

# Ironman™ Integral Web Cooling Process System

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## AMERICAS

**United States**  
MEGTEC Systems, Inc.  
Telephone: +1-920-336-5715  
Toll-free: +1-800-558-2884

**Solvent Recovery Division**  
MEGTEC Systems, Inc.  
Telephone: +1-772-567-1320

**Brazil**  
MEGTEC Systems, Inc.  
Telephone: +55-19-3885-6116

**EUROPE**  
**France**  
MEGTEC Systems SAS  
Telephone: +33-1-69-89-47-93

**United Kingdom**  
MEGTEC Systems, Ltd.  
Telephone: +44-1628-59-1700

**MEGTEC Environmental Ltd.**  
Telephone: +44-1257-42-7070

**Germany**  
MTS Environmental GmbH  
Telephone: +49-6181-94040

**Sweden**  
MEGTEC Systems AB  
Telephone: +46-31-65-7800

**MEGTEC Systems Amal AB**  
Telephone: +46-532-62900

**ASIA - PACIFIC**  
**Singapore**  
Singapore Sales Branch -  
MEGTEC Systems SAS  
Telephone: +65-6298-4666

**China**  
MEGTEC Systems (Shanghai) Ltd.  
Telephone: +86-21-6769-7878

**India**  
MEGTEC Systems India Pvt. Ltd.  
Telephone: +91-20-3026-9600

**Japan**  
MEGTEC Systems, Inc.  
Telephone: +81-78-783-0161

**Australia**  
MEGTEC Systems Australia, Inc.  
Telephone: +61-3-9574-7450

[www.megtec.com](http://www.megtec.com)

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## Space savings – Process integration

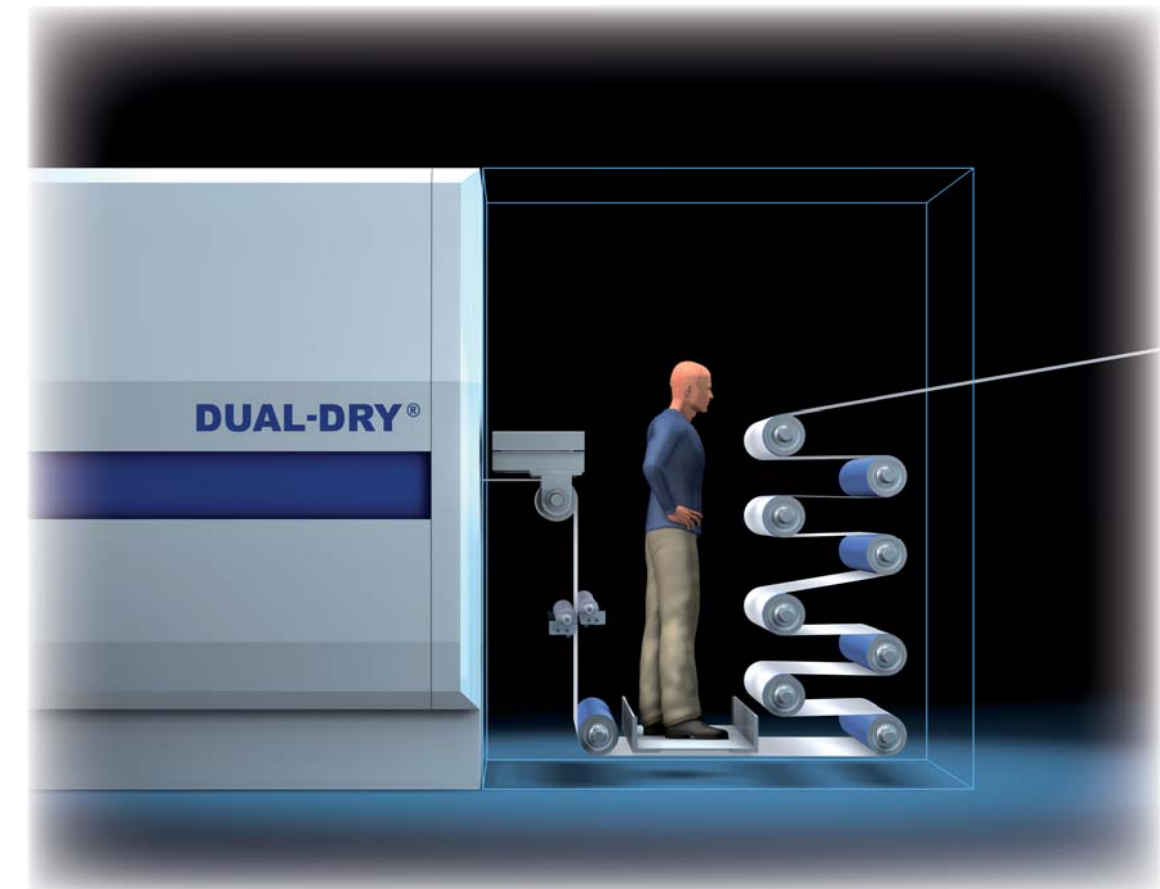
The Ironman is available in combination with all series of MEGTEC dryers -- the Dual-Dry, Coanda Plus and MEGAIR Compact. By its compact design and process integration, the Ironman saves floor-space in comparison to a traditional dryer-chill-roll combination with tilt-box web guide and silicone applicator, which often require additional structure in the press.

