1 CROP INFORMATION

PRESET OPERATING TEMPERATURES ON DRYERS FITTED WITH

GRAIN GUARD CONTROLLER

Grain type	*Air Temperature (Plenum)*		*Grain Temperature (Crop hot)*		*Cool Temperature* (Crop cold)*	
	ºF	*ºC*	*ºF*	*ºC*	*ºF*	*ºC*
Barley	**190**	**87**	**120**	**49**	**120**	**49**
Barley seed	**130**	**54**	**105**	**110**	**105**	**110**
Beans	**150**	**65**	**110**	**44**	**110**	**44**
Corn	**220**	**104**	**130**	**55**	**130**	**55**
Corn seed	**160**	**71**	**110**	**44**	**110**	**44**
Flax	**150**	**65**	**120**	**49**	**120**	**49**
Flax seed	**120**	**49**	**105**	**41**	**105**	**41**
Grain Sorghum	**230**	**110**	**130**	**55**	**130**	**55**
Grain Sorghum Seed	**160**	**71**	**110**	**44**	**110**	**44**
Linseed	**150**	**65**	**105**	**41**	**105**	**41**
Oats	**160**	**71**	**130**	**55**	**130**	**55**
Oats Seed	**160**	**71**	**105**	**41**	**105**	**41**
Peas	**150**	**65**	**105**	**41**	**105**	**41**
Rape Seed	**180**	**82**	**120**	**49**	**120**	**49**
Rape Seed Seed	**120**	**49**	**110**	**44**	**110**	**44**
Rough Rice	**150**	**65**	**110**	**44**	**110**	**44**
Rough Rice Seed	**120**	**49**	**110**	**44**	**110**	**44**
Soy Beans	**190**	**87**	**120**	**49**	**120**	**49**
Soy Beans Seed	**150**	**65**	**105**	**41**	**105**	**41**
Sunflower - Bird	**140**	**60**	**90**	**32**	**90**	**32**
Sunflower - Oil	**150**	**65**	**100**	**38**	**100**	**38**
Wheat	**170**	**76**	**120**	**49**	**120**	**49**
Wheat Seed	**130**	**54**	**105**	**41**	**105**	**41**

*NOTE; The cool temperature is only used on automatic dryer models, it is set at the same temp as the grain hot to allow immediate discharge – for cooling outside the dryer which is used in some set-ups. More normally the grain would be cooled before discharge and this cool temp should be reduce to 10-15*ºF* above the ambient conditions.

RECOMMENDED DRYING TEMPERATURES

Crop type	*Moisture content & points of interest*	*Plenum temperature*	*Max. final grain temperature*	*Final storage level*
BARLEY				
Feed		180 - 200ºF	120ºF	14%
Malting/Seed	Below 21%	120 - 150ºF	105ºF	
	Above 22%	110 - 130ºF	105ºF	

If light samples are experienced Maximum Plenum Temperature should not exceed 140ºF

WARNING!

Great care should be taken with the storage of barley grown for malting or seed between the actual harvesting of the material and the drying of it. The harvested crop must be stored wet for the minimum amount of time reasonably possible. It is recommended that the crop is not stored in large heaps but spread so that the maximum depth does not exceed 2 feet.

Take care not to operate the dryer at low PTO speeds. In malting or seed crop drying good air flow is important.

Crop type	*Moisture content & points of interest*	*Plenum temperature*	*Max. final grain temperature*	*Final storage level*
WHEAT:				
Feed		180 - 200ºF	140ºF	14%
Milling	Below 25%	150 - 180ºF	120ºF	14%
	Above 25%	140 - 170ºF	120ºF	14%
Seed		100 - 130ºF	105ºF	14%

SPECIAL NOTES:

1. High gluten wheats mean slower drying
2. Wet cereals in general i.e., over 27% moisture content - dry carefully.
   Do not exceed Grain Final Safe Temperature. If this is apparent, stop the burner, allow dryer to continue circulating grain until cool, then relight burner and complete drying process.
3. Seed wheat over 27% moisture content - use no heat to a maximum of 105ºF plenum until moisture content is below 20%, then continue with care using a plenum temperature of 120ºF maximum

FINAL SAFE STORAGE MOISTURE CONTENT WILL DEPEND UPON STORAGE GRAIN TEMPERATURE DUE TO VARYING CROP CONDITIONS THE ABOVE ARE RECOMMENDATIONS ONLY

