



Bandera

Agricultural film

Our history

1947

Luigi Bandera officially established the company and started the history of extrusion in Italy

1950

Costruzioni Meccaniche Luigi Bandera became a joint stock company, scaling up its activities to become an industrial concern

1960/70

Costruzioni Meccaniche Luigi Bandera experienced a remarkable industrial growth developing a wide and diversified range of extrusion products

1980/90

Costruzioni Meccaniche Luigi Bandera was acknowledged as one of the leading companies in the extrusion sector of both Blown Film and Sheet, in Italy and worldwide

2015/2016

Opening of the House of Extrusion, 3000 m² housing R&D and test-running activities on complete production lines

Today

Bandera focuses on Blown Film and Flat Die extrusion technologies, offering customized engineering services and an after-sales global network

Bandera top numbers

since 1947

experts in extrusion

15,500

active clients
all over the world

35,000

extruders installed
running worldwide

100%

in house design
and manufacturing

55,000

m² production sites

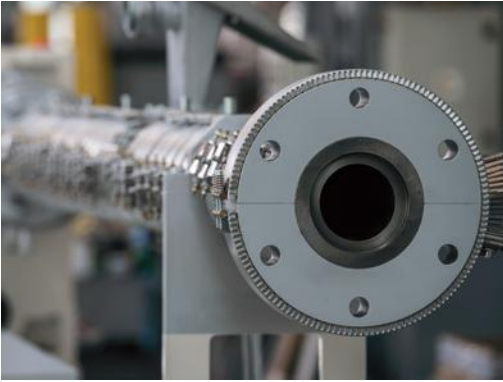
54,000 †

of extruded polymers
per day

205 employees

75% technical
background

Bandera: highest quality in extrusion



Product line shares



Blown
Film lines



Rigid Film
and Sheet
lines



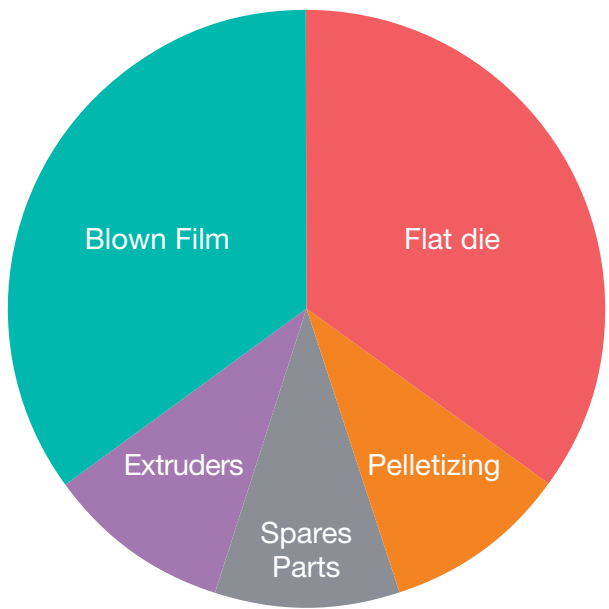
Extrusion
lines



Spare
Parts



Pelletizing



Source: internal data as of January 2019

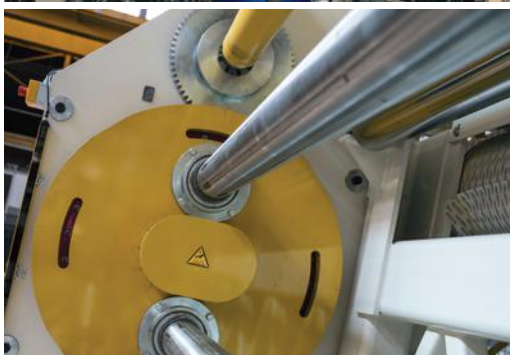
Bandera Blown Film Technology for flexible packaging and converting

Smart Flex® lines (1 and 5 layers) competitive investment, maximised flexibility, power consumption reduction, functional and compact layout

Techno Flex® lines for multi-layer film (3 and 5 layers) with top performances

Barrier Flex® lines for the high-barrier film (7, 9 and 11 layers)

HDB Flex® lines for the production of FFS industrial bags



Agri and Geo lines

Bandera is worldwide leader in the production of
complete multilayer Blown Film big plants
dedicated to **Agricultural Film** and **geomembrane**.

