POSSIBLE ORIGINAL SALE QUOTES

All ages listed in brochure, catalog, here and otherwise are approximate.

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We hereby offer for a limited period of 30 days following the date hereof the items described below and/or in the specifications, if any, consisting of the pages attached hereto. **This offer is subject to the terms and conditions contained herein and attached hereto and in the specifications, if any, and to no others whatsoever. We object to any additional or different terms.**

NOMINAL SPECIFICATIONS

Material:	Crystal PS
Feed form:	Free flowing, Pellet &Regrind Blend
Resin feed stream temperature:	Ambient Non Dried
Output rate:	1500 Lbs/hr.
Finished width:	72" Finished
Thickness range:	0.020-0.080
Co-extrusion structure:	N/A
Power supply:	460/3/60 *Note* all motors sized for 3500 foot elevation
Mechanical / Electrical line speed:	TBD
Application:	Custom Sheet
End user water supply:	Tower water for extruder feed section, gearbox, and barrel cooling. Tower or Chill water to roll stand cooling system depending on sheet extrusion process requirement.
End user clean air supply:	90 psig

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PRICE SUMMARY

ITEM	DESCRIPTION	PRICE
1.1-1.3	5 inch (130 mm), 34:1 L/D, Thermatic III Water Cooled Extruder • 300 HP (222 kW) AC Drive System with Line Choke • Davis Standard Extruder Screw	
2.1	Davis-Standard TPC Control Panel • Pre-wired and Pre-mounted Control and Drive Cabinets	
3.1	Screen Changer Package • Xaloy Dual Bolt DBC-379 Hydraulic Screen Changer • Support Stand • Hydraulic Power Unit	
4.1	Polymer Melt Pump System • 5 inch Extruder Pump System • Valved Adapter Network • Static Mixer in Downstream Adapter	
5.1	76 inches (1930 mm) Wide Sheet Die • External fixed side mounted deckling • Heavy Duty Die Cart with Work Platform	
6.1	80 inch (2032 mm) Wide XP EXPRESS® Series Roll Stand System • 20 inch (508 mm) Diameter Cooling Rolls • Individual Roll Drive System with Planetary Gear Boxes • Vertical Downstack Orientation • 25 Foot (8 meter) long Conveyor	
7.1	Power Shear	
8.1	Single Station Unwind Assembly	
	TOTAL SYSTEM PRICE	$1,215,000

Price Includes:

- ♦ FOB Pawcatuck CT
- ♦ Installation Verification and Start-Up Assistance
  - ♦ Electrical & Mechanical Start-Services
  - ♦ Process Start-up Support
  - ♦ All Travel & Living Expenses Included
- ♦ 18 week delivery from receipt of down-payment pending confirmation

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Davis Standard Services

Systems Engineering and Integration

Davis Standard will provide the necessary mechanical/electrical engineering and integration to interface all the proposed items into a fully functional production line. Davis Standard will provide a dedicated project manager to interface with Buyer's personnel coordinating all aspects of the proposed line from initial schedules to final commissioning. Documentation as to the status of the project will be issued on a bi-weekly basis so that all involve will be kept abreast of the projects schedule

Pre shipment testing and inspection

Complete set up and electro-mechanical test prior shipment at the Davis-Standard manufacture facility

Mechanical and Electrical Checkout

Davis Standard will provide the necessary Engineers and Technicians to perform a thorough Check out of both mechanical and electrical functions of the entire line and any associated equipment provide by Davis Standard. This service will take approximately 5 days from completed installation.

Process Verification and Operator Training

Davis Standard will provide the necessary personnel to train your operators in the proper use and operation of the line. Davis Standard will also demonstrate the line's capability as to the mutually agreed performance criteria. This service will take approximately 5 days to complete.

Extrusion Lab Testing

Extrusion lab testing at Davis-Standard on customer supplied resin formulation is available from Davis-Standard, at an additional charge, in accordance to the fees in affect at time lab service is rendered. This testing is limited to determining extrusion screw output rate, specific energy requirement, melt temperature, melt quality, and melt pressure stability verification.