Crop type	*Moisture content & points of interest*	*Plenum Temperature*	*Max. final grain temperature*	*Final storage level*
OILSEED RAPE:				
Oil extraction	Up to 17%	140 - 180ºF	120ºF	8%

SPECIAL NOTES:

1. Plenum temperatures of up to 200ºF have been used without apparent oil/quality loss
2. Excessive heat gives slower drying - cooling prolonged
3. Mature crops dry relatively easily
4. Desiccated early crops may contain 30% volume of immature seeds which are less easily dried
5. High oil content crops mean slower drying
6. With moisture content above 17% - for every 2% increase in moisture content, reduce plenum temperature by 10ºF

Crop type	*Moisture content & points of interest*	*Plenum temperature*	*Max. final grain temperature*	*Final storage level*
OILSEED RAPE:				
Seed	Reduce plenum temperature by 10ºF	90 - 120ºF	110ºF	8%

Crop type	*Moisture content & points of interest*	*Plenum Temperature*	*Max. final grain temperature*	*Final storage level*
LINSEED				
Oil extraction and/or seed	Up to 15%	120 - 150ºF	120ºF	8%
For every 2% increase in moisture content reduce plenum temperature by 10ºF				
		90 - 120ºF	105ºF	8%

FINAL SAFE STORAGE MOISTURE CONTENT WILL DEPEND UPON STORAGE GRAIN TEMPERATURE DUE TO VARYING CROP CONDITIONS THE ABOVE ARE RECOMMENDATIONS ONLY

Crop type	*Moisture content & points of interest*	*Plenum Temperature*	*Max. final grain temperature*	*Final storage level*
PEAS/FIELDS BEANS:				
Processing/ Protein		110 - 120ºF	105ºF	14%
NOTE: In general protein is not affected by heat but excessive heat will cause splitting damage				
Seed	Below 24%	90 - 110ºF	105ºF	14%
	Above 24%	70 - 90ºF	105ºF	14%
	Above 27%	No heat to 50ºF	105ºF	14%

DIRECT HARVESTED:

1. Can experience handling problems over 25% moisture content
2. Slow dryer to minimum speed on GRAIN GUARD
3. Do not use loading auger over 25% moisture content (see below)

DRYING FROM STORE:

1. This crop is susceptible to splitting if excessive heat is used
2. Increase temperature in 5ºF stages and check for splits to a maximum of 110ºF plenum temperature: No heat - 110ºF
3. Do Check for handling damage prior to drying

Crop type	*Moisture content & points of interest*	*Plenum Temperature*	*Max. final grain temperature*	*Final storage level*
OATS				
Feed		150 - 200ºF	130ºF	14%
Seed		110 - 150ºF	105ºF	14%

NOTE: Oats for feed use can stand plenum temperatures up to 220ºF

FINAL SAFE STORAGE MOISTURE CONTENT WILL DEPEND UPON STORAGE GRAIN TEMPERATURE DUE TO VARYING CROP CONDITIONS THE ABOVE ARE RECOMMENDATIONS ONLY

Crop type	*Moisture content & points of interest*	*Plenum temperature*	*Max. final grain temperature*	*Final storage level*
LUPINS:				
Drying for Seed				

* With GRAIN GUARD control box dryers use “FLAX SEED” pre set temperatures owing to low heat requirement
* Furry seed - may generate fluff in handling
* Very tough skin
* Pre-drying treatment - pre-cleaning helpful, if not essential

METHOD:
1. Polish dryer with barley prior to handling
2. Slow dryer to 500 rpm
3. Be careful if moisture content over 23% / 24% - augers may not handle
4. Recommended plenum temperatures no heat - 105ºF - 120ºF **ABSOLUTE MAXIMUM**

Crop type	*Moisture content & points of interest*	*Plenum temperature*	*Max. final grain temperature*	*Final storage level*
HERBAGE SEEDS (SAFE DRYING AIR TEMPERATURES FOR 90% GERMINATION)				
(Grass seed)				
PRG/IRG	Up to 25%	130ºF	90ºF	13%
	Between 25% - 30%	120ºF	90ºF	13%
	Between 30% - 35%	110ºF	90ºF	13%
	Between 35% - 40%	100ºF	90ºF	13%

NOTES:
* Always grown for seed
* Grass seed does not flow easily over 22% moisture content
* Polish the dryer prior to use with barley or other dry grain
* Operate PTO speed at about 500 rpm
* Check loading auger flights match properly so as not to impede flow of seed