Agri FutureFilm® Blown Film lines for agricultural film
Geo FutureFilm® Blown Film lines for geomembrane

AGRI
FUTUREFILM® 

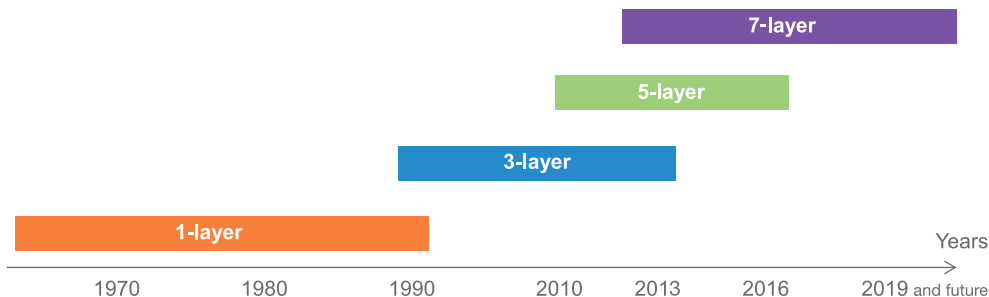
GEO
FUTUREFILM® 

Latest market trends on Agricultural Film

A

Increasing number of layers

To take the advantage of the use of a wide range of material and optimising production costs.



B

Continuous research for improving performances

Extruders for Agri FutureFilm®

Screw diameter

from 75 to 220 mm

Standard L/D ratio

30

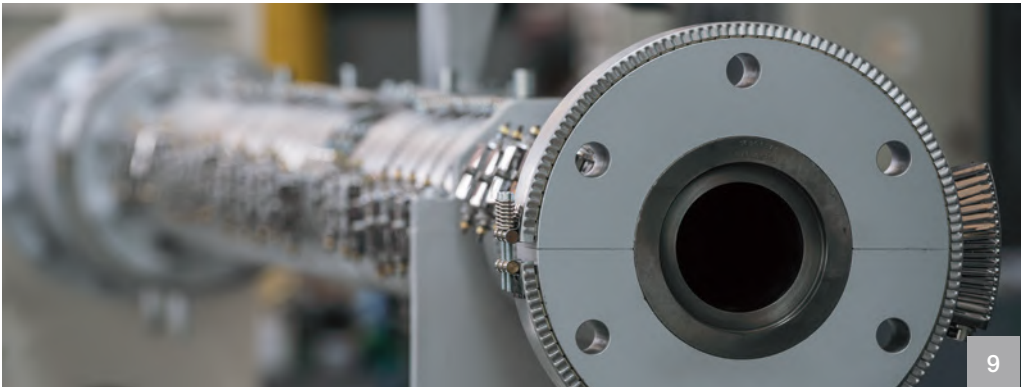
Production output

from 200 ÷ 1600 kg/h

Screw design studied in according to the rheological and thermal properties of the processed material.

Better thermoregulation system studied to grant the best possible condition for the processed material.

Possible **solution for the injection of liquid PIB** for the production of silo-stretch.