Web break detectors, colour density controls and load cells to measure web tension can be integrated into the system. The chill stack drive is prepared to be integrated into the press drive concept. A MEGTEC drive solution is available upon request.

## Standard features for Ironman

Maximum web speed	18 m/s (3540 fpm)
Maximum paper web widths	965, 1475, 2060, 2380, 2860 mm
Standard paper weight	30 – 150 g/m <sup>2</sup> (27- 250 g/m <sup>2</sup> on option)
Configurations	Horizontal, single or double web
Web direction	Left hand or right hand configuration
Control	PLC with modem
Number of Chill Rolls	2 + 4 or 8 or 12
Electrical power	400V/50Hz or 460V/60Hz
Norms and safety	CE standards & U.S. and Canadian norms including UL/CSA

## High performance commercial printing



The technical requirements production demands for web offset printers are constantly increasing. More and more printers are producing high quality work with lower grade paper and higher ink coverage. To maintain profitability, printing presses need to operate under optimum conditions – at maximum possible print speed and with minimum paper waste. Ink coverage and diverse chemical makeup have become increasingly difficult to dry. Less expensive paper grades used by the printer to remain competitively priced also can present added challenges to the heatset drying process. Press speeds at or near maximum are essential. These factors, individually and in combination with each other, have generated the need for a better means of technically managing the drying and chilling process in web printing. The new Ironman™ Integral Web Cooling Process system provides a solution to 3 major problems in high speed heatset printing:

- Condensate on the chill rolls
- Marking on downstream rollers
- Smoke in the pressroom

By design, the Ironman handles the difficulties experienced in today's heatset printing environment and enables the presses to run faster with trouble-free operation.

*The bottom line is process knowledge*

# Ironman™

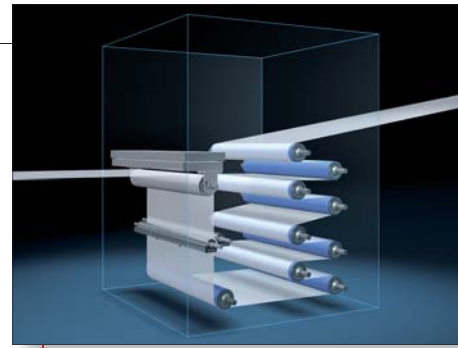
## Integral Web Cooling Process System



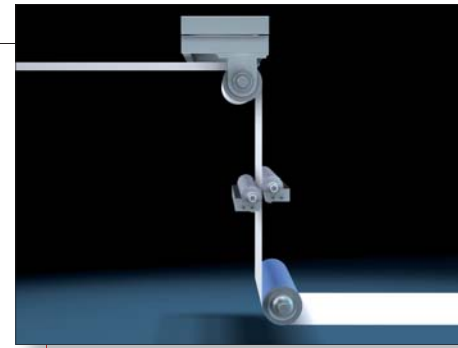
Robust steel rollers are driven, allowing use of conventional rotary unions and bearings.



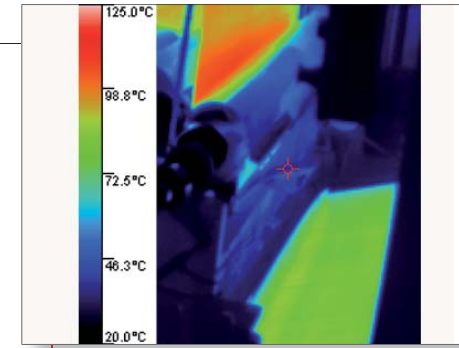
Innovative silicone applicator with cooled rollers for even and low film weights.



Web is turned through steering guide, passes into the opposed rollers of the silicone and directed to the chill stack unit.



Ironman process unit includes chilled L-wrap rollers, steering guide and chilled silicone applicator with opposing rollers.



Effective evaporative cooling and uniform silicone application.



A cool bead of silicone being applied to the web by chilled applicator rollers.

### Performance benefits of Ironman

- Increase of production speed at difficult drying jobs
- Increase of press up-time due to higher speeds and reduced maintenance time
- Less maintenance for press cleaning
- Better working conditions for pressmen due to a smoke-free pressroom area
- Reduced silicone consumption due to improved uniformity of application
- Paper drying temperature can be lowered by typically 10-15°C
- Increased residual moisture in the paper
- Simple operation eliminates operator errors
- Easy to use automatic process control
- Integrated web guide
- PLC with diagnostic assistance and modem
- Reduced floor space
- Easy installation

### The new Ironman

- No Chill Roll condensate
- No marking on downstream rollers
- No Smoke to pressroom
- Increased productivity

### What is it?

The Ironman Integral Web and Conditioning unit consists of an L-wrap roller which turns the horizontal web downwards by a 90° angle. This roller has a web guiding function and replaces conventional tilt-box design web guides downstream. Following the L-wrap roller, a highly innovative silicone application unit seals both sides of the web and increases web moisture. The web then passes through a modular chill stack where it is cooled down to press room temperature. The number of rollers depends upon the speed of the press.