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The Following Quotation has been prepared for:

Item #1.1

5 inch (130 mm), 34:1 L/D, Water Cooled Thermatic III Extruder - Vented

Gear Reducer

- Heavy duty double reduction helical gear reducer
- Rated 400 HP (296 kW) at 100 RPM with a 1.5 service factor
- Thrust bearing with a L-10 life of 192,000 hours at 5,000 psi (350 bar) and 100 RPM
- Rugged stress relieved cast iron housing
- Pressurized lubrication system including pump, heat exchanger, and filter with differential alarm switch
- Gear Ratio: As Required
- Motor direct coupled with coupling, guard, and motor mounting base
- AGMA class 11 or better gears

Feed Section

- Cast construction
- Large rectangular feed opening
- Pre-piped cooling to prevent bridging
- Large air spacer provided for thermal isolation and access to feed section bushing without machine disassembly
- Mushroom head E-Stop button
- Stainless Steel feed hopper with sight glass, shut off slide gate and discharge chute
- Drawer Style bunting magnet

Barrel

- Bi-metallic cast-in liner D-S 1000 or equivalent
- 4140 Steel Alloy construction
- Rated for 10,000 psi (700 bar) operation
- Barrel supports for alignment and thermal expansion
- Precision honed
- Safety rupture disc rated for 9000 psi (600 bar)
- Standard bolt flange for bolt-on screen changer
- Pressure transducer in discharge
- Vented and plugged
- Protected by insulated heavy gauge steel covers

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Item #1.1 – continued:

Heating/Cooling (8 zones)

- Cast aluminum heating/cooling elements with corrosion resistant tubes
- Clamping bolts to maintain intimate thermal contact through heating/cooling cycles
- Matched heater/cooler pairs precision bored for optimum heat transfer with corrosion resistant tubes, NPT water connections
- Heaters are designed with all electrical connections on top of the heater and all water connections on the bottom
- Teflon lined stainless steel braided hose connections
- Closed loop cooling system including pressurized reservoir with sight glass, pump, heat exchanger, flow control valves, and solenoid valves
- Sacrificial anode to prevent galvanic corrosion

Vent and Vacuum System

- Vented with Stack
- Hinged cover with sight glass
- Vacuum gauge
- 3 HP (2.29 kW) vacuum pump piped to vent, and pre-mounted on extruder base at factory
- Water ring seal pump with flow control valve, solenoid valve and filter strainer requiring separate water connections
- Operator controls in main extruder panel

Piping/Wiring

- All heaters and thermocouples pre-wired to terminal strips
- Control and E-Stop wiring included
- All cooling water pre-piped to common Inlet/Outlet manifold

Base

- Heavy duty fabricated steel H-Beam construction
- Centerline to match downstream equipment
- Precision machined for accurate alignment
- Lifting holes for ease of installation
- Bolt-down floor pads

Accessories

- Screw cooling assembly
- Hydraulic screw pusher

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Item #1.2

300 HP (222 kW) AC Drive with Vector Duty Motor Including:

- Drive mounted and wired in separate enclosure
- 0.01% speed regulation with encoder
- AC line circuit disconnect
- AC Line or DC Bus Choke
- Current limit and acceleration control
- Ten turn speed control potentiometer
- Screw speed and load indication
- Forced ventilation motor with cooling blower and filter
- 1800 RPM base speed motor
- Motor over temperature protection

Item #1.3

Davis Standard Extruder Screw

- Fabricated from 4140 steel
- Designed specifically for application
- Hard surfaced screw flights
- Chrome plating
- Cored for feed section cooling
- Screw tip extension into S/C Body

Item # 2.1

Davis-Standard TPC Control Panel – Dual Language: English / Spanish

- The DS-TPC provides a touch panel solution to replace discrete temperature controllers, temperature indicators, pressure indicators, pressure controllers, drive operators, and drive indicators
- The DS-TPC includes a 12.1 inch color touch screen with built in PLC processor, subpanel mounted multi-loop temperature control, and PLC I/O modules required for the system
- The DS-TPC is designed to offer touch-screen control - AT THE SAME PRICE as discrete devices performing the same functions. This is accomplished through the use of fixed hardware components and preconfigured engineering solutions
- Standard features common to all DS-TPC systems include the following:
  - o 12.1 inch Color HMI mounted in control panel
  - o Extruder melt temperature indication
  - o Extruder drive controls including speed and load indication
  - o Extruder breaker plate pressure monitor including 2 alarms
  - o Melt Temperature monitors
  - o Cold start inhibit - Barrel only
  - o 10 Recipes (temperature only)