Die heads: the heart of the process

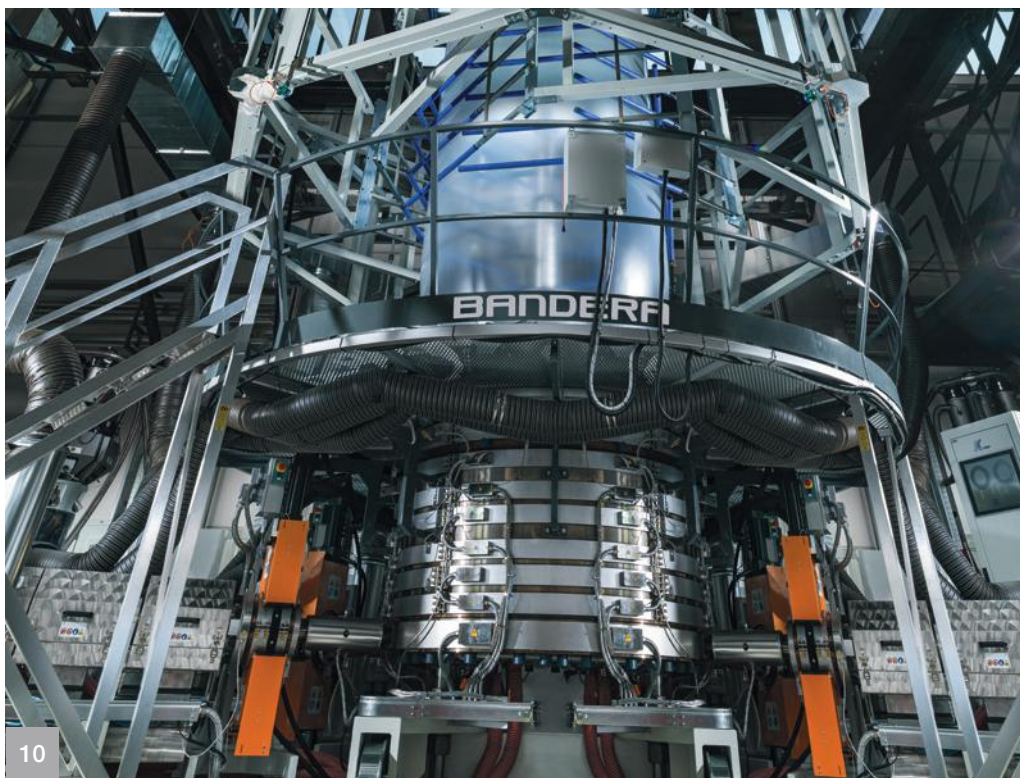
Number of layers 1-3-5-7

Die diameter

- up to 2500 mm

Film width

- up to 24 m according to raw materials and thickness



Haul-off units

Oscillating haul-off

up to 4300 mm rollers width

Fixed haul-off

up to 8500 mm rollers width

Special fixed haul-off

to process both agricultural film and geomembrane

Flattening and gusseting devices

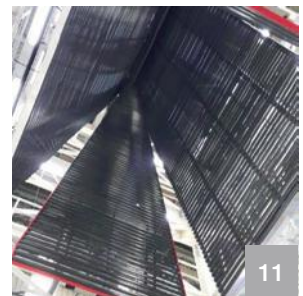
Collapsing and **gusseting** devices
long 8 to 24 m

Gusseting devices with
independent top/bottom/tilting
and tip adjustment system

**Device with fully automatic
motorised** control

Wide variety of different material
solutions

- wooden slats
- aluminum rolls
- carbon fiber rolls
- special polymer slats
- special combination



Winders for Agricultural Film

Fully automatic winders (new ASN series)

Surface/axial/combined

winding mode

Film width

from 2500 to 5500 mm

Mono or double station

face-to-face or back-to-back solutions

Shaftless winder (new TA series)