The Ironman has been conceived, developed, engineered and prototype tested using the full portfolio of MEGTEC's DFSS (Design for Six Sigma) tools. Customers around the world have been interviewed and the required quality and operational functions have been carefully incorporated into the design. MEGTEC's experience over decades and the stated requirements of end-users and press manufacturers completed the basis for a precise specification for the Ironman. Available technology and components have been carefully evaluated, and technology has been developed as necessary to meet the demands of today's high speed heatset web offset printers.

### No chill roll condensate

The dried web leaves the heatset dryer typically at 100-150°C before having contact with the chill roll. Smoke, condensate and marking of rollers are occasional unwelcome effects on production and are dependent on production speed, paper, ink, dryer performance and adjustment. The evaporative cooling effect of the Ironman's innovative silicone application system, reduces the solvent vapor pressure that helps to create the gap between the web and chill surface. Additionally, the small roll diameter of 7.5" (180 mm) of the Ironman chill rolls assists in minimizing the web "lift-off" as compared with traditionally larger diameter chills. The Ironman rollers are not subject to the troublesome level of condensation and thus they stay clean. Chill roll condensate is typically caused by the accumulation of solvent in the boundary layer between paper and chill roll. With the bigger diameter of conventional chill rollers, the thickness of the boundary layer is quite significant and this presents two physical problems: first the boundary layer resists heat flow from the web to the roller reducing the desired web cooling, and second, the boundary layer constantly delivers a volume of air containing solvent vapor such that an oil film develops by condensation on the cold roller surface. If the chill roller surface is increased to counter this, condensation may be reduced but the web is then not sufficiently cooled following the roller, often resulting in increased smoking in the room. Further, there is then a tendency for ink "picking" from the surface of the printed web which is then deposited on the roller surface.

The Ironman's small roll diameter of 7.5" (180 mm) of the Ironman does not allow the creation of a sufficiently high boundary layer at any speed or web tension. In addition, the surface temperature of the L-wrap roller is precisely controlled to maximize the web cooling function while solving the condensation/picking problem. The roller stays clean from condensate that would otherwise cause web marking.

### No smoke in the press room

Conventional dryer/chill systems allow the formation of visible aerosols comprised of millions of tiny liquid spheres in the area approximately 0,5 m - 1,0 m after the dryer. The refraction and diffraction of light through these particles creates a «smoke effect». The web exiting the dryer is still appreciably hot and has an evaporation rate that enables the moisture in the web to be turned into water vapor. When that vapor exits the web and hits the colder atmospheric air, it expands and cools rapidly, condensing to produce the aerosol particle. To counter this physical phenomenon, the web path to L-wrap roller of the Ironman is kept very short – less than 300 mm - and is fully enclosed. Consequently, the L-wrap roller cools down the web before the aerosol creation can take place.

### No marking on rollers

As the web cools and is guided around chill rollers and path rollers, there can be a tendency to deposit ink on the surface of the rollers, especially rollers which do not turn in precision with the speed of the web. This can be avoided by two means: elimination of sliding friction by matching speed of the roller surface to speed of the web, and by applying silicone to the web to reduce friction. The Ironman uses both methods in a unique way. The initial L-wrap roller is driven to match the web speed and eliminate sliding friction. The web then passes through the silicone applicator that applies silicone fluid to reduce friction throughout the remaining web path into and through the folder. All of the chill rollers of Ironman are driven, thereby minimizing the friction between the web and roller surface, thus allowing for a minimal consumption of silicone while eliminating roller marking. Immediately after the first roller silicone is applied on both sides of the web, protecting the surface and performance of all rollers further down the path. Without silicone coating an unprotected ink film has a tendency to mark chills and especially rollers which do not turn in precision with the speed of the web. To avoid ink marking the Ironman has driven rollers; the first roll has a proprietary coating and is temperature controlled.

### Robust Design

The mechanically driven rollers of the Ironman allow the use of robust conventional bearings and rotary unions. Furthermore the silicone applicator is located further downstream from the first L-wrap cooling roller providing lower silicone roll contact temperatures, and dramatically reducing production of airborne silicone. Less silicone in the air means less need to clean this area. The silicone applicator is sealed in a housing which protects the environment from silicone misting. No silicone mist can be transported by the dryer into the oxidizer system where silicate could plug the oxidizer's heat exchange system. Evaporated water and silicone mist are immediately condensed on the chilled applicator rollers and flow back into the silicone pans, keeping silicone consumption low and increasing moisture in the web. The cooling feature of the silicone application rollers is patent applied and ensures that contact between web and roller always has a fluid film. By maintaining the fluid film, the rotation of the silicone rollers can be operated in either direction without any build-up of ink on the roller even at very low application rates. Both silicone applicator rolls always have a constant kiss angle which delivers very uniform silicone application across the entire web width for all application rates and at all web steering angles.