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Item #2.1 – continued:

- In addition, your system has been configured to include the following features:
  - o DS-TPC HMI mounted in light duty swing arm
  - o Control of (8) extruder heat/cool zones
  - o Control of (12) heat only zones
  - o Melt pump control including melt pump in and out pressures

- Solid-state contactors and circuit breaker protection on each control zone
- Main circuit breaker with external interlock to disconnect incoming power when servicing
- A control transformer is provided in the panel for all control circuitry
- Solid-state contactors and circuit breaker protection on each control zone
- Air conditioned
- UL 508 listing or other code compliance available at extra cost, as required by local codes

Item # 3.1

Xaloy DBC-379 Dual Bolt

- Hydraulic power
- Bolt flange connection
- Support Cart

Hydraulic Power Unit

- Three phase hydraulic pump, with reservoir, accumulator, and valving
- Safety circuit to prevent actuation when slide plate gates are open

Item #4.1

5 inch Extruder Polymer Melt Pump System

- Oversized for, 232 cc/rev.
- Precision Machined Alloy housing
- Hardened tool steel bearings, and gear shafts
- Viscoseals
- One (1) electrically heated single-phase control zone
- AC drive with 0.01% speed regulated control with encoder
- Gear reducer
- Support stand mounted on integral extruder base
- 4000 psi (266 Bar) maximum operating pressure
- Inlet and outlet rupture discs to protect pump

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Item #4.1 – continued:

Control System

- Speed control via TPC
- Pressure control in TPC
- Speed control and indicator
- Inlet and Outlet pressure transducers
- All controls in extruder control panel

Adapter System

- Alloy steel construction
- Up and Downstream adapters
- Sized for application
- Electric heater bands with temperature control zone(s)
- Valved upstream adapter
- Static Mixer in downstream adapter

Item #5.1

Flexible Lip Sheet Die

- Specifications:
- Die Width: 76 inches (1930 mm)
- Flexible Lip Range: 0.100 inches (0 - 2.54 mm)
- Number of Zones: 7

- Manifold designed to suit application
- Streamlined choker bar 45° angle
- Push/pull 2 1/2 inch centers for choker bar
- Manual lip adjustment
- Alloy Tool Steel
- Hard chrome plated interior surfaces
- Flash plated exterior
- Cartridge heaters and control thermocouples
- Completely wired with standard in-cage wiring
- Die tool kit with necessary wrenches for operation and maintenance
- External fixed side mounted deckling for die width reduction of 6 inches (150 mm) per side

Die Support Cart

- Adjustable height to provide alignment with take-off rolls
- Heavy duty construction
- Floor casters mounted to base
- Work Platform

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Item #6.1

XP-Express® Series Roll Stand System, Individually Driven Rolls

- Cooling Roll Width: 80 inches (2032 mm)
- Cooling Roll Diameters: 20 inches (508 mm)
- Orientation: Vertical, Downstack

Frames

- Flat ground steel plate frames
- CNC Machined for precise alignment
- Sized to minimize deflection
- Precise die to nip height adjustment
- Wheel and track mounted
- Variable speed line movement system
- Split bearing caps with jacking bolts for easy roll removal. Pinned for reinstallation
- Proprietary anti torsion, ant friction dual linear bearing assembly design
- Frame mounted hydraulic cylinders for direct roll actuation
- Roll Installation/Removal support arms

Cooling / Finishing Rolls (Quantity Three (3))

- Double shell spiral baffled
- Increased inertia design for minimum deflection
- Stainless steel overlay
- Chrome plated finish to a1/2-1 Ra finish, 55 to 60 Rockwell 'C'
- Designed for minimum deflection and optimum heat transfer
- Maximum roll total indicated run-out 0.001 inches (25 microns)
- Self-aligning, precision fit roller bearings
- Dual flow rotary union, with ball valves
- Braided hose utilized from rotary union bottom of roll stand guard, then connects to hard pipe provided from side cart mounted TCU

Hands Free Roll Gap - XP Express

- Hydraulic actuated nips with one pressure regulator per roll
- Gap set by precisely positioning hydraulic cylinders with integral linear position sensors through remote operation via rollstand frame mounted touch screen
- Roll Gap Control operation selection
  - o Resolution 0.0005 inches (0.0127 mm) or less/feedback device resolution 0.0001 inches (0.0025 mm)
  - o System always active while rolls are closed insuring gap remains constant
  - o Set and adjust while in operation under full nip pressure
  - o Immediate response to setpoint change or controlled to ramp to desired new gap setpoint
- Simple calibration routine
- Reduces setup time, and time for rapid product changes