Suitable mainly for **small length rolls**

Film width

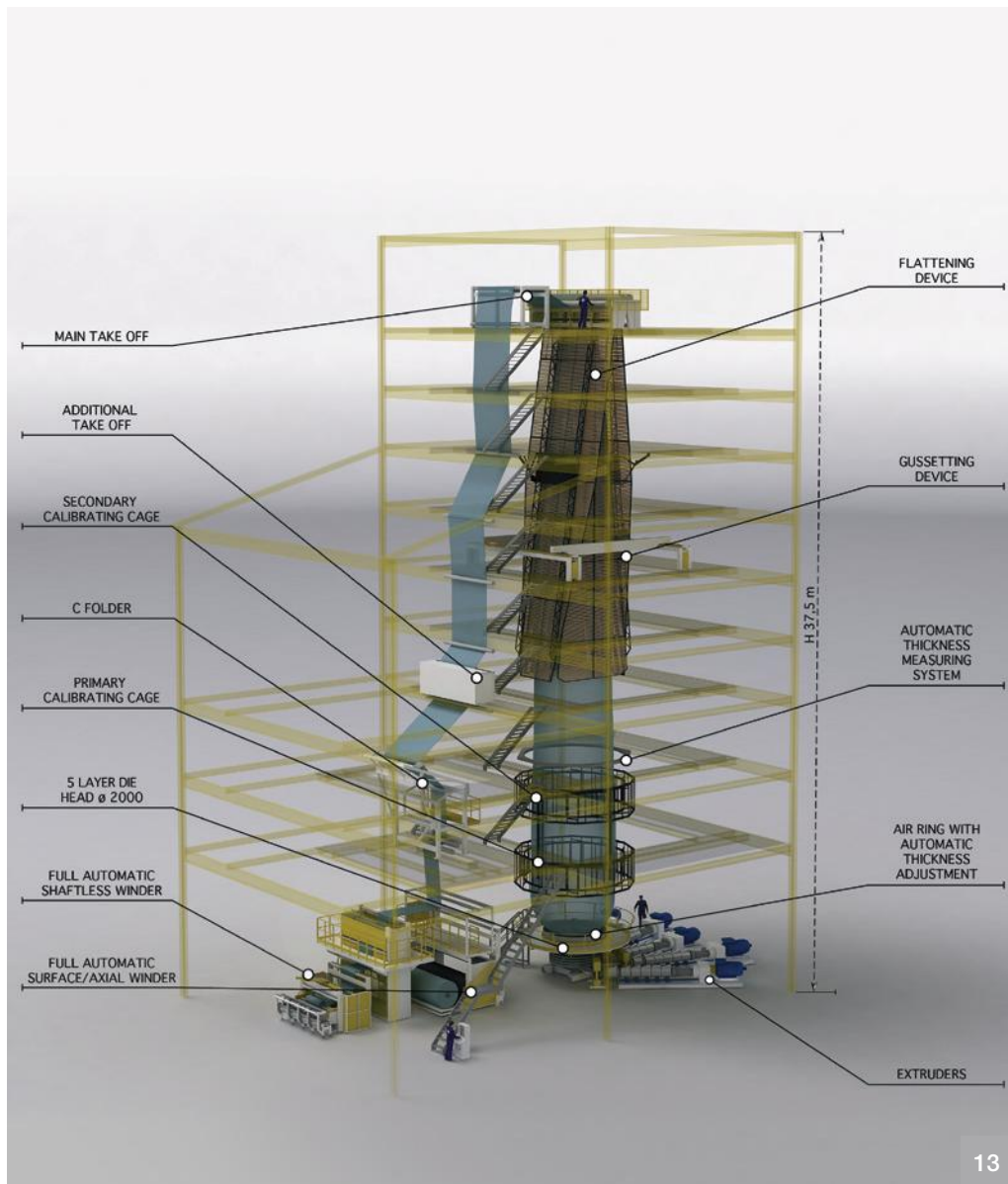
from 2500 to 5500 mm

High efficiency

up to 30 roll changes/hour



5 and 7 layers Blown Film concept for Agricultural Film



Wide variety of Agricultural Films

Greenhouse cover film

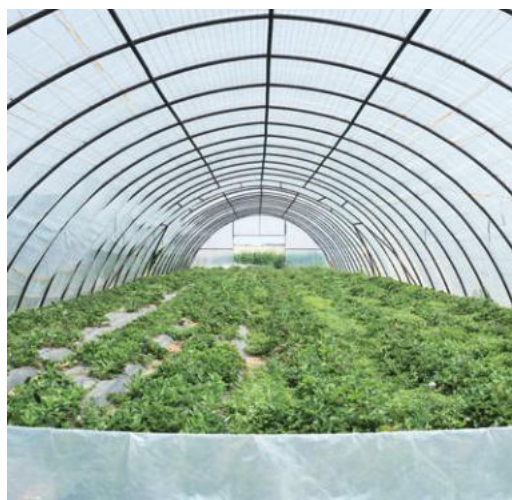
Silo-bags and silage film

Silo-stretch film

Fumigation film

Mulch film

Low walk-in tunnel film



Greenhouse cover film

Applications

Greenhouses film from 6 m to 24 m open width

Protection against sun, wind and rain

Suitable for temperature/humidity control

Crops protection greenhouse effect

Earlier harvests and higher yields

Film main characteristics

- **Thickness** 120 to 250 μm
- **Duration** 2 to 4 seasons
- **Layers** mainly 3 and strong trend to 5 & 7 layers

Polymers

- LDPE, LLDPE, mLLDPE
- EVA + charge + anti-UV additives
- PA for barrier and mechanical properties



Silo-bags and silage film

Applications

Temporary silos, liners for soya and grain storage facilities, ground sheets and bale covers.