FINAL SAFE STORAGE MOISTURE CONTENT WILL DEPEND UPON STORAGE GRAIN TEMPERATURE DUE TO VARYING CROP CONDITIONS THE ABOVE ARE RECOMMENDATIONS ONLY

TEMPERATURE CONVERSION CHART

C		*F*	*C*		*F*	*C*		*F*
-17.8	0	32.0	32.8	91	195.8	61.1	142	287.6
-15.0	5	41.0	33.3	92	197.6	61.7	143	289.4
-12.2	10	50.0	33.9	93	199.4	62.2	144	291.2
-9.4	15	59.0	34.4	94	201.2	62.8	145	293.0
-6.7	20	68.0	35.0	95	203.0	63.3	146	294.8
-3.9	25	77.0	35.6	96	204.8	63.9	147	296.6
-1.1	30	86.0	36.1	97	206.6	64.4	148	298.4
1.7	35	95.0	36.7	98	208.4	65.0	149	300.2
4.4	40	104.0	37.2	99	210.2	65.6	150	302.0
7.2	45	113.0	37.8	100	212.0	66.1	151	303.8
10.0	50	122.0	38.3	101	213.8	66.7	152	305.6
10.6	51	123.8	38.9	102	215.6	67.2	153	307.4
11.1	52	125.6	39.4	103	217.4	67.8	154	309.2
11.7	53	127.4	40.0	104	219.2	68.3	155	311.0
12.2	54	129.2	40.6	105	221.0	68.9	156	312.8
12.8	55	131.0	41.1	106	222.8	69.4	157	314.6
13.3	56	132.8	41.7	107	224.6	70.0	158	316.4
13.9	57	134.6	42.2	108	226.4	70.6	159	318.2
14.4	58	136.4	42.8	109	228.2	71.1	160	320.0
15.0	59	138.2	43.3	110	230.0	71.7	161	321.8
15.6	60	140.0	43.9	111	231.8	72.2	162	323.6
16.1	61	141.8	44.4	112	233.6	72.8	163	325.4
16.7	62	143.6	45.0	113	235.4	73.3	164	327.2
17.2	63	145.4	45.6	114	237.2	73.9	165	329.0
17.8	64	147.2	46.1	115	239.0	74.4	166	330.8
18.3	65	149.0	46.7	116	240.8	75.0	167	332.6
18.9	66	150.8	47.2	117	242.6	75.6	168	334.4
19.4	67	152.6	47.8	118	244.4	76.1	169	336.2
20.0	68	154.4	48.3	119	246.2	76.7	170	338.0
20.6	69	156.2	48.9	120	248.0	77.2	171	339.8
21.1	70	158.0	49.4	121	249.8	77.8	172	341.6
21.7	71	159.8	50.0	122	251.6	78.3	173	343.4
22.2	72	161.6	50.6	123	253.4	78.9	174	345.2
22.8	73	163.4	51.1	124	255.2	79.4	175	347.0
23.3	74	165.2	51.7	125	257.0	82.2	180	356.0
23.9	75	167.0	52.2	126	258.8	85.0	185	365.0
24.4	76	168.8	52.8	127	260.6	87.8	190	374.0
25.0	77	170.6	53.3	128	262.4	90.6	195	383.0
25.6	78	172.4	53.9	129	264.2	93.3	200	392.0
26.1	79	174.2	54.4	130	266.0	96.1	205	401.0
26.7	80	176.0	55.0	131	267.8	98.9	210	410.0
27.2	81	177.8	55.6	132	269.6	101.7	215	419.0
27.8	82	179.6	56.1	133	271.4	104.4	220	428.0
28.3	83	181.4	56.7	134	273.2	107.2	225	437.0
28.9	84	183.2	57.2	135	275.0	110.0	230	446.0
29.4	85	185.0	57.8	136	276.8	112.8	235	455.0
30.0	86	186.8	58.3	137	278.6	115.6	240	464.0
30.6	87	188.6	58.9	138	280.4	118.3	245	473.0
31.1	88	190.4	59.4	139	282.2	121.1	250	482.0
31.7	89	192.2	60.0	140	284.0	123.9	255	491.0
32.2	90	194.0	60.6	141	285.8	126.7	260	500.0

°C = (°F - 32) / 1.8 °F = 1.8 x °C + 32

E.G. 120°F = 48.9°C OR 120°C = 248°F

GRAIN DRYING NOTES

Date	Crop Type	Plenum Temp	Grain Temp	Cool Temp	% m.c.	Comments