAGE 1-2



1

Pilot anthropometrics are recorded

Predicted fit is validated and ejection seat integration checked

Order processed using AGILE+ software and pilot data captured



## STAGE 3-4



4

Kit is picked and packed then shipped to PFF

Kit is inspected, sizes validated, serial no's logged.

Equipment assembly begins



**PERFECT FIT  
REDUCES  
LEADTIME FROM  
WEEKS TO DAY**

## STAGE 5-8



Equipment is assembled, tailored and made operationally ready

Finite adjustments are made for pilot



## STAGE 8-10

Once assembled, the kit is declared 'ready for pilot fitting'

Certificate of Conformity is dated and signed



Pilot returns for final check

Squadron collects kit and pilot is ready for flight

5

6

7

8

9

10



# TOTAL SAFETY, FROM THE PILOT TO AIRCRAFT

## SURVITEC F-35 GROUND SUPPORT SERVICES

Utilising both our broad engineering capability and extensive global service network, Survitec offer a full ground support equipment (GSE) maintenance service for the F-35 aircraft. The service entails an inspection, evaluation, maintenance and repair of all critical GSE, with work conducted either on base if required, or at a Survitec maintenance hub. Our facilities are staffed by specialist GSE engineers with comprehensive experience in military platform repair and maintenance.

Survitec currently support UK based F-35 GSE from a single maintenance hub in Great Yarmouth, managing repair & maintenance capabilities against defined GSE requirements. The Survitec station is strategically located less than 1 hour from central F-35 bases in the UK, and can accommodate a 24 hour turnaround when necessary.













## GET IN TOUCH

### **SURVITEC**

1-5 Beaufort Road, Birkenhead, Merseyside, CH41 1HQ

**T:** +44 (0) 151 670 9009 **F:** +44 (0) 151 670 0958

**Email:** [info@survitecgroup.com](mailto:info@survitecgroup.com)

**[www.survitecgroup.com](http://www.survitecgroup.com)**

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