Silage of grass, corn: storage away from oxygen (PE film) to speed up fermentation.

Film main characteristics

- **Thickness** 120 to 250 μm
- **Duration** 2 to 4 seasons
- **Layers** mainly 5 and strong trend to 7 layers

Polymers

- LDPE, LLDPE, mLLDPE
- EVA + charge + anti-UV additives
- PA for barrier and mechanical properties



Silo-stretch film

Applications

Wrapping silage of hay storage away from oxygen in wrapped bales using a stretchable film.

Film main characteristics

- **Thin films** 15 to 23 μm
- **Duration** 1 or more years
- **Number of layers:** 3 - 5 and strong trend to 7 layer film

Polymers

- LLDPE (C8) + tackifier agent (PIB)
- EVA (%VA > 18%); also VLLDPE as tackifier liquid PIB injection from back of the screw



Fumigation film

Applications

Soil fumigation reduction in the use of fumigants such as methyl bromide by trying to break the emissions during the treatment and keep more active gas in the soil using plastic films more gastight VIF/TIF films.

Film main characteristics

- **Thickness:** 20 to 30 μm

Polymers

- LDPE - PA - EVOH



Mulch film

Applications

Mulch film conservation soil moisture and water management + reduction of weed growing and thermal (transparent films).

Raise soil temperature for better and earlier crops.

Film main characteristics

- **Thickness** 15 to 50 μm
black/transparent/coloured
12 μm photo-degradable
films: corn, cotton
- **Layers** 3, 5 and 7-layer film for
longer life

Polymers

- LD/LLDPE + carbon black
- **Thin films** with mLLDPE
(> 40 %) blends
- EVA for thermal
and special applications
- Compostable resins



Low walk-in tunnel film

Applications

Protection against wind, rain, thermal variations

Crop protection greenhouse effect

Earlier crops

Late crops

Film main characteristics

- **Thickness** 60 to 120 μm
- **Duration** 1 year
 - Standard transparent films (salad, etc.)
 - Transparent thermal films (strawberry, etc.)
 - Light diffusion thermal films (melons, etc.)
- **Layers** mainly 3-layer, trend to 5-layer

Polymers

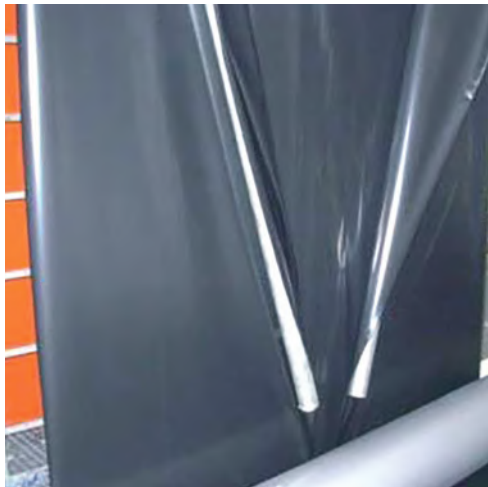
- LDPE or coext LDPE/LLDPE
- EVA (14% or 18%) for thermal
- Films EVA + charge for light diffusion films



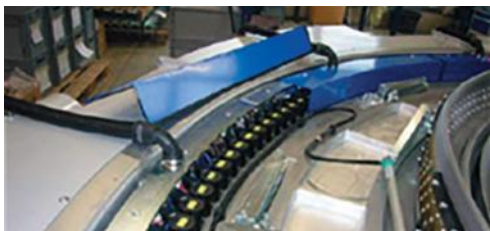
Highest capability of plant customisation