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Item #6.1 – continued:

Roll Temperature Control

- Pressurized closed loop- 275F (135C) water system
- Three separate zones each with an immersion heater, centrifugal pump, shell and tube heat exchanger, expansion tank, flow switch, and solenoid valve
- Automatic air bleeding system
- 18 kW Heaters
- Temperature control via PLC
- Side cart mounted, hard piped from TCU to braided hose at bottom of roll stand guard

Conveyor

- 25 Foot (8 meter) long
- First 10 idlers water cooled
- Remaining idlers Teflon sleeved
- 2.5 inch (63.5 mm) diameter with protective sleeves
- Provisions for gauge mounting

Protective Film laminate Let-off

- Two Let-Off Stations mounted on pull roll assembly.
- Each station includes following features:
  - o Manual side lay
  - o Spreader Roll
  - o Air brake to maintain tension on the web
  - o Combination 3, 6 and 8 inch core size assembly
  - o Super chuck safe release assembly
  - o Tension transducer feedback controller (min. tension 10lb (4.5 kg)) Combination 3, 6 and 8 inch core size assembly
  - o Roll handling & loading equipment including any platform staging space is not included in this specification or pricing

Sheet Line Control Panel

- Enclosure - fan cooled, wired for 460/3/60
- Enclosure size is 120 inches (30 cm) Wide x 52 inches (13 cm) High x 20 inches (50 cm) Deep
- Three (3) AC drives for roll control with encoder feedback
  - o Designed for Yaskawa F7 drives
  - o Drives include dynamic braking
- Pull Roll Yaskawa F7, AC drive with encoder feedback
- Heat / Cool zones - 18KW heaters / water pumps sized per application
- PLC temperature and drive control through roll stand mounted HMI
- E-Stops and pull cords on the roll stand will wire to sheet line panel. All others will be wired to extruder or main OCS
- Safety circuitry for Guardmaster Cadet interlock switches
- 1/2 HP (0.37 KW) Locomotion drive
- 115 or 240 VAC sheet line receptacles mounted
- PLC platform is Allen-Bradley Control Logix with temperature control

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Item #6.1 – continued:

Roll-Stand OCS

- OCS for mounting on Roll Stand designed as " stand-alone" or for interface to supervisory system
  - o 12 inch (300 mm) Pro-Face ® Color touch screen for local operator interface controlling sheet line functions
  - o Roll Open / Close pushbuttons
  - o Hydraulic Roll Press control "HI / LO" selector switch
  - o Traverse FWD / REV selector switch
  - o E-Stop push button
  - o E-Stop Reset (When stand-alone)
  - o Alarm Silence pushbutton

Pull Roll Section

- 8 inch (200 mm) diameter rolls
- Neoprene rubber covered
- Adjustable pressure regulator per side
- Roll width to match polishing rolls
- Pneumatic actuation

Pull Roll OCS

- Separate remote pushbutton station for Pull Roll Open / Close Pull Roll Section

Drive Train

- Standard mounting location is on operator side of machine
- Brinkmann Planetary reducers direct mounted

Safety Features

- Emergency shutdown cables on in-going nips
- Hand guard on pull roll nips
- Safety cage on downstream side of 3 rollstand - opens all rolls
- Drive train guarding
- Safety gate on upstream and downstream sides of pull roll, with upstream side interlocked to open nip
- Meets or exceeds ANSI B 151.20 Sheet Extrusion Safety Standards

Two Edge Trim Assemblies

- Two stations mounted on conveyor, one top, and one bottom
- Includes 12 knife holders each side, adjustable across width of sheet, independently positioned
- Tandem blade holders, for blade change while running
- Guarded
- Edge trim removal and granulation by customer

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Item #7.1

Power Shear

- 72 inches (1829 mm) maximum cutting width
- Designed to cut up to 0.25 inches (6 mm) thick sheet
- Wheel and track mounted
- Digital cut to length control
- Bowed conveyor between pull rolls and shear
- Micarta top on shear bed
- Safety stop cord and infeed finger guard

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