V folder in action



C folder in action



Automatic thickness measurement
and adjusting system



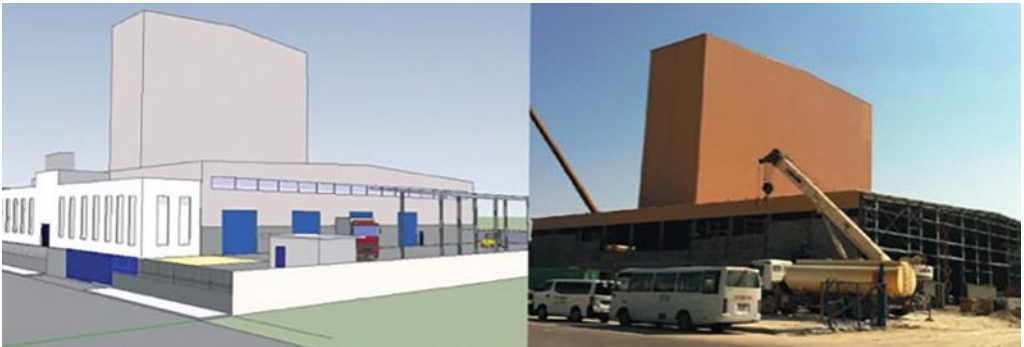
Gusseting and
flattening device

Bandera, unique know-how

**Bandera delivers turn-key projects,
thanks to its long-term expertise and know-how**

Besides engineering and manufacturing agricultural film lines,
Bandera's technical department is skilled and experienced
to provide a top level consultancy service: projecting
the factory hosting the plant itself

Make visions possible



Experience and proven performances



Maximum flexibility: geomembrane

Geomembrane production can be processed with **the same extrusion head used for agricultural film**

Geomembrane target market growth is ongoing, especially in emerging economies.

Standard configuration for a 3-layer geomembrane extrusion line:

- **high-capacity extruder** for the inner layer and two smaller extruders intended for the outer layers, arranged with bimetallic barrels and anti-wear coated screws
- **coextrusion head** (die up to Ø 2300 mm) equipped with internal bubble cooling system (IBC)
- **fixed haul-off unit**, suitably designed for production needs
- **fully-automated winders**, 8.5 m width, with automatic shaft extraction and reel downloading



Agricultural

Over 500 agricultural film plants sold worldwide.

Loyalty level is more than 60%.



● Sales

Source: internal data as of January 2019

Film customers



Bandera reference list

COUNTRY	LINE TYPE	INSTALLATION YEAR	N° LINES
ARGENTINA	AGRI	2013	1
	AGRI	2002	1
	AGRI-GEO	2005-2012	4
	AGRI	2009-2015	2
	AGRI-GEO	2013	1
	AGRI	2012-2013	2
BELGIUM	AGRI-GEO	2011-2017	2
BRAZIL	AGRI	2010	1
	GEO	2009	1
	AGRI-GEO	2011	2
	GEO	2019	1
CHILE	GEO	2001	1
	AGRI-GEO	2007-2012	2
CHINA	AGRI	2014	1
	GEO	2014	1
	AGRI	2011	1
COLOMBIA	AGRI-GEO	2007-2016	6
CUBA	AGRI	2016	1
EGYPT	AGRI-GEO	2007-2013	2
	AGRI-GEO	2013-2016	2
FINLAND	AGRI	2000	2
FRANCE	AGRI	2010-2015	2
	AGRI	2018	1
GERMANY	AGRI	2000	1
GREECE	AGRI	2004-2016	2
INDIA	GEO	2013	1
	AGRI	2016	1
	AGRI	2016	1
INDONESIA	AGRI-GEO	2019	1
ISRAEL	AGRI-GEO	2000-2016	5
ITALY	AGRI	2003-2018	6
	AGRI+GEO	2006-2019	8
	AGRI	2006-2018	4
	AGRI	2009-2011	2
	AGRI	2006-2018	7
	AGRI	2007	1
	AGRI-GEO	2006	2
	AGRI	2009-2016	2

From 2000 to April 2019

COUNTRY	LINE TYPE	INSTALLATION YEAR	N° LINES
ITALY	AGRI	2010-2016	2
JORDAN	AGRI	2000	1
KOREA	AGRI	2006	1
LEBANON	AGRI	2005	1
MALAYSIA	AGRI	2011	1
MEXICO	AGRI	2009-2012	2
	AGRI	2006-2016	2
	AGRI-GEO	2007-2009	3
	GEO	2017	1
MOROCCO	AGRI	2002	1
	AGRI	2003	1
	AGRI	2004	1
PERU	GEO	2011-2016	3
POLAND	AGRI	2016	1
	AGRI	2001	1
	AGRI	2000	2
	AGRI-GEO	2011	1
	AGRI	2016	1
PORTUGAL	AGRI-GEO	2009	2
SAUDI ARABIA	GEO	2013	1
	AGRI-GEO	2013	1
SLOVENIA	AGRI	2001	1
SPAIN	AGRI	2010-2017	3
	AGRI	2015-2017	2
SYRIA	AGRI	2011	1
TAIWAN	GEO	2006-2009	2
THAILAND	AGRI	2019	1
TURKEY	AGRI	2005	1
	AGRI	2010	1
	AGRI	2008	1
U.K.	AGRI	2009-2016	2
UNITED ARAB EMIRATES	AGRI-GEO	2007-2010	3
USA	AGRI	2017	1
	GEO	2018	2

100% Bandera

In-house engineering of complete extrusion plants.

In-house manufacturing of the extrusion system's most important parts.

They both ensure **high level quality** and fast supply of spare parts, including parts for non-standard machinery.

Over the years the company has built a **detailed understanding of rheology** for all thermoplastic materials, resulting in state-of-the-art finished products.

Flow **simulation and design allow** a pre-project check on any system performance.



Manufacturing departments

3 production sites covering a total area of 55,000 m²

Mechanical and electrical assembly area of extruders and complete lines

Specialised in the production of screws, barrels and extrusion heads

The House of Extrusion®, the brand new R&D centre, fully dedicated to wet tests

Extensive use of CNC machine tools for the manufacture of screws, barrels and extrusion die heads



Quality as an asset

Quality is a state of mind, our is subject to constant review, ensuring **customer satisfaction**

Quality is crucial to us in every stage of **design**, **manufacturing** and **technical support**

ISO 9001 from 1998



Quality control

Top quality control **procedures**

Prior **verification of materials** and constant monitoring of suppliers

Checking the product during the manufacturing stages

Quality control of **finished products**

Identification and **tracking** of materials and products

Constant **review of instruments** for measuring and tests



We do local,



Headquarters



Service centres



Sales office

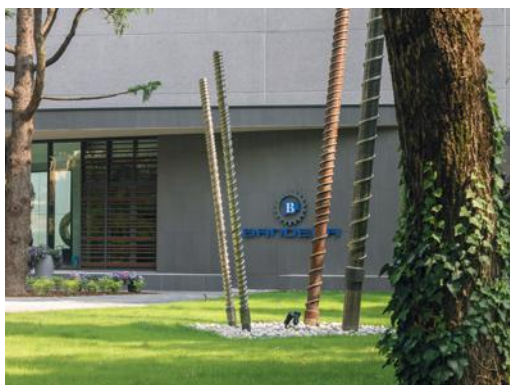
we act global



Source: internal data as of January 2019

The House of Extrusion[®]

Brand **new centre housing R&D** activities and wet tests on complete production lines, launched in May 2015, with an investment of € 4 million.



A responsive and efficient Customer Service

6 After-sale service centres for a worldwide assistance

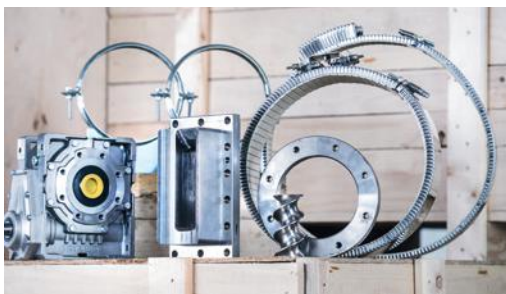
Top class on-site technicians specialised in installation and start-up

Customised procedures training for new applications

Scheduled interventions for extraordinary maintenance

Cost effective **spare parts packages**

Reclaiming of existing machines and **revamping** of complete extrusion lines



Bandera: a synonym for excellence



Worldwide reputation for **trustworthiness**,
integrity and **high standards** of business context.

Extrusion knowledge®

In-house design and production

Guaranteed line **performance output**

Customer requirements
full satisfaction

Competitive and cost-effective lines

Reliable and robust **equipment**

Experienced & **Innovative**

Flexibility in project engineering

Future-oriented

Sound-proficient and **well-organised**

Top-level performances



BANDERA

EXTRUSION INTELLIGENCE